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Re: Canada Gazette Notice No. SLPB-005-17 — Consultation on a Technical, Policy and Licensing Framework for Spectrum in the 600 MHz Band

Attached, please find the reply comments of Rogers Communications Canada Inc. (Rogers) in response to *Canada Gazette*, Part I, August 19, 2017, *Consultation on a Technical, Policy and Licensing Framework for Spectrum in the 600 MHz Band* (SLPB-005-17).

Rogers thanks the Department for the opportunity to provide input on this important issue.

Yours very truly,

A handwritten signature in black ink that reads 'Howard Slawner'.

Howard Slawner
Vice President – Regulatory Telecom
HS/pg

Attach.

Consultation on a Technical, Policy and
Licensing Framework for Spectrum
in the 600 MHz Band
SLPB-005-17

Reply Comments of
Rogers Communications Canada Inc.
November 3, 2017



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Executive Summary

- E1. The 600 MHz auction is an opportunity for ISED to foster innovation and competition. Providing access to additional low-band mobile spectrum will allow wireless carriers to increase network coverage. At the same time, licensing this spectrum will address Canada's ever-growing demand for data capacity and it will provide a key building block for 5th generation (5G) technology, which is expected to drive higher levels of innovation and productivity throughout the Canadian economy.
- E2. The 600 MHz auction is also an opportunity to re-set the competitive landscape. The regional competitors of today are experienced, sophisticated, and have ready access to capital, allowing them to vigorously compete with the three national carriers. They no longer require any further subsidies from the Canadian taxpayer. It is time ISED recognize this and discontinue spectrum set-asides.
- E3. Since the regional carriers no longer require special treatment, ISED should refocus its attention on the state of competition more generally, especially between the three national carriers. The continued use of set-asides and caps over the past ten years has favoured Bell and Telus (. They are able to mitigate the impact of ISED's spectrum aggregation limits by combining their spectrum into a single network. ISED's efforts to assist the new entrants have unintentionally assisted Bell and Telus. The playing field must be re-balanced to foster sustainable competition in the future.
- E4. If ISED persists with a set-aside, it must be reduced from 30 MHz to 20 MHz since this amount is sufficient to efficiently deliver the necessary capacity and speed. Regional carriers eligible for the set-aside can compete for an additional 10 MHz block among the open lots if they require more than 20 MHz.
- E5. A 30 MHz set-aside will likely result in a poor auction outcome since only 40 MHz will be available for the three national carriers who serve 90% of the customers. To make matters worse, there is a real likelihood that only two carriers, or perhaps just one, will win all the open spectrum. This outcome would undermine ISED's objective of four strong competitors in each region. Unless every carrier has a realistic opportunity to obtain this valuable resource, the introduction of next generation wireless services could be hindered.
- E6. The calls for a larger set-aside by the regional carriers and other parties are transparently self-serving. They ignore the negative impact that a reduction in the amount of open lots will have on competition, affordability, infrastructure investment, and rural deployment. Regional carriers have already received billions of dollars in spectrum subsidies since 2008 and should not benefit from yet another set-aside, much less a larger set-aside. Nor should the regional carriers be gifted a low-band

spectrum advantage over all national networks which is what will happen if the set-aside consists of 30 MHz or more.

- E7. To prevent this outcome, if ISED institutes a set-aside, it must adopt a 20 MHz cap as well. Without a cap, it is very possible that the 600 MHz spectrum will end up concentrated in the hands of a few. Network sharing partners can use their combined balance sheets to great effect. Without a cap, joint bidding could facilitate bids aimed at excluding other carriers from the open lots. Only a 20 MHz cap will result in an outcome that will empower every carrier and hasten the adoption of 5G in line with the competition objectives that ISED has itself set out.
- E8. ISED should hold an additional consultation to consider more simplified auction formats and allow interested parties to provide their input. Rogers remains concerned by the Department's narrow focus on novel, untested, and complex proposals associated with the combinatorial clock auction ("CCA") auction format. No rationale has been offered by the Department for why it did not consider simpler auction formats that could be highly effective for this award. It is troubling that a key aspect of the rules was not clearly and adequately set out in the consultation paper, with the result that many comments were based on a misapprehension of ISED's proposal. Although ISED has recently provided clarification, there has been very little time for respondents to consider the complex issue of how a set-aside might be implemented within a CCA format. The CCA proposed by the Department remains needlessly complicated and other less complex formats should be seriously considered.
- E9. The use of the CCA format has often resulted in very high prices and asymmetrical results, with some bidders having to pay far more than other bidders for similar spectrum. It is also too easily subject to spiteful bidding meant to drive up opponent prices rather than merely to obtain spectrum. This situation is only made worse when the CCA format is used without a cap and with a set-aside, which creates highly asymmetrical price driving opportunities.
- E10. ISED should seriously consider returning to a simultaneous multi-round auction ("SMRA") or simple clock auction format. The use of generic licences and Tier 2 licence areas will reduce aggregation risks, negating the need for a CCA format. An SMRA or simple clock auction would simplify the auction and moderate prices by avoiding the spiteful bidding that is enabled by the CCA format. Spiteful bidding artificially inflates spectrum prices and reduces the amount of capital that can be invested in rural coverage and advanced new technologies.
- E11. If ISED does continue with one of its three proposed CCA formats, it should use a standard CCA with Generalized Axiom of Revealed Preference ("GARP") activity rules. This format provides the best combination of flexibility and restrictiveness, allowing for price discovery while holding bidders to their valuations. The Weak

Axiom of Revealed Preference (“WARP”) activity rules have proven too open to abuse in past auctions. On the other hand, the Enhanced CCA (“ECCA”) is simply not an appropriate auction format as the pricing mechanism may artificially drive prices above the level needed to efficiently allocate spectrum. Such artificially inflated spectrum costs will ultimately be borne by Canadian consumers through the prices they pay for wireless services.

- E12. ISED recently clarified the design of the set-aside product. Normally, in a CCA auction with a set-aside, there are two products, one for the set-aside and one for the open blocks. If a set-aside-eligible bidder wanted to bid for more blocks than in the set-aside, they would have to bid also for the open product. That, in the absence of any other bidding restrictions, would allow set-aside-eligible bidders to drive up the prices of the open lots, as happened in the 2008 AWS auction. The 600 MHz auction proposes to avoid this problem by having all 7 lots available in the set-aside product. However, this approach creates gaming opportunities of its own, as we explain below.
- E13. Rogers recommends that, if a set-aside is adopted, the auction use the standard format in which set-aside-eligible bidders wishing to acquire more than the set-aside spectrum have to bid explicitly for both all the set-aside product and the open product. In order to avoid price driving, the auction must at the same time include fair bidding rules. Fair bidding rules prevent set-aside-eligible bidders from bidding on open blocks as long as there are cheaper blocks available in the set-aside for that service area. Such rules will not in any way impact the new entrants’ ability to secure spectrum through a set-aside but will limit the ability and incentives of set-aside-eligible bidders to engage in strategic price-driving, which hurts competition, affordability, infrastructure investment, and rural deployment. Rogers’ proposed approach would also improve price discovery for set-aside-eligible bidders relative to the Department’s current proposals.
- E14. Finally, the 600 MHz auction is an opportunity to assist over-the-air television broadcasters. Having already been forced to bear significant costs to transition from analog to digital technology, which have not been fully depreciated, they must now move to new frequencies incurring significant expense. ISED must ensure these broadcasters have the time and financial resources to complete this transition while maintaining the same level of service they have always provided Canadians.

Introduction

1. Rogers Communications Canada Inc. (“Rogers”) welcomes the opportunity to reply to comments filed by other parties in response to *SLPB-005-17: Consultation on a Technical, Policy and Licensing Framework for Spectrum in the 600 MHz Band*¹ (the Consultation), posted on Innovation, Science and Economic Development Canada’s (“ISED” or “the Department”) website on October 6, 2017.
2. Rogers stated its position on all of the issues raised in the Consultation in its comments of October 2, 2017. This reply is limited to comments on proposals made by other parties. Failure to address any specific issue raised by other parties should not be taken by the Department as Rogers’ acquiescence with the position.

Rogers’ Reply to Comments of Other Parties

3. In our original comments, Rogers supports the comments of the Canadian Association of Broadcasters (“CAB”) ² of the need to address the impact of the 600 MHz auction on over-the-air (“OTA”) television. We similarly support the comments of Bell who share our concerns. Local television is a foundational element of the Canadian broadcasting system, which provides significant value and is a low-cost means for access to television,³ in rural and urban markets across Canada. However, systemic changes in local OTA television’s business model have posed a significant challenge to the sector’s financial health. As both Rogers and Bell highlight, broadcasters have not yet seen their substantial costs to transition from analog to digital technology, and to implement the current digital television allotment plan, be fully depreciated.⁴ Now, only a few short years later, OTA television broadcasters will be required to implement another costly transition.
4. In light of the above, we support the CAB and Bell proposals that the Government cover the costs incurred by local television stations to vacate the 600 MHz spectrum in order to accommodate the plan to re-allocate the spectrum.⁵
5. CAB also urges “ISED to work in cooperation with Canadian Heritage and Finance to establish new funding, financed by 600 MHz spectrum auction proceeds, to help secure the future of local television during this challenging time.”⁶ Bell echoes this view but makes a further specific suggestion that 10% of the 600 MHz auction

¹ ISED, *SLPB-005-17: Consultation on a Technical, Policy and Licensing Framework for Spectrum in the 600 MHz Band* (Consultation); <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11316.html>.

² Rogers Comments, para 27.

³ Bell Comments, para 2-3.

⁴ Rogers Comments, para 25; Bell Comments, para 5.

⁵ Bell Comments, para 6; CAB Comments, para 7.

⁶ CAB Comments, para 7.

proceeds be put into an independently-administered fund, similar to the former Local Programming Improvement Fund, to help support local OTA television stations meet the cost of producing local programming.⁷ Rogers is not committed to any specific plan at this time; however, in light of the important role that OTA television continues to play in the communities it serves, including the provision of local news and information programming, emergency alerting, and support for community organizations and charities, we fully support all efforts to ensure the sustainability of local OTA stations.

Q1A—ISED is seeking comments on its proposal to implement a set-aside as a pro-competitive measure in the auction process for the 600 MHz band.

6. After reviewing the comments of all of the parties, Rogers continues to believe that the Department should use the 600 MHz auction as an opportunity to re-set the competitive landscape. Canada now has four strong competitors in each market supported by two national wireless networks, Rogers and Bell-Telus (“Belus”), in most provinces, a third regional network supporting a fourth retail competitor. The state of competition is markedly different than a decade ago when set-asides were first instituted by the Department. The time has come for a broader set of policies that reflect the current state of competition.
7. The independent wireless-only new entrants of 2008 have consolidated into regional quad-play conglomerates that are more than capable of vigorously competing, both for spectrum and in the marketplace, with the three national carriers. As Bell states, “In fact, contrary to the presumption that competitive measures are required in the 600 MHz auction, there is an abundance of compelling evidence that today’s wireless marketplace is highly competitive and the ‘regional providers’ do not need financial concessions in the form of set-aside spectrum.”⁸
8. Further, the “new entrants” now have substantial spectrum holdings, with spectrum portfolios that include high, mid and low band mobile spectrum, and do not require subsidized access to additional mobile spectrum through another set-aside. In fact, on a June 2017 investor call, Shaw highlighted its “decent advanced spectrum position” and with respect to sub-1 GHz spectrum that, given its “strong holdings” in the 700 MHz band, the “600 MHz addition to that is a relatively small addition”.⁹

⁷ Bell Comments, para 7.

⁸ Bell Comments, para 15.

⁹ Dippon, *Telus Comments – Expert Report of Christian M. Dippon, PhD*, para 20.

9. Even a new entrant like CCI states that the Consultation's proposals, "unjustly discriminates against the 'big three' incumbent service providers, given there are additional telecommunications entities that are of similar size, and means, but are eligible to bid on the set-aside spectrum because they lack the necessary share of the wireless subscriber market to be considered a "national incumbent service provider".¹⁰
10. Set-asides artificially constrain the supply of spectrum for non-eligible bidders. They have also been exploited by set-aside-eligible bidders to drive up the price of non-set-aside spectrum (behaviour that is encouraged, rather than suppressed, by the proposed auction rules). Both of these factors have increased spectrum costs for those companies that are not eligible to bid for set-aside spectrum. As a result, Canada has the highest spectrum spend per person in the world over the last decade, and the national carriers have less capital available to invest in new and innovative technologies and network expansion in rural areas.
11. Ultimately, the high cost of spectrum is borne by Canadian consumers and businesses. Set-asides therefore do not promote more affordable prices. Instead, they unnecessarily inflate the long-run of wireless services.
12. On top of this, set-asides have been used by eligible bidders to secure scarce and valuable spectrum below market value and then sell the spectrum in the secondary market at a significant profit. This does nothing to promote the Department's objectives and simply enriches the shareholders of these companies.
13. Set-asides in combination with spectrum aggregation rules and the associated entities rules have also had unintended consequences. As Rogers explains in its comments, the principle source of competitive intensity and innovation in the Canadian wireless market is the rivalry that exists between the three national carriers. The combined effect of set-asides, caps and the associated entities rules has been that Bell and Telus have been able to bid separately in each auction knowing full well that they will combine their spectrum afterwards. It has allowed them to mitigate the impact of spectrum aggregation limits and to place strategic bids that prevent other competitors from securing contiguous blocks in order to combine their spectrum. All of this has provided an advantage to Bell and Telus and has distorted competition between the three national carriers. The playing field must be re-balanced to foster sustainable competition.
14. For all of these reasons, the Department should discontinue its use of set-asides. They are unnecessary and inefficient.
15. In the event that ISED retains a set-aside for the 600 MHz auction, Rogers urges the Department to reduce it from 30 MHz to 20 MHz. At the same time, the Department

¹⁰ CCI Comments, pg 3.

should adopt a cap of 20 MHz on individual bidders and possibly a 30 MHz cap on bidding consortiums. Fair bidding rules should also be implemented to prevent strategic price driving by set-aside-eligible bidders.

16. By adopting Rogers' proposal, the Department will be able to ensure that all four competitors in each region will have a reasonable opportunity to secure this valuable resource that will be used to fuel innovation and investment in the years to come. Taking these steps will also promote ongoing vigorous competition between the national carriers. Our proposed 20 MHz auction cap would guarantee additional low-band spectrum capacity for the networks of the fourth regional carriers at a fair market price, thus addressing ISED's concerns regarding the ongoing ability of regional operators to expand and contribute to the competitive intensity of the market.
17. Rogers' proposals will also foster innovation and investment, as well as rural deployment, since it will reduce abusive price-driving behaviour by set-aside-eligible bidders and free up more capital for investment in new and innovative technologies and rural network expansion. Therefore, if the Department does not remove the set-aside, it should, at a minimum, reduce the size of the set-aside, implement a spectrum cap, and adopt fair bidding rules, as this approach would better achieve ISED's own objectives.
18. That the proposed set-aside is likely to artificially inflate the cost of spectrum, at least for the national operators, is identified by the set-aside-eligible bidder Shaw in their expert report by a former ISED auction advisor, Peter Cramton. The report highlights throughout how set-asides can still achieve high auction prices,¹¹ as if high spectrum costs in themselves are a good outcome for wireless subscribers.
19. Further, the Cramton report emphasizes how set-asides can raise revenues by driving competition amongst incumbents for residual spectrum.¹² However, this is clearly bad policy, a point specifically highlighted in the recent GSMA report on spectrum pricing:

“While regulators in OECD countries rarely act to hold back spectrum from the market, they have sometimes created artificial scarcity for incumbent operators through measures that reserve spectrum for entrant bidders. If this leaves too little spectrum available to meet the minimum demands of large incumbents, this may result in operators paying very high prices for the spectrum that they do win. Typically, in such cases, high prices for winning incumbents are offset by much lower prices for entrant bidders.”¹³

¹¹ Cramton, *Shaw Comments – Appendix A*, pg. 2-3 and 6-8.

¹² Cramton, *Shaw Comments – Appendix A*, pg. 5-6.

¹³ GSMA, *Effective Spectrum Pricing: Supporting better quality and more affordable mobile services*.

