Commission for
Communications Regulation

Proposed Multi Band Spectrum Award

Non-confidential Submissions to Document 20/32

Reference: ComReg 20/68

Date: 24/07/2020

Content

Section Page

1 Eircom Limited and Meteor Mobile Communication Limited (trading as ‘eir’ and ‘open eir’), collectively referred to as ‘eir Group’ or ‘eir’ 3
2 Imagine Communication Group 18
3 Three Ireland (Hutchison) Limited 24
4 Vodafone Ireland Limited 40

1 Eircom Limited and Meteor Mobile Communication Limited (trading as ‘eir’ and ‘open eir’), collectively referred to as ‘eir Group’ or ‘eir’

eir

Response to ComReg Consultation:

Proposed Multi Band Spectrum Award – Draft Information Memorandum and Draft Regulations

ComReg Document 20/32

24 June 2020

DOCUMENT CONTROL

Document name	eir response to ComReg 20/32
Document Owner	eir
Status	Non-Confidential

The comments submitted in response to this consultation document are those of Eircom Limited and Meteor Mobile Communications Limited (trading as 'eir' and 'open eir'), collectively referred to as 'eir Group' or 'eir'.

Summary

- eir commends ComReg for its supportive response to the national Covid crisis making available 700MHz on a temporary basis to augment mobile data capacity and assist operators in managing substantial changes in network consumption. eir urges ComReg to continue to make the 700MHz spectrum available on a temporary basis until the longer term licensing is determined.
- eir believes it is timely and appropriate for ComReg and/or DCCAE to undertake a review of the most effective mechanism to determine the longer term licensing of the 700MHz band that will encourage investment in the availability of high quality mobile data services across the country.
- eir is concerned that ComReg is proposing detailed rules for design principles which are still the subject of an ongoing consultation process. This process is not appropriate and ComReg cannot simply dismiss the concerns of interested parties in the way it has done. eir's position is reserved accordingly.
- eir notes that any changes to the design principles will require further consultation on the detailed implementing rules for the Information Memorandum (IM). In any event a further consultation on the draft IM is required in light of significant unexplained changes to reserve prices and the absence of details of the method to calculate the early liberalisation fee. ComReg has also failed to consult on the rules that will apply should an existing mobile operator voluntarily surrender some of its existing holdings in advance of the award.
- With regard to the proposed detailed auction design for the bands to be awarded, eir continues to believe that the auction design should be simplified wherever possible to facilitate effective participation by bidders.
- eir welcomes ComReg's proposals regarding exposure pricing transparency. However eir remains of the view that ComReg has failed to appreciate the fundamentally different nature of risk faced by a budget constrained bidder in a CCA as compared with an SMRA or SCA.
- eir looks forward to further engagement on these important matters.

Response to consultation on the draft Information Memorandum

Response to Covid 19

1. In section 1.2 ComReg notes the temporary spectrum licensing framework introduced in response to Covid-19 noting "*that it was intended solely to address the exceptional and extraordinary situation presented by COVID-19 and is entirely without prejudice to this Award Process.*" The temporary framework was established following an accelerated consultation and Decision making process at the end of March. eir commends ComReg for its supportive response to the national Covid crisis making available capabilities to augment mobile data capacity and assist operators in managing substantial changes in network consumption. The temporary framework established the availability of licences for a 3 month period which could, subject to application and ComReg consent, be extended for a further 3 months. Thereafter the emergency measures will fall away absent further decision making by ComReg.

2. At the end of March nobody could reasonably predict how the Covid-19 crisis will evolve. Almost three months on and it is still difficult to predict but it seems the exceptional and extraordinary situation will unfortunately persist for some time. It is likely that office buildings will remain closed or below capacity to facilitate social distancing and a large proportion of workers will be required to work from home into 2021. The crisis has reinforced the importance of the widespread availability of fixed and mobile broadband services and we believe the temporary licensing of 700MHz should be allowed to continue until the longer term licensing of the 700MHz is addressed. Operators temporarily using the 700MHz have the ability to rapidly cease using the spectrum (using over the air updates) as necessary when the longer term licensing is determined.

3. eir believes it is timely and appropriate for ComReg to undertake a review to consider extending the temporary licensing framework for 700MHz until the longer term licensing of the band is determined[1];

4. eir notes that the draft programme for Government (15th June 2020) acknowledges the importance of High-Speed Broadband and Remote Working. Wider geographic availability of mobile broadband is an important enabler. However given Ireland's rural population density there are some areas where it is not economic to provide coverage solely on a commercial basis taking into account the high spectrum licensing fees that arise as a result of ComReg's preferred

[1] eir does not believe it would be appropriate to further extend the temporary liberalisation measures in the 2100MHz band given the material spectrum imbalance that persists.

award mechanism, the Combinatorial Clock Auction (CCA). A CCA may not be the most appropriate mechanism to determine the longer term rights to the 700MHz band if the societal objective of improved rural connectivity is to be pursued.

5. eir believes it is timely and appropriate for ComReg and/or DCCAE to undertake a review of the most effective mechanism to determine the longer term licensing of the 700MHz band that will encourage investment in the availability of high quality mobile data services across the country.

Disjointed Consultation Process

6. eir acknowledges the opportunity to respond to ComReg's Consultation on the draft Information memorandum in relation to the proposed Multi Band Spectrum Award (MBSA2). However eir is disappointed that ComReg continues to largely dismiss, with no substantive analysis, concerns raised in our previous responses to ComReg 19/59 and ComReg 19/124. In doing so ComReg does not appear to have either fully considered the concerns raised or given cogent reasons for dismissing them.

7. It is of concern that the detailed rules being consulted on are in relation to the matters proposed by ComReg in the draft Decision. ComReg appears to have ignored all responses that did not agree with its proposals. ComReg states in para. 1.4 "*ComReg welcomes and acknowledges the responses received to Document 19/124 and notes that the matters raised in respect of same will be addressed in ComReg's forthcoming response to consultation and final Decision on the Award Process which ComReg aims to publish in Q4 2020.*" We also note that ComReg intends to publish responses to ComReg 19/124 and invite comments. However this will not be done until after the current consultation closes. There is a complete lack of proper and fair consultation process with industry. ComReg is consulting on the detailed implementation of proposals that are themselves subject to an ongoing consultation process whilst at the same time keeping interested parties in the dark as to the views of others on the proposals. This does not appear to be a fair consultation procedure. Accordingly eir reserves its position on a number of important outstanding matters raised in its response to ComReg 19/124 including but not limited to:

   - ComReg's proposed manner to address early liberalisation of eir's existing 3G licences is disproportionate
   - Absent material improvements to the CCA format eir is unable to support its use. ComReg has sought to dismiss concerns raised stating in para 1.19 that it "*ComReg considered such*

concerns to be relatively minor and manageable." ComReg must properly respond to the concerns raised by eir in its response to 19/124 regarding the risk of gaming in the [✂].

8. If the substance of any of the proposals changes ComReg will be required to consult again on the detailed rules to support the implementation of the proposals. Unless specifically addressed in this response eir's position in respect of the issues raised in our previous response remain as expressed in our response to ComReg 19/124 and must be considered accordingly.

Legal terms and conditions

9. ComReg sets out various legal terms and conditions in chapter 5 of the Draft IM. The IM will be fundamental to ComReg's proposed award process. It is essential that Interested Parties are able to rely on its contents and be confident there will not be sudden unexpected changes. We do not believe that the IM in its current form is adequate. In particular, the disclaimers set out in Chapter 5 and the right of ComReg to amend the IM are drafted so broadly as to render it meaningless and incapable of being relied upon by Interested Parties.

10. For example para. 5.27 seeks to reserve the right for ComReg *"not to proceed with any part of the Award Process described in this Information Memorandum;*" and para. 5.31 seeks to reserve powers for ComReg to make any changes it sees fit with only an obligation to inform Interested Parties of the amendments or modifications. eir requests ComReg's assurance that any material changes will be subject to a proper consultation exercise with Interested Parties afforded the opportunity to input their views and have their views fairly considered.

11. The disclaimer at Paragraph 5.13 is unacceptably broad stating "*No legal obligations on the part of ComReg to grant any Licences will arise unless and until the granting and commencement of a Licence or Licences by ComReg following the completion of the Award Process.*" This cannot be the case as Para. 5.17 clearly establishes that an agreement is formed between Applicants and ComReg. It is wrong for ComReg to seek to set aside its legal obligations under the IM.

12. Paragraph 5.25 requires Interested Parties to notify ComReg should they discover any error or omissions or lack of clarity in the IM. This requirement should be extended to ComReg and its agents such that ComReg should promptly notify Interested Parties if it discovers any error or omissions or lack of clarity in the IM. Furthermore there should be a clear obligation on ComReg to properly consult on the manner on which an error or omission will be addressed irrespective of who discovers it.

Timeline for process

13. Table 18 sets out an indicative timeline commencing when the IM is published (day X) up to the circulation of Bidder Materials to qualified Bidders (X plus 15 weeks). The granularity of the proposed interim steps and timelines is welcome. It is important that Bidders have sufficient time to prepare for their participation in the proposed award process including mock auctions etc. Consequently eir strongly believes that a sufficiently detailed outline of the further preparatory steps and minimum timelines should be circulated for interested parties to review and comment on. This can be done on the assumption that a Main Stage will be required and should set out indicative activities and minimum timelines from the circulation of Bidder Materials to the start date of the Auction.

Application stage

14. eir welcomes that it is no longer a requirement to provide copies of application documents on a CD-ROM as was the case in previous award processes. eir believes ComReg can take further steps to modernise the application process by moving away from the requirement for paper copies to be provided by hand. ComReg should develop an electronic means for the submission of applications which will be a much more efficient mechanism.

