Commission for
Communications Regulation

Proposed Multi Band Spectrum Award

Non-confidential Submissions to Document 20/56

Reference: ComReg 20/78

Date: 26/08/2020

Content

Section Page

1 Introduction

1. This document contains the non-confidential submissions received to ComReg Document 20/56[1]. Should any interested party wish to make comment, ComReg would appreciate receipt of any submission by **Wednesday 9 September 2020**. Any comments should be submitted in written form and sent to the below email address for the attention of Mr. Joseph Coughlan and clearly marked – Submissions to ComReg Document 20/78:

   Email: marketframeworkconsult@comreg.ie

2. In submitting any views on these submissions, ComReg requests that electronic submissions be submitted in an unprotected format so that a non-confidential version of each submission can be readily included in any public consultation that ComReg might issue.

3. ComReg appreciates that some of the information may be considered confidential. In order to promote openness and transparency, ComReg will publish all submissions received, as well as all substantive correspondence, subject to the provisions of ComReg's guidelines on the treatment of confidential information (Document 05/24).

4. In this regard, any respondents should make their submission in accordance with the instructions set out below. When making a submission which contains confidential information, respondents must choose one of the following options:

5. Preferably, submit both a non-confidential version and a confidential version of the submission. The confidential version must have all confidential information clearly marked and highlighted in accordance with the instruction set out below and include the reasons as to why they consider any particular material to be confidential. The separate non-confidential version must have redacted all items that were marked and highlighted in the confidential version.

   OR

[1] ComReg Document 20/56 – Information Notice on Request for views from interested parties on auction formats including potential alternative options or modifications to ComReg's proposed auction format – Published 6 July 2020.

6. Submit only a confidential version and the reasons as to why they consider any particular material to be confidential, and ComReg will perform the required redaction to create a non-confidential version for publication. With this option, respondents must ensure that confidential information has been marked and highlighted in accordance with the instructions set out below. Where confidential information has not been marked as per our instructions below, then ComReg will not create the non-confidential redacted version and the respondent will have to provide the redacted non-confidential version in accordance with option A above.

7. For ComReg to perform the redactions under Option B above, respondents must mark and highlight all confidential information in their submission as follows:

    - Confidential information contained within a paragraph must be highlighted with a chosen colour,

    - Square brackets must be included around the confidential text (one at the start and one at the end of the relevant highlighted confidential information),

    - A Scissors symbol (Symbol code: Wingdings 2:38) must be included inside each of the square brackets.

8. For example, “Redtelecom has a market share of [✂ 25% ✂].”

2 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 -
Request for views from interested parties on auction formats including potential alternative options or modifications to ComReg's proposed auction format

ComReg Document 20/56

17 August 2020

DOCUMENT CONTROL

Document name	eir response to ComReg 20/56
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 agrees that an Auction Format Regulatory Impact Assessment (RIA) should be undertaken by ComReg.
- eir notes the sequencing of this request for views on auction formats so soon after its consultation on the draft detailed rules to implement a specific format. eir is approaching the request for views with an open mind and expects that ComReg will too.
- The Auction Format RIA must consider all potential options. The list of options in the Information Notice is significantly deficient.
- In particular, the Auction Format RIA must consider all possible combinations of auction format and spectrum packaging (in particular as regards time-slicing or not the 2.3GHz and 2.6GHz bands, and packaging of the 2.1GHz spectrum) and not only a subset thereof.
- The Auction Format RIA should also consider the option of auctioning the 700MHz spectrum on its own.
- ComReg's proposed packaging of the available spectrum is unnecessarily complex. It could be simplified by awarding the 700MHz band separately and not time-slicing the 2.3GHz and 2.6GHz bands.
- Whilst ComReg's proposed enhancements to the CCA are welcome, they still do not fully address the risks of gaming and inefficient outcomes raised by eir in previous responses. In this submission we propose some additional measures that would enhance a CCA. However eir remains of the view that the Simple Clock Auction (SCA) is the best approach in the Irish circumstances.
- eir does not believe that Three's concern regarding the potential for asymmetric pricing of 700MHz spectrum is a relevant or material consideration.
- Should ComReg conclude that Three's concern regarding the potential for asymmetric pricing in the 700MHz band requires changes to the auction format the list of options put forward is, in our view, materially incomplete – it only includes changes to a CCA format auction and does not consider other options, such as the use of an alternative auction format for the award of all of the spectrum, or just the 700MHz spectrum.
- eir has reviewed each of the options set out in Information Notice and has rejected them for the reasons detailed in this submission.
- There remains a lot of work to be done on auction design and eir looks forward to further engagement with ComReg on these important matters. The Auction Format RIA is a critical component of this.

Views on Auction formats / design

The need for a full regulatory impact assessment

1. ComReg states (para. 2.3) it "*is considering whether it may be appropriate to consider the auction format options for the Proposed Award in a RIA format ("Auction Format RIA")*". Given the very great importance of the award of 700MHz, 2.1GHz, 2.3GHz and 2.6GHz spectrum to the future of the electronics communications market in Ireland, it is essential that ComReg undertake a comprehensive, systematic and robust evaluation of all options for all aspects of the award design, and not just the choice of auction format. Moreover, this must be undertaken with an open mind as to the eventual conclusions, without any preconception as to which option might be best in each case. ComReg has to date failed to undertake such a comprehensive, systematic and robust evaluation.

2. eir notes the sequencing of this request for views on auction formats so soon after ComReg's consultation on the draft detailed rules to implement a specific format. eir is approaching the request for views with an open mind on the basis that ComReg will undertake an auction Format RIA starting from first principles and that this request for views is not simply an administrative exercise by ComReg.

3. Each and every possible combination of options, for example as regards spectrum packaging and auction format, needs to be considered and evaluated in the round – it is not acceptable for some combinations to be ignored because of a preconception about the merits of one particular option in respect of one particular aspect of the award design. No one aspect of the award design should take precedence over all others. All aspects need to be considered together and the best overall combination of choices identified based on the specific circumstances in Ireland.

4. As such it is essential that ComReg properly considers and evaluates all possible choices of auction format(s) not only in combination with its preferred time-slicing approach, but also with alternative options for the packaging of the available spectrum, including with the 2.1GHz spectrum being time-sliced but with no time-slicing of the 2.3GHz and 2.6GHz spectrum, and with the 2.1GHz spectrum being packaged into two categories differing by start date and duration, also with no time-slicing of the 2.3GHz and 2.6GHz spectrum. Consideration should also be given as to whether the 700MHz band should be awarded separately, to further simplify a multi-band spectrum award for the higher frequency bands. ComReg's current list of options for evaluation is therefore significantly deficient and will

need to be expanded for the Auction Format RIA. We look forward to further engagement with ComReg when the draft Auction Format RIA is published for consultation. For the avoidance of doubt eir believes that the most appropriate auction format in the circumstances is a Simple Clock auction (SCA).

Spectrum packaging options

5. As regards packaging approaches, as noted above, as part of its regulatory impact assessment we believe ComReg needs to consider not only its preferred time-slicing approach, but also at least two other potential approaches, and to do so in the context of all potential auction formats – with the objective of identifying the combination of spectrum packaging approach and auction format that together provide the best choice for this award.

6. The two other potential approaches that we believe ComReg needs to consider are:
   - Where the 2.1GHz spectrum is time-sliced but the 2.3GHz and 2.6GHz spectrum is not time-sliced.
   - Where the 2.1GHz spectrum is split into two categories according to the start date and duration of the licences, i.e. one category for licences that start in 2022 and are of ~18 years duration and a second category for licences starting in 2027 and of ~13 years duration (again with no time-slicing of the 2.3GHz or 2.6GHz spectrum).

7. eir continues to disagree with DotEcon and ComReg's analysis of the need to time-slice the 2.3GHz and 2.6GHz spectrum. eir also continues to disagree with DotEcon and ComReg's analysis of the relative merits of time-slicing the 2.1GHz spectrum vs packaging the 2.1GHz spectrum according to licence start date and duration, at least in the case of a CCA format auction.

The need to time-slice the 2.3GHz and 2.6GHz spectrum

8. As regards time-slicing of the 2.3GHz and 2.6GHz spectrum, eir continues to maintain its view that this will be of little if any practical benefit to any bidder, and will add significant unnecessary complexity to the auction process for all concerned – in particular if this is what tips the balance in favour of a CCA format auction rather than a simpler format, such as a SCA.

9. Whilst we are grateful to DotEcon and ComReg for their concern over the potential for other bidders to bid strategically to drive up the price that eir might have to pay to re-acquire the

2.1GHz spectrum that it currently holds, as noted in our response to ComReg 19/14, we see little if any benefit in being able to bid for 2.3GHz or 2.6GHz spectrum in time-slice 2 only (at least in the context of a CCA) when we do not expect any bidder to be interested in acquiring 2.3GHz or 2.6GHz spectrum in time-slice 1 only (and hence bidding for this spectrum in time-slice 1 only). In this case (a) there is little prospect of eir actually winning 2.3GHz or 2.6GHz spectrum in time-slice 2 only, and (b) any bids by eir for time-slice 2 only spectrum are unlikely to even be price-setting for the winners of 2.3GHz and 2.6GHz spectrum, given that the inclusion of any such bid in a feasible combination of bids will almost certainly involve valuing the corresponding spectrum in time-slice 1 at the reserve price.

10. The only potential use we see of time-slicing the 2.3GHz and 2.6GHz spectrum in these circumstances is that it might allow [✂], although what the benefit of this might be to eir is not entirely clear to us at present – in particular, given the rules of the CCA, we would not expect this to have any material impact on the final outcome of the auction (we do not believe it would stop competitors from driving up the price that eir would have to pay for 2.1GHz spectrum in time-slice 2 for example).

11. Strangely enough, the circumstances in which we think there might be merit in time-slicing the 2.3GHz and 2.6GHz spectrum is if a uniform price auction format is used (such as an SMRA or SCA, but not a CMRA). In this case we agree with DotEcon that there could well be benefit to eir in being able to switch from 2.1GHz time-slice 2 spectrum into 2.3GHz and/or 2.6GHz time-slice 2 spectrum – the reason being that in this case [✂] (which incentive will in any case be moderated if there is also a uniform price for all 2.1GHz time-slice 2 spectrum).

12. A further risk with time-slicing the 2.3GHz and 2.6GHz spectrum, that ComReg does not appear to have considered, is the risk that some bidders may decide that the reserve price for this spectrum in time-slice 1 is too high relative to its expected value in time-slice 1, as estimated at the time of the auction. Demand in time-slice 1 may therefore be less than the available supply, leading to some of this spectrum remaining unallocated in time-slice 1. Whilst reputationally this might be unfortunate, more worrying is the risk that those bidders might subsequently discover that they did actually have a valuable use for this spectrum in time-slice 1, but were unable to use it because they had not acquired it in the auction. Surely it would be better therefore for the 2.3GHz and 2.6GHz spectrum to be sold in lots covering the entire ~20 year period from 2021, so as to ensure that bidders did not find themselves unable to make use of this spectrum from the earliest possible date because of underestimating its value at the time of the auction.

13. In eir's view therefore it is essential that ComReg (a) properly assesses the likely risks and benefits of time-slicing the 2.3GHz and 2.6GHz spectrum in the context of this specific award, taking into account all aspects of likely demand (in particular the likelihood that anyone will bid for spectrum in time-slice 1 on its own), and also (b) evaluates all potential spectrum auction formats both with and without time-slicing of the 2.3GHz and 2.6GHz spectrum, in order to identify the best possible combination of options for this particular spectrum award.

Packaging of the 2.1GHz spectrum

14. As regards the packaging of the 2.1GHz spectrum, either in two time-slices or as two categories of licence with differing start date and duration, eir continues to believe that there is far less difference between the two options than DotEcon and ComReg suggest.

15. In particular eir believes that, if a CCA is used, there is just as much opportunity for competitors to drive up the price that eir has to pay for 2.1GHz spectrum from 2027, irrespective of the way in which the 2.1GHz spectrum is packaged. Time-slicing the 2.1GHz spectrum will not prevent bidders from driving up the price that eir has to pay for 2.1GHz spectrum in time-slice 2 – all that they will have to do is [✂].

16. ComReg has previously proposed that the Early Liberalisation Option (ELO) may be exercised by an existing 3G licensee from the date a Decision is issued regarding the MBSA2 and that eir should be required to pay an Early Liberalisation Fee (ELF) determined by the outcome of the auction. ComReg proposes that Three and Vodafone should not be required to pay an ELF. Consequently eir's competitors will be able to exercise the ELO without any uncertainty in advance of the Information Memorandum being published. This leaves eir in the invidious position of having to decide whether to exercise the ELO without any knowledge of the level of ELF it will have to pay until after the award process has been completed[1]. The time between the issuance of a Decision and the completion of the award process could be a significant amount of time particularly if any part of the award process is subsequently challenged [✂] To date ComReg has not addressed these concerns. Rather, Dotecon has sought to trivialise the issue by suggesting that a requirement for eir to

[1] It is also notable that the mechanism to calculate the ELF will be set out in the Information Memorandum. Given that the proposed mechanism was not included in the draft Information Memorandum it is not clear whether ComReg intends that eir must wait until publication of the final Information Memorandum before it will even have sight of the mechanism.

pay an ELF is highly unlikely. If that is the case then it should be established upfront that no ELF will apply. However if ComReg persists that the level of the eir ELF will be determined by the auction then the only reasonable and proportionate approach that ComReg can adopt is:

- The ELO can only be exercised by any operator after the award process has concluded.
- Appropriate safeguards that do not currently exist are built into the auction process to ensure that there are no opportunities for gaming by eir's competitors to inflate the ELF. This may include consideration as to whether a pro rata ELF mechanism based on the auction outcome should be established for Three and Vodafone for the early liberalisation period.
- The mechanism to calculate the ELF is designed to ensure that it is only based on the value of liberalisation in the period to 2027 and that the mechanism is subject to a proper consultation process.

To do otherwise places eir at an unacceptable disadvantage relative to its competitors.

17. Moreover, to the extent that there is any incentive for strategic demand reduction in the auction, eir likewise believes it would be just as easy for bidders to bid in a way that was consistent with an 'acceptable sharing' of the spectrum between them if the spectrum were packaged in time-slices, as if it were packaged by licence start date and duration.

18. In any case, eir strongly disagrees with DotEcon's suggestion that there is a clear split of the 2.1GHz spectrum between the existing MNOs that they would all find acceptable – certainly not the split put forward by DotEcon. [✂]. eir therefore expects there to be effective competition for all of the available 2.1GHz spectrum in the auction.

19. In eir's view, the circumstance in which the choice between time-slicing vs categorising the 2.1GHz spectrum according to start date and duration is material is, once again, if a uniform price auction format is used. In this case it is indeed preferable for the 2.1GHz spectrum to be time-sliced, since that would then ensure that all bidders pay the same price for 2.1GHz spectrum in each time-slice. By contrast, categorising the 2.1GHz spectrum by start date and duration in these circumstances would indeed put eir at risk of having to pay a higher price than its competitors for the same spectrum, as a result of price driving by one or more of its competitors. But to repeat, we believe that risk would exist in a CCA even if the

spectrum were time-sliced; it is only if a uniform price auction format is used that in our view there is any benefit from time-slicing as compared with categorising the spectrum by start date and licence duration.

20. Hence, once again, eir is of the view that ComReg needs to properly consider both of these options, alongside the choice of whether or not to time-slice the 2.3GHz and 2.6GHz spectrum, when considering each potential auction format.

ComReg's Options 1 to 4

21. As regards the specific auction format options listed by ComReg:

- **Option 1: CCA**

22. eir is grateful to DotEcon and ComReg for their work to date, in response to eir's concerns regarding the need for additional price information, and their proposal to provide bidders with additional information regarding the 'discount' that they would enjoy if this were to be the final primary round and there were no unallocated lots at the end of that round, and hence the 'exposure price' of each package that the bidder might bid for. eir strongly supports the provision of this additional information and believes it essential, at a minimum, that this information be provided if ComReg continues with its proposal to use a CCA format auction for this award.

23. eir is strongly of the view however that this change alone is insufficient to address its concerns with the efficacy of the CCA in the context of this specific award. eir's principal concern remains that budget-constrained bidders may find themselves (through no fault of their own) unable to bid in a manner that is consistent with them winning the spectrum package of most value to them, as a result of the rules proposed by ComReg (potentially winning nothing at all), and hence the outcome of the auction may be inefficient. eir believes therefore that further changes to the rules proposed by ComReg will be required if a CCA is to be used for this award, and if not, a different auction format that does not leave budget-constrained bidders facing such a risk must be used instead (such as an SCA, with or without a relaxed activity rule).

24. The specific further changes that eir considers essential if a CCA is to be used for this award are as follows:

- For the bid amount of each primary bid to be its exposure price.

- If there are any unallocated lots at the end of the final primary round, to replace the normal supplementary round by one or more 'additional rounds', in which each bidder would be able to place both a 'headline bid' (equivalent to a primary bid in a primary round) and, if they wished, a number of 'additional bids', with additional bids having to comply with the same rules as would apply in the supplementary round of a normal CCA if the additional round were the final primary round and a bidder's highest bid for its 'final primary package' were its headline bid in this round; such rounds to end when there is feasible combination of bids including exactly one bid from each bidder that is of maximum value amongst all possible feasible combinations of bids; winning bids and base prices to then be calculated in the same way as for a standard CCA based on all bids submitted in all rounds of the auction[2]. We call this an Iterative CCA.

We provide further details of these proposed changes, and a discussion of why we consider them essential, in the Annex to this document. However whilst our proposals enhance the efficacy of a CCA we remain of the view that this format is inferior to an SCA taking due account of the Irish circumstances.

[2] Such additional rounds would therefore be very similar to the rounds of a CMRA format auction, but such rounds would only be used if there were unsold lots at the end of the final primary round, and the auction would still use Vickrey-nearest minimum core pricing, rather than be pay-as-bid.

- **Option 2: SMRA**

25. Whilst eir would prefer a simple uniform price, pay-as-bid auction format for this award, eir believes that some form of simple clock auction would be preferable to an SMRA, an SMRA/clock hybrid or an Enhanced SMRA.

26. eir's specific concern with SMRA-type auction formats, in the context of this award, is the fact that bidders may not be able to switch their demand cleanly between lot categories – any attempt to switch entirely out of one category and into another may result in the bidder holding (and potentially winning) lots in both categories. Given that a number of the bands to be included in this award are potential substitutes for each other, [✂], such switching risk is very likely to be problematic (and clearly could lead to an inefficient outcome).

27. If, despite our misgivings, ComReg were to decide to use an SMRA format for this award, we would urge ComReg to include rules that facilitate clean switching between lot categories, for example allowing an unlimited number of withdrawals with only a limited penalty being imposed on the bidder if some or all of the relevant lots remained unallocated at the end of the auction e.g. a penalty of only 10% of the withdrawn bid amount – see for example the rules of the ACMA's auction of 1800MHz spectrum in 2015.

- **Option 3: SCA with relaxed activity rule**

28. As previously noted, eir's principal concern with the CCA format proposed by ComReg is that budget-constrained bidders may find themselves (through no fault of their own) unable to bid in a manner that is consistent with them winning the spectrum package of most value to them, as a result of the rules proposed by ComReg (potentially winning nothing at all), and hence the outcome of the auction may be inefficient. The fact that the outcome of an SCA format auction, with or without a relaxed activity rule, could also be inefficient is not therefore sufficient reason to reject this format. ComReg needs to undertake a systematic and robust comparison of the merits and risks of each format in the context of this specific award, rather than in theory, before making its final decision as to the best auction format for this award.

29. As noted above, eir is now proposing some changes to the CCA format which we believe may ameliorate, but not entirely eliminate, our principal concern with that format. For the avoidance of doubt eir remains of the view that an SCA format is superior taking due account of the Irish circumstances.

