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Technical Report

Joint Technical Report, Mobile Operator Responses to 10/71, 10/105 and 11/11

Prepared for ComReg by Red-M and Vilicom

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An Coimisiún um Rialáil Cumarsáide

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1 Introduction

This document follows on from ComReg document 10/71 ‘Retuning and Relocating GSM900 Spectrum Assignments in Ireland’, ComReg document 10/105 ‘Inclusion of the 1800MHz Band into the Proposed joint award of 800MHz and 900MHz spectrum’ and ComReg document 11/11 ‘Interim Licences for the 900MHz band’. This document reviews the comments received from interested parties in response to those ComReg documents.

This short briefing note considers each operator response and the overall picture of operator positions that emerges as a result.

In particular this document focuses on the details in the responses that are pertinent to Joint Technical Reports 10/71c and 10/105b regarding the retuning and relocating of GSM900 and GSM1800 spectrum assignments in Ireland prepared by Red-M and Vilicom (the “Reports”) and the extent to which those responses, would require revisiting any of the conclusions reached in the Reports.

References to ComReg document 11/29 (also entitled ‘Interim Licences for the 900MHz band’) containing ComReg’s decision on GSM 900 interim licences are also included where points are made in relation to consultation responses relevant to the Reports.

2 ComReg Documents

2.1 ComReg Document 10/71 'Retuning and Relocating GSM900 Spectrum Assignments in Ireland'

ComReg document 10/71 discussed the issue of the concurrent release of spectrum at 900MHz and 800MHz. The Red-M/Vilicom report 10/71c (Retuning and Relocating GSM900 Spectrum Assignments in Ireland) published alongside ComReg document 10/71 examined three scenarios in the context of the liberalisation of 900MHz mobile spectrum in Ireland.

Report 10/71c estimated the impacts of the scenarios on mobile operators in terms of timescales and engineering costs. The scenarios were:

- an existing GSM licensee is assigned 2 x 10 MHz (Scenario 1);
- a GSM licensee is assigned 2 x 5 MHz (Scenario 2); and
- Meteor Mobile Communications Limited ("Meteor") maintains its existing spectrum bandwidth (2 x 7.2MHz), but has to retune 200 kHz lower to ensure "Block E" is unencumbered for spectrum liberalisation. (Scenario 3).

Red-M and Vilicom have analysed all the responses received to ComReg document 10/71 with a specific focus on those relating to relocation and retuning at 900MHz in the context of Red-M/Vilicom report 10/71c.

2.2 ComReg Document 10/105 'Inclusion of the 1800MHz Band into the Proposed Joint Award of 800MHz and 900MHz Spectrum'

ComReg document 10/105 contained proposals for the liberalisation and release of spectrum at 1800MHz in a concurrent spectrum award process with the 900 MHz and 800 MHz bands. The Red-M/Vilicom report 10/105b (Retuning and relocation at 1800MHz) published alongside ComReg document 10/105 examined three scenarios in the context of the potential liberalisation of 1800MHz mobile spectrum in Ireland. Relocation scenarios were examined assuming existing operators obtain 2x15 MHz of spectrum or more and so would not have to contend with the additional engineering consequences of adapting their existing networks to a reduced spectrum allocation at 1800 MHz.

Red-M and Vilicom have analysed all the responses received to ComReg document 10/105 with a specific focus on those relating to relocation and retuning at 1800MHz in the context of Red-M/Vilicom report 10/105b.

2.3 ComReg Document 11/11 'Interim Licences for the 900MHz band'

ComReg document 10/71 consulted on the potential for interim licences in the 900MHz band. ComReg document 11/11 discusses the key points raised in responses to ComReg document 10/71 in relation to this issue, and provides a draft decision about the provision of interim licences in the 900MHz band. Therefore responses received to ComReg document 11/11 generated fewer comments that particularly pertain to the Reports, though certain aspects of matters relating to timescales are indirectly related to technical matters considered by the Reports.

2.4 ComReg Document 11/29 and Decision 03/11 'Interim Licences for the 900MHz band'

ComReg document 11/29 and Decision 03/11 set out ComReg's response to consultation and the subsequent Decision¹ on its interim licence proposal for the 900MHz band respectively. In this document, references to ComReg document 11/29 are included where relevant points are made in relation to ComReg reports 10/71c, 10/105b and the consultation responses received.

