Commission for
Communications Regulation

Information Notice

Spectrum Liberalisation - Publication of non-confidential responses to ComReg Document 11/60, correspondence from interested parties and ComReg's written responses to same

Document No:	**11/102**
Date:	**22 December 2011**

An Coimisiún um Rialáil Cumarsáide
Commission for Communications Regulation
Abbey Court Irish Life Centre Lower Abbey Street Dublin 1 Ireland
Telephone +353 1 804 9600 *Fax* +353 1 804 9680 *Email* info@comreg.ie *Web* www.comreg.ie

ANNEX A

A1. Publication of non-confidential responses received to ComReg Draft Decision Document 11/60

1. Stephen Minch – received 18 September 2011
2. TG4 – received 12 October 2011
3. HKC – received 12 October 2011
4. RTÉ and RTÉNL- received 14 October 2011
5. Arqiva – received 14 October 2011
6. Telecommunications and Internet Federation ("TIF") – received 14 October 2011
7. Vodafone – received 14 October 2011
8. Telefónica – received 14 October
9. H3GI – received 14 October 2011
10. Eircom Group – received 14 October 2011
    a. Supplemental submission received 18 October 2011
    b. Spreadsheets referred to in Eircom Group's submission of 14 October submitted on 15 November 2011.

A2. Publication of non-confidential correspondence provided by respondents (and ComReg written responses to same) since September 2011

1. Telefónica: Email to ComReg of 7 September 2011 "Meeting Request" (email dated 7 September 2011)
2. ComReg: Reply to Telefónica O2 email of 7 September 2011 (email dated 8 September 2011)
3. Telefónica: Email to ComReg of 24 October 2011 "Timetable for Spectrum Auction" (email dated 24 October 2011)
4. ComReg: Reply to Telefónica O2 email of 24 October 2011 (email dated 26 October 2011)
5. Eircom Group: Spreadsheet attached to email of 19 September 2011 (letter available in ComReg Document 11/69)
6. Eircom Group: Email to ComReg "RE: ComReg 11/60: request for information" (email dated 3 October 2011)
7. ComReg: Reply to Eircom Group email of 3 October 2011 (email dated 7 October 2011)
8. Eircom Group: Letter to ComReg of 28 October 2011 regarding extension request for responses to ComReg Document 11/75 (email dated 28 October 2011)
9. H3GI: Letter to ComReg of 4 October 2011 "ComReg DOC. NO.S 11/60, 11/60a and 11/58" (letter dated 4 October 2011)
10. ComReg: Reply to H3GI letter of 4 October 2011 (letter dated 5 October 2011)
11. H3GI: Email to ComReg of 4 November 2011 "ComReg Doc. No. 11/75" (email dated 4 November 2011)
12. H3GI: (Another) Email to ComReg of 4 November 2011 "ComReg Doc. No. 11/75" (email dated 4 November 2011)
13. ComReg: Reply to H3GI email of 4 November 2011 (email dated 15 November 2011)
14. H3GI: Email to ComReg of 24 November 2011 "ComReg Doc. No. 11/75" (email dated 24 November 2011)

15. ComReg: Reply to H3GI email of 24 November 2011 (email dated 25 November 2011)
16. DCENR: Email to Digital Switchover Group (DSG) of 22 November 2011 "interference between services in UHF bands" (email dated 22 November 2011)
17. RTE: Reply to DCENR email (to DSG) of 22 November 2011 "re: interference between services in UHF bands" (email dated 22 November 2011)
18. DCENR: Reply to RTE email of 22 November (to DSG) of 22 November 2011 "re: interference between services in UHF bands" (email dated 23 November 2011); and
19. RTE: Reply to DCENR email (to DSG) of 23 November 2011 "re: interference between services in UHF bands" (email dated 23 November 2011).
20. ComReg: Letter to DCENR of 21 December 2011 "Overload Problem" (email and letter of 21 December 2011)

ANNEX A

A1. Publication of non-confidential responses received to ComReg Draft Decision Document 11/60

1. Stephen Minch – received 18 September 2011

Reference: Submission re ComReg 11/60

Stephen Minch

Introduction

I am a private citizen, a consumer and live in a rural area of Ireland.

My submission,

- addresses deficiencies in ComReg's methodology, proposes an alternative and draws attention to the very low requirement for area coverage (13%) in the draft decision and the consequent damage to the interests and safety of rural residents and rural visitors.

- draws attention to the lack of foundation in the reasoning that "roll-back" will not occur and highlights possible consequences of "roll-back".

- highlights the low level of consumer participation and the consequent lack of consideration or weight given by ComReg to consumer oriented proposals that have been received so far.

- draws attention to the absence of a quantitative analysis and makes some general comments about applying market dogma to small countries with large areas of high dispersion and low density.

Coverage

“Option 3”

ComReg has opted for a coverage level as follows

> *“Option 3 — Impose a coverage obligation which would require all new licensees to provide a minimum level of area coverage sufficient to serve 50%-70% of the population.” ComReg 11/60 at A8.160*

ComReg qualified the above as follows

> *ComReg favours the top end of this range, 70%.” - ComReg 11/60a at A8.207*

Methodology and Statistics - 76,000 omitted.

ComReg projects population coverage to the 70% level by building from the 60% level as follows.

> *Looking now at the mid-point of this range (60%). Based on CSO census data, there are 165 towns with a population of more than 1,500 people, and together with the 5 big cities, this equates to 60.7% of the total population. - ComReg 11/60a at A8.164*

> *Looking now at the top end of the range (70%). An extra 10% of population equates to approximately 400,000 people. Based on CSO census data, of this 400,000, approximately 120,000 live in towns with between 500 — 999 people, and a further 100,000 people live in towns under 500 people but with at least 50 (inhabited) houses. This leaves a further 180,000 people who live in very small towns/villages/single housing in Ireland that would be included to bring up the total to 70% population. -ComReg 11/60a at A8.165*

In its calculations ComReg seems to have omitted all towns in the population range 1001 - 1500; comprising a total population of 76,000. These towns[1], if included, would considerably reduce the obligation ComReg asserts on behalf of providers to extend their networks to small towns and villages, under Option 3

The last group that ComReg identifies - “people who live in very small towns/villages/single housing” are also in areas that have no defined or measured boundaries. ComReg would need to specify how it plans to measure that group so as to ensure providers’ compliance with their coverage obligations, as proposed under Option 3

It should be possible for ComReg to produce a representative coverage map of its own, that meets but does not exceed the minimum licence obligations as proposed under Option 3. The only unknown element in such a map would be “the people who live in very small/towns/villages/single housing”. The public would be better informed if ComReg were to do so. The tools for carrying out this exercise are freely available from CSO.

[1] http://dl.dropbox.com/u/39502907/Towns_Listing.xls

Terminology

Towns

ComReg uses the terms town and townland interchangeably in its decision document as follows.

> *" This is based on CSO data (from the 2006 census) which indicates that just under 70% of the population live in towns with 50 inhabited houses or more." - ComReg 11/60a footnote 385*

> *"a 70% demographic coverage obligation would be sufficient to provide coverage in all townlands in Ireland with over 50 inhabited houses" - ComReg 11/60*

> *" Based on CSO data which indicates that just under 70% of the population live in townlands with 50 inhabited houses or more." - ComReg 11/60*

The CSO provides methodology on its Census activities and comments on townlands as follows:

> *"Townlands are not used as administrative areas within the boundaries of legally defined urban areas – Cities, and Towns - and for most other urban areas without legal boundaries it is not possible to compile townland population figures as building development has completely obliterated the physical features by which townland boundaries were originally defined on Ordnance Survey maps."*[2]

As "townland" is a term in Ireland that describes both rural and urban areas, ComReg should be clear as to what exactly it means and what CSO data it is using.

Coverage

ComReg should clarify that the formulation, "level of area coverage sufficient to serve 50%-70% of the population" means population coverage only.

ComReg also uses the term "demographic coverage" at various points. It should clarify that this also means population coverage only.

[2] http://www.cso.ie/surveysandmethodologies/surveys/populations/documents/pdf_docs/COP_quality_report_appendix9.pdf

Electoral Divisions

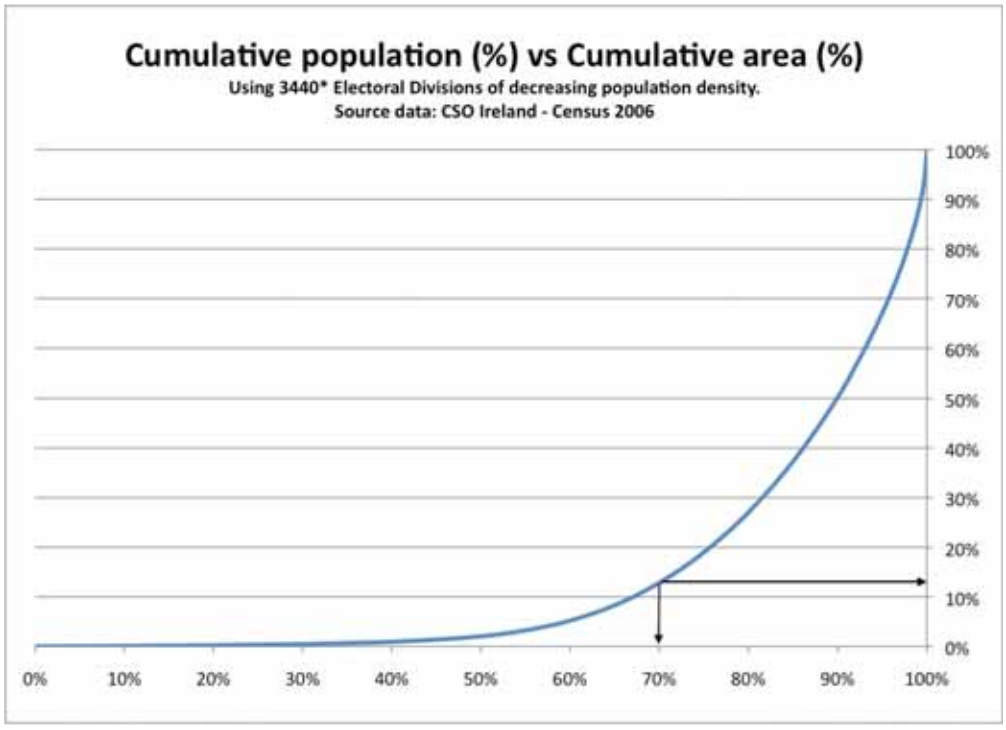
An alternative method would be to use electoral divisions, instead of towns, to project potential coverage. Electoral divisions have the following benefits;

- Compatibility with DCENR mapping for the NBS and RBS schemes.
- Complete national coverage.
- Standard Unit (LAU 2) of EU statistical research
- Increasing resolution (granularity) with density.
- Known and measured geographic areas.

Population coverage vs Area Coverage

(70% population coverage equals 13% area coverage)

Using this method, 938 electoral divisions (EDs) will suffice to meet the '70% of population' condition under option 3. The resulting coverage areas amount to just 12.9%[3] of the total national area.



Graph of national population against area coverage showing 70% of population equal to 12.9% of area.
**Total of 3440 Electoral Divisions nationally including 'St. Mary's (part)'.*

Being defined areas, EDs may all be depicted on a map (shown below). The map shows licence-compliant network coverage by any provider using population density as a main factor in decision making.

These areas show a good level of contiguity and could reasonably represent a compliant 'roll-out' plan for a new-entrant, or a compliant 'roll-back' plan for an incumbent under Option 3.

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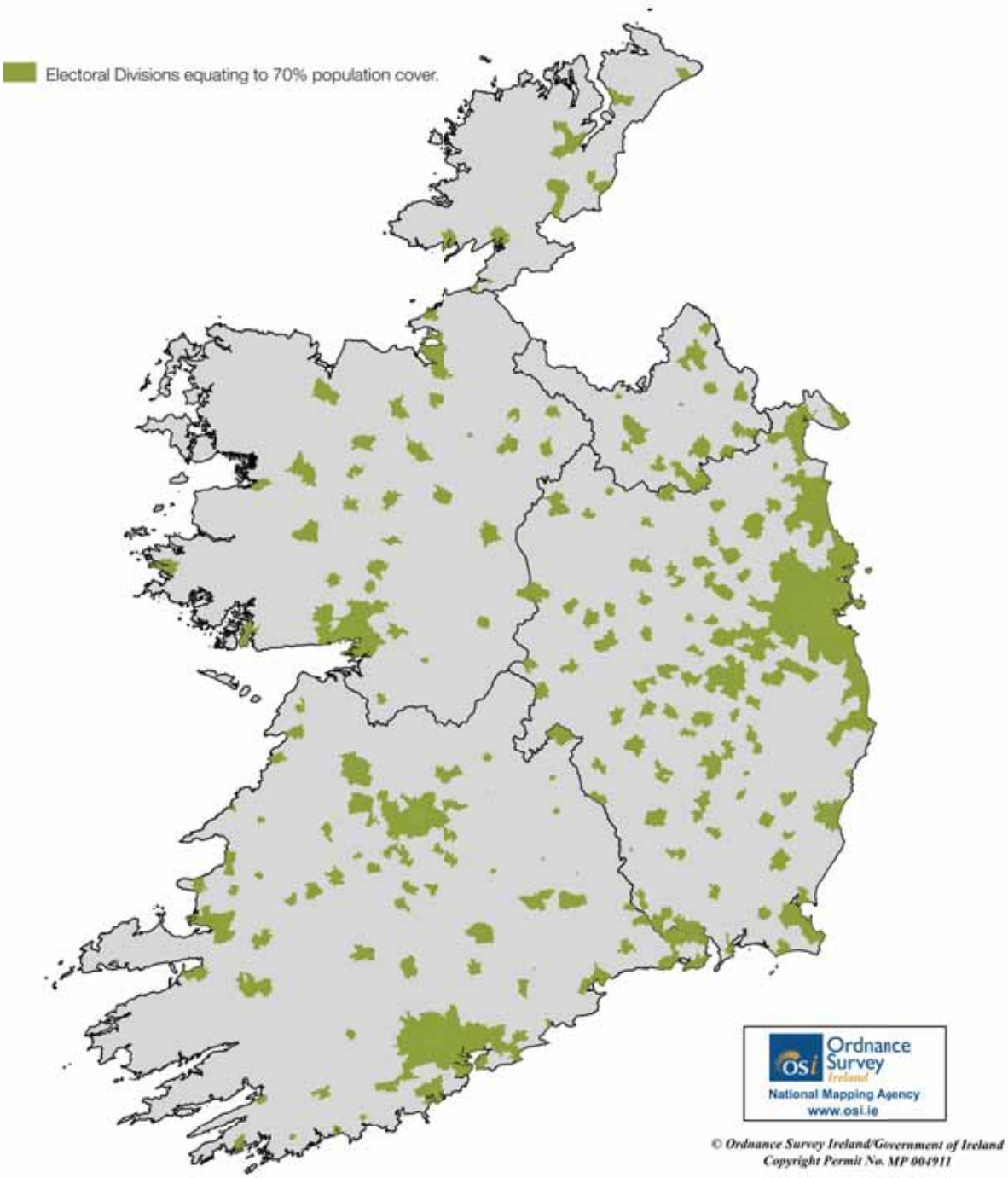
[3] http://dl.dropbox.com/u/39502907/ED_Listing.xls

Minimum coverage required by new licences (Map)



Map shows 938 out of 3440 electoral divisions[4] amounting to 70.06% of the population but just 12.9% of the national area. (Source data: CSO Census 2006)

[4] Electoral division Ballynaneashagh (24006) is shown additionally due to OSI privacy requirements. A full listing is available at http://dl.dropbox.com/u/39502907/ED_Listing.xls

Roll-back

ComReg states the problem of "roll-back" as follows

"The end result could be that the overall level of coverage provided by the market could be much reduced from current levels. This would potentially be very damaging for consumers who would no longer have the ubiquity of mobile coverage in rural areas that they are accustomed to." - ComReg 11/60a at A8.153

The likelihood of Roll-back

ComReg then offers some suggestions as to why it considers "that the possibility for this [roll-back] appears quite limited"

1. Coverage is a differentiator in marketing and advertising.

"coverage has been an important competitive differentiator, and one that has been given prominence in advertising and marketing. On the basis of competition between networks, the first MNO to roll back voice coverage would create significant opportunities for rivals to win its customers;" - ComReg 11/60a at A8.60

Coverage may be given prominence in advertising, but that is hardly an indicator of the accuracy[5] of the claims made. It would appear to be either naive or specious on the part of ComReg to fail to point that out.

Independent coverage information is difficult to get. ComReg's own site-viewer website disclaims ownership of the base station location information and will not vouch for its accuracy.

ComReg has been delegated the task by ASAI of bringing realism to advertising in a related topic; "up to" or peak data download speeds, but its success has been limited (partially, perhaps, because ComReg uses this terminology itself). In any case Ireland continues to have a low ranking in 'promise vs delivery' statistics[6], which suggests that consumers are unlikely to derive reliable information from advertising and may only find out the truth, to their cost, after entering into a long term contract.

2. 3g coverage exceeds obligations.

"Furthermore, the coverage obligations in 3G licences (and the greater coverage levels actually achieved under competition) underpin voice coverage levels." - ComReg 11/60a at A8.61

The GSM (voice) obligations of the two early entrants, O2 and Vodafone, were 90% and 92% of area respectively. From the graph (page 7) above it can be seen that their respective 3g licences, at 80% and 85% of population, only amount to 27% and 37% respectively in terms of area coverage.

The scoping exercise under the National Broadband Scheme determined that 40% of the country, measured by area, was "unserved" by broadband, including HSPA services delivered under the 3g licences. It follows then that 3g services were absent from at least that 40% of national area.

Further evidence of this absence is provided by the fact that the Infrastructure provision for the NBS came in large part from upgrading existing sites[7] to 3g. This was carried out by one provider only.

The upgrading of those sites and the increased coverage was not achieved through competition, as stated above by ComReg, but through a €79.8M subsidy to the NBS contractor. The NBS contractor's obligation to maintain those same sites ends in July 2014.

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[5] One provider's advertising includes the claim that -"We've already built Ireland's largest high speed mobile network" - but ComReg relates that the same provider advised it that other providers had "more extensive networks". ComReg would be in a position to know which of the two statements more fairly reflected the true position; consumers would not.

[6] http://www.netindex.com/promise/1,7/EU/

[7] http://www.kildarestreet.com/wrans/?id=2011-05-17.1227.0&s=%22Telecommunications+Services.%22

As a check, ComReg would be in a position to determine whether GSM-only sites were disproportionately present outside the high density urban areas for those providers operating mixed technologies, and if so, it would be an indicator that digital divide was occurring in relation to newer technologies after a baseline GSM service had been established.

One trend that could emerge is that city-based consumers contract their main service from a low cost new-entrant while maintaining a PAYG service from an incumbent to cover usage while in rural areas. In this way new entrants would not even have to conclude a roaming agreement with a larger incumbent network. The cost/revenue implications for incumbents if such a trend became established would be unsustainable and roll-back would be inevitable. Eventually there would be no rural provider remaining or just one, who was extracting a monopolistic rent. Again, the consequences for consumers, particularly rural consumers, would be extremely disadvantageous and discriminatory.

Alternatively the regulator would have to intervene to compensate carriers who retained more extensive rural networks. The success of possible Interventions by the regulator are discussed later.

Safety consequences for citizens

There are obvious disadvantages to consumers from 'roll-back' but some safety issues arise also, mostly related to the inability to summon help or receive warnings in remote locations, and therefore also to the inoperability of the geo-location function of mobile phones in guiding emergency services to the site of an accident. Particular examples would be,

- Farm workers in isolation using single operator machinery.
- Forestry workers in isolation using single operator machinery.
- Inshore fishing and leisure activities.
- Lakes' and waterways' activities.
- Mountain and cliff rescue.
- Road traffic accidents.
- Victims of crime.
- National Emergency. (e.g. The inability to receive a radiation warning by text alert.)

Safety consequences for the State

It would be an open question as to whether liability would attach to the State in the above circumstances, where injury or death had occurred, and where a policy had been pursued that had foreseeable consequences such as 'roll-back', whether or not the public had been informed of the changing safety risks.

The regulator is obliged under Irish and EU Law to have regard, amongst other things, for the safety of EU citizens.

(6) Measures that require an electronic communications service to be provided in a specific band available for electronic communications services shall be justified in order to ensure the fulfilment of a general interest objective as defined by or on behalf of the Government or a Minister of the Government in conformity with European Union law such as, but not limited to—

(a) safety of life, (b) the promotion of social, regional or territorial cohesion, (c) the avoidance of inefficient use of radio frequencies, or (d) the promotion of cultural and linguistic diversity and media pluralism, for example, by the provision of radio and television broadcasting services.[8]

[8] http://www.dcenr.gov.ie/NR/rdonlyres/1E182D74-AB6F-4DDC-8348-1A20F60ACF2E/0/SINo333of2011FrameworkRegsFinal.pdf

Consumer Participation

Submissions

The Consumer Panel of ComReg

The Consumer Panel does not appear to have made any submission to the process.

Others

There appears to be only one submission to date from any consumer group - Ireland Offline, however the submission of Ericsonn (a network equipment and handset manufacturer) also represents some consumer interests.

Ireland Offline

Ireland Offline in document 9/51s proposed infrastructure and spectrum sharing. The advantages were either stated or can be inferred as follows:

- Lower costs to Networks through jointly owned and shared infrastructure
- Strategic network planning to promote better coverage.
- Greater protection of scenic areas.
- More efficient use of spectrum
- Improved data services
- Improved and transparent access for new entrants
- Elimination of digital divide.
- Economies of scale
- Universal Service provision by mobile provider (possibility of)

In a caustic website release[9] the proposal was further developed. It recommended splitting the licence between high density areas where normal competitive forces could play, and lower density areas (prone to market failure) where a single Radio Access Network could achieve the advantages described above.

Ericcsonn

The views put forward by Ericcsonn have to some extent also reflected the needs of consumers by highlighting the low area coverage obligation and in proposing a shared network.

General Response by ComReg to Consumer Participation.

While ComReg has a statutory role as guardian of the public interest, its responses to consultations have been for the most part to balance the interests of potential new market entrants as against incumbents, and to ensure the integrity of the auction process so as to maximise the value of the licences to the State. Its obligation to consumers has manifested only in an assumption that efficient allocation will be maximised through the auction process and that consumers' interests will thereby be balanced with other stakeholders.

Response to Ireland Offline.

ComReg quoted a single uncontroversial phrase from the Ireland Offline submission.

Response to Ericcsonn

Apart from a perfunctory email response, Ericcsonn's concerns on coverage were not addressed, nor were its proposals for a shared network.

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[9] http://irelandoffline.org/2011/06/another-fine-mess-you-made-of-things-ComReg/

Miscellaneous

Intervention & Enforcement

ComReg maintains that it could intervene should roll-out or coverage not evolve as imagined. Whatever about ComReg's optimism, the incumbents are all well-resourced multinationals capable of sustaining prolonged High Court actions to prevent or at least delay intervention by ComReg to alter licence conditions. Objectively, neither the appeals panel nor the High Court nor the European Court of Justice have been happy or fruitful places for ComReg in the past. ComReg should therefore seek and publish legal opinion on its rights in regard to altering the licence conditions of compliant licence holders.

Weighing of Factors

It appears that there has been no scheme put in place for the systematic weighing and weighting of factors. For instance the real threat of diminution of the service area from 92% to 13% is seen by ComReg to have equivalence, in some unexplained way, to the extra choice that might be offered to consumers by an unknown new entrant.

ComReg attaches value to abstractions such as competition, the possibility of innovation, or the possibility of lower prices, without any corresponding assessment of their actual likelihood, at what level they might emerge, or how these elements might be valued by consumers if they came to have concrete expression. There is no weighting of the importance of factors as between groups of interested parties.

It should be possible to construct a quantitative scheme so that the ranking of concerns within and between classes of stakeholders, and the effects of possible outcomes and their likelihood, both within groups and between groups, can be given some sort of rational foundation and defensible decisions thereby obtained.

Choice & Innovation

Small countries, particularly where there is high dispersion and low density do not have the luxury of sampling everything at an infrastructural level. It is extremely wasteful. Realistically Ireland is a 'technology taker' in this field at least. Realistically only one new mobile technology is under discussion - LTE, and the possibilities for innovation are predominantly at the marketing level.

Market Entry & Exit

Again much is made of low barriers-to-entry being uncontroversially a good thing. ComReg should consider if there is an desirable upper limit to the number of MNOs, and if there are not tools to ensure competition other than a continuing dilution of licence conditions in the hope of attracting new entrants, who are then required to build out yet another physical network? Any new network will inevitably cover the same high density areas (or some subset thereof) as the incumbents.

Over the period of the licence the actual cost of the licence itself to a new entrant will be small relative to the physical network costs. It should follow that if ComReg wants to attract new entrants it should concentrate on reducing the cost to them of network acquisition. Perhaps even more important, is a means for a new entrant to recoup its investment in network infrastructure should it have to leave the market. Shared ownership of the network infrastructure would allow for that and thereby engender confidence in entering the market in the first place.

Who Pays ?

In all of this, it's as well to remember that the consumer pays the entire bill.

Summary

- ComReg's analysis of the coverage outcome under the new licence obligations contains an important error in calculation and is vague in its terminology.
- ComReg has not produced a representative coverage map under minimum compliance. The public will not be properly informed of the possible extent of "roll-back" under the draft decision.
- Actual compliance with 70% population coverage means as little as 13% area coverage.
- ComReg's reasoning on the unlikelihood of "roll-back" is unconvincing.
- ComReg's estimation of its powers to intervene to mitigate "roll-back" during the licence period are optimistic in light of its established record of intervention and enforcement.
- ComReg has attributed value to abstractions that do not arise in a small economy with high dispersion and low density.
- ComReg is preparing to trade abstract benefits such as competition, ease of entry, the chance of lower prices, the chance of innovation etc. in place of established real benefits such as ubiquity of service.
- ComReg itself has only stated, but not weighed, the paramount importance of ubiquity to the safety, productivity, and convenience of consumers and the state.
- ComReg's consumer panel has been absent and has had nothing to say on the loss of rural service.
- ComReg has not considered proposals, by Ireland Offline and Ericsonn, for a shared rural network, that would result in significant benefits and savings for consumers, providers and the state under sections 17 (3) and 17(6) of the Framework Directive regulations

Recommendations

1. Maintain or increase the current level of 92% mandated coverage of the national area for voice and text.
2. Evaluate the benefits of a mandatory shared rural or national network.
3. Subject to 2 above, require data coverage in 92% of national area within 5 years.

2. TG4 – received 12 October 2011

From: Neil Keaveney
Sent: 12 October 2011 11:55
To: Louise Power
Subject: TG4 response to Comreg paper 1160

A chara
Is mian le TG4 na pointí tábhachtacha seo a leanas a chur i láthair an Choimisiúin maidir leis an ábhar seo.

It is TG4's understanding that RTÉNL, the entity that delivers TG4's terrestrial television transmission requirements, has raised questions over the impact of the release of the 800MHz spectrum for the Digital Dividend. RTÉNL estimates that 2.5% of Irish households could be negatively affected by this spectrum release in the manner proposed.

It is also our understanding that ComReg proposes that broadcasters and viewers would be responsible for correcting and paying the costs for the correction of any interference arising out of the spectrum release.

These proposals are a source of some concern to TG4. We suggest that, as has been customary in other EU States, a study on the effects of the spectrum release be carried out to establish the implications of the proposed release and to identify any issues that require resolution.

TG4 proposes that Ireland follow best practice in other EU countries with the licencee being held responsible for mitigating against interference and for dealing directly with complaints from affected viewers.

Neil

Neil Keaveney
Stiúrthóir Teicneolaíochta TG4
TG4
Baile na hAbhann, Co na Gaillimhe
W: www.tg4.ie

3. HKC – received 12 October 2011

Commission for Communications Regulation,
Block DEF,
Abbey Court,
Irish Life Centre,
Lower Abbey Street,
Dublin 1.

11th of October, 2011

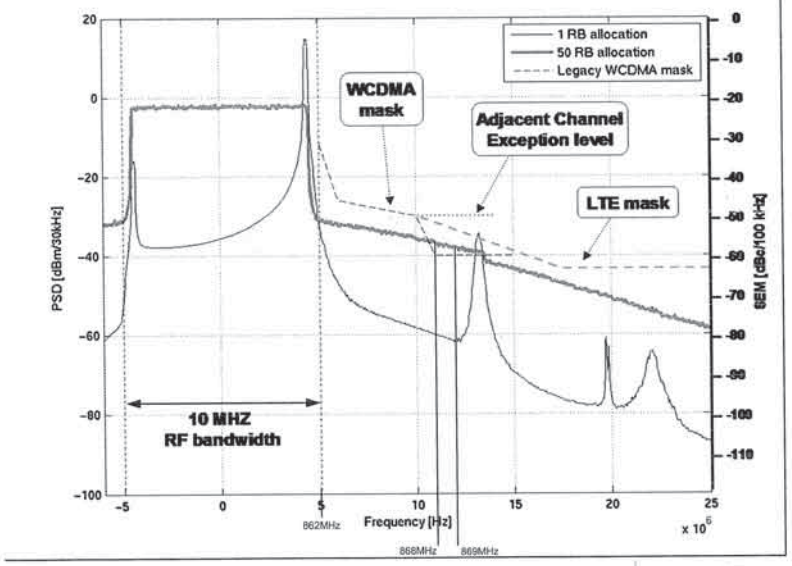
To whom it may concern,

In response to Comreg publication 60/11 - I would like to express my concern with the proposed use of the 790MHz to 863MHz bandwidth by Long Term Evolution (LTE) or 4G mobile phone operators.

I refer to a CEPT (European Conference of Postal and Telecommunications Administrations) report, No. 30 http://www.erodocdb.dk/docs/doc98/official/pdf/CEPTRep030.pdf .

One of the areas that this report looked into was the effects of out of band interference from LTE/4G equipment on adjacent bands.

In the diagram below, which is taken from figure 5 of that report and modified to show the frequency band (868MHz to 869MHz) used by intruder alarm equipment, you can see that the green line dissects that band around -38dBm mark. Note; the green line illustrates the scenario where the LTE/4G equipment utilises all the available 50 radio blocks.



www.hkc.ie

HKC Ltd., Registered in Ireland.
Reg. No. 178663. VAT Number E 6578663F.
Directors: G. Kelly, A. Kelly, M. Stone, N.Quigley.

Dublin Office
Parkway Business Centre,
Ballymount, Dublin 24,
Ireland.

T: +353 1 456 7007.
F: +353 1 456 8332.
E: sales@hkc.ie

London Office
11-15 Betterton Street,
Covent Garden, London,
WC2H 9BP

T: 0800 111 4599.
F: +44 20 7379 0801.
E: sales@hkc.ie

Even when the LTE/4G equipment utilises 1 radio block (blue line) the intruder alarm equipment band is dissected around the -60dBm mark. This is well within the bounds of operation for wireless intruder alarm equipment.

This represents a problem for existing premises using such intruder alarm equipment in that they are fully functioning now but may become prone to errors in the future if LTE/4G equipment is introduced into their environs.

I respectfully suggest that LTE/4G equipment should only be permitted for use if they have better filtering i.e. if the filtering lowers the proposed out of band interference by at least 40dB.

Yours sincerely,

Michael Bergin.

Michael Bergin.
Product Manager, HKC Ltd.

www.hkc.ie

HKC Ltd., Registered in Ireland.
Reg. No. 178663. VAT Number E 6578663F.
Directors: G. Kelly, A. Kelly, M. Stone, N.Quigley.

Dublin Office
Parkway Business Centre,
Ballymount, Dublin 24,
Ireland.

T: +353 1 456 7007.
F: +353 1 456 8332.
E: sales@hkc.ie

London Office
11-15 Betterton Street,
Covent Garden, London,
WC2H 9BP

T: 0800 111 4599.
F: +44 20 7379 0801.
E: sales@hkc.ie

4. RTÉ and RTÉNL- received 14 October 2011

RTÉ and RTÉNL Response to

ComReg Consultation Responses 11/60 and 11/60a

Multi-Band Spectrum Release

Release of the 800 MHz, 900 MHz and 1800 MHz radio spectrum bands

(and accompanying Annexes)

14th October 2011

Executive summary

Introduction

RTÉ and RTÉNL wish to thank ComReg for responding to our serious concerns regarding the future protection of the new digital television broadcasting services from mobile interference. However, the ComReg Consultation Responses/ draft Decision document (ComReg 11/60 and 11/60a) has raised further concerns. We exhort ComReg to exert every effort to ensure that the Free-to-Air terrestrial television platform (DTT/SAORVIEW) is protected because it will continue to constitute the only freely available digital television service for Irish citizens after Analogue Switch-off ASO. By the end of 2011, in accordance with Government and legislative imperative, RTÉ and RTÉNL will have spent tens of millions of euro developing the DTT network for Ireland. The potential total market for DTT in Ireland is still under consideration by ComReg, but research indicates that in addition to the primary television set, many households throughout the country have secondary and tertiary sets, all of which rely on the free-to-air service offering. Therefore, RTÉ and RTÉNL find the proposals in the draft Decision to be inappropriate in terms of the potential damage they could cause to the emerging Free-to-Air digital terrestrial television platform. Furthermore RTÉ and RTÉNL note the recent decision by Ofcom to delay auction of this spectrum in the UK following its consultation process.[1]

The European Commission Decision 2010/267/EU concerning the release of the 800MHz band states that Member States shall ensure that these new systems in the 800MHz band give appropriate protection to systems in adjacent bands. RTÉ and RTÉNL suggest that the current ComReg draft Decision document does not provide an appropriate level of protection for broadcast services. In addition, as highlighted below, ComReg's approach is in contrast to other countries where this spectrum is similarly being released. To date, proposals in other European countries typically require the 800MHz licensee to:

- Mitigate against causing interference at their base stations (particularly useful for communal television reception systems e.g. in apartment complexes).
- Contribute to the cost of mitigating against the interference at the viewer's receiver.
- Deal with interference complaints from affected television viewers directly or through an independent body.

In the absence of a detailed Irish study, RTÉ and RTÉNL suggest that there is a real danger that ComReg may have underestimated the potential level of interference to DTT viewers in Ireland, and therefore is intending to proceed in a way which ignores the entitlements of viewers of free-to-air televisions services. One possible approach would be to ensure that Irish householders do not have to pay for the interference

[1] http://www.bbc.co.uk/news/technology-15223275?print=true

and inconvenience caused by other users of the spectrum. This seems to be akin to a "polluters pay" principle.

Furthermore, RTÉ and RTÉNL seek clarification as to whether or not ComReg is considering – or would consider – that some of the revenues received from the Irish spectrum auction could be used to recover any costs associated, and to compensate the broadcasters for any costs they incur in implementing interference mitigation.

This Response document summarises RTÉ and RTÉNL's key comments, and addresses specific sections in the ComReg draft Decision notice.

1. Key Comments

1.1 Cost to Viewers: If this spectrum is released, as currently proposed, interference can be expected to affect at least 2.5% of Irish SAORVIEW / DTT households by RTÉNL's estimates (circa 50,000 Irish households)[2] and possibly more. It should be noted that this is a conservative estimate, as research undertaken by Arqiva in the UK [9] suggests the actual interference may be five times greater (see Section 2.7.4 below). Apart from the reputational damage that this interference will likely attract to the SAORVIEW platform and the cost to broadcasters, these households will be financially burdened twice for Analogue Switch Off (ASO); once, at ASO to move to digital, and then again when this adjacent spectrum is used by telecommunication services. The ComReg Decision notice shows no efforts to quantify this cost to the Irish public, either in monetary or social terms, due to the loss of Free-to-Air television services.

1.2 Cost to Industry: Our concerns are raised in the context of the substantial time, effort and financial resources committed by the broadcast industry, as well as DCENR[3] and ComReg, to move to digital and release the digital dividend. It is in our view unacceptable that a new telecommunications service be allowed to interfere with the broadcasting spectrum that remains and the services being carried on that spectrum; and equally unacceptable that the cost of remedying the problems caused by the new telecommunication service could be forced on to broadcasters and other existing users of the adjacent spectrum.

[2] 2.5% of households is derived by applying Ofcom's analysis [1 – see Referenced Publications listing below] in the UK (2.8% of households including channel 60), taking account of the exclusion of Channel 60 for core broadcasting as proposed in the draft Decision document.

[3] Department of Communications, Energy and Natural Resources.

1.3 Regulatory Basis: The European Commission Decision 2010/267/EU (Article 2, second paragraph) states that *"Member States shall ensure that the new systems in the frequency band 790-862 MHz provide appropriate levels of protection to systems in adjacent bands"*, e.g. DTT broadcasting services. ComReg's proposal to protect broadcasting against this interference falls short of what is being done in other EU Member States and therefore falls short of what is so far determined as "appropriate levels of protection" in other Member States which are comparable in terms of similar broadcast use.

Furthermore, RTÉ and RTÉNL suggest that it is somewhat irregular that ComReg could licence new systems under the Wireless Telegraphy Act 1926 that it has already accepted (unfortunately at a greatly underestimated level) will cause interference to an existing licensed service without providing any mechanism for the new licensee to mitigate against the problem either before or after the problems occur. ComReg does not include the impact of the 800MHz band use on broadcast viewers in its draft Regulatory Impact Assessment (RIA). The burdening of Irish television viewers, public service broadcasting, and the broadcast industry for a second time in order to facilitate extended mobile services demonstrates a lack of proportionality.

RTÉ and RTÉNL would also question whether the current proposal is in accordance with ComReg's objectives of promoting the interests of users of spectrum, since there is a significant risk that users will not have proper access to DTT services. In addition, what is proposed does not ensure that the integrity of a public communications network is maintained. In short, the proposal is discriminating and lacks proportion.

RTÉ and RTÉNL recommend that the RIA should consider the process whereby an "acceptable level of loss" for existing terrestrial broadcasting services as a result of interference from new mobile services is to be determined. RTÉ and RTÉNL recommend that it is the DCENR, where primary responsibility for national radio spectrum policy resides, who should conduct a public consultation in this regard in order to determine exactly what such an "acceptable level of loss" might mean in the Irish context. This is given the probability that, even after all mitigation options have been exhausted, the proposed implementation of mobile services in the 800MHz band will inevitably cause some net loss of coverage for digital television services.

1.4 Spectrum Policy: RTÉ and RTÉNL believe that releasing this spectrum as proposed, and introducing significant interference to existing licensed public services, is not in line with ComReg or DCENR spectrum policy. In this regard RTÉ and RTÉNL wish to reference the DCENR Spectrum Policy Statement, Sept 2010, page 3: *"The Minister is committed to ensuring that the national*

spectrum resource is managed and used effectively and efficiently so as to ensure that Ireland does not lag behind in the development of world-class communications infrastructures, technologies and services for the express purpose of raising our competitiveness, contributing to our economic development and improving the quality of life of our citizens. ***An equally important objective of spectrum policy is to ensure that public policy objectives are also served. In particular, it is necessary to ensure that adequate spectrum is available for the provision of essential government services in areas such as safety and security, for public service broadcasting*** *and scientific applications, such as meteorology, and also for leisure uses." [emphasis added].*

1.5 Technical Analysis: RTÉ and RTÉNL find ComReg's assessment of the investigations conducted in other counties to be less than comprehensive. This has led to the assumption that avoiding channel 60 will solve "most (if not all)"[4] of the interference issues. This is not the finding in the UK or other countries so far (see Section 2.8 below). Furthermore, given the wide range of variables, RTÉ and RTÉNL would urge that ComReg undertake its own detailed technical assessment (including modelling and field trials) of the problem, as has been carried out in other countries. The failure to do this is a significant matter that vitiates the process undertaken in this consultation.

1.6 Recommended actions: RTÉ and RTÉNL urge that ComReg, in fulfilment of its legal obligations, consider and consult on the following actions before proceeding to award licences in the 800MHz band:

- Conduct a detailed study, with direct engagement from the industries concerned, to estimate the potential level of interference in Ireland and the impact of all relevant mitigation methods.
- Establish what is an acceptable level of lost coverage for DTT (after mitigation).
- Conduct a cost analysis on interference mitigation.
- Create a licensing framework that minimises the amount of interference expected for broadcast viewers **before it occurs**, including pre-emptive action from the licensee likely to cause the interference.

[4] [2] section A10.120

- Create a framework to manage viewers who experience interference, ensuring the shortest time possible between a complaint of interference being reported to its being resolved.
- Create a framework to fund the cost of resolving interference issues.

2. Specific Comments on ComReg's Draft Decision (ComReg documents 11/60 and 11/60a)

2.1 [3], Sections 2.18-2.20 – Current usage of the 800MHz band. No reference is made to PMSE[5] or OB[6] links usage of the 790 to 862MHz band. For example, RTÉ Radio and RTÉ Television have a significant amount of licensed equipment operating in this band which will need to be migrated to below 790MHz. As part of this process ComReg needs to work with these licensees to ensure that adequate alternative spectrum can be allocated. As with the broadcast transmission infrastructure there will be a relatively significant cost and disruption for RTÉ and other users to migrate from this spectrum.

2.2 [3], Chapter 3 – Draft RIA and Assessment against Statutory Obligations. The draft RIA is incomplete as it makes no reference to the impact of the new licensed services on Digital Broadcast Services in the adjacent band, or to the impact on existing users of the 790 to 862MHz band not related to ASO.

2.3 [2], A10.67 – A10.98 – Overview of International Studies and Licence Conditions.
RTÉ and RTÉNL draw attention to the studies undertaken by regulators elsewhere, particularly in the UK, with whom RTÉ and RTÉNL have worked closely in terms of making this spectrum available. However, given the level of uncertainty, RTÉ and RTÉNL suggest that ComReg conduct its own appropriate due diligence in consultation with industry, specific to Ireland, before licensing operators in the 800MHz band.

2.4 [2], A10.104 – While avoiding channel 60 will reduce the occurrences of interference, RTÉ and RTÉNL suggest that ComReg re-examine the analysis

[5] Programme Making and Special Events (PMSE)
[6] Outside Broadcast (OB)

carried out in other counties (particularly Ofcom's work in the UK). It appears that the level of interference remaining below channel 60 has been underestimated. RTÉ and RTÉNL believe this current ComReg proposal could instead increase the footprint of the new 800 MHz band, placing an effective additional 8MHz guard band within the remaining broadcast spectrum, without extracting any additional "dividend" from this spectrum. Once again this is at the cost of the broadcasters, and threatens any potential future growth of broadcasting to reach the level as aspired to in current DCENR broadcast policy. Furthermore, no analysis has been done to estimate the repercussions of further compacting the DTT plan into less spectrum; nor has the continued availability of sufficient broadcast white space spectrum for PMSE been sufficiently investigated.

2.5 [2], A10.107 - RTÉ and RTÉNL welcome the application of Case A BEM[7] in all cases given the digital broadcasting has already been established in the adjacent band, again noting that CEPT Report 30 (Executive Summary)[8] states that this alone is not sufficient to protect broadcasting: *"It should be understood that block edge masks do not always provide the required level of protection of victim service and in order to resolve the remaining cases of interference additional mitigation techniques would need to be applied"*.

2.6 [2], A10.120 – International Studies:

2.6.1 RTÉ and RTÉNL must question ComReg's view that channel 60 has been determined to account for "most (if not all)" of the potential interference issues. According to the Ofcom study [1] channel 60 accounts for approx 30% of the SINR[9] problems in a standard domestic installation,[10] and approximately 12% of all interference (see Section 2.8).

2.6.2 With regard to the channel 60 approach in Switzerland, it is worth noting the following important differences with respect to Ireland:

[7] Block Edge Mask (BEM)
[8] http://www.erodocdb.dk/docs/doc98/official/pdf/CEPTRep030.pdf
[9] Signal to Interference and Noise Ratio
[10] Ofcom has only published a breakdown of interference figures into SINR and Overload for the Standard Domestic Installation reference situation: [1], Annex 8.

- Switzerland proposes a lower in-block EIRP[11] than ComReg.
- A general clause in 800MHz licence to cover interference is proposed in Switzerland.
- Terrestrial broadcast television has a particularly low penetration in Switzerland at approximately 7% of households, so cases of interference can be expected to be less common and more manageable.

2.7 [2] A10.121 - Comments on receiver performance incorrectly suggest that studies carried out in other countries may over-estimate potential interference problems:

2.7.1 RTÉ and RTÉNL have found from a sample of 10 approved SAORVIEW receivers that performance (in terms of interference rejection of adjacent channel DTT signals) is broadly similar to, and as varied as, the samples given by Ofcom[12], and ECC Report 148.[13] It should also be noted that the n+9 channel performance of some superhetrodyne receivers requires higher protection ratios at channels 52 to 55 (depending on which 800MHz block is in use). For example, several of the SAORVIEW receivers tested demonstrate poorer performance at channel 52 than at channel 59 (and only marginally better than channel 60 in one case), with respect to rejecting an interferer in the first adjacent block above 790MHz. This means that it is not always correct to assume that channels further away from 790MHz will experience less interference.

2.7.2 The Ofcom work does not always assume the worst case receiver, despite listing this in the summary information. The poorer performance of some receivers in the presence of "bursty" signals (i.e. when the mobile base station is not fully loaded or is idle) was not included in the modelling[14]. Research conducted by ANFR (Agence Nationale de Fréquences) in France also highlights the increased severity of interference from bursty/idle base stations to broadcast reception [6]. ComReg needs to consider the effect of bursty/idle base stations in their assessment of potential interference.

2.7.3 Furthermore, the assumption of worst case receivers is appropriate for this analysis, noting that these may not necessarily be the least expensive receivers

[11] Effective Isotropic Radiated Power
[12] [1] Tables 39 to 43
[13] [5] Table 5a
[14] [1], Annex 6

on the market. The viewer will have no indication as to the interference rejection capabilities of their receiver other than that it is SAORVIEW-compliant. It should also be noted that performance of even the worst performing receivers in the Ofcom research [1], in terms of interference rejection, is well within the technical parameters specified in RTÉ's DTT licence,[15] and well within the technical parameters used to plan and coordinate DTT internationally[16].

2.7.4 Other factors and assumptions in the Ofcom research [1] would mean that the Ofcom figures underestimate the problem, particularly if applied to Ireland. Some of these include:

- the 59dBm/10MHz in-band EIRP limit (i.e. 56dBm/5MHz, 3dB lower than ComReg's proposal at 59dBm/5MHz)
- the assumed rural/urban split.
- interference to primary television sets only.
- reduced standard-deviation of propagation (to 1dB) close to base-stations.
- mobile base-station co-location.

Furthermore, studies carried out by Arqiva in the UK indicate that the **Ofcom analysis may underestimate the potential number of people affected by interference by a factor of five** [9] (i.e. equating to 12.5% of households below channel 60).

2.8 [2], A10.122 – Taking a detailed look at the Ofcom results, it is not correct to ascertain that "most (if not all) SINR degradation issues would likely occur in channel 60". Figure 1 below is reproduced from [1], section 1.10:

[15] [7], Tables 6 and 8, assuming adjacent channel interference from mobile systems has a broadly similar impact as interference from other DTT systems.
[16] [8], Section 3.3.2.

No mitigation	Number of households affected by interference			
DTT channel	Standard domestic installations	Communal aerial systems	Domestic installations with amplifiers	Total
60	34,662	41,177	12,303	88,142
59	14[2]	48,335	14,085	62,434
58	5,504	16,333	3,723	25,560
57-51	25,537	23,863	7,865	57,265
≤50	49,494	391,912	77,082	518,488
Total	115,212	521,619	115,058	751,889

Figure 1. Source Ofcom [1]

From this chart channel 60 represents approximately 12% of the interference issues. More detailed figures are given in sections 8, 9, and 10 of the Ofcom document [1], and a figure of 30% is similarly derived for SINR specific interference associated with channel 60 for standard domestic installations.

Research from ANFR in France [6] shows that when only considering channels 58, 59, and 60, channel 60 is responsible for approx 60% of the interference. While this is most of the interference (in channels 58, 59, 60 only) a significant proportion still needs to be accounted for in channels 58 and 59, as well as channels below this number.

Similarly, studying the details of Swedish research conducted by Progira [4] where only channels 58, 59 and 60 are studied, RTÉ and RTÉNL find that when comparing areas with a similar number of mobile base stations and similarly powered DTT sites[17], the channel 60 interference represents approximately 60% of the combined interference on channels 58, 59 and 60.

2.9 [2], A10.126 – RTÉ and RTÉNL suggest that it is not correct to conclude channel 60 will not be required for the provision of six DTT multiplexes, given that bilateral planning and coordination is not yet complete between Ireland and the UK. RTÉ and RTÉNL believe that this proposal effectively increases the amount of spectrum attributable to mobile services, once again at the cost of Irish television viewers and broadcasters. Furthermore, no analysis has been presented by ComReg to quantify the repercussions of further compacting the DTT plan into less spectrum.

2.10 [2], A10.128 – Based on Ofcom's analysis RTÉ and RTÉNL believe that without mitigation there could be significant interference in channels 59, 58, and below, amounting to 2.5% of the population (approx 50,000 households). This

[17] In this case RTÉ and RTÉNL compared Skövde (channel 60), Skellefteå (channel 59), and Kalix-Överkalix (channel 58), noting that the Progira research considers a 2MHz guard band for the channel 60 calculations.

represents a significant interference risk and merits pre-emptive action in addition to a detailed strategy for handing interference complaints that do arise.

2.11 [2], A10.129 – RTÉ and RTÉNL believe that given the evidence presented here, that more research requires to be done. RTÉ and RTÉNL respectfully suggest that ComReg conducts a detailed assessment of the potential interference problem and that ComReg re-evaluate its proposed spectrum release. The information presented in the Table below, most of which is presented in the ComReg document (unless sourced elsewhere as noted below), shows how other Member States are proposing to deal with this problem:

Country	**In-block EIRP Limit (5MHz)**	**Conditions/Mitigation being considered**
Ireland	59dBm	Use channel 60 as a guard band
France[18]	Unknown	800MHz operators to compensate DTT viewers: "in case of interference, operators will take the necessary measures to enable the resumption of television service reception by any appropriate means" – draft 2012 budget bill (Sept 2011)
Sweden	56-64dBm	800MHz licensee must pay for the costs associated with cooperation, investigations and measures to remedy television interference
Switzerland	56dBm	Use channel 60 as a guard band. Clause in 800MHz licence requiring operator to modify its parameters or stop transmission
UK[19]	61dBm	Recoup predictable and controllable costs from new licensees. Establish an independent body "MitCo"[20] to manage problems.

2.12 [2], A10.131 – While the effects of receiver overloading may be considered a function of the receiver it is worth noting that without a high power interfering signal, the overloading would not occur. A more understandable and fairer approach being applied elsewhere is the "polluter pays" principle [cf. Arqiva 9],

[18] Telecompaper.com, Thursday Sept 29th, 2011: http://www.telecompaper.com/news/french-lte-operators-to-bear-the-cost-of-dtt-interference

[19] "Coexistence of new services in the 800 MHz band with digital terrestrial television", Ofcom, 2 June, 2011, section 6

[20] An independent body to arbitrate/oversee fixing the interference problems.

where the new licensee is responsible for the mitigation of any problems they are likely to cause.

2.13 [2], A10.132 - RTÉ and RTÉNL note that according to the Ofcom work [1] additional base station filtering is particularly effective at reducing interference at channel 59, and reduces the interference by up to 99.99%, compared to 97.5% for receiver filtering alone, in a communal receive system scenario.[21]

RTÉ and RTÉNL suggest that ComReg should consider this measure given the number of people living in managed apartment complexes where communal reception systems may be the only option for receiving free to air television. It is a simple solution for the mobile operator to implement pre-emptively without causing any disruption to the television viewer.

2.14 [2], A10.133, A10.134 – RTÉ and RTÉNL agree that the use of filters at the receiver is the most effective solution for the majority of potential overload issues. RTÉ and RTÉNL would also add that the use of receive filters is a highly effective way of dealing with many SINR issues. It should be considered that receiver filters will introduce some additional loss in the receive systems. While this may be marginal and difficult to demonstrate on an individual basis, it will reduce the quality of fringe reception for those viewers.

2.15 [2], A10.135 – This paragraph suggests that Irish television viewers and the broadcast industry should bear the cost of applying the receive filter solution, after other mobile operator-based mitigation methods have been exhausted. ComReg needs to complete its RIA in determining what this cost might amount to, and ComReg also suggests that the victim should bear the cost of this interference rather than the interferer, which is unusual. RTÉ and RTÉNL contend that this is unacceptable, as explained in the Key Comments above, and is an irrational approach to take by a regulator.

2.16 [2], A10.139 - In relation to interference from mobile devices (i.e. uplink interference) into broadcast television reception, it is important to understand that mitigation by simply moving the interferer away from the television receiver may not always be practical. At some of the distances concerned (CEPT Report 30 on this matter found that the worst case interference scenario

[21] [1], Annex 8

resulted from a separation distance of approx. 22m[22]) the interferer may be in a separate dwelling in a multi-tenant building and completely unaware that they are causing a problem to a neighbour's reception.

2.17 [2], A10.142 – In the absence of a detailed Irish study RTÉ and RTÉNL estimate that at least 2.5% of the Irish population could be affected below channel 60 by the unmitigated implementation of services in the 800MHz band as currently proposed. RTÉ and RTÉNL believe that this will prove to be too great a problem for ComReg to deal with in a timely and efficient way: as Irish Free-to-Air television viewers are likely to lose their television service during the period of investigation and resolution, and, should this happen, it would be likely to cause them significant distress.

2.18 [2], A10.144 – Any system designed to resolve viewers' complaints about interference must be promptly and directly effective. The process as proposed by ComReg would most likely consist of the following sequential steps:

1. Viewer reports complaint to service provider.
2. Service provider investigates and verifies complaint.
3. Service provider reports complaint to ComReg.
4. ComReg investigates and verifies complaint.
5. ComReg requests interfering operator to resolve complaint.
6. Interfering operator attempts to resolve complaint.
7. ComReg verifies complaint has been resolved.

Resolution of a complaint could take several months. This is unacceptable for Irish Free-to-Air television audiences and will cause damage to the reputation of the terrestrial digital television platform. Broadcasters do not have the resources, nor should they be required to, in order to deal with additional interference investigations of this scale, and the consequent public disquiet.

This potential disruption caused by mobile interference into broadcasting is sufficiently serious to merit that some public entity, independent of ComReg and the licensees, be charged with ensuring interference complaints are quickly remedied.

[22] [10], section A3.1.3

3. Referenced Publications

[1] "Technical analysis of interference from mobile network base stations in the 800 MHz band to digital terrestrial television", Ofcom, June 2011.

[2] "Multi-band Spectrum Release – Annexes", ComReg Document 11/60a, August 2011.

[3] "Multi-band Spectrum Release – Release of the 800 MHz, 900 MHz and 1800 MHz radio spectrum bands.", ComReg Document 11/60, August 2011.

[4] "Interference from future mobile network services in frequency band 790 – 862 MHz to digital television in frequencies below 790 MHz", Progira (via PTS), 2009.

[5] "Measurements on the Performance of DVB-T receivers in the presence of interference from the mobile service (especially from LTE)", ECC Report 148, 2010.

[6] "Étude sur l'évaluation du brouillage de la radiodiffusion par le LTE en terme de population dans la Mayenne", ANFR, March 2011 http://www.anfr.fr/fileadmin/mediatheque/documents/etudes/Etude%20Canal%2060%20-%20Compl%C3%A9ments.pdf

[7] "Digital Video Broadcasting Terrestrial (DVB-T) Network - Technical Conditions attached to a Digital Terrestrial Television (DTT Licence)", ComReg Document 07/90b, November 2007.

[8] "Final Acts of the Regional Radiocommunication Conference for planning of the digital terrestrial broadcasting service in parts of Regions 1 and 3, in the frequency bands 174-230 MHz and 470-862 MHz (RRC-06)", ITU, 2006.

[9] Arqiva response to Ofcom's consultation: http://stakeholders.ofcom.org.uk/binaries/consultations/dtt/responses/arqiva.pdf

[10] "CEPT Report 30", ECC, October 2009.

5. Arqiva – received 14 October 2011

Multi-Band Spectrum Release

Release of the 800 MHz, 900 MHz and 1800 MHz radio spectrum bands.

Commission for Communications Regulation, Ireland.

Consultation Document Number 11/60

About Arqiva

Arqiva is a media infrastructure and technology company operating at the heart of the broadcast and mobile communications industry and at the forefront of network solutions and services in an increasingly digital world.

Arqiva provides much of the infrastructure behind television, radio and wireless communications in the UK. In this role it is implementing UK Digital Switch-Over from analogue television to Freeview – a huge logistical exercise requiring an investment by Arqiva of some £700m and which is successfully being delivered to time and budget.

Arqiva is also a founder member and shareholder of Freeview, and operates two of the UK's three Freeview commercial multiplexes, providing 40+ services on Freeview to 19 million homes.

In addition Arqiva provides end-to-end capability for broadcasters, media companies and corporate enterprises, with services including:

- outside broadcasts (10 trucks including HD, used for such popular programmes as *Question Time* and *Antiques Roadshow*);
- satellite newsgathering (30 international broadcast SNG trucks);
- 10 TV studios;
- spectrum services for Programme-Making & Special Events (PMSE)[1]; and
- satellite distribution (over 1200 services delivered).

Specifically in respect of the Digital Terrestrial Television (DTT) platform:

1. Arqiva Broadcast & Media is contracted to all current DTT multiplex operators to provide their transmission networks, where access to Arqiva's broadcast sites and Managed Transmission Services is regulated by Ofcom;
2. Arqiva Digital Platforms represents the Multiplex Licence operations of Arqiva, and has a contract for Managed Transmission Services with Arqiva Broadcast & Media; and
3. Arqiva's spectrum planning and antenna design team provides a consultancy service to Ofcom.

[1] Such as the wireless cameras operated by the BBC and Sky News, and the radio mics used in virtually all television production and many West End shows.

Arqiva Response

Arqiva welcomes the opportunity to respond to this consultation and notes concerns associated with the heightened risk of interference to DTT services from the introduction of wireless mobile broadband services based on LTE technology in the 800MHz band adjacent to DTT broadcast services.

Ofcom the UK regulator have undertaken extensive analysis to determine the potential risk of interference and the likelihood of interference has been proven to be material. Arqiva have further added tothe Ofcom analysis and observe an enhanced risk of interference as referenced in Arqiva's response[2] to Ofcom's consultation, 'Coexistence of new services in the 800 MHz band with digital terrestrial television.'[3] In recognition that their original analysis was incomplete, particularly from a sensitivity perspective, Ofcom have recently engaged in further modelling activity to better determine the likelihood and extent of interference from the introduction of LTE services in the 800 MHz band. Thus emphasising the seriousness with which Ofcom is examining the co-existence issue and Arqiva believe that the risk of interference should not be underestimated.

More specifically Arqiva's observations relate to the MoU in annex 12 of document reference number 11/60a. This annex outlines the manner in which cross border interference issues will be minimised. Our specific concern centres on the option for mobile network operators to operate at higher power levels than those noted in the MoU through agreement. At face value the MoU would appear to constrain the extent to which power levels of LTE services might be increased excessively as agreement between Administrations would be unlikely if increased LTE inter-network interference were likely to arise. However, this would appear to ignore a situation where identical spectrum frequencies are held by the same operator in Northern Ireland and the Republic of Ireland. It would then be potentially possible for the services being deployed in the Republic of Ireland border region to be afforded higher operating power levels than those permissible to its sister organisation in Northern Ireland. In addition, irrespective of the operating power level, sites could be built very close to the border with the agreement of the sister organisation which, would lay down far higher cross-border field strengths than the levels specified in para. 3.2 of the MoU. This would then lead to a heightened risk of interference from LTE network services in the Republic of Ireland to adjacent Digital Terrestrial Television services in Northern Ireland and hence disruption to the consumer experience.

Arqiva recognises that this is in no way the intent of the draft MoU and would welcome the necessary amendments to the MoU to avoid any risk of this situation arising. Furthermore, we are keen to work with Comreg to ensure that adequate protection arrangements are afforded to Digital Terrestrial Television services to minimise any risk of interference.

[2] http://stakeholders.ofcom.org.uk/binaries/consultations/dtt/responses/arqiva.pdf
[3] http://stakeholders.ofcom.org.uk/consultations/coexistence-with-dtt/

6. Telecommunications and Internet Federation ("TIF") – received 14 October 2011

the voice of the telecommunications and internet federation

telecommunications and internet federation

Mr. Alex Chisholm
Chairman
Commission for Communications Regulation
Abbey Court
Irish Life Centre
Lower Abbey Street
Dublin 1

14th October 2011

Re: TIF Submission on Spectrum Minimum Price

Dear Alex,

On behalf of the IBEC Telecommunications and Internet Federation Mobile and Wireless Industry Group, I address two key issues in relation to the pricing of mobile phone spectrum licences:

1. The appropriate measure of economic output to use in order to apply international benchmarks to a minimum price for spectrum licences in Ireland,
2. Approaches to future price indexation.

1. GDP Vs GNP as measure of income levels within Ireland

Section 160 of Document 11/59 notes that *'we opted to use GDP as an independent variable in our regression analysis rather than GNP as it is a better reflection of the domestic income levels within Ireland'.* This statement is factually incorrect in the case of Ireland as GNP represents a much more accurate indicator of income earned and accrued to Irish citizens. The nominal size of GDP in 2010 was some 18% higher than the value of GDP, largely due to the substantial profits earned by multinational companies based in Ireland. Ireland is exceptional in international terms in having such a large difference between GDP and GNP. It has been well established and is regularly recognised by Irish Government and international agencies that in the case of Ireland, GNP is a much more accurate reflection of the income available to Irish citizens.

The OECD has acknowledged the important distinction between GDP and GNP as follows:

"Ireland is another country where GDP has to be read with care. Ireland's position has risen up the GDP per head rankings since 1999, and is now in the top five countries in the OECD. This remarkable transformation has been put down to a mix of factors, of which inward investment in high value-added businesses is one. But does GDP per head accurately reflects Ireland's actual wealth, since all that inward investment (and foreign labour) generates profits and other revenues, some of which inevitably flows back to the countries of origin?

Another measure, Gross National Income, accounts for these flows in and out of the country. For many countries, the flows tend to balance out, leaving little difference between GDP and GNI. But not so for Ireland, as outflows of profits and income, largely from global business giants located there, often exceed income flows back into the country. This means that in a GNI ranking, rather than being in the top five, Ireland drops to 17th. In other words, while Ireland produces a lot of income per inhabitant, GNI shows that less of it stays in the country than GDP might suggest." Source: OECD Observer.

Forfás, the State's own enterprise advisory agency, notes that '*The GNP measure of economic activity is used to benchmark Irish international performance in R&D as it removes the distortion to output measurement caused by the large financial flows through the economy by multi-national firms'*.

Clearly, GNP rather than GDP is the more accurate indicator of the income available for spending in a domestic market, and it should be the variable used in the benchmarking analysis of the minimum price of licence values. Failure to use GNP in the analysis would constitute a significant technical error in the benchmarking analysis and would be inconsistent with the views of a range of Government and international agencies.

2. **Approaches to future price indexation:**
   Document 11/60 notes that '*SUFs would be subject to a simple form of indexation reflecting the annual rate of inflation using the CPI published by the Central Statistics Office. Interested parties should also note that indexing the fees in this manner gives an incentive to trade spectrum, which might be useful if permitted in the future. Further as noted by DotEcon, indexing using CPI would be reasonable as operators' revenues are influenced by consumer inflation. See Section 14.3 of DotEcon Report 11/58.'*

We believe this statement to be incorrect as the CPI is a very broad measure of inflation in the Irish economy and does not accurately reflect operators revenues as claimed. A more accurate indicator would be the CPI sub-index on 'telephone and telefax equipment and services' also officially published by the CSO.

Yours sincerely,

Fergal O'Brien
Chief Economist
IBEC

7. Vodafone – received 14 October 2011

Vodafone response to the ComReg Draft Decision on Release of the 800 MHz, 900 MHz and 1800 MHz Radio Spectrum Bands [NON-CONFIDENTIAL]

Ref. ComReg Document 11/60

Response Date:14 Oct 2011

Executive summary

1. Vodafone welcomes the opportunity to respond to ComReg's Draft Decision on the release of the 800 MHz, 900 MHz and 1800 MHz radio spectrum bands. This response should be read in conjunction with the previous Vodafone submissions on the licensing of the 1800 MHz and sub-1 GHz bands.

2. In general while Vodafone consider that the current ComReg proposals are reasonable and in large measure address the concerns we have previously expressed, we maintain our view as set out in response to ComReg 09/99 that administrative assignment of at least 2 X 5 MHz of 900 MHz spectrum and at least part of the 1800 MHz band to existing mobile operators on a liberalised basis is a superior approach in terms of the achievement of ComReg's statutory regulatory objectives.

3. Vodafone supports ComReg's views in relation to spectrum caps and in general welcomes the addition of the new 900MHz caps for the first time slice which could under some circumstance facilitate the early release of liberalised spectrum and recognizes the imperfect substitutability between 800MHz and 900MHz. Vodafone would have serious concerns if there was any attempt to force operators to prematurely vacate GSM900 spectrum and we address this in more detail below.

4. Vodafone continue to have concerns regarding certain aspects of the benchmarking process leading to the setting of the minimum prices particularly as they relate to the continuing reliance on GDP (rather than GNP) as a variable in the benchmarking process and the use of CPI for indexing of SUFs.

5. Finally, Vodafone welcome the removal of unnecessary and unwarranted conditions from future licences and in some cases but not all cases, ComReg's proposals regarding the application of QoS obligations. We do have serious concerns regarding possible future review of QoS obligation and the effect that could have on the value of spectrum holdings and again, this is given in more detail below.

Comments on ComReg Licensing Proposals

Spectrum Caps

6. As set out previously in our responses to ComReg 10/71 and 10/105, Vodafone agrees with ComReg's proposals that an overall 2 X 50 MHz cap covering the sub-1 GHz and 1800 MHz bands and a 2 X 20 MHz cap on sub-1 GHz spectrum would be appropriate to avoid the possibility of extreme asymmetries in distribution of spectrum as an outcome of the award process that could have an adverse impact on competition in the provision of communications services.

7. For the reasons we set out in our response to ComReg 10/71 Vodafone agrees that a separate 2 X 20 MHz sub-1GHz spectrum cap is reasonable in the context of the spectrum available in the 800 MHz and 900 MHz bands. This cap strikes a balance between avoiding extremely asymmetrical outcomes in spectrum allocations (that could for example potentially lead to one or more existing licensees losing access to sub - 1 GHz spectrum

entirely with a potentially major adverse impact on competition and consumer welfare) while providing the opportunity for bidders to obtain sufficient spectrum so that the various likely strategies for service provision can be effectively accommodated.

8. Vodafone has no objection to ComReg's new proposal for a 2 X 10 MHz competition cap in the 900 MHz band for the first time slice only. This proposed sub-cap appears to enhance the potential for the proposed award process to achieve an efficient outcome by reflecting the imperfect substitutability of 800 MHz and 900 MHz spectrum in the near term, arising from issues including differences in availability of suitable equipment.

9. We also agree with ComReg's conclusion that existing spectrum holdings of current licensees in the 2.1 GHz band, or in other spectrum bands, should not be taken into account in the proposed joint award.

10. In relation to the approach to any spectrum lots that may go unsold as a possible outcome of the multi-band spectrum award process, we consider that ComReg's proposal that these would not be assigned for at least 2 years post-auction will only be effective in avoiding the creation of an incentive to 'wait and see' where ComReg confirms that any future award for unallocated spectrum in these bands will only be on terms that are no more favourable than the terms of the currently proposed multi-band spectrum award process. In the absence of this confirmation it is possible that prospective bidders could strategically withhold demand in the present auction on the calculation that they may have an opportunity to obtain unallocated spectrum in the bands on more commercially favourable terms at a later date.

Auction Format

11. As stated in our response to ComReg 10/71, Vodafone supports the use of a CCA format when combined with the relative cap activity rule as this is a reasonable approach that in large measure addresses the concerns that we have previously raised (including the issue of risks of serious service disruption that could arise as outcomes of the alternative auction formats for the competitive award of the entirety of the sub-1 GHz bands). We therefore welcome ComReg's current proposal to retain this format in an award process for both the sub-1 GHz and 1800 MHz bands.

12. Vodafone has consistently supported in principle the inclusion of 1800 MHz spectrum in a multi-band spectrum award process as this could increase the economic efficiency of the auction by allowing greater flexibility to bidders to obtain combinations of spectrum usage rights that accommodate their business plans. Our previously expressed reservations in the specific circumstances of this proposed award process as set out in our response to ComReg 10/105 related to our concerns around the very limited time then remaining to expiry of the original term of our 900 MHz licence and impact of the potential delay to a spectrum award in that context. This was in addition to the considerably increased complexity associated with the inclusion of the spectrum in the 1800 MHz band to the frequencies to be awarded (particularly with uniform implementation of a two time slices approach to licences across the bands).

13. The granting of an Interim 900 MHz licence to Vodafone subsequent to the provision of our response to ComReg 10/105 has mitigated our concerns around the impact of delay in holding the spectrum award process. However the concern around increased complexity led to our proposing an alternative approach that would simplify the auction process in the event that the 1800 MHz spectrum was also to be auctioned. We maintain our view that this

previously proposed modified auction approach, by removing the need to award licences for two temporal lots, is a superior option that would reduce the complexity of the auction process substantially and thereby better fulfil regulatory objectives. We consider that, if pursued by ComReg at an earlier stage, this alternative option had a reasonable prospect of securing the necessary agreement from existing licensees to be bought out of the tail period of their relevant existing licences. However the adoption of our proposed alternative approach at this late stage no longer appears to be feasible given the requirement to complete an award process without additional delay. In these circumstances ComReg's currently proposed auction format, including its approach to use of temporal lots, is an appropriate approach to implement despite its considerable complexity.

Early Liberalisation Option

14. Vodafone appreciates ComReg's adoption of our recommendation of how rebates from taking up the early liberalisation option should be administered, namely that this should take the form of a discount from the up-front and/or annual spectrum usage fees that would otherwise be payable by the licensee. This approach avoids any distortion that would arise from direct or indirect subsidy of operators by funding this rebate as a direct payment from other licensees/bidders/operators in the market.

Interim 1800 MHz Licences

15. In our response to ComReg 10/105a Vodafone noted the potential 6 ½ month gap in time between the expiry date of existing licences in the 1800 MHz band and the commencement of new licences in the band in the second time slice to be awarded in the proposed auction. This break in 1800 MHz spectrum availability could arise under certain possible auction outcomes and/or where the proposed early liberalisation option was not fully taken up by existing 1800 MHz licensees. This was highlighted by Vodafone as a problematic aspect of the proposed structure of the joint award process that would present significant risks of disruption to the delivery of current standards of communications services.

16. We maintain our view that a firm advance commitment from ComReg to grant Interim 1800 MHz Licences in relevant circumstances (where one or more of the existing licensees were to acquire sufficient 1800 MHz spectrum in the second proposed time slice, but insufficient or no 1800 MHz spectrum in the proposed first time slice) is appropriate and necessary and would in large measure address the uncertainty and possible risk to quality of service for a period that otherwise arises under ComReg's current spectrum auction proposals.

17. While ComReg's commitment to evaluating (post-auction but significantly in advance of licence expiry) whether 1800 MHz interim rights of use could reasonably be required, is a positive step, it falls far short of removing uncertainty for licensees as to whether the continuity of provision of current standards of services to their customers could be negatively impacted by a 6 ½ month restriction on the availability of sufficient spectrum usage rights in the 1800 MHz band.

18. Vodafone considers that ComReg's unwillingness to make a firm commitment prior to the proposed auction to grant 1800 MHz Interim Licences to existing licensees where they apply for these to avoid a temporary loss of access to sufficient spectrum in this band is not objectively justified. For the reasons highlighted in Vodafone's response to ComReg

10/105, the opportunity cost of granting Interim 1800 MHz licences is very low to non-existent while the benefits would be considerable. By providing certainty now on the option for licensees to have continuous access to sufficient 1800 MHz spectrum for delivery of communications services before new licences in the second time slice would come into effect, a firm pre-auction commitment by ComReg to granting Interim 1800 MHz licences, where requested, would most effectively fulfil the statutory regulatory objectives of maximising the efficient use of spectrum and promoting the interests of end users. Vodafone therefore urges ComReg to provide a commitment to grant Interim 1800 MHz spectrum licences, where requested by licensees in the relevant circumstances highlighted above, in its Decision on the multi-band spectrum award process.

Transitional Issues and Potential Advance Commencement of New Licences

19. Vodafone is extremely concerned regarding advance commencement of new licences, should ComReg contemplate a timeframe of as little as 5 months for a spectrum relocation process (and other activities required to provide continuity of service for the maximum number of customers) in the case of an existing operator being reduced to a single 5 MHz block of 900 MHz spectrum after the auction (the Scenario 2 outcome). In our response to ComReg 10/71, Vodafone have already made our position very clear – and supplied supporting evidence - on what is a realistic timeframe for a relocation process should a Scenario 2 situation occur and if serious customer disruption is to be avoided. Vodafone will not repeat in its entirety the details of our response on that occasion since ComReg has already acknowledged receipt of our views. However, on the basis of ComReg's new proposal in relation to Scenario 2, Vodafone reiterate our views that the Red-M\Vilicom report is inappropriate and insufficiently robust as a basis for determining the impact on customers in the event of a forced and premature vacating of spectrum.

20. Indeed, Vodafone do not believe that the Red-M\Vilicom report can be legitimately used as supporting ComReg's proposals for advanced commencement of new licences in the case of Scenario 2. In ComReg 11/60 (section 7.14), ComReg states that based on the Red-M/Vilicom report, it understands the minimum time required to complete a relocation in the 900MHz band would be 5 months. In section 7.15, ComReg states that that interested parties did not disagree with these findings. However in section 7.16, ComReg states that '*It should be noted that the above timeframes are based upon the premise that the existing GSM licensees can relocate <u>all</u> (emphasis added) of their existing spectrum assignment into a single contiguous spectrum location*'.

21. The Red-M\Vilicom report (ComReg 10/71c) says specifically: "*The modelling processes showed that for the assumed reference network, an additional 414 GSM900 sites would be required nationally to counteract the increase in interference caused by the reduction in assigned bandwidth . . . . . A four year period is estimated for the completion of all 414 sites, but it is estimated that 90% of these sites could be completed by the end of year-2. It is therefore likely that GSM900 spectrum could be relinquished at the end of the 2 year period, although there may be minor additional disruption to network subscribers. This additional disruption would be localised to areas where the remaining sites that are required have not been completed*."

22. Based on the above, it is clear that ComReg cannot depend on the Red-M\Vilicom minimum relocation times in the case where an existing licensee is required to vacate some or all of its existing GSM900 spectrum. Should a Scenario 2 situation occur, ComReg is

obliged to take utmost account of the evidence given by Vodafone (and other respondents as well as being addressed in the Red-M\Vilicom report) of the timeframes reasonably required by operators who have to accommodate a reduced allocation of GSM900 spectrum

23. In Vodafone's particular situation under a possible Scenario 2 outcome, the move from 7.2Mhz to 5Mhz would result in a 30% reduction in capacity of the GSM900 layer. Vodafone Ireland have one of the lowest allocation of GSM900 frequencies across Vodafone operators in Europe while at the same time serving a population distribution that has a significant proportion of population located in rural area's. These two factors put considerable pressure on the utilisation of our GSM900 band to serve a significant number of GSM only customers. [redacted] Reducing this spectrum to 5Mhz will require the roll-out of additional sites and upgrading existing GSM900 with GSM1800. The timelines for this are dependent on a number of factors - acquisition of new sites, planning permission, landlord agreement and space being available for upgrades. These are external factors that need to be overcome before rolling out replacement network. [redacted] To be clear UMTS900 would not be an alternative in this scenario as Vodafone would only have 2x5Mhz of spectrum which must be used to serve the GSM base.

24. Vodafone does welcome ComReg's intention to be flexible in its approach to any Scenario 2 occurrence particularly as ComReg itself states in section 6.6 '*so as to avoid undue negative effects on consumer services during any transition period.*' However, ComReg gives no indication as to what it would consider 'undue negative effects'. Before obliging any forced spectrum vacating under a Scenario 2 occurrence, it would be incumbent on ComReg to conduct a rigorous analysis as to the scope and extent of consumer disruption. For the avoidance of doubt, should ComReg proceed to enforce the facilitation of an advanced commencement of 900 MHz licences -without the rigorous analysis of the potential for consumer disruption and on the assumption that a 5 month timeframe is sufficient - despite Vodafone's position and arguments, then Vodafone believes that ComReg would be entirely liable for any service disruption/degradation experienced by consumers that would directly result.

25. Vodafone would remind ComReg that its current 900 MHz spectrum is used to support services for customers of Meteor, eMobile and 3 in areas where these operators have no coverage. If Vodafone was forced to terminate these arrangements in order to offload traffic because of a reduced spectrum allocation then the acid test would be whether these other operators could build replacement coverage in a 5 month period. That Meteor in particular has not built such coverage over the term of its existing 900 MHz license speaks of the difficulty and cost involved.

26. Vodafone does agree with ComReg that the relocation activities associated with a Scenario 1 outcome are likely to be less problematic and more readily amenable to a commonly agreed approach.

Spectrum Fees

27. Vodafone considers that ComReg's proposal to reduce the minimum licence prices of both sub-1 GHz and 1800 MHz spectrum to €20 million and €10 million respectively from €25 million and €12.5 million levels previously proposed in ComReg 10/71 and 10/105 is a positive move that somewhat mitigates the risks of spectrum inefficiently going unallocated in these bands as an outcome of the proposed spectrum award process. However it continues to be Vodafone's position, as set out in our response to earlier consultation documents on the licensing of the sub-1 GHz and 1800 MHz bands that a benchmarking approach is not appropriate to use in setting the minimum price. The measures which ComReg now proposes, such as the limited transparency during the award process, anonymisation of bidder identities etc, are sufficient to effectively address concerns regarding any potential for tacit collusion as may exist. The proposal to address these through the setting of the minimum licence price is unnecessary and continues to pose a significant risk of spectrum going unallocated. The minimum licence price should be set at a low but non-trivial level that would be sufficient to deter spurious bidders, with the determination of final licence prices being left to the outcome of competitive bidding activity in the auction process. Vodafone does not believe that the proposed modification of the spectrum caps so that it would not be possible for any individual bidder to bid for more than 2 X 10 MHz of spectrum in the 900 MHz band in the first time slot materially changes the position in relation to any scope for tacit collusion, and does not therefore justify ComReg's current approach.

28. Vodafone find it difficult to find any justification for ComReg's claims that NRAs in other countries - when they set prices at a low but non-trivial level - have different objectives from ComReg and that this somehow justifies ComReg setting minimum prices in the manner and at the level the now propose. Vodafone consider the objectives of all EU NRAs regarding spectrum to be principally and similarly driven by the EU Communications Regulatory Framework.

29. In Vodafone's view, ComReg should clarify if its reference to varying NRA spectrum policy objectives is intended to support ComReg's stated intention given in ComReg 09/99 *that ' the minimum price should deliver a fair return to the State for the use of this finite natural resource and the price of spectrum should reflect its economic value to the user*'. In Vodafone's response to ComReg 09/99, we stated that '*Vodafone does not believe that the factor that the minimum price should deliver a fair return to the state is a valid objective in the setting of the minimum licence price……Vodafone would question the validity of this factor, which could reasonably be regarded as a revenue raising objective (at least up to the undefined 'fair' level), and how it can be reconciled with ComReg's statutory objectives under the EU Regulatory Framework and the Communications Act 2002. Vodafone does not believe that the DCENR Report of Working Group on Spectrum Policy (2008)*[1] *is relevant to informing ComReg's objectives as claimed in the consultation, particularly as it has no clear relationship to ComReg's statutory objectives under the EU Regulatory Framework or the Communications Act 2002 and in Vodafone's view may clearly conflict with these objectives. This may arise, for example, where setting the minimum licence price at a level judged to equate to a 'fair' return to the state for use of the spectrum resource could lead to the demand for spectrum being choked off and at least some of the 900 MHz spectrum band going unallocated*.

[1] *http://www.dcenr.gov.ie/NR/rdonlyres/7691C849-3049-4C29-ACEF-5FD4518B04E4/0/SpectrumGroupReport050908RORFinal.doc*

30. Vodafone fails to see any clear distinction, between ComReg's claim that benchmarked minimum licence prices are not market prices but are in fact 'conservative' market prices or market valuations of spectrum[2]. ComReg (through DotEcon) has determined a range of benchmark market prices and the fact that ComReg chooses to use a point in the lower range of those prices does not change the fact that they are based on the final outcome prices achieved in spectrum auctions. They are not reserve prices set in advance of an auction with a view to eliminating spurious bidders and Vodafone believes ComReg's basis or rationale for using them for that purpose is flawed and risks leaving unallocated spectrum.