30. If ComReg does not accept eir's proposed changes however, we continue to believe that it should be more important to ComReg to ensure that all bidders in the auction (including budget-constrained bidders) are able to submit the bids that would allow them to win the spectrum package of most value to them in the final outcome (without having to pre-judge what that outcome might be), and not be restricted by the rules in a way that would prevent them from doing so, potentially leading to dissatisfaction and potential challenge to the final auction outcome (as well as an inefficient outcome). Notwithstanding any theoretical risk of inefficiency in other regards, we therefore continue to believe that an SCA (with or without a relaxed activity rule) would be a better choice in these circumstances.

- **Option 4: CMRA**

31. eir continues to believe that the CMRA would not be a good choice of auction format for this award, for the reasons stated in its response to 19/59R. Moreover, eir is now of the view that a number of the advantages of the CMRA, as compared with the standard CCA, could likewise be achieved through the use of an Iterative CCA. In eir's view therefore the Iterative CCA would be a better choice of format than the CMRA for this award. However as noted above we strongly believe that the SCA format is the most appropriate taking due account of the unique aspects of the proposed award.

ComReg's Options 5(a) to (g)

32. The list of options put forward by ComReg in response to Three's concern regarding the potential for asymmetric pricing of the 700MHz spectrum is, in our view, materially incomplete – it only includes changes to a CCA format auction and does not consider other options, such as the use of an alternative auction format for the award of all of the spectrum, or just the 700MHz spectrum. It would appear that ComReg has once again allowed its prejudice in favour of the CCA auction format to colour its thinking, rather than taking a dispassionate view of the potential options for dealing with Three's concern (if required).

33. Given that Three's concern relates specifically to the pricing of the 700MHz spectrum, in our view, to the extent that any change is necessary to deal with that concern, and on the assumption that ComReg is not willing to contemplate using a different auction format to award all of the available spectrum, the correct solution is to auction the 700MHz spectrum separately from the other spectrum to be awarded, and for that auction to be a simple uniform price auction – for example perhaps an SMRA/clock hybrid auction. This would, in our view, wholly deal with Three's concern, and at the same time would significantly reduce

the complexity of the auction process, without undue risk to ComReg's primary objectives for the award of the available spectrum. We believe this would be a far better solution than any solution that involves 'tweaks' to the CCA format, which risks distorting the outcome of the auction, either directly or through distorted bidding incentives.

34. As regards the specific options that ComReg has put forward:

Option 5(a): Prohibition on any two bidders winning more than 2x25MHz of 700MHz spectrum

35. Three's concern is about the potential for asymmetric pricing of 700MHz spectrum, not the potential for two bidders to win all of the available spectrum. Irrespective of the merits of Three's case there is no justification whatsoever for prohibiting two bidders from winning all of the available 700MHz spectrum (subject to the already proposed sub-1GHz cap). Such an additional 700MHz spectrum cap could clearly lead to an inefficient outcome, and there is no justification for this. This option would therefore, at the very least, be disproportionate and should be rejected by ComReg.

Option 5(b): Prices for 700MHz spectrum to be calculated as if there were a cap of 2x25MHz on any pair of bidders

36. Whilst this option would at first glance appear only to affect the prices to be paid by winning bidders and not the allocation of spectrum, this is incorrect. This proposed change to the pricing rule would mean that Three would not have to pay the full opportunity cost of its winning bid if it were to win 700MHz spectrum in competition with eir and Vodafone. Three would only have to pay what any fourth bidder for 700MHz spectrum was willing to pay, or the reserve price, for its first lot of 700MHz spectrum. As such, Three would in all likelihood be able to bid significantly above its true value for 700MHz spectrum in order to win that first lot, in the knowledge that it almost certainly would not have to pay the true opportunity cost of its bid. It is easy to see therefore how this could lead to an inefficient outcome in which Three won 700MHz spectrum that should have been won by either eir or Vodafone.

37. Again therefore, irrespective of the merits of Three's concern, this option cannot be justified, would at the very least be disproportionate, and should be rejected by ComReg.

Option 5(c): Cap on amount of supplementary bids for third 700MHz lot

38. Given the very limited description of this option in ComReg's Information Notice, we are unable to understand exactly how it is intended to operate. Any comments we make on this option are therefore preliminary only and eir entirely reserves its position on this option. To the extent that ComReg wishes to explore this option further we would expect full details to be provided for consideration by way of a separate consultation.

39. We note that a bidder whose final primary round package included at most two 700MHz lots would already be limited by the final price cap to bidding no more than the final round price for any additional 700MHz lots – this additional constraint therefore appears to be unnecessary in this case. As regards a bidder whose final primary round package included three (or more) 700MHz lots, the only way we can see in which such a bidder could be limited to bidding no more than the final round price for its third 700MHz lot would be to force that bidder to make a supplementary bid for a package identical to its final primary round package but with the number of 700MHz lots reduced to two, for an amount that was no less than its maximum bid for its final primary round package less the final round price for one (or more) 700MHz lot(s). We further note that, to be consistent with the final price cap, the amount of this mandatory supplementary bid would seem to need to be exactly equal to the bidder's maximum bid for its final primary round package less the final round price for one (or more) 700MHz lot(s).

40. It seems to us that this could potentially lead to such a bidder inefficiently not winning the third 700MHz lot in their final primary package since they would not necessarily be able to express their full willingness to pay for that third lot. We believe this could arise, for example, if there were an unallocated 700MHz lot at the end the final primary round (for example because another bidder had reduced their demand from two lots to zero lots in the final primary round). It seems to us therefore that this option also risks an inefficient outcome.

Options 5(d), (e) and (f): Increasing the prices that Three's competitors have to pay

41. Options 5(d), (e) and (f) all attempt to address Three's concern by increasing the price that competitors to Three will have to pay if there is weak competition for 700MHz lots. We see no objective justification for such an arbitrary price increase. In particular we see no mechanism by which such a price increase would lead to more efficient use of spectrum – on the contrary such a price increase could well lead to a reduction in the efficiency of spectrum use, as a result of lower investment in networks and services because of the

additional capital that such higher prices would take out of the industry. In our view therefore any such arbitrary price increase would be wholly unjustified and contrary to ComReg's statutory and regulatory objectives.

Option 5(d): Higher reserve price for 700MHz lots

42. As regards Option 5(d), ComReg is already proposing to set the reserve price for 700MHz lots at a level that is comparable with the likely market value of the spectrum. Indeed, given the reserve price that ComReg has already proposed for 700MHz lots, eir is of the view that any asymmetry in the pricing of 700MHz spectrum between eir and Vodafone on the one hand, and Three on the other, is in reality likely to be quite low. Any increase in the reserve price of 700MHz lots is therefore, in eir's view, more likely to lead to an inefficient choking off of incremental demand for 700MHz lots, rather than any material reduction in the asymmetry of pricing between winning bidders.

43. Of particular concern to ComReg should be the risk that any higher reserve price chokes off demand to the point where one or more 700MHz lots remain unallocated at the end of the auction. Given the already high level of reserve price proposed by ComReg[3], eir believes this is not an inconceivable possibility. eir is therefore strongly of the view that there is no room for any increase in the currently proposed reserve price for 700MHz lots.

Option 5(e): Higher value on unsold lots for 700MHz lots when price setting

44. ComReg provides very little detail of how this proposed option would work in practice, and hence it is difficult for eir to comment effectively. eir therefore reserves its position on this option until further details are provided. To the extent that ComReg wishes to explore this option further we would expect full details to be provided for consideration by way of a separate consultation.

45. For example, on the basis of ComReg's description it is very unclear to us what would happen if a bidder's winning bid was for an amount that exceeded the reserve price, but was for less than the higher value used for price setting. Would the bidder not win the spectrum? Or would the bidder have to pay a price based on the higher value even if that exceeded the amount of their winning bid? Or would they only have to pay the amount of their bid, even

[3] As noted in our response to ComReg 20/32, Draft Information Memorandum, ComReg has failed to provide any explanation regarding changes to the proposed reserve prices and these must be consulted on further.

though that could be less than the higher value used when setting base prices for other winning bidders?

46. Clearly, the answer to this question will have significant implications for how bidders choose to bid in the auction. We note in particular that if winning bidders only have to pay the amount of their bid if that is less than their base price based on a higher value for unsold lots, then that is a form of first-price or pay-as-bid pricing rule, and consequently it would not be surprising if bidders were to shade their bids, with the consequent risk of an inefficient outcome.

47. Similarly, as regards ComReg's second option for how such a higher value might be derived, given the very limited information provided by ComReg we are unable to deduce exactly how it would expect to derive a value based on "alternative valuations expressed by other bidders for a third lot". Surely that is what core pricing already does? Or is ComReg proposing to calculate some sort of 'average value' expressed for a third lot by all bidders, and then use that as the higher value for unsold lots when calculating the base price for each bidder? If so, one potentially significant problem with this approach is that the price to be paid by some bidders could well depend to a significantly greater extent on their own bids than it would using standard Vickrey-nearest minimum revenue core pricing. Given this potential, there will no doubt be an increased incentive on such bidders to shade their bids in order to reduce the amount they might have to pay, again potentially leading to an inefficient outcome.

48. Moreover, notwithstanding the lack of detail in ComReg's description of this option, we nevertheless note that this approach would not be consistent in principle with minimum revenue core pricing since it could require prices to be higher than opportunity cost. This approach would also almost certainly create incentives to deviate from truthful bidding – specifically it would almost certainly create incentives to bid shade with the potential for this to lead to an inefficient outcome. We find it hard to comment on whether this would create a contradiction in how ComReg assigns lots given our uncertainty over exactly what ComReg intends in this regard, but there certainly is the potential to create such a contradiction depending on exactly what ComReg decides to do. And finally, as already noted, ComReg has provided insufficient detail as regards how it would propose to estimate a suitable higher value for unsold lots when setting prices for us to be able to comment on the reliability and/or robustness of their proposed methods.

Option 5(f): Non-linear reserve prices for 700MHz lots

49. Again, ComReg has provided insufficient detail in its Information Notice on how this option would operate for eir to be able to comment effectively, and eir therefore reserves its position on this option until further detail is provided. To the extent that ComReg wishes to explore this option further we would expect full details to be provided for consideration by way of a separate consultation.

50. For example, would the round price for 700MHz lots be non-linear in the first round, and if so, how would ComReg then propose to increase round prices thereafter? Or would these non-linear reserve prices only apply to the pricing of winning bids? If the latter, what does ComReg propose to do if a winning bid is less than the non-linear reserve price for the winning package?

51. And even if we ignore these issues, it seems to us that non-linear reserve prices applying only to the pricing of spectrum would only have an impact on the final price of a winning package if the opportunity cost of the overall package were below the (non-linear) reserve price of the package – noting that in a CCA for multiple lot categories there isn't a price for each individual lot category. As such it seems unlikely to us that this option would do much if anything to address Three's concern (irrespective of its merits) except in very limited circumstances.

52. This option would also represent a radical change in policy as regards reserve prices (intentionally or otherwise) – from being an instrument intended to promote efficient use of spectrum and reduce the incentive to engage in certain types of gaming behaviour, to being a mechanism primary concerned with extracting value from bidders. All that is required to achieve ComReg's original objectives for a reserve price is to set a price that is somewhat below the likely marginal value of the spectrum – that is to say somewhat below the price at which demand would equal supply. Setting a reserve price that varies with the amount of spectrum that a bidder acquires does nothing more to promote efficient use of spectrum or reduce the incentive for gaming – all that it does is increase the price that a winning bidder has to pay, extracting a higher proportion of the value of the spectrum.

53. Moreover, the degree of confidence that ComReg will be able to attach to any estimate of the value of incremental lots to a bidder (which it will need to justify any non-linear reserve prices) will be significantly lower than the (already limited) confidence that it can attach to its

estimate of the likely marginal value of the spectrum overall. As such, the risk that it will mis-price marginal lots and thereby choke off incremental demand will be significantly increased.

54. eir's preliminary position therefore is that it does not support the use of non-linear reserve prices for any category of lot in this award (let alone all categories).

55. As regards the likely value of incremental 700MHz lots, [✂]. In which case marginal values for incremental 700MHz lots could be both increasing and decreasing.

Option 5(g): Weighted Vickrey-nearest pricing

56. We struggle to see how the use of a weighted version of Vickrey-nearest minimum revenue core pricing could have any positive impact on Three's specific concern (if it has merit) regarding asymmetric pricing of 700MHz spectrum except by chance, and ComReg provide no explanation in their Information Notice as to how this option might address Three's concern specifically. Unless and until such an explanation is provided, eir therefore reserves its position on this option. To the extent that ComReg wishes to explore this option further we would expect full details to be provided for consideration by way of a separate consultation.

Annex

1. Introduction

eir has repeatedly highlighted to ComReg the significant challenges that some bidders can face when bidding in a CCA format auction, and the risk that those challenges will lead to an inefficient outcome – not because the bidder has done anything wrong, but because they have had to make a choice between options when they have insufficient information to be able to know which option is the correct one (both for them individually, and for an efficient outcome).

Whilst we continue to believe that the best solution to this risk would be for ComReg to use a different auction format such as the SCA (alongside other measures to reduce the complexity of the award[4]), we have nevertheless developed some proposals for changes to the CCA format currently preferred by ComReg, which we believe would go some way towards ameliorating some of the challenges and risks that we have highlighted, without creating any additional risks so far as we can see.

In summary, those changes are as follows:

- For the bid amount of each primary bid to be its exposure price.
- If there are any unallocated lots at the end of the final primary round, to replace the normal supplementary bids round by one or more 'additional rounds', in which each bidder would be able to place both a 'headline bid' (equivalent to a primary bid in a primary round) and, if they wished, a number of 'additional bids', with additional bids having to comply with the same rules as would apply in the supplementary round of a normal CCA if the additional round were the final primary round and a bidder's highest bid for its 'final primary package' were its headline bid in this round; such rounds to end when there is feasible combination of bids including exactly one bid from each bidder that is of maximum value amongst all possible feasible combinations of bids; winning bids and base prices to then be calculated in the same way as for a standard CCA based on all bids submitted in all rounds of the auction[5]. We call this an Iterative CCA.

Our recommendation is that ComReg adopt both of these proposals.

[4] For example by awarding the 700MHz by a separate award process, and not time-slicing the 2.3GHz and 2.6GHz bands.
[5] Such additional rounds would therefore be very similar to the rounds of a CMRA format auction, but such rounds would only be used if there were unsold lots at the end of the final primary round, and the auction would still use Vickrey-nearest minimum core pricing, rather than be pay-as-bid.

2. Primary bid amounts equal to exposure prices

We propose that the amount of each primary bid be equal to the exposure price of the package as defined in paragraph 4.115 of ComReg 20/32, i.e. be equal to the sum of the round prices of the lots included in the bid minus the relevant bidder's 'discount' (as notified to that bidder before the start of the round), subject to that price being no less than the total of the reserve prices for the lots within the package.

The advantage of this change is that it would allow a budget-constrained bidder to continue bidding (efficiently) on a package whose total round price exceeded their budget (and/or their value), but whose discounted price did not. The problem with simply telling each bidder what their discount would be, but not reducing their primary bid amount by that amount, is that the bidder has to decide whether it can afford to take the risk that it will have to pay more than the discounted amount – for example if its discount subsequently goes down, or there are unallocated lots at the end of the final primary round – since their bid at the full round price will be binding on them for the rest of the auction. Setting the amount of each primary bid equal to its exposure price removes this problem. Since the same discount would apply to all potential primary bids by a bidder in a round, this change should not otherwise affect a bidder's choice of primary bid package – relative prices of packages would remain the same (being equal to the difference in total round price between the packages). Bidders would in effect be bidding the full round price for lots they were still competing for, but would only be bidding the current maximum 'second price' for lots that were no longer subject to competition from other bidders.

As a side benefit, this would eliminate an inconsistency in ComReg's currently proposed rules whereby a bidder's ultimate knock-out bid amount may be less than the amount that they had to bid for the same package in the final primary round, for example if there are no 'unsold' lots at the end of the round and the bidder has a non-zero discount at the start of the round. A bidder's KO bid amount, in the case where there are no unsold lots at the end of the final round, is equal to the total round price of their final primary package less their discount, whereas under ComReg's currently proposed rules the same bidder would have to bid the full round price for their final primary package. This may be of no consequence to bidders who have an adequate budget (and deposit) to be able to make the higher bid, but for other bidders this may be material and lead to them unnecessarily reducing their demand, potentially leading to an inefficient result.

The fact that a bidder's discount may go down, or disappear completely in subsequent rounds, does not appear to us to be problematic. The amount of each primary bid made by a bidder would be

reduced by the amount of the discount applicable in that round. If a bidder's discount were to go down (or disappear completely) in a future round that would affect the amount of any primary bid that the bidder made in that future round, but would have no effect on the bidder's previous bids, which would stand as made. If a bidder wished to make a higher bid for a previously discounted primary bid package then they would be able to do so, subject to the activity rules.

The fact that different bidders may bid different amounts for the same package of lots in the same round also seems unproblematic to us. Any such difference could only arise as a result of a difference in the discount notified to each bidder before the start of the round, reflecting a difference in the current maximum 'second price' that those bidders would have to pay for the lots within their package that were no longer being (actively) competed for by other bidders. All bidders would still be bidding the same amount for the lots that were being (actively) competed for, being the round price of those lots.

Finally, we see no reason why this change should give rise to any issues with respect to the implementation of ComReg's proposed activity rules, chain bid requirements, or relative and final price caps. All of those rules are intended to ensure that all of a bidder's bids are consistent with their previously revealed preferences in eligibility reducing rounds (constraining rounds) or the final primary round. In all cases the relevant constraints are based on the difference in the price of two packages in either the relevant constraining round or the final primary round – see for example 4.79(b), 4.81(b), 4.85(b) and the second bullet of 4.142 of ComReg 20/32. Given that the same discount applies to all packages in a given round (for the same bidder), the difference in price between two packages in a given round will be the same whether that difference is calculated pre- or post-discount. For simplicity we suggest that the calculation be undertaken pre-discount, i.e. solely on the basis of round prices, and hence identically to the calculation required to implement the currently proposed rules.

What would be slightly different is that the bid amount of a proposed relaxed primary bid would be reduced by the relevant discount in the round. This would then mean that the necessary amount of any required chain bids would similarly be reduced by that same discount (see for example 4.79(a), 4.81(a) and 4.85(a) of ComReg 20/32). A bidder would only have to submit a chain bid for the relevant constraining package if its existing highest bid for that package were below this discounted amount. This is entirely consistent with maintaining consistency with a bidder's revealed preferences.

The condition for a bidder being able to submit a relaxed primary bid would continue to be that the amount of any and all required chain bids be no greater than the price of those bids in the current

round, but that price would now be the post-discount price[6]. Again, this is entirely consistent with maintaining consistency with a bidder's revealed preferences.

As regards the final price cap, for a bidder that submits a non-zero bid in the final primary round we envisage that the final price cap would apply in exactly the same way as it would without discounting – the amount of the bidder's final primary bid would be discounted, but they would have the option of increasing that amount in the supplementary round if they wished, and the final price cap on all other supplementary bids would be based on the bidder's highest bid for their final primary package, irrespective of how and when that bid was made.

For a bidder that did not make a non-zero bid in the final primary round however, we believe the final price cap on the amount of any supplementary bid should be reduced by the amount of the bidder's discount (if any) in the final primary round. Thus, a bidder that chose to make the zero bid (or did not submit a valid primary bid) in the final primary round would not be able to make a supplementary bid for an amount that exceeded the amount they would have been required to bid for the same package in the final primary round post-discount. Again, we consider this necessary to ensure consistency with the revealed preferences of the bidder.