20. High spectrum prices do not achieve any of ISED's primary goals of rural deployment, affordable retail prices, and maintaining four strong competitors in each region. Clearly, fair bidding rules are necessary to protect Canadian consumers and businesses from the downstream impact of strategic price-driving behaviour by set-aside-eligible bidders.
21. In contrast to Shaw's expert report claims, regulators do not, in fact, "commonly use set-asides to encourage competition".¹⁴ Surveying more than 100 auctions of mobile spectrum in Europe, North America and Australia/New Zealand, we have identified only a small minority that used set-asides. Many recent examples have failed to achieve the regulator's stated goals and instead ended in default by the new entrant (e.g. Argentina 2014, Saudi Arabia 2017), resale of the spectrum by the new entrant or merger of the new entrant with an established operator (e.g. Canada 2008 & 2014, Netherlands 2010 & 2012). It would be more accurate to say that some regulators have used set-asides in very limited situations to address very specific competition concerns.
22. In proposing a 30 MHz set aside for this award, ISED is adopting a policy that is considerably more interventionist than its European peers. On a population weighted basis, set-aside eligible bidders currently control about 17% of Canadian mobile spectrum, a figure that will rise to nearly 20% if the set aside is implemented as proposed. Some regional operators (e.g. Eastlink in Atlantic Canada) already have more than 20% of spectrum in their region and one (SaskTel having) has more than 35%. If we compare this to European countries that have previously implemented set asides, we observe that other regulators have discontinued set asides once the entrant's spectrum share exceeds roughly 15%:
- i. **Denmark:** 10 MHz of 900 and 20 MHz of 1800 was set aside for Three Denmark in 2010, at a time when its share of spectrum was 14%. No reservation was provided for the subsequent 800 MHz auction in 2012, indicating that the regulator viewed an 18% share of spectrum as competitive.
 - ii. **France:** 20 MHz of 1800 was directly transferred to Free Mobile in 2016, lifting its spectrum share to 13%. There was no set-aside for the 700 MHz auction, indicating that the regulator viewed a 17% share of spectrum as competitive.
 - iii. **U.K.:** For the 4G auction in 2013, Three UK was guaranteed to win either 10 MHz at 800 MHz or 40 MHz at 2600 MHz, at a time when its spectrum share was 10%. No set-aside is proposed for the forthcoming auction of 2.3 GHz and 3.5 GHz, at a time when Three UK has a 15% share of spectrum usable by 2020 (and another operator has just 10%).

¹⁴ Cramton, *Shaw Comments – Appendix A*, pg. 1.

23. In contrast to set-asides, spectrum caps, as Rogers proposes, have been deployed in the large majority of 3G and 4G spectrum auctions. In fact, one of the pro-competitive designs that Shaw's expert report praises is the German 3G auction.¹⁵ However, as Cramton himself describes in the report, this was a spectrum auction with *no set-asides*, where the German regulator set caps that prevented any single party winning more than 25% of the available spectrum – roughly equivalent to Rogers' own proposal for a 2x10 MHz cap across operators.
24. Further, most academic and industry observers urge regulators to be very cautious in using set-asides. For example, Cave and Webb highlight the "mixed results" associated with set-asides and the risk of "assigning spectrum to less efficient operators".¹⁶ Even Shaw's expert is on record saying that set-asides "may result in entry by firms with higher costs and less attractive offerings than incumbents" and "that they may prohibit efficient aggregation of spectrum".¹⁷ The potential upside for Canadian consumers from set-aside spectrum for such powerful regional operators is therefore likely to be very limited while the risks to competition between national carriers from a 30 MHz set-aside is quite high.
25. Rogers notes that Bell also calls on the Department to eliminate the set-aside for many of the same reasons provided by Rogers in its comments, including the fact that the regional carriers are well-capitalized and established cable companies and do not require subsidized access to spectrum.¹⁸ Rogers agrees with Bell where it explains that the Competition Bureau's views on the competitiveness of the wireless market are both unsubstantiated and out of date.¹⁹ The Bureau's views provide no credible or reasonable basis for the adoption of another set-aside. Had ISED carried out a competition assessment similar to that required by the European Commission, as outlined in the expert report in Telus' comments,²⁰ it is Roger's view that the Department would not have identified any justification for implementing a set-aside.
26. Rogers also agrees with Bell where it explains that the use of a spectrum cap would be preferable to a set-aside from a public policy perspective. As Bell notes, a significant problem with set-asides is that eligible bidders are able to inflate the prices paid for non-set-aside spectrum while being completely shielded from such behavior themselves.²¹ The use of a cap would limit the risk of spectrum concentration while avoiding all of the harmful gaming associated with set-asides.²²

¹⁵ Ibid, pg. 7.

¹⁶ Cave, Martin and William Webb. 2015. *Spectrum Management*, Cambridge University Press, pg 105.

¹⁷ Cramton, Peter and et al. 2011. *Using Spectrum Auctions to Enhance Competition in Wireless Service*, 54 Journal of Law and Economics, pg S169.

¹⁸ Bell Comments, para 21-30.

¹⁹ Bell Comments, para 9-15.

²⁰ Dippon, *Telus Comments – Expert Report of Christian M. Dippon, PhD*, para 45.

²¹ Bell Comments, para 32.

²² Ibid.

For these reasons, Rogers fully supports Bell's proposal that the Department implement a 20 MHz spectrum cap rather than adopt a set-aside.

27. Based on an expert report commissioned for the 600 MHz auction, Telus proposes that a less harmful alternative to competition than a set-aside is the use of bidder credits, though they also voiced their general opposition to providing preferential measures to well-capitalised regional operators.²³ Rogers has reviewed the report and agrees that bidder credits would be a more transparent approach in communicating the extent of government subsidy and that "national providers are not faced with significantly inflated spectrum prices from fake bidding or restricted spectrum supply".²⁴ However, much like the recent U.S. AWS-3 and 600 MHz spectrum auctions, bidder credits, like set-asides, almost invariably lead to windfall gains for eligible bidders that are either spectrum speculators or so large that they do not need financial assistance. A better approach would be Rogers's proposal for a cap of 2x10 MHz on each bidder, which would ensure a wide distribution of this valuable spectrum – including to the regional operators – without advantaging any particular players.
28. Telus also has used this consultation as an opportunity to portray itself as disadvantaged and in need of special treatment by the Department. Specifically, Telus complains that it holds relatively small amounts of sub-1 GHz spectrum and that the auction rules should be rigged in such a way as to ensure that it will have the opportunity to successfully acquire up to four blocks of valuable 600 MHz spectrum while its national rivals would be restricted to acquiring fewer or no blocks of 600 MHz spectrum.²⁵ Telus' portrayal of the situation is entirely disingenuous and its proposals are transparently self-serving and should be rejected by the Department for the following reasons.
29. To begin with, Telus' claim that it has a "*heritage as the original new entrant and the only still standing company to ever create new competition in the history of the Canadian mobile industry, without being provided lucrative incentives and subsidies to do so*" is a fantasy that can be safely dismissed by the Department.²⁶ The reality is that Telus' heritage consists of the combination of two incumbent monopoly telephone companies and their respective mobile wireless operating arms. Eventually, the combined entity expanded beyond its traditional operating territory, where it dominated the competition, and acquired national PCS entrant Clearnet.
30. Since 2008, Telus has also systematically combined its mobile spectrum with Bell in order to jointly operate a national mobile wireless network, enjoying capacity and cost-savings advantages. This includes, but is not limited to, the combination of

²³ Telus Comments, para 38.

²⁴ Dippon, *Telus Comments – Expert Report of Christian M. Dippon, PhD*, para 107.

²⁵ Telus Comments, para 28-31 and 51-57.

²⁶ Telus Comments, para 45.

Telus' 25 MHz of 850 MHz cellular spectrum with an equal amount of Bell's 850 MHz spectrum, as well as the combination of both companies' 700 MHz spectrum blocks. In fact, Telus has received subordinate licences from ISED providing them with full sanctioned use of the spectrum. The result is that Telus has access to a national swath of a minimum of 45 MHz of sub-1 GHz spectrum that is similar to the sub-1 GHz holdings of Rogers. Moreover, Telus and Bell also hold additional unpaired blocks of 700 MHz spectrum that, combined, cover the entire country. They therefore already exceed their own threshold.

31. On top of this, Telus is the largest spectrum holder in Canada of 800 MHz trunked mobile radio spectrum that it used in the past to operate Enhanced Specialized Mobile Radio ("ESMR") services, a fact that was conveniently omitted from Telus' sub-1 GHz analysis.²⁷ As the Department itself has stated, "The 800 MHz spectrum is attractive as service provisioned over lower frequencies can reach subscribers at a greater distance from the base station."²⁸ Telus holds as much as 10 MHz of 800 MHz ESMR spectrum throughout Canada and up to approximately 15 MHz in major markets such as Toronto and Montreal.²⁹ It is important to note that this spectrum has been included in certain LTE bands that have been standardized by 3GPP and LTE mobile devices and network equipment are already commercially available for this spectrum, as stated in the *Consultation on the Spectrum Outlook 2018 to 2022*. In fact, as the Spectrum Outlook Consultation also notes, LTE technology has already been deployed in the band in the U.S., and this band is currently being considered for potential release in Canada between 2018 and 2022.³⁰
32. Telus' proposed sub-1 GHz screen unduly targets Rogers and would virtually remove Rogers from competing in the 600 MHz auction. What Telus has failed to recognize in its sub-1 GHz analysis is that Rogers has had to obtain more spectrum, at great expense, in order to more effectively compete with the combined spectrum holdings of Telus and Bell. As Rogers explains in its comments, the rules for spectrum auctions since 2008 have allowed Telus and Bell to mitigate the impact of spectrum aggregation limits by combining their spectrum, thereby enjoying wider mobile broadband channels over which to provide faster speeds than their competitors. Faced with this disadvantage, Rogers has had no realistic alternative option but to acquire more spectrum. Knowing this, Telus is now seeking to restrict

²⁷ Telus Comments, footnote 34.

²⁸ ISED, *Consultation on the Spectrum Outlook 2018 to 2022*, para 121; <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11333.html#s6.3>.

²⁹ Telus, *Annual Information Form for the year ended December 31, 2007, 2008*, pg 10; <http://about.telus.com/servlet/JiveServlet/previewBody/1262-102-1-1247/2007%20Annual%20Information%20Form.pdf>.

³⁰ ISED, *Consultation on the Spectrum Outlook 2018 to 2022*, para 116-118; <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11333.html#s6.3>.

Rogers' ability to bid in the 600 MHz auction, which would negatively impact downstream competition, infrastructure investment, and affordability for consumers.

33. Telus' concerns about Rogers' supposed advantages in the auction are disingenuous, as well as incorrect. To begin with, Telus asserts that Rogers is already in a network sharing arrangement with Videotron and that "5G technology and market forces may drive Rogers to eventually partner with all or most of the regional cableco mobile providers."³¹ While Rogers does have an agreement with Videotron, we do not have a comprehensive national sharing agreement like Bell and Telus do, nor do we have an "immediate avenue to negotiate subordinate access to the proposed 30 MHz set-aside nationally"³² like Telus suggests. Unlike Bell and Telus, Rogers makes its own network investments across all of Canada. The auction rules therefore have distinctly favoured Bell and Telus over and over again, not Rogers.
34. Moreover, Telus' contention of Rogers' "bidding power" is ridiculous and ignores the facts. Telus accuses Rogers of having "outspent the next highest bidder (TELUS) by a factor of nearly three, spending \$3.3B to outbid TELUS in acquiring two contiguous paired blocks of spectrum in all of the top six markets"³³ during the 2014 700 MHz auction. They then explain they fear Rogers will outbid them again. What Telus fails to mention that it was Telus, along with Bell, who set Rogers' price. Rogers paid \$3.3B because that is the amount Telus and Bell were willing to pay. In fact, if Bell and Telus had not deliberately split their bids between the low band and high band blocks during the auction, presumably in an attempt to separate Rogers from any possible joint network partners, Bell and Telus would likely have won the lower paired blocks. The prices paid and the 700 MHz auction's allocation outcome were due, in large part, to Telus' (and Bell's) own actions. Bell and Telus went on to outbid Rogers in the subsequent AWS-3 auction thereby demonstrating the strength of the Bell and Telus balance sheet.
35. In summary, contrary to Telus' claims, there is no justification for modifying the 600 MHz auction policy to grant the special concessions that Telus seeks for itself.
36. The Department should also reject the Railway Association of Canada's request that 5+5 MHz of 600 MHz spectrum be set aside for railways, similar to the policy for Public Safety Broadband in the 700 MHz band.³⁴ Railways are commercial common carriers, like mobile wireless telecommunication providers, not first responders nor law enforcement agencies. Canada's two largest publically-traded railway

³¹ Telus Comments, para 44.

³² Telus Comments, para 56.

³³ Ibid.

³⁴ Railway Association of Canada Comments, pg 2-3.

companies have a combined market capitalization in excess of \$105B.³⁵ This is an industry consisting of well-capitalized companies that are not in need of taxpayer-subsidized spectrum from a band plan that has already been fully designated for commercial mobile service.

37. If the Department and Government's goals for the wireless industry include a focus on retail pricing, policy must reflect the costs of the key input that ISED directly controls. As Rogers explains in our Comments, since 2008, Canadian operators have paid roughly US\$350 per person for spectrum, compared to under US\$200 in the United States and just over US\$50 in the United Kingdom. In the same time period, the new entrants have been able to secure spectrum at a modest cost of C\$0.59/MHzPop, while Rogers (C\$2.65/MHzPop) and Bell-Telus (C\$1.52/MHzPop) have been obliged to pay huge premiums.³⁶ While spectrum is undeniably a valuable public resource, it must be recognized that high spectrum prices are bad for the Canadian economy, the wireless industry and for consumers and businesses, who ultimately pay for them.
38. This view of high spectrum costs as bad wireless policy is shared by both Canada's largest wireless provider and one of its smallest; as Ice Wireless states, "ISED should be sensitive to the fact that any cost incurred by a mobile operator, and spectrum licence cost is no exception, will be passed onto the consumer."³⁷
39. Therefore, the Department must also carefully consider the likely impact that its proposed auction formats will have on affordability and consumer prices. Although Shaw does not express a preference for auction type, they do state that the use of ECCA would need sensible bid increments to prevent price driving.³⁸ While this proposal suggests a lack of understanding of the details of the ECCA, as price increments cannot be set in order to offset the ECCA's flaws, it echoes concerns from SaskTel, Bell, and Telus, along with Rogers, who all highlight the problems with the ECCA format due to implied price driving and inflated prices.³⁹
40. No matter which auction format ISED ultimately selects, the auction must include fair bidding rules to protect and promote downstream competition. Fair bidding rules prevent set-aside-eligible bidders from bidding in open blocks as long as there are cheaper blocks available in the set-aside. Even Eastlink, a set-aside-eligible bidder, recognizes this and proposes bidding rules "to ensure that set-aside-eligible bidders do not dump all their points into the open-market bids during the clock rounds."⁴⁰

³⁵ As per Bloomberg Markets at close of trading October 17, 2017. Canadian National Railway Co., \$75.3B; Canadian Pacific Railway, Ltd., \$30.7B.

³⁶ Rogers Comments, para 32-33.

³⁷ Ice Wireless Comments, para 23.

³⁸ Shaw Comments, para 90-95.

³⁹ SaskTel Comments, para 47-50; Telus Comments, para 91-95; Bell Comments, para 54-56.

⁴⁰ Eastlink Comments, para 50.

Fair bidding rules will not in any way impact the new entrants' ability to secure spectrum through a set-aside but will limit the ability and incentives of set-aside-eligible bidders from strategic price driving, which hurts competition, customer affordability, infrastructure investment, and rural deployment.

41. The Department's response to Rogers' request for clarification on the treatment of bids for set-aside spectrum has disclosed that the intention of the rules is that set-aside-eligible bidders may bid for up to 7 blocks and that these are treated as bids for set-aside product under the activity rules. In Rogers' view, this aspect of the rules could not be readily inferred from the consultation document itself, as Eastlink's comments above clearly demonstrate. However, Rogers considers that this approach – in effect, combining the set-aside and open product for the purposes of set-aside-eligible bidding – is insufficient to mitigate the risk of price-driving. As we discuss below, Rogers considers that the logically correct and clearly superior approach is for bidders to make bids explicitly for certain amounts of set-aside and open product, but subject to a fair bidding rule, where a set-aside-eligible-bidder would need to bid for all three set-aside lots if these were cheaper than open lots before adding additional open lots to their package bid. We discuss this in more detail below.
42. The proposed set-aside ISED is considering as a pro-competitive measure in the auction process for the 600 MHz band will not achieve the Department's goals for rural deployment, customer affordability, or increased competition. Rather, as proposed, the set-aside will simply result in discounted spectrum for leading Canadian telecommunication conglomerates while at the same time harming competition between the national carriers.
43. While Rogers still believes that no set-aside is required for the 600 MHz auction, in the event that ISED does retain a set-aside, we urge the Department to reduce it from 30 MHz to 20 MHz. At the same time, the Department should adopt a cap of 20 MHz on individual bidders and a 30 MHz cap on bidding consortiums. Further, fair bidding rules should also be implemented to prevent strategic price driving by set-aside-eligible bidders.
44. By adopting Rogers' balanced proposals, the Department will reduce abusive price-driving behaviour by set-aside-eligible bidders and free up more capital for investment in new and innovative technologies and rural network expansion, as well as promote ongoing vigorous competition between the national carriers. Taking these steps will also provide additional low-band spectrum capacity for the networks of the regional carriers, ensuring their ongoing ability to expand and contribute to the competitive intensity of the market. Rogers' pro-competitive proposals for the 600 MHz auction will result in a win-win-win for new entrants, national carriers, and the Department, and ultimately, all Canadians.