3 Views of the Respondents

3.1 Vodafone Ireland Limited ("Vodafone")

3.1.1 Response to ComReg Document 10/71

Vodafone states that 10/71c 'significantly understates' the issues they will face². Vodafone however disagrees with ComReg's (then) proposal to grant licences on a GSM only usage basis because on page 6 of their confidential response it states:

[Confidential Text]

Vodafone does not give an approach, timescale or cost for its proposed liberalisation within the terms of an interim licence that would grant liberalised use in the 900MHz band. Vodafone's comment that 10/71c 'significantly understates' the issues Vodafone will face would be consistent with an assumption that both the costs and timescales would be greater than those contained in 10/71c.

In addition, in its introduction on page 2, Vodafone referred again to a suggestion it made in a previous response submission:

- 'c) *A better approach (described in detail in the response document) was to extend the current 900 MHz spectrum licences of each of the existing licensees in respect of 5 MHz of their current individual 7.2 MHz allocations, whilst auctioning the rest of the 900 MHz band. This would eliminate the risk of costly disruption and loss of competition while*

¹ D 03/11

² In its confidential responses to 09/99 Vodafone focussed on the case where it obtains no 900MHz spectrum and attempted to demonstrate that it would have significant issues if this were the case. It does not provide significant further detail in their response to 10/71 from which to draw significant additional conclusions.

offering the same potential for new entry which ComReg sought in its approach.'

It could be taken from this that there is a technically and commercially viable network with only 2 x 5 MHz of 900 MHz assignment, although (under this suggestion) the extension would coincide with an auction of the rest of the 900 MHz band at which Vodafone may expect to increase its assignment beyond 2 x 5 MHz.

In Scenario 2 of 10/71c, it is estimated that 90% of the additional sites required could be completed by the end of year 2, allowing the GSM900 spectrum to be relinquished at the end of the 2 year period, with minor additional disruption to network subscribers.

Vodafone expresses concern that the probable impact of scenario 2 is understated, however 10/71c pointed out that this additional disruption would be localised to areas where the remaining sites that are required have not been completed. There are several other 'mitigating techniques' 10/71c suggested that operators might consider in these localised areas to adjust to a reduction in 900 MHz spectrum allocation such as:

- Increase the use of AMR (Adaptive Multi-Rate) coding at 900 MHz and 1800 MHz
- Offload capacity to existing 1800 MHz and 2100 MHz cells where possible.
- Add new 1800 MHz & 2100 MHz cells on existing 900 MHz sites.

Scenario 2 of 10/71c did not assume the use of any of the mitigating techniques outlined above, as there was no operator information available on which to base realistic assumptions. The mitigating steps were included to illustrate that there were a range of additional potential options that could be used.

Vodafone also expressed concern that the transition period of 15-20 months is insufficient, however the suggestion of 10/71c was that techniques listed above might be applied to minimise the impact of any delays in building new sites on the welfare of subscribers.

Vodafone disagrees with the suggestion that AMR could provide any further capacity enhancement [**Confidential Text**]. It would be helpful to understand what this statement means in terms of quantifying the current extent of AMR half rate use for capacity management and the impact of any increase in the use of AMR-HR modes.

As previously noted, Scenario 2 of 10/71c did not assume any increased use of AMR as no information was available to Red-M and Vilicom on which to base any hypothesis of increased use.

The deployment of AMR increases network capacity, however this may be at the expense of reduced voice quality where AMR-HR modes are used extensively. Network equipment vendors provide controls that allow operators to manage the conditions under which AMR-HR modes can be activated, and therefore trade off increased capacity against reduced voice quality.

In Scenario 2 of 10/71c, the network re-plan assumed no use of AMR-HR before or after the spectrum was reduced.