31. Even if the benchmarking approach were appropriate to use in setting minimum licence prices, which Vodafone does not accept, the use of GNP rather than GDP as an independent variable in the benchmarking regression equation is the optimal approach. Vodafone continues to consider that the use of GDP per capita, rather than GNP per capita, is fundamentally flawed in the Irish context. The latter is clearly superior to the use in terms of reflecting the income actually available to Irish residents. The key distinction is that GDP is a geographically based measure of the value of output in contrast to GNP which is a resident based measure. In the case of Ireland the GDP figure is exceptionally distorted through the use of transfer pricing the many large multi-national companies based in Ireland. While in many countries GDP and GNP may closely match, in Ireland's case they do not even closely approximate to each other. To be clear, it is the GNP level which reflects the income level of residents as measured by GNP per capita, with its direct implications for consumption patterns. This is therefore the relevant factor in the context of spectrum valuation and not the value of national output (GDP) – much of which may be attributable to foreign owners of factors of production located in the country.

32. The valuation that bidders place on spectrum is related to the income level of the residents of the country to whom they would provide services using the spectrum, rather than to the value of the output produced within the country. It is not the case that the GDP and GNP measures necessarily approximate to one another. For example if a large part of the value arising from production of goods and services within a specific country actually accrues to residents of other countries (e.g. profits accruing to multinational companies headquartered in other jurisdictions) then income actually available to the residents in that country will be much lower than the per capita GDP measure indicates. The income level of residents as measured by GNP per capita, with its direct implications for consumption patterns, will be the relevant factor in the context of spectrum valuation, not the value of national output – much of which may be attributable to foreign owners of factors of production located in the country.

33. DotEcon is aware of the issue of the large difference between GDP and GNP in Ireland but claims that the former has been chosen over the latter as: *"… it is a better reflection of the domestic value of output in a country which in turn is a closer proxy factors that may affect spectrum valuations such as the level of development in a country and the potential willingness to pay for telecommunications services."*[3]

34. Vodafone believe this interpretation of the relative value of GDP versus GNP is mistaken. GNP is clearly a superior reflection of the level of income earned by citizens in a country and better reflects the potential for spending on domestic telecommunication services. This is not a trivial matter concerning a dispute about definitions. The difference between Irish

[2] *paragraph A9.144, ComReg 11/60a*
[3] *ComReg Document 10/71b page 8, footnote 4.*

GNP and GDP in 2010 is approximately 18%. This difference drives higher valuations in the DotEcon benchmark analysis and ends up in higher ComReg's reserve prices and higher costs for mobile operators.

35. With respect to the time period covered by the national income data used in the benchmarking model, Vodafone welcomes the recognition of the requirement to include updated per capita income data (although this should be based on the GNP per capita measure as already stated) to take account of the structural adverse change in economic and financial conditions that has occurred in Ireland following the credit crisis. However Vodafone believes that the benchmark report must continue to adhere to the principle of using the most up to date national income data available where possible and, as data on GNP per capita for 2010 may well be available prior to the holding of the proposed spectrum award process for the 800 MHz and 900 MHz bands in 2011, 2010 data should if possible be used in the regression equation to obtain a more accurate estimate of the optimal minimum licence price.

36. Vodafone note that the latest preliminary census estimate from the CSO website indicates a slightly higher population figure than used in the study. This would further reduce the per capita income independent variable and provided that there is no population size element in the regression equation this could reduce the licence price further and should be taken into account.

37. ComReg state that SUFs will be subject to a simple form of indexation reflecting the annual rate of inflation using the CPI published by the Central Statistics Office. Vodafone does not believe that there is any justification for indexing SUFs. Notwithstanding Vodafone's view, if ComReg determines that spectrum usage fees indexed to inflation should apply, then the most accurate measure of inflation with respect to the communications industry must be used. This is not CPI, but rather the communications sub-component of the overall consumer price index. Vodafone notes that this data is readily available from the CSO and has been referenced by ComReg in its most recent Quarterly Report on the Irish communications market. This measure clearly more closely reflects the overall trend in the costs and revenues of the communications industry over the relevant period than the change in the overall CPI and has a stronger empirical justification than indexation relative to the overall CPI.

38. Vodafone has serious concerns that ComReg does not appear to take account of the impact of spectrum trading, which it now proposes to implement and the effect this has in undermining the rationale to continue to apply spectrum usage fees. As stated in Vodafone's response to ComReg consultation document 10/71, the availability of the option to trade some or all of their existing licensed frequencies will effectively lead licensees to internalise the opportunity costs of inefficient spectrum use or failure for other reasons (e.g. business case not realised as expected) to utilise spectrum. It is therefore neither objectively justified nor proportionate to impose spectrum usage fees, at least after the first 3 years of the licence, within which time spectrum trading should have been fully implemented.

Requirement for Transparency in Relation to Future Arrangements for the 2.6 GHz Band

39. Vodafone remains of the view, as set out in our response to ComReg consultation document 10/71, that given the significant degree to which spectrum in the 2.6 GHz band is likely to be substitutable for 1800 MHz spectrum in particular it is important that maximum transparency in relation to the timing and terms of availability of spectrum in the 2.6 GHz band is provided prior to the proposed auction of the 1800 MHz and sub-1 GHz spectrum bands. This transparency is necessary in order to enable prospective bidders to determine as accurately as possible their valuation of the spectrum currently proposed to be auctioned. Full information on the intended future licensing arrangements for the 2.6 GHz band at this present stage would maximise the prospects for an efficient allocation of spectrum not only in respect of the bands currently proposed to be auctioned, but also the 2.6 GHz and other related bands (such as the 2.3 GHz band) if the future allocation of the latter were subsequently to be determined by an award process.

40. It is therefore unfortunate that while ComReg's Draft Decision notes the previous requests by Vodafone and other consultation respondents for clarity in relation to the future arrangements for the 2.6 GHz band prior to the proposed multi-band spectrum auction[4], no additional information (besides the reference in the ComReg Annual Action Plan 2011 to future reports and consultations) has been given. Vodafone considers that there is still the opportunity for ComReg to address the present unsatisfactory lack of visibility regarding the future licensing of this band prior to the holding of an auction for spectrum in the 1800 MHz and sub-1 GHz bands and we urge ComReg to avail of it in the interests of most effectively fulfilling its statutory regulatory objectives.

Spectrum Trading/Sharing

41. Vodafone welcome ComReg's proposal that a spectrum cap restriction would apply only for the duration of the spectrum award and that operators would post-auction, and subject to the licences granted on award and their conditions and in line with competition law, be free to trade, lease and combine rights to use spectrum after the auction. This is very positive. However given the lack of transparency regarding bidder identities in current ComReg spectrum auction proposals, there is a significant probability that the final auction outcomes could mean that parties seeking to share or pool spectrum (perhaps in the context where they may already be engaged in infrastructure sharing agreements) would find that their spectrum assignment would not be adjacent to one another and that resulting spectrum efficiency and particularly end user benefits from improved services and service availability would not be able to be realised. Vodafone believes that even better welfare maximising outcomes in terms of efficient spectrum sharing and pooling may be achieved if there was a mechanism within the auction process whereby bidders at the end of the primary round of the auction (for example following the conclusion of the assignment stage but prior to publication of the outcome) would have the opportunity to reach common agreement on the positioning of operators in the band to maximise the scope for spectrum sharing and pooling. For example, one possible process could entail the assignment round being completed but the results not made known to the bidders. ComReg could then allow the bidders some time to agree a set of final assignments which were acceptable to all parties. Once agreed, bidders would then pay the price they submitted as part of the assignment

[4] *ComReg document 11/60a, paragraph A3.74, p47*

round. If there was no negotiated agreement reached, the final allocations would then be announce based on the outcome of the actual assignment round.

Licence Coverage and Roll-Out Conditions

42. In regard to the proposals for coverage and roll-out obligations, Vodafone considers that ComReg's proposal for a minimum 70% population coverage requirement to apply to all licensees is reasonable and consistent with the key objectives of promoting efficient infrastructure investment and providing the necessary incentives for licensees to pursue competitive differentiation on the basis of coverage levels. However we consider that a minimum 70% geographic coverage requirement would strike a superior balance between the relevant objectives such as promoting competition, investment, and consumer welfare. Vodafone believes that the full benefits to end users of provision of innovative services in these bands would be most effectively achieved if this higher effective coverage requirement were set.

43. We note ComReg's reasoning for its proposal for an asymmetric roll-out obligation to apply, with a 3 year roll-out period applying to an existing operator, and a 7 year roll-out period for a new entrant to meet the same minimum 70% population coverage target. Vodafone however remains of the view, as previously expressed in our responses to ComReg 09/99 and 10/71, that a symmetric roll-out obligation on all licensees to meet the coverage obligation within 3 years of licence award is the most appropriate and proportionate approach to use. An asymmetric roll-out obligation in Vodafone's view risks distorting the basis of competition in the market.

44. In general terms Vodafone notes those respondents to earlier consultations who do not have existing 900 MHz allocations have actively advocated early liberalisation. If ComReg is to give weight to these submissions then it is inconsistent to cede these "new entrants" to the 900MHz band an extended period to make effective use of spectrum they say they need at the earliest possible juncture.

45. A question also arises as to whether asymmetric license conditions undermine the integrity of the auction process. Such an approach yields a situation where two bidders effectively are competing for different but mutually exclusive lots. This gives rise to differential valuations being assigned not by virtue of the "value" the bidders believe they can extract from a given lot but rather by virtue of the fact that the lots themselves are different.

46. The benefit of the auction format is to move away from a "beauty competition" assessment of a bidder's ability to make use of the spectrum they effectively purchase. However this is precisely what the proposal to impose asymmetric roll-out conditions does. Having proposed that it will make some assessment of bidder's ability to implement a network roll-out, it is not clear why ComReg should chose to differentially assess this aspect of a bidder's potential to make use of a spectrum allocation and not to assess any other aspect (e.g. business plan for retail services).

47. However Vodafone had previously argued that if ComReg proceed to adopt an asymmetric approach to roll-out times between existing network operators and new entrants then it would be more consistent with ensuring efficient utilisation of spectrum to require new entrant licensees to meet progressively higher roll-out targets by specified dates prior to achieving the proposed final target coverage requirement within 7 years of licence award. We consider that ComReg's modified proposal in paragraph 5.87 of ComReg 11/60 that an

interim coverage level of half of the target coverage requirement be met by a new entrant licensee within 3 years of licence award is a positive step, and somewhat mitigates our previously expressed concern that under ComReg's original proposal a new entrant licensee would only be required to achieve a very low level of coverage for up to the first 6 years of the licence. This modified proposal should therefore be incorporated into the finalised licence conditions where asymmetric roll-out licence conditions are adopted.

48. Consistent with our position expressed at a previous stage of this consultation process, Vodafone agrees with ComReg's conclusions that other frequency bands should count towards the 70% coverage obligation provided that a minimum of half of this coverage target is provided via spectrum in the 800/900/1800 MHz spectrum bands, and that coverage via national roaming should not count towards the coverage and roll-out obligations. These measures should provide the necessary flexibility for licensees to optimise the use of their spectrum usage rights in various spectrum bands while also providing the appropriate incentives for efficient and sustainable infrastructure based competition.

Licence QoS and Other Conditions

49. Vodafone notes ComReg's proposal in paragraph 5.122 of the consultation document to apply QoS licence conditions to all relevant services of the licensee, defined as including those provided by any third party/s (via contractual or other arrangement with the licensee) such as a MVNO on the licensee's network. We strongly disagree with this position as it is not tenable for ComReg to expect licensees to feasibly monitor and ensure that the minimum QoS standards are being observed by third parties such as MVNOs hosted on licensed operator's network when many factors that determine the QoS experienced by the customers of those MVNOs are not under the control of the licensee. For example, full MVNOs control the capacity of the transmission links between the host operator and their own switching infrastructure and call blocking rates would be directly influenced by decisions made by the MVNO on the operation of these links. Dropped call rates could be influenced by, for example, the MVNO choice of handset and the extent to which its settings are compatible with the host's radio network. It is not made clear by ComReg how host operators would be expected to enforce these QoS parameters for any MVNO or whether they are entitled to monitor the service of what is effectively a competitor's offering (other than as part of normal O&M activity).

50. The situation is even more complex in the case of national roaming (NR) partners where there is further complication in the form of services such as in-call handover and requirement for handover between 2G and 3G networks on the host network. The quality of these services can be dependant on the quality of the network data in both the host and NR partner. The level of faults in the latter's network or commercial decisions by the partner as to the NR services they wish to purchase influence the QoS experienced by their own customers both on their own and the roamed network. These decisions cannot be subject to monitoring or cannot be enforced by the host networks.

51. It is Vodafone's view that continuing robust competition and contract negotiations between hosts and MVNO\NR partners (as have already taken place) should address any concerns ComReg has in respect of QoS issues.

52. Vodafone strongly agrees with ComReg's conclusion that it would not be appropriate to impose minimum broadband QoS conditions. If customers of the licensee experience an

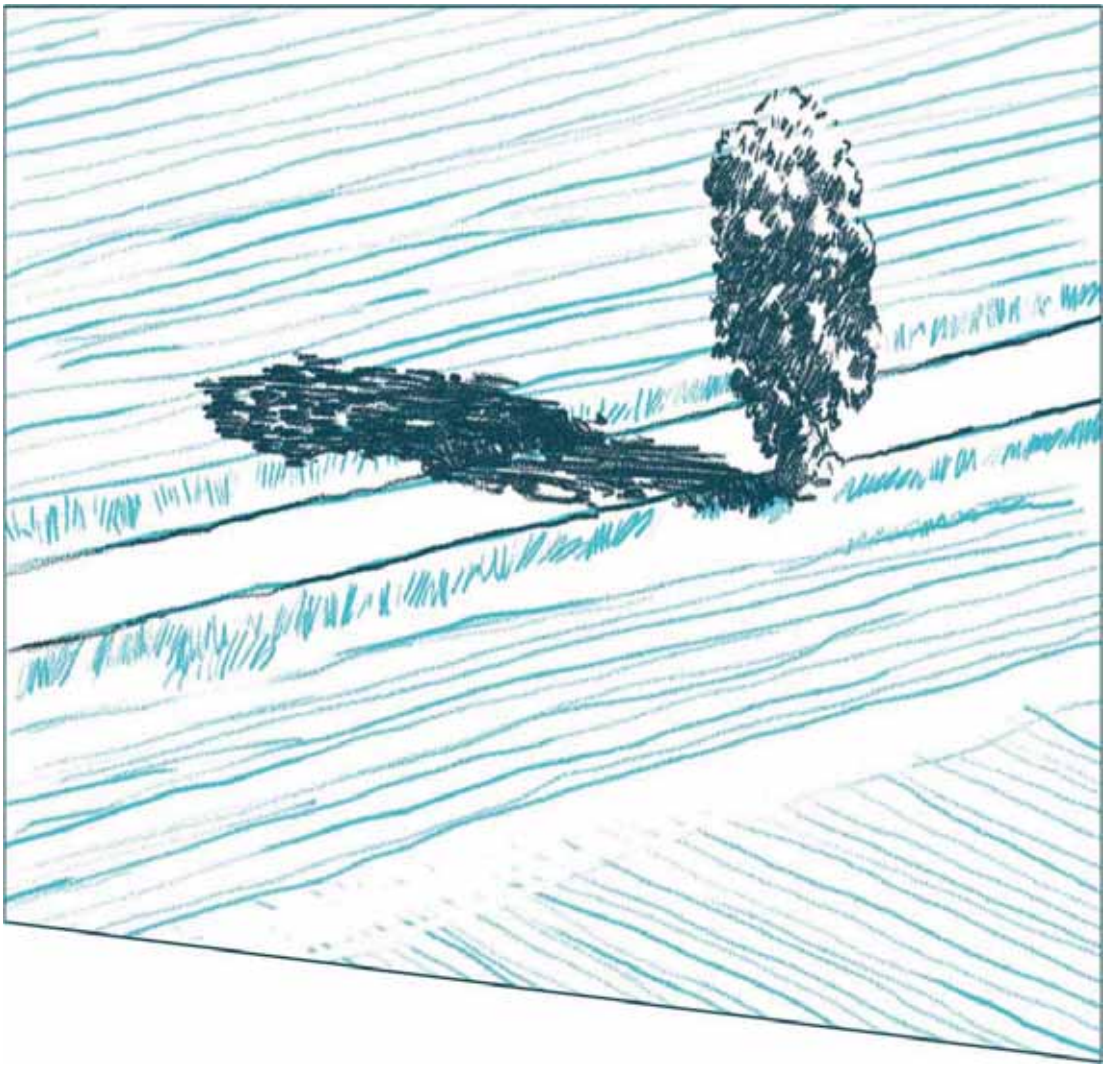
inadequate or sub-standard QoS from their broadband service provider then they will seek to switch to competing service providers. This provides a sufficient commercial incentive for licensees to maintain at least an acceptable minimum QoS, if not to seek to differentiate themselves from competitors with products offering superior QoS where these are desired by at least some end user segments. This approach also maximises the flexibility of operators to meet varying customer requirements, as ComReg has indicated.

53. Vodafone believes that the vigorous competition that exists in the mobile market negates any requirement for QoS obligations in relation to voice services. If ComReg is minded to include such obligations, then those proposed by ComReg can only be viewed as proportionate and justified if they apply to the licence holders own customers and not those of 3rd parties such as MVNOs and national roaming partners (for the reasons given in sections 50 and 51 above).

54. Vodafone support ComReg's intention to remove licence conditions in relation to international roaming, billing obligations (being addressed as a separate process), non-ionising radiation and access to the emergency services as these matters are already or will be provided for by the General Authorisation. In the case of billing, the obligations that current exist in the licence of some mobile providers are anachronistic and discriminatory.

55. Vodafone would have serious concerns regarding ComReg suggestion that it may make the QoS obligations attached to the licences subject to periodic review. ComReg may feel entitled to do so under EU directives but such a position generates significant regulatory uncertainty for potential bidders at this time. Auction participants will value the spectrum based on a known set of licence conditions and obligations and not some future unknown set which may be applied by ComReg. If as a result of a future ComReg review, there are material changes to conditions and obligations attaching to licences, these changes should only be applied if they are objectively justified and are the result of a full consultation process. There should also be provision for rebates to licence holders if the new conditions entail significant costs which result in the future valuations of licences to be negatively impacted thus affecting their tradability going forward.

8. Telefónica – received 14 October



Release of the 800 MHz, 900 MHz and 1800 MHz radio spectrum bands

Comments on Document 11/60

Telefónica

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Executive Summary

1.1. This is the response of Telefonica Ireland ("Telefonica") to ComReg Document 11/60 entitled "Multi-band Spectrum Release", the ninth in a series of ComReg consultations and responses relating to the licensing and liberalisation of the 800, 900 and 1800 MHz radio spectrum bands owned by the State and which ComReg is tasked to manage. Telefonica trades in Ireland as O2.

1.2. It is almost a year since ComReg published its last substantive consultation on its proposed spectrum auction (Document 10/105). Telefonica welcomes the publication of Document 11/60, and agrees with ComReg that how the three bands at issue are assigned is "*critical to the development of mobile services in Ireland".* It is therefore crucial that in making its final Decisions that ComReg makes the right choices, and in so doing complies with its legal and regulatory obligations and objectives in managing spectrum. Telefonica believes however that ComReg's proposal, which in its structure broadly mirrors that set out originally 2 years ago in Document 09/99 has been overtaken by events and by the passage of time. If ComReg is to comply with its obligations and objectives it must now revise its proposal to reflect the current factual situation and regulatory circumstances. Telefonica considers that such revision is capable of completion within a short time-frame in light of the detailed consultations held to date, and in this Response sets out proposals that it believes would simplify the process and bring ComReg's proposal into compliance with its legal and regulatory objectives and obligations.

Requirement to revise ComReg's proposal to reflect current situation

1.3. It is uncontestable that there have been significant changes since ComReg originally made its proposal for a spectrum auction with two temporal lots and licences starting in 2013. These changes include changes to the time-lines for auction, changes in the structure of the market itself, technology changes and the significant and continuing deterioration of the market for mobile telecommunications services in the context of the most severe recession in the history of the Irish state and the ongoing Eurozone financial crisis.

Change in time-lines from ComReg's original proposal impacting auction date and structure

1.4. ComReg's proposal in 2010 was made on the basis of an auction taking place in early 2011, allowing two years before licence commencement in 2013 for any unsuccessful operators to make alternative arrangements. It was also made on the basis that the first temporal lot involved licences of a duration of 2.5 years, beginning in 2013 (the "T1 licence") with network roll-out having already commenced several months before this. While Document 11/60 does not contain any time-line or date for the proposed auction, Telefonica believes that the earliest such an auction could now be completed is Quarter 3 of 2012, significantly reducing the lead-

time post-auction and pre-licence commencement to 6 months or less. This is not sufficient time (a) for the technical changes required in re-tuning and re-locating within the 900 MHz band and (b) to allow any GSM operators who are unsuccessful in obtaining spectrum, or who obtain less than bid for, to arrange an orderly transition out of the band without causing huge customer disruption. In addition, no legislation has yet been passed mandating Analogue Switch Off ("ASO") before the end of 2012. Notwithstanding requests from all of the operators on this point, Document 11/60 provides no clarity or certainty that 800 MHz will actually be available for use from January 2013 (with Dotecon in fact acknowledging that it may not). All of these factors have serious and adverse knock-on effects on the feasible start date of the T1 licence, pushing the date forward to at least early 2014 and shortening the T1 licence to a maximum of only 12-18 months in duration.

1.5. As well as the changes to the time-lines noted above, the T1 proposal in itself raises a number of serious difficulties, especially with the addition of the proposed new 900 MHz sub-cap. In particular, this structure adds significant complexity and risk with no apparent benefit, creates incentive for price manipulation, gives an unfair headstart to one particular operator in the industry, H3GI, in the rollout of advanced services and fails to be technology neutral, by disincentivising incumbent GSM operators from rolling out UMTS. As such this structure fails in ComReg's stated aim of ensuring efficient allocation of spectrum at the market price. In particular, Telefonica wishes to emphasise that ComReg's continuing refusal to confirm interim GSM licences for Telefonica and Vodafone to cover the 6 month gap created by the T1 proposal, in itself renders this proposal legally non-compliant.

1.6. In the circumstances, Telefonica contends that ComReg must now urgently reconsider its proposal (a) to start new licences in January 2013 and (b) to split the proposed licences into two temporal lots with a potential 6.5 month licence gap. While ComReg has previously rejected proposals on this issue from various operators, Telefonica considers that the current changed situation shifts the balance in favour of a single licensing time slice with a licence start date that allows sufficient time post-auction and pre-licence commencement for necessary network alterations which might start with a date of at least January 2014. Telefonica's detailed proposal on this issue is set out in detail in section 6.

Change in market environment and structure

1.7. ComReg will be aware of the severity of the downturn in the market for telecommunications services, as well as the wider economic crises both in Ireland and internationally. Both factors have a significant dampening effect on the value of, affordability of and demand for, spectrum in Ireland. Both the Irish operators and their international parents are now operating in a significantly different trading and funding environment to that which prevailed several years ago when ComReg first began this spectrum consultation process. However notwithstanding ComReg's specific statutory obligations to take account of industry sustainability, at no stage does either ComReg or its advisor Dotecon engage in any

assessment of either the local telecommunications market or economy in Ireland, or the affordability of the auction it is proposing for those most likely to wish to purchase spectrum. The benchmark and minimum price set are fundamentally flawed in that they are entirely based upon auctions in other, very different jurisdictions with no factoring in of the Irish market. Further, ComReg engages in no assessment of likely demand for spectrum specifically in Ireland, and in particular whether demand exceeds supply in each of the proposed bands, a fundamental requirement to justify the holding of any auction in any band. Telefonica previously requested ComReg to test this proposition before expending the resources of ComReg and the industry on an auction.

1.8. ComReg's proposal does not take account of changes to the market structure. As ComReg will be aware, several new MVNOs have launched (and in one case wound up), while Telefonica and Meteor have created the first network share in Ireland. Notwithstanding its statutory obligations to take account of the market and of users of spectrum, only one reference is made to the existence of MVNOs and no reference is made at all to the existence of the network sharing agreement between Telefonica and eircom/Meteor. This is despite the fact that ComReg has publically endorsed the benefits of network sharing. For example, Paragraph 6.4, Network Sharing in Ireland, in Document 10/43 states: "*ComReg has encouraged infrastructure sharing to ensure that innovative new services can be rolled out speedily and with a minimal environmental impact...*" and further in Paragraph 6.5, Conclusion, states: *"The sharing of passive and active telecommunications infrastructure can potentially promote a successful, vibrant and competitive telecommunications market…"*

1.9. ComReg is legally required to revise its proposal to reflect the realities of the current market structure, and to take into account material market factors of which ComReg is fully aware. In particular Telefonica notes that notwithstanding its detailed submissions on the subject, and ComReg's legal obligations in this regard, no provision is made for spectrum trading, while joint bidding is addressed in a single paragraph. ComReg is claiming to facilitate joint bidding, yet as stated above has acknowledged that sharing of passive and active telecommunications infrastructure can potentially promote a successful, vibrant and competitive telecommunications market. However, by refusing to allow for augmented spectrum caps for a joint bidder, ComReg is, in practice prohibiting joint bidding for any combination of the current operators. For the reasons outlined in section 10 (Spectrum Fees), Telefonica believes that ComReg's failure to take account of the structure and state of the Irish market and its stances on spectrum trading and on joint bidding are in breach of ComReg's statutory obligations and objectives. As they directly impact upon the outcome of the proposed auction, they must now be addressed.

1.10. Before finalising its Auction Proposal, ComReg must rectify these omissions in its analysis by, *inter alia,* taking proper account of the changed circumstances outlined above, making due provision for spectrum trading and sharing, and confirming that it will not hold an auction in

any band where demand does not exceed supply.

Other concerns

1.11. In addition to the general requirement to revise the Auction Proposal to reflect changes outlined above, Telefonica has a number of other concerns relating to specific aspects of the Auction Proposal set out in Document 11/60, as described below.

Minimum Price

1.12. While Telefonica welcomes the reduction in the minimum price, it considers that there are a number of significant flaws in the manner in which ComReg arrives at the most recent figures proposed. These relate, *inter alia*, to the benchmark conducted by Dotecon to set the price for 800 MHz and 900 MHz spectrum, the relativity analysis conducted in relation to 1800MHz, and the manner in which the figure of €20 million is selected by ComReg from within the benchmark range, with the unsupportable reliance on "tacit collusion" as the sole justification for doing so, and in the process adding at least €100m to the minimum price across all lots on this ground alone. The rationale for reliance on "tacit collusion" is particularly difficult to discern, having selected an auction format designed to prevent collusion occurring and as Ireland has a strict competition law regime which addresses such issues, without the necessity to introduce arbitrary minimum price figures. The rationale is also flawed and contradicts the position taken by ComReg on other aspects of the minimum price. The flaws identified are set out in section 10 (Spectrum Fees).

Auction Format

1.13. Telefonica remains of the view that an open auction for currently occupied 900 MHz spectrum is not the option that best meets ComReg's statutory objectives and obligations. Without prejudice to this, Telefonica appreciates ComReg's efforts to identify an auction format that minimises some risks relating to strategic bidding. However, Telefonica continues to have concerns about certain aspects of the proposed format, which it believes creates a significant risk that the auction will not meet ComReg's own stated objectives. These are set out in section 5 (Auction Format) together with proposals to tackle these concerns.

Spectrum caps

1.14. The new 900 MHz sub-cap is the most significant new structural change introduced by Document 11/60 into ComReg's Auction Proposal. It has been introduced without consultation, and seemingly in response to a submission by H3GI, who will be the main beneficiary from this cap. Telefonica considers that ComReg has not fully considered the potentially very serious implications of this cap for the remainder of the industry and for consumers. It discriminates in favour of H3GI in providing it with a headstart in the rollout of UMTS services and in doing so, distorts competition in the market (as other operators would

first have to reduce their GSM requirements at 900 MHz in order to be able to fit any kind of UMTS services within the proposed cap). It is likely to unjustifiably drive up the price of 800 MHz and push down the price of 900 MHz. It also restricts the ability to switch demand during the auction in response to price increases, constraining the auction outcomes and reducing the likelihood of efficient allocation of spectrum, contrary to ComReg's own stated objectives and its obligations. With the proposed 900MHz cap ComReg is in practice pre-determining the outcome of the auction. Telefonica considers that ComReg should now urgently consult fully with all of industry on this proposed cap, working with it to assess its wider implications before making any final decision.

Advanced Commencement proposal

1.15. Telefonica appreciates ComReg's intention, in making the Advanced Commencement Proposal, to facilitate an early start in the use of 900 MHz for liberalised services by a new entrant to the band. However, as demonstrated in the diagram set out at section 9, it is not technically feasible to make the spectrum in question available as proposed, as the full band will likely be required to physically facilitate the relocation and re-tuning of 900 MHz lots prior to licence commencement required by ComReg's Full Assignment Round approach.

Failure to take account of and comply with ComReg objectives

1.16. As mentioned above it is incontestable that there have been significant changes since ComReg originally made its proposal for a spectrum auction, yet these changes have not been taken into account. ComReg is required by Ministerial Direction (Policy Direction On Industry Sustainability) to ensure that in making regulatory decisions in relation to the electronic communications market, it takes account of the state of the industry (at the time) and in particular the industry's position in the business cycle and the impact of such decisions on the sustainability of the business of undertakings affected. Furthermore, ComReg has not taken into account timelines, and events that have transpired, since its original proposal – for example it has not adequately addressed the issues relating to ASO, the need to balance liberalisation with the regulatory and licensing circumstances in the State, and spectrum trading. ComReg has a statutory obligation to provide clear information and to take into account the impact of any of its decisions on further investment in the sector by the industry, including investment in infrastructural development.

1.17. ComReg's T1 proposal, in particular the addition of a proposed new 900 MHz sub-cap, represents a failure by ComReg to meet its statutory obligation to ensure that there is no distortion or restriction of competition in the electronic communications sector. ComReg fails to ensure the avoidance of discrimination in the treatment of undertakings, because ComReg is aware that H3GI is the only existing operator that could launch UMTS immediately. Such a proposal is therefore clearly in breach of ComReg's obligation to be technology neutral, by disincentivising incumbent GSM operators from launching UMTS and thereby discriminating

against them. The other operators would first have to reduce their GSM requirements at 900MHz in order to be able to fit any kind of UMTS services within the proposed cap.

1.18. ComReg, by not taking account of changes in the structure of the market, recent technology changes and the significant and continuing deterioration of the market for mobile telecommunications services in setting the minimum price in the proposed auction, is failing to meet its statutory obligation to encourage the promotion of innovation within the industry. It is also a failure by ComReg to follow a Direction from the Minister to *"take account of the state of the industry, and in particular the industry's position in the business cycle and the impact of such decisions on the sustainability of the business of the undertakings affected"*.

Content and presentation of Document 11/60

1.19. Telefonica is aware of the complexity of the issues presently consulted upon and the volume of text written to date, both by ComReg and by Consultation participants. Despite the volume of documents however, key issues that Telefonica specifically identified and requested ComReg to address are not addressed at all, or are addressed but only in a few lines. These include issues such as certainty around ASO and the availability of 800 MHz spectrum, the question of demand not exceeding supply in any band, spectrum trading, joint bidding, the factors used in setting the minimum price and a range of other key issues. Telefonica considers that ComReg has failed to consult adequately or at all on a number of key issues.

1.20. The sheer volume of documentation and of the claims made, make it impossible in the very short consultation period provided to individually address each claim. Failure by Telefonica to specifically address any particular assertion or recommendation by ComReg or its advisers must not therefore be deemed to be acceptance, or presented, implicitly or otherwise, as such. In particular, in several places ComReg has incorrectly represented Telefonica's position on issues relating to the Auction Proposal; Telefonica would refer ComReg to its position as set out in its original submissions, and in many cases, restated in this document. To the extent that any matters have not been addressed by ComReg but appeared in Telefonica's original submissions, Telefonica continues to rely on them, and fully reserves its position in that regard.

Reservation of rights

1.21. Telefonica repeats its general reservation of rights, as set out in detail in previous submissions, in particular section 5 of its response to document 10/71. In particular, given the length of Document 11/60 and its supporting documents, Telefonica must fully reserve its position with regard to the limited amount of time that has been provided to Telefonica, and the industry, to deal with ComReg's latest proposal and the consultation process as a whole. We reserve the right to supplement this response with further comments. In particular, Telefonica has not has sufficient time to consider and respond to the submission by H3GI as published by ComReg on 4th October. Comments on this document will be submitted separately.

Requirement to revise the Auction Proposal

1.22. In conclusion, ComReg must substantially revise the approach adopted in this consultation process before making any final decision on any auction proposal and/or the assignment or award of 900MHz spectrum. For the reasons set out in this document, ComReg will be acting unlawfully if it proceeds with its proposed Full Band Auction without fully addressing the issues and concerns raised. Telefonica fully reserves its legal rights in the event that ComReg proceeds in that manner.

2. Introduction and Background

Developments in the market for telecommunications services

2.1. ComReg will be aware that the spectrum auction is happening at a time when the mobile sector is contracting. Irish mobile operators face the twin challenge of an Irish economy which is experiencing the most devastating recession in the history of the State and the behavioural change of many mobile subscribers to substitute mobile voice for mobile data. The revenue impact of these changes is clear from ComReg's latest quarterly report. The mobile sector generated quarterly revenues of €411ml in Q2 2011 which represents approximately a 10% revenue reduction on the same quarter in 2009. This trend is confirmed through lower mobile voice minutes and lower subscriber numbers in Q2 2011. There would seem to be little sign of a turnaround in the domestic economy or consumer welfare in the short to medium term.

2.2. Revenue challenges in the sector mean that this auction is being conducted against the backdrop of a maturing market and against the strategic challenge that the spectrum being auctioned will not significantly change or increase revenues during the period of the licenses. This is unlike auctions for 3G spectrum in 2000 and 2001 where the spectrum had the capability of delivering new broadband enabled services and the mobile market was experiencing significant growth. Telefonica would request ComReg to consider the economic challenges in the current market in terms of its price for spectrum and the amount of spectrum to be considered in auctions.

Importance of making the right choice

2.3. ComReg itself has identified the importance of radio spectrum, contributing approximately 2.2% to GDP, but also playing an important role in the implementation of socio-economic policy. Mobile communications plays an increasing role in the beneficial use of spectrum, and the decisions ComReg is proposing to implement will shape the mobile communications landscape in Ireland for the next 17 years. The proposed auction will play an important role in implementation of Government policy to encourage roll-out of Next Generation Broadband, as stated by The Minister for Communications, Energy, and Natural Resources on 12th September in relation the the Next Generation Broadband Task Group: " . . . . . *we are entering into a significant period in terms of the roll out of high speed broadband in Ireland, particularly with the proposed auction of spectrum for high speed mobile broadband later this year*". This consultation is being considered at a time when Ireland is suffering the worst financial crisis in the history of the state, when revenues in the communications sector are in decline; even though consumer demand for mobile data is growing exponentially and operators need to continue to invest in networks to meet that demand. It has never been more important for ComReg to get this spectrum assignment right.

ComReg's Regulatory Impact Assessment

2.4. Telefonica has particular concerns therefore with the Regulatory Impact Assessment (RIA) conducted by ComReg. Later in our response we refer to the approach ComReg has taken in the RIA to justify the inclusion of 1800MHz in the range of spectrum to be auctioned. The following paragraphs address other issues raised by the RIA conducted by ComReg.

2.5. A regulatory impact assessment should be more than text justifying a course of action. A RIA should be evidenced based and not a speculative narrative of how a market or an operator, incumbent or new entrant, may behave in a given scenario. ComReg's RIA is littered with opinions and speculation without evidence or supporting argument. In other member states market assessments are conducted as a source of supporting evidence for RIAs. ComReg has not taken one independent review of the mobile market, the impact of the spectrum auction on that market or the impact on competition. It is incredible given the importance of this spectrum to the future of Ireland's mobile services that ComReg has not offered such a market assessment to support its viewpoint

2.6. Telefonica, by way of example, would cite the many occasions in the RIA where ComReg assigns views to 'new entrants' without referring to consultation submissions. In para 3.53 ComReg says that the inclusion of 1800MHz with other spectrum bands would be 'strongly favoured' by new entrants. There is no supporting view or market assessment that new entrants would support such a view. Equally in para 3.82 ComReg makes the astonishing claim that incumbent mobile operators do not want 1800MHz included in the auction as incumbents would believe it rational grounds for limiting potential new entry.

2.7. The RIA also addresses the issue of administrative assignment as opposed to auction, specifically in relation to 900MHz. ComReg appears to argue that reducing the amount of 900MHz spectrum in the auction through allocating a number of lots to existing operators would in some way allow existing operators to gain more spectrum in an auction of the remaining 900MHz lots. ComReg fails to explain why, if the existing operators have sufficient 900MHz spectrum through administrative assignment, they would wish to secure more.

2.8 Telefonica has grave concerns that ComReg continues to make decisions in this spectrum process without conducting independent assessments of the impact of these decisions on the mobile market. In particular ComReg has failed to take on board the clear intention of policy direction number 4 on the sustainability of the industry. In paras 3.222-3.224 ComReg dismisses this obligation without any market evidence. The sustainability of the industry is dependent on predictability throughout the auction process and clear regulatory approaches which consider business continuity, the current business cycle and the need for today's mobile operators to plan ahead and invest in jobs and infrastructure. ComReg's approach to this policy direction ignores those issues.

3. Proposal to include 800, 900 and 1800 MHz spectrum in a full band auction

Inclusion of 800 MHz

3.1. In its response to Document 10/71 Telefonica highlighted as a fundamental and preliminary point that in order to be able to sell 800 MHz licences with a start date of January 2013, ComReg has a legal obligation to ensure that 800 MHz will be available for use from the promised start date. It was noted both by Telefonica and other operators that there was no legal certainty around the availability of 800 MHz and that certain practical steps needed to be taken to guarantee availability on the promised start date. Telefonica requested that ComReg publish its proposals to guarantee availability of 800 MHz as part of the consultation process. ComReg has not responded to these requests, nor to similar requests from other operators, whether in Document 11/60 or otherwise. In the circumstances Telefonica has no option but to strongly reiterate that in order to be entitled to auction 800 MHz licences with a particular start date, ComReg must have the legal right to do so. It must be able to guarantee the availability of the commodity it is proposing to auction on the promised start date.

3.2. Telefonica is particularly concerned by a Dotecon reference to the possibility of a delay in the availability of 800 MHz spectrum *"if 800 MHz spectrum were to become available for use later than currently scheduled where such delay is relatively short this would not necessarily have negative effects on competition"* (Paragraph 143 of Document 11/58). The possibility of delay has also previously been suggested by ComReg in Document 11/29 (page 16) and Document 11/11 (page 37). As indicated in our response to Document 10/71, it is simply not possible for potential bidders to value or even make a decision to bid at all upon spectrum whose availability is uncertain; nor indeed is ComReg legally entitled to sell a commodity whose availability it does not control and cannot guarantee; any such contract would be void and unenforceable. ComReg is failing in its legal duties by requiring operators to proceed on the basis of such legal uncertainty, and thus requiring operators to "hedge" their commercial and technical plans, against the significant cost and risk associated with such legal uncertainty. Operators would clearly have a legal right of redress to seek clarity on this issue, should matters progress without the appropriate assurances being given. Telefonica fully reserves its rights in this regard.

3.3. Dotecon's sanguine attitude to the possibility of delay, if shared by ComReg is simply not acceptable. In this context a delay of even 6 months in ASO would equate to losing a significant percentage of the 2.5 year term of this licence, not to mention the significant competitive disadvantage relative to purchasers of 900 MHz spectrum. This decrease in value cannot simply be calculated by reference to the % of the term lost, given the strategic implications of delay.

3.4. ComReg is either auctioning 800 MHz with guaranteed availability to purchasers from

January 2013 or it is not, but as indicated last year in its Response to Document 10/71, Telefonica considers that this must be made clear before this consultation process ends and any final decision is reached on the inclusion of 800 MHz spectrum, and the promised start date of any licence. If, as appears to be the case, there is a risk that 800 MHz may not in fact be available by 2013 then ComReg's Auction Proposal and its RIA on inclusion of 800 MHz must be substantially revised to meet the risks and issues raised by this. Telefonica's suggestions on mitigation of such a risk are set out below in section 6.

Inclusion of 1800 MHz

3.5. Telefonica's position, as indicated in several responses, is that as a Regulator with a statutory objective of ensuring efficient spectrum use, ComReg should facilitate the efficient planning of spectrum utilisation by operators, by making known the date for availability of all bands of interest (800 MHz, 900 MHz 1800 MHz, 2.1GHz, 2.3GHz, 2.6GHz). Telefonica has also submitted that ComReg should seek to group together bands that are near substitutes for each other. Telefonica considers both statements to be uncontroversial and rational. Applying this position to the 1800 MHz band, Telefonica's view remains as set out in its Response to Document 10/105 namely that "*the most sensible way for ComReg to progress is to ensure that 800 MHz and 900 MHz is auctioned together and that 1800 MHz and 2.6 GHz should also be auctioned together (possibly with 2.3 GHz). If ComReg cannot combine all four into a quad-band auction, then they should be separated into two separate auctions, below 1GHz and above 1GHz*". ComReg has known of the upcoming expiry of MMDS licences in the 2.6GHz band and of the option to use the band for mobile broadband services since its consultation document 98/57, and yet has not clarified the status.

3.6. In that regard we were concerned to note that, as it did in Documents 10/105 and 10/71, ComReg has once again misrepresented Telefonica's position on this issue, and such misrepresentation has significant legal implications. ComReg and Dotecon both refer to Telefonica as noting that there are arguments supporting the inclusion of 1800 MHz with the auction of 800 MHz and 900 MHz, suggesting that Telefonica now support the tri-band auction. They also suggest that Telefonica's primary concern about inclusion of 1800 MHz spectrum centred around it delaying the 800/900 MHz auction. Neither statement is correct, and having now done this twice we must specifically request again that ComReg cease representing Telefonica's position in this way.

3.7. The reasons for this position are as previously set out by Telefonica, most recently in its Response to Document 10/105 (pages 2-5). These include that:

(i) **Lots that are substitutes should not be sold in separate auctions**. This reasoning is strongly supported by ComReg and Dotecon as their primary justification for auctioning 800 & 900 MHz spectrum together, and the exact same reasoning applies to 1800 MHz and 2.6 MHz.

(ii) **Greater weight must be given to ensuring substitutable spectrum is auctioned together than potentially complementary spectrum.** In focusing exclusively on perceived efficiency gains of including 1800 MHz as complementary to 800 MHz and 900 MHz, ComReg has failed to consider the greater efficiency gains of auctioning 1800 MHz and 2.6 GHz together. This reasoning is incorrect, and contradicts ComReg and Dotecon's own reasoning on the importance of auctioning substitutes together when considering 800 MHz and 900 MHz spectrum.

(iii) **Sequential assignment.** Considerable emphasis is placed on the perceived needs of a new entrant to purchase both sub- and above 1GHz simultaneously rather than sequentially. However, sequential auctions are going to happen in any event under ComReg's current Auction Proposal, given that it is not currently proposing to include 2.6 GHz with the other bands in the multi-band auction. Telefonica's position is that the benefits in the present case of auctioning substitutable spectrum together outweigh the disadvantages of sequentially auctioning spectrum. Further, the disadvantages can be mitigated in the present situation; if ComReg clarifies the time-table for subsequent 1800 MH/2.6 GHz auction before an 800/900 MHz auction occurs (which it is within its control to do), then bidders will know that they have the option to purchase above and below 1 GHz, just in two separate processes by ComReg and all before the bulk of 1800 MHz would come available anyway, in 2014 under our proposal. Telefonica notes that ComReg's Annual Action Plan currently shows that an expert report on the 2.6GHz band will be published in 2011, and that it is now due. In addition, ComReg plans to hold a consultation on liberalisation of the 2.6GHz band in 2012, which should have been issued earlier during 2011 to provide clarity when planning the auction. If 2.6 GHz cannot in fact be ready in time to be auctioned in a quad band auction, Telefonica does not see how there could be a "significant time-lag" in holding a subsequent 1800 MHz and 2.6 GHz auction as is suggested in Document 11/60 (A3.66); once the infrastructure is in place to actually hold an auction, it should be straightforward to run another auction shortly afterwards, and it would have to happen during 2012 anyway given the expiry dates of some of the 2.6GHz licences.

(iv) **Benefit to a new entrant of greater supply of spectrum.** ComReg and Dotecon do not consider the fact that addition of 2.6 GHz to the auction of 1800 MHz spectrum would be a benefit to such a new entrant, given that the increased supply would increase their chances of purchasing sufficient spectrum above 1 GHz. In that context Telefonica notes the stated aim of ComReg of including 1800 MHz spectrum with 800 and 900 MHz spectrum in order to facilitate an 1800 MHz only entrant. ComReg cannot justify separating two substitutable bands to facilitate such an extremely unlikely scenario (given the prohibitive costs of building such a network and current economic and market conditions). But in any event auctioning 1800 MHz with

2.6 GHz would benefit rather than disadvantage such an entrant given the additional supply.

Grounds for not auctioning 1800 MHz and 2.6 GHz together are not justifiable and confer an unfair advantage on one operator

3.8. ComReg seeks to justify the non-inclusion of the 2.6 GHz band on the basis that "*the availability of 2.6 GHz spectrum is not certain at this point"* (Document 11/58 paragraph 59). Telefonica does not consider that this is a justifiable response, given that this decision on the availability of 2.6 GHz is a matter for ComReg, and so entirely within its control. ComReg has at all times been aware of the substitutability of 1800 MHz and 2.6 GHz spectrum. Its own advisers recommend the auctioning of substitutable spectrum together. However ComReg continues to delay publication of its consultation and decision on the availability of the 2.6 GHz band. ComReg has been silent on the matter since response to the Call for Input was received 15 months ago in July 2010, and must now ensure to meet the target for progress contained in the current Action Plan. Given that the licence terms in question begin to expire in 2012 ComReg is required in any event to reach a decision imminently. This band is currently occupied by another telecoms operator and competitor, UPC. In addition to losing the demonstrable benefits of auctioning 1800 MHz and 2.6 GHz together, the net effect of delaying a decision on 2.6 GHz and thereby avoiding its inclusion in the multi-band auction is to potentially create a significant competitive advantage for UPC in procuring spectrum. The mobile operators will be compelled to meet their above 1 GHz needs from the 1800 MHz auction as they have no certainty as to when 2.6 GHz might be available. They are then less likely to have sufficient funds or remaining demand to be able to meaningfully compete for 2.6 GHz, essentially clearing the field for UPC to pick up 2.6 GHz spectrum with little or no competition. This would be an inefficient outcome from the entire assignment process.

3.9. ComReg's actions in this regard seem inexplicable. ComReg has had ample opportunity, since it first began consulting on spectrum auctions almost 4 years ago, to have held and completed its consultation on 2.6 GHz availability. Telefonica submits that it should now immediately close out this consultation, and reach a decision on auctioning 2.6 GHz together with 1800 MHz, either as part of the multi-band auction, or in a subsequent auction focussed on spectrum above 1 GHz. Given that current 1800 MHz licences do not expire until 2014, there remains sufficient time to do so and auction 1800 MHz well in advance of licence expiry.

Decision to hold a full band auction

Demand exceeding supply

3.10. ComReg noted in Consultation 08/57 that "*where demand for spectrum is expected to exceed supply, an auction would be ComReg's preferred assignment method*" (Document 11/60 A

3.88). The point was made by Telefonica in its Responses to Documents 10/71 that if demand does not exceed supply, there is therefore no requirement to go to the unnecessary expense, delay and risk of an auction and that ComReg should instead simply proceed to administratively assign spectrum to the applicants.

3.11. In Documents 11/58-60 ComReg has not responded to Telefonica's submissions on the issue of demand not exceeding supply, and the implications of this for the holding of an auction. Telefonica must therefore reiterate its request that before ComReg incurs further significant expense on the auction process (and puts the operators to further significant expense) that it establish demand in each of the 3 bands at issue, and in any band(s) where demand does not exceed supply, that it proceed to allocate that spectrum immediately to the relevant applicants. Telefonica would note that ComReg's objective is the efficient allocation of spectrum in a timely manner that facilitates the rollout of new products and services, not the holding of an auction; this does not automatically equate to the most efficient allocation, nor indeed does it meet ComReg's other obligations and objectives. Pursuant to the Policy Direction to ComReg by the Minister (Policy Direction on Regulations Only Where Needed), ComReg has discretion as to whether to impose regulatory obligations (which would in our view include an obligation to enter into an auction in order to secure spectrum), it must before deciding to impose such regulatory obligations on undertakings, examine whether the objectives of such regulatory obligations would be better achieved by forbearance from imposition of such obligations and reliance instead on market forces. Accordingly, if a simple analysis of market forces established that supply exceeds demand, there is no necessity to proceed to an expensive and time consuming regulatory auction.

3.12. ComReg would not be legally justified in delaying the allocation of spectrum simply on the basis that it thinks auction participants might prefer to have the option to buy all their requirements in one go. The business certainty provided by having a confirmed allocation of spectrum (a bird in the hand) is more useful than having more bidding options in an auction (which is not legally required), and immediate allocation avoids unnecessary delay in making liberalised spectrum in that band available. Particularly in the case of 1800 MHz spectrum which is not a substitute for 800 MHz or 900 MHz, there would be no justification in withholding its allocation if demand does not exceed supply. ComReg has in previous consultations acknowledged specifically in relation to the 1800 MHz band that demand may not be great (citing this as a ground for not auctioning it with 900 MHz spectrum), and more recently Dotecon noted that notwithstanding recent LTE developments "*there remains uncertainty as to the actual level of demand for 1800 MHz spectrum*" (Document 11/58 paragraph 54).

Selection of full band auction format for full licence period

3.13. In licensing spectrum, ComReg must meet a complex range of statutory obligations. This includes an obligation to choose the most proportionate (least disruptive) option as well as

being required to protect the interests of consumers, competition in the mobile market, users of spectrum, and protect GSM. Telefonica remains of the view that the full band auction format for the entire licence period might not be the correct option to meet ComReg's statutory obligations, when the alternative of a partial auction and partial assignment better meets its obligations in a more proportionate and less risky manner. Essentially partial auction and assignment combines the same benefits of having prices set by auction and facilitating new entrants, while also ensuring against the risk of consumer and industry disruption that would arise from the sudden loss of 900 MHz spectrum to an existing operator. The reasoning may be summarised as follows:

(a) Full auction carries risk of serious disruption. An auction builds in the inherent risk that one or more GSM incumbents will get less or not get any 900 MHz spectrum (as is acknowledged by ComReg, see for example Document 11/29 page 39). When combined with the fact that Telefonica and Vodafone's interim licences will then expire within 6 months or less of the auction, loss of licence for either would mean massive disruption to their customer base through loss or impairment of service, as well as losses to their roaming partners and MVNOs, damage to competition and to GSM services. ComReg will be fully aware of its legal obligations to consumers, as has been expressly detailed in previous consultation responses.

(b) ComReg can avoid this risk. By expanding to include 800 MHz as well as 900 MHz spectrum, ComReg now has sufficient sub-1GHz spectrum to grant extensions to incumbents and still have enough spectrum left over to meet the demand for sub-1GHz spectrum from new entrants. In earlier consultations ComReg rejected extensions for incumbents on the grounds that there would not be enough spectrum left over to allow for new entrants; this is no longer the case; a short term allocation of 3 lots for GSM continuity would leave 10 lots of sub-1GHz spectrum available for auction, rising to the full 13.

(c) ComReg are acting disproportionately. ComReg is acting disproportionately, and in breach of its various obligations, by taking the riskier option of a full band auction, when it has the less risky option of partial extension and partial auction available to it, which meets all of its objectives in a more proportionate way with less risk.

This issue is dealt with in greater detail in section 6 below relating to the start date of the new licences

4. Spectrum Caps

The new 900 MHz sub-cap

4.1. The new 900 MHz sub-cap is the most significant new structural change introduced by Document 11/60 into ComReg's Auction Proposal. As a preliminary point, Telefonica notes that it is surprised and concerned that a change of this significance is to be decided upon without first consulting fully upon it with industry; no questions on the new sub-cap are raised or specific submissions invited, despite it being a new element to the Auction Proposal.

4.2. It is not clear from Document 11/60 what prompted ComReg to look at introducing an additional band cap. Telefonica can only assume it was on foot of the submission from H3GI in July 2011, shortly before Documents 11/60 was published. The main beneficiary of this band cap is H3GI. It appears from Document 11/58-60 that ComReg has not fully appreciated the very serious implications of this sub-cap for the remainder of the industry and for consumers. These include:

(i) **Discrimination in favour of H3GI in the launch of advanced services.** The 900 MHz cap would mean that H3GI is the only existing operator that can launch a UMTS service in the short term. Such a measure is discriminatory and breaches the fundamental principle of equal treatment. As ComReg has previously acknowledged the GSM operators require their current 900 MHz spectrum for GSM services. Limiting their ability to purchase no more than an extra 2x2.8 MHz means that they cannot launch a UMTS service in the short term after the auction. This discriminatory measure distorts competition on the market, giving H3GI an unfair advantage insofar as it essentially leaves the field clear for H3GI to have a headstart in launching advanced services. This effectively penalises the other operators for the fact that the assignment process has been delayed, and they have legacy GSM customers and must therefore use the bulk of any 900 MHz bought within the cap to maintain services for these customers (ComReg has previously acknowledged that H3GI is in a better position to take full advantage of liberalised sub-1GHz spectrum and also recognised the continuing requirements of operators for 900 MHz spectrum to provide GSM services – Document 11/29, page 23).

(ii) **ComReg is forcing long-term technology selection on operators and the market.** With UMTS 900 ruled out in the short term, this is likely to force existing operators to try to purchase 800 MHz for LTE in T1 if they wish to roll out advanced services in T1. It is disingenuous to suggest that the sub-cap will only have a short term effect. An operator forced by the cap to purchase 800 MHz spectrum in the first time-slice and opt for LTE technology will then incur significant costs in rolling out LTE at 800 MHz. It would simply not be practical or financially feasible to then switch

to investing in the rollout and provision of UMTS 900 based services in the second time slice. ComReg is therefore shaping demand for 900 MHz and availability of UMTS 900 services for the entire 17 years of the proposed new licences. It is making it far less likely that any of the existing GSM operators will be in a position to offer UMTS 900 services to their customers

(iii) **Unjustifiably driving up the price for 800 MHz spectrum.** The 900 MHz cap forces demand from the existing operators to the 800 MHz band. In the event of strong demand for 800 MHz, which would arise if either H3GI or a new entrant also bid for it, the possibility of switching demand to the 900 MHz band is effectively eliminated. This runs directly counter to ComReg's own stated strategy in relation to the auction and to caps, which is to faciliate switching between bands and not to constrain auction outcomes by means of caps. This will at the very least significantly drive up the price of 800 MHz, and might result in at least one existing operator not being in a position to offer advanced services in the short term, which it could have done if it had been allowed to switch its demand to 900 MHz in response to price increases.

(iv) **Fragmentation** - an operator might want (for efficiency reasons) to operate in a single band below 1 GHz. If a bidder requires three lots below 1 GHz, then the cap prevents them from being obtained in the 900MHz band. That the cap only applies to the first time slice is of little use in mitigation, as it would not be practical to switch bands after just 2.5 years.

(v) **Driving down the price and demand for 900 MHz.** For the reasons outlined above, the cap is likely to drive down demand for and the price of 900 MHz. ComReg would essentially have forced the other 3 operators out of the 900 MHz band for advanced services, clearing the way for H3GI to pick 900 MHz up on long term licences for less than it would have had to pay in a competitive auction.

4.3. Telefonica is surprised at the introduction of this proposal, as it restricts the outcome of the auction and pre-determines that at least one lot of 900MHz spectrum will either remain unsold, or will only be sold to a new entrant to the band. This is directly equivalent to reserving a lot of spectrum for a new entrant to the band – a proposal that was made initially by ComReg in 08/57 but which has been eliminated from further consideration during the consultation process. The proposal to impose such a restriction is directly contrary to ComReg's own view (as stated in 11/60, 3.146) that the auction itself should determine the assignments without restriction:

> "Any form of administrative assignment of spectrum (i.e. Option 2) imposes a restriction on the range of possible outcomes in the auction. The more extensive the restriction, in terms of the possible auction outcomes which it precludes, the more likely it is that the actual optimal allocation is precluded from arising. Restrictions on auction outcomes will impact firstly on

> competition in the auction itself and ultimately downstream competition and consumers. An efficient outcome in the auction would be best achieved by not imposing unnecessary restrictions on the possible outcomes of the auction and thereby maximising the opportunities for competition in the auction itself – for example, a restriction that there must be a new entrant excludes all potential auction outcomes where no prospective new entrant is a successful bidder".

4.4. ComReg would also appear to have accepted that such a sub-optimal auction outcome will have consequential loss for comsumer welfare, e.g. (11/60, 3.158):

> "Given the current (and likely future) importance of the mobile service market even small moves away from the optimal spectrum allocation could have potentially very large impacts on welfare over the period up until 2030. Market mechanisms may eventually undo mistakes made but during that time there would be less competition and less innovation relative to the optimal spectrum rights allocation and the loss to consumer welfare could be large".

ComReg has pre-determined that there should be at least 4 operators in the 900MHz band, without carrying out any market analysis or regulatory impact assessment to support this decision.

4.5. Despite the lengthy analysis and exploration of considerations, neither ComReg nor DotEcon have stated specifically why it is now proposed to introduce this new cap. Telefonica notes that the primary driver appears to have been a concern raised by H3GI that 900 MHz spectrum is more in demand than 800 MHz up until approximately 2015, and that therefore ComReg should ensure more participants have the option to purchase 900 MHz in T1. However, as outlined in section 6, Telefonica considers that for practical and legal reasons the earliest the new licences can in fact start is 2014/2015, at which point this perceived differential in value for new services on ComReg's own analysis will have disappeared, removing the need for a separate band cap.

4.6. Telefonica considers that the consequences of the cap outlined above are potentially unfair and contrary to ComReg's obligations and objectives, including the obligations to ensure the efficient use of spectrum, promote competition in new services, not to discriminate as between users of spectrum and act in a technology neutral manner. They run directly counter to ComReg's stated aim in relation to caps which is not to "*constrain auction outcomes and thereby reduce the potential for realising a competitive and efficient result".* These consequences are not addressed in Documents 11/58-60 nor are they weighed against the perceived benefits of the cap. Telefonica further submits that the likely delayed start of the T1 licences to 2014-15 (and possible elimination of T1 altogether) renders the perceived disparity in value of 900 MHz and 800 MHz before 2015 a non-issue. In the circumstances Telefonica strongly submits that ComReg is legally obliged to now fully consult with industry on the proposed cap, working with it to assess its wider implications as outlined above, before reaching any final decision.

Joint bidding for spectrum

4.7. In its Response to Document 10/71 Telefonica highlighted the fact that ComReg is required by its objectives and obligations as Regulator to facilitate joint bidding for spectrum spectrum or, at least, not prohibit joint bidding. Therefore, it should not design its auction in such a way as to block joint bidding for spectrum. In summary, referring to ComReg's own statements to the effect that "*the aim of regulatory authorities is to facilitate efficient investment..[by] avoiding inefficient duplication of networks"* (page 32 of *Strategy Statement 2010-2012)* Telefonica noted that:

(i) network sharing is supported by national regulatory authorities as a means of achieving investment in and rollout of next generation networks that might not otherwise be feasible, and that one of the efficiencies it facilitates is spectrum sharing;

(ii) ComReg should, in compliance with its objectives and obligations inter alia in relation to efficiency of spectrum use, facilitate joint bidding for spectrum for shared use;

(iii) ComReg should not prohibit joint bidding in the set spectrum caps or bidder characteristics, noting specifically that "*a bidder on behalf of a shared network might have spectrum requirements of greater than ComReg's proposed 2x20 MHz cap, which is based on the requirements of single operator networks*". (See page 21 for the detailed submissions).

4.8. The issue of joint bidding was also raised by other operators in their responses. Notwithstanding these submissions however, the issue is solely addressed in 3 short paragraphs (paragraphs 417-9) of Dotecon's Document 11/58, which are then quoted by ComReg in its own documents. Dotecon recommends that collective bidding should be permitted by means of a joint bid vehicle. This is welcome, although Telefonica notes that legally, ComReg would have no basis for prohibiting such an applicant. However Dotecon and ComReg then go on to effectively prevent joint bidding by any combination of the existing operators, by stipulating that the caps, which are set on the basis of demand of a single operator, may not be adjusted to reflect the greater demand inherent in joint bidding by two operators. ComReg will have been aware of this fact, as it was specifically highlighted by Telefonica, which called either for no caps, or combined caps for a joint bidder (see above and page 20 of Response to 10/71). However, the point is simply not addressed or responded to by ComReg or Dotecon anywhere in Documents 11/58-60. There is no consultation on this point, no analysis of pros and cons. No reference is made to the existence the network share agreement entered into between Telefonica and eircom/Meteor, or to the intensification of site sharing in the industry generally. Simply on the basis of this lack of consultation and analysis of relevant factors Telefonica considers that ComReg's recommended position is procedurally and legally flawed.

4.9. ComReg's recommended position is also substantively wrong. It is contradictory to on the one hand acknowledge that joint bidding is permissible, and then to immediately rule it out for a significant proportion of the likely bidders. It runs contrary to ComReg's own obligations and objectives, for the reasons already outlined by Telefonica in its Response to 10/71, and which include:

(i) **Inhibiting more efficient use of spectrum by existing operators.** Where joint sourcing of spectrum for shared use should logically allow for fewer lots in total than two networks buying singly. Ensuring efficient use of spectrum is an objective of ComReg.

(ii) **Inhibiting the efficiency of network sharing.** ComReg is also preventing a network share from fully realising its efficiency, contrary to its own stated support for network shares as drivers of efficiency in the ultimate interests of consumers

(iii) **Discrimination between operators and new entrants.** The cap for joint bidding is discriminatory in its effect, in allowing joint bidding by new entrants such as H3GI or others, but in practice ruling it out involving any one of the current sub-1GHz.

(iv) **Preventing the freeing up of spectrum for new entrants.** In addition to more efficient use by the operators in question, reduced demand would also leave more spectrum free for new entrants, something repeatedly identified by ComReg as a benefit in other contexts; and

(v) **Failing to take account of market demand in setting caps.** ComReg and Dotecon have stated that their objectives in setting spectrum caps include not setting them so tightly as to restrict competition and constrain auction outcomes. However in setting its spectrum caps too tightly to faciliate joint bidding, it is acting entirely contrary to this objective. Further, there is no analysis by ComReg or Dotecon of the pros and cons of faciliating this type of bidder in setting any of the proposed caps, notwithstanding that the issue was clearly flagged by multiple operators over a year ago, again a procedural flaw. It also fails to take account of market conditions where ComReg is aware of network share arrangements being in place, and potentially has a direct impact on the commercial freedom to operate within or outside network share arrangements.

(vi) **Artificially propping up demand and prices.** In a situation where operator demand could be met with less spectrum overall, ComReg is not entitled, under its objectives, to artificially prop up demand and competition for spectrum (and thereby revenue) in setting its spectrum caps, when this runs counter to its objectives.

4.10. In the circumstances Telefonica submits that it must now properly consult with industry on the issue of joint bidding and conduct a full analysis of the spectrum caps it is proposing in the

light of the regulatory objective of not discriminating against or inhibiting the operation of sharing of spectrum, as an efficient means of spectrum allocation and use.

Spectrum sharing, pooling and trading

4.11. ComReg has again failed to clarify the position with regard to spectrum trading and spectrum sharing and has not recognised and acted upon its current powers and responsibilities in relation to this issue. As Telefonica has raised from the outset, ComReg's failure to clarify the position on spectrum trading is inconsistent with its obligation to contribute to the development of the internal market and fails to promote competition as required under section 12 of the Communications Regulation Act. Furthermore, it represents a failure by ComReg to co-ordinate its actions with the regulatory authorities of other Member States and to comply with its statutory obligation to have due regard to international developments.

4.12. The EU Telecoms Reform Package clearly provides that it will be a requirement to make these licences tradable. The Framework Directive (2002\21\EC) as amended (by 2009\140\EC) includes specific provisions permitting spectrum trading, as implemented in Ireland by the European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011. Article 9 as amended provides that Member States are required to permit licences to be made tradable in specified bands and the recent proposal by the European Commission has called upon the European Parliament and the Council to adopt as a priority *"appropriate measures, pursuant to Article 9b(3) of the Directive 2002/21/EC, to ensure that Member States allow trading within the Union of spectrum usage rights in the harmonised bands …..880-915 MHz, 925-960 MHz,…..1805-1880 MHz*" – this is set out in Article 6(5) of the Proposal for a Decision of the European Parliament and of the Council establishing the first radio spectrum policy programme COM(2010) 417 final.

4.13. ComReg has failed to deal with the spectrum trading inevitability, simply by saying that it will set out separately its modality on this matter in due course. This is not how a Regulator should react to EU driven policy. ComReg is about to issue licences for a period of up to 17 years and should clarify the position with regard to its plans on spectrum trading before it makes any decision in that regard, particularly in circumstances where EU policy has been made clear. ComReg has not raised any objection to spectrum trading or reason to why it should be prevented. Telefonica stated its position regarding spectrum trading most recently in response to document 11/28 (Spectrum Strategy) and awaits ComReg's response to that document.

5. Auction Format

Combinatorial clock auction

5.1. ComReg has stated that its proposed format for the forthcoming auction will be a combinatorial clock auction (CCA). This is one of a number of auction formats that have been deployed or are proposed for awards of similar spectrum in other European countries. Specifically, we understand that the CCA format has been used in Austria, Denmark, Netherlands and the UK, and is proposed for use in Australia, Switzerland and the UK. As with all auction formats proposed for spectrum auctions where the there are multiple lots and bands, the CCA offers both advantages and disadvantages. One concern that Telefonica has with the CCA is that the auction rules are relatively complex to read and interpret compared to other formats, such as the more standard SMRA (simultaneous multiple round auction, e.g. as used in Germany and Spain).

5.2. To avoid creating an undue burden on participants, Telefonica believes it is very important that, if ComReg proceeds with the CCA format, it adheres closely to the rules used for recent awards, such the Danish 2.6GHz auction. Any changes to such rules should be clearly explained and justified, so that bidders have the information they need to investigate their implications.

5.3. In anticipation of the publication of detailed rules for bidding in the auction, Telefonica submits the following comments on key aspects of the CCA process relevant to Ireland:

- **Lot structure**. Telefonica supports the use of generic lots within bands to avoid proliferation of categories and package bid options, and to facilitate assignment of contiguous spectrum within bands. In general, each band should be its own category, and bands should not be broken up unless there are clear reasons to anticipate value differences between lots. As previously discussed, we believe the bidding process would be greatly simplified if the temporal lots approach was abandoned, as this would halve the number of lot categories required, and hugely reduce the number of possible bid packages that bidders need to consider when developing their business cases and bid strategy.

- **Auction structure**. We presume that the bidding phase of the auction will consist of primary rounds, followed by a supplementary round, and finally an assignment round. Telefonica is comfortable with this general structure, and is relying on the statement in section 3.3.3 of the Draft Decision (11/60, chapter 8) that “An Algorithm will be provided in the Information Memorandum, which will allow a bidder who had won lots in the combinatorial clock rounds to calculate the minimum price it would need to bid to be guaranteed to win these lots in the supplemental round”.

- **Auction schedule**. For bidders, it is very important to have as much certainty as possible over the scheduling of bidding rounds, so that we can manage internal governance processes. However, we recognise that ComReg will wish to maintain some flexibility over round scheduling, so it can respond to developments in the auction. Accordingly, we urge ComReg to set clear bounds within which it will make decisions on round scheduling. In particular, we request that:
  - There are no more than 10 primary rounds each day
  - There is at least one clear business day between conclusion of the primary rounds and start of the supplementary round
  - Bidders are required to pay the upfront fees due following the supplemental round before ComReg proceed to the assignment round
  - There is at least one clear business day between announcement of the bid options for the assignment round and the start of the assignment round.
- **Bid increments**. For bidders, one of the most significant sources of uncertainty is the rate at which prices may increase, both by round and on each business day. One common problem is that auctioneers base bid increments on simple percentages of current prices, but do not give adequate consideration to the absolute price increases faced by bidders, which may escalate rapidly as current round prices increase. Accordingly, we urge ComReg to set clear bounds within which it will make decisions on bid increments, and in particular to focus on absolute bid increases not just percentage increases. In particular, we request that:
  - Price increases per round are limited to 250,000 euro per lot
  - Price increases per day are limited to 2,000,000 euro per lot
- **Activity rules**. We support the use of a relative price activity rule, as used in the Danish 2.6GHz auction. Given that this is one of the more complex aspects of the auction, we urge ComReg not to deviate from rules used elsewhere without very clear explanation.
- **Information revelation in primary rounds**. All previous CCAs to date have been run with restricted transparency. We are not convinced that restricting information during the primary rounds is beneficial; we think that revealing more complete information about bids in each primary round could make it easier for bidders to refine their views on the value of lots (especially temporal lots) during the auction. However, we understand that auctioneers often favour only revealing aggregate demand data as a way to prevent tacit collusion across bidders. Given ComReg's stated (but unsubstantiated) concern about tacit collusion, we view restrictions on transparency as

a much more effective and less distorting measure to tackle this issue than setting reserve prices at the high end of possible value ranges for the spectrum.

- **Winner determination**. We support the implementation of an orthodox winner determination process in which the highest value set of package bids across all available frequencies is identified as the winning set of bids. We strongly oppose any measures to distort the winner determination process to favour particular types of allocation outcome, such as ensuring a minimum number of winning bidders in any particular bands. Even without the 900MHz cap just proposed, the caps that ComReg has proposed are more than enough to ensure multiple winners of spectrum in each band. Accordingly, there is no need for further measures that would distort winner determination and may close off efficient auction outcomes. In particular, we strongly support ComReg's conclusion that 'set aside' measures, as proposed for the UK 800 MHz auction, are inappropriate in the Irish auction context.

- **Price determination**. We support the use of a 'second price' rule for the determination of prices. We believe that this is an essential feature of the auction rules, and that any deviation from the second price concept would undermine the likelihood of an efficient auction outcome. This is also a very complex element of the auction design, and we urge ComReg to provide as much information about its approach to pricing as possible, and not to deviate from rules used elsewhere without very clear explanation. To help bidders to understand the pricing process and to ensure we have confidence in the process, we urge ComReg to provide all bidders with access to its software at the earliest opportunity (at least 3 months before the start of the auction and ideally at the same time as the detailed rules are published). By way of example, we understand that Ofcom – also supported by DotEcon – provides standalone software for winner and price determination to all prospective bidders that can be used by bidders to test the process.

- **Supplementary round results**. We understand that in most previous CCAs, governments have announced the winning bids after the completion but not always the base prices for each bidder. We cannot see any reason for restricting such information, and urge full revelation of results as soon as the winner and price determination process following the supplementary round is concluded, as this should help all bidders prepare for the assignment bid round.

- **Assignment round**. The proposed use of temporal lots threatens to complicate the assignment round process. In previous CCA auctions, it was possible to treat each category of lot as a separate parallel auction for the purposes of receiving and processing assignment round bids. However, with temporal lots, it is necessary to link categories within bands where spectrum is divided on a temporal basis, so that bidders can target contiguous spectrum across time periods as well as across frequencies.

This will greatly increase bid options in the assignment round and add an extra element of risk and uncertainty for bidders. We note that it will not even be possible to guarantee bidders contiguous spectrum across time periods even when there is a single assignment process across time periods. We think this another strong argument in favour of abandoning the two temporal lot approach. However, if ComReg decides to persist with temporal lots, we consider that combined assignment processes for all lots within bands are essential.

- **Risk of Abandonment.** While we accept that the use of a relatively high deposit at application stage (as is proposed) will reduce the likelihood of a winning bidder abandoning their lots after the auction but before full payment is required, this is still a possibility. It has happened before in Ireland, where H3GI bid in the 26GHz auction but declined to accept the licence. There remains an unallocated lot in the band today. To avoid such an outcome, ComReg should require payment of the relevant fee following the clock and supplemental rounds before commencing the assignment round. If there is a default at this time, it will be possible to re-run the primary rounds before concluding the auction.

- **Transparency and the Supplemental Round.** The Supplemental Bid Round as proposed by ComReg could serve to introduce uncertainty and reduce transparency within the CCA auction. Throughout the clock phase, bidders at least will have round by round information of the overall demand and price growth, however on completion of the clock phase there will be a single-shot blind bidding round, albeit one with certain restrictions on the bids than may be submitted. One difficulty for bidders is that the winners, the number of lots per winner, and the price to be paid will all simply be announced following the Supplemental Bid Round without any facility for bidders (winning or losing) to verify how their particular bid led to the final result. This will be of obvious concern, particularly where the outcome of the Supplemental Round is materially different than the status at the end of the Clock Rounds.

  Telefonica sees two means by which ComReg might facilitate the verification of the Winner and price determination – i) by publication of full details of the Supplemental Round Bids so that bidders might verify the outcome, or (ii) by selection of a suitable third party who could receive the bid details and carry out independent verification.

  A similar concern exists in relation to the assignment round, however the overall impact will be lesser.

6. Temporal Lots

Start Date of Temporal Lot 1

6.1. ComReg first proposed a start date of January 2013 for its new licences in Document 10/71. This date was selected solely on the basis of the anticipated availability of 800 MHz spectrum from that date. At that time it was anticipated that the proposed multi-band auction would be over by early 2011, leaving 2 years between auction conclusion and start of the new licences. In Document 11/60 ComReg again proposes a licence start date of January 2013, however the situation has fundamentally changed. While the date for the proposed multi-band auction has not yet been set, Telefonica believes that the earliest it can now happen is Q3 of 2012, meaning that the maximum amount of time likely to be left between auction end and proposed licence commencement is 6 months or less. For this reason alone Telefonica submits that the proposed licence start date is simply not workable, and must be substantially pushed out by ComReg for the following reasons.

(i) **Insufficient lead time for re-tuning and re-location**

The present Auction Proposal, with its division of bands into new blocks of 5 MHz, means that regardless of the outcome, all of the existing GSM operators will have to re-locate their spectrum holdings within bands. ComReg and its advisers acknowledge that there is a minimum lead time required by existing operators to re-locate and re-tune their networks. With time now so short between probable auction conclusion and start date, there is likely to be insufficient time for all operators to move to their new locations without disruption of services.

(ii) **Possibility of a delay in ASO**

As set out in section 3 ComReg has not provided any guarantee that ASO will happen in time in Q4 2012, to ensure that the 800 MHz band is fully vacated in time for new licensees to begin use in January 2013. It is possible, even if the relevant legislative provisions are passed in time, that practical obstacles will arise, for example a continued need for analogue services in households unable to afford the Saorview set top boxes. For the reasons outlined above, ComReg is not entitled to auction licences with a start date it cannot guarantee. Telefonica submits that ComReg has not left sufficient time between ASO and licence commencement to minimise the impact of these risk outcomes materialising

(iii) **Insufficient time to mitigate the risk of widespread consumer disruption caused by failure to win spectrum at auction.**

In Document 11/29, on page 39, ComReg stated that *"ComReg is not at this time in a position to know which operators will win spectrum, much less which blocks of spectrum any operator will hold. To take an example, it is theoretically possible, although very unlikely, that either*

Vodafone or O2, or both, wil not win any 900 MHz spectrum rights. If this were to occur it is unlikely to be proportionate to require Vodafone and/or O2 to turn off their 900 MHz GSM network on the day the results of the broader spectrum release process becomes known, as to do so would have the potential to cause serious consumer disruption with no countervailing benefits to the winners of such rights of use of spectrum, in circumstances where such winners would not automatically have equipment deployed."

ComReg's current Auction Proposal runs directly contrary to this statement. ComReg itself is proposing that consumers must be given at least 6 months advance notice of termination of any technology[1], however under the current proposal, Telefonica and Vodafone are likely to have less than six months to cease using the 900 MHz bands in the event that they do not win 900 MHz spectrum (although Meteor by contrast will have 3 years). As ComReg has accepted, were this situation to arise, it would lead to utter chaos in mobile telecommunications services in Ireland. There would be widespread loss of and disruption to customer services, with knock on effects on all aspects of economic and social life in the State, from disruption of public services, businesses, not to mention the destruction of the business of the operator in question, with significant job losses. New entrants to the band would simply not have sufficient time post-auction to rollout alternative services for these customers, while no existing operator has the capacity to pick up these customers if either Telefonica or Vodafone had to exit the band. However ComReg (and Dotecon's) sole response to this very serious issue in Document 11/60 is to assert that this risk has been eliminated with the selection of the CCA format, and that ComReg does not therefore need to take any steps to mitigate it. This is simply wrong. The logic applied is that Telefonica and Vodafone will be able to work out how much they would have to bid to secure spectrum and that they can therefore pay this amount, so that the risk of loss of spectrum does not arise. However, this wrongly equates knowing **how much** they have to pay with actually being either **able or willing to pay** the very significant sums involved. It is wrong to state that the risk of either operator not winning spectrum is eliminated or even that it is remote.

Both ComReg and Dotecon are simply assuming that both Telefonica and Vodafone can and will pay whatever it takes to buy 900 MHz spectrum for GSM continuity of service. (See for example Document 11/60 3.97 "*on the assumption that incumbent operators are willing to pay the price determined by the auction*"). Were either to fail to win spectrum, the auction would be a failure by ComReg, given the chaos and disruption that would ensue. Under its current proposal in other words, ComReg are claiming to set up an open auction, but are then banking on (or hoping) that Telefonica and Vodafone win spectrum in order to avoid a catastrophically bad outcome for the market, for customers and the wider society. However ComReg is not privy to the internal financial and strategic positions of either company, or

[1] 11/60, chapter 5.10

more importantly of their international parents or of competeing bidders either. Nor can it deny that there must exist a price at which one or both operators would decide they cannot or will not pay. This is not an assumption therefore that ComReg as a responsible Regulator is entitled to make. The risk – already expressly identified by ComReg as one that would have the potential to cause serious consumer disruption - remains.

As Regulator, ComReg is legally obliged to allocate spectrum in a responsible manner that avoids serious or unnecessary risks of the kind outlined above. In dealing responsibly with risk, ComReg will be aware that globally accepted risk assessment practice dictates it is not only the likelihood of the outcome arising, but also the severity of the consequences if the risk materialises, that determine the steps that must be taken to mitigate that risk. Thus risks are typically rated by both severity and likelihood. So a risk that is perceived by ComReg as having a low likelihood of occurring, but has extremely serious implications if it does, is rated a high risk, and must be mitigated against. Allocating spectrum in a manner that eliminates the risk of the kind of fundamental disruption outlined above, is the very basic "hygiene" or first step in determining an allocation strategy; every other factor, be it efficient allocation, revenue, rollout of new services or liberalisation must come second to this primary obligation of having functioning mobile communications services.

Essentially ComReg cannot "have its cake and eat it". If it is to take the position that existing operators must go into an auction and fight for their survival, with no extensions to protect GSM services, then it must plan that auction to cover the scenario where one of these operators loses, by leaving sufficient time post-auction for an orderly transition. Failure to do so is a fundamental failure in its obligations as a responsible Regulator. It also leaves itself open to the allegation that it is manipulating the auction set up to maximise the pressure on Telefonica and Vodafone (and not the other operators) to purchase spectrum or otherwise face the immediate loss of almost their entire businesses, thereby unfairly discriminating against these operators and unjustifiably driving up the price that they are forced to pay.

(iv) **Insufficient time to allow for a reduction in 900 MHz holding to 5 MHz**

Finally, the proposed start date of T1 leaves insufficient time after the auction to allow an operator who might have had its holding of 900MHz reduced from 2x7.2 MHz to 2x5 MHz to make the necessary adjustments to their network before licence commencement. This has implications not just for that operator, but also for the new licensee coming in to the spectrum block being vacated. Again the implications of leaving insufficient time are significant disruption to customers arising from loss or degradation of services. The effect is of pressurising an operator that might otherwise prefer to reduce its 900 MHz holding to 1 block, to instead increase it to 2 blocks, thereby potentially leaving less 900 MHz available for a new entrant.