Q1B—ISED is seeking comments on its proposal to set aside 30 MHz of spectrum in the 600 MHz band for eligible entities and to have open bidding (no pro-competitive measures) on the remaining 40 MHz in the band.

45. Upon review of all of the submissions, the proposed 30 MHz set-aside clearly remains a bad option for Canadian wireless consumers, especially those in rural areas, as it only leaves a little more than half of the 600 MHz spectrum for 90% of Canadian subscribers. The request by set-aside-eligible bidders to increase the size of the set-aside to 40 MHz would result in just 30 MHz available for open bidding and would be even worse for rural deployment, infrastructure investment, affordable retail prices, and competition between four strong operators.
46. All national providers have raised valid objections to the well-capitalized, quad-play, regional telecommunication conglomerates benefiting from yet another set-aside. As Bell states, set-aside spectrum winners since 2008 have received more than an estimated \$4 billion in spectrum subsidies through set-asides.⁴¹ However, all three national providers also strenuously recommend that if the Department is committed to proceeding with a set-aside, it must not exceed 20 MHz so as not to unduly provide an enduring contiguity advantage in low band spectrum to networks that provide service to less than 10% of Canadians.⁴²
47. Increasing the spectrum available through open bidding to 50 MHz, along with implementing a 20 MHz cap, would still maintain competition in the auction while increasing the chances that both national networks would obtain some spectrum. Implementing these measures, and fair bidding rules, would not increase the price of spectrum for regional competitors at all but would prevent them from abusing the auction rules to strategically increase the costs of national carriers, which would have long term benefits to all Canadian mobile wireless subscribers in terms of retail pricing.
48. Videotron, Eastlink, and Shaw have all requested an increase in the set-aside.⁴³ This is unsurprising, as they are the overwhelmingly likely winner in each of their operating territories, making the request transparently self-serving. Shaw states a set-aside of 40 MHz would:
- (i) maximize network capacity achievable in a single LTE channel; (ii) maximize peak data rates achievable in a single LTE channel; (iii) maximize end-user experience; (iv) maximize capital expenditure efficiency; (v) maximize coverage for the benefit of consumers; (vi) reduce

⁴¹ Bell Comments, para 24.

⁴² Rogers Comments, para 77; Bell Comments, para 35; Telus Comments, para 64.

⁴³ Videotron Comments, para 36; Eastlink Comments, para 27; Shaw Comments, para 53.

the number of cell sites required in a network; and, (vii) improve network quality as a result of wider channelization.⁴⁴

49. Rogers agrees that all of these benefits would be available to any operator with access to a 40 MHz block of spectrum. However, we disagree with Shaw that such advantages should be given cheaply to set-aside-eligible bidders and denied to non-eligible bidders. Shaw fails to mention that no network in Canada, including any of the national networks, has access to a 20+20 MHz channel of sub-1 GHz spectrum. As Telus states, no operator in Canada currently has access to a contiguous 30 MHz sub-1 GHz channel.⁴⁵ Shaw and the other well-capitalized regional operators looking for an increased set-aside would be thus gifted a low-band spectrum advantage over all national networks. Moreover, as Rogers demonstrated in its initial comments, a 10+10 MHz block is all that is necessary, both technologically and financially, to deploy the 600 MHz spectrum. A 20+20 MHz block offers a benefit but is unnecessary. If any bidder is to be allowed access to such a block, they should have to compete for it. Otherwise, set-aside-ineligible bidders who currently served 90% of all subscribers would be permanently disadvantaged.
50. Submissions from BCBA, Cogeco, and Sogetel also request that the Department increase the set-aside to 40 MHz, along with introducing additional pro-competitive measures to assist the entrance of a fifth operator (or even more).⁴⁶ The Department should reject these proposals, so as not to create excessive fragmentation of spectrum that will not have the same service and competition benefits of holding larger, contiguous blocks. Niche providers focused on small rural areas have other options to acquire spectrum, such as commercially negotiated spectrum subordination arrangements.
51. Bell also has significant concerns that regional providers are not only receiving preferential access to spectrum but that they continue to receive financial subsidies. In the event that the Department moves forward with a set-aside, Bell recommends that ISED require, “the winners of set-aside spectrum to pay the average price per MHz-Pop that is paid in the auction. This requirement reduces the incentives for set-aside-eligible bidders to asymmetrically raise the costs for set-aside-ineligible bidders since they would now face the risk of higher prices.”⁴⁷ Rogers supports this general principle, which could also be achieved by adopting our proposals for a simple auction format (without package bidding) along with our own proposed fair bidding rules. Such an approach reduces incentives for set-aside-eligible bidders to make predatory bids with the primary outcome of raising spectrum costs and undermining wireless affordability for low-income Canadians.

⁴⁴ Shaw Comments, para 62.

⁴⁵ Telus Comments, para 63.

⁴⁶ BCBA Comments, para 20-22; Cogeco Comments, para 58; Sogetel Comments, para 22.

⁴⁷ Bell Comments, para 33.

52. Numerous commenters highlight the larger holdings of sub-1 GHz spectrum held by national carriers. Rogers did indeed win its initial cellular spectrum in a comparative selection process in order to provide competition to the new wireless arms of the incumbent wireline telephone companies. However, it was not “free” as some contend. Rogers has paid approximately \$1.275B in annual spectrum fees over the period 1985-2017 for its 850 MHz and 1900 PCS spectrum that was not acquired through auction. In addition, Rogers won its initial spectrum allocations at a time when the money losing wireless market was measured in the thousands, not the tens of millions of customers the industry enjoys today. As a result, Rogers Wireless incurred huge losses in its first 20 years of operation and continues to serve countless business customers that require legacy support. On the other hand, some of the new entrants were already profitable a few years after launch. Rogers, and the other national wireless providers, should therefore not be penalized simply for being innovators and providing wireless service to Canadians since the beginning of the wireless era.
53. The only other low band mobile spectrum Rogers possesses is in the 700 MHz band. As a result of the 700 MHz auction rules, Rogers spent over \$3.3B to secure the minimum quantity of 700 MHz spectrum necessary to provide the coverage and service quality that our customers demand, no more than a 10+10 MHz channel in any operating area; specifically, a 10+10 MHz useable channel.⁴⁸ That is the same amount of spectrum that set-aside-eligible bidders will be able to secure at a fraction of the cost if the 600 MHz set-aside is reduced to 20 MHz. In service areas where Rogers only secured 5+5 MHz, a 20 MHz 600 MHz set-aside would be double the spectrum that Rogers acquired at much higher prices for its 700 MHz spectrum.
54. Rogers also acquired its 5+5 MHz of 700 MHz spectrum at a significantly higher average \$/MHzPop rate compared to what regional bidders paid for their 700 MHz spectrum. In fact, every regional competitor, not just the speculators, paid a lower \$/MHzPop rate in the 700 MHz auction than all of the national operators. After acquiring their 700 MHz spectrum at artificially low rates, some quickly flipped their spectrum for a huge windfall. As set-aside-eligible bidders in the upcoming 600 MHz auction, the same companies are set to benefit again.
55. It is clear that Rogers has not received any undue preference in obtaining its sub-1 GHz spectrum portfolio. Rogers won its 850 MHz spectrum in a competitive process and from the outset has paid substantial fees for this spectrum to the Department. Rogers won, at a significant cost, its 700 MHz spectrum at auction against the other national carriers and regional telecommunication conglomerates, who benefited from rules that unduly favoured the joint-national network bidders (Bell and Telus) and the

⁴⁸ Note: Although the paired lower 700 MHz spectrum was auctioned as 6+6 MHz blocks, 5+5 MHz is the largest usable LTE channel within a 6+6 MHz block. For simplicity, we use 5+5 MHz, or multiples of, when discussing 700 MHz spectrum.

regional carriers. Even a 30 MHz set-aside of 600 MHz spectrum would result in a continuing undue preference to the regional carriers and have the unintended consequence of negatively affecting competition between the national carriers to the detriment of all Canadians.

56. Reducing the 600 MHz spectrum set-aside to 20 MHz – as well as implementing a 20 MHz cap and fair bidding rules – ensures the Department achieves all four of its goals of rural deployment, infrastructure investment, affordable retail prices, and, downstream competition from four carriers. 20 MHz (10+10 MHz) is sufficient bandwidth for a strong business case to deploy LTE services in rural areas and the competitive landscape of Canada’s mobile wireless market – i.e. the financial strength of the “new” entrants – means that there will be a single set-aside winner in all service areas (except, perhaps, in Eastern Ontario). It is simply unnecessary to gift a newer or regional operator a third 5+5 MHz block as it would have limited additional impact on its competitiveness over and above the first two 5+5 MHz blocks. Further, even if ISED believes that a regional competitor should be permitted to acquire more than 20 MHz – more contiguous sub-1 GHz spectrum than any national carrier has – the Department could adopt rules that allow such operators to compete for it by bidding on open blocks.

Q1C—ISED is seeking comments on its proposal to limit the eligibility criteria to bid on set-aside spectrum to those registered with the CRTC as facilities-based-providers, that are not national incumbent service providers, and that are actively providing commercial telecommunication services to the general public in the licence area of interest, effective as of the date of application to participate in the 600 MHz auction.

57. Notwithstanding our view that the well-capitalized newer entrants do not require additional taxpayer subsidized spectrum to add to their already large taxpayer subsidized spectrum portfolios, Rogers remains convinced that only those new entrants that are actively providing commercial mobile wireless services and are operating a wireless network should be eligible to bid for the 600 MHz set-aside spectrum, and only in service areas where they have already deployed their existing mobile spectrum. A number of commenters, including Bell, Videotron, Eastlink, and Tbaytel, share Rogers’ view that the Department should use a more stringent requirement to determine set-aside-eligibility, similar to what was used for the AWS-3 auction.⁴⁹

⁴⁹ Bell Comments, para 36; Videotron Comments, para 48; Eastlink Comments, para 37; Tbaytel Comments, para 28.

58. As Bell highlights, the Consultation document contemplates two categories of bidders: competitors that entered the market after the 2008 AWS spectrum auction and national incumbent service providers, with no mention made of a potential third category of bidder – those who do not already have some spectrum.⁵⁰ If the Department's goal is to ensure sustained, facilities-based wireless competition, then the set-aside spectrum should be restricted to those most able to use it.
59. For all the reasons outlined above, the Department can easily reject Telus' proposal to create a new set of eligibility criteria that is transparently self-serving.⁵¹ They argue that ISED should use the FCC's set-aside eligibility criteria and implement a screen of 45 MHz on sub-1 GHz spectrum holdings. While this would prevent Telus from bidding on the 600 MHz band in their wireline areas where they hold 25 MHz of Cellular spectrum and between 24-36 MHz of 700 MHz spectrum, as well as extensive their ESMR holdings, Telus could be confident that their network partner would be able to acquire the 600 MHz spectrum and then promptly subordinate it to Telus. Telus would also acquire all the 600 MHz spectrum in Bell's wireline territory (where Bell is over the 45 MHz threshold) and subordinate it to Bell. Under such a patently self-serving proposal, the Belus joint network would acquire all the open 600 MHz spectrum while the Rogers network would be excluded in nearly every licence area. It appears to Rogers that Telus is proposing eligibility rules that are tailored to allow the Belus network to completely foreclose the open block spectrum by preventing their main competitor, Rogers, from meaningfully participating in the 600 MHz auction. Such an anti-competitive outcome would be terrible for the industry and, more importantly, for Canadian wireless subscribers.
60. The Department should also reject calls by parties such as Xplornet, Cogeco, CCI, and Sogetel to create spectrum aggregation limits (caps) within set-asides or more restrictive rules meant to support the entry of an additional fifth (or more) wireless operators in service areas.⁵² Such measures will incentivize spectrum speculators or excessive fragmentation of the 600 MHz band and not in any meaningful way improve rural deployment of advanced wireless services or affordable rates for Canadians.
61. Similarly, the Department should reject Shaw's hybrid proposal to allow operating wireless operators to bid on licences outside of their wireless service areas, even if they do not have mobile wireless coverage and only have wireline facilities in that service area.⁵³ As Shaw's expert report itself cautions, "[Pro set-aside] arguments certainly do not imply that set-asides necessarily improve auction outcomes. Excessive set-asides without other eligibility constraints may allocate spectrum to

⁵⁰ Bell Comments, para 38.

⁵¹ Telus Comments, para 61.

⁵² Xplornet Comments, pg 3; Cogeco Comments, para 57; CCI Comments, pg 3-4; Sogetel Comments, para 29.

⁵³ Shaw Comments, para 67.

less efficient providers who are unable to build out their spectrum, provide services, or increase competitive pressures.”⁵⁴

62. Given the potential for a set-aside to allocate spectrum at below its true market price and so create subsequent windfall gains for speculative bidders, it was expected that parties would lobby for rules that would help them to win set-aside spectrum. Rather, if the Department’s policy is to promote an effective fourth regional competitor, this objective should not be undermined by creating artificially protected positions for further winners (i.e. a fifth or further operators). As we saw resulting from the 2008 AWS-1 auction, simply introducing large numbers of new but unsustainable competitors into the Canadian wireless market does not provide sustainable benefits to Canadian consumers and businesses.
63. There is a reason the Department has refined its wireless competition policy to four strong competitors in every region, as unsustainable competition has no meaningful, long-term impact on rural deployment, infrastructure investment, or affordability. If ISED ultimately concludes that as a set-aside is necessary to fully achieve its four-competitor objective, it should implement a two-block 20 MHz set-aside limited to operating wireless new entrants, rather than undermining and weakening competition by creating opportunities for further winners of set-aside spectrum.
64. It is also for these reasons as well that the Department should take measures to ensure spectrum availability for the national networks, as these are the operators most likely to ensure vigorous and sustainable competition.

Q1D—ISED is seeking comments on its proposal to limit the transferability of the set-aside spectrum for the first five years of the licence term.

65. Most submissions were in general support of the Department’s proposal that would provide a five-year moratorium on the transfer of set-aside spectrum to a set-aside-ineligible entity.⁵⁵ Videotron suggests that the transfer moratorium should be 10 years, while BCBA and CCI suggests that the moratorium should be for the entire licence term.⁵⁶ While moratoriums should be applied to deter pure spectrum speculators, the secondary market serves an important purpose in that it allows operators to better match their spectrum portfolios with network demands and it therefore provides for the efficient allocation and use of the spectrum resource.

⁵⁴ Cramton, *Shaw Comments – Appendix A*, pg. 3.

⁵⁵ Shaw Comments, para 78; Eastlink Comments, para 41; Cogeco Comments, para 61; Xplornet Comments, pg 4; Ecotel Comments, para 21; Ice Wireless Comments, para 5; Tbaytel Comments, para 31; Sogetel Comments, para 31.

⁵⁶ Videotron Comments, para 89; BCBA Comments, para 26; CCI Comments, pg 4.

Therefore, there is necessarily some degree of compromise required between the competing objectives of discouraging speculative acquisition while allowing the secondary market to correct inefficiency. A five-year moratorium strikes the correct balance.

66. It must be highlighted that moratoriums on 600 MHz spectrum transfers are directly tied to the speculative bidding that is incentivized under the Department's proposed "pro-competitive" rules. The proposal of a set-aside, the proposed size of the set-aside, the price disparity that could be created by spiteful bidding of set-aside-eligible bidders – or, as a calculated business strategy to inflate the value of licences in the secondary market – and the associated entity rules that favour Bell and Telus' national joint network, all could contribute to excessive spectrum costs that will not benefit anyone but speculators. We would also highlight that such concerns would be irrelevant if ISED abandoned the set-aside and adopted our proposal of 20 MHz caps.
67. Telus suggests that the Department should restrict the transfer of set-aside spectrum to only areas that have already been deployed in order to reduce speculation.⁵⁷ We believe that such a proposal would be overly restrictive to the efficiency of the secondary market, which allows operators to reallocate spectrum in response to customer demands and network needs. However, Rogers still strongly recommends that the Department extend any moratorium on the transfer of set-aside spectrum to all entities, including set-aside-eligible ones. This should limit the incentives for set-aside-eligible bidders to take advantage of "pro-competitive" auction rules to acquire discounted spectrum not available to all bidders and then re-sell the spectrum a short time later to other set-aside-eligible carriers, in order to realize a considerable profit.
68. The need for such rules can be seen in statements made by set-aside-eligible bidders who have requested additional rules to help them win spectrum with little to no competition but also want to ensure they can still quickly flip the licence to other set-aside-eligible bidders for a profit, as was done following the 700 MHz auction. For instance, Cogeco requests that ISED implement a set-aside of set-aside spectrum for operators with no mobile spectrum, but it then later states, "*In particular*, Cogeco agrees that set-aside spectrum licensed to a set-aside-eligible entity be transferable only to another set-aside-eligible entity for the first five years of the licence term."⁵⁸ [Emphasis added.] ISED must remove any incentive for spectrum speculation.