3.1.2 Response to ComReg Document 10/105

Vodafone Ireland Limited (“Vodafone”) is in favour of including 1800MHz spectrum in a single award process and a ‘potential modified auction approach’ where it proposed that ComReg could ‘buy out’ the tail period of the existing licences in the 900 MHz and 1800 MHz bands with a preference for immediate liberalisation of existing 900MHz and 1800MHz licences. Although Vodafone is also in favour of ComReg’s proposed arrangement for an auction of the band (p8, Vodafone’s response to Q1), its point at the bottom of p4 does not seem entirely consistent with this view as it suggests existing spectrum allocations (which do not fit directly into ComReg’s proposed arrangement) should be maintained:

‘in principle the best approach to the licensing of the 1800 MHz band would be to extend the duration of most or all of the spectrum usage rights under 1800 MHz licences held by existing licensees in this band, at a minimum until the end date of the current 3G licences in 2021, and to auction only the remainder of the band.’

Vodafone is of the opinion that minimising delay is important (p2, first paragraph), but also asserts that it is essential that ComReg makes all reasonable efforts to provide clarity on proposals for the 2.6GHz band before any auction (p5, first paragraph). These objectives are not necessarily consistent given the unavailability of the 2.6GHz band until at least 2014. The issue of interim licences for the 900 MHz band has now been addressed in ComReg document 11/29 and Decision 03/11 and the subsequent S.I. (S.I 189 of 2011).

In relation to providing clarity regarding the use of LTE and WiMAX technologies in the 1800MHz bands (final paragraph of p7), Vodafone states:

‘Vodafone urges ComReg to confirm in advance of the joint spectrum award process that use of LTE and WiMax technologies will be permitted in these bands.’

The recent EC decision of 18th April 2011³ on the harmonisation of the 900MHz and 1800MHz frequency bands should now allow ComReg to provide clarity on the technical parameters that would be adopted.

Question 13 regarding transitional issues is the most relevant of the consultation questions in ComReg document 10/105 in the context of the Reports. Vodafone recognises that there is a wide range of possible outcomes from a joint award process for the 800MHz, 900 MHz and 1800 MHz bands and therefore a flexible approach to transition is required. It also agrees with the costs and timescales of the scenario

³ EC Decision (18 April 2011) at:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32011D0251:EN:NOT>

defined in ComReg report 10/105b. In answer to Q13 of ComReg Consultation 10/105, Vodafone states that:

‘Vodafone has no objection to the actual findings of the analysis carried out in ComReg document 10/105b in terms of the steps, timescales, and costs involved in completing re-tuning and/or relocation of spectrum assignments by existing licensees in the 1800 MHz band.’

However Vodafone has noted that the scenario presented is based on 2 x 15MHz of spectrum and does not consider the implications of an existing 1800MHz operator obtaining a reduced spectrum assignment. A detailed analysis of one such scenario was completed for 900MHz and was deemed inappropriate for 1800MHz, as small changes in some of the input assumptions could result in large changes in the impact of the scenario. This has been accepted by Vodafone.

‘Vodafone acknowledges the reasons set out by Red-M/Vilicom in section 2.5 of their report as to why no quantification of these scenarios has been undertaken and we consider the very high complexity of such an exercise is a justifiable basis for not doing so.’

Vodafone’s key issue with the transitional issues of Q13 is therefore the issues that arise if it does not achieve 2x15MHz. **[Confidential Text]**. Vodafone’s submission is essentially that loss of spectrum cannot be accommodated without significant customer impact. If this is accepted as the over-riding principle, it follows therefore, and it is implied by Vodafone, that the auction process must guarantee that an existing operator keeps at least the amount of spectrum that it currently has by removing it from the auction and setting a price in some manner other than through direct auction.

However the counter argument, as presented in ComReg document 10/105a section 3.2 (p9), is that if there is sufficient spectrum for existing operators to win sufficient amounts at auction and for new entrants to win sufficient spectrum to ensure that their spectrum holding at 1800MHz allows them to be effective competitors to the incumbent, then the onus is on Vodafone to bid enough at auction to win the spectrum, and that to pre-judge the issue by making administrative grants to incumbents, irrespective of the commercial terms, would be to risk not maximising economic efficiency.

The debate between these opposing points of view is not essentially technical, and those contrary views could both be held by organisations agreeing with the conclusions in ComReg report 10/105b. The technical observation is that there is sufficient spectrum at 1800MHz to ensure that incumbent operators, as long as they are willing to bid enough, can win, not only the amount of spectrum they currently hold, but also increase their holding at 1800MHz. At the same time there is sufficient spectrum to allow the introduction of new competitors.