Obligation to select a licence start date that leaves sufficient time post-auction to allow for all auction outcomes

6.2. Telefonica submits that ComReg is obliged to address the risks outlined above, by leaving sufficient time after the auction and before licence commencement to cover all potential scenarios of spectrum re-location, re-tuning, reduction or loss outlined above, in order to ensure that regardless of auction outcome there will be an orderly transition from the current licensing regime to the new regime after the auction without customer disruption. Telefonica has consistently maintained the position that this would take 4 years to cover the most disruptive scenario of spectrum loss, while ComReg's own advisors Vilicom suggest at least 2 years would be required. ComReg can then provide for advanced commencement of the new licences post-auction, in much the same way as is currently proposed, if an earlier start date then proves feasible once the outcome of the auction is known. Telefonica's specific proposals, which it believes balance earliest possible licence commencement with appropriate risk mitigation, are set out below.

Two Temporal Lots structure

Reduction in length of T1 to 18 months

6.3. The two temporal lots structure was first proposed by ComReg in Document 09/99. It is designed to work around the expiry of Meteor's 900 MHz GSM only licence in 2015. At the time, assuming a 2010 auction the T1 licence could have had a term of up to 4.5 years, with the T2 licence lasting 15 years. However, with the auction now not taking place until at least mid-2012, due to delay by ComReg, the T1 licence term has shortened considerably, to approximately 18 months. Telefonica understands that no other NRA has ever licensed spectrum on such a short-term basis (other than as an extension to an incumbent), nor is it aware of any other auction to have adopted the two temporal lots approach now being proposed by ComReg. Telefonica considers that this T1 licence has reached a point where, given its extremely short duration and the difficulties it creates for the auction, it must be fundamentally reassessed.

Risk associated with an unnecessarily complex and untested format

6.4. ComReg's advisers Dotecon recognise the complexity that having two time slices across three bands adds to the auction. Telefonica understands that this two-lot format exponentially increases the number of possible permutations of outcomes and bids to an already complex multi-band proposal. This is not a trivial issue. Added complexity increases the risk of error and uncertainty, both for ComReg and for auction participants. ComReg's aim should be to design an auction that as far as possible ensures efficient and fair allocation of spectrum; preferably using an established format that has been proven to work effectively in practice. Unnecessarily overcomplicating the auction, with an untested design and thereby increasing the risk of error (and having to re-run) is something that ComReg should seek to avoid. The

undesirable and unnecessary complexity created by the two time-slices has previously been flagged to ComReg, and Telefonica considers that this issue has not been fully or properly addressed by ComReg or its advisers.

Scope for gaming behaviour

6.5. ComReg and Dotecon have both taken the view that there is likely to be strong demand for 900 MHz in T1. In this circumstance, bidding for T1 will likely have disproportionate impact on the auction outcome over the 17 year licence period. In such a situation, Telefonica considers that there is a real risk of "gaming behaviour" by auction participants, whereby a bidder with lower demand can bid up the price for lots of spectrum for their competitors with greater demand, especially legacy demand which it is public knowledge must be met. Using an auction structure that facilitates price manipulation for unfair competitive gain would constitute a failure in ComReg's stated aim of ensuring efficient allocation of spectrum at the market price.

6 month gap in 1800 MHz licences for Telefonica and Vodafone

6.6. The Auction Proposal creates a six month gap between expiry of Telefonica and Vodafone 1800 MHz licences in 2014, and the proposed start of T2 licences in 2015. For the reasons outlined below, ComReg's refusal to provide an interim licence to bridge the gap engineered by the temporal lots proposal in itself renders the Auction Proposal legally non-compliant.

Scope for more refined bidding behaviour

6.7. Dotecon suggest that the two temporal lots allows scope for "more refined bidding behaviour", suggesting that operators might have demand for 900 GSM in T1 but not T2. This is only correct if a change in demand for spectrum in any band happens to coincide with the transition from T1 to T2. However demand for GSM will not simply disappear in 2015, meaning that there is likely to be limited scope for such adjustment of demand for 900 MHz between the two time slices.

Contiguity of spectrum across time lots cannot be guaranteed

6.8. ComReg suggests that it is possible to structure the allocation of spectrum to ensure that there will be temporal contiguity of spectrum allocation between the two time slices, meaning that an operator would not have to relocate within a band in 2015. Telefonica does not consider that this can in fact be promised, given the variety of permutations of spectrum allocation feasible under the two temporal lots proposal. One example would be where 3 operators buy two lots of 900 MHz each and a fourth buys 1 lot in T1. Then, in the second time slice, the fourth operator buys 3 lots, while the other operators' allocations reduce to 1 each. In that situation, it is not possible for the fourth operator to obtain contiguous spectrum without requiring at least 2 of the other 3 operators to move.

Alternative Proposals

6.9. Telefonica considers that there are several options open to ComReg that are more compliant with its statutory objectives. These options include:-

- 1 temporal lot with all blocks starting 12 months post auction except for 3 900 MHz blocks starting in 2015;
- 1 temporal lot with licences starting from 2014, & licence buy out;
- 1 temporal lot with licences starting from 2015.

Each of these is considered in more detail in the following sections.

1 temporal lot with all lots starting 12 months post auction bar 3 blocks at 900 MHz starting in 2015

6.10. This option would involve the three GSM operators releasing back 2x2.2 MHz of their existing 900 MHz holdings, in return for an extension to 2015 of 1 block each of 900 MHz spectrum. This would enable ComReg to auction all bar three blocks of 900 MHz with a licence start date of 12 months post-auction with the remaining 3 blocks being auctioned with a start date of 2015. This meets ComReg's objectives of having sufficient time post-auction for re-location and re-tuning, avoids the risk of consumer disruption, avoids having to buy out Meteor in full, (seen by ComReg as more difficult to achieve), avoids the increased risk and complexity of the two time slices, while ensuring there is sufficient 900 MHz available for purchase for liberalised services as early possible after the auction is held. There would be competition for all categories of blocks, given that any of the existing GSM operators is as likely to want more than 1 of the 3 2015 900 MHz blocks or a second block starting from 2014, ensuring a competitive auction for all blocks; equally with 4 blocks starting as soon as possible post-auction, any new entrant wishing to purchase 900 MHz has as good a chance of doing so under this proposal, as it does under the current proposal. The advanced commencement and early liberalisation options would still be available. Essentially, as the diagram below illustrates, the difference between the current Auction Proposal is 1 block of 900 MHz is potentially liberalised slightly later and the overall start date shifts out by a number of months; the latter is something Telefonica believes is a practical necessity caused by the later auction date.

Current Proposal – 5 lots available from early 2013, 2 from 2015, sold as lot categories

Reserved for Meteor until 2015	Reserved for Meteor until 2015	Open auction	Open auction	Open auction	Open auction	Open auction

Alternative Proposal – 4 lots available from 12 mths post-auction, 3 lots from 2015, 1 temporal lot

Reserved for Meteor until 2015	Reserved for O2 until 2015	Reserved for Vodafone until 2015	Open auction	Open auction	Open auction	Open auction

NB: the tables represent the number of lots only, rather than any specific location in the band.

1 temporal lot with licences starting from 2014, & licence buy out from Meteor

6.11. This is a variant of the modified auction format proposed by Vodafone in its response to Document 10/71. Telefonica appreciates that this was rejected by ComReg on the basis that (a) the two lots did not cause any real problems and (b) it would be too difficult to negotiate licence buy back from Meteor. With regard to (a) Telefonica submits that the issues raised by the two temporal lots are in fact substantial, and make this a format that should be avoided if, as is the case, there are other less problematic alternatives available. With regard to (b) Vodafone's proposal involved buy back of 2.5 years of Meteor's licence with Meteor being left in the same position as Telefonica and Vodafone if it failed to win spectrum, of having insufficient time to make alternative arrangements. However, Telefonica's proposal would involve buying back only 12 months of the licence, and would give Meteor a longer buffer between auction end and licence start.

1 temporal lot with licences starting from 2015

6.12. This is in effect the approach taken by a number of NRAs in auctioning spectrum; extending existing licences so that they all co-terminate, allowing for a straightforward auction of licences all with the same start date, without having to buy out any licences. As set out in detail in the Response to Document 10/71, it meets the requirement that there is sufficient time post-auction for orderly transition in and out of the 900 MHz band by an exiting operator and new entrant. Realistically Telefonica considers that even without this issue, the earliest licences are likely to be able to start is late 2013/early 2014, given the re-tuning and re-location time-lines so that there is not a significant difference in start dates in effect. It removes the need for temporal lots and thereby eliminates the risks outlined above of error, manipulation and licence gaps. ComReg and Dotecon have themselves acknowledged that 800 MHz based services are unlikely to be feasible much before 2015, so that there is no actual delay in the rollout of advanced services. The one disadvantage this option has over the previous two, is that it delays the liberalisation of currently unused 900 MHz. However ComReg has the discretion to liberalise existing licences, meaning that only the currently unused blocks would remain unliberalised.

Liberalisation issue

6.13. Applying ComReg's reasoning on balancing of objectives as set out in Document 11/29 Telefonica considers that the benefits of the options outlined above in better meeting ComReg's objectives outweigh the fact that full liberalisation is achieved later (though with option 1 only in the case of 1 block).

6.14. ComReg is placing undue emphasis in this Consultation Process on the need to liberalise "*as soon as possible"* – as per Commission Decision 2011/251/EU. By doing so, ComReg is failing in its obligation to encourage the interoperability of pan-European services and failing to follow the European Commission Decision which envisages that *"the current use of GSM in the 900 MHz and 1800MHz bands should remain protected in the whole Community as long as there is a reasonable demand for the service."* – as per Commission Decision 2009/766/EC.

6.15. It is not the case, as ComReg asserts, that it must proceed with liberalisation immediately, without due regard to the regulatory and licensing circumstances it has created. ComReg continues to have a discretion in this regard and an obligation to take account of the specific needs of the electronic communications sector in the State. In particular, ComReg is acting contrary to its obligations as a Regulator by proposing to conduct an auction at a time when there is still uncertainty and a lack of clarity surrounding the availability of spectrum in the 800 MHz band. ComReg has a statutory obligation to promote the provision of clear information to operators, and is failing in this obligation by refusing to provide clarity on a matter that could have significant impact on the approach operators take to acquiring spectrum and its value.

6.16. ComReg fails to take into account the actual benefits to consumers in allowing for a later start date, given that the lead time post-auction and pre-licence commencement has now been significantly reduced to 6 months or less. As a Regulator, ComReg has a statutory obligation to implement new measures in a proportionate and non-discriminatory manner and to adopt an option that has the least adverse effect on operators and consumers – this applies to liberalisation, as it does to any other matter. A slight delay to the proposed start date of new liberalised licences is the more appropriate and proportionate course of action in circumstances where such a delay would be relatively short and would result in an overall benefit to consumers and operators which outweighs any disadvantage or cost of delay. In particular, any such delay would be insignificant in the context of the time it has taken to conduct this Consultation Process and the overall licence period of 17 years that is proposed for the new licences.

6.17. In summary therefore, ComReg and Dotecon will have to push out the licence start date to provide a sufficient buffer post-auction, have underestimated the problems caused by the two temporal lots approach and overstated the difficulties associated with the alternatives

available. They have not updated their proposal to take account of the changes brought about by the passage of time and delay in the auction since the start date and the two temporal lot proposal were first proposed. Telefonica believes that ComReg should now revise its approach to the start date and the temporal lots and is willing to work with it and the other operators to come up with a solution that is more compliant with the totality of ComReg's obligations.

7. Full Assignment Round

7.1. Telefonica supports ComReg's proposal for a full assignment round, however only subject to appropriate compensation being made to an operator who incurs additional cost as a result of this. ComReg and DotEcon have considered various outcomes of the full assignment round, and have concluded that there is no case where an operator might be forced to undertake network re-tuning or re-engineering as a result of the full assignment round, but the worst case would involve undertaking such work earlier than would have occurred without the full assignment round.

7.2. This conclusion seems to have been derived without proper consideration of the point made by Telefonica in response to questions 6 and 7 of document 10/105. Telefonica believes there is a circumstance where the full assignment round would cause an operator to incur network re-tuning or reconfiguration costs that would otherwise not occur.

7.3. At present, three operators hold licences to operate GSM networks in the 1800MHz band, with termination dates at the end of 2014 and mid 2015. Those operators can expect an entitlement to continue to operate their licences up to the relevant termination date without modification if they so choose. If ComReg proceeds with the auction as proposed including two temporal lots, then it would be entirely reasonable for one of the existing licensees to want to operate their existing licence to termination, but also to bid to buy liberalised 1800MHz spectrum in the second licence period for some or all of their 1800MHz spectrum. In the event that the operator was successful in their bidding, then they might roll-out an LTE or other network for operation in the second period. In this case no re-tuning of the GSM network occurs as a result of any decision by the operator – they would expect to continue to operate the GSM network as licensed in T1, and would have an entirely different network in T2.

7.4. If however, the operator is forced to re-tune its GSM network during T1 as a result of the outcome of the assignment round for T1 then the operator should be entitled to appropriate compensation for the costs involved. This is not simply bringing forward the date when the cost is incurred, it is a new cost caused only by the use of a full assignment round in T1.

7.5. ComReg should accept as a principle that if a network operator incurs costs as a result of the full assignment round that they will be appropriately compensated. The above is one example that must be catered for, however there might be more.

Contiguity of spectrum for Network Sharing Operators

7.6. The Auction Proposal essentially prevents joint bidding by any combination of the existing GSM operators, including Telefonica and eircom/Meteor who have a network sharing agreement. Telefonica submits however that in the interests of facilitating efficient spectrum management ComReg should provide for contiguity of the spectrum allocated to Telefonica

and eircom/Meteor following the auction. Under the current proposal, as Telefonica and eircom/Meteor or other network sharing bidders will not have information about each other's bidding during the auction, it will not be possible for them to bid to ensure a contiguous allocation. However, given that contiguous spectrum obviously allows for more efficient network operation and spectrum use, and as such furthers a key objective of ComReg, Telefonica is requesting that ComReg structure the allocation round to facilitate this contiguous assignment

8. Interim rights of use in the 1800 MHz band

8.1. The two temporal lot proposal creates a gap between the expiry date of Telefonica and Vodafone's current 1800 MHz GSM licences at the end of 2014, and the start date of new licences in mid-2015. In Document 11/60 ComReg specifically refuses to commit to granting an interim licence to Telefonica and Vodafone to bridge the gap between licences. ComReg's position is that it will "re-consider the matter once the outcome of the auction is known....and determine whether to grant such licences".

8.2. Telefonica believes that this stance by the Regulator is contrary to its obligations and objectives, and in itself renders the Auction Proposal as a whole legally non-compliant. As noted above it is ComReg's obligation to manage the licensing of spectrum to facilitate the provision of mobile communications services to the public. This Auction Proposal however engineers a situation where there is likely to be a gap in such services for a six month period.

8.3. ComReg's rationale is that "it is very difficult to ascertain in advance the probability that Vodafone and/or Telefonica would, as a result of the auction, be placed in a position where they would seek the grant of interim GSM rights of use in the 1800 MHz band. Equally it is difficult to evaluate the consequences to Vodafone and/or Telefonica of not having such rights of use". This stance is inexplicable and simply wrong. It flies in the face of the facts. Telefonica currently uses its 1800 MHz spectrum for GSM services only **[Redacted]**. Finally, the very high price for 1800 MHz spectrum **[Redacted].** In the circumstances, Telefonica would reiterate, as it informed ComReg in its Response to Document 10/105, that it is possible that it will not be seeking to liberalise some or all of its 1800 MHz prior to licence expiry, something it is legally entitled to do. For ComReg to state, in the face of these submissions that it is "very difficult" to know whether it is likely that 1800 MHz spectrum will be kept for GSM is inexplicable. **[Redacted]** Equally the consequences of a loss of 1800 GSM spectrum for 6 months are not "very difficult" to assess. **[Redacted]**

8.4. Even more important and more problematic however, is the effect of ComReg's refusal to confirm that it will grant licences to bridge any such gap. As outlined by Telefonica in its Response to Document 10/105, ComReg is creating a situation where Telefonica and Vodafone are being put under pressure to hand back their existing licences and purchase more expensive liberalised spectrum **[Redacted].** Telefonica fully reserves its legal rights in relation to this issue. We would refer you to both our own and other operators' submissions on this point in the Responses to Document 10/105.

8.5. The exact same principles apply to the present situation as did when ComReg granted interim licences in May 2011 to Telefonica and Vodafone to cover the gap between expiry of existing

900 MHz GSM licences and the proposed start of new licences in January 2013. ComReg in Document 11/11 set out all the reasons why such an interim licence is both necessary and justifiable (primarily to facilitate spectrum planning and allocation, and avoid consumer disruption caused by loss of licence). It is simply inexplicable that ComReg is not prepared to take similar steps (on a much smaller scale, for a much shorter period) to deal with the 1800 MHz 6 month gap created by its proposal. Telefonica must therefore reiterate its position that ComReg is legally required to confirm that if it persists with its Auction Proposal and if a 6 month gap emerges, that Telefonica will be given the option to obtain a 6 month licence for continuity of services to customers prior to the start of new licences in the 1800 MHz band. The alternative is to eliminate this gap altogether by means of one of the options outlined above. Telefonica is of the view that an auction can not proceed until this matter has been clarified, and reserves its position in this regard

9. Spectrum fees

9.1. Telefonica continues to have significant concerns with the approach taken by ComReg to setting the minimum price in the proposed auction. Many of these concerns have already been stated in our responses to the previous consultations, and while it is acknowledged that the proposed minimum price has been amended in the latest proposal, Telefonica does not believe that ComReg and DotEcon have given due consideration to the concerns raised (and in several cases has not responded at all to specific concerns). Telefonica's statements in response to the previous consultations, including ComReg's Spectrum Strategy (11/28) remain valid and have either not been fully considered, or the consideration not fully explained by ComReg to date.

9.2. It is not proposed to repeat all of the submissions made in response to the previous consultations here, however we reiterate our opposition to a number of the aspects of the approach to setting the minimum price and usage fees, including, the use of benchmarks, the benchmark produced by DotEcon in this case (including the use of GDP), ComReg's application of the benchmark to derive minimum prices below 1GHz, the relativity pricing for 1800MHz, and the indexation of future spectrum usage fees.

Minimum prices

9.3. In document 11/60, ComReg continues to propose minimum prices that are exceptionally high, both for spectrum above and below 1GHz. There remain standing only two valid reasons given by ComReg for such high minimum prices: deterring frivolous bidders; and preventing collusion in the auction by incentive reduction. There seems little debate that the former can be achieved by minimum prices set at a fraction of those currently proposed, which leaves only the prevention of collusion as the claimed justification for setting of such high minimum prices. This has led to ComReg attempting to anticipate what the sale price would be in Ireland for each category of lot and setting the minimum close to that level. Telefonica believes this is an impossible task as only the auction itself will determine the value of each lot. Any attempt to do so is prone to significant and substantive error, the consequences of which could be to cause spectrum to remain unsold. This would be an inefficient outcome and would be contrary to ComReg's objectives.

9.4. ComReg has not explained why it believes the proposed CCA in Ireland is more susceptible to collusion by bidders than in any other market. We note that the CCA is specifically designed to produce an efficient outcome (see further comments below) and that where this issue has arisen before, ComReg has chosen the bottom of the anticipated range of prices on the basis that a properly designed auction mechanism prevents collusion (e.g. Section 4.1 (footnote 6) of document 07/93R, 26GHz Information Memorandum). Telefonica has previously proposed that DotEcon should produce a benchmark of minimum prices as another indicator for ComReg, however this does not seem to have been considered.

9.5. Telefonica urges ComReg to revisit its approach to setting the minimum prices for this auction. Our view is that prices across the three bands have been set unduly high, contrary to ComReg's objectives in failing to provide for the efficient allocation of spectrum, needlessly exposing Ireland to the risk that lots may go unsold unnecessarily, and negatively impacting upon pricing of services and ability to invest in new products. We believe that this problem has arisen owing to errors in the benchmarking methodology employed to derive the potential ranges for minimum prices, and misinterpretation of ComReg's own objectives, when selecting price levels within these ranges.

Benchmark

9.6. As stated in response to previous consultation documents, Telefonica has concerns about the use of benchmarks as a means to determine pricing. In order to be useful, they must produce a relevant set of data from situations that are directly comparable to that in Ireland at the current time. This is never completely possible and as a consequence benchmark results can have a significant error margin that renders them unreliable. This is recognised by DotEcon as they have included a number of adjustments and corrections to the source data in order to attempt to account for the individual characteristics of auction results. Telefonica's view is that the benchmark results are little more than an indicator, that should be used cautiously.

9.7. When applying benchmarks to another country, they must always be interpreted in light of the specific circumstances of the local market. We strongly believe that the current model does not take account of a number of Irish-specific issues, which if included in the model would result in a lower benchmark range.

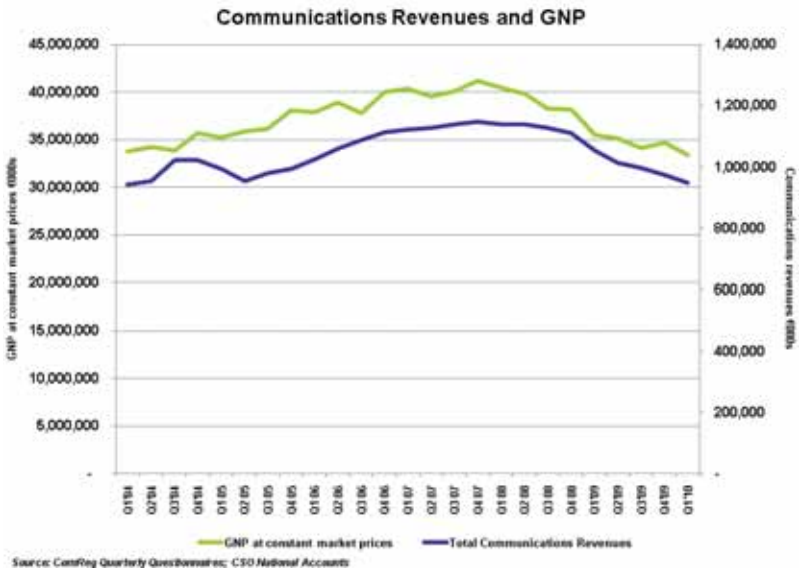
(i) Use of GDP

Telefonica has previously raised a specific concern (response to 10/71) regarding the use of Gross Domestic Product (GDP) rather than Gross National Product (GNP) in the benchmark report, and we refer to our previous detailed submissions on this issue. We remain of the view that GDP is not a useful comparator for the Irish economy because of the large distorting effect of non-national trade. This view was also expressed by several other operators. GDP in Ireland is currently over 22% greater than GNP, and where there is such a divergence, GNP is a more relevant comparator for the value of a spectrum licence. The value of the licence is derived almost exclusively from anticipated revenue generated by servicing Irish consumers. The consumption and revenue generated will be determined by the welfare of those consumers, and on the contrary will be minimally influenced by the value of non-national but domestically located production. Neither ComReg nor DotEcon have adequately answered this point of criticism in documents 11/58, 11/59, or 11/60.

9.8. In document 11/59, DotEcon states that they ". . . opted to use GDP as an independent variable in our regression analysis rather than GNP as it is a better

reflection of the domestic income levels within Ireland". Telefonica believes this view simply cannot be sustained on analysis, given the particular circumstances in the Irish economy. State agencies including Forfás have repeatedly stated (e.g. in its Annual Competitiveness Reports) that GNP is a better measure of Irish living standards than GDP. In its most recent quarterly bulletin, the Central Bank forecasts a continuing divergence between GDP and GNP, with the latter having slower growth. DotEon appears to have dismissed this consideration on the basis of cursory examination, and must now re-examine the impact that a change to use of GNP would have on its benchmark report.

9.9. Telefonica notes that ComReg itself has used GNP rather than GDP as an indicator of overall revenues in the communications markets, for example in document 10/73r:



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(ii) The Irish Economy

It is impossible to believe that the current state of the Irish economy will not have a significant impact on valuations. All expert analysis states that the Irish economy will continue to struggle for several years, with the current unprecedented uncertainty making it impossible to obtain a consensus prediction for recovery. The only consensus available seems to be for the short term, where it is predicted that domestic demand will continue to contract[2]. ComReg has derived minimum prices

[2] E.g. Central Bank Quarterly Bulletin, Q4 2011

based on anticipated bidder valuations using discounted cash flows. This means that the early years of the licence will have a far greater impact on the overall valuation than later years. The market for mobile services is currently shrinking by approximately 10% in per annum. Bidders now preparing their valuations for spectrum will take into account recent trends in overall market revenue, and predicted future revenue, which is dependent on the overall national economic performance. ComReg must accept that consequentially the current difficult circumstances of the Irish economy will have a significant impact in reducing bidder valuations. This has not been adequately taken into account in the benchmarking report. The only response to this issue, which again was raised by all operators, is Dotecon's statement that "*including recently completed auctions in the dataset used for our analysis will be informative on spectrum valuations in the current economic climate*" (Doc 11/59, paragraph 36). However, none of these auctions took place in countries undergoing a recession of the severity and length of that in Ireland, and cannot be taken as a substitute for taking into account the actual state of the Irish economy, particularly when there is plenty of data available on this subject.

We would also take issue with the assertion in paragraph 37 (Document 11/59), based on studies in other countries that consumer demand for telecommunications services is more resilient than other services implying that the downturn is not having a serious effect on mobile operators business; again, as is set out in section 2, demand for telecommunications services has been badly affected by the present downturn. Finally, Dotecon emphasise the long term nature of the licences and argue that therefore the transient component of shifts in GDP should not have much effect on the value of long-lived assets. This ignores the fact that the bulk of the valuation of spectrum is based on their short term value, given the impossibility of predicting the state of the telecommunications market over a longer period.

(iii) Failure to allow for differences in country sizes

Telefonica has repeatedly made the point in previous submissions that pricing for spectrum in larger countries is not an accurate reflection of the value of spectrum in smaller countries, where the smaller market means that there is less opportunity to generate revenue. ComReg has failed to respond to this submission, and Telefonica again requests that it do so.

(iv) Change in winner to bidder ratio

Dotecon's report on this issue is unclear. However, it suggests, in paragraphs 97-101, that, having previously used a winners to bidders ("WTB") ratio of 0.86, it used a WTB ratio of 0.77 in its most recent calculations. This change has a significant impact on the benchmark range – had Dotecon maintained its original 0.86 ratio, the

minimum price according to table 11 would have been several million euro lower – with the bottom end dropping from €15 million to €12 million. This change in WTB ratio seems to have been motivated by the observation that recent auctions in other jurisdictions had proven competitive, resulting in a lower WTB ratio in its auction dataset. However once again there is simply no analysis of whether this would translate into greater demand in the Irish market. Again, for such a significant price increase (a 25% increase in the bottom end of the range), Telefonica believes that ComReg and Dotecon are required to provide actual substantiation. Otherwise they are open to the allegation that the WTB is being manipulated to push the price back up again, when other recent changes, such as the drop in GDP had pushed it down slightly. Further, as noted below, ComReg's stance in altering the WTB ratio (perceived increased competitiveness) contradicts the position it is taking on tacit collusion, where it strongly asserts the risk that the auction will not be competitive. That the output of the benchmark model is so sensitive to a single variable that it can be adjusted by DotEcon without analysis of specific local market conditions essentially gives ComReg and Dotecon a free-hand to adjust the output arbitrarily. This calls into question the credibility of the entire model as an objective means to determine minimum prices.

(v) Selective exclusion of recent auctions without substantiation

Finally, Telefonica notes that while claiming to use a comprehensive dataset of recent auctions, Dotecon have selectively excluded a number of recent auctions, without strong justification. For example, recent 2.6 GHz auctions are excluded. According to Dotecon these prices "depressed price predictions", however they are excluded owing to a subjective analysis that the rules and the caps were "flawed"; but with no substantiating data provided to justify this. Telefonica also notes the exclusion of other auctions which would have reduced the predicted price, including the Danish auction on the basis that it was "uncompetitive" and the Swedish 800 MHz auction on the basis that several of the blocks were less valuable than others, impacting price. Telefonica disputes these exclusions as not being sufficiently justified and having the effect of keeping the predicted price up

ComReg's Selection within the Range

9.10. We also strongly object to ComReg's failure to propose minimum prices at the lower end of the value range identified by its advisors.

9.11. The benchmark analysis conducted by DotEcon in its 09/99c report produced an estimate of the market value of 900 MHz spectrum of between €16m and €34m per 2x5 MHz lot. This was subsequently revised to €18m to €26m in DotEcon report 10/71b. We note that in the original report, DotEcon did make a recommendation that prices are set towards the higher

end of the range; however, on revision, DotEcon pointedly did not make any specific recommendations regarding setting reserve prices within the interval, while in the most recent report, they repeatedly urge caution in the selection of minimum prices, and specifically recommend selection of a price from the lower end of the range (see for example paragraph 4.202, Document 11/60). As Telefonica stated in response to 10/71, ComReg should have opted for the bottom of range produced by the benchmark (and for the avoidance of doubt, this meant procedurally ComReg should have chosen the bottom of the benchmark following revision, not that Telefonica believed that €18m was the correct value as is suggested by ComReg (11/60 paragraph 4.175)). Nevertheless, ComReg has persisted in selecting reserve prices significantly above this level. We believe there are several problems with this methodology.

9.12. **(i) Middle of the range is contrary to ComReg's objectives**

First, we consider that this decision is at odds with ComReg's own statutory objectives, which emphasises the efficiency of spectrum allocation and assignment as the most important goal of any award, above other concerns, such as raising revenue. We consider that the economic and regulatory case for setting minimum prices at the bottom end of the range is overwhelming

(ii) Benchmarks are prone to error

Telefonica believes the benchmarking approach is prone to significant error. Again, in response to document 10/71 we requested that ComReg should have DotEcon produce a graph or table showing the results produced by the model compared with the actual results achieved in the 12 most recent auctions. This request has not been responded to.

(iii) Implications of setting price too high are more serious than setting it too low

It should be recognised that the cost of setting the minimum price wrong is asymmetric. If reserve prices are set too high, the implication is that the allocation of spectrum will be inefficient; bidders may be deterred from bidding and lots may go unsold unnecessarily. By contrast, if the minimum price is set too low, the implication is that the auction might raise less revenue but this only occurs if the auction is uncompetitive. Given ComReg's statutory objectives to promote efficient spectrum use, we believe the former concern must outweigh the latter and the reserve prices should therefore be set at a more conservative level (i.e. no higher than the bottom of the range produced by DotEcon as adjusted). At no point has ComReg considered the relative impact of setting the minimum price too high versus setting it below the anticipated market value. This should be considered within ComReg's Regulatory Impact Assessment.

(iv) Setting price from within the benchmark contradicts ComReg's stated objectives

According to ComReg "*the benchmark methodology does not attempt to set the market value of the spectrum. The minimum price is the starting point in the auction for the spectrum price...therefore the efficiency of the auction will not be impacted once the minimum price is set a reasonable safe distance below the likely market value of the spectrum*" (A9.88). The first statement in this quote is not correct – Dotecon's price range extends to figures that attempt to reflect the market value of spectrum by reference to the sale price of similar spectrum in other jurisdictions; it claims to be "*a lower bound estimate of the market value of liberalised 900 MHz spectrum*" (paragraph 8 Document 11/59) but this makes it an estimate of market value nonetheless. Consequently to avoid setting the reserve price at a possible market price, as ComReg itself acknowledges, it should take this benchmark range, and then set the minimum price "*a reasonable safe distance below the likely market value*" i.e. below the bottom of the benchmark price range identified by Dotecon.

(v) Uncertainty related to the benchmark argues for a cautious approach

Dotecon highlight several aspects of the benchmark which merit taking a cautious and conservative approach to setting the price. These include uncertainty in the relative pricing of 1800 MHz versus 800/900 MHz spectrum noting that *"the exact relative valuation of 1800 MHz to that of sub-1GHz spectrum is not crucial for this purpose provided any uncertainty is reflected in appropriate conservatism in setting the level of the minimum price".* Telefonica notes that there is also uncertainty in the relative pricing of 800 MHz and 900 MHz. This uncertainty is acknowledged to be greater in the most recent report, as a result of lower perceived substitutability in the short term. This again would argue for a cautious approach to price setting. The 800/900 MHz relative pricing uncertainty is not addressed by Dotecon in Document 11/59. Other uncertain factors include uncertainty of demand, and of the impact on pricing of auctioning multiple bands simultaneously. All of these factors argue for a conservative approach to pricing, and mitigate against selecting anything higher than the bottom end of Dotecon's range.

(vi) Impact of the addition of CPI

ComReg selects a headline price of €20 million for 800 & 900 MHz spectrum, on foot of Dotecon's recommendation that it select a price from the lower end of its range. However, applying average CPI to this price over the proposed term produces a minimum price of €24 million, which is the higher end of Dotecon's range.

ComReg's previous approach to price setting against benchmarks

9.13. The approach described above (setting the minimum no higher than the bottom of the range) would also be consistent with ComReg's previous best practice on setting minimum prices for auctions. The emphasis on efficiency as the key objective and the resulting decision to set reserve prices at the low end of a benchmark range is expressed by ComReg in document 07/93R (Information Memorandum for the 26GHz award):

> *"There is no exact methodology for setting minimum prices for a spectrum auction. However, a number of considerations arise in the context of the 26 GHz national block award process. On the one hand, the minimum price must be high enough to deter frivolous bidders reduce the gains from collusion or demand-reducing strategies; and, encourage bidders to return licences they are not using. On the other hand, the minimum price must be low enough to stimulate participation in the auction; and avoid choking potential demand off inefficiently. ComReg's key priority in this auction is to support the efficient use of spectrum. In that regard an important consideration is to set the minimum price at a level that facilitates participation by serious bidders such that the auction process can then determine the true 'market' or 'economic' value of the spectrum. A number of methodologies for determining an appropriate minimum price for the 26GHz national block assignment were considered. A benchmarking-based approach, using evidence from comparable awards in other countries, was the preferred choice due to its practical, transparent and evidence-based nature. The results of the benchmarking approach indicated that a minimum price in the range of €350,000-€450,000 per lot would be appropriate for this award. As ComReg considers it important that the value of the spectrum is determined by the auction itself and the minimum price should be at a level that promotes participation in the auction process, a minimum price of €350,000 per 2x28MHz lot was chosen. It is considered that this price would minimise the risks of demand being choked and spectrum going unused inefficiently, while also deterring frivolous bidding and/or strategic manipulation of the auction process."* [3]

The Tacit Collusion premium

9.14. ComReg's selection of €20 million as the minimum price for sub-1GHz spectrum rests entirely on the unsubstantiated claim that this auction is vulnerable to tacit collusion amongst bidders, This single issue has greater impact than any other on the final minimum price selected. The tacit collusion "premium" over the minimum price recommended by Dotecon alone is in excess of €100m across all lots, accounting for a quarter of the total price of all lots at the reserve price (the total being €410 million). As such it is one of the most significant issues in the entire consultation. Telefonica considers that ComReg's position on this issue is wrong, unsubstantiated and runs contrary to its legal and regulatory objectives. We strongly submit that ComReg revisit its position on this issue before it proceeds to a final decision. The

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3 ComReg 07/93R (26GHz Auction), section 3.2.1.

following factors are relevant:

(i) ComReg's claims on likelihood of collusion are unsubstantiated

In the first instance, ComReg provides absolutely no evidence, no data to substantiate its assumptions about likelihood of collusion by bidders. This is notwithstanding the fact that all of the operators highlighted the lack of substantiation in their responses to Document 10/71, and requested that it be provided. It makes statements such as "Given the concerns about tacit collusion", but provides no basis for these concerns. Given the very significant impact that the tacit collusion premium has on the minimum price, and the fact that a higher price goes against a number of important ComReg objectives, ComReg is legally required to base such concerns on actual evidence and analysis rather than unsubstantiated assertions.

(ii) Choking off demand – unsubstantiated assertions

According to ComReg, in selecting a price within the Dotecon range, "*the primary consideration is the trading off of the suppression of incentives for strategic behaviour to weaken competition within the auction and the risk of choking off demand from serious bidders*". Both ComReg and DotEcon then go on to assert that €20 million will not choke off demand. However once again there is simply no evidence, no data of any kind to substantiate this assertion. As previously noted, there is no analysis of levels of demand and value in the Irish market in any of the ComReg or Dotecon documents, a deficiency in itself, and one that makes this assertion around choking off demand completely unfounded. Telefonica therefore reiterates that ComReg must do the work to properly assess levels at which demand could be choked off before it makes such crucial decisions, especially in a situation where every single operator has objected to the proposed price as excessive. The reality is that the **only** way to avoid choking off demand is not to set the price too high, so it is crucial that this analysis is done. By contrast, ComReg has a whole range of tools to prevent collusion, including the auction format itself, which is specifically designed to prevent collusion.

(iii) ComReg wrongly conflates "natural outcomes" with collusion and seeks to penalise legitimate outcomes

In several places in Documents 11/60 concern is expressed about the possibility of a "natural outcome" where low demand for spectrum results in lower prices. This includes reference to demand being reduced via joint bidding. (see for example paragraph 100 in Document 11/59), where Dotecon refer to an auction outcome where no new entrant materialises and note that they would not set the minimum price to reflect this (quite likely) scenario as "*in such a case wining bidders would be enjoying a significant surplus by paying much less than value and such a level might*

not be consistent with disincentivising tacit collusion and/or pre-auction consolidation" Dotecon goes on to refer to setting the minimum price to prevent operators from benefiting from these outcomes. However, as Telefonica pointed out in its response to Document 10/71, an outcome that results from low demand is indeed a natural outcome but it is also an entirely legitimate and legal one. It is not collusion, tacit or otherwise, it is simply the logical consequence of there being more spectrum available than there is demand for it, and represents efficient allocation of spectrum via open auction. ComReg is not entitled, under its statutory objectives and obligations, to seek to penalise or prevent such legitimate outcomes simply because they result in lower prices; as long as they are efficient outcomes its objectives are met. To take the example given by Dotecon above, the existing operators are not at fault, and should not be penalised with a higher price than would otherwise have been reached, for a scenario where no new entrant materialises; ComReg is not entitled to increase the minimum price simply to prevent operators paying the market value in that situation. Further, neither ComReg nor Dotecon are legally entitled to structure the auction to "disincentivise" legitimate "pre-auction consolidation" as Dotecon suggest – as is set out in more detail in the section on joint bidding. Both are contrary to ComReg's statutory objectives.

Fears of collusion focus on 900 MHz in T1 as a result of the new sub-cap

9.15. ComReg acknowledges in Document 11/60 that the addition of the 800 MHz and 1800 MHz bands reduces the likelihood of collusion but goes on to state that,

> *"upon closer consideration ComReg remains of the view that a natural outcome could still be tacitly reached, especially in respect of the 900 MHz band given the 900 MHz sub cap proposal in the first time slice."*

Again, the concerns about 900 MHz spectrum price collusion are unsubstantiated. However, even if they could be substantiated there are a number of serious problems with using T1 900 concerns to justify a 25% price increase across all bands and temporal lots. In the first instance, the 900 MHz sub-cap is ComReg's own invention, only introduced in this latest consultation. If, as appears to be the case, tacit collusion is **the** overriding fear of ComReg, accounting for 25% of the proposed price it is inexplicable that ComReg would on its own initiative introduce a sub-cap that by its own analysis increases the likelihood of such collusion, and then react to this by hiking up the price, when surely the more rational approach is not to introduce the sub-cap in the first place. Second, as Telefonica has previously set out in detail, this sub-cap proposal is problematic and unnecessary and should be dropped. Once dropped ComReg must revisit its tacit collusion concerns and premium, if the T1 900 licence is in fact the primary driver. Finally, the 900MHz T1 licence accounts for a fraction of the total number of spectrum licences on offer (7 out of 46 licences over the two temporal lots). ComReg is required to act proportionately; it is not proportionate to

substantially increase the price of the remaining spectrum across all other bands and temporal lots as a result of concerns predominantly relating to this one category; a more proportionate response is to deal with the issue by deploying measures affecting only the specific spectrum giving concern.

Contradictory stance on competitiveness of the auction

9.16. ComReg is taking a contradictory stance on the competitiveness of the auction, which has the effect of driving up the minimum price further. In setting the benchmark, Dotecon assume a minimum of 5 bidders, and use a winner to bidder ratio of 0.77 or 0.8. Reference is made to using a lower winner to bidder ratio than previously applied by Dotecon in earlier consultations, on the basis of an assumption that the auction will be more competitive than previously anticipated. This change has a significant effect on the benchmark range, raising the bottom of the range from €12 million to €15 million. However, by contrast the entire tacit collusion argument is based on the assumption that the auction will not be competitive, leaving scope for collusion; and tacit collusion is then justified to increase the minimum price significantly. Telefonica considers that ComReg cannot logically sustain such contradictory stances and include price increases for both; one of the increases must be dropped.

Tacit collusion and ComReg objectives

9.17. As has been highlighted by other operators as well as Telefonica, ComReg's prioritisation of tacit collusion over other objectives to such a remarkable extent is both contrary to its statutory objectives and stands out amongst other NRAs which have not seen a requirement to elevate the issue to such an extent. ComReg seeks to justify its divergent approach on the basis that other NRAs have different objectives. However as ComReg will be aware, all NRAs should have the same objectives under the relevant EU legislation, so that claiming divergent objectives does not justify ComReg's position.

Setting minimum price at market value

9.18. ComReg appear to be taking a contradictory position on the issue of whether the proposed minimum price represents the estimated market value. On the one hand, at paragraph 9.10 ComReg state that "*setting a higher minimum price, and particularly one that would more closely reflect the real economic value of spectrum access would reduce the opportunity/ability and incentives of bidders to engage in such behaviour*". However, several paragraphs later, when seeking to counter the criticisms of operators that it should not set the minimum price at the market price, it states that *"the efficiency of the auction will not be impacted once the minimum price is set a reasonable safe distance below the likely market value of the spectrum,"* In other words, ComReg having stated that its priority is eliminating tacit collusion by setting the price at or near the market value, then go to claim that it is also setting the price safely below the market value. The reality is that it is consciously aiming for what it thinks is the market value to tackle the perceived threat of collusion, and is prepared to

take the risk in doing so that this price is too high. Telefonica believes that under its obligations and objective this is not a risk that ComReg is entitled to take; ComReg's objective is the efficient allocation of spectrum, and an excessively high price is as much of a failure as would be facilitating collusion (which is adequately eliminated by other means).

Auction Format Should Prevent Collusion

9.19. For this award, the current decision by ComReg to opt for a minimum price significantly above the minimum appears to rest on the unsubstantiated claim that this auction may be vulnerable to tacit collusion amongst bidders. We note that this was mentioned as a reason by DotEcon for setting reserve prices towards the higher end of the range in their initial analysis. However, the auction method has now changed to CCA, and in their subsequent work and revision to minimum prices ranges DotEcon omit this issue, which we would interpret as an acceptance that the claim that there is high risk of tacit collusion is weak.

9.20. We strongly urge ComReg to review its concerns about tacit collusion in light of its decision to use a combinatorial clock auction for this award. This format has well understood incentive properties that make tacit collusion impractical. Indeed, we note that both DotEcon and Professor Peter Cramton of Maryland University - who we understand were the two advisors that assisted Ofcom in developing the combinatorial clock auction format – are on record in highlighting the anti-collusion benefits of the CCA format, if necessary with restricted transparency:

DotEcon: "During our own research and the emerging academic literature on combinatorial auctions, DotEcon developed two practical designs for combinatorial auctions: the Sealed Bid Combinatorial Auction (SBCA) and the Combinatorial Clock Auction (CCA). User benefits includes… Incentivising straightforward, value-based bidding by participants by deterring collusion and gaming strategies"[4]

Peter Cramton: "The conclusion from the now long history of spectrum auctions using the simultaneous ascending auction is that it works reasonably well in simple situations with a single geographic scheme. However in more complex settings, the approach leads to complex bidding strategies that complicate the auction and may undermine the efficient assignment of spectrum. Fortunately, there is a better way. All that is needed is a number of complementary enhancements that ultimately simplify the bidding process, improve its efficiency, and greatly expand its power. First, much of the game playing, such as tacit collusion and other bid signaling, can be eliminated with a shift to anonymous bids. In a package clock auction the round-by-round revelation of information is limited to aggregate

4 Source: DotEcon Media Backgrounder, Spectrum Auctions, available at: http://www.dotecon.com/publications/mbSpectrumAuctions.pdf

measures of competition. Limiting round reports to prices and excess demand for each product gives the bidders the information needed to form expectations about likely prices and in resolving common value uncertainty, yet such reports do not allow the signaling strategies that support tacit collusion. Moreover, the streamlined report simplifies bidder decision-making and keeps the bidders focused on what is most relevant, the relationship between prices and aggregate demand."[5]

9.21. As these comments show, ComReg already has tools to hand to resist the theoretical risk of tacit collusion, such as its choice of auction format, and, if necessary, restrictions on information revelation in the auction. It is incomprehensible that even though ComReg has an auction design that is claimed to prevent collusion, it still persist in justifying a high minimum price on the need to reduce the incentive to collude. It is simply unnecessary to use minimum price setting as a tool for tackling tacit collusion, and inappropriate, given the risk to the efficiency of the auction outcome.

9.22. Finally, we note that the results of the benchmarking work appear to be very sensitive to changes in input data or assumptions about the variables used. To give one of many possible examples, observe that the estimated range for market value is based on an estimate of the winner to bidder ratio. It appears that ComReg has selected a ratio of 0.77, reflecting an anticipation of a reasonable level of competition in the auction. This seems at odds with the concern that tacit collusion could derive from some kind of common industry assumptions of a 'natural' division of the lots between incumbents. A more consistent application of the winner to bidder ratio would be to set the ratio to 1 and select reserve prices at or below the bottom end of the range (as previously recommended by DotEcon[6]), or to set the ratio to e.g. 0.77 and select reserve prices significantly below the lower end of the range.

9.23. More generally, we note that the availability of benchmark data varies across bands, and the decisions about relative prices across bands appear to be driven more by a desire to maintain a consistent ratio with the proposed eligibility points rather than any clear steer from the valuation data. Furthermore, there are no benchmarks at all for valuing temporal lots, and the minimum price division between time periods is based on arbitrary assumptions about the discounted value of future profit streams, rather than any underlying consideration of the usefulness of particular frequency bands (based on availability of network equipment and handsets, roll-out timetables and local market development).

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5 Peter Cramton, 'Auctioning the Digital Dividend', International Workshop on Communication Regulation in the Age of Digital Convergence: Legal and Economic Perspectives Karlsruhe Institute of Technology, Karlsruhe, 2 December 2008.

6 In its report to the Ministry of Economic Affairs in the Netherlands (November 2010) DotEcon stated in paragraph 154 that "Where reserve prices are set to reflect market value, it is good practice to set them a percentage mark down from the market value estimates to minimise the risk choked off demand"

9.24. We consider that ComReg's proposed eligibility points ratios are reasonable and the decision to link minimum prices to eligibility points within time periods is prudent. However, the approach reinforces the need for caution when setting minimum prices; setting the price too high in just one category could undermine the efficiency of the entire auction. Accordingly, ComReg should adopt prices at the very low end of its benchmark range for all categories, so as to forestall this risk.

Relative Benchmark for 1800MHz

9.25. In document 10/105, ComReg first proposed to set the minimum price for lots in the 1800MHz band at 50% of the minimum for 800MHz and 900MHz. This approach was criticised by Telefonica in its response, and DotEcon has attempted to retrospectively produce evidence to show that this is an appropriate approach. However Telefonica believes ComReg has overestimated the value of a lot of 1800MHz spectrum in Ireland and is running a significant risk of choking off demand. It is unclear why ComReg and DotEcon are persisting with the current relative price approach as it offers no advantage over determining the minimum price for 1800MHz independently. If there is a scarcity of benchmark prices for the 1800MHz band, this will be even more so the case where data is required for both 800MHz/900MHz and 1800MHz sold together – further reducing the number of reference points. Telefonica views the approach of locking the minimum price for 1800MHz relative to that for 800MHz and 900MHz is unreliable and most likely produces an erroneous result. ComReg should set the 1800MHz minimum price independently.

9.26. Telefonica also considers that, should ComReg persist with its relative benchmarking for 1800MHz that a more detailed analysis is required than has been done to date. ComReg suggests that in selecting the lower end of the Dotecon range, it is mitigating the risk of not getting the relativity analysis right. However, the relativity analysis has a much more significant impact on the price of 1800 MHz spectrum. To take an example, if ComReg used the ratio of 1:4 used by the Danish authorities in a recent auction, this would bring the price down to €5 million from €10 million. Slightly reducing the price of 800 MHz & 900 MHz but leaving the 50% price rule intact has much less of an effect – in the present case, reducing the price from €12.5 million to €10 million.

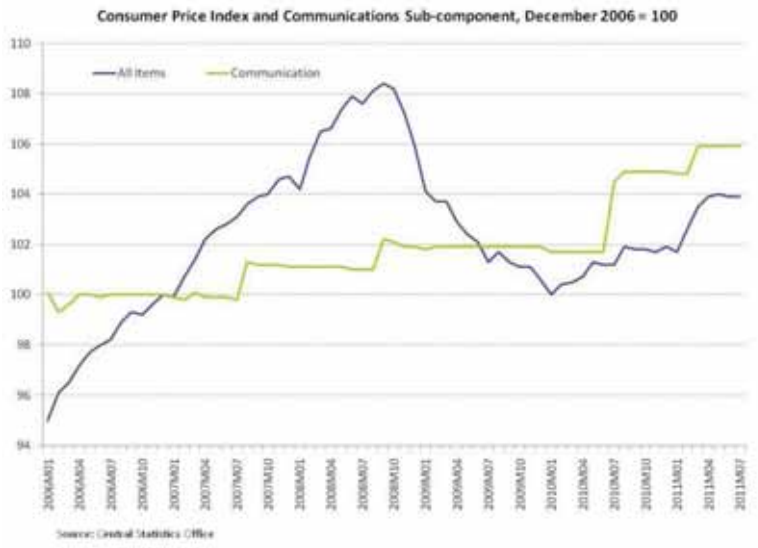
9.27. Telefonica is also concerned that setting the eligibility points between 1800MHz and 800/900MHz to facilitate switching in the auction is having an undue effect on the pricing of 1800 MHz spectrum. For example we note the following statement "*we considered there to be merit in setting the relative reserve prices of sub-1GHz and 1800 MHz to match the proposed 2:1 eligibility ratio of sub-1GHz versus 1800 MHz spectrum so as not to distort bidders choices between spectrum*" (paragraph 29, Document 11/59, see also paragraph 4.204 Document 11/60). In this as in other statements, there is the impression that ComReg and Dotecon have lost sight of the fact that holding an auction is a means to an end, not an end in itself. It is simply not justifiable, under any of ComReg's objectives or obligations to

charge a higher price for 1800 MHz spectrum simply to allow for "neat" auction set up on eligibility points, particularly when the spectrum in question is acknowledged not to be substitutable so that any such switching is unlikely.

9.28. Telefonica also takes issue with the blanket claim that the relative value of sub 1GHz and above 1GHz spectrum has remained constant (argued by Dotecon to justify the use of pre-2000 auctions). This is not sustainable, given the technology changes and the much greater range of spectrum bands now available for use. In particular, 800 MHz spectrum was not previously available for use, and the greater availability of sub-1GHz spectrum with its superior propagation characteristics must have an impact on the relative value of 1800 MHz, decreasing its value. Dotecon provides no data to justify this assertion.

Indexation of the Annual Spectrum Usage Fees

9.29. Telefonica has already stated its view that the Consumer Price Index (CPI) is not a relevant measure of changes in spectrum licence fees. There is no correlation between the CPI and mobile communications pricing (see graph below from ComReg 11/66), let alone spectrum valuation.



9.30. The CPI is not a relevant index to apply to spectrum licences, it is a measure of changes in consumer pricing, and has little or no bearing on the value of an operator licence. It is widely acknowledged that CPI is not appropriate for use in respect of forms of investment, which spectrum is, because CPI relates to consumer expenditure. There is international case law and even legislation (ref the Federal Acquisitions Regulations on US government acquisitions), which recognises that the use of an inflation index must only take account of

economic factors having a direct and specific relationship to performance of the contract or subject matter in question. It is internationally accepted that the index must be constructed to encompass a large sample of relevant items while still bearing a logical relationship to the type of costs being measured. The basis of the index should not be so large and diverse that it is significantly affected by fluctuations not relevant to the costs being measured.

Calculation of Minimum Price using CPI

9.31. Having decided that the minimum price valuation should be €20m in Net Present Value (NPV), ComReg then proceeds to derive the minimum upfront and annual fees based on an approximate 50/50 split. However in calculating the appropriate value for each component, ComReg uses the eircom discount rate of 10.2% and has set the value of CPI to zero. Telefonica believes this to be a straightforward error in the approach to calculating the NPV. The discount rate used to derive the NPV already includes a component to account for inflation. If ComReg intends to index-link the annual spectrum usage fees, then this value should be removed from the discount rate used to derive the NPV meaning that a lower upfront payment and annual fee is required to derive the NPV of €20m (or whatever the final minimum price is). At present ComReg is effectively double counting the indexation of annual usage fees.

10. Licence Conditions and Draft Decision

10.1 ComReg's draft decision will inevitably have to be revisited in light of the submissions yet to be received from the industry in response to its various new proposals and positions and it therefore needs to be re-issued for consideration and review after the key decisions mentioned above have been made. ComReg must clarify its position on these important issues to comply with its duties as a Regulator to promote regulatory certainty and predictability. It must avoid adopting a final Decision without first providing clarity on all matters by covering them all in the draft form. Telefonica fully reserves its legal rights in this regard.

Licence Term

10.2 In all of the previous consultations Telefonica has the issue of licence duration, investment incentive and the natural difficulty for a network operator to continue to invest as the end of a licence approaches. Telefonica remains of the view that the best way to ensure operators have an ongoing incentive to invest is to grant licences that are of indefinite term, and refers ComReg to the considerations as expressed in the previous responses. A less effective alternative, but one which mitigates the investment vacuum would be to include a guaranteed minimum notice period before termination of the licences. This could take the form of a simple guarantee that any decision necessary for re-assignment of the spectrum at the end of the licence would be in place before the minimum period has expired. If the decision was not in place, or was delayed, then the licence term would automatically extend to ensure that the operator had the necessary minimum time required to recover investment and also to transition customers and services out of the relevant spectrum. Telefonica's view is that the minimum notice period should be no less than 5 years.

What rights are the applicants bidding for?

10.3 Even though ComReg is proposing to hold an auction within the confines of the Wireless Telegraphy Act, it is unclear exactly what rights bidders are being asked to buy. This might be clarified when the relevant Statutory Instruments are published, however ComReg should also clarify these matters in its Decision, and in the text of the Licence Schedule. Specifically, Telefonica is concerned that nowhere in the Draft Decision or Licence Text is there a description of the rights of use that are being sold to bidders. It appears that licensees are only being granted the right to "to keep and have possession of terrestrial systems capable of providing electronic communications services"[7]. This text in no way describes the entitlements that are being auctioned, and Telefonica specifically requests that ComReg

[7] Draft Licence Schedule (11/60a, "8.6 Part 2 General")

clarifies the following:

- That licensees are to be granted exclusive rights to use the radio spectrum corresponding to the lots being sold at auction
- That licensees are to be granted the rights of use for the full licence period, e.g. 2015 to 2030 in the case of T2 under ComReg's current proposal, subject to compliance with licence conditions
- Any restrictions or exclusions from the rights of use, whether spatial, temporal, or otherwise
- What protection to their rights of use are the licensees entitled to, e.g. from interference

Drafting Comments

10.4 In addition to the points raised in above, Telefonica suggests the following drafting amendments:

3.3.2 "multiple combinatorial clock rounds, in each round of which the auctioneer will set the price for each type of lot, and bidders will bid, subject to detailed activity rules to be set out in the Information Memorandum, for packages of lots of spectrum at that price, until supply equals or exceeds demand at the round price".

3.3.11 " an assignment round . . . . Where an Existing GSM Licensee does not avail of the Early Liberalisation Option in Temporal Lot 1 ~~and does not win spectrum rights in Temporal Lot 2~~ compensation will be provided for the relocation . . . . " (see further reasoning in section 7 above.

10.5 ComReg's proposal that prospective bidders seeking to participate in the proposed auction must first agree to comply with the terms of a project plan identifying project milestones and related deliverables to be achieved and the imposition of a regime of liquidated damages for non-compliance with such milestones, is contrary to ComReg's obligation as a Regulator to promote regulatory predictability and certainty. This is particularly the case in circumstances where the details and obligations arising from such a project plan will not become clear until after completion of the auction. Such a proposal is clearly in breach of the principles of natural justice, by seeking to impose penalties on successful bidders for non-compliance with obligations yet to be determined. ComReg has a statutory obligation under section 10 of the Communications Regulations Act 2002 to promote the provision of clear information.

10.6 The Framework Directive (2002\21\EC) (as amended by 2009\140\EC) provides that where ComReg intends to take measures which have a significant impact on the relevant market, it shall give interested parties the opportunity to comment on the draft measure within a reasonable period. ComReg's proposal obliging successful bidders to commit to achieving milestones that have not been predetermined or consulted upon, which may result in

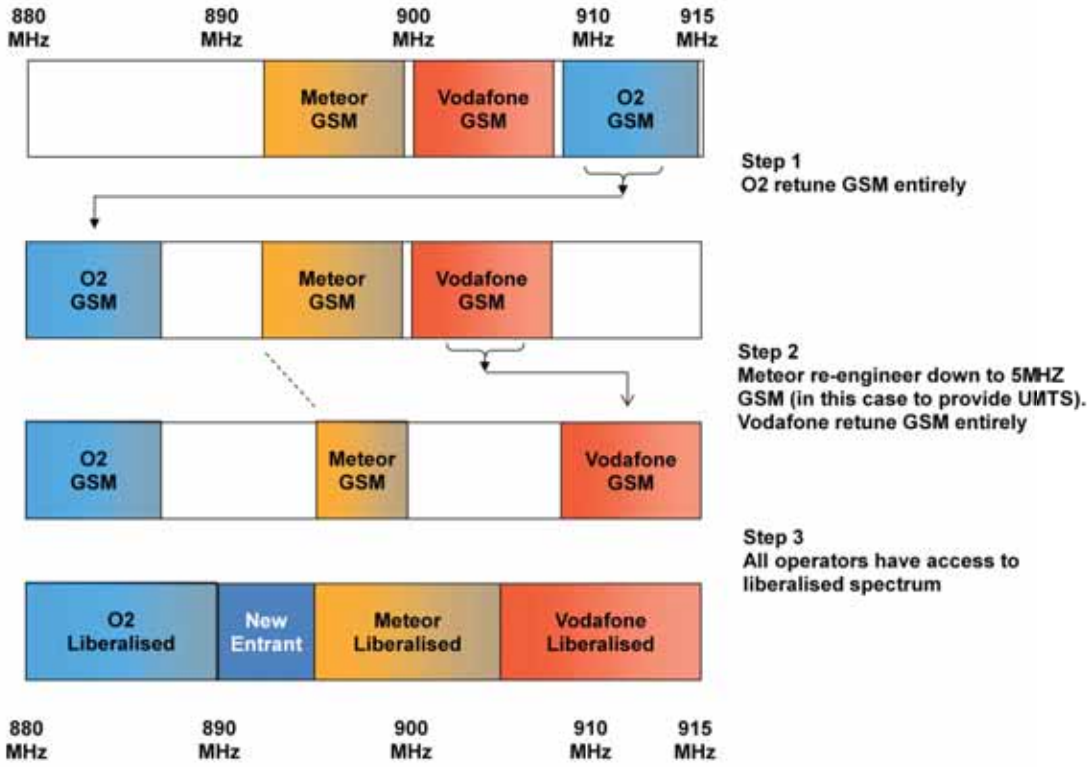
significant, and at present unquantifiable, penalties for non-compliance with such milestones is a measure which would have significant impact on the relevant market. It must form the basis of a separate consultation prior to the auction. By failing to consult with the licensees in relation to the terms of the proposed project plan, ComReg is failing in its obligation to act in a transparent manner and in a manner which promotes regulatory predictability by ensuring a consistent regulatory approach over appropriate review periods, in accordance with its obligations under the European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011.

11. Advanced Commencement Proposal

11.1. Telefonica appreciates ComReg's intention, in making the Advanced Commencement Proposal, to facilitate an early start in the use of spectrum for liberalised services. It envisages that licences may begin operating 5 months after the auction closes, assuming that all necessary re-tuning and re-location required by the auction outcome has taken place. Telefonica notes that under current time-lines, and depending on the actual auction outcome there is likely to be less than 6 months between auction conclusion and the proposed start dates of January 2013, meaning that Advanced Commencement as currently proposed would not bring liberalisation forward. More importantly, Telefonica is concerned that there could be a significant amount of network re-engineering and re-tuning work required in the 900MHz band post-auction which would involve network operators undertaking network adjustments both sequentially and concurrently. It is not known how different operators will prioritise and value the ability to obtain spectrum for continued GSM service or for provision of liberalised services – this will only be determined by the assignment round of the auction. It is possible that an operator would place a higher value on the ability to re-configure its network early than on maintaining the existing position within the band, and the sequential actions might require one operator to vacate spectrum so that another operator can move-in to that position in the band. ComReg also needs to consider that network sharing operators might want to hold contiguous assignments in the band.

11.2. The reconfiguration of the band might involve a series of "moves" similar to those made in a "Gem Puzzle". The diagram below depicts just one such sequence of moves, however there are several variations on this example. In this case, it is assumed that Telefonica, Vodafone, and Meteor obtain 2 lots of 900MHz each (Meteor's assignment might be of 2 liberalised lots), and a new entrant to the band obtains 1 lot. In this case, all three existing operators will be required to undertake significant network re-tuning, and it is only possible for Vodafone to commence when O2 has completed. In addition the network operators might need to undertake re-engineering of their GSM assignment plans in order to be able to use some liberalised spectrum for UMTS services.

11.3. In the below scenario it is not technically feasible to make the currently unoccupied spectrum in question available in the 900 MHz band as proposed, as the full band will be required to physically facilitate the sequential relocation and re-tuning of 900 MHz lots of all existing occupants prior to licence commencement required by ComReg's Full Assignment Round approach. Essentially, the currently unoccupied space will be required to facilitate the necessary movement around in the band needed to re-locate and re-tune to the new 5 MHz block format away from the current 7.2 MHz holdings and more generally to move to the new allocations post-auction.



11.4. Telefonica takes issue with the statement in paragraph 7.35 that "*advanced commencement...would insure against delays of availability of 800 MHz spectrum*". Allowing 900 MHz licences to start several months earlier does not in any way excuse ComReg of its obligation to provide certainty around the start dates of the 800 MHz spectrum it is proposing to auction. We refer to the submissions in section 3 on this issue. In particular, purchasers of 800 MHz spectrum only would be disadvantaged, relative to purchasers of 900 MHz spectrum, in this situation.

12. Timetable

A considerable degree of uncertainty exists in relation to the process and timetable that ComReg will follow in the proposed spectrum assignment. Telefonica estimates that the proposed auction will not take place before Q3 of 2012. The assignment has already been significantly delayed, and it is now over three years since ComReg began formal consultation. The ongoing delay in reaching a final decision on the assignment has already pre-determined some decisions in the process (interim licences) and will continue to impact on the choices that are available to ComReg. In addition, the uncertainty regarding the date for an auction hampers operators in their preparation. Telefonica now calls on ComReg to produce a detailed timetable showing the steps to be taken up to the grant of licences, together with the planned time for each; for example, Annex 3 of document 07/93.

9. H3GI – received 14 October 2011

Response by Hutchison 3G Ireland Limited
in respect of ComReg Document No. 11/60
"Multi-Band Spectrum Release – Release of the 800 MHz, 900 MHz and 1800 MHz radio spectrum bands"

14 October 2011

EXECUTIVE SUMMARY

- Hutchison 3G Ireland Limited ("H3GI") welcomes the opportunity to respond to ComReg Doc. No. 11/60, *"Multi-Band Spectrum Release – Release of the 800 MHz, 900 MHz and 1800 MHz radio spectrum bands"* ("ComReg's Response to Consultation"). However, that opportunity is tainted by ComReg's complete failure to properly consider and discuss H3GI's previous submissions in respect of its proposed spectrum caps structure in an open manner and respond to key clarifications sought by H3GI in order to properly understand ComReg's position and respond accordingly. In the latter regard, H3GI refers to the correspondence contained in Annex 1.

- H3GI has set out clearly in its previous responses to consultation, the need for ComReg to conduct a thorough assessment of the likely future competition in markets for the provision of mobile electronic communications services after conclusion of the award of the 800, 900 and 1800 MHz bands.

- It is H3GI's view that ComReg should ensure that the outcome of the proposed auction process will guarantee the existence of four credible players in the mobile communications market, with each operator holding a minimum spectrum portfolio ("MSP"), post-auction. In support of H3GI's position, H3GI refers in particular to the independent report prepared by Value Partners Management Consulting ("Value Partners") and Radio Regulatory Associates Limited ("RRA") and submitted to ComReg as part of H3GI's submission in July 2011.

- H3GI has explained in its submissions and responses to consultation how ComReg's proposed spectrum caps will fail to secure the existence of four credible players in the market post-auction. H3GI has also proposed alternative spectrum rules, including a spectrum floor of 2 x 10 MHz of sub-1 GHz spectrum, and an overall spectrum cap of 2 x 40 MHz which it believes ComReg should adopt in place of its current proposal.

- H3GI's remains of the view that ComReg's approach fails to promote competition. A failure by ComReg to engage as suggested will result in a material diminution of competition to the detriment of consumers. It will also result in a reduction in the efficient use of spectrum, in breach of ComReg's objectives and statutory obligations in section 12 of the Communications Regulation Act 2002, as amended (the "Act").

- Both ComReg and DotEcon have sought to dismiss H3GI's views, seeking to rely in particular, on what they refer to as "*patently different*" market conditions between the UK and Ireland (without, however, further clarification/elaboration of these conditions), and the fact that the UK regulator, Ofcom, was directed by the UK Government to carry out the type of competition assessment which H3GI advocates should be carried out by ComReg.

- H3GI does not deny that Ofcom's conclusion was the result of a comprehensive competition assessment – indeed, it is precisely this type of assessment which H3GI calls on ComReg to undertake.

- It is unclear from DotEcon's analysis what the "*characteristics [of the UK market] that are uncommon in other countries*" might comprise, or why DotEcon

does not consider it appropriate for ComReg to consider the effect on competition of the planned auction in the context of the "*many other factors*" considered by Ofcom.

- H3GI submits that ComReg is nonetheless actually required to carry out the type of competition assessment conducted by Ofcom and advocated by H3GI.

- It is difficult to understand how ComReg can properly discharge its statutory obligations pursuant to section 12 of the Act, and satisfy itself that competition in the downstream market will be secured without first having carried out a thorough assessment of the likely future competition in markets for the provision of mobile electronic communications services after conclusion of the award of the 800, 900 and 1800 MHz bands, including in particular, an assessment as to the minimum number of credible players that ComReg considers should be present in the market so as to ensure the existence of sufficient competitive tension in the market for mobile communications in Ireland, going forward.

- Whilst Ofcom has conducted a thorough analysis of the likely future competition in markets for the provision of mobile electronic communications services after conclusion of the award of the 800 and 2600 MHz bands and Value Partners and RRA have examined the applicability of Ofcom's analysis to Ireland, H3GI submits that the analysis carried out by ComReg and DotEcon is, at best, superficial and falls well below the level required of it.

- H3GI submits that ComReg should and is obliged to conduct a detailed competition assessment in respect of Ireland. H3GI notes that ComReg has failed to carry out the relevant assessment.

- The MSP proposed by Value Partners and RRA is as follows:

  - 2 x 10 MHz of contiguous sub-1 GHz spectrum; and
  - 2 x 10 MHz of 1800 MHz spectrum.

- According to Value Partners and RRA, the MSP set out above represents the minimum level necessary to enable an operator to sustain a competitive mobile service in Ireland (taking into account, for example, capacity and downlink data speeds). The report notes the importance of sub-1 GHz spectrum, a vital component of the spectrum mix needed to serve customers inside buildings, particularly taking into account the growing needs of consumers seeking to use data services at a fixed location inside buildings, and sets out Value Partners and RRA's views as to the likely growth of these services over the next five years or so – i.e. during the expected lifetime of the new licences.

- It is H3GI's view that DotEcon has failed to do a proper and comprehensive analysis of the minimum spectrum portfolios required to ensure credible competition between four mobile network operators, and, as such, ComReg's dismissal of H3GI's views is flawed.

- H3GI believes that ComReg has misunderstood the extent of its role in the award process and in particular, its role in ensuring the promotion of

competition within the market (in accordance with its statutory obligations). This in turn has led ComReg to dismiss the case advanced by H3GI, for the need to guarantee the existence of a market (post-auction) in which four credible players compete, and to adopt inappropriate parameters for the spectrum caps set. H3GI notes the references in ComReg's Response to Consultation where it agrees with DotEcon "*that the main purpose of spectrum caps is to ensure that **extreme** outcomes which could harm competition do not emerge from the proposed auction, while also ensuring that the distribution of spectrum shall be determined by competition amongst the bidders and not by the cap set on the amount of spectrum that each bidder may be obtain*."[1] (emphasis added). H3GI submits that the starting position adopted by ComReg is plainly wrong and misguided. ComReg's starting position (i.e. to avoid extreme outcomes which could harm competition) is incorrect. ComReg's statutory obligation is to promote competition. This amounts to a positive obligation to take steps to advance and increase competition in the market for mobile communications in Ireland. H3GI submits that as the absolute minimum the correct standard of review should be that which applies in the context of EU and national merger control rules i.e. to seek to avoid a situation which would result in a substantial lessening of competition / significant impediment of effective competition within the relevant market. It is wholly unsustainable for ComReg and DotEcon to advocate a low standard.

- In relation to the duration of the proposed licences, H3GI refers ComReg to its responses to ComReg Doc. No. 11/28 and in particular, the independent report commissioned by H3GI from NERA Economic Consulting ("NERA") contained in Annex 3. NERA concludes that there is a strong case for Ireland to adopt indefinite terms for mobile spectrum licences, subject to suitable conditions being imposed to protect ComReg's ability to fulfil its statutory objectives. H3GI re-iterates its previously expressed position and urges ComReg to award "indefinite licences" in respect of 900 MHz and 800 MHz and amend the 3G licences of Vodafone, O2, Meteor and H3GI to provide that they too are indefinite (so that equality of treatment is protected).[2]

- H3GI welcomes the reduction in the proposed minimum reserve price. However, it still regards the minimum reserve price as too high and that it will have a negative impact on demand and the efficient use of spectrum.

- ComReg proposes a minimum reserve price of €20 million per block of sub-1 GHz spectrum and €10 million per block of 1800 MHz. In this regard, ComReg's primary concern would appear to be to minimise the risk of tacit collusion or strategic behaviour (aimed at weakening competition in the auction).[3] This is echoed by DotEcon's updated report on benchmarking ("DotEcon's Report on Benchmarking").

- H3GI takes issue with ComReg's and DotEcon's approach to the minimum reserve price. Actual collusive behaviour is sufficiently dealt with by: (i) the threat of expulsion from the award process; and (ii) prosecution under the Competition Act, 2002 for entering into an agreement or concerted practice

1 Paragraph 4.36 of ComReg's Response to Consultation.

2 Page 12 of H3GI's response to ComReg Doc. No. 10/71, *"800MHz, 900MHz and 1800 MHz spectrum release"*.

3 Paragraph 4.198 of ComReg's Response to Consultation.

contrary to section 4 of that Act. The only way to determine the true, long-run economic value of spectrum access is to allow the market to determine this value. ComReg is prioritising short term revenue over competition in the medium and long term.

- ComReg's proposals in relation to transitional issues are unclear. H3GI submits that in order to ensure the availability of spectrum from February 2013, ComReg needs to set out in its decision a concrete timetable in relation to the establishment and publication of its proposed Project Plan.

- In order for the proposed auction to be legally certain, ComReg must address the consequences of delay in relation to transitional issues and the availability of 800 MHz for the commencement of the proposed licences, including the refund of spectrum fees pro-rata for any delay.

- H3GI welcomes ComReg's advanced commencement proposals.

Recommendation:

ComReg:

1. Implements H3GI's proposed alternative spectrum rules;

2. Awards indefinite 800, 900 and 1800 MHz licences in the upcoming auction and amends the 3G licences of Vodafone, O2, Meteor and H3GI to provide that they too are indefinite (so that equality of treatment is protected);

3. Implements a minimum reserve price in line with minimum reserve prices elsewhere;

4. Addresses the consequences of delay in relation to transitional issues and the availability of 800 MHz for the commencement of the proposed licences, including the refund of spectrum fees pro-rata for any delay; and

5. Publishes a concrete timetable in relation to the establishment and publication of its proposed Project Plan.

INTRODUCTION

H3GI welcomes the opportunity to respond to ComReg's Response to Consultation. However, that opportunity is tainted by ComReg's complete failure to properly consider and discuss H3GI's previous submissions in respect of its proposed spectrum caps structure in an open manner and respond to key clarifications sought by H3GI in order to properly understand ComReg's position and respond accordingly. In the latter regard, H3GI refers to the correspondence contained in Annex 1. The comments contained in this document are in addition and without prejudice to H3GI's previous responses to ComReg's consultations on liberalisation of the 900 MHz spectrum band.

The format of this document is as follows:

1. Part 1 addresses the need for a thorough competitive assessment, the need for a four credible player market and minimum spectrum portfolios, a spectrum floor and overall cap of 2 x 40 MHz;
2. Part 2 addresses ComReg's proposed sub-1 GHz spectrum cap, overall spectrum cap of 2 x 50 MHz and additional spectrum cap of 2 x 10 900 MHz (2013 – 2015);
3. Part 3 addresses the promotion of competition and applicable standard;
4. Part 4 addresses licence duration and indefinite licences;
5. Part 5 addresses the minimum reserve price;
6. Part 6 addresses transitional issues;
7. Part 7 addresses advanced commencement;
8. Part 8 addresses 800 MHz and delay;
9. Part 9 addresses miscellaneous matters;
10. Annex 1 contains correspondence between H3GI and ComReg in relation to ComReg's Response to Consultation and related documents;
11. Annex 2 contains details of Value Partners and RRA's spectrum credentials; and
12. Annex 3 contains a copy the independent report commissioned by H3GI from NERA Economic Consulting ("NERA") in relation to indefinite licences.

PART 1 – COMPETITIVE ASSESSMENT, FOUR CREDIBLE PLAYER MARKET AND MINIMUM SPECTRUM PORTFOLIO, SPECTRUM FLOOR AND OVERALL CAP OF 2 X 40 MHZ

H3GI has set out clearly in its previous responses to consultation (in particular, its submissions of 5 July and 22 July 2011[4]), the need for ComReg to conduct a thorough assessment of the likely future competition in markets for the provision of mobile electronic communications services after conclusion of the award of the 800, 900 and 1800 MHz bands.

In particular, H3GI considers that such assessment is a necessary and fundamental starting point for ComReg. In the absence of such an assessment, it is difficult to understand how ComReg feels that it can properly assess the likely impact and appropriateness of the proposed auction process and the structure of that process (including in particular, the proposed spectrum caps). To do otherwise, is tantamount to setting rules without first deciding on the purpose/outcome to be achieved by those rules.

4 For the purposes of this response, H3GI's submissions of 5 July and 22 July 2011 are referred to as H3GI's first submission and second submission, respectively.

It is H3GI's view that ComReg should ensure that the outcome of the proposed auction process will guarantee the existence of four credible players in the mobile communications market, with each operator holding a MSP, post-auction. In support of H3GI's position, H3GI refers in particular to the independent report prepared by Value Partners and RRA (the "Value Partners and RRA July Report") submitted to ComReg as part of H3GI's second submission.

H3GI has explained in its submissions and responses to consultation how ComReg's proposed spectrum caps will fail to secure the existence of four credible players in the market post-auction. H3GI has also proposed alternative spectrum rules, including a spectrum floor of 2 x 10 MHz of sub-1 GHz spectrum, and an overall spectrum cap of 2 x 40 MHz which it believes ComReg should adopt in place of its current proposal.

Each of the above issues is discussed in more detail below.

H3GI's remains of the view that ComReg's approach fails to promote competition. ComReg needs to: (i) conduct an assessment of the likely future competition in markets for the provision of mobile electronic communications services after conclusion of the award of the 800, 900 and 1800 MHz bands; and (ii) ensure that after the auction, subject to demand, there are at least four holders of a minimum spectrum portfolio, ie four players that are credibly capable of providing high quality data services in the future. A failure by ComReg to engage as suggested will result in a material diminution of competition to the detriment of consumers. It will also result in a reduction in the efficient use of spectrum, in breach of ComReg's objectives and statutory obligations in section 12 of the Act.

<u>Failure by ComReg to carry out an assessment of the likely competition in the mobile communications market post-proposed auction</u>

In the first submission, H3GI referred to the recently published consultation paper by Ofcom in relation to its upcoming 800 and 2600 MHz award: *Ofcom Consultation on assessment of future mobile competition and proposals for the award of 800 MHz and 2.6 GHz spectrum and related issues (22 March 2011)*("Ofcom's Consultation") and enclosed a copy of Hutchison 3G UK Limited's ("H3GUK's") non-confidential response to Ofcom's Consultation. H3GI advocated that ComReg should apply a similar approach to that of Ofcom in respect of the award of 800, 900 and 1800 MHz, referring, in particular, to the following in Ofcom's Consultation:

1. Given the importance of this spectrum to the economy, society and competition, including reducing or eliminating the Digital Divide, conducting <u>an assessment of the likely future competition in markets for the provision of mobile electronic services after conclusion of the award of the 800, 900 and 1800 MHz bands</u>;

2. <u>The promotion of competition at the national wholesale level to ensure that after the auction, subject to demand, there are at least four holders of a minimum spectrum portfolio that mean they are credibly capable of providing high quality data services in the future</u> by means of spectrum floors and by setting safeguard spectrum caps. (emphasis added)

H3GI stated:

"This spectrum is critical to economic recovery, society and future competition, including reducing or eliminating the Digital Divide. This is acknowledged by ComReg. At page 18 of ComReg Doc. No. 10/105, "Inclusion of the 1800 MHz Band

into the Proposed joint award of 800 MHz and 900 MHz Spectrum", ComReg states: "… It is … likely to be the case that the outcome of the award process … will be the most significant determinant of the future structure of the mobile market in Ireland". As a result, ComReg should conduct an assessment of the likely future competition in markets for the provision of mobile electronic services after conclusion of the award of the 800, 900 and 1800 MHz bands. The promotion of competition at the national wholesale level in Ireland needs to ensure that after the auction, subject to demand, there are at least four holders of a minimum spectrum portfolio that mean they are credibly capable of providing high quality data services in the future ("Credible Future MNO Competition"). As a result, ComReg should impose appropriate spectrum floors and caps. H3GI does not believe that the spectrum cap currently proposed by ComReg is sufficient to ensure Credible Future MNO Competition. This is supported by the response of H3GUK to Ofcom's consultation. In particular, H3GI believes that it is inappropriate for ComReg to proceed on the unproven assumption that the spectrum cap currently proposed by ComReg is sufficient to ensure Credible Future MNO Competition." (emphasis added)

Both ComReg and DotEcon have sought to dismiss H3GI's views on the need/importance for ComReg to conduct a thorough assessment of the likely impact on competition of the award process post-auction, and H3GI's views on the need to ensure the existence of four credible players in the market, each with a MSP, post-auction. In so doing, ComReg and DotEcon seek to rely in particular, on what they refer to as "*patently different*" market conditions between the UK and Ireland (without, however, further clarification/elaboration of these conditions), and the fact that the UK regulator, Ofcom, was directed by the UK Government to carry out the type of competition assessment which H3GI advocates should be carried out by ComReg.

In ComReg Doc. No. 11/58, *"Economic Consultant's Report – Issues relating to the award of spectrum in multiple bands in Ireland"*, ("DotEcon's Issues Report"), DotEcon states as follows:

"Ofcom's conclusion that it would need to ensure that there are at least four national wholesale providers in the UK was the result of a comprehensive competition assessment. This assessment was carried out by Ofcom in response to a Direction to do so by the Government and approved by Parliament. This Direction was imposed upon Ofcom along with other Directions in an Order relating to the award process for 800MHz and 2.6GHz spectrum and implementation of a broader spectrum strategy including 900MHz and 1800MHz spectrum liberalisation, spectrum trading, indefinite licence duration and licence fee setting to reflect full market value.

