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Aline Chevrier

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Re: Canada Gazette Notice No. SLPB-002-19: Consultation on a Policy and Licensing Framework for Spectrum in the 3500 MHz Band

Attached, please find the comments of Rogers Communications Canada Inc. (Rogers) in response to *Canada Gazette*, Part I, June 22, 2019, *Consultation on a Policy and Licensing Framework for Spectrum in the 3500 MHz Band* (SLPB-002-19).

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

Yours very truly,



Howard Slawner
Vice President – Regulatory Telecom
HS/pg

Attach.

Consultation on a Policy and Licensing Framework
for Spectrum in the 3500 MHz Band
SLPB-002-19

Comments of
Rogers Communications Canada Inc.
August 2, 2019



Executive Summary

- E1. The 3500 MHz auction is an opportunity for Innovation, Science and Economic Development Canada to promote both innovation and competition. The 3500 MHz (and 3800 MHz) spectrum band is emerging globally as a key pioneer band for enabling the deployment of 5th generation (5G) wireless technology. The propagation characteristics of this spectrum provides facilities-based operators a balance between decent area coverage and greatly increased network capacity that will support the deployment of advanced next-generation wireless technologies. The arrival of 5G technology, which has the potential to revolutionize how we work, study and play, will only accelerate Canadians' growing demand for mobile data services. As Canada's largest wireless provider and the leader in the Machine-to-Machine market, Rogers continues to invest heavily in advanced communication networks and requires access to additional spectrum.
- E2. The Department has an important role to play in ensuring that Canada continues to be at the forefront of 5G innovation and adoption by providing access to the 3500 MHz spectrum band in wide, contiguous bandwidths. The auction is also an opportunity to re-set the competitive landscape and re-focus attention on the state of competition in the marketplace as a whole, especially among the three national carriers. Shaw, Videotron, and Eastlink have the customer base, knowledge, facilities and access to capital to compete vigorously with the three national carriers. They no longer require massive subsidies from the Canadian taxpayer in the form of spectrum set-asides. Other jurisdictions, such as the U.K. and Denmark, have moved away from using set-asides to allowing established players and newer entrants to compete on their own merits (subject to spectrum caps safeguarding competition), including in the 3500 MHz band. It is time ISED took the same approach and discontinued unnecessary set-asides.
- E3. Rather than simply favouring the regional carriers, who are all large, diversified communications companies that do not require any protection, ISED should implement spectrum caps on individual bidders and on networks to promote effective wireless competition. The continued use of set-asides and the application of individual-operator caps to bidders who jointly deploy the spectrum they win in a single mobile network have favoured Bell and Telus. Through their joint network, they are able to circumvent ISED's spectrum aggregation limits and acquire much larger amounts of spectrum in each band, providing them with network speed and capacity advantages.
- E4. ISED's efforts to assist the new entrants have unintentionally assisted two of the largest carriers in Canada. Spectrum scarcity created by set-asides has led to tighter caps on the national players and relatively greater advantages for Bell and

Telus relative to Rogers through aggregating spectrum and escaping those tight caps. The impact of this approach is simply unsustainable for the 3500 MHz band due to the effect the amount of spectrum won will have on the quality and character of 5G services that can be delivered.

- E5. The playing field must be re-balanced to foster sustainable competition amongst all operators, not focussing only on the position of regional players. If ISED is committed to four carriers in each market, then outcomes where the two national networks do not obtain any spectrum, have holes in their national coverage or end up with vastly differing amounts of spectrum runs completely counter to its stated goals of fostering wireless competition. Unless every carrier has a realistic opportunity to obtain a sufficient amount of the valuable 3500 MHz to compete effectively, the introduction of next generation 5G wireless services could be hindered.
- E6. For these reasons, ISED should apply a 60 MHz spectrum cap to individual operators and an 80 MHz spectrum cap to single or joint networks where multiple carriers combine their spectrum into one network. While Rogers acknowledges that it has historically opposed all spectrum aggregation limits, this auction requires a spectrum cap to ensure that the Department's competition objectives can be met. Without one, it is very possible that the 3500 MHz flexible use spectrum will end up concentrated in the hands of a few. Without a network cap, network sharing partners can bypass individual caps and use their combined balance sheets to great effect. Large 3500 MHz flexible use spectrum imbalances can lead to first mover advantages in new 5G services that will be challenging to overcome, even with the subsequent release of 3800 MHz spectrum. Only a combination of individual and joint network spectrum caps will result in an outcome that will empower every carrier – both national and regional – and hasten the adoption of 5G in line with the competition objectives that ISED has itself set out.
- E7. The network spectrum cap should extend 10 years beyond the issuance of flexible use 3500 MHz licences. The Department should use the network spectrum cap to evaluate all 3500 MHz transfer and subordination requests and not permit any joint network to obtain more than 80 MHz for the 10-year moratorium. Any spectrum above the 80 MHz network cap should be returned to the Department for re-assignment. This network cap will achieve ISED's competition objectives and will benefit all Canadian wireless consumers without any of the unintentional negative impacts of set-asides.
- E8. If ISED ultimately elects to adopt a set-aside, all set-aside-eligible bidders should only be able to bid on set-aside-eligible spectrum in all service areas. In the AWS-1 and 600 MHz auctions, set-aside-eligible bidders repeatedly parked eligibility points

in the open blocks, maintaining their own eligibility while driving up the prices of the three national carriers and the costs of Canadian wireless consumers. Unless checked, such behaviour can be expected again in this auction should there be a set-aside. ISED should therefore require that set-aside-eligible bidders be made to bid on the set-aside blocks even outside of their current telecommunications footprint, rules which can be easily implemented and prevent fundamental gaming of the auction. However, even better for competition in the Canadian wireless industry would be no set-aside as Rogers' proposed individual and network caps are enough to achieve ISED's competition objectives.

- E9. The 3500 MHz auction policy will help shape the competitive landscape of the wireless industry for the next decade and directly impact the 3800 MHz policy, as these two spectrum bands should be viewed as being parts of the greater 3300-4200 MHz band. It is vital that the Department consider individual and network 3500 MHz spectrum caps, both within the auction and the post-auction period, with consideration for the 3800 MHz band. This includes the impact of the 3500 MHz assignment stage and the need to defragment the greater 3300-4200 MHz band, where technically possible and economically feasible, when the 3800 MHz band is ready for assignment.
- E10. Rogers supports the proposal to use a clock auction format for the 3500 MHz auction. It is widely understood that there is no single best auction format for awarding spectrum. Given the large amount of spectrum blocks available on a Tier 4 licensing level, we agree that the clock auction format will reduce complexity in the 3500 MHz band. Further, given the larger number of products of regional lots in this auction, a combinatorial auction with package bids would be impractical. A combinatorial format is also unnecessary given that the aggregation risks are manageable for bidders, especially if ISED adopts a slightly modified information policy, as proposed in our response to Q5, and eligibility points regime, as proposed in our response to Q18. Detailed responses to ISED's questions are provided in our submission.
- E11. In addition, if Canada is to become an innovation leader, ISED must take a holistic approach to 5G. Access to spectrum is essential but equally important is access to infrastructure. ISED must work with the Canadian Radio-television and Telecommunications Commission (CRTC) and all levels of government to ensure carriers have access to the poles (hydro and telecom), ducts, streetlights, and municipal property that are needed to place antennas and wires. Backhaul will be crucial to 5G and carriers must be able to deploy the necessary trunks and dishes.

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Introduction

1. Rogers Communications Canada Inc. (Rogers) is pleased to provide Innovation, Science and Economic Development Canada (ISED or the Department) with the following comments in response to *SLPB-002-19: Consultation on a Policy and Licensing Framework for Spectrum in the 3500 MHz Band*¹ (the Consultation), published in the *Canada Gazette*, Part I, June 22, 2019.
2. The 3500 MHz spectrum auction will be critical for setting the right conditions for 5G competition in Canada. A poor policy for the band could harm the deployment of 5G services, harming Canadian consumers and businesses and jeopardising any chance for Canada to be a leader in the early 5G period. When deciding on a framework for the 3500 MHz auction, the Department must consider the spectrum that will be made available to each of the networks, not simply the operators. ISED should support Canadian competition by applying a spectrum cap of 60 MHz for any individual operator and 80 MHz for any single or joint network. An effective spectrum cap allows the Department to ensure support for regional carriers in the urban areas where they are primarily focused, without the need to provide yet more taxpayer subsidies via another set-aside. The Department must also fully consider the 3500 MHz spectrum band within the context of the 3800 MHz spectrum band becoming available in the near future. The 3800 MHz policy is intimately tied to the competitive landscape that 3500 MHz auction policy will shape and cannot be viewed in a vacuum but, rather, as inextricably intertwined.
3. Effective spectrum licensing regimes help Canadian network operators meet the constant, increasing demand for data. Canada's mobile data traffic grew 38% in 2017, and is expected to grow four-fold from 2017 to 2022, a compound annual growth rate of 34%. In fact, Cisco predicts that Canadian mobile data traffic by 2022 will be equivalent to two times the volume of the entire Canadian Internet in 2005.² The trend of wireless traffic growth is likely to significantly increase with the advent of 5th generation (5G), as a result of new services and applications enabled by the ability of 5G to use and provide wireless bandwidth that was previously only available over wired facilities. Ensuring that spectrum continues to be available for current deployments of 4th generation (4G) Long Term Evolution (LTE) and coming 5G (and beyond) networks is critical to delivering advanced connectivity.
4. As Canada's largest single operator network, Rogers knows that wireless providers require continued and growing access to spectrum to keep pace with Canadians' demand for data services where they live, work, and play. In order to address the dramatic growth in demand for mobile data services, Rogers has already made

¹ ISED, *SLPB-002-19: Consultation on a Policy and Licensing Framework for Spectrum in the 3500 MHz Band* (Consultation); <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11439.html>.

² Cisco, *VNI Mobile Forecast Highlights, 2017-2022*; https://www.cisco.com/c/m/en_us/solutions/service-provider/vni-forecast-highlights.html#.

significant investments to deploy 4G LTE mobile broadband technology to approximately 96% of the Canadian population.³ We also continue to deliver innovative broadband services to Canadians on our march to 5G. Rogers is currently working with our network infrastructure vendor, Ericsson, on 5G trials in Toronto and Ottawa, in addition to other select cities over the next year.⁴

5. Yet, for facilities-based operators like Rogers to continue providing Canadians with the most advanced and innovative connectivity solutions, they must maintain access to interference-free, licensed spectrum that is the essential input for their networks. Canadian facilities-based network operators made capital investments in Canada's wireless infrastructure totaling \$2.92 billion in 2017 – an increase of 13.2% from 2016.⁵ Access to large, contiguous blocks of 3500 MHz spectrum will be critical for 5G services and facilities-based operators to continue the significant investments required to maintain and grow network infrastructure that enables Canadians to fully participate in the digital economy.
6. According to the CRTC, telecommunications investments made in both wireless and wireline networks was \$12.1 billion in 2017 for plant and equipment, a combined capital intensity of 24% due to the requirement to maintain and upgrade extensive network infrastructure.⁶ These numbers will only continue to grow as, according to a recent report by Accenture, the initial rollout of 5G networks is estimated to require approximately \$26 billion in capital investment, the vast majority of which will be made by Canada's facilities-based mobile wireless service providers.⁷ As Canada's largest wireless operator, Rogers increased our 2018 wireless capital expenditures to continue delivering reliable performance for our customers by augmenting our existing LTE network with 4.5G technology that is also 5G-ready.⁸ However, in order to enhance consumer experiences and meet evolving usage demands, Canadian spectrum policy, including fees policy, must ensure that spectrum can be effectively deployed within facilities-based terrestrial networks.
7. The 3500 MHz band may be the most important spectrum band for initial 5G deployments. It will provide the first opportunity for operators to access sufficiently large contiguous blocks of spectrum to provide very high bandwidth services,

³ Rogers, *Rogers Communications 2017 Annual Report.*, April 2017.

⁴ Rogers, *Rogers and Ericsson partner to bring 5G to Canadians*, April 2018;

<https://about.rogers.com/2018/04/16/rogers-ericsson-partner-bring-5g-canadians/>.

⁵ Nordicity, *Benefits of the Wireless Telecommunications Industry, 2017*; <https://www.cwta.ca/wp-content/uploads/2019/03/2017-Report-on-Economic-Benefits-of-Canadian-Wireless-Industry-Final-....pdf>.

⁶ CRTC, *Communications Monitoring Report 2018 – Retail Mobile Sector*, pg 3-4;

<https://crtc.gc.ca/eng/publications/reports/policymonitoring/2018/cmr2018-mobile.pdf>.

⁷ Accenture, *Fuel for Innovation: Canada's Path in the Race to 5G*, pg 16; https://www.5gcc.ca/wp-content/uploads/2018/06/CWTA-Accenture-Whitepaper-5G-Economic-Impact_Updates_WEB_06-19-2018.pdf.

⁸ Rogers, *Rogers Communications Reports Third Quarter 2018 Results*, October 2018.

especially in urban areas, with decent propagation characteristics. For ISED to secure its competition objectives, it must look beyond its stated aim of protecting and promoting regional competitors and must be alert to the risks for competition posed by an outcome in which 3500 MHz spectrum is very asymmetrically distributed amongst networks. The amount of 3500 MHz spectrum deployed within a mobile network will determine the key measures of service quality for novel 5G services (including peak speeds, capacity, latency, and reliability) and will therefore affect the network choices of early adopters..

8. To ensure that Canada is a leader in 5G, ISED must consider how pro-competitive measures will impact the availability of 3500 MHz spectrum for initial deployments when consumers – both retail and enterprise users – are evaluating wireless network options for new 5G services. Significant spectrum asymmetries risk creating competitive distortions that are not temporary but, rather, will have a long-lasting impact if consumers make their decisions on initial 5G service quality. Even if additional spectrum in the 3800 MHz band will become available in the future customers will already have made choices about their 5G providers.
9. The Department should be concerned about two things:
 - i. **That one or two operators gain an overly large advantage in early 5G rollouts, which may raise enduring competition concerns.** Although the 3500 MHz and 3800 MHz bands may eventually become effectively a single band (and so both substitutable and possible to combine into larger contiguous blocks), competition will be adversely affected if excessive asymmetries arise in the initial allocation of the lower 3500 MHz range. If a single network is able to take advantage of competition rules to acquire twice as much 3500 MHz spectrum as any other network, it may be able to establish an enduring lead in the provision of 5G services that could permanently damage 5G wireless competition. As early adopters of 5G will have already made decisions about network operator and might well be reluctant to switch, competition will be harmed even if the overall division of the broader 3300-4200 MHz band later becomes more symmetric once the 3800 MHz band is released. This impact is likely to be greatest in the enterprise 5G market, where buyers may be looking for long-term contracts to supply 5G connectivity to underpin business processes or to embed in other products or services.
 - ii. **The distribution of spectrum is overly fragmented amongst licensees, especially in urban areas.** There is a risk that if operators – especially those with larger customer bases – secure too little spectrum, it could delay the ability of network operators to deliver higher quality 5G services until after the 3800 MHz auction. This could weaken the competitiveness of the Canadian economy versus our major trading partners.

10. To address these issues, ISED should use both bidder and network spectrum caps as competition safeguards for the 3500 MHz auction in order to avoid excessively asymmetric holdings during the early deployment phase of 5G. Pro-competitive measures in the subsequent award of 3800 MHz spectrum should then look at holdings across the entire 3300-4200 MHz band, taking into account bidders' holdings resulting from the 3500 MHz auction and fixed wireless licence transition. In summary, the Department's policy and licensing framework for the 3500 MHz band should ensure that:

- competition between the three national operators (two national networks) remains effective, with each of the three being able to offer services competitive against the other two, taking into account the possibility of spectrum being combined; and,
- a 4th regional player has a reasonable opportunity to acquire spectrum and to build a network that can offer an adequate service in terms of speed and network capacity, allowing that player to compete effectively for its target customers.

11. Spectrum caps must be set at a level that ensures effective competition amongst 5G networks but not so tight that they unduly fragment the market. No evidence has been provided to suggest or support any regulatory intervention to force the entrance of a 5th player into markets, and any such move would be unjustified and unsupported by ISED's stated policy on competition. Any such policy action that results in such an outcome, whether intentional or unintentional, would be detrimental to consumers by denying most, if not all, operators access to large amounts of spectrum in the 3500 MHz band that are essential to very high speed 5G services.

Spectrum caps, no set-aside

12. Achieving the Department's policy objectives for the 3500 MHz band does not require creating opportunities for 5th players or pursuing outcomes in which regional competitors are strongly advantaged and heavily subsidised at the taxpayers' expense. Rather, all of the 3500 MHz band policy objectives of the Department (foster innovation and investment, enabling the development and adoption of 5G; support sustained competition; facilitate deployment of services, including rural areas⁹) can be achieved by ensuring that the division of this spectrum amongst competing networks is not significantly imbalanced. ISED's objectives can be achieved simply and effectively by setting appropriate symmetric caps for both individual bidders and for networks and does not require nor benefit from the use of a set-aside, as we explain below.

⁹ ISED, *Consultation*, para 11.

13. The Department should focus on ensuring sufficient access to spectrum for a regional player to be able to compete effectively without making large financial transfers to regional players. Regional players are well-resourced major corporations and there is no justification for the Canadian taxpayer subsidising such bidders, such as the recent \$634M subsidy as a result of the set-aside in the 600 MHz auction.¹⁰ Subsidies to regional players will not lead to lower prices for consumers, regardless of how effective these players may be as retail competitors:

- If regional players are, as the Department and Government hopes, effective competitors that drive price competition with national players, then they will have no need to pass any spectrum subsidy through to customers. Rather, the subsidies primarily turn into windfall gains for their shareholders. This effect is compounded when regional players sell spectrum in the secondary market that they acquired at subsidized prices in auctions.
- Conversely, if – as is more plausible – prices and service quality are set primarily by competition amongst the national players, then raising national operators' costs by making open spectrum more expensive may lead to consumers paying more, not less.

14. As such, Rogers strongly opposes the use of a set-aside in the 3500 MHz auction, as this may prevent an adequate allocation of spectrum to set-aside-ineligible bidders, leaving them unable to provide the quality of service that Canadians deserve. A set-aside would be harmful to the industry as a whole and would be damaging to the country's competitiveness vis-à-vis other countries, especially with Europe, where most network operators will already have access to bandwidths of 80-100 MHz. Further, a set-aside is simply unnecessary if ISED adopts Rogers' suggestion of both bidder and network caps, as this would fully implement ISED's competition objectives by ensuring that sufficient spectrum was available for regional players.

15. The introduction of 5G services and the massive machine type communications (mMTC) use-case will see 10-100 times more devices connected to the network, with some Internet of Things (IoT) devices having 10-year battery lives. IoT will empower a wide variety of sectors to increase their productivity and develop new business models. In the healthcare sector, medical and e-health services will be enabled along with a diverse range of wearables. In the transportation sector, Connected Cars will possess increasing self-driving capabilities as well as advanced logistics, robust mobility functions, and enhanced location services. For public services, sensor networks for Smart Cities and remote sensing will enhance the abilities of governments of all levels to deliver services to citizens. Several

¹⁰ Calculated by taking the difference of cost of spectrum at the auction average \$/MHzPop rate and what the regional competitors actually paid.

technologies enabled or enhanced by 5G connectivity, including virtual reality (VR), and augmented reality (AR), are expected to offer Canadian consumers and businesses advanced products and applications in many industrial verticals. Ultra-reliable low latency communications (urLLC) that demands immediate, synchronized eye-to-hand feedback to remotely control robots and deliver the tactile internet with latency below one millisecond will also drive innovation in Canadian industry. The 3500 MHz auction policy must ensure that overall Canadian industrial policy remains globally competitive.