Main Stage

15. Without prejudice to eir's continuing opposition to a number of aspects of ComReg's proposals for this auction, including the use of a CCA format, eir makes the following comments as regards ComReg's specific proposals for a Combinatorial Clock Auction (CCA) as set out in the draft IM.

- **Additional pricing information**

16. eir welcomes and supports ComReg's proposal to provide additional pricing information to bidders before the start of each round, in the form of the minimum discount that each bidder could expect to enjoy if that round were to be the final primary round and there were to be no 'unsold' lots at the end of that round.

17. eir notes however that this discount may go down as well as up in later rounds (and may even disappear completely) and that if there are any 'unsold' lots at the end of the final primary round then a bidder may still need to make a supplementary bid for its final primary package that is significantly higher than its final primary bid in order to be certain of winning that package (and if

it does not, risks winning nothing at all). Hence, whilst the provision of this additional information is welcome, it by no means fully addresses the concerns raised by eir in relation to the uncertainty that bidders face as to the amount they might actually have to pay as a result of any bid, and the result of the auction if they do not submit their knock-out bid in the supplementary bids round. At the very least, further additional information could potentially be useful (but again, is unlikely to fully address eir's concerns).

18. For example, after the end of the final primary round and before the start of the supplementary bids round, eir believes that the outcome of the auction could be enhanced if each bidder were provided with the following information, in addition to that already proposed by ComReg in the draft IM:

- The minimum bid that the bidder could make for its final primary package in the supplementary bids round for that bid to win. We anticipate that this could be calculated by assuming that all other bidders that made a non-zero bid in the final primary round made the knock-out bid for their final primary package in the supplementary bids round, and no other supplementary bids were made by any bidder.
- The minimum bid that the bidder would need to make for its final primary package in the supplementary bids round for that bid to win if no other supplementary bids were made by any other bidder.

19. Regulation 9(4)(a) of the Authorisation Regulations requires that ComReg, having regard to the provisions of Regulation 17 of the Framework Regulations, establish open, objective, transparent, non-discriminatory and proportionate procedures for the granting of rights of use for radio frequencies and cause any such procedures to be made publicly available. The provision of this further additional information could, in eir's view, provide bidders with a greater understanding of the level of risk to them if they were to make a supplementary bid for their final primary bid package at less than the knock-out bid amount and hence improve the chances that the outcome of the auction would be as efficient as possible.

- **Looped relative caps (Annex 11)**

20. We note that DotEcon appear to have identified a lacuna in the (already very complex) rules used in MBSA1, regarding the application of constraints arising out of eligibility reducing bids made after a bidder has submitted an eligibility reducing relaxed primary bid, and thereby created a loop of relative caps. DotEcon and ComReg propose to fill this lacuna with yet more

complex calculations to determine which pre-existing constraint should be replaced by a new constraint arising out of the latest eligibility reducing bid.

21. Whilst DotEcon and ComReg provide a detailed explanation of how this complex new rule would work, they provide no analysis of the consequences of this new rule (for example will the new constraint be tighter or looser than the constraint that it replaces), nor any consideration or evaluation of other options for dealing with this lacuna. For example, given that eligibility and activity are already calculated separately in each Time Slice, have DotEcon and ComReg considered the option of identifying constraining rounds separately for each Time Slice (such that a bid that reduces eligibility in Time Slice 1, but not in Time Slice 2, creates a constraint on future bids in respect of Time Slice 1 but not Time Slice 2, and therefore completely avoids the creation of loops of relative caps)? If not, we request that the analysis be undertaken with a view to reducing the complexity of the award process. If the analysis has already been undertaken we request that it be shared with interested parties so they may consider whether it is appropriate to reject this option.

- **Identification of candidate frequency bands (Annex 9)**

22. eir notes (A9.28) that DotEcon and ComReg are proposing to use random selection to select a single Candidate Frequency Plan for each winner ordering in the case where there are multiple potential frequency plans that minimise the Total Time Slice Variation and have the greatest value of unsold Time Slice 1 lots forming one contiguous range. Whilst not explicit, the implication is that these random selections would be made independently across different winner orderings.

23. The problem with this approach is that the result, in terms of the Assignment Options presented to each bidder, may be more limited than it needs to be. For example, in Annex 9, Example 4, Step 3, each of Bidders A and B are presented with 6 options, which encompass all possible options. However, a different set of random selections could have led to Bidders A and B being presented with only 4 options: for example without the second and sixth options. Those bidders would then have no option in which they could win lots 5 and 6 in both time slices.

24. eir believes bidders should always be presented with the widest possible range of options compatible with an efficient assignment. We therefore believe that all tied best Candidate Frequency Plans for each winner ordering should be taken forward to determine the Assignment Options presented to each bidder.

- **Exclusion of bids submitted by a bidder that has failed to meet a deposit call following completion of the main stage of the auction**

25. eir notes that ComReg has changed the rule concerning the treatment of bids submitted by a bidder that has failed to meet a deposit call following completion of the main stage of the auction and has been excluded from the auction as a result (para 4.154), such that ComReg may choose to exclude some but not all of the bids submitted by such a bidder when re-running the winner and price determination algorithm. eir cannot see any circumstance in which it would be appropriate for any bid made by a bidder that has been excluded from the award process to be included in the calculation of the winning bids and prices to be paid by the remaining bidders. ComReg must delete the words "some or" from the final sentence of this paragraph, or explains when and why this option might be needed. The bids submitted by an excluded bidder are by definition illegal as they do not conform to the rules of the award process. As such they must be prohibited from bidding otherwise the outcome of the process will be inefficient and contrary to ComReg's duties under Regulation 9(4)(a) of the Authorisation Regulations.

- **Base price determination**

26. Paragraph 4.167 states that any Base Price that is not a multiple of EUR 1000 will be rounded up to an "even" multiple of EUR 1000. This could be interpreted to mean that the Base Price needs to be a round multiple of EUR 2000. eir assumes this is intended to mean the next highest round multiple of EUR 1000 and requests ComReg to clarify this matter.

- **Failure to appreciate the fundamentally different nature of risk faced by a budget constrained bidder in a CCA as compared with an SMRA or SCA**

27. eir notes that DotEcon and ComReg appear to continue to fail to recognise or acknowledge the fundamentally different nature of the risk faced by a budget constrained bidder in a CCA, as compared with an SMRA or SCA, as evidenced for example by the complete lack of any discussion of this point in DotEcon's report at Annex 12 of the IM.

28. In an SMRA or SCA , a budget constrained bidder who finds that the price of its preferred package has increased to the point where it exceeds its budget (but not its value for the package) always has the option to bid on a smaller package, and to continue bidding on that smaller package until the price of that package reaches either the bidder's value for that package or its budget, at which point it again has the option of bidding on an even smaller

package, and so on. Hence, unless and until prices increase to the point where all packages of interest to the bidder are too expensive for the bidder, either because the price of the package exceeds its value to the bidder or exceeds the bidder's budget, the bidder can continue to bid and is at no risk of winning nothing at all.

29. By contrast, a budget constrained bidder in a CCA can face the risk that they will win nothing at all, despite being willing to pay a higher price than bidders that do win lots. For example, a budget constrained bidder may have bid on a package of lots in the final primary round that was affordable to it at final round prices, but then discover that the knock-out bid required to be sure of winning that package is significantly higher and, whilst it might still be below the bidder's valuation for that package, is more than the bidder's budget. If that bidder then limits it maximum bid for that package to its budget, it is entirely possible that the bid will not win. Moreover, any bids that the bidder wishes to make for smaller (cheaper) packages will be limited by the final price cap, and as such will have to be lower than the bidder's budget by at least the difference in price between the bidder's final primary package and the relevant smaller package at final primary round prices. A bidder in these circumstances therefore cannot make a bid up to its full budget for a smaller package (as compared with an SMRA or SCA where this is always possible). It therefore faces the risk that it will not win either its preferred package or a smaller package (and hence nothing at all), despite the fact that it might have been willing to make a significantly higher bid for a smaller package, which might have won if it had been allowed to make it.

30. DotEcon state that one rational response to this risk can be for such bidders to compromise and bid for smaller packages, rather than bidding for larger packages up to their full incremental value. They suggest that a bidder might do this because "*it does not expect that its bids for larger amounts to be competitive*"[sic]. What DotEcon seem to fail to recognise is that this is not about expectation, but rather about the willingness of the bidder to take the risk that it is wrong, and the consequences if it is wrong – being the potential that they will (inefficiently) win nothing at all, rather than simply the risk that they will pay a higher price than would have been the case if they had not continued bidding for the larger package (which is the normal incentive for strategic demand reduction in uniform price auctions). Hence the incentive for demand reduction is likely to be stronger (leading to an increased likelihood of an inefficient outcome favouring stronger bidders) and at the same time is unlikely to completely eliminate the risk that a budget constrained bidder could win nothing at all when it would be efficient for it to win a smaller package than the one it bid on the final primary round. The outcome of the award process is very strongly influenced by each bidder's appetite for risk in a very non-transparent situation. ComReg's failure to properly consider this matter places it in breach of Regulation 17(1) which

requires that ComReg ensure inter alia that the issuing of individual rights of use for such radio frequencies are based on objective, transparent, non-discriminatory and proportionate criteria.

End date of licences

31. We note an inconsistency between paragraph 3.12, which states that the end date for Time Slice 2 will be 30 November 2040, and Tables 17 and A3.4 as regards lot categories B2.6F/2 and B2.6T/2, where the end date is stated as being 30/11/2035. We understand that the former is ComReg's intention and trust that the latter will be corrected accordingly.

Early Liberalisation

32. eir has set out its concerns regarding the proposed approach to address the expiry of the existing 2.1GHz licences in previous responses and we look forward ComReg's consideration of these matters in its response to consultation. eir has raised a number of concerns including the proposed methodology for calculating the Liberalisation fee.