⁵⁷ Telus Comments, para 71.

⁵⁸ Cogeco Comments, para 62.

Q1E—ISED is seeking comments on its proposal to auction the set-aside spectrum as three separate paired blocks of 5+5 MHz.

69. Most submissions, including those from Bell, Telus, Eastlink, Videotron, SaskTel, Xplornet, BCBA, Ecotel, Ice Wireless, SSi Micro, Tbaytel, and the Regional Municipal County of Témiscouata (“MRC”) support auctioning the set-aside spectrum as paired blocks of 5+5 MHz.⁵⁹ In the context of a CCA, where there are no aggregation risks, it is logical to provide maximum flexibility for bidders by offering spectrum in 5+5 MHz blocks that can then be aggregated as bidders wish.

Q2—ISED is seeking comments on its proposal to use Tier 2 service areas across the country, except in the three Territories (Yukon, Northwest Territories and Nunavut) where Tier 4 service areas would apply.

70. The largest group of commenters support the Department’s proposal to use Tier 2 licence areas across the country, except in the three Territories where the Department proposes to use Tier 4. Bell, Shaw, Videotron, SaskTel, Xplornet, CCI, and Ice Wireless all support the Department’s service areas,⁶⁰ as the use of these relatively large licence areas is a good fit with the 600 MHz band’s propagation characteristics. As we state in our comments, the use of Tier 2 regions (and Tier 4 in the North) also would substantially address concerns regarding aggregation risk across regional boundaries, as the regions are large and populations at Tier 2 regional boundaries are modest.⁶¹

71. The Department should reject Telus’ proposal to divide each Tier 2 license into two sub-licences with all the urban Tier 4 service areas as a single “urban sub-licence” and all rural and remote Tier 4 service areas as a “rural sub-licence”.⁶² Sogetel and MRC also propose an unworkable urban/rural licensing division.⁶³ Such proposals are not consistent with the propagation qualities of the 600 MHz spectrum and will result in interference issues by creating a patchwork of service areas. As Rogers shares in our comments, we have extensive first-hand experience dealing with

⁵⁹ Bell Comments, para 45; Telus Comments, para 72; Eastlink Comments, para 42; Videotron Comments, para 53; SaskTel Comments, para 35; Xplornet Comments, pg 5; BCBA Comments, para 27; Ecotel Comments, para 22; Ice Wireless Comments, para 6; SSi Micro Comments, para 29; Tbaytel Comments, para 30; MRC Comments, para 23.

⁶⁰ Bell Comments, para 46; Shaw Comments, para 82; Videotron Comments, para 54; SaskTel Comments, para 36; Xplornet Comments, pg 2; CCI Comments, pg 5; Ice Wireless Comments, para 8.

⁶¹ Rogers Comments, para 102.

⁶² Telus Comments, para 70ii.

⁶³ Sogetel Comments, para 42; MRC Comments, para 29.

wireless interference challenges between Tier 4 licensees through our joint venture Inukshuk Wireless Partnership in the 3.5 GHz band. Licensing 600 MHz spectrum at a Tier 4 (or smaller) level with spectrum that has even stronger propagation characteristics would increase the complexity, number and severity of service area interference risks for a spectrum band that Canadians will come to rely on.⁶⁴

72. For similar interference reasons, the Department should also reject proposals by other carriers to use Tier 3 or Tier 4 (or smaller) service areas.⁶⁵ The propagation characteristics of the 600 MHz band are best suited to be licensed on a primary basis using Tier 2 service areas. This will result in less coordination being required between licensees and will allow for more effective use of the radio spectrum than would be the case if smaller licence areas were used.

73. The large amount of support for licensing 600 MHz spectrum using Tier 2 service areas, and Tier 4 service areas in the North, provides the additional benefit of reducing aggregation risk and allows for the use of auction formats such as the SMRA and simple clock auctions. The multitude of benefits resulting from less complex auction formats that provide less incentives for price driving behaviour would be a benefit for all bidders, both national and regional operators.

Q3—ISED is seeking comments on:

- a. the proposal to use generic licences and;
- b. the proposal to categorize all blocks won by set-aside-eligible bidders as set-aside blocks.

74. There is broad support in the submissions for the use of generic licences, reflecting the importance of contiguity of frequency assignments.⁶⁶ As we highlight in our original response, the use of generic licences in combination with the decision to use Tier 2 licensing reduces aggregation and fragmentation risk for bidders to such an extent, that a CCA may not be the best format for the 600 MHz auction.⁶⁷

75. Most respondents also support ISED's proposal to treat all blocks won by set-aside-eligible bidders as set-aside blocks for the application of the moratorium on the transfer of set-aside spectrum. Rogers continues to support this view but, as per our original position in response to Q1D, the moratorium on transfers of set-aside

⁶⁴ Rogers Comments, para 167.

⁶⁵ Eastlink Comments, para 43; CCSA Comments, para 22; BCBA Comments, para 34; Sogetel Comments, para 39-42; Ecotel Comments, para 23; ITPA Comments, para 23-25.

⁶⁶ Telus Comments, para 78; Shaw Comments, para 83; Videotron Comments, para 60; SaskTel Comments, para 37; Xplornet Comments, pg 5; CCI Comments, pg 5; Ecotel Comments, para 39; Ice Wireless Comments, para 9; SSI Micro Comments, para 34; Tbaytel Comments, para 37; Sogetel Comments, para 47.

⁶⁷ Rogers Comments, para 103.

spectrum should be extended to all entities, including set-aside-eligible ones, in order to discourage speculative bidding.

76. Bell, however, takes an opposing view, which appears to be based on the presumption that transferability restrictions are unnecessary in order to address concerns about speculative bidding as long as “set-aside bidders pay the average price per MHz-Pop that is paid in the auction” or if separate auctions for set-aside and non-set-aside spectrum are conducted.⁶⁸ While Rogers agrees that windfall gains to speculators would be limited if all spectrum were sold at the same price, we cannot see how separate auctions for set-aside and non-set-aside spectrum would guarantee this.
77. Rogers has further concerns regarding the categorization of all blocks obtained by set-aside-eligible bidders as set-aside blocks for the purpose of auction mechanics (as opposed to just for the purposes of setting the licence conditions). Specifically, Rogers recently asked ISED to clarify how set-aside-eligible bidders actually bid for blocks. Normally, in an auction with a set-aside, there would be two products, a set-aside product and an open product. Set-aside-eligible bidders who wished to obtain more blocks than available in the set-aside would have to make incremental bids for the open block product. It was Rogers’ initial understanding – and evidently that of other respondents too - that this was the case in the 600 MHz auction as well. However, in its recent clarification, ISED explained that in fact set-aside-eligible bidders would bid in a single product of up to 7 blocks (which includes both the set-aside and open blocks). Set-aside-eligible bidders would not bid on the open product at all.
78. Rogers is troubled that this key point was not highlighted in the consultation document. Rogers had, in its initial comments, made the point that fair bidding rules were required based on the belief that set-aside-eligible bidders could bid in both products, thereby driving up open block prices without repercussion. Fair bidding rules would prevent them from bidding in the open product if the set-aside product was cheaper. Eastlink made a similar suggestion, proposing, “In order to ensure that set-aside-eligible bidders do not dump all their points into the open-market bids during the clock rounds, the Department could establish a bidding rule that set-aside-eligible bidders are only able to bid on open market spectrum in licence areas where they are set-aside-eligible once they have bid on three set-aside blocks under the set-aside generic licence.”⁶⁹ It appears therefore that several participants missed the fact that set-aside-eligible bidders bid only on a single product. However, while fair bidding rules are not necessary based upon the clarification provided by ISED,

⁶⁸ Bell Comments, para 43.

⁶⁹ Eastlink Comments, para 50.

this is not a sufficient mitigation of the problem of price-driving opportunities for set-aside-eligible bidders.

79. While Rogers appreciates that the fair bidding rule that we proposed is not directly relevant to ISED's alternative proposal for defining categories of blocks, we have a separate concern that ISED's proposals will lead to alternative distortions. For a CCA to work properly, price increases in the clock rounds should be based on real bids that will potentially set prices via the opportunity cost pricing rule. ISED's proposals are inconsistent with this principle, as they would make it possible for the price of a set aside category to rise even if there is no excess demand for the reserved blocks. Such a rule risks perverting price discovery, leading to heightened uncertainty over final prices and outcomes, something that ISED says it wants to avoid. The rule may also open up unintended gaming opportunities.
80. To mitigate these risks, ISED should revert back to the conventional method of bidding between set-aside and open licences, accompanied by a fair bidding rule. There should be two products, a set-aside product with X lots (we think this number should be no higher than 2 lots) and an open product with 7-X lots. A set-aside-eligible bidder seeking more than X lots would have to enter incremental bids in the open product. In order to avoid price driving behaviour by set-aside-eligible bidders, the aforementioned fair bidding rule should be applied, preventing any bids in the open product if there is a cheaper block available in the set-aside.⁷⁰ This format will better prevent gaming of the auction than the current proposal in the consultation document. It would also provide for better price transparency, in that the clock price of set-aside lots would likely more clearly indicate the price that a set-aside-bidder would ultimately pay. An even better approach would be not to use a CCA, and instead adopt one of the clock or SMRA formats described in the annex to this submission, formats that are proven to work with set asides. All such problems would, of course, disappear if the Department dropped its proposal for a set-aside and instead adopted tight spectrum caps, as proposed by Rogers and Bell.

⁷⁰ Additional rules may be applied in the supplementary round to ensure bidders make set-aside-eligible bids that set appropriate opportunity cost for open and set-aside spectrum alike.

Q4—ISED is seeking comments on:

- a. the use anonymous bidding during the auction; and
- b. the information that will be disclosed to bidders during the clock rounds, as described in annex A (which would also apply to the CCA with a modified activity rule set out in annex B) and annex C.

81. There is very broad support for the use of anonymous bidding during the multiple round allocation phase of the 600 MHz auction from Rogers, Bell, Telus, Shaw, Videotron, SaskTel, Xplornet, CCI, Ice Wireless, SSI Micro, Tbaytel, and Sogetel, with only Eastlink opposed.⁷¹ Rogers believes that the overwhelming support for anonymous bidding is due to the concern that bidders have about gaming of the auction.

82. Rogers shares this concern, especially in light of the Department's policy objectives for the 600 MHz spectrum: to foster innovation and investment; to support sustained competition, so that consumers and businesses benefit from greater choice; and, to facilitate deployment and timely availability of services across the country, including rural areas.⁷² These policy goals can only be achieved if all networks are able to acquire sufficient spectrum to economically deploy, and fair bidding rules are put in place to prevent strategic price driving. The Department can further mitigate risks of negative outcomes by moving away from a CCA format.

Q5—ISED is seeking comments on:

- a. The advantages and disadvantages of the three auction formats being considered for the 600 MHz auction:
 - i. Combinatorial clock auction, using the WARP-based activity rule ([annex A](#));
 - ii. Combinatorial clock auction, using the GARP-based activity rule ([annex B](#));
 - iii. Enhanced combinatorial clock auction ([annex C](#)).
- b. Where there is a preference for one of the options, respondents are asked to provide a rationale and explanation.

83. In our initial comments, Rogers raised several concerns with the CCA format. It is complicated and open to spiteful bidding resulting in excessive prices. In its comments, Eastlink similarly cautioned ISED about the pitfalls of the CCA format

⁷¹ Rogers Comments, para 105; Bell Comments, para 48; Telus Comments, para 80; Shaw Comments, para 86; Videotron Comments, para 64; SaskTel Comments, para 39; Xplornet Comments, pg 4; CCI Comments, pg 5; Ice Wireless Comments, para 11; SSI Micro Comments, para 35; Tbaytel Comments, para 39; Sogetel Comments, para 48; Eastlink Comments, para 55.

⁷² ISED, *Consultation*, para 8.

and that alternative auction designs should be considered and adopted. It explained, “We submit that the SMRA format is more appropriate for Canada where regional service providers are critical to sustainable competition, particularly in rural areas, and where such providers may value regional licences more than large national service providers.”⁷³ Rogers agrees that an SMRA format would be superior. A simple clock auction would also provide for more simplicity and certainty; this would still allow for package bidding and so not introduce any aggregation risks. ISED should not restrict consideration to variations of the CCA and should consider the merits of alternative auction formats.

84. Rogers is unclear as to why the Consultation document only proposed variations of the CCA format. While the last two major auctions in Canada were CCAs, the issues surrounding this auction design have become more apparent, not only in this country but around the world. The CCA is falling into disfavour, both among regulators⁷⁴ and in the academic literature⁷⁵, due to its asymmetric results, where bidders obtaining identical licenses pay dramatically different prices, concerns about outcome efficiency and its overall propensity to driving up costs. Its only real advantage, avoiding aggregation risk, is already addressed by the use of Tier 2 licence areas.
85. The complicated nature of the CCA design – exacerbated by ISED’s use of set-aside spectrum and rather unorthodox bidding and pricing rules – is illustrated by Rogers’ recent clarification question. While Rogers’ appreciates ISED’s quick response, the fact that we had to ask for clarification demonstrates the difficulty in understanding the proposed auction format. The CCA, particularly the one being proposed, is needlessly complicated and there is a strong likelihood some bidder will make a strategic error by simply failing to understand a key rule. Even ISED appears to have reservations as suggested by its recent request for proposals to review auction format options for the 600 MHz auction.⁷⁶
86. As a result, Rogers re-iterates the need to assess other auction formats. ISED should hold another consultation to specifically examine various auction designs with feedback from the participants. To assist, Rogers includes two possible formats in an Appendix, a hybrid SMRA and a simple clock auction. These should be studied, along with other auction solutions, in an open public forum. Limiting ourselves to the

⁷³ Eastlink Comments, para 57.

⁷⁴ For example, the UK – which pioneered the CCA – has decided not to use the CCA for its next major spectrum auction. Denmark and Mexico have also switched to alternative formats. The Dutch and Austrian regulators have consulted on alternatives.

⁷⁵ See, for example, various chapters in parts IV and V of a newly released book that collates some of the best papers written on spectrum auction formats: Bichler, Martin & Goeree, Jacob, *A Handbook of Spectrum Auction Design*, Cambridge University Press, 2017.

⁷⁶ Public Works and Government Services Canada, *Review of Auction Format Options for 600 MHz Auction (ISED 186360)*; <https://buyandsell.gc.ca/procurement-data/tender-notice/PW-17-00796579>.

CCA format could have serious negative consequences with a poor auction outcome.

87. If the Department does elect to use a CCA, it must look closely at the serious concerns raised regarding the untried and untested ECCA format, and in particular about the implications of the format for pricing, which are strongly shared by other respondents. As Bell, Telus, and SaskTel clearly point out, the ECCA format will result in higher prices than would emerge from a CCA because opportunity costs are not determined based on bids actually made by competitors but on the basis of the greatest conceivable opportunity cost that could result from *hypothetical* bids that rival bidders might feasibly make under the ECCA's activity rules.⁷⁷ As SaskTel states of the ECCA format, "over-charging of bidders could be substantial."⁷⁸

88. Rogers is concerned that respondents who have supported the ECCA, such as Videotron, Xplornet, Cogeco, and Tbaytel, may have failed to fully understand the implications of the format. This is understandable, given that the description of the format in the consultation document is highly technical and, as Bell states, "lacks sufficient numerical examples for a reader to be confident about the meaning of the rules" and that claims about ECCA's potential strengths "are unsupported conjectures, which appear to be largely false."⁷⁹ For example:

- i. **Tbaytel.** In its response, Tbaytel appears to fail to draw a distinction between the use of GARP to define activity rules and the ECCA format, and favours the ECCA because it encourages truthful bidding⁸⁰ – a claim which has not been made in this form in the consultation document (and which certainly has not been substantiated).
- ii. **Videotron.** Appears to prefer the ECCA format because of the greater certainty over prices that the format is promised to deliver (at least as long as there remain no unsold lots at the end of the clock stage) without much regard of the impact that the format has on higher prices.⁸¹ Further, Videotron (and other commenters) appear to fail to recognize that ECCA only provides minimum pricing certainty, it does not provide any maximum pricing certainty.
- iii. **Shaw.** Although they do not endorse any particular format, including the ECCA, Shaw appears to believe, mistakenly, that the risk of higher prices under the format can be addressed by choosing sensible bid increments in the clock phase.⁸²

⁷⁷ Bell Comments, para 56; Telus Comments, para 95; SaskTel Comments, para 47.