The competition assessment conducted by Ofcom therefore considers the effect on competition of the planned auction in the context of many other factors, which will together largely govern the use of mobile spectrum. In addition, the proposed safeguards of competition will be implemented in a market with characteristics that are uncommon in other countries. Therefore, the approach adopted in the context of the very particular circumstances in the UK at present should not be treated as a

generally applicable approach to spectrum management or spectrum awards."[5]

(emphasis added)

H3GI does not deny that Ofcom's conclusion was the result of a comprehensive competition assessment – indeed, it is precisely this type of assessment which H3GI calls on ComReg to undertake.

H3GI acknowledges that Ofcom was directed by the UK Government to carry out a competition assessment. However, while the UK and Irish positions in respect of 900 MHz are not identical the approach adopted by Ofcom is consistent with proper and effective regulation which takes into account the importance of the spectrum auction. Indeed, H3GI takes the view that proper and effective regulation is required of ComReg resulting from its statutory objectives and obligations (including in particular, the promotion of competition under section 12 of Act), and furthermore that any differences between the UK and Irish positions in respect of 900 MHz are not such as to warrant a wholly different approach by ComReg. In fact, taking into account the importance of spectrum auctions to the proper functioning of competition H3GI does not believe that there is any material difference (other than form) between the circumstances surrounding Ofcom's competition assessment and ComReg's decision making process regarding the upcoming 800, 900 and 1800 MHz award.

Further, the fact that Ofcom carried out its assessment in response to a direction to do so by the UK Government and approved by UK Parliament does not detract from H3GI's position. This direction was imposed upon Ofcom along with other directions in an order relating to the award process for 800MHz and 2.6GHz spectrum and implementation of a broader spectrum strategy including 900MHz and 1800MHz spectrum liberalisation, spectrum trading, indefinite licence duration and licence fee setting to reflect full market value.

ComReg's decision in respect of the upcoming auction is also being made in the context of spectrum liberalisation, spectrum trading, indefinite licence duration and licence fee setting. Further, H3GI notes that Ofcom and ComReg award spectrum under the same EU electronic communications regulatory framework.

It is unclear from DotEcon's analysis what the "*characteristics that are uncommon in other countries*" might comprise, or why DotEcon does not consider it appropriate for ComReg to consider the effect on competition of the planned auction in the context of the "*many other factors*" considered by Ofcom.

Notwithstanding ComReg's and DotEcon's views as to the purported differences between the UK and Irish positions (and without prejudice to H3GI's views on these), H3GI submits that ComReg is nonetheless actually required to carry out the type of competition assessment conducted by Ofcom and advocated by H3GI. ComReg

[5] Paragraphs 155 and 156 of DotEcon's Issues Report.

itself has noted the importance of ensuring competition both 'for' the market (i.e. at the award process) and 'in' the market (i.e. competition in the downstream retail market, as a result of the award process used and the level of competition within that award process)[6], and the effect that the award process will have on competition within the relevant retail markets, post-auction:

"*The award process used, and the level of competition within that award process, will have a significant impact on the level of competition downstream*"[7] (emphasis added);

"*Ensuring competition at the retail level is promoted is the primary goal. Competition in the auction/for the market can therefore be seen as a means to an end. Competition at the retail level between operators for customers is what drives benefits to consumers*"[8] (emphasis added);

"The award of licences in the 800 MHz, 900 MHz and 1800 MHz bands is critical to setting the initial conditions for the next phase of development in the mobile market in Ireland. With the liberalisation of these key spectrum bands, this is a hugely important stage of development in the market. Mistakes in this phase of market development will likely have enduring consequences for competition on the downstream retail market. Given the large proportion of customers who have 2G only devices there is significant potential for a considerable take-up of advanced handsets, and lower priced data services"[9] (emphasis added);

"Setting the initial conditions correctly at this stage of market development is critical for the long term impacts on the market. In this regard, it is worthwhile looking back at what has happened in many markets for 2G services. The experiences with 2G throughout the EU show that initial conditions are largely determinative of market outcomes. In most cases, those operators that entered the market first have maintained a very strong market position despite later entry and very efficient Mobile Number Portability systems to facilitate customer switching. This is also evident in the Irish market"[10] (emphasis added); and

"Given the current (and likely future) importance of the mobile service market even small moves away from the optimal spectrum allocation could have potentially very large impacts on welfare over the period up until 2030. Market mechanisms may eventually undo mistakes made but during that time there would be less competition and less innovation relative to the optimal spectrum rights allocation and the loss to consumer welfare could be large. Moreover, given the still relatively immature nature of the mobile broadband market, errors could allow operators to obtain a stranglehold on the market that they would not have managed in an optimal spectrum rights allocation"[11] (emphasis added).

6For example, at paragraphs 3.60 and 3.61 of ComReg's Response to Consultation.

7 Paragraph 3.61 of ComReg's Response to Consultation.

8 Paragraph 3.145 of ComReg's Response to Consultation.

9 Paragraph 3.148 of ComReg's Response to Consultation.

10 Paragraph 3.149 of ComReg's Response to Consultation.

11 Paragraph 3.158 of ComReg's Response to Consultation.

As such, it is difficult to understand how ComReg can properly discharge its statutory obligations pursuant to section 12 of the Act, and satisfy itself that competition in the downstream market will be secured without first having carried out a thorough assessment of the likely future competition in markets for the provision of mobile electronic communications services after conclusion of the award of the 800, 900 and 1800 MHz bands, including in particular, an assessment as to the minimum number of credible players that ComReg considers should be present in the market so as to ensure the existence of sufficient competitive tension in the market for mobile communications in Ireland, going forward.

Whilst Ofcom has conducted a thorough analysis of the likely future competition in markets for the provision of mobile electronic communications services after conclusion of the award of the 800 and 2600 MHz bands and Value Partners and RRA have examined the applicability of Ofcom's analysis to Ireland, H3GI submits that the analysis carried out by ComReg and DotEcon is, at best, superficial and falls well below the level required of it.

H3GI submits that ComReg should and is obliged to conduct a detailed competition assessment in respect of Ireland. H3GI notes that ComReg has failed to carry out the relevant assessment.

Four credible player market and MSP

As indicated above, H3GI considers that ComReg is required to ensure that the proposed auction will guarantee the existence of four credible players in the mobile communications market, each with a MSP, post-auction. In support of this, H3GI refers to the analysis carried out by Ofcom and set out in Ofcom's Consultation, H3GUK's non-confidential response to Ofcom's consultation and the analysis carried out by Value Partners and RRA (and set out in the Value Partners and RRA July Report) examining the applicability of Ofcom's analysis to Ireland. The Value Partners and RRA July Report sets out clearly the welfare benefits of guaranteeing the existence of four credible players in the market, each with a MSP, post-auction.[12]

Although ComReg dismisses H3GI's position (i.e. a credible four player market), neither ComReg nor DotEcon provide a clear basis for their views, nor do they set out their views as to what they consider is an appropriate number of players in the market (e.g. whether this is 3, or 4, or 5, and/or the appropriate degree of symmetry between spectrum holdings). This is discussed in more detail, below.

It is difficult to understand how ComReg can properly dismiss the arguments advanced by H3GI concerning the need to ensure the existence of a credible four player market (post-auction) and related spectrum floor proposals, without simultaneously setting out ComReg's views as to what it considers to be an appropriate number of players in the market and their credibility (e.g. the degree to which some asymmetry in players' holdings can properly be tolerated).

Notwithstanding this, ComReg appears to accept the proposition of a four player market, at least in the context of seeking to justify its proposed sub-1 GHz spectrum

[12] H3GI does not agree with DotEcon's arguments against the use of the Cournot model in the Value Partners and RRA July Report. While further elements can be taken into consideration, in the current and near term, it provides a clear indication of the likely welfare benefits outlined in their report.

cap, on the basis, *inter alia*, that at least 4 bidders will win some spectrum. However, neither ComReg nor DotEcon have demonstrated the case for a market in which four operators may bid for spectrum but which fails to guarantee the existence of four credible players.

In terms of credibility of players, H3GI notes that ComReg itself, in the context of its discussion concerning possible administrative assignment of spectrum and the benefits of inclusion of the 1800 MHz band in the upcoming auction, has recognised the need for and desirability of operators obtaining a broad portfolio of spectrum:

"*An assignment process that included both the 1800 MHz band and the available sub-1 GHz bands would therefore provide new entrants with the opportunity to acquire a broader portfolio of spectrum usage rights to enable them to compete on a level footing with existing operators*"[13] (emphasis added); and
"*The award/grant of the available sub-1 GHz spectrum bands and the 1800 MHz band in a single process would provide an opportunity for all operators to acquire spectrum in the various bands and so acquire a portfolio of spectrum rights that would enable them to optimise their network*" [14] (emphasis added); and

"*Option 3, a process including the 1800 MHz spectrum band in an assignment process with the 900 MHz and 800 MHz bands, would better enable participants in the assignment process to obtain their optimal portfolio of spectrum usage rights which would enable them to make more efficient investments in new networks, compared to Option 2*"[15] (emphasis added).

Neither ComReg nor DotEcon have set out clearly what they consider the necessary/appropriate mix/portfolio should comprise, and instead, seek to simply dismiss H3GI's arguments by relying on ComReg's proposed spectrum caps to sufficiently address the situation, without providing any analysis/basis for their views.

The MSP proposed by Value Partners and RRA is as follows:

- 2 x 10 MHz of contiguous sub-1 GHz spectrum; and
- 2 x 10 MHz of 1800 MHz spectrum.

According to Value Partners and RRA, the MSP set out above represents the minimum level necessary to enable an operator to sustain a competitive mobile service in Ireland (taking into account, for example, capacity and downlink data speeds). The report notes the importance of sub-1 GHz spectrum, a vital component of the spectrum mix needed to serve customers inside buildings, particularly taking into account the growing needs of consumers seeking to use data services at a fixed location inside buildings, and sets out Value Partners and RRA's views as to the likely growth of these services over the next five years or so – i.e. during the expected lifetime of the new licences.

In determining the minimum necessary mix of spectrum, Value Partners and RRA have carried out a robust examination of ComReg's proposed spectrum caps and analysis carried out by ComReg's consultants, DotEcon.

13 Paragraph 3.54 of ComReg's Response to Consultation.

14 Paragraph 3.55 of ComReg's Response to Consultation.

15 Paragraph 3.78 of ComReg's Response to Consultation.

Value Partners and RRA examined carefully existing and future spectrum requirements, taking into account, in particular, the rise in data hungry applications and the growing needs of consumers seeking access to mobile data services from a fixed location inside buildings. H3GI refers in particular, to Exhibits 3 – 6 (inclusive) at paragraph 3.2.3 of the Value Partners and RRA July Report. Such features serve to highlight the importance of sub-1 GHz spectrum.

Value Partners and RRA consider that in order to compete in the market in future, it is vital for operators to have access to a sufficient amount of sub-1 GHz spectrum to handle these data volumes and provide end-users with adequate data rate speeds. Based on the analysis carried out by Value Partners and RRA, it was determined that consumers are sensitive to network quality metrics such that data rate throughput is a key driver. In future, competition between operators will be based on data speeds etc in much the same way to date, that competition between operators has occurred on the basis of roll-out/network coverage. H3GI refers to the following statements in the Value Partners and RRA July Report:

"*The ability of an operator to deliver high data rate speeds to users located inside buildings is a competitive differentiator, operators that can provide these data services will be perceived as having better network quality and will impact on consumers preferences when choosing a network. This is an issue that is likely to become more relevant in the future as it is expected that high speed data applications will become ubiquitous as the mobile market develops. Therefore, access to sub-1 GHz spectrum is an important issue now but will only grow in importance as the mobile market develops over the next few years*." [16]

For the reasons set out in the Value Partners and RRA July Report, H3GI therefore concluded, that 5 MHz of sub-1 GHz spectrum is insufficient to compete with an operator with 2 x 20 MHz of sub-1 GHz spectrum. Accordingly, DotEcon is wrong to submit that 2 x 5 MHz of sub-1 GHz spectrum and the existing mobile network operator's holdings of 2.1 GHz spectrum would be sufficient to compete with an operator with 2 x 20 MHz of sub-1 GHz spectrum. This is discussed in further detail, in the context of ComReg's proposed spectrum caps, in Part 2 below.

It is H3GI's view that DotEcon has failed to do a proper and comprehensive analysis of the minimum spectrum portfolios required to ensure credible competition between four mobile network operators, and, as such, ComReg's dismissal of H3GI's views is flawed.

In their report, Value Partners and RRA recommended alternative spectrum rules to: (i) ensure a sustainable and competitive four player market going forward; and (ii) avoid the risk of damage to the Irish economy, namely, the combination of a total spectrum cap of 2 x 40 MHz across all bands and a spectrum floor of 2 x 10 MHz of contiguous sub-1 GHz spectrum, alongside the 2 x 20 MHz sub-1 GHz spectrum cap already proposed by ComReg in its consultations (the "Alternative Spectrum Rules"). H3GI agrees with the analysis of Value Partners and RRA and calls again on ComReg to implement the Alternative Spectrum Rules in the upcoming auction.

In both submissions, H3GI indicated that it looked forward to an open-minded discussion of these issues in ComReg's forthcoming consultation. H3GI is disappointed that the open-minded discussion invited by it, has not occurred.

16 Page 19 of the Value Partner and RRA Report dated 22 July 2011.

Rather, it appears that ComReg has simply disregarded the points made by H3GI and its independent consultants Value Partners and RRA, without any substantive engagement in respect of or justification for ComReg's position, in favour of ComReg's proposed spectrum caps. In so doing, ComReg has failed to carry out a substantive review of the issues, and appears to simply rely on the analysis carried out by ComReg's economic consultants, DotEcon, in particular the following statements in the DotEcon's Issues Report:

"In its report, VP-RRA assert at the outset that there needs to be four national network operators in the Irish mobile market, each holding a sufficient amount of spectrum. This is based on:

1) An FCC comparison of market structures and performance in the US, Western Europe and Asia Pacific with similar income levels, which found that the structure is converging to three or four national competitors per market in many countries.

2) The notion that a market with more operators is more competitive and, specifically, a market with four players is more competitive than a market with three players.

3) The fact that Ofcom has concluded in its competition assessment conducted as part of its design of an award process for allocating 800MHz and 2.6GHz spectrum that competition will be secured by ensuring that there are four effective national wholesale providers in the market.

It is not clear why either of the first two points should lead us to the conclusion that a fairly symmetric four network operator market is essential in Ireland and as such, that the four existing mobile operators should therefore be protected.

In particular:

• The fact that Ireland has four existing mobile network operators at present does not necessarily mean that the long run market structure should involve four fairly symmetric network operators, as opposed to three operators or four network operators that are not largely symmetric; and

• While in theory more competitors mean more intense competition, and this is indeed often the case, this statement neglects:

o the issue of the efficient number of competitors, which takes into account the number of operators that it might be efficient for to duplicate network infrastructure to provide services;

o the issue of economic feasibility of four mobile operators, as in the long-run this is not determined by the either caps or floors within the auction (which only have temporary effect on the distribution of spectrum immediately post auction);

o the implications of spectrum scarcity and in particular, whether it might be desirable for operators to hold larger amounts of spectrum to facilitate delivery of advanced services and lower the incremental costs of additional coverage, provided that at the same time there is sufficient competition amongst a sufficient number of reasonably similar operators; and

o whether asymmetric outcomes in terms of spectrum holdings may still be compatible with reasonably effective competition given the need to satisfy other

objectives (for example, as the number of networks might vary by location, with operators having dissimilar needs for spectrum as result).

……...

Leaving these issues to one side, we consider in detail below VP-RRA's third point, that is, that Ofcom's assessment that in order to safeguard competition in the UK mobile market it would need to ensure that there are at least four network operators post-auction implies that this same number of operators would also be required to safeguard mobile competition in Ireland."[17] (emphasis added)
H3GI addresses each of these points in turn. As a preliminary point, H3GI however, wishes to draw to ComReg's attention that H3GI, Value Partners and RRA do not assert "*ever more competitors result in net benefits to society through greater competitive intensity"*. Rather, based on the work done by Ofcom, H3GUK, Value Partners and RRA, H3GI, Value Partners and RRA assert that four mobile network operators with sufficient spectrum to credibly compete will result in net benefits to Irish society. DotEcon has failed to substantively address this fundamental point and has not advanced any arguments to disprove same.

As indicated above, ComReg fails to set out its views as to the desirable/appropriate number of players in the market. It is nevertheless implicit that DotEcon believes this might involve three operators or four network operators that are not largely symmetric. The rationale and/or basis for DotEcon's position is however, unclear and unsubstantiated, and the terminology used is at best vague and unhelpful. In particular, DotEcon does not provide any guidance as to what "*largely symmetric*" might mean in practice. Given that this statement is a fundamental point and key to ComReg's views on the appropriate structure of the auction (including in particular the proposed level of spectrum caps), it is imperative that the basis for DotEcon's views is set out.

Likewise DotEcon's purported rebuttals of H3GI's view are superficial and the terminology used is vague.

For example, what is the efficient number of competitors, taking into account the number of operators that it might be efficient for to duplicate network infrastructure to provide services? What amounts to sufficient competition amongst a sufficient number of reasonably similar operators, and what are reasonably similar operators? What amount of spectrum is required to facilitate delivery of advanced services? In relation to the lowering of incremental costs of additional coverage, what level of costs are involved in DotEcon's analysis? What dissimilar needs for spectrum? DotEcon does not address or explain any of these matters.

H3GI also notes the following statements made by DotEcon at paragraph 149 and footnote 26 of DotEcon's Issues Report:

"We conclude that while we accept that this is a reasonable action for Ofcom to take given the market conditions and the other features of the proposed award process in the UK, and having taken due consideration of the report by VP-RRA, we do not consider that there is a compelling case to adopt the same course of action in Ireland, where both market conditions and other features of the proposed multi-band award are different. In particular:

[17] Paragraphs 150 – 154 of DotEcon's Issues Report.

• *The case for ensuring four fairly symmetric national network operators in Ireland is ambiguous given the different size and geographical characteristics of Ireland and the UK; and*

• *The spectrum caps set for the proposed multi-band auction in Ireland will in any case ensure that:*

a) At least four bidders will win sub-1GHz spectrum; and

b) Where these four bidders are the existing mobile operators in Ireland, these will all have the minimum amount of spectrum required to be an effective competitor in one of the scenarios proposed by Ofcom."

"In this respect, we note that ComReg's objective to promote competition does not extend to ensuring a particular number of competitors, either in the auction or in the market for services provided using spectrum." (emphasis added)

The basis for DotEcon's assertion that ComReg is not required to ensure a particular number of competitors is confusing and unclear. Nor is it clear on what basis DotEcon has taken this view - is it based on legislation or a judicial decision? If not, is it a legal or economic interpretation of ComReg's statutory obligations? H3GI is not aware of any such provision in legislation or judicial decision, which supports DotEcon's assertion. Indeed, it is difficult to understand how competition can as a matter of fact, be promoted and ComReg's statutory objectives as set out in section 12 of the Act achieved, without proper consideration of the minimum number of competitors needed in order to ensure effective competition in the relevant market(s) concerned. Surely, DotEcon is not suggesting that a market with only one or two players is consistent with ComReg's objectives, or that in the event of a monopoly/duopoly, ComReg would be neither required nor empowered to address the effects of such a situation given the provisions of the Act. For the reasons set out in this response, H3GI does not agree with DotEcon's assertion.

More generally, and for the reasons raised by H3GUK in its non-confidential response to Ofcom's Consultation, H3GI submits that DotEcon is not entitled to simply rely upon one of the scenarios currently proposed by Ofcom, as a basis for rejecting H3GI's alternative proposals, without DotEcon/ComReg doing its own independent and comprehensive analysis of what is appropriate for Ireland. DotEcon is not correct when it states: "*Where these four bidders are the existing mobile operators in Ireland, these will all have the minimum amount of spectrum required to be an effective competitor in one of the scenarios proposed by Ofcom."* Ofcom has assessed a future mobile broadband market that is based on LTE and Ofcom assumes that the 2.1 GHz band will be used for the foreseeable future as a UMTS band rather than LTE. Therefore, ComReg's proposed auction rules will not deliver an Ofcom MSP.

Further, at paragraphs 158 - 164 of DotEcon's Issues Report, DotEcon states:

"In its competition assessment, Ofcom considered the case for ensuring 3, 4 or 5 national wholesale providers,[29] and concluded that ensuring 4 such providers should safeguard competition over the period considered in the assessment (5-10 years). This assessment was based on an evaluation of competition, efficiency and broader social value (which it equated to widespread coverage). Each of these factors varies

significantly in the case of Ireland relative to the UK, and as such, the conclusion of the UK competition assessment does not translate into a suitable prescription for the planned award in Ireland.

The competition assessment carried out by Ofcom considered the following issues (discussed in turn below).

Competition

The main thrust of Ofcom's assessment of relative attractiveness of a market with 3, 4 or 5 national wholesale providers is that more providers leads to more competitive intensity which ensures low prices and high quality and innovation. As such, relative to the option of ensuring four such providers, a market with three national wholesale competitors would have less competitive intensity.

1. An assumption underlying this conclusion is that the market can support four effective competitors in the future, that is, that the potential demand by consumers will make the roll-out and maintenance of up to four national high speed data networks financially viable given geography and demographics. This assessment was made by Ofcom based on a potential market for services more than 13 times greater than that in Ireland based on relative populations.

Imposing restrictions on auction outcomes that are not sustainable in the long run give up competition for spectrum within the auction and efficiency of the outcome without generating more intense service market competition.

Ireland is also very different from the UK in its demography, with a higher than average number of consumers living in very low population density areas. Indeed, schemes deemed necessary to tackle the issue of ensuring availability of broadband services to customers that are considered economically unviable to serve in Ireland (National Broadband Scheme, Rural Broadband Scheme) have not been necessary to adopt in the UK or indeed in other EU Member States. Therefore, Ofcom's assessment in the UK that this is economically feasible for four operators to be profitable in the long term does not necessarily carry across to the Irish case. This is good reason to be somewhat less restrictive in terms of the potential outcomes that the Irish auction might achieve to reflect these different circumstances.

Efficiency

Ofcom's assessment considers the efficient use of spectrum, spectrum fragmentation, economies of scale in networks and efficient investment and innovation. It noted that:

1. The greater number of operators Ofcom ensures, the greater the probability that spectrum will be used inefficiently;

2. Blocks of 2x20MHz of sub-1GHz are most efficient for providing services, but it may be possible for a national wholesaler to largely match the benefits of a 2x20MHz block of contiguous sub-1GHz spectrum with a combination of a smaller block of sub-1GHz spectrum and 2x15MHz or 2x20MHz of contiguous high frequency spectrum;

3. Network sharing could allow three, four and possibly five wholesale providers to operate a smaller number of networks (perhaps two or three) effectively, which if possible may mitigate or eliminate the risk of higher overall fixed costs; and

4. There is little compelling evidence that the differences in the number of national wholesale competitors (between 3, 4 and 5) would have a significant difference on investment incentives.

These points are relatively generic and as such likely carry over to the Irish case. However, they do not provide any evidence that four national wholesale operators might be desirable in Ireland on efficiency grounds; on the contrary, point 3 suggests that if operators were forced to become more efficient, the way to do this would be to operate two or three networks between them.

Broader social value

Ofcom considered that the main way that national wholesale operators might contribute to promoting broader social value would be through providing widespread coverage for mobile broadband services. It noted that while competitive intensity is likely to be higher with a larger number of national wholesale competitors, this effect is not certain, partly because there are fixed costs involved in networks, and this might tend to reduce coverage when there are more competitors. Incentives to roll

out advanced data services might be reduced as well. These concerns are more acute in the case of Ireland due to the different demographics and geography.

Given the uncertainty underlying the effect of more competitors on coverage, we do not consider that the assessment of broader social value by Ofcom leads automatically to the conclusion that the optimal number of operators required in the Irish market is the same as in the UK. In particular, Ofcom's assessment clearly does not rule out the possibility that three competitors might be sufficient to protect competition in Ireland, or four competitors in which only three are reasonably symmetric national network operators with additional network operators having a more limited geographical focus." (emphasis added)

H3GI does not agree with DotEcon's assessment of the applicability of Ofcom's competition assessment to Ireland. H3GI submits that the differences in demography between the UK and Ireland are misleading, and are not such as to warrant a materially different approach.

Further, if it is ComReg's view that Ireland cannot economically sustain four players in the market, in the absence of a thorough market analysis/competition assessment, the basis for ComReg's view is unclear. Where is the data to support this conclusion? Which market(s) does DotEcon purport to have reviewed? As far as H3GI can ascertain, DotEcon has simply expressed a view without also properly considering the potential impact of the auction process, and without also properly considering possible developments in that market over the next 5 – 10 years. H3GI submits that such an approach does not constitute an appropriate/sufficient analysis, particularly in terms of the assessment of the impact of competition at the wholesale level on the downstream market. In this respect H3GI notes that ComReg itself has recognised that competition in the downstream market is "*an ongoing, dynamic process*"[18]. ComReg's market analysis procedures under the European Communities (Electronic Communications Networks and Services)(Framework) Regulations, 2011 require it to look to future developments in the market. A forward-looking approach is also consistent with that adopted in other types of situations of *ex ante* type regulation, including that for example, of the European Commission and the Competition Authority in the context of assessing the likely effects of mergers on

18 Paragraph 3.145 of ComReg's Response to Consultation.

relevant market(s). Further detail on the appropriate standard of review is set out in Part 3 of this response.

In terms of DotEcon's implicit view that three mobile network operators or, three mobile network operators with a national focus and one mobile network operator with a sub-national focus would be economically feasible in Ireland and sufficient to protect competition in Ireland, again H3GI asks where is the data is to support this conclusion? How can DotEcon properly consider this to be appropriate?

In any event, H3GI considers that it is entirely inappropriate for ComReg to interfere with the market and positively seek to bring about the exit of a player, by way of the structure of the upcoming auction. The survival of operators in the market should occur as a result of normal competitive tension, in a market where all operators have been afforded the opportunity to compete on fair and equal terms. It is submitted that ComReg's proposed spectrum caps will not allow operators to compete on fair and equal terms.

In relation to universal broadband coverage, different countries have different approaches. The approaches adopted by Ireland, the UK and elsewhere to date are not determinative or sufficient.

In relation to efficiency, DotEcon refers to the fact that Ofcom notes the possibility of network sharing and states that this (i.e. network sharing) would be a more appropriate means of seeking to make operators more efficient. H3GI submits that the possibility for operators to share networks does not weaken the case for a comprehensive assessment of competition and requisite minimum spectrum portfolios by ComReg. If it does, DotEcon has not explained itself sufficiently. Notwithstanding this, the Value Partners and RRA July Report explicitly recognises that the possibility of operators negotiating shared networks in the future is directly linked to/depends upon the extent to which individual operators have a minimum spectrum portfolio[19], and as such DotEcon's attempt to artificially separate these issues is disingenuous.

19 "*An operator that has a credible spectrum portfolio is more likely to be able to negotiate on equal terms as this operator could 'go it alone' if necessary. An operator without a credible portfolio of spectrum will enter negotiations in a weak position and will likely emerge with a less favourable deal that may lessen competitive intensity to the detriment of consumers. ComReg's current proposals risk one operator failing to secure a credible portfolio of spectrum and therefore may be in a weak*

In relation to broader social value, H3GI notes that the lack of DotEcon's detailed analysis of the impact of the difference in population density as between Ireland and the UK is striking. DotEcon refers to Ofcom's analysis as not *"necessarily"* or *"automatically"* transferring to Ireland, without further explanation/reasoning. At no time has H3GI suggested automatic transference. Rather, H3GI has demonstrated/provided sufficient evidence as to why Ofcom's position concerning the need for a four credible player market is applicable in an Irish context, and H3GI has invited ComReg and DotEcon to carry out the same type of analysis/exercise.

Despite this, DotEcon and ComReg have failed to conduct a proper and comprehensive assessment of competition and requisite minimum spectrum portfolios and instead have simply criticised the applicability of another expert analysis.

Finally, H3GI would welcome clarification as to what "*reasonably*" symmetric national network operators might comprise.

Spectrum floors

As indicated above, H3GI and its independent consultants Value Partners and RRA have recommended the imposition of a spectrum floor of 2 x 10 MHz of contiguous sub-1 GHz spectrum (alongside the 2 x 20 MHz sub-1 GHz spectrum cap already proposed by ComReg). H3GI submits that the proposed spectrum floor is necessary to guarantee the existence of four credible players, with the necessary minimum spectrum portfolio, in the market post-auction. H3GI has already noted that ComReg's current proposed spectrum caps are not sufficient to ensure the MSP advocated by H3GI. H3GI's views on ComReg's proposed caps are set out in more detail in Part 2 below.
In response to H3GI's spectrum floor proposals, ComReg states in its Response to Consultation:

"ComReg also agrees with DotEcon's conclusions in Section 4.4 of its Report (11/58), regarding H3GI's submission that ComReg should impose spectrum floors in order to ensure effective market competition. While this maybe a reasonable action for Ofcom to take in its particular circumstances, there is not a compelling basis for ComReg to do likewise, given the patently different market conditions between Ireland and the UK and the fact that other features of the proposed multi-band award are different. In particular, ComReg agrees with DotEcon that the case for ensuring four fairly symmetric national network operators in Ireland is ambiguous, whilst the proposed spectrum caps will in any event ensure that at least four bidders can win sub-1GHz spectrum, and provide appropriate safeguards against excessively

position to negotiate a spectrum sharing agreement" (Paragraph 3.4.2 of the Value Partners and RRA Report dated 22 July 2011).

asymmetric outcomes. Imposing floors and caps along the lines proposed in the H3GI submission would constrain auction outcomes, and thereby reduce the potential for realising a competitive and efficient result."[20] (emphasis added)

H3GI responds to DotEcon's analysis of H3GI's submission that ComReg should impose spectrum floors in order to ensure effective market competition (and ComReg's endorsement of that analysis), below.

As a preliminary point, however, it is striking that neither ComReg nor DotEcon have clearly explained nor set out the "*patently different market conditions between Ireland and the UK*", nor what the alleged "*other features of the proposed multi-band award [that] [sic] are different*" might be. Given the significance of these alleged "*differences*" as the basis for ComReg's findings, and its ultimate dismissal of H3GI's position on spectrum floors, it is imperative that ComReg clearly sets out what these "*differences*" are.

Although H3GI accepts that *"Imposing floors and caps along the lines proposed in the H3GI submission would constrain auction outcomes, and thereby reduce the potential for realising a competitive and efficient result"*, ComReg's statement ignores the fact that ComReg has a number of statutory objectives to balance, and in particular, the promotion of competition and innovation, and the efficient use and effective management of spectrum. H3GI submits that an inappropriately regulated competitive auction will not promote a medium and long term competitive downstream market and as a result, efficient use of spectrum.

At paragraphs 165 – 167 of the DotEcon's Issues Report, DotEcon concludes:

"In summary, the auction rules proposed for the planned multi-band award in Ireland have been set in the context of the conditions in Ireland to ensure that the market structure going forward will be determined not by ComReg but by the competitive rivalry amongst the mobile operators themselves. The proposed spectrum caps provide protections for downstream competition in mobile services.

It would be counterproductive to apply restrictions on the auction outcome, such as tighter caps or spectrum floors that lead to fragmentation of spectrum. In particular, caps and floors are only restrictions on auction outcomes and not long run market structure. Imposing unnecessary restrictions would not create a gain in long-run competitive intensity in service markets if it simply created unsustainable outcomes.

Ofcom's proposals for use of spectrum floors in addition to spectrum caps to safeguard competition in the UK vary significantly from the spectrum caps proposed in Ireland, and indeed appear to be fit for purpose in the UK case. However, Ofcom's

[20] Paragraph 4.44 of ComReg's Response to Consultation.

proposals do not affect our view on the appropriateness of the auction format and rules proposed for a multi-band auction in Ireland." (emphasis added)

H3GI disagrees with DotEcon's conclusion. Whilst the auction rules have been set in the context of Ireland's conditions, DotEcon and ComReg have failed to take proper account of those conditions. In this respect, ComReg's views on spectrum floors is clearly coloured by its failure to conduct a competition assessment of the market and its undue dismissal of H3GI's views on the need to ensure four credible players, with the necessary MSP, post-auction.

Whilst there is an argument that spectrum caps or floors do not determine the economic feasibility of four mobile operators in the long run, they ensure that ComReg does not determine, by virtue of its proposed spectrum cap structure, that only three mobile operators are feasible, with all the attendant harm to competition identified by Value Partners and RRA in their July report; caps and floors are not restrictions on long run market structure, however, if chosen incorrectly, they can determine long run market structure to the detriment of competition and as a result, consumer welfare. As a result of ComReg's proposed spectrum cap structure, ComReg will determine the market structure going forward to the detriment of competition. Further, ComReg itself has recognised the impact that the award process (and the structure of that process) will have on long-term competition in the relevant downstream market.[21]

Fragmentation of spectrum is not objectionable *per se*. This is yet another example of DotEcon failing to demonstrate its point by reference to facts and figures.

In terms of the "*unsustainable outcomes*" referred to by DotEcon, H3GI calls on DotEcon to clarify what these might be.

DotEcon has failed to demonstrate any of its assertions regarding economic feasibility. H3GI submits that ComReg should adopt the same approach as that adopted in the UK, namely a comprehensive competition and minimum spectrum portfolio assessment.

In Annex 6 to ComReg's Response to Consultation, contained in ComReg Doc. No. 11/60a, ComReg states as follows:

21 For example, "*The award process used, and the level of competition within that award process, will have a significant impact on the level of competition downstream*" (emphasis added) (paragraph 3.61 of ComReg's Response to Consultation); and in terms of ensuring that competition at the retail level is achieved, "*Competition in the auction/for the market can therefore be seen as a means to an end…..*" (emphasis added) (paragraph 3.145 of ComReg's Response to Consultation).

"ComReg concurs with DotEcon's assessment that the situations facing Ofcom and ComReg are significantly different. ComReg notes that there are important differences between the communications markets in the UK and Ireland.

In addition, if the proposed spectrum floor was applied, this would appear to facilitate a natural auction outcome, potentially facilitating tacit collusion with a strong possibility of the weakest bidder acquiring the reserved spectrum at the reserve prices, whilst also enhancing an inefficient outcome where the bidders who value the spectrum the most do not access a sufficient amount (whilst remaining under the proposed spectrum cap).

The Report draws heavily from the report sent to Ofcom by H3GUK. ComReg would question the robustness of the consultant's findings when comparing two very different markets.

The use of a spectrum floor can restrict competition and efficiency in the auction and could result in a natural outcome. As stated by DotEcon in paragraph 94 of its report, "the objective in setting spectrum caps is to preclude outcomes, and only those outcomes, that are sufficiently extreme as to harm competition". By employing a spectrum floor, this could affect auction efficiency and spectrum could be inefficiently assigned. Such a spectrum floor could be almost equivalent to ex ante market partitioning by ComReg and as such would be inappropriate. Ultimately this could adversely affect competition in the market.

ComReg considers that its proposal to apply a 2 × 10 MHz 900 MHz cap (for the first time slice), a 2 × 20 MHz sub-1 GHz cap and an overall cap of 2 × 50 MHz best achieves its goal of only precluding outcomes which would comprise extreme asymmetries, which could in turn affect competition in the market. In light of this, ComReg maintains that its proposal is superior to the VP/RRA proposal, as it allows for some asymmetry in spectrum distribution but not so much to distort competition in the market, whilst preserving competitive tension in the spectrum award competition and allowing for an efficient outcome."[22] (emphasis added)

H3GI responds to DotEcon's analysis of H3GI's submission that ComReg should impose spectrum floors in order to ensure effective market competition below.

As a preliminary point, however, H3GI submits that there is nothing inappropriate in drawing heavily from the report sent to Ofcom by H3GUK. In fact, to do so is efficient. For example, figures 9, 10, 11, 12, 13 and 14 of the report sent to Ofcom by H3GUK showing European governments attempts to increase competition in mobile communications with the introduction of 3G technology at the start of the 2000s, the telecoms operators that actually acquired 3G new entrant licences in each country, the 3G entrants that are now remaining in the market after ten years, mobile voice and broadband pricing in Western Europe, Western European mobile broadband price and network quality and mobile broadband penetration in Western Europe relate to the position in Europe, including Ireland, address the position in Ireland and support Value Partners and RRA's conclusions. H3GI strongly refutes any suggestion that the findings of Value Partners and RRA are anything less than robust.

[22] Paragraphs A6.164 – A6.168 of ComReg Doc. No. 11/60a.

ComReg refers to a *"natural auction outcome"*. This is referred to by DotEcon in its updated benchmarking report and commented on below. It would appear to mean auction at a price below ComReg and DotEcon's perceived value of the available spectrum. However, as previously stated by H3GI, the only proper determinant of the value of the 800, 900 and 1800 MHz bands is the auction itself.

ComReg also refers to tacit collusion. It does so in order to imply that auction at a price below ComReg and DotEcon's perceived value is inappropriate and somehow wrong. As previously stated by H3GI and others, there are means within ComReg's disposal to deal with concerns of collusion. The minimum reserve price, spectrum caps and the non-implementation of a spectrum floor should not be amongst such means.

ComReg also refers to an alleged inefficient outcome where the bidders who value the spectrum the most do not access a sufficient amount (whilst remaining under the proposed spectrum cap). ComReg would appear to be equating revenue under the proposed auction with efficiency and prioritising this over the medium and long term well-being of the mobile communications market in Ireland. This is not correct. Any loss to Government finances is more than outweighed by benefits to society.

H3GI questions below the standard applied by ComReg in terms of auction design. In any event, H3GI submits that ComReg's proposed spectrum cap structure is sufficiently extreme so as to harm competition, involving a loss of welfare to the Irish economy of in excess of €740 million[23].

This outcome would appear to be in direct contrast to ComReg's stated recognition of the importance of consumer welfare and its acknowledgement that "*even small losses to consumer welfare or unrealised potential gains would have a substantial impact on consumer welfare over the period of the new liberalised licences*"[24]. It is submitted that consumer welfare losses in excess of €740 million are by no means "*small*".

Finally, H3GI refutes ComReg's statement that *"Such a spectrum floor could be almost equivalent to ex ante market partitioning by ComReg and as such would be inappropriate. Ultimately this could adversely affect competition in the market*". It would not be *ex ante* partitioning of the market for mobile communications in Ireland. It would not be *ex ante* partitioning of any other relevant market. By way of contrast, in imposing a spectrum floor, ComReg would be ensuring that ComReg's proposed spectrum caps structure would not result in a substantial lessening of competition / significant impediment of effective competition in the market for mobile communications in Ireland or otherwise harm competition, in accordance with ComReg's statutory obligation to promote competition in the mobile communications market in Ireland.

<u>Extreme outcome / extreme asymmetry – appropriate standard of review</u>

As indicated above, H3GI believes that ComReg has misunderstood the extent of its role in the award process and in particular, its role in ensuring the promotion of competition within the market (in accordance with its statutory obligations). This in turn has led ComReg to dismiss the case advanced by H3GI, for the need to

23 Paragraphs 1.4 and 5.4.1 of the Joint VP/RRA Report dated 22 July 2011.

24 Paragraph 3.168 of ComReg's Response to Consultation.

guarantee the existence of a market (post-auction) in which four credible players compete, and to adopt inappropriate parameters for the spectrum caps set.

H3GI notes the references in ComReg's Response to Consultation where it agrees with DotEcon "*that the main purpose of spectrum caps is to ensure that **extreme** outcomes which could harm competition do not emerge from the proposed auction, while also ensuring that the distribution of spectrum shall be determined by competition amongst the bidders and not by the cap set on the amount of spectrum that each bidder may be obtain*."[25] (emphasis added)
H3GI submits that the starting position adopted by ComReg (referred to above) is plainly wrong and misguided.

ComReg's starting position (i.e. to avoid extreme outcomes which could harm competition) is incorrect. ComReg's statutory obligation is to promote competition. This amounts to a positive obligation to take steps to advance and increase competition in the market for mobile communications in Ireland. H3GI submits that as the absolute minimum the correct standard of review should be that which applies in the context of EU and national merger control rules i.e. to seek to avoid a situation which would result in a substantial lessening of competition / significant impediment of effective competition within the relevant market. It is wholly unsustainable for ComReg and DotEcon to advocate a low standard. The appropriate standard of review is addressed in more detail, in Part 3 below.

Further, and notwithstanding the fact that neither ComReg nor DotEcon have carried out a proper or detailed analysis of the likely future competition in the relevant markets, ComReg concludes that "*the proposed spectrum caps will provide appropriate safeguards against excessively asymmetric outcomes*" (emphasis added). ComReg does not however, provide any clarification or explanation, as to what it considers might constitute "*excessively asymmetric outcomes*" and in particular, at what level, potential differences in spectrum holdings will be considered to be "*excessively*" asymmetric.

Notwithstanding the lack of clarity regarding ComReg's views on "excessive" asymmetry, it remains the case that ComReg's proposed spectrum caps in respect of sub-1 GHz spectrum in the second temporal lot are likely to result in three operators obtaining 2 x 20 MHz of sub-1 GHz spectrum, with one operator obtaining only one 2 x 5 MHz block of critical sub-1 GHz spectrum.[26] It is difficult to understand how this result could not properly be considered to be an "excessively asymmetric" outcome. It begs the question, what would ComReg regard as excessively asymmetric: no sub-1 GHz spectrum?

The above position (i.e. three operators obtaining 2 x 20 MHz of sub-1 GHz spectrum, with one operator obtaining only one 2 x 5 MHz block of critical sub-1 GHz spectrum) also appears to contradict other statements made by ComReg elsewhere in ComReg's Response to Consultation. In this respect, H3GI notes that in dismissing the proposed administrative assignment of a certain amount of liberalised 900 MHz spectrum to incumbent operators (Option 2B in ComReg's Response to Consultation), in favour of an auction process, ComReg noted that "*it could be argued that if incumbent operators were granted an administrative assignment of say*

25 Paragraph 4.36 of ComReg's Response to Consultation.

[26] The critical nature of this spectrum is variously acknowledged in ComReg's Response to Consultation.

one block of 900 MHz this may not be enough sub 1 GHz spectrum to ensure that an incumbent would be a successful competitor in the new liberalised world."[27] (emphasis added)

Likewise in dismissing the reservation of a certain amount of spectrum for a new entrant (Option 2A in ComReg's Response to Consultation), ComReg recognises that "*if the set aside of spectrum for new entrants is not large enough to enable a new entrant to be an efficient competitor, and the new entrant fails to win any additional spectrum, then Option 2A would not result in the promotion of competition over and above what could be achieved using a CCA (i.e. Option 1) to award all spectrum*"[28] (emphasis added). H3GI notes that ComReg does not however, provide any indication as to what it considers might be "*enough*".

Indeed, as indicated above, ComReg itself recognises the importance of ensuring the current auction process is structured correctly, and the impact this might have on the future structure of the market.

ComReg concludes:

"ComReg considers that its proposal to apply a 2 × 10 MHz 900 MHz cap (for the first time slice), a 2 × 20 MHz sub-1 GHz cap and an overall cap of 2 × 50 MHz best achieves its goal of only precluding outcomes which would comprise extreme asymmetries, which could in turn affect competition in the market. In light of this, ComReg maintains that its proposal is superior to the VP/RRA proposal, as it allows for some asymmetry in spectrum distribution but not so much to distort competition in the market, whilst preserving competitive tension in the spectrum award competition and allowing for an efficient outcome." (emphasis added)

H3GI has already indicated above its views as to the correct standard of review to be applied by ComReg and why the preclusion only of outcomes which would comprise "*extreme*" asymmetries fails to meet this standard of review. The appropriate standard of review is addressed in more detail, in Part 3 below.

Notwithstanding this, it is difficult to understand how ComReg can reconcile the asymmetry that will be created by ComReg's proposed sub-1GHz and overall spectrum caps, namely the possibility that an operator could only obtain 5 MHz of sub-1 GHz, with ComReg's stated goal of precluding extreme asymmetries – indeed, it is difficult to comprehend how this situation could be considered to be anything other than one of extreme asymmetry.

In this respect, H3GI notes that ComReg's own economic consultants, DotEcon, would appear to believe that a 2 x 15 MHz sub-1 GHz spectrum cap with the possibility that the four existing mobile operators do not acquire all of the sub-1GHz spectrum available is an extreme auction outcome where competition could undoubtedly be harmed.[29] ComReg appears to endorse DotEcon's views at paragraph 4.22 of ComReg's Response to Consultation.

27 Paragraph 3.123 of ComReg's Response to Consultation.

28 Paragraph 3.160 of ComReg's Response to Consultation.

29 Paragraph 104 of DotEcon's Issues Report.

DotEcon would also appear to believe that two operators with 2 x 25 MHz of sub-1 GHz spectrum with 2 x 15 MHz distributed in some way between at least two other bidders would be an extreme outcome and will likely have a damaging effect on competition.[30] Again, ComReg appears to endorse DotEcon's views at paragraph 4.21 of ComReg's Response to Consultation.

H3GI notes that DotEcon does not provide any explanation or basis for these views. Notwithstanding this, and without prejudice to H3GI's position, as to whether or not H3GI considers the above outcomes to be "extreme", it would seem to follow that if ComReg at least, accepts (based on DotEcon's views) that two operators with 2 x 25 MHz of sub-1 GHz spectrum with 2 x 15 MHz distributed in some way between at least two other bidders would be an extreme outcome, ComReg must surely accept that the likely outcome of ComReg's current spectrum caps i.e. three operators obtaining 2 x 20 MHz of sub-1 GHz spectrum with one operator obtaining only one block of 2 x 5 MHz of sub-1 GHz spectrum, comprises an "extreme" outcome. H3GI re-iterates its previous assertion that ComReg is prioritising short term revenue over competition in the medium and long term.

DotEcon states:

"Of course, in the long run excessive fragmentation of spectrum in an auction may lead to exit or consolidation. Therefore, there are mechanisms for unsustainable market structures to adjust over the long run. Nevertheless, there may still be costs to society if new services are delayed as a result of excessive fragmentation of spectrum in the short run. Also, windfall gains may be enjoyed if competition for spectrum in the auction is muted, with these gains realised on market consolidation (i.e. by a purchaser of spectrum pooling its interests with another party, whether through explicit spectrum trading or through other mechanisms). Therefore, there are clear costs from forcing an auction to produce a more fragmented outcome (for example through excessively tight floors or caps) when less fragmented outcomes would allow an acceptable level of competition in downstream mobile services markets and would in any case likely be allowed by competition and regulatory authorities if they arose subsequently. Such approach would simply reduce competition within an auction and restrict potentially efficient outcomes for no long-term benefit."[31] (emphasis added)

Although DotEcon raises the issue of excessive fragmentation of spectrum, it fails to provide any explanation as to what this might mean in practice, and what level/degree of fragmentation is considered by it to be "*excessive*". Notwithstanding this, DotEcon fails in any event, to demonstrate how implementing the Alternative Spectrum Rules proposed by Value Partners and RRA in their July report would

[30] Paragraph 126 of DotEcon's Issues Report.

[31] Paragraph 153 of DotEcon's Issues Report.

result in "*excessive*" fragmentation of spectrum (whatever DotEcon might consider that term to mean).

DotEcon also raises the issue of windfall gains by a purchaser of spectrum pooling its interests with another party. However, it fails to explain why a purchaser of spectrum pooling its interests with another party makes the price paid by a successful bidder for spectrum in the upcoming auction a *"windfall gain"* and as a result, wrong. The scope of future spectrum pooling is unclear. As a result, DotEcon has no basis for asserting that it will give rise to a windfall gain. H3GI objects to DotEcon's characterisation of the Alternative Spectrum Rules proposed by Value Partners and RRA as *"excessively tight"*. As stated above, DotEcon has failed to demonstrate that the Alternative Spectrum Rules are *"excessive"*.

DotEcon states "*less fragmented outcomes would allow an acceptable level of competition in downstream mobile services markets and would in any case likely be allowed by competition and regulatory authorities if they arose subsequently"* (emphasis added). What is an acceptable level of competition in downstream mobile services markets? DotEcon does not provide any clarification. On what basis does DotEcon state that competition and regulatory authorities would be likely to permit such an unexplained level of competition if it arose subsequently, and to which competition and regulatory authorities, is DotEcon referring? What regulatory and competition standards does DotEcon consider is/should be applied by these authorities? DotEcon does not explain any of this or set out its views for the same. As a result, H3GI considers DotEcon's analysis to be fundamentally flawed.

H3GI has already addressed above H3GI's disagreement with DotEcon's conclusion that "*Such approach would simply reduce competition within an auction and restrict potentially efficient outcomes for no long-term benefit"*, and the reasons for this.

At paragraph 157 of the DotEcon's Issues Report, DotEcon states:

"In particular, relative to the Irish case:

1) There is less spectrum becoming available in the UK than in Ireland over the period of the competition assessment (5-10 years from the end of the auction). This means that the competitive landscape after the auction is unlikely to change in the UK over the duration of the competitive assessment unless there is secondary trading (and indeed that might be handicapped if uncompetitive service markets were allowed to emerge). This is not necessarily the case in Ireland.

• In the UK, owing to the move to indefinite licensing (900MHz and 1800MHz licences are already indefinite subject to the payment of annual fees, 2.1GHz licences were awarded initially for 20 years, and will then moving to a rolling licence term subject to annual fee payments) there will be no harmonised spectrum becoming available through primary allocation for the provision of advanced mobile services in the 10 years after the auction with any degree of certainty.

• In Ireland, at minimum, the 2.1GHz and 2.6GHz bands will become available for award over the same time period, making available up to 2x135MHz of high frequency spectrum.

2) A significant asymmetry of spectrum holdings exists amongst existing UK operators before the auction, generating a potential concern that this is not exacerbated as a result of the planned award. In contrast, the situation in Ireland going into the auction is much more symmetric.

• In the UK, while each operator has at least 2x10MHz of 2.1GHz spectrum, the 900MHz band is shared in its entirety by two operators, and at present 2x60MHz of the 1800MHz band is held by another operator (though this will be reduced to 2x45MHz before the auction).
• In Ireland, the spectrum usage rights being auctioned in the relevant bands constitute all usage rights for the spectrum in these bands (with the exception of a number of blocks for a short time period (2013-2015)). Further, all spectrum under 1GHz will be available for award amongst bidders in the auction. Spectrum in the 2.1GHz band is allocated symmetrically across existing mobile operators, with each operator holding usage rights for 2x15MHz. The proposed 2x10MHz cap on 900MHz spectrum in the short term (2013-2015) should also prevent significantly asymmetric outcomes during this period that may damage competition by affecting business continuity of existing GSM services or limiting early access to sub- 1GHz spectrum for advanced data services if equipment for such services is slow to emerge in the 800MHz band.

3) The competition assessment carried out in the UK, and the related assessment that measures to promote competition were necessary, was in the context of spectrum caps that would by themselves allow significantly asymmetric outcomes and substantial spectrum holdings amongst a small number of operators. This same correction is not necessary given the tighter spectrum caps proposed in Ireland and the proposal to award all spectrum in the relevant bands.

• In the UK, a sub-1GHz cap of 2x27.5MHz is proposed. The most asymmetric outcome that this sub-1GHz cap would permit would be where two operators, O2 and Vodafone, maintain their existing sub- 1GHz holdings and win a further 2x10MHz each, one existing mobile operator wins 2x10MHz of sub-1GHz spectrum and the fourth existing operator wins no sub-1GHz spectrum. This scenario is not that unlikely, as O2 and Vodafone would not have to compete for the full 2x27.5MHz each; they would simply have to compete for 2x10MHz each of the 800MHz spectrum available. In this scenario, without any sub-1GHz spectrum, this fourth operator would likely not be able to compete with its rivals over the time horizon considered in the competition assessment. Intervention is therefore necessary to ensure competition where these spectrum caps are used and where a four-player market is deemed necessary.

• In Ireland, a sub-1GHz cap of 2x20MHz is proposed. The most asymmetric outcome that this would permit would be where three existing mobile operators win 2x20MHz and one operator wins 2x5MHz. This outcome is unlikely, as the value of a second block to the fourth bidder as expressed in its bids in the auction would need to be lower that the value of a fourth block to all three other bidders. In any case, in this scenario, all four bidders would have at least 2x5MHz of sub-1GHz spectrum, and where these were the existing mobile operators, all four would have high frequency spectrum even if they did not win any 1800MHz spectrum in the auction. Therefore, the case, if any, for intervention to ensure that this outcome does not occur is at best unclear and at worst unfounded."

For the following reasons, H3GI does not agree that there is less spectrum becoming available in the UK than in Ireland over the period of the competition assessment (5-10 years from the end of the auction):

1. 2.1 GHz will not become available until 2022 at the earliest, 10 years from the proposed auction;

2. Holders of 2.1GHz are likely to continue using 2.1 GHz for UMTS for the foreseeable future; and

3. It is implicit in ComReg's published documentation that 2.6 GHz will not become available on a national basis until after 2019, 8 years from the proposed auction.

In relation to the symmetry of spectrum holdings in Ireland going into the auction, H3GI submits that ComReg's proposed spectrum cap structure will create the exacerbated significant asymmetry of spectrum holdings that is a potential concern in the UK, and for the reasons set out in H3GI's submissions and the Value Partners and RRA July Report, that this should also be of concern to ComReg in terms of competition in the market going forward.

ComReg's proposed spectrum cap structure will ensure a significantly asymmetric outcome and substantial spectrum holdings amongst a small number of operators. For the reasons set out above, H3GI does not agree that the outcome where three existing mobile operators win 2 x 20 MHz and one operator wins 2 x 5 MHz is unlikely. H3GI refers in particular to the detailed analysis carried out by Value Partners and RRA, set out at paragraph 4.4.6 of the Value Partners and RRA July Report. ComReg or DotEcon have not advanced any arguments/provided sufficient reasoning as to why this situation is "*unlikely*".

Overall spectrum cap of 2 x 40 MHz

H3GI has advocated that ComReg's proposed overall spectrum cap of 2 x 50 MHz should be replaced by a lower overall cap of 2 x 40 MHz. H3GI considers that ComReg's current proposed cap is too high, and will not ensure the existence of four credible players, each with a MSP, post-auction. H3GI's proposals concerning an overall spectrum cap of 2 x 40 MHz, and ComReg's/DotEcon's dismissal of those proposals are discussed further, at Part 2 below.

PART 2 – SUB-1 GHZ SPECTRUM CAP, OVERALL SPECTRUM CAP OF 2 X 50 MHZ AND ADDITIONAL SPECTRUM CAP OF 2 X 10 900 MHZ (2013 – 2015)

Sub-1 GHz Spectrum Cap of 2 x 20 MHz

H3GI has set out in its previous responses and submissions its views that a sub-1 GHz spectrum cap of 2 x 20 MHz is unnecessarily high, and has called on ComReg to adopt a cap of 2 x 15 MHz with possible relaxation to 2 x 20 MHz, should supply exceed demand.

H3GI has also set out its concerns that ComReg's proposed spectrum cap structure is likely to lead to a situation in which three operators each obtaining 2 x 20 MHz of sub-1 GHz spectrum, with a fourth operator obtaining only one block of 2 x 5 MHz of sub-1 GHz spectrum, and that as a result, competition in the market will be distorted.

H3GI has already indicated above the MSP required by each operator to compete in the market. For the reasons set out in the Value Partners and RRA July Report, it is considered that the minimum amount of sub-1 GHz spectrum required is 2 x 10 MHz of contiguous sub-1 GHz spectrum. Value Partners and RRA have also demonstrated in their report why a sub-1 GHz spectrum holding of 2 x 5 MHz either on its own or in combination with spectrum in the 1800 MHz band does not comprise a "substitute" for a sub-1 GHz spectrum holding of 2 x 20 MHz, but instead comprises an "extreme" outcome/level of asymmetry.

H3GI notes that neither ComReg nor DotEcon have provided sufficient reasoning for their dismissal of H3GI's sub-1 GHz spectrum cap proposals, nor explained in sufficient detail why ComReg's proposed sub-1 GHz spectrum cap of 2 x 20 MHz will not lead to an extreme outcome/level of asymmetry of spectrum holdings post-auction or otherwise harm competition.

H3GI discusses each of these issues in further detail below.

As a preliminary point however, H3GI welcomes ComReg's decision not to impose an even higher sub-1 GHz spectrum cap. H3GI notes, for example the following statements made by DotEcon at paragraph 126 of DotEcon's Issues Report:

"Some respondents have argued that the proposed sub-1GHz spectrum cap is too high, while others have argued that the cap should be at least 2x20MHz or higher. We note that extreme outcomes that would be possible where the sub-1GHz cap were higher (two operators with 2x25MHz of sub-1GHz spectrum with 2x15MHz distributed in some way between at least two other bidders) and consider that such outcomes will likely have a damaging effect on competition. Therefore, we do not consider further the option of increasing this sub-1GHz cap where four or more parties apply for sub-1GHz spectrum at the application stage." (emphasis added)

Whilst H3GI agrees that ComReg should not impose a higher sub-1 GHz spectrum cap for the reasons set out in the Value Partners and RRA July Report, H3GI asks the question: where is DotEcon's: (i) assessment of the likely future competition in markets for the provision of mobile electronic communications services after conclusion of the award of the 800, 900 and 1800 MHz bands; and (ii) analysis of minimum spectrum portfolios? As indicated by H3GI above, without such assessment of the market and analysis of the correct level of minimum spectrum portfolio, it is difficult to understand how ComReg can properly satisfy itself as to the appropriateness of its proposed sub-1 GHz spectrum cap.

As regards ComReg's dismissal of H3GI's concerns that ComReg's proposed spectrum cap will result in one operator obtaining only 2 x 5 MHz of sub-1 GHz spectrum, H3GI notes the following statements made by DotEcon at paragraph 132 of DotEcon's Issues Report:

"One of the existing operators, H3GI, has argued in its response that the proposed sub-1GHz spectrum cap of 2x20MHz would risk it only being awarded 2x5MHz of this spectrum. In response to this, we consider that the following points are important:

• A 2x20MHz sub-1GHz cap would not allow three operators to use their bids in the auction to prevent a fourth bidder from winning any sub-1GHz spectrum;

• With a sub-1GHz cap of 2x20MHz, the risk of only being awarded 2x5MHz

of sub-1GHz spectrum does not apply only to one operator only but to all existing operators;

• If it were the four existing mobile operators competing for spectrum in the auction and if bidders were to bid for sub-1GHz spectrum based on their valuations for this spectrum, for one bidder to only be awarded 2x5MHz of sub-1GHz spectrum it would have to have incremental value of a second 2x5MHz sub-1GHz lot of less than the incremental value that each of the other three existing operators have for a fourth 2x5MHz sub-1GHz lot. The probability of this situation arising in reality is low, but where this were to be the case, the allocation of more than 2x5MHz of sub-1GHz of spectrum to that bidder would in fact not be efficient; and

• The proposed format for the award process is a multi-round combinatorial auction (a CCA), which should give all bidders the opportunity to observe how much others value this spectrum (in the aggregate) at round prices. In this case, each bidder can calculate the cost to it of pursuing various options relative to others (e.g. bidding on different amounts of spectrum in the auction with a view to facing different levels of cost and service capabilities over the duration of the resulting licences).

Given these points, we consider that the proposed sub-1GHz cap of 2x20 MHz strikes a good balance of the relevant factors in setting a sub-1GHz spectrum cap." (emphasis added)

With respect, the fact that *"A 2x20MHz sub-1GHz cap would not allow three operators to use their bids in the auction to prevent a fourth bidder from winning any sub-1GHz spectrum"* (emphasis added) misses the point.

As previously submitted by H3GI and supported by the Value Partners and RRA July Report, one block of 2 x 5 MHz of sub-1 GHz spectrum falls below the MSP identified by Value Partners and RRA, and significantly below a holding of 2 x 20 MHz (which the remaining three operators are likely to obtain), and as such will place the weakest bidder in the upcoming auction at a significant competitive disadvantage in the mobile communications market. DotEcon's analysis (and ComReg's endorsement of it) is unduly simplistic, and fundamentally fails to recognise the importance of the carrier's lower frequency spectrum holding when providing mobile data services at a fixed location inside a building, not least in terms of capacity and downlink speeds. H3GI refers in particular, to paragraph 3.2.3 et seq. of the Value Partners and RRA July Report in support of its position.

Notwithstanding this, neither ComReg nor DotEcon appear to have carried out a proper analysis of the points made by H3GI, nor explained why an outcome in which three operators each hold 2 x 20 MHz of sub-1 GHz spectrum and one operator holds only one block of 2 x 5 MHz sub-1 GHz spectrum, is not considered to be an "*extreme*" outcome. As discussed above in Part 1 of this response, it is difficult to imagine a more extreme outcome, save the failure by an operator to obtain any sub-1 GHz spectrum. In any event, it is not clear why ComReg should not consider the possibility/likelihood of an operator obtaining only one block of 2 x 5 MHz of sub-1 GHz spectrum does not comprise an extreme outcome, when at the same time ComReg expressly recognises as extreme, an outcome in which two operators each obtain 2 x 25 MHz of sub-1 GHz spectrum, with the remaining 2 x 15 MHz of sub-1 GHz spectrum distributed among two other operators (e.g. each obtaining 2 x 7.5 MHz of spectrum) (paragraph 4.21 of ComReg's Response to Consultation). In this respect, and without prejudice to H3GI's views as to the correct standard of review

that should be adopted by ComReg (i.e. not simply "extreme" outcomes), it is nonetheless submitted that ComReg has failed to apply its own threshold correctly.

Again with respect, it is not true that "*With a sub-1GHz cap of 2x20MHz, the risk of only being awarded 2x5MHz of sub-1GHz spectrum does not apply only to one operator only but to all existing operators"* (emphasis added). This is disingenuous and misleading. As demonstrated in the Value Partners and RRA July Report, [**Confidential**].

DotEcon states that "*The probability of [one bidder having incremental value of a second 2x5MHz sub-1GHz lot of less than the incremental value that each of the other three existing operators have for a fourth 2x5MHz sub-1GHz lot] arising in reality is low"* (emphasis added). On what basis can DotEcon properly assert that this is low? DotEcon has not presented the basis on which it appears to have formed this view. It is universally acknowledged that sub-1 GHz spectrum is critical to the future of mobile communications services, greater volumes of spectrum ensure greater technical efficiency and provide competitive advantages, and there is a clear incentive for incumbents to weaken a competitor in the market. On this basis, H3GI disagrees with this analysis.

DotEcon further states: *"… where [one bidder to only be awarded 2x5MHz of sub-1GHz spectrum] were to be the case, the allocation of more than 2x5MHz of sub-1GHz of spectrum to that bidder would in fact not be efficient"*. DotEcon's reference to "efficiency" and the context within which this is made is unclear. If DotEcon means efficient in terms of the auction, H3GI submits that DotEcon is incorrectly prioritising revenue at the expense of spectrum efficiency and competition. If DotEcon means efficiency in terms of spectrum use, for the reasons set out elsewhere in this response, H3GI submits that ComReg's proposed spectrum cap structure will harm competition and as a result, spectrum efficiency. DotEcon, like ComReg, is equating revenue under the proposed auction with efficiency and failing to promote competition.

Elsewhere in ComReg's Response to Consultation, H3GI notes that:

"*ComReg remains of the view that the proposed competition caps are appropriate. They take account of the fact that the propagation qualities of the sub-1 GHz spectrum bands make them particularly valuable and sought after. Further, the caps would allow a bidder to acquire sufficient 1800 MHz spectrum so as to effectively compete with users of sub-1 GHz spectrum while also allowing a bidder to acquire up to 2 x 20 MHz of sub-1 GHz spectrum and 2 x 30 MHz of 1800 MHz spectrum which would seem to be enough spectrum to deploy a service and provide additional capacity in populous areas."* [32] (emphasis added)

While H3GI agrees that sub-1 GHz spectrum is particularly valuable and sought after, H3GI does not agree that ComReg's proposed caps properly take account of the propagation characteristics or that they are appropriate.

As regards the reference to "*sufficient 1800 MHz spectrum*", Value Partners and RRA have clearly set out in the Value Partners and RRA July Report the need for an operator to acquire a sufficient level of sub-1 GHz spectrum, and why it is both unsatisfactory and inappropriate for ComReg to seek to rely on the availability of 1800 MHz spectrum as a substitute for a sufficient amount of sub-1 GHz spectrum.

32 Paragraph 4.40 of ComReg's Response to Consultation.

Value Partners and RRA have clearly demonstrated why 1800 MHz spectrum is not sufficient to overcome the difficulties of capacity and downlink speeds in the context of mobile data services at a fixed location inside a building.

Whilst the basis on which ComReg has reached its conclusion as to what level of spectrum seems to be "*enough*" is unclear, H3GI does not dispute the fact that a holding of 2 x 20 MHz of sub-1 GHz spectrum and 2 x 30 MHz of 1800 MHz spectrum is in fact likely to be "*enough*" spectrum, nor the fact that ComReg's proposed caps will allow "*a*" bidder to acquire this level of spectrum. However, this latter issue is precisely the point – ComReg's proposed cap structure may well favour a limited number of operators, but the caps fail to ensure that all bidders will have access to "*enough*" spectrum so as to enable them to compete fairly and equally in the market, post-auction.

H3GI's position remains that absent appropriate spectrum caps and a spectrum floor, the proposed format for the award process does not sufficiently safeguard competition.

Without prejudice to H3GI's position above in respect of a spectrum floor, H3GI notes that ComReg has still failed to properly address H3GI's arguments in favour of a sub-1 GHz spectrum cap of 2 x 15 MHz that can be relaxed to 2 x 20 MHz in the absence of demand for the remaining 5 MHz block. H3GI submits that the mere assertion by DotEcon (and endorsed by ComReg at paragraph 4.22 of ComReg's Response to Consultation) that "*there is no obvious case on competition grounds for requiring such an outcome*"[33] does not in itself constitute a proper and reasoned assessment of the situation or H3GI's proposals, and in any event, is factually incorrect. H3GI has set out above in Part 1 of this response, the need for ComReg to ensure the existence of four credible players in the market, each holding the necessary MSP, post-auction.

Overall Spectrum Cap of 2 x 50 MHz

H3GI has set out in its previous responses and submissions its views as to why ComReg's proposed overall spectrum cap of 2 x 50 MHz is inappropriate, and should be replaced by a lower overall cap of 2 x 40 MHz. In particular, H3GI considers that an overall spectrum cap of 2 x 40 MHz is necessary to ensure the existence of four credible players in the market, with each operator holding a MSP, post-auction.

H3GI notes that it is not alone in its assertion of an overall spectrum cap of 2 x 40 MHz. At paragraphs 133 – 136 of DotEcon's Issues Report, DotEcon states:

"Existing operator Meteor has argued against the overall spectrum cap being set at 2x50MHz on the basis that it would unfairly favour the large established operators O2 and Vodafone, affording them the opportunity to squeeze out the competitive tension created by smaller operators and potential new entrants.

In respect to this argument, we note again the objective in setting spectrum caps is to preclude outcomes, and only those outcomes, that are sufficiently extreme as to harm competition. Given this:

• *This spectrum cap would allow for an 1800MHz-only entrant – where there were value in operating such an 1800MHz-only network, the proposed spectrum caps*

[33] Paragraph 129 of DotEcon's Issues Report.

would provide such an entrant with the scope necessary to acquire as much spectrum as it might feasibly need for providing advanced data services using 1800MHz frequencies;

• The most asymmetric outcomes that might result given the market has four existing operators are:

o Two existing operators winning 2x20MHz each of sub-1GHz spectrum and 2x30MHz each of 1800MHz spectrum; or

o An entrant winning 2x50MHz of 1800MHz spectrum with the remaining 2x25MHz distributed amongst the existing operators, which also win all of the sub-1GHz spectrum available. Neither of these outcomes is unequivocally harmful to competition:

o In the former case, the other two existing operators would between them be able to win 2x25MHz of sub-1GHz spectrum and 2x15MHz of 1800MHz spectrum. As for one bidder potentially being awarded 2x5MHz of sub-1GHz spectrum, the arguments in the previous sub-section apply. As for high frequency spectrum, even if in the most extreme case one of the existing operators were to be awarded no spectrum in the 1800MHz band, each of these operators has existing rights of use of high frequency spectrum in the 2.1GHz band, and further high frequency spectrum will be made available within the duration of the licences awarded in this auction.

o In the latter case, again, given the existing holdings of high frequency spectrum in the 2.1 GHz band by each of the four mobile operators, and the award of 2x65MHz of sub-1GHz of spectrum amongst them under this scenario, there is no reason to automatically consider that such an outcome would be harmful to competition even though there would be some asymmetry across operators in the bands in which spectrum was held.

In contrast, the proposed alternative overall spectrum cap of 2x40 MHz would ensure almost fully symmetric outcomes where the number of alternative feasible allocations of spectrum amongst bidders would be small. For example, if only the four existing mobile operators were to bid in the auction, the outcome would most likely be that each existing operator would win 2x15MHz or 2x20MHz of sub-1GHz spectrum plus 2x15MHz or 2x20MHz of 1800MHz spectrum, or some small variant thereof. Given the number of alternative outcomes that would be precluded relative to the alternative 2x50MHz cap, it is highly likely that the imposition of such a cap would result in significant inefficiency of allocation, and potentially spectrum going unsold inefficiently. The benefit to competition of ensuring relatively symmetric spectrum holdings of operators after the auction is not clear, and in any case does not appear to be sufficiently great to offset the efficiency loss as a result of significantly limiting the breadth of feasible auction outcomes.

Given these points, and the importance of allocating the spectrum available in the most efficient way, we do not think that there is a case for lowering the overall spectrum cap on account of asymmetric outcomes resulting in harm to competition." (emphasis added)

For the reasons set out in the Value Partners and RRA July Report, H3GI disagrees with ComReg's proposed overall spectrum cap of 2 x 50 MHz. DotEcon however, fails to recognise or acknowledge this, and as such does not appear to engage with any of the arguments raised by H3GI in this respect. In relation to DotEcon's comments in respect of the objective in setting spectrum caps, H3GI refers to its

comments set out above in relation to the applicable standard and questions whether only outcomes that harm competition are *"sufficiently extreme"*.

DotEcon states: "*This spectrum cap would allow for an 1800MHz-only entrant – where there were value in operating such an 1800MHz-only network, the proposed spectrum caps would provide such an entrant with the scope necessary to acquire as much spectrum as it might feasibly need for providing advanced data services using 1800MHz frequencies*" (emphasis added).

H3GI asks the question: where is DotEcon's analysis? It is providing for something that is theoretically possible without first considering whether it is likely. As a result, it is preferring a possibility over the clear and likely harm to competition identified by both Meteor and H3GI. H3GI does not believe that there would be value in operating an 1800 MHz-only network.

As explained in H3GI's previous submissions and the Value Partners and RRA July Report, the provision of indoor quality data services will become essential in the mobile communications market in Ireland over the lifetime of the proposed licence. As a result, an 1800 MHz-only would not be able to credibly compete with mobile network operators that have 2 x 20 MHz of sub-1 GHz. H3GI finds it strange that ComReg would prefer the highly unlikely prospect of an 1800 MHz-only network over the real and present risk of harming competition as a result of ComReg's proposed spectrum cap structure. It is not clear to H3GI why ComReg is advocating such an unlikely prospect? In any event, ComReg itself appears to recognise (e.g. in Annex 3 of ComReg's Response to Consultation) the very real need for operators to have a mix of high and low frequency spectrum.[34]

DotEcon identifies what it regards as *"The most asymmetric outcomes that might result given the market has four existing operators"* and states *"Neither of these outcomes is unequivocally harmful to competition"* (emphasis added). In relation to one bidder potentially being awarded 2x5MHz of sub-1GHz spectrum, H3GI refers to its comments above. In relation to one of the existing operators not being awarded any spectrum in the 1800MHz band, notwithstanding the 2.1 GHz spectrum held by such an operator and the possible but uncertain availability of 2.6 GHz, a credible mobile network operator requires 10 MHz of 1800 MHz in order to compete with a mobile network operator with 20 MHz of sub-1 GHz spectrum. In relation to an entrant winning 2x50MHz of 1800MHz spectrum, this does not address the minimum spectrum portfolio a credible mobile network operator requires in order to compete with a mobile network operator with 20 MHz of sub-1 GHz spectrum.

DotEcon discusses the alternative overall spectrum cap of 2 x 40 MHz. It states that this would ensure almost fully symmetric outcomes. It highlights that the alternative overall spectrum cap would preclude a number of alternative outcomes relative to the 2 x 50 MHz cap. It states that "*it is highly likely that the imposition of such a cap would result in significant inefficiency of allocation, and potentially spectrum going unsold inefficiently"* (emphasis added). DotEcon states that the benefit to competition of ensuring relatively symmetric spectrum holdings of operators after the auction is not clear, and in any event does not appear to be sufficiently great to offset the efficiency loss as a result of significantly limiting the breadth of feasible auction outcomes.

[34] See for example, A3.24 page 33 of ComReg Document No. 11/60a.

H3GI does not agree that an overall spectrum cap of 2 x 40 MHz, as part of the alternative spectrum rules proposed by Value Partners and RRA in their July report, would ensure almost fully symmetric outcomes. It would ensure four credible mobile network operators with enough spectrum to compete with each other. There would still be differences in their spectrum holdings and these differences would result in competitive differences. The preclusion of a number of alternative outcomes *per se* does not justify rejecting the alternative overall spectrum cap of 2 x 40 MHz.

H3GI submits ComReg must conduct: (i) an assessment of the likely future competition in markets for the provision of mobile electronic communications services after conclusion of the award of the 800, 900 and 1800 MHz bands; (ii) an analysis of minimum spectrum portfolios; and (iii) an assessment of the prospects of an 1800 MHz-only network.

In the absence of such assessment and analysis, DotEcon and ComReg are rejecting the alternative overall spectrum cap of 2 x 40 MHz purely on the grounds that it precludes a number of alternative outcomes.

H3GI does not agree with the unsubstantiated assertion that it is "*highly likely*" that an overall spectrum cap of 2 x 40 MHz will result in spectrum going unsold inefficiently. In this regard, H3GI refers DotEcon to Exhibit 37 of the Value Partners and RRA July Report.

H3GI does not agree with the assertion that the benefit to competition of ensuring relatively symmetric spectrum holdings of operators after the auction is "*not clear*". For the reasons set out above, H3GI does not agree with the assertion that the benefit to competition of ensuring relatively symmetric spectrum holdings of operators after the auction does not appear to be sufficiently great to offset the efficiency loss as a result of significantly limiting the breadth of feasible auction outcomes. Finally, H3GI again queries what DotEcon means by allocating spectrum available in the most "*efficient*" way. In this regard, H3GI refers to its comments above.

Additional Spectrum Cap of 2 x 10 MHz of 900 MHz (2013 – 2015)

H3GI welcomes ComReg's proposal to implement an additional spectrum cap of 2 x 10 MHz of 900 MHz for the first 'time slice'. However, it urges ComReg to extend this additional spectrum cap to the second time slice. Otherwise, ComReg runs the risk of significant harm to competition. At paragraph 4.41 of ComReg's Response to Consultation, ComReg states:

"ComReg agrees with DotEcon that it would be prudent to have an additional spectrum cap on the 900 MHz band, for the first time slice. While ComReg agrees that the 800MHz and 900 MHz spectrum bands may not be closely substitutable for one another in the short term, this should change as equipment which utilises 800 MHz spectrum becomes more readily available. In the interim period, a spectrum cap on the 900 MHz band will address short-term competition concerns which arise from the current imperfect substitutability between the 800 MHz and 900 MHz bands. Having regard to DotEcon's comments and its recommendation, ComReg considers that a cap on the 900 MHz band should apply in the first time slice."

H3GI submits that it is not clear that equipment which utilises 800 MHz spectrum will become more readily available by the second time slice. In the absence of this certainty, ComReg is taking a significant risk in respect of the future of competition in the Irish retail mobile communications market.

PART 3 – PROMOTION OF COMPETITION AND APPLICABLE STANDARD

H3GI notes that pursuant to section 10(1)b of the Act, ComReg's function is to manage, *inter alia*, the radio frequency spectrum resource and in exercising this function, ComReg's objectives shall include *inter alia*, the promotion of competition and innovation in the market, and the efficient use and effective management of spectrum.

H3GI considers that in choosing to address only "*extreme*" outcomes/"*extreme*" asymmetries that will "*undoubtedly*" harm competition, ComReg has failed to comply with its statutory functions and objectives, in particular its objective to promote competition by adopting an incorrect and inappropriate approach. H3GI notes that neither ComReg nor its consultants, DotEcon, seem entirely clear as to the applicable standard it is required to apply and instead waver between examining situations/outcomes that "*may*"/"*could*" or would "*likely*" result in harm to competition, and those which would "*undoubtedly*" harm competition. Likewise, ComReg appears to be unclear as to whether it is concerned about "*highly*" asymmetric distributions of sub-1 GHz spectrum, or purely "*extreme*" asymmetric distributions.

Without prejudice to H3GI's position on this issue (i.e. the applicable standard of review that should be adopted by ComReg), H3GI considers that ComReg's proposed approach will result in an "*extreme*" outcome/"*extreme*" asymmetries in the market place, that will "*undoubtedly*" harm competition. Further detail on these issues is set out below.

ComReg's functions under the Act

H3GI notes that section 10(1)(b) of the Act, provides as follows:

"10. (1) The functions of [ComReg] [sic] are -

……..

> *(b) to manage the radio frequency spectrum and the national numbering resource, in accordance with a direction under section 13"* (emphasis added)

ComReg's objectives under the Act

The objectives of ComReg in discharging its functions, are set out in section 12 of the Act. In particular, Section 12(1) of the Act provides as follows:

"*12.(1) The objectives of [ComReg] [sic] in exercising its functions shall be as follows-*

> *(a) in relation to the provision of electronic communications networks, electronic communications services and associated facilities –*
>
> > *(i) to promote competition,*
> > *(ii) to contribute to the development of the internal market, and*
> > *(iii) to promote the interests of users within the Community,*
>
> *(b) to ensure the efficient management and use of the radio frequency spectrum and numbers from the national numbering scheme in the State in accordance with a direction under section 13, and*
>
> *……..*" (emphasis added)

Positive obligation on ComReg to promote competition

In relation to ComReg's objectives in section 12(1)(a) of the Act, section 12(2)(a) stipulates that ComReg is required to take all reasonable measures which are aimed at the promotion of competition, including:

- ensuring that users, including disabled users, derive maximum benefit in terms of choice, price and quality;
- ensuring that there is no distortion or restriction of competition in the electronic communications sector; and
- encouraging the efficient use and ensuring the effective management of radio frequencies and numbering resources. (emphasis added)

In addition to the Act, the Common Regulatory Framework[35] requires ComReg, *inter alia*, to:

- take utmost account of the desirability of technological neutrality in complying with the requirements of the Framework Regulations, Authorisation Regulations, Access Regulations, Universal Services and Users' Rights Regulations, and Privacy Regulations in particular, those designed to ensure effective competition[36];
- ensure that, in the transmission of content, there is no distortion or restriction of competition in the electronic communications sector[37];
- give due weight to the need to maximise benefits for users and to facilitate the development of competition[38]; and
- ensure that competition is not distorted by any transfer or accumulation of rights of use for radio frequencies, and, for this purpose, ComReg may take appropriate measures such as mandating the sale or lease of rights of use for radio frequencies[39]. (emphasis added)

It is also noted that, in pursuit of ComReg's objectives under regulation 16(1) of the Framework Regulations and section 12 of the Act, ComReg must apply objective,

35 Specific regulations include: the European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. No. 333 of 2011) (the "Framework Regulations"); the European Communities (Electronic Communications Networks and Services (Authorisation) Regulations 2011 (S.I. No. 335 of 2011) (the "Authorisation Regulations"); the European Communities (Electronic Communications Networks and Services) (Access) Regulations 2011 (S.I. No. 334 of 2011) (the "Access Regulations"); the European Communities (Electronic Communications Networks and Services) (Universal Service and Users' Rights) Regulations 2011 (S.I. No. 337 of 2011) (the "Universal Service and Users' Rights Regulations"); and the European Communities (Electronic Communications Networks and Services) (Privacy and Electronic Communications) Regulations 2011 (S.I. No. 336 of 2011) (the "Privacy Regulations").

36 Regulation 16(1)(a) of the Framework Regulations (ibid).

37 Regulation 16(1)(b) of the Framework Regulations (ibid).

38Regulation 11(1) of the Authorisation Regulations (ibid) which provides that where ComReg considers that the number of rights of use to be granted for radio frequencies should be limited it must, without prejudice to sections 13 and 37 of the Act: (a) give due weight to the need to maximise benefits for users and to facilitate the development of competition; and (b) give all interested parties, including users and consumers, the opportunity to express their views in accordance with Regulation 12 of the Framework Regulations.

