

February 16, 2018

**Senior Director, Spectrum Licensing and Auction Operations**

Innovation, Science and Economic Development Canada

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Re: **Gazette Notice SLPB-006-17** — Consultation on the Spectrum Outlook 2018 to 2022

Dear Sir/Madam,

**Introduction**

- 1 The BC Broadband Association (“BCBA”) is a group of telecommunications service providers, equipment suppliers and infrastructure constructors in Western Canada. We represent regional and local internet service providers who operate in both rural and urban parts of British Columbia and Alberta.
- 2 The spectrum addressed in this consultation is integral to the growth of innovation, the digital economy, consumer choice, and competition in Canada. The vast majority of this activity will be concentrated in Canada’s major urban centres.
- 3 This spectrum is also crucial to the broadband growth in Canada’s rural and remote areas. With very limited terrestrial infrastructure, rural communities depend on microwave backhaul links, fixed wireless access connections, and mobile wireless handsets to participate in the digital economy.

**Spectrum is a Tool for Achieving the Basic Service Objective**

- 4 ISED has devoted significant funding to building infrastructure to expand and improve the availability of broadband connectivity in rural areas, and ISED continues to fund rural broadband through the Connect to Innovate program. These programs have been successful in many rural communities across Canada.
- 5 At the same time, ISED has conducted spectrum auctions in a way that encourages the entry of new national mobile carriers. This effort has been successful, but success has come at the expense of small carriers serving rural and remote communities.
- 6 With access to only licence-exempt and lightly-licensed (3.65 GHz WBS) spectrum, and very limited access to licensed spectrum (3.5 GHz FWA), regional and local internet service providers have been building broadband networks in their communities for over 20 years. Today, these companies provide high-speed connections to rural households not served by national Cablecos and ILECs, and competition in urban and suburban markets.
- 7 In particular, the 50 MHz of WBS (3.65 GHz) spectrum that is available to regional and local carriers has brought connectivity to numerous rural communities. Regional and

local carriers have made significant investments into deploying rural broadband networks using this band. This investment should be encouraged through an expansion of this band, and should not be devalued by curtailing or limiting access to this band.

- 8 Spectrum is an important tool that can be leveraged to achieve the Basic Service Objective in rural communities across Canada. Indeed, many parts of rural Canada could have access to 50 Mbps services without funding support if regional and local service providers had access to mobile spectrum.
- 9 In the coming years, ISED should conduct auctions in a way that facilitates the participation of regional and local service providers.
- 10 In particular, auctions should be conducted using small geographic areas, and using simple formats such as the SMRA format.
- 11 Some commercial mobile spectrum that will be auctioned in urban areas should be made available on a lightly-licensed basis in rural areas, encouraging the deployment of this spectrum.

### **Measures to Encourage Spectral Efficiency**

- 12 In order to ensure that backhaul spectrum is used efficiently in Canada, the fee mechanism for backhaul microwave links must be revised. The mechanism that is currently in place is outdated and discourages both rural deployments and efficient usage of spectrum.
- 13 ISED should not introduce new regulations, such as mandating the use of spectrum-sharing mechanisms, into licence-exempt bands. Despite the congestion in these bands, the free use of these bands with minimal restrictions fosters innovation and opportunity.

### **Responses to Questions**

Q1 – What future changes, if any, should ISED examine with regard to the existing licensing regime to better plan for innovative new technologies and applications and allow for benefits that new technology can offer, such as improved spectrum efficiency?

- 14 The format of spectrum auctions has precluded the participation of regional and local carriers. As a result, deployment has been concentrated in cities, and national carriers and new competitors have not brought higher speeds and cheaper services to rural Canadians.
- 15 Canada should return to the simpler SMRA auction format for future spectrum auctions. The combinatorial auction format inherently favours large companies that are bidding for many licences, and the complexity of the auction format increases the cost of participation, discouraging local and regional carriers from participation.