3. Iterative CCA

Separately, but in addition to the above proposal, we propose a change to the CCA rules currently proposed by ComReg in the circumstances where there are unallocated lots at the end of the final primary round, affecting the supplementary round only (with no change if there are no unallocated lots at the end of final primary round).

Specifically, if there are any unallocated lots at the end of the final primary round, we propose that the supplementary round be replaced by one or more 'additional rounds' to elicit further bids from bidders and determine the winning outcome and base prices in an iterative manner, as follows:

- Before the start of each additional round, ComReg sets a round price for each type of lot and communicates those new round prices to the bidders
- Each bidder can submit at most one 'headline bid' in each additional round, in exactly the same way and subject to exactly the same constraints as primary bids in the primary rounds

[6] Again, given that the same discount would apply to the total round price of both the relaxed primary bid and all required chain bids, the test for whether or not a proposed relaxed primary bid was acceptable would be the same whether done pre- or post-discount. In this case however we think it is probably better to think in terms of the post-discount prices since that is what the bidder would actually be bidding.

- However, each bidder can also submit a number of 'additional bids' in each additional round, in exactly the same way and subject to essentially the same constraints as supplementary bids in the supplementary round of a standard CCA:
    - The bid amount of each such additional bid must be at least the greater of the reserve price of the package and the highest bid that the bidder has already made for the package
    - The bid amount cannot exceed the current round price of the package (which is equivalent to the final price cap in a standard CCA supplementary round)
    - For packages that exceed the bidder's eligibility in the round, the bid amount cannot exceed the relevant relative price cap.
- We propose that in the first additional round bidders be permitted to submit additional bids only (no headline bid) – their headline bid for this first additional round being the primary bid they made in the final primary round
- In subsequent additional rounds, a headline bid can be a relaxed bid (i.e. for a package that exceeds the bidder's eligibility in the round) provided that it complies with the relevant relative price cap, which may require the bidder to make one or more additional bids (as per chain bids in the primary rounds), and those additional bids must themselves be compatible with the constraints on additional bids
- Once each round has ended, ComReg to compute the highest total value across all feasible bid combinations (being bid combinations that include at most one bid from each bidder and whose combined demand is no greater than the number of lots available in each category)
- If that value is strictly greater than the value of all feasible bid combinations that include exactly one bid from each and every bidder (which can include the zero bid, but only if the bidder has made that bid) then there will be a further round of bidding in which some (or all) round prices will be increased - the round prices to be increased to be determined in the same way as in the most recent Danish CMRA, or some similar process[7]
- Otherwise (i.e. if there is at least one feasible combination of bids that includes exactly one bid from each and every bidder and has equal highest value amongst all feasible combination of bids), that was the final additional round; ComReg to then calculate the winning combination of bids and base prices in the same way as currently proposed (for the standard CCA), based on all of the bids made in all rounds of the auction (primary bids, chain bids, headline bids and additional bids).

[7] Bidders to be informed as to which round prices are to be increased and the new round prices before the start of the next additional round. We believe it could also be helpful to provide bidders with more information than this before the start of each additional round – which we discuss further below – but probably not aggregate and/or excess demand as those quantities are usually calculated following each primary round of a CCA (being the sum of the primary bid quantities) since those are no longer particularly useful indicators of demand in the context of additional rounds.

The key advantage of this proposed change would be that no bidder could come away from the auction with nothing, unless they had explicitly submitted the zero bid (or failed to make a primary or headline bid in a round and were therefore deemed to have submitted the zero bid).

Moreover, provided that the price increments used in the additional rounds were not overly large, bidders would be able to get a far more refined understanding of how much they would likely need to pay in order to win their final primary package, and if that were more than they were willing to pay (for example because the likely price exceeded their budget), be able to reduce their demand to a smaller package and potentially bid all the way up to their maximum willingness to pay for that smaller package (and so on if need be). Budget-constrained bidders in particular would therefore be in a much better position to make an informed choice about whether to continue bidding for the package they would ideally like to win, or to focus on winning a smaller package, without the risk that they might accidentally win nothing at all (or a subset of what they would ideally win) if they make the wrong choice.

We believe a further advantage of this approach is that it could reduce the incentive for some bidders to deliberately bid so as to increase uncertainty at the end of the final primary round – for example by bidding to leave a relatively large number of lots unallocated. We believe the benefits of doing this would likely be significantly reduced (if not entirely eliminated) since bidders would be able to learn more about the likely level of final prices through the additional rounds, rather than having to guess at what final prices might be within the potentially wide range between final round prices and the knock-out bid amount for their final primary package that could result from a large number of unallocated lots.

It occurs to us that it might also be helpful for bidders to be given certain additional information before the start of each additional round. For example, perhaps the highest total value among all feasible combinations of bids to date and the highest total value across all feasible combinations of bids that include the bidder's primary/headline bid from the previous round (in the case of a bidder that submitted a non-zero bid in that round). Note however that we do not consider the provision of this additional information to be an essential part of our proposal – if for any reason ComReg were to decide that the provision of this or any other additional information would not be appropriate for any reason, we believe that the Iterative CCA format we propose would still be a significant improvement on the standard CCA.

4. Combining our two proposals

We see no reason why it should not be possible to combine these two proposals and run an Iterative CCA in which primary bid amounts are equal to exposure prices – and indeed believe that this would be better than implementing either one of our proposals on its own. For consistency, we suggest that in this case each bidder's discount in the final primary round also apply to their headline bids (if any) in all additional rounds i.e. that the amount of each headline bid be equal to the total of the round prices of the lots included in the headline bid in the relevant additional round less the bidder's final primary round discount[8]. All round price increases in additional rounds would therefore apply equally (per lot) to all bidders that were still submitting headline bids.

[8] With the rules constraining the amount of additional bids being adapted to reflect this change in a very similar way to the way in which we have proposed that the rules for the amounts of chain bids and supplementary bids be adapted to reflect the discounting of primary bids in the standard CCA.

3 Imagine Communication Group

Imagine response to: -

ComReg 20/56, Request for views from interested parties on auction formats including potential alternative options or modifications to ComReg's proposed auction format

14th August 2020

Imagine Communications Group
Sandyford Business Centre, Dublin 18, Ireland

1. Introduction

Imagine welcomes the opportunity to provide its views on auction formats including potential alternative options or modifications to ComReg's current preferred auction format as described in document ComReg 20/56.

Having reviewed the relevant information, previous responses to related consultations and a great deal of analysis, opinion and evidence offered by operators, regulators and experts in the design and implementation of auctions going back many years it is clear only that opinion is greatly divided as to which format is best for any given set of objectives and circumstances.

With twelve different options to consider comprising four main auction formats, one sub option and five modifications of the current preferred format it is not feasible for Imagine to provide detailed views with supporting evidence on the likely impact of each regulatory option on stakeholders, competition and consumers.

Nevertheless Imagine have provided a view on which of the issues raised are of most concern to it.

2. Imagine's views

2.1. View on RIA

Given the complexity and quantity of options and modifications set out Imagine would be supportive of ComReg considering the auction format options for the Proposed Award in an RIA format ("Auction Format RIA").

Imagine believe that this would aid the understanding of the relative merits of the current preferred auction format and the alternative auction formats and their potential impact upon industry stakeholders, competition and consumers.

However, Imagine would not be in favour of such a RIA if it were to delay in any way the availability of spectrum and associated vital investment in infrastructure beyond the key MBSA2 milestones and timelines as set out in Section 1.4 of ComReg 20/56.

Not withstanding the current temporary ECS spectrum arrangements[1] Imagine believes that it is imperative that the MBSA2 timelines are met.

[1] ComReg 20/56 Section 1.5 COVID 19: Temporary ECS licences

2.2. View on Auction Formats

In terms of Option 1 CCA and Option 2 SMRA Imagine believe that there are important advantages and disadvantages to each format and that the final choice of auction format for any particular application should depend on an analysis of the circumstances.

Nevertheless Imagine remains of the view that CCA is a suitable mechanism for the auction and allocation of this spectrum and stands by its previous statement as referenced by ComReg[2], however, Imagine would also point out that this reference omits an important part of the full text[3] which stated that:-

> ***"****Given the recent experience of the CCA auction process of 3.5GHz Imagine believes that CCA is a suitable mechanism for the auction and allocation of this spectrum.* ***However, Imagine believes that the process as constructed and operated for 3.5GHz spectrum does significantly disadvantage smaller operators****."***

Imagine agree with the arguments put forward by ComReg regarding Option 3 SCA[4] and Option 4 CMRA[5] formats and don't believe either of these would be more favourable than a CCA or SRMA format.

With regard to Option 5, CCA with amended rules and the seven sub options to modify the current preferred CCA format, Imagine believe that there exists an inherent risk that such departures from the relatively well understood and tested approach of the current preferred CCA format could undermine the benefits of its original design whilst also increasing the risk of unforeseen outcomes.

In general Imagine is of the view that any amended rules implemented to address issues arising in the 700MHz and 2.1GHz bands should not have a detrimental impact on the remaining bands that are not affected by issues such as those relating to asymmetry or time slice requirements.

Specifically, with regard to Option 5 (f) Introduce non-linear 700 MHz Reserve Prices[6], Imagine would be strongly opposed to the possibility of having non-linear reserve prices for any other (non 700MHz) bands.

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[2] ComReg 20/56 section 2.32 *"Option 1 [CCA] appears to be supported by Imagine in its submission to Document 18/60"*

[3] ComReg 19/59f Non-Confidential Submissions to Document 18/60 - Imagine response section 2.1

[4] ComReg 20/56, 2.3.3 Option 3: Simple Clock Auction ("SCA") with relaxed activity rules.

[5] ComReg 20/56 2.3.4 Option 4: Combinatorial multi-round ascending ("CMRA") auction format

[6] ComReg 20/50 2.83

Imagine also reiterate its statement made in response to ComReg 19/59[7] that:-

> *"In our view it is highly questionable to assume or infer substitutability between these bands [2.1GHz, 2.3GHz & 2.6GHz TDD] ..... There appears to be no valid justification therefore for creating time slices for 2.3GHz and the TDD portion of the 2.6GHz bands as this is only needed for the 2.1GHz FDD bands..."*

3. Summary of Imagine's Views

There is no doubt that an Auction Format RIA would further aid the understanding of the relative merits of the proposed and alternative auction formats. However, Imagine is of the view that the most important consideration at this stage of the process is to progress with holding and completing the Auction without delay to ensure the earliest availability of spectrum and associated investment in infrastructure to support vital services.

Measures taken to address issues arising in the 700MHz and 2100MHz bands should not affect the remaining bands.

Imagine would not be in favour of any proposed change of auction format or modification of the currently preferred CCA format that:

- increases the complexity of the auction
- has a disproportionate effect on smaller operators
- gives advantage to larger MNO or results in higher prices to smaller bidders

[7] ComReg 19/59R, Response to consultation and further consultation on a Proposed Multi Band Spectrum Award for the 700 MHz, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands

4 Three Ireland (Hutchison) Limited

Multiband Spectrum Award - Modifications to Auction Format

Response to Document 20/56 from Three

17th August 2020

1. Introduction and Summary

Three welcomes the publication of document 20/56 by ComReg. There have already been several consultation documents issued in the process to develop the next multi-band spectrum award, which is now expected to take place in H1 2021. For many aspects of the proposed award and the licences that are to be issued there would seem to be broad agreement between ComReg and the interested parties; however there remain a number of important problematic areas regarding the award format and rules. We are pleased that ComReg has taken the step to examine those issues further at this stage – while some time is needed to give these matters proper consideration, this process should lead to a fairer, more objective and better designed auction and ultimately prevent a longer delay to the award of the spectrum.

All respondents and ComReg favour the use of an open auction to award the spectrum. It is in relation to the choice of auction format, the specific rules for that format, and the application of caps on bidders that there remains either disagreement or direct opposition. There is also disagreement between ComReg and interested parties (respondents) regarding the division of licences into two time periods (Time Slicing) and the consequences this brings for the auction.

ComReg has proposed to use a Combinatorial Clock Auction (CCA) for the award. We do not agree that this is the appropriate auction format for the award, and we note that there has been little specific support expressed for the use of the CCA by any operator absent the use of Time Slicing. While we do not agree that a CCA is an appropriate auction format, and we note that most administrations have now moved to other auction formats, there is a particular flaw associated with ComReg's specific proposal to use a CCA (using second price/opportunity cost) in combination with bidder caps that take into account existing spectrum holdings. This creates a discriminatory effect in the auction damaging Three with respect to the 700MHz band. This flawed approach is contrary to ComReg's obligation to award the spectrum using a process that is non-discriminatory and proportionate, most particularly in relation to pricing. It should be noted that it is not specifically the use of a CCA auction on its own or the use of spectrum caps on their own that causes the price discrimination, *but the specific combination* that ComReg has proposed to use.

ComReg is aware of the issue, but presumably initially arrived at a conclusion that (i) Time Slicing is needed to address the expiry of Eir's 2.1GHz spectrum in 2027; (ii) a CCA auction is the preferred format to address aggregation risk created by the Time Slices; and (iii) The bidder caps are required to prevent an outcome from the auction that ComReg erroneously believes may be harmful to competition. The effect of the caps combined with ComReg's specific auction format and rules is to directly discriminate against Three, most notably for price in the 700MHz band without any evidence based objective reason for doing so. As this is contrary to ComReg's statutory objectives and functions, in particular its obligation under Regulation 11(2) and Regulation 19(2) of the Authorisation Regulations (and Article 42 EECC), ComReg must specify which particular outcomes it has deemed will cause this harm to competition and also provide adequate analysis to demonstrate that it is proportionate; otherwise this approach would be contrary to ComReg's specific statutory objectives. This has not occurred so far.

It is important to note that the bidder caps *only apply during the auction* – there is no impediment to Three or any other bidder obtaining spectrum that is greater than the cap immediately after the auction (though some competition analysis by ComReg might be carried out at that stage) as ComReg has not specified that any particular spectrum holding should be prevented. This means that the only lasting effect of ComReg's proposal might well be to adversely affect the price that Three must pay relative to other bidders in the auction.

There are some other important factors that ComReg has either not considered or has not provided clarity on the nature of its considerations in the above context. This includes the fact that there is in place an option for Virgin Media to obtain some of the spectrum currently licensed to Three. In addition, most of the licensed spectrum that is currently counted in the bidder caps will expire mid-way through the new licences (2030) that are to be issued. This means that spectrum that is currently held would count against a bidder for the full 20-year) licence duration (to 2040), even though it might only be available for a fraction of that time. ComReg has not given any assurances as to how this will be taken into account in the current or any future award.

We note that some clarifications have been requested by ComReg regarding Three's recommended amendments to the auction rules, in the event that ComReg ultimately decided to proceed with a CCA auction. We provide those clarifications in section 4 below. We note that other respondents might also wish to see these clarifications in order to respond fully to this consultation. For this reason, we aim to submit the non-confidential version of this response to ComReg early and respectfully suggest that it should be circulated to the other respondents (by ComReg or Three) so that they might be able to take these clarifications into account in their own responses.

The scope of this particular consultation is focussed on examining some alternative auction formats and a number of different options aimed at remedying problems identified with the specific CCA auction proposed in document 19/124. We provide a detailed response for each of the options in section 4. Overall, we conclude that either a Hybrid-SMRA or an enhanced version of the Simple Clock auction (eSCA) are the auction formats that can best fulfil ComReg's objectives and satisfy all interested parties. To facilitate discussion of the Hybrid SMRA and the eSCA, we provide a complete set of indicative rules for these formats in Annex I and Annex II respectively. Without prejudice to this, we also respond in detail in section 4 to all of the CCA options.

We also observe that ComReg has missed the most obvious and straightforward modification that would remove the discriminatory effect of the CCA – to use spectrum caps that only count spectrum that is available in the award and apply equally to all bidders. We have added this in as Option 6.

A summary of our position on each auction format option is set out in Table 1. The formats we consider appropriate and in line with ComReg's statutory functions and objectives are highlighted in light green. Other formats that may be potentially viable or more appropriate than ComReg's current proposal, as they would not discriminate against bidders, are highlighted in light orange. Formats that we consider non-viable, because they would produce inefficient spectrum allocations and/or introduce unreasonable, disproportionate, unacceptable and potentially unlawful discrimination between bidders, are highlighted in light red.

Table 1: Summary of Three's views on each auction format option

Option	Summary Description	Comment
1. CCA as proposed in ComReg 19/124	Combinatorial Clock Auction using second-price rule and caps that take into account existing spectrum holdings. Time Slicing included.	Three does not believe a CCA is the optimum award format. Additionally, there are serious errors with the specific use of CCA with the rules in this option as it directly discriminates against Three (without any clear basis for doing so) and is contrary to ComReg's statutory functions and objectives.
2. (a) Hybrid SMRA with Time Slicing	Hybrid SMRA using a pay-as-bid rule. Spectrum Caps could be as proposed by ComReg counting existing spectrum or only spectrum available in the auction. Time Slicing remains.	We believe a Hybrid SMRA is a leading candidate format for this award and would deliver ComReg's objectives .Variants of this format have been chosen for recent and forthcoming 5G awards in Austria, Luxembourg, Netherlands, Slovakia and the UK, and another version used in Australia, Canada and the USA. However, if implemented with Time Slicing, this format may increase aggregation risk for bidders.
2. (b) Hybrid SMRA with alternative spectrum packaging	Hybrid SMRA using a pay-as-bid rule. Spectrum Caps could be as proposed by ComReg counting existing spectrum or only spectrum available in the auction. No Time Slicing but two categories of 2.1GHz Lot.	As above but using two categories of 2.1GHz Lot instead of Time-Slicing. Overall, we believe this is a more appropriate, and objective format than ComReg's proposed CCA format notwithstanding Vodafone's concerns about the lot structure, which we address in section 4. **We urge all interested parties to consider the full set of rules that we present in Annex I.**
3. Simple Clock Auction (SCA) or enhanced simple clock auction (eSCA)	A Simple Clock Auction using a pay-as-bid rule. Time Slicing included. We propose enhancements to the format, so as to address ComReg's concerns. We refer to this modified format as an eSCA.	Eir has suggested that a Simple Clock Auction should be considered. We agree that this is an appropriate format if Time Slicing is retained but only if modifications are made to the rules to address concerns about unallocated lots and price driving. Like the Hybrid SMRA, we believe that and eSCA would deliver ComReg's objectives rather than a CCA which does not do so. **We urge all interested parties to consider the full set of rules that we present in Annex II.**
4. CMRA	A Combinatorial Multi-round Ascending	There are significant challenges to using this format with ComReg's award, including complexity and poor transparency. For these reasons it is not an appropriate format.
5. (a) CCA with Rule Change	As Option 1, with a joint cap of 2x25MHz (5 Lots) on any two winners.	Originally suggested by Three. Though not removing adverse discrimination entirely, this modification removes the most egregious discrimination against Three. It also addresses the concern that

		Three could be the only MNO to win no 700MHz spectrum. Three remains of the view that Options 2 or 3 are more appropriate, however if a CCA was retained then of all variants to Option 5, this is the most fair, proportionate and reasonable one.
5. (b) CCA with Rule Change	As Option 5(a), but the joint cap of 2x25MHz (5 Lots) only applies for price determination.	Originally suggested by Three. Though not removing adverse discrimination entirely, this modification removes the most egregious discrimination against Three. In order of preference, it comes after Option 5(a).
5. (c) CCA with Rule Change	Cap on the marginal value bid for a third Lot of 700MHz	This modification is intended to reduce Gaming in a CCA and would be used in combination with either 5(a) or 5(b) above. For the avoidance of doubt, it is not by itself a sufficient modification to the CCA rules to address the price discrimination against Three.
5. (d) CCA with Rule Change	Increase 700MHz Reserve Price	We do not find this to be an appropriate remedy to the issues identified in ComReg's proposals. It simply increases pricing for all bidders without addressing the flawed discrimination. It would be impossible to determine the correct price so could choke off demand.
5. (e) CCA with Rule Change	Increase the value of any unsold Lots in price determination	As proposed by ComReg, this variation is not a suitable remedy to the issues identified in ComReg's proposals. Options 5(a/b) provide a preferable modification to achieve the same result.
5. (f) CCA with Rule Change	Introduce non-linear 700MHz Reserve Price	Like Option 5(d) this modification does not remove the flawed discrimination and could choke off demand. It is not supported or an appropriate remedy.
5. (g) CCA with Rule Change	Weighted Vickrey Prices	This modification does not address the main problem with ComReg's proposal. It only applies in a limited way where joint opportunity cost is material in price determination. This does not address the concern.
6. CCA with symmetric in-auction caps	CCA as proposed by ComReg, but with caps that only take into account spectrum that is available in the award.	This is the minimalist and most effective modification to ComReg's proposed CCA while ensuring compliance with statutory functions and objectives. The CCA rules remain unchanged and only a change to application of the caps is needed. It gives non-discriminatory treatment to all bidders.