33. There is a material omission in the draft IM regarding the Liberalisation Fee. The Liberalisation Fee is defined in the draft 2.1 GHz Early Liberalisation and Interim Licensing Regulations as having "*the meaning set out in the Information Memorandum*". eir has been unable to identify any reference to the Liberalisation Fee and the proposed method for its calculation in the draft IM. ComReg must provide the missing section of the draft IM for consultation.

34. Regarding the exercise of the early liberalisation option we welcome the confirmation in section 13(3) and 13(6) of the draft Regulations that the option may be exercised before or after the award. The consultation on the missing section of the draft IM relating to the method of determining if a fee is applicable, and if so the amount, should also include ComReg's proposal to adjust the fee downwards if the option is exercised after the Award.

Treatment of surrendered spectrum

35. In our response to 19/124 eir requested ComReg to clarify what steps / rules will be in place should an operator seek to voluntarily surrender some of their existing spectrum. eir believes this matter would be best addressed in a fully transparent manner in the IM and is disappointed to note that ComReg has not brought forward any proposals to address voluntary surrender in the draft IM. eir believes the manner in which this is to be addressed in the IM requires further consultation.

Rollout and Coverage – Specific Locations

36. ComReg proposes that the licences will have an obligation to provide outdoor coverage to 100% of Specific Locations (Table 3 of the draft Licence and detailed in Annex 4 of the draft IM). eir notes that that the coverage will be assessed per Table A4.8 based on outdoor coverage at or around the locations and agree that this is the appropriate method of measurement. As the obligation applies to specific locations it should be acknowledged that a failure to comply with the obligation at a specific location may the result of factors outside of the licensee's control such a resistance to planning applications or lack of cooperation from the person responsible for the Specific Location. As such the list of Specific Locations can only include locations where the site owner / controller has consented to acting in a reasonable manner facilitate the licensees to provide coverage. If a site owner / controller is unwilling to make this commitment the location should be removed from the list of Specific Locations.

Roll-out targets should be symmetrical

37. eir has further considered the proposed roll-out targets and believes that ComReg's proposals to set lower asymmetric targets for new entrants does not promote the efficient use of the spectrum. ComReg has not demonstrated that end users would be better off with new entrants providing an inferior minimum standard of service for the period covered by the licences. eir accepts that a new entrant may take longer to achieve the mandated minimum level of coverage. However eir can see no justification as to why a new entrant should not be required to achieve the same minimum coverage levels as other users of the spectrum albeit over a longer period of time.

Spectrum Fees

38. The proposed reserve prices and annual Spectrum Usage Fees (SUF) are set out in Tables 12 to 15. The reserve prices have changed significantly, particularly in respect of the 700MHz and 2.1GHz bands whereas the SUF remain unchanged. ComReg offers no explanation for the changes in reserve prices. The reserve price changes do not appear logical given that the SUFs remain unchanged and both are derived from the Minimum Price calculations. The changes can only be explained if there has been a change in ComReg's proposed methodological approach. However methodological changes should only take place following a proper consultation process. ComReg is required under Regulation 19(2) of the Authorisation Regulations to ensure that fees are objectively justified, transparent, non-discriminatory and proportionate

in relation to their intended purpose. ComReg must urgently issue a consultation on how proposed spectrum fees will be derived.

2 Imagine Communication Group

Imagine response to: -

ComReg 2032, Proposed Multi Band Spectrum Award – Draft Information Memorandum and Draft Regulations

24th June 2020

Imagine Communications Group
Sandyford Business Centre, Dublin 18, Ireland

1. Introduction 3

2. Imagine Comments 5

2.1. Spectrum Fees 5

2.2. Exposure Pricing 5

1. Introduction

Imagine welcomes the opportunity to respond to the Draft Information Memorandum and Draft Regulations[1] and notes that the stated purpose of this draft IM is to detail and consult on the rules and procedures ComReg intends to employ in the implementation of its draft Decision as laid out in ComReg 19/124[2].

Imagine also looks forward to the forthcoming publication of non-confidential versions of submissions received to Document 19/124 and commenting on same.

Having provided both a response to ComReg 19/59R[3] and comments on ComReg 19/124 and whilst acknowledging the positions laid out in ComReg 19/124 Imagine's views on the following aspects of ComReg's proposals remain unchanged.

Spectrum Caps

The overall cap proposed by ComReg at 375MHz whilst addressing the objective of avoiding the creation of an effective duopoly and reducing the possibility of exacerbating the level of asymmetry between Three and Eir post-award[4] could, had it been lower, have reduced the likelihood that the majority of the spectrum will be acquired by the three MNO at the expense of other operators and new entrants, particularly existing and potential FWA operators.

Timeslices

Imagine is disappointed that ComReg proposes to award the 2.3 and 2.6GHz bands in the same time slices defined for the 2.1GHz band. Imagine does not believe that time slices are necessary or appropriate for the 2.3 and 2.6GHz bands.

Rollout Obligations

Imagine agrees with the higher rollout obligations proposed[5] for a Licensee that is a New Entrant and wins at least 2 × 10 MHz in the 700 MHz Duplex and 2 × 20 MHz across the remaining Award Spectrum.

Imagine would also propose that given the finite spectrum resource available a higher base station rollout obligation, for example 400 base stations, in the Performance Bands than

---

[1] ComReg 20/32 – Proposed Multi Band Spectrum Award – Draft Information Memorandum and Draft Regulations

[2] ComReg 19/124 – Proposed Multi Band Spectrum Award - Response to Consultation and Draft Decision on the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands – Chapter 9.

[3] ComReg 19/59R - Proposed Multi Band Spectrum Award - Including the 700 MHz, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands, Response to consultation and further consultation

[4] ComReg 19/124 Para 6.252

[5] ComReg 20/32, Para 2.32 to 2.40

that proposed by ComReg[6] would be appropriate both in the case of an Existing Operator (other than an Existing MNO) and also in the case of a New Entrant there should be no distinction between an MNO and Other operator.

Eir 2.3GHz Transition

Imagine believes that the Eir RurTel service occupies a disproportionate amount of spectrum (20MHz) for the number of customers served. (80 reported at the time of publication of document 19/124[7])

ComReg has acknowledged the impact of the RurTel service on the lower 30MHz of the 2.3GHz band through the designation of this block as a fixed frequency lot in the case that a full migration has not been achieved by Eir[8]

Imagine believes that the proposal to adopt the Eir 2.3 GHz Transition proposals as set out in Section 9.3.2 of Document 19/59R[9] should be amended to eliminate any potential for Eir to have an advantage in bidding for the 2.3GHz fixed frequency block due to having internal knowledge of the timetable for the migration that other bidders do not have. This could be achieved through Eir having to submit a migration plan to be approved by ComReg prior to the auction and for this information to be made available to the other bidders.

Furthermore Imagine believes that the migration could and should be informed not just by the ability of the RurTel customers to avail of the services that would be provided via the NBP[10] but also by services that could be provided by a winning bidder, for example an equivalent VoIP service delivered via FWA or indeed a fixed voice service delivered via a mobile connection.

[6] ComReg 20/32, Para 2.41, Tables 10 and 11

[7] ComReg 19/124 – Para 5.89

[8] ComReg 19/124 – Section 6.3.5

[9] ComReg 19/124 – Section 8.62

[10] ComReg 19/59R – Section 9.55

2. Imagine Comments

2.1. Spectrum Fees

Imagine agrees with the proposal for a two-part payment structure composed of an upfront fee ("minimum SAF") and an on-going stream of indexed Spectrum Usage Fees ("SUFs") but would have a preference for a larger proportion to be given to the SUF rather than the proposal for it to be apportioned on a 40/60 basis.

2.2. Exposure Pricing

Imagine agrees with the view expressed by DotEcon in Annex 12[11] that

> *"providing exposure prices could be seen as a measure to level the playing field to remove any advantages of more sophisticated and better resourced bidders able to undertake such calculations."*

Imagine is of the view that providing Exposure Pricing as outlined in ComReg 20/32 sections see Section 1.3, 4.2.2 and Annex: 12 is a welcome addition to the auction process as a tool that helps address transparency concerns and governance challenges that may in particular impact smaller operators and therefore should be included.

[11] ComReg 20/32, Annex 12 DotEcon Report on Exposure Pricing p 13.

3 Three Ireland (Hutchison) Limited

Multi-Band Spectrum Award – Draft Information Memorandum

Response to Document 20/32 from Three

24th June 2020

1. Executive Summary

The Covid-19 pandemic has brought forward increased demands on communications networks, many of which will remain permanently. Connectivity has proven to be essential during this time to allow people stay connected for work and social purposes. The Stay at Home policy would not have been possible without the current deployment of modern networks and other technology that has helped us through this stage of the crisis.

As Ireland and other economies struggle to deal with the economic fall-out of the pandemic, investment decisions are more uncertain - however ongoing investment in modern communications networks has never been so important. It is needed to help with the recovery, and ComReg must make sure that its decisions facilitate this investment. Getting the terms for access to spectrum right is one of the key areas where ComReg can facilitate this investment but equally if the terms are wrong it will be hindered.

Three has already pointed out (in response to previous consultations) that we have serious disagreement with the format and rules that ComReg has proposed to use in this award. Three would be placed at a disadvantage under the proposed rules, and this is a matter that needs to be remedied for the process to meet ComReg's objectives. We have already suggested some remedies to ComReg, which include the use of a different auction format, or the addition of two additional caps on bidders (that any two bidders cannot win more than 5 Lots of 700MHz and a price cap on marginal Lots). ComReg must move quickly to adopt these changes so as to avoid delay to the award process and availability of the spectrum.

We note that ComReg proposes to introduce a new element to the award process (if it is decided to proceed with a CCA), namely the introduction of Exposure information. This addition does not address the concerns we have already identified regarding the award process.