16. The availability of unencumbered spectrum in this award varies from as little as 40 MHz up to 200 MHz. Meanwhile, it is widely recognized that in order to provide a 5G service that is a significant enhancement versus 4G LTE, operators will need access to bandwidths of 30-40 MHz or higher. Higher bandwidths per network are needed to maintain competitiveness with other countries. Practically, this means that if a set-aside was adopted nationwide, there would be many service areas where set-aside-eligible bidders would be unable to buy any spectrum in the auction. This would leave the Bell-Telus and Rogers networks with only 30 MHz each. Given that 90% of users in Canada currently use these networks, a set-aside would thus deprive the vast majority of Canadians from access to good quality early 5G services.
17. In addition, a set-aside will add significant complexity to the 3500 MHz auction process:
 - Regardless of the detailed auction rules, any set-aside will result in set-aside-eligible bidders facing restricted (or no) competition and enjoying very large subsidies at the expense of the taxpayer.
 - Creating a protected class of lots provides great opportunities for set-aside-eligible bidders to engage in gaming behaviour within auctions. This may include deliberately driving up the price of open lots, or indirectly doing so as a result of using open lots to hide demand and avoid bidding straightforwardly. The 600 MHz and previous auctions demonstrate such behaviour on industrial scales. This further exacerbates price differences between set-aside and open spectrum, ultimately increasing costs for Canadian wireless consumers.
18. By relying on well-designed spectrum caps instead of set-asides, these distortions can be entirely avoided and the auction rules significantly simplified.
19. Spectrum caps rather than set-asides are used as the primary means to promote competition in other jurisdictions (e.g. Australia, Ireland, UK, Austria, Denmark, Sweden), including in early 3500 MHz auctions. Canada has become the exception in the use of set-asides or reservations in mature mobile markets.

Spectrum caps protect both regional players and network competition

20. If ISED wishes to create opportunities for regional players and protect network competition, a simple set of caps is all that is required. The spectrum cap needs to be designed to leave sufficient spectrum for regional players while at the same time taking into account the impact of spectrum sharing on competition amongst the national operators.
21. In this regard, the key question is whether bidders who combined their spectrum holdings by virtue of network sharing arrangements should be able to bid under the same individual spectrum caps as other bidders who will be limited to their own winnings. ISED has historically permitted joint network partners to bid under individual spectrum caps but this approach is more problematic in the 3500 MHz auction than in previous auctions such as the 700 MHz auction or the AWS-3 award. Bell and Telus deploying combined spectrum in a joint network could potentially have double the amount within the 3500 MHz band as the next largest network, creating a speed and capacity advantage that no other operator could replicate.
22. At the same time, the design of the spectrum cap as a competition safeguard should not discourage spectrum sharing where this has no adverse competitive impact. Discouraging spectrum sharing could jeopardise cost savings and efficiency gains from jointly deploying a shared network, which can clearly be in the public interest in remote high-cost, low-population locations. ISED needs to balance this consideration with the risk of distorted competition, which is a particular problem in the 3500 MHz band, given the importance of this band in supporting early 5G era in Canada.
23. The size of the spectrum caps should depend on the intention of bidders to combine their spectrum resources in a single network, with sharers individually being subject to somewhat tighter caps than independent bidders but allowed jointly to acquire more than would be possible under a single cap. Without such tighter caps, spectrum sharing in the 3500 MHz band might be motivated not by network cost reductions but primarily driven by a desire to stifle facilities-based competition by creating a technical advantage over other networks that would not be able to replicate a similar quality service without access to sufficient 3500 MHz spectrum.
24. There are multiple ways in which such spectrum caps contingent on sharing could be implemented. An obvious option would be to require bidders to give an undertaking not to combine the spectrum they win in order to benefit from the individual cap. Bidders who intend to combine spectrum would then be subject to a tighter cap. If bidders who have bid under an individual cap subsequently decide to combine their spectrum, they would be required to return to ISED any spectrum in excess of the amount they could jointly have won under the tighter cap. The Department could further enforce their 3500 MHz competition policy by evaluating all subordination requests against the spectrum cap.

25. Accordingly, Rogers proposes the following individual and network spectrum caps, which are aimed at striking a balance between the twin risks of distortions to competition and undue fragmentation of prime 5G spectrum.

- **A spectrum cap for any individual operator should be set at 60 MHz.** This cap would include any spectrum that operators retain in the band after the transition period. This cap would guarantee at least 20 MHz initially for a regional player in areas where they had no existing spectrum holdings even if (a) all three national operators were to bid under individual caps and (b) each won up to the permitted amount (which will not be possible in many service areas where supply is limited by retained holdings of regional operators).
- **A spectrum cap for any individual network should be set at 80 MHz.** Where bidders who take part as separate entities intend to combine spectrum in a single network, the cap should be adjusted on a service area-by-service area basis so that no more than 80 MHz is available for any single network. This network cap would not inhibit or discourage sharing, especially if (as we set out below) bidders subject to a network cap are guaranteed contiguity in the assignment round, but will prevent network sharing partners from abusing the individual cap rule to create a huge first mover advantage in 5G delivery. It will account for the fact that network sharers might have a larger joint customer base than single operators – in aggregate, if not always in localized areas. For example, this network cap would still enable Bell and Telus to obtain up to 80 MHz combined for the Bell-Telus (“Belus”) joint network. Importantly, if Bell and Telus took up this option, this cap would ensure at least 60 MHz for operators other than Bell, Telus, and Rogers. Thus, this network spectrum cap should ensure all three networks in a service area (two national networks and the local, regional network) obtain a sufficient amount of spectrum and that ISED’s objectives for competition are met.

26. Over the last several auctions, Rogers believes the associated entity and collusion rules failed to prevent auction participants from coordinating their bidding. The established national network sharing relationship of Bell and Telus, combined with previous auction rules that allowed strategic partners to bid independently and then combine spectrum within the Belus network after the auction, have disrupted an essential competitive dynamic of the Canadian marketplace. The recent 600 MHz auction again showed a clear and deliberate strategy by Bell and Telus to secure spectrum in complementary geographic footprints, even if Bell was ultimately unsuccessful. Given the speed and cost advantages that deploying a larger amount of 3500 MHz spectrum within a single network will give them, there is every chance that Bell and Telus could adopt a similar approach with better execution in the 3500 MHz auction. This could result in an outcome in which their combined 3500 MHz spectrum holdings would give them an unassailable competitive spectrum advantage in the early 5G period, assisting in the capture of IoT customers who

would face high transaction costs in moving their business to another provider later, such as when the 3800 MHz spectrum becomes available.

27. The use of a network spectrum cap must be accompanied by broader associated entity rules. They should not be based upon any agreement to specifically use a particular spectrum band but should take into consideration current network sharing arrangements. Carriers already sharing networks will, almost assuredly, share future spectrum as well and the associated entity rules should reflect this. If carriers wish to share the 3500 MHz spectrum after the auction is complete, they should not be allowed to combine more than 80 MHz into a single network. This can be accomplished either through a secondary cap or by preventing transfers, including subordinate licences, after the auction. Any surplus held over the 80 MHz would have to be returned to ISED. These steps will ensure that there is effective competition in the provision of new 5G services.
28. The three national carriers together serve about 90% of the market and any distortion of competition between them ultimately hurts customers. It is essential the 3500 MHz auction treat all carriers, and their associated networks, equally. A spectrum cap applied to networks is necessary to ensure facilities-based network and service competition can bring the benefits of flexible use 3500 MHz spectrum to all Canadian consumers.

Impact of different amounts of available spectrum

29. The amount of spectrum available in this auction varies across service areas as a result of retained spectrum holdings after the transition period. Specifically, Rogers, Bell, and Xplornet will retain some of their existing spectrum holdings in most service areas. However, as these retained holdings would count towards the spectrum cap, they do not affect the effectiveness of the proposed competition measures. They would simply limit the ability of these bidders to bid for additional spectrum in service areas where the supply is limited because of the retained holdings.
30. In this regard, it is critical to recognize that Xplornet's retained holdings (and those of other non-national mobile operators) should count against ISED's objective of promoting regional players. Measures to make spectrum available for a further 5th player are disproportionate and unjustified; they would limit the amount of spectrum that any other player could hold to such an extent that high-speed 5G services would be compromised. Even if Xplornet were not willing to develop carrier services, there is nothing to stop regional players accessing Xplornet's spectrum through leasing or transfers, especially in urban areas where regional mobile carriers are most focused.
31. The Department should not try to pick and choose who is an acceptable 4th player and who is not. Where Xplornet or another operator is present in a service area with enough spectrum to offer a credible service (possibly in collaboration with another regional operator), the 4th player objective should be considered met.

32. Table 1 below describes the likely outcomes of the 3500 MHz auction, with differing policy options such as No Spectrum Aggregation Limits, Set-Asides, and Spectrum Caps. In the “Existing Regional Competitor” column, the aggregation limits are evaluated based on the Department accounting for the current 3500 MHz holdings of non-national carriers as part of either spectrum caps or set-asides. In the “Additional Regional Competitor” column, the aggregation limits are evaluated based on the Department not accounting for the current 3500 MHz holdings of non-national carriers and creating set-asides or spectrum caps for a 5th regional competitor. For clarity, the Department should not adopt any policy that effectively guarantees a 5th competitor, as it would overly fragment the 3500 MHz band.

Table 1: Potential Outcomes of Various Pro-Competitive Measures

	Existing Regional Competitor	Additional Regional Competitor
Spectrum Caps	<p><u>Rogers' recommended proposal</u></p> <ul style="list-style-type: none"> • Spectrum caps account for existing regional holdings • With joint network cap, holdings between national networks and local competitors are comparable, though not equal, supporting ISED's competition objectives • Joint network cap guarantees spectrum for regional operators, no need for set-aside • Spectrum rates are comparable for all bidders, supporting ISED's consumer pricing objectives • NOTE: Without 80 MHz network cap, Bell & Telus acquire maximum individual cap and effectively double cap, end result is similar to No Spectrum Aggregation Limits 	<ul style="list-style-type: none"> • Spectrum caps do not account for existing regional holdings, meaning 150 MHz for 4 operators in many regions, implying a cap of 40 MHz or less • Results in virtual set-aside, limiting spectrum available for national networks • With an individual spectrum cap but no joint network cap, potential for very asymmetric results between national networks • 3500 MHz spectrum is very fragmented between national networks and two local competitors, leading to poor 5G experience
No Spectrum Aggregation Limits	<ul style="list-style-type: none"> • Bell/Telus joint bid vehicle could obtain disproportionate amount of lots • Highly asymmetrical holdings between national networks, incompatible with ISED's competition objective • High spectrum costs for all national operators, severely limiting capital available for network deployments, incompatible with ISED's consumer pricing objectives • Regional carriers secure some spectrum in key urban markets paying same rates as national operators 	<ul style="list-style-type: none"> • Bell/Telus joint bid vehicle could obtain disproportionate amount of lots • Highly asymmetrical holdings between national networks, incompatible with ISED's competition objective • High spectrum costs for all national operators, severely limiting capital available for network deployments, incompatible with ISED's consumer pricing objectives • Regional carriers secure some spectrum in key urban markets paying same rates as national operators
Set-Aside	<ul style="list-style-type: none"> • Accounts for current holdings of non-national competitor • Highly asymmetrical holdings between national networks, risks outcome where one national network cannot effectively compete • High spectrum costs for all national operators, severely limiting capital available for network deployments • Regional carriers secure some spectrum for discount while price driving national operators' costs • Band is fairly fragmented, leading to constrained early 5G rollout • Use of spectrum caps, in conjunction with set-asides, magnifies negative impacts 	<p><u>Worst 3500 MHz outcome</u></p> <ul style="list-style-type: none"> • Does not account for current holdings of non-national competitor, attempting to create 5 (or more) local competitors • Limited 3500 MHz auction spectrum for all networks at very high costs for national networks, severely limiting capital available for network deployment • Regional carriers secure some spectrum for discount (with subsidy funded by taxpayers) while price driving national operators' costs • Band is highly fragmented, leading to constrained early 5G rollout • Use of spectrum caps, in conjunction with set-asides, magnifies negative impacts

Auction Design

33. Rogers welcomes the Department's shift to a simpler pay-as-bid auction format. However, we do have some concerns regarding the rules for switching and the potential for viable switches to be denied. The clock auction format as proposed creates unnecessary complexity and uncertainty by differentiating between submitted and processed bids, which means that a bidder may end up with a different spectrum portfolio than the one it had bid for without knowing whether this would be the case when placing a bid. We would welcome more information regarding the operation of rules permitting and limiting switching between service areas.
34. As demand reductions in one service area may not be processed in full if this were to result in excess supply in that service area, it may be the case that switches to other service areas cannot be fully accommodated. If bidders wanted to switch their demand across multiple service areas, this may then require them to specify an order of preference over switches being denied (similar to the provisions in the forward auction of the US incentive auction). This creates unnecessary and avoidable complexity. Using a version of the clock auction that designates standing high bids at the end of every round will be much simpler for bidders and the auctioneer.
35. On the other hand, it is questionable whether there is any need to facilitate switching between service areas in order to achieve an efficient spectrum allocation. Experience in recent combinatorial clock auctions (CCA) suggest that few bidders genuinely treat different service areas as substitutes and switching between service areas is primarily used strategically. If this were the case, limiting switching between service areas might be another way of keeping complexity manageable and preventing malignant price driving behaviour.
36. Rogers generally supports the Department's proposed approach to setting eligibility points for spectrum licences in the 3500 MHz auction across service areas, and pre-auction deposits. However, while we agree that it makes sense to adjust the opening bids for encumbered blocks to reflect the lower population coverage, we recommend the Department assign the same eligibility points to both encumbered and unencumbered blocks in a service area if the impairment is at most 50%. This will make it easier for bidders to switch between different products in the same service area that are likely substitutes in response to changes in prices, thereby promoting price discovery. Our proposal is discussed in detail in our response to Q18 below.
37. The proposed information policy creates aggregation risk for both set-aside eligible and set-aside ineligible bidders, as discussed in our response to Q5 below. Should the Department elect to adopt a set-aside, which we strongly oppose, it should provide aggregate demand information for each product (open and set-aside) to all

bidders in order to reduce aggregation risks and ensure an efficient outcome for the auction.

38. The 3500 MHz auction will be greatly simplified if there is no set-aside. The auction is already complex in terms of the number of products proposed and every effort should be made to reduce this complexity. There is no need whatsoever for a set-aside as all the Department's policy objectives for the 3500 MHz band can be achieved through a combination of per bidder and per network spectrum caps, as set out above, without the negative impacts on national networks from set-asides and the high cost to the taxpayer through subsidies.
39. If a set-aside is used, which we strongly oppose, the proposed eligibility rules for the set-aside in all likelihood enhances gaming opportunities. For instance, it would become much easier for set-aside-eligible bidders to either park their demand in open lots or drive up the prices of open lots in service areas in which they are not set-aside eligible at low risk of winning them in a clock auction or SMRA compared to the CCA, where every bid is potentially winning. This would unnecessarily increase the spectrum costs for the world-class national networks that Canadians rely on and be the antithesis to government policy to enhance consumer wireless pricing. As we discuss in more detail in our response to Q1C, the set-aside eligibility rules should be drafted in a way that allows all non-national operators to bid for set-aside lots rather than open lots in all service areas. None of these concerns would arise under Rogers' proposed approach that avoids a set-aside and thus differentiated categories altogether, and instead relies on other competition measures, such as individual and network spectrum caps to implement the Department's spectrum and wireless policy.

Assignment stage

40. As discussed further below, it is likely that spectrum at the top of the 3500 MHz band will have a value premium – especially for operators that secure less than 70-80 MHz for a single network – owing to the greater scope for aggregation with spectrum released in the future auction of the 3800 MHz band. To address this, ISED should give priority access to higher frequencies to individual bidders and joint networks that acquire no more than 60 MHz. This will make it easier for them to catch up with networks with access to larger combined holdings, who have less need to aggregate spectrum later. (Alternatively, ISED could propose a plan to defragment the combined band after the 3800 MHz auction).
41. In the event that the Department does not adopt a joint network spectrum cap, with the result that it is possible for Bell and Telus to win essentially double the amount of spectrum available to regional competitors and Rogers, the Department should prohibit network sharers with access to larger amounts of spectrum from the top of the 3500 MHz band. This would ensure that once spectrum becomes available in the 3800 MHz band, a network sharer with large amounts of 3500 MHz spectrum would

not have the ability to cement and even extend its advantage by winning spectrum directly above 3650 MHz that would be contiguous with spectrum already won in the 3500 MHz band.

42. Again, this could be simply implemented by requesting that national operators give undertakings prior to the auction not to combine spectrum subsequent to the auction. Winners of spectrum who offered no such undertaking or bid jointly would then be automatically placed at the bottom of the 3500 MHz band in the assignment stage. However, network partners should also be assigned adjacent spectrum by default to recognize their established joint network relationship and ensure an efficient use of Canada's spectrum resources.

Investment in Innovation

43. ISED's mobile wireless competition policy must also be more holistic than simply reduced spectrum costs for non-national carriers if it wishes to stimulate investment in innovative new technologies such as 5G. 3500 MHz spectrum is only one potential ingredient for 5G. Access to infrastructure is also essential. The Department can increase competition by ensuring that any infrastructure and rights-of-way held by municipalities, hydro utilities, and local telephone companies are made available to all other competitors. The Department should also ensure access to urban real estate (municipal and private sector) for new 5G micro sites (poles, lamp posts, street furniture, etc.) is available. The mandatory roaming regime should be maintained and continued into the 5G era in order to offset the advantages of the Belus joint network.

Spectrum fees for licences obtained outside upcoming auction

44. The Consultation states that a separate consultation will be launched to determine the spectrum licence fees that will apply to the 3500 MHz spectrum licences obtained outside the upcoming auction process.¹¹ It is important for the Department to note that spectrum licence fees, like all costs, are ultimately paid for by all Canadians. Therefore, high spectrum licence fees will raise the prices for wireless services in Canada. The Canadian Chamber of Commerce has found, "For Canada to capitalize on the opportunities provided by [5th Generation wireless technology], the federal government should ensure there is enough mobile radio spectrum available to telecommunications providers and that the cost of that spectrum is in line with the cost in similar jurisdictions."¹²
45. However, Canada's Cellular and Personal Communications Services (PCS) spectrum licence fee rate is among the highest of such rates among developed countries and is significantly higher than the rate charged in the United States. Using

¹¹ ISED, *Consultation*, para 179.

¹² Canadian Chamber of Commerce, *Stuck in Traffic for 10,000 Years: Canadian Problems that Infrastructure Investment can Solve*; www.chamber.ca/media/blog/170719-stuck-in-traffic-for-10000-years.

the Cellular and PCS rate of \$0.035/MHzPop for 3500 MHz spectrum licences outside of this auction would add approximately \$108M (60%) to the \$180M annually in mobile spectrum fees that the wireless industry currently pays. Considering the billions of dollars already paid by licensees in spectrum auction payments, as well as the wireless industry’s substantial contribution to the Canadian economy – more than \$27.5 billion to GDP in 2017¹³ – the Department is already receiving more than a fair return for the use of the spectrum resource. The Department should lower spectrum licence fees to a level that is closer to the Department’s actual administrative costs of managing the spectrum. This action would eliminate a significant financial drag on the wireless industry and would result in more affordable services and greater investment in advanced wireless networks and services.

Technical rules for the band

46. The Department should launch a revision or new Standard Radio System Plans (SRSP) for the 3500 MHz at the earliest possibility. Issue 3 of *SRSP-303.4 – Technical Requirements for Fixed Wireless Access Systems Operating in the Band 3475-3650 MHz* was published in December 2008 and thus predates the deployment of even 4G LTE radio equipment in Canada. As such, the SRSP, as well as *RSS-192 – Fixed Wireless Access Equipment Operating in the Band 3450-3650 MHz*, will need to be updated to accommodate new and innovative technologies like 5G in the 3500 MHz band. This was highlighted by Rogers and others in the Department’s *Consultation on Revisions to the 3500 MHz Band to Accommodate Flexible Use and Preliminary Consultation on Changes to the 3800 MHz Band*.