In summary, we find that there are several viable options available to ComReg to achieve its objectives which would be less likely to lead to unfair and discriminatory outcomes than the preferred option identified by ComReg. A Hybrid-SMRA is the best auction format, followed by an eSCA. Without prejudice to this, if ComReg was to proceed with a CCA, the optimum modification is to change the caps to only count spectrum available in the auction Option (6)

above. After this, next in order of suitability is a combination of Option 5(a) or 5(b), and 5(c). We view that the other options are not suitable.

In Section 2.5 of the consultation document ComReg suggests that it is open to Three to return a 2 × 5 MHz sub-1 GHz block to ComReg in order to eliminate the discriminatory effect in the proposed award. We provide further detail in section 2 below, however Three does not see that that there are any competition issues or any other potential harm which needs to be addressed by Three returning spectrum. The sole purpose of surrendering spectrum would be to ameliorate the effect of discrimination in the auction process. There are other options available to ComReg to eliminate the discrimination and these should be adopted. To require early surrender of spectrum licences undermines the basis for investment in licences and their dependant networks.

2. Points of Clarification

Amendments to the CCA

ComReg has requested some specific clarification regarding Three's proposed amendment to the CCA auction described by ComReg in document 19/124 (if it were to be used). This clarification is provided below in section 4 with an expanded description of the amendment. There are some other points of clarification that Three would like to provide.

Return of sub-1GHz spectrum

In Section 2.5 of the consultation document ComReg suggests that it is open to Three to return a 2 × 5 MHz sub-1 GHz block to ComReg in order to ameliorate the discriminatory effect in the proposed award. We note that Three suggested return of spectrum in the 2.1GHz band as one possible action that could simplify the lot categories in the award, and that if a solution could be found whereby all existing licensees returned 2.1GHz spectrum to create a common commencement that this would also eliminate the requirement for interim licences. No solution has developed from this suggestion.

While there may be some similarities to Three's earlier suggestion regarding the 2.1GHz band there are also significant differences. It is surprising that ComReg is suggesting that a licensee should be required to surrender a licence early in order to remedy a defective process proposed by the regulator itself. ComReg has not evidenced any competition issues or any other potential harm which needs to be addressed by Three returning spectrum and ComReg itself has stated that "*the existing spectrum asymmetry does not appear to be harming competition*" (most recently in paragraph 6.184 of 19/124).

Again, while the cases are different, we note that in neither case has ComReg made a proposal in relation to how to compensate the licensee for loss of its upfront investment in the licence. This undermines the regulatory certainty that is required by a bidder at an auction or an investor in networks – that their licence will remain available and in place under predictable conditions for the duration of the licence. While noting that the Liberalised Use Regulations under which the licences were issued do not specifically provide for a return of the Spectrum Access Fee or other loss, it would be possible to provide for this in the MBSA II Regulations.

We note that it is open to any licensee to return spectrum at any time. In paragraph 2.96 of the consultation document, ComReg states "*If Three was to avail of this possibility, ComReg observes that Three should indicate this possibility in its response to this Information Notice*", however it is impossible to respond to this statement as it is unclear what possibility is being offered to Three over and above that which it is already entitled in any event.

Other clarifications

In relation to paragraph 2.12 of the consultation document, it should be noted that Three has not stated that it is necessary for an auction result to deliver uniform prices in all cases. It is clear that each bidder may have different valuations that will drive their bidding, and this will be influenced by many factors including their existing licences and their business plan. ComReg has proposed an auction where winning prices are determined by opportunity cost. In effect, each winner's price is determined based on how much extra other bidders would have been willing to pay. In this type of auction, where bidder caps have the effect to prevent bidders from expressing a value for a full set of bids, they limit the calculation of opportunity cost and as a result winner price determination.

In the auction as proposed by ComReg in document 19/124, Three would be limited in its bidding when compared to the two other mobile network operators. This means that Three could not express a value for spectrum it would be willing to buy in the same way as other bidders – in effect some of Three's value which determines pricing for other bidders would be ignored. It is this price difference caused by the auction format and rules that Three objects to, and not those derived from different bidder valuations.

In the last paragraph of section 2.12, ComReg states:

> "*Although there are scenarios in which Three is limited in the extent to which it can impose opportunity costs on other bidders compared to the opportunity cost others can impose on Three, this is not primarily due to the award format but rather the fact that Three would be entering the Proposed Award from a materially different position to other potential participants in terms of existing spectrum holdings".*

As explained above, this paragraph is factually incorrect.

We also believe ComReg is taking a mistakenly positive view of the degree of support for the proposed auction mechanism and Lot structure. Among the interested parties, there is no support for Time Slicing as proposed. Two of the respondents disagree with the use of a CCA auction mechanism Eir and Three), and a third (Vodafone) only agrees that it is suitable because of the complexity introduced by Time Slices. We have seen no specific support expressed by Imagine for the use of a CCA over other auction formats. We believe ComReg should carefully review the positions of respondents and give them due consideration in the decision-making process in line with its statutory functions and objectives.

3. ComReg's Functions

As noted in our previous submissions, ComReg is obliged, when structuring awards and awarding 'rights of use' / awarding spectrum and associated licenses, to adhere to both specific spectrum regulatory obligations and its statutory objectives and functions. These obligations require ComReg (when structuring such awards), in particular, to (a) guarantee non-discrimination, fairness, objective treatment as well as legal certainty and consistency and (b) enhance competition, efficient use of spectrum and investment in the market. Three is of the firm view that the current award structure raises serious concerns about the compatibility of ComReg's proposals with these legal requirements (as further outlined above and below) and its erroneous view that direct discrimination / bias against Three is in fact in line with these objectives.

In its submissions to ComReg, Three has set out serious legal concerns in relation to ComReg's proposals to use a CCA auction (*but accepts certain amendments to a CCA could reduce the extent of the discrimination / biased outcomes*), together with award spectrum caps that count spectrum which is not included in the award itself noting that this will directly lead to asymmetrical caps in the auction and unjustifiable discriminatory treatment of Three. As a result ComReg has, contrary to its statutory objectives and State aid rules, failed to provide any objective or fair basis for such treatment (noting that other operators will directly benefit from ComReg's proposals).

Three is of the view that: (i) ComReg has not identified any legal or objectively justifiable basis for the inclusion of the caps[1] (i.e. has not defined the extreme spectrum asymmetry it is trying to prevent nor identified why the proposed caps are necessary to prevent extreme spectrum asymmetry), neither has ComReg carried out the analysis required to demonstrate that the caps proposed is a proportionate remedy given the discriminatory impact.

Three notes that: (i) ComReg has neither evidenced nor provided objective reasoning behind the implementation of the spectrum caps and (ii) no Regulatory Impact Assessment or assessment of the effect of the proposal to provide spectrum competition caps on competition has been carried out.[2] ComReg has not clearly identified the nature of the harm, competition or otherwise, it is proposing to address (e.g. extreme spectrum asymmetry), the significance of this harm (and how the significance is manifested in a market / on end users) or the likelihood of this harm occurring (is it likely or just theoretical). Therefore it is very difficult to understand how the spectrum caps / other restrictions are proportionate or lawful in compliance with Regulation 11 of the Authorisation Regulations, Regulation 17(1)(b) of the Framework Regulations or otherwise or address any perceived competition concern in the Irish market. We strongly refute that there is such a concern in respect of Three.

[1] The purpose of the cap is to prevent any single operator having 'too much' mobile spectrum and underpinning the implementation of these caps is ComReg's desire to 'promote and safeguard competition by avoiding extreme asymmetric outcomes…which could be detrimental to downstream competition'. (Information Notice ComReg 20/56 dated 6 July 2020, p 15-16.)

[2] Responses to 19/124 (non-confidential comments), p 49.

Three notes the recent General Court decision of *CK Telecoms UK Investment Ltd v European Commission*[3], (in which it annulled the Commission's decision which prohibited the proposed acquisition by CK Hutchison Holdings Ltd of Telefónica Europe plc). One aspect arising from this case which Three considers relevant in the context of this spectrum award is that the General Court held the Commission's theories of harm must appear '*sufficiently realistic and plausible*'[4] (ie, that they must not be purely theoretical) and that the Commission must demonstrate a '*strong probability*' of the existence of significant impediments following the transaction[5]. In essence, the General Court held that the Commission could not intervene in the market / prohibit the transaction on the basis of somewhat vague qualitative findings. Three would view this General Court judgment as instructive as regards the legal test that must be met by ComReg in the present circumstances. It is clear that ComReg, in setting auction rules which will have a significant effect on the operation of competition in the in the Irish market for up to 20 years (with long term impacts for operators and end users) is required to fully substantiate / evidence any concern that would warrant the inclusion of competition caps in a way that causes discrimination (i.e. engage in a substantive assessment of the effect of the proposal on competition in the market).

4. Detailed Review of Options

ComReg's preferred design, based on the CCA, is not an appropriate or viable candidate because the interaction of the CCA pricing rule and the sub-1 GHz cap introduces a price discrimination against Three which is contrary to ComReg's functions under the Authorisation Regulations and Communications Regulations Act 2002 (as amended). For the reasons we set out below, we are of the view that ComReg ought to adopt either a Hybrid SMRA (Option 2b) or an enhanced Simple Clock Auction (variant of Option 3) in line with its statutory objectives. A CCA may also be a viable alternative *provided that* ComReg adopts rule changes that eliminate the direct discrimination against Three. There are options available to ComReg to remedy the currently proposed discrimination. The simplest means to achieve this is to only count spectrum in the award towards the caps – labelled Option 6 here. Alternatively, a combination of Option 5(c) with either of 5(a), or 5(b) could achieve this.

Option 1: CCA with exposure pricing

ComReg has previously proposed to run the auction using a CCA auction format with the following key rules: time slicing in supra-1 GHz bands; and a cap of 2x35 MHz on sub-1 GHz spectrum holdings (Option 1). Three believes that Option 1 is not an appropriate or viable approach, as it discriminates between MNOs without adequate justification, is contrary to ComReg's statutory objectives and duties, and is therefore unlawful. For a number of reasons, the choice of a CCA and use of time slicing is also unpopular with respondents.

[3] (Case T-399/16).
[4] Ibid, para 117.
[5] Ibid, para 118.

Discrimination against Three

The discrimination, which is against Three, arises from the interaction of the CCA 'second price' rule and the proposed sub-1 GHz cap, as previously explained by Three in response to 19/124 and is fundamentally flawed. This introduces a *de facto* reservation at reserve price of 2x5 MHz in the 700 MHz band for Vodafone and Eir, but not Three, in the likely event that only the three incumbents bid for this band. Even in scenarios where a fourth or further bidder participates, unless that bidder bids at competitive levels, Vodafone and Eir would still benefit from a price discount on their first lot relative to Three.

Vodafone and Eir's advantage relative to Three under Option 1 arises because, going into the auction, Three has 2x25MHz of sub-1 GHz spectrum, including 2x15 MHz in the 900 MHz band, whereas Vodafone and Eir each have 2x20 MHz, including 2x10 MHz at 900 MHz. The difference between the operators is the smallest possible, given the available spectrum and a minimum unit size of 2x5 MHz. Three acquired this extra lot arising from a competitive auction process followed by a merger of Three Ireland and Telefonica Ireland. As ComReg is aware, this merger (including spectrum holdings) was examined by the EC (M.6992) who found that it was not harmful for competition, and ComReg subsequently confirmed that it agrees with this point of view regarding the spectrum holdings. It should be noted that as part of the merger commitments, Virgin Media retains the option to acquire 2x5MHz of Three's 900MHz spectrum and 2x10MHz of its 1800MHz spectrum (and 2x10MHz of 2.1GHz spectrum up to July 2022). Were this option to be exercised, then Three would have no more sub-1GHz spectrum than either Vodafone or Eir. ComReg has not explained how, if at all, these matters have been taken into account in its deliberation. In any event, all 2x25MHz will expire in 2030, however the impact of ComReg's asymmetric cap will remain to 2040 – twice as long. ComReg has not been able to give any assurances as to how it will address this situation for the 2030 to 2040 period

Importantly, ComReg has not identified any competition concerns arising from the current distribution of sub-1 GHz spectrum. To the contrary, ComReg has stated (including most recently in paragraph 6.184 of 19/124) that "*the existing spectrum asymmetry does not appear to be harming competition*". ComReg has identified a concern that competition could be harmed as a result of imbalances in sub-1 GHz spectrum, if any one bidder was to acquire more than 2x35 MHz but has not demonstrated any basis or evidence for this concern. Accordingly, ComReg has proposed a cap at this level. This cap may be characterised as a "precautionary cap", in that its purported purpose is to address ComReg's general concern that competition could potentially theoretically be harmed, as opposed to ComReg actually identifying the harm that is likely to occur ie so that such likely harm is sufficiently realistic and plausible that could justify the proposed measure and acting to prevent specific instances of harm. We note that many other European countries (e.g. Denmark, Germany, Switzerland and the UK) have completed or proposed 700 MHz awards in which a single bidder could acquire 2x40 MHz or more of sub-1 GHz spectrum.

As ComReg recognises, it has a duty under section 12 of the Act of 2002 and Regulations 16 and 17 of the Framework Regulations, Regulation 19(2) of the Authorisation Regulations and Article 42 EECC to adopt selection criteria and impose fees that are "*are objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose*". ComReg's proposal fails to meet these criteria and is flawed because:

- It discriminates against Three because it positions other MNOs to obtain their first 700 MHz block at a discounted price relative to Three;
- No evidence has been put forward by ComReg that would justify such intervention (i.e. no consumer or competition harm identified or evidenced);
- It cannot be objectively justified because the price discount is not reflective of actual opportunity costs but rather is a consequence of ComReg's rules precluding Three from expressing a relevant opportunity cost; and
- It is disproportionate because the discount applies in scenarios where there are no competition concerns, and the purpose of the cap is anyway precautionary in nature, lacking supporting arguments that could justify price discrimination against one MNO.

The discrimination occurs because of ComReg's specific proposal to use a CCA format *in combination with* a 2x35 MHz sub-1 GHz cap counting existing spectrum holdings. Three does not think the CCA is an appropriate format for this award, but it accepts it is an option where the ComReg Proposal is modified. Modifications that would reduce the discrimination include an auction without the cap, or if the cap was set at any higher level, of if the cap only counted spectrum available in the auction because in those circumstances, Three would be able to express an opportunity cost for a third lot. Alternatively, if the 2x35 MHz sub-1 GHz cap was adopted in conjunction with an auction format that used a pay-your-bid-type pricing rule rather than opportunity cost-based pricing (such as an SMRA or SCA), then there would also be no price discrimination.

In short, ComReg could adopt either the CCA or a 2x35 MHz sub-1 GHz cap but it cannot have both together without modification to the rules, in Three's view. To do so would be contrary to ComReg's objectives for awarding spectrum and unlawful.

Unpopular format

The CCA format and use of time slicing is also unpopular with respondents. The CCA format proposed by ComReg is opposed by two prospective bidders (Eir and Three) and drew only lukewarm support from the other two (Imagine and Vodafone). Notably, Vodafone said that it only supported the CCA, if there was time slicing, arising from concerns that time slicing would otherwise introduce severe aggregation risk and Imagine has not specifically commented on the merits of the auction format. No party supported time slicing.

Alternative Designs

Given these problems with Option 1, ComReg should amend its design, in Three's view. Broadly, it has three options:

A. It could use an alternative auction format, one with a pay-your-bid-type pricing rule – Options 2(a), 3 or 4, in which case it could also change the spectrum packaging so as to remove time slicing – Option 2(b);

B. It could keep the CCA with time slicing but raise or remove the sub-1 GHz cap, or set caps that only count the spectrum available in the award; or

C. It could keep the CCA with time slicing *and* the sub-1 GHz cap but with amended rules that remove the price discrimination against Three – Options 5(a) or 5(b), plus 5(c).

We note that ComReg did not put forward any B-type options that raise or remove the sub-1 GHz cap. To facilitate a full discussion, we have added this as an additional Option 6.

Options 2-4: Alternative auction formats

As an alternative to using a CCA, both ComReg and the MNOs have identified a number of auction formats that could be used for this award, including the SMRA, Clock and CMRA. These are labelled as Options 2, 3 and 4.

Three has previously proposed that ComReg adopt a Hybrid SMRA, a format widely used by other European regulators for 5G awards. We continue to believe this is a leading option. A Hybrid SMRA works best without time slicing – Option 2(b). If time slicing is maintained, then package bidding may be necessary. In this case, a Simple Clock Auction (SCA) – Option 3 – could be used, but we suggest some enhancements to the rules proposed by Eir so as to address ComReg's concerns about this format; we refer to this as the eSCA. Importantly, both the Hybrid SMRA and eSCA can be run with ComReg's proposed sub-1 GHz cap without creating the price discrimination against Three that is inherent in ComReg's CCA design.

Option 2: Simultaneous Multiple-Round Ascending Auction (SMRA)

The SMRA is the most widely used auction format for allocating spectrum. It is a very flexible format which can be implemented with a wide variety of rules. For this award, we believe there is broad agreement that an Allocation Stage conducted using an SMRA would need to be implemented with generic lots, so that frequencies can be assigned on a contiguous basis in the Assignment Stage.

Given this constraint, we believe there are broadly three versions of the SMRA that could be adopted for the Irish award:

- **SMRA with generic lots ("Standard SMRA").** In this format, used for the German 2019 5G auction, bidders compete for individual generic lots within categories. Standing high bidders for each lot are identified at the end of each round, and these may be displaced in subsequent rounds by bids at a higher price level. Activity rules allow bidders to switch between lots within and across categories, and these are typically quite effective in mitigating substitution risk. However, in situations where there are strong complementarities between lots, bidders may face aggregation risk.

- **Simple Clock Auction ("SCA").** In this format, used for 5G auctions in Austria and Switzerland in 2019, generic lots are grouped into categories with a common clock price. In each round, bidders submit demand for a number of lots in a category at the clock price, and bidding continues at ascending price levels until there is no excess demand in any category. Bids submitted in the final round become winning bids. There are no standing high bids and, in the simplest version, no demand retention. Therefore, by default, this is a package bid format

that entirely eliminates aggregation risk. A potential drawback of this approach is that demand could fall below supply later in an auction, leading to unsold lots.

- **Hybrid Clock-SMRA ("Hybrid SMRA").** In recent years, formats combining key features of the Standard SMRA and SCA have emerged. There are several variants, including one version adopted for recent and forthcoming 5G awards in Austria, Luxembourg, Netherlands, Slovakia and the UK, and another version, known as the 'eSMRA', used in Australia, Canada and the USA. The defining characteristics are that bidding and prices proceed much like a clock auction, but there are mechanisms for retaining demand by preventing demand falling below supply, thereby minimizing the likelihood of lots going unsold. However, the demand retention rules mean that bids are not true package bids, and bidders may therefore be exposed to some aggregation risk.