The Temporary Spectrum Licences issued by ComReg have been of considerable help to network operators in responding to new demands brought about as a consequence of Covid-19. They have allowed Three to increase its network capacity in areas that experienced congestion. We expect this changed demand will remain in the long-term, and we encourage ComReg to provide for maintenance of the Temporary Licences as close as is possible to the completion of the award. If this is not possible, then they should be continued at least up to the time when ComReg has finalised its Decision for the award process.

Introduction

The context within which ComReg is preparing this multi-band spectrum auction has changed dramatically in the last four months. The Covid-19 pandemic has brought about a drastic change to work and home life and has sent world economies into recession. The requirement for people to work from home, and the increased demand for connectivity has reminded us all of the importance of modern communications networks for people to be able to continue to work effectively and to stay connected with their friends and family. Voice and broadband services provided by wireless networks are critical in ensuring a functioning economy during the COVID-19 pandemic and they will have ongoing importance to ensuring economic recovery. During this time, it has been helpful to be able to boost network throughput by using

the Temporary Spectrum Licences issued by ComReg in April. We need to maintain this additional connectivity, but to support economic recovery, we also need investment to continually develop our communications networks. Just as is the case across multiple sectors of the economy, the investment climate for network operators is currently challenging.

ComReg must take these new circumstances into account in the current consultation process. Any decisions taken must avoid disruption to existing connectivity that customers have come to depend upon, including the continuation of the Temporary Spectrum Licences to as close as is possible to the conclusion of the award process. Further, ComReg needs to make sure that its process will facilitate continued network investment as this will be a critical requirement for growth of productivity and a return to growth in the Irish economy. Ensuring that it has chosen the most appropriate award process that will deliver a fair and efficient outcome should remain a priority, but it is also important that ComReg moves quickly to make the new spectrum available to network operators. Accordingly, it is more important than ever that ComReg adopts a carefully considered, fully reasoned and comprehensive approach to all aspects the proposed spectrum award. ComReg should also extend the Temporary Spectrum Licences so they continue in operation until the new award has been completed.

As ComReg will be aware, Three has some strong specific objections to the award process and rules as proposed by ComReg in document 19/124. There are fundamental issues that need to be resolved in order to deliver a fair award process that conforms to the requirements on ComReg. For this reason, it is surprising that ComReg has chosen to publish its Draft Information Memorandum (IM) without first taking account of the views of interested parties as submitted in response to the document 19/124 (the Previous Consultation). While a desire to progress to the award as quickly as possible might have led to the decision to publish the Draft IM before taking account of views on the award design, this risks causing further delay in the event that ComReg is required to again consult on the IM because of significant changes to the award process. If ComReg is truly open to considering those submissions, then some change is likely.

2. Prior Comments and Submissions

This Current Consultation process is intrinsically linked with the Previous Consultation process. We note ComReg's reason for proceeding with the Current Consultation before the appropriate step of reviewing the submissions to the Previous Consultation, providing its own response, and publishing a Draft IM for the final process to be used. We would caution that these issues cannot be side-stepped as they are of fundamental importance. ComReg needs to ensure that the views of respondents are properly taken into consideration, as is necessary in a genuine consultation process.

Specific concerns identified in Three's Earlier Response also affect aspects of the Current Consultation. In particular, Chapters 3 and 4 which relate to the auction format and proposed competition caps. A significant amount of time and expense was deployed by Three in submitting the Earlier Response (including providing solutions / mitigations to these serious issues) in order to ensure the award meets ComReg's objectives.

Three does not believe that it is appropriate for it to again repeat all the serious concerns expressed in its Earlier Response. Accordingly, while comments are provided on certain

aspects of this Consultation, such responses are entirely without prejudice to all the points made by Three in its Earlier Response and this response should not be interpreted as an acceptance of any element of the Previous Consultation including any element which impacts on the approach to the Current Consultation. This includes without limitation the following points:

- That a Combinatorial Clock Auction (CCA) is not the most appropriate format for this award;
- That the award caps place Three at an unfair disadvantage relative to its competitors;
- If ComReg, notwithstanding our objections, decided to press ahead with using a CCA for this award, there are remedies in the form of revisions to the caps and other rules available to ComReg which would be necessary to create a more level playing field for all bidders;
- That the proposed price for an Interim Licence in the 2.1GHz band is excessive, without logic and is unjustified;
- That ComReg has erred in its specification of receive power for the purpose of coverage obligations.

3. Covid-19 – New Context

Like many countries around the word, Ireland has experienced a massive shock. The health measures necessary to prevent spread of Covid-19 have forced us all to change our home life and work life. We have been reminded of the importance of modern communications networks and they have played a pivotal role in allowing people to continue work while staying at home but also to maintain vital connectivity for social purposes.

Economic Crisis

The measures taken to combat spread of Covid-19 have also caused a sharp compression of economic activity in Ireland and its trading partners. According to IBEC's latest Quarterly Economic Outlook[1] it is now expected that this effect will not be temporary but will last well into 2021 and the recovery will take until 2022/2023. A similar situation has been forecast by the ESRI[2] who note that "even for businesses that remain open, investment is likely to be curtailed significantly due to the large increase in uncertainty brought on by the pandemic". In addition, the Irish Fiscal Advisory Council (IFAC) advises that it might well take 2 to 3½ years to return to pre-crisis levels of activity[3]. We note that during this period, there is also a growing risk of a cliff-edge Brexit happening in December 2020.

IBEC reports that both consumer sentiment and business confidence are low bringing uncertainty into consideration of any significant investment projects. This uncertainty applies to communications network operators also, and ComReg must take it into account in its award proposals, avoiding discontinuity; inefficient investment; and excessive spectrum pricing

[1] IBEC Quarterly Economic Outlook, Q2 2020
[2] ESRI Quarterly Economic Commentary, Summer 2020
[3] The Fiscal Impact of Covid-19, Irish Fiscal Advisory Council, May 2020

Despite the uncertainty described above, shortening the road to recovery will require that wireless network operators ramp up investment in technology and modern infrastructure, including facilitating the development of modern fixed and mobile communications networks.

This can be achieved by extending the Temporary Spectrum Licences to provide continuity up to the new award, by ensuring excessive pricing for access to spectrum is avoided, and by ensuring that the award process itself gives confidence to investors. To do this, it must be fair and non-discriminatory and must determine the minimum prices that deliver an efficient outcome.

Changed Work Practices

The change to working practice that was forced upon us in recent months is likely to have a lasting effect. One of the side-effects of the Covid-19 crisis has been an acceleration of changes to work practices which would previously have been expected to take years to accomplish but have now been adopted in a matter of days. In a recent Ibec CEO survey, 73% of CEOs identified increased use of remote working as a significant change in their business organisation over the coming years and 56% expect that there will be an increase in flexible working practices as a result of the crisis. Working from home has become accepted as normal for a significant part of the workforce and will be expected to continue. This will only be possible through further investment in networks including wireless networks, particularly in the rural areas that do not currently have adequate connectivity.

Enabling the National Recovery

In launching its most recent Connectivity Report[4], John Griffin of Ericsson Ireland stated that "The potential for 5G is very exciting and it could add as much as €42 billion to Ireland's GDP by 2030, an important consideration in the country's economic recovery post Covid-19."

The Irish Fiscal Advisory Council has recommended that the new Government should:

- Mandate public sector employers, colleges and other public bodies to move to 20% home and remote working in 2021; and
- Examine the feasibility and merits of changing tax arrangements to encourage more people to work remotely.

Ibec's survey indicates the emergence of something of a regional divide with almost half of all workers in parts of Dublin having the potential to telework versus only 31% of workers in Monaghan. In general, existing commuter towns had the most significant share of workers who could potentially work from home. On the other hand, rural towns in the areas worst impacted by Covid-19 or by any Brexit fallout were the least likely to have workers who could potentially work from home. Wireless networks can help rebalance this divide, and in recent months, Three has reprioritised its network investment to meet these new demands. ComReg's priority should be to encourage on-going investment in modern wireless networks, not just to bridge current gaps, but to ensure we have in place the networks we will need in near future.

4

Spectrum Licensing is Critical

The Temporary Spectrum Licences issued by ComReg in April have helped in an important way to meet the new demands placed on mobile networks. In mid-March when measures to prevent spread of Covid-19 were announced, Three experienced an immediate and significant growth in average and peak throughput for both voice and data, with a number of peaks in this demand. At this time, we believe the changes to work and life practice has brought about permanent increase in demand for data of approximately [✂] overall. The physical location of the demand also changed – out of city centres to residential areas. The number of Cells on Three's network that we would classify as congested increased during that time [✂]. Three has to date rolled-out [✂] sites in the 700MHz band and [✂] sites with liberalised 2100MHz spectrum. This has brought a significant benefit to our customers as we have been able to re-establish pre Covid-19 network performances in the areas where the 2100MHz Temporary Spectrum has been deployed despite a [✂] increase of data traffic volumes. In the areas where the 700MHz Temporary Spectrum has been deployed, the daily average downlink user throughput increased by [✂].

It is important that ComReg should ensure that the current Temporary Spectrum Licences continue at least until ComReg has issued its decision for the award of spectrum, but ideally they would extend until the award process has completed.

ComReg must also ensure that it proceeds quickly to deliver the appropriate award process, and while it is important to progress without delay, it is critical that the process is appropriate. Getting the auction format or rules wrong at this point will deliver an inefficient outcome, delay investment in networks, and ultimately hinder the move to new ways of working in Ireland and slow down our national economic recovery.

4. Comments on the Draft Information Memorandum

As noted above in section 2, the following comments are provided without prejudice to Three's position as expressed in its Earlier Response.