- 16 Spectrum should be auctioned using small licence areas. For most spectrum auctions, there is no technical justification for using licence areas larger than Tier-4. Indeed, the FCC typically uses smaller geographic licence areas than ISED. The use of small geographic licence areas encourages the participation of regional and local carriers, and encourages the deployment of spectrum in rural areas.
- 17 By enabling regional and local carriers to access spectrum, spectrum will be used more efficiently in all parts of Canada.
- 18 The BCBA supports flexible-use licenses that permit mobile or fixed operations. In many sparsely-populated areas, mobile spectrum is well-suited to providing fixed wireless broadband services.
- 19 The light-licensing regime has been successful for rural carriers. Regional and local carriers have used the WBS (3650-3700 MHz) band extensively in order to deliver fixed wireless broadband services, bringing high-speed connectivity to otherwise un-served communities.
- 20 The BCBA recommends that ISED consider licensing some spectrum using a combination of a lightly-licensed regime in rural areas, and auctioned licences in urban areas. This would promote the deployment of mobile and fixed broadband services in rural communities.
- 21 ISED is currently embarking on the implementation of a dynamic spectrum sharing mechanism. The BCBA welcomes the opportunity for its members to access unused spectrum, however we remain concerned that such a mechanism could be ultimately inefficient in congested areas.

### **Commercial Mobile Services**

Q2 –Do you agree with the above assessment on demand for commercial mobile services in the next few years? Is there additional information on demand, which is not covered above, that should be considered? If so, please explain in detail.

Q3 – What new technology developments and/or usage trends are expected to address traffic pressures and spectrum demand for commercial mobile services? When are these technologies expected to become available?

Q4 – Recognizing the trend of increasing commercial mobile traffic, what operational measures (e.g. densification, small cells or advanced traffic management) are being taken to respond to, and support, increasing traffic? To what extent are these measures effective?

- 22 The BCBA does not represent any mobile carriers in this submission, and so has no specific response to questions 2, 3, and 4.
- 23 The BCBA does represent several fixed wireless carriers that have deployed LTE equipment, and these carriers would be in a position to offer mobile services if they could obtain mobile spectrum.

## Licence-Exempt

Q5 – Do you agree with the above assessment of demand for licence-exempt spectrum in the next few years? Is there additional information regarding demand, which is not covered above, that should be considered? If so, please explain in detail.

- 24 The BCBA agrees with ISED's assessment that demand for licence-exempt spectrum will continue to grow.
- 25 These bands are heavily congested, to the extent that, in many areas, the bands are not practical for commercial use. For example, fixed wireless access networks operating in the 900 MHz, 2.4 GHz, and 5.8 GHz bands may be un-reliable, and point-to-point links in these bands are frequently degraded due to high noise levels.
- 26 The deployment of LTE-U and other LTE variants that employ the licence-exempt bands will exacerbate the pressures on these bands, as major carriers deploy high-powered transmitters in already congested areas.

Q6 – What new technologies and/or sharing techniques are expected to aid in relieving traffic pressures and addressing spectrum demand for licence-exempt applications? When are these technologies expected to become available?

- 27 The BCBA believes that segmentation of the licence-exempt bands for commercial and household uses will enhance the ability of businesses to use solutions based on licence-exempt communications. For example, the designation of the band 5150-5250 for lightly-licensed use by carriers has made this band more attractive for commercial use.
- 28 The BCBA does not, at this time, recommend that ISED mandate spectrum sharing techniques in licence-exempt bands.

Q7 – What existing licence-exempt frequency bands will see the most evolution in the next five years? Are there any IoT applications that will have a large impact on the existing licence-exempt bands? If so, what bands will see the most impact from these applications?

- 29 The BCBA hopes that, with increased capacity demands, the higher-frequency (i.e. millimetre wave) licence-exempt bands will be more extensively used. These bands are more appropriate for short-distance high-capacity connections, such as those frequently used within the home.



8 – Will the trend for offering carrier-grade or managed Wi-Fi services continue to increase over the next five years? If so, will this impact congestion in Wi-Fi bands and which bands would be most affected?

- 30 The BCBA notes that the introduction of LTE technologies into licence-exempt bands will further elevate the noise level in these bands. Nonetheless, the BCBA does not believe that the use of licence-exempt bands should be limited or restricted.