As discussed in prior consultations, we think the Hybrid SMRA is preferable to the Standard SMRA for this award, as it offers the same advantages, and – given the large number of lots and categories – will allow for a simpler and quicker process. Therefore, we restrict our further comments to a discussion of the pros and cons of adopting the Hybrid SMRA (Options 2(a) and 2(b)) and variants of the SCA (Option 3).

Option 2(a): Hybrid SMRA with time slices

ComReg acknowledges that an SMRA would provide a "*mechanically simple*" process for allocating the available spectrum (as compared to the relatively complex CCA rules). However, it also identified a number of concerns with the Standard SMRA, including potential for substitution and aggregation risk, and vulnerability to gaming strategies. It further observed that modifications associated with the Hybrid SMRA could to some extent "*mitigate these issues*" but "*would not eliminate the risks entirely*."

For reasons we have previously explained, we think that ComReg's residual concerns about the Hybrid SMRA format are overstated:

- **Substitution risk.** Activity rules in the Hybrid SMRA make it easy to switch demand across categories while there is significant excess demand. Switching may become harder as demand converges on supply, but bidders are well placed to anticipate this. Overall, we think substitution risk under this format is low.

- **Aggregation risk.** Aside from the issue of time slices, we believe that aggregation risks for bidders in this award are modest and could be managed within a Hybrid SMRA framework. Within bands, bidders may have minimum demands, but these are likely low. Across bands, the only case where there are very strong complementarities is bands that are divided up into time slices.

- **Gaming strategies.** In multi-band settings, all auction formats are vulnerable to gaming behaviour to some degree. As previously discussed, we are much more concerned about potential gaming under a CCA format than under this format. We recognise that incentives for demand reduction are greater under an SMRA than a CCA, but we do not think this is a viable concern, as evidence from other auctions suggest bidders typically only drop the lots they do not expect to win, so there may be no impact on allocative efficiency. We also disagree with ComReg

that smaller bidders may have stronger incentives for demand reduction than bigger bidders (paragraph 2.35) – in fact, bidders pursuing larger quantities are the ones with the strongest financial incentive to reduce demand.

The Hybrid SMRA has emerged as the most popular format in the 5G era for spectrum awards, having been adopted in eight countries so far, including six multi-band auctions in Europe.[6] Other regulators have assessed the same pros and cons as ComReg and concluded that the Hybrid SMRA is the best format for their situation. Results have borne out these assessments: the format has a solid track record, with competitive awards and sensible price outcomes; and, unlike the CCA, there have been no instances of peculiarly high or asymmetric price outcomes.

When comparing the situation in other countries that adopted the Hybrid SMRA to the Irish situation, the only significant difference that we have identified is at 2100 MHz, where new licences will come available at two different times. ComReg's preferred approach to managing this is to adopt time slicing, with frequency blocks available in two periods, TS1 (2021/2022-27) and TS2 (2027-2040). This introduces aggregation risk, as bidders will likely want some degree of continuity in 2.1 GHz holdings across the time slices, so as to support long-term network investment in the band. ComReg also proposes time slicing for other coverage bands, to facilitate switching between 2.1, 2.3 and 2.6 GHz. However, this measure only makes sense in a package bid format, as otherwise it would needlessly extend aggregation risk to additional bands.

Though not in favour of Time slicing, Vodafone has said that if it is used, then Vodafone prefers that ComReg adopt a package bid format. We understand their position. We would also prefer to avoid exposing bidders to aggregation risk across time slices. Accordingly, we recommend that ComReg should adopt a Hybrid SMRA and also revise the spectrum packaging so as to eliminate time slicing, as in Option 2(b).

Option 2(b): Hybrid SMRA with two 2.1 GHz categories

As ComReg notes at paragraph 2.37, Three has proposed that a hybrid SMRA format is used for this award. We continue to believe that this is a good format which avoids the legal flaws associated with the current CCA proposal. We think the format would work best if the 2.1 GHz band is structured into two categories of 'early' availability lots (corresponding to the current holdings of Three and Vodafone) and 'late' availability lots (holdings of Eir). This approach eliminates the need for time slicing, and thus avoids creating undue aggregation risk for bidders.

To facilitate an informed discussion of the hybrid SMRA, we set out a description of how the auction could work in the context of the Irish Multi Band Award in Annex I. The rules we propose are based upon DotEcon's design for other European regulators. We encourage all respondents to provide their comments on the format, and to say whether they agree with our view that it is preferable to a CCA with time slicing.

[6] In Europe: Austria (1 forthcoming), Luxembourg (1), Netherlands (1), Slovakia (1 forthcoming), UK (2 including 1 forthcoming); and elsewhere: Australia (2 including 1 forthcoming), Canada (1 forthcoming), USA (4 – including 1 underway).

We note at paragraph 2.44 ComReg said that Vodafone does not support our proposal for two categories of lot at 2.1 GHz, because of concerns that it may (somewhat) disadvantage companies (including Three) whose existing 2.1 GHz spectrum expires earlier. Vodafone's concerns relate to the experience of its sister company in the German auction, where a similar two-category lot structure was used. Vodafone says that in Germany, bidders may have exploited the two-lot structure so as to bid for lots that are "*desired by others, causing significant distortion in the auction*." We agree that there was strategic play in the German auction; however, it is also apparent from the bidding and final outcome that this was linked to genuine competition amongst four bidders to acquire 2.1 GHz spectrum. We have, of course considered whether Three would be vulnerable to a competitor engaging in price driving at 2.1 GHz in Ireland, given that we are in an equivalent position to Vodafone. On balance, we think the risks are moderate and, in general less than with a CCA format. The key difference is that bidders are exposed to winning a sub-set of their demand, so price driving is a more risky strategy under an SMRA than under a CCA.

In summary, we acknowledge that there are advantages and disadvantages to our proposed lot structure at 2.1 GHz, but on balance we think this is the best approach to manage risk for bidders while eliminating the complexity of time slicing. We encourage all stakeholders to share their opinion on this trade off.

Option 3: Simple clock auction (SCA)

If stakeholders cannot align on an alternative to time slicing in the 2.1 GHz band, then Eir's proposal to adopt a SCA design provides a potential alternative route that combines package bidding with a pay-your bid rule. In each round of a SCA, bidders have complete flexibility to drop demand. Accordingly, they do not face any aggregation risk, so the format could be run with time slicing.

ComReg expressed concern that the SCA may "*not provide bidders with enough flexibility to express their demand for different combinations of packages*." We do not think this is an important point, as we are confident that a well-designed clock auction would provide sufficient flexibility and price discovery to allow bidders to identify efficient outcomes.

ComReg's two other concerns regarding this format have more weight:

- There is a risk that lots may inefficiently go unsold because demand can fall below supply if there are significant drops in demand in response to rising prices.
- The fact that bids are not committing until the final round might encourage gaming behaviour, such as parking demand or price driving.

If ComReg were to adapt a SCA, there would therefore need to be some change to the auction rules to address these concerns. Eir has proposed that the auction should be run with a relaxed activity rule which might, under certain conditions, allow bidders to expand demand. This could reduce the likelihood of lots going unsold inefficiently. However, ComReg expressed concern that this might increase "*potential for gaming that would allow bidders to hide their demand or distort prices*". We agree that a relaxed activity rule is not the best fix to the SCA.

In Sweden, PTS proposes to use a DotEcon-designed SCA to award 2.3 GHz and 3.5 GHz spectrum.[7] We understand that this format includes provision for exit bids, submitted when bidders drop demand, which can be used if necessary to backfill any lots unsold after the final clock round. Exit bids could in principle be used in Ireland as an alternative to having a CCA-style supplementary round. In Sweden, exit bids are applied on a band-by-band basis, and, as necessary, winning exit bids are identified in a separate winner and price determination stage. This could work in Ireland too provided it does in a way that does not re-introduce aggregation risk, given the possibility that a bidder might submit exit bids in one band (e.g. 2.3 GHz) and later switch demand to a substitute band (e.g. 2.6 GHz). We therefore suggest some refinements to the exit price rule to help bidders manage risk.

We also share ComReg's concern that if bids are insufficiently committing, bidders may engage in price driving. With the simple SCA, this risk is even worse than with a CCA, as package bids from past rounds do not remain live. We think a good solution here is to add some rules that allow demand to be retained under certain circumstances, so as to make bids more committing while retaining some of the benefits of package bidding.

In order to encourage an informed discussion of this format alongside the Hybrid SMRA, we set out a full description of how an SCA could work in the context of the Irish Multi Band Award in Annex 2. The rules we propose build upon the versions of the SCA previously implemented by DotEcon for regulators in Austria and Switzerland, and proposed in Sweden. To avoid confusion with the standard SCA, we call this the enhanced Simple Clock Auction (eSCA).

Specifically, we propose an eSCA with the following key changes from the standard SCA:

- **Demand retention rule.** On a frequency band basis, we propose that demand be retained from the prior round if bidders do not experience a change in their price. Specifically, in each frequency band, if the price in all of the relevant categories where the bidder was active in the last round is unchanged, then the bidder's demand from the prior round in those categories would be automatically carried over into the current round. Note the rule is applied on a per band rather than per category basis, given that some bands have multiple categories. At 2.1 GHz, this means bidders would be able to reduce demand in one time slice if the price changed in the other time slice. However, they could not drop demand at say, 2.3 GHz, in response to price changes that only affect other bands. This rule change would de facto mean that bidders can make package bids within bands but not across bands. This would mean that aggregation risk related to time slicing is addressed.

- **Optional exit bids.** When bidders drop eligibility, they would have the option to place a limited number of exit bids for packages of lots in the same frequency band at price levels between the current and prior round. These optional exit bids could be selected as winning bids after the final clock round or in the supplementary round, subject to competition and availability.

[7] PTS, Appendix 1 to the Decision to limit the number of licences in the 3.5 GHz and 2.3 GHz bands, ref no 18-8496, Open invitation to apply for licences to use radio transmitters in the 3.5 GHz and 2.3 GHz bands; Available at: https://www.pts.se/globalassets/startpage/dokument/legala-dokument/beslut/2020/radio/engelska-filer-auktionsinbjudan-35-23/appendix-1---open-invitation.pdf

- **Compulsory exit bids.** In the 700 MHz and 2100 MHz band categories, we propose additional demand retention rules to prevent bidders from trying to hide demand or price driving in categories where incumbents may have more predictable demand. Specifically, we propose that if bidders drop more than 1 lot in the same round, then they will be obliged to submit exit bids for each extra lot that they drop. In effect, part of their prior round demand is retained in the form of compulsory exit bids. These optional exit bids could be selected as winning bids after the final clock round or in the supplementary round, subject to competition and availability.

- **Supplementary round for unallocated lots.** In case the main auction ends with unsold lots, we propose that these be made available in a sealed bid supplementary round, with a separate parallel process for each frequency band. Exit bids that were not selected as winning bids in the clock rounds would carry over into the supplementary rounds. We also propose that bidders be allowed to submit bids for other packages of unallocated lots, but subject to a reserve price based on the prices payable in the clock rounds. A standard winner determination process would be used for each band, together with a simple pay-your-bid rule. Holding this round could substantially reduce the risk of lots going unsold.

With these or similar amendments, we believe the SCA merits serious consideration as a candidate format for this award as it avoids the legal flaws associated with the current CCA proposal Accordingly, to facilitate discussion of this format, we have set out a potential complete set of rules in Annex II. We encourage all stakeholders to provide their comments on the format, and to say whether they agree with our view that it is preferable to a CCA with time slicing.

Option 4: Combinatorial multi-round ascending ("CMRA") auction format

ComReg previously concluded that "*a CMRA format would be unsuitable for the proposed award because the format is relatively novel and, with the large number of lots available in the Proposed Award, it could be challenging for bidders who wish to maintain a large list of bids as such bidders may need to reconsider and update many bids on a round-by-round basis*." We agree with these observations. Like Eir, we also concerned that format lacks transparency and is unnecessarily complex. We therefore do not consider the CMRA to be a good or appropriate format for this award.

We are also concerned that the use of a CMRA with an asymmetric in-auction cap could introduce opportunities for strategic play by bidders subject to laxer caps. Depending on the participants and how bidding evolves, there may be opportunities to exploit the predictable lack of competitive bids for incremental lots at 700 MHz. Therefore, even though the CMRA uses a pay-your-bid rule, we are not certain it would entirely remove the unjustified discrimination against Three.

Options 5: CCA with amended rules

At paragraph 2.57, ComReg seeks views on seven options to amending its CCA design and whether they would be necessary and appropriate to address Three's concerns regarding price asymmetry and discrimination. We regard these as falling into two groups:

- **Viable – options 5(a), 5(b) and 5(c).** These are options that either partially address the discrimination, or are complementary. Strictly, only the first two options 5(a) and 5(b) would with certainty reduce the discrimination. We would accept either approach, although we suppose that the minimalist version of 5(b) that we propose is most likely to be attractive to all stakeholders, given it cannot affect allocation and its impact on prices is the minimum necessary to resolve the discrimination. Option 5(c) is a complementary measure that would foreclose potential gaming (price driving) strategies.

- **Non-viable – options 5(d), 5(e), 5(f) and 5(g).** None of these options, as proposed by ComReg, directly address the discrimination and similar legal issues arise. While some of them may reduce the magnitude of the discrimination, they do so only by placing additional costs on other bidders.

Viable CCA options

ComReg is consulting on three options for amending its CCA based on amendments submitted by Three. Options 5(a) and 5(b) involve setting a joint cap of 2x25 MHz on any two winners, either (a) for winner and price determination, or (b) only for price determination. These two options are mutually exclusive. The purpose of adopting one or other of these amendments would be to address the discrimination against Three, so that ComReg's CCA format is viable.

Option 5(c) involves capping the value that bidders can express for a third lot. This is proposed as an additional measure to eliminate potential price driving tactics that could otherwise undermine the fairness and efficiency of a CCA award. It is not merely designed to address the discrimination against Three, but it also would help to support a more complete bid set for price determination which is particularly relevant under Option 5(b). We support adoption of this rule if a CCA is adopted, regardless of what other amendments are made to the CCA design. For the avoidance of doubt, while adopting this amendment by itself would improve ComReg's design, this would not be acceptable to us as the flawed discrimination would remain.

In the following, we respond to the points raised by ComReg in the consultation.

Option 5(a): CCA with joint cap of 2 × 25 MHz in the 700 MHz Duplex on any two winners

Under this option, ComReg would introduce an additional joint cap of 2x25 MHz in the 700 MHz band. To implement this cap in the context of a CCA, we also proposed two supporting rule modifications:

- Amending the closing rule for the clock rounds so bidding would continue if only two bidders remained competing for three 700 MHz lots each.

- Optionally, a requirement that bidders bidding for packages containing three 700 MHz lots also submit a supplementary bid for otherwise identical packages with two 700 MHz lots, with a price difference no greater than the final clock price for 700 MHz. This option is discussed separately as option 5(c).

ComReg observes at paragraph 2.60 that greater information is required in relation to why the rule changes are required; succinctly:

- The **2x25 MHz joint cap** is required to eliminate the discrimination against Three if ComReg decides to proceed with a CCA with its preferred sub-1 GHz cap. The rule ensures than in a 3 MNO scenario, at least one 700 MHz reserve price bid must be present in the alternative bid set that determines Three's price, as is already the case for Eir and Vodafone.

- The **change to the closing rule** is required to ensure the clock rounds cannot close with demand that violates the joint cap. This ensures that bidders will have a guaranteed 'knock out' bid amount that they could submit to secure at least their final clock package (see further detail below)

Importantly, while these rules may result in Three securing a better price outcome in a three-bidder contest, with a discount on the first lot equivalent but not exceeding that afforded to Eir and Vodafone, they will not change the prices that Eir and Vodafone pay. This distinguishes them from ComReg's new options 5(d)- (g) which attempt to lessen the discrimination by increasing the absolute prices paid by every other winning bidder.

ComReg also requested greater specificity on how the closing rule would operate in practice. This is very simple. Under the current rules, the clock price at 700 MHz is increased if aggregate demand exceeds supply. Under the revised rules, the clock price at 700 MHz would also be increased if aggregate demand equals supply AND there were no more than two clock-round bids that included 700 MHz lots.

In the following, we respond to ComReg's preliminary observations/queries:

- *Whether a joint cap would place a restriction on bidders that goes beyond what ComReg has deemed necessary to safeguard competition*. We note that ComReg's own proposal goes beyond what it has deemed necessary to safeguard competition, with flawed discriminatory effect.

- *Whether it would prevent an outcome where both Vodafone and Eir obtain 70 MHz of spectrum, whereas Three only has 50 MHz.* This would require that Three does not bid for any 700MHz spectrum, note that Three would then have zero after 2030. Again it only has effect if there is no other bidder which is precisely when ComReg's proposal is most discriminatory. (We note that ComReg's proposed caps prevent an outcome where the following is obtained: Eir 80MHz, Voda 60MHz, Three 50MHz or Voda 80MHz, Eir 60MHz, Three 50MHz (up to 2030), with no coherent analysis or explanation provided as to why) We do not see why it should be a plausible or viable concern. The effect of the cap is to eliminate one rather asymmetric outcome. In our view, this would level the playing field between operators, as the discount available to Eir and Vodafone for their 1st lot has the effect of making them more competitive for a 2nd lot if, as is plausible, they place a higher value of the 2nd lot than the 1st lot. We also note that the cap would still allow any one of Eir, Three or Vodafone to obtain 70 MHz.

As with ComReg's 2x70 MHz cap, a joint cap of 2x25 MHz in the auction may be justified as a precautionary measure, designed to head off the potential for competition concerns. ComReg has previously argued that "*a cap above 70 MHz risks there being only two winners for 700 MHz spectrum in this award*" (ComReg 19/124a paragraph 74) which is precisely the outcome described above. A joint cap would ensure at least three winners.

- *Whether it would amount to an effective reservation of some 700 MHz Duplex spectrum for Three in the event that only the existing MNOs competed for 700 MHz Duplex spectrum*. The effect of ComReg's existing cap is to create an effective reservation of some 700 MHz spectrum for Eir and for Vodafone in a situation where only the three MNOs compete for this band. Our proposal removes the flawed discrimination against Three by providing us with an equivalent concession.

- *Whether it would preclude outcomes where Three has less sub-1 GHz spectrum than Eir and Vodafone. It doesn't preclude a 3-2-1 outcome, so either Vodafone or Eir could emerge with more spectrum than Three, but not both.* This is factually correct, assuming only the three MNOs bid. We do not see why this should be a concern. To be clear, Three could still end up with the (joint) lowest amount of sub-1 GHz spectrum, and either Eir or Vodafone could have the largest amount.

- *Whether adding additional rules may introduce undue complexity*. We do not believe these modest changes materially add to the complexity of an already complex format. Indeed, because this rule precludes a potentially extreme allocation outcome that could be used to drive prices, it may actually reduce strategic complexity for bidders. If ComReg wishes to address concerns regarding complexity, it should switch to an SMRA-type format.

Option 5(b): CCA with joint cap of 2 × 25 MHz in the 700 MHz Duplex on any two winners for price determination

Under this option, the joint cap of 2x25 MHz would only be applied for the purposes of price determination. Specifically, the 2x25 MHz cap would not apply in the winner determination and would only be applied to the alternative bids sets used to determine prices. The key difference between this and Option 5(a) is that it would not preclude an outcome where Eir and Vodafone together won the entire 700 MHz band. Like Option 5(a), it would eliminate the price discrimination against Three.

At 2.64, ComReg requests greater detail regarding how it would identify the "alternative bid sets" used to determine prices. We think there are two possible approaches:

- A minimal intervention, in which the 2x25 MHz cap is applied to price determination only in specific circumstances where there would otherwise be price discrimination against Three; or

- A broader intervention, in which the 2x25 MHz cap is applied more generally to price determination.