Vodafone is concerned that there is insufficient evidence to determine the timeframes required for transition arrangements for the joint award of the 800MHz, 900 MHz and 1800 MHz spectrum bands but that this is addressed with the flexible approach to transition as presented by ComReg. On the other hand, assuming the scenarios

presented in ComReg reports 10/71c and 10/105b match reality, Vodafone does not have any objections to the timeframes presented.

In its answer to Q15, Vodafone states:

'Vodafone considers that there is unlikely to be a significant difference in the costs to licensees between partial and full relocation of frequencies within the 1800 MHz band.'

This is in agreement with the analysis and conclusions of ComReg report 10/105b.

In its response to 10/105, Vodafone does not address any other points presented in ComReg report 10/71c and 10/105b.

3.1.3 Response to ComReg Document 11/11

In its response to 11/11, Vodafone does not make any comments pertaining to ComReg reports 10/71c and 10/105b.

3.2 Telefónica Ireland Limited (“O2”)

3.2.1 Response to ComReg Document 10/71

O2 does not address the figures given in 10/71c directly, but appears to contemplate moving to 2x5MHz for GSM traffic given ‘sufficient’ time to plan.

10/71c also concludes that an operator could move to 2x5MHz use given ‘sufficient’ time to plan. The fact that the two conclusions are similar does NOT however imply that the approach in 10/71c Scenario 2 would be in any way adopted by O2.

In section 2.2.2 on page 3, O2 suggests

“For practical purposes as well as legal reasons, the duration of the interim licences should be modified (at least for 2x5MHz) to 2015”.

This is also addressed in O2’s response to question 5, on page 12. It can be taken from this that O2 considers it technically and commercially viable to operate a network with 2 x 5 MHz of 900MHz spectrum, though there are no details of how this would be used: GSM900, UMTS900, different regional uses, etc.

3.2.2 Response to ComReg Document 10/105

In previous consultation responses, the positions of Telefónica Ireland Limited (“O2”) and Vodafone have been largely aligned. However on the subject of whether 1800MHz spectrum should be included in the auction, O2 suggests that the auction of 1800MHz spectrum should be delayed, and its position is therefore different to that of Vodafone.

The timing of spectrum release was not considered explicitly in the Reports, although timing aspects have an important implicit effect on the transitional strategies discussed in the Reports.

In relation to the arguments put forward by O2 leading to their position of preferring a delay in 1800MHz spectrum release, its position may have been informed by a stated concern about potential delays arising from the inclusion of the 1800 MHz band affecting the proposed issue of interim licence in the 900 MHz band. The issue of interim licences was finalised in ComReg document 11/29 and Decision 03/11.

In justifying a delay in 1800MHz availability until clarity can be provided on the availability of the 2.6GHz band, even though 1800MHz is available now, O2’s argument is on the basis of propagation characteristics and the difference between spectrum above and below 1GHz in this regard. Whilst propagation below 1GHz is certainly advantageous, justifying the timing of a spectrum auction solely on the basis of propagation characteristics appears tenuous and ignores other factors that are significant.

O2 states that

'Bands that are close substitutes should be auctioned together so that bidders can switch between bands depending on how bidding, contention, and availability develops in the auction'

Based on this same reasoning, it could be argued that bands that are complementary should also be auctioned together. A substantial number of existing GSM networks utilise the propagation characteristics of each band to successfully manage their networks by using the lower band to provide a coverage layer and the higher band to provide a capacity layer.

O2 also states that

'Operators need to be able to take a holistic view when planning spectrum use, and also when buying spectrum at auction'

This would appear to support the inclusion of the 1800MHz spectrum in a triple band auction.

In the context of the recently announced strategic network partnership between O2 and Eircom, neither organisation rules out closer co-operation, if it is allowed in the terms of their licences and under competition law. LTE-Advanced will support intra- and inter- band carrier aggregation⁴, which allows increased possibilities for sharing. Sharing scenarios were not considered in the Reports and the number of such potential scenarios is large, and any analysis would therefore have to assume factors that could not possibly be known. From a purely technical perspective though increased possibilities for sharing could offer operators additional flexibility that could simplify transitional arrangements following an auction and reduce costs.