39 Regulation 9(11) of the Authorisation Regulations (ibid).

transparent, non-discriminatory and proportionate regulatory principles by, amongst other things:

- promoting regulatory predictability by ensuring a consistent regulatory approach over appropriate review periods;
- ensuring that, in similar circumstances, there is no discrimination in the treatment of undertakings providing electronic communications networks and services;
- safeguarding competition to the benefit of consumers and promoting, where appropriate, infrastructure-based competition;
- promoting efficient investment and innovation in new and enhanced infrastructures, including by ensuring that any access obligation takes appropriate account of the risk incurred by the investing undertakings and by permitting various cooperative arrangements between investors and parties seeking access to diversify the risk of investment, while ensuring that competition in the market and the principle of non-discrimination are preserved;
- taking due account of the variety of conditions relating to competition and consumers that exist in the various geographic areas within the State; and
- imposing ex-ante regulatory obligations only where there is no effective and sustainable competition and relaxing or lifting such obligations as soon as that condition is fulfilled. (emphasis added)

Further, General Policy Direction No. 1 on Competition (2004) requires ComReg to focus on the promotion of competition as a key objective, and where necessary, to implement remedies which counteract or remove barriers to market entry, and to support entry by new players to the market and entry into new sectors by existing players. In so doing, ComReg is required to have a particular focus on:

- market share of new entrants;
- ensuring that the applicable margin attributable to a product at the wholesale level is sufficient to promote and sustain competition;
- price level to the end user;
- competition in the fixed and mobile markets;
- the potential of alternative technology delivery platforms to support competition. (emphasis added)

H3GI considers that the above references clearly place a positive obligation on ComReg to actively adopt policies to advance and increase competition for the benefit of everyone i.e. consumers, businesses and the economy as a whole. It is therefore, incumbent on ComReg to adopt and implement all suitable and proportionate measures to achieve this objective.

H3GI's view is based on the recognised canons of statutory construction and interpretation. As a matter of construction, H3GI therefore considers that, where the text of the legislation in question is clear and unambiguous, the proper approach to statutory construction and interpretation is to ascertain the plain or literal meaning of the words concerned.

In support of this approach, H3GI refers to case-law in the area, and in particular to the following statements made by O'Flaherty J in *Cork County Council –v- Whillock*[40]:

40 [1993] 1 IR 231, at paragraph 237.

"*…it is clear to me that the first rule of construction requires that a literal construction must be applied. If there is nothing to modify, alter or qualify the language which the statute contains, it must be construed in the ordinary and natural meaning of the words and sentences*";

as well as to the statements made by Blayney J in *Howard –v- Commissioners of Public Works*[41]:

"*The cardinal rule for the construction of Acts of Parliament is that they should be construed according to the intention expressed in the Acts themselves. If the words of the statute are precise and unambiguous, then no more can be necessary to expound those words in their ordinary and natural sense. The words themselves alone do in such a case best declare the intention of the law giver.*"

As regards the plain and ordinary meaning of the relevant references in the Act relating to ComReg's functions and objectives, in particular, the requirement on ComReg to promote competition, and to ensure that competition in the market is not restricted or distorted, H3GI considers that this clearly requires ComReg to take positive action to advance or increase competition in the market.

H3GI views are supported by the dictionary definitions of the relevant terms, as set out in The New Shorter Oxford English Dictionary[42]:

- "*to promote*" means to further the development, progress, or establishment of (a thing); encourage, help forward, or support actively (a cause, process etc);
- "*to encourage*" means to urge, incite; to recommend, advise; to allow, promote, or assist (an activity or a situation);
- "*to ensure*" means to guarantee, warrant; to make certain the occurrence of (an event, situation, outcome etc).

Standard required to promote competition

As indicated above, the Act clearly requires active and positive conduct to advance or increase competition. Furthermore, it requires ComReg to take reasonable measures to guarantee/make certain that the measures taken do in fact increase/encourage competition. However, it appears to H3GI that both ComReg and DotEcon have adopted an incorrect and inappropriate approach which is entirely at odds with the positive obligation to ensure that competition in the market is promoted.

In the current context, ComReg and DotEcon appear to consider that the applicable standard requires ComReg merely to avoid outcomes which will lead to "*extreme*" asymmetries and which would "*undoubtedly*" harm competition. Examples of the approach adopted by ComReg and DotEcon are set out below.

DotEcon states at paragraph 102 of DotEcon's Issues Report:

41 [1994] 1 IR 101, at paragraph 151.

42 Published by the Oxford University Press, Fourth Edition 1993.

"In that (10/71a) report we considered that a spectrum cap set for sub-1GHz spectrum should balance the benefits of protecting competition against the costs of doing so; that is, it should seek to obtain benefit from precluding only those outcomes that would undoubtedly result in harm to competition." (emphasis added); and

At paragraph 4.36 of ComReg's Response to Consultation and paragraph 96 of Annex 6 to ComReg's Response to Consultation, ComReg states:

"ComReg … agrees with DotEcon that the main purpose of spectrum caps is to ensure that extreme outcomes which could harm competition do not emerge from the proposed auction, while also ensuring that the distribution of spectrum shall be determined by competition amongst the bidders and not by the cap set on the amount of spectrum that each bidder may be obtain." (emphasis added)

"Such an overall cap (i.e. for 1800 MHz and sub 1 GHz spectrum) would be appropriate as such a cap would guard against extreme asymmetrical and anti-competitive outcomes in total spectrum distribution at 800 MHz, 900 MHz and 1800 MHz while not unduly restricting bidders from switching their bids between bands during the award". (emphasis added)

As noted above, H3GI submits that this standard is inappropriate and inconsistent with ComReg's obligations under the Act. Further, neither ComReg nor DotEcon have provided any explanation as to why their review should be confined simply to the avoidance of "*extreme*" outcomes. Even if this were an appropriate standard of review (which H3GI does not suggest is the case), this still does not provide any basis for ComReg's / DotEcon's superficial dismissal of the points made by H3GI, in favour of a more thorough assessment of the issues.

In terms of the applicable standard required, H3GI considers that ComReg's statutory obligation to promote competition requires a much higher level/standard than that currently adopted by ComReg. In particular, H3GI considers that ComReg is required to take positive measures (including intervention where necessary) to guarantee/ensure that it increases competition in the relevant market. This is a reasonable measure to adopt in the circumstances. In practice, H3GI considers that this requires ComReg to carry out an assessment of competition in the market both prior to and post- the proposed auction, to identify how ComReg can best structure the auction so as to actively contribute towards the development of competition in the market, and to take steps to ensure that competition in the market is in fact promoted.

Such approach appears to be consistent with the purpose of sectoral regulation as a general principle (i.e. specific sectoral regulatory regimes in relation to competition primarily reflect the need to actively inject and promote effective competition into the sector, and facilitate market reform, rather than simply reacting to anti-competitive conduct), and with the approach and analysis adopted by ComReg in designating particular operator(s) with significant market power ("SMP") in terms of pro-actively reviewing markets in which competition may not be working effectively by carrying out a prospective analysis of the relevant market(s) concerned and pro-actively identifying the necessary measures (remedies) that should be implemented to introduce (or at the very least, maintain) competition in the relevant market(s). Likewise, H3GI refers to the Competition Authority's statutory duty to promote competition in the economy, and discharge of this obligation. Specifically, the Competition Authority appears to consider this as requiring it to analyse areas of the economy where competition may be absent, limited or restricted, and identify

workable solutions to increase competition (where the Authority identifies it as absent, limited or restricted)[43] (emphasis added).

As acknowledged by ComReg in its Response to Consultation, the impact on competition is assessed not just at wholesale level (competition "for" the market) but fundamentally also, in terms of competition at the retail level (competition "in" the market). H3GI considers that in the current context the promotion of competition at the retail level requires positive action on ComReg's part to ensure that the auction is structured in such a way so as to guarantee the existence of at least four credible operators, with each holding the MSP required, so that they are able to compete effectively and offer consumers an enhanced choice of service offerings in terms of variety and quality of services (e.g. download speeds) etc.

H3GI considers that its proposed approach is also consistent with ComReg's obligation to take reasonable measures and to act in a proportionate manner. At paragraph 105 of DotEcon's Issues Report, DotEcon states:

"We noted that the requirement on it to be proportionate in its actions, in combination with these objectives, in the case of the planned multi-band auction, amounts to a requirement on it to constrain bidding freedom of operators in the auction only to the degree necessary to ensure that these objectives are met." (emphasis added)

H3GI accepts that ComReg has a duty to act proportionately. However, given the criticality of the spectrum being awarded by ComReg (in particular, sub-1 GHz spectrum) and the probable harm that it will cause, H3GI submits that it is necessary and proportionate for ComReg to intervene in the current situation, and to promote and safeguard competition by ensuring that spectrum caps are set at a level that will guarantee the existence of four credible players in the market, with each holding a MSP, post-auction.

H3GI further considers that ComReg's proposed approach to the structure of the auction is inconsistent with ComReg's obligation to promote regulatory predictability by ensuring a consistent regulatory approach over appropriate review periods, in that ComReg's current approach contradicts the previous position of the ODTR who in 2001 designed the 3G competition to include four licences with comparable spectrum holdings.[44] H3GI submits that ComReg's proposed approach to auction structure and in particular the proposed sub-1 GHz spectrum caps will not ensure the existence of at least four operators in the Irish market, but rather three larger operators and one weaker operator i.e. in practical terms, 3½ operators.

Accordingly, setting as a standard a requirement to avoid outcomes which will lead to "*extreme*" asymmetries and which would "*undoubtedly*" harm competition is wholly unsustainable. The basis for ComReg's approach in this respect, is unclear and unprecedented. It is H3GI's view that ComReg's adoption of this inappropriately low and unnecessarily restrictive standard has led it to reach incorrect and unfounded conclusions, and to improperly dismiss the arguments made by H3GI concerning spectrum floors and caps.

43 Page 15 of the Competition Authority's Annual Report 2010, which sets out the responsibilities/obligations of the Authority's Advocacy Division, through which the Authority primarily discharges its statutory duty to promote competition in the economy.

44 ODTR Doc. No. 01/96, *"Information Memorandum – Four Licences to provide 3G Services in Ireland"*.

Notwithstanding the fact that H3GI considers ComReg has a positive obligation to actively promote competition, H3GI considers that as an absolute minimum ComReg must avoid the likelihood of competition in the relevant market will be distorted i.e. at the very least, ComReg must ensure that competition in the market is safeguarded. In this respect, H3GI submits that the appropriate standard is that which is applicable in merger analysis. H3GI refers in particular to the test set out in the EU Merger Regulation, whereby a merger which does not result in the significant impediment of effective competition within the Common Market (or a substantial part of it) will be deemed to be compatible with the Common Market.

H3GI therefore submits that in the context of ComReg's current consultation, the minimum level or standard applicable would be whether the proposed spectrum cap structure is likely to result in a significant impediment of effective competition in the retail mobile communications market in the State, whereby this may exist well below the level of "*extreme*" outcomes/asymmetries. As indicated above in Parts 1 and 2 of this response, H3GI considers that ComReg's proposed spectrum caps are likely to lead to distortion of competition in the market and to result in a significant impediment of effective competition in the retail mobile communications market in Ireland, with three operators obtaining 2 x 20 MHz of sub-1 GHz spectrum, and the other remaining operator obtaining only one block of 2 x 5 MHz of sub-1 GHz spectrum, and therefore being less able to compete in the market.

In considering whether this type of merger law analysis/test is applicable in the current context, H3GI notes in particular, that a merger law analysis is necessarily prospective and involves looking forward in an attempt to predict how participants in the market will behave and react subsequent to the proposed merger, and that this is similar to the analysis required under the relevant telecoms regulatory package (including in particular the 2011 Framework Regulations). Accordingly, H3GI considers that the type of merger law analysis referred to above, is the minimum level or standard appropriate/analogous test in the current context.

H3GI further notes that before reaching a determination as to whether or not effective competition in the market is likely to be significantly impeded, the merger law analysis requires the relevant regulator to first conduct a thorough assessment of the relevant market(s) (i.e. define the relevant market(s)), and to engage in rigorous, coherent and data-based economic analysis so as to substantiate the conclusions drawn. As indicated above, ComReg has failed to conduct a thorough assessment of the relevant market(s) and H3GI further submits that the analysis carried out by ComReg and DotEcon fails to meet the necessary degree of rigour etc required. Accordingly, H3GI suggests that the conclusions drawn by ComReg as to the appropriateness of its proposed spectrum caps are incorrect and unsubstantiated.

Notwithstanding the above and without prejudice to H3GI's views as to the correct standard to be employed, H3GI notes that in any event, ComReg's own application of the standard adopted by it, has not been carried out in a consistent manner and once again, H3GI queries the robustness of the conclusions drawn by ComReg.

Inconsistency in language

As indicated above, both ComReg and its consultants, DotEcon have been unclear as to the applicable standard of review employed. The lack of clarity in approach is exacerbated by the inconsistency in the language used by both ComReg and DotEcon.

DotEcon is inconsistent in the language that it uses to describe the standard that it has applied. At paragraphs 106 and 124 of DotEcon's Issues Report, DotEcon states:

"We also noted the related trade-off in the less extreme case where sufficiently tight spectrum caps in effect ensure symmetric spectrum holdings by all operators, and where such a policy may also negatively affect efficiency."

"To reiterate, the objective in setting spectrum caps for this auction was to:

• On the one hand, ensure that the kinds of extreme outcomes that would likely result in harm to competition in the provision of services to end customers would not be permitted; while

• On the other hand, ensure that, within this limit, the distribution of spectrum would be decided by competition in the auction and would not be dictated by the caps set on the amount of spectrum that individual bidders could be awarded."

Whereas elsewhere DotEcon refers to extreme outcomes that could undoubtedly harm competition, here DotEcon refers to extreme outcomes that would likely result in harm to competition.

ComReg has also changed its approach in relation to the applicable standard. At paragraph 127 of Annex 6 to ComReg's Response to Consultation, ComReg states:

"ComReg recognised in Section 4.1.1 of Consultation 10/71 that —highly asymmetric distributions of sub-1GHz spectrum could be detrimental to competition downstream, and, for this reason, a number of jurisdictions have imposed sub 1 GHz caps within their auctions. …" (emphasis added)

Why has ComReg changed its approach, from being previously concerned about highly asymmetric distributions to now only being concerned about extremely asymmetric distributions? H3GI submits that the use of the word "extreme" by ComReg and DotEcon is an attempt to discredit the independent, objective and reasonable work of both Value Partners and RRA, both of whom have extensive experience of advising both regulators and industry in respect of spectrum matters. Details of this experience are set out in Annex 2.

PART 4 – LICENCE DURATION AND INDEFINITE LICENCES

In relation to indefinite licences, ComReg states as follows:

"The issue of indefinite licences has been discussed by ComReg in Consultation 11/28, "ComReg's proposed strategy for managing the radio spectrum 2011-2013'' where, among other items, ComReg considered that:

- *there could be co-ordination issues (e.g. how to manage major allocation and harmonization changes) associated with indefinite licences as an incumbent licensee with an indefinite licence could prevent the spectrum band being used to its full potential or frustrate the process to delay the benefits of the harmonisation changes; and*

- *the periodic release (and re-assignment) of spectrum to be in line with the expected cycle of technology and investment to be compatible with the aims of the Common Regulatory Framework. This ensures that no entrenched*

positions develop that may be allowed to sustain themselves indefinitely, and which would be impervious to normal market pressures.

In addition to those considerations, ComReg notes that the implementation of major allocation and harmonisation changes is often as a result of an EC Decision to harmonise a particular spectrum band, and these Decisions are obligatory on member states. It is important to implement these Decisions in good time and in a manner that allows the benefits to be realised without distorting competition. A term limited licence allows for easier transition and co-ordination, as for example a whole spectrum band could be refarmed towards its new use without the risk that an incumbent licence holder may have incentives to act as a hold out with a view to capturing some of the surplus in the new use. In situations where such decisions are decentralised the market may only move at the speed of the most patient firm.

Furthermore, ComReg notes that indefinite licences are often linked to the trading of spectrum rights. In considering this issue, it is important to distinguish between trades within and between uses. ComReg believes that there are good reasons to be sceptical about the degree to which competing entities in lucrative markets with a harmonised approach to spectrum management will be willing to trade (or even lease) spectrum usage rights to each other and the evidence available so far shows that these trades do not systematically occur even with indefinite duration spectrum licences.697 While ComReg notes that trading will be less likely to occur as the licence approaches its end, ComReg's proposed approach to spectrum licensing will allow new services to be introduced in a harmonised manner (if necessary) and will allow prospective purchasers (including current licence holders) to compete with each other for the next tranche of usage rights.

As discussed above, Consultation 11/28 sought feedback and empirical evidence on the issue of licence duration and trading. ComReg has received a number of responses to this consultation and ComReg will issue its Response to Consultation in due course providing further views on the issue of indefinite licences. For the purpose of this document and in relation to the 800 MHz, 900 MHz and 1800 MHz award process, ComReg remains of the view that the licence duration for the time-slices proposed are appropriate, and does not envisage making any change to the current approach based on a definitive time-based expiry."

H3GI refers ComReg to its responses to ComReg Doc. No. 11/28. In particular, it refers ComReg to the independent report commissioned by H3GI from NERA contained in Annex 3. NERA concludes that there is a strong case for Ireland to adopt indefinite terms for mobile spectrum licences, subject to suitable conditions being imposed to protect ComReg's ability to fulfil its statutory objectives. In particular, NERA concludes that:

1. The current approach in Ireland of fixed term licences with no renewal option is inconsistent with ComReg's core objective of encouraging efficient use of spectrum. A shift to an indefinite licence regime would provide stronger incentives for investment and for spectrum trading.

2. There could be static and dynamic efficiency gains in Ireland of €250 million to €450 million over a 15 year period if a policy of indefinite terms is adopted.

3. Indefinite licence terms are better suited to meet the relevant objectives of a spectrum manager (ComReg), provide incentives for efficient utilisation of scarce spectrum, and promote competition and investment which should benefit consumers as well.

4. Consumers are also likely to be better off with indefinite term licences. This is because, amongst other matters, indefinite terms may increase the scope for entry and make the market more contestable, and competitive.

5. Countries that have been at the forefront of spectrum management reforms have either implemented or are considering implementing indefinite licences. The United Kingdom has implemented indefinite licences. New Zealand and the United States have implemented similar concepts. Australia and Canada are both considering indefinite licences.

H3GI re-iterates its previously expressed position and urges ComReg to award "indefinite licences" in respect of 900 MHz and 800 MHz and amend the 3G licences of Vodafone, O2, Meteor and H3GI to provide that they too are indefinite (so that equality of treatment is protected).[45]

PART 5 - MINIMUM RESERVE PRICE

H3GI welcomes the reduction in the proposed minimum reserve price. However, it still regards the minimum reserve price as too high and that it will have a negative impact on demand and the efficient use of spectrum.

ComReg proposes a minimum reserve price of €20 million per block of sub-1 GHz spectrum and €10 million per block of 1800 MHz. In this regard, ComReg's primary concern would appear to be to minimise the risk of tacit collusion or strategic behaviour (aimed at weakening competition in the auction).[46] In particular, ComReg states:

"The auction format should not only promote competition but should also minimise the possibility of any form of tacit collusion amongst bidders. Since the outset, ComReg has been concerned about tacit collusion occurring, and expressed its concerns in Consultations 09/99, 10/71 and 10/105. While the proposals to auction the 800 MHz and 1800 MHz bands with the 900 MHz band may have reduced these concerns, ComReg remains of the view that collusion could occur, especially in respect of the 900 MHz band where a spectrum cap is proposed in the first time slice."[47]

This is echoed by DotEcon's Report on Benchmarking:

In relation to Part C of ComReg Doc. No. 09/99c, "Liberalising the Future Use of the 900 MHz and 1800 MHz Spectrum Bands"

1. *"We had particular concerns about the possibilities for tacit collusion given the acute scarcity of spectrum and the likely limited field of bidders. For instance, even without explicit coordination, there might be a 'natural' outcome in which in*

[45] Page 12 of H3GI's response to ComReg Doc. No. 10/71, *"800MHz, 900MHz and 1800 MHz spectrum release"*.
[46] Paragraph 4.198 of ComReg's Response to Consultation.

[47] Paragraph 4.201 of ComReg's Response to Consultation.

the absence of credible competition from entrants, the amount of spectrum won by incumbents was determined by their relative existing competitive positions. Also, there could be strong incentives for pooling of interests or non-participation simply to limit competition within the auction if minimum prices were set too low."[48]

2. *"We made a specific recommendation in this report that ComReg consider a minimum price towards the upper end of this range (€25m-€30m) because of strong concerns about tacit collusion given the potential for a 'natural' outcome amongst incumbents if competition from entrants were weak"*.[49]
In relation to ComReg Doc. No. 10/71b, "Award of 800 MHz and 900 MHz spectrum, Update report on benchmarking"

In relation to ComReg Doc. No. 10/71b, "Award of 800 MHz and 900 MHz spectrum – Update report on benchmarking "

3. *"Furthermore, including the 800MHz band might make it more difficult to achieve a 'natural' outcome amongst incumbents (for instance, it is not obvious even given the current relative strengths of incumbents how they might choose between 800MHz and 900MHz spectrum). Therefore, concerns about tacit collusion, although still present, were somewhat reduced in importance relative to our first report."*[50]

H3GI takes issue with ComReg's and DotEcon's approach to the minimum reserve price. Actual collusive behaviour is sufficiently dealt with by: (i) the threat of expulsion from the award process; and (ii) prosecution under the Competition Act, 2002 for entering into an agreement or concerted practice contrary to section 4 of that Act. The only way to determine the true, long-run economic value of spectrum access is to allow the market to determine this value. ComReg's and DotEcon's focus on tacit collusion is disproportionate. DotEcon's concept of a 'natural outcome' is unclear and inconsistent. Elsewhere, DotEcon has championed the determination of spectrum holdings by the market.[51] DotEcon states "… *there could be strong incentives for pooling of interests or non-participation simply to limit competition within the auction if minimum prices were set too low*". What does DotEcon mean by *"pooling of interests"*? DotEcon fails to discuss the economic merits and disadvantages of such pooling. ComReg is prioritising short term revenue over competition in the medium and long term.

At paragraph 4.196 and footnote 106 of ComReg's Response to Consultation, ComReg proposes that SUFs should be indexed to inflation and states as follows:

[48] Paragraph 3.

[49] Paragraph 13.

[50] Paragraph 22.

[51] At paragraph 165 of DotEcon's Issues Report.

"SUFs would be subject to a simple form of indexation reflecting the annual rate of inflation using the CPI published by the Central Statistics Office. Interested parties should also note that indexing the fees in this manner gives an incentive to trade spectrum, which might be useful if permitted in the future. Further as noted by DotEcon, indexing using CPI would be reasonable as operators' revenues are influenced by consumer inflation. See Section 14.3 of DotEcon Report 11/58."

H3GI disagrees with this proposal. It introduces an unacceptable level of uncertainty into the bidding process.

At paragraphs 38 – 41 of DotEcon's Report on Benchmarking, DotEcon discusses the recent 800 MHz Swedish auction. Apart from referring to HI3G as H3GI and H3G and incorrectly referring to HI3G when it should have referred to Net4Mobility as the winner of the top two lots, DotEcon incorrectly states that HI3G paid more for its 2.6 GHz spectrum than it did for its 800 MHz spectrum. HI3G paid 296.6 m SEK for 2 x 10 MHz of 2.6 GHz. It paid 431 m SEK for 2 x 10 MHz of 800 MHz. DotEcon questions the competitive nature of the auction and as a result, the extent to which it reflects market value. It contrasts the bidding capability of the two marginal bidders in the Swedish auction with the bidding capability of E-Plus in the German auction. The Swedish auction was competitive. As a result, it reflects market value. DotEcon may not like the level of competition or the market value secured. It might prefer that stronger bidders had participated and that a higher market value had been secured. However, that would not be reflective of the Swedish market value for 800 MHz spectrum at the time of its award. It would simply be DotEcon's perceived value of 800 MHz. DotEcon's analysis lacks objectivity.

At paragraphs 63 – 66 of DotEcon's Report on Benchmarking, DotEcon discusses the recent 900 and 1800 MHz Danish auctions. H3GI does not agree that these auctions were not competitive and that the prices achieved did not reflect market value. Whilst the regulator set the minimum reserve prices to ensure that only serious bidders would take part in the auction and the incumbent operators were constrained from participating, other parties were free to participate and H3GI's sister company in Denmark was willing to pay the reserve price.

PART 6 – TRANSITIONAL ISSUES

As a general point, H3GI welcomes the acknowledgement by ComReg at page 135 of ComReg's Response to Consultation that:

"*ComReg also sees merit in incorporating aspects of H3GI's suggested approach to transitional issues, such as:*

- *the setting of milestones for specific tasks;*
- *a sufficiently robust and transparent mechanisms to monitor compliance with milestones;*
- *appropriate financial measures to dissuade non-compliance with milestones; and*
- *that the process adopted by ComReg reasonably includes the involvement of affected third parties, having regard to the protection of commercially sensitive information*."

H3GI calls on ComReg to provide a firm commitment and specific details of the types of milestones and financial measures that ComReg proposes to adopt in respect of transitional issues.

In addition to the above, H3GI notes that in relation to scenario 1 (where existing GSM licensees win liberalised rights of use in respect of at least the amount of spectrum in the 900 MHz and/or 1800 MHz bands as they already hold), ComReg states:

"At this point in time, ComReg remains confident that there would be sufficient time for Scenario 1 activities to be completed by all existing GSM licensees in both the 900 MHz and 1800 MHz bands between the completion of ComReg's proposed joint award process and proposed commencement of liberalised licences in early 2013. On this basis, and in light of the need to ensure and encourage timely completion of Scenario 1 activities prior to the proposed commencement of liberalised licences in early 2013, ComReg is proposing, in principle, the following mechanisms to achieve this outcome."[52]

At publication, ComReg expected to complete its proposed joint award process by the end of 2011. If this changes, does ComReg remain confident that there will be sufficient time for scenario 1 activities to be completed by all existing GSM licensees in both the 900 and 1800 MHz bands in advance of the proposed commencement of liberalised licences in early 2013? What happens if the proposed auction is delayed? ComReg proposes to establish and publish a re-location "Project Plan". How long does ComReg think that will this take? What happens if this is delayed? What happens if the transitional activities take longer than expected? In particular, will ComReg refund a successful bidder pro-rata for any delay?

H3GI submits that in order to ensure the availability of spectrum from February 2013, ComReg needs to set out in its decision a concrete timetable in relation to the establishment and publication of its proposed Project Plan. H3GI further submits that parties that fail to discharge their obligations in accordance with the milestones set out in the proposed Project Plan should pay exponential penalties as delays increase. Finally, H3GI submits that in order for the proposed auction to be legally certain, ComReg must address the consequences of delay for the commencement of the proposed licences, including the refund of spectrum fees pro-rata for any delay.

In relation to scenario 2 (where existing GSM licensees win reduced liberalised rights of use in respect of 900 and/or 1800 MHz spectrum and may need to modify their network accordingly), ComReg's proposes to adopt a flexible approach.[53]

What does this mean? In order for the proposed auction to be legally certain, ComReg must address the consequences of delay for the commencement of the proposed licences, including the refund of spectrum fees pro-rata for any delay.

H3GI re-iterates its views that relocation and re-tuning should not take as long as alleged by the incumbent operators.

PART 7 – ADVANCED COMMENCEMENT

H3GI welcomes ComReg's advanced commencement proposals. In order to encourage prompt completion of transitional issues and ensure the prompt delivery of

[52] Paragraph 6.9 of ComReg's Response to Consultation.

[53] Paragraph 6.6 of ComReg's Response to Consultation.

liberalised services on 900 MHz, H3GI submits that ComReg should reserve Lot A of the 900 MHz band in the first time slice for a new band entrant.

In relation to additional spectrum fees for advanced commencement, ComReg states as follows:

"ComReg proposes that spectrum fees would apply to the advanced commencement element of liberalised licences issued in the 900 MHz (and potentially 1800 MHz band).

Whilst ComReg's minimum price proposal for liberalised licences in the 800 MHz, 900 MHz and 1800 MHz bands in Temporal Lot 1 and 2 include a spectrum access element, ComReg does not consider it necessary for an additional spectrum access element to apply in respect advanced commencement liberalised licences. In that regard, ComReg notes that the proposed assignment stage of the proposed auction would allow bidders to incorporate and determine the equivalent "access" element for advanced commencement blocks in the 900 MHz band.

In ComReg's view, the appropriate spectrum fee for the advanced commencement element of liberalised licences should be the additional spectrum usage fees (SUFs) for each day a liberalised licence commences earlier than the proposed commencement date for Temporal Lot 1, based on the proposed applicable SUFs for the spectrum band and quantum of spectrum in question (see Chapter 4). In light of ComReg's proposal for the advanced commencement date for the 900 MHz band (as set out above), this would mean:

- *additional daily 900 MHz SUFs payable from 5 months following the proposed auction; or*

- *earlier if the winner of the advanced commencement licence applies for and is granted advanced commencement earlier than the 5 month period."*[54]

If "*the proposed assignment stage of the proposed auction would allow bidders to incorporate and determine the equivalent "access" element for advanced commencement blocks in the 900 MHz band",* H3GI does not understand why a bidder would pay additional daily 900 MHz SUFs payable from 5 months following the proposed auction. This would amount to an increase in the winning bid in respect of something that had already been factored in and in respect of which there is no certainty in advance of the auction outcome. H3GI submits that a successful bidder for advanced commencement blocks should only pay annual spectrum fees in respect of advance commencement.

PART 8 – 800 MHZ AND DELAY

There is no certainty in relation to the availability of 800 MHz from February 2013. What happens in the event that the availability of 800 MHz is delayed? H3GI submits that in order for the proposed auction to be legally certain, ComReg must address the consequences of delay for the commencement of the proposed licences, including the refund of spectrum fees pro-rata for any delay.

PART 9 - MISCELLANEOUS

[54] Paragraphs 7.46 – 7.48 of ComReg's Response to Consultation.

Spectrum Sharing

At paragraphs A 10.51 and A 10.52 of ComReg Doc. No. 11/60a, ComReg states:

"In relation to the former point [spectrum sharing] [sic], it should be noted that spectrum sharing and pooling can in principle bring benefits such as reduced costs and improved quality of service, but can also give rise to policy concerns, particularly in relation to competition. Having regard to this balance of interests and to the statutory framework, it is not possible for ComReg to give a blanket guarantee that spectrum sharing and pooling agreements will be allowed as the details of any such agreements would have to be in compliance with relevant telecommunications and competition law, and it is only possible to make such an assessment on a case-by-case basis having seen the details of the agreement.

However, in designing this proposed auction, ComReg has been careful not to include restrictions in the licences that would inhibit such sharing after the award process. In that regard, it should be noted that:

- *The proposed spectrum cap is for the duration of the competition;*
- *The proposed minimum coverage level is set to a level that provides scope for meaningful collaboration;*
- *The proposed licence conditions are set in line Part B of the Authorisation Regulations 2011; and,*
- *The proposed technical conditions comply with the technical parameters as set in the EC Decisions."*

H3GI welcomes ComReg acknowledgement that spectrum sharing can in principle bring benefits such as reduced costs and improved quality of service and the care that ComReg has shown not to include restrictions in the licences that would inhibit such sharing after the award process. However, it is probable that as a result of the current design of the auction, some operators may not be in a position to spectrum share by virtue of their location within the spectrum bands to be auctioned. With a view to allowing for the possibility of spectrum sharing with all of its positive benefits, whilst also taking account of the potential competition concerns, H3GI urges ComReg and DotEcon to devise a solution to this problem.

Separate Parties who bid as a Single Entity

ComReg proposes that in the case of any such combined bid the spectrum cap should remain the same as in any other bid.[55] H3GI agrees with this proposal.

Inclusion of 1800 MHz in the Proposed Award Process

H3GI supports the inclusion of 1800 MHz in the proposed award process.

Unallocated Spectrum

[55] Page 77 of ComReg's Response to Consultation.

ComReg proposes to retain discretion as to how to proceed if some spectrum is left unsold and that spectrum that is left unsold should not be assigned for a period following the auction.[56] Given the scarcity and importance of the spectrum involved, ComReg should not decide that spectrum that is left unsold should not be assigned for a period following the auction.

Licence Conditions

ComReg proposes to require licensees give six months notice of its intention to terminate the provision of services using one technology, which the licensee intends to provide with another technology in all bands in which spectrum is being awarded.[57] H3GI does not agree with this proposal. Companies in all sectors change technology every day. They do so without the actual or perceived need for regulation. H3GI submits that ComReg's proposal is disproportionate and contrary to regulation 10 (2) of the European Communities (Electronic Communications Networks and Services)(Authorisation) Regulations, 2011 (the "Authorisation Regulations").

ComReg proposes to include a condition that would require the GSM operator to meet the guard band obligation as set down in Decision 2009/766/EC and Decision 2011/251/EU.[58] For the reasons previously expressed by H3GI in respect of this matter, H3GI agrees with this proposal.

H3GI notes that ComReg is not proposing to impose licence conditions providing for a review at regular intervals of Quality of Service obligations.[59] For the reasons previously expressed by H3GI in respect of this matter, H3GI agrees with this proposal.

Proposed Metrics for measuring coverage

At paragraph A. 8.113 of ComReg Doc. No. 11/60a, ComReg states:

"… ComReg notes that MNOs typically have coverage maps on their web sites showing both indoor and outdoor coverage. ComReg believes that these maps are of limited value, particularly with products such as Mobile Broadband (HSDPA) and would be best replaced by similar colour coded maps where signal differences are noted by six dB drops (i.e. with maybe four to six different intensities of colour, representing a 24 to 30dB range in signal) and text explaining the relationship between the colour intensities and the service expected".[60]

H3GI does not agree with this proposal on the basis that it would involve the disclosure of confidential and information not designed for these purposes.

Co-existence of services in the 800 MHz band and the broadcasting service below 790 MHz

[56] Page 76 of ComReg's Response to Consultation.

[57] Paragraph 5.10 of ComReg's Response to Consultation.

[58] Paragraph 5.53 of ComReg's Response to Consultation.

[59] Paragraph 5.131 of ComReg's Response to Consultation.

[60] A 8.113 of ComReg Doc. No. 11/60a.

In relation to the maximum EiRP, ComReg proposes 59 dBM. Sweden has set the maximum EiRP at 64 dBm and 67 dBM. In light of Ireland's geography, H3GI submits that this would appear to be a more suitable level.

Value Partners and RRA Report dated 22 July 2011

At paragraph 4.18 of ComReg's Response to Consultation, ComReg states:

"H3GI's consultants recommended, with H3GI's support, a total spectrum cap of 2 × 40 MHz across the three bands and a spectrum floor of 2× 10 MHz of contiguous sub 1 GHz spectrum with a 2 × 20 MHz sub 1 GHz spectrum cap. However, their consultant's report stated that "… the MSP [Minimum Spectrum Portfolio] used in the rest of this document herein was:

- *2× 10MHz of contiguous sub-1GHz; and*
- *2×10GHz [sic] 75 of 1800MHz spectrum."*

For the record, there is no inconsistency in the recommendation of Value Partners and RRA, with support, of a *"total spectrum cap of 2 × 40 MHz across the three bands and a spectrum floor of 2× 10 MHz of contiguous sub 1 GHz spectrum with a 2 × 20 MHz sub 1 GHz spectrum cap"* and a minimum spectrum portfolio of 2× 10MHz of contiguous sub-1GHz and 2×10MHz of 1800MHz spectrum. Value Partners recommend the former in order to ensure the latter.

Elisa Case Study

At page 18 of ComReg Doc. No. 11/57, *"Joint Technical Report, Mobile Operator Responses to 10/71, 10/105 and 11/11"*, a technical report prepared by Red-M and Vilicom for ComReg (the "Technical Report"), Red-M and Vilicom discuss the Elisa case study raised by Value Partners and RRA in its report dated 17 March 2011 (the "Value Partners and RRA March Report") and state:

"The report considers an Elisa case study to show how liberalising 900MHz can be accomplished quickly, and uses this case study to assert that Vodafone and O2 have exaggerated the implications of re-farming issues in Ireland. The case study is particularly interesting because the key to Elisa's effective re-farming of the 900MHz band was the introduction of AMR half rate mode into its network.

However the relevance of the Elisa case-study is significantly weakened because there is no consideration of the position of O2/Vodafone in Ireland, which differs significantly from that of Elisa in Finland. In particular, in Finland, three "incumbent" operators shared the 900MHz band equally. If this were also the case in Ireland, there would be no additional spectrum to auction, and H3GI could not therefore obtain it.

Elisa had 2x11.4MHz of 900MHz spectrum with which to liberalise, whilst incumbents in Ireland have 2x7.2MHz of spectrum. As ComReg notes on p44 of ComReg document 11/29, the provision of UMTS services requires 2x5MHz of spectrum. This left 2x6.4MHz of spectrum for Elisa to support existing GSM 900 subscribers, whilst incumbents in Ireland would have to manage with only 2x2.2MHz."

Red-M and Vilicom's central criticism would appear to be that the distribution of 900MHz spectrum is fundamentally different in Finland compared to Ireland. It is stated that as the Irish incumbent operators each have 2 x 7.2MHz of 900MHz

spectrum and a 3G UMTS carrier requires approximately 2 x 5MHz of bandwidth; consequently the Irish 900MHz GSM networks would be each reduced to only 2 x 2.2MHz which is insufficient to accommodate the current subscriber base.

However that was not the baseline assumption underpinning the Value Partners and RRA March Report. The Value Partners and RRA March Report puts forward argumentation for the release of liberalised 900MHz spectrum immediately following the auction and not delayed until 2013 to synchronise with 800MHz spectrum availability. It also assumed that a spectrum cap of 2 x 10MHz of 900MHz spectrum would apply to the 900MHz band. It is the view of Value Partners and RRA that such a spectrum cap will very likely result in [**Confidential**] acquiring 2 x 10MHz of 900MHz spectrum with the remaining 2 x 5MHz being acquired by [**Confidential**] (or possibly a new entrant although new entry is extremely unlikely). Therefore, in this likely scenario, the distribution of spectrum is actually very similar to Finland with [**Confidential**] holding 2 x 10MHz of liberalised 900MHz spectrum with additional spectrum in the 1800MHz band.

As noted in section 4.4 of the Value Partners and RRA March Report, Elisa made use of the fact that more than 50% of handsets on its network supported Adaptive Multi-Rate Half-Rate Codec (AMR-HR) and some off-loading of capacity onto GSM1800 spectrum helped reduce the traffic load on the 900MHz GSM network. If Elisa had over 50% of handsets able to support AMR-HR in 2007 it is likely that at least 50% of handsets in Ireland have similar functionality in 2011 and probably a higher percentage of handsets now have this capability. It is also assumed by Value Partners and RRA that [**Confidential**] 1800MHz spectrum following the planned award. Therefore, O2 (Ireland), for example, will also be able to off-load 900MHz GSM capacity onto its GSM 1800MHz network as Elisa did to relieve capacity on its 900MHz GSM network.

In the Value Partners and RRA report provided by H3GI to ComReg in July 2011, reference is made to how quickly O2 (UK) rolled out a HSPA 900MHz network in the UK. It should be noted that O2 (UK) told Ofcom repeatedly that refarming the GSM spectrum was very complex and would take several years to accomplish. However, O2 (UK) subsequently found that it was simple and the task was completed within a few months of Ofcom's decision to liberalise the 900MHz spectrum. It is accepted that O2 (UK) has 2 x 17.4MHz of 900MHz spectrum but it is also worth noting that the O2 (UK) GSM network supports approximately 16.4 million subscribers. In addition to the 900MHz spectrum holdings, O2 (UK) also has 2 x 5.8MHz of 1800MHz spectrum. However, this band is believed to be primarily used to provide capacity relief in urban hotspots.

Therefore, O2 (UK)'s GSM network supports 942,000 subscribers/MHz (paired spectrum) if only the 900MHz network is considered or 706,000 subscribers/MHz if 900MHz and 1800MHz is combined (which is overly conservative given the limited geographical use of 1800MHz). In contrast the O2 (Ireland) network currently supports approximately 1.28 million subscribers; which if only the 900MHz band is considered equates to approximately 178,000 subscribers/MHz or 59,000 subscribers/MHz if the spectrum holdings in the 900MHz and 1800MHz bands are combined.

As noted earlier, the Value Partners and RRA proposal is that the liberalised 900MHz spectrum should be available immediately post award and it is very likely that O2 (Ireland) will acquire 2 x 10MHz of 900MHz spectrum. If so, this will mean that the 900MHz network would then be supporting approximately 128,000 subscribers/MHz if the full assignment of spectrum is used for GSM.

Compared to the O2 (Ireland) network; the O2 (UK) network has over seven times as many subscribers and less 1800MHz spectrum to provide capacity off-load (this is assuming that O2 (Ireland) retains if not extends its current 1800MHz spectrum holdings). Despite these challenging circumstances O2 (UK) was able to release a block of contiguous 900MHz spectrum to launch a HSPA network in a matter of months.

When account is taken of the expected post auction spectrum distribution – whereby [**Confidential**] have 2 x 10MHz of 900MHz spectrum (plus 800MHz spectrum) and at least 2 x 15MHz of 1800MHz spectrum, the Irish and Finnish situations are rather similar. In terms of mitigation techniques, the AMR-HR option used by Elisa is probably more attractive now than it was in 2007. Another factor that has eased the refarming task now compared to 2007 is that the market share of GSM/HSPA 2100MHz handsets is now significantly higher than when Elisa refarmed its 900MHz spectrum. This opens another option to reduce the traffic load on GSM networks and thereby help facilitate the spectrum refarming exercise.

Support of the "majority of respondents"

At paragraph 125 of DotEcon's Issues Report, DotEcon states:
"In their responses to ComReg's proposals, the majority of respondents have agreed that the proposed caps would indeed prevent undesirable outcomes involving extreme spectrum asymmetries among market players."

H3GI submits that the support of the *"majority of respondents"* needs to be treated with care. For the reasons set out above, it is in the interests of the incumbent mobile network operators to support ComReg's proposed sub-1 GHz spectrum cap. In relation to the overall cap of 2 x 50 MHz, two of the four mobile network operators, the weaker two mobile network operators, do not agree with ComReg's proposal.

Administrative Assignment

H3GI notes the comments of ComReg at paragraph 3.98 of ComReg's Response to Consultation and the accompanying footnote regarding H3GI's overall support for an auction. It wishes to re-iterate that its support for an auction is without prejudice to its previous advocacy for an administrative assignment.

Pricing of Administratively Assigned Spectrum and/or Spectrum Reserved for New Market Entrants

At paragraph 3.131, footnote 64 and paragraph 3.136 of ComReg's Response to Consultation, ComReg states as follows:

"It is highly unlikely that the fees set for the administratively assigned spectrum are likely to reflect the correct market price for this spectrum which would be achieved if this spectrum formed part of an overall auction."

"In order to be correct, the regulator would have to know in advance what the price of the spectrum will be (which it cannot do and this is why an auction is used). Alternatively the regulator would need to be able to look back at the counterfactual and determine what the efficient price should be – this would likely be contentious."

"It would only be by accident that the prices chosen would be the correct one."

ComReg assumes that the correct approach to determining the price for administratively assigned spectrum is to determine the price that spectrum would have achieved if it formed part of an overall auction, appears afraid to be contentious and appears to believe that it is not possible to determine a price for spectrum other than by way of an auction. H3GI disagrees with this approach. ComReg should determine the appropriate price for administratively assigned spectrum. This can be done by reference to prices paid in the upcoming award. However, it does not have to be the price that it would have achieved if it had formed part of the award. This reflects the range of statutory obligations that ComReg is charged with protecting. There is nothing wrong *per se* in being contentious. Arguably, ComReg is too afraid to be contentious. ComReg has experience of setting prices for spectrum other than by way of an auction. It did so in relation to the award of the 2.1GHz licences and will undoubtedly do so again in relation to other spectrum.

Draft Decision

Paragraph 3.3.2 – please clarify whether the reference in the last line of that sentence should read "until demand exceeds supply at the round price", rather than as currently drafted i.e. until supply exceeds demand at the round price.

Paragraph 3.3.14 – please clarify where the liquidated damages referred to will be set out and how these will be calculated.

Paragraph 3.4 – please clarify whether the reference to the application "properly being made" requires positive action on the part of ComReg to accept the application.

Draft Schedule to the Licence

Part 4 Roll-out and Coverage Requirements, 4. Performance Guarantee, "*In the event that the Licensee fails to meet the Coverage and Roll-out obligations, €2 million will be payable by the Licensee on demand to ComReg*" – is it intended that this will apply without any recognition of, for example, the level by which the Licensee has failed to meet the relevant Coverage and Roll-out obligations e.g. if only just failed to meet them, will all of the €2 million be payable on demand?

Part 5 Quality of Service (QoS) Obligations, 1. Compliance, Reporting and Performance Guarantees, *"In the event that the Licensee fails to meet the Quality of Service obligations, €1 million will be payable by the Licensee on demand to ComReg"* – is it intended that this will apply without any recognition of, for example, the level by which the Licensee has failed to meet the relevant QoS obligations e.g. if only just failed to meet them, will all of the €1 million be payable on demand?

Workshops and Trial Auction(s)

H3GI welcomes ComReg's proposal to hold workshops with interested parties as well as running a trial auction(s) to familiarise interested parties with the auction software.

ANNEX 1

Hutchison 3G Ireland Limited
Registered office

3rd Floor
One Clarendon Row,
Dublin 2, Ireland

Registered Number: 316982
Place of Registration: Republic of Ireland

Three.ie

Dr Samuel Ritchie, Manager Spectrum Operations
Commission for Communications Regulation
Abbey Court
Irish Life Centre
Lower Abbey Street
Dublin 1
BY COURIER AND EMAIL: samuel.ritchie@comreg.ie

23 September 2011

Dear Samuel

COMREG DOC. NO.S 11/60, 11/60A AND 11/58

I refer to ComReg Doc. No. 11/60, *"Multi-Band Spectrum Release – Release of the 800 MHz, 900 MHz and 1800 MHz radio spectrum bands"* ("ComReg's Response to Consultation"), ComReg Doc. No. 11/60a, *"Multi-Band Spectrum Release – This document contains annexes relevant to publication 11/60"* and ComReg Doc. No. 11/58, *"Economic Consultant's Report – Issues relating to the award of spectrum in multiple bands in Ireland"* ("DotEcon's Issues Report").

For the purposes of properly considering and responding to ComReg's Response to Consultation, Hutchison 3G Ireland Limited ("H3GI") would appreciate if you could provide the following confirmation and clarification as a matter of urgency.

At paragraph 4.44 of ComReg's Response to Consultation, ComReg states:

"ComReg also agrees with DotEcon's conclusions in Section 4.4 of its Report (11/58), regarding H3GI's submission that ComReg should impose spectrum floors in order to ensure effective market competition. While this maybe a reasonable action for Ofcom to take in its particular circumstances, there is not a compelling basis for ComReg to do likewise, given the patently different market conditions between Ireland and the UK and the fact that other features of the proposed multi-band award are different. ...."

Please confirm whether ComReg is referring exclusively to the different market conditions between Ireland and the UK and features of the proposed multi-band award in Ireland and the UK referred to by DotEcon in DotEcon's Issues Report.

At paragraph 156 of DotEcon's Issues Report, DotEcon states:

"... In addition, the proposed safeguards of competition will be implemented in a market with characteristics that are uncommon in other countries ....."

Please clarify what these characteristics are.

Hutchison 3G Ireland Limited
Registered office

3rd Floor
One Clarendon Row,
Dublin 2, Ireland

Registered Number: 316982
Place of Registration: Republic of Ireland

Three.ie

At paragraph 164 of DotEcon's Issues Report, DotEcon states:

" ... Ofcom's assessment clearly does not rule out the possibility that three competitors might be sufficient to protect competition in Ireland, or four competitors in which only three are reasonably symmetric national network operators with additional network operators having a more limited geographical focus."

Please confirm whether ComReg shares DotEcon's belief that it is possible that three competitors or four competitors in which only three are reasonably symmetric national network operators with additional network operators having a more limited geographical focus might be sufficient to protect competition in Ireland.

Yours sincerely

MARK HUGHES
Head of Regulatory

Hutchison 3G Ireland Limited
Registered office

3rd Floor
One Clarendon Row,
Dublin 2, Ireland

Registered Number: 316982
Place of Registration: Republic of Ireland

Three.ie

Dr Samuel Ritchie, Manager Spectrum Operations
Commission for Communications Regulation
Abbey Court
Irish Life Centre
Lower Abbey Street
Dublin 1
BY COURIER AND EMAIL: samuel.ritchie@comreg.ie

4 October 2011

Dear Samuel

COMREG DOC. NO.S 11/60, 11/60A AND 11/58

I refer to my letter dated 23 September 2011.

Given the amount of time available to ComReg to produce ComReg Doc. No. 11/60, *"Multi-Band Spectrum Release – Release of the 800 MHz, 900 MHz and 1800 MHz radio spectrum bands"* ("ComReg's Response to Consultation") and related documents, Hutchison 3G Ireland Limited ("H3GI") is concerned that it is taking ComReg so long to clarify and confirm the matters raised in my letter. H3GI is further concerned that it may not have sufficient time to properly consider and respond to ComReg's response to my letter by 14 October 2011 (the deadline for responding to ComReg's Response to Consultation). H3GI urges ComReg to respond to my letter dated 23 September 2011 as a matter of urgency and in any event, no later than close of business on Wednesday 5 October 2011.

H3GI reserves all rights in respect of this matter including the right to request an extension of the deadline referred to above in light of ComReg's response to my letter dated 23 September 2011.

Yours sincerely

MARK HUGHES
Head of Regulatory

Commission for
Communications Regulation

BY EMAIL AND POST

Mr Mark Hughes,
Head of Regulatory,
Hutchison 3G Ireland Limited,
3rd Floor,
One Clarendon Row,
Dublin 2.

5 October 2011

ComReg – 800 MHz, 900 MHz and 1800 MHz Consultation Process

Dear Mr Hughes,

I refer to your letters dated 23 September and 4 October in relation to the above.

Having carefully considered your requests, we are satisfied that the views and materials contained in ComReg Document 11/60 (and associated documents) provide sufficient reasoning, clarity and transparency to interested parties in relation to ComReg's measure (spectrum caps) as proposed in Document 11/60.

In addition, we do not consider it appropriate to engage with individual interested parties on substantive consultation issues by way of written correspondence in light of, amongst other things, obligations regarding the transparency of ComReg's consultation process and ComReg's desire to ensure that the current consultation process remains as inclusive as possible.

In any event, and noting that the proposed measure continues to be the subject of consultation, we would, of course, welcome any additional views and material that Hutchison 3G Ireland and/or its consultants may wish to provide on or before 14 October 2011.

We advise that, as usual, ComReg will be publishing this letter in due course in the interests of ensuring the utmost transparency of its consultation process – subject, as usual, to its *Guidelines on the Treatment of Confidential Information* and to any comments you might wish to make in that regard.

Yours sincerely,

Dr. Samuel Ritchie
Manager Spectrum Operations

An Coimisiún um Rialáil Cumarsáide
Commission for Communications Regulation
Abbey Court Irish Life Centre Lower Abbey Street Dublin 1 Ireland
Telephone +353 1 804 9600 *Fax* +353 1 804 9665 *Email* info@comreg.ie *Web* www.comreg.ie

ANNEX 2

Value Partners' spectrum credentials

Exhibit 1: Value Partners has unparalleled spectrum licensing experience internationally

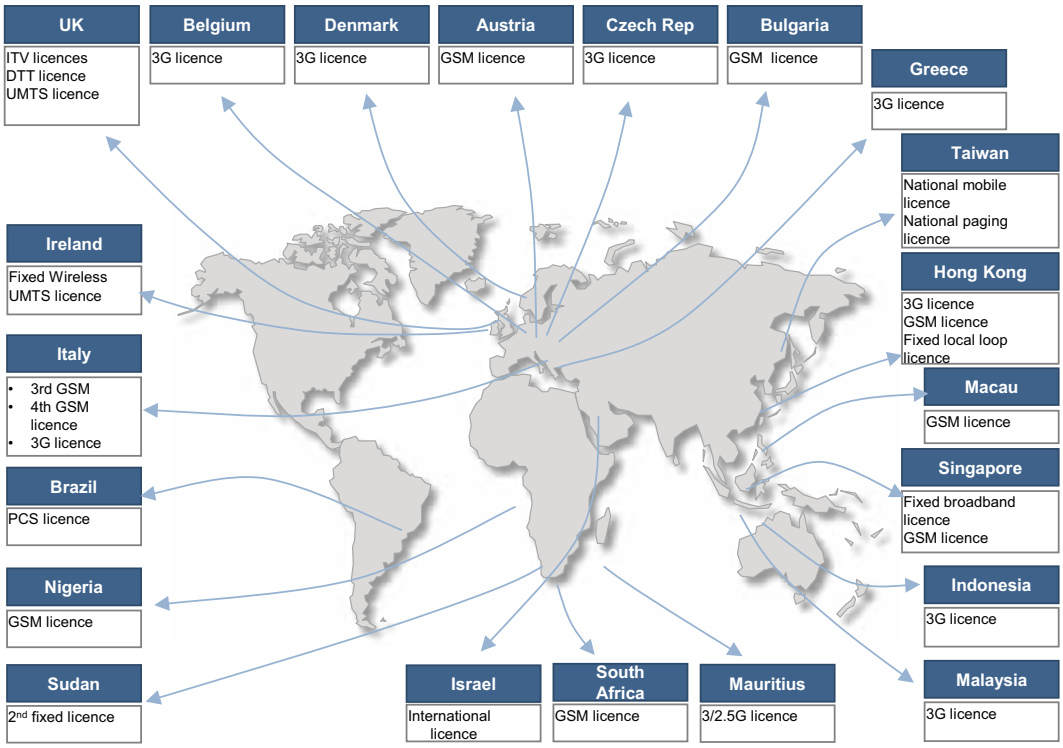


Exhibit 2: Value Partners has advised leading mobile operators on their mobile spectrum strategies; illustrative examples

Assessed the incremental value of owning 2.6GHz spectrum to offer mobile broadband services. We assessed the potential market share and revenue upside of owning additional bandwidth. Based on a technical model provided by the operator we also looked at potential cost savings. A probability assessment of the resulting value using the "Monte Carlo" method was conducted

Advised on the likely handling of 2.1GHz spectrum by Ofcom in the UK at the point of licence expiration in 2021. Specifically, the likelihood of the application of automatic right of renewal for existing licence holders, and the likely charging mechanism if this action was taken. We calculated a range for the potential Administered Incentive Price benchmarked against existing AIP prices for other spectrum bands, and international spectrum valuations

Supported the business development plan for a European mobile satellite operator. We developed a range of potential propositions from mobile broadband to mobile TV, and tested these propositions through detailed business case modelling. Our main focus was developing a strong business plan to secure financing, while ensuring compliance with harmonised spectrum regulation

Estimated the likely value of 3G spectrum in Gabon, which involved creating a business case and NPV modelling exercise as well as benchmarking spectrum prices across Africa

Developed the auction strategy for a major UK fixed network operator. Auction rules were complex; there were 42 licences and bids could be transferred during the auction. We modelled the value of the licences and devised the appropriate bidding strategy within the auction rules

Exhibit 3: Value Partners has helped commercial operators in assessing and bidding for new spectrum awards

3G licence commercial bid in Malaysia

- Value Partners developed a detailed strategy for 3G and provided support with the licence auction
- Value Partners was responsible for: formulating the overall strategy for 2.5G and 3G covering all areas (commercial, technical, operational and organisational); developing a business model reflecting the value of 3G spectrum to an incumbent operator and the effect of different customer migration scenarios; managing an extensive market research programme; providing regulatory and PR support and lobbying; and preparing the licence application document.

Application for WLL spectrum

- Value Partners prepared the operators' winning application for WLL spectrum in the 3.5GHz and 26GHz bands
- Value Partners' role was to develop the internal business case justifying the investment and then produce the licence application document and project manage the whole process
- We also prepared a detailed model comparing relative costs of WLL versus HDSL and fibre

3G licence bid in Indonesia

- Developed the 3G business case and advised on an optimal 3G network rollout strategy
- Developed the commercial strategy for the 3G business
- Developed a bid strategy involving a series of wargaming workshops with BoD on alternative bidding strategies
- Recommended final amount and spectrum allocation to bid for in successful application

3G turnkey licensing support

- Provided 3G licensing turnkey support
- Developed a model to value the incremental value of a 3G licence and inform management's decision on whether to bid for an A licence, a B licence or both
- Developed commercial 3G strategy and evaluated the optimum migration plan from 2G to 3G
- Prepared the bid book

European altnet WLL auction support

- Provided auction support to a large European altnet bidding for BWA spectrum
- Developed a detailed model to assess the economics of BWA versus alternative access options
- Advised client on bidding strategy and amount to bid for different regional licences

2G and fixed licence bid support

- Supported a consortium, in preparing a licence bid for a fixed and mobile licence in Singapore
- Developed the business case, commercial plan, technical and operational plan
- Provided overall project management support for all bid related activities

Spectrum holdings evaluation

- Reviewed client's existing spectrum holdings in order to determine the value and efficiency of these holdings, potential gaps and future spectrum requirements.
- Conducted an assessment of the spectrum demands across the business
- Provided an understanding of spectrum management issues at the global and local levels

SE Asian Mobile Operator: Regulatory Lobbying

- We advised a successful 3rd entrant in an Asian market on its lobbying strategy to secure additional GSM spectrum from the regulator
- This involved creating an economic model to demonstrate to the regulator the value of awarding additional spectrum to our client as opposed to incumbent operators or to new entrant licensees
- We supported the client in presenting and negotiating with the regulator on this award leading to the successful granting of significant extra spectrum allocation

Exhibit 4: Value Partners has advised both regulators and operators on policy issues with respect to spectrum

Contacts within leading regulators	Strategic, policy and auction support to leading operators
	
• Association with regulators over many years: - ran the public consultation exercise during the 3G / GSM licence mobile bids for the governments / regulators in Hong Kong, Denmark, Belgium - advised OFCOM on spectrum liberalisation - designed and managed the auction process for 2.5GHz spectrum for the IDA in Singapore	• Value Partners has been advising a number of firms in Asia, Europe and Latin America on evaluating the value of spectrum to their business, as well as on lobbying regulators to achieve best practice policy outcomes: - advice includes turnkey licence bid support, valuing licences, and commercial launch support

Exhibit 5: Value Partners has provided auction design support to regulators

Auction framework for 3G licence

- Value Partners worked for the Danish telecoms regulator and government departments to develop their 3G licensing regime
- The key objectives were to maximise the level of competitive infrastructure investment in the country and realise a fair value for the spectrum for the government.
- Our role included detailed commercial modelling of alternative scenarios and working alongside investment banking partners in negotiations with the Government and other interested parties.
- We also designed their auction process and assisted with the auction logistics

BWA auction

- Value Partners was appointed by the IDA in Singapore to design and manage a complex wireless broadband spectrum auction in the 2.3 and 2.5 GHz bands
- Given the range of possible technologies that could be deployed in these bands and interference issues with adjacent countries we divided the available spectrum into 15 blocks and designed a multi round ascending auction that allowed bidders to select their optimum combination of spectrum blocks
- We designed the full auction rules and managed the process for over 10 bidders and raised S$ 9.6m

3G licensing framework

- We worked for the Belgian Government to evaluate the 3G opportunity for the Belgian mobile industry and assess the economic impact of encouraging a new 3G entrant into the Belgian market in the context of the country's existing frequency allocations.
- Additionally, we assessed the effect on the sector of introducing a range of licensing and regulatory policy decisions such as national roaming, site sharing, number portability and power emissions regulation

3G licensing strategy

- Value Partners advised OFTA on its strategy for licensing 3G in Hong Kong
- We built a detailed financial model to determine the likely operational performance of successful 3G licence bidders under a range of scenarios
- We designed an innovative bidding framework including the introduction of two world's firsts: ongoing royalty payment mechanisms and mandated MVNO wholesale capacity provision by 3G licensees

Exhibit 6: Value Partners has advised international regulators on broader spectrum policy issues

Spectrum Trading Policy

- For Ofcom, Value Partners managed the team designing a policy for spectrum trading (Phase 1)
- We led a large team from Ofcom, the Radio-communications Agency, independent lawyers and technical consultants
- The work involved defining spectrum policy options, liaising with industry stakeholders, preparing a consultation document and managing the industry consultation process.

National Frequency Allocation Plan

- Value Partners advised the Nepali government on developing a National Frequency Allocation Plan
- The project involved consulting on current and future requirements of more than 20 government departments, a series of public consultation programmes with industry and public interest groups and the regulator of the key neighbouring country
- We conducted a thorough review of the commercial use of current spectrum assignments as well as internal government use.

Mobile Spectrum Management

- For the Government of Lebanon, and in the context of the Lebanese NFAP, Value Partners provided an expert opinion relating to aspects of claims and counterclaims made by the Government and an incumbent mobile operator
- Value Partners performed a short technical analysis of the issues under consideration by examining specific evidence, looking at best practice and carrying out international benchmarks.
- All these were assessed in the context of Lebanon's FAP and implications were derived.

Spectrum licensing options

- Working with the GSMA's Spectrum Management Group to develop common industry policy around a number of the licensing options and uses of radio spectrum

Spectrum Valuation

- Value Partners worked with DGPT in Indonesia to determine the value of the spectrum and licences awarded to new fixed and mobile licensees and the value lost by the ending of the incumbents' monopolies
- Value Partners modelled the businesses and determined the appropriate compensation levels for the ending of the monopolies.

Demand and supply of spectrum for Special Events programs in the UK

- Performed a study on the current and future situation of the PMSE market for spectrum in the UK.
- The study involved understanding the future needs of PMSE users, understanding the operational capability of the industry and how this will change as technology evolves and spectrum use changes, understanding the opportunity cost and (private) value of PMSE spectrum to its users and how this will change in the future and evaluating different candidate options for the future management of PMSE spectrum

Satellite Spectrum Pricing and Policy

- Value Partners worked with the Brazilian national telecoms regulator undertaking an analysis of the international geo and non geo commercial satellite markets and developing policy recommendations for the satellite sector
- As part of this study, we undertook an analysis of frequency occupation for orbital slots in a number of different territories with the aim of providing recommendations on the management of national satellite frequencies

Spectrum utilisation fee (SUF) for 2G spectrum

- Value Partners was engaged by OFTA to review possible 2G SUF structure and their potential implication on the market. The study included the definition and assessment of the pricing principles of SUF

RRA's spectrum credentials

Brian Last has over thirty-five years experience in spectrum management and regulatory matters. He has held various senior leadership positions in the UK regulatory authorities (Radiocommunications Agency and Ofcom): dealing with policy development and management of numerous spectrum awards; public mobile networks (2G, 3G and systems beyond); involved in liberalisation of mobile spectrum, trading and spectrum pricing. He has been running his own consultancy company (Radio Regulatory Associates Ltd) for over five years advising on the above topics and EU acquis activities, e.g. the award of 800MHz and 2.6GHz, liberalisation of the GSM spectrum bands, advice to accession states regarding the alignment of national laws and the associated regulatory framework with the EU acquis etc.

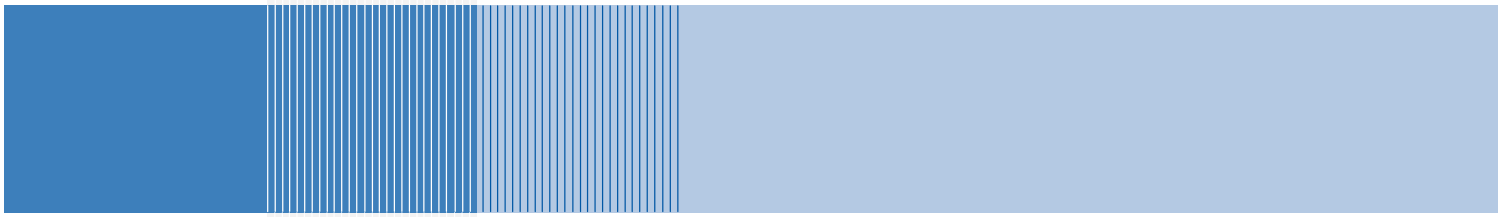
ANNEX 3

REPORT FROM NERA ECONOMIC CONSULTING DATED 4 OCTOBER 2011

04 October 2011

Indefinite Term Licences for Mobile Spectrum

A Report for Hutchison 3G Ireland Limited



NERA
Economic Consulting

Project Team

Richard Marsden

Sumit Sharma

Soren Sorensen

NERA Economic Consulting
15 Stratford Place
London W1C 1BE
United Kingdom
Tel: +44 20 7659 8500
Fax: +44 20 7659 8501
www.nera.com

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Executive Summary

NERA Economic Consulting has been commissioned by Hutchison 3G Ireland Limited to provide an independent review of the economic rationale for a change in approach to licence duration and renewal for spectrum used by mobile operators in Ireland. In the context of Ireland's on-going transition to a market-based spectrum management regime, a shift to indefinite licences would create better incentives for efficient use of spectrum over the long term. Currently, ComReg issues mobile licences for a fixed term of 15 or 20 years, after which licences may be reclaimed and re-auctioned. This report explores the economic rationale for a change in regime. We conclude that there is a strong case for Ireland to adopt indefinite terms for mobile spectrum licences, subject to suitable conditions being imposed to protect ComReg's ability to fulfil its statutory objectives.

Broadly speaking there are three main approaches to licence expiry: fixed-term licences with spectrum reverting to the state on expiry; fixed-term licences with provision for renewal; and indefinite licence terms which can be revoked under well-defined and specific circumstances. Historically, fixed terms have been the dominant approach in most countries, with great variation across regulators with respect to the duration of licences (from ten up to twenty years) and the extent to which procedures for renewal are defined and/or expected to be applied. In the context of a traditional command and control approach to spectrum management, regulators are typically reluctant to grant long terms and are cautious about creating expectation of renewal. Absent regulations that allow trading and change of use, reclaiming licences is the main tool available to regulators to support refarming of spectrum for new services and technologies.

However, the introduction of spectrum trading and liberalisation by the European Commission alters this picture. These reforms make it possible for the market to facilitate introduction of new services and technologies. Furthermore, fixed licence expiry dates are a potential barrier to market-driven change. As licences approach their expiry date, incentives for operators to trade spectrum in the secondary market and/or invest in networks dependent on spectrum diminish.

Licence expiry is associated with market illiquidity because the value of a licence will diminish toward the end of the licence term which is likely to hinder the development of trading markets. This will result in a lower volume of trading, and some of the benefits of a flexible and efficient market based approach to spectrum allocation will be lost. Fixed term licences also carry the risk that spectrum lies idle as reassignment by the spectrum manager normally takes significant time and resources. Indefinite licence terms which can be revoked under well-defined and specific circumstances, liberalisation and spectrum trading offer a simpler and less expensive approach to ensure that spectrum is utilised efficiently.

The adverse impact of licence expiry on investment has a solid basis in economic theory, and is supported by empirical observations from other sectors like agriculture. We note that empirical evidence for decreasing investment in mobile networks as licence expiry approaches is ambiguous. However, we believe that this can be explained by other factors, such as an expectation amongst operators that their licences will be renewed, that they will be able to win back spectrum that is re-awarded, or the fact that the investment relates to networks (for example 3G) for which licences are not about to expire. Moreover, fixed expiry dates may create anti-competitive asymmetries between operators, as larger operators

enjoy greater certainty than smaller rivals that they can win back spectrum in an auction, and therefore may have greater confidence about maintaining investment levels.

In this context, it is no coincidence that the countries that have been at the forefront of spectrum management reforms, such as Australia, Canada, New Zealand, the United Kingdom and the United States, are also at the forefront of reforms to licence terms.

Particular attention has focused on the reforms made by the UK regulator Ofcom, which uniquely has characterized its licence term regime as "indefinite". The term "indefinite" is somewhat misleading though. It does not imply, as some critics suggest, that spectrum is assigned indefinitely to an operator, with the implication that the spectrum manager surrenders its ability to reallocate the spectrum. In fact, UK mobile licences still have a fixed term of 15 or 20 years, after which licences may be revoked for defined spectrum management reasons given 5-years notice (or less in exceptional circumstances).

Although other leading reform countries have not yet introduced indefinite licences, many have similar regimes or are reviewing their approach. For example, in practice, the New Zealand approach of 20-year licences, with provision for notice of renewal at least 5 years before expiry, is not much different from the UK with respect to certainty provided to operators. Similarly, although the United States awards spectrum licences for only 10 years, the licence terms provide such a strong expectation of renewal that the regime may be characterised as similar to the United Kingdom. Both Australia and Canada have implemented market reforms while maintaining fixed term licences (10-15 years) which expire with no right of renewal. However, in recent consultations, regulators in both countries expressed concern that this approach was undermining incentives for investment, and indicated a desire to move to longer licences (possibly indefinite) that offer a strong expectation of renewal.

As these examples show, it is quite practical for the regulator to maintain powers to reclaim licences in defined circumstances, while at the same time giving operators sufficient certainty that they trade spectrum and invest in network construction. There are a variety of ways this can be achieved but the key elements are a very high (and well defined) expectation of renewal and, ideally, at least five years notice of any potential revocation for spectrum management reasons.

A further concern for any government may be the loss of future revenue streams if licences cannot be reclaimed and re-auctioned. However, this need not be a concern. In the United Kingdom, administrative incentive pricing (AIP) is applied to licences after the expiry of their initial term. AIP charges proxy the opportunity cost of the spectrum, and can provide a steady payment stream as an alternative to one-off auction revenues.

Most operators will prefer indefinite licences for the security of tenure they provide. Potential new licensees are sometimes an exception, even though they would benefit from the security of tenure of indefinite terms once they enter the market. An obvious reason why licensees may say that they prefer fixed terms over indefinite terms is that they are typically looking for an entry opportunity which may be provided by a government-run award. In practice, it is unclear a priori if the costs of acquiring spectrum are less under fixed terms or indefinite terms, but liberalised indefinite term tradable spectrum usage rights may provide more flexibility with regard to entry timing as a potential entrant can acquire spectrum from

the market. This will allow entry and exit decisions to be based on market developments and business plans and not be constrained by the timing of expiry of existing fixed term licences or new spectrum release.

There is a risk that a single operator acquires a disproportionate amount of spectrum via trading in order to preclude market entry or gain a competitive advantage. With indefinite licences, a regulator may be concerned that the situation may persist indefinitely. In such cases safeguards such as limits on the amount of spectrum that can be held by any operator at any time and ex-ante competition review of spectrum trading when such trading would lead to significantly less competition in the downstream market may be required. Spectrum caps or forced divestment of spectrum may also be required when secondary spectrum trading is not efficient. For example trading may not result in a socially optimal redistribution of strategically important mobile spectrum (for example sub-1 GHz spectrum bands). This is because, given the competitive advantage of holding such spectrum, incumbents may be reluctant to sell any spectrum they hold in these bands.

Consumers are also likely to be better off with indefinite term licences because as mentioned earlier the additional flexibility with regard to entry timing should make the market more contestable and competitive, and provide incentives for operators to invest adequately to meet growing traffic demand, to expand their network footprint and roll-out new services like mobile broadband more extensively. The importance of (high speed) broadband access for Ireland is recognised by both ComReg and DCENR which identifies high speed broadband services as being critical in attaining the Government's twin goals of becoming a 'Smart Economy' and a 'Knowledge Society'. Given the low population density in Ireland, next generation (4G) mobile networks will play an important role in providing fast broadband access to Irish consumers. Indefinite terms will mean more investment in these new networks and better internet access for Irish consumers.

Ireland is currently in the process of adopting its own market-based reforms, including trading and liberalisation of mobile spectrum, in line with EU directives. The implementation of these reforms provides a natural backdrop for complementary reforms to licence terms. We find that there would be static and dynamic efficiency benefits for Ireland if a policy of indefinite terms were to be adopted. Static efficiency gains derive from improved utilisation of spectrum by new or existing users of spectrum resulting from trades of licences that would not have occurred without a shift to indefinite licences. Dynamic efficiency gains capture increases in consumer surplus where investment, roll out and adoption of new services and technologies happens earlier than would otherwise have been the case. We estimate that these static and dynamic efficiency gains in Ireland could plausibly be of the order of €250 million to €450 million over a 15 year period.

In conclusion, we find that the current approach in Ireland of fixed term licences with no renewal option is inconsistent with ComReg's core objective of encouraging efficient use of spectrum. A shift to an indefinite licence regime would provide stronger incentives for investment and for spectrum trading. The potential benefits from reform are particular great in relation to the mobile sector.

1. Introduction

Hutchison 3G Ireland Limited ("H3GI") has commissioned NERA UK Limited ("NERA") to provide an independent expert analysis of the economic rationale for introducing indefinite licence terms for mobile spectrum in Ireland. This could involve an indefinite licence extension for existing 2.1GHz 3G licences and licensing of the pending 800MHz, 900MHz, and 1800MHz licences on an indefinite basis. It should be noted at the outset that an indefinite licence term does not mean irrevocable spectrum rights. The government should continue to have the right to revoke licences and reclaim spectrum in specific and well defined circumstances.

This report sets out our analysis of the relevant issues, and is structured as follows:

- Section 2 provides definitions for different approaches to licence terms;
- Section 3 discusses possible advantages and disadvantages of different approaches in the context of spectrum trading and liberalisation from the perspective of different stakeholders – the spectrum manager, incumbent licensees, potential future licensees and consumers;
- Section 4 presents information on the approach adopted to license terms for selected countries, and summarises the trend in licensing conditions across these countries;
- Section 5 analyses the static, dynamic and competitive effects of indefinite term licences in Ireland; and
- Section 6 presents our conclusions and recommendations.

2. Approaches to Licence Duration and Renewal

Spectrum licences for mobile services may have many different terms and conditions attached to them. These can be grouped into three categories: policy conditions (such as roll-out obligations) designed to achieve specific public interest goals; technical conditions (such as frequency endowments, guard bands and block-edge masks), designed to promote efficient use of spectrum and management of interference; and non-technical conditions (such as licence duration, usage restrictions and tradability), which determine how the spectrum is used. This report focuses on the third category: non-technical conditions. Specifically, we explore the approaches available for determining licence duration (the number of years that a licence is valid for) and conditions for renewal. However, any discussion of licence duration and renewal would be impossible without considering the broader context of controls on spectrum use and trading.

Historically, the dominant approach towards licence duration in most countries has been to set fixed terms, but there is great variation across regulators with respect to the length of term. There is also variation in the extent to which procedures for renewal are defined and/or expected to be applied. Many countries require licensees to re-apply for licences on expiry, often as part of a competitive process. In the context of a traditional command and control approach to spectrum management, many regulators have tended towards a rigid approach of fixed terms with no direct renewal. Under such a regime, regulators are entirely responsible for determining how spectrum is allocated, and the ability to reclaim licences through licence expiry is the main standard tool available to them to support refarming of spectrum for new services and technologies.

In recent years, European countries have tended to move away from the command and control approach to spectrum management in favour of market-based approaches, such as auctions, trading and liberalisation. Indeed, with respect to mobile services, the European Commission has recommended that all licenses be issued on a technology and service neutral basis, and that these licenses allow for spectrum trading.[1] These reforms mean that in the future:

- Mobile spectrum will be tradable both between incumbents and entrants, and may potentially be partitioned or aggregated to form licences with different frequency, time or geographic endowments; and

- Licences will be issued or refarmed on a service and technology neutral basis, meaning that mobile operators will have great flexibility over the services that they provide to end users and the technology and equipment that they deploy to provide these services. For example, existing mobile licences at 900MHz and 1800MHz, which historically have been restricted to GSM technologies, will be available to be redeployed for new technologies, such as 3G and LTE.

These changes also have implications for the approach that governments take to licence duration and renewal. Such reforms mean that it is possible for the market to facilitate

[1] *Commission Directive 2009/140/EC*, European Commission, 25 November 2009.

introduction of new services and technologies by existing operators or new service providers. In this context, the importance of licence expiry as a tool for re-allocation of spectrum may be greatly diminished. Therefore, with the introduction of other spectrum management reforms, it is appropriate for regulators to review their approach to licence duration.

We explore the potential costs and benefits of different approaches to licence renewal in Section 3. To facilitate comparison, we define three types of approach that regulators can and have adopted for licence duration:

- Fixed term with no defined renewal provision or expectation of renewal;
- Fixed term with a renewal provision or expectation of renewal for another fixed term; and
- Indefinite term with revocation possible in specific and well defined circumstances.

In practice, of course, the particular approach taken by countries may not fit neatly into any one of these categories. For example, there is a continuum of approaches to licence renewal, from possible but not expected to guaranteed except under specific defined circumstances.

Fixed term with no renewal provision or expectation of renewal

The key characteristic of this approach is that, upon expiry of the fixed term, the licence reverts back to the spectrum manager. The existing licensee has no guarantee that it will be able to reacquire the frequencies that it was previously using. The regulator may decide to reallocate the spectrum to the same or different use, and has discretion over the assignment process. In Europe, the most common approach is to re-assign frequencies using an auction. Such auctions are typically scheduled before expiry, so as to prevent any discontinuity in licence use between terms.

This is the current mobile licensing regime in Ireland. Mobile licences are typically granted for a fixed term of 15 or 20 years, and there are no explicit renewal provisions in either the 2G or 3G licences. With respect to 2G licences, which expire between 2011 and 2015 in Ireland, ComReg proposes to reclaim and reassign these frequencies via an auction. It has not yet adopted a formal position on the 3G licences, but the de facto assumption would be that without a change of policy it would adopt the same approach again.

Fixed term with a renewal provision or expectation of renewal for another fixed term

In this case, the licensee has a degree of certainty that its licence term will be renewed for a further fixed term upon expiry of the initial fixed term. The expectation of renewal of spectrum usage rights may be based on an explicit provision dealing with renewal terms in the original licence or based on precedent i.e. past instances when the spectrum manager has renewed licences. Typically, there will also be some procedure for notifying the licensee of a decision to (or not to) renew the licence some time in advance of expiry.

Many countries have adopted renewal processes for mobile licences. For example, this is the standard approach in Canada and the United States, where terms are only ten years but renewal is usually automatic provided that licensees fulfil their policy and technical

conditions. However, there is great variation with respect to the certainty and notice provided by different regulators with respect to renewal.

Indefinite term with revocation possible in specific and well defined circumstances

An indefinite term licence is defined as having the following term conditions:

- An initial fixed term (say 20 years) during which the licence can be revoked in a limited and narrowly defined set of conditions similar to revocation conditions attached to current fixed term licences (e.g. for non-payment of licence fees, a breach of the terms of the licence or national security reasons). During this initial term the licence may not be revoked for spectrum management reasons.

- Once the initial period has expired, the grounds for revocation include the right to revoke for spectrum management reasons subject to a minimum notice period of five years. Unless revoked, the licence remains in force and the licensee continues to hold the licence (i.e. it is indefinite in duration). Alternatively, this may be defined as a process of automatic, rolling renewal, with a minimum term always equal to the notice period.

Under these conditions, an indefinite licence is clearly not the same as an irrevocable licence. The spectrum regulator retains the power to intervene if it perceives that the market is no longer delivering an efficient outcome in terms of spectrum allocation.

The UK has led the way in introducing indefinite licences, as defined above, for commercially used spectrum. Most recently, following a decision on refarming of 2G spectrum, it has announced its intention to convert existing 3G licences to indefinite terms, from the previous fixed terms of 20 years.[2] It also plans to award new licences at 800MHz and 2.6GHz on an indefinite term basis.[3]

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[2] *Statement on variation of 2100 MHz Third Generation Mobile Wireless Telegraphy Act Licences,* Ofcom, 20 June 2011.

[3] *Consultation on assessment of future mobile competition and proposals for the award of 800 MHz and 2.6GHz spectrum and related issues*, Ofcom, 22 March 2011.

3. Licence Terms and Stakeholders

In this section, we consider the costs and benefits of the three approaches to licence duration and renewal from the perspective of various stakeholders:

- Spectrum manager (Section 3.1);
- Incumbent licensees (Section 3.2);
- Potential new licensees (Section 3.3); and
- Consumers (Section 3.4).

In Section 3.5 we summarise the position of these different stakeholders under different licence terms and renewal regimes.

3.1. Spectrum Manager

Spectrum is a scarce and valuable resource. ComReg estimates that in 2009 the use of radio spectrum contributed about 2 % to Irish GDP, and employed over 26,000 people.[4] Given the scarcity value of spectrum, a spectrum manager needs to ensure that spectrum is allocated efficiently and that it is not left unused for long periods.