The minimal intervention would work as follows:

- Normal price determination rules apply for all winner determination outcomes except as defined in Clause II below

- Amended price determination rules apply for winner determinations in which:

    i. There are exactly three winners of 700 MHz spectrum.

ii. One or more of those winning bidders is a bidder that was excluded from bidding for 3 lots at 700 MHz, owing to the sub-1 GHz cap.

- If Clause II above applies, then for the purpose of setting the price for a winning bidder of 700 MHz that was excluded from bidding for 3 lots at 700 MHz, the following rules apply:

    i. Any bid sets that include exactly two bids by other winning bidders of 700 MHz and do not include any reserve price bids are excluded for the purposes of price determination.

    ii. Price determination otherwise proceeds in the normal way.

This minimalist intervention would remove the price discrimination against Three, as – like Vodafone and Eir – it would mean that the price for our first lot of 700 MHz cannot be set by a coalition of two other MNOs. By necessity, this means that Three's price may be below the opportunity cost of jointly denying Eir and Vodafone. However, from our perspective, the effect on pricing is no different from that of ComReg's sub-1 GHz cap, which denies Three from expressing an opportunity cost for a third lot.

A broader intervention would involve extending the 2x25 MHz cap to a wider range of winning outcomes and to a broader range of bidders. While this could be made to work, there is a risk that some bidders may secure unduly low-price outcomes if other bidders do not place bids for packages containing 2 lots of 700 MHz. This so-called 'missing bids' problem is actually a generic issue with the CCA, but the impact on prices could be exaggerated if there are missing bids and the rules require the regulator to discard otherwise price setting bids. Accordingly, we have decided not to develop this approach further.

In the following, we respond to ComReg's preliminary observations/queries:

- *Whether the exclusion of certain bid combinations for determining opportunity cost could reduce incentives to bid truthfully thereby polluting the price discovery process and compromising the efficiency of the award*. Under ComReg's existing rules, in a three MNO scenario, the sub-1 GHz cap may have the effect of encouraging Eir and Vodafone to overbid for 2 or 3 lot packages because they know they cannot pay more than reserve price for the 1st lot. The minimalist intervention case puts Three in the same position, enabling it to compete on a level playing field for up to 2 lots. As all three MNOs are in the same situation, there is no distortion to price discovery.

- *Whether excluding certain combinations of bids from the price determination could lead to prices that do not fully reflect opportunity cost pricing and the benefits of same*. It is already the case that, under ComReg's rules, Eir's price and Vodafone's prices may not be reflective of true opportunity costs as the cap excludes Three from expressing an opportunity cost reflecting our intrinsic value for a third lot. Under the minimalist intervention, the same concession is afforded to Three. This may mean that Three's price does not fully reflect opportunity cost based on all bids received, but it is fair because any discount available to Three would be consistent to that already available to Eir and Vodafone.

A broader application of a 2x25 MHz to price determination could in principle result in more pronounced divergences between prices and opportunity costs. In this case, it may be prudent to take further measures to prevent missing bids, for example by also implementing Option 5(c).

Option 5(c) – CCA with a third 700 MHz Duplex lot value cap

Under this option, which could be applied together with either option 5(a) or 5(b), there would be a cap on the marginal value that a bidder can express for its third lot in the 700 MHz Band, such that it cannot be higher than the final clock price. This could be implemented via a requirement that bidders bidding for packages containing three 700 MHz lots also submit a supplementary bid for otherwise identical packages with two 700 MHz lots, with a price difference no greater than the final clock price for 700 MHz.

Adding this rule would offer several benefits. Firstly, it would prevent bidders form expressing inflated values for a third lot of 700 MHz, for gaming purposes.[8] It would also ensure that there is a rich set of supplementary bids for the purposes of setting prices, thus making it less likely that the CCA produces highly asymmetric price outcomes as a result of so-called 'missing bids'.

In the following, we respond to ComReg's preliminary observations/queries:

- *Whether it would result in bidding restrictions that could be justified on competition grounds*. The bidding restriction may be justified on grounds of promoting transparent bidding and efficient auction outcomes by closing off gaming opportunities and supporting price discovery. We do not believe the measure would have any impact on competition. The measure would not prevent Eir and Vodafone competing fairly for a third 700 MHz lot; it would only preclude them from submitting predatory or price-setting bids.

- *Whether bidders have a value in being able to effectively guarantee winning their final primary package and whether a bidder whose final primary package included three 700 MHz lots would be permitted to submit a supplementary bid that would guarantee it would win those Lots*. By capping the premium that a bidder can place on a third 700 MHz lot at the final clock price, it is impossible that the bidder could be directly outbid for the third lot. It is possible that they could be out-competed by a coalition of bids including their own two 700 MHz lot package. In effect, a bidder that ends on three 700 MHz lots has a knock-out (KO) option to ensure they either win this package or an otherwise identical package with two 700 MHz lots. This is similar to when a bidder ends the clock rounds on a relaxed chain bid, in which case it does not have a KO bid for one specific package, but instead has a chain of KO bids sufficient to secure one of the packages in the chain. This should be an acceptable outcome for all concerned.

- *Whether it would unduly advantage Three by limiting Eir's and Vodafone's ability to compete for a third 700 MHz lot*. Three is not advantaged. The measure would

[8] For further explanation refer to Three's response to Document 19/124, section 5

not prevent Eir and Vodafone competing fairly for a third 700 MHz lot; it would only preclude them from submitting predatory or price-setting bids.

- *Whether the assumption that all bidders (including potential new entrants) do not have an increasing marginal valuation for a third 700 MHz lot is correct and would not compromise the efficient assignment of spectrum rights of use*. We believe this assumption is justified, and it is consistent with observations from 700 MHz awards elsewhere in Europe. If ComReg were to receive hard evidence that a bidder may have ascending value for a third 700 MHz lot (as opposed to unsubstantiated claims by bidders that want to preserve gaming options), then we concede this rule would constrain such a bidder. We do not believe that ComReg will receive such evidence.

- *Whether the proposed rule changes would create excessive complexity such that it would compromise the ability of the Exposure Pricing functionality to operate correctly and provide useful information to bidders*. The rule does not add complexity. To the contrary, it increases certainty for bidders as it eliminates extreme winner determination scenarios where bidders make exaggerated bids for a third 700 MHz lot and/or deliberately omit bids for two 700 MHz lots. We do not believe this amendment will have any impact on ComReg's ability to provide an exposure information during the auction.

In summary, we think this rule is a prudent addition to the CCA auction rules, independent of measures to remove the flawed discrimination against Three.

Non-viable CCA options

In addition to the above amendments to the CCA, ComReg has identified a series of other possible amendments to the CCA which are designed to lessen the price discrimination against Three. We have studied each of these options closely and have concluded that none sufficiently addresses our concerns. Each option may, to varying extents, reduce the magnitude of the price discrimination, but none of these approaches as proposed by ComReg, would remove the flawed discrimination against Three. Some options could also have undesirable side effects, such as reducing price discovery or choking off efficient demand. We also doubt that any of these options would be attractive to other MNOs, as they may increase the price that others pay for winning 700 MHz spectrum.

We have identified a variation of option 5(e), which we describe below, that would remove the flawed discrimination. As with the other options, we do not think it would be supported by other bidders, as it may have the effect of increasing their price.

In short, we do not think any of these further options are a suitable way forward. They are strictly dominated by changing the auction format (Option 2b) or adapting the winner determination and/or pricing rule (options 5a or 5b).

Option 5(d) - Increase 700 MHz Duplex reserve prices

Three does not support any upwards revision to the reserve price for 700 MHz spectrum lots. Such a change would not adequately address the flawed discrimination against Three and may introduce other problems.

We disagree with this proposal for the following reasons

- *It does not directly address the discrimination concern*. As ComReg observes, pushing up the Reserve Price has the effect of increasing the value of reserve price bids in the price determination. In a scenario where only the three MNOs bid for 700 MHz spectrum, this will reduce the discount available to Eir and Vodafone relative to Three. In effect, increasing the Reserve Price reduces the magnitude of discrimination against Three but it does not remove the discrimination. Three believes ComReg has a legal and regulatory duty to ensure a fair and non-discriminatory process (i.e. remove the flawed discrimination), so this approach is insufficient.

- *It is inconsistent with best practice on setting Reserve Prices*. There is a broad consensus on the principle that Reserve Prices should be set conservatively relative to the estimated market value (even if ComReg and stakeholders may not be fully aligned on what amounts are conservative). This approach, if appropriately implemented, should allow for price discovery in an open auction. As ComReg observes, "*higher Reserve Prices could choke off efficient demand for spectrum, both in terms of an individual lot and any incremental spectrum demand from any bidder*." Three agrees with this. We therefore oppose any increase in reserve price, as they would be a deviation from best practice of setting reserve prices conservatively.

- *It could lead to spectrum going unsold inefficiently.* Setting higher Reserve Prices closer to ComReg's own best guess of market-clearing levels comes with an associated risk of spectrum going unsold. If ComReg inadvertently set prices too high, this could mean an inefficient award outcome.

Option 5(e) – Increase the value of unsold 700 MHz Duplex lots in price determination

Under this approach, reserve prices for 700 MHz would remain unchanged but the value placed on unsold lots in the price determination would be increased. As ComReg says, this method provides a more direct way of reducing the 700 MHz price asymmetry. This eliminates some of the disadvantages associated with option 5(d) and 5(f), such as the loss or price discovery and risk of choking off inefficient demand.

ComReg proposes two ways that the higher value for unsold 700 MHz lots could be set:

- a benchmarking estimate that is above the 700 MHz Reserve Price; or

- alternative valuations expressed by other bidders for a third lot

We do not support approach (I), as setting the value under this approach is inherently arbitrary. If the value is set too low, it would not adequately address the discrimination, which is unacceptable, unlawful and not in line with ComReg's statutory functions If the value is set too high, it may result in bidders paying more than necessary for spectrum. Although this would be in Three's favour in this instance, we object on principle to approaches that needlessly add to industry costs of spectrum acquisition.

Depending on the detailed rules, approach (II) could provide a mechanism to reflect the level of opportunity cost that Three could have imposed absent the competition cap. ComReg suggests setting this price based on an estimate of the value that others bidders place for a 700 MHz lot in the auction. However, in the context of a multi-band CCA, this is not straightforward as it may not be possible to infer precise marginal valuations from available bids. It is also unclear which bidder's marginal values would be relevant. In this context, we do not support rules that involve inferring marginal lot valuations based on package valuations owing to their complexity.

A simpler approach would be to set the value of unsold 700 MHz duplex lots at the lower of:

- The final clock price; and
- The highest value which does not change the allocation outcome had a reserve price bid at this level been included in the winner determination.

- This value would effectively capture the maximum level of opportunity cost that Three could have imposed for a third lot absent the competition cap, assuming it would not have been a winning bidder. Consequently, this approach would eliminate the discrimination.
- Nevertheless, we do not think this a good approach, for the following reasons:
  - It may overstate the opportunity cost that Three would impose on Eir or Vodafone had it been allowed to bid for 3 lots. It is therefore much more burdensome intervention than options 5(b). We do not support imposing additional costs on other mobile operators when there are alternative ways of addressing the discrimination without doing this.
  - It is a substantial deviation from the principle of opportunity cost pricing – much more so than our minimalist option 5(b), so may introduce undue incentives for Eir or Vodafone to moderate demand for packages with three 700 MHz lots. While we do not think this is a problem per se, making this type of rule change begs the question why ComReg does not instead switch to a simpler, pay-your-bid auction format.

Option 5(f) - Introduce non-linear 700 MHz Duplex reserve prices

Three does not support the introduction of non-linear reserve prices, largely for the same reasons we oppose Option 5(d). Increasing reserve prices in this way would not adequately address the discrimination against Three and may introduce other problems.

We disagree with this proposal for the following reasons:

- *It does not directly address the discrimination concern*. Pushing up the Reserve Price for two-lot and three-lot packages may lead to some or all winning bidders paying more than they would otherwise have done. This may have the effect of reducing the price discount available to Eir and Vodafone relative to Three. However, like option 5(d), it will not necessarily remove the discount. As such, it only affects the magnitude of discrimination against Three and does not remove the flawed discrimination.

- *It is inconsistent with best practice on setting Reserve Prices*. Standard practice in spectrum auctions is to adopt a linear reserve price across generic lots and to set it conservatively relative to the estimated market value. Setting a higher price for larger packages is inconsistent with this approach. There is a risk that this approach could inefficiently choke off demand for larger packages and subvert price discovery.

- *Spectrum could go unsold.* The risk of spectrum going unsold is likely small, and rather less than under Option 5(d), as only the reserve price for larger packages is increased. Nevertheless, if bidders have ascending values for 2 lots over 1 lot, it is possible that scaling up the 2-lot package price could eliminate otherwise winning demand.

We are also concerned that this approach would be arbitrary and almost certainly inconsistent with some bidders' valuation structures. Three believes that all bidders are likely to have descending incremental values for a third lot but that bidders could have ascending or descending values for the second lot. In the absence of a common, unidirectional value structure, we think that any attempt by ComReg to set escalating Reserve Prices would be inherently arbitrary. It is also unclear how this proposal may impact the auction outcome.

Option 5(g) - Use weighted Vickrey nearest prices

ComReg is consulting on whether to adopt a weighted Vickrey-nearest price rather than the Vickrey-nearest Minimum Revenue Core rule set out in the Draft Information Memorandum. Such a rule change would not address Three's concern that Eir and Vodafone may each get a price discount on their first lot that is not available to Three. Rather, it would only alter the relative level of prices between two (or more) bidders where a joint opportunity cost is material in the price determination. Therefore, it has no merit as a remedy for the discrimination.

Notwithstanding the fact that this option is irrelevant to the discrimination concern, we believe there may be a case on fairness grounds that bidders winning more 700 MHz lots should pay a greater share of any joint opportunity costs. However, given that 700 MHz is only one of four bands in the auction, its far from obvious whether this change would have any meaningful effect. ComReg observes that a weighted Vickrey nearest price rule was used in the Canadian 600 MHz auction; however, our understanding is that the rule had no impact on the final prices paid by bidders.[9]

In principle, the addition of the weighted nearest Vickrey rule (depending on its form), may provide a small disincentive to bid to win larger packages of spectrum, but in practice we expect it would have a negligible impact on how bidders behave. In particular, Three does not believe that this disincentive would be sufficient to discourage a bidder engaging in price driving in the 700 MHz band, if they believed there was a strategic benefit from doing so.

Option 6 - Use Caps that only count the spectrum available in the award

Finally, if ComReg really wants to stick with a CCA (which we do not believe is appropriate) then the most obvious modification is to use caps that only count spectrum available in the

[9] Simple Vickrey prices were in the core, and no joint-opportunity adjustments were needed.

award itself. For example, at 700 MHz, it could adopt either a 2x10 MHz cap or 2x15 MHz cap for all bidders, instead of a broader cap that includes 800 MHz and 900 MHz.

Annex I: Hybrid SMRA with two categories at 2.1 GHz

1. In our prior submission, Three proposed that a hybrid clock-SMRA format (Hybrid SMRA) be used for this award. This format is now widely used around the world for multi-band 5G spectrum awards. In Europe, it has been used for 5G auctions in the UK, the Netherlands and Luxembourg and will be used for forthcoming auctions in Austria, Slovakia and the UK. Elsewhere, a similar design – known as the enhanced SMRA (eSMRA) – has been adopted for recent and forthcoming awards in Australia, Canada and the United States. Our understanding is that all European instances of this format were designed by DotEcon, the consultancy also advising ComReg on this award.

2. To facilitate an informed discussion of the hybrid SMRA, we set here a description of how the auction could work in the context of the Irish Multi Band Award. The rules we propose are based upon DotEcon's design for other European regulators. We encourage all stakeholders to provide their comments on the format, and to say whether they agree with our view that it is preferable to a CCA with time slicing.

3. In the absence of time slicing, we have proposed to structure the 2.1 GHz band into two categories of 'early' availability lots (corresponding to the current holdings of Three and Vodafone) and 'late' availability lots (holdings of Eir). We note at paragraph 2.44 that ComReg said that Vodafone does not support this approach, in part because of concerns that it may (somewhat) disadvantage companies (including Three) whose existing 2.1 GHz spectrum expires earlier. However, Vodafone also has argued that a CCA is only preferred if time slicing is maintained, and opposes time slicing. We acknowledge that there are advantages and disadvantages to our proposed lot structure at 2.1 GHz, but on balance we think this is a good approach to manage risk for bidders while eliminating the complexity of time slicing. We encourage all stakeholders to share their opinion on this trade off.

Spectrum packaging

Lot structure

4. We propose a simplified lot structure to facilitate switching between categories in an SMRA, as illustrated in Table 2. Other packaging options could also work.

5. The changes relative to ComReg's CCA design are as follows:

   - No time slices in any band.
   - 2100 MHz: divided into two categories, based on availability date: Early (9 lots) and Late (3 lots).
   - 2300 MHz: we propose that the generic lots be sold in 10 MHz units, given likely low interest in 5 MHz units and for consistency with other categories, so as to facilitate switching.
   - 2600 MHz TDD band: we propose that this band be restructured into 2 blocks of 25 MHz, so as to remove any risk that a bidder wins an inefficiently small amount of TDD spectrum in this band.

Table 2: Proposed lot structure for SMRA

Category name	Band	Frequency range	# lots	Lot size (MHz)	Eligibility points per lot
A	700 MHz	703-733/ 758-788	6	2x5	2
B1	2100 MHz (Early)	1920-1980 / 2110-2170	9	2x5	1
B2	2100 MHz (Late)		3	2x5	1
C1	2300 MHz (lower)	2300-2330	1	30	3
C2	2300 MHz (generic)	2330-2390	6	10	1
C3	2300 MHz (upper)	2390-2400	1	10	1
D	2600 MHz FDD	2500-2570 / 2620-2690	14	2x5	1
E	2600 MHz TDD	2570-2620*	2	25	2

* Each block in Category E would incorporate one of the two guard band lots at 2570-2575 MHz and 2615-2620 MHz, which are subject to power limitations. Given the limited value of these 5 MHz units, we discount them for purposes of setting eligibility points.

6. With respect to eligibility points weighting, we have endeavoured to keep as close as possible to ComReg's original approach, although we would alternatively support a higher weighting for 700 MHz.

Spectrum caps

7. All bidders would be subject to the following competition caps (as proposed by ComReg):

   - **Sub 1-GHz Competition Cap.** No bidder can have more than 70 MHz (2x35 MHz) across the 700, 800 and 900 MHz spectrum bands, including existing holdings.

   - **Overall Competition Cap:** No bidder can have more than 375 MHz 700 MHz Duplex, 800 MHz, 900 MHz, 1800 MHz, 2.1 GHz, 2.3 GHz, 2.6 GHz and 3.6 GHz Bands.

8. No other restrictions on the ability of bidders to bid for spectrum are proposed. We note that, as in the CCA design, a bidder that opted to bid simultaneously for both the lower (C1) and upper (C3) 2.3 GHz lots would be exposing itself to winning two discontinuous blocks at 2.3 GHz. Otherwise, frequency contiguity within bands can be guaranteed.

Allocation Stage

Bidding rules

9. The bidding process is modelled on the standard Simultaneous Multiple Round Ascending (SMRA) auction format but with common prices for lots within each category, as in a Clock Auction. Bidding is similar to the clock rounds of a CCA, except that there are standing high bids and there is no package bidding, meaning that bidders could, in principle, win a subset of their expressed demand in any particular round.

10. In round 1:

    - Each bidder submits bids for a quantity of lots in each category at the relevant reserve price. The only restrictions on bids is that they cannot exceed the available supply and must respect the Spectrum Caps.

    - In each category, if aggregate demand at the reserve price equals or exceeds supply, then the price for new bids in round 2 will increase. Otherwise, the price remains at the reserve price.