1. In Table 13 and again in Table 16, the reserve price for the TDD guard band lots are given as €216,000 for TS1 and €245,000 for TS2. In addition, an annual SUF of €61,515 applies to each of these lots. Using a WACC of 7.13% for illustration, that is equivalent to a reserve price of EUR 1.5 million for a 20-year licence, or €0.06 /MHz/pop. This is an exceptionally high price for acquiring spectrum that is encumbered and cannot be deployed for high-power mobile services. We understand that in other European countries, these blocks were typically bundled with adjacent TDD spectrum to no additional cost.

   Three requests ComReg to review this price and explain the rationale for associating such high fees for guard band blocks, as it does not seem to make sense.

2. In Tables 12 and 13 (and other subsequent tables), the Reserve Prices for each Lot Category has been adjusted by ComReg and are different to those in document 19/124, without explanation. This adjustment is not consistent across all Lot Categories. While

we might speculate as to the reasons for these changes, ComReg should explain the reason.

3. In section 2.3.7 of the Draft IM, ComReg details the refunds of Licence fees payable to a Winning Bidder in the event of delayed access to Lots beyond the originally planned commencement dates as shown in Table 5. In paragraph 2.97, ComReg states that for the SAF the refund will be calculated based on "*a pro-rata portion of the SAF already paid by the Winning Bidder on a daily basis for each whole day following the commencement dates as set out in paragraph 2.23 and Table 5*".

   We note that the SAF must be paid by winning bidders up-front and in advance of the conclusion of the award process. The SAF represents a significant investment by the winning bidders and is for the purpose of obtaining an asset with a 20-year life span. The method of calculating refunds as proposed by ComReg simply assumes a linear division of the value of the licence across each day of its duration. This ignores the time-related discounting that will be applied by bidders when considering the investment. In reality the early days of the licence will make a significantly higher contribution to value for the winning bidder than the final days. As a consequence, ComReg's calculation under-values the loss to a winning bidder of delayed commencement of their licence.

   ComReg has applied discounted cash flows when deriving the minimum price and reserve price that should apply for each Lot. The same logic applies for estimating the value for each day of delayed commencement. ComReg should revise this part of the Draft IM accordingly to take account of these issues.

4. In Table 17, ComReg reports the licence duration for frequency genetic B-lots. The expiry date for generic paired and unpaired lots in the 2.6 GHz band is given as 30/11/2035. We assume that this is just an error (should read 30/11/2040) and that it will be corrected. If this is not the case, we request that ComReg explain.

5. In Table 8 and Annex 4, ComReg specifies multiple specific locations which must be covered by licensees. Most of these locations or campuses are State owned, and all are either or State Semi-State owned. To simply include an absolute list in this manner would leave licensees in a weakened position when it comes to negotiating access to the sites necessary to provide this coverage. This is particularly the case for large campuses where there might be no alternative to placing a site within the campus itself. It is already Three's experience that some of the locations listed in Annex 4 are difficult to negotiate access to.

   To restore the balance in negotiations, ComReg must make allowance for the fact that some of the sites listed might not be covered if it proves too difficult or expensive to do so. ComReg can maintain an incentive for both licensees and site owners to cover these sites by setting a quota of sites from the tables that must be covered. Three recommends this quota is set at 70%.

6. There is an inconsistency in the rules regarding bidder association and non-disclosure of participants. Paragraph 3.127 states that ComReg will not inform Bidders about the identity of other Bidders. Paragraph 3.78, states that if two Bidders have common insiders, ComReg will contact those two Bidders and notify them that they need to resolve this conflict. In so doing, however, ComReg will have provided information to the parties involved about each other's participation, which would mean they have information not

available to other Bidders. Furthermore, if ComReg discovers the conflict after the auction starts, one or both of the Bidders involved may be at risk of being excluded from the process, whereas had they known about the issue earlier, the two parties might have been able to avoid this.

It seems to us that the obvious solution to this problem is for ComReg to publish the identity of all applicants at the qualification stage, so that bidders have some ability to identify potential conflict issues and resolve them in a timely manner. Our understanding is that this is the approach adopted in many other European countries, including the UK, which otherwise has similar rules regarding insiders. ComReg could still keep confidential the information about the Initial Bids and the Initial Eligibility.

7. In Annex 9, ComReg describes the algorithm it proposes to use during the Assignment Round to identify potential band plans that are intended to minimise any misalignment between time slices. In our view, the proposed algorithm is unnecessarily complex for most likely assignment round situations. ComReg should instead adopt a simpler default approach, and only use this algorithm in situations where there are more than 6 winners in a band. In the event that such algorithm was to be used, then we have some specific concerns as follows.

   Paragraph A 9.3 states that "*For the 2.1 GHz, 2.3 GHz, 2.6 GHz FDD and 2.6 GHz TDD bands in the Assignment Stage, an algorithm will be used for the generation of Assignment Options that: […] gives Bidders a variety of options for location of contiguous frequency-generic blocks across the band, but also tries to minimize misalignment of frequencies between Time Slices*" [Our emphasis].

   We query why ComReg is using an algorithm that "*tries to minimize*" when, for most allocation outcomes, it should be able to use a brute force solving technique that will precisely minimize. ComReg's algorithm should identify each and every minimum misalignment band plan. It appears that the proposed recursive algorithm does not do this, but rather it produces a shortlist of band plans, from which bid options are derived. We request that ComReg clarifies if our understanding of this point is correct.

   For any allocation outcome, the number of feasible band plans across the two time slices is the factorial of the number of bidders (N) squared, i.e. $(N!)^2$. For example, with 4 winners in each time slice in a band, there are $(4!)^2 = 576$ potential band plans. In this case, a complex recursive algorithm is not needed to identify those band plan options that minimize misalignment, as a computer can quickly solve this with a brute force search across all 576 options.

   We recognise that the number of options grows very rapidly with the number of winning bidders in a band. Nevertheless, a brute force method should be straightforward up to about 6 winners (518,400 options). Given that ComReg is allocating national lots, it seems unlikely that there will more than 6 winners in the same band. Therefore, in all likely cases, a brute force search will be tractable. When tractable, brute force solutions are clearly preferable to more complex algorithms, which are hard to understand and verify, and by design may be less than 100% reliable. In particular, there is a risk that if ComReg's algorithm is applied in situations where brute force was tractable, appropriate assignment bid options are excluded or inappropriate bid options are included.

We propose that ComReg adapt the rules to:

- Use brute force to identify assignment round options if the number of winning bidders is in the same band is 6 or less; and
- Only use the algorithm described in Annex 9 in bands where there are 7 or more winning bidders in the same band.

8. In section 3.6 of the Draft IM, ComReg describes the process for the Assignment Round. In summary, it is proposed that there will first be an Assignment Stage in which Bidders may bid for their preferred frequency assignments for the frequency-generic B-Lots won in the Main Stage. It is proposed that the result of the Assignment Stage will form a Provisional Assignment Plan and will be notified to the Assignment Bidders. It will then be followed by the Negotiation Phase.

   During the Negotiation Phase, Assignment Bidders can negotiate with each other to develop an Alternative Assignment Plan, which will be accepted by ComReg if agreed by all relevant Assignment Bidders. Each Assignment bidder will be aware of the Provisional Assignment Plan and their own Additional Price when entering the Negotiation Phase.

   In the first place, it should be noted that it would be preferable if the Assignment Plan could be agreed entirely by the winners of generic B Lots in each band without need for an Assignment Phase at all. This would represent the most efficient outcome as no additional fees would be required, and all winning bidders would need to be happy with the outcome. In practice, we recognise that we cannot depend on a successful Negotiation Phase, so the Assignment Phase is necessary.

   Three's experience of the past has been that the Negotiation Phase has not been successful and that the reason for this is because the Assignment Bidders enter the negotiation already knowing the outcome of the Assignment Round, so there is a default option and each knows what their Additional Price will be. The Additional Price must be paid by each winning bidder regardless of the outcome of the Negotiation Phase and this has acted as a barrier to any further change – some bidders will not want to have to pay the opportunity cost for an assignment that they "give up", while others will perceive that their best advantage is to stick to the outcome of the Assignment Phase. This means the Negotiation Phase is unlikely to overturn the default outcome from the Assignment Round.

   Three proposes that ComReg should change the order of proceeding through the Assignment Stage slightly, in a way that is more likely to deliver a successful outcome. We still believe it will be necessary to receive bids for the Assignment Phase, however the results of this stage should not be notified to the Assignment Bidders until after the Negotiation Phase. If the Negotiation Phase produces an agreed Assignment Plan in any band, then that should be accepted by ComReg without running the Winner and Price Determination and with zero Additional Price. In any band for which agreement cannot be reached, ComReg should then run the Winner and Price Determination to determine the Assignment Plan and the Additional Price.

The above change would mean that the Assignment Bidders would be incentivised to reach agreement with no Additional Price and without requiring ComReg to determine the outcome. This would produce the most efficient result.

9. In paragraphs 3.100 – 3.108 and also 4.107, ComReg describes the procedure that it might follow if a bidder is excluded. ComReg has retained significant discretion in relation to the course of action that it might take in this circumstance, including keeping bids made up to that point or voiding them. We agree that circumstances might arise where a bidder should be restricted or excluded. Depending on the circumstances, it might be necessary to re-run part of the process or to remove bids previously submitted by the excluded bidder. This eventuality could have a significant bearing on the outcome of the auction and is particularly important in the Main Stage where there is a lot at stake for all bidders.

   The current process is lacking in transparency as it does not specify whether ComReg will inform the remaining bidders if one has been excluded. At the minimum, remaining bidders should be informed at the time that a bidder has been excluded, and whether or not their bids made up to that point remain valid or have been removed from the winner and price determination. This is the minimum level of transparency that is required for the remaining bidders to have confidence in the integrity of the award process. It would be wholly inappropriate for ComReg to suspend a bidder or exclude them from placing further bids without informing the remaining bidders of this fact, particularly if the bids already submitted by the excluded bidder cease to become valid bids.