Although the economic efficiency of spectrum use is typically defined as the primary goal of the spectrum manager, it will also have a number of other objectives, which may or may not be consistent with the efficiency objective. In summary, a typical set of objectives for a regulator may include:

- Promoting efficient use of spectrum, meaning allocating spectrum to the most high value uses, assigning it to users that can generate the highest value, and encouraging sustainable investment by licence holders; [5]
- Ensuring that radio frequencies do not lie unused for long periods of time if there is a viable use for the spectrum;
- Meeting the country's international obligations, including management of interference at national borders and taking account of European and international harmonisation initiatives;
- Promoting competition in downstream markets, so as to ensure that a variety of services are delivered to consumers at reasonable prices;

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4 *ComReg Document 11/28*, 12 April 2011.

5 See for example *ComReg Document 11/28*, 12 April 2011.

- Supporting related public policy objectives, such as the availability of broadband services to rural areas and access by different groups within society, such as the poor and elderly; and

- Generating revenues from the sale of spectrum.

In the following subsections, we analyse each of these possible objectives and explore how effectively they may be achieved under different approaches to licence duration and renewal.

3.1.1. Efficient allocation

In the absence of spectrum trading and liberalisation, a fixed term licence is a useful spectrum management tool. This is because it allows the spectrum manager to periodically reallocate and reassign spectrum in response to changing technologies and market developments. This command and control approach to spectrum assumes that the spectrum manager can:

- Identify the best use and technology for a band of spectrum at a given time;

- Predict the technology, investment and market cycles accurately to set the fixed term; and

- Allocate radio spectrum to users who will use it efficiently for the entire fixed term of the licence.

In practice, it is unlikely that the spectrum manager has the information required to make all these decisions. Technology and markets develop rapidly, continually and unpredictably. It will be difficult to set fixed terms to correspond to these developments. A more flexible market based approach is likely to allocate scarce spectrum more efficiently. Following the revisions to the Common Regulatory Framework for Electronic Communications Networks and Services at the European level, [6] ComReg identifies the following implications for spectrum management: [7]

- *"limits on the restrictions that can be placed on the rights of use of Electronic Communications Services (ECS), with the aim of moving to a more technology-and service-neutral licensing environment; and*
- *allowing for the transfer or lease of individual usage rights for radio frequencies between undertakings."*

The move to technology and service neutral licensing and spectrum trading recognises that market based mechanisms are better at reallocating and reassigning spectrum usage rights on a continuous basis, and able to accommodate inherently unpredictable technology and market developments.

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[6] *Commission Directive 2009/140/EC,* European Commission, 25 November 2009.

[7] *ComReg Document 11/28*, 12 April 2011, Pg 20.

To date spectrum auctions have been the most prominent market based mechanisms used to allocate mobile spectrum, but as Martin Cave points out in his paper on spectrum management, [8]

> *"…auctions by themselves do not make a fundamental change in spectrum management, because they usually operate in a framework of command and control over the use of the licence that is being auctioned. Thus they introduce a competitive element into the assignment process, but do not necessarily introduce flexibility into spectrum use."*

What is required in order to ensure the efficient use of spectrum is that initial allocations made via auctions are combined with liberalised spectrum usage rights which are tradable. Spectrum liberalisation and trading both between incumbents and entrants will help allocate spectrum to its most valuable use and efficient user, and facilitate the introduction of new services and technologies.

A fixed term licence with no renewal will interrupt efficient allocations via spectrum trading because it will disrupt the market when licences expire, and reduce the value of spectrum when licences are close to expiry. A fixed term licence with some expectation of renewal will also impede efficient market based allocations because buyers and sellers will be unsure if spectrum usage rights will be valid beyond the fixed term. This uncertainty of licence tenure will diminish incentives to trade spectrum as it will be difficult to estimate the value of spectrum. An indefinite term licence with revocation possible in specific circumstances has well defined spectrum usage rights in the sense that there is minimal uncertainty with regard to the licence term. This will facilitate spectrum trading and the efficient allocation of spectrum, a conclusion also reached by the Australian Productivity Commission: [9]

> *"…There was some concern that long term or perpetual licences would lock in spectrum uses. It was presumed that spectrum licences would be limited to specified uses, and hence that a limited term might still be needed to give the regulator scope to change spectrum use when licences expire. But as explained previously, the RC Act does not require that spectrum licences be limited to a specified use. They are not linked to the spectrum plan and have considerable latitude to adopt different uses and technologies. With some attention to creating core conditions that are as technologically neutral as possible, spectrum licences would have the characteristics required for perpetual licences."*

We note that contrary to what ComReg suggests, there is no incentive for licensees to "hold out" and delay trading in the expectation that they will be able to sell spectrum at a higher price later if licences are issued for an indefinite term.[10] This is because:

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[8] *Cave, M., Market-Based Methods of Spectrum Management in the UK and the European Union,* Telecommunications Journal of Australia , Volume 58, Number 2-3, 2008, Monash University Epress.

[9] *Productivity Commission 2002, Radiocommunications,* Report no. 22, AusInfo, Canberra, 1 July 2002, Pg. XLV.

[10] *ComReg Document 11/28*, 12 April 2011, Pg 24.

- Firstly, as explained above, indefinite terms make it easier to value and hence trade spectrum usage rights. All relevant information at a given point in time (for example foreseeable technological developments and new uses) will be reflected in the spectrum trading price in an efficient market. Any changes in the value of spectrum will be the result of new information such as technological breakthroughs, etc. Once revealed this information will also be incorporated in the spectrum trading price in an efficient market. Unless a licensee has private information there is unlikely to be any gain from holding out.

- Secondly, it need not be the case that the value of spectrum increases as new technologies are developed; it might decrease, and to delay selling could be a loss making strategy. For example, increasing substitutability of spectrum bands, and the development of radio technologies and devices that can operate across multiple frequencies may decrease the relative value of a particular spectrum band.

We also note that once spectrum usage rights are technology and service neutral, it no longer makes sense to set the licence term in line with future technology and investment cycles as the market will facilitate the introduction of new services and technologies. In this context the basis for setting fixed terms is unclear and the importance of licence expiry as a tool for reallocation of spectrum may be greatly diminished.

The investment incentives for licensees under fixed and indefinite licence terms are discussed in detail Section 3.2.1. In general, security of tenure associated with indefinite licences will allow mobile operators to invest in their networks continuously as markets and technologies develop without the threat of potential termination of the licence leading to unexploited stranded investments. This will result in sustainable and high levels of investment by licensees.

3.1.2. Unused spectrum

Given the scarcity value of spectrum, a spectrum manager would like to avoid situations when useful spectrum is left unused. Such a situation can arise because:

- The spectrum manager fails to reallocate spectrum in a timely fashion; and/or

- A licensee does not use its spectrum allocation.

3.1.2.1. Spectrum manager fails to reallocate spectrum

The risk that a spectrum manager fails to reallocate spectrum in a timely fashion is higher with fixed terms because in every period that the licence expires the spectrum manager needs to organize and implement a reallocation mechanism. Ofcom sees this as one of the disadvantages of fixed term licences, and states,[11]

> *"...In particular, reassignment by the regulator typically takes significant time and resource. The spectrum may also lie idle for a period as the regulator prepares for*

[11] *Consultation on assessment of future mobile competition and proposals for the award of 800 MHz and 2.6 GHz spectrum and related issues,* Ofcom, 22 March 201, Pg 74.

reassignment. While it may be possible to reduce this problem through the use of overlay auctions, the approach of an indefinite term together with spectrum trading seems likely to offer a simpler and less costly way of ensuring the spectrum is used efficiently."

Another problem with fixed terms is that licences may not co-terminate. This can occur either because licences are issued at the same time with different fixed terms (though this is not usually true), or because licences with the same fixed term are issued at different times – for example in the case of operators entering the market in different years. The renewal of licences is complicated because renewal decisions for expiring licences should not favour one licensee over another, and this can delay and complicate spectrum liberalisation and renewal. For example, if expiring licences are renewed on a liberalised basis whereas existing licences continue to have technology and service restrictions then existing licensees will be disadvantaged. The problem of non co-terminating licences will not occur with indefinite terms.

3.1.2.2. Licensee fails to use spectrum

The risk that a licensee does not utilise the entire spectrum allocated to it is also lower with indefinite terms provided spectrum usage rights are liberalised and traded efficiently. ComReg recognises that indefinite term licenses will be more tradable, and says that *"as a term-limited licence approaches its end date, the market for such a licence will diminish."*[12] The higher tradability of spectrum usage rights provides licensees an incentive to use or sell their spectrum. The Australian Productivity Commission also reached the same conclusion in its study:[13]

"…But perpetual rights would not lock in spectrum use. On the contrary, their greatly improved marketability would emphasize the opportunity cost of not using licences efficiently. Competing users, new technologies and changing market opportunities would impose a discipline on incumbents to use the spectrum efficiently or sell it or lease it to others who can."

The incentives for mobile network operators to use spectrum efficiently or trade unused spectrum arise because they are commercial organizations which strive to minimize costs by optimising spectrum usage. For a given spectrum allocation, more capacity can be provided by increasing network investment. Conversely, for given network investment, more capacity may be provided if more spectrum is deployed. The operator's technical valuation of marginal spectrum will be no more than the network costs that it will avoid as a result of having that spectrum. If a buyer is willing to pay more for marginal spectrum than the seller's avoidable network costs, it will be profit maximising for an operator to sell spectrum.

In this context, there is a risk that a single operator acquires a disproportionate amount of spectrum via trading and hoards this spectrum in order to preclude market entry and/or gain a competitive advantage. It is also possible that the secondary spectrum trading market is not efficient. For example trading may not result in a socially optimal redistribution of

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[12] *ComReg Document 11/28*, 12 April 2011, Pg 26.

[13] *Productivity Commission 2002, Radiocommunications,* Report no. 22, AusInfo, Canberra, 1 July 2002, Pg. XLVI.

strategically important mobile spectrum (for example sub-1 GHz spectrum bands). This is because, given the competitive advantage of holding such spectrum, incumbents may be reluctant to sell any spectrum they hold in these bands. With indefinite licences, a regulator may be concerned that the situation may persist indefinitely. In such cases other policy tools may be required to address competition concerns. For example, ex-ante competition reviews of mobile spectrum trading that might significantly lessen competition in the downstream market should prevent significant risk to competition in the downstream market arising via trading in the first place.[14] Further, as a pre-emptive measure, a regulator may impose caps on spectrum holdings below 3 GHz and particularly sub-1 GHz, for example, as proposed by the Telecommunication and Internet Federation.[15]

3.1.3. International coordination and harmonisation

The allocation and use of radio spectrum needs to be coordinated internationally in order to avoid interference problems. There are also advantages for end-users, service providers, and equipment manufacturers if spectrum use is coordinated internationally as this allows operators and equipment manufacturers to exploit economies of scale.[16] This means that from time to time ComReg may need to make major allocation and harmonisation changes in line with other European countries or internationally. Usually such major allocation and harmonisation changes happen infrequently and take a long time to develop and finalise. For example the reallocation of spectrum originally used for analogue television for mobile services (also known as the Digital Dividend) has taken over ten years in Europe.[17] We also note that existing 2G licences in Ireland have a fixed term of 15 years, and 3G licences a fixed term of 20 years.[18] This suggests that at the time these licences were issued no major allocation and harmonisation changes were foreseen for the next 15/20 years in the spectrum bands used for these services.

On expiry a fixed term licence reverts back to the spectrum manager who can take this opportunity to make major allocation and harmonisation changes if required. This reallocation will proceed smoothly if the year of expiry of the fixed term licence coincides with the year when major allocation and harmonisation changes need to be made. However, this may not always be the case. For example although the 2.6 GHz band is subject to a June 2008 Commission decision which harmonizes this band for the provision of electronic communication services,[19] it has been difficult to implement these changes in Ireland where

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[14] For example Ofcom proposes undertake *ex-ante* competition reviews (Source: *Statement to make 900MHz, 1800MHz and 2100MHz public wireless network licences tradable*, Ofcom, 20 June 2011).

[15] *IBEC Telecommunications and Internet Federation,* Submission on ComReg 11/28-Review of the Period 2008-2010 and Proposed Strategy for Managing the Radio Spectrum: 2011-2013, 24 May 2011.

[16] *Commission Directive 2009/140/EC*, European Commission, 25 November 2009, Para 33.

[17] For example see: http://ec.europa.eu/information_society/policy/ecomm/radio_spectrum/topics/reorg/dividend/index_en.htm , and ComReg 09/15.

[18] http://www.comreg.ie/radio_spectrum/search.541.874.10003.0.rslicensing.html.

[19] *Commission Decision 2008/477/EC*, European Commission, 13 June 2008.

this band is licensed to UPC for MMDS TV services for a fixed term that does not expire till April 2014.[20]

An indefinite term licence during its initial term is similar to a fixed term licence. After that an indefinite term licence can be revoked for spectrum management reasons subject to a minimum notice period of five years. Given that major allocation and harmonisation changes take place infrequently and take a long time to develop there should be sufficient time for a spectrum manager to provide five years notice before undertaking major allocation and harmonisation changes.

In fact an indefinite term licence with an initial term of 20 years and subject to revocation after the initial term for spectrum management reasons, given five years notice, will provide more flexibility than a fixed term license of 20 years which is reacquired and then reallocated for another fixed term of 20 years. This is because the latter would only permit major allocation and harmonisation changes in the year when the first fixed term expires (i.e. in the 20th year) and then when the second fixed term expires (i.e. in the 40th year). The indefinite term license on the other hand would allow for major allocation and harmonisation changes to be made in any year after the initial period has expired subject to a five year notice period i.e. in year 21 (notice given in year 16), year 22 (notice given in year 17), year 23 (notice given in year 18) and so on.

3.1.4. Promoting competition

Effective competition between operators will ensure that consumers are offered a wide variety of services at reasonable prices. Both actual entry and the potential threat of entry will promote competition.

With fixed term licences entry is only likely to occur periodically when existing licences expire and are reallocated, or new spectrum is released. This is because the closer a fixed term licence is to expiry the less attractive it will be for a potential entrant to buy the associated spectrum usage rights. This will be true even if there is an expectation of renewal, as this does not guarantee that the licence will be renewed. It will be difficult for an entrant to develop a business case given the uncertainty of tenure. Indefinite term licences will provide greater security of tenure which should facilitate entry (and exit) at any time during the term of the licence. This is because a potential entrant will be guaranteed that spectrum usage rights will not be revoked except for major allocation and harmonisation changes, and this should provide sufficient time to recover investments and make a reasonable profit. This in turn should lead to more competitive pressure as the market will be contestable to a greater degree than under fixed term licences. As the Australian Productivity Commission states:[21]

> *"Perpetual licences would allow market participants to choose if and when they enter or exit the industry. Instead of facing an arbitrary cut off date, licensees could match their licence holdings to their business plans."*

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[20] *ComReg Document 10/38*, 14 May 2010 and *ComReg Document 10/58s,* 27 July 2010.

[21] *Productivity Commission 2002, Radiocommunications,* Report no. 22, AusInfo, Canberra, 1 July 2002, Pg XLVI.

However, a potential concern with spectrum trading and indefinite terms as opposed to fixed terms is that one operator could acquire a disproportionate amount of spectrum, and this situation might persist and reduce competition. As ComReg says, it *"needs to ensure that spectrum rights do not become concentrated in too few hands such that competition in downstream markets would be restricted to a significant extent (or otherwise foreclosed)."*[22] As mentioned earlier, in such cases additional safeguards such as trading in spectrum bands being subject to limits on the amount of spectrum that can be held by any one operator at any time, and ex-ante competition reviews of trading which might significantly lessen competition in the downstream market may be required. Ex-post competition law can be used to identify other anti-competitive practices that are not related to spectrum allocation. Once identified, these practices can be tackled directly.

The periodic re-release of spectrum through auctions is in any case unlikely to be helpful in dealing with the existing market power of operators. This is because the strength of a bidder will to some extent be based on its current position in the market. As a result the same licensees are likely to reacquire spectrum when spectrum is re-released. For example ComReg found with regard to GSM licences that the *"likelihood of O2 and Vodafone not winning spectrum in a competitive award is very low."*[23] Fixed expiry dates may in fact favour larger operators if they enjoy greater certainty than smaller rivals that they can win back spectrum in an auction.

There is also a pan-European dimension to spectrum trading and licensing. Operators present in multiple countries will be able to realise economies of scale in production and marketing and this may also lead to more competition. It is likely to be easier to implement such a strategy by acquiring indefinite term spectrum usage rights from the market rather than waiting for fixed term licences to expire in different countries and/or wait for spectrum managers in these countries to release new spectrum. It is also unlikely that fixed term licences in different countries will expire simultaneously. The European Commission emphasizes this Community dimension in its 2009 directive:[24]

> *"The undue fragmentation amongst national policies results in increased costs and lost market opportunities for spectrum users, and slows down innovation, to the detriment of the internal market, consumers and the economy as a whole. Moreover, the conditions for access to, and use of, radio frequencies may vary according to the type of operator, while electronic services provided by these operators increasingly overlap, thereby creating tensions between rights holders, discrepancies in the cost of access to spectrum, and potential distortions in the functioning of the internal market."*

Finally, we note that irrespective of whether licences are issued for fixed or indefinite terms, a spectrum manager will always be able to use primary allocations of new harmonised bands (like the 2.6 GHz band, and possibly spectrum currently being used by the military and other

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[22] *ComReg Document 11/28,* Pg 24.

[23] *ComReg Document 09/99*, 21 December 2009, Pg 44.

[24] *Directive 2009/140/EC*, European Commission, 25 November 2009.

public bodies) to influence competition among existing operators or to promote its other policy goals.

3.1.5. Public policy goals

In relation to spectrum use, regulators often have related public policy goals. Historically, these have often been included in spectrum licences in the form of roll-out and coverage conditions. Repeated spectrum awards provide a tool for addressing new public policy issues as they arise. Therefore, a possible concern with the introduction of indefinite licences, is that regulators may be surrendering a tool to intervene in the market.

For example, in the case of mobile, spectrum managers may be mandated to:

- extend and/or improve the availability of mobile services to areas which are not covered at present; and/or
- enable internet access and use by groups within society, such as the poor and elderly, who may either lack the skills or financial means to access broadband services.

One way to extend the availability of services for users is to include service coverage obligations in the original licence conditions. Of course, coverage obligations can be included in both fixed and indefinite term licences. For example, Ofcom proposes to include broadband coverage obligations in one of the 800 MHz licences to be issued for an indefinite term.[25] However, with indefinite licences, changing terms later may be more difficult as licensees may raise concerns with regard to changes to existing terms and conditions.

How concerned should regulators be about this loss of flexibility? Our view is that this should not be a major concern, for three reasons:

Firstly, imposing policy conditions on licences may be a rather blunt tool. It is far from straightforward to specify various technical parameters used to measure quality and coverage obligations, especially when technologies are new and evolving. Such obligations could distort investment and roll-out decisions and result in a less valuable service than would otherwise have been the case. This might occur if regulators misjudge the value that consumers place on different services. For example, consumers might value indoor coverage more than speed but regulators might emphasize the latter in mandated coverage obligations. Alternatively, conditions designed to promote one type of service may inadvertently prevent roll-out of another type of service that emerges later which offers superior benefits to consumers.

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[25] *Consultation on assessment of future mobile competition and proposals for the award of 800 MHz and 2.6GHz spectrum and related issues*, Ofcom, 22 March 2011, Pg 80.

Secondly, it is always possible to set up incentive schemes outside the initial licence terms and conditions to deal with new public policy concerns. The Rural Broadband Scheme and the National Broadband Scheme are two such examples in Ireland.[26]

Finally, demand side interventions by governments, such as subsidies to groups who cannot afford broadband services or training to previously excluded groups within society, may be a much more effective and less distorting way of achieving public policy goals. These demand side interventions are unrelated to licence terms, and can be undertaken with both fixed and indefinite terms.

3.1.6. Revenue generation

The initial allocation of spectrum can be used to generate revenues via licence fees. These licence fees can be set to recover the costs of the licensing process and managing spectrum, to ensure that spectrum is allocated to its most valuable use, and/or to raise revenue for the government. Given the substantial benefits of mobile services to consumers and the economy, and the scarcity of mobile spectrum, the most important goal of spectrum managers should be to ensure that this spectrum is used efficiently. Revenue generation should be a secondary objective. As mentioned earlier, indefinite term licences should result in efficient utilisation of spectrum (Section 3.1.1and 3.1.2), and in cost savings for the spectrum manager because there will be no need to organise a licence renewal process every time a licence expires.

However, if licences are issued for an indefinite term, then a concern for any government may be the loss of future revenue streams if licences cannot be reclaimed and re-auctioned. This need not be a concern if the spectrum manager uses administrative incentive pricing (AIP). With AIP the fee levels are set by the spectrum manager based on its estimate of the market value of spectrum. AIP can provide a steady payment stream as an alternative to one-off auction revenues, and help ensure that incumbent operators pay a fair price for the spectrum they hold. In the United Kingdom, AIP (now Annual License Fee - ALF) is applied to licences after the expiry of their initial term.

In principle, in an efficient trading market, the price for which spectrum could be sold would signal the opportunity cost of spectrum and promote its optimal use. Ofcom, the UK regulator, proposes to assess the respective roles of trading and AIP on a sector-by-sector basis.[27]

Next we discuss the costs and benefits of the three approaches to licence duration and renewal from the perspective of incumbent licensees.

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[26] The Rural Broadband Scheme in Ireland aims "to enable a basic broadband service to be provided to individual rural premises which are not capable of obtaining a broadband service from existing internet service providers." The National Broadband Scheme in Ireland aims to provide broadband in areas where these services have been found to be insufficient (Source: http://www.dcenr.gov.ie/Communications/Communications+Development/).

[27] *SRSP: The revised Framework for Spectrum pricing,* Ofcom, 29 March 2010.

3.2. Incumbent Licensees

Incumbent licensees typically prefer indefinite term licences to fixed term licences. The main reason is that security of tenure will allow mobile operators to invest in their networks continuously as markets and technologies develop without the threat of potential termination of the licence leading to unexploited stranded investments. We discuss this further in Section 3.2.1 below. Before that we consider how licence terms might affect optimal utilisation of spectrum, raising funds for investment, and competition between fixed and mobile operators.

Optimal Utilisation

As discussed in Section 3.1.1 and 3.1.2, minimal uncertainty with regard to renewal rights associated with indefinite terms makes spectrum more marketable and this is likely to lead to a more active spectrum trading market. A more active trading market will allow operators to optimise their spectrum holdings and minimise operating costs by balancing investment in network equipment and spectrum as described in Section 3.1.2.2. The increased scope for entry and exit associated with indefinite terms also means that the market will be contestable to a greater degree which should increase the competitive pressure on incumbent operators to use their spectrum efficiently.

Raising funds for investment

With fixed terms, uncertainty related to the renewal of the licence and the cost of renewal may mean that operators will not be able to raise adequate funds for investment and/or face an increase in the cost of funds towards the end of the licence terms. This is due to the potential destruction of shareholder value and increase in costs of business which will occur if an operator:

- Fails to win any spectrum: In this case the operator will no longer be able to use its network infrastructure to provide mobile services, and it may need to exit the market.
- Wins less spectrum than it had before: In this case it will need to exploit the spectrum it wins more intensively thereby raising network costs and/or incur additional costs of non-technical measures like roaming agreements.
- Wins spectrum in a different band than before: In this case the operator may need to incur costs of retooling its network to work with new frequencies, costs of non-technical measures such as roaming, and additional costs of migrating some end users between spectrum bands.[28]

In all three situations the operator's competitive position in the market will be adversely affected and its costs will increase. This is likely to affect its ability to raise funds. The inability to raise adequate funds or the increased cost of funds will mean that an operator may

[28] These might be customers who do not have multi-band phones and/or are using a technology (for example 2G) which is not provided in the reacquired spectrum band.

not be able to invest adequately to meet growing traffic demand, to expand its network footprint, and/or to roll-out new services like mobile broadband extensively.

Competition between fixed and mobile operators

Mobile operators increasingly compete with fixed operators to provide voice, data and video services. Fixed operator licences in Europe are usually for an indefinite term which means fixed operators can continually invest in their networks without the risk that their licences may not be renewed. Indefinite term spectrum licences will put mobile operators on an equal footing and allow them to compete better with fixed operators.

3.2.1. Licensee investment incentives

Mobile networks require continuous investment to cope with expected growth in traffic, both in terms of scale, for example deploying more backhaul and configuring more uplink capacity, and innovation, for example deploying more spectrum efficient network technology and network upgrades which also require significant investment. If licences are for fixed terms operators need to ensure that there is significant payback early – in general an operator would expect to break-even about a third of the way through a fixed term, recover investment in the first half, and generate free cash flow in the second half to be able to earn a reasonable return on its investment. This means there is unlikely to be substantial new investment in new sites or services in the second half of a fixed term licence because there might be insufficient time to recover investments, and make a reasonable profit. So, as licences approach their expiry date, incentives diminish for operators to invest in networks dependent on spectrum. Such behaviour has a solid basis in economic theory, and is supported by empirical observations from other sectors such as agriculture.[29]

We note that empirical evidence for decreasing investment in mobile networks as licence expiry approaches is ambiguous. However, we believe that this can be explained by other factors, such as an expectation amongst operators that their licences will be renewed, that they will be able to win back spectrum that is re-awarded, or the fact that the investment relates to networks (for example 3G) for which licences are not about to expire. We believe that ComReg's observation that three of the mobile operators in the Irish market invested significantly towards the end of their licence terms can be explained by these factors.[30] For example eircom in its submission to ComReg states:[31]

> *"In the last two financial years (1July 2008 to 30 June 2010) eircom Group has invested [ ] in its mobile network. The vast majority of this investment, [ ], has been in respect of our 2100MHz licence (expiry date in 2027). Limited sums have been invested in maintaining existing capabilities provided under our GSM licence given*

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[29] See for example: Besley, T., *Property Rights and Investment Incentives: Theory and Evidence from Ghana,* Journal of Political Economy, 1995, vol. 103, no.5; and
Li Guo, Rozelle S., and Brandt L., Tenure, land rights and farmer investment incentives in China, Agricultural Economics 19 (1998), 63-71.

[30] *ComReg Document 11/28,* 12 April 2011, Pg. 25.

[31] *Response to ComReg Consultation paper Review of the Period 2008-2010 & Proposed Strategy for Managing the Radio Spectrum: 2011-2013 ComReg Document 11/28*, eircom Group, 24 May 2011.

the regulatory uncertainty created by the publication of ComReg 08/57 calling into question our legitimate expectation of licence renewal.

The regulatory uncertainty resulting from ComReg's ongoing review has inhibited rather than promoted investment contrary to ComReg's objectives. It is arguable that under a more flexible licensing regime (with indefinite licences or at the very least clearly defined renewal rights) we would have adopted an investment profile generating greater societal benefits. The root of the problem is the arbitrary nature of finite licence durations and the inflexible nature of current licences. Flexible spectrum rights support continuous investment which is infinitely superior to ComReg's apparent policy approach of periodic re-release which serves to stall service development in the run-up to the re-release process."

Telefonica and Vodafone also make similar points. Telefonica in its submission to ComReg states that it expected its licence to be renewed, and this was the reason it continued to invest in its GSM network. Without such an understanding it would not have made these investments.[32] Vodafone says that it invested in its 3G network because its 3G licence is not due to expire for about 10 years, and it too expected that its 900 MHz licence would be renewed, and this was the reason for continued investment in its 2G network.[33]

We note that longer licence terms (for example 30 years) might mitigate some of the negative effects of fixed terms initially, but investment incentives will still be distorted towards the end of the licence term, and the spectrum trading market will not be as effective in allocating spectrum efficiently as it would with indefinite term licences (Sections 3.1.1and 3.1.2). In this context the Electronic Communications Committee[34] writing in 2006 recommended that rolling term licences which remain in force with no fixed end date (similar to the indefinite term licence described in Section 2) balance the spectrum manager's need for flexibility and the licensee's need for security of tenure.[35] It is no surprise then that countries that have been at the forefront of spectrum management reforms, such as Australia, Canada, New Zealand, the United Kingdom and the United States, are also at the forefront of reforms to licence terms and are moving to indefinite terms or fixed terms with very strong expectation of renewal (as we discuss in Section 4).

3.3. Potential New Licensees

Once potential entrants enter the market, their interests typically align with existing licensees, i.e. they will prefer indefinite terms for the reasons discussed in the previous section. For example, in the case of the recent consultation in Canada on this issue (as discussed in Section 4.2), both incumbents and small recent entrants supported indefinite terms. Typically,

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[32] *Spectrum Strategy 2011-2013 Response to Consultation 11/28 (Public Version)*, Telefonica.

[33] *Vodafone response to ComReg Consultation on Review of the Period 2008-2010 & Proposed Strategy for Managing the Radio Spectrum: 2011-2013 (Non-confidential)*, Vodafone, 24 May 2011.

[34] The Electronic Communications Committee is a body that helps develop common policies for regulating spectrum in Europe and represents it at international bodies.

[35] *Enhancing Harmonisation and Introducing Flexibility in the Spectrum Regulatory Framework,* Electronic Communications Committee, March 2006, Pg 14.

only aspiring new licensees prefer fixed terms over indefinite terms as they may hope that it will be easier and/or cheaper for them to enter the market in the case of fixed term licences. However, in practice, it is far from clear whether shifting to indefinite licences would really constrain opportunities for entrants; in fact, it may significantly increase scope for entry.

As discussed earlier in Section 3.1.4, with fixed licence terms entry is only likely to occur at the expiry of licence terms. A potential entrant is likely to wait for the spectrum manager to reacquire and reallocate spectrum or release new spectrum before it enters the market. Liberalised indefinite term tradable spectrum usage rights provide more flexibility as a potential entrant can acquire spectrum from the market. This allows a potential entrant to base its entry decision on market developments and its business plans, and not be constrained by the timing of expiry of existing fixed term licences or new spectrum release.

The cost of acquiring spectrum under indefinite terms will be determined by the market price of spectrum, and that under fixed terms by the licence fee determined in an auction. It is unclear a priori which will be the cheaper alternative. The answer will depend on the market price of spectrum, the level of AIP, and the outcome of any auction held to allocate the spectrum. Only if a spectrum manager plans to administratively allocate spectrum at below the market price to a new entrant might it be cheaper to enter the market with fixed term licences.

A potential concern for new entrants who buy indefinite spectrum usage rights after the initial period is over is that these usage rights can be revoked for spectrum management reasons subject to a minimum notice period of five years, which is unlikely to be sufficient time to make a reasonable return on investments. However as mentioned earlier major allocation and harmonisation changes occur infrequently and take a long time to implement – from 10 to 20 years (Section 3.1.3). Entrants should be well informed about such changes, and be able to take these into account before making their entry decision. If a major allocation and harmonisation change is imminent then entry may not be feasible till after such changes have been implemented.

Finally, a spectrum manager has other policy tools that can be used to promote entry. For example, primary allocations of new harmonized bands, limits on the amount of spectrum that could be held by any one operator, and ex-ante reviews of mobile spectrum trading which might adversely affect competition in the downstream market can be used to remove obstacles to entry.

3.4. Consumers

The impact of a shift to indefinite licences would be felt only indirectly on consumers, via the impact on the timing and quality of available services, and on price levels. Consumers will be better off if there is effective competition in the downstream market for mobile services, and if operators invest adequately to meet growing traffic demand, expand their network footprint and roll-out new services like mobile broadband extensively. As discussed in Section 3.1.4, indefinite terms should encourage entry. Entry and the threat of potential entry should make the downstream market contestable by disciplining incumbent operators, and making the market more competitive which will help ensure that consumers are offered a wide variety of services at reasonable prices.

With regard to investments by operators, the security of tenure that indefinite terms provide means that operators will be able to invest continuously as markets and technologies develop without the threat of potential termination of their licences which is likely lead to earlier availability of new services and service upgrades for consumers (Section 3.2.1). Under a fixed term, licence investments may be delayed or diminished till the licence is renewed and the benefits of immediate investment and/or more investment for consumers will be lost.

Indefinite terms will also provide incentives for optimal and efficient utilisation of spectrum by operators (Sections 3.1.1 and 3.1.2), and make it easier to raise capital for investment (Section 3.2). In a competitive market, these cost savings would be passed on to consumers in the form of lower prices. More investment will also enable mobile communication providers to compete better with their fixed network counterparts. This increase in inter-modal competition should also benefit consumers. In contrast, with fixed terms, there is potential for discontinuity of service and/or the need for operators to make costly adjustments which might be passed on to consumers in the form of higher prices or lower quality of service. It is also possible that an operator has to exit the market which will increase market concentration. Such discontinuity of service and reduction in competition are unlikely to occur with indefinite term licences.

3.5. Conclusion

The discussion above suggests that there is a strong case to adopt indefinite terms for mobile spectrum from the perspective of various stakeholders. Indefinite licence terms are better suited to meet the relevant objectives of a spectrum manager, provide incentives for efficient utilisation of scarce spectrum, and promote competition and investment which should benefit consumers as well.

The primary aim of a spectrum manager is to ensure that spectrum is used efficiently and that no viable spectrum is left unused. With the introduction of liberalisation and spectrum trading, indefinite terms are better at achieving these goals. Indefinite terms facilitate efficient allocation of spectrum via trading because security of tenure is required for effective trading markets. Uncertainty of tenure, a feature of fixed terms, diminishes incentives to trade and this impedes the efficient allocation of spectrum via trading both between incumbents and entrants. Valuable spectrum is also less likely to be left unused with indefinite terms because an efficient trading market should emphasise the opportunity cost of holding spectrum for licensees, and with indefinite terms spectrum managers do not need to organise a reallocation mechanism in every period that a licence expires which eliminates the possibility of spectrum remaining unallocated and unused.

Meanwhile, there is no evidence to suggest that other objectives of a spectrum manager, such as international coordination and harmonisation, promoting competition, and support of related public policy goals, would be adversely affected by a shift to indefinite licences. Where necessary, other tools such as ex-ante reviews of spectrum trading which might lessen competition in the downstream market, limits on the amount of spectrum that can be held by any one operator, and demand-side interventions, may be used to achieve such objectives.

For incumbent licensees, indefinite terms provide the advantage of security of tenure. This means that they can invest in their networks continually as markets and technologies develop without being constrained by potential licence expiry. This allows operators to cope with growing customer demand, introduce new services and spectrum efficient network technologies and upgrades, and compete better with fixed operators. Indefinite terms also avoid the potential destruction of business value in case an operator fails to reacquire the spectrum it previously held, and an efficient trading market should allow operators to optimise their spectrum holdings.

Potential new licensees, once they enter the market, typically have the same interests as incumbent licensees. Aspiring new licensees may prefer fixed terms over indefinite terms as they may hope that it will be easier and/or cheaper for them to enter the market in the case of fixed term licences. However, in practice, it is far from clear whether shifting to indefinite licences would really constrain opportunities for entrants; in fact, it may significantly increase scope for entry by providing more flexibility with regard to entry timing as potential entrants can acquire spectrum from the market. This allows a potential entrant to base its entry decision on market developments and its business plans, and not be constrained by the timing of expiry of existing fixed term licences or new spectrum release.

Consumers are also likely to be better off with indefinite term licences. This is because the increased scope for entry associated with indefinite terms is likely to lead to a more

contestable and competitive market, and indefinite term licences provide incentives for operators to invest adequately to meet growing traffic demand, to expand their network footprint and roll-out new services like mobile broadband more extensively. Higher investments will mean better services for consumers. Indefinite terms also avoid the potential for discontinuity of service.

4. Licence Terms in Different Countries

In this section we discuss the approach to license terms in a selected group of countries. Table 4-1 provides an overview of licensing terms in these countries. Section 4.6 concludes based on licence terms in the countries discussed below, that it is quite practical for the regulator to maintain powers to reclaim licences in defined circumstances, while at the same time giving operators the certainty they need to trade spectrum and invest in network build. Indefinite term spectrum licences which may be revoked for defined spectrum management reasons given 5-years notice (defined in Section 2) are not impractical, and similar or equivalent licensing terms have either been adopted by some countries or are under review elsewhere.

Table 4-1
Overview of Licensing Conditions in Different Countries

Country	Type of regime	Term of licences	Renewal conditions	Tradable?	Liberalised?
Australia	Fixed term, no renewal (but renewal approach under review)	15 years	Licences resold by auction, but may be bought by current user	Yes	Yes
Canada	Fixed term, with strong expectation of renewal	10 years (but likely to move to longer terms)	Presumption of renewal, but greater clarity requested by operators	Yes, but subject to constraints	Yes, but subject to constraints
New Zealand	Fixed term, with high likelihood of renewal	20 years	Renewal notice posted 5 years before licence expiry	Yes	Yes
United States	Fixed term, with strong expectation of renewal	10 years	Renewal usually automatic subject to meeting usage conditions	Yes, but subject to approval	Yes, but subject to approval
United Kingdom	Indefinite term	Remain in force until revoked	May be revoked for well defined spectrum management reasons subject to a five year notice period	Yes, proposed to be subject to ex-ante competition review	Yes

4.1. Australia

Concerns that fixed terms may be impeding trading

Australia has been a world leader in spectrum management reform, and has had a comprehensive spectrum trading regime since 1997. The ACMA considers these reforms a great success, with trading volumes of about 5% of licences, "similar to turnover in [the] housing market"[36]. Nevertheless, following the tenth anniversary of the introduction of

[36] Richard Scheelings, February 2009, "Spectrum Tading: Improving the efficiency of the secondary market for spectrum", an ACMA presentation.

trading, it launched a major review with the aim of identifying further changes that could improve the efficiency with which spectrum is used. The issue of licence renewal was identified as one of the key barriers to a fully efficient market, prompting government support for a shift to much greater certainty on renewal.

Spectrum licences are offered for terms of up to 15 years, and historically have been issued with no automatic right of renewal. Typically, expiring licences are reallocated using an auction, but may be re-acquired by the existing user. The ACMA sends expiry reminders to licensees during the last two years of their licence; for example, notices arising from allocations made in 2000 will be issued in 2013. Licences may only be reissued to the same user without a price-based contest under limited circumstances, such as special approval from the Minister or identification of a special public interest by the ACMA.

In the ACMA's Spectrum Trading paper, length of tenure was identified as an issue that "*affects the dynamism of trade in secondary markets as well as the willingness of operators to continue to invest in the network with limited remaining tenure when there is currently no certainty of licence re-issue*."[37] This view was widely supported by respondents to the consultation, many of whom called for measures to provide greater security of tenure for rights, so as to provide greater certainty over the timeframes for trades, investment and financial return. In particular, the security of licence tenure beyond licence expiry was identified as the most significant impediment to spectrum trading. Specifically, respondents argued that: "*[t]he consequence of uncertain tenure is sellers have weaker incentives to sell in the first half of the licence term, and aspirant buyers are discouraged from buying during the remaining half of the term."*[38]

In its own concluding document, the ACMA accepted these arguments in principle, and announced its intention to draw up new guidelines that will favour renewal of licences. However, a full shift away from fixed terms to a framework that allows for a presumption of renewal will require primary legislation. It is unclear from our research when this will happen. However, we note that the Government has already accepted in principle that apparatus licences should be renewed unless licensees have failed to comply with their licence conditions or there are compelling spectrum management reasons for re-allocation.[39]

4.2. Canada

Reviewing framework for licence renewal

Industry Canada is currently in the process of reviewing the licence terms applied to spectrum sold by auction, including spectrum for mobile services. In a public consultation released in April 2009, it initially proposed to maintain the current approach of 10-year licences with a high expectation of renewal.[40] However, following comments from the industry which

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37 The ACMA, July 2009, Response to Submission of Spectrum Trading, page 4.

38 Ibid, page 4.

39 Ibid, page 3.

40 Industry Canada, Consultation on Revisions to the Framework for Spectrum Auctions in Canada, April 2009, Canada Gazette notice DGRB-001-09.

strongly favoured longer licences and a possible switch to indefinite duration, Industry Canada revised its position. In its statement on decisions, released March 2011, it recognizes the role of longer licence terms in facilitating investment, and asks for comments on its proposal to explore changes to legislation to support "*longer or indefinite licence terms*."[41]

Canada's spectrum manager cites a number of influences for its proposed change in approach. First, it states that all eight respondents on this issue "*were in agreement that a 10-year licence term is insufficient*".[42] In this regard, it is notable that the respondents represent a broad range of stakeholders from across Canada's mobile industry who often disagree on other issues. They included: the three national incumbent operators (Bell Mobility, Rogers and Telus), two established regional incumbents (MTS Allstream and SaskTel – the former being also a provider of business communication solutions nationwide), one newly established regional entrant (Bragg) and the CWTA, an industry body for the wireless industry. All respondents asked for licence terms of at least 15 years and ideally 20 years in duration. Two respondents (Bell Mobility and Bragg) went further in calling for indefinite licences, and no respondents seem to have opposed this.

There was full support from industry for the concept that licences be issued with a high expectation of renewal, but a number of respondents called for greater clarity on circumstances under which renewal might not be granted, and called for this expectation to be clarified in both the text of policy documents and conditions placed on spectrum licences. Two respondents also expressed concern about the lack of clear guidance with respect to expectation of renewal for previously renewed licences.

Secondly, Industry Canada highlights "extensive reviews" undertaken by other countries, "*such as Australia, the United Kingdom and the United States". It observes, a "common finding in these reviews is that traditional methods of spectrum management have often impeded access to spectrum and are slow to adapt to changes in technology and markets. As a result of the reviews, these countries are taking steps to evolve from a prescriptive style of spectrum management to an approach that embraces more flexibility and less regulatory intervention in the market, while retaining necessary regulatory powers to manage the spectrum effectively when required. Consequently, some countries are adopting longer licence terms, ranging from 10-year to indefinite.*"

In light of such evidence, Industry Canada concluded that licence terms in excess of ten years would provide greater incentives for the industry to invest in developing network infrastructure, technologies and related innovations. It also found that longer terms would be consistent with a modernized approach to spectrum management, and reduce administrative burden associated with licence renewal. In conclusion, it proposed to "*explore and consider changes to legislation, regulations, policies and frameworks that would confer the necessary powers to permit Industry Canada to move to longer or indefinite licence terms while maintaining the flexibility to deal with policy requirements and potential reallocation of*

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41 Industry Canada, Decisions on Revisions to the Framework for Spectrum Auctions in Canada and Other Related Issues, March 2011, p.5-6.

42 Ibid, p.5.

spectrum." It also proposed to make terms related to expectation of renewal more explicit and to apply annual licence fees to licences once the initial terms have expired.

4.3. New Zealand

Long licence terms and five-year notice of renewals

New Zealand was the first country in the world to introduce market reforms in spectrum management, introducing trading and liberalization for many frequency bands from 1997. Licences from this period onwards were allocated for 20 years, sufficient to provide great certainty over tenure for licence holders at the point of acquisition. However, no policy was initially adopted for licences approaching expiry. As licences matured, it became obvious that incentives for investment and trading may be undermined if action was not taken to address this oversight in policy. In particular, there was concern about the status of 800MHz and 900MHz cellular rights, which were due to expire in 2011.

Accordingly, in 2003, the Cabinet agreed to a policy for the allocation of commercial spectrum rights at expiry. It describes this as follows:

> *"Subject to a case-by-case review, replacement rights will be offered to existing rightholders five years before expiry to provide certainty for investment and to ensure a seamless transition from one term to another. If a rightholder does not accept the renewal offer, the rights will be auctioned. The policy requires the offer price to approximate the market value of the rights and produce a fair return to the Crown. The offer price will be determined using a methodology that is transparent and simple to administer."*[43]

The 800 MHz and 900 MHz bands were the test case for this new policy. The government ultimately approved the renewal of existing licences, for a further 20 years, subject to the reallocation of some spectrum to an entrant operator, and the introduction of a new approach for administratively assessing the market value of the spectrum bands (known as the optimised deprival valuation [incremental ODV] approach).

4.4. United States

10 year terms with de facto automatic renewal

In the United States, licences are only granted for terms of 10 years. However, there is a strong presumption of renewal, and the requirements that a licensee must meet in order to reasonably expect renewal are well defined. In general terms, a licensee must provide "substantial service" to its license service area no later than the end of its license term. "Substantial" service is defined as service which is sound, favourable, and substantially above a level of mediocre service which might minimally warrant renewal. Licensees that fail to meet this requirement will forfeit their licence and will not be eligible to regain it.

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[43] New Zealand Ministry of Economic Development website (http://www.med.govt.nz/).

For cellular licences, the requirements to prove substantial services are typically described in specific terms. For example, licensees in the Lower 700 MHz Band are expected to demonstrate the following:[44]

1. *"the construction of four permanent links per one million people in the licensed service area of a licensee that chooses to offer fixed, point-to-point services;*
2. *the demonstration of coverage for 20 percent of the population of the licensed service area of a licensee that chooses to offer fixed, point-to-multipoint services; and*
3. *the demonstration of coverage for 20 percent of the population of the licensed service area of a licensee that chooses to offer mobile services."*

So although the United States awards spectrum licences for only 10 years, the licence terms provide such a strong expectation of renewal that the regime may be characterised as similar to the indefinite licence terms in the United Kingdom which we discuss next.

4.5. United Kingdom

Indefinite licence terms which may be revoked for well defined reasons subject to 5-years notice

Particular attention has focused on the reforms made by UK regulator Ofcom, which uniquely has characterized its licence term regime as "indefinite". The term "indefinite" is somewhat misleading though. It does not imply, as some critics suggest, that spectrum is assigned indefinitely to an operator, with the implication that the spectrum manager surrenders its ability to reallocate the spectrum. In fact, UK cellular licences have a fixed term of 15 or 20 years, after which licences may be revoked for defined spectrum management reasons given 5-years notice (or less in exceptional circumstances). Ofcom states a number of reasons why it prefers indefinite terms,[45]

> *"In particular, the award of licences with an indefinite duration reduces the need for regulatory intervention to reassign spectrum at the end of the licence term. One disadvantage of fixed term licences is that at the end of the licence term the licence expires and so the rights to use it must be returned to the regulator, unless any other action has been taken. This may result in a period during which the spectrum remains unused, as the regulator must go through a process to reassign those rights. Furthermore, incentives to invest closer to the end of a licence term are significantly reduced given that communications networks generally require continual investment. This lack of investment could result in detriment to consumers and citizens. The alternative of licences with an indefinite duration removes the requirement for return to the regulator, removes the risk of discouraging investment and creates additional*

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[44] FCC website, http://wireless.fcc.gov/services/index.htm?job=licensing&id=lower700.

[45] *Consultation on assessment of future mobile competition and proposals for the award of 800 MHz and 2.6 GHz spectrum and related issues,* Ofcom, 22 March 201, Pg 74.

> *opportunities for the market to secure the efficient use of the spectrum, particularly in the presence of spectrum trading."*

And further that,

> *"We consider that, as a matter of principle, it is preferable to look to market mechanisms to promote the efficient use of resources rather than regulatory intervention, unless the case for such intervention is clear. In relation to our spectrum awards to date we have not identified a general need to recover spectrum at the end of the initial term."*

4.6. Conclusion

It is no coincidence that countries that have been at the forefront of spectrum management reforms, such as Australia, Canada, New Zealand, the United Kingdom and the United States, are also at the forefront of reforms to licence terms. Both Australia and Canada have implemented market reforms while maintaining fixed term licences (10-15 years) which expire with no right of renewal. However, in recent consultations, both regulators have expressed concern that this approach undermines incentives for investment, and indicate a desire to move to longer licences (possibly indefinite) that offer a strong expectation of renewal.

Particular attention has focused on the reforms made by UK regulator Ofcom, which uniquely has characterized its licence term regime as "indefinite". UK cellular licences have a fixed term of 15 or 20 years, after which they remain in force until revoked. Licences may be revoked for defined spectrum management reasons given 5-years notice (or less in exceptional circumstances). In practice, this is not so different from the New Zealand approach of 20-year licences, with provision for notice of renewal at least 5-years before expiry. Similarly, although the United States awards spectrum licences for only 10 years, the licence terms provide such a strong expectation of renewal that the regime may be characterised as similar to the United Kingdom.

These examples show, it is quite practical for the regulator to maintain powers to reclaim licences in defined circumstances, while at the same time giving operators the certainty they need to trade spectrum and invest in network build. There are a variety of ways this can be achieved but the key elements are a very high (and well defined) expectation of renewal and, ideally, at least five years notice of any potential revocation for spectrum management reasons.

5. Mobile Networks in Ireland

Spectrum licences in Ireland are currently for fixed terms with no renewal provision or expectation of renewal. In this context we discuss the level of competition in the Irish mobile market, the role of mobile broadband in Ireland, investment risks and incentives associated with rolling out 4G networks, and the static, dynamic and competitive benefits of moving to indefinite terms.

5.1. The Mobile Market in Ireland

Ireland has four mobile network operators (MNOs) and this compares well with other Member States in the European Union which usually have three to four operators.[46] An indication of the level of competition between MNOs in Ireland is the number of subscribers switching service providers. Almost two and half million mobile numbers were ported between Irish mobile operators since mobile number portability was launched in June 2003.[47] There is also a downward trend in the HHI index[48] calculated based on revenue market shares of the four Irish MNOs (Figure 5.1). Competition for customers is stronger in the mobile broadband market with shares more evenly distributed compared to overall market shares.[49]

In addition to competing with each other, MNOs also compete with mobile virtual network operators (MVNOs) like Tesco mobile and fixed network operators. There is increasing competition between fixed and mobile operators because these networks now provide similar services to end users – voice and internet access.[50] The mobile handset penetration level in Ireland is also high – as of March 2011 the mobile penetration rate in Ireland was 107.8% excluding mobile broadband.[51] This suggests that most people who want to subscribe to mobile services can do so.

The high level of penetration and competition (both between mobile operators and between fixed and mobile operators) suggest that the Irish mobile market is a mature market which should supply consumers a wide range of services at reasonable prices. Spectrum management policies like indefinite terms will encourage investment in existing and new services like next generation mobile broadband, and can therefore be adopted. In any case, as discussed in Section 3.1.4, indefinite terms should also promote competition (see Section 3.1.4). Furthermore safeguards such as limits on the amount of spectrum that can be

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[46] *Commission staff working document accompanying the Progress report on the Single European Electronic Communications Market (15th report)*, European Commission, 25 May 2010.

[47] *ComReg Document 11/40*, 26 May 2011, Pg 62.

[48] The standard HHI is calculated as $H = \sum_{i=1}^{n} s_i^2$ where s_i is the market share of each individual MNO.

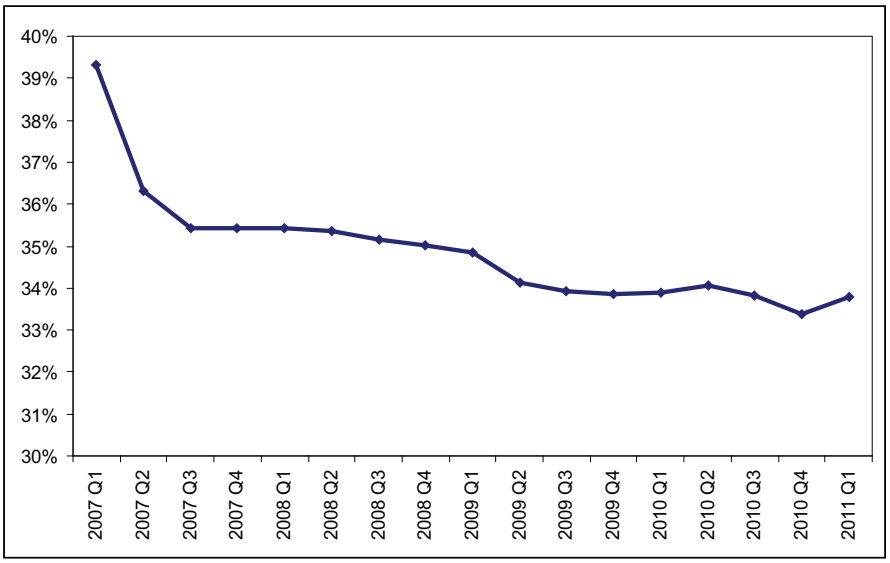
[49] The mobile broadband subscription market shares of the four MNOs in Q1 2011 were as follows: Three: 33.8%; O2: 28.8%; Vodafone: 27.2%; and Meteor: 10.2%. This compares to overall market shares in Q1 2011 of 6.5% for Three, 31.5% for O2, 42.3% for Vodafone, and 19.7% for Meteor (Source: *ComReg Document 11/40*, 26 May 2011).

[50] The development of faster mobile broadband networks like LTE is likely to further intensify the competition between fixed and mobile operators.

[51] The penetration level was 121% including mobile broadband (Source: *ComReg Document 11/44,* 21 June 2011, Pg. 51).

held by any one operator and ex-ante competition reviews of spectrum trading can be used to ensure a level playing field for all operators.

Figure 5.1
Evolution of HHI Index based on the Revenue Market Share of Four Irish MNOs



Source: ComReg Quarterly Key Data Reports – ComReg Documents 11/44, 10/43, 09/71, and 09/17, and NERA calculation.
Note: We have not used subscriber market shares to calculate the HHI index because subscriber numbers were revised by ComReg in November 2010 to reflect corrections made to Three's subscriber numbers. This means that the subscriber market share time series may not be consistent.

5.2. Mobile Broadband in Ireland

The importance of (high speed) broadband access for Ireland is recognised by both ComReg and DCENR which identifies high speed broadband services as being critical in attaining the Government's twin goals of becoming a 'Smart Economy' and a 'Knowledge Society'. [52] [53] Mobile broadband provides broadband access to many consumers in Ireland today, and it will play an important role in providing next generation broadband access to consumers.

Mobile broadband subscriptions have been growing in Ireland and accounted for 36.4% of all broadband subscriptions in Q1 2011. The contribution of mobile broadband to broadband growth is also higher than other technologies like DSL and Cable. In Q1 2011 45.2% of total broadband net additions were mobile. The relative importance of mobile broadband in Ireland compared to other EU countries is illustrated by the fact that, while Ireland's per capita fixed broadband penetration rate of 23.2% is lower than the EU27 average of 26.6%, the Irish per capita broadband penetration rate including mobile broadband (36.1%) is higher

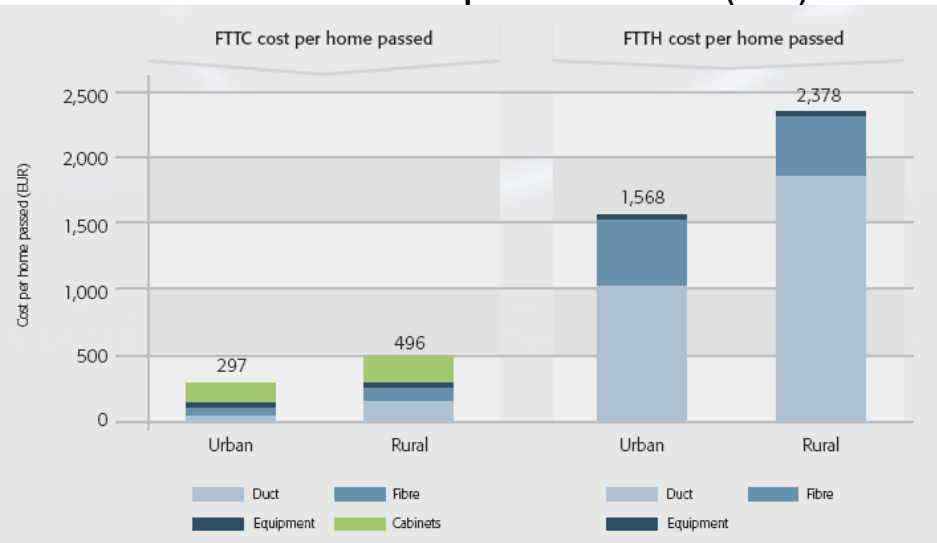
[52] DCENR: The Department of Communications, Energy, and Natural Resources.

[53] *ComReg Document 11/40*, 26 May 2011, Pg 8.

than the EU27 average (33.8%).[54] Mobile broadband in Ireland has also been instrumental, through the National Broadband Scheme, in providing broadband access in areas where it was previously not provided.[55] In some of these areas, in addition to providing broadband, mobile voice provides an alternative to fixed voice where no choice was available previously.

Given the low population density in Ireland,[56] next generation (4G) mobile networks will play an important role in providing fast broadband access to Irish consumers. In rural areas the business case for the rollout of next generation fixed broadband access is weak, and mobile broadband may be the more practicable solution. In urban areas it will provide an alternative to fixed networks, and this cross-platform competition will benefit consumers. Figure 5.2 presents estimated costs of rolling out next generation fixed broadband access in Ireland. For comparison the costs of rolling out BT's super fast broadband in the UK are about 50% less expensive than the costs of rolling out FTTC (Fibre to the Cabinet) in Ireland.[57]

Figure 5.2
Estimated FTTC and FTTH Costs per Home Passed (EUR) in Ireland



Source: Summary of Analysys Mason Report, TIF NGN Subgroup, February 2010.
Note: FTTC – Fibre to the Cabinet; FTTH – Fibre to the Home.

Next generation mobile broadband is cheaper to roll out than next generation fixed broadband because the latter requires extensive civil works to lay fibre in ducts to cabinets or to customer premises. Wireless networks like LTE do not require extensive civil works, and the cost of rolling out these networks is consequently lower in rural areas given the spectrum

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54 *ComReg Document 11/40*, 26 May 2011.

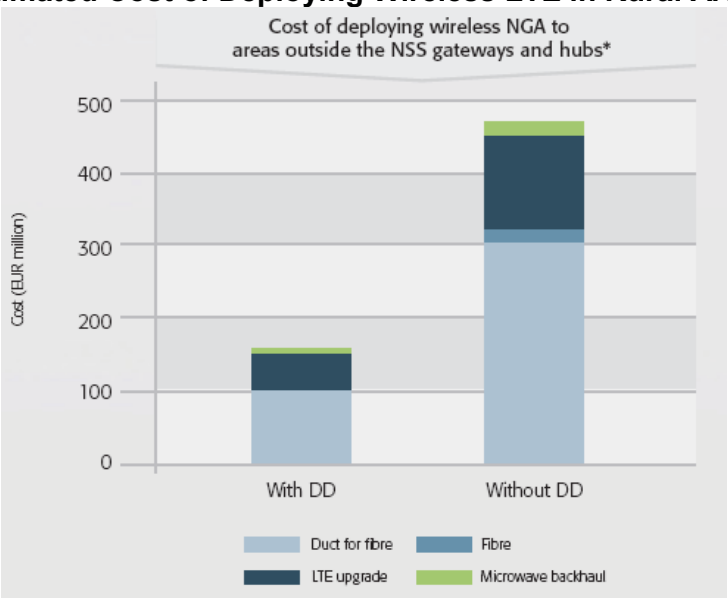
55 http://www.dcenr.gov.ie/Communications/.

56 In 2010, 38.38% of the population in Ireland lived in rural areas and the population density was less than 65 people per square kilometre. (Source: World Bank online database).

57 *Summary of Analysys Mason Report,* TIF NGN Subgroup, February 2010 attached to *Building a Next Generation Access Network for Ireland, Issues and Options*, A Report by the Telecommunication and Internet Federation (TIF), April 2010.

made available for mobile services through the digital dividend. Figure 5.3 presents the estimated costs of deploying wireless LTE in rural Ireland which can be used to provide high speed broadband services like high definition video and video conferencing.[58] [59]

Figure 5.3
Estimated Cost of Deploying Wireless LTE in Rural Areas



Source: Summary of Analysys Mason Report, TIF NGN Subgroup, February 2010.
Note: With DD – With Digital Dividend Spectrum; Without DD – Without Digital Dividend Spectrum.

5.3. Investment Incentives and Risks

Given the crucial role of mobile networks in providing current and next generation broadband access in Ireland, it is important that spectrum managers adopt policies that encourage continuous and sustainable investment in these networks. These investments will depend on a number of factors such as the upcoming spectrum auction in Ireland, and the spectrum each MNO wins in this auction. In any case, security of tenure provided by indefinite terms will result in strong incentives for operators to invest in their networks as explained in Section 3.2.1. Security of tenure is especially important given uncertain market and technological developments in the context of next generation broadband networks which means there are significant risks associated with investments in these networks. The European Commission notes the following in the context of next generation fixed access networks: [60]

> *"(i) uncertainty relating to retail and wholesale demand; (ii) uncertainty relating to the costs of deployment, civil engineering works and managerial execution; (iii)*

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[58] LTE based mobile broadband will provide download peak rates of at least 100 Mbps, and uplink rates of at least 50 Mbps (Source: *Review of the wholesale local access market,* OFCOM, 23 March 2010, Pg 21).

[59] *ComReg Document 11/28*, 12 April 2011, Pg15.

[60] *Commission Recommendation 2010/572/*EU, 20 September 2010, Annex 1.

> *uncertainty relating to technological progress; (iv) uncertainty relating to market dynamics and the evolving competitive situation, such as the degree of infrastructure-based and/or cable competition; and (v) macroeconomic uncertainty."*

Of these factors, uncertainty with regard to the level of retail demand, the willingness of consumers to pay for data access, technological progress, and the changing competitive landscape also affect MNOs investing in next generation 4G networks. These uncertainties mean that the time required to recover investments and earn a reasonable return on investments is uncertain, and there is a risk that this may take longer than expected. In addition macroeconomic uncertainty is particularly relevant to Ireland. As ComReg states[61],

> *"At the same time, Ireland is confronting an economic recession that may impact on the ability of operators to access capital markets, constrains consumer spending and, as a result, brings uncertainty regarding the financial returns potentially available on foot of investment in communications infrastructure."*

The value that retail consumers place on broadband connections will depend on the services that are available, not on the underlying technology used to deliver these services. Consumers who primarily use their broadband for surfing and checking emails will not place additional value on faster broadband connections. In addition it is not clear if and when new content and services like IP TV will become widely available in Ireland, and it is the development of new internet based services and content that will make it worthwhile for consumers to pay for faster broadband access. BEREC in a recent survey found that the actual take-up of NGA products in most Member States of the European Union falls significantly short of the coverage already achieved, and that customers may not be willing to pay higher prices for high speed broadband services as they can access the services they want using existing broadband connections.[62]

While consumers are not willing to pay more for data access, they are consuming increasing amounts of data, and there is a growing gap between the growth of mobile data volumes and revenues. Figure 5.4 illustrates the problem faced by UK mobile operators. Low consumer willingness-to-pay for data services means that it is likely to take longer to recoup investment made in deploying next generation mobile networks – how much longer is difficult to predict.[63]

Mobile networks will require continuous investment to cope with expected growth in traffic. Investment will be needed both for increased scale, for example deploying more backhaul and configuring more uplink capacity, and innovation, for example deploying more spectrum efficient network technology and network upgrades. In this context it is important to note

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[61] *ComReg Document 11/40*, 26 May 2011, Pg3.

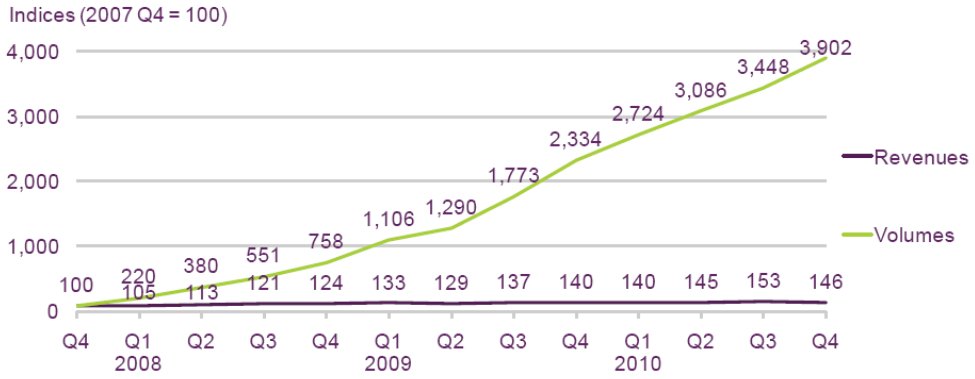
[62] *Next Generation Access – Collection of factual information and new issues of NGA roll-out*, BEREC, Feb 2011.

[63] At the same time revenues generated from traditional voice services are also being eroded with the increasing use of SMS, email, and VoIP services like Skype by consumers.

that the growth rate of traffic is uncertain,[64] and that mobile broadband is a developing technology.

Indefinite terms will allow MNOs the freedom to recoup their investments over a suitable time frame and not be constrained by the need to do so before a licence expires. It will also allow them to develop business and investment plans that take into account changing markets, services and technologies as explained in Section 3.2.1. This will mean more investment in mobile networks and better internet access for Irish consumers.

Figure 5.4
Mobile Data Volume and Revenue Growth in the UK



Source: Communications Market Report: UK, Ofcom, 4 August 2011, Pg 265.

5.4. Potential Benefits to Ireland from Adopting Indefinite Licence Terms

In this section we discuss the static, dynamic and competitive effects of moving to indefinite term spectrum licences (as defined in Section 2) in Ireland. It is assumed that these licences may be revoked subject to a five year notice period following an initial fixed term. We conclude based on our high level analysis below that the potential benefits could be in the region of €250m-€450m over a 15-year period.

5.4.1. Static Effects

As discussed in Sections 3.1.1 and 3.1.2 indefinite terms facilitate efficient allocation of spectrum because security of tenure helps in the development of active trading markets by removing market illiquidity associated with licence expiry. Spectrum is also less likely to be left unused. Efficient allocation and utilisation of spectrum will lead to efficiency gains when existing or new users make better use of spectrum. One way to estimate the gains in static efficiency is to use the following formula:[65]

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[64] The growth rate will depend on the development of new services, the adoption of new devices like smart phones and tablets, and the changing competitive landscape – both mobile and fixed.

[65] *Study on conditions and options in introducing secondary trading of radio spectrum in the European Community*, Analysys Consulting Ltd, DotEcon Ltd., and Hogan & Hartson LLP for the European Commission, May 2004, Exhibit 15.6.

Static efficiency gains = *No. of usage rights*

** (% of trades per annum with indefinite licences*

minus % of trades per annum with expiring licences)

** Value to new user minus value to previous user*

Based on this method we estimate that these static efficiency gains in Ireland could plausibly be of the order of = €23m-€41m million over a 15-year period. We explain how this estimate is derived below.

- No. of Usage Rights: We define the number of usage rights in 5MHz blocks instead of pairs of 5MHz blocks in order to include TDD spectrum in our calculations. We consider all spectrum currently available for mobile or likely to become available in the medium-term in Ireland. This amounts to 122 blocks:
  - 800MHz = 2x30MHz = 12 blocks of 5 MHz;
  - 900MHz = 2x35MHz = 14 blocks of 5 MHz;
  - 1800MHz = 2x75MHz =30 blocks of 5 MHz;
  - 2.1GHz (3G) = 2x60MHz + 20MHz TDD = 28 blocks of 5 MHz; and
  - 2.6GHz = 2x70MHz + 50MHz TDD = 38 blocks of 5 MHz.

  This is arguably a conservative estimate because it does not consider potential additional bands that might be made available for mobile in the future, such as new digital dividend spectrum at 700MHz.

- Volume of trading: A 2002 study for the European Commission assumed that up to 10% of all spectrum would be traded each year if spectrum usage rights are liberalised and tradable (it also recommended a UK-type approach to licence renewal).[66] However, experience from early adopters of trading suggests that volumes are rather lower for high-value bands, such as mobile, where there are smaller numbers of licensees. We therefore conservatively assume that an average of only 2% of blocks would be traded each year with indefinite licences (roughly 37 blocks every 15 years). Without indefinite licences, there would be a diminishing incentive to trade as the licence approached expiry. For simplicity, we suppose that for the first 5 years, 80% of trades would still happen, for the middle 5 years, 50% of trades would still happen, and for the final five years only 20% of

[66] *Study on conditions and options in introducing secondary trading of radio spectrum in the European Community*, Analysys Consulting Ltd, DotEcon Ltd., and Hogan & Hartson LLP for the European Commission, May 2004, Exhibit 15.4.

trades would still happen – which implies an average of 1% of block traded every year (roughly 18 every 15 years).[67]

- Current value of spectrum: As a proxy for the value of spectrum, we adopt the minimum price recommendations proposed by DotEcon to ComReg for the forthcoming mobile spectrum auction, which were based on a benchmarking exercise for international spectrum awards. DotEcon proposed a price of €18-26m for 2x5MHz of sub-1GHz spectrum and €8-16m for 2x5MHz of 1800MHz spectrum (which provides a proxy for all mobile spectrum above 1GHz).[68]
  Translating this into 5MHz blocks, this implies a total value for all 122 blocks of 5MHz of €0.618bn - €1.106bn (€234m-€338m for sub-1GHz[69] + €384m-€768m for spectrum above 1GHz[70]), which equals an average of approximately €5m-9m per block.

- We assume that in the case of trades, the spectrum will continue to be used to provide mobile services. An average gain in value of trade of 25% can be expected because of better and more efficient utilisation of spectrum. [71]

Accordingly, based on these assumptions, the gain in static efficiency can be calculated as:

[122 blocks] x [2% minus 1%] x [€5m-9m range in value] x 25%

= € 1.53m-€2.75m per annum static efficiency gains

This formula can be used to calculate the static efficiency gains in Ireland over a 15 year period as follows:

[122 blocks] x [1% x 15 years] x [[€5m-9m range in value] x 25%

= €23m-€41m.

5.4.2. Dynamic Effects

We would also expect substantial dynamic efficiency gains from more investment on the one hand, and earlier investment on the other leading to the rapid adoption and rollout of new services and technologies. This is because security of tenure will enable mobile operators to keep investing in their networks on a continuous basis as markets and technologies develop.

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[67] With indefinite terms we assume that the trading level will be 2% per year which is 10% over a five year period. With fixed terms we assume that 80 % of trades go ahead in the first five years (80% of 10%), 50 % of trades go ahead in the middle five years (50% of 10%), and 20 % of trades go ahead in the final five years (20% of 10%). This means that with a 15 year fixed term the level of trading is 15% which is an average of 1% per year.

[68] Source: *ComReg Document 10/105a*, December 2010, pp.40-61.

[69] 26 blocks of sub-1GHz spectrum multiplied by €9-13m (the value of 5MHz sub-1GHz spectrum based on minimum price recommendations proposed by DotEcon to ComReg).

[70] 96 blocks of spectrum above 1GHz multiplied by €4-8m (the value of 5MHz spectrum above 1GHz based on minimum price recommendations proposed by DotEcon to ComReg).

[71] 25% is the minimum difference in valuation between buyers and sellers sufficient to stimulate a trade if the buyer and seller have imperfect information about each other's true valuation (Source: Myerson R.B. and Satterthwaite M.A., Efficient Mechanisms for Bilateral Trading, Journal of Economic Theory, 29 (1983)).

So when more spectrum efficient network technology, network upgrades or new technologies become available, operators can invest in these technologies and roll out better and new services without the risk that their licence may not be renewed and that they do not have enough time to recover their investment and make a reasonable profit (see Section 3.2.1). At the same time indefinite terms should lead to an efficient spectrum trading market which should emphasize the opportunity cost of not making investments, and stimulate investment by operators. As discussed in Sections 5.2 and 5.3 this will mean better high speed broadband access for Irish consumers which will be critical in attaining the Government's twin goals of becoming a 'Smart Economy' and a 'Knowledge Society'.

An example of the rapid introduction of a new service via spectrum trading (through mergers) and liberalisation is the introduction of mobile broadband data networks in the US. By 2006 the US was served by three mobile broadband data networks though no 3G licences had been distributed as yet.[72] It should be noted that in addition to liberalisation and trading, licence terms in the US provide such a strong expectation of renewal that the regime may be characterised as similar to indefinite licence terms (see Section 4.4).

Dynamic efficiency gains, whether resulting from trading or investment from existing operators, normally substantially outweigh static efficiency gains if they realise earlier adoption of valuable services by consumers, especially if the services represent significant improvements on previous ones. For example, Hausmann estimates that the total cumulative cost of regulatory delays in making spectrum available for mobile network operators in the USA in the 1980-1990s was around USD100bn.[73] Further, an Analysys Mason study for the European Commission estimating Europe-wide benefits from trading and liberalisation, estimated dynamic efficiency gains to exceed static gains by a ratio of approximately 200:1.[74] Of these, approximately 20% of gains were associated with smaller scale innovations which include improvements in existing services by employing new technology rather than entirely new innovations.

We have not attempted a detailed model of the impact on consumer surplus of indefinite licences leading to earlier adoption of new mobile services for this study. However, as a simple proxy, if we use the Analysys Mason ratio of dynamic to static gains, but assume that trades only realised smaller scale innovations and that only one in four trades realised such benefits, this would still imply dynamic efficiency gains of €230-€410m over a 15-year period. This should be an underestimate of the gains because in practice we may expect even greater dynamic efficiency gains from earlier investments by existing operators, whether or not there are spectrum trades.

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[72] *Hazlett, Thomas W., Spectrum policy and competition in mobile services* in Making Broadband Accessible For All, Vodafone Policy Paper Series, Number 12, May 2011.

[73] Hausman, JA, Valuing the effect of regulation on new services in telecommunications (1997), Brookings Papers on Economic Activity, Microeconomics, p.2.

[74] *Study on conditions and options in introducing secondary trading of radio spectrum in the European Community*, Analysys Consulting Ltd, DotEcon Ltd., and Hogan & Hartson LLP for the European Commission, May 2004, chap 15 Exhibit 15.7 and 15.13.

5.4.3. Competitive Effects

It is not clear that competition in the market will be adversely affected if indefinite term licences are issued. In fact indefinite terms accompanied by other policy tools, where necessary, may promote competition.

As discussed in Section 3.1.4, indefinite terms provide greater security of tenure which should facilitate entry at any time during the term of the licence. This should lead to more competition as the market will be contestable to a greater degree than under fixed term licences when entry is only likely to take place at the end of the licence term. There is a risk that one operator acquires a disproportionate amount of spectrum via trading and then hoards this spectrum to preclude market entry and gain a competitive advantage, and/or that the secondary spectrum trading market for strategically important mobile spectrum (for example sub-1 GHz spectrum bands) is inefficient. This may be because given the competitive advantage of holding such spectrum incumbents may be reluctant to sell any spectrum they hold in these bands. In such cases additional regulatory tools such as limits on the amount of spectrum that can be held by any operator at any time and ex-ante competition reviews of spectrum trading which might adversely affect downstream competition may be required.

There is also a pan-European dimension to spectrum trading and licensing. Potential new entrants could consider entry into multiple markets simultaneously, and realise economies of scale in production and marketing. It is likely to be easier to implement such a strategy by acquiring indefinite term spectrum usage rights from the market rather than waiting for fixed term licences to expire in different countries and/or wait for spectrum managers in these countries to release new spectrum. It is also unlikely that fixed term licences in different countries will expire simultaneously.

Finally as mentioned earlier there is increasing competition between fixed and mobile operators because these networks provide the same services to end users – voice and data. Fixed operator licences in Europe are usually for an indefinite term which means fixed operators can continually invest in their networks without the risk that their licences may not be renewed. Indefinite term spectrum licences will put mobile operators on an equal footing and allow them to compete better with fixed operators. This should increase inter-modal competition to the benefit of consumers.

6. Conclusions and Recommendations

We find that the current approach in Ireland of fixed term licences with no renewal option is inconsistent with ComReg's core objective of encouraging efficient use of spectrum. A shift to an indefinite licence regime would provide stronger incentives for investment and for spectrum trading. The potential benefits from reform are particularly great in the case of the mobile sector.

Indefinite licence terms are better suited to meet the relevant objectives of a spectrum manager, provide incentives for efficient utilisation of scarce spectrum, and promote competition and investment which should benefit consumers as well. For incumbent licensees, indefinite terms provide the advantage of security of tenure. This means that they can invest in their networks continually as markets and technologies develop without being constrained by potential licence expiry. Potential new licensees, once they enter the market, will typically have the same interests as incumbent licensees. It is far from clear whether shifting to indefinite licences would really constrain opportunities for entrants; in fact, it may significantly increase scope for entry.

Consumers are also likely to be better off with indefinite term licences. This is because indefinite terms may increase the scope for entry and make the market more contestable, and competitive. The increased contestability and competition may result from the actual new entry and/or the discipline of potential entry occurring at any time during the lifetime of a licence, as opposed to only at the end of a licence term. Increased competitive pressure and security of tenure will create incentives for operators to invest adequately to meet growing traffic demand, to expand their network footprint and roll-out new services like mobile broadband more extensively. Higher investments will mean better services for consumers.

There is a risk that one operator acquires a disproportionate amount of spectrum via trading and then hoards this spectrum to preclude market entry and gain a competitive advantage, and/or that the secondary spectrum trading market for strategically important mobile spectrum (for example sub-1 GHz spectrum bands) is inefficient. In such cases additional regulatory tools such as limits on the amount of spectrum that can be held by any one operator at any time and ex-ante competition reviews of spectrum trading which might adversely affect downstream competition may be required.

Finally, there will be static and dynamic benefits for Ireland if a policy of indefinite terms is adopted. Efficient allocation and utilisation of spectrum will lead to efficiency gains when existing or new users make better use of spectrum resulting from trades of licences that would not have occurred without a shift to indefinite licences. In addition to static efficiency gains there will also be dynamic efficiency gains from more investment on the one hand, and earlier investment on the other, leading to the rapid adoption and rollout of new services and technologies. We estimate that these static and dynamic efficiency gains in Ireland could plausibly be of the order of €250 million to €450 million over a 15 year period.

Countries that have been at the forefront of spectrum management reforms, such as Australia, Canada, New Zealand, the United Kingdom and the United States, are also at the forefront of reforms to licence terms. The experience from these countries shows that it is quite practical

for the regulator to maintain powers to reclaim licences in defined circumstances, while at the same time giving operators the certainty they need to trade spectrum and invest in network build. There are a variety of ways this can be achieved but the key elements are a very high (and well defined) expectation of renewal and, ideally, at least five years notice of any potential revocation for spectrum management reasons.

NERA Economic Consulting
15 Stratford Place
London W1C 1BE
United Kingdom
Tel: +44 20 7659 8500
Fax: +44 20 7659 8501
www.nera.com

NERA UK Limited, registered in England and Wales, No 3974527
Registered Office: 15 Stratford Place, London W1C 1BE

10. Eircom Group – received 14 October 2011
    a. Supplemental submission received 18 October 2011
    b. Spreadsheets referred to in Eircom Group's submission of 14 October submitted on 15 November 2011.

eircom Group

Response to ComReg Consultation Paper:

Response to Consultation and Draft Decision – Multi-Band Spectrum Release
Release of the 800 MHz, 900 MHz and 1800 MHz spectrum bands

ComReg Document 11/60

14 October 2011

DOCUMENT CONTROL

Document name	eircom Group response to ComReg Consultation Paper 11/60
Document Owner	eircom Group
Last updated	*14/10/2011*
Status	Final

The comments submitted to this consultation are those of Meteor Mobile Communications Ltd. (MMC) and eircom Ltd (eircom) collectively referred to as eircom Group.

Please note that for the purposes of the Freedom of Information Acts, 1997 and 2003, and indeed generally, information supplied by eircom/meteor to you may contain commercially sensitive information consisting of financial, commercial, technical or other information whose disclosure to a third party could result in financial loss to eircom/meteor, or could prejudice the competitive position of eircom/meteor in the conduct of its business, or could otherwise prejudice the conduct or outcome of contractual or other negotiations to which eircom/meteor is a party.

Accordingly, you are requested to contact a member of eircom Group's Regulatory Operations where there is a request by any party to have access to records which may contain any of the information herein, and not to furnish any information before eircom/MMC has had an opportunity to consider the matter.

EXECUTIVE SUMMARY

- eircom Group is of the view that ComReg's proposed manner to address expiry of the existing GSM licences is disproportionate and while we offer comments on detailed elements of ComReg's proposed award process our position is reserved accordingly.

- A number of material deficiencies persist in the draft Decision and draft licence conditions which must be addressed. Our detailed response details all matters which in our view need to be addressed including some suggested drafting amendments. The most significant of these matters include the following:

- Of particular concern is the risk to long term competition arising from:
  - ComReg's proposal to set a high total spectrum cap. Such a cap could result in extremely asymmetric outcomes with a detrimental impact on competition and ComReg has not provided any analysis as to how this will be avoided
  - ComReg's proposal to set high minimum fees, particularly in respect of 1800MHz that creates a significant risk of an inefficient result from the proposed award process
  - ComReg's proposal to set finite licence durations creating significant uncertainty and undermining the incentive to invest in the latter years of the licence

- A continuing lack of clarity undermines the ability of potential bidders to form a view on the value of the spectrum to be awarded. To the maximum extent possible ComReg must provide clarity on the following matters including as a matter of priority:
  - The timing of availability of the 2.6GHz band and the manner in which the spectrum will be awarded bearing in mind that the MMDS licences (using the 2.6 GHz band) are actually due to expire in 2012 for Dublin, Galway and Waterford regions
  - ComReg's position in respect of spectrum trading and spectrum pooling must be clearly articulated establishing high level principles
  - A licensing scheme is required for fixed terminal stations in rural areas
  - The liability, if any, of licensees should issues arise in respect of the co-existence of the 800MHz band and the 490-790MHz Broadcasting Band
  - Coverage compliance metrics must be clarified as the proposed Electric Field Strength per MHz figures are unrealistically high.