47. We propose that at as a starting point, the Department look at potentially harmonizing power limits between the 3500 MHz band and comparable mobile bands in Canada, taking into consideration differences in propagation. Any updates to the RSS should be written based on international Third Generation Partnership Project (3GPP) standards for TDD systems operating in similar bands.

Table 2: Comparison of Comparable Mid-Band SRSP Power Levels

Band	Tx Frequencies (MHz)	SRSP	Urban SRSP Power Limit	Rural SRSP Power Limit
PCS	1930-1995	510	1640 W/MHz	3280 W/ MHz
AWS	2110-2180	513	1640 W/MHz	3280 W/ MHz
BRS	2620-2690	517	1640 W/MHz	
FWA	3475-3650	303.4	32 dBW (1,589 W)	
3500MHz	3450-3650		1640 W/MHz	3280 W/ MHz

¹³ Nordicity, *Benefits of the Wireless Telecommunications Industry*, 2017.

3800 MHz Band

48. Rogers view is that the 3800 MHz band (3700-4200 MHz) holds great potential for 5G services in Canada and the Department should strive to maximize the amount of spectrum available for commercial mobile services in the band as quickly as possible. To accomplish this, ISED should take steps to allow shared use of this band by commercial mobile service operators and by Fixed Satellite Service (FSS) operators.
49. While FSS provides valuable services in deep rural and remote areas of Canada, especially in the Far North, the value of this spectrum is far greater to Canadians if used to provide terrestrial 5G. As terrestrial 5G services will be of greatest value to Canadians in urban and suburban areas and along major transportation corridors, Rogers believes that the best approach would be to displace FSS operators in urban and suburban parts of Canada, while FSS operators in deep rural and remote parts of Canada continue to operate with suitable exclusion zones and guard bands. Rogers believes that this remedy is imminently practical, as urban and suburban FSS earth stations can in many cases be economically replaced by a fibre optic or other fixed connection, which would greatly reduce the demand for FSS capacity in those areas.
50. We note that the Federal Communications Commission is tackling the same issue in the United States and are conducting a public consultation to determine the optimum outcome. A number of parties have proposed some innovative solutions that may be applicable in Canada:
- ACA Connects Coalition submitted a proposal that would make 370 MHz available for 5G services, with an emphasis on converting urban markets first; their view is that 130 MHz of spectrum is sufficient to meet the ongoing needs of FSS operators;
 - AT&T submitted a proposal that would split the 3800 MHz band into three portions; an “unrestricted” portion for high power 5G commercial services; an “adjacent licenses” portion where 5G operations are restricted to permit coexistence with FSS operations; and an “FSS” portion for “re-packed” FSS operators; (AT&T did not propose specific amounts of spectrum for each portion, leaving that to a future consultation);
 - Wireless Internet Service Providers Association (WISPA), Google, and Microsoft jointly proposed an arrangement in which the lower 200 MHz is allocated exclusively for 5G mobile services and the upper 300 MHz is shared by 5G Fixed (Point-to-Multipoint) and FSS operators; this approach allows the use of 10 km exclusion zones to protect FSS operations; and,

- C-Band Alliance submitted a proposal that would make 180 MHz available for 5G services, employing a 20 MHz guard band and leaving 300 MHz for FSS operators.

51. The FCC summarized these proposals in Public Notice DA-19-678 (published July 19, 2019) and are now seeking comments on these specific proposals. Rogers recommends that ISED should closely monitor this proceeding, as we are confident that the FCC will adopt a solution that maximizes the efficient use of the band by both 5G and FSS operators.

52. Rogers' view is that ISED should seek to make at least 400 MHz of the 3800 MHz band (3700-4100 MHz) available in Canada for commercial 5G services with flexible licensing, with FSS operators re-packed into the remaining portion of the band (4100-4200 MHz). If the WISPA/Google/Microsoft approach is adopted in the U.S., ISED should consider making the entire 3800 band (3700-4200 MHz) available for 5G, with flexible licensing in the lower portion and fixed (point-to-multipoint) licensing in the upper portion.

53. The remainder of Rogers' comments will respond to the specific issues raised in the Consultation Paper.

Q1A: ISED is seeking comments on its proposal to implement pro-competitive measures in the 3500 MHz auction.

54. Rogers agrees with the Department's views that licensing of 3500 MHz spectrum as a flexible use band is an opportunity to release spectrum to further support investment by service providers and to improve wireless services for Canadians.¹⁴ The competition issues facing the Canadian wireless industry require a more holistic approach than a simple decision on how to offer access to spectrum on preferential terms to certain providers, yet again. If the Department wishes to create successful competition within the 3500 MHz band that both protects network competition and creates opportunities for regional players, they should implement per bidder and per network spectrum caps and absolutely not adopt a spectrum set-aside. The network spectrum cap should not allow the combining of more than 80 MHz of 3500 MHz flexible use spectrum, through transfers or subordination, for 10 years following the issuance of flexible use licences. A well-designed spectrum cap that ensures sufficient spectrum for regional players while at the same time taking into account the impact of spectrum sharing on competition amongst the national operators is critical to supporting long term competition in the Canadian wireless industry.

¹⁴ ISED, *Consultation*, para 27.

55. The market has evolved considerably since 2008, when Industry Canada initially set aside spectrum in the AWS-1 auction and Rogers helped launch the modern smartphone era in Canada as the exclusive carrier for the Canadian launch of the Apple iPhone. AWS-1 “new entrants” have either gone bankrupt or strengthened their regional positions as part of some of Canada’s biggest telecommunications conglomerates. Bell and Telus have formed a network sharing arrangement (the “Belus” network) dividing the country in two, and Bell has acquired MTS. Canada now has four strong competitors in each market supported by two national wireless networks (Rogers and Belus) and, in most provinces, a third regional network supporting a fourth retail competitor. Largely due to the competition between the national networks, Canadians in all regions currently have access to world-class mobile voice and broadband data services with the wireless measurement company Open Signal stating, “As the 5G era approaches, Canada has become a standard bearer for the power of 4G networking — and it continues to impress in our metrics.”¹⁵ As a result, the state of competition is markedly different than a decade ago and requires a broader set of policies than simply reserving spectrum for particular qualified parties.

Spectrum costs in Canada continue to be amongst the highest in the world

56. Before deciding on any pro-competitive policies, an assessment of the impact of past policies is necessary. While ISED has been successful in introducing new entrants into the Canadian wireless industry, it did come at a considerable cost. Spectrum acquisition and annual costs, particularly for national carriers, are very high in Canada. In fact, since 2001, licensees have spent more than \$20B on spectrum at auction and in annual fees, with the bulk of auction costs occurring since 2008.¹⁶ In ISED’s most recent 600 MHz auction, due to the large amount of spectrum set-aside for the regional competitors, one of the national carriers, Bell, was unable to secure any spectrum even with bids exceeding \$1.25B in the clock and supplementary rounds.¹⁷ The wireless industry currently pays more than \$180M in annual mobile spectrum fees and approximately \$52M in annual fixed service fees.¹⁸ 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.

¹⁵ Open Signal, *Mobile Network Experience Report: Canada (February 2019)*;

<https://www.opensignal.com/reports/2019/02/canada/mobile-network-experience>.

¹⁶ ISED, *Spectrum Auctions*; http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf01714.html. Note: \$20B is nominal and does not account for inflation. Spectrum fees calculated based on industry holdings.

¹⁷ ISED, “Bidding Information”, *Auction of Spectrum Licences in the 600 MHz Band*;

http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf11331.html.

¹⁸ ISED, *Decision on the Licence Fee Framework for Fixed Point-to-Point Systems*, para 73; available from:

<http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11532.html>. Mobile spectrum fees calculated based on industry holdings.

57. As Rogers has previously shared with the Department, a 2017 report from the GSMA highlighted recent academic work that links upfront input costs to depressed investment and reduced price competition.¹⁹ The report presented evidence linking high spectrum spending with lower quality and reduced take-up of mobile broadband services, and higher consumer prices for mobile broadband data. Further, the report identified Canada as having the highest spectrum spend per person in the world over the last decade. Between 2008-2016, Canadian operators paid roughly US\$350 per person to acquire spectrum at auctions, compared to under US\$200 in the United States and just over US\$50 in the United Kingdom. That figure has risen to C\$452 for Canadian operators, including recent auctions such as 2019's 600 MHz. While operators directly pay these costs to the government in auctions, Canadian consumers ultimately bear a significant share of these high costs through the prices they pay.
58. However, this is only part of the Canadian story, as spectrum spending at auctions across carriers is highly unbalanced. Table 3 compares spectrum spend per person and per person per MHz of spectrum (MHzPop) across Canadian mobile operators from 2008-2019, from the AWS-1 auction up to and including the 600 MHz. The regional carriers have been able to secure spectrum at a modest cost of C\$0.66/MHzPop. In contrast, Rogers (C\$2.32/MHzPop) and Bell-Telus (C\$1.43/MHzPop) have been obliged to pay huge premiums. The latter are not strictly market prices but have been inflated due to artificial auction constraints that have benefited the new entrants. The inflated expenditures reduce the capital available to national carriers to invest in their two networks.

¹⁹ GSMA, *Effective Spectrum Pricing: Supporting better quality and more affordable mobile services*; <https://www.gsma.com/spectrum/effective-spectrum-pricing/>.

Table 3: Total spectrum spend per person by Canadian operators, 2008-2019

Auction Participants	Spectrum spend	Total spectrum acquired (population weighted)	Spectrum spend per person	Spectrum spend per MHzPop
Telus	C\$5.00B	104 MHz	C\$142.34	C\$1.45
Bell	C\$1.83B	44 MHz	C\$52.20	C\$1.37
Belus	C\$6.84B	148 MHz	C\$194.53	C\$1.43
Rogers	C\$6.04B	79 MHz	C\$171.84	C\$2.32
Regional Carriers	C\$3.00B	174 MHz	C\$85.54	C\$0.66
TOTAL	C\$15.9B		C\$451.91	C\$1.33

Notes: Auction costs have not been adjusted for inflation. Auction spending of Public Mobile, Mobilicity, and MTS included in Regional Carriers. 2008 AWS-1 excludes results for PCS-G block and I block. Does not account for transactions in secondary market.

59. The same GSMA study also thoroughly debunked the myth that the amount of money that operators spend on spectrum should have no impact on the development of mobile services, as spectrum costs are supposedly “sunk” and do not affect subsequent investment decisions. It cites extensive theoretical and empirical work from academia, which shows that in industries with natural limits on the number of viable operators, high input costs depress incentives for investment. In a comprehensive global study of spectrum auction prices, the study also found evidence linking higher spectrum prices to low investment in 4G networks and higher consumer prices for mobile data. Further, it is important to note that Canadian spectrum costs should not even be considered “sunk”, as auctioned spectrum moves to annual fees and non-auctioned spectrum is subject to fees from the start of its licence term. High spectrum costs are ongoing in Canada, not sunk.
60. These conclusions match with our own experience with auction formats, as the 700 MHz auction rules resulted in Rogers spending over \$3.29B to secure the minimum quantity of 700 MHz spectrum necessary to provide the coverage and service that our customers demand. In the 600 MHz auction, set-aside rules meant Rogers spent more than double the \$/MHzPop rate than regional carriers to secure spectrum for the largest single operator network serving more than 10.8M Canadians. Spectrum is the lifeblood of mobile networks. However, this represents significant capital diverted from continued expansion of our rural coverage and investment in innovative 5G technologies.
61. Previous set-asides have therefore come at a significant cost. They have driven up spectrum costs dramatically against Canada’s peers, costs which are borne not just by operators but also wireless subscribers, and the economy in general. More

importantly, they have skewed auction results, causing large variances in what different operators pay. This directly affects the ability of carriers to invest, and thereby compete with one another. ISED must seriously assess whether such measures are helpful. The main beneficiaries of set-asides have been speculative acquirers of spectrum who have subsequently sold it for a profit.

Regional carriers are capable competitors

62. Since 2008, the Department has been focused on introducing new competition in the mobile wireless market. This objective has evolved to ensuring there are four strong competitors in each area of Canada. Looking at the competitive landscape today, this goal has been fully achieved and there is a strong competitor to the national carriers in every region. These fourth carriers are all part of established telecommunications companies that are among Canada's largest providers of quad play services, including telephony, television, internet, and mobile services and no longer (if they ever truly did) require ongoing support.

63. The regional carriers have continued to leverage ISED spectrum policy support to the advantage of their shareholders:

- Shaw, Freedom Mobile's parent, has an enterprise value of \$18.6B (an increase of \$1.06B since the 600 MHz auction consultation);
- Quebecor, Videotron's parent, has an enterprise value of \$14.2B (an increase of \$3.9B since the 600 MHz auction consultation);²⁰
- SaskTel has a market share of 62% in its operating area²¹ and the deepest spectrum portfolio of any single carrier in Saskatchewan; and
- Bragg Communications, parent of Eastlink and Canada's largest privately-held telecommunications company, reports more than \$640M in annual revenue, not including their mobile wireless business.²²

These are all well-capitalized, highly-competitive, companies with an established presence in their operating regions which are not in need of taxpayer-subsidized spectrum prices.

64. Moreover, in the 600 MHz auction, multiple regional competitors made clock and supplementary bids in excess of a billion dollars each. Through the advantageous auction rules, all the spectrum awarded to regional competitors cost less than \$1B total while they were able to drive the costs of spectrum paid by the national carriers. In light of the recent evidence provided by the 600 MHz auction data, it makes no sense to provide non-national carriers with access to the 3500 MHz band at heavily

²⁰ As per Scotiabank, *Converging Networks* [Analyst Report], June 10, 2019.

²¹ CRTC, *CMR 2018 - Retail Mobile Sector*; <https://open.canada.ca/data/en/dataset/f4233c69-f639-4cab-a234-80dbdd04eaa0>.

²² CRTC, *Reporting Guide for the Aggregated 2016 Broadcasting Distribution Undertakings (BDU) Annual Return Form – Bragg Communications*; http://crtc.gc.ca/public/5040/Bragg_2016_BDU_Aggregate_Return_public.pdf.

subsidized prices on the basis that they require continuing financial support in terms of a set-aside.

65. This is the sixth auction in succession that ISED has proposed competition measures aimed at supporting “new competitors” and/or regional operators, including 2008’s AWS-1 band, 2014’s 700 MHz band, and 2015’s 2500 MHz and AWS-3 bands and 2019’s 600 MHz band. Over the last decade, ever larger quantities of spectrum have been set aside or reserved for such players. Some of that spectrum has ultimately been sold to national operators or other regional operators, resulting in windfall gains for the seller. As recently as July 12, 2019, set-aside-eligible bidders have sold spectrum they acquired through a set-aside.²³
66. The Department should also reject any claims made by regional carriers that national carriers at any point received “free spectrum” as they have no basis in reality. While national operators were awarded spectrum with no upfront costs in the first decade of wireless service, they have paid annual fees every single year for that mobile spectrum. It is important to note that these particular spectrum awards were made at a time when demand for mobile wireless services was a fraction of what it is today, and operators were incurring significant annual operating losses. National carriers have never received free spectrum and have generally paid significantly more for all their spectrum vis-à-vis regional competitors. For instance, regional carriers were awarded AWS-3 for a pittance in auction fees that sees them pay an average annual fee of just \$0.0005/MHzPop over their licence term. Over the same period, national carriers are paying \$0.035/MHzPop for Cellular and PCS spectrum.²⁴ This means that national carriers are paying a rate of 702% more per year for their so-called “free” spectrum compared to the regional carriers’ sweetheart AWS-3 spectrum deal during the same time period. Table 4 below highlights the large taxpayer subsidy provided to regional carriers. Further, Eastlink just sold set-aside AWS-3 spectrum, presumably making a massive profit at taxpayer expense. Rogers alone has paid almost \$1.2B in annual spectrum fees since 2001 for its 850 MHz and 1900 PCS spectrum that was not acquired through auction. The myth that the national carriers received free spectrum while the new entrants have not must be fully dispelled once and for all.

²³ ISED, *Transfer of spectrum licences held by Bragg Communications Inc. to TELUS Communications Inc.*; <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11537.html>

²⁴ Industry Canada, *CPC-2-1-10 — Spectrum Licence Fee Calculations for Cellular and Incumbent Personal Communications Services (PCS)*; <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01291.html>

Table 4: Regional carriers AWS-3 spectrum subsidy

	Auction Cost	Total MHzPops	\$/MHzPop	Annual \$/MHzPop Cost	Min. Licence Subsidy (Spectrum @ PCS & Cellular rate minus Auction Costs)	Max. Licence Subsidy (Spectrum @ Open Rate minus Auction Costs)
Shaw	\$56.4M	554M	\$0.10	\$0.005	\$350.5M	\$1.47B
Videotron	\$31.2M	297M	\$0.11	\$0.005	\$176.6M	\$798.3M
Eastlink	\$10.0M	93M	\$0.11	\$0.005	\$33.5M [#]	\$250.2M [#]
Regionals	\$98.2M	934M	\$0.11	\$0.005	\$560.6M	\$2.51B

Note: [#] Does not include profits Eastlink made by selling set-aside spectrum to Telus in July 2019; Open spectrum rate calculated as \$2.80/MHzPop from both AWS-3 (2015) and 700 & AWS-3 (Residual 2015) auctions.

Set-asides encourage abusive price-driving behaviour

67. Strategic bidding by new entrants plagued the AWS-1 auction. The new entrants repeatedly bid on open blocks when cheaper set-aside blocks were available, freely parking their eligibility points on the open blocks, driving up the costs for the national carriers while keeping the set-aside prices down. Similar behaviour was seen in the 600 MHz auction, where set-aside-eligible bidders like Videotron parked points in Alberta and British Columbia, driving up open prices for spectrum for which they had no intrinsic valuation.

68. Anything that creates strategic opportunities for set-aside-eligible bidders to drive up the prices paid for non-set-aside spectrum will only increase wireless prices. The most recent set-aside in the 600 MHz auction resulted in Rogers and Telus having to pay, respectively, 211% and 290% higher prices on a MHzPop basis than the average price paid by the regional carriers. Higher spectrum costs are ultimately borne by consumers and negatively impact affordability for all Canadian mobile subscribers and generally hurt competition in the mobile industry. As Rogers has previously highlighted, there are a number of reasons why bidders eligible to take advantage of pro-competitive measures might seek to drive up the price of open spectrum:

- i. Bidding for open spectrum instead of set-aside spectrum may be an effective strategy in order to maintain flexibility for subsequent bids on the set-aside spectrum that the eligible bidder actually wants;
- ii. By driving up the price of non-set-aside spectrum, a winner of set-aside spectrum might seek to establish a higher valuation for its spectrum in the case that it were eventually to transfer that spectrum to another party. Spectrum speculation of this type was seen when Videotron acquired spectrum in the 700 MHz auction

and later sold it to Freedom Mobile for a much higher valuation, in part due to the higher prices that Rogers and other national carriers paid; and

- iii. A winner of set-aside spectrum might wish to reduce the financial resources available to other winners that could be used for network deployments or to promote products and services for customers post-auction. Ultimately, such behaviour is detrimental to all Canadian consumers and businesses and to competition in the market place.

69. Such strategic behaviours that punish all Canadian wireless consumers can be avoided by not adopting a set-aside in the 3500 MHz auction. It is past time for the Department to retire the use of set-asides in mobile spectrum assignments.