In its response to Q13 (p11), and its response to ComReg document 10/105 in general, O2 does not directly address the proposed process steps, estimated timescales and costs as presented in ComReg reports 10/71c and 10/105b.

As a general point, O2 confirms the fact that the transitional issues with 1800MHz license will depend on the outcome of the auction and will be better addressed following the auction.

3.2.3 Response to ComReg Document 11/11

O2 does not make any comments pertaining to ComReg reports 10/71c and 10/105b.

⁴ 3GPP : Release 10 : section 10.1 'Carrier Aggregation for LTE', p.100

3.3 Meteor Mobile Communications Limited (“Meteor”)

3.3.1 Response to ComReg Document 10/71

Meteor notes the fact that 10/71c states that Meteor’s own (confidential) analysis of their own costs of relocation appears reasonable. We assume therefore that Meteor is in overall agreement with the conclusions of 10/71c scenario 3, even if it may not agree with all of the details in the scenario.

Meteor does not address any other points raised in 10/71c.

3.3.2 Response to ComReg Document 10/105

Meteor’s previous response to ComReg document 10/71 is broadly supportive of the inclusion of the 1800MHz band in a joint spectrum award process, subject to ‘appropriate’ measures in relation to spectrum caps and auction eligibility criteria.

Meteor’s responses to ComReg document 10/105 do not directly address the proposed process steps, estimated timescales and costs as presented in the Reports. Furthermore a number of the comments are specifically applicable to the 900MHz auction and liberalisation, rather than the inclusion of 1800MHz into the proposed joint award. Meteor seems much more concerned with the auction of 900MHz spectrum than the auction of 1800MHz spectrum, and there is a considerable discussion of spectrum sharing and pooling, which echoes some of the comments contained in the O2 response.

As mentioned previously, question 13 regarding transitional issues is the most relevant to the matters considered in the Reports of all the consultation questions in ComReg document 10/105. Meteor’s response to this question is to refer to previous submissions in response to ComReg documents 09/99 and 10/71. In relation to its comments on ComReg document 10/71, Red-M/Vilicom wrote in their commentary on these previous submissions that:

‘Meteor notes the fact that 10/71c states that Meteor’s own (confidential) analysis of their own costs of relocation appears reasonable. We assume therefore that Meteor is in overall agreement with the conclusions of 10/71c scenario 3, even if they may not agree with all of the details in the scenario.’

We noted that a small technical error appears to have crept into Meteor’s response. At the foot of p25 of its response, when questioning ComReg’s proposed coverage objectives, it calculates the required LTE signal strength to be ‘69dB μ V/m/MHz’. Based on its preceding calculation, we understand it to mean ‘69dB μ V/m/5MHz⁵’.

⁵ At 1800MHz

3.3.3 Response to ComReg Document 11/11

In its response to 11/11, Meteor does not make any comments pertaining to the Reports.

3.4 Hutchinson 3G Ireland Limited (“H3GI”)

3.4.1 Response to ComReg Document 10/71

H3G does not address 10/71c directly, but states that access to 2x5MHz at 900MHz in the short term would allow it to rapidly roll out greater 3G coverage (presumably using 900MHz carriers on existing cell sites). **[Confidential Text]**

3.4.2 Response to ComReg Document 10/105

The previous response to ComReg document 10/71 by Hutchinson 3G Ireland Limited (“H3GI”) is generally not supportive of the inclusion of the 1800MHz band in a joint spectrum award process on the basis that ‘interested parties have not shown sufficient demand for 1800MHz.’

H3GI’s response to ComReg document 10/105 does not directly address the proposed process steps, estimated timescales and costs as presented in the Reports. While, as mentioned above, question 13 regarding transitional issues is the most relevant to the Reports, of all the consultation questions in 10/105, H3GI has not provided a response to this question.

3.4.3 Response to ComReg Document 11/11

On p18, H3GI describes the Irish mobile market as

‘a market characterised by incumbent operator historic advantages and a significant imbalance in spectrum allocation amongst mobile operators’

Including the 1800MHz band into the proposed joint award of the 800MHz and 900MHz spectrum as proposed in ComReg document 10/105 will provide opportunities for this perceived ‘imbalance’ to be addressed, enabling operators to make extensive choices regarding spectrum allocation and network planning.