- In light of the Network Share Arrangement (NSA) entered into between Meteor Mobile Communications Ltd and Telefonica O2 Ireland Ltd since the last consultation appropriate measures should be incorporated to facilitate adjacent spectrum assignments for NSA partners in the interest of maximising the efficient use of spectrum.

- We would also welcome clarification in respect of potentially discriminatory constraints on eircom Group's options in the proposed assignment phase.

- Finally, we request ComReg to establish, publish and maintain a high level project plan clearly identifying key activities and milestones towards its proposed spectrum award process.

INTRODUCTION

eircom Group welcomes the opportunity to comment on ComReg's draft Decision. Our submission comprises three parts. Part 1 addresses the draft Decision instrument and considers the issues in the order in which they appear. Part 2 addresses the proposed licence obligations in the same manner. Part 3 addresses additional matters relevant to the draft Information Memorandum.

It should be noted from the outset that we remain of the view that ComReg's proposed manner to address expiry of the existing GSM licences is disproportionate and while we offer comments on detailed elements of ComReg's proposed award process our position is reserved accordingly.

Process – High level project plan

Before addressing the substance of ComReg's proposals we feel obliged to highlight our concerns regarding the absence of any timetable (indicative or otherwise) setting out the key activities and timelines that would be required to complete ComReg's proposed award process. eircom Group and other interested parties have made a number of requests for greater clarity in this regard and to date ComReg has declined to provide such clarity.

It is extremely disappointing that all that is said in respect of timescales in the material presented by ComReg is[1] "*This document contains ComReg's refined and detailed proposals for assigning spectrum in these bands by means of a multi-band spectrum auction, which is expected to occur within the next 4-6 months". "ComReg*[2] *remains very conscious of the desirability of completing this spectrum award process in a timely fashion, and it remains ComReg's intention to complete by year-end the proposed competitive process for the selection of parties to whom rights of use for the radio frequencies concerned are to be granted. However, ComReg notes that this is a relatively challenging timescale for all concerned and further that it cannot commit to this timetable, nor give precise dates for intervening publications, in advance of receiving and analysing submissions now invited to this consultation."*

ComReg's proposed award process is complex. The burden of preparatory requirements for interested parties and indeed ComReg are substantial and require proper planning. It is standard best practice for any major project, such as that proposed by ComReg, to maintain a high level project plan setting out major activities, the anticipated duration of such activities and anticipated milestone dates. It is recognised that project timelines may be impacted by unforeseen events or delays and as such it is accepted practice that high level project plans are regularly reviewed and updated as circumstances dictate. We request ComReg to establish, publish and maintain a high level project plan. We can see no objective reason why ComReg should not proceed in this manner.

[1] ComReg 11/60, Paragraph 1.1

[2] ComReg 11/60, Paragraph 9.13

PART 1: Comments on Draft Decision

Section 1

The draft Decision defines a "New Entrant" as a person who is not an Existing GSM licensee. This defined term is not used anywhere in the draft Decision and should therefore be deleted.

Section 2

Regarding ComReg's assessment of the facts and its draft Regulatory Impact Assessment, we note ComReg's apparent criticism that eircom Group continues to reject the manner in which ComReg proposes to address licence expiry "*without any additional and up to date explanation as to why such an administrative assignment would be justifiable or necessary.*"[3] eircom Group has presented its detailed views on these matters during the consultation process, most recently in response to ComReg 09/99. Subsequent to that consultation, ComReg has published three further consultations (ComReg 10/71, ComReg 10/105 and ComReg 11/11), none of which expressed ComReg's position following consideration of the responses to its consultation, ComReg 09/99. It is only now, a year and a half after our response to ComReg 09/99 that ComReg has set out its position in respect to the material presented to it in submissions to that consultation. The facts presented to ComReg in our submission to ComReg 09/99 are as relevant today as when first presented and it is disappointing that ComReg seeks to diminish the validity of our position by the passage of time when such passage of time has wholly been at the control of ComReg.

In the draft Decision ComReg seeks to justify a draconian treatment of existing GSM licensees by reference to a qualitative and somewhat subjective Regulatory Impact Assessment. We do not agree with ComReg's assessment. In particular, we remain firmly of the view that Meteor Mobile Communications Ltd enjoys an enforceable legal right to 900 MHz licence extension. The amendments brought by ComReg to the auction process do not address the fact that not meeting the legitimate expectations of mobile licensees puts existing and future investments at risk, thereby endangering competition in the mobile market. eircom Group's, and Meteor Mobile Communications Ltd's rights in particular, are in this regard fully reserved and the positions expressed below are without prejudice to this.

Section 3.1

We look forward to sight of draft Preparatory Licence Regulations and associated licence conditions, and the Liberalised-Use Licence Regulations.

Broader Spectrum Framework

eircom Group and a number of other respondents have highlighted the merits and need for greater flexibility to be introduced in mobile licences. It is in particular essential that licences allow for spectrum trading, spectrum pooling and that their duration is set so as to maximise investment

[3] ComReg11/60a, paragraph A 3.130

incentives. ComReg sets out its view on these 'broader spectrum framework' issues at paragraph 1.12 and Annex 10.3 to the draft Decision.

As ComReg will be aware the Next Generation Broadband Taskforce Spectrum Policy Working Group was established by the Minister for Communications, Energy and Natural Resources in June 2011 and has met on a number of occasions to discuss how national spectrum policy should evolve to enable the roll-out of bigger broadband to more places as soon as possible. The Working group is chaired by DCENR with representatives from all major communications providers utilising spectrum. The Spectrum Policy Working Group has identified licence duration / investment incentives, spectrum trading and spectrum pooling as important policy areas and would welcome discussions with ComReg on these issues.

We are of the view that the perhaps understandable reluctance for key stakeholders, in particular ComReg, to engage either bi-laterally or at an industry level during the ongoing consultations should be reconsidered. ComReg has, since 2008, declined to participate in any spectrum policy debate with key stakeholders other than by way of written submissions. We feel this is sub-optimal in terms of forging a long-term sustainable policy solution for the industry and we believe that such stakeholder engagement (on policy formulation rather than policy implementation) can happen with appropriate safeguards to protect ComReg's statutory independence and the integrity of the consultation process.

We agree with the broad based consensus within the Spectrum policy working Group on the need for certainty of length of licence in the context of maximising investment incentives and the need to formally provide for Spectrum Trading, Sharing and Pooling in the terms and conditions of the proposed licences.

Spectrum Trading: we welcome ComReg's acknowledgement that trading of spectrum will be permitted in the 800MHz, 900MHz, and 1800MHz bands. However we also note ComReg's statement[4] when discussing spectrum caps that "*For the avoidance of doubt: the foregoing statement does not indicate that any particular rights of use of spectrum will or should be designated as tradable*." This creates uncertainty as to whether the rights of use issued following the proposed award process will in fact be tradable. We further note ComReg's intention that it "*will set out separately its modality on this matter* [spectrum trading] *in due course.*"[5] We acknowledge that further consultation will be required to establish specific conditions and procedures to support a trading regime but we can see no objective reason why ComReg cannot establish in advance of the proposed award process that the licences will be tradable in principle. In order for interested parties to be in an informed position to determine their level of interest and the value associated with that interest in the proposed new spectrum licences we believe that the Liberalised-Use Licence Regulations should clearly establish that:

- The licences to be issued under the Regulations will be tradable

[4] Paragraph A6.85, ComReg 11/60a

[5] Paragraph 1.12, Comreg 11/60

- A clear date will be set (eircom Group suggests no later than the date of commencement of the first licences to be issued under the Regulations) by which a proportionate regime with associated conditions and procedures will be established
- Licensees may request insertion of the trading conditions at any time during the currency of the licence. There will be no upward adjustment to licence fees.

Spectrum pooling: As highlighted in our previous submissions and recognised in the Spectrum Policy Working Group, the need to provide for spectrum pooling is particularly required to allow industry put its best foot forward in trying to meet the need for Broadband in Rural areas using wireless technologies. We welcome ComReg's confirmation that it "*has been careful not to include restrictions in the licences that would inhibit such sharing after the award process*"[6]. We believe ComReg's position is consistent with our own that no legislative changes are required to the Wireless Telegraphy Act regime to facilitate pooling initiatives. Again in the interest of ensuring fully informed participants in the proposed award process we believe that the existence of a right to pool spectrum must be explicitly stated in the Liberalised-Use Licence Regulations.

While we understand that spectrum pooling may potentially give rise to competition law issues, we do not believe that this constitutes a legitimate obstacle to including within the licence conditions the right to pool and/or share spectrum. A blanket requirement for competition approval creates an unnecessary degree of uncertainty as to when operators can co-operate in respect of the provision of rural broadband. We believe that existing competition laws, including in particular the merger control provisions of the Competition Act, 2001 and sections 4-5 of the Competition Act as well as Articles 101 and 102 TFEU are sufficient to address this issue. This is consistent with proposals being considered within the Next Generation Broadband Taskforce by the Target Setting Group. In particular, one approach that is being considered in relation to spectrum pooling is to limit it in practice where it is required to address parts of the market where likely market failure is predicted.

We welcome in this context ComReg's view[7] that the proposed 70% demographic coverage proposed level "*is without prejudice to the possibility of legitimate operator co-operation (such as network sharing) arising in the future which would appear, in principle, to be a more efficient means of serving sparsely populated areas. So long as there remains competition between networks, such co-operation allows operators to minimise their costs and avoid any inefficient infrastructure duplication.*"

Licence duration: In its discussion of licence duration[8] ComReg notes that it has consulted separately on indefinite licence duration in ComReg 11/28[9]. In the draft Decision material ComReg notes the various considerations it sought views on in ComReg 11/28 and concludes: "*Consultation 11/28 sought feedback and empirical evidence on the issue of licence duration and trading. ComReg has received a number of responses to this consultation and ComReg will issue its Response to Consultation in due course providing further views on the issue of indefinite licences. For the purpose of this document and in relation to the 800 MHz, 900 MHz and 1800 MHz award*

[6] Paragraph A 10.52, ComReg 11/60a

[7] Paragraph A 8.62, ComReg 11/60a

[8] Paragraphs A 10.53 – A 10.61

[9] ComReg's proposed strategy for managing the radio spectrum 2011-2013

process, ComReg remains of the view that the licence duration for the time-slices proposed are appropriate, and does not envisage making any change to the current approach based on a definitive time-based expiry."

We do not understand how ComReg can reasonably state such a conclusion without setting out its analysis of the evidence received in response to ComReg 11/28. It has been recognised in the Spectrum Policy Working Group that a key policy issue is how best to incentivise continuous investment. ComReg maintains[10] that "*On 12 July 2030, the end date of the second time slice, all 800 MHz, 900 MHz and 1800 MHz licences granted under the proposed joint auction shall expire and all spectrum rights of use granted thereunder shall cease to exist and such licences shall not be renewed or extended in the case of any licensee. ComReg, or its successors, reserves the right to administer the entire spectrum that shall be released upon that date, at its absolute discretion and subject to its statutory remit.*" This approach fails to promote continuous investment. What will be the incentive for licensees to continue to invest in their networks in the final years before licence expiry? This period is likely to be at least five years taking into account equipment life cyle and return on investment requirements. Potential participants in the award process require clarity in regard to this significant issue.

We are unable to comment further in the absence of sight of ComReg's reasoning. ComReg's reasoning (in its response to ComReg 11/28) must be made available to interested parties. We reserve the right to make further representations.

Section 3.2

No comment.

Section 3.3

The following comments in respect of section 3.3 of the draft Decision are without prejudice to our fundamental position that any solution requiring compulsory release of spectrum by existing licensees and an auction for the assignment of spectrum in the 900 MHz and 1800MHz bands based on arbitrary licence expiry dates that bear no relationship to the ongoing efficient use of the spectrum, would be unreasonable, disproportionate, and discriminatory and run contrary to the obligations of ComReg as set out in section 12 of the Communications Regulation Act, 2002 as amended to encourage efficient investment in infrastructure and promote innovation and to encourage the efficient use of radio frequencies.

Section 3.3.1

eircom Group agrees in principle with the proposal for two temporal lots. We note that it "*is currently intended*" for Temporal Lot 1 to commence on 1 February 2013. We strongly believe that the terms of the award process must be clearly defined in unambiguous terms. As such the text "*which is currently intended to commence on*" should be deleted and replaced with "*From*". If this is not possible due to uncertainty in particular regarding the achievement of analogue switch-off

[10] Paragraph 4.92, ComReg 11/60

(ASO) deadlines, then ComReg must clearly specify how Eligible Bidders will be compensated for any delay in access to the 800MHz spectrum. In our view impacted Eligible Bidders should be refunded the Spectrum Access Fee pro rata for the period of delay relative to the Temporal lot 1 time period.

Section 3.3.2

eircom Group agrees in principle with the high level design proposal of multiple combinatorial clock rounds subject to detailed activity rules yet to be published for review by interested parties. We reserve the right to alter our expressed view should the detailed rules be found to be deficient in any respect.

Section 3.3.2 states that the multiple combinatorial clock rounds phase will continue until supply exceeds demand. It is our understanding that this phase can also cease when demand equals supply. As such section 3.3.2 should be amended to read "*.., until supply exceeds or is equal to demand at the round price.*"

Section 3.3.3

eircom Group agrees in principle with the high level design proposal of a single, sealed bid supplemental round following the combinatorial clock rounds. We further agree in principle with the proposal that a second price rule will be applied to calculate prices payable by winner in the auction. We note these high level design proposals are subject to detailed rules yet to be published for review by interested parties. In particular we await sight of the algorithm "*which will allow a bidder who had won lots in the combinatorial clock rounds, to calculate the minimum price that it would need to bid to be guaranteed to win those lots in the supplemental round.*" We reserve the right to alter our expressed view should the detailed rules be found to be deficient in any respect.

Section 3.3.4

eircom Group agrees in principle with the high level design proposal of an assignment round. We discuss further the proposed high level mechanics of the assignment round in our comments on Sections 3.3.5 and 3.3.11 below.

Section 3.3.5

We recognise the merits in seeking to promote contiguous spectrum assignments across temporal lots. However we do not believe this should be limited to consider only the spectrum assignments won by Eligible Bidders. An Eligible Bidder is defined in section 3.3 as "*those to whom Liberalised-Use Licences and rights of use will be granted.*" The construction of section 3.3.5 appears to unfairly exclude un-liberalised assignments (the spectrum assignments existing during Temporal Lot 1 where an Existing GSM Licensee with GSM rights of use which are intended to continue after the proposed commencement date for Temporal Lot 1 chose not to or was unsuccessful in exercising the Early Liberalisation Option). The Existing GSM Licensee would also be an Eligible Bidder if it won spectrum in Temporal Lot 2. However the constraint proposed in section 3.3.5 only

applies to liberalised spectrum won across the Temporal Lots. We can see no objective reason why un-liberalised assignments should be excluded in this manner. By way of illustration if an Existing GSM Licensee in the 1800MHz band exited the award process with 2x14.4MHz of unliberalised spectrum in Temporal Lot 1, effectively occupying three lots in the band, and won three lots of liberalised spectrum in Temporal Lot 2, there is clearly a justifiable case for the assignment round to facilitate a contiguous holding of three blocks across the Temporal Lots.

In order to eliminate unfair discrimination against Existing GSM Licensees section 3.3.5 should be amended as follows: "*...for Eligible Bidders ~~winning~~ with rights to ~~the same amount~~ equivalent quantities of spectrum ~~rights~~ blocks in Temporal Lot 1 and 2....*"

Accommodating Network Sharing in the Assignment Phase

We would like to draw ComReg's attention to an issue that has not previously been raised regarding maximising the efficient use of spectrum, consistent with ComReg's statutory objectives, in the context of network sharing activities. Initiatives to share physical transmission equipment by mobile operators to support logically distinct Radio Access Networks are now a reality in Ireland in light of the Network Share Arrangement (NSA) entered into between Meteor Mobile Communications Ltd and Telefonica O2 Ireland Ltd. We believe that the award process should facilitate network sharing participants to acquire adjacent spectrum holdings within the bands in question in order to maximise the efficiency of the network sharing arrangement and the efficient use of the spectrum due to certain limitations[11]. We submit at Appendix 1 to this response, an expert report prepared for us by Power Auctions LLC which explores mechanisms to accommodate network sharing agreements in the assignment stage of the proposed award process. Power Auctions identify four potential mechanisms, any of which can be incorporated in the design of the proposed award process in a straightforward manner. We submit that any one of these mechanisms will enhance the efficiency of spectrum allocation and must accordingly be incorporated within the design of the award process.

Clause 3.3.6

eircom Group would agree in principle with allowing the possibility of earlier commencement of a 900MHz Liberalised-Use Licence in respect of Blocks A and B or Block A depending on the relevant circumstances post award, provided it is not done in a manner that is prejudicial to eircom Group.

However there appears to be a risk that ComReg will constrain eircom Group's options in the full assignment round if we choose not to or fail to acquire Liberalised-Use Licences in the 900MHz band in Temporal Lot 1. Dotecon states in its report[12] "*As an aside, we note that ComReg has proposed as part of its proposals for allowing the advanced commencement of liberalised licences for at least some 900MHz spectrum that where Meteor were not to liberalise any of its existing*

[11] [redacted] The constraint is due to the instantaneous bandwidth (IBW) supported by the LTE radio Unit. This is the bandwidth over which the Radio Unit is transmitting. While an LTE Radio Unit can operate in any portion of the 790 – 860 Mhz band, the typical IBW supported is 20 MHz. For an efficient network sharing arrangement, this IBW drives the requirement for adjacent spectrum allocations.

[12] Paragraph 399, ComReg 11/58

900MHz spectrum holdings in the first time slice, it would not be permitted to bid on the two lowermost lots in the band, that is, those lots currently unassigned, as it would not have a liberalised licence in the 900MHz band. If this proposal is adopted, this (and any similar) constraints on assignment options would be implemented through the winner and price determination algorithm for determining the outcome run after bids have been submitted and the assignment round has closed." This is far from an aside. We have reviewed the draft Decision and have not identified any such ComReg proposal to constrain eircom Group in the manner suggested by Dotecon. As such it is not at all clear to us whether ComReg intends to propose to constrain eircom Group's options in the full assignment round or not. For the avoidance of doubt we do not consider such a constraint acceptable. The full assignment round will determine band positions in both temporal lots, subject to constraints to ensure contiguous assignments across Temporal Lots 1 and 2. If eircom Group is precluded from bidding for blocks A and B in Temporal Lot 1 it will be precluded from blocks A and B in the Temporal Lot 2. In contrast, any other bidder in the full assignment round may bid for blocks A and B irrespective of whether they wish to avail of the early commencement option. Such treatment of eircom Group, if proposed, is entirely discriminatory and unjustified.

At least one of the blocks will be required to facilitate any relocation activities within the band. Depending on when the award process is completed, in turn informing the period for relocation activities to be completed, and the extent of the relocation activities, there may be a requirement for both blocks A and B to facilitate relocation activities. As such we do not believe it can unequivocally be stated that Block A could be made available immediately following completion of the award process.[13] Such matters can only be determined when all the facts are known following completion of the award process.
More generally, chapter 7 of ComReg 11/60 sets out a number of factors that will need to be considered. The manner in which these factors will be considered should be clearly set out in the Information Memorandum.

Section 3.3.7

eircom Group has no principled objection to the possibility of Liberalised-Use Licence(s) commencing earlier in the 1800MHz band provided that:

- It is not done so in a manner discriminatory to eircom Group (for example constraining our options in the assignment round).
- Sufficient spectrum is made available to ensure timely completion of any relocation activities within the band.
- A decision is taken on the merits once all facts are known when the proposed award process is concluded.
- All relevant factors are clearly set out in the Information Memorandum.

[13] Paragraph 7.27, ComReg 11/60

Section 3.3.8

eircom Group would agree in principle with the Early Liberalisation Option as set out in section 3.3.8 of the draft Decision. We request that paragraph 3.3.8 be amended to more accurately reflect what is proposed[14] as follows: "*the ability for an Existing GSM Licensee with GSM rights of use which are intended to continue after the proposed commencement date for Temporal Lot 1 to relinquish its existing GSM 900 MHz and/or 1800 MHz spectrum rights or part thereof contingent on it winning at least the same quantum of liberalised 900 MHz and/or 1800 MHz spectrum rights in the same Time Slice ("Early Liberalisation Option"). Where such an Existing GSM Licensee availed of the Early Liberalisation Option for its existing GSM 900 MHz and/or 1800 MHz spectrum rights, a rebate would be provided to the Existing GSM Licensee*."

The Early Liberalisation Option is a critical component of ComReg's proposals. It is our understanding that the winner determination algorithm will be designed to ensure that eircom Group will only be successful in seeking to avail of the Early Liberalisation Option if its bid exceeds the opportunity cost of the spectrum in question. As such eircom Group must pay the market price for the spectrum. Subject to reviewing the detailed activity rules and algorithms yet to be published, we have no objection to this in principle. However we object to ComReg's proposal in respect of the manner in which the Early Liberalisation Option would be implemented, in particular the manner in which the rebate is proposed to be calculated.

In effect eircom Group would be upgrading its licence from a technology specific GSM licence to a technology neutral licence. It is our understanding that the rebate is intended to ensure that eircom Group is able to make efficient decisions. The market price paid less rebate should represent the upgrade cost. i.e. the rebate should equal the market value of a technology specific GSM licence. However both the approach considered by Dotecon and the approach ComReg proposes to calculate the rebate[15] are deficient and cannot be justified. We submit at Appendix 2 to this response, an expert report prepared for us by Power Auctions LLC which identifies and corrects for these deficiencies. As such we recommend a rebate of € 4.53m to be allocated to the 900 MHz spectrum and a rebate of € 3.19m to be allocated to the 1800 MHz spectrum.

Section 3.3.9

eircom Group agrees with the principle of establishing appropriate auction spectrum caps in order to strike "*a balance between allowing for asymmetric spectrum holdings amongst spectrum winners based on the auction outcome while not allowing for the kind of extreme outcomes where competition could undoubtedly be harmed.*"[16]

As highlighted in our previous responses we agree that the proposed cap of 2x20MHz in the 800MHz and 900MHz frequency bands strikes the correct balance. We have also given consideration to the newly proposed cap of 2x10MHz in the 900MHz band for Temporal Lot 1 and conclude that it too strikes the correct balance to deal with short term substitutability issues.

[14] See for example ComReg 11/58, Paragraph 335

[15] As discussed at Paragraphs 4.130 to 4.165 of ComReg 11/60

[16] Paragraph 104, ComReg 11/58

However, as highlighted in previous responses we object to the proposed cap of 2x50MHz across the three bands. In our response to ComReg 10/105 we highlighted the very real risk of extremely asymmetrical outcomes with a significant detrimental impact on competition.

This is not addressed in any satisfactory manner by Dotecon and ComReg and Dotecon's analysis, which ComReg relies upon, is clearly and fundamentally flawed. First, there is absolutely no basis for Dotecon's view that a 2x50MHz cap "*seem*[s] *to allow a potential entrant to acquire a sufficient amount of bandwidth to compete with operators with sub-1GHz spectrum.*"[17] Nowhere do Dotecon or ComReg present any reasoned explanation as to how 2x50MHz of 1800MHz is equivalent to 2x20MHz (or less) of sub-1GHz spectrum. If this is based on a technical evaluation, then we require a copy so as to be able to comment usefully on this issue.

Second, eircom Group fundamentally disagrees with Dotecon's view, adopted by ComReg, that "*neither of the most asymmetric outcomes that might result from the proposed spectrum caps would be unequivocally harmful to competition.*"[18] The most asymmetric outcomes identified by DotEcon includes the following, having regard to the fact that there are now four operators:

"o Two existing operators winning 2x20MHz each of sub-1GHz spectrum and 2x30MHz each of 1800MHz spectrum; or
o An entrant winning 2x50MHz of 1800MHz spectrum with the remaining 2x25MHz distributed amongst the existing operators, which also win all of the sub-1GHz spectrum available."[19]

The proposed 2x50MHz cap could give rise to the following in respect of four existing operators:

Outcome 1	Bidder 1	Bidder 2	Bidder 3	Bidder 4
Sub 1GHz	2x20MHz	2x20MHz	2x20MHz	2x5MHz
1800MHz	2x30MHz	2x30MHz	2x15MHz	-

And the following with the addition of a new entrant:

Outcome 2	Bidder 1	Bidder 2	Bidder 3	Bidder 4	Bidder 5
Sub 1GHz	2x20MHz	2x20MHz	2x20MHz	2x5MHz	-
1800MHz	2x25MHz	-	-	-	2x50MHz

Dotecon considers that the risk of a detrimental effect on competition resulting from either of these outcomes is offset because, in respect of outcome 1, "*the other two existing operators would between them be able to win 2x25MHz of sub-1GHz spectrum and 2x15MHz of 1800MHz spectrum*" and, in respect of both outcomes, "*each of these operators has existing rights of use of high frequency spectrum in the 2.1GHz band*".

This rationale is flawed. First, it is not correct to assume that "*the other two existing operators would between them be able to win 2x25MHz of sub-1GHz spectrum and 2x15MHz of 1800MHz spectrum* given the potential outcome in respect of Bidder 4 above. It is also wrong to assume, as Dotecon does, that the existing 2.1GHz rights of use are substitutable for the proposed 1800MHz rights. The existing 2.1GHz rights of use are technology specific, limited solely to the provision of UMTS technology. Whilst the existing 2.1GHz may be made technology neutral in the future, neither the timing nor the terms under which such a variation would be made are known.

[17] ComReg 11/58, Paragraph 111

[18] ComReg 11/60, Paragraph 4.26

[19] ComReg 11/58, Paragraph 134

Dotecon further suggests there is no need for concern because "*further high frequency spectrum will be made available within the duration of the licences awarded in this auction*." We do not understand how DotEcon can be in the position to make such a categorical statement. eircom Group and other interested parties have, for a number of years, been calling on ComReg to provide clarity on the timing of availability of potential substitute bands such as the 2.6GHz band. To date ComReg has declined to provide the requested clarity. There is a world of difference between potential substitute spectrum being made available in 2014, 2019 or indeed later. Unless Dotecon has been given information by ComReg that has not been made available to all stakeholders, Dotecon's suggestion is without any meaningful foundation for the purpose of assessing the implications on market competition for the currency of the proposed 1800MHz licences.

We note further that the reasons provided by Dotecon in fact did not allow Dotecon to conclude that asymmetric outcomes would not, or not be likely, have detrimental effects on competition. Rather, Dotecon was only able to conclude that "*there is no reason to **automatically** consider that such an outcome would be harmful to competition.*" [emphasis added] This is a significantly lower standard than showing that an asymmetric outcome is not likely to distort competition and it does not appear Dotecon has conducted any meaningful assessment of the competitive implications of extreme outcomes. It is also striking that a much higher standard was applied by Dotecon in relation to the alternative overall spectrum cap of 2x40MHz[20] which Dotecon dismisses because it "*would ensure almost fully symmetric outcomes where the number of alternative feasible allocations of spectrum amongst bidders would be small* and because the benefit to market competition of relatively symmetrical holdings "*is not clear*" with no explanation however why a situation of four competing players with access to similar spectrum resources could be considered detrimental to market competition. The application of this double standard leads Dotecon and ComReg to the unreasonable position of preferring a situation where the detriment to competition is only "not automatic" to a situation where the benefit to competition is not clear. Surely a situation where the benefit to competition is not clear is preferable to a situation where the detriment to competition is only "not automatic".

It would seem that rather than being guided by a true assessment of the long term competitive effects flowing from symmetric and asymmetric outcomes, Dotecon has sought to identify the most preferable outcome in terms of the number of outcome permutations in the award process. In other words, Dotecon has sought not "*limiting the breadth of feasible auction outcomes*". However, maximising the number of outcome permutations in the award process to the detriment of ensuring long term competition is not consistent with ComReg's statutory objectives and does not constitute a reasonable basis for ComReg's proposed decision on spectrum caps. Dotecon states that with a 2x40MHz cap "*it is highly likely that the imposition of such a cap would result in significant inefficiency of allocation, and potentially spectrum going unsold inefficiently.*" eircom Group does not agree. In our view the only reason, with a 2x40MHz cap, that there would be an inefficient outcome and spectrum going unsold is if reserve price for 1800MHz blocks is set too high (which it currently is[21]).

We note that the "Report Prepared for Hutchison 3G Ireland Ltd 'H3GI'" released by ComReg on 4th October[22] supports the position that the total spectrum cap should be reduced to 2x40MHz. The Report also proposes that a spectrum floor should also be set. We do not consider that the introduction of a spectrum floor is necessary as we are concerned that this would unnecessarily increase the complexity of the proposed award process in a context where the substantive competition concerns can be addressed by reducing the total spectrum cap.

[20] ComReg 11/58, Paragraph 135

[21] As discussed further in this response under paragraph 3.3.12

[22] ComReg 11/69, Publication of non-confidential correspondence

We are of the strong view that ComReg cannot reasonably sacrifice long term market competition to expand the breadth of feasible auction outcomes. Taking all of the above into account we request ComReg to adopt a cap of 2x40MHz across the three spectrum bands.

Clause 3.3.10

eircom Group agrees in principle with the high level design proposal of eligibility points which are not transferrable between Temporal Lots. We note these high level design proposals are subject to detailed rules yet to be published for review by interested parties. We reserve the right to alter our expressed view should we find the detailed rules to be deficient in any respect.

Section 3.3.11

eircom Group agrees in principle with the high level design proposal for a full assignment round and principles for compensation as set forth in section 3.3.11 provided our concerns expressed under section 3.3.6 regarding discriminatory constraints are addressed, and that mechanisms are incorporated to allow for the possibility of adjacent holdings as set out by us under section 3.3.5. The proposed award process is a combination of many moving parts and subject to detailed activity rules yet to be published for review by interested parties. We reserve the right to alter our expressed view should the detailed rules be found to be deficient in any respect.

Section 3.3.12

eircom Group has the following comments to make in respect of the proposed reserve prices and Spectrum Usage Fees (SUF).

We welcome ComReg's downward revision of the proposed minimum price to €20m for sub 1GHz spectrum. Whilst this is a positive move in the right direction there remains considerable risk that the minimum price proposals will negatively impact on the efficiency of the proposed award process.

Sub 1-GHz Minimum Fee Proposal

ComReg has relied heavily on the benchmarking analysis undertaken by Dotecon, set out in ComReg 11/59. Dotecon proposes that the "*sub-1GHz spectrum should have a minimum price for a 2 × 5 MHz block in the range €15m to €26m, with the entire range reflecting a likely lower bound estimate of market value for Ireland*"[23] and that the minimum price for 1800MHz be set around 45% to 60% of the sub-1GHz minimum price. Dotecon further concludes that "*We consider that it is unlikely that demand would be choked off inefficiently within our recommended range of €15m-€26m for a 2x5MHz block of sub 1-GHz spectrum. However, clearly risks increase towards the upper end of the range and a trade-off needs to be struck. We do not make any specific recommendation within this range, but we consider that the lower half of the range is likely to*

[23] ComReg 11/60, Paragraph 4.200

create a useful moderation of incentives for strategic behaviour whilst running very little risk of discouraging serious bidders with a chance of winning spectrum."[24]

In light of the above ComReg proposes to set the sub-1GHz minimum price at just below the mid-point of the range at €20m (relative to a mid-point of €20.5m) and to apply a relativity adjustment of 50% to determine the 1800MHz minimum fee.

A considerable number of objections have been raised in respect of Dotecon's benchmarking approach. Benchmarking analyses are always fraught with difficulties in trying to generate indicators that are comparable with national circumstances. Criticism of Dotecon's approach has included the time series over which the potential comparators have been drawn and the manner in which adjustments have been made to seek to adjust for the particular circumstances of the Irish economy.

The time series includes all spectrum auctions since 2000. The early 2000s saw a significant number of 3G auctions. It is wrong to assume that the factors informing bidder valuations in the 3G auctions are the same as today. In our view it is constructive to consider European auctions undertaken over the last few years to assess the reasonableness of ComReg's proposals. Whilst this is a relatively small dataset it has the benefit of reflecting current factors informing bidder valuations including the economic climate. Furthermore a European focus is also likely to capture the non trivial impact of the economic regulatory regime. In addition to a common regulatory framework, International Roaming services are regulated directly by European Regulation and European Commission policy has a significant impact on the national regulation of wholesale mobile voice termination rate services.

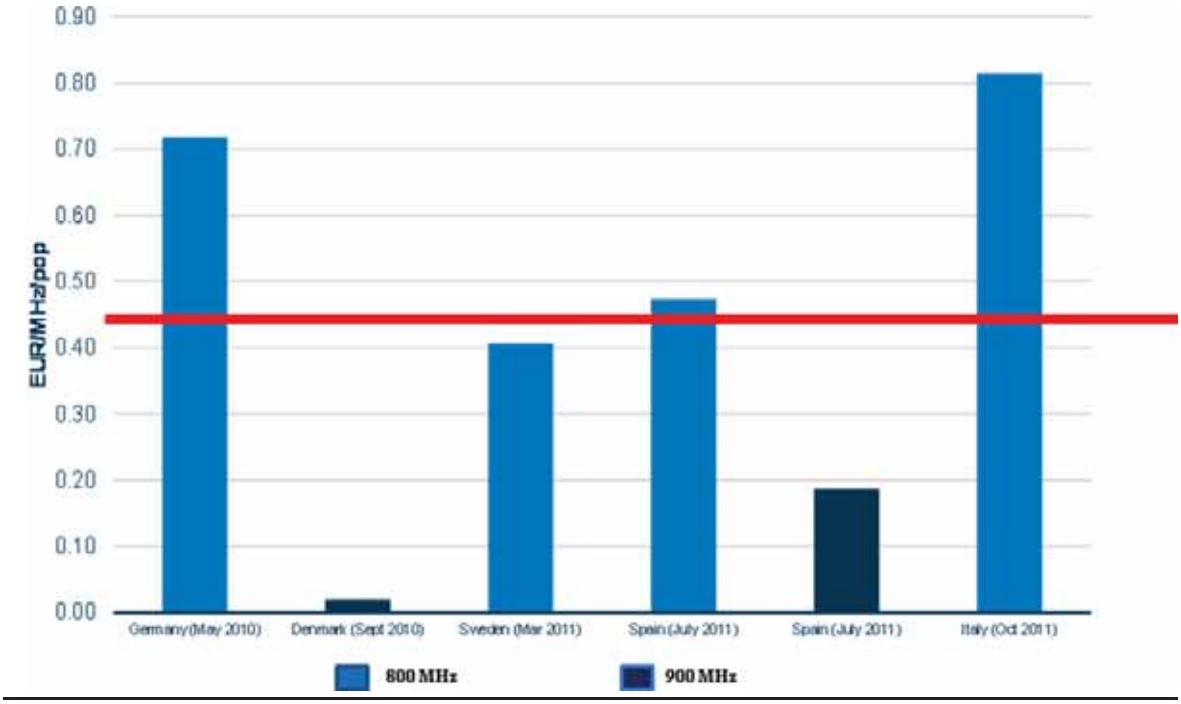
It is accepted as a matter of principle[25] that the benchmarking exercise should not set out to predict the final winning licence price in the proposed auction process. The minimum price should be set at a level to minimise the risk of setting a minimum price that chokes off efficient demand (i.e. demand of serious bidders) in the auction.

Chart 1 below sets out the average €/MHz/pop achieved at recent European auctions for sub 1GHz spectrum relative to ComReg's current proposed minimum fee (red line).

[24] ComReg 11/59, Paragraph 140

[25] ComReg 11/59, Paragraph 8

Chart 1: Recent Sub 1GHz European Auctions



As can be seen from above ComReg's proposed minimum price appears to be at the lower end of outcomes in respect of European 800MHz auctions. That said if the minimum price for the Swedish auction had been set at ComReg's proposed level it is arguable that the Swedish auction could not have proceeded in an efficient manner. Dotecon[26] sets out a discussion of a number of reasons why it believes that we should not take too much stock from the Swedish outcome, highlighting a number of differences between the Swedish and Irish circumstances. Nobody would deny that there will always be a number of significant differences between a particular national spectrum auction and the Irish circumstances. Indeed this highlights the need to apply extreme caution when using the results of Dotecon's analysis to inform a decision in respect of minimum fees to be applied in Ireland.

It is also notable that Dotecon appears to put more reliance on outcomes that exclude new entrant bidders[27] "*The existing mobile operators in Sweden constituted only three bidders in the auction with 2x30MHz of available spectrum and a spectrum cap of 2x10MHz per bidder. Hence, the marginal bidders driving competition in this auction were Com Hem and Netett Sverige, neither of which were established mobile operators in Sweden at the time of the auction. In contrast, the marginal bidder for 800MHz spectrum in the German auction, E-Plus, was an established mobile operator in Germany at the time of the German auction*." This bias in Dotecon's thinking appears to be at odds with ComReg's objective of not precluding new entrant participation in the award process.

[26] Comreg 11/59, Paragraphs 119-127

[27] ComReg 11/59, Paragraph 124

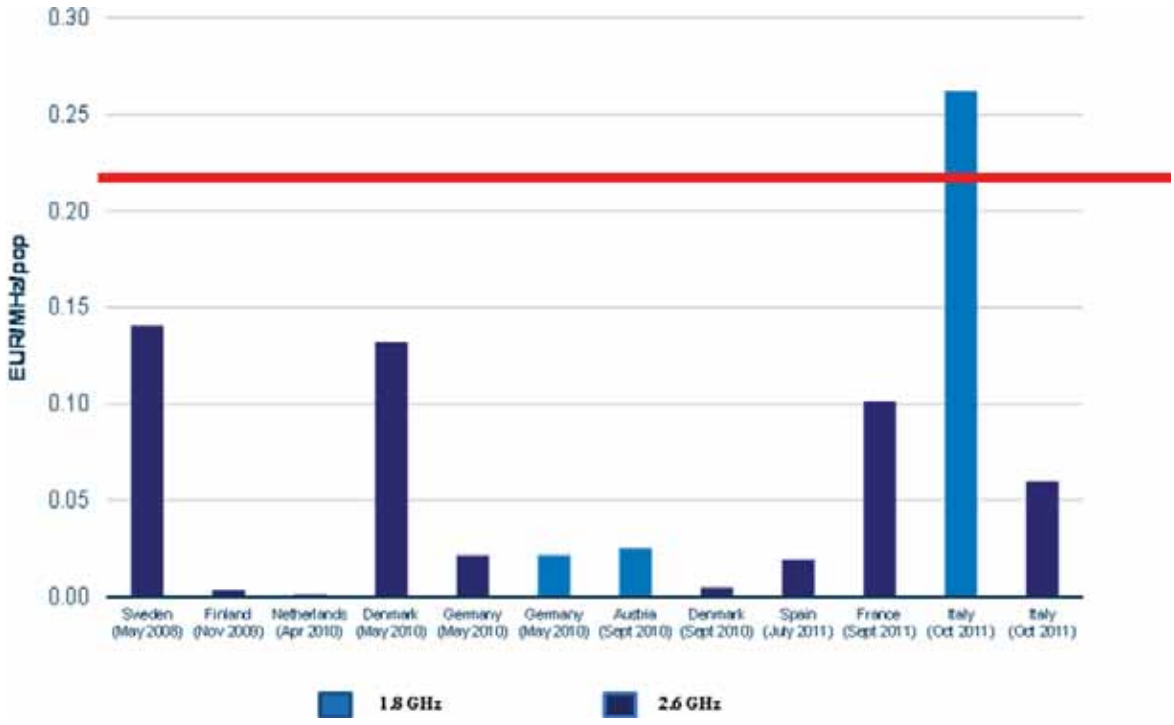
In our view minimum prices for sub 1GHz spectrum should be set no higher than the lower end of Dotecon's lower bound estimate (currently €15m) so as not to preclude potential outcomes. Given that the establishment of a minimum price is not to predict the final price in the proposed award process a price no higher than the lower end of Dotecon's lower bound estimate would appear to meet all relevant criteria to ensure that the level meets ComReg's objectives to maximise the efficiency of the award process.

1800MHz Minimum Fee Proposal

Turning now to the minimum price for 1800Mhz spectrum and the proposal be set at a price relative to the sub-1GHz minimum fee benchmark. ComReg proposes that the 1800MHz minimum price be set at €10m per block at 50% of ComReg's proposed Sub-1Ghz minimum price. Again we consider it instructive to consider recent outcomes in European auctions to assess reasonableness of what ComReg proposes in respect of the 1800MHz minimum price.

Chart 2 below sets out the average €/MHz/pop achieved at recent European auctions for 1800MHz and 2600MHz spectrum relative to ComReg's current proposed minimum fee (red line). We include the 2600MHz band given its substitutability to the 1800Mhz band.

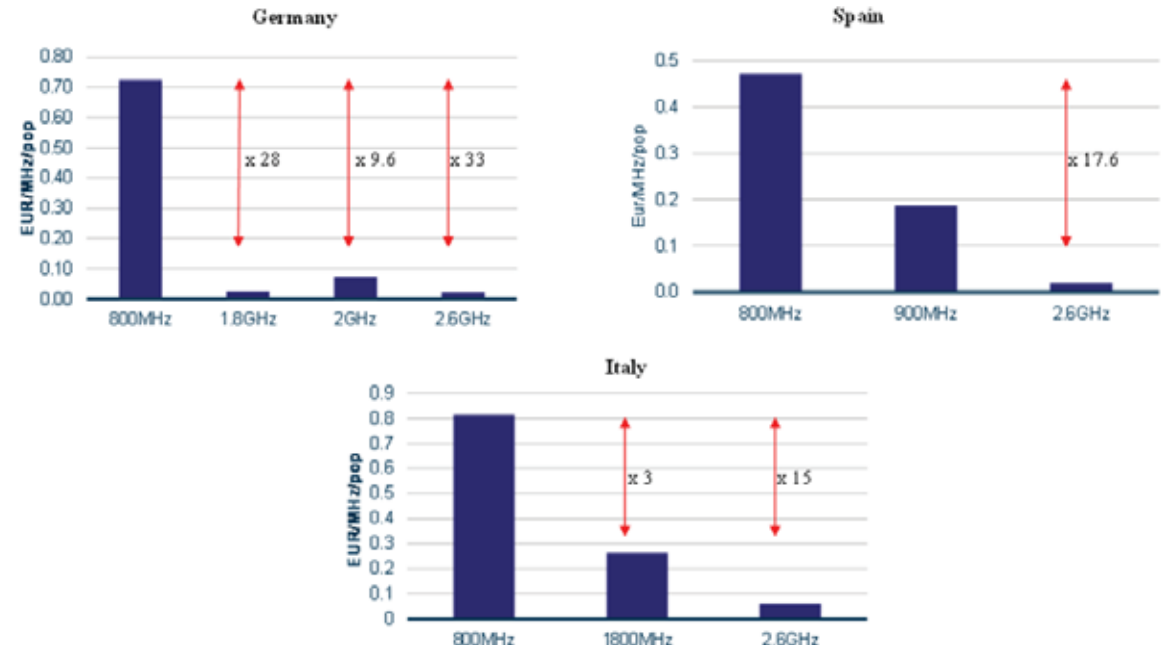
Chart 2: Recent 1800MHz and 2600Mhz European Auctions



The comparison clearly highlights that ComReg's proposal is well in excess of recent auction outcomes, with the one exception of Italy (Oct 2011). There is a very real likelihood that ComReg's proposed 1800MHz minimum price is excessive and at odds with its stated objectives. The excessive minimum price appears in part to be related to the proposed methodological approach of

making a 50% adjustment relative to the Sub-1GHz minimum price. There have been three recent multiband auctions in Europe as illustrated in chart 3.

Chart 3: Recent European Multi-band auctions



In each case it is clear that none of the outcomes in respect of higher frequency spectrum conform to ComReg's proposed relativity factor. The nearest outcome to ComReg's theoretical relationship is the Italian auction (October 2011)[28] in respect of the 1800MHz band. Here the 1800MHz outcome was 32% of the 800MHz outcome. As such we strongly believe that ComReg should amend its adjustment factor to no more than 30%.

Taking into account our position in respect of the Sub-1GHz minimum price and assuming the lower end of Dotecon's lower bound estimate, currently proposed at €15m, we believe the minimum prices cannot objectively be set higher than:

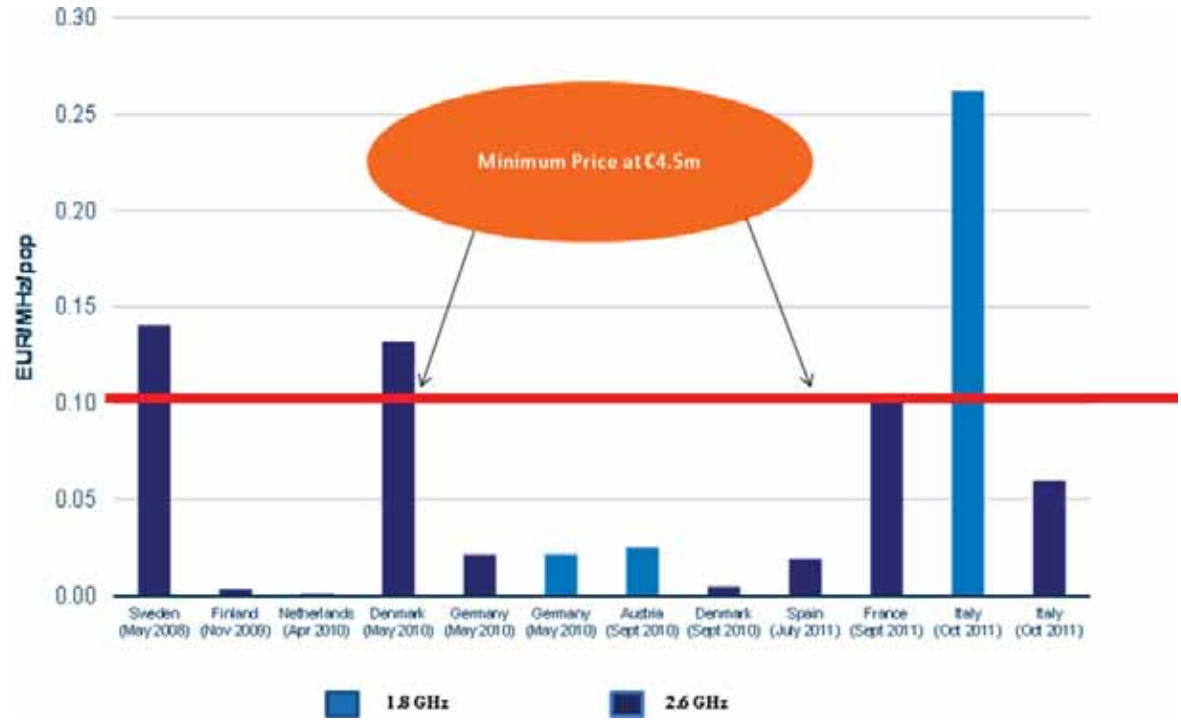
	Per block
Sub-1GHz minimum price	€15m
1800MHz minimum price	€4.5m

Charts 4 and 5 below illustrate how the revised Irish minimum price would sit relative to the outcomes of recent European auctions.

[28] It should be noted that the Italian auction sold 800MHz spectrum at over 80cts/MHz/pop suggesting relatively high spectrum valuations in Italy which is most likely also reflected in the 1800MHz outcome.

Chart 4: Revised Irish Minimum Price relative to recent Sub 1GHz European Auctions

Chart 5 Revised Irish Minimum Price relative to recent 1800MHz and 2600Mhz European Auctions



Benchmarking adjustments for the Irish economy

eircom Group and other interested parties have highlighted that Gross National Product (GNP) rather than Gross Domestic Product (GDP), as proposed by Dotecon, is a more appropriate independent variable to reflect domestic income levels within Ireland. We are therefore disappointed to note that ComReg continues to believe that Dotecon has adequately addressed the concern of interested parties in its reports[29]. Dotecon sets out its view[30]:

"*Confronting then the issues raised with the variables used in benchmarking analysis, we opted to use GDP as an independent variable in our regression analysis rather than GNP as it is a better reflection of the domestic income levels within Ireland. If we consider domestic income levels as a proxy of willingness to pay for mobile communications services within a country, as well as other factors such as the level of development within a country that affects the value of spectrum, then we consider GDP to be a better explanatory variable than GNP in our regression model.*"

There is widespread agreement that it is necessary to consider domestic income levels as a proxy for willingness to pay for mobile communications services. However Dotecon is simply wrong when it asserts that GDP is the better explanatory variable. Expert economic analysts acknowledge that GDP is not the most appropriate variable to consider Ireland's domestic economy. For example, consider the Central Statistics Office (CSO) report[31] 'Measuring Ireland's Progress 2010'. The CSO reports Gross National Income (GNI)[32] along with GDP because "*Ireland, along with Luxembourg, are exceptions in the EU with a wide divergence between GDP and GNI.*"[33] "*The relationship between GDP and GNI in Ireland is exceptional among EU countries, with Luxembourg the only other country where the difference between the two measures is more than 10% of GDP. The gap reflects the importance of foreign direct investment to the Irish economy. Luxembourg had a GNI/GDP ratio of 71.2 compared with 82.9 for Ireland in 2010, while the average for the EU countries was 99.9.*"[34]

The choice of GDP or GNP would not be a concern for the vast majority of EU countries given the close relationship highlighted by their respective GNI/GDP ratios[35]. The same cannot be said in respect of Ireland with a GNI/GDP ratio of 82.9. GDP is not the correct variable to be used for Dotecon's analysis and the analysis must be corrected accordingly.

Error in the calculation of reserve prices and SUFs from the Minimum price

Further to our recent requests on 6th September and 19th September, ComReg provided clarification on 30th September in respect of the calculations used to derive the proposed reserve

[29] ComReg 11/60a, Paragraph A9.93

[30] ComReg 11/59, Paragraph 160

[31] CSO report published September 2011, available at http://www.cso.ie/releasespublications/documents/other_releases/2010/progress2010/measuringirelandprogress2010.pdf

[32] **Gross National Income** (GNI) is equal to Gross National Product (GNP) plus EU subsidies less EU taxes.

[33] Page 8 of the CSO report

[34] Page 17 of the CSO report

[35] See table 1.2 on page 17 of the CSO report

prices and SUFs from the proposed minimum prices. eircom Group has reviewed the calculations and concludes that whilst the methodology applied is appropriate ComReg has erred in its calculations and as such its proposed reserve prices are overstated relative to the proposed minimum price. The error arises due to the manner in which ComReg seeks to calculate the NPVs for the half year elements (Years 2.5, 3 and 17.5) of the proposed temporal periods. ComReg proposes that the half year elements are calculated as Yr 2.5 = Yr 2 / ((1+discount rate)^0.5), Yr 3 = Yr 2.5 / ((1+discount rate)^0.5), and Yr 17.5 = Yr 17 / ((1+discount rate)^0.5). This has the effect of over inflating the numerators in subsequent calculations as the denominator is derived from annual discount factors.

This error can be easily corrected by ensuring that both the numerator and denominator are derived on a consistent basis. A very close approximation (ignoring the 19 days in July 2015 beyond expiry of Temporal Lot 1) of the correct reserve prices can be calculated using 6 monthly discount factors which yield the following NPVs of constant cash flow:

Period	**NPV**
Temporal Lot 1	4.55
Temporal Lot 2	12.69
First 15 years	16.18

The correct reserve prices, based on ComReg's proposed minimum fee for sub-1GHz spectrum would therefore be €2.8m for Temporal Lot 1 and €7.8m for Temporal Lot 2.

An alternative approach, using annual discount factors, to ensuring consistent numerators and denominator would be to make a proportionate adjustment to the Year 3 discount factor such that the NPVs of constant cash flow for:

- Temporal Lot 1 = Yr1 + Yr2 + (Yr3 x 45%)
- Temporal Lot 2 = Yr3 x55% + (sum of Yr4 to Yr17) + (Yr18 x45%)
- First 15 years = sum of Yr1 to Yr15

We have previously shared this alternative approach with ComReg in our email dated 19th September. We note that ComReg did not comment on the merits of our approach in its response of 30th September. eircom Group requests ComReg to correct the errors in its calculations.

Indexation of SUFs

eircom Group does not agree with ComReg's proposal to index SUFs using the CPI published by the Central Statistics Office. ComReg has used a nominal Weighted Average Cost of Capital (WACC) when calculating the annuity for the SUF. As such CPI has been accounted for in the level of the proposed SUF. Further indexation would result in double counting and is erroneous.

Interest on Deposits

We note the requirement for deposits to be placed by bidders with their applications to participate in the proposed award process. Any interest accruing on such deposits should be to the benefit of the relevant applicant.

Section 3.3.13

eircom Group has no objection to the pro rata application of SUFs in the event that one or more parties exercises the early commencement option as set out in section 3.3.6 provided our concerns expressed under that paragraph are addressed to our satisfaction.

Section 3.3.14

eircom Group recognises the need to ensure that any and all transitional activities must be undertaken in an orderly, co-ordinated and timely manner. There is broad agreement that the precise level of activity required will be determined by the outcome of the award process and cannot be predicted in advance. There is however high level recognition of the types of activities that may be required of existing GSM licensees in the 900MHz and 1800MHz in the period from the end of the award process to 31 January 2013. Whether there is a common understanding between the technical teams of the existing GSM licensees as to how those activities would be implemented is less certain. The time period available for the transition activities is also unknown. To date ComReg has declined to set out an indicative timetable to the start of the proposed award process. It is entirely possible that there could be nine or less months for the transitional activity to be completed.

Against this backdrop we question ComReg's proposal to leave all practical consideration of transitional activity until after the completion of the proposed award process. We believe this is a risky approach given that the period for transitional activities may now be challenging. It may be prudent to commence more generic technical planning activities in advance of the award process.

Comreg proposes[36] "*to discuss with existing GSM licensees and all winners of liberalised 900 MHz and 1800 MHz rights of use how best to complete such activities in a timely and orderly manner - with a view to the establishment and publication of a relocation 'Project Plan' that would clearly identify project milestones and related deliverables.*" As noted by ComReg this may require a degree of negotiation and mediation which will consume some of the transitional period. In our view it may be beneficial to undertake preparatory technical discussions in advance of the proposed award process.

ComReg states it "*would envisage prospective bidders seeking to participate in the proposed joint award process agreeing to comply with a final decision in respect of the project plan and to the regime of liquidated damages*."[37] Whilst we understand the rationale for such a position we would question whether it will achieve the desired objective of a timely and orderly transition.

[36] A 7.30

[37] ComReg 11/60a, Paragraph A 7.32

Firstly we would question an obligation on a prospective bidder to agree in advance with a final decision, before the circumstances of such decision are known. This would appear to be seeking to circumvent an entity's right to object to an unreasonable decision.

Secondly we would question whether the threat of liquidated damages will ensure a timely transition. The threat of liquidated damages would incentivise existing GSM licensees to build headroom into their estimated project milestones in order to reduce the risk of being penalised. This could lead to protracted debates over the reasonableness or otherwise of project milestones. In our view a co-operative and participative approach which encourages parties to make best endeavours is more likely to achieve the desired outcome.

We also note ComReg's consideration[38] "*that, where appropriate to facilitate transition activities, it should retain its discretion to consider requests to vary an existing GSM licence by the holder of that licence and from other parties*." Under Regulation 6 of SI 339 of 2003, Meteor Mobile Communications Ltd's licence can only be amended either on its request or, alternatively, where objectively justifiable and in a proportionate manner and/or where in the interest of the efficient and orderly use of apparatus for wireless telegraphy or the radio frequency spectrum. Any amendment must be in accordance with the Authorisation Regulations, SI 335 of 2011, Regulation 15 of which similarly provides that any amendment may only be made in objectively justifiable cases and in a proportionate manner and that ComReg must seek and have regard to representations.

Section 3.4

eircom Group agrees with section 3.4 as drafted. Our comments on the draft schedules to the Liberalised-Use Licences are set out in Part 2 of this submission.

With respect to the payment of fees we note Comreg's intention[39] to implement a measure in some form in its award process such that "*all upfront payments arising from the 'main stage' of the auction should be received by ComReg before that stage of the auction should be declared complete*." eircom Group does not consider that such a measure is necessary. This would achieve nothing more than elongating the duration of the award process. All bidders are required to make substantial financial deposits with their applications to participate in the award process. If a bidder was to participate frivolously and walk away during or after the assignment phase they would automatically default their deposit. In our view the deposit acts as sufficient incentive to ensure only serious bidders participate. Furthermore any bidder that walks away is still liable for any outstanding debts that can be pursued through appropriate legal channels.

Section 3.5

eircom Group agrees in principle with the granting of Preparatory Licences on request to Eligible Parties, subject to sight of the proposed schedules to the licence and the opportunity to comment on same. We assume that there will be no fees associated with this class of licence given that the

[38] ComReg 11/60a, Paragraph A 7.34

[39] ComReg 11/60a, Paragraph A 9.114

value of such licences to bidders will be captured in the Spectrum Access Fees determined by the award process and that SUF will not be applicable as the relevant spectrum is not being used.

PART 2: Comment on Draft Liberalised-Use Licence schedule

Licence Part 1, Commencement & Termination Date

We assume one licence will be issued per winning bidder comprising all blocks awarded during the assignment process covering both temporal periods. This is necessary if the proposed roll-out and coverage obligations are to be valid (the proposed rollout target periods are in excess of the time period covered by temporal lot 1). It is conceivable that a licensee may have different quantities of liberalised spectrum in each of the bands across the temporal lot periods. As such the duration for which the right to use a particular frequency block persists must be expressly stated by reference to each block in Part 1 of the licence.

Licence Part 2, General

eircom Group is content with the proposed content and drafting of Part 2 of the draft Licence.

Licence Part 3, Technical Conditions

eircom Group has reviewed the proposed Technical Conditions and has no objection to what is proposed.

We have also reviewed the draft MoU for the 800MHz band. The electric field strength parameters proposed in the draft MoU for the 800 MHz band are correctly aligned with the relevant ECC Recommendation i.e. ECC/Rec/(11)04, which eircom Group believes is the correct approach

ComReg has focused on Annex 1 of ECC/Rec/(11)04, which looks at allowed electric field strength, when developing the draft MoU. There are further techniques which can be used such as dividing available Physical Layer Cell Identities (PCI) between operators at and across the border identified in other Annexes of ECC/Rec/(11)04. eircom Group recommends that the PCI option included in ECC\Rec(11)04 should either be explicitly identified in the MoU or alternatively the MoU should indicate that the other remedies identified in ECC/Rec/(11)04 may be used where necessary.

Licence Part 4, Roll-out and Coverage requirements

As outlined in previous responses eircom Group agrees with ComReg's proposal to set a symmetric coverage target of 70% demographic coverage.

eircom Group has previously set out its views in respect of asymmetric roll-out targets. We have reviewed ComReg's analysis in documents supporting the Draft Decision and remain of the view that asymmetric roll-out targets are not adequately justified. We would further observe that the articulation of the obligation in the proposed licence condition requires further clarification.

The draft condition refers to a "New Entrant" as a defined term. This term is not defined in the proposed licence. The term New Entrant is defined in the Draft Decision as "*a person who is not an Existing GSM Licensee*", i.e. excluding Meteor, O2, and Vodafone. If the Draft Decision

definition is applied to the proposed licence condition this would mean that H3GI would be afforded seven years to meet the coverage obligation. This is at odds with ComReg's position that the longer (seven year) roll-out period should apply in respect of "*a new entrant to the mobile market* [that] *would not have an existing mobile network.*"[40] H3GI clearly has an existing mobile network and it would be unjustifiably discriminatory if it was afforded a longer roll-out period. The term "New Entrant" must be correctly defined in the proposed licence.

Metrics to measure coverage

eircom Group has previously highlighted concerns that the proposed average pilot signal field strength metrics for LTE systems results in a high threshold for the purpose of measuring coverage compliance. We have reviewed ComReg's further reasoning in Annex 8 of the consultation. We remain concerned that there is some ambiguity in the methodology applied for conversion Electric Field Strength per 5MHz and Electric Field Strength per MHz metrics.

ComReg has converted[41] a value of 48dbμV/m for a 5MHz bandwidth to a 62dbμV/m/MHz figure. ComReg appears to have added 20*log(5) to 48 to get a value of 62. eircom Group believes the correct conversion is to subtract 10*log(5) to get 41 dbμV/m/MHz. We note that other administrations, for example Finland and Sweden appear to apply a methodology consistent with our own view[42]. Similarly, this methodology is also recommended within ECC/Rec/(11)04[43]. We note ComReg's view[44] that "*As LTE is still an evolving technology ComReg will review these figures on an evidential basis as required.*" We trust that ComReg will approach this matter in a proportionate manner. Setting the converage metric at too high a threshold could significantly and disproportionately impact on the costs of coverage rollout.

We further note that the proposed licence conditions are constructed on the basis that LTE coverage may be measured using average pilot signal field strength or measured using Block Error Rate. We have no objection to the proposed Block Error Rate metrics and as such would be comfortable to move forward on the basis of Block Error Rate as the preferred coverage measurement metric.

Performance Guarantees in respect of coverage obligations

eircom Group has previously raised objections to the imposition of performance guarantees as they represent an unnecessary overhead. We remain of that view. However if a performance guarantee scheme is to be imposed it must be done so in an efficient and proportionate manner and we believe that further clarity must be provided in terms of the operation of the scheme.

[40] ComReg 11/60, paragraph 5.85

[41] ComReg 11/60a, Paragraph A8.116

[42] http://www.pts.se/upload/Ovrigt/Radio/Koordavtal-Finland-2500-2690MHz.pdf

[43] In cases of other frequency block sizes 10 x log (frequency block size/5MHz) should be added to the field strength values

[44] ComReg 11/60a, Paragraph A 8.117

Cost efficiency of the scheme

We note ComReg's view[45] that performance guarantees are a "*relatively inexpensive tool in ensuring compliance with licence conditions*". We assume that ComReg envisages a similar scheme as to that in place for existing 3G licences such that financial guarantees must be maintained in respect of the performance targets. We note the proposed licence condition is silent on this aspect. Financial guarantees can take a number of forms including cash deposits and financial instruments with the latter generally being the more cost effective to maintain by the person subject to the performance guarantee. A financial instrument could cost in the region of 2% per annum of the value of the performance guarantee. In the case of the proposed coverage and roll-out performance guarantee the annual cost to the licensee might be in the region of €40k. Such cost becomes unnecessary once the coverage and roll-out target has been achieved. As such the coverage and rollout performance guarantee scheme must allow for release of the performance guarantee at any time between licence commencement and the date by which compliance must be achieved, upon request by the licensee and following timely completion of compliance assessment.

Proportionality of the scheme

The proposed licence condition states that the full performance guarantee, €2m, shall be payable by the licensee if it fails to meet the coverage and roll-out obligations. This proposal is draconian. For example consider two licensees with a coverage target of 70%. If the first licensee, following compliance assessment by ComReg, is deemed to have achieved 69.9% and the second licensee is deemed to have achieved 60% is it proportionate that both licensees should be subject to the same penalty? Prima facie the first operator would appear to have made a significant effort to achieve the target whereas the second operator may not have given such attention to its obligations. The scheme must be graduated such that the penalty imposed is proportionate to the degree of non-compliance.

The scheme must also allow for the impact of events outside the direct control of the licensee that may impact on network roll-out activities. For example the movement restrictions imposed during the foot and mouth crisis in 2001 significantly impacted on Meteor's roll-out activities for a number of months. Whilst that event did not result in Meteor missing its rollout targets it is possible that similar unforeseen events in the future could directly impact on an operator's ability to meet its licence obligations. The effects of such events should be excluded from the compliance assessment and the means to address this must be set out clearly in the performance guarantee scheme.

Consistency of the scheme

The proposed licence condition appears to allow for each licensee to propose and agree different programmes to measure, monitor and report on coverage compliance. We request ComReg to clarify how it intends to ensure consistency between each operator's programme.

[45] ComReg 11/60a, paragraph A8.313

Licence Part 5, Quality of Service (QoS) Obligations

eircom Group has no objection to the proposed Quality of service metrics.

eircom Group has previously raised objections to the imposition of performance guarantees in respect of quality of service targets as they represent an unnecessary overhead. We remain of that view. However if a performance guarantee scheme is to be imposed it must be done so in an efficient and proportionate manner and we believe that further clarity must be provided in terms of the operation of the scheme.

Cost efficiency of the scheme

We note ComReg's view[46] that performance guarantees are a "*relatively inexpensive tool in ensuring compliance with licence conditions*". We assume that ComReg envisages a similar scheme as to that in place for existing 3G licences such that financial guarantees must be maintained in respect of the performance targets. We note the proposed licence condition is silent on this aspect. We are subject to various quality of service performance targets under our existing 3G licence. These targets are assessed annually and are subject to discrete financial guarantees for each target in each assessment period.

ComReg proposes that quality of service compliance will be assessed with regard to two citeria - network unavailability and minimum voice call standard. Network unavailability is measured by reference to one metric (service unavailability) and minimum voice call standard is measured by reference to three metrics (maximum permissible call blocking rates, maximum permissible dropped call rates and transmission quality). There are two criteria and four metrics in play and it is proposed that each will be assessed every six months.

Across both temporal lots there are 34 assessment periods. If discrete financial guarantees are required a licensee will be required initially to put in place a financial guarantee totaling €34m, assuming all metrics are assessed together. The balance of the financial guarantee would reduce six monthly following each compliance assessment. If financial guarantees are required to be put in place for each criteria or each metric the total required increases to €68m and €136m respectively.

As previously noted a financial instrument could cost in the region of 2% per annum of the value of the performance guarantee. For a financial guarantee initially of €34m the cost of maintaining the financial instrument would be in the region of €6m. We do not consider this to be a relatively inexpensive tool.

If on the other hand ComReg is considering the maintenance of a single financial guarantee of €1m for the duration of the licence we would observe that the annual cost is significantly reduced to €10k per annum.

[46] ComReg 11/60a, paragraph A8.313

Proportionality of the scheme

The proposed licence condition states that the full performance guarantee, €1m, shall be payable by the licensee if it fails to meet the quality of service obligations. This proposal is draconian. For example the magnitude of non-compliance and potential consumer detriment that ComReg is seeking to discourage is significantly different for a licensee narrowly missing one of the four metrics, following compliance assessment by ComReg, compared to a licensee failing to achieve any of the four metrics. The scheme must be graduated such that the penalty imposed is proportionate to the degree of non-compliance.

The scheme must also allow for the impact of events outside the direct control of the licensee that may impact on quality of service metric. For example a significant and persistent failure of the electricity supply network could directly impact on an operator's ability to meet its licence obligations. The effects of such events should be excluded from the compliance assessment and the means to address this must be set out clearly in the performance guarantee scheme.

Consistency of the scheme

The proposed licence condition appears to allow for each licensee to propose and agree different programmes to measure, monitor and report on quality of service compliance. We request ComReg to clarify how it intends to ensure consistency between each operator's programme particularly as it is ComReg's stated objective[47] "*of ensuring a minimum network QoS standard on the provision of services to consumers*".

[47] ComReg 11/60a, paragraph A8.314

PART 3: Additional matters relating to the Draft Information Memorandum

In addition to the matters raised above, we request that the following points are addressed in the Draft Information Memorandum.

A. Availability of 2600MHz band

The 2600MHz band is harmonised across Europe for mobile use in accordance with Decision 2008/477/EC. Award processes have been completed or plans for award processes are well advanced in nearly every Member State. Ireland is a notable exception. LTE deployments have already commenced in many countries in the 2600MHz band and the band is internationally recognised as a complement and substitute to the 800MHz, 900MHz and 1800MHz bands. ComReg proposes to set aside consideration of inclusion of the 2600MHz in the proposed award process due to uncertainty regarding the timing of availability of the band. Resolution of this uncertainty is entirely within the control of ComReg. It is extremely disappointing that eighteen months since ComReg's call for input[48] ComReg is only now "*drafting a first consultation document*"[49] in respect of its review of the possible five year extension of the MMDS licences. The MMDS licences (using the 2.6 GHz band) are actually due to expire in 2012 for the Dublin, Galway and Waterford regions and due to their foreshortening are not eligible for consideration of renewal on expiration of the period of 15 years after the date of commencement of the first licence so granted.[50]

We note that with the passage of time arising from ComReg's administrative delays it will be challenging for ComReg to conclude the review prior to the proposed award process, as far as we understand ComReg's intended timescales for the completion of the proposed award process. However it is incumbent on ComReg to provide as much clarity as possible to interested parties regarding this strategically important band in advance of the proposed award process. It is simply not sufficient for ComReg to state, in response to concerns regarding clarity on the availability of the 2600MHz band, "*Interested parties are requested to monitor this process and respond to ComReg's consultation at the appropriate time.*"[51] In our view ComReg should use every effort to conclude the review in advance of the proposed award process.

We note ComReg's view "*that it is not appropriate to include the 2.6 GHz band in this particular multi-band auction. Instead, it will form part of a separate award process, which may include other relevant spectrum bands.*"[52] Absent the conclusion of ComReg's review regarding the possible five year extension of the MMDS licences ComReg must, at the very least, make a clear statement in the Information Memorandum that the 2600MHz band (2500-2690MHz) will form part of a separate open and competitive award process with rights of use determined by such award process

[48] ComReg 10/38, Call for input on potential uses and licensing options of the 2.6GHz spectrum band, was published on 14th May 2010

[49] ComReg 11/60a, Paragraph A3.44

[50] As clearly established under Regulation 7(1) of SI 73 of 1999, Wireless Telegraphy (Programme Services Distribution) Regulations

[51] ComReg 11/60a, Paragraph A3.74

[52] ComReg 11/60a, Paragraph A3.75

commencing upon termination of the MMDS licences which shall occur no later than 2019, such date subject to the conclusions of ComReg's review.

B. Proposals for Terminal Stations

As set out in ComReg's documents, "*Decision 2010/267/EU sets an in-block emission limit of 23 dBm for terminal stations in the 800 MHz band. ComReg proposes that licence exemption for the 800 MHz band should only apply to those terminal stations complying with the in-block limits as set out in Decision 2010/267/EU*".[53]

"*While recognising that Decision 2010/267/EU allows Member States to relax this limit for specific deployments, e.g. in rural areas provided other services and networks are protected and any cross-border obligations are not compromised, ComReg proposes that licence exemption for the 800 MHz band should only apply to those terminal stations complying with the in-block limits as set out in Table 18 below* [23dBm subject to a tolerance of up to +2dB]."[54]

The digital dividend at 800MHz offers the potential to serve both mobile and fixed customers with credible broadband speeds. However, there are still limits to what can be cost effectively achieved at 800MHz, particularly if indoor coverage is required. For fixed customers, broadband must be available indoors to the target customer base. Furthermore, the signal must be strong enough, to ensure that the overall spectral efficiency of the base station is not impaired.

eircom Group has undertaken detailed RF planning analysis to look at the challenge of providing broadband to fixed customers currently served by overhead lines in the rural network, using LTE at 800MHz. These customers are dispersed across the whole of the country with a very low customer density and challenging terrain at times.

Our study indicates that indoor broadband coverage could be economically provided to 85% of the target base (i.e. very rural) absent the use of external antennae. However our study confirms near ubiquitous broadband availability in fixed premises (approximately 99%) can be achieved when the use of external antennae was considered.

This shows a clear requirement for the use of external antennae to enable the rollout of bigger broadband to more places as soon as possible for customers in very difficult to serve areas using LTE based broadband. While 23 dBm transmitted power (EIRP) is a reasonable level for mobile devices, it precludes licence exemption for fixed terminals which use external antenna. This is because external antenna improve the gain in a focused way by several dB, resulting in a transmitted power greater than 23 dBm.

We appreciate that ComReg cannot, at this point in time, create a blanket exemption for externally mounted antenna as it is required by the EU Decision to ensure adequate protection of other services, networks and applications. However ComReg is silent on how the issue of external antenna power limits will be approached.

Unlike EC decision 2010/267/EU, ComReg document 11/60 makes no reference to relaxing the limit for fixed terminal stations in rural areas. Hence it is not clear if ComReg will allow the use of terminals with external antenna by some licensing regime or if it will simply preclude the use of external antenna, thereby reducing the potential of the 800MHz band to contribute towards the provision of ubiquitous broadband to the benefit of all citizens.

[53] ComReg 11/60, Paragraph 5.58

[54] ComReg 11/60a, Paragraph A 8.508

Over time as practical experience grows it may be possible to extend the licence exempt scheme to fixed terminal stations in rural areas with a maximum transmitted power (EIRP) limit greater than 23 dBm. If terminals with an EIRP greater than 23 dBm can only be allowed through a licensing scheme, then this licensing process must be fast, cost effective and with little administrative overhead.

This is an important issue and we believe ComReg should clearly set out how it intends to approach the licensing of fixed terminal stations in rural areas with an EIRP greater than 23dBm in the Information Memorandum.

C. Co-existence of the 800MHz band and the 490-790MHz Broadcasting Band: Mitigation measures

eircom Group has reviewed the evidence presented by ComReg in Annex 10.4. eircom Group has no objection to the proposed licence obligations setting Case A BEMs and a maximum in-block EIRP limit of 59 dBm/5Mhz for the 800MHz band. ComReg goes on to consider the three general categories that potentially lead to a loss or reduction in DTT broadcast reception.

The first category is SINR degradation. ComReg concludes that no specific mitigation measures are required because channel 60 will not be used for DTT purposes in Ireland, subject only to future consideration of a 7th and 8th multiplex, and ComReg believes that any degradation issues in respect of channels 58 and 59 would be of small scale. Any such degradation issue would be addressed through ComReg's statutory obligations to investigate interference. Whilst we generally support the thrust of ComReg's conclusion in this regard we request clarification in respect of the following:

- Use of channels 58 and 59: The current DTT plan shows 8 occurrences of the use of channels 58, and 59. We would welcome confirmation as to the extent of potential use of these channels post ASO.
- Interference investigation: ComReg believes there is potential for SINR degradation to occur in channels 58 and 59 and these would be addressed through its statutory obligations. It is not clear to us what the outcome of such an investigation might be if SINR degradation arose in respect of the transmissions of a mobile operator that is fully compliant with the technical conditions of its licence. We would welcome clarification as to what liability, if any, may arise in respect of a compliant mobile operator.
- Cross border SINR degradation: We would similarly welcome clarification as to what liability, if any, may arise in the event that compliant transmissions of an Irish mobile operator are considered to cause SINR degradation in respect of a DTT service in Northern Ireland.
- Long term planning and potential for second digital dividend: There are currently two of a potential total of eight multiplexes in operation in Ireland. As it stands, the broadcasting band will not be heavily utilised post ASO. This presents a near term opportunity to deliver immediate benefits by eliminating national SINR degradation concerns consistent with supporting longer term opportunities such as the creation of a second digital dividend[55]. eircom Group proposes that the DTT channel plan should be amended to ensure use of the

[55] We welcome ComReg's commitment to explore opportunities for a second digital dividend (ComReg 11/28, Paragraph 7.1.5)

upper channels is minimised to the maximum extent possible and in particular use of channels 58 and 59, in addition to channel 60 should be avoided. This seems to us a reasonable and pragmatic solution to the risk of SINR degradation given the nascent nature of DTT use in Ireland.

The second category is the risk of receiver overload. The extent to which this risk may arise in reality is open to question with the broadcasting community perhaps overstating its likelihood. In any event we agree with ComReg's conclusion that the most effective and appropriate means to address receiver overload is the use of appropriate filters in the DTT receiver system. We welcome ComReg's clarification that the onus rests with the DTT community in Ireland to ensure consumers are suitably advised.

The third and final category is degradation of service from user terminals. eircom Group fully concurs with ComReg that this problem is minor and transitory in nature and is best managed by users of the equipment directly.

Appendix 1: Expert report prepared by Power Auctions LLC on behalf of eircom Group in respect of the ccommodation of Network Sharing Agreements in the Assignment Stage of Ireland's Spectrum Auction

ACCOMMODATION OF NETWORK SHARING AGREEMENTS IN THE ASSIGNMENT STAGE OF IRELAND'S SPECTRUM AUCTION

PREPARED FOR EIRCOM GROUP BY POWER AUCTIONS LLC

30 September 2011

Introduction

Network Sharing Agreements (NSAs) allow telecommunication companies to share tower locations, tower equipment and other infrastructure to operate their networks and provide telecommunications services to their customers. These agreements can be highly welfare enhancing, as they eliminate substantial duplicative costs of building out and running wireless telecommunications networks, without necessarily any accompanying reduction in competition. The cost of building out a network is the major cost component in a company's introduction of new service.

It is now well understood that good auction design is the cornerstone of a successful spectrum award process. A good design should allow participants to express their valuations to the greatest extent possible and to produce efficient allocation. In the context of NSAs, an auction design should allow bidders to express the value of their network sharing agreements as it affects their willingness to pay for the spectrum. For the Ireland award, the proposed Combinatorial Clock Auction (CCA) format, while being a highly advanced and desirable auction design that addresses many important concerns, completely neglects the NSA issue.

In particular, the package-bidding aspect of the CCA format addresses complementarities within spectrum bands, complementarities between different spectrum bands, and complementarities between different time intervals. At the same time, the proposed auction procedures do not provide sufficient flexibility to accommodate a different kind of complementarity that arises as a result of network sharing agreements among the participants. The major obstacle for the efficient integration of the network sharing agreements is the "across-bidders" nature of such complementarities. In general, it is extremely hard to accommodate "across-bidders" complementarities as it would require complex mechanisms for bid coordination among bidders. Unfortunately, such coordination mechanisms are most likely to be used to facilitate non-competitive behaviour instead of serving its intended purpose.

Fortunately, the "across-bidders" NSA complementarity is very simple to accommodate. In order to maximise the value of their NSA, two bidders only need to make sure that, if they each win blocks within the same band, that they are awarded adjacent frequency assignments. There are no other requirements on specific product quantities or bands associated with the NSA complementarity. This simplicity provides a unique opportunity for ComReg to fully accommodate the NSA complementarity within the proposed auction format without adding any complexity or otherwise altering the auction process.

As is standard for the CCA format, the current auction design consists of a Principal Stage, which decides the allocation and pricing of "generic" blocks of various categories of spectrum, and an Assignment Stage, which decides the mapping from generic spectrum to physical spectrum for winners. The expected revenues from the Assignment Stage are negligible as compared to the Principal Stage, where virtually all of the auction revenues are generally derived. The main objective of the Assignment Stage is to achieve an efficient frequency mapping in an expeditious way.

In addition to being a convenient tool for enabling a simple Principal Stage, the Assignment Stage (with only slight modification) can also be used effectively to fully accommodate the NSA complementarity. By focusing on or favouring the assignments that respect the necessary congruity constraints for the NSA participants, the improved auction design can take full advantage of any "across-bidders" NSA complementarity.

The biggest advantage of accommodating NSAs during the Assignment Stage is the elimination of the exposure problem for bidders during the Principal Stage. The spirit of this effect is almost exactly the same as the standard accommodation of the within-bidder complementarity for a bidder who has won multiple "generic" blocks in the same band. Since bidders under an NSA would not need to worry about receiving a non-contiguous assignment, they would have absolutely no incentives to shy away from bidding during the Principal Stage. Therefore, taking into account the NSA complementarity during the Assignment Stage can only promote competition.

Thus, any evaluation of accommodating Network Sharing Agreements in the auction design should be based on weighing the costs and benefits of a relatively negligible diminution of revenues in the Assignment Stage against the potentially quite substantial consumer and social benefits of realising the full potential of NSA complementarities. Accommodating NSAs is required to maximise the utilisation of the spectrum. At the same time, it should be emphasized that accommodating NSAs does not require any adjustment to the Principal Stage, and the mitigation of the exposure problem of the NSA bidders may meanwhile increase their willingness to bid aggressively in the Principal Stage. Therefore, if this change were to reduce auction revenues, the reduction should only be negligible—and the change in auction revenues could well be positive.

To summarise, the main purpose of NSAs is to mitigate the duplicative or unnecessary infrastructure costs of rolling-out duplicate networks for different companies. It is of great social benefit, as it directly reduces the cost of networks, reducing prices and speeding new services in the downstream consumer market. The current auction design fails to recognize the complementarities that arise from NSAs, but only minor modifications to the design are required to accommodate NSA complementarities.