70. Several jurisdictions initially used reservations to support new entry to the wireless industry and then subsequently allowed those carriers to compete on their own, subject to spectrum caps to safeguard competition. For example, both the U.K. and Denmark had set-asides reserved for a new competitor. However, they both ended such privileges over time. In the U.K., Ofcom used set-asides and caps in 2000 and 2013 respectively but their recent 3.4-3.6 GHz auction did not reserve any spectrum for new entrants, instead relying only on spectrum caps. In Denmark, the wireless carrier “Three” which entered the market with a 3G licence, benefited from a set-aside of 900 and 1800 MHz spectrum in 2010. The Danish authorities subsequently held open auctions, requiring Three to compete on its own without artificial support. Three proved its ability to compete in open auctions, winning spectrum in 2016 and 2019 comparable to the amounts of spectrum won by incumbents. It is time Canada followed suit and required the regional carriers, who are well capitalized, to compete on their own.

Policy affecting competition between national carriers is vital

71. Over the last 15 years, the key dynamic driving service and price innovation in the mobile wireless industry has been competition between Rogers, Bell, and Telus. As noted above, Rogers was first to deploy 4G LTE in Canada, which helped drive the cost per gigabyte of mobile broadband data down for all wireless subscribers while increasing speeds. We also helped launch the modern smartphone era in Canada as the exclusive carrier for the Canadian launch of the Apple iPhone and the first operator to launch Android in Canada. Canadians in all regions currently have access to world-class mobile voice and broadband data services due to the competition between national operators, with the wireless measurement company Open Signal stating that Canadian national operators’ network speeds “surpass the majority of the world's operators.”²⁵ Today, the three national operators are

²⁵ Open Signal, *State of Mobile Networks: Canada (January 2017)*;
<https://opensignal.com/reports/2017/01/canada/state-of-the-mobile-network>.

upgrading their networks and racing to launch 5G, the next generation of connectivity services to Canadians.

72. While the regional carriers that came to market after the 2008 auction have played a role in competition, especially amongst value-focused customers, the three national carriers still play the pivotal roles in both price competition and technological advancement. ISED's spectrum allocation policy, however, has continued to focus exclusively on support for those entrants, with scant regard for the negative impact of such policies on sustainable competition between the national carriers. The Department must provide greater consideration of the impact that set-asides and asymmetric caps have had on spectrum prices for national wireless service providers, and thus the prices Canadian consumers pay. This is especially true if pro-competitive measures result in unduly asymmetric spectrum allocations to one or both of the national networks.
73. Indeed, the Department should be focusing at least as much attention on asymmetries between national carriers as it does between them and recent entrants. The Canadian market is unusual in that two of the largest three operators, Bell and Telus, share their spectrum and their network. Whereas, in the downstream market, Rogers, Bell and Telus have similar weight, this is not necessarily true when competing for spectrum, where Bell and Telus can potentially leverage the combined weight of their spectrum sharing and joint network arrangement. Policies to assist regional carriers have had unintended consequences of negatively influencing competition amongst national carriers, exacerbated by the Bell and Telus joint network. The result has been that the Bell and Telus joint network has been able to acquire one of the largest spectrum portfolios in the world, despite caps and set-asides in previous auctions. The impact to wireless competition of the Bell and Telus network acquiring double the spectrum in the 3500 MHz band of Rogers' or any other network would be even greater than in previous auctions.
74. The challenges with the existing associated entity and collusion rules have been clearly demonstrated by the ongoing Bell and Telus relationship. Since 2008, Bell and Telus combine their spectrum after every auction, along with their local telecommunications wireline assets, allowing them to avoid capital costs and improve speeds. While the failure of Bell to secure any 600 MHz spectrum may provide a short-term challenge to the Bell and Telus joint network in terms of low-band coverage, this will not be repeated in the coming 3500 MHz auction. Even with Bell being unsuccessful in securing 600 MHz spectrum, the bid data shows, without any direct collusion, Bell and Telus attempting to divide the non-set-aside spectrum between the two companies perfectly along the lines of their wireline territories.
75. The Department's competition measures in the 4G era have focused almost exclusively on spectrum for regional carriers, while ignoring asymmetries between national operators. Maintaining a truly competitive mobile market for the 5G era

relies on more than just ongoing assistance to regional carriers. 3500 MHz spectrum caps that apply at the network-level both within the auction and post-auction operating environment must be adopted in order to ensure a level playing field between the national carriers.

Spectrum caps are essential

76. Rogers has long been a proponent of open auctions. We continue to believe having market forces fully determine the outcome of spectrum licensing ensures those companies that value the spectrum the most will be able to acquire it and put the spectrum to its highest use. It also makes certain that all bidders pay the true market value of this scarce and valuable resource to the benefit of Canadian taxpayers. However, due to the effect of the Belus joint network, the use of a spectrum cap applied to networks is necessary to ensure competition between the three national operators remains effective and allow the Department to ensure a 4th regional player has a reasonable opportunity to acquire spectrum in the urban areas where they are concentrated.
77. The 3500 MHz auction will be the sixth auction in succession that ISED has proposed measures aimed at supporting the regional carriers and/or new entrants. The result of this policy is that it artificially squeezes spectrum available for national carriers, as seen in the AWS-3 and 600 MHz auctions where one of the national carriers did not receive any spectrum. Further, the manufactured scarcity has had dramatic bidding repercussions resulting in significantly higher spectrum prices, ultimately borne by Canadian wireless consumers. Should the Department adopt auction rules focused on generating asymmetric auction results (both prices paid and spectrum for networks), competition within the early deployment phase of 5G era could be irrevocably damaged. Such competitive outcomes would be terrible for the industry and Canadians.
78. As such, the Department must adopt a 3500 MHz spectrum cap applied at the network-level that will prevent the combining of 3500 MHz spectrum above the cap for ten years. Rogers recommends the Department adopt an individual cap set at 60 MHz, which includes any flexible use spectrum that operators will retain in the 3500 MHz band after the transition period. This would guarantee at least 20 MHz for a regional player in areas without existing spectrum holdings by such players even if all three national operators bid under individual caps and won up to the permitted amount, which will not be possible in many service areas where supply is limited by retained holdings of regional operators. Where bidders who take part in the auction as separate entities intend to combine spectrum, the individual cap should be reduced to allow the joint network to obtain up to 80 MHz combined as set out above. Under this scenario, regional carriers would be guaranteed a significant amount of spectrum up to 60 MHz. Most importantly, all three networks in a service

area would have comparable – though not equal – amounts of spectrum, which would ensure robust competition in the initial 5G phase.

79. To ensure compliance with the spectrum cap on sharing, bidders could be required to provide a legally-binding undertaking not to combine the spectrum they win in order to benefit from the individual cap. If bidders who have bid under an individual cap later decide to combine their spectrum, they would be required to return to ISED any spectrum in excess of the amount they could jointly have won under the 80 MHz network cap. The Department should also evaluate any spectrum subordination applications within 10 years of the issuance of 3500 MHz flexible use licences under the 80 MHz network cap.
80. The spectrum cap as recommended by Rogers will allow the Department to achieve all its competition goals for the 3500 MHz band. It guarantees regional carriers access to a minimum amount of 3500 MHz spectrum for their network launches. It also prevents an asymmetric spectrum outcome where a single joint network could manipulate auction rules to have double or more the spectrum available to any other network and cement an early 5G technical lead that could be challenging to overcome even when additional spectrum comes online following the 3800 MHz auction.
81. Such a policy is well supported by the *Framework for Spectrum Auctions in Canada*. It contemplates the various measures available in an auction that could be used by ISED to promote a more competitive marketplace if required. One is set-asides, the other is spectrum caps. According to the Framework, spectrum aggregation limits (caps) may be imposed by the Department when “a bidder that acquires an amount of spectrum beyond a certain level would not face effective competition from providers of closely substitutable services.”²⁶
82. These concerns are not just theoretical. As described above, Rogers believes Bell and Telus have an established pattern of spectrum sharing. Even without any collusion, the AWS-3 auction saw Bell and Telus divide the non-set-aside spectrum between the two companies perfectly along their wireline territories, only evenly dividing the Southern Ontario service area. During the 700 MHz auction, Rogers believes based on the bidding results Bell and Telus took actions to strategically keep newer entrants and regional players from being contiguous with Rogers. In the 600 MHz auction, while Bell was ultimately unsuccessful in its bidding strategy, Telus and Bell were clearly attempting to divide the open spectrum along their wireline footprint and were perhaps only foiled due to the noise created by irrational bidding actions of the regional carriers. They will have learned from their mistakes and will not repeat them. The combined financial resources of Bell and Telus would

²⁶ ISED, *Framework for Spectrum Auctions in Canada*; <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01626.html#section4>.

allow them to make credible bids for all the available spectrum in order to minimize any auction spectrum available for Rogers or make its costs prohibitively expensive. The motives for such bids would be clearly anti-competitive, aimed at reducing Rogers' ability to compete in the marketplace.

83. Rogers' spectrum cap proposals would not eliminate competition within the auction. To the contrary, there would be competition amongst regional carriers and rural wireless internet providers to win spectrum in rural areas (presuming regional mobile carriers are interested in any rural Tier 4 service areas). Should Bell and Telus elect to bid under the individual operator cap, that will generate both significant competition within the auction and increased facilities-based competition as both national operators will be required to build their own national radio networks.
84. The Department must carefully evaluate the impact that its 3500 MHz auction policy is likely to have on market outcomes, as that is the true objective of spectrum policy. The creation of a set-aside and/or the absence of a spectrum cap could permit a significant and asymmetric concentration of spectrum holdings during the initial deployment phase of 5G services. This would have a negative impact on the successful development of multiple, competing 5G networks in Canada.

Q1B: ISED is seeking comments on the use of a set-aside, an in-band spectrum cap, or a combination of both, including the amount of spectrum that should be applied for the use of a set-aside, and/or the amount of spectrum that should be subject to an in-band spectrum cap. Provide supporting rationale for your responses.

85. Rogers does not generally support set-asides or caps that interfere with the operation of market forces and artificially distort outcomes, providing an unfair subsidy to one or more competitors at the expense of others. In general, Rogers supports the use of open bidding for the licensing of mobile spectrum so that those companies that value the spectrum the most will be able to bid for it and put the spectrum to its highest use. This will also ensure that Canadians will derive the maximum benefits from this scarce and valuable resource. Looking at the specific circumstances related to the 3500 MHz band, the best auction policy is to adopt a 60 MHz spectrum cap for individual bidders and 80 MHz for joint networks.

No evidence to support a set-aside

86. As highlighted above, spectrum set-asides are no longer necessary and are growing in harm to the national networks that serve 90% of Canadians. As outlined above, there is a strong fourth operator in each region of Canada, part of established, diverse telecommunications companies with strong balance sheets that do not need taxpayer subsidies. They all possess spectrum portfolios that include low, mid, and

high mobile spectrum bands, providing the fourth carriers with a very high MHz-per-customer ratio. Therefore, Shaw, Videotron, Eastlink, and Xplornet, some of Canada's largest communications conglomerates, no longer need any public support obtaining spectrum, let alone indirect subsidies worth hundreds of millions of dollars.

87. Moreover, introducing a set-aside structured to guarantee the operation of a "5th carrier" in some primarily rural service areas would most likely result in a national network being shut out of acquiring spectrum at auction. The most recent set-aside in the 600 MHz auction resulted in Rogers and Telus having to pay, respectively, 211% and 290% higher prices on a MHzPop basis than the average price paid by the regional carriers. Further, the size of the set-aside (along with an unsuccessful bidding strategy) contributed to Bell not winning any 600 MHz spectrum, meaning one of the two national networks cannot provide service to almost half of all Canadians using the band. While Rogers is pleased to have secured 600 MHz spectrum from coast-to-coast-to-coast, the overall 600 MHz auction results were not a good policy outcome for Canada nor Canadian wireless consumers.
88. Should the Department elect to provide a fourth set-aside, it would be a disaster for Canadian wireless competition. Such a policy failure would be compounded should the Department elect to provide a set-aside and not accept Xplornet's holdings, or those of other non-national operators, as counting towards the in-band set-aside (and/or spectrum cap). There is no technical or economic reason to adopt another spectrum set-aside, especially one that would result in a minimal amount of 3500 MHz spectrum for either of the national networks serving 90% of Canadians. Rogers warned of such policy outcomes as a result of the proposed 600 MHz rules and our fears were confirmed. We were incorrect only as to which national network would come out with little or no spectrum.
89. Consider, for example, the situation in 4-093 Strathroy, a service area in Southern Ontario with a population of over 46,000. Only 40 MHz will be available in the auction. Of the remaining 160 MHz, 110 MHz is split between two regional competitors, CCI (50 MHz) and Xplornet (60 MHz), and just 50 MHz held by Inukshuk Wireless Partnership. A set-aside at any meaningful level would shut out Telus from the service area and prevents one or both of the Belus and Rogers networks from a meaningful amount of spectrum. If such an outcome is enforced, it is quite likely that no incumbent mobile operator would deploy in Strathroy until after the second auction, meaning that all or most mobile users in the town would have no true 5G services until at least 2023. Rogers submits that a better approach would be to not have any set-asides and let the market decide the optimal allocation across bidders, subject to network and bidder spectrum caps.
90. Providing the non-national carriers with another unjustifiable set-aside will simply be yet another windfall for them paid for by the public. As seen in the AWS-1, 700 MHz and 2500 MHz auctions, set-aside-eligible bidders have been able to take advantage

of the auction rules to secure spectrum (that they did not actually require) at reduced prices and re-sell the spectrum to other bidders for their own financial benefit. For example, due to the auction rules in place reserving spectrum for the new entrants, Videotron paid only \$420 million for its 700 MHz and 2500 MHz spectrum but then sold all the spectrum it obtained outside its footprint (i.e. outside of Quebec and Eastern Ontario) for \$430 million. Effectively, Videotron was given 30-50 MHz of free spectrum in its operating territory plus an additional \$10 million in cash, courtesy of Canadian taxpayers. This has not helped competition or affordability for Canadian consumers, in fact, it has done the opposite. It has also delayed the deployment of spectrum in a number of regions, negatively impacting the mobile wireless services to Canadians living in the affected service areas.

91. ISED has already successfully introduced a fourth carrier in every market in Canada. However, in fostering this new competition, ISED's efforts also had the unintended consequence of skewing the competitive landscape between the three national carriers. The last two major spectrum auctions with set-asides, the AWS-3 (2015) and 600 MHz (2019), each saw one of the national operators not win any spectrum, in part due to the size of the set-aside. It is time to retire spectrum set-asides in Canada once and for all.

3500 MHz spectrum caps

92. If the Department wishes to create opportunities for regional players and protect network competition, it should adopt a 3500 MHz spectrum cap. Such a spectrum cap needs to be designed to leave sufficient spectrum for regional players while at the same time taking into account the impact of spectrum sharing on competition amongst the national operators.
93. Competition is best served when there are at least two competing networks offering the highest quality services in each area. Given the limited quantity of spectrum available in the 3500 MHz auction, there is a theoretical risk that, without any constraints, a single operator could gain a significant advantage when competing for 5G customers. Even with a simple individual spectrum cap, there is a risk that two partner companies that share spectrum (e.g. Bell and Telus), with a single combined network, obtain all, or nearly all the available spectrum.
94. Spectrum caps should ensure that no single operator or group of operators could prevent there being at least three separate networks (and potentially four operators) with a critical mass of 5G spectrum after this auction. This is achievable without a set-aside by using a cap on individual bidders combined with a limit on the spectrum that may be combined by separate winners into a single network.
95. As Rogers describes in Q1A above, we recommend the Department adopt an individual spectrum cap of 60 MHz, which would include any flexible use spectrum that operators will retain in the 3500 MHz band after the transition period. Where

bidders who take part in the auction as separate entities intend to combine spectrum, the individual cap should be adjusted so that no single network could deploy more than 80 MHz. The spectrum cap should also be applied following the completion of the auction and issuance of flexible use licences, prohibiting the transfer or subordination of licences to a single or joint network for 10 years, which would prevent individual bidders from any risk or coordination or collusion. This would guarantee that in each service area with three facilities-based networks, networks would each have comparable – though not equal – spectrum allotments. It would also guarantee up to 60 MHz of spectrum to regional carriers without incentivizing them to drive up spectrum costs for national carriers, and thus the majority of Canadian wireless consumers.

96. To ensure compliance with the spectrum cap on sharing, bidders could be required to provide a legally-binding undertaking not to combine the spectrum they win in order to benefit from the individual cap. If bidders who have to bid under an individual cap later decide to combine their spectrum, they would be required to return to ISED any spectrum in excess of the amount they could jointly have won under the 80 MHz network cap. The Department should also evaluate any spectrum subordination applications within 10 years of the issuance of 3500 MHz flexible use licences under the 80 MHz network cap. The bottom line is that no network should have access to more than 80 MHz of 3500 MHz spectrum until the 3800 MHz band is awarded. At that time, the Department can either expand the in-band cap or create a spectrum cap that applies to the broader 3300-4200 MHz band, depending on how much spectrum is ultimately made available for flexible use.

No case for reserving spectrum for a fifth player

97. As stated above, the Department should reject any arguments made by existing regional mobile operators that ISED should adopt special rules that would guarantee spectrum for themselves, even when a 3500 MHz 4th operator already exists within a service area. Rogers does recognize that in some service areas not having spectrum aggregation limits that are structured to guarantee existing regional mobile network operators may result in these operators not securing 3500 MHz spectrum at auction. However, there is already a 4th competitor guaranteed in these service areas. In addition, regional mobile competitors have significant financial resources to be competitive within the auction, especially as the auction format does not provide any preference for national packages. Regional competitors have as much opportunity to acquire spectrum at auction for any service area as the national providers. In addition, regional operators were recently gifted 30 MHz of 600 MHz spectrum at below market rates that they will be busy deploying and will be able to access additional mid-band spectrum when the 3800 MHz band is auctioned in 2022.
98. For the avoidance of any doubt, whether the Department adopts a set-aside (which we strenuously oppose) or spectrum cap (which we support), the Department must

fully account for the spectrum held post-transition by all operators. The Department must not adopt measures that do not account for Xplornet's and other non-national mobile operators' holdings as spectrum available for a fourth operator. To do so would severely limit the spectrum available as open spectrum, should the Department ultimately adopt the poor policy choice of a set-aside, or effectively serve as a set-aside in the case of spectrum caps. Such a policy decision would result in such asymmetric spectrum distributions to networks that it could hobble the early deployment of 5G services in the 3500 MHz band in Canada. Further, we can think of no regulator internationally who has intervened to create five competing mobile wireless operators, primarily in rural areas where the economics of network deployment are already challenging.

99. The Department should not create excessive fragmentation of 3500 MHz spectrum that will not have the same service and competition benefits of holding larger, contiguous blocks, especially in the first 5G band that will permit the ability to create bandwidths greater than 40 MHz. Should the regional carriers truly be focused on acquiring spectrum in primarily rural areas, they have other options such as commercially negotiated spectrum subordination arrangements.
100. In most major urban markets, the spectrum cap proposed by Rogers will be effective in both ensuring there is a 4th retail operator and the mobile wireless regional carriers can secure spectrum. In some corner cases, the regional carriers will be able to compete for spectrum but are not guaranteed spectrum (nor are national carriers). The Department should reject any arguments that suggest Xplornet's 50 MHz of flexible use spectrum in Edmonton or Ottawa means there must be an additional set-aside of spectrum or caps that specifically benefits Shaw or Videotron, for example. Both companies are able to effectively compete for spectrum under the caps proposed by Rogers, could come to a commercial subordination arrangement for Xplornet's spectrum in urban parts of the service area, and will also be able to avail themselves of 3800 MHz spectrum. No special rules should be created in order to create a fifth competitor in all regions, or any specific one.

Q1C: ISED is seeking comments on its proposal to limit the eligibility criteria to bid on set-aside spectrum licences to those registered with the CRTC as facilities-based providers* that are not National Mobile Service Providers, and that are actively providing commercial telecommunication services to the general public in the relevant Tier 2 service area of interest, effective as of the date of application to participate in the 3500 MHz auction.