On p31, paragraph 1, H3GI asserts that it is not in a ‘better position’ to take advantage of liberalised 900 MHz spectrum than incumbents.

H3GI states that:

‘H3GI expressly rebuts ComReg’s statement (referred to at page 10 of the draft Response) that “HG3I is in a better position to take advantage of liberalised 900 MHz spectrum, as the incumbent 3G only carrier, and might thus be put in a more advantageous position than the other MNOs were it awarded 900 MHz spectrum prior to 2013H’

In Red-M/Vilicom report 10/71c, section 2.9, the question of the differing positions of incumbent 900MHz operators (Meteor, O2, Vodafone) and new entrants (H3GI or any other new entrant) is summarised. 10/71c does not deal with, which type of

operator is in the 'better' position, in relation to the use of liberalised 900MHz spectrum, but contrasts the differing positions and engineering challenges that each type of operator would encounter. To re-iterate the example positions listed in 10/71c:

Existing Operator Assigned 2 x 5 MHz of spectrum

- *Operator reduces GSM 900 MHz spectrum usage from 2 x 7.2 MHz to 2 x 5 MHz, deploying the techniques listed in section 2.8*
- *Operator cannot 'liberalise' in the medium term whilst also supporting existing customers*
- *LTE, with a flexible carrier bandwidth from 1.4MHz to 20MHz may offer a more flexible approach than UMTS, as UMTS requires total migration from 900 MHz 2G network and machine to machine users of GSM900 mobile networks in particular will be difficult to migrate even with generous terminal subsidies.*

Existing Operator Assigned 2 x 10 MHz of spectrum

- *Operator reduces GSM900 MHz spectrum usage from 2 x 7.2 MHz to 2 x 5 MHz, deploying the techniques listed in section 2.8*
- *Operator uses 2 x 5 MHz to 'liberalise' early, rolling out UMTS mobile broadband to rural customers and improving coverage depth in urban areas*

New Entrant Assigned 2 x 5 MHz of spectrum

- *Operator uses 2 x 5 MHz to 'liberalise' early, rolling out UMTS mobile broadband to rural customers and improving coverage depth in urban areas*

Contrasting the case of an incumbent with 2x10MHz and an new operator with 2x5MHz

- *The incumbent needs to free up 2.2MHz of GSM spectrum, using a mixture of re-planning, offloading and new site build, followed by a UMTS build out which can use existing sites, feeders and antennas*
- *The new operator does not require the re-planning phase, but must build 900MHz sites. These may be a mixture of existing sites which may need new antennas⁶ assuming these are not already multi-band,*

⁶ Assuming they are not already dual-band

and new sites designed to take maximum advantage of the favourable propagation characteristics at 900MHz.

The operators have not chosen to provide sufficient detail in any of their responses as to how they actually intend to deal with these diverse challenges, and it would therefore involve speculation to determine which operator is in the ‘better’ position, even assuming the notion of ‘better’ could be accurately determined. ComReg considers the differing positions of the operators in ComReg document 11/29 ‘Interim Licences for the 900MHz band’, and makes the following statements in accordance with the quotation from 10/71c above:

- *Provision of UMTS services will effectively require one 2x5 MHz block of 900 MHz spectrum.*
- *Accordingly, for the current 900 MHz incumbent MNOs to operate both UMTS and GSM services they would need to be granted rights of use in respect of additional spectrum, so that each of them held rights of use in respect of 2 x 10 MHz of 900 MHz spectrum. If this were not done the incumbents could not launch a UMTS 900 MHz network while effectively continue to provide service to the GSM customer base. As discussed earlier, given the current spectrum assignments and position of the incumbent 900 MHz operators, and the 2 x 5 MHz block size proposed, it is not technically possible to avoid some form of relocation activity in the band, and consequent time delay arising from such relocation activity.*

In p38, paragraph 2, H3GI also states that

‘Whilst H3GI acknowledges that it will face the full costs of site acquisition, site build, commissioning of base stations etc. in the 900 MHz spectrum band, will require extensive radio planning and design work to accommodate 900 MHz and will be required to either rig new antennae to deploy 900 MHz, H3GI could roll out a UMTS 900 MHz network in rural areas in six months i.e. significantly in advance of January 2013.’