Accommodating NSAs in the Assignment Stage of the Auction

Broadly speaking, there are at least four approaches to accommodating the social benefits of Network Sharing Agreements in the Assignment Stage:

(1) Unconditional direct implementation: only assignments that realise the synergistic values created by NSAs are considered during the Assignment Stage.

(2) Conditional direct implementation: all assignments are considered in the Assignment Stage, but assignments that realise synergistic values of NSAs are given a monetary bonus in the selection (representing an estimate of the realised social value).

(3) Authorisation of communication and coordination among NSA partners but otherwise use the existing proposed rules for the Assignment Stage.

(4) Winners in a given band bid on the entire vector of allocations in the Assignment Stage (as opposed to bidding only on their own allocation).

We discuss each of these approaches, in turn, within the following illustrative example.

An Illustrative Example

Consider the assignment problem that arises when there are three winners (Bidders 1, 2 and 3) in the 800 MHz band, each of whom wins 2 blocks in both time slices. Additionally, assume that two of the winners (Bidders 1 and 2) are partners in a Network Sharing Agreement that allows them to share infrastructure costs if feasible (i.e. in the event that they are assigned contiguous spectrum within the same band). Observe that the auction allocation already encourages (and requires) efficiencies, in the sense that each bidder will win both time slices of the same frequencies block, and each bidder will win two consecutive blocks. As a result, there are only six possible configurations in this example, as seen in the next Table. Moreover, four out of these six alternatives (shaded in yellow) assign contiguous spectrum to the two bidders with a Network Sharing Agreement:

Band Plan	"Lower End" $pos = (1,1,0,0,0,0)$	"Middle" $pos = (0,0,1,1,0,0)$	"Upper End" $pos = (0,0,0,0,1,1)$
1	Bidder 1	Bidder 2	Bidder 3
2	Bidder 1	Bidder 3	Bidder 2
3	Bidder 2	Bidder 1	Bidder 3
4	Bidder 2	Bidder 3	Bidder 1
5	Bidder 3	Bidder 1	Bidder 2
6	Bidder 3	Bidder 2	Bidder 1

Result without Accommodation

Under the current proposed rules, given the very simple structure of the assignment problem in this case, all bidders are presented with a menu consisting of only three different positions: the Lower End; the Middle; and the Upper End of the band.

Additionally, let us assume that Bidders 1 and 2 have a Network Sharing Agreement that creates a synergistic value $v > 0$ if they are assigned adjacent frequencies.

For purely demonstrative purposes, consider the following set of bids[56] in the Assignment Stage:

Bidder	"Lower End" $pos = (1,1,0,0,0,0)$	"Middle" $pos = (0,0,1,1,0,0)$	"Upper End" $pos = (0,0,0,0,1,1)$
Bidder 1	0	5m	10m
Bidder 2	0	5m	9m
Bidder 3	0	6m	9m

Given the bidding data, the total value of bids for each band plan can be easily calculated:

Band Plan	"Lower End" $pos = (1,1,0,0,0,0)$	"Middle" $pos = (0,0,1,1,0,0)$	"Upper End" $pos = (0,0,0,0,1,1)$	Total Value
1	Bidder 1	Bidder 2	Bidder 3	14m + *v*
2	Bidder 1	Bidder 3	Bidder 2	15m
3	Bidder 2	Bidder 1	Bidder 3	14m + *v*
4	Bidder 2	Bidder 3	Bidder 1	16m
5	Bidder 3	Bidder 1	Bidder 2	14m + *v*
6	Bidder 3	Bidder 2	Bidder 1	15m + *v*

Depending on the magnitude of the value *v* created by contiguous spectrum under the Network Sharing Agreement, the value-maximizing band plan is either 4 or 6. Band Plan 6 maximises value subject to Bidders 1 and 2 being awarded adjacent spectrum; while Band Plan 4 maximises value subject to Bidders 1 and 2 being non-adjacent.

The traditional implementation of the Assignment Stage fails to recognize the extra social value generated by the NSA between Bidder 1 and Bidder 2. And unless the bidders in the NSA are permitted to coordinate their bids, it is very difficult for them to bid in such a way as to recognise *v*. The chosen assignment is then efficient only if the value of the NSA is less

[56] A general perception in the industry is that blocks in the middle are worth more than blocks at the lower end, and that blocks at the upper end are more valuable than blocks in the middle.

than 1m. In reality, given the relatively low values that bidders assign to exact frequency allocations (low top-up bids), the value of the NSA is probably much greater. Therefore, the traditional assignment approach to the Assignment Stage may lead to a highly inefficient outcome.

The value maximizing assignment that ignores the NSA value (i.e., as if $v = 0$) is:

Band Plan	"Lower End"	"Middle"	"Upper End"	Total Value
4	Bidder 2	Bidder 3	Bidder 1	16m

Unconditional Direct Implementation

Under the unconditional implementation, only assignments that realise the synergistic values created by Network Sharing Agreements are considered during the assignment stage. That is, in this example, only Band Plans 1, 3, 5 and 6 are considered; the allocation that maximises bids subject to Bidders 1 and 2 being assigned adjacent spectrum is selected.

The chosen outcome might be inefficient when the value of the NSA is relatively low in comparison with the value of different frequency assignments. It should be noted that this appears to be a highly unlikely scenario for Ireland; the relative value of the existing Network Sharing Agreement between O2 and Meteor is likely to exceed the value of winning any specific frequencies by many times over.

The value maximizing assignment under the unconditional implementation of the NSA during the Assignment Stage is:

Band Plan	"Lower End"	"Middle"	"Upper End"	Total Value
6	Bidder 3	Bidder 2	Bidder 1	15m + v

Conditional Direct Implementation

Under the conditional implementation, all assignments are considered, but the auctioneer uses an estimate of the social value of the NSA (including both the value of specific frequencies and the value of the NSA) to calculate the total value of each assignment. The auctioneer's estimate of the NSA value represents the amount of the positive externality. As long as the estimate of the NSA value is correct, this procedure will select the efficient assignment.

The idea of favouring socially-beneficial assignments has long ago become a standard in other industries. In fact, Google, the most successful Internet search engine ever, uses a very similar approach for its ad auctions that assign advertisers to positions on the search screens. Since Google acts as a matchmaker, the main goal of maximizing profits is well aligned with the goal of maximizing the social value of the match. That is why Google augments advertisers' bids by their quality scores in order to assign positions on the screen. The purpose of the quality adjustment process is to better capture social value by allowing bidders with higher quality scores to appear higher on the search screens where they can be easily found by consumers looking for them. In the same spirit, the conditional

implementation of the network sharing agreements will favour the assignments that create an extra social value by awarding the adjacent frequencies to bidders that participate in the NSA.

The value maximizing assignment under conditional implementation of the NSA during the Assignment Stage is then:

i. $v < 1m$

Band Plan	"Lower End"	"Middle"	"Upper End"	Total Value
4	Bidder 2	Bidder 3	Bidder 1	16m

ii. $v > 1m$

Band Plan	"Lower End"	"Middle"	"Upper End"	Total Value
6	Bidder 3	Bidder 2	Bidder 1	15m + *v*

The main advantage of this approach is that all possible assignments are considered during the Assignment Stage, not only those that result in a contiguous spectrum for bidders with network sharing agreement.

Authorisation of communication and coordination

One very simple approach for accommodating NSA externalities is to remove the usual proscription on bidding communication and bidding coordination among NSA partners in the Assignment Stage (but not in the Principal Stage). Without making any other change in the auction rules, Bidders 1 and 2 are allowed to communicate with each other and make bidding agreements before placing their Assignment Stage bids. For example, the bidders might agree that Bidder 2 will place a substantial bid for the "Middle", while Bidder 1 will place a substantial bid for the "Upper End" and a modest bid for the "Lower End".

Given an NSA value *v* greater than 1m, it seems as though the bids of Bidders 1 and 2 will be sufficiently large to yield:

Band Plan	"Lower End"	"Middle"	"Upper End"	Total Value
6	Bidder 3	Bidder 2	Bidder 1	15m + *v*

Bidding on the entire vector of allocations

As noted above, the current proposed rules would present bidders with a menu consisting of only their own positions: the Lower End; the Middle; and the Upper End of the band. However, given that Bidders 1 and 2 care not only about their own location in the spectrum but also the location of their NSA partner, it may be natural instead to allow bidders to bid on the entire vector of allocations.

Thus, in this example, rather than bidding on a menu of three locations ("Lower End", "Middle", and "Upper End"), bidders would bid on a menu consisting of all six Band Plans.

Bidders 1 and 2 would clearly submit nonzero bids only on Band Plans 1, 3, 5 and 6. Given an NSA value *v* greater than 1m, it seems likely that the bids of Bidders 1 and 2 will be sufficiently large to yield:

Band Plan	"Lower End"	"Middle"	"Upper End"	Total Value
6	Bidder 3	Bidder 2	Bidder 1	15m + *v*

In any event, this result is clearly more likely to arise when bidders bid on the entire vector of allocations than when bidders can only bid on their own locations.

Technical Description of the Assignment Stage

This section describes some of the technical detail of implementing the Conditional and Unconditional Direct Implementations.

A typical band contains N generic blocks of spectrum that need to be assigned to K bidders during the Assignment Stage of the auction.[57] In the event that not all N blocks are awarded, i.e. if the number of unsold blocks is positive, let K include the seller as a regular winner of the unsold blocks. For each bidder $k \in K$, let s_k be a number of generic blocks that a bidder k won during the Principal Stage of the auction. Therefore, the assignment problem can be completely described by a vector $\boldsymbol{s} = (s_1, s_2, ..., s_K)$ subject to $\sum_{k=1}^{K} s_k = N$.

The standard contiguity constraint on bidders' blocks results in a total of $K!$ possible band plans.

For the Assignment Stage, all bidders $k \in K$ are presented with a bidder-specific set of all possible bundles (or *positions*) that are consistent with the winning of s_k contiguous blocks. Let $pos \in \{0,1\}^N$ be a characteristic vector (or *position vector*) that corresponds to a particular position. For a bidder $k \in K$, a position vector $pos \in \{0,1\}^N$ is consistent with the winning of s_k contiguous blocks if the following three conditions are satisfied:

i. A position vector pos covers s_k blocks;

ii. A position vector pos corresponds to a set of contiguous blocks in the band;

iii. A position vector pos does not prevent other bidders in the set K from getting a contiguous assignment.

Example: *Consider an assignment problem for the band with four generic lots and two bidders who won two blocks each, i.e.,* $N = 4$, $K = 2$, $\boldsymbol{s} = (s_1, s_2) = (2,2)$. *There are three possible position vectors that satisfy the first and second conditions* $\{(1,1,0,0),(0,1,1,0),(0,0,1,1)\}$ *with only two of them simultaneously satisfying the third condition* $\{(1,1,0,0),(0,0,1,1)\}$. *Therefore, in this example each bidder would be presented with only two possible positions during the Assignment Stage.*

Denote POS_k a set of all possible positions for a bidder $k \in K$ that are consistent with a winning of s_k contiguous blocks. During the Assignment Stage Bidding Round, each bidder $k \in K$ is allowed to place nonnegative bids on all positions in POS_k. In case a bidder $k \in K$ does not specify bid amounts for some positions in POS_k, zero bids are entered automatically for these positions. Denote BID_k a set of final bids for a bidder $k \in K$ in the

[57] With a slight abuse of notation, N represents both the number and the set of blocks for a given band, K represents both the number and the set of winners for a given band.

Assignment Stage. Denote b_{ik} a bid amount for the position pos_{ik} by a bidder $k \in K$. Also pos_{ik}^{j} is the j[th] element of the position vector pos_{ik}.

Result without Accommodation

In order to find the final band plan, the following binary optimization problem has to be solved:

$$\underset{\{\gamma\}}{Max} \sum_{k \in K} \sum_{i \in POS_k} b_{ik} \gamma_{ik}$$

subject to:

$$\sum_{k \in K} \sum_{i \in POS_k} pos_{ik}^{j} \gamma_{ik} = 1 \quad \forall j \in N \tag{1}$$

$$\sum_{i \in POS_k} \gamma_{ik} = 1 \qquad \forall k \in K$$

$$\gamma_{ik} \in \{0,1\} \qquad \forall k \in K, \quad \forall i \in POS_k$$

Corresponding payments are calculated using the second-price rule.

Conditional Direct Implementation

For simplicity only one network sharing agreement is considered. The following approach can be easily generalized for any number of existing network sharing agreements among bidders in K. Let A denote the subset of bidders who have an existing network sharing agreement among them. Denote $v > 0$ an extra social benefit that results from the fully contiguous assignment for bidders in A. Additionally to the main assignment stage, consider an abstract assignment stage problem with the same set of objects to be assigned, all winners from set A who collectively has to be assigned $s_A = \sum_{a \in A} s_a$ blocks and a phantom bidder h who has to be assigned $N - S_A$ blocks (not necessary contiguous).

The set of all possible positions for the phantom bidder, POS_h, is generated in a similar way with an exception of possible non-contiguity of $N - S_A$ blocks. To be precise, a position vector pos belongs to the POS_h if it satisfies only two conditions:

i. A position vector pos covers exactly $N - S_A$ blocks;

ii. A position vector pos does not prevent bidders in the set A from getting a contiguous assignment.

Also, such positions in POS_h can be generated as complements to the jointly feasible positions of the bidders in set A.

For those positions of the phantom bidder h that guarantee a contiguous spectrum assignment for bidders in A in the abstract assignment problem, v, the NSA value, is entered as a bid amount. Other positions of the phantom bidder h receive default zero bids. Note that the phantom bidders is neither part of the set K nor A.

In order to find the final band plan, the following binary optimization problem has to be solved:

$$\underset{\{\gamma\}}{Max} \sum_{k\in K} \sum_{i\in POS_k} b_{ik}\gamma_{ik} \quad + \quad \sum_{i\in POS_h} b_{ih}\gamma_{ih}$$

subject to:

$$\begin{aligned}
&\sum_{k\in K} \sum_{i\in POS_k} pos_{ik}^{j}\gamma_{ik} = 1 \quad \forall j \in N \\
&\sum_{a\in A} \sum_{i\in POS_a} pos_{ia}^{j}\gamma_{ia} + \sum_{i\in POS_h} pos_{ih}^{j}\gamma_{ih} = 1 \quad \forall j \in N \\
&\sum_{i\in POS_k} \gamma_{ik} = 1 \qquad \forall k \in (K \cup h) \\
&\gamma_{ik} \in \{0,1\} \qquad \forall k \in (K \cup h), \quad \forall i \in POS_k
\end{aligned} \tag{2}$$

Corresponding payments are calculated using the second-price rule.

Unconditional Direct Implementation

The previous formulation for the conditional implementation of the network sharing agreement can be easily adopted for the unconditional implementation.

The only difference is the set of bids submitted on behalf of the phantom bidder h. Unlike the conditional implementation of the network sharing agreement (2), only those positions of the phantom bidder h that guarantee contiguous spectrum assignment for bidders in A in the abstract assignment problem are generated. Therefore, POS_h only includes such positions.

In order to use previous formulation for the unconditional implementation, default zero bids are entered for all positions in POS_h. With these modifications, the formulation of the binary optimization problem (2) can be used for both conditional and unconditional network sharing agreement implementations.

Appendix 2: Expert report prepared by Power Auctions LLC on behalf of eircom Group in respect of rebate calculation for GSM License liberalisation in Ireland

REBATE CALCULATION FOR GSM LICENSE LIBERALISATION IN IRELAND: A REVIEW AND RECOMMENDATION

PREPARED FOR METEOR BY POWER AUCTIONS LLC

12 October 2011

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Executive Summary

In this document, we briefly review the rebate calculation proposals brought forth so far and point out our concerns with each of them. We then recommend a new rebate calculation based on ComReg's and DotEcon's proposed approaches. Our calculation builds upon previous calculations by: correcting some apparent calculation errors in DotEcon's report (Document No. 11/58); accounting for growth in the wireless market;removingan unnecessary inflation adjustment; and accounting for the short period before the licences went into use. Using these adjustments, we recommend rebates of € 2.73m for Vodafone, € 2.73m for O2, and €7.72m for Meteor.

Review of Previous Rebate Calculations

Due to the number and variety of the calculations, a short summary of the rebate calculations proposed up to this point is in order.

In Document No. 10/105 (henceforth, the "10/105 Consultation"), ComReg agrees that it is appropriate to issue a rebate in the event that an incumbent GSM operator agrees to early liberalization. On page 34, table 2 of 10/105, ComReg computes proposed rebates for each of the parties as follows:

Table 1. ComReg Initial Proposed Rebate Calculation (10/105)

Operator	Spectrum	Proposed Rebate
Vodafone	1800 MHz band 2x14.4 MHz	€ 1.28m
O2	1800 MHz band 2x14.4 MHz	€ 1.28m
Meteor	1800 MHz band 2x14.4 MHz	€ 2.03m
Meteor	900 MHz band 2x7.2 MHz	€ 1.01m

Source: Document No. 10/105, Table 2 (p.34), last column.

ComReg's initial proposed rebate calculation does not account for the time value of money, an important factor that is taken into account in subsequent calculations. However, even taking the methodology at face value, DotEcon identified some flaws in the computation of Meteor's rebate. First, ComReg does not include the € 1.9m administrative fee (to cover the costs of the award process) that Meteor paid as part of its initial spectrum fees in June 2000. In addition, ComReg used a time period of 2.5 years out of a total of 15 years for both parts of Meteor's rebate. In reality, Meteor paid for 2.2 MHz of additional 900 Mhz spectrum with a term starting 6 months after the initial term. So, for part of Meteor's payment (approximately € 1.6m) the straight-line proportion of the licence period foregone should be 29 months / 174 months = 0.167 and for the other part (approximately € 12.7m) the straight-line proportion of the licence period foregone should be 29 months/ 180 months = 0.161.

In Document No. 11/58 (henceforth, the "11/58 Report"), DotEcon recomputes values using ComReg's methodology with these twocorrections, resulting in a modified rebate total of € 3.42m for Meteor.

Table 2. DotEcon's recalculation of ComReg's Initial Proposed Rebate Calculation (11/58)

Operator	Spectrum	Proposed Rebate
Meteor	1800 MHz band 2x14.4 MHz 900 MHz band 2x4.8 MHz	€3.08m
Meteor	900 MHz band 2x2.4 MHz	€0.34m

Source: Document No. 11/58, Table 3 (p. 88), last row, and Table 4 (p. 89), last row.

In response to Consultation 10/105, Meteor proposed a modification to the ComReg calculation that accounts for the time value of money. The licence costs are adjusted using Meteor's Weighted Average Cost of Capital (WACC) of 10.21% instead of the Consumer Price Index (CPI). This resulted in a modified rebate of € 4.3m for the 1800 MHz spectrum and € 2.1mfor the 900 MHz spectrum, for a total rebate of € 6.4m for Meteor.

In the 11/58 Report on pages 87 - 89, DotEcon also recomputes values based on Meteor's proposed methodology, with the same corrections as outlined above and with an inflation adjustment included. The results of their calculations are summarized in the table below:

Table 3. DotEcon's Recalculation of Meteor's Proposed Rebate Calculation (11/58)

Operator	Spectrum	Proposed Rebate
Vodafone	1800 MHz band 2x14.4 MHz	€3.74m
O2	1800 MHz band 2x14.4 MHz	€ 3.74m
Meteor	1800 MHz band 2x14.4 MHz	€ 8.90m
Meteor	900 MHz band 2x7.2 MHz	€ 0.93m

Source: Document No. 11/58, Table 2 (p.87), middle row; Table 3 (p. 88), middle row; and Table 4 (p. 89), middle row.

In addition, in their 11/58 Report, DotEcon introduced a new methodology for computing the rebates and applied it to all three operators. First, DotEcon acknowledged that it is correct to account for the time value of money and adopted Meteor's use of a discount rate of 10.21% (Meteor's WACC). Second, DotEcon argued that Meteor is applying the WACC incorrectly to the undiscounted price. Third, DotEcon assumed "a constant stream of annualised payment over the term of licence (i.e. g=0) as there is no strong rationale for increasing or decreasing rental values over period." We will address this rather severe assumption in our critique below. DotEcon'scalculations are summarized in the next table:

Table 4. DotEcon's Recommended Rebate Calculation (11/58)

Operator	Spectrum	Proposed Rebate
Vodafone	1800 MHz band 2x14.4 MHz	€0.81m
O2	1800 MHz band 2x14.4 MHz	€0.81m
Meteor	1800 MHz band 2x14.4 MHz 900 MHz band 2x4.8 MHz	€ 3.51m
Meteor	900 MHz band 2x2.4 MHz	€ 0.35m

Source: Document No. 11/58, Table 2 (p.87), first row; Table 3 (p. 88), first row; and Table 4 (p. 89), first row.

Finally, in Document No. 11/60 (henceforth, the "11/60 Consultation"), on page 98 in Table 3, ComReg computes new proposed rebates using the same methodology as in the initial 10/105 Consultation, with none of the above errors corrected but substituting the Euribor rate for the CPI. ComReg computed the Euribor rate at 42.7% for a start date of Jan. 2000 and 43.8% for a start date of July 2000. This results in new proposed rebates that are summarized in the table below:

Table 5. ComReg's Revised Proposed Rebate Calculation (11/60)

Operator	Spectrum	Proposed Rebate
Vodafone	1800 MHz band 2x14.4 MHz	€ 1.37m
O2	1800 MHz band 2x14.4 MHz	€ 1.37m
Meteor	1800 MHz band 2x14.4 MHz	€ 2.28m
Meteor	900 MHz band 2x7.2 MHz	€1.14m

Source: Document No. 11/60, Table 3 (p.98), last column.

Critique of DotEcon's Recommended Rebate Calculation

We have reviewed DotEcon's recommended rebate calculation and we have found that there is considerable merit to its approach. However, we have three significant critiques of the rebate calculations that are contained in the 11/58 Report:

- We have attempted to reproduce DotEcon's recommended rebate calculation (as displayed in Tables 2-4 of the 11/58 Report) and we have found the numbers to be irreproducible.
- DotEcon assumes "a constant stream of annualised payment over the term of licence (i.e. g=0) as there is no strong rationale for increasing or decreasing rental values over period." This seems to be an absurd assumption to make for mobile telephone licences.
- Despite that it is beneficial to Meteor, we have no understanding why DotEcon would include both an adjustment for the time value of money and an adjustment for inflation. It seems to us that only an adjustment for the time value of money is appropriate.

On the first critique, we took DotEcon's methodology as given and attempted to reproduce the recommended rebates for Vodafone, O2 and Meteor. As best we can determine, the rebate values displayed in Tables 2-4 of the 11/58 Report were calculated incorrectly for all three operators. Our attempt to correct the calculations based on DotEcon's methodology (which we nevertheless do not adopt, owing to the second critique) is summarized in the next table:

Table 6. Power Auctions' Recalculation of DotEcon's Recommended Approach

Operator	Spectrum	Proposed Rebate
Vodafone	1800 MHz band 2x14.4 MHz	€ 1.82m
O2	1800 MHz band 2x14.4 MHz	€ 1.82m
Meteor	1800 MHz band 2x14.4 MHz 900 MHz band 2x4.8 MHz	€ 4.44m
Meteor	900 MHz band 2x2.4 MHz	€ 0.48m

Source: Power Auctions spreadsheet (available upon request).

We are unclear as to the source of the errors in the 11/58 Report. However, at the very outset, the comparison between Tables 2 and 3 of the 11/58 Report should be viewed with some unease. DotEcon's calculation of Meteor's rebate for its July 2000 licences (€ 3.51m) is more than four times DotEcon's calculation of Vodafone's and O2's rebates for their January 2000 licences (€0.81m), despite that they have fairly similar issue and expiry dates and Meteor's price (€14.60m) was approximately two times Vodafone's and O2's prices (€7.12m).

As to the second critique, DotEcon states in clause 303 of the 11/58 Report:

> This approach is consistent with the methods used in the benchmarking exercise for rebasing the prices of licences to account for differences in licence length. We assume a constant stream of annualised payment over the term of licence (i.e. g=0) as there is no strong rationale for increasing or decreasing rental values over period.

Power Auctions finds the assertion that there is no strong rationale for an increasing rental value over time to be absurd. For many years, the mobile telephone market has been considered to be one of the fastest-growing sectors of the economy. For example, in 1992, in a study of competition in the US mobile market, the government's General Accounting Office began its study by writing:

> The U.S. cellular telephone service industry has grown from an industry with about 92,000 subscribers in 1984 to about 7.6 million subscribers in 1991, making it one of the fastest growing industries in the country.

The current radio spectrum licensing homepage of ComReg begins by stating:

> Mobile communications is one of the fastest growing sectors of telecommunications with mobile phone penetration rates in Ireland now exceeding 100%.

ComReg's own data indicates a high growth rate in spectrum usage, implying a high growth rate in the annualized value that can be imputed to spectrum licences. For example, the Irish mobile penetration rate was 121% in Q1'08, as compared to 88% in Q1'04 and only 45% in Q1'00. The SMS volume was 2,362 millionin Q1'08, as compared to 910million in Q1'04 and fewer than 100million in Q1'00.[58] Observe that the annualized growth of the penetration rate of the Irish mobile market from Q1'00 to Q1'08 was therefore 13% per year; and the annualized growth of SMS volume from Q1'00 to Q1'08 was 52% per year. Moreover, mobile operators who sought spectrum licences in Ireland in the year 2000 were fully cognizant of the likelihood of a high rate of growth in the market. To say that "there is no strong rationale for increasing or decreasing rental values over period" is, to us, absurd.

As to the third critique, we are assuming that 10.21%, the weighted average cost of capital of Eircom set by ComReg in 2008, is based on nominal euro, not on real euro. If we are mistaken, then we stand corrected.

Critique of ComReg's Proposed Rebate Calculation

We have reviewed ComReg's proposed rebate calculation and we have found that there is also some merit to its approach. In particular, we share ComReg's conclusion of attributing approximately equal value to every year of the licence—the difference being that we obtain this conclusion by using a 10% annualized growth rate in the licence value, in conjunction with a discount rate equaling Meteor's Weighted Average Cost of Capital (WACC) of 10.21%. However, we have three significant critiques of the proposed rebate calculations that are contained in the 11/60Consultation:

- ComReg does not take account of the operators' true cost of capital, which is the correct concept to be applying.
- ComReg fails to make the two corrections to its calculations that even its consultant DotEcon recommended: adding the administrative fee associated with the licence assignment in the initial licence cost; and correcting the relevant time periods.
- Additionally, we note that Meteor reports that it did not begin providing service using the licences until February 2001. Therefore, the first seven months of the licences issued in July 2000, and the first month of the licence issued in January 2001, should be deleted from the calculations.

On the first critique, we note that by applying only a Euribor adjustment, ComReg erroneously imputes a cost of capital to a wireless operator that is based on a short-term[59], risk-free[60] rate of return. By way of contrast, investments in the telecommunications industry are in actuality long-term in nature and highly risky—recall the plunge in telecommunications valuations that

[58] ComReg, *Irish Communications Market: Key Data Report – June 2008*, Figures 4.1.1.1 and 4.2.1.1; ComReg, *Irish Communications Market: Key Data Report – June 2004*, Figures 2.2.1 and 2.2.5; Office of the Director of Telecommunications Regulation, *Irish Telecommunications Market: Quarterly Review* – March–May 2000, Section 3.2.

[59] In footnote 94 on p. 98 of the 11/60 Consultation, ComReg states that it utilized a 12-month Euribor rate. We note that the licence durations are 15 years, and that 15-year interest rates are invariably far greater than 1-year interest rates.

[60] For example, the Wikipedia entry on 9 October 2011 for *risk-free interest rate* stated: "Risk-free assets usually refer to short-dated government bonds. For USD investments, usually US Treasury bills are used, while a common choice for EUR investments are German government bills or Euribor rates."

accompanied the bursting of the dot-com bubble in 2000. Any assumption that a wireless operator's cost of capital is a short-term, risk-free rate is obviously fallacious.

As to the second critique, we only note that DotEcon has persuasively made the argument for its corrections in the 11/58 Report.

As to the third critique, we observe simply that, if Meteor was unable to initiate providing service using the licences until February 2001, then for valuation purposes, Meteor's licences effectively had durations of only 14 years and 5 months. This adjustment will not have a substantial effect on the rebate calculations, but the calculations are still more valid with the date-of-service adjustment than without them.

Power Auctions'Recommended Rebate Calculation

We propose combining all the improvements made by the DotEcon approach with some additional improvements. First, we do not understand why an inflation adjustment is being added on top of the WACC adjustment, and we suggest removing this uplift. Next, we do not believe that an assumed growth rate of 0% in the value stemming from the licence in DotEcon's calculations is defensible. In our calculations in Tables 7 and 8 below, we consider the effect of assuming 5%, 10% and 15% growth rates, respectively, in the last three columns.

We believe that an annual rate of growth in the range of 10 – 15% is appropriate. As noted above, the annualized growth of the penetration rate of the Irish mobile market from Q1'00 to Q1'08 was 13% per year. Another benchmark upon which one may turn is that the annual growth rate of the global wireless industry, by revenue, from 1999 to 2003 was just over 16%.[61] At the end of the day, our best assessment of the growth rate to apply to the value of each licence over the entire period is 10% per year. Observe that one advantage of selecting this growth rate is that it recovers ComReg's initial intuition that approximately equal values should be imputed to each year of the licence. With an annual growth rate of 10% approximately equaling the discount rate of 10.21%, the relative licence value in year t (discounted to year 0) is:

$$\frac{(1+.10)^t}{(1+.1021)^t} = .9981^t \approx 1.$$

In Table 7 below, we consider the effect of assuming 5%, 10% and 15% growth rates, respectively, in the last three columns. We highlight the column that utilizes a 10% growth rate, as this appears to us to be the most appropriate choice of growth rate.

In Table 8 below, we repeat the same calculations as in Table 7, but we make further adjustmentfor Meteor's report that it did not begin providing service using the licences until February 2001. Therefore, the first seven months of the licences issued in July 2000, and the first month of the licence issued in January 2001, should be deleted from the calculations. Thus, for valuation purposes, Meteor's licences effectively had durations of only 14 years and 5 months. This adjustment does not have a substantial effect on the rebate calculations, but the calculations are still more valid with the date-of-service adjustment than without them.

[61] "Global Wireless Telecommunications Services," Data Monitor, reference code 0199-2154, May 2004.

We highlight the column of Table 8 corresponding to the 10% annual growth rate in licence value, as the assumptions made in computing this column seem the most appropriate for the rebate calculation. Note that our recommended rebates for Vodafone and O2 do not include a date-of-service adjustment, as we do not have any information as to whether there was any delay between the issue date of January 2000 and the dates that Vodafone and O2 began service using these spectrum allotments. If there was delay, then the corresponding adjustments should also be made for Vodafone and O2.

Our methodology yields a recommended rebate of € 6.99m, based on Meteor's July 2000 payment of € 14.6m,and a recommended rebate of € 0.73m, based on Meteor's January 2001 payment of € 1.59m. The corresponding methodology yieldsrecommended rebates of € 2.73m for Vodafone and O2 based on their January 2000 payments of € 7.12m each.

Table 7. Power Auctions'recommended approach, without adjustment for date of service

Operator	Spectrum	Rebate calc., under 5% growth rate	Rebate calc., under 10% growth rate	Rebate calc., under 15% growth rate
Vodafone	1800 MHz band 2x14.4 MHz	€1.97m	€ 2.73m	€3.59m
O2	1800 MHz band 2x14.4 MHz	€ 1.97m	€ 2.73m	€3.59m
Meteor	1800 MHz band 2x14.4 MHz 900 MHz band 2x4.8 MHz	€4.91m	€ 6.72m	€8.74m
Meteor	900 MHz band 2x2.4 MHz	€ 0.53m	€ 0.72m	€ 0.93m

Source: Power Auctions spreadsheet (available upon request).

Table 8. Power Auctions' recommended approach, with adjustment for date of service

Operator	Spectrum	Rebate calc., under 5% growth rate	Rebate calc., under 10% growth rate	Rebate calc., under 15% growth rate
Vodafone	1800 MHz band 2x14.4 MHz	€ 1.97m	€ 2.73m	€ 3.59m
O2	1800 MHz band 2x14.4 MHz	€ 1.97m	€ 2.73m	€ 3.59m
Meteor	1800 MHz band 2x14.4 MHz 900 MHz band 2x4.8 MHz	€ 5.19m	€ 6.99m	€ 8.99m
Meteor	900 MHz band 2x2.4 MHz	€ 0.54m	€ 0.73m	€ 0.93m

Source: Power Auctions spreadsheet (available upon request).

Note: Shaded column provides Power Auctions' recommended rebates.

Finally, in Table 9, we provide a comparison of the various rebate proposals and recommendations:

Table 9.Comparison of Rebate Calculations

Method	Rebate Amount		
	Vodafone	O2	Meteor
ComReg original proposal 10/105	€1.28m	€1.28m	€ 2.03m + € 1.01m = € 3.04m
Meteor proposal	N/A	N/A	€ 4.3m + € 2.1m = € 6.4m
DotEcon version of Meteor proposal 11/58	€3.74m	€3.74m	€ 8.90m + € 0.93m = € 9.83m
DotEconrecommendation 11/58	€0.81m	€0.81m	€ 3.51m + € 0.35m = € 3.86m
DotEcon recommendation 11/58, as corrected by Power Auctions	€ 1.82m	€ 1.82m	€ 4.44m + € 0.48m = € 4.92m
ComReg updated proposal 11/60	€ 1.37m	€ 1.37m	€ 2.28m + € 1.14m = € 3.42m
Power Auctions recommendation, using 5%growth rate and date-of-service adjustment	€1.97m	€1.97m	€5.19m + € 0.54m = € 5.73m
Power Auctions recommendation, using 10% growth rate and date-of-service adjustment	€ 2.73m	€ 2.73m	€ 6.99m + € 0.73m = € 7.72m
Power Auctions recommendation, using 15% growth rate and date-of-service adjustment	€ 3.59m	€ 3.59m	€ 8.99m + € 0.93m = € 9.92m

Source: Collected from tables above.

Note: Shaded row provides Power Auctions' recommended rebates.

Power Auctions' Recommended Cost Allocation

Finally, it is possible that Meteor may choose to liberalise its 900 MHz spectrum but not its 1800 MHz spectrum, or may choose to liberalise its 1800 MHz spectrum but not its 900 MHz spectrum. In order to address how much of a rebate Meteor should receive in these eventualities, it is necessary to do a cost allocation of the rebate arising from the payment of € 14.60m for the licence issued to Meteor in July 2000. This licence encompassed 2x4.8 MHz of 900 MHz spectrum and 2x14.4 MHz of 1800 MHz spectrum.

In ComReg's proposals to date, ComReg has implicitly proposed *the same or higher* €/MHz cost allocation to the 1800 MHz as to the 900 MHz spectrum. This can be seen in the proposals from the 10/105 Consultation (as reviewed in Table 1, above) and the 11/60 Consultation (as reviewed in Table 5, above). Both of these consultations propose fully *double* the rebate to the 1800 MHz spectrum as to the 900 MHz spectrum. Such an allocation seems to Power Auctions to be clearly incorrect, for several reasons:

- It is well understood (in the year 2000 and in the year 2011) that 900 MHz spectrum is worth substantially more than 1800 MHz spectrum.
- This assessment was reflected at the time in ComReg's pricing of spectrum to Vodafone and O2, who received their 900 MHz and 1800 MHz spectrum in separate allocations. Vodafone and O2 each paid €12.70m (i.e. €0.882m per MHz) for their 900 MHz allocations—see p. 63 of ComReg 11/29—and €7.12m (i.e. €0.247m per MHz) for their 1800 MHzallocations.

- Spectrum valuations were generally higher when Vodafone and O2 received their 1800 MHz licences than when they received their 900 MHz licences, and so the 0.882/0.247 = 3.57 ratio likely understates the true value ratio in the year 2000.
- Observe that Vodafone and O2 paid €7.12m for a licence comprising 2x14.4 MHz of 1800 MHz spectrum issued in January 2000 while Meteor paid €14.60m for a licence comprising 2x14.4 MHz of 1800 MHz spectrum and 2x4.8 MHz of 900 MHz spectrum in July 2000. Constant prices would imply that Meteor paid €7.48m(i.e. €0.779m per MHz) for 2x4.8 MHz of 900 MHz spectrum in July 2000—see Tables 2 and 3 of the 11/58 Report.
- In August 2011, ComReg proposed a ratio of 2:1 for reserve prices of 800 and 900 MHz spectrum as compared to 1800 MHz spectrum for the multi-band spectrum release in Ireland—see the 11/60 Consultation.
- In May 2011, Ofcom proposed reserve prices of £3m per MHz for 800 MHz spectrum and £0.5m per MHz for 1800 MHz spectrum in the upcoming UK combined auction. This would represent amuch more realistic value ratio of 6:1.[62]

Thus, Power Auctions' recommended allocation of this payment (and hence of this rebate) is 3.57:1 on a per-MHz basis, derived from ComReg's pricing of spectrum to Vodafone and O2. Applying this cost allocation to the recommended rebate of Table 8 yields the following separate rebates:

Table 10. Power Auctions' recommended allocation of rebates between 900 MHz and 1800 MHz spectrum

Operator	Spectrum	Total rebate from Table 8	Portion allocated to 900 MHz spectrum	Portion allocated to 1800 MHz spectrum
Licence issued in Jan. 2000	1800 MHz band 2x14.4 MHz 900 MHz band 2x4.8 MHz	€ 6.99m	€3.80m	€3.19m
Licence issued in July 2000	900 MHz band 2x2.4 MHz	€ 0.73m	€ 0.73m	—
Total allocation of rebates			€4.53m	€ 3.19m

Source: Power Auctions spreadsheet (available upon request).

Note: Shaded row provides Power Auctions' recommended cost allocation of rebates.

Therefore, at the end of the day, we recommend a rebate of € 4.53m to be allocated to the 900 MHz spectrum and a rebate of € 3.19m to be allocated to the 1800 MHz spectrum.

[62]Ofcom, *Consultation on assessment of future mobile competition and proposals for the award of 800 MHz and 2.6 GHz spectrum and related issues*, 22 March 2011,Table 8.2.

a. Supplemental submission received 18 October 2011

Meteor Mobile Communications Limited

1 Heuston South Quarter,
St. Johns Road, Dublin 8.

Tel: +353 1 430 7000 Fax: +353 1 430 7010
Email: info@meteor.ie

18th October 2011

Sinead Devey
Commission for Communications Regulation
Irish Life Centre
Abbey Street
Dublin 1

By email

Dear Sinead,

Supplemental Submission re ComReg 11/60

With reference to our submission to ComReg 11/60 submitted on 14th October and our comments under the heading "*Error in the calculation of reserve prices and SUFs from the Minimum price*" commencing on page 21 of that submission. We feel it would be helpful to further clarify our position on the correct method to derive proposed reserve prices from the proposed minimum price and request that ComReg gives due regard to this supplemental submission.

In our response we illustrated, in an approximate manner, the error in ComReg's calculation and a more appropriate approach, using six monthly discount factors, to better address the part year component of Temporal Lot 1, 1st February 2015 to 12th July 2015. We set out in the attached spreadsheet our view of the appropriate method to calculate the reserve prices. We further prove our approach by reverse engineering from the derived SUFs (the method used to calculate the SUFs is not in dispute). For illustrative purposes we have used ComReg's proposed minimum price of €20m per sub-1GHz block as set out in ComReg 11/60, although as highlighted in our submission of 14th October, we do not agree with that proposed minimum price.

As illustrated in the 'Comment' tab of the attached spreadsheet, the correct and precise reserve prices, based on ComReg's proposed minimum fee for sub-1GHz spectrum, are €2.74m for Temporal Lot 1 and €7.88m for Temporal Lot 2. We note these prices are expressed in February 2013 terms and adjustments will be made for the time value of money between the proposed auction and 1st February 2013, as clarified in Dr Ritchie's email to us of 16th September 2011.

Yours sincerely,

W. McCoubrey

William McCoubrey
Head of Regulatory Affairs

Comreg Calculation

1. Comreg has used a discount rate of 10.2%
2. To account for Two temporal lots Comreg has defined the following time periods:
   Temporal Lot 1: commencing 1st Feb 2013 until 31st July 2015, with 3 payment/discount factor dates 1) 1st Feb 2013, 2) 1st Feb 2014 and 3) 1st August 2014
   Temporal Lot 2: commencing 1st August 2015 until 31st July 2030 with 16 payment/Discount factor dates, 1st commencing 1st Feb 2015, 2nd - 15th payment is Feb of following yrs, 15th Payment Jul 2029 and 16th/final payment Feb 2030
3. a) The NPV of constant cashflow of €1/year at 1st Feb 2013 is as follows:

Temporal Lot 1	2.77
Temporal Lot 2	7.03
First 15 years	8.29

   b) Assuming SUF €1.21 per annum results in reserve price of:

Temporal Lot 1	3.34
Temporal Lot 2	8.48

Issues/Correction

1. a) Temporal Lot 1: 3rd payment is one year after the second payment and the time period is for 44.38% of one yr i.e. 1st Feb 2014 to 13th July 2015, therefore the discount factor should be multiplied by % Year:
   0.823449*44.38% = 0.365
   It is incorrect to adjust the discount factor by assuming a payment date of 1st August 2014 to take account of 0.5yr payment as this will a) results in an increased reserve price by bringing forward payment date and b) does not take account that 3rd payment is 50% (should be 44.4%) of 2nd payment
   a) Temporal Lot 2: There should be 15 equal annual SUF payments commencing 13th July 2015 (v's 16 commencing 1st feb 2015) and ending 13th July 2029
2. a) The NPV of constant cashflow of €1/year at 1st Feb 2013 is as follows:

Temporal Lot 1	2.27
Temporal Lot 2	6.53
First 15 years	8.29

   b) Assuming SUF €1.21 per annum results in reserve price of:

Temporal Lot 1	2.74
Temporal Lot 2	7.88

Alternatively, we can calculate the NPV of annual SUF's which should closely equate to the reserve price above

		Year 0	Year 1	Year 2	Year 3	
Temporal Lot 1		01-Feb-13	01-Feb-13	01-Feb-14	01-Feb-15	13-Jul-15
% Year		0.0%	100.0%	100.0%	44.4%	
Discount Factor	10.21%					
Deposit	01-Feb-13					
SUF Cashflow - Undiscounted	1.21	0	1.21	1.21	0.54	
Discount Factor[1]		**1.000**	**1.000**	**0.907**	**0.823**	
Discounted Cashflow		2.75	1.21	1.10	0.44	
or						
XNPV @ 1st Feb 2013[2]		2.75				

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Timeslice 2	01-Feb-13	13-Jul-15	13-Jul-16	13-Jul-17	13-Jul-18	13-Jul-19	13-Jul-20	13-Jul-21	13-Jul-22	13-Jul-23	13-Jul-24	13-Jul-25	13-Jul-26	13-Jul-27	13-Jul-28	13-Jul-29
SUF Cashflow - Undiscounted		1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21
Discount Factor[1]	**1.000**	**0.789**	**0.715**	**0.649**	**0.589**	**0.534**	**0.485**	**0.440**	**0.399**	**0.362**	**0.328**	**0.298**	**0.270**	**0.245**	**0.223**	**0.202**
Discounted Cashflow	7.90	0.95	0.87	0.79	0.71	0.65	0.59	0.53	0.48	0.44	0.40	0.36	0.33	0.30	0.27	0.24
or																
XNPV @ 1st Feb 2013[2]	7.90															

[1] Using dates to calculate discount factor

[2] Using formula XNPV= (Discount Rate, SUF payments, Payment Dates)

(Inputs in orange)

Discount rate	10.20%

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Year count	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Cumulative Discount Factor given discount rate above	1	0.907441016	0.82345	0.74723	0.67807	0.61531	0.55836	0.50667	0.45978	0.41722	0.3786	0.34356	0.31176	0.2829	0.25672	0.23296	0.21139	0.19183
			0.86443	0.82345														0.20137
			Yr 2.5	Yr 3														Yr 17.5

NPVs of constant cashflow of €1/year	
Period	**NPV**
First 2.5 years (years Feb 2013 - Jul 2015) Y1+Y2+Y2.5	2.77
Last 15 years (Jul 2015-Jun 2030) Y3 -> Y17+Y17.5	7.03
First 15 years (years 15 inclusive) Y1 -> Y15	8.29

(These NPV's give the relative values of licences over different periods assuming that cashflows are uniform over time.)

Assumed value of 15-year licence starting year 1	20
Implied value of First 2.5 years (years 2013 - Jul 2015)	6.69
Implied value of T2 licence (discounted to year 1)	16.95

(This is the "minimum price" to be implemented.)

Assumed proportion of total value in annual fee	50%
NPV to be recovered through annual fee	10
Implied annual fee annuity	1.21

(These NPV's give the relative values of licences over different periods assuming that cashflows are uniform over time.)

SUF per annum	1.21
Implied reserve price for first 2.5 years (years 2013 -2015)	3.34
Implied reserve price for a T2 licence	8.48

(This is the breakdown of the minimum price into annual SUF and a reserve price.)

(Inputs in orange)

			01-Feb-15															
Discount rate	10.20%		13-Jul-15															
	Deposit & 1st SUF	2nd SUF	3rd SUF	1st SUF	2nd SUF	3rd SUF	4th SUF	5th SUF	6th SUF	7th SUF	8th SUF	9th SUF	10th SUF	11th SUF	12th SUF	13th SUF	14th SUF	15th SUF
	TL1	TL1	TL1	**TL2**	TL2	TL2	TL2	TL2	TL2	TL2	TL2	TL2	TL2	TL2	TL2	TL2	TL2	TL2
Year count	**1**	**2**	**3**	**3.5**	**4.5**	**5.5**	**6.5**	**7.5**	**8.5**	**9.5**	**10.5**	**11.5**	**12.5**	**13.5**	**14.5**	**15.5**	**16.5**	**17.5**
Cumulative Discount Factor given discount rate above	1	0.907441	0.82345	0.78823	0.71528	0.64907	0.58899	0.53448	0.48501	0.44011	0.39938	0.36241	0.32887	0.29843	0.27081	0.24574	0.22299	0.20235
% Year	100%	100%	44.4%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Cumulative Discount Factor given discount rate above * % Yr	1	0.907441	0.36548	0.78823	0.71528	0.64907	0.58899	0.53448	0.48501	0.44011	0.39938	0.36241	0.32887	0.29843	0.27081	0.24574	0.22299	0.20235

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Cumulative Discount Factor given discount rate above	1.00	0.90744	0.82345	0.74723	0.67807	0.61531	0.55836	0.50667	0.45978	0.41722	0.37860	0.34356	0.31176	0.28290	0.25672

NPVs of constant cashflow of €1 / year	
Period	**NPV**
First 3 years	2.27
Last 15 years (years 4.5-18.5 inclusive)	6.53
First 15 years (years 15 inclusive)	8.29

(These NPV's give the relative values of licences over different periods assuming that cashflows are uniform over time.)

Assumed value of 15-year licence starting year 1	20	(This is the "minimum price" to be implemented.)
Implied vaule of First 2.5 years (years 2013 -2015)	5.49	
Implied value of Year 5-19 licence (discounted to year 1)	15.76	38

Assumed proportion of total value in annual fee	50%	(These NPV's give the relative values of licences over different periods assuming that cashflows are uniform over time.)
NPV to be recovered through annual fee	10	
Implied annual fee annuity	1.21	

SUF per annum	1.21	(This is the breakdown of the minimum price into annual SUF and a reserve price.)
Implied reserve price for first 2.5 years (years 2013 -2015)	2.74	
Implied reserve price for a Year 5-19 licence	7.88	

#REF!

Assumes reserve price is paid 1 yr prior to 1st SUF

		Year 0	Year 1	Year 2	Year 3	
Timeslice 1		01-Feb-13	01-Feb-13	01-Feb-14	01-Feb-15	44.4%
					163.000	
Deposit	01-Feb-13					
SUF Cashflow	1.21	0	1.21	1.21	0.54	
Discount Factor		1.000	1.000	0.907	0.823	
Discounted Cashflow		2.75	1.21	1.10	0.44	
Cumulative discounted cashflow		2.75	3.96	5.06	5.51	

NPV SUF's @ 1st Feb 2013	€2.75
Reserve Price @ licence commencement Date	€2.75
Minimum Price @ Licence commencement Date	€5.51

NPV SUF's **@ Deposit Date - 1st Feb 2013**	10.20%	2.75
Reserve Price @ Deposit Date		2.75
Minimum Price @ Deposit Date - 1st Feb 2013		**5.51**

npv @ Feb-13

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	
Timeslice 2	01-Feb-13	13-Jul-15	13-Jul-16	13-Jul-17	13-Jul-18	13-Jul-19	13-Jul-20	13-Jul-21	13-Jul-22	13-Jul-23	13-Jul-24	13-Jul-25	13-Jul-26	13-Jul-27	13-Jul-28	13-Jul-29	
Undiscounted		1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	15
Discount Factor	1.268	1.000	0.907	0.823	0.747	0.678	0.615	0.558	0.507	0.460	0.417	0.379	0.343	0.312	0.283	0.257	
Discounted Cashflow	7.91	1.21	1.10	1.00	0.90	0.82	0.74	0.68	0.61	0.56	0.50	0.46	0.42	0.38	0.34	0.31	10.03
Cumulative discounted cashflow	7.91	9.12	10.21	11.21	12.11	12.93	13.68	14.35	14.97	15.52	16.03	16.49	16.90	17.28	17.62	17.93	

NPV SUF's **@ 13th July 2015**	€10.0
Reserve Price @ licence commencement Date	€10.0
Minimum Price @ Licence commencement Date	€20.1

		XNPV
NPV SUF's **@ Deposit Date - 1st Feb 2013**	10.20%	7.91
Reserve Price		7.91
Minimum Price @ Deposit Date - 1st Feb 2013		**15.81**

b. Spreadsheets referred to in Eircom Group's submission of 14 October submitted on 15 November 2011.

Please note that these four spreadsheets are attached to this Adobe pdf file. Please click on the thumbnails below to access the files.

A2. Publication of non-confidential correspondence provided by respondents (and ComReg written responses to same) since September 2011

1. Telefónica: Email to ComReg of 7 September 2011 “Meeting Request” (email dated 7 September 2011)

From: Healy Gary (IE)
Sent: 07 September 2011 11:59
To: George Merrigan
Cc: Hickey Tom
Subject: Meeting request

George

As discussed previously and in earlier correspondence Telefonica O2 are anxious to understand the timetable of key actions/documents leading to the auction. We have reviewed comreg's recent document but feel we do not have sufficient clarity on the sequence of key events which would allow us to plan for key approval processes to Telefonica group.

We would like to meet to discuss the sequence of key documents and actions in relation to the auction. There is no expectation that comreg would be able to set out a definitive timetable at this stage given the time to be allowed for consultation and reviewing of consultation responses, however we believe clarity on the sequence of key events leading to the auction would assist us in our internal communication and approval processes.

We are happy to meet in the next week or so at your convenience.

Best

Gary

Gary Healy

2. ComReg: Reply to Telefónica O2 email of 7 September 2011 (email dated 8 September 2011)

From: George Merrigan
Sent: 08 September 2011 17:31
To: Healy Gary (IE)
Cc: Hickey Tom; Samuel Ritchie
Subject: RE: Meeting request

Dear Gary

Thank you for your e-mail in which you ask for additional clarity on the sequence of events/documents leading to ComReg's proposed auction of the 800 MHz, 900 MHz and 1800 MHz bands and request a meeting to discuss same.

I note that you acknowledge the difficulty in setting out a definitive timetable for such events.

Based on the details provided by ComReg in Chapter 9 of Consultation 11/60, we would expect the sequence of events leading up to the proposed auction to be as follows:

- publish and consult upon draft information memorandum and draft Statutory instrument(s);
- publish response to consultation and final decision on ComReg's spectrum release proposals;
- hold workshops and trial auction(s) with interested parties to familiarise interested parties with the auction software;
- publish final information memorandum and final statutory instruments; and
- hold proposed auction.

In relation to your request for a meeting, whilst ComReg in no way wishes to restrict any party in making effective and full submissions, or in providing relevant information, during the course of a consultation process, it does not appear necessary in this instance to hold bilateral meetings with interested parties (let alone a sub-set of interested parties) as suggested in your e-mail, with regard to the above matters. In principle, and in practice, it would appear that all relevant submissions and information can be adduced by way of written material provided to ComReg through the normal mechanisms.

Finally, as is ComReg's usual practice, your e-mail is considered to be a submission in response to consultation, and, subject to ComReg's guidelines on the treatment of confidential information and to any comments you wish to make in that regard, please be advised that your e-mail will be published as a response in due course. In addition, please note that this e-mail will also be published in due course.

Kind Regards

George

George Merrigan | Director, Market Framework Division |
✉Commission for Communications Regulation, Abbey Court, Irish Life Centre,
Lower Abbey Street, Dublin 1, Ireland
www.comreg.ie

3. Telefónica: Email to ComReg of 24 October 2011 “Timetable for Spectrum Auction” (email dated 24 October 2011)

From: Hickey Tom (IE)
Sent: 24 October 2011 11:47
To: George Merrigan; Samuel Ritchie
Subject: Timetable for Spectrum Auction

Dear George/Samuel

I note the statement in yesterday's Sunday Independent which quoted a ComReg spokesperson as saying "The 4G auction is expected to take place early next year". This would indicate that ComReg is now working to a revised timetable. Can you please provide a copy of this revised timetable?

Regards
Tom Hickey

Tom Hickey | Telefónica Ireland Limited

4. ComReg: Reply to Telefónica O2 email of 24 October 2011 (email dated 26 October 2011)

From: George Merrigan
Sent: 26 October 2011 07:45
To: 'Hickey Tom (IE)'
Cc: Samuel Ritchie
Subject: RE: Timetable for Spectrum Auction

Dear Tom

Thank you for your email of Monday last.

Since receiving same, ComReg has published its draft Information Memorandum (ComReg document 11/75 available at www.comreg.ie). Section 3.2 sets out the process overview and an indicative timetable.

I advise that, as usual, ComReg will be publishing this correspondence in due course in the interests of ensuring the utmost transparency of its consultation process - subject, as usual, to its Guidelines on the Treatment of Confidential Information (see ComReg document 05/24 at www.comreg.ie) and to any comments you might wish to make in that regard.

Kind Regards

George Merrigan | Director, Market Framework Division |
✉**Commission for Communications Regulation, Abbey Court, Irish Life Centre,**
Lower Abbey Street, Dublin 1, Ireland
www.comreg.ie

5. Eircom Group: Spreadsheet attached to email of 19 September 2011 (letter available in ComReg Document 11/69)

(Inputs in orange)

Discount rate	10.21%

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Year count	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Cumulative Discount Factor given discount rate above	1	0.90735868	0.8233	0.74703	0.67782	0.61503	0.55805	0.50635	0.45944	0.41688	0.37826	0.34322	0.31142	0.28257	0.25639	0.23264	0.21109	0.19153

NPVs of constant cashflow of €1/year	
Period	**NPV**
First 2.45 years (years Feb 2013 - Jul 2015)	2.28
Last 15 years (Jul 2015-Jun 2030)	6.54
First 15 years (years 15 inclusive)	8.28

(These NPV's give the relative values of licences over different periods assuming that cashflows are uniform

Assumed value of 15-year licence starting year 1	20
Implied value of First 2.45 years (years 2013 -2015)	5.50
Implied value of T2 licence (discounted to year 1)	15.78

(This is the "minimum price" to be implemented.)

Assumed proportion of total value in annual fee	50%
NPV to be recovered through annual fee	10
Implied annual fee annuity	1.21

(These NPV's give the relative values of licences over different periods assuming that cashflows are uniform

SUF per annum	1.21
Implied reserve price for first 2.5 years (years 2013 -2015)	2.75
Implied reserve price for a T2 licence	7.89

(This is the breakdown of the minimum price into annual SUF and a reserve price.)

(Inputs in orange)

Discount rate	10.21%

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Year count	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Cumulative Discount Factor given discount rate above	1	0.907358679	0.8233	0.74703	0.67782	0.61503	0.55805	0.50635	0.45944	0.41688	0.37826	0.34322	0.31142	0.28257	0.25639	0.23264	0.21109	0.19153
					0.74703													

NPVs of constant cashflow of €1/year	
Period	**NPV**
First 2.5 years (years 2013 -H1 2015)	2.32
Last 15 years (H2 2015-H1 2030 inclusive)	5.76
First 15 years (years 15 inclusive)	8.28

(These NPV's give the relative values of licences over different periods assuming that cashflows are uniform

Assumed value of 15-year licence starting year 1	20
Implied vaule of First 2.5 years (years 2013 -2015)	5.60
Implied value of Year 5-19 licence (discounted to year 1)	13.90

(This is the "minimum price" to be implemented.)

Assumed proportion of total value in annual fee	50%
NPV to be recovered through annual fee	10
Implied annual fee annuity	1.21

(These NPV's give the relative values of licences over different periods assuming that cashflows are uniform

SUF per annum	1.21
Implied reserve price for first 2.5 years (years 2013 -2015)	2.80
Implied reserve price for a Year 5-19 licence	6.95

(This is the breakdown of the minimum price into annual SUF and a reserve price.)

6. Eircom Group: Email to ComReg “RE: ComReg 11/60: request for information” (email dated 3 October 2011)

From: McCoubrey, William
Sent: 03 October 2011 17:34
To: Samuel Ritchie
Subject: RE: ComReg 11/60: request for information

Dear Samuel,

Thank you for your response of 30th September. In respect of the matters raised and clarifications received:

Item 1: Thank you for the clarification in respect of near term timing issues related to the draft Information Memorandum. We remain concerned regarding the absence of an outline timeline for the ongoing project and will address our wider concern in our response.

Item 2: Thank you for setting out the workings. We will review and revert if we have any further questions on the mechanics of the calculations.

Item 3: We note your response that the post-ASO DTT plan will be substantially the same as the current DTT plan. We further note from the current plan that channel 60 is currently in use for DTT purposes at Rosscarbery. It is stated in Annex 10 of ComReg 11/60, paragraph A 10.123, that channel 60 is not licensed to RTE in respect of the current two multiplexes in operation. We assume that any current use of channel 60 is temporary for the period of parallel running of analogue and digital transmission and that channel 60 will be vacated upon completion of ASO. We would welcome confirmation of whether our assumption is correct. The current DTT plan also shows 11 occurrences of the use of channels 57, 58, and 59. We would welcome confirmation as to the extent of use of these channels post ASO.

Item 4a: Your comments are noted. We would not dispute that ComReg has stated positions in ComReg 11/60. ComReg notes (annex 10 paragraph 10.61) "Consultation 11/28 sought feedback and empirical evidence on the issue of licence duration and trading. ComReg has received a number of responses to this consultation and ComReg will issue its Response to Consultation in due course providing further views on the issue of indefinite licences. For the purpose of this document and in relation to the 800 MHz, 900 MHz and 1800 MHz award process, ComReg remains of the view that the licence duration for the time-slices proposed are appropriate, and does not envisage making any change to the current approach based on a definitive time-based expiry." It is difficult for us to form a view on the merits of ComReg's stated position in ComReg 11/60 on relevant matters, for example licence duration, without sight of ComReg's further views arising from evidence submitted by interested parties to ComReg 11/28. As such we hope that ComReg's Response to ComReg 11/28 will be forthcoming in the near future and we reserve the right to make further representations as appropriate.

Items 4b & 5: I would be grateful if you could confirm when these items will be published.

Regards,
William

7. ComReg: Reply to Eircom Group email of 3 October 2011 (email dated 7 October 2011)

From: Samuel Ritchie
Sent: 07 October 2011 12:41
To: McCoubrey, William
Subject: RE: ComReg 11/60: request for information

Dear William

Thank you for your e-mail dated 3 October 2011. I address the matters raised as follows.

Item 1: Noted.

Item 2: Noted.

Item 3: The most recent update of the spreadsheet containing summarised technical information representing the current transmitter schedules attached to the licences issued to RTÉ, the BAI and other users of the broadcast bands shows that the licensing of channel 60 at Rosscarbery has been withdrawn. See:

(http://www.comreg.ie/radio_spectrum/technical_parameters.542.1071.html).

Item 4a: Noted.

Items 4b & 5: These documents were published on 4 October 2001 in ComReg document 11/69.

As is ComReg's usual practice, correspondence, such as your email, are treated as submissions in response to consultation, and, subject to ComReg's guidelines on the treatment of confidential information and to any comments you wish to make in that regard, your e-mail will be published as a response. Accordingly, I would be grateful if you could let me know by close of business Monday 10 October 2011 if there is anything in your e-mail that Meteor considers to be properly confidential and ought not to be published in order that these materials (or, as the case may be, appropriate versions of them) might in due course be published as consultation responses. Please note that ComReg will publish this e-mail in due course.

Regards

Samuel

Dr. Samuel Ritchie
Manager Spectrum Operations

Commission for Communications Regulation

8. Eircom Group: Letter to ComReg of 28 October 2011 regarding extension request for responses to ComReg Document 11/75 (email dated 28 October 2011)

Meteor Mobile Communications Limited

1 Heuston South Quarter,
St. Johns Road, Dublin 8.

Tel: +353 1 430 7000 Fax: +353 1 430 7010
Email: info@meteor.ie

28th October 2011

Mr. Patrick Mulvey
Commission for Communications Regulation
Irish Life Centre
Abbey Street
Dublin 1

patrick.mulvey@comreg.ie

By Email

Dear Patrick,

Further to the publication of the Multi-band Spectrum Release Draft Information Memorandum, ComReg 11/75, I write to request an extension to the deadline of 21st November 2011 set for receipt of responses.

The Draft Information Memorandum presents a significant volume of new material concerning the detailed rules and procedures for ComReg's proposed award process which we must review, analyse and carefully consider. These are complex issues that are fundamental to the future operation of our business. We do not consider a four week consultation period to be sufficient or reasonable.

Meteor therefore requests that the consultation period be extended by at least an additional two weeks, extending the full response period to Friday 4th December 2011 at the earliest.

I trust that ComReg will look favourably on this request.

Yours sincerely

W. McCoubrey

William McCoubrey
Head of Regulatory Affairs

9. H3GI: Letter to ComReg of 4 October 2011 “ComReg DOC. NO.S 11/60, 11/60a and 11/58” (letter dated 4 October 2011)

Hutchison 3G Ireland Limited
Registered office

3rd Floor
One Clarendon Row,
Dublin 2, Ireland

Registered Number: 316982
Place of Registration: Republic of Ireland

Three.ie

Dr Samuel Ritchie, Manager Spectrum Operations
Commission for Communications Regulation
Abbey Court
Irish Life Centre
Lower Abbey Street
Dublin 1
BY COURIER AND EMAIL: samuel.ritchie@comreg.ie

4 October 2011

Dear Samuel

COMREG DOC. NO.S 11/60, 11/60A AND 11/58

I refer to my letter dated 23 September 2011.

Given the amount of time available to ComReg to produce ComReg Doc. No. 11/60, *"Multi-Band Spectrum Release – Release of the 800 MHz, 900 MHz and 1800 MHz radio spectrum bands"* ("ComReg's Response to Consultation") and related documents, Hutchison 3G Ireland Limited ("H3GI") is concerned that it is taking ComReg so long to clarify and confirm the matters raised in my letter. H3GI is further concerned that it may not have sufficient time to properly consider and respond to ComReg's response to my letter by 14 October 2011 (the deadline for responding to ComReg's Response to Consultation). H3GI urges ComReg to respond to my letter dated 23 September 2011 as a matter of urgency and in any event, no later than close of business on Wednesday 5 October 2011.

H3GI reserves all rights in respect of this matter including the right to request an extension of the deadline referred to above in light of ComReg's response to my letter dated 23 September 2011.

Yours sincerely

MARK HUGHES
Head of Regulatory

10. ComReg: Reply to H3GI letter of 4 October 2011 (letter dated 5 October 2011)

Commission for
Communications Regulation

BY EMAIL AND POST

Mr Mark Hughes,
Head of Regulatory,
Hutchison 3G Ireland Limited,
3rd Floor,
One Clarendon Row,
Dublin 2.

5 October 2011

ComReg – 800 MHz, 900 MHz and 1800 MHz Consultation Process

Dear Mr Hughes,

I refer to your letters dated 23 September and 4 October in relation to the above.

Having carefully considered your requests, we are satisfied that the views and materials contained in ComReg Document 11/60 (and associated documents) provide sufficient reasoning, clarity and transparency to interested parties in relation to ComReg's measure (spectrum caps) as proposed in Document 11/60.

In addition, we do not consider it appropriate to engage with individual interested parties on substantive consultation issues by way of written correspondence in light of, amongst other things, obligations regarding the transparency of ComReg's consultation process and ComReg's desire to ensure that the current consultation process remains as inclusive as possible.

In any event, and noting that the proposed measure continues to be the subject of consultation, we would, of course, welcome any additional views and material that Hutchison 3G Ireland and/or its consultants may wish to provide on or before 14 October 2011.

We advise that, as usual, ComReg will be publishing this letter in due course in the interests of ensuring the utmost transparency of its consultation process – subject, as usual, to its *Guidelines on the Treatment of Confidential Information* and to any comments you might wish to make in that regard.

Yours sincerely,

Dr. Samuel Ritchie
Manager Spectrum Operations

An Coimisiún um Rialáil Cumarsáide
Commission for Communications Regulation
Abbey Court Irish Life Centre Lower Abbey Street Dublin 1 Ireland
Telephone +353 1 804 9600 *Fax* +353 1 804 9665 *Email* info@comreg.ie *Web* www.comreg.ie

11. H3GI: Email to ComReg of 4 November 2011 “ComReg Doc. No. 11/75” (email dated 4 November 2011)

From: Mark Hughes
Sent: 04 November 2011 15:14
To: Samuel Ritchie
CC: Sinead Devey; Jim Connolly; Patrick Mulvey
Subject: ComReg Doc. No. 11/75

Dear Samuel,

In relation to paragraph 3.32 (f)(*"has as a director or senior executive any individual who is a director or senior executive of the Connected Person or any of its Controlled Persons"*), should the reference to *"Connected Person"* be a reference to *"the Bidder"*?

With kind regards.

Mark.

Mark Hughes
Head of Regulatory

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12. H3GI: (Another) Email to ComReg of 4 November 2011 “ComReg Doc. No. 11/75” (email dated 4 November 2011)

From: Mark Hughes
Sent: 04 November 2011 17:44
To: Samuel Ritchie
CC: Sinead Devey; Jim Connolly; Patrick Mulvey
Subject: ComReg Doc. No. 11/75

Dear Samuel

In relation to paragraph 3.68 (*"Prior to the submission of its Application, a potential Bidder shall take all reasonable measures with a view to identifying its Connected Persons, Associated Persons and Insiders"*), should the reference to *"Associated Persons"* be a reference to *"Associated Bidders"*, as there is no definition of "Associated Persons" in ComReg Doc. No. 11/75? Can ComReg clarify why there is this requirement in relation to associated persons or bidders in this section as there would not appear to be any other obligations relating to associated persons or bidders in this section?

With kind regards.

Mark.

Mark Hughes
Head of Regulatory

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13. ComReg: Reply to H3GI email of 4 November 2011 (email dated 15 November 2011)

From: Patrick Mulvey
Sent: 15 November 2011 16:57
To: Mark Hughes
Subject: ComReg Document 11/75

Dear Mr. Hughes,

Thank you for your emails of 4 November 2011 in relation to the draft Information Memorandum (Document 11/75) (as attached).

ComReg would respond to the issues raised in those emails as set out below.

- In relation to paragraph 3.32(f) you are correct. The phrase “Connected Person” should be replaced with “Bidder” in this paragraph.

- In relation to the use of the term “Associated Person” again you are correct. It was intended that this phrase be replaced with “Associated Bidder” throughout the document. Accordingly “Associated Person” should be replaced with “Associated Bidder” in paragraphs 3.68, A.6.1 and A.6.12.

- In relation to the requirement regarding Associated Bidders, ComReg would draw your attention to the restrictions imposed by paragraph 3.38 and the mechanisms for seeking exemptions from same.

ComReg appreciates your assistance in improving the Draft Information Memorandum and please contact us if you encounter any similar issues in the document.

Best regards,

Paddy

Paddy Mulvey

Radio Spectrum Engineer

Commission for Communications Regulation

Abbey Court
Irish Life Centre
Lower Abbey Street
Dublin 1
Ireland

www.comreg.ie

Visit our new consumer website at http://www.askcomreg.ie

14. H3GI: Email to ComReg of 24 November 2011 “ComReg Doc. No. 11/75” (email dated 24 November 2011)

From: Mark Hughes
Sent: 24 November 2011 11:54
To: Patrick Mulvey
Subject: ComReg Doc. No. 11/75

Dear Patrick,

Regarding Annex 7, paragraph A 7.43, H3GI requests ComReg to confirm whether these statements are correct. It seems that the general rule in the rest of Annex 7 and the Information Memorandum as a whole is that all caps refer to the best bid of some other package regardless of whether this best bid was a primary bid or a bid entered in the supplementary bids round. However, paragraph A 7.43 in Annex 7 appears to argue that caps are linked only to the primary bids for the concerned packages.

Regarding Annex 7, paragraph A 7.53, H3GI requests ComReg to explain why, given a bid of €64 million for package 1, it is necessary to bid *"at least €75m, to satisfy the relative cap on package 1"*? According to the table in paragraph A 7.48, the relative cap on package 1 is *"HB(2)-€13m"* which should imply that a bid on package 2 should be at least €13m higher than the bid on package 1 to satisfy the relative cap on package 1. If this reasoning is correct, the sentence should read *"at least €77m, to satisfy the relative cap on package 1"*.

With kind regards.

Mark.

Mark Hughes
Head of Regulatory

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15. ComReg: Reply to H3GI email of 24 November 2011 (email dated 25 November 2011)

From: Patrick Mulvey
Sent: 25 November 2011 14:06
To: Mark Hughes
Subject: ComReg Doc. No. 11/75

Dear Mark,

Please see below in relation to your email of 24 November 2011.

The statement in paragraph A7.43 is not incorrect, but could usefully be clarified. In this particular example, the maximum amounts by which Supplementary Bids for Packages 1 and 3 can exceed the highest bid for Package 2 are determined by Primary Bids made for Package 2. This is a particular feature of the example presented in paragraphs A7.36 to A7.43.

- Specifically, as shown in the table following paragraph A7.40, any Supplementary Bid for Package 1 is limited to the highest bid for Package 2, less €23m. This differential of -€23m is due to the final price cap, which results from the final primary bid for package 2. It is the difference in price between package 1 and package 2 at the round 5 prices.

- A Supplementary Bid for Package 3 is limited to the highest bid for Package 2 plus €5m. This differential of +€5m is due to the relative cap arising from the primary bid made for package 2 in round 2, which was the last round in which the bidder was eligible to bid for Package 3. It is the difference in price between package 3 and package 2 at the round 3 prices.

Therefore, in this particular case, maximum amount which any Supplementary Bid for Package 1 or Package 3 can exceed that of Package 2 arise due to previous Primary Bids made for Package 2. This is the reason for the comment about the example made in paragraph A7.43. That various Primary Bids made on one particular package determine the differentials within the caps of all other packages is special feature of this particular example and will not in general be the case.

The absolute values of the caps applying to Supplementary Bids for Packages 1 and 3 are determined by applying the differentials discussed above to the highest bid of any type made for Package 2. This is most clearly seen in the table following paragraph A7.40, where the caps on Packages 1 and 3 are shown in the form HB(2)+X, where HB(2) is the highest bid of any type for Package 2, as explained previous in Paragraph A7.33 and X is the relevant differential.

Regarding paragraph A7.53, thank you for identifying this typo. The logic laid out in the preceding paragraph (A7.52) is correct and explains how any particular level of supplementary bid for Package 1 determines a permissible range for bids for Package 2. Therefore, if a bid of €64m is made for package 1, in order to satisfy the relative cap on Package 1, the highest bid for Package 2 must be at least €77m. In practice this lower bound is always satisfied, as the bidder had already made a bid at €82m for Package 2 in Round 5.

Kind Regards,

Paddy

16. DCENR: Email to Digital Switchover Group (DSG) of 22 November 2011 "interference between services in UHF bands" (email dated 22 November 2011)

From: Susan Fleming
Sent: 22 November 2011 11:24
To: Kehoe, Mick
Cc: DCENR's Digital Switchover Group (DSG)
Subject: interference between services in UHF bands

Hi Mick

A number of weeks ago you raised an issue at the DSG about the potential for interference between the broadcast services and new services. Eamonn has considered this issue and considers that it should be dealt with in the technical group. In this regard could the group seek to find a solution ASAP? Can you please study the issue and report to the next DSG with your findings and proposals for a resolution to this issue so that a solution can be agreed.

Best Regards

Susan Fleming

Department of Communications, Energy and Natural Resources

17. RTE: Reply to DCENR email (to DSG) of 22 November 2011 “re: interference between services in UHF bands” (email dated 22 November 2011)

From: Kehoe, Mick [RTE]
Sent: 22 November 2011 11:46
To: Susan Fleming
Cc: DCENR's Digital Switchover Group (DSG)
Subject: RE: interference between services in UHF bands

Susan,

It is a policy issue rather than a technical issue. Please see attached the RTÉ/RTÉNL response to the ComReg consultation on the subject. This consultation closed in mid October.

RTÉNL corresponded with, and tried to engaged with, the BAI, TV3 and TG4 on this consultation response but they were non responsive.
As ComReg are the party undertaking the consultation they were not in a position to discuss a response to their own consultation (ComReg are part of the DSG Technical group).

The issue and solutions are as outlined in our response attached.

Regards,
Mick....

18. DCENR: Reply to RTE email of 22 November (to DSG) of 22 November 2011 “re: interference between services in UHF bands” (email dated 23 November 2011); and

From: Susan Fleming
Sent: 23 November 2011 12:06
To: Kehoe, Mick; Mike Byrne
Cc: DCENR's Digital Switchover Group (DSG)
Subject: RE: interference between services in UHF bands

Hi all

From my perspective it is not clear there is a technical problem and so it is not clear that there is an issue at all.

Although RTENL appears to indicate that there are real issues which will impact on TV viewers, ComReg who is responsible for managing the spectrum in Ireland does not appear to be in the least concerned, hence my confusion. Issue or no issue – that is the question.

Best Regards

Susan Fleming

Department of Communications, Energy and Natural Resources

19. RTE: Reply to DCENR email (to DSG) of 23 November 2011 “re: interference between services in UHF bands” (email dated 23 November 2011).

From: Kehoe, Mick [RTE]
Sent: 23 November 2011 12:28
To: Susan Fleming
Cc: DCENR's Digital Switchover Group (DSG)
Subject: RE: interference between services in UHF bands

Susan,

I hope ComReg are right. RTÉNL stand by its position and at least if/when a problem does arise we will know where to divert the phone calls.

Regards,
Mick....

20. ComReg: Letter to DCENR of 21 December 2011 “Overload Problem” (email and letter of 21 December 2011)

From: Hugh Tuckey
Sent: 21 December 2011 16:19
To: 'Susan Fleming'
Cc: Kehoe, Mick
Subject: Overload problem

Hi Susan

Attached please find a letter setting out the ComReg position as a member of the DSO SG in relation to the issue raised by RTÉ / RTÉNL about TV reception in the UHF band when non broadcast services come on stream in the 800MHz sub-band following DSO. ComReg believes that viewers should be made aware of the issue so that they can take appropriate remedial steps at the time they are making the change over to digital. Retrofitting at some stage in the future is, we consider, less than ideal and can, in a lot of cases, be avoided.

I hope the letter helps.

Best wishes

Hugh

Commission for
Communications Regulation
Coimisiún Um
Rialáil Cumarsáide

21 December 2011

Ms Susan Fleming,
Broadcasting Division,
Department of Communications, Energy and Natural Resources,
29 – 31 Adelaide Road,
Dublin 2.

Dear Susan,

I refer to the email correspondence between you and RTÉNL about TV reception in the UHF band after digital switch over and would like to make the following observations, in the context of ComReg's role as participant in the Department's Digital Switch Over Steering Group (DSO SG), so as to hopefully clear up any confusion on this matter.

Firstly, in relation to the notion of whether the coexistence issue between DTT and electronic communications services in the 800 MHz band is of a technical or policy dimension, we do not consider the matter to be a technical issue for ComReg to address in the context of its statutory functions, objectives and duties in relation to the management of the radio frequency spectrum.

This is because:

- there are significant issues in relation to the suitability of consumer DTT-receiving systems and, in particular, there is a legacy of consumer television aerial systems which extend reception into the 800 MHz band;
- many of these systems will likely result in consumer DTT-receiving systems being susceptible to possible overloading from electronic communications services ("ECS") operating in the 800 MHz band;
- the proposed technical conditions for new services in the 800 MHz band accord with EC Decision 20/267/EU; and
- technical conditions on any existing or new services are not targeted to tackle possible issues related to television reception systems which extend reception into the 800 MHz band.

Given these factors, it is, in our view, imperative that DTT consumers are in a position to ensure that their DTT reception system is installed in such a way so as to not unduly receive radio signals from outside of the television frequency bands that may be present at some point in the future (i.e. not suffer from electromagnetic disturbance in the form of radio frequency

overload). In simple terms, for DTT consumers to effectively receive a DTT service it is important that an appropriate receiving system is in place and that it is fit for purpose.

In this context, we are firmly of the view that the issue is more appropriately characterised as being a technical matter to be resolved from the perspective of the provision and receiving of DTT services.

Of course, for consumers to be in a position to avoid receiver overloading, it is, we believe, incumbent upon RTÉ (and by extension, 'Saorview') to properly inform DTT consumers and the TV installer community of the issue and how this issue can be resolved in simple, easy-to-understand terms.

Based on our review of the guidelines for the reception of the 'Saorview' service, we do not believe that they are sufficient in this regard. The guidelines state, for instance that "*the vast majority of homes with existing outdoor/rooftop aerials will be able to receive the SAORVIEW signal…if you currently receive TV3 as an analogue service through your aerial then you aerial is most likely fine and is pointing in the right direction. You should not need to do anything with your aerial*". We would note that TV3 currently transmits from twelve sites in analogue across the UHF band, three of which use channels from the 800MHz sub band. Accordingly, should an existing analogue free to air viewer in an area where TV3 is currently transmitting in the 800MHz band choose to migrate to the Saorview service, that viewer is, following the advice given in the guidelines, likely to be more susceptible to overloading when new services are launched in the 800 MHz band.

It is the responsibility of consumers to ensure that their television reception system is installed in such a way that it has sufficient levels of protection so as not to receive radio signals from outside of the television frequency bands that may be expected at some point in the future. Indeed Annex 1 of Directive 2004/108/EU ("EMC Directive") provides that:

> *"Equipment shall be so designed and manufactured, having regard to the state of the art, as to ensure that it has a level of immunity to the electromagnetic disturbance to be expected in its intended use which allows it to operate without unacceptable degradation of its intended use"..*

The Directive also provides that

> *"A fixed installation shall be installed applying good engineering practices and respecting the information on the intended use of its components, with a view to meeting the protection requirements set out in Point 1. …."*

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ComReg is of the view that the combination of an antenna, any associated amplifiers and filters and a DTT receiver is a fixed installation within the meaning of the EMC Directive and that, in light of EC Decision 20/267/EU it is reasonable to expect that ECS signals will be transmitted in the 800 MHz band throughout Europe. Consequently, we believe DTT consumers should be advised by RTÉ, in simple-to-understand language, to check that their current aerial systems are likely to function correctly in the presence of ECS signals in the 800 MHz band and, in particular, do not receive signals above 790 MHz and, if they do, to contact a properly qualified installer to remedy any likely problem. In this context we note that RTÉ, in its Saorview information booklets, advises consumers that *"Some households will need a new TV aerial or need to adjust their existing aerial to receive SAORVIEW. A standard installation of a new aerial should cost no more than €160 (including VAT)".*

Further, we understand that RTÉ/RTÉ NL are currently providing briefing to TV installers but, given the apparent confidential nature of these briefings, we are not privy to the specifics of same.

I trust the above is helpful.

Yours sincerely,

Hugh Tuckey.

Hugh Tuckey,
Strategic Resources.

Commission for Communications Regulation
An Coimisiún um Rialáil Cumarsáide
Block DEF, Abbey Court, Irish Life Centre, Lower Abbey St, Dublin 1
Bloc DEF, Cuirt na Mainistreach, Ionad Irish Life, Sraid Na Mainistreach Íocht, Baile Atha Cliath 1
Telephone +353 1 804 9600 *Fax* +353 1 804 9665 *Email* info@comreg.ie *Web* www.comreg.ie