101. Rogers does not support the use of a set-aside in the 3500 MHz band, which will result in another substantial and unwarranted taxpayer subsidy to the regional

carriers that would also create asymmetric network competition and harm the early deployment of 5G services in Canada. In the event the Department elects to adopt a set-aside in the 3500 MHz spectrum auction, we believe the Department should use the proposed criteria to determine eligibility to bid on set-aside spectrum. However, the Department should designate these bidders as set-aside-eligible in all service areas in order to increase auction fairness and competition within set-aside spectrum.

102. Rogers continues to believe that regional carriers that are actively providing commercial mobile wireless services and are operating a wireless network are the most appropriate option to secure set-aside spectrum. Introducing new, unsustainable competition into the Canadian wireless market does not benefit Canadian consumers and businesses. It is also clear that the well-capitalized regional carriers do not require speculative opportunities to acquire taxpayer subsidized spectrum in order to flip it for their own profit, such as Eastlink's recent AWS-3 sale or Videotron's 700 MHz and 2500 MHz sale.
103. One of the arguments that ISED originally put forward for shifting from an SMRA format (used for the AWS-1 auction) to a CCA format (used for the 700 MHz, 2500 MHz and 600 MHz auctions), was that the CCA would encourage more straightforward bidding. This was a major concern for set-aside-ineligible bidders because it was widely observed that eligible bidders in the AWS-1 auction abused the set-aside rules to "park" demand in more expensive non-set aside spectrum, thus driving up the price that Rogers, Bell, and Telus paid beyond the market clearing level. Unfortunately, this type of abusive bidding continued with the CCA. Most recently, in the 600 MHz auction, the bid data reveals that Shaw was actively engaged in driving set-aside prices for other entrants in areas where it had no mobile operations and no known ambition to launch, whereas Videotron spent a substantial portion of the auction bidding on non-set aside spectrum in BC and Alberta. Both actions subverted price discovery and likely influenced the auction outcome.
104. Making set-aside-eligible bidders able to bid for set-aside spectrum outside their operating territories, will decrease the incentive, indeed arguably the requirement, to park points in open spectrum and unfairly increase the costs for national operators and, by extension, the costs for all Canadian consumers. Bid data from previous spectrum auctions shows numerous examples of open spectrum price-driving behaviour by set-aside-eligible bidders. Rogers' proposal will also provide symmetric opportunities for set-aside-eligible bidders to retaliate against each other. As an example, Shaw, under the current proposal, is able to increase the cost of set-aside spectrum in Saskatchewan but SaskTel is unable to reciprocate against Shaw in its key markets of British Columbia or Alberta.

105. Speculation can also be curtailed by extending the moratorium on transferring set-aside spectrum to set-aside-eligible bidders, as discussed below. Further, this eligibility criteria in no way limits the ability for set-aside-eligible bidders to compete for additional open spectrum, should they wish to obtain any. Any measure that can encourage truthful bidding behaviour can only be a positive for Canadian wireless competition and Canadian consumers.

Q1D: ISED is seeking comments on its proposal that any set-aside licences acquired by set-aside-eligible bidders would not be transferable to set-aside-ineligible entities for the first five years of the licence term.

106. The Department states, “in order to ensure the effectiveness of the set-aside and to deter speculation, it is proposed that the set-aside licences acquired by set-aside-eligible bidders, would not be transferable to set-aside-ineligible entities for the first five years of the licence term.”²⁷ Notwithstanding Rogers’ general objection to set-asides, we support the Department’s proposal that would provide a five-year moratorium on the transfer of set-aside spectrum to a set-aside-ineligible entity. If a set-aside is used, this moratorium is necessary to limit incentives for rent-seeking behavior by speculative bidding further distorting auction outcomes. Indeed, the very need for such a transfer restriction demonstrates the fact that set-asides create rent-seeking behaviour and may unfairly enrich some bidders at Canadian taxpayers’ expense. The recent sale of set-aside AWS-3 spectrum by Eastlink just four years after acquiring the spectrum at a below market rate shows both why set-asides are bad policy and why moratoriums are needed.

107. However, if the objective of the Department is to deter speculation and eligibility to bid on the set-aside spectrum is limited to facilities-based-providers that are actively providing commercial telecommunication services in the licence area of interest, the Department should also extend the moratorium on the transfer of set-aside spectrum to all entities, including set-aside-eligible ones. Such a move will further limit spectrum speculation and help ensure that the spectrum is obtained by operators who will move quickly to deploy services and benefit Canadian consumers. The industry has already witnessed regional competitor to regional competitor transactions in which regional competitors have profited by hundreds of millions of dollars. All such speculation should end.

108. The transferability rules should also be amended to prevent joint network partners from abusing the spectrum cap that Rogers recommended in Q1A and Q1B. As previously explained, carriers who bid separately but who subsequently merge their spectrum holdings (whether through a permanent transfer or subordinate licence)

²⁷ ISED, *Consultation*, para 42.

should not be allowed to combine more than 80 MHz total together. For example, if both carriers were to win 60 MHz at auction for a total of 120 MHz, only 80 MHz could be combined. The remaining 40 MHz would have to be returned to ISED. This would better reflect the true nature of the network sharing partners and prevent them from skewing the auction despite the associated entity and collusion rules. The 80 MHz joint spectrum cap for the 3500 MHz band should be in place for 10 years. However, the Department could consider modifying it if there is a single spectrum cap for the 3500 MHz and 3800 MHz bands. For clarity, these rules should not exclude swaps of equal amounts of spectrum in the same service area that would enable greater contiguity of spectrum and a more efficient management of Canadian spectrum resources.

Q1E: ISED is seeking proposals for other eligibility criteria along with supporting rationale.

109. Rogers does not have alternative proposals for eligibility criteria, notwithstanding our recommendation above that the Department use its proposed criteria to determine basic set-aside eligibility but that a bidder that is designated set-aside-eligible in any service area is set-aside-eligible in all service areas.

Q1F: ISED is seeking comments on the inclusion of grid-cell and sub-divided licences towards the spectrum cap, and the proposal to allow the return of these licences in order to increase a licensee's eligibility to bid on additional spectrum within the related licence area.

110. Rogers supports the inclusion of grid-cell and sub-divided licences towards the cap and the proposal to allow the return of licences in order to increase a licensee's eligibility to bid on additional spectrum covering the entire related licence area. However, for clarity, current 3500 MHz licensees should be able to bid on sub-divided spectrum within any Tier 4 service area where they do not meet the relevant threshold.

Q2: ISED is seeking comments on its proposal to use Tier 4 service areas for the 3500 MHz licensing process.

111. Rogers generally supports licensing mobile spectrum bands using larger tier service areas to minimize potential interference risks and reduce coordination efforts, which helps provide the greatest number of Canadians with the best network

experience possible. While using Tier 3 areas would be the best spectrum management policy in a greenfield mobile band with these propagation characteristics, Rogers supports the Department's proposal to use Tier 4 service areas for the 3500 MHz licensing process.

112. As we shared in our comments for the 3500 MHz Consultation, Rogers has had first hand experience dealing with interference issues even within the current Tier 4 licensing of the 3500 MHz Fixed Wireless Access band.²⁸ Signals at 3500 MHz can propagate over long distances even without atmospheric issues and we have seen numerous cases of interference at distances over 40 km, some as much as 80 km. The vast majority of our interference experience has been base-station-to-base-station but we have also seen issues of interference into customer premises equipment (CPE).
113. The potential for these interference risks using Tier 4 service areas is only likely to increase with the introduction of flexible use licences and new deployments of new fixed and mobile 5G NR equipment coexisting with operators using out-dated legacy equipment. The work being undertaken by the Radio Advisory Board of Canada to provide recommendations to enhance ISED's Spectrum Management System database should help coordination efforts (in all bands) and Rogers supports all efforts by the Department to improve spectrum management in Canada.
114. However, the Department should reject any proposal to license the 3500 MHz spectrum awarded as part of this process at smaller than a Tier 4 level, including the Department's proposed Tier 5. Tier 5 service areas should absolutely be restricted to frequencies above 6 GHz, and likely millimetre wave (mmWave) bands and above, until better coordination tools and advancements in technology make interference mitigation technically and economically feasible in low and mid-band spectrum.

Q3A: ISED is seeking comments on its proposal to include all remaining spectrum (including partially encumbered Tier 4 areas) as part of the auction as shown in table A1 of annex A.

115. Rogers supports the Department's proposal to include all remaining spectrum (including partially encumbered Tier 4 areas) as part of the auction as shown in table A1 of annex A. Rogers fully expects that in most, if not all, service areas demand for 3500 MHz flexible use spectrum is likely to exceed supply, one of the primary factors

²⁸ Rogers Comments, *Consultation on Revisions to the 3500 MHz Band to Accommodate Flexible Use and Preliminary Consultation on Changes to the 3800 MHz Band*, para 85.

in the Department's determination of whether an auction should be used as the assignment process.²⁹

116. With ISED publishing a map of sub-divided and grid-cell licences that reflect the holdings as of June 6, 2018 for licensees that continue to be eligible for these holdings and a list of all generic blocks available for auction with service areas that have encumbrances noted, all potential bidders will have the information needed to develop their bidding strategy.³⁰ Auctioning all remaining spectrum, including the partially encumbered service areas, will allow the spectrum to go to those who most value the spectrum.

Q3B: ISED is seeking comments on its proposal to consider all spectrum acquired through the auction and only Tier 4 licences that will be issued through the transition process, simultaneously in the assignment round of the auction, in order to determine the specific frequency assignments of all licences in the 3500 MHz band.

117. Looking forward, it is important that this auction provides a path for all facilities-based operators to eventually achieve blocks of up to 100 MHz of contiguous spectrum (or two blocks that are sufficiently close that they can be aggregated) in the greater 3300-4200 MHz band, so they are able to deliver the full benefits of 5G to Canadians. The Department should implement rules that would not just consider all spectrum acquired through the current auction and Tier 4 licences issued through the transition process simultaneously in the assignment round of the 3500 MHz auction but would also encompass spectrum won in the future 3800 MHz band.

118. In order to maintain and maximize contiguity across the 3500 MHz and future 3800 MHz bands, the Department should facilitate rationalizing the band plans by supporting spectrum swaps wherever technically possible and economically feasible. Since 4G LTE and 5G NR equipment possess some frequency agility, spectrum swaps could allow operators to maintain contiguous spectrum across a broad frequency range. This would have the added benefit of allowing multiple operators to potentially obtain contiguous 100 MHz bandwidths or the ability to consolidate spectrum into a single 5G radio with near-contiguous holdings and maximize the benefits of 5G technology for Canadians.

119. It should be highlighted that some sub-divided licences can account for significant geographic or population coverage and thus should also be included to the maximum extent possible to realize the benefits of spectrum contiguity. Grid-cell

²⁹ ISED, *Framework for Spectrum Auctions in Canada*, section 2; <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01626.html>.

³⁰ ISED, *Consultation*, para 60.

licences, by definition, only account for small geographic areas and should be subject to best efforts after sub-divided licences have all been accounted for during the assignment round and voluntary frequency swaps post-auction for contiguity.

Q3C: ISED is seeking comments on the proposal that licensees who acquire multiple flexible use Tier 4 licences in a given area, either as a result of the auction or as a result of the transition process, be assigned contiguous spectrum, and that this also apply to partial area licences acquired through the auction.

120. Rogers supports the Department's proposal that licensees who acquire multiple flexible use Tier 4 licences in a given area, either as a result of the auction or as a result of the transition process, be assigned contiguous spectrum, and that this also apply to partial area licences acquired through the auction. However, as mentioned above, the Department must also consider the assignment round of the 3500 MHz auction as simply Part A of the assignment round of the greater 3300-4200 MHz band and take into consideration contiguity of the assignment round of the future 3800 MHz auction as Part B.

121. Further, the Department should also take into account where a licensee has spectrum holdings in adjacent service areas and, to the maximum extent possible, licensees should be assigned the same spectrum blocks in all adjoining service areas. This will simplify frequency coordination and interference management, which will become ever more complex in a flexible use environment over 172 Tier 4 service areas. With our extensive first-hand experience to date coordinating interference between legacy wireless technologies and 4G LTE, we know this will become even more important with the widespread deployment of 5G technologies in the band.

Q3D: ISED is seeking comments on the proposal to classify all partial tier licences as encumbered blocks.

122. The Department should adopt its proposal to classify all partial tier licences as encumbered blocks. While the encumbrance of some licences is quite small in terms of population impacted, such as the example of 4-160 Kamloops that covers 0.04% of the population in the service area,³¹ this could still create challenges for larger national networks to have widespread coverage. As legacy operators may not be operating equipment that is compatible with modern 4G LTE systems, let alone more advanced 5G systems, the potential for interference and, at a minimum, interference mitigation will be significantly increased for those operators acquiring licences

³¹ ISED, *Consultation*, para 62.

covering the rest of the tier. By treating these partial tier licences as encumbered, all stakeholders will be aware of the additional challenges that may accompany efforts to fully deploy across the entire licence area.

Q3E: ISED is seeking comments on the proposal to bundle the remaining portions of the encumbered areas offered in the auction as a combined encumbered block of 20, 30, 40 MHz or more, depending on the number of 10 MHz blocks being bundled. In particular the bundle would include the tier areas where existing sub-divided or grid cell licenses are encumbering the majority of the tier. This would apply where the geography of the remaining portions is the same or similar, and/or the remaining area covers a relatively small population. Comments on the proposed list of encumbered service areas where multiple blocks may be combined for the purpose of the auction are also sought.

123. Rogers supports the proposal to bundle the remaining portions of the encumbered areas offered in the auction, where the geography of the remaining portions is the same or similar and/or the remaining area covers a relatively small population, as a combined encumbered block. Combining all encumbered spectrum in a tier into a single encumbered block will help facilitate contiguity of holdings acquired in the 3500 MHz and 3800 MHz auctions and Tier 4 flexible use licences acquired as part of the 3500 MHz transition process. The ability for facilities-based operators to eventually assemble contiguous bandwidths of ideally up to 100 MHz is key to deliver on the promise of 5G. Multiple operators each holding between 10 and 40 MHz of encumbered spectrum – especially if they also hold additional licences covering the entire tier – would potentially frustrate the ability for the Department to assign contiguous spectrum.

124. The proposed list of encumbered service areas where multiple blocks may be combined for the purpose of the auction found in Table 1 of Annex A appears to bundle encumbered blocks in a mostly useful manner. Most major markets only have a single encumbered block, except for Calgary and Ottawa and London. In 4-086 London/Woodstock/St. Thomas, creating two encumbered blocks of 20 MHz each where one covers 99.9% and one 99% of the population may create too much fragmentation in the assignment stage for an operator looking to provide service to 99% of the population. As such, the Department should combine these blocks into a single package of encumbered blocks. This is discussed further below in response to Q4C and Q4D.

Q3F: ISED is seeking comments on the proposal that the bundled encumbered blocks would not count towards the spectrum cap during the auction, but that any transfers of the licences post-auction would be subject to the spectrum cap and the conditions of licence as described in section 11.2.

125. Should the Department elect to adopt a spectrum cap for the 3500 MHz auction, bundled encumbered blocks awarded through the auction should count towards the cap. Under ISED's proposal, it would be possible for an auction bidder to gain access to the spectrum cap's maximum plus an additional 50 MHz covering 99.9% of the population of Toronto. If a spectrum cap was set at 50 MHz, this could result in a single auction bidder effectively acquiring double the cap for one-fifth of Canada's population.

126. However, encumbered blocks held by any licensee as part of the transition process should not count towards a potential spectrum cap during the auction process if the Department adopts its proposal to not guarantee contiguity to sub-divided licences awarded as part of the transition process. As such, it is possible that an auction participant would not be able to secure up to the potential spectrum cap in contiguous spectrum for their current serving area, impacting their customers' network experience. Encumbered blocks should only be included in spectrum holding calculations in a post-auction transfer to ensure the policy goals of a potential spectrum cap are achieved.

Q4A: ISED is seeking comments on its proposal to use generic licences.

127. Rogers supports the proposal to use generic licences in the auctioning process. For those bidders successful in acquiring more than one spectrum licence, the contiguity of that spectrum is of the utmost importance for maximizing the utility of the spectrum. The use of generic licences greatly simplifies the auction process and guarantees a contiguous assignment with existing holdings in the 3500 MHz band.

Q4B: ISED is seeking comments on its proposal to categorize all blocks won by set-aside-eligible bidders as set-aside blocks.

128. Notwithstanding our objections to the use of a set-aside, Rogers supports the proposal to categorize all blocks won by set-aside-eligible bidders as set-aside blocks in the event that the Department elects to adopt a set-aside. However, as proposed above in response to Q1D, the Department should extend the moratorium on the transfer of set-aside spectrum to all entities, including set-aside-eligible ones. Such a move will limit spectrum speculation and help ensure that the spectrum is

obtained by operators who will move quickly to deploy services and benefit Canadian consumers. For clarity, these rules should not exclude swaps of equal amounts of spectrum in the same service area that would enable greater contiguity of spectrum and a more efficient management of Canadian spectrum resources.

Q4C: ISED is seeking comments on its proposal to create separate categories for encumbered and unencumbered blocks, as well as open and set-aside blocks.

Q4D: ISED is seeking comments on its proposal to create separate categories for unencumbered and for various encumbered block in a service area.

129. Rogers generally supports the Department's proposal to create separate categories for encumbered and unencumbered spectrum. To reduce the risk for bidders in the clock phase, any impaired block, regardless of how small the impairment is in population terms should not be subsumed in the unencumbered category. For example, there are a number of blocks with grid licences covering between 0.01 to 1% of the population. Even though the impairment seems small on a population basis, the actual valuation impact could still be significant if these grid licences cover particularly vital hotspots (roads, railways and agglomerations) or the potential to create interference with adjacent (spectrally or geographically) licensees. For clarity, however, as per above, encumbered blocks awarded as part of the auction process should count towards the individual and joint network spectrum caps.

130. Notwithstanding our strenuous objection to the use of yet another spectrum set-aside, Rogers also supports the Department creating separate products for open and set-aside blocks in the event that the Department elects to adopt a set-aside. However, to minimize auction complexity, the Department should only create a separate category for encumbered spectrum if the value difference is material.

131. For example, in London/Woodstock/St. Thomas (4-086), ISED proposes to have a total of three categories:

- 4-086-0: 4 unencumbered blocks;
- 4-086-1: 2 encumbered blocks (99.99% of population available);
- 4-086-2: 2 encumbered blocks (99% of population available); and,
- 4-086-3: 1 encumbered block (81% of population available).

132. To reduce bidding complexity, we urge ISED to collapse these categories. For 4-086, we propose to collapse 4-086-1 and 4-086-2 into a single product. This would leave three products for the service area:

- 4-086-0: 4 unencumbered blocks;

- 4-086-1: 4 encumbered blocks (99%+ of population available); and,
- 4-086-2: 1 encumbered block (81% of population available).

133. We propose that blocks with a population coverage that differs by less than 10% can be grouped into the same product, reducing complexity considerably without exposing bidders to undue risk. Adopting this proposal reduces the number of encumbered products from 49 to 44. Our proposed alternative lot structure is summarized in Table 5.