    - In each category, the Auctioneer will identify **Standing High Bids** using a **Ranking Mechanism** (see below). In each category, if aggregate demand equals or exceeds supply at the reserve price, then the number of standing high bids will be the same as the supply of lots; otherwise, it will equal the level of aggregate demand.

11. In subsequent rounds:

    - In each category, each bidder may submit new bids at the round price or (if applicable) opt to maintain its standing high bids at the bid amount. As in round 1, bids cannot exceed the available supply and must respect the spectrum caps. In addition, bids must be consistent with the **Activity Rules** (see below). **No withdrawals of standing high bids** are permitted, but bidders may replace standing high bids with new bids at a higher price.

    - In each category, if aggregate demand at the relevant round price equals or exceeds supply, then the price for new bids in the next round will increase. Otherwise, the price remains unchanged.

    - In each category where there is new activity, the Auctioneer will identify a revised set of standing high bids using the ranking mechanism. As a consequence of the activity and no withdrawal rules, the number of standing high bids in each category can never be less than the lower of the available supply of lots and the maximum level of demand expressed at any price level.

Ranking mechanism for standing high bids

12. After the completion of a bidding round, the auctioneer determines the provisional winning bids separately for each lot category, as follows:

    I. Bidders who submitted new bids for lots in the category are randomly ranked. This order is then used to enter the bids into a queue.

II. All provisional winning bids that are not replaced by new bids are entered into the queue in their original order (from the previous round), below the bids identified in Step I.[10]

III. The top ranked bids in the queue are then identified as provisional winning bids, as long as blocks are available in the category and the entire list has not yet been processed.

13. As a consequence of this ranking procedure:

- Bids at the current clock price are always ranked above bids at the previous clock price.
- In categories where no new bids have been placed, any provisional winning bids that were determined in the preceding round remain unchanged.
- At the end of each round, bidders will typically be standing high bidders on their entire demand in a category or have no standing high bids in that category. At most one bidder at a time in each category can be standing high on a subset of its demand.

Round prices

14. If all lots have been allocated as 'standing high bids' at the current round price in a category, the price will increase in that category for the next round. In each category, a new round price would be set equal to the previous round price plus a bid increment. Bid increments would be determined at the discretion of the Auctioneer, subject to certain parameters, such as minimum and maximum limits on the size of the increment in absolute terms or as a percentage of the previous price.

15. As a consequence of this rule, at the end of each round, there may be standing high bids in the same category at up to two price levels: the current round price; and the previous round price. This difference in bid level between bidders may arise because bidders with standing high bids at the previous price are not obliged to bid at the new price level in order to maintain demand until they are outbid. This is different from the clock stage of CCA, where there are no standing high bids and bidders are required to submit new bids every round in order to maintain demand.

Activity rule and 'waivers'

16. The auction would use an eligibility points-based activity rule, which would constrain the maximum number of bids a bidder can make in a round. Bidders will only be able to maintain or reduce their demand, measured in eligibility points, as bidding progresses.

17. Each bidder's eligibility in the next round would be equal to their activity in the previous round, which would be calculated as the sum of eligibility points associated with:

- their existing standing high bids (excluding any standing high bids that were replaced by new bids); and

[10] This is the same ranking procedure as used in implementations of the Hybrid SMRA in Austria, Slovakia, Netherlands and Luxembourg. A slightly different procedure is used in the United Kingdom.

- their new bids (including any standing high bids that replaced their own standing high bids).

18. The proposed eligibility points per lot are set out in Table 2, and (with the partial exception of 2.6 GHz TDD, where we discount the guard band blocks) have the same weighting as proposed by ComReg for its CCA design.

19. Waivers are used in an SMRA instead of extensions. Bidders are allowed up to three waivers where they may abstain from bidding without affecting their eligibility for the next round. A bidder could opt to submit a waiver 'proactively' alongside a set of new bids that was otherwise insufficient to maintain its current level of eligibility. Alternatively, a waiver would be deployed automatically on behalf of a bidder that failed to submit a decision in a round if (a) the bidder would otherwise lose eligibility; and (b) the bidder has at least one waiver remaining. Waivers can be deployed in any round except round 1.

No withdrawals

20. Bidders are not allowed to withdraw their bids. Consequently, bidders with standing high bids must opt either to maintain them at the current bid amount or replace them with bids at the current round price, which may be the same or higher.

21. In each category, if the price associated with a bidder's standing high bids:

    - is *the same as the current round price*, the bidder may only replace its standing high bids with new bids at the same price if it is increasing its total demand in the category.

    - is *lower than the current round price*, the bidder may replace all of its standing high bids with new bids at the higher price, whether or not it is increasing its total demand in the category.

22. These rules ensure that, for each bidder in each category, there is a common price for all their standing high bids, which must be either the current round price or the prior price.

Information policy

23. After the end of each round, the Auctioneer would inform bidders of the level of excess demand in each category.[11] No information is provided about the breakdown of demand across bidders.

Winner and price determination

24. The Allocation Stage closes when there is a round in which there are no new bids in any category and no waivers are played. All standing high bids at the end of this round become winning bids. In each category, winning bidders pay the amount of their winning bids.

25. Under this approach, deployed in all DotEcon versions of this format to date, it is possible that winning bidders may pay different prices per lot for spectrum in the same category. This could happen because the auction ends when some bidders

[11] This is a simplification of the UK rules, where reported aggregate demand is rounded up to specified integers, so as partially to disguise the information and make certain types of strategic behavior more difficult. For this format and this award in Ireland, Three believes that this there is no need to hide information about aggregate demand, but we are open to alternatives.

have standing high bids at a previous round price, whereas other bidders have already raised their bids to the final round price. The difference in fees due could be quite large given that all lots won by the same bidder must be priced either at the higher or lower level. This is arguably unfair. Alternatively, ComReg could adopt a common price per lot, with all winning bidders paying the same per lot price as the lowest winning price level. Three would support this change. We encourage other stakeholders to comment on their preferred approach.

Assignment Stage

26. The Assignment Stage would be run using the same process as proposed by ComReg for the CCA, albeit with the simplification that there is no time slicing. In each category, winning bidders of generic lots would have the opportunity to bid for preferred frequency positions in a series of sealed bid, second price auctions. Bid options would be constrained to ensure that every bidder is guaranteed to win contiguous spectrum in each category.

27. The following special rules would apply:

    - 2.1 GHz. A combined assignment round would be run for the two 2.1 GHz categories, so bidders are guaranteed contiguous spectrum regardless of how much 'early' or 'late' spectrum they buy. We note that this approach would require Eir to include its existing 2.1 GHz holdings in the assignment round.

    - 2.3 GHz. Bidders that acquire exactly one of the fixed frequency 'lower' or 'upper' 2.3 GHz lots would be guaranteed to be assigned spectrum adjacent to these blocks. In the event that a bidder acquired both the upper and lower lots, but did not acquire all the generic lots, their bid options would allow their spectrum to be split into up to two parts, subject to a guarantee that any spectrum they are assigned must be adjacent with one of the fixed lots.

28. Overall, the bidding process is simplified as compared to the CCA because there is no time slicing, and therefore no risk of misalignment across time slices.

Annex II: Enhanced Simple Clock Auction with time slicing

1. The Hybrid SMRA design described in Annex I would work best if ComReg abandons time slicing in favour of having separate categories of 'early' and 'late' spectrum at 2100 MHz. If time slicing is preserved at 2100 MHz, then we propose instead an amended version of the SCA, which for convenience we call the enhanced Simple Clock Auction (eSCA).

2. To facilitate an informed discussion of the eSCA format, we set out in this section a description of how the format could work in the context of the Irish Multi Band Award. The rules we propose are inspired by clock auction designs developed by DotEcon for other European regulators. We encourage all stakeholders to provide their comments on the format, its pros and cons versus the hybrid SMRA, and whether they agree with our view that the eSCA is preferable to a CCA.

Spectrum packaging

Lot structure

3. The proposed lot structure is set out in Table 3. Unlike the SMRA, as this is partial package bid format, it includes time slices at 2.1 GHz. The only deviation from ComReg's existing spectrum packaging is that we have eliminated time slicing in the 2300 MHz and 2600 MHz bands, as we think that this is unnecessary and it was not supported by any of the stakeholders in prior consultation responses.

Table 3: Proposed lot structure for eSCA

Category name	Band	Frequency range	# lots	Lot size (MHz)	Eligibility points per lot
A	700 MHz (generic)	703-733/ 758-788	6	2x5	4
B1	2100 MHz TS1 (generic)	1920-1980 / 2110-2170	9	2x5	2 (TS1 only)
B2	2100 MHz TS2 (generic)		12	2x5	2 (TS2 only)
C1	2300 MHz (lower)	2300-2330	1	30	6
C2	2300 MHz (generic)	2330-2390	12	5	1
C3	2300 MHz (upper)	2390-2400	1	10	2
D	2600 MHz FDD (generic)	2500-2570 / 2620-2690	14	2x5	2
E1	2600 MHz TDD (lower)	2570-2575	1	5	1
E2	2600 MHz TDD (generic)	2575-2615	8	5	1

E3	2600 MHz TDD (upper)	2615-2620*	1	5	1

4. With respect to eligibility points weighting, we adopt ComReg's original approach, although we would alternatively support a higher weighting for 700 MHz. Removing time slicing at 2300 MHz and 2600 MHz would mean that lots in these categories, like 700 MHz, would count towards both TS1 and TS2 eligibility.

Spectrum caps

5. All bidders would be subject to the same sub-1 GHz and overall competition caps as proposed by ComReg. These caps apply for both time slice periods.

Allocation Stage

6. The Allocation Stage consists of two phases of bidding:

   I. **Clock round phase.** Allocation is primarily determined in the clock rounds. In the clock rounds, bidders bid for quantities of lots in each category at specified clock prices. Prices are increased in successive rounds for categories that have excess demand. The clock rounds close when there is no longer excess demand in any category, and bidders win their final round demand. Unlike the conventional SCA, there are (limited) provisions to carry over demand from prior rounds and for exit bids (optional and compulsory) that reduce the likelihood of the clock rounds ending with a significant number of unallocated lots.

   II. **Supplementary phase.** In the event that the clock rounds end with some unallocated lots, these lots will be made available in the supplementary round, which consists of a series of sealed bid rounds, one for each band, as necessary. Exit bids that were not identified as winning bids in the clock rounds may be carried over into the supplementary rounds, and bidders may submit new bids, subject to minimum bid amounts linked to the outcome of the clock round phase.

Clock round phase

Bidding rules

7. The bidding process is modelled on the SCA format with bids for quantities of lots at common prices within each category. Bidding is similar to the clock rounds of a CCA, but there are differences in the activity rules and in winner and price determination, as set out below. Like the CCA but unlike the SMRA, there are no standing high bids, but there are provisions to retain some demand from prior rounds if necessary. The demand retention rules vary by band, so as to give bidders flexibility to change demand where they need it, while also foreclosing gaming behaviour and reducing the likelihood of lots going unallocated in the clock rounds.

8. In round 1, Each bidder submits bids for a quantity of lots in each category at the relevant reserve price. The only restrictions on bids is that they cannot exceed the available supply and must respect the Spectrum Cap**s** across both time slices.

9. From round 2 onwards, in each category, if aggregate demand at the clock round price exceeds supply, then the price for new bids in the next round will increase. Otherwise, the price remains unchanged.

10. From round 2 onwards, bidders may make the following bids:

i. In the 700 MHz band:

- *if the clock price has not changed*, a bidder may maintain or increase its demand (subject to the spectrum caps and activity rules) but cannot reduce its demand. In effect, a bidder's demand carries over from the previous round.
- *if the clock price has increased*, a bidder may:
  - submit a bid for the same or larger quantity of lots at the clock price (subject to the spectrum caps and activity rules);
  - submit a bid for a smaller quantity of lots at the clock price:
    - for the first lot of reduced demand, the bidder may use some or all of the associated eligibility points to switch demand to another category or otherwise place an *Optional Exit Bid* for one lot of 700 MHz; and
    - for each additional lot of reduced demand, the bidder cannot use the associated eligibility points to switch demand to another category and will be deemed to have placed a *Compulsory Exit Bid* for one lot of 700 MHz.

ii. In the 2100 MHz band:

- *if the clock price has not changed for either TS1 or TS2*, a bidder may maintain or increase its demand in either category (subject to the spectrum caps and activity rules) but cannot reduce its demand. In effect, a bidder's demand carries over from the previous round.
- *if the clock price in at least one category has increased*, a bidder may:
  - submit a bid in one or both categories for the same or larger quantity of lots at the clock price (subject to the spectrum caps and activity rules);
  - submit a bid for a smaller quantity of lots in one or both categories at the clock price:
    - for the first lot of reduced demand in either category, the bidder may use some or all of the associated eligibility points to switch demand to another category or otherwise place an *Optional Exit Bid* for the relevant category of 2100 MHz; and
    - for each additional lot of reduced demand in a 2100 MHz category, the bidder cannot use the associated eligibility points to switch demand to another category and will be deemed to have placed a *Compulsory Exit Bid* for one lot in the applicable category.

iii. In the 2300 MHz band:

- *if the clock price has not changed for all 2300 MHz categories where the bidder had demand in the prior round*, a bidder may maintain or increase

its demand in any 2300 MHz category (subject to the spectrum caps and activity rules) but cannot reduce its demand. In effect, a bidder's demand carries over from the previous round.

- *if the clock price has increased in one or more 2300 MHz categories where the bidder had demand in the prior round*, a bidder may:
  - submit a bid in one or more categories for the same or larger quantity of lots at the clock price (subject to the spectrum caps and activity rules);
  - submit a bid for a smaller quantity of lots at the clock price, in which case the bidder may use some or all of the eligibility points associated with the demand reduction to switch demand to another category or to place *Optional Exit Bids* for the relevant category of 2300 MHz paired.

iv. In the 2600 MHz paired band:

- *if the clock price has not changed*, a bidder may maintain or increase its demand for 2600 MHz paired (subject to the spectrum caps and activity rules) but cannot reduce its demand. In effect, a bidder's demand carries over from the previous round.
- *if the clock price has increased*, a bidder may:
  - submit a bid for the same or larger quantity at the clock price (subject to the spectrum caps and activity rules);
  - submit a bid for a smaller quantity of lots at the clock price, in which case the bidder may use some or all of the eligibility points associated with the demand reduction to switch demand to another category or to place *Optional Exit Bids* for 2600 MHz paired.

v. In the 2600 MHz unpaired band:

- *if the clock price has not changed for all 2600 MHz unpaired categories where the bidder had demand in the prior round*, a bidder may maintain or increase its demand in any 2600 MHz unpaired category (subject to the spectrum caps and activity rules) but cannot reduce its demand. In effect, a bidder's demand carries over from the previous round.
- *if the clock price has increased in one or more 2600 MHz unpaired categories where the bidder had demand in the prior round*, a bidder may:
  - submit a bid in one or more 2600 MHz unpaired categories for the same or larger quantity of lots at the clock price (subject to the spectrum caps and activity rules);
  - submit a bid for a smaller quantity of lots at the clock price, in which case the bidder may use some or all of the eligibility points associated with the demand reduction to switch demand to another category or to place *Optional Exit Bids* for the relevant category of 2600 MHz unpaired.

11. Bids must normally be submitted within the scheduled round time. As in the CCA, bidders start the auction with three extension rights, one of which is deployed

automatically each time that a bidder fails to submit a set of bids in the normal round time. An extension right entitles the bidder to additional time to submit its bids in that round. A bidder has at most three extensions and once these have been used, no further extensions are available for use.

12. If a bidder fails to submit a set of bids in a round, including both normal time and extension time if applicable, then:

    - in categories where the clock price is the same as the previous round, the bidder's prior demand will be carried over into the current round; and

    - in categories where the clock price has increased from the previous round, the bidder's demand at the clock price will be zero and the bidder will have foregone the opportunity to submit *Optional Exit Bids* associated with their demand reduction, but will still be subject to *Compulsory Exit Bids* at 700 MHz and 2100 MHz if applicable.

Clock prices

13. At the end of each round, for each category, the Auctioneer calculates the level of aggregate demand at the clock price. If aggregate demand exceeds supply for any Lot category, the clock price in the next round is increased. Otherwise, the clock price is unchanged.

14. Bid increments are determined at the discretion of the Auctioneer, subject to certain parameters, such as minimum and maximum limits on the size of the increment in absolute terms and/or as a percentage of the previous price.

A**ctivity rules and exit bids**

15. The auction uses an eligibility points-based activity rule. The proposed eligibility points per lot are set out in Table 3, and have the same weightings as proposed by ComReg for its CCA design. In each round, a bidder's activity is equal to the sum of eligibility points associated with their demand across all categories at the applicable clock prices (including demand that carried over from the prior round if applicable). From one round to the next, bidders may maintain or reduce their activity but cannot increase their activity.

16. In each round where a bidder's activity is less than their activity in the previous round, a bidder may submit *Optional Exit Bids*:

    - *Optional Exit Bids* are for individual lots, not packages of lots.

    - In each category, a bidder's total number of *Optional Exit Bids* cannot exceed the difference between the bidder's demand for lots in the current round and the previous round.

    - Across all categories, the eligibility points associated with all *Optional Exit Bids* cannot exceed the difference in eligibility points between their current and previous round activity, less any eligibility points associated with lots subject to *Compulsory Exit Bids.*

    - In each category, the exit bid amount must be an amount less than the clock price and greater than or equal to the previous clock price.

    - All *Optional Exit Bids* in the same category must be at the same price.

17. At 700 MHz and 2100 MHz, a bidder may also be subject to *Compulsory Exit Bids* (see bidding rules above):

    - *Compulsory Exit Bids* are bid for individual lots.
    - By default, *Compulsory Exit Bids* are priced at the previous clock price – in effect part of the bidder's prior demand at the prior price is retained.
    - Optionally, in a round where a bidder has one or more *Compulsory Exit Bids*, it may increase the Euro amount bid for each *Compulsory Exit Bids* , provided that:
        - if applicable, the bid amount is the same amount as any *Optional Exit Bids* for lots in the same category submitted in the same round; and
        - otherwise, is an amount less than the clock price and greater than the previous clock price.

Clock rounds information policy

18. After the end of each round, the Auctioneer informs bidders about the level of excess demand in each category. No information is provided about the breakdown of demand across bidders.

Clock rounds winner and price determination

19. The clock rounds close when there is a round in which there is no excess demand in any category.

20. In each category, winning bids are determined as follows:

    - All bids submitted in the final round at the clock price become winning bids.
    - Any bids from prior rounds that were retained at the final clock price become winning bids.
    - If, after completion of steps I and II, there are unallocated lots, all *Optional Exit Bids* and *Compulsory Exit Bids* are ranked together in price order from highest to lowest. Subject to available supply, the highest ranked exit bids with bid amounts that equal or exceed the previous clock price (i.e. bids that have a value no less that one bid increment below the final clock price) become winning bids.
    - If, after completion of steps I, II and III, there are unallocated lots, these remaining lots will be offered in the supplementary round.

21. In each category, all winning bidders pay a Uniform Price for lots allocated at the end of the clock rounds, which is set equal to the amount of the lowest winning bid in that category. Accordingly, the Uniform Price for lots in each category cannot be higher than the final clock price nor lower than the penultimate clock price in that category.