⁷⁸ SaskTel Comments, para 48.

⁷⁹ Bell Comments, para E8.

⁸⁰ Tbaytel Comments, para 47.

⁸¹ Videotron Comments, para 70.

⁸² Shaw Comments, para 95.

89. Rogers agrees with SaskTel and Bell's strongly expressed concerns that the ECCA is novel, untested and has not been subject to any academic review.⁸³ The 600 MHz band is simply too important for the future of the sector, the experience of Canadian consumers, and the Canadian economy at large for this auction to be used as a laboratory. The likely high spectrum prices this format would result in, compounded by the set-aside limiting the spectrum available to the national networks, would result in less capital for rural deployment and increased pressures on affordable prices for consumers.
90. In relation to the choice between WARP and GARP, Bell and Telus have expressed a preference for WARP because they consider that the GARP approach is unduly constraining, in particular where bidders may adjust their valuations in the course of the open bidding stage.⁸⁴ Such adjustments would clearly be prevented by imposing constraints that are based on the assumption of an immutable underlying set of valuations.
91. On the other hand, Rogers, like SaskTel,⁸⁵ has expressed its preference for GARP on the basis that the WARP activity rules as they have been used in the 700 MHz and 2500 MHz auctions were open to strategic manipulation. Similar strategic manipulation problems with WARP are likely in the 600 MHz auction, and will exacerbated if a set-aside is used.
92. The main problem with the activity rules in the 700 MHz and 2500 MHz auction were that they created a curious inconsistency between the clock rounds and supplementary round in that it was possible to make a set of bids in the clock round that could not be made as supplementary bids; this clearly indicated a flaw in the rules. The obvious solution to this problem would have been to enforce consistency with revealed preferences in eligibility-reducing rounds not only on supplementary bids, but also on clock bids, by requiring bidders to increase the bid amounts for their constraining bids in line with increased relaxed bids during the clock rounds. This rule was used, for example, in the Irish multi-band auction and the more recent Irish 3.6 GHz auction.⁸⁶
93. Introducing such a requirement alongside the WARP rules would address Rogers' concerns without requiring a move to full GARP, which is much more complicated than simply fixing the immediate and obvious problem with the currently proposed WARP rules. However, if this deficiency in the current implementation of the WARP rules cannot be corrected, Rogers considers that GARP would be preferable as it also avoids such tensions between clock rounds and supplementary bids. Again

⁸³ SaskTel Comments, para 50; Bell Comments, para 63.

⁸⁴ Bell Comments, para 52; Telus Comments, para 90.

⁸⁵ SaskTel Comments, para 41.

⁸⁶ See, for example, Comreg, *3.6 GHz Band Spectrum Award - Information Memorandum*; <https://www.comreg.ie/publication/3-6-ghz-band-spectrum-award-information-memorandum/>.

though, neither GARP nor WARP address our general concerns about incentives for some bidders to exploit CCA rules to artificially inflate prices for the national operators. Rogers' first preference remains the adoption of a format that does not have such damaging incentives.

94. While a non-CCA format would be best, and GARP rules are preferred over uncorrected WARP rules, the Department should definitely not move forward with the untested and, in all likelihood, disastrous choice of the ECCA format. The ECCA format alone would significantly increase spectrum costs and, in combination with the set-aside, will be very vulnerable to strategic price driving.

95. However, the implementation of a 20 MHz spectrum cap and the reduction of the set-aside to 20 MHz – both required measures to ensure all networks are guaranteed access to the 600 MHz spectrum – are even more critical to ensure the Department's policy objectives for the 600 MHz band are reached. Achieving the Department's goals of increasing capital investments for expanding networks and deploying new technology across Canada and ensuring that telecommunication services are affordable for low-income Canadians depends most importantly on the measures required to maintaining competition between the two national wireless networks, Rogers and the Belus joint network.

Q6—ISED is seeking comments on:

- a. The proposal that winners of more than one block in a single service area be assigned contiguous blocks; and
- b. The proposed structure of the assignment stage, including the order of the assignment rounds and the combination of service areas into a single assignment round.

96. Submissions by other commenters that addressed ISED's proposals that ensure winners of more than one block be assigned contiguous blocks were unanimously in support.⁸⁷ There was also similarly broad support for the structure of the assignment stage, although Eastlink has concerns that assigning spectrum in descending order of population indicates a bias towards urban areas over rural ones.⁸⁸ CCI has similar

⁸⁷ Bell Comments, para 64; Telus Comments, para 96; Shaw Comments, para 96; Eastlink Comments, para 64; Videotron Comments, para 73; SaskTel Comments, para 51; Xplornet Comments, pg 6; BCBA Comments, para 43; CCI Comments, pg 6; Ice Wireless Comments, para 14; SSI Micro Comments, para 38; Tbaytel Comments, para 45; Sogetel Comments, para 53.

⁸⁸ Eastlink Comments, para 66.

concerns but goes further and identifies that the structure of the assignment round results in “the potential for gamesmanship”.⁸⁹

97. As Rogers states in our Comments, additional provisions are needed in order to allow for the possibility of adjacent licence holders to partner with each other to make more efficient use of the spectrum.⁹⁰ This means that it is important for actual or potential network partners to end up next to each other, which creates both uncertainties and options for spiteful bidding. Ultimately, such actions harm competition and consumers, particularly if only some bidders can secure partnering arrangements.
98. In order to deal with these issues, Rogers proposes a number of possible amendments that would ensure that Bell and Telus, who have an established network sharing partnership, will end up with contiguous blocks, and that other winners would not be prevented from exploring partnering options by having assignments that are not adjacent.
99. Conversely, the proposals put forward by Telus do not address concerns about strategic bidding but, rather, seem to facilitate such behaviour.⁹¹ As Telus notes, Videotron made substantial assignment bids in the 2500 MHz auction in order to secure a position next to Rogers.⁹² What Telus conveniently fails to mention, however, is that Videotron was forced to pay a substantial proportion of these bids because Telus itself made substantial bids aimed at preventing an outcome in which Videotron would win spectrum adjacent to Rogers' spectrum holdings. Telus' proposals – and in particular the suggestion that set-aside spectrum be placed at one end of the band – appear to be aimed plainly at allowing spiteful bidding in the assignment round, and limiting the ability of winners of set-aside spectrum to explore all options for entering possible network sharing arrangements.
100. The Department should therefore adopt Rogers' proposal to move Bell and Telus to one end of the band and Rogers to the other, or one of our other proposals.⁹³ That way, there is a greater opportunity for regional carriers to secure network arrangements with either national network. This could result in a more efficient use of the 600 MHz spectrum.

⁸⁹ CCI Comments, pg 6.

⁹⁰ Rogers Comments, para 141.

⁹¹ Telus Comments, para 103.

⁹² Telus Comments, para 99.

⁹³ Rogers Comments, para 141.

Q7—ISED is seeking comments on the proposed methodology for incrementing prices during the clock rounds, as described in annex A.

101. Rogers re-iterates the recommendations it made in response to Q3. The current format in which set-aside-eligible bidders bid in a single product of 7 lots, including both set-aside and open blocks, and having them all designated as “set-aside” blocks, despite the fact that the supply of set-aside blocks for pricing purposes is limited to 3 lots, could result in undue uncertainty over price and allocation outcomes and encourage substantial gaming. The auction design should rather use two products, one for the set-aside (currently 3 lots) and an open product (currently with 4 lots). Set-aside-eligible bidders seeking more than 3 lots will have to bid in both products.
102. However, in order to make the 2-product design fair, it must prevent price driving behaviour. Rogers agrees with Bell's view that prices should only increase for products with genuine excess demand, as the proposed methodology for incrementing prices could “result in artificially high prices being paid for non-set-aside spectrum which further increases the pricing distortions that arise due to implementing spectrum set-asides.”⁹⁴ Implementing rules that could cause the price for open spectrum to increase, even if there is no excess demand for spectrum in this category, will not in any way achieve better rural deployment, increased infrastructure investment, or affordable retail prices.
103. The concern identified in our Comments was that with the conventional set-aside rules, there is nothing to stop an entrant from bidding for non-set-aside spectrum when the set-aside spectrum is in fact cheaper.⁹⁵ This concern is addressed by the clarification that all bids made by set-aside-eligible bidders are considered to be bids on set-aside spectrum. However, this opens up new gaming opportunities as the clock price of set-aside product may increase, even if there is only a single set-aside-eligible bidder who might eventually still be able to win the set-aside spectrum at reserve. These concerns are shared by Telus who state, “The proposed methodology for incrementing prices during the clock rounds fails to address the fundamental shortcoming of previous auctions with set-asides, as gaming behaviour as seen in the AWS-1 auction remain fully available.”⁹⁶ This is especially concerning when, as Telus also notes, in the majority of licence areas with only one likely set-aside-eligible bidder, the price of set-aside spectrum may be determined by the reserve price, and would be unlikely to increase above the price of open spectrum.⁹⁷ Telus' suggestion, however, of addressing this concern by removing set-asides and

⁹⁴ Bell Comments, para 65.

⁹⁵ Rogers Comments, para 143.

⁹⁶ Telus Comments, para 104.

⁹⁷ Telus Comments, para 105.

moving to an open auction with a sub-1 GHz spectrum cap,⁹⁸ is – as we have explained above – transparently self-serving and bad policy.

104. Concerns have been raised over the price of open spectrum being artificially inflated in the clock rounds through set-aside-eligible bidders strategically bidding on open spectrum. For the same reasons, parties have highlighted the need for fair bidding rules. It is important to note that these concerns were not solely raised by the national providers – the only bidders that would be impacted by strategic price driving. Eastlink proposes a rule that would allow set-aside-eligible bidders to bid on open spectrum only once they have bid on all the set-aside spectrum.⁹⁹ In other words, they could bid on open spectrum only if they make bids for more blocks than have been set aside. Eastlink’s proposal would correspond to such a ‘fair bidding’ rule for the clock rounds.

105. As noted above, Rogers advocates a set-up in which set-aside-eligible bidders wishing to obtain more blocks than have been set aside would have to bid also on open blocks, and we agree with Eastlink that there needs to be a fair bidding rule that prevents a set-aside-eligible bidder from bidding in the open product if the identical licence is cheaper in the set-aside product. This is crucial to prevent gaming and price driving by the set-aside-eligible bidders.

106. We note also that introducing a 20 MHz cap and reducing the set-aside to 20 MHz would also help discourage the type of gaming behavior we have identified. These measures, especially if implemented together, would prevent set-aside-eligible bidders from expressing demand for very large packages that they cannot feasibly expect to win and thus make spiteful bidding with the sole aim of raising rivals’ costs significantly more risky.

Q8—ISED is seeking comments on the proposed Affiliated and Associated Entities rules that would apply to bidders in the 600 MHz auction.

Q9—ISED is seeking comments on the proposed rules prohibiting collusion and other communication rules, which would apply to bidders in the upcoming 600 MHz auction.

107. In Rogers’ 600 MHz Comments, we propose that the associated entity rules should be amended to recognize existing relationships between the national carriers.¹⁰⁰ This is a view shared by other wireless carriers, such as Eastlink.

⁹⁸ Telus Comments, para 106.

⁹⁹ Eastlink Comments, para 50.

¹⁰⁰ Rogers Comments, para 158.

Eastlink submits that Bell and Telus should be required to bid as a single Associated Entity under these auction rules. It seems that every auction Bell and Telus bid separately and then, almost immediately following the auction, swap licences regionally to ensure each has access to the other's spectrum in the region where that particular partner is responsible for their shared network. In this way, Bell and Telus inevitably end up with at least twice the spectrum that any other entity is able to secure.

Eastlink supports carriers' ability to secure commercially reasonable agreements in the secondary spectrum markets. However, we note that Bell and Telus' unrestricted ability to acquire spectrum up to allowable individual caps and then invariably combine assets in the secondary markets is an obvious circumvention of the Department's Associated and Affiliated Entities rules under this auction and all of the auctions over the past 10 years, and has created a significant imbalance in spectrum holdings by one network provider – Bell/Telus – as compared to all other network providers. Eastlink submits that this result ultimately undermines the Department's objectives of sustainable facilities-based competition in the retail wireless market.¹⁰¹

108. Cogeco states that the Belus network sharing agreement has been around since 2001 and that, based on the Department's proposal, "Bell and Telus are clearly 'associated entities,' as their network sharing agreement relates to the 'acquisition and use' of the spectrum acquired at auction and there is no reason to believe that they would treat any differently any 600 MHz spectrum obtained in this auction."¹⁰² Cogeco also highlights that Bell and Telus have built out their Radio Access Networks disproportionately in different parts of the country, largely along the lines of their incumbent wireline networks – areas where they have operated in some parts for over 100 years.

As shown above, the deployment of sites by Bell and Telus is highly complementary, with Bell almost exclusively in Eastern Canada and Telus predominantly in Western Canada. Of particular note is the fact that Telus has no sites at all in Atlantic Canada, even though it has licences there, and that Telus' Eastern Canada deployment is focused on those parts of Quebec where it is the incumbent local exchange carrier (ILEC).

The inescapable conclusion is that Bell and Telus are treating their networks as one.¹⁰³ [Emphasis added.]

¹⁰¹ Eastlink Comments, para 69-70.

¹⁰² Cogeco Comments, para 109.

¹⁰³ Cogeco Comments, para 112-113.

109. Rogers agrees that Bell and Telus are associated entities and should be treated as such. However, being classified as an associated entity only has any consequence if there is a spectrum cap. Otherwise, Bell and Telus can simply bid as a single bidder, obtain the same amount of spectrum they otherwise would have, and be able to coordinate even better than if they had bid separately. It is therefore essential that ISED adopt Rogers' proposed 20 MHz cap in order to keep an even playing field in the auction and preserve competition in the retail market. Bell and Telus should be bound together by a single cap.
110. Consequently, if there is no cap, Bell and Telus must not be allowed to bid as a single bidder. This would allow them to bid with perfect coordination backed by their combined balance sheets and would skew the playing field even more.
111. Cogeco suggests that Rogers and Videotron be treated similarly in Quebec and mistakenly argues the 700 MHz auction demonstrates the impact of the agreement.¹⁰⁴ However, the 700 MHz auction results show just how different the much more limited Rogers-Videotron network agreement is. Whereas Bell and Telus could bid separately for 5+5 MHz blocks and know that their network would have access to a combined 20 MHz of prime 700 MHz spectrum, Rogers spent significantly to acquire two blocks in Quebec in order to ensure that it would have access to 20 MHz of spectrum, of which only 10 MHz was designated as prime. Rogers' bidding strategy is national in scope and was not altered by the situation in Quebec. Furthermore, while it appears that Bell and Telus were attempting to align their licenses during the auction, no effort was made by Rogers to align with Videotron. Rogers clearly targeted the lower block while Videotron staked its licence in the upper block. As ISED is aware, the upper and lower blocks cannot be used together. The network agreement with Videotron did not impact Rogers' bidding behaviour and Rogers should not be considered an associated entity of Videotron.
112. Upon review of the 600 MHz Comments, Rogers' assessment remains unchanged regarding the 600 MHz auction. Without caps and improved associated entity rules, there is a real danger that this crucial resource will end up in a limited number of hands and harm competition by granting an advantage to Bell and Telus. ISED must ensure every bidder has a fair chance to win spectrum.

Q10—ISED is seeking comments on its proposal to issue spectrum licences in the 600 MHz band with a 20-year licence term and the proposed wording of the condition of licence above.

¹⁰⁴ Cogeco Comments, para 116-119.