10. In paragraph 3.167 in relation to the 2.6GHz band, ComReg states the following:

    "*In the 2.6 GHz Band, as the fixed frequency A-Lots are best utilised by Bidders also obtaining 2.6 GHz TDD Generic Frequency Lots, a Bidder will be prevented from submitting a Bid for a Package of Lots which includes the 2.6 GHz TDD Fixed Frequency Lot (Lower) and the 2.6 GHz TDD Fixed Frequency Lot (Upper) in a given Time Slice unless the Bidder also places a bid for all Lots in the 2.6 GHz TDD Band in the same Time Slice*".

    For the avoidance of doubt, our understanding is that this restriction only applies where a bidder submits a bid for both the Upper and Lower Fixed Frequency Lots. ComReg might confirm that this is the case.

11. ComReg proposes to introduce a new feature for this auction (if it chooses to use a CCA). It is an exposure tracker developed by DotEcon that calculates estimated bidder-specific price discounts after each clock round. This may provide some guidance for bidders regarding their potential final price if the clock rounds were to end and they were to win their final clock package. On balance, we think this might be useful, however the information obviously comes with certain caveats, such as the possibility of unsold lots, which limits its reliability.

    DotEcon argues that the exposure data is unlikely to introduce opportunities for gaming. Our position is that the format is already vulnerable to gaming, but we tend to agree that providing this extra information is unlikely to make the situation materially worse. On the other hand, we do not think this extra information does anything to address our broader concerns with the use of a CCA for the proposed award. A CCA with asymmetric caps is still the wrong format.

5. DotEcon Report in Annex 12

In document 19/124, ComReg has stated its intention to publish a paper on Exposure for consultation, and that paper has now been incorporated into the Draft IM as a report from DotEcon. We note that while the report does address the question of whether additional information can/should be provided to bidders during the Main Stage of the CCA, it also includes substantial argument on the merits of the CCA auction format. We asked NERA Economic Consulting to review Annex 12, and we provide the following comments following discussion of that review.

Overall, we note that the report contains a large amount of general material that is only loosely relevant to ComReg's proposed award. The paper is quite helpful in explaining the evolution of the CCA design but, in our view, the analysis paints an overly positive picture of the benefits and relevance of this particular auction format. We do not oppose the addition of an exposure tracker in ComReg's CCA implementation, but we also do not think that it meaningfully addresses the concerns about the format as already described to ComReg in detail in the Earlier Response.

Strengths and weakness of the CCA

We agree with DotEcon's starting position that spectrum auction design is necessarily a matter of "horses for courses" (page 1). We further agree that the CCA may be a viable candidate auction format in situations where (a) price discovery is beneficial; and (b) there are material complementarities between lots. For auctions of spectrum suitable for mobile, our view is that price discovery will almost always be desirable, so we have a general preference for open auction processes. We are much more sceptical regarding the case for package bid formats, such as the CCA, to address complementarities. In many situations, there may be other measures, such as spectrum packaging and activity rules, that are effective in diminishing aggregation risk. The CCA also introduces other risks, such as unduly high and asymmetric pricing, and governance challenges, which offset the benefits from its effectiveness in managing complementarities.

As we have set out in our Earlier Response, we do not think package bidding is really required to address aggregation risk in the proposed award process. The decision to use the CCA flows from ComReg's decision to use time slicing for 2100 MHz, which then leads it to adopt time slicing for other bands. The use of time slices creates an aggregation risk, which then led ComReg to propose the use of package bidding. However, as we pointed out, ComReg could have followed the German approach of having two separate categories of 2100 MHz lot based on start date, instead of time slicing. This would have hugely simplified spectrum packaging and would have diminished aggregation risk sufficiently that a simpler open auction format would be attractive. ComReg expressed concern that the German approach if implemented in Ireland might strategically disadvantage Eir but based on the reasoning we advanced in the Earlier Response, this is incorrect. If anything, Eir would be advantaged by our proposed change, but we judge the impact to be *de minimus* compared to the benefits for all from simplifying the award process.

ComReg has suggested that it would have picked the CCA regardless of the time slicing issue; however this would put it at odds with other regulators in Europe – such as Austria,

Luxembourg, Netherlands, Slovakia and UK – all of which have adopted hybrid clock-SMRA formats rather than the CCA for forthcoming 5G multi-band awards. This implies that a significant factor that has pushed ComReg towards the CCA for this auction is that it shares DotEcon's apparent belief that the CCA is more robust to strategic behaviour than other formats. We disagree with this view.

We recognise that DotEcon has considerable expertise with respect to auction design, however they are not entirely impartial as they seem to be invested in the CCA format. It is one they have helped develop and have championed since the late 2000s. It is important to understand that DotEcon's claims that to the effect that there are limited downsides to the CCA format are controversial. They are at odds with the emerging academic literature on the format, and largely gloss over the many peculiar outcomes associated with spectrum auctions using the CCA format outside Ireland.

DotEcon have three main blind spots when analysing the downsides of the CCA:

- They misinterpret the incentives for price driving behaviour;
- They fail to recognise that price driving in CCAs for spectrum is often low risk, owing to predictable demand profiles and asymmetries between MNOs, together with information learned during the clock rounds; and
- They understate the potential problem of 'missing bids' in more complex multi-band settings.

We welcome DotEcon's acknowledgement of the emerging literature showing how price driving behaviour can distort outcomes and prices in CCA. However, DotEcon is wrong to belittle the real-world relevance of these studies. DotEcon describes price driving as "*malicious bidding*" and argues that the importance of motives to make bids that make others pay more "*is highly debatable*" (page 7) - we disagree. Our concern is that the CCA often generates prisoner's dilemma-type situations in which bidders that do not price drive (i.e. behave 'cooperatively') are exposed to much worse outcomes than those that do price drive (i.e. 'do not cooperate'). As each auction is effectively a one-off game, this may create a strong incentive for all bidders to engage in price driving as a defensive strategy.

Marsden and Sorensen (2017) in the Handbook of Spectrum Auction Design describe this defensive rationale for engaging in price driving:

"*In practice, our experience is that bidders often engage in price-setting behaviour for two primarily defensive reasons:*

- *If they don't engage in such tactics, they fear that others will and they will pay much more for similar spectrum. In this context, the example of Sunrise, which paid more for a strictly smaller package of spectrum than Swisscom in the 2012 Swiss 4G auction, is often held up as an example of an outcome that no one wants to replicate.*
- *By over-bidding, it may be possible to exert price and budget pressure on a rival that would otherwise not exist, thereby increasing the chance that they surrender other target lots. This may be particularly relevant in a multi-band auction, when bidders are*

> *bidding on large packages of lots that are both substitutes and complements, and the value of the spectrum may account for a substantial proportion of enterprise value.*"[5]

In short, bidders engage in price driving because (a) they do not want to end up paying significantly more for the same thing as other bidders who they believe will price drive; and (b) in a multi-band auction, there may be opportunities to influence price growth in ways that increases strategic pressure on rivals.

DotEcon also over-estimates the risks for bidders engaging in price driving in a CCA. They say that "*bidders in CCAs will typically have limited knowledge of each other's demand structures*" (page 59), but this is obviously untrue for mobile awards. The reality of most mobile spectrum auctions is that there is a limited pool of bidders, many of whom have predictable baseline demands, and that winning bidders are often setting each other's prices. This is particularly true for smaller bands, like 700 MHz and 2100 MHz, where the number of realistic ways that lots could be arranged amongst three MNOs is limited, and MNO business cases are likely to be similar or differ predictably based on their existing spectrum deployments. In such situations, there are often predictable pressure points and MNOs may have a high degree of confidence about what bid sets are winnable or not. Furthermore, many price setting bids may be submitted in the supplementary round when bidders may have greater certainty about potential auction outcomes.

It is true that with multi-band awards in situations of bidder asymmetry, the potential for price driving may exist to some degree in all open formats, however DotEcon is wrong to say that "*[p]ricing driving is about objectives, rather than auction format*." With standard ascending open formats, such as the SMRA and clock, bidders that engage in price driving may be driving their own price. This is a powerful disincentive to engage in price driving, provided all bidders have substantial demand in each category. The problem with the CCA is that it is much easier for bidders to identify situations where (a) they can raise prices without driving their own price; or (b) if they drop demand, they are exposed to having their own price driven up by a rival without any further option to respond.

DotEcon is surprisingly quick to dismiss concerns about the use of the CCA formats in cases where it produced high and asymmetric price outcomes. For example, in the case of Austria 4G in 2013, they say that "*it is not clear how such bidding behaviour can be differentiated from bidders simply having value for larger packages of spectrum and competing for those. Therefore, these supposed examples of price driving behaviour are largely indistinguishable from bidders competing for additional spectrum*." This is true in the narrow sense that the data is not public. However, as representatives of the firms involved are on record saying that they thought that the Austrian 4G auction was a disaster, and blaming the format for high prices, we tend to believe that the auction was distorted by reciprocal price driving. We also note that the RTR has subsequently conducted a multi-region 3.5 GHz award and scheduled a multi-band 5G award; in both cases, after consultation with prospective bidders, it opted for simpler clock-based formats over the CCA. This is hardly a vote of confidence in the CCA.

As DotEcon points out, spectrum caps may be effective in curbing opportunities for price driving behaviour (page 73). We agree but ComReg must also be wary of caps introducing

[5] Richard Marsden and Soren T. Sorensen, Strategic Bidding in Combinatorial Clock Auctions – A Bidder Perspective, in Bichler and Goeree (Eds), Handbook of Spectrum Auction Design, p.756.

predictable asymmetries between bidders that may create lower or zero risk opportunities for price driving. Here, we refer ComReg to our Earlier Response where we explained that ComReg's low-band cap leaves Three unfairly exposed to price setting at 700 MHz.