It is understood that not all 719⁷ sites would be required to roll out a UMTS 900MHz in rural areas as many of these sites will be based in urban or suburban environments. Furthermore, due to the propagation characteristics of 900MHz only a subset of these ‘rural sites’ would be required to provide the desired coverage. In many rural areas, for example, where UMTS2100 coverage might benefit from increased range and in-building coverage from UMTS900 coverage, an initial plan to roll out a network might involve addition of UMTS900 equipment to existing sites. As transmission, site and power are already in place, the operation involves installation of new NodeB equipment and replacement of single-band antennas with dual-band where necessary. Planning permission maybe required for replacement antennas if they do not adhere to the rules as stated in S.I. No. 600/2001 — Planning and Development Regulations, 2001, (CLASS 31). The number of sites that could be completed in 6-months if the ‘roll-out’ is to equip existing UMTS2100 sites with UMTS900 equipment and where

⁷ ComReg 11/11, Table 2, p29

no planning permission is required, would be dependent on the number of teams assigned and their working hours. With such information, the project timescales could be predicted with low risk. It would be expected that this option for 'roll out' of a UMTS900 network could be completed fairly rapidly.

Optimisation of the network for 900MHz coverage, which might include re-planning, site acquisition, planning permission and new site builds, would be significantly more challenging to complete this within a 6-month timeframe, given the associated risks where planning delays are involved. In footnote 29 on page 21 of ComReg document 11/29, ComReg also considers that a 6-month timeframe for completion of all these activities would be 'optimistic'.

Without clarity of the definition of 'rolling out a network', and neither the knowledge of the availability of resources applied nor the percentage of the 719 H3GI sites that are required to provide coverage to rural areas, it is difficult to comment on the validity of the 6-month timeframe. It would be possible to 'roll out' a network starting a rapid upgrades program to many existing sites, followed by the longer and slower process of cost optimisation, where redundant rural sites are removed from the network.

On p42, paragraph 6, and p43 of its response to ComReg Document 11/11, H3GI dispute some figures published by ComReg regarding the penetration of handsets supporting 3G in 900MHz bands, and quotes different sources of forward looking statements about future mobile sales. Red-M/Vilicom report 10/71c did not contain directly comparable statistics on mobile sales, but did consider the implications of user handsets functionality in section 6.4. These considerations were in relation to offload strategies for GSM900 spectrum. It was estimated that 20-50% of the handsets in use support 3G and are equipped with USIMs (Universal Subscriber Identity Module). 10/71c also considered that it is the penetration within a mobile operator's installed base that is most important. The penetration lags the 'new sale' figures by approximately the average lifespan of a mobile terminal in a network. Operators will have accurate estimates for their own networks and can influence churn to a certain extent by promotions and offers.

It is worth noting that incumbent operators are likely to have a greater proportion of GSM only handsets in their installed base and that in relation to switching off an old network completely, 'laggards' need to be considered. Legacy users may include M2M (Machine to Machine) users such as remotely managed vending and ticketing machines.

3.4.4 H3GI's Supporting Document Prepared by Value Partners and RRA

In support of its response to ComReg document 10/105, H3GI supplied a report prepared by Value Partners Management Consulting and Radio Regulatory Associates Ltd. This report does not directly consider any of the consultation questions raised by ComReg in ComReg document 10/105 or ComReg document 11/11, nor does it directly refer to the Reports.

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 O2⁸ 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.

⁸ The progress that O2 is making on this task in the UK, where each GSM900 operator has 2x17.4MHz of GSM900 spectrum, is direct evidence that they know how to move quickly.

4 Conclusion

Red-M and Vilicom have reviewed all responses received to ComReg document 10/71 'Retuning and Relocating GSM900 Spectrum Assignments in Ireland', ComReg document 10/105 'Inclusion of the 1800MHz Band into the Proposed joint award of 800MHz and 900MHz spectrum' and ComReg document 11/11 'Interim Licences for the 900MHz band', along with ComReg's analysis and decision in ComReg document 11/29 'Interim Licences for the 900MHz band'.

Attention has been focused on the details in the responses that influence the conclusions reached in the Reports regarding the retuning and relocating of GSM900 and GSM1800 spectrum assignments in Ireland.

The comments received do not lead us to believe that any update or re-write of ComReg report 10/71c or 10/105b is required.