113. A large number of submissions, including Bell, Telus, Shaw, Eastlink, Videotron, SaskTel, Xplornet, Ice Wireless, SSI Micro, Tbaytel, and Sogetel, join Rogers in support of the Department's proposal to license the 600 MHz band for a 20-year term and that the licensee will have a high expectation that a new licence will be issued for a subsequent term through a renewal process.¹⁰⁵ 20-year terms are consistent with licence terms for recent spectrum auctions and renewed spectrum licences.
114. The Department should reject BCBA and CCI's proposals for shorter licence terms.¹⁰⁶ Such an approach would create a great degree of uncertainty for licensees with respect to the ongoing viability of their operations, their network planning purposes, and in order to secure additional funding for their substantial ongoing investments. Long term licence certainty will be vital for the 600 MHz band, which may be used for deployments of advanced 4G LTE technology or pioneer 5G technologies still under development.
115. Several commenters cautioned the Department about implementing opportunistic sharing in the 600 MHz band, especially within the middle of a licence term. They identify numerous technical, regulatory, and economic challenges that such a policy would have on spectrum management for technology that is still a long way from being ready for testing, let alone commercial deployment. As Videotron states,
- Tout compte fait, imposer l'accès opportun au spectre sous licence constituerait un changement radical aux règles actuelles en matière de politique de gestion du spectre au Canada. Il s'agit d'une question grave qui soulève de nombreux enjeux très complexes. Elle doit donc nécessairement faire l'objet d'un processus exhaustif de consultation publique aux paramètres clairement définis, de façon à ce que toutes les parties intéressées puissent pleinement faire valoir leurs arguments et défendre leurs intérêts.¹⁰⁷
116. Rogers wholly supports SaskTel's statement that, "The Department must give careful consideration to the impacts of proposed licence conditions on existing networks, including impacts to customer experience and network investments, and that consideration cannot be given in the 600 MHz auction context."¹⁰⁸ As outlined in the Consultation document, the total amount of the proposed opening bids for the

¹⁰⁵ Bell Comments, para 68; Telus Comments, para 112; Shaw Comments, para 101; Eastlink Comments, para 73; Videotron Comments, para 80; SaskTel Comments, para 56; Xplornet Comments, pg 7; Ice Wireless Comments, para 19; SSI Micro Comments, para 43; Tbaytel Comments, para 50; Sogetel Comments, para 60.

¹⁰⁶ BCBA Comments, para 50; CCI Comments, pg 7.

¹⁰⁷ Videotron Comments, para 87.

¹⁰⁸ SaskTel Comments, para 57.

600 MHz spectrum nationwide is \$1.537 billion.¹⁰⁹ Canadian wireless providers must clearly understand all of their rights, obligations and terms of licence upfront.

117. Lastly, given the extent to which the 600 MHz band is currently occupied by OTA television stations and that it will take a number of years for all of these stations to be transitioned out of the band, it is important that the proposed 20-year licence term for a given mobile licence only commence once all the OTA television stations have vacated the spectrum in the geographic area covered by the licence. Considering the cost of these valuable licences, it would be unfair to pay ISED for a 20-year licence but only have access to it for 18 years. The licence term should equal the actual amount of time the licence holder may actually use the licence.

Q11—ISED is seeking comments on the proposals on the condition of licence related to transferability and divisibility, and the proposed wording above.

118. Most submissions were in general support of the Department's proposals on the condition of licence related to transferability and divisibility.¹¹⁰ As noted above, Videotron suggests that the transfer moratorium should be 10 years, while the BCBA and CCI suggest that the moratorium should be for the entire licence term.¹¹¹ While moratoriums should be applied to deter pure spectrum speculators, the secondary market serves an important purpose that allows operators to better match their spectrum portfolios with network demands. For example, CCI sold its 2500 MHz spectrum outside of their traditional operating area that they had acquired at auction only two years prior.¹¹²

119. However, Rogers still strongly recommends that the Department extend any moratorium on the transfer of set-aside spectrum to all entities, including set-aside-eligible ones. Over the past few years, set-aside-eligible bidders have been able to take advantage of "pro-competitive" auction rules to acquire discounted spectrum not available to all bidders and then re-sell the spectrum a short time later to other set-aside-eligible carriers, for a significant profit. We would also highlight, again, that such transferability concerns would be irrelevant if ISED abandoned the set-aside and adopted our proposal of 20 MHz caps.

¹⁰⁹ ISED, *Consultation*, para 149.

¹¹⁰ Telus Comments, para 114; Shaw Comments, para 102; SaskTel Comments, para 59; Xplornet Comments, pg 7; Ice Wireless Comments, para 20; Tbaytel Comments, para 51; SSI Micro Comments, para 107.

¹¹¹ Videotron Comments, para 89; BCBA Comments, para 50; CCI Comments, pg 7.

¹¹² ISED, *Transfer of Spectrum Licences Held by Corridor Communications Inc. to Kian Telecom Inc.*; <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11305.html>.

120. The Department should reject proposals by Sogetel and MRC that would force subordination agreements upon licensees that acquire exclusive usage spectrum licences at significant and ongoing costs.¹¹³ Licensees also expend considerable resources in network planning and deployments wherever it is economically feasible and market-demand exists, and any mandatory process could result in challenges to the Department's current policy of setting deployment targets for spectrum licences. If a spectrum licence was involuntarily sub-divided, it could result in interference and serve as an impediment to the future deployment plans of the primary licence holder, including other spectrum sharing arrangements. The propagation characteristics of the 600 MHz band only increases the interference risks and challenges.
121. There is also no evidence for the need for mandatory subordination. As Rogers recently stated in our AWS-1 licence renewal comments, we have received many requests over the years and agreed to provide spectrum in almost every case. As long as Rogers is not using, or plans to use, the spectrum, we make it available. This has helped foster network deployment in rural and remote parts of the country.
122. Subordination and other spectrum sharing agreements should therefore continue to be negotiated on a voluntary basis to ensure that the primary licensees' deployed wireless networks and future deployment plans are not negatively impacted to the detriment of current and future wireless subscribers.

Q12—ISED is seeking comments on the proposed deployment condition of licence as stated above.

123. A range of commenters echo Rogers' support of the Department's proposed deployment condition of licence, including Bell, Shaw, Eastlink, Videotron, and Xplornet.¹¹⁴ While some commenters argue there should be more aggressive deployment requirements,¹¹⁵ especially in rural/remote areas, the Department should reject these proposals. The Consultation's proposed tiered approach that includes mid-term deployment requirements will help to ensure that deployment progresses across all licensed areas throughout the licence term while striking the right balance between ensuring rural coverage and the realities of challenging economics for rural/remote areas.

¹¹³ Sogetel Comments, para 62; MRC Comments, para 56.

¹¹⁴ Bell Comments, para 71; Shaw Comments, para 103; Eastlink Comments, para 77; Videotron Comments, para 93; Xplornet Comments, pg 8.

¹¹⁵ Sogetel Comments, para 65; MRC Comments, para 64; Ecotel Comments, para 49; BCBA Comments, para 54; SaskTel Comments, para 61; Telus Comments, para 117.

124. However, the Department should still clarify that for any Tier 2 licence that does not meet underlying Tier 3 (Year 10) or Tier 4 (Year 20) deployment requirements, the licensee will be renewed in all underlying Tier 3 or Tier 4 service areas that meet or exceed deployment requirements by the deployment timelines and only those that do not would be returned to ISED. It is important to remember that, within any Tier 2 service area, there will always be small communities and areas where the economics of deploying coverage are extremely difficult and will not yield a positive business case, even where public funding may be available. It would be counter-productive for the Department to not renew licences for Tier 3 or Tier 4 service areas where coverage has been adequately deployed, simply because these service areas happen to fall within the same Tier 2 service area as another Tier 3 or Tier 4 service area where the deployment requirements have not been satisfied.

Q13—ISED is seeking comments on proposed conditions of licence outlined in annex G that would apply to licences issued through the proposed auction process for spectrum in the 600 MHz band.

125. Rogers generally supports the Department's proposed conditions of licence as outlined in annex G and that would apply to 600 MHz spectrum licences issued through the proposed auction.

126. Rogers fully supports the comments of the many interested parties including Bell, Shaw, Videotron, Sogetel, and Telus that call for the elimination of the research and development ("R&D") condition of licence requirement.¹¹⁶ As Videotron states,

Le marché canadien du sans-fil est un marché hautement concurrentiel, au sein duquel l'innovation est un outil-clé utilisé au quotidien par les joueurs de l'industrie afin de se démarquer et de se différencier de leurs concurrents. Ces joueurs n'ont pas donc besoin d'une mesure réglementaire pour les inciter à investir dans la recherche et le développement. Parce qu'ils doivent demeurer innovateurs, ils le font de leur propre chef.¹¹⁷

127. Rogers agrees with Videotron's assessment and supports the broad calls to eliminate the R&D requirement. At a minimum, Rogers supports Bell's proposal to reduce the 2% requirement to a lower percentage (Bell provides 1% as an example, though even that may be too high).¹¹⁸ A lower percentage would make it less difficult

¹¹⁶ Telus Comments, para 122; Bell Comments, para 76; Shaw Comments, para 104; Sogetel Comments, para 68; Videotron Comments, para 96.

¹¹⁷ Videotron Comments, para 96.

¹¹⁸ Bell Comments, para 77.

for licensees to meet the requirement despite the CRA rule changes that limit eligible SR&ED claims. Sogetel suggests, “de changer la règle actuelle en diminuant considérablement le pourcentage exigible et d’inclure l’obligation de donner le montant à un organisme de R&D attiré et reconnu par ISDE.”¹¹⁹ As an alternative, Rogers would recommend the implementation of a cap on the 2% R&D requirement. Once the 2% reaches a certain revenue threshold (for example \$100 million) the licensee’s 2% of adjusted gross revenues is capped at that level and cannot increase. The cap would prevent the R&D requirement from distorting the marketplace and the investment decisions of licensees and thereby free up more capital to invest in the expansion of wireless coverage in remote areas.

128. A number of submissions, including SaskTel, Videotron, Telus, and Bell, echoed Rogers’ proposals for modification of the annual reporting condition of licence in order to help reduce administrative burdens for both the Department and licence holders.¹²⁰ Instead of annual reports, the Department should move to an “on request” model, where carriers are only obligated to provide only those documents specifically requested by ISED each year or, increase the length of time between the provision of certain reports. Such a move would reduce the regulatory and engineering burden on operators, as well as the Department, while still ensuring ISED can adequately monitor spectrum licensees to fulfill its mandate. As SaskTel notes, such a move would be in line with the Treasury Board of Canada’s “Red Tape Reduction Plan”.¹²¹

129. Bell repeats their call for the removal of the mandatory roaming condition of licence, while Telus updates their call for the removal of mandatory roaming for 5G technology,¹²² both positions the Department should firmly reject.

130. Bell states that the CRTC Telecom Regulatory Policy (“TRP”) 2015-177 established duplicative roaming regulations to those contained in ISED’s CPC-2-0-17 that, “may result in different and/or conflicting commercial outcomes for wireless carriers than the Commission’s wholesale roaming regulations, then ISED’s proposed COL on mandatory roaming introduces unnecessary regulatory uncertainty for all market participants.”¹²³

131. In fact, TRP 2015-177 does not duplicate CPC-2-0-17 and ISED’s mandatory roaming provisions remain necessary. While TRP 2015-177 did establish rate regulation for wholesale roaming services provided to non-national carriers, Client Procedures Circular (“CPC”) 2-0-17 *Conditions of Licence for Mandatory Roaming*

¹¹⁹ Sogetel comments, para 68.

¹²⁰ SaskTel Comments, para 63; Bell Comments, para 85; Telus Comments, para 140; Videotron Comments, para 97.

¹²¹ SaskTel Comments, para 64.

¹²² Telus Comments, para 131; Bell Comments, para 84.

¹²³ Bell Comments, para 83.

and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements covers important areas not contemplated by the CRTC, including the mandated roaming requirement itself. CPC-2-0-17 further includes a roaming request process backed-up by commercial negotiation timelines and arbitration if the two parties cannot come to a roaming agreement. This end-to-end process benefits millions of Canadian mobile customers by balancing the objective of encouraging the “deployment of advanced networks that provide the greatest choice of basic and advanced services available at competitive prices to the greatest number of Canadians”¹²⁴ with the fact that operators may require access to wholesale roaming services on a reasonable basis as they continue to expand their networks in an orderly manner. The mandatory roaming condition of licence therefore remains every bit as necessary today as when it was first introduced.

132. The basis for Bell’s suggestion to remove the mandatory roaming condition is to preserve facilities-based competition. Bell states, “A mandatory roaming COL that requires national wireless carriers to provide roaming to other national wireless carriers is at odds with the principles of facilities-based competition and creating incentives to invest in network infrastructure.”¹²⁵
133. The mandatory roaming regime has not impaired facilities-based competition. Unlike MVNOs, who build little to no facilities themselves, Canadian wireless carriers who roam, including Rogers, have invested billions of dollars into their networks during the mandatory roaming regime. The conditions of licence ensure such investment by only entitling roaming to carriers who build and operate their own home network. Furthermore, roaming carriers are only entitled to services they deliver themselves and at a level of quality they provide their own customers. This necessitates continuous investment by Rogers and all roaming carriers.
134. ISED (or Industry Canada as it was known then) was very deliberate when it introduced mandatory roaming, creating a regime to stimulate competition. In first establishing the mandatory roaming conditions of licence in 2008, ISED intentionally included all carriers, including national carriers. Subsequently, in 2013, ISED intentionally broadened the scope of mandatory roaming in the revised CPC-2-0-17, making the obligation indefinite and including in-territory roaming. ISED stated that this expansion was done to provide “the opportunity for operators to negotiate access to the best possible geographic coverage of roaming for their customers at a quality and at a level of service comparable to the Home Network.”¹²⁶ TRP 2015-177

¹²⁴ ISED, *CPC-2-0-17 — Conditions of Licence for Mandatory Roaming and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements, Issue 1*; <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10563.html#Roaming>.

¹²⁵ Bell Comments, para 81.

¹²⁶ ISED, *DGSO-001-13 Revised Frameworks for Mandatory Roaming and Antenna Tower Site Sharing*, para 34; <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10546.html>.

did not address these issues as they were already resolved at the time of the CRTC proceeding.

135. ISED must therefore maintain the current mandatory regime. TRP 2015-177 does not duplicate the conditions of licence. The mandated roaming requirements remain essential, especially in light of the Belus joint network, whereby each partner only builds out their Radio Access Network to an area roughly equal to their own wireline footprint. Contrary to Bell's assertion, mandated roaming is not at odds with facilities-based competition but their joint network arrangement is. It has allowed Bell and Telus to avoid investing billions of dollars into their network. The same will be true as Bell and Telus undoubtedly will build out their 5G Radio Access Networks only in their own wireline footprints and share with each other. Mandated roaming is one of the few policies that mitigates the economic advantage their joint network creates.

136. The Department should also reject proposals by CCSA and CanWISP to force subordination agreements upon mobile network operators or the BCBA's proposal that primary licensees disclose highly confidential and competitive network build plans in order to provide "reasonable justification".¹²⁷ Such measures are unnecessary. Licensees have acquired exclusive usage spectrum licences at significant and ongoing costs. They continue to expend considerable resources in network planning and deployments wherever it is economically feasible and market-demand exists. Further, any mandatory process could result in challenges to the Department's current policy of setting deployment targets for spectrum licences. If a spectrum licence was involuntarily sub-divided, it could result in interference and serve as an impediment to the future deployment plans of the primary licence holder, including other spectrum sharing arrangements.

137. Subordination and other spectrum sharing agreements should therefore continue to be negotiated on a voluntary basis to ensure that the primary licensees' deployed wireless networks and future deployment plans are not negatively impacted to the detriment of current and future wireless subscribers.

Q14—ISED is seeking comments on the proposed opening bids as presented in table 1.

138. Rogers continues to support the Department's proposed opening bids as presented in the Consultation table 1. As Shaw notes, there are a number of uncertainties in the current mobile wireless policy environment,¹²⁸ and the

¹²⁷ CCSA Comments, para 22; CanWISP Comments, para 17; BCBA Comments, para 57.

¹²⁸ Shaw Comments, para 106.

Department should not increase opening prices and instead allow for market-based price discovery.

Q15—ISED is seeking comments on the proposed eligibility points for spectrum licences in the 600 MHz as outlined in table 2, and pre-auction deposits as outlined above.

139. There was general support for Department's proposed approach to setting eligibility points for spectrum licences in the 600 MHz auction from Rogers, Eastlink, and SSi Micro and no broad objections from any party.¹²⁹

140. Rogers still believes its proposal that the Department make public prior to the commencement of bidding the identities of all bidders, the licences on which they are qualified to bid, and their initial levels of eligibility points as was done in the AWS-1 auction.¹³⁰ Revealing this information will assist price discovery in the auction, making it easier for bidders to interpret competitive dynamics and refine valuations in each service area, and promoting a level playing field across participants.

141. However, the Department should reject Shaw's suggestion to auction the 600 MHz spectrum prematurely. As Shaw itself states, Tier 2 spectrum licences will not be available until at least 2021 based on the television broadcast repacking.¹³¹ Depositing irrevocable letters of credit for 50% of auction amount will effectively tie up capital that could be deployed for more useful, immediate purposes. Shaw's reasoning that it would be useful for network planning purposes does not make sense, as deploying 600 MHz will be similar to deploying their 700 MHz spectrum. A one-for-one network overlay of 600 MHz onto 700 MHz sites is most likely, with only very limited sites considered for exclusion due to 600 MHz propagation. And once the Department announces the size of the set-aside, due to the proposed rules and market realities, Shaw will be able to know with a high level of confidence the minimum level of spectrum they will win in each of their operating areas.