Table 5: Proposed encumbered spectrum revisions

Tier & Product #	Tier Name	Population of Tier 4	Percentage of Population Available	Number of Blocks
4-021-1	Edmundston	26,504	61%	2
4-023-1	Matane	112,039	59%	1
4-030-1	Québec	904,330	82%	2
4-044-1	Drummondville	112,390	95%	5
4-049-1	Sorel	58,740	86%	5
4-050-1	Joliette	161,106	99%	4
4-052-1	Sainte-Agathe-des-Monts	77,087	94%	4
4-054-1	Mont-Laurier/Maniwaki	48,488	99.60%	1
4-055-1	Ottawa/Outaouais	1,452,852	99.50%	5
4-055-2	Ottawa/Outaouais	1,452,852	79%	1
4-066-1	Chibougamau	45,730	67 - 78%	5
4-070-1	Kingston	177,314	74%	1
4-071-1	Napanee	42,993	18%	4
4-072-1	Belleville	154,982	57%	5
4-073-1	Cobourg	65,180	63%	4
4-074-1	Peterborough	165,516	56%	1
4-077-1	Toronto	7,030,750	99.90%	5
4-079-1	Guelph/Kitchener	707,534	91%	1
4-086-1	London/Woodstock/St. Thomas	678,149	99% - 99.99%	4
4-086-3	London/Woodstock/St. Thomas	678,149	81%	1
4-092-1	Sarnia	123,953	93%	2
4-111-1	Winnipeg	830,151	90%	1
4-119-1	Estevan	46,006	70%	1
4-119-2	Estevan	46,006	52 - 58%	5
4-120-1	Weyburn	22,877	35 - 46%	6
4-120-4	Weyburn	22,877	14%	1
4-122-1	Swift Current	46,219	15 - 16%	4
4-123-1	Yorkton	63,024	16%	4
4-126-1	Watrous	27,288	5 - 15%	4
4-127-1	Battleford	99,433	87%	5
4-129-1	Lloydminster	37,539	1%	2
4-133-1	Stettler/Oyen/Wainwright	51,420	80%	2
4-136-2	Calgary	1,416,856	91 - 99%	5
4-140-1	Vegreville	15,396	89%	2
4-150-1	West Kootenay	78,941	92%	4
4-154-1	Victoria	458,861	24%	5
4-156-1	Courtenay	118,732	99.80%	2
4-158-1	Squamish/Whistler	74,365	92%	1
4-158-2	Squamish/Whistler	74,365	77%	1
4-158-3	Squamish/Whistler	74,365	4%	2
4-160-1	Kamloops	106,972	99.96%	4
4-164-1	Williams Lake	38,440	99.60%	2
4-171-1	Nunavut	35,975	76%	2
4-171-2	Nunavut	35,975	21%	5

Q5: ISED is seeking comments on the use anonymous bidding during the auction.

134. Rogers supports the use of anonymous bidding as proposed by the Department, should the Department adopt a spectrum cap for the 3500 MHz auction. However, should the Department elect to adopt a set-aside, it should enhance the information available to all bidders in order to reduce aggregation risks and ensure an efficient outcome for the auction. In the event of a set-aside, ISED should provide aggregate demand information for each product (open and set-aside), as well as aggregate information for the entire service area. This will benefit both set-aside-eligible and set-aside-ineligible bidders alike. For clarity, Rogers does not support the implementation of a set-aside in the 3500 MHz auction.
135. All bidders require information about demand for each individual product to minimize aggregation risks, regardless of the category. To illustrate this, consider the following example of a set-aside-eligible bidder who is bidding for 30 MHz but is close to reaching their valuation. The bidder's valuation structure is such that ideally at these prices they want to drop to zero. However, as they have no valuation for smaller packages, they may prefer to continue bidding further for 30 MHz if they know that they would otherwise be retained on some but not all blocks. Set-aside-eligible bidders do not receive information about the exact number of blocks bid for by the other set-aside-eligible bidders. They would therefore have to either guess demand or probe by switching their demand across service areas to find out how much set-aside demand there is in each service area. Guessing demand is risky and switching demand across service areas may lead to an inefficient allocation if the bidder cannot switch back out of an area that they do not want to win at current prices.
136. Set-aside-ineligible bidders face a similar issue. When a set-aside-ineligible bidder wishes to drop, they do not know how much of their demand may be retained. They would need to have information about the current set-aside price as well as current demand for both the open and set-aside products to determine how likely it is for them to secure a subset of their demand.
137. In short, providing all bidders with information about aggregate demand and prices for each product increases efficiency (as it removes the need to probe demand) and reduces aggregation risk. It, therefore, provides the right balance between promoting transparency and price discovery on the one hand, and limiting scope for strategic bidding (because no one bidder has certainty about the level of demand from individual rivals) on the other. This is the standard approach applied for most clock auctions around the world including for this same auction format in the United States.

Q6: ISED is seeking comments on its proposal to use a clock auction format for the 3500 MHz spectrum auction.

138. Notwithstanding our concerns raised above with the complexity and proposed rules that could permit switches between service areas to strategically park eligibility points or malignantly drive prices, Rogers supports the proposal to use a clock auction format for the 3500 MHz auction. It is widely understood that there is no single best auction format for awarding spectrum. Regulators should pick the format that they think is most likely to fulfil their objectives based on a detailed evaluation of supply and demand conditions. Given the large amount of spectrum blocks available on a Tier 4 licensing level, we agree that the clock auction format will reduce complexity in the 3500 MHz band. Further, given the larger number of products of regional lots in this auction, a combinatorial auction with package bids would be impractical. A combinatorial format is also unnecessary given that the aggregation risks are manageable for bidders, especially if ISED adopts a slightly modified information policy, as proposed above in response to Q5, and eligibility points regime, as proposed below in our response to Q18.

139. In the context of the 3500 MHz auction, the clock auction format addresses many of the problems with the application of a combinatorial clock auction (CCA) format that we highlighted in 600 MHz auction consultation comments and unfortunately came to pass. In Europe, as in Canada, the CCA has been associated with high and asymmetric price outcomes and allegations that outcomes were distorted by spiteful bidding. In two countries, Austria and the Netherlands, bidder unhappiness with the conduct and outcomes of CCAs led to legal challenges. There is also a growing body of academic literature that has highlighted theoretical and practical flaws in the CCA design, especially in more complex settings, such as an award with many regional categories. Theoretical research as well as lab experiments have shown that the CCA produces much less-efficient outcomes than simpler formats, in particular when there are many products.³² As such, the CCA would not be a good

³² The use of package bidding increases complexity for bidders considerably. The number of possible packages that a bidder needs to evaluate grows exponentially with the number of regions and available lots. The efficiency of the allocation crucially depends on bidders' ability to identify the right packages to bid for. Kagel, Lien and Milgrom (2010) compare the efficiency of the Porter CCA and the SMRA in lab experiments.³² They find that bidders tend to focus on only one or two packages in the Porter CCA. Their decision to bid for certain packages is predominantly driven by profitability at current clock prices. In setups in which simulated bidders cannot identify the efficient allocation by simply bidding on the most profitable package each round, the CCA had lower average efficiency in lab experiments, and substantially lower frequencies of 100 percent efficiency, than the corresponding SMRA auctions. Bichler, Shabalin and Wolf (2013) also ran extensive lab experiments to compare the performance of both the SMRA and the standard CCA. They find that bidders do not bid for all relevant packages in the CCA and focused primarily on bids that are likely to win given the specific valuation structure and the prices in the clock rounds. The CCA achieved much lower efficiency than the SMRA in their experiments. This is in line with Scheffel and Bichler (2012) who find "*that the limited number of packages that bidders evaluate to be the greatest barrier to efficiency, much more so than differences in the auction formats.*" This suggests that the efficiency of the CCA potentially worsens in more complex settings as bidders will find it even harder to identify the right packages to

candidate for the 3500 MHz auction with Tier 4 service areas and encumbered and unencumbered products.

140. Beyond theoretical research and examples in other jurisdictions, the 600 MHz auction detailed bid data showed regional carriers bidding for blocks that they were very unlikely to have any real interest in (e.g. both Shaw and Videotron on large packages covering all of Atlantic Canada, Videotron in Western Canada, etc.). In Round 24, aggregate demand in Saskatchewan was 27, including Shaw on 7 and Videotron on 3. SaskTel is not a wireless competitor of either company (and Videotron was not even set-aside-eligible for the province), which implies that the bidders had no intrinsic valuation-based rationale for making these bids and that they were parking points for strategic reasons. Any changes to auction format to limit such gaming behaviour by regional carriers is very welcome.

Q7: ISED is seeking comments on the proposed structure of the clock stage and on the proposed methodology for calculating processed demands and posted prices after each clock round, as described in annex C.

141. Rogers supports the proposed structure of the clock stage and, notwithstanding our objection to a set-aside in the 3500 MHz auction, supports the proposed calculation of posted prices which ensures that set-aside-eligible bidders pay the full market price if they intend to acquire more than just the set-aside amount. The proposed format follows the rules used in recent U.S. auctions (600 MHz and 24 GHz), as well as a recently completed auction for 3.6-3.8 GHz spectrum in Australia.

142. One concern with the methodology for calculating processed demands is that it may prevent a simultaneous switch by two or more bidders which should be permissible when applied simultaneously but not if they are evaluated sequentially. Suppose Bidder A wants to switch from product 1 to product 2 whereas Bidder B wants to switch the other way around. The situation is summarized in the following table.

bid for. This risk is severe in the context of an auction with a regional lot structure as the number of possible packages a bidder can bid for is enormous. Bichler, Goeree, Mayer and Shabalin (2014) test a number of different formats in lab experiments and find that simplicity of the bid language and the payment rule have a substantial positive impact on the auction outcome. Their results suggest that simpler bidding languages and payment rules (such as those used in the SMRA) have a significant positive impact on the auction outcome. The CCA, however, uses a complex bid language and payment rule and achieves the worst outcomes in their lab experiments.

Table 6: Calculating processed demands

	Product 1	Product 2
Eligibility points	1	2
Bidder A (previous round)	2	0
Bidder A (current round)	0 (price point: 0%)	1 (100%)
Bidder B (previous round)	0	1
Bidder B (current round)	1 (price point: 100%)	0 (0%)
Demand from other bidders at clock prices (maintain bids)	3	3
Supply	4	4

143. Suppose Bidder A’s reduction in Product 1 is processed first. It is partially applied (from 2 to 1) which frees up 1 eligibility point. This is insufficient to allow Bidder A to increase their demand for product 2. Bidder B is not allowed to reduce their demand for product 2, as this would lead to unsold spectrum. They are also not allowed to increase their demand for Product 1, as this would violate the activity rule. The round results are thus as follows:

- Bidder A has processed demand of 1 block for Product 1; and
- Bidder B has processed demand of 1 block for Product 2.

144. Note that if the bids had been processed simultaneously, both switches could have been applied in full and the round results would have been as follows:

- Bidder A has processed demand of 2 blocks for Product 2; and
- Bidder B has processed demand of 1 block for Product 1.

145. It would be useful if ISED could provide an explanation as to whether both increase and decrease bids can be made at intra-round bid levels. In this respect, a short document similar to the technical guides provided by the FCC ahead of the US 600 MHz and US 26 GHz auction would be helpful.³³

146. For example, we note that the FCC allowed increase bids at intra-round bid levels below the current clock price:

³³ For the US 600 MHz auction see *Appendix G to DA 15-1183*: <https://www.fcc.gov/document/application-procedures-broadcast-incentive-auction>; For the 26 GHz auction, see *Technical Guide*, <https://www.fcc.gov/document/application-procedures-broadcast-incentive-auction>.

By placing one (or more) simple bid(s) requesting to increase demand for a product r at one (or more) price(s) in a round, the bidder indicates that at all prices associated with this round (i.e., prices that are greater than or equal to the last round's posted price and less than or equal to the clock price) it is willing to buy any quantity that is greater than or equal to its processed demand and less than or equal to the maximum quantity that it specifies in a bid for product r .³⁴

147. It is important for bidders to be able to submit increase bids at different intra-round bid levels, as this allows them to prioritize increased bids for different products if the corresponding reduction is only partially applied. For example, a bidder who wants to reduce their demand for Product 1 and simultaneously increase their demand for Products 2 and 3 may have a preference for 2 over 3 if the reduction in Product 1 is only partially applied. If the increase bid for 2 is submitted at a lower price point than their increase bid for 3, it is processed first in the queue and thus given priority in case the reduction in Product 1 is only partially applied.

Q8: ISED is seeking comments on the proposed range of percentage increments.

148. Rogers is concerned that the auction rules do not foreclose the possibility of very large absolute bid increments, which may unduly accelerate the auction (thus subverting price discovery) and raise governance issues for all bidders. While we do not oppose the use of 20% bid increments in certain service areas that have low starting prices, such a high percentage may quickly lead to overly large price increases if competition endures. Moreover, ISED has proposed very high starting prices for the most valuable areas – in these cities, a 20% increment would be too high even from Round 1 and a 10% increment may quickly become too large.

149. The efficiency of a clock auction is dependent on the evolution of clock prices. Very high increments can lead to irreversible distortions of relative prices, thus preventing optimal switching and subverting price discovery. Absolute price increments should be modest to ensure that relative price changes are always supported by actual demand. While we support intra-round bidding, ISED should recognize that the ability to make intra-round bids does not address this concern, as switch decisions are made at clock prices and bidders only get information about demand at intermediate prices if the clock stops. More specifically, this issue is not addressed by the use of FCC-style increase bids at intra-round bid levels, as discussed in our answer to Q7. The intra-round bid level is only relevant for prioritization of the increase bid in the queue, but the bid itself still entails a commitment to increase demand at clock prices.

³⁴ US 26 GHz Technical Guide.

150. Setting bid increments in an auction with a very large number of products is also challenging. At any particular point in the auction, the appropriate percentage increment may vary significantly between service areas. However, given the limited time available to process bids, it is not practical for ISED to examine the situation in each service area separately every round. Instead, a general rule is required that will enable ISED to quickly determine new round prices and provide an appropriate degree of predictability for bidders. Care must be taken when creating the rule, as there is a high risk that a general rule could lead ISED to adopt either too high bid increments for some service areas or too low for others. The former is particularly detrimental for price discovery and could impede efficient switching of demand, while the latter could unnecessarily extend the length of the auction. The former is significantly more harmful to the public interest than the latter outcome.
151. To address this issue, Rogers recommends the Department commit to not using increments larger than 10% in the most valuable service areas. We further urge ISED to establish a maximum absolute increment, expressed in \$/MHzPop terms that it will not exceed for any product. This rule would apply whenever the application of a default percentage increment would otherwise result in an overly large price increase for a product in a single round.
152. We propose the following absolute caps on bid increments:
- \$0.05/MHzPop for the top 3 cities (Toronto, Montreal, and Vancouver);
 - \$0.04/MHzPop for the next 3 cities (Ottawa, Calgary, and Edmonton);
 - \$0.03/MHzPop for other areas designated as having large population centres; and,
 - \$0.02/MHzPop for all other service areas.
153. Adopting this rule would offer a number of advantages over a simple uniform percentage increment rule and possesses no obvious disadvantages:
- i. It would prevent excessive acceleration of prices in any particular service area towards the end of competition in that area, just at the point when price discovery is most important.
 - ii. At higher level of prices, it will provide bidders with a predictable path for future bid increments, thus making internal governance and decision making easier.
 - iii. It will help ISED to run the auction smoothly. The rule should be easy to automate in the bidding software. Furthermore, it will reduce the burden on ISED to monitor price evolution in all 172 service areas.
 - iv. It will not materially impact the length of the auction, as the cap on bid increments only applies when prices are already at a high level. At most, it may add a few extra rounds of competition to service areas where there is very high competition.

154. There is a further issue with prices in smaller service areas that have small populations. In these service areas, there may be many rounds when even a 20% price increment is smaller than the \$1,000 minimum price upward rounding rule. As a result, in percentage terms, prices in these service areas could accelerate much faster than anywhere else.
155. For example, the opening price in 4-163 Golden is only \$3,000. With a 10% increment, the price would increase by 333% over the first 10 rounds under ISED's proposed \$1,000 rounding rule, whereas it would only increase by 157% if prices are rounded up to the nearest \$100. To put this into context, the price in Toronto would only increase by 136% over the first 10 rounds using the same 10% bid increment.
156. We request that ISED clarify whether this is intentional. On the one hand, we recognize that there is a case for a somewhat faster acceleration of prices for service areas starting at very low prices so as to not prolong the auction unnecessarily. On the other hand, for very small, low-value service areas, the rounding rule introduces a risk that the prices rise too quickly relative to larger service areas. In particular, if a bidder's willingness to acquire spectrum in smaller areas is contingent on winning spectrum in metropolitan areas, then ISED's proposed rounding rule has the potential to expose such a bidder to aggregation risk. Rounding up to a smaller amount (e.g. \$500) may reduce this risk, which increases the efficiency of the allocation.

Q9A: ISED is seeking comments on the proposed structure of the assignment stage, including the order of the assignment rounds, treatment of existing holdings, the combination of service areas into a single assignment area and parallel bidding.

157. Rogers fully supports the treatment of existing holdings and efforts to provide contiguity for spectrum provided through the transition process with spectrum awarded through the auction process. Maximizing spectrum contiguity increases spectrum efficiency and reduces the amount of coordination required, which will allow operators to provide the best possible network experience to wireless consumers.
158. Countries worldwide are engaged in a competition for leadership in the deployment of 5G technology, which will be a key enabler of the digital world. Frequencies in the 3300-4200 MHz range have emerged as the most important band globally for 5G deployment, owing to the large quantity of capacity available and scope for deploying blocks of up to 100 MHz, suitable to deliver the highest possible speeds. At present, many European countries are leading Canada and the United States in making this spectrum available to mobile operators. By the end of 2020, as

illustrated in Table 7, nearly all western European countries will have released between 300 and 390 MHz at 3.4-3.8 GHz, and are expected to have at least three operators with contiguous spectrum 5G holdings of 70-140 MHz.

Table 7: Survey of approaches to award of 3.4-3.8 GHz in Europe

Country	Amount of spectrum already awarded	Amount of spectrum to be awarded	# MNOs with at least 70 MHz contiguous	Approach to allocation
Austria	390 MHz	-	3	Single award; contiguous spectrum guaranteed. All 3 incumbents won 100 MHz+
Belgium	-	TBD	TBD	Plans not yet announced
Denmark	-	TBD	TBD	Plans not yet announced, but operators are conducting live trials with 100 MHz blocks
Finland	390 MHz	-	3	Single award; contiguous spectrum guaranteed. All 3 incumbents won 130 MHz licenses
France	-	310 MHz	TBD	Late 2019 – contiguous spectrum guaranteed
Germany	300 MHz	-	3	Single award; contiguous spectrum guaranteed all 3 incumbents won 70-90 MHz and new entrant secured 50 MHz.
Ireland	350 MHz	-	3	325 MHz sold with contiguity guarantee plus 25 MHz in separate block
Italy	200 MHz	TBD	2	Spectrum sold in 2 blocks of 80 MHz and 2 blocks of 20 MHz, 1 each to four MNOs
Luxembourg	-	Up to 400 MHz	TBD	Expected 2020 - plans not yet announced but all 3 operators expected to secure blocks ≥ 100 MHz
Netherlands	-	TBD	TBD	Expected 2021 - Plans not yet announced
Norway	-	300 MHz	TBD	Single award, contiguous spectrum guaranteed, consulting on 100 MHz cap per operator.
Portugal	-		TBD	Expected 2020 - plans not yet announced
Spain	360 MHz	-	1+	Government consulting on defragmentation plan which would lead to all 4 MNOs having 80-100 MHz contiguous each
Sweden	-	300 MHz	TBD	Single award; contiguous spectrum guaranteed; 120 MHz cap per operator
Switzerland	300 MHz	-	3	Single award; contiguous spectrum guaranteed; all three MNOs won 80-120 MHz each
UK	270 MHz	120 MHz	1+	Ofcom currently consulting on rules for second award including proposals to allow defragmentation which could lead to all 4 MNOs having 80 MHz+ contiguous each

159. For legacy reasons, it is not immediately possible for Canada to match the amount of spectrum being released in Europe. In the forthcoming award, only 200 MHz (including existing holdings) will be available, some of which is impaired. As a result, individual operators are likely to win only 30-60 MHz, depending on availability and

competition constraints in each service area. This means that, until further spectrum is released, no Canadian operator will, by itself, be able to match the 5G capacity and speeds that will be offered by most mobile network operators in Europe.