Finally, we think that DotEcon underplays the risk of missing bids distorting the outcome of CCAs. As they point out, this may have been a contributing factor in the Swiss 4G auction in 2012, when one bidder (Sunrise) paid a much higher price than a larger rival (Swisscom) despite winning a strict subset of Swisscom's winning bid.[6] We agree that bidders have become more sophisticated since then, so it is less likely that bidders make poor choices. Nevertheless, the bottom line is that supplementary bidding in a large multi-band auction is complex, given the huge number of bid options, and bidders may make mistakes or simply take different approaches that can have significant implications for final prices.

ComReg's own example of winner and price determination in Annex 6 provides a textbook example of defensive incentives for overbidding in a CCA. In this example, there are four bidders who have 7 valid bids combining lots in two categories (A and B) at the end of the supplementary round. For convenience, we copy Table A6.1 from the consultation below. The auction ends with two bidders, Bidder 2 and Bidder 3, each winning the same package (1,1) with identical bids of 15 each, and a combined value of 30. However, owing to other bids submitted, Bidder 2 pays only 10.5, whereas Bidder 3 must pay 13.5. [✂

✂].

Table A6.1 Valid bids at the end of the Supplementary Bids Round

Bidder	Lot Category A	Lot Category B	Bid Amount
Bidder 1	1	0	8
Bidder 1	1	1	10
Bidder 1	0	2	12
Bidder 2	2	0	16
Bidder 2	1	1	15
Bidder 3	1	1	15
Bidder 4	2	2	24

[✂

✂]

To repeat, we don't think this a rare situation. Indeed, it is easy to draw analogies with actual CCAs. For example, Sunrise's bad price outcome in the Swiss 4G auction is probably an example of one bidder 'cooperating' while others bid aggressively in the supplementary round.

[6] DotEcon refer various to the "early Swiss CCA in 2001" and the "Swiss 3G auction in 2000", but we assume this is a mistake as the CCA did not exist in the 3G era, and they mean the Swiss 4G auction in 2012.

Meanwhile, the inflated prices seen in the subsequent Dutch and Austrian 4G auctions can probably be attributed to situations where all bidders bid aggressively.

Again, we refer ComReg back to our opinion as submitted in response to Documents 19/124 and 19/59. The CCA auction is the wrong choice for ComReg's proposed award, and in particular the specific rules proposed by ComReg in this case would place Three at an unfair disadvantage relative to its competitors. The risks we identify are real and have been observed in practice.

./

4 Vodafone Ireland Limited

Non-Confidential Version

Proposed Multi Band Spectrum Award –
Draft Information Memorandum and Draft Regulations

The 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands

ComReg Document 20/32
Response to Consultation

Executive Summary

I. Vodafone welcome the opportunity to respond to ComReg consultation 20/32– 'Proposed Multi Band Spectrum Award – Draft Information Memorandum and Draft Regulations.

II. We would like to acknowledge the comprehensive work that ComReg have completed, building on earlier Consultations, the previously published Connectivity Studies, and previous Draft Decision. We believe that ComReg have comprehensively analysed both the drivers for allocating this additional spectrum and the appropriate mechanisms for assigning this spectrum in the market.

III. In our previous submissions, we discussed the vital role that spectrum plays in the communications value chain and submitted that the efficient allocation and assignment of spectrum, and efficient processes for the awards of mobile spectrum, are a key support to the Irish economy and should be a key policy priority for ComReg. We also illustrated that there is less spectrum allocated to mobile operators in Ireland than other European countries.

IV. This proposed spectrum auction provides the opportunity for operators to increase spectrum allocation to match the rest of Europe and therefore allow Irish consumers and business to gain access to high quality services, full use of available handsets and the advantage of pan-European services. We welcome the recognition that ComReg have afforded to the importance of benchmarking Irish spectrum allocations against European norms. This supports the capability of Ireland to avail of leading edge pan-European mobile services.

V. We must comment on this Draft IM in light of the current Covid Emergency and the role of the telecommunications sector in supporting the recovery of both our economy and society through infrastructure investment and digital acceleration. This investment in the mobile sector will greatly enhance long-term societal resilience. ComReg have a major role in encouraging investment to support infrastructure rollout a critical input over which ComReg have greatest control is certainty on auction timing. It is very important in this regard to adhere to the time plan outlined in this document.

VI. Our changed ways of working and living in the Covid Emergency drove very significant increase in demand for data and voice services, and clearly illustrated the central role that telecommunications plays in supporting both industry and society. We acknowledge that ComReg moved swiftly and efficiently to ensure access to greater network capacity through Temporary Spectrum allocations actions. In section 1 below, we discuss the further actions that ComReg should take in response to this ongoing Covid Emergency, and in particular the extension of the temporary measures up to the conclusion of this auction.

VII. In Section 2 below, we include commentary on Annex 12 of the Draft IM: "DotEcon Report on Exposure Pricing". This report contains a comprehensive overview of the theory supporting the planned auction format. We broadly agree with the conclusions of this report, firstly, that a CCA auction is appropriate for the complex multi-band auction planned, and secondly, we strongly support the addition of a process to provide Exposure Pricing information to the auction rounds.

VIII. The other aspects of the Auction Rules are broadly aligned with the previous 2012 MBSA and the 2017 auction of 3.5GHz spectrum. In relation to previous auctions we are of the view that the workshops, mock Auctions and electronic bidding processes all worked efficiently. In addition, the process of Main Stage, Assignment Stage, and Negotiation worked effectively.

IX. We raised a number of issue in our response to ComReg's Draft Decision of Dec 2019. The points we raised on Transition and the complexity of the planned auction are still relevant and we urge ComReg to address those issues.

X. A critical issue raised in the December 2019 response relates to the timing and detail of coverage obligations. Notwithstanding the points raised in our previous submission the emergence of the Covid 19 crisis further supports the position that in the shorter term we should focus on network capacity and resilience and that coverage targets should be moved to later in the overall coverage target program. We give more details of this in Section 1 below.

XI. Lastly, we urge ComReg to work to the timeline published in the Process Overview and Timeline Sec.3.2. of this Draft IM to complete the Award, process. This will facilitate effective and efficient investment by operators and produce the best services for all our customers

Section 1 The COVID Emergency: Temporary Measures, Roll-out Obligations, Time-Slices, and Cost

The COVID Emergency

In publishing its final position on Covid Temporary Measures in doc 20/27 Comreg stated those proposals were in recognition of the "exceptional and extraordinary situation raised by COVID-19 " Additionally ComReg did clearly state that those proposals were without prejudice to its MBSA proposals

It is now clear that the Covid Emergency will have longer-term effects on the Irish economy; effects that we believe will justify further action by ComReg to support required telecommunications industry investment in Ireland. The industry faces a demand from customers for much higher capacity resilient and secure services but in a challenged economy with resulting constraints on investment.

Our network investment therefore must be efficient and customer focussed. To achieve this there is a range of actions ComReg should take:

1. Make spectrum available to operators on an assured long-term basis by completing the auction process as with the timeframes committed in the Draft IM.
2. Extend the Temporary Spectrum Management Measures until that auction is complete.
3. Ensure that Network investment can adapt to short-term capacity and investment demand by extending the timeframe of planned 3-year coverage targets.
4. To ensure most effective network investment by replacing the coverage obligations on individual high bands with an aggregate target
5. Re-examine and reduce spectrum usage fees

Extending the temporary spectrum management Measures.

Connectivity is an essential policy and infrastructural tool for the economic recovery, as evidenced the European Commission's latest Country Specific Recommendations for Ireland in response to COVID-19, "The restart of the economy requires that Ireland advances on its ambitious environmental, climate, energy and infrastructure investments".

Since the introduction of COVID measures mobile speech or voice traffic has increased by 30%, fixed data traffic has increased by 50% and mobile data has increased by over 15% which we have supported on our network.

The extension of the temporary spectrum allocation measures will allow us to continue to provide high capacity data services to match the sudden increase in data capacity and ongoing changes to patterns of use in the network. It appears many businesses are preparing to support home

working for at least a majority of their staff. The ways of working, communicating, entertainment and socialising are increasingly reliant on resilient stable infrastructure and this presents new challenges to network capacity management . The steps taken by ComReg to release additional capacity have provided a critical input. In advance of the outcome of the planned MBSA we have no efficient way provide this capacity, and there is now a real requirement to extend the temporary measure out to the end of the MBSA process.

Coverage Rollout Obligations

Timing of Rollout, 3-year target.

In our response to ComReg 19/124, we detailed how Vodafone have worked on a nominal roll-out plan, refreshing our radio equipment to ensure the most effective and efficient use of the spectrum acquired. The most efficient process to follow in achieving this type of refresh is to complete equipment change and optimisation in a sequence of geographic clusters. This cluster-by-cluster approach is operationally efficient and has the added advantage of minimising customer service impact.

In addition, we anticipate that the completion of this RAN refresh will require more significant upgrade to our own and to third party tower infrastructure than previous RAN refresh projects. These structural upgrades will be driven by the increased number of antenna needed for additional frequency bands and by the by the move operators will make from ground based BTS deployments to tower based Remote Radio Head BTS deployments.

In analysing the practical time needed to complete this program (even advance of the demands arising from Covid) it is very clear that we cannot meet the proposed ComReg target of 85% population at 3 years and ensure a program minimising customer impact.

In our response to ComReg 19/124 we proposed reducing or removing the 3-year element of the coverage targets listed in Table 4 of that document. Given that the Covid Emergency will drive additional network capacity requirements in areas with more than adequate existing coverage areas it is even more appropriate to remove the 3 year coverage target points.

Targets in Other bands

Roll-out for other bands

ComReg have proposed an obligation to rollout large quantity of sites in the "Other bands", 2.1GHz, 2.3GHz and 2.6GHz. The obligation proposed is a rollout of 1200, 550, and 550 sites respectively in these bands.