Q16—ISED is seeking comments on the proposed renewal process for spectrum licences in the 600 MHz band.

¹²⁹ Rogers Comments, para 184; Eastlink Comments, para 15; SSi Micro Comments, para 48.

¹³⁰ Rogers Comments, para 185.

¹³¹ Shaw Comments, para 108-112.

142. There was a high level of support for the Department's proposal that licensees will have a high expectation of renewal at the end of the initial licence term, including from Bell, Telus, Eastlink, Videotron, SaskTel, BCBA, CCI, Ecotel, Ice Wireless, SSi Micro, Tbaytel, and Sogetel.¹³² It is essential that licensees that comply with their licence conditions have the certainty needed to make the significant investments required to deploy advanced wireless networks.
143. However, Rogers reiterates its request that the Department clarify that for any Tier 2 licence that does not meet underlying Tier 3 (Year 10) or Tier 4 (Year 20) deployment requirements, the licensee will be renewed in all underlying Tier 3 or Tier 4 service areas that meet or exceed deployment requirements by the deployment timelines. As noted above, there will always be small communities and areas where the economics of deploying coverage are extremely difficult and will not yield a positive business case, even where public funding may be available. It would be counter-productive for the Department to not renew licences for Tier 3 or Tier 4 service areas where coverage has been adequately deployed, simply because these service areas happen to fall within the same Tier 2 service area as another Tier 3 or Tier 4 service area where the deployment requirements have not been satisfied.
144. Rogers thanks the Department for the opportunity to share its views and participate in this process.

¹³² Bell Comments, para 91; Telus Comments, para 149; Eastlink Comments, para 83; Videotron Comments, para 108; SaskTel Comments, para 68; BCBA Comments, para 61; CCI Comments, pg 9; Ecotel Comments, para 57; Ice Wireless Comments, para 25; SSi Micro Comments, para 49; Tbaytel Comments, para 57; Sogetel Comments, para 75.

Appendix: Sample Alternative Formats

- A1. Rogers is providing an overview of alternative auction formats that the Department may want to consider due to the high number and varied concerns with the combinatorial clock auction (“CCA”) formats proposed in the Consultation. The two alternatives are a modified clock auction, similar to what was used for the U.S. in the forward stage of their recent 600 MHz spectrum auction and a hybrid simultaneous multi-round auction (“SMRA”), as will be used in the U.K.’s forthcoming auction of 2.3 GHz and 3.4 GHz spectrum. As with ISED’s CCA variants, both these formats are implemented with generic lots, followed by an assignment round.
- A2. These alternatives provide better options for all bidders, not just Rogers. The primary beneficiaries of lack of package bidding will, in fact, be regional carriers, as they can focus their bids on their operating areas and not face the same risk of being displaced from bids on large, nationally-based packages of licences.¹³³ Package bidding is unnecessary in the 600 MHz auction due to the proposed generic licences and Tier 2 licence areas, which means there is little danger of aggregation risk – the avoidance of which is the primary advantage of a CCA.
- A3. An SMRA or clock auction would also simplify the auction and moderate prices by avoiding the worst aspects of the CCA format, specifically spiteful bidding, benefitting each of the national carriers equally. As a result, less capital would be diverted from spending on expanding networks and deploying new technology across Canada, which is where money should be spent. Any policy that increases spectrum prices ultimately hurts the Government of Canada’s efforts to make telecommunication services more affordable for low-income Canadians.
- A4. Both of these alternative auction formats can incorporate ISED’s proposed “pro-competitive measures”, along with the enhancements Rogers has proposed to further enhance competition, such as steps to improve the flexibility of fourth competitors to explore network sharing arrangements. Either auction format alternative would prove to be a significant improvement over all of the currently proposed CCA auction formats for all potential bidders and at achieving the Department’s policy objectives with the 600 MHz spectrum auction and licensing policy. Thus, Canadian consumers and business will be the ultimate beneficiaries of the improved format and a win-win-win for Canadian wireless policy.

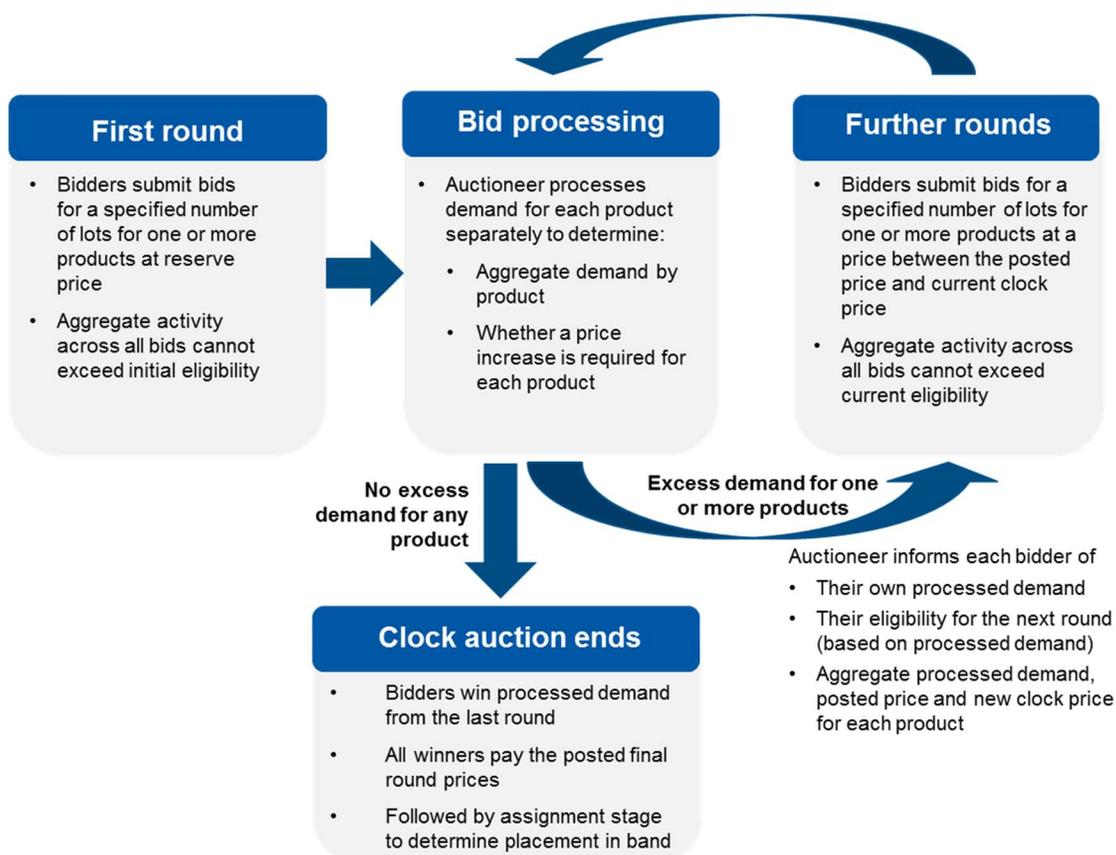
¹³³ SaskTel Comments, para 23; Eastlink Comments, para 57.

Modified Clock Auction

A5. In this document, we describe how a modified clock auction format could be adapted to allocate the 600 MHz spectrum in Canada. The rules are based on the clock auction format used by the FCC for the Forward Auction stage of the U.S. 600 MHz Incentive Auction¹³⁴, but with some modest simplifications to the bidding rules.¹³⁵ Similar to the U.S. auction, the format allows for bidders to bid on generic 2x5 MHz lots for each product and can be implemented with a set-aside.

A6. An overview of the format is provided in the figure below.

Appendix Figure 1: Modified Clock Auction Format



¹³⁴ See for example FCC, *Public Notice DA 15-1183*, Appendix G, https://apps.fcc.gov/edocs_public/attachmatch/DA-15-1183A1.pdf

¹³⁵ Bidders in the FCC auction could make three different types of bids: ‘simple bids’, ‘all-or-nothing bids’ and ‘switch bids’. The clock auction proposed here only includes ‘simple bids’ for simplicity. Only a small number of ‘all-or-nothing bids’ was submitted in the FCC auction, which suggests that this type of bid, while making bid processing more complex, adds little to no value for bidders. ‘Switch bids’ allow bidders to switch between categories in a particular service area at a price point between the posted and the clock price. This feature would only be of interest to bidders if the clock prices for open and set-aside spectrum are slightly out of sync and the bidder wants to guarantee that it gets the cheaper of the two. This can be easily avoided by syncing the clock prices for open and set-aside spectrum whenever there would otherwise be a small discrepancy between the two. ‘Switch bids’ were rarely used in the FCC auction.

A7. In the following paragraphs, we first summarize the key features of the auction, and then set out the bidding rules in more detail.

Key features:

- Bidders submit bids for a number of generic 2x5 MHz lots (quantities) of each product.
- A product is defined as a specific category (open or set-aside spectrum) in a particular service area. Thus, if a set-aside is used, then with 16 services areas, there would be 32 products.
- Bidding takes place using a clock auction format (similar to the clock rounds in a CCA):
 - Bidders submit bids for a quantity of one or more products in each round;
 - The clock price for a product increases if aggregate demand exceeds supply; if there is no excess demand, it is unchanged from the previous round; and,
 - The clock auction ends after a round with no excess demand for any product.
- All bids are subject to a simple eligibility-points based activity rule:
 - Bidders can reduce demand and/or switch demand between products as long as this does not create excess supply for any particular product; and,
 - If a switch or reduction would lead to unsold lots, the reduction or switch is only applied partially or not at all.
- If a set-aside is applied in a service area:
 - Only set-aside-eligible bidders are permitted to bid for the set-aside product; and
 - Set-aside-eligible bidders are subject to a “fair bidding rule” that requires them to bid for set-aside spectrum first whenever this is cheaper than open spectrum.

Bid submission and processing in Round 1

A8. Bidders submit bids for quantities of each product at the respective opening bid level. These bids will determine their activity in the first round, measured in eligibility points. A 100% activity requirement is applied in Round 1, but this may be relaxed modestly in subsequent rounds.¹³⁶

A9. At the end of the round, the auctioneer processes demand from all bidders. For each product, it identifies a posted price, which is the price at which all lots in a product would be sold if the auction were to close after that round. The auctioneer then determines clock prices for the second round by applying an increment to the posted price of each product. At the end of Round 1, the posted price is always equal to the opening bid and the clock price is always set one increment higher, regardless of whether there was excess demand.

¹³⁶ In the U.S. 600 MHz auction, the activity requirement could be set anywhere between 95% to 98%. We recommend an activity requirement of 95% for Canada to provide bidders with some flexibility to switch demand across service areas from Round 2 onwards. We further propose a 100% activity requirement in Round 1 to encourage bidders to submit a bid at reserve price for the entire eligibility for which they applied.

Bid submission in Round 2 and subsequent rounds¹³⁷

A10. In each subsequent rounds, bidders can submit bids for different quantities of each product at any bid price between the posted price and the clock price.

A11. A bidder may submit more than one bid for a product provided that all such bids:

- are at different price points;
- are for different quantities; and
- satisfy the principle of “one-directionality”, which requires that if bids for a product are sorted in ascending price order, they can either only be for strictly larger or smaller quantities relative to the bidder’s posted demand.

A12. Bids must also satisfy a simple eligibility-point based activity rule. A bidder’s activity (as measured by the eligibility points associated with its bids at any specific price level) across all products in a single round cannot exceed its eligibility.

A13. Subject to these constraints, each bidder has the following options with respect to the bid or bids that it submits for any particular product:

- **Maintain its demand.** This requires submitting a single bid for the same quantity as its processed demand from the previous round at the current clock price. This bid indicates that the bidder is willing to buy the same number of lots as in the last round at any price between the current posted price and the clock price. If a bidder makes this bid, it is guaranteed to end the round on the same processed demand as in the previous round.

For example, suppose a bidder has processed demand of 4 lots for product A. Submitting a bid for 4 lots for product A at the current clock price guarantees that the bidder will have processed demand of 4 lots at the end of the round.

- **Increase its demand at a price between the posted price and the current clock price.** This requires submitting a single bid for a larger quantity at a bid price.¹³⁸ This bid indicates that the bidder wants to buy any quantity between its previously processed demand and the number of lots included in its bid at any price between the **current posted price and the clock price**. If a bidder makes

¹³⁷ The FCC allowed bidders to make three types of bids: simple, all-or-nothing and switch bids. As most bids submitted in the FCC auction were simple bids, we propose that ISSED only allow simple bids, so as to simplify the auction rules.

¹³⁸ Note that similar to the FCC rules, we propose to allow bidders to submit a bid to increase demand at a price between the posted price and the clock price. This bid still entails a commitment to buy all lots at the clock price. However, this affects the order in which bids are processed. So if a bidder wants to increase demand for a number of products, it can submit these bids at different price points (relative to the respective price point) to establish a priority order in which they should be applied in case the corresponding reduction bid (which frees up eligibility to increase demand for these other products) is only applied partially. See example below on switching between products as well as the section on bid processing.

this bid, it is guaranteed to end the round on the same or higher processed demand as in the previous round. (Note: such bids are only possible if eligibility is being switched from another product).

For example, suppose a bidder has processed demand of 2 lots for Product B. Submitting a bid for 4 lots of Product B at bid price \$X means that the bidder can receive processed demand of 2, 3 or 4 lots at the end of the round. The next round posted price can be anywhere between the current posted price and the clock price.

- **Reduce its demand at a price between the posted price and the current clock price.** This involves submitting a bid for a smaller quantity than its processed demand at a bid price between the posted price and the current clock price. This bid indicates that the bidder wants to:
 - acquire its processed demand provided that the posted price is less than its bid price;
 - acquire any quantity between the number of lots included in its bid and its processed demand as long as the posted price is equal to its bid price;
 - acquire the number of lots included in its new lower quantity bid if the posted price exceeds its bid price.

For example, suppose a bidder has processed demand of 4 lots for Product C. Submitting a bid for 2 lots of Product C at a bid price of \$X means that the bidder can receive processed demand of:

- *2 if remaining demand (including from other bidders) is sufficient to cover all available lots. In this case, the next round posted price will either be equal to \$X (if demand is exactly equal to supply) or higher than \$X (if demand exceeds supply).*
- *2, 3 or 4 if remaining demand (including from other bidders) is insufficient to cover all available lots. If the bidder ends with processed demand of 2 or 3, the posted price will be \$X, otherwise it will be equal to the previous round posted price.*

Note that a bidder can submit more than one bid to reduce his demand. If the bidder submits more than one such reduction bid, these bids must follow the principle of 'one-directionality', i.e. they must request a bigger reduction at higher bid prices.

For example, suppose a bidder has processed demand of 4 lots for Product C and wants to submit a separate bid for 3, 2 and 1 lots. The bid price for 3 lots, \$X3, needs to be strictly lower than the bid price for 2 lots, \$X2, which, in turn, needs to be strictly lower than the bid price for 1 lot, \$X1. Submitting these 3 bids means that the bidder can receive processed demand of:

- *1 if remaining demand (including from other bidders) is sufficient to cover all available lots. In this case, the next round posted price will either be equal to \$X1 (if demand is exactly equal to supply) or higher than \$X1 (if demand exceeds supply).*
- *2 if remaining demand (including from other bidders) is sufficient to cover all, but one available lot. In this case, the next round posted price will be equal to \$X2.*

- *3 if remaining demand (including from other bidders) is sufficient to cover all, but two available lots. In this case, the next round posted price will be equal to \$X3.*
- *4 if demand from other bidders is insufficient to cover all available lots. In this case, the next round posted price will be equal to the previous round posted price.*
- **Switching demand between products.** To switch demand from one product to another, a bidder would need to submit a bid to reduce its demand for the product it is switching out of and a bid to increase its demand for the product it is switching into at the same price point:
 - If the bid to reduce demand for the product the bidder is switching out of is denied, the corresponding bid to increase demand for the other product is not applied at all;
 - If the bid to reduce demand for the product the bidder is switching out of is only applied partially, the bid to increase demand for the other product is only applied to the extent that the overall demand of the bidder does not exceed its eligibility.

A14. Owing to the fair bidding rule, set-aside-eligible bidders are also required to bid for set-aside spectrum first whenever the clock price for set-aside spectrum is less than the posted price of open spectrum in a service area. In this case, a set-aside-eligible bidder may express incremental demand for spectrum in a service area beyond the maximum available set-aside lots by bidding for the open product. This restriction is relaxed in case the posted price of set-aside spectrum is equal to or higher than the clock price of open spectrum.