160. Depending on ISED's competition rules and the outcome of the award, it may be possible for two operators than run joint networks to share spectrum so as to match what is available in Europe. Realistically, however, there is likely to be at most one group that can do this in each service area (typically Bell-Telus). This creates a regulatory tension for ISED. On the one hand, allowing such combinations could mean earlier availability of the best 5G services in Canada. On the other hand, creating a situation in which one network has an advantage over all rivals raises serious competition concerns and would undermine the successful development of multiple, competing 5G networks in Canada. As set out above, this tension can be effectively managed through having a network spectrum cap for operators that intend to combine their spectrum.
161. Looking forward, the best way to address this concern will be to release the 3800 MHz spectrum as soon as possible. We recommend ISED prioritize the release of as much spectrum above 3650 MHz as soon as possible. Ideally, it should release spectrum at 3650-3700 MHz, moving current WBS users to 3400-3650 MHz or to other spectrum, as well as spectrum above 3700 MHz, so as to allow continuity in supply between the current and future award.
162. Having sequential awards of spectrum within the greater 3300-4200 MHz band raises a further concern that spectrum holdings of individual operators may be unduly fragmented, which could lead to higher costs and lower quality in 5G deployment. It is important therefore that the design of the current award, especially the rules concerning assignment of frequencies to licence holders, take into account the potential for the same parties to acquire additional spectrum in the next auction. Specifically, ISED should develop rules that maximise the likelihood of multiple operators being able to deploy bandwidths of 80-100 MHz.
163. As below in Q9B, Rogers supports the general principle of using a sealed bid, second price auction format to assign specific frequencies to winning bidders. This is a tried and tested format that works well whenever the value differences between lot placements are expected to be small. However, there is a major flaw in the proposed ISED design, which is that it ignores the value to bidders from being next to actual or potential partners. The design must also be adapted to eliminate any incentive for bidders to try to block rivals from being adjacent.
164. In the assignment round, synergy values come from two sources:
- i. **Technical value.** In some bands, there are differences in the value of specific frequency blocks, for example owing to differences in interference vulnerability.

- ii. **Strategic value.** Companies may have strong preferences regarding their neighbours. As they run a joint network, Bell and Telus likely place a large premium on being adjacent. Similarly, other bidders may prefer to be adjacent, so they also retain an option to share spectrum in the future. Meanwhile, regional carriers generally prefer to be next to established operators (and vice versa), so they have a future option to trade spectrum.

165. For the 3500 MHz auction, technical value is negligible but strategic value is exponentially high due to the ability of 5G technology to operate in blocks up to 100 MHz of contiguous spectrum or non-contiguous blocks within 200 MHz, referred to as “instantaneous bandwidth” (IBW). Further, the ability of n78 equipment to span the 3300-3800 MHz range with the potential to operate across an IBW of 300 MHz with future software upgrades means that operators and networks that acquire 60 MHz or less in this award may attach a high value on securing higher frequencies so as to support future aggregation.
166. The forthcoming generation of 5G equipment is expected to have an “operating bandwidth” (OBW) of 400 MHz, up from 200 MHz at present. Within this 400 MHz range, it will be possible to retune equipment remotely. This means that operators will face little cost of moving, provided that they stay within the OBW of their equipment. However, some of the spectrum to be released by ISED in the 3800 MHz band may fall outside the OBW of the equipment that operators deploy following the 3500 MHz auction. While future n77 radios will be able to operate across the entire 3300-4200 MHz range with potentially larger IBWs, initial deployments in Canada will likely use equipment focused on 3400-3800 MHz (as used in Europe), so will not work for frequencies above 3800 MHz. It is likely that Canadian operators focused on an early 5G deployment will have built a significant number of n78 radios that would need to be replaced (or overlaid with n77 radios). However, it remains unclear when n77 equipment will become available, as it is unclear when spectrum above 3800 MHz will become widely available in the U.S. and Europe.
167. As such, even if the spectrum is non-contiguous, operators will likely attach a premium to being assigned spectrum at the top of the 3500 MHz band. A bidder that is able to aggregate spectrum within the IBW of its equipment would not have to upgrade early deployed 3500 MHz equipment. Further, they will be able to offer equivalent headline speeds to having contiguous spectrum, provided that vendors implement a solution for intra-band carrier aggregation. To deploy two spectrum blocks outside the IBW would require deploying additional equipment (including two antennas) which would be much more expensive and may not be practical on all base stations.
168. Allowing a joint network that has access to a combined 80 MHz to secure a position at the top of the 3500 MHz band would allow that network to lock in such significant cost savings that its negative impact on long term competition cannot be

overstated. Such an outcome would be similar to a wildly asymmetric allocation of spectrum amongst facilities-based competitors, and assignment rules should be defined to prevent it.

169. Given that the assignment bidding process is conducted anonymously, the risk of an inefficient assignment outcome from a strategic perspective is substantial. Fortunately, the strategic preferences of bidders are predictable, so it is possible for ISED to adapt the rules both to eliminate risk of not being next to a potential partner where this is desirable and to eliminate potential anti-competitive behaviour to foreclose such options.

170. We see two possible paths that ISED could take so as to maximize efficient use of spectrum across the current and future awards.

Option 1: Place network share partners at the bottom of the band

171. Under this approach, on a region-by-region basis, individual operators would be allowed to identify a network share partner. Partner operators may bid separately in the allocation stage, but would be placed together in the assignment stage, so that they could combine their spectrum. In the event that, in combination, the holdings of two partners exceeded the spectrum cap for an individual operator, they would be automatically assigned frequencies at the bottom of the band.

172. This approach offers several benefits:

- It removes aggregation risk for network share partners who wish to link their spectrum in the most efficient way (i.e. in contiguous blocks). It also allows them to offer immediately the highest quality 5G services to their customers.
- By ensuring that other operators are placed in higher frequencies, it maximizes the likelihood that those other operators can secure equivalent spectrum later through the second auction that is within an IBW of 300 MHz. This should prevent any long-term threat to competition. Moreover, it prevents the network share grouping from deliberately trying to block rivals from being at the top of the band for anti-competitive reasons.
- It will allow for a more straightforward assignment round, as bidders whose preferences are more focused on contiguity with a partner than on frequency position, are removed from the bidding process.

173. One downside of this approach is that it does not provide a path to full defragmentation of the band. It may result in some operators having non-contiguous holdings outside the 300 MHz IBW limit following the second auction.

Option 2: Issue frequency flexible licenses and defragment after the next auction

174. Under this approach, all licences awarded in the assignment round of this auction would be frequency flexible. This means that all winning bidders would be obliged to

include these frequencies in a full band reassignment process that would take place as part of the second auction and would prioritise award of spectrum in contiguous blocks. The assignment round for the first auction would still run as proposed by ISED.

175. We propose that ISED commit to rules based on the following principles for the assignment round of the second auction now, so as to give bidders reasonable certainty regarding how their assignments may change in the future:

i. As part of the second auction, all licensees in the band would be guaranteed:

- contiguous assignments if this is feasible, given the available spectrum
- if contiguity is not possible, there would be rules to ensure that:
 - most bidders receive contiguous spectrum; and
 - any bidders that are not contiguous would be within an IBW of 200 MHz and their spectrum would not be split into more than two blocks each of which must be at least 20 MHz.

ii. Licensees that do not acquire any spectrum in the 3800 MHz auction would be guaranteed to be reassigned to frequencies within the 3450-3650 MHz range. Thus, only bidders that won additional spectrum would be exposed to the possibility of having to move to frequencies outside the IBW of any equipment they have already deployed.

iii. ISED commits to consulting on other assignment round rules that are likely to minimize the cost and disruption to bidders of having to move frequencies, including:

- Rules that minimize that bidders have to move frequencies; and,
- Compensation for any operators obliged to move outside the OBW range of their existing equipment (this could come from the auction proceeds).

176. The approach is guaranteed to produce a futureproof assignment after the 3800 MHz auction. If ISED makes available the WBS spectrum (3650-3700 MHz), this approach further guarantees contiguous assignments for all spectrum holders in the 3300-4200 MHz range after the second auction. The main downside is that it may discourage investment in 5G equipment before the second auction if bidders perceive a substantial risk that they have to replace some equipment after the second auction. As set out above, there are measures that ISED could take to minimize this risk.

177. Rogers recommends that the Department provide a firm commitment to defragmentation of the 3500 MHz band, where technically possible and economically feasible, in order to maximize the spectrum efficiency of the greater

3300-4200 MHz band. However, joint network operators who obtain more than 60 MHz should be placed at the bottom of the 3500 MHz band to facilitate the long-term facilities-based competition that has provided Canadians with the world-class networks that they enjoy today.

178. Subject to the above, Rogers supports the proposal to conduct the assignment stage in sequential rounds, service area by service area, in descending order of population. By assigning two or more service areas in a single assignment round when the service areas form a contiguous geographic area, and the winners and the number of licences they have won are the same in the considered service areas, the benefits of contiguous spectrum are enhanced. We further support the proposed treatment of existing licence holdings, including the proposals regarding weighting for calculating prices above Vickrey levels and the proposal to present all contiguous assignment bid options to bidders regardless of whether they are feasible or not, so that bidders cannot infer how many lots have been won by other winning bidders. We also support the proposal that bidders receive full information about their own assignment at the end of each assignment round but no information regarding the location of other winning bidders.

Q9B: ISED is seeking comments on the proposal to apply bidder optimal core prices and to use the “nearest Vickrey” approach in determining the assignment prices.

179. Rogers generally supports the general principle of using a sealed bid, second price auction format to assign specific frequencies to winning bidders applying bidder optimal core prices and using the “nearest Vickrey” approach. This is a tried and tested format that works well whenever the value differences between lot placements are expected to be small.

Q10: ISED is seeking comments on the proposed affiliated and associated entities rules that would apply to bidders in the 3500 MHz auction.

Q11: ISED is seeking comments on the proposed rules prohibiting collusion and other communication rules, which would apply to bidders in the upcoming 3500 MHz auction.

180. The Department should carefully evaluate and take all the necessary steps to ensure any affiliated and associated entities rules promote a fair and efficient outcome in current and future auctions or any licensing processes. Rogers further believes that the Department must integrate its policies and auction rules regarding collusion and affiliated and associated entities within a single framework, including

spectrum aggregation limits, to ensure that unintended consequences do not benefit one or more bidders in auctions.

181. The purpose of the associated entity and collusion rules is to ensure a fair auction in order to achieve ISED's ultimate goal of a competitive wireless industry. Every carrier must stand equal and have the same opportunity to successfully bid for and win spectrum. If some carriers can circumvent the rules, then that advantage will carry into the marketplace. The Department must modernize its associated and affiliated entities rules to take into account how the spectrum will be used in post-auction mobile network sharing partnerships. For clarity, the Department should not consider existing fixed wireless network partners as affiliated entities for the purpose of bidding separately for flexible use 3500 MHz licences.
182. Further, no fixed use licensee who does not apply to participate in the 3500 MHz flexible use auction should be treated as an auction bidder.³⁵ Fixed licensees are required to maintain service throughout the auction in order to meet their licence conditions. Treating the fixed licensee as a bidder may force unnecessary spectrum transfers and unnecessarily inhibit the continued operation of established fixed networks. Any disruption to primary licensees, or their subordinate licensees, will have a disproportionate impact on rural consumers who already have limited access to high-speed internet connectivity. Such an interruption is unnecessary as the auction is issuing flexible licenses and any assessment of affiliated and associated entity status should be determined on the basis of the which entities hold, or will hold, the flexible licences at the time they are issued. Making a blanket presumption that fixed holders are in effect bidders and will be treated as such unnecessarily complicates the continued delivery of fixed services. Failing to consider fixed licences as bidders will not harm the integrity of the auction as all bidders will fully understand who holds, or will hold, the flexible licences at the time of the auction.
183. The ability to compete fairly in the 3500 MHz auction is compounded by the relatively limited amount of spectrum available in the first auction of the larger 3300-4200 MHz band and the desire of operators to eventually secure bandwidths of up to 100 MHz in this key 5G band. With at least four bidders in every region, the spectrum available in each service area will be squeezed. Demand will exceed supply in most, if not all, 172 Tier 4 service areas. Scarcity will be exacerbated if the Department adopts a completely unwarranted set-aside. It must not repeat the precedent from the 600 MHz auction, where the set-aside contributed to an outcome in which one of the two national networks failed to obtain any spectrum in half the country.
184. Moreover, the initial spectrum scarcity in the greater 3500 MHz band will also affect bidder relationships and bidding behaviour. The limited supply of spectrum in

³⁵ ISED, *Consultation*, para 114-115.

the first auction in this band will increase pressure on operators to form new or extend existing network sharing arrangements. Being able to combine spectrum to create wider contiguous blocks approaching 100 MHz is a tremendous advantage when there is a limited amount. Combining balance sheets to increase bidding strength creates further advantages. Whether formed before or after the auction, the impact of the network sharing arrangement will be the same – incumbent carriers who have such arrangements before the auction, or are thinking of doing so afterwards, will seek to coordinate their bids. Without appropriate spectrum caps, this will further increase the likelihood that only a single network (i.e., the Belus joint network) will be able to initially offer customers a national 5G experience using the full 100 MHz bandwidth in the 3500 MHz band

185. On their own, the associated entity and collusion rules cannot prevent this outcome. Over the last five auctions, related carriers have been freely allowed to bid separately. Furthermore, Rogers believes coordinated bidding has been witnessed repeatedly. The same bidding patterns emerge time and time again, even when they are unsuccessful at cutting through the noise of all the bidders. There is no need to collude if you already know exactly where you need to bid and where your partner, or likely partner, has to bid. While the rules prevent overt cheating and still allow even sophisticated bidders opportunities to not secure their desired spectrum, Rogers has little confidence in them to prevent coordinated bidding.
186. ISED must therefore use the entire auction framework to prevent such behaviour and avoid any monopolization of the 3500 MHz spectrum. The associated entity and collusion rules are intrinsically tied to the spectrum aggregation limits, and they must be designed in conjunction with one another and not in isolation. For example, without a spectrum cap, the associated entity rules carry little weight. Being designated associated entities will not harm incumbent network sharing partners as they can obtain all the spectrum they want as a single bidder. In fact, they will be able to better coordinate their bids than if they bid apart. At the same time, Rogers believes the collusion rules are ineffective in preventing coordinated behaviour between related parties even when bidding separately. Long-standing network sharing partners already have well developed bidding strategies and no collusion is necessary to achieve their auction goals. They each know exactly what to do without breaking any rules. These rules are ineffective on their own. They must be tied to effective spectrum aggregation rules.
187. That is why, as already recommended, there must be a 60 MHz spectrum cap against an individual bidder and an 80 MHz cap on any combination of 3500 MHz spectrum for a shared network for at least 10 years after the issuance of flexible use licences. Only this approach will provide a fair bidding playing field. Otherwise, incumbent mobile network partners can bid separately and ignore the anti-collusion rules. With no cap at all, they could accept becoming associated entities and, as a joint bidder, could dominate the auction and monopolize the 3500 MHz spectrum.

Our proposed dual cap would prevent more coordinated behaviour between related incumbent bidders than both the associated entity and anti-collusion rules combined.

188. Further measures, in addition to the dual spectrum cap, are also needed. In previous auctions, Rogers believes that other operators have found ways to coordinate bidding even with caps. Carriers simply avoid coming to any agreement for the specific spectrum being auctioned, allowing them to bid separately, all the while knowing exactly how their partner will bid due to their existing network relationship. They then combine spectrum after the auction, providing both parties acquire the necessary spectrum. ISED should therefore consider two solutions to avoid this practice: strengthen the associated entity rules and limit the transferability and subordination of the licences after the auction.
189. To begin with, the associated entity rules should be amended to recognize existing relationships between the national carriers. The current rules would only capture entities who have specifically agreed to share the flexible use 3500 MHz spectrum licences. That is easily avoided. Joint mobile network partnerships between incumbent carriers do not have to make any such agreement. As explained above, they already understand where to bid based on their existing spectrum sharing arrangement. To be effective, the associated entity rules should capture incumbents already sharing mobile spectrum.
190. As we highlighted in our 600 MHz comments, this was already done in Denmark. Spectrum regulators there recognized the effect of existing network sharing relationships and forced them to bid together going forward. The Danish auction rules state:
- “Commitment 3: In the future, the parties are obliged to buy frequency licenses in common (through the joint venture). This will avoid a situation where the parties buy spectrum separately and afterwards pool the obtained frequency resources in the joint venture, thus gaining access to an overall larger amount of spectrum.”³⁶
191. In addition, ISED should restrict the transferability and subordination of licences between licence holders in the future. As previously explained, if licence holders wish to combine spectrum after the auction, they should not be allowed to combine more than 80 MHz and no more than 80 MHz should be permitted to be deployed on a single radio until 3800 MHz flexible use licences are awarded. Any surplus spectrum must be returned to ISED. This will prevent any unwritten agreements from skewing the auction.

³⁶ DCCC, *Denmark: Network Sharing Agreement in Danish Mobile Telecommunications Sector*; http://ec.europa.eu/competition/ecn/brief/02_2012/dk_mobile.pdf.

192. These changes are essential. Without caps and improved associated entity rules, there is a real danger that this crucial resource will end up concentrated in a single national network and hurt competitiveness. ISED must ensure every bidder has a fair chance to win spectrum.

Q12: ISED is seeking comments on its proposal to issue new flexible use spectrum licences in the 3500 MHz band with a 20-year licence term and the proposed wording of the condition of licence above. Licence terms for all flexible use licences, regardless of when they are converted from fixed to flexible use, will terminate on the same date as licences issued through the auction process.

193. Rogers supports the Department's proposal to issue new flexible use spectrum licences in the 3500 MHz band with a 20-year licence 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. 20-year terms are consistent with licences issued for recent spectrum auctions and renewal terms. This approach provides licensees with a greater degree of certainty with respect to the ongoing viability of their operations, for network planning purposes, and in order to secure additional funding for their substantial ongoing investments. This will be vital for the 3500 MHz band, which will be one of the pioneer 5G bands in Canada and globally.

194. The Department should take a very cautious approach when exploring opportunistic access, as discussed in paragraph 150 of the Consultation, so as not to negatively affect the advanced mobile and fixed service networks that already provide connectivity to digital technologies and services that is a defining feature of the digital economy. Opportunistic sharing technology is still years away from commercial deployment and has substantial technical, regulatory, and business challenges to overcome before it can become a reality.

195. Once these technical challenges have been solved, trials should be restricted to bands with open spectrum designations, lightly licensed mobile bands or bands with limited users in restricted geographic areas that will be protected from interference. This will allow the Department to trial new spectrum management technologies and policies in bands that do not pose large risks to incumbent licensees and the extensively deployed communications infrastructure already providing advanced connectivity to Canadians. The Department should also recognize the large amount of total spectrum already available for unlicensed use vis-à-vis the much smaller amount of licensed cellular mobile radio spectrum.

196. Only once trials have proven successful and stakeholders have a better understanding of the implications of the technology, should the Department consider a future consultation process to ensure such a fundamental change in spectrum

planning and usage is in the public interest. Licensees have spent over \$17.5 billion at spectrum auctions since 2001 on acquiring exclusive licences.³⁷ Licensed operators have paid an additional estimated \$3.7 billion in spectrum fees and invested more than \$50 billion to construct world class networks and infrastructure to service Canadians.³⁸ Canadian wireless providers must clearly understand all of their rights, obligations and terms of licence upfront.

Q13: ISED is seeking comments on the proposals on the condition of licence related to transferability and divisibility, and the proposed wording above.