Supplementary phase

22. Lots unallocated after completion of clock round winner and price determination are made available in up to five sequential sealed bid supplementary rounds, one for each frequency band where there are unallocated lots, and proceeds in the following order:

A. The 700 MHz category (A).

B. The two 2100 MHz time slice categories (B1 and B2).

C. The three 2300 MHz lots (C1, C2 and C3).

D. 2600 MHz paired (D).

E. The three 2600 MHz unpaired categories (E1, E2 and E3)

23. In each round, a bidder may submit up to two types of bids:

- *Individual bids.* Individual bids are exit bids that were not identified as winning bids in the clock rounds. Bids amounts for individual bids are not discretionary. They may include:

    i. *Optional exit bids.* If the bidder has *Optional Exit Bids* that were not allocated after the clock rounds, it may opt to carry one or more of these bids into the supplementary round at the same bid amount. In each category, if the bidder opts only to retain a subset of its relevant exit bids, the highest priced exit bids must be retained first. There is no restriction on the number of *Optional Exit Bids* that could become winning bids.

    ii. *Compulsory Exit Bids.* If the bidder has *Compulsory Exit Bids* that were not allocated after the clock rounds, these automatically carry over into the supplementary round at the same bid amount. There is no restriction on the number of *Compulsory Exit Bids* that could become winning bids.

- *Package bids*. In addition, bidders can submit up to X mutually exclusive package bids, combining lots from the available categories, where X is a number to be set at the discretion of the Auctioneer prior to the round taking place. Each bidder can win at most one package bid (in addition to winning any number of individual bids). The bid amount for a package is discretionary but must be greater than or equal than the sum of the Uniform Prices (as identified in clock round price determination) for the relevant lots in each category.

24. Winner and price determination take place for each supplementary round before proceeding to the next round. For each round:

- The Auctioneer identifies the highest value combination of bids:

    i. that can be accommodated from the supply of lots unallocated in the clock rounds;

    ii. does not cause any winning bidder to breach the spectrum cap; and

    iii. includes at most one package bid and any number of individual bids from any one bidder.

- If there is more than one combination of bids with highest value, priority is given to combinations that minimize the number of unsold lots. If there is still a tie, the winning combination is determined from amongst the remaining tied combinations by random draw.

25. Each bidder pays the amount of the winning bids. For the avoidance of doubt, this means that prices paid for lots in the supplementary round could be lower (if individual bids are selected), equal or higher (if package bids are selected) than the Uniform Price in the applicable category.

Assignment Stage

26. The Assignment Stage would be run using the same process as proposed by ComReg for the CCA, albeit with a potential simplification if time slicing is not used for 2300 MHz and 2600 MHz spectrum. In each category, winning bidders of generic lots would have the opportunity to bid for preferred frequency positions in a series of sealed bid, second price auctions. Bid options would be constrained to ensure that every bidder is guaranteed to win contiguous spectrum in each category, and across categories within bands where feasible.

5 Vodafone Ireland Limited

Non -Confidential Version

Proposed Multi Band Spectrum Award

Request for views from interested parties on auction formats including potential alternative options or modifications to ComReg's proposed auction format

Response to Information Notice

ComReg Document 20/56

Introduction

Vodafone are grateful for the opportunity to respond to ComReg Information Notice 20/56

Planning for the next mobile spectrum award in Ireland has run over a period of six years, from the publication of Document 14/101 – Spectrum award – 2.6 GHz band with possible inclusion of 700 MHz, 1.4, 2.3 and 3.6 GHz bands

ComReg have produced a very long and comprehensive set of consultations on every aspect of the proposed award.

In responding to these consultations, Vodafone have commented on the bands to be awarded, the award format and the associated conditions. We have emphasized on a number of occasions the need to ensure that the time line for award of spectrum in Ireland aligns with the European norms to ensure Irish customers have access to the best possible products and services.

Three Ireland Limited have now proposed a number of variations to the planned auction design. In our view these proposals are not justified, and instead of removing discrimination they seek to copper fasten Three's very significant spectrum advantages gained through the O2/Three merger process.

We comment below in more detail on the various options and modification proposed in 20/56

In summary, of the options presented, we favour Option1, a CCA with Exposure pricing.

As per our previous submission, we believe that only a CCA will work with the complex set of lots emerging from the Time Slice structure; an SMRA could be run if the time slices are removed.

The SCA and CMRA options 3 and 4 have significant unknowns and lack transparency.

Each of the Options 5a to 5c appear to be an evident attempt by Three to distort the auction rules in their favour, seeking to guarantee their continued spectrum advantage. The only argument that Three have raised against the current Draft IM is a possible asymmetric price outcome. Running auctions using spectrum caps that apply to all parties but asymmetrically effect operators with larger holdings of spectrum has been a feature of previous auctions in Ireland and in other countries. Redesigning the auction to allow Three to maintain a spectrum advantage at low cost would clearly be discriminatory.

The options 5 d to 5f serve to increase prices and reduce transparency in the auction. Introducing these measures could not be regarded as a proportionate to any identified fault in the auction process and would not be in line with ComReg core objectives.

Finally, we support the proposal that ComReg have made to Three to return a block of sub-1GHz spectrum pre-auction. This option would allow for a symmetrical starting point and equalize price pressure on all operators.

As Three's issues with the current auction process are caused only because of their larger holding of sub 1GHz spectrum this option should address their concerns.

The current Covid emergency significantly disimproves the climate for investment in Ireland. In these circumstances there is a need for Comreg to facilitate and encourage efficient investment in telecommunications. Comreg should follow up on the excellent work they have done in putting the Temporary spectrum Management Measures in place by completing the long term award process for these important mobile spectrum bands quickly, simply and at the lowest possible cost.

Comments on sections of ComReg 20/ 56

2.1 Background information

ComReg's spectrum competition cap proposals

2.7 In order to promote and safeguard competition by avoiding extreme asymmetric outcomes in the Proposed Award which could be detrimental to downstream competition, ComReg currently proposes to apply two sets of spectrum competition caps.

- An aggregated 70 MHz sub 1GHz
- An aggregated 375 MHz (in each of Time Slice 1 and 2)

2.8 In designing its competition cap proposals, ComReg observed that while these spectrum competition caps would apply equally to all bidders, the proposed caps would of course affect bidders differently due to any pre-existing spectrum holdings.

2.1.2 ComReg's assessment on asymmetric pricing

- Asymmetric prices are not discriminatory because such prices may arise due to bidders starting from different positions and facing different levels of competition from each other. :

Vodafone have a number of observations on this Background information.

We agree that the current spectrum caps are a reasonable measure to prevent damage to competition.

Any asymmetric price outcome in this planned award would arise because of the different stating points of the bidders

Outcome with asymmetric prices have been a feature of previous auctions in Ireland and internationally

We note the spectrum caps from MBSA1

ComReg 12/52 Information Memorandum

Spectrum Caps

4.24 Applications submitted by Applicants at the Application Stage of the Award Process and all Bids made by Bidders in the Main Stage of the Auction are subject to the following Spectrum Caps:

- For each Time Slice separately, a total cap of 2 × 50 MHz of spectrum across all three bands (800 MHz, 900 MHz and 1800 MHz);
- For each Time Slice separately, a cap of 2 × 20 MHz of sub- 1GHz spectrum (that is, spectrum in the 800 MHz band plus spectrum in the 900 MHz band); and
- For Time Slice 1 only, a cap of 2 ×10 MHz of spectrum in the 900 MHz band.

In that auction, Three were effectively guaranteed a block of 900MHz at reserve price: a much lower cost than the cost to other operators. This outcome arose because Three had started with less spectrum. Now that positions are reversed, and Three are starting with more spectrum, they cannot reasonably complain that a possible outcome of the planned award could be that they will pay more.

Option 1: CCA with Exposure Pricing

2.27 ComReg's preliminary view, as outlined in Document 19/124, was that the CCA is the auction format best suited to deal with the risks associated with the Proposed Award. The assessment of alternative auction formats against these risks is set out in detail in Section 7.3 of Document 19/59R and Section 6.1.4 of Document 19/124.

2.28 In Document 20/32 ComReg proposes to provide additional information to bidders during the Main Stage of the Proposed Award regarding what a bidder would pay at most for a particular package if the clock rounds stopped with no excess demand and it won that package ("Exposure Pricing"). ComReg will make a final determination on whether to include Exposure Pricing following an assessment of all information provided by respondents to Document 20/32 and any other advice it may receive. In that regard, ComReg may include Exposure Pricing as part of Option 1 or include as a separate Option 1(b) where Option 1(a) would be a CCA without Exposure Pricing.

Vodafone strong support the addition of exposure pricing, see our response to Doc 20/32.

" 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. "

Our comment on the suitability of CCA still stand

Option 2: Simultaneous Multi-Round Ascending Auction ("SMRA")

ComReg discusses the SMRA format in the context of the following two potential options:

- Option 2(a) – SMRA with Time Slices as per Document 20/32; and
- Option 2(b) – SMRA with two 2.1 GHz Band lot categories and no Time Slices.

We note that Comreg do not offer the option of removing the time slices from the auction completely. We previous submitted that this option was possible and would lead to the most straightforward and transparent auction. If the time-slices were removed, it would be possible to run an effective SMRA auction. We continue to believe that no variation of the SMRA has been presented that is suitable for an auction with the multiple lot types now planned.

Option 2(a) – SMRA with Time Slices

Vodafone note and agree with ComReg's observations on an SMRA with Time Slices:

- bidders bidding on a combination of lots may be exposed to the risk of ending up being the standing high bidder for (and winning) some but not all of the lots it requires (i.e. aggregation risk);
- it exposes bidders to substitution risks as it is not possible to eliminate switching impediments under the traditional activity rules; and

2.34 In response to Document 19/59R, an SMRA was proposed by Three and suggested as one of two possible formats by Vodafone. In summary:

- Vodafone submitted that *"open, simultaneous, multi-round auctions (whether **SMRA** or CCA) are the most efficient way to assign new spectrum"* .

2.35 An SMRA was also proposed by Vodafone and Three in response to Document 19/124:

- Vodafone recapped its previously stated views in response to Document 19/59R (see above) but also noted "*the representation from others to replace the CCA auction format, but believe that CCA must be used if the Award contains a Time-Slices element*."[30]

Option 2(b) –SMRA with two 2.1 GHz Band lot categories

In its response to Document 19/59R, Three proposed an SMRA format with two GHz Band lot categories

We repeat our opinion expressed in our response to Document 19/124, we do not support this two lot category proposal for the following reasons:

- This solution was used in Germany and, having engaged with its experts who participated in the German award, Vodafone believes that it is not a good solution.
- The issues noted by DotEcon (fragmentation of competition, targeting lots and tacit collusion) played a significant part in that auction where parties bid for lots that were desired by others, causing significant distortion in the auction.

Option 3: Simple Clock Auction ("SCA") with relaxed activity rules.

2.45 In its response to Document 19/59R, Eir proposed a SCA due to the use of the "pay as bid" approach. and the following claimed advantages[42]:

- There is no uncertainty over the amount that would need to be paid if a bid won, hence bidders could easily decide whether or not they could afford to submit a particular bid.

In Document 19/124, ComReg was of the preliminary view that an SCA with relaxed activity rules would be unsuitable for the proposed Award Process for several reasons, including that it would not provide bidders with enough flexibility to express their demand for different combinations of packages.

We note that the support that eir gives to a SCA appears to be focused on the better transparency in that format compared to a CCA.

In our view the issues with transparency are better dealt with by Exposure pricing process described by Comreg in Doc **20/32**

In an observation common to Option 3 and Option 4, we are reluctant to support a new and untested auction formation.

Option 4: Combinatorial multi-round ascending("CMRA") auction format

ComReg was of the preliminary view that a CMRA format would be unsuitable for the Proposed Award because the format is relatively novel and, with the large number of lots available in the Proposed Award, it could be challenging for bidders who wish to maintain a large list of bids as such bidders may need to reconsider and update many bids on a round-by-round basis.

In an observation common to Option 3 and Option 4, we are reluctant to support a new and unfamiliar auction format. Given that this award will occur at the end a series of European auctions and probably be the last auction in Ireland for some time, we have a strong preference to use a well establish process in which reasonable expertise should be available to all parties.

Option 5: CCA with amended rules

2.55 In its submission to Document 19/124, Three proposes that, if a CCA is to be used, the following three amendments could be made to ComReg's current preferred auction format:

- Option 5(a) – CCA with joint cap of 2 × 25 MHz in the 700 MHz Duplex on any two winners; or
- Option 5(b) – CCA with joint cap of 2 × 25 MHz in the 700 MHz Duplex on any two winners for price determination; and
- Option 5(c) – CCA with a third 700 MHz Duplex lot value cap.

The following comments apply to Options 5(a) to 5(c):

The current MNOs Vodafone, eir and Three operate in a competitive market. ComReg have committed to assign this spectrum in an open transparent and non-discriminatory process.

These options 5(a) to 5(c) appear to be aimed specifically at preventing an outcome where Three have less spectrum than the other MNOs.

Just as it would be would be entirely inappropriate for Comreg to and introduce specific rules to guarantee a number of blocks of 700Mhz spectrum to Vodafone only it is against the non-discriminatory principles of section 12 of the Act of 2002 to introduce rules that preserve Three's spectrum advantage.

These rules appear to have no purpose other than to reduce the price that Three would pay and so do not align with ComReg's objective in the auction. In fact they discriminate against other bidders.

Option 5(a) – CCA with a joint cap of 2 × 25 MHz in 700 MHz Band on two winners for the purposes of winner and price determination

In this option Three suggest removing scenarios where both Vodafone and Eir both win 2×15MHz.

Vodafone agree with the ComReg observations:

2.56 ComReg also has the following preliminary observations/queries regarding Option 5(a):

I. The joint cap would appear to place a restriction on bidders other than Three, not for the purpose of preventing distortions to competition[48], but rather to address Three's concerns in relation to the price it might have to pay for 700 MHz Duplex spectrum.

II. It would preclude spectrum holding outcomes that would be permitted under ComReg's current spectrum competition cap proposals[49]. In particular, it would prevent the potential for both Vodafone and Eir to obtain 70 MHz of sub-1 GHz spectrum.

III. ComReg questions whether it would amount to an effective reservation of some 700 MHz Duplex spectrum for Three in the event that only the existing MNOs competed for 700 MHz Duplex spectrum.

IV. Assuming the existing MNOs were the only bidders for 700 MHz Duplex spectrum, it would appear to preclude an outcome where Three would have a lower amount of sub 1-GHz spectrum than both competing MNOs post award. In effect, it would prevent an outcome where Three has 5 sub-1 GHz lots post award in contrast to Vodafone or Eir who could still end up having 5 sub-1 GHz lots post award.

V. Whether the introduction of new closing rules for the clock rounds and steps to prevent missing bids would create undue additional complexity.

2.57 In addition, the queries raised in relation to Option 5 (b) below would also apply to Option 5 (a) given that Option 5 (a) includes amendments to winner and price determination whereas Option 5 (b) concerns just price determination.

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[48] The main purpose of a competition cap is to ensure that the distribution of spectrum rights in an award is determined by competition among bidders, subject to ensuring that extreme asymmetric outcomes which could harm downstream competition do not emerge from the award. Three's proposal does not relate to this purpose.

2.2.1 Option 5 (b) – CCA with a joint cap of 2 × 25 MHz in 700 MHz Band on two winners for purposes of price determination

Vodafone note the following ComReg observations:

2.58 Notwithstanding, ComReg has the following preliminary observations/queries: around Option 5(b):

- Whether the exclusion of certain bid combinations for determining opportunity cost could reduce incentives to bid truthfully thereby polluting the price discovery process and compromising the efficiency of the award.
- Whether excluding certain combinations of bids from the price determination could lead to prices that do not fully reflect opportunity cost pricing and the benefits of same[50].

In our view Option 5(b) would distort the auction process and exclude bids that would correctly reflect opportunity costs.

2.2.2 Option 5 (c) – CCA with a third lot value cap

2.59 Three proposes a cap on the marginal value that a bidder can express for its third lot in the 700 MHz Band, such that it cannot be higher than the final clock price.

2.60 ComReg has the following preliminary observations/queries with regard to Option 5(c).

I. Whether it would result in bidding restrictions that could be justified on competition grounds. In particular, it would appear to limit the bid amounts that bidders could place for lots that are permitted by the spectrum competition cap. This could restrict potentially efficient outcomes that could have arisen absent any such restriction. (e.g. Vodafone and/or Eir winning a third 700 MHz lot).

This proposal would result in restriction on outcomes, which are not justified - the spectrum cap are the competition control, this additional rule would be anti-competitive

II. Whether bidders have a value in being able to effectively guarantee winning their final primary package and whether a bidder whose final primary package included three 700 MHz lots would be permitted to submit a supplementary bid that would guarantee it would win those lots.

Yes, we would see it as an important feature of the CCA to be able to guarantee winning our final primary package. Not being able to do that would significantly distort the auction process.

III. Whether it would unduly advantage Three by limiting Eir's and Vodafone's ability to compete for a third 700 MHz lot.

Yes, we believe that this option would potentially limit our ability to bid for a third 700 MHz lot

IV. Whether the proposed rule changes would create excessive complexity such that it would compromise the ability of the Exposure Pricing functionality to operate correctly and provide useful information to bidders.

We agree that this rule change would add excessive complexity.

2.2.3 Options 5d - 5g

2.61 In the context of considering other potential means by which to mitigate Three's stated concerns[47], ComReg is also seeking views on four further sub-options under Option 5, being:

- Option 5(d) - Increase 700 MHz Duplex reserve prices;
- Option 5(e) - Introduce non-linear 700 MHz Duplex reserve prices;
- Option 5(f) – Increase the value of unsold 700 MHz Duplex lots in price determination; and
- Option 5(g) - Use weighted Vickrey nearest prices.

Option 5 (d) Increase 700 MHz Reserve Prices

We understand that ComReg sets minimum prices by reference to a conservative lower bound estimate of the market value of the spectrum that is likely to be below final prices. This approach encourages competition while also discouraging frivolous bidders and means that final prices would ultimately be determined by the bidders in the proposed auction and not ComReg.

Vodafone would strongly oppose increasing Reserve Prices.

Increasing Reserve Prices for 700 MHz lots would appear to have no justification under Comreg mandate to assign spectrum using transparent and non-discriminatory criteria.

The range of proposals 5(d) to 5(g) also add considerable complexity and uncertainty to the auction process. This could prevent other bidders expressing their true value for packages in the auction process and ultimately distort the outcome of the auction.

We consider that Reserve Prices to be close to market value. It is likely that a post Covid recession would reduce market values further and that there is no scope to increase these prices without risking choking off demand.

Option 5 (e) Place a higher value on 700 MHz unsold lots in Price Determination

Option 5 (f) Introduce non-linear 700 MHz Reserve Prices

Option 5 (g) Use Weighted Vickrey nearest prices

We will comment on options 5(e), 5(f), and 5(g) together.

In each of these proposals, it appears ComReg would be stepping away from the core principles that underlie the auction design.

It is likely that more revenue could be raised than is strictly necessary to ensure an efficient outcome).

Comreg could potentially create incentives to deviate from truthful bidding.

The pricing of 700MHz lots would cease to be objective and transparent.

The additional complexity and lack of transparency would potentially deter bidders.

These proposal would lessen competition during the course of the award by reducing incentives for Eir and Vodafone to compete for additional lots

2.5 Three returning a 2 × 5 sub-1 GHz block to ComReg in advance of the Proposed Award

We note and fully support the ComReg suggestion that Three could return a block of 900MHz spectrum in advance of the completion of the auction design for the forthcoming award.

We should state that even without this option Three have no justified case for seeking changes to the current auction design as described in the Draft IM 20/32

The concerns that Three have expressed have arisen only because they have an additional sub1GHz block. They have this block because, as Nera observe, they were "de facto guaranteed to win one 900 MHz lot at reserve price [in ComReg's 2012 MBSA]."

If Three was to return this 900MHz 2x5 block all three MNOs would be permitted to bid for the same number of 700 MHz Duplex lots (or other sub-1 GHz lots if returned and included) in the Proposed Award.

This outcome would allow for a straightforward application of the CCA auction design as described in ComReg 20/32 and avoid the distortions of the process that are would result from any of the other suggested changes to the auction formant in Option2 to Option 5(g) above.