Bid processing in Round 2 and subsequent rounds

A15. At the end of each round, the auctioneer sorts all bids for all products by their price point from lowest to highest and evaluates each bid in the resulting bid stack in turn.¹³⁹

A16. When evaluating a bid, the auctioneer checks the following:

- Can the bid be accepted in full given the aggregate demand for a product at the current stage of processing? So as to avoid unsold spectrum, no bid is applied in full that reduces aggregate demand for a product below the available supply. This means that some bids that involve a reduction in the quantity bid for of a product may only be applied partially or not at all. Note that the processing algorithm ensures that the maximum number of lots are retained from a single bidder.¹⁴⁰

¹³⁹ The price point is the percentage of the distance between the posted price of the previous round and the clock price of the current round. So for example, if the posted price is \$1,000 and the clock price is \$1,100, a bid at \$1,050 would have a price point of 50%. All bids at the same price point are ordered randomly. The order of bids remains the same throughout bid processing.

¹⁴⁰ This ensures that if two or more bidders reduce demand at the same price point, the algorithm aims to minimise the number of bidders with partially accepted demand.

- Can the bid be accepted given the bidder's eligibility? No bid will be applied in full if the bidder does not have sufficient eligibility. This means that some bids that involve an increase in the number of lots of a product may only be applied partially or not at all.

A17. Bids that can be accepted in full are removed from the bid stack. If a bid is accepted partially or cannot be accepted at all at this stage of processing, it is added to the queue. Whenever a bid is either accepted partially or in full, all bids in the queue are re-evaluated again to check whether they can be accepted in full or partially now. If a bid from the queue can be accepted in full, it is removed from the queue. The auctioneer keeps iterating over the bid stack and the queue until all bids from the bid stack have been evaluated and no further bids in the queue can be accepted in full or partially.

A18. All partially or fully accepted bids determine the "processed demand" of each bidder. The auctioneer uses processed demand to determine the posted price for each product:

- If aggregate processed demand exceeds supply at the clock price, the next round's posted price is set to the clock price of the current round.
- If aggregate processed demand is equal to supply at the clock price and at least one bid for a reduction was applied either fully or partially, the posted price is set to the highest bid price of any such bid. This ensures that the posted price will be equal to the bid price of the bid that caused demand to equal supply.
- Otherwise, the posted price is left unchanged. This ensures that in situations in which aggregate processed demand at the posted price is less than or equal to supply, the price does not increase.

A19. As a last step, the auctioneer determines the eligibility for each bidder for the next round. The eligibility of a bidder is determined as the sum of eligibility points associated with its processed demand divided by the current activity requirement.

Information provided to bidders at the end of each round

A20. At the end of each round, bidders are provided with the following information:

- Their own processed demand by product;
- Their eligibility for the next round;
- Aggregate processed demand for each product (across all bidders);
- The new posted price for each product; and,
- The clock price for each product for the next round.

End of the clock auction

A21. The clock auction ends after a round in which aggregate processed demand does not exceed the available supply for any product.

A22. Winning bidders win their processed demand in the last round and pay a price per lot equal to the posted price for the relevant product. This approach gives bidders a high degree of certainty over outcome and prices if the auction ends in any particular round, much more so than is possible with a CCA or ECCA.

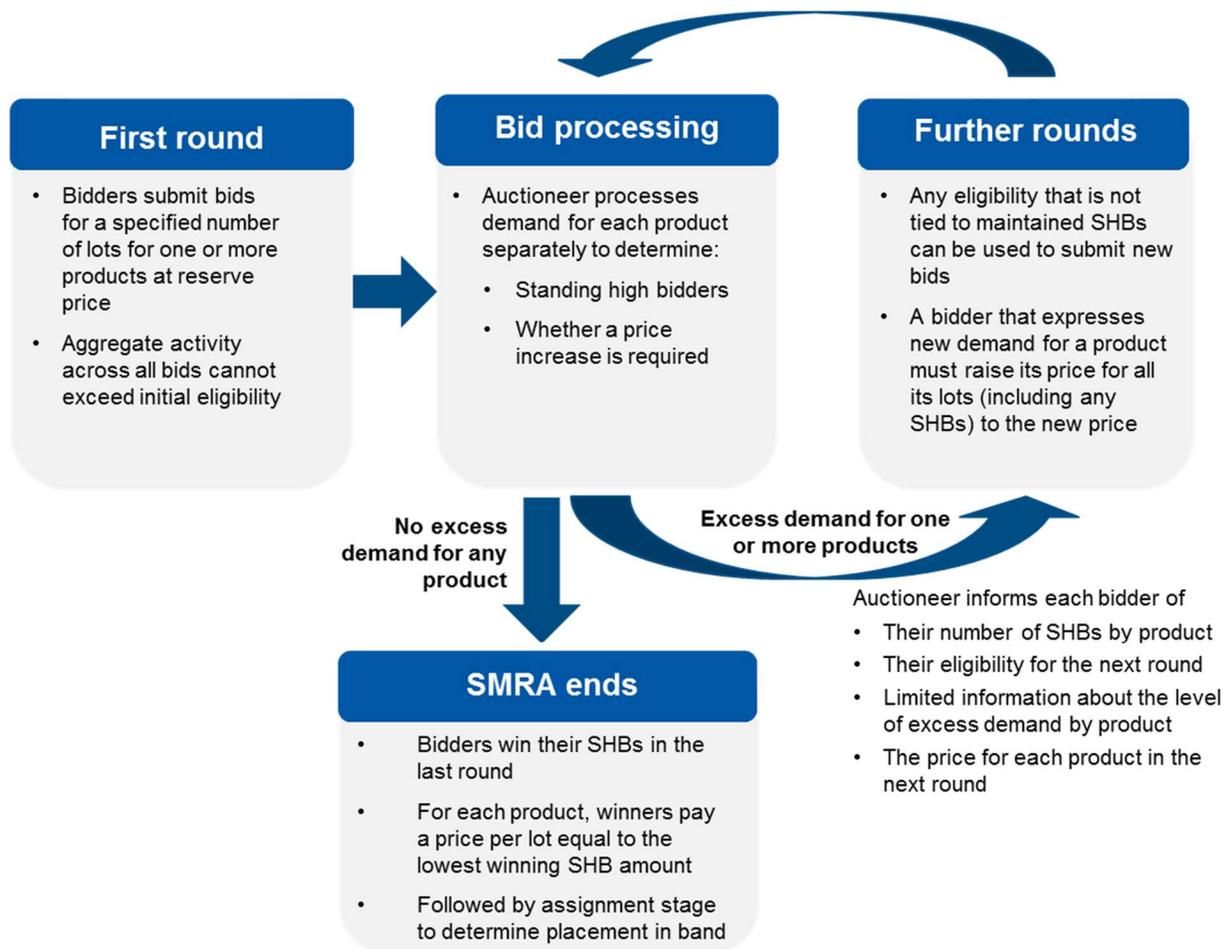
A23. The clock auction is followed by an assignment stage to allocate specific frequencies to winning bidders. The same mechanism as proposed by ISED for the assignment round following a CCA would work equally well with this auction format. The additional provisions for the assignment round that we proposed in our answer to Q6 would also be applicable to this format.

Hybrid SMRA

A24. In this document, we describe how a Hybrid SMRA format could be adapted to allocate the 600 MHz spectrum in Canada. The rules are based on Ofcom’s auction design for the forthcoming award of 2.3 GHz and 3.4 GHz spectrum in the U.K. The format allows for bidders to bid on generic 2x5 MHz lots for each product and can be implemented with a set-aside.

A25. An overview of the format is provided in the figure below.

Appendix Figure 2: Hybrid SMRA Auction Format



A26. In the following paragraphs, we first summarize the key features of the auction, and then describe the bidding rules in more detail.

Key features:

- Bidders submit bids for a number of generic 2x5 MHz lots (quantities) of each product.

- A product is defined as a specific category (open or set-aside spectrum) in a particular service area. Thus, if a set-aside is used, then with 16 services areas, there would be 32 products.
- Bidding takes place using a Hybrid SMRA format, with pricing rules that are similar to those used in a clock auction:
 - Bidders submit bids for a quantity of one or more products in each round;
 - At the end of each round, standing high bids (provisional winning bids) are identified for each product;
 - Each product has a 'current round price', a common price for a generic lot;
 - The current price is increased for any product with excess demand; and,
 - The auction ends after a round in which there are no new bids or waivers submitted.
- All bids are subject to a simple eligibility-points based activity rule:
 - Bidders can either maintain or decrease their eligibility; and,
 - Eligibility points not associated with standing high bids can be freely bid on any product in the next round.
- If a set-aside is applied in a service area:
 - Only set-aside-eligible bidders are permitted to bid for the set-aside product; and
 - Set-aside-eligible bidders are subject to a "fair bidding rule" that requires them to bid for set-aside spectrum first whenever this is cheaper than open spectrum.

Bid submission and processing in Round 1

A27. Bidders submit a bid for the number of generic lots they wish to obtain of each product at the opening bid. Each bid is for a generic 2x5 MHz lot of a particular product.

A28. At the end of Round 1, the auctioneer determines the standing high bids ("SHBs") for each product. SHBs are determined by a random draw across all bids for a product (which by definition were all placed at the common opening bid amounts).

A29. For each product:

- each bidder is allocated a unique random number and is ranked from highest to lowest;
- Bidders with higher random numbers are allocated SHBs first, and this process continues until all supply has been allocated (or, if demand is below supply, all bids have been identified as SHBs);
- At most one bidder may be assigned fewer SHBs than the number of bids submitted. This bidder is designated as a "partial standing high bidder".

A30. The auctioneer increases the clock price for the next round for each product for which the number of SHBs is equal to the number of available lots.

Bid submission in Round 2 and subsequent rounds

A31. A bidder's activity in a round determines its eligibility in the next round. Activity is measured in eligibility points. In each round, a bidder's activity must be less than or equal to its eligibility:

- In Round 1, this is based on a bidder's initial eligibility;
- From Round 2 onwards, it is based on a bidder's previous round activity (subject to a suitable activity requirement to provide bidders with some flexibility to switch between different service areas – we propose 95%,¹⁴¹ based on precedent from the FCC 600 MHz auction).

A32. A bidder's activity in a round is determined as the sum of the eligibility points associated with its maintained SHBs and the eligibility points associated with its new bids.

A33. In each of the following rounds, bidders can use the eligibility that is not associated with maintained SHBs in that round to submit new bids:

- If a bidder wants to submit one or more new bids for a product for which it currently does not hold any SHBs, it can simply submit these new bids at the round price;
- If a bidder wants to submit new bids for a product for which it currently holds one or more SHBs, it needs to replace them with new bid(s) at the current round price alongside the new bids it wants to submit. So, for example, if a bidder holds two SHBs at a price of \$1,000 and it wants to submit one new bid at the current round price of \$1,100, it needs to replace its two SHBs with two new bids at \$1,100 as well.

A34. Owing to the fair bidding rule, set-aside-eligible bidders are also required to bid for set-aside spectrum first whenever the price for set-aside spectrum is less than the price of open spectrum in a service area. Set-aside-eligible bidders will also have to bid for set-aside spectrum first whenever the round price for set-aside spectrum is less than the round price for open spectrum in a service area. Set-aside-eligible bidders can submit new bids for open spectrum if the sum of their maintained SHBs and new bids for set-aside spectrum cover all lots included in the set-aside product. This restriction is relaxed in case the posted price of set-aside spectrum is equal to or higher than the price of open spectrum.

A35. The U.K. rules allowed for a limited number of withdrawals from SHBs, subject to harsh penalties. We are not convinced that withdrawals are needed in the Canadian context. However, there may be merit in exploring this issue further.

¹⁴¹ Ofcom will apply a 100% activity requirement for its auction, but it is selling national lots.

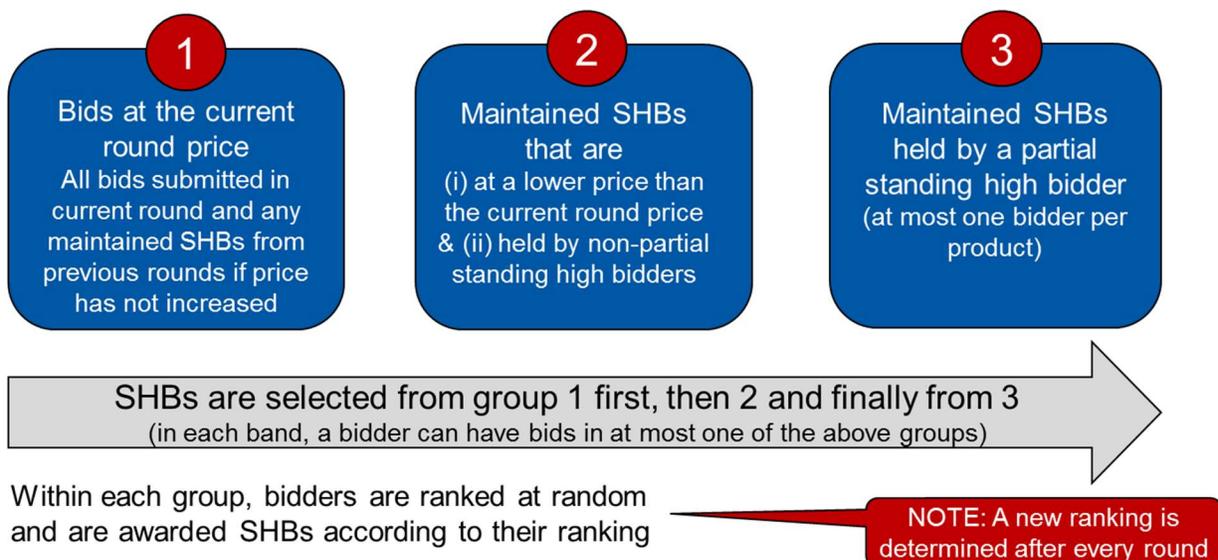
Bid processing after round

A36. After each round, the auctioneer determines the SHBs for each product. The auctioneer distinguishes between three groups of bids:

- Group 1: Bids at the current price;
- Group 2: Maintained SHBs that are at a lower price and are held by non-partial standing high bidders; and
- Group 3: Maintained SHBs held by a partial standing high bidder (at most one bidder).

A37. Within each group, bids are sorted randomly on a bidder-by-bidder basis similar to the first round. The auctioneer starts with the bids from the first group and designates as many of them as necessary as SHBs to cover all available lots. If there are fewer SHBs than needed to cover all available lots, the auctioneer moves to the second group. This is illustrated in the following figure.

Appendix Figure 3: Determination of Standing High Bids



A38. The auctioneer then determines the round price for each product for the next round. The round price increases for a given product if the number of SHBs at the previous round price is equal to the number of lots available in the band. This ensures that there can only ever be SHBs at two different prices for any particular product.

Information provided to bidders at the end of each round

A39. At the end of each round, bidders are provided with the following information:

- their eligibility for the next round;
- their number of SHBs for each product;

- for each product, total excess demand in lots¹⁴² – which is the sum of all maintained SHBs and new bids submitted in the previous round less the number of lots available; and
- for each product, the round price for the next round.

Waivers

A40. Bidders can use up to three waivers to preserve eligibility as an alternative to bidding. If a bidder uses a waiver, its eligibility will remain the same as in the previous round.

A41. The following restrictions apply:

- waivers can only be used from Round 2 onwards;
- waivers can only be used in a round in which a bidder's activity is insufficient to maintain its eligibility; and
- waivers can only be used if the bidder does not submit new bids for any lots in that particular round.

End of the hybrid SMRA

A42. The hybrid SMRA ends after a round in which no new bid or waiver was submitted. SHBs become winning bids and determine the amount to be paid by each bidder.

A43. There are two possible pricing rules. The U.K. auction will use a simple pay-your-bid pricing rule. However, a disadvantage of this approach is that it may lead to a price discrepancy between bidders winning lots in the same product. Specifically, some bidders may have to pay the current round price whereas other bidders may win lots at the previous round price. The difference can never be more than one bid increment. To eliminate this differential, we propose that all bidders pay the same price per lot, set equal to the lowest winning SHB.

A44. The Hybrid SMRA is followed by an assignment stage to allocate specific frequencies to winning bidders. The same mechanism as proposed by ISED for the assignment round following a CCA would work equally well with this auction format. The additional provisions for the assignment round that we proposed in our answer to Q6 would also be applicable to this format.

– End of Appendix –

¹⁴² For the UK, Ofcom has proposed a more restrictive information rule, but these restrictions are specific to the structure of spectrum in the UK.