197. Notwithstanding Rogers' strenuous opposition to adopting yet another set-aside for the 3500 MHz auction, should ISED ultimately adopt a set-aside we support the proposal to provide a five-year moratorium on the transfer of set-aside spectrum to a set-aside-ineligible entity. However, the Department should extend this moratorium on the transfer of potential set-aside spectrum to all entities, including set-aside-eligible ones. Combined with the mid-term deployment requirements, as discussed below in Q14, such an action will help deter spectrum speculators and ensure the spectrum is available to help deliver 5G service to Canadians in a timely manner.

198. We also support the Department's proposal to evaluate transfer applications for flexible use licences against any spectrum cap. The Department should evaluate transfer applications against the single network cap of 60 MHz for five years and against the spectrum cap of 80 MHz for any joint, shared, or any other combination of networks for ten years. The Department should also place a moratorium on any subordination transfer applications that exceed these caps for the same lengths of time (ten years), including in instances where the primary and subordinate licensees may be separately and actively providing services to customers in the applicable licence area. To do differently will effectively invalidate the Department's mobile wireless competition policy and handicap facilities-based competition and investment to the detriment of Canadians from coast-to-coast-to-coast.

199. For clarity, the Department should continue to permit transfers or cross-subordination for the same amount of spectrum within the same licence areas to provide increased contiguity of spectrum holdings to more efficiently manage spectrum resources. Such transfers or subordinations would not change the spectrum concentration of a service area, so would not exceed any spectrum cap or potential set-aside. Increasing contiguity of spectrum holdings will allow for improved service delivery and provide a benefit to all Canadians wireless consumers.

³⁷ ISED, *Spectrum Auctions*; http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf01714.html. Note: \$17.5B is nominal and does not account for inflation.

³⁸ CWTA, *Facts & Figures: Investment and Job Creation in Canada*; <https://www.cwta.ca/facts-figures/>.

Q14: ISED is seeking comments on the proposed deployment condition of licence as stated above as well as on the proposed levels of deployment.

200. Rogers fully supports the Department's goal to "encourage licensees to put the spectrum to use and to deter acquisition of spectrum licences by speculators and those whose intent is to preclude access to the spectrum by their competitors."³⁹ The Department has created general deployment requirements for high band spectrum that are equal to those of the 600 MHz low-band spectrum, within the same time frames. However, further, the Department has proposed coverage requirements for incumbent mobile network operators that are extremely aggressive and completely unrealistic to match current LTE networks that have been deployed using lower band frequencies with more favorable propagation characteristics. For the reasons discussed below, the Department should require network operators to provide coverage to 90% of the population within their mobile LTE network footprint as provided by their PCS, AWS, and BRS spectrum bands within 10 years of the initial licence issuance date and 13 years to cover 97% of the population.
201. The 600 MHz, 700 MHz, and 850 MHz spectrum bands should be viewed as providing similar coverage capabilities due to similar propagation characteristics and form the coverage layer of a mobile network. The 3500 MHz band has much closer propagation characteristics to the PCS, AWS, and BRS spectrum bands, which form the capacity layer for facilities-based mobile networks. Due to differences in population densities between urban and suburban areas and those of rural and remote communities, the coverage layer may provide sufficient capacity on its own while immediately overlaying the entire network with all capacity bands may not be required nor economically feasible. Requiring all flexible use 3500 MHz licensees to build out their 3500 MHz licences to both the general deployment requirements for the band and their current LTE network grid for high band spectrum holdings will ensure the spectrum is put to use and Canadians benefit from this public resource.
202. The Rogers LTE network already covers 96% of Canadians, perhaps more once we complete a review of the coverage of our mobile LTE footprint as of June 5, 2019. Nearly matching that low band LTE coverage with a band that has limited propagation in only a handful of years would require more engineering resources and tower crews than exists in all of Canada. Multiplying that by the demand of the other national network and the various regional LTE mobile networks may require more resources than exist in North America. To even try would result in massive costs and resulting price increases to consumers or a delay in 5G to consumers outside of major urban centres, as national and regional mobile operators could elect to not pursue spectrum outside of major markets. The Department should set the

³⁹ ISED, *Consultation*, para 168.

more realistic, yet still challenging, requirement of equalling mobile LTE coverage provided by PCS, AWS, and BRS spectrum bands.

Q15: ISED is seeking comments on the proposed conditions of licence outlined in annex H that would apply to flexible use licences.

203. Notwithstanding our specific comments above regarding applying a spectrum cap to subordination applications, extending a moratorium on transfers of potential set-aside spectrum to apply to set-aside eligible bidders, and deployment requirements, Rogers generally supports the Department's proposed conditions of licence as outlined in annex H and that would apply to 3500 MHz spectrum licences issued through the proposed auction. Below are some proposals to further enhance the proposed conditions of licence to the benefit of all Canadians.

Lawful Intercept

204. With respect to lawful interception, it is important to note that mobile spectrum licensees, such as Rogers, have a long history of cooperation with law enforcement and security agencies, subject to appropriate legal processes and judicial oversight. Moreover, Rogers' significant investment in the technology, resources and expertise that are required to support lawful interception activities is a substantial benefit that accrues directly to the Canadian public.

205. Rogers strongly believes that any lawful interception obligations, imposed as a condition of licence or pursuant to legislation, should be limited to capabilities that are provided for in industry standards and incorporated in commercially available equipment. Defining lawful intercept requirements based on industry standards will result in greater availability of technology, better on-going support, and lower cost than non-standardized requirements.

206. We believe that the Department should clarify the proposed wording of the condition of licence such that the lawful interception capabilities that must be maintained will be limited to those capabilities that are provided for in industry standards and incorporated in commercially available equipment.

Research and Development

207. The research and development ("R&D") condition of licence has served its purpose and should be phased out. As the Department has noted elsewhere, this condition of licence was initially established to stimulate R&D in the telecommunications sector when the first mobile spectrum licences were issued in the mid-1980s.⁴⁰ Since then,

⁴⁰ ISED, *Consultation on Revisions to the Framework for Spectrum Auctions in Canada*; <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09371.html#DGRB00109.06.1>.

billions of dollars have been invested in R&D and the mobile industry in Canada is well established. This condition has therefore achieved its objective and is no longer required.

208. Rogers agrees with the *Telecommunications Policy Review Panel Final Report* and the *OECD Telecommunications Regulatory Institutional Structures and Responsibilities* report, which cautioned against the mix of regulation and industrial development strategy.⁴¹ The Department has other alternatives for encouraging R&D in Canada. We would also note that the U.S., U.K. and Australia do not impose an R&D condition of licence and Rogers is not aware of any other jurisdiction that imposes such a condition of licence. Market forces will ensure that wireless equipment manufacturers and licensees will continue to invest heavily in R&D to enhance their competitive position.

209. At a minimum, we propose to reduce the 2% requirement to a much lower percentage. A lower percentage would make it less difficult for licensees to meet the requirement despite the Canada Revenue Agency (CRA) rule changes that limit eligible SR&ED claims. Alternatively, the Department could discontinue using the SR&ED definition of eligible R&D to return more flexibility to facilities-based operators to target their R&D spend on priority areas instead of directing capital resources to areas that are of lesser import but conform administratively. The Department could also create an absolute 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 and in 5G services.

Annual Reporting

210. The Department should modify the annual reporting condition of licence in order to help reduce administrative burdens for both the Department and licence holders. Current annual reports consume significant regulatory and engineering resources within wireless operators to generate and appear to provide uncertain value for ISED at such a high frequency. Alternative models for reporting requirements could involve moving to an "as-requested" model, where carriers are only obligated to provide only those documents specifically requested by ISED each year or increasing the length of time between the provision of certain reports. Such a move would reduce the administrative burden on operators, as well as the Department, while still ensuring ISED can adequately monitor spectrum licensees to fulfill its mandate.

⁴¹ Ibid.

Mandatory Roaming

211. Rogers supports the mandatory roaming condition of licence and the Department should continue to firmly reject calls for its removal or modification. As the Department is fully aware, Client Procedures Circular (CPC) 2-0-17 *Conditions of Licence for Mandatory Roaming and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements* covers important areas not duplicated by the CRTC Telecom Regulatory Policy 2015-177, 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”⁴² 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 and should be technology neutral.
212. 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, i.e., including 5G, and at a level of quality they provide their own customers. This necessitates continuous investment by Rogers, Canada’s largest single operator network, and all roaming carriers.
213. 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. Mandated roaming is not at odds with facilities-based competition but the Belus joint network arrangement is. It has allowed Bell and Telus to avoid investing billions of dollars into the Belus network. The same will be true if Bell and Telus will be permitted to build out their 5G Radio Access Networks only in their own wireline footprints and share with each other (although Rogers is opposed to this). Mandated roaming is one of the few policies that mitigates the economic advantage their joint network creates and should be maintained. It should also be applied to 5G networks

⁴² 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>.

if Bell and Telus are permitted to extend their joint network arrangement to the deployment of 5G.

Access to Infrastructure

214. ISED must work with the CRTC and all levels of government to ensure all carriers have fair and reasonable access to the poles (hydro and telecom), ducts, streetlights, and municipal property that are needed to place antennas and wires. Backhaul will be crucial to 5G and carriers must be able to deploy the necessary trunks and dishes.

Q16A: ISED is seeking comments on its proposal to amend all FWA conditions of licence based on the proposed conditions of licence in annex I.

Q16B: ISED is seeking comments on its proposal to apply this amendment on June 5, 2019, plus one year—June 5, 2020.

215. Rogers generally supports the Department's proposal to amend all FWA conditions of licence based on the proposed conditions of licence as outlined in Annex I, as well as the timing of the amendment. Our comments in response to Q15 above would also apply to the conditions of licence found in Annex I, as applicable.

216. In addition, the Department should provide clarity on how the deployment condition of licence applies through the transition period as licences are converted from FWA to flexible use, and operators look to refarm their current spectrum for fixed services to mobile 5G use.

Q17: ISED is seeking comments on the proposed opening bids as presented in annex D.

217. Rogers supports the Department's proposed opening bids as presented in annex D of the Consultation. While these prices are at the higher end of comparable international benchmarks, switching rules and the use of spectrum caps instead of set-aside spectrum would mean there would be less opportunity for regional carriers to price drive national operators spectrum and unfairly increase costs for 90% of Canadian mobile consumers.

218. While Rogers recognizes that the opening prices are high relative to international benchmarks, we believe that they accurately reflect the value and importance of the 3500 MHz spectrum to 5G deployments. In the event that the Department elects to adopt a set-aside for the 3500 MHz auction, which we strongly oppose, the opening

prices will ensure Canadian taxpayers receive a fairer return and limits the windfall for regional carriers' shareholders.

Q18: ISED is seeking comments on the proposed eligibility points for spectrum licences in the 3500 MHz as outlined in annex D, and pre-auction deposits as outlined above.

219. Rogers proposes that, as was done in the AWS-1 auction, 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 each bidder's initial levels of eligibility points.⁴³ 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, especially if the Department elects to adopt a set-aside.

220. Rogers generally supports the Department's proposed approach to setting eligibility points for spectrum licences in the 3500 MHz auction across service areas, and pre-auction deposits. However, while we agree that it makes sense to adjust the opening bids for encumbered blocks to reflect the lower population coverage, we recommend the Department assign the same eligibility points to both encumbered and unencumbered blocks in a service area if the impairment is at most 50%. This will make it easier for bidders to switch between different products in the same service area that are likely substitutes in response to changes in prices, thereby promoting price discovery. For clarity, Rogers supports switching between encumbered and unencumbered blocks within one region, depending on price discovery and local deployment plans. However, we strenuously object to switching between regions that is primarily driven by strategic gaming behaviour.

221. We recognize that the Department is proposing to start the auction with an activity requirement of 95% and this should give bidders some flexibility to switch demand between substitutable products. However, by itself, this rule may not be enough to ensure individual bidders can always switch demand between substitutable categories within service areas. First, the 95% requirement may not provide enough flexibility to some bidders and there is a risk that they respond by trying to "park" demand in unwanted service areas, which may distort prices elsewhere. Second, ISED may decide to increase the activity requirement later in the auction, reducing or eliminating any flexibility.

222. Consider the following example. Suppose a number of bidders decide to switch to an encumbered product in a service area in response to it being considerably

⁴³ ISED, *Licensing Framework for the Auction for Spectrum Licences for Advanced Wireless Services and other Spectrum in the 2 GHz Range*, Section 6.1; <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08862.html#sect61>.

cheaper (at that point in the auction) than the unencumbered product. This increases competition for the encumbered product and raises its price. If this continues, the price of the encumbered product may start catching up with the price of the unencumbered product and some bidders may want to switch back. However, under ISED's proposed points structure, they may be unable to switch back as they may have insufficient eligibility. Thus, ISED's rule could in theory lead to bidders being locked into bidding for an encumbered product, which may prevent adequate competition for the superior unencumbered product. The principle here must be that bidders should be allowed to switch freely between products in a service area in response to changes in prices.

223. Our proposal is to assign the same eligibility points to any product with a population availability of at least 50% in a service area and half the eligibility points to any product with a population availability of less than 50%. This approach is summarized in the following table for ISED's proposed lot structure in service areas with encumbered products. This approach will allow much easier switching between substitute products within service areas.

Table 9: Proposed revised eligibility points

Tier #	Tier Name	% Population Available	ISED's Proposed Opening Bids	ISED's Proposed Eligibility Points	Proposed Revised Eligibility Points
4-021	Edmundston	unenc.	\$14,000	3	3
4-021-1	Edmundston	61%	\$8,000	2	3
4-023	Matane	unenc.	\$57,000	10	10
4-023-1	Matane	59%	\$34,000	7	10
4-030	Québec	unenc.	\$588,000	120	120
4-030-1	Québec	82%	\$484,000	100	120
4-044	Drummondville	unenc.	\$57,000	10	10
4-044-1	Drummondville	95%	\$55,000	10	10
4-049	Sorel	unenc.	\$30,000	6	6
4-049-1	Sorel	86%	\$26,000	5	6
4-050	Joliette	unenc.	\$82,000	20	20
4-050-1	Joliette	99%	\$81,000	20	20
4-052	Sainte-Agathe-des-Monts	unenc.	\$39,000	8	8
4-052-1	Sainte-Agathe-des-Monts	94%	\$37,000	7	8
4-054	Mont-Laurier/Maniwaki	unenc.	\$25,000	5	5
4-054-1	Mont-Laurier/Maniwaki	100%	\$25,000	5	5
4-055	Ottawa/Outaouais	unenc.	\$1,453,000	290	290
4-055-1	Ottawa/Outaouais	100%	\$1,446,000	290	290
4-055-2	Ottawa/Outaouais	79%	\$1,143,000	230	290
4-066	Chibougamau	unenc.	\$23,000	5	5
4-066-1	Chibougamau	78%	\$18,000	4	5
4-066-2	Chibougamau	67%	\$16,000	3	5

Tier #	Tier Name	% Population Available	ISED's Proposed Opening Bids	ISED's Proposed Eligibility Points	Proposed Revised Eligibility Points
4-070	Kingston	unenc.	\$115,000	20	20
4-070-1	Kingston	74%	\$86,000	20	20
4-071	Napanee	unenc.	\$22,000	4	4
4-071-1	Napanee	18%	\$4,000	1	2
4-072	Belleville	unenc.	\$101,000	20	20
4-072-1	Belleville	57%	\$58,000	10	20
4-073	Cobourg	unenc.	\$33,000	7	7
4-073-1	Cobourg	63%	\$21,000	4	7
4-074	Peterborough	unenc.	\$108,000	20	20
4-074-1	Peterborough	56%	\$61,000	10	20
4-077	Toronto	unenc.	\$16,311,000	3,260	3,260
4-077-1	Toronto	100%	\$16,295,000	3,260	3,260
4-079	Guelph/Kitchener	unenc.	\$460,000	90	90
4-079-1	Guelph/Kitchener	91%	\$419,000	80	90
4-086	London/Woodstock/St. Thomas	unenc.	\$441,000	90	90
4-086-1	London/Woodstock/St. Thomas	100%	\$441,000	90	90
4-086-2	London/Woodstock/St. Thomas	99%	\$437,000	90	90
4-086-3	London/Woodstock/St. Thomas	81%	\$357,000	70	90
4-092	Sarnia	unenc.	\$63,000	10	10
4-092-1	Sarnia	93%	\$59,000	10	10
4-111	Winnipeg	unenc.	\$540,000	110	110
4-111-1	Winnipeg	90%	\$483,000	100	110
4-119	Estevan	unenc.	\$23,000	5	5
4-119-1	Estevan	70%	\$16,000	3	5
4-119-2	Estevan	58%	\$14,000	3	5
4-119-3	Estevan	52%	\$12,000	2	5
4-120	Weyburn	unenc.	\$12,000	2	2
4-120-1	Weyburn	46%	\$5,000	1	1
4-120-2	Weyburn	39%	\$5,000	1	1
4-120-3	Weyburn	35%	\$4,000	1	1
4-120-4	Weyburn	14%	\$2,000	1	1
4-122	Swift Current	unenc.	\$24,000	5	5
4-122-1	Swift Current	16%	\$4,000	1	3
4-122-2	Swift Current	15%	\$3,000	1	3
4-123	Yorkton	unenc.	\$32,000	6	6
4-123-1	Yorkton	16%	\$5,000	1	3
4-123-2	Yorkton	16%	\$5,000	1	3
4-126	Watrous	unenc.	\$14,000	3	3
4-126-1	Watrous	15%	\$2,000	1	2
4-126-2	Watrous	5%	\$1,000	1	2
4-127	Battleford	unenc.	\$51,000	10	10

Tier #	Tier Name	% Population Available	ISED's Proposed Opening Bids	ISED's Proposed Eligibility Points	Proposed Revised Eligibility Points
4-127-1	Battleford	87%	\$44,000	9	10
4-129	Lloydminster	unenc.	\$19,000	4	4
4-129-1	Lloydminster	1%	\$1,000	1	2
4-133	Stettler/Oyen/Wainwright	unenc.	\$26,000	5	5
4-133-1	Stettler/Oyen/Wainwright	80%	\$21,000	4	5
4-136	Calgary	unenc.	\$1,417,000	280	280
4-136-1	Calgary	99%	\$1,397,000	280	280
4-136-2	Calgary	91%	\$1,289,000	260	280
4-140	Vegreville	unenc.	\$8,000	2	2
4-140-1	Vegreville	89%	\$7,000	1	2
4-150	West Kootenay	unenc.	\$40,000	8	8
4-150-1	West Kootenay	92%	\$37,000	7	8
4-154	Victoria	unenc.	\$298,000	60	60
4-154-1	Victoria	24%	\$70,000	10	30
4-156	Courtenay	unenc.	\$61,000	10	10
4-156-1	Courtenay	100%	\$60,000	10	10
4-158	Squamish/Whistler	unenc.	\$38,000	8	8
4-158-1	Squamish/Whistler	92%	\$35,000	7	8
4-158-2	Squamish/Whistler	77%	\$29,000	6	8
4-158-3	Squamish/Whistler	4%	\$1,000	1	4
4-160	Kamloops	unenc.	\$55,000	10	10
4-160-1	Kamloops	100%	\$55,000	10	10
4-164	Williams Lake	unenc.	\$20,000	4	4
4-164-1	Williams Lake	100%	\$20,000	4	4
4-171	Nunavut	unenc.	\$18,000	4	4
4-171-1	Nunavut	76%	\$14,000	3	4
4-171-2	Nunavut	21%	\$4,000	1	2

Q19: ISED is seeking comments on the proposed renewal process for spectrum licences in the 3500 MHz band.

224. Rogers supports the Department's proposal that licensees will have a high expectation of renewal at the end of the initial licence term. 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.

225. Rogers thanks the Department for the opportunity to share its views and participate in this process.