It is inaccurate to label these bands as 'Performance Bands'. Generally, mobile operators will use these bands to provide high quality services matching the capacity demands of customers in each site area. Another use of these additional bands can be to provide high capacity solutions in areas such as railway stations. Because there are fewer customers per site, customers in rural areas can often obtain a better service (measured by data-rates) from sites with fewer frequency bands installed than customers in areas with higher population do.

These additional bands are best implemented through customer driven processes that dictate the bands required on each site from time to time depending on demand.

The quality of service experienced by the customer is driven by multiple factors among which the number of bands is not the most significant. In the past, a significant number of sites were equipped with 2.1 GHz equipment specifically to provide a 3G service. ComReg refer to the current number of site equipped with 2.1 GHz equipment but this is not a good measure of the optimum number of sites to be equipped with 2.1GHz in a multi-band technology-neutral network. In the context where lower and higher frequency bands will support the same services, the lower bands could more efficiently support customer services.

As all bands will, in the future, will be technology and service neutral the previous justification for having high site numbers equipped with specific bands will not apply. As a specific example, we do not anticipate that it will offer any service advantage to customers to equip 500 sites with 2.6GHz equipment within 4 years to meet the targets described in Table 10.

In addition these obligations make it very inefficient to procure small quantities of spectrum in a band (e.g. with 10 MHz of 2.3GHz an operator would have the full obligation) whereas this small quantity of spectrum could provide a useful function for operators in limited locations. This increases the risk of having blocks of spectrum in each band unsold in the auction process.

As ComReg recognise the interchangeable nature of the three bands 2.1GHz, 2.3GHz and 2.6 GHz, we suggest they set a single rollout target for use of spectrum from any of these performance/capacity bands. ComReg could set a condition that compels operators winning spectrum in these Other Bands to use at least one of these bands on 500 sites in within 5 years. This would be a suitable figure to prevent spectrum hoarding.

Equipping specific counts of sites with high band equipment in the 2.1GHz, 2.3GHz and 2.6GHz bands would be particularly inefficient if different amounts of spectrum are awarded in two time-slices. We suggest therefore that if ComReg do not accept our suggestion to award 2.3GHz and 2.6GHz spectrum in a single time-slice then it would be unreasonable not to change the target site count for other bands to an aggregate target.

We note also that Comreg are breaking the 2.6GHz and 2.3GHz bands into 2 time slices. The argument for that is that the bands are substitutable with the 2.1GHz band. If that is the case then it should follow that a single aggregate 'high-band' target for site roll-out should apply to these bands.

Timing:

The time given for completion of the target in Table 10 is 4 years. It would be more appropriate to change this timeline to 7 years to align with the coverage rollout conditions. This would allow operators to avail of greater deployment efficiencies in new site rollout and upgrades, i.e. enabling us to make a single site visit to site to equip them to meet coverage and rollout conditions

Alternative to Time-Slices

DotEcon comments on time Slice Section 4.53 of ComReg 19/124

In our response to 19/124 we highlighted that we do not agree with the position taken by DotEcon: arguing that multiple time-slices cause no issue as operators could bid for only packages that span both time-slots. In the auction process, very significant price differentials may occur between spectrum prices in both time slices and we need to understand the value of this spectrum, and combinations of different spectrum, in these time-slices.

This valuation will be difficult for all bidders, particularly in the short time slices and there is an increased and significant risk that someone will incorrectly value spectrum which will lead to inefficient outcomes and possible inefficient use of the spectrum.

Time slice in other band

Similarly we are still of the opinion that it would be better to offer the 2.6 and 2.3GHz spectrum in a single time-slice. We believe that the gains in auction simplicity outweigh the risk that there is gaming the 2.1GHz bidding process (outlined in paragraph 4.107 of ComReg 19/124).

The gain in simplicity is important to bidders. We note in addition that it appears unprecedented to split unused bands into separate time-slice lots.

Fees

We agree with the principal of splitting the fee proposed on a 40/60 basis between upfront and ongoing charges. ComReg should ensure that minimum prices are conservative.

In the 2.3GHz band, the various co-ordination restrictions and the uncertain transition will significantly reduce the value of this band. This reduction is not adequately reflected in the benchmark figure.

We agree the points Nera make, quoted in Section 7.318. "The significant increase in supply of spectrum and limited ability of operators to monetize 5G services means ComReg should expect spectrum prices per MHz to fall relative to the 2012 4G auction"

Section 2

Vodafone Commentary on Annex12: DotEcon Report on Exposure Pricing

"Vickrey and minimum revenue core pricing in combinatorial spectrum awards."

A report for ComReg 13 May 2020"

Introduction

Given the complexity of the lots on offer in this auction, we agree that a combinatorial clock auction (CCA) is the most effective auction format to use.

The principle difficulty we had with previous CCA auctions was the lack of price transparency. We welcome the study that has been completed on Exposure Pricing and we believe that including this mechanism would be a significant positive change in the auction design, with no apparent down-side for the auctioneer or the process.

In addition, the report includes a comprehensive review of other auctions completed, of pricing methodologies, and of activity rules. We broadly agree with the conclusions reached.

Comments on Sections of the DotEcon report

From Executive summary :

Combinatorial auctions and when they should be used

We agree that CCA auction are the most suitable format in a complex auction with multiple lot types.

Price driving bids

"The fact that bidders set rivals' prices has given rise to a variety of criticisms of the CCA on the grounds that it gives opportunities for malicious bidding."

While we recognise that price driving has been a factor in a number of CCA auctions in other countries we do not believe that price driving is a major factor in this planned auction.

All of the operators in Ireland currently have significant spectrum holding. This, combined with the competition Caps in the current planned auction, will mean that Bidders could not effect downstream competition by 'overbidding' for spectrum.

Missing bids

"Some experimental trials of CCAs have found that bidders tended to be reluctant to submit a full range of supplementary bids for packages they might win."

We do not believe that this is an issue, provided enough bids allowed and sufficient time to submit. There is sufficient experience with CCA auctions internationally and in Ireland to prevent this being a problem.

Exposure pricing

"One criticism of the CCA (and second-price auctions more generally) is that it creates practical problems for bidders, as they may need to make bids for a package higher than the eventual price they pay. In contrast, clock auctions and SMRAs are pay-as-bid, so bidders always know their financial exposure."

In our experience this has been a significant issue for us as a bidder.

✂

✂

"Information is typically available to bidders in the clock rounds of a CCA to allow them to understand the extent to which they might expect ultimately to pay close to their bids amounts, or might pay significantly less"

In our experience of CCA in Ireland, the information available has not been sufficient to allow us to calculate the likely final price we paid.

"It is not necessarily the case that bidder's discounts would always increase from one clock round to the next"

We understand the limitations of exposure pricing information, and that the discount may fall during the bidding process.

We note the comments on gaming potential.

We agree strongly that there is no downside to providing bidder specific discounts as additional information to bidders.

Relationship of this study to MBSA2

We note that the comment that this project was commissioned independently of ComReg's current on-going consultation process for the forthcoming Multiband Spectrum Award (MBSA2).

However, given the complexity of CCA and our previous experience, any move to assist would be most welcome.

3 The Combinatorial Clock Auction

3.1 Motivation for the CCA

"The Combinatorial Clock Auction was developed to deal with situations with multiple lot categories where bidders have complex demand structures with complementarity and substitutability and where pre-packaging is not feasible."

Given the complexity of the current planned auction, we agree that CCA is the most appropriate auction format.

The rest of chapter 3 has a discussion of the General Structure and Mechanics of CCA, we have not commented on these.

4 Advantages and disadvantages of the CCA

4.3 Governance issues

The multi-layered decision process where bid teams within bidding firms need to seek approval from management and shareholders for their budget and bid strategy and the firm may have to seek funds on financial markets, for either auction expenditures or further activity, may generate inefficiencies and practical difficulties.

We agree that this is a real issue. As noted above, Governance in an international company can be complex and any additional information we can bring to the Governance process sis useful.

4.3.1 Second prices and exposure

"The second price rule results in bidders not knowing how much they will pay for their chosen packages, both during the clock rounds and in the sealed-bid supplementary round."

"Therefore, one may prefer to find ways of bringing more price certainty to existing second-price formats such as the CCA. ".

We agree that this is an issue. Exposure pricing would certainly make a positive contribution to solving this. Given our lack of experience of Exposure Pricing in European auctions, and the small amount of other worldwide precedent, it is difficult for us to evaluate in detail how effective the Exposure Pricing information might be in a practical auction in Ireland, but, from the information in this study it is clear that the Exposure Pricing has at least some positive value with no apparent downside.

5 Alternative pricing methodologies

5.1 Providing information on price exposure

A common complaint about CCAs is that bidders do not know what they are likely to pay when they bid, as a result of the MRC pricing methodology determining winning prices after the supplementary bids round in the light of all bids received in the course of the auction. "

This is an issue for us. The range of possible outcomes in previous auctions very large.

5.3.3 Risks of gaming

We note the comment made in this section on the risk of gaming. We consider that this risk is low, there are too many lot types and the auction is too complex for this to be an issue.

.

6 Simulations of exposure pricing

"In this section we present, as a proof-of-concept, evaluations of exposure pricing using both some bid data from real-world auctions and using simulated bid data."

We appreciate the efforts made to test Exposure Pricing, this is useful. It is difficult for us to evaluate the likely added information that this process could supply in a real Auction in Ireland, but as discussed elsewhere, there is no apparent downside to this added process.

7 Conclusions

We broadly agree with the conclusions of the report:

- There is little gain in using price driving strategies within CCAs

- Uncertainty about pricing can be addressed to some degree through providing bidders with additional information about what they might need to pay at most if their bid in a clock round of a CCA were successful.

- DotEcon have demonstrated that it is feasible to calculate these exposure prices and report them to bidders during the clock rounds. It seems unlikely that releasing exposure prices would create any gaming opportunities