## Satellite

Q9 – ISED is seeking comments on the above demand assessment for MSS and earth observation applications for the period 2018-2022. Is there additional information on demand, which is not covered above, that should be considered?

Q10 – ISED is seeking comments on the above demand assessment for FSS/BSS for the period 2018-2022. Is there additional information on demand, which is not covered above, that should be considered with regards to the below bands?

- a) C-band
- b) Ku-band
- c) Ka-band

Q11 – What and how will technology developments and/or usage trends aid in relieving traffic pressures and addressing spectrum demand for satellite services? When are these technologies expected to become available?

Q12 – What satellite applications (e.g. broadband Internet, video broadcasting, backhaul, etc.) do you consider a priority for the period 2018-2022?

- 31 The BCBA does not represent any commercial satellite operators in this submission, and so has no specific response to questions 9, 10, 11, or 12.
- 32 We note that there is a large quantity of spectrum in the fixed satellite bands of 3700-4200 MHz and 5925-6425 MHz. These bands are in a frequency range that has proven to be useful for delivering broadband services over fixed wireless systems in rural areas. The availability of these bands to regional and local carriers would accelerate the deployment of 50 Mbps and faster services to many rural communities.

## Backhaul

- 33 ISED must reform the existing outdated fee structure for backhaul links, to promote efficiency. Three measures are required.
- 34 First, backhaul spectrum use should be priced based on the amount of spectrum used, not the link capacity. The current pricing mechanism does not encourage the efficient use of spectrum.
- 35 Second, spectrum fees for the use of lower frequencies should be higher than the fees for the use of higher frequencies. This would encourage the efficient use of low-frequency bands which are valuable for long-distance links.



- 36 Third, spectrum fees should be reduced in rural and remote areas. The provision of high-capacity circuits to rural communities is currently not sustainable due to the cost. A congestion-based fee structure would support the deployment of 50 Mbps and higher services in rural and remote areas. That is, fees for backhaul frequency use should be significantly lower in areas where there are very few or no other uses of the same frequency band.
- 37 The BCBA also notes that the current fee structure imposes excessive fees for high-capacity links. These fees do not support a sustainable business that would bring 1 Gbps connectivity to a rural community. Fees associated with high-capacity links, especially in un-congested areas, should be reduced significantly.

Q13 – Do you agree with the above assessment on demand for backhaul in the next five years? Is there additional information on demand, which is not covered above, that should be considered? If so, please explain in detail.

- 38 The BCBA agrees with ISED's assessment that backhaul demands will grow with demands on commercial cellular.

Q14 – Backhaul service in Canada is delivered using a variety of solutions, including fibre optics, microwave radio and satellites. What changes, if any, are anticipated to the mix of backhaul solutions employed?

- 39 As capacity demands on cellular and fixed wireless networks grow, the BCBA expects that more distribution sites will be fed by fibre backbone, and new fibre infrastructure will be deployed to meet the demand.
- 40 However, opportunities will arise for non-incumbent carriers to deploy 5G systems. With less fibre-optic infrastructure than incumbent carriers, non-incumbent carriers will be heavily dependent on microwave backhaul.
- 41 Rural carriers are experiencing the same demand growth as urban carriers. Rural carriers will deploy more backhaul links to serve more customers that are far away from fibre infrastructure, and rural carriers will expand and upgrade existing backhaul links in order to better serve customers' demands.

Q15 – What and how will technology developments and/or usage trends aid in relieving traffic pressures and addressing spectrum demand for backhaul services? When are these technologies expected to become available?

- 42 The BCBA expects that advances in technology will continue to improve spectral efficiency in backhaul systems.
- 43 These advances will be implemented and deployed more aggressively if ISED implements a fee structure that encourages spectral efficiency.



Q16 – Will the demand for commercial mobile, licence-exempt, satellite, or fixed wireless services/applications impact the demand for backhaul spectrum? If so, how and which of these services/applications will create the most impact?

- 44 Increasing demand for fixed wireless will increase backhaul demands in rural areas.
- 45 A fee structure that permits low-cost access to spectrum in un-congested areas will enable local carriers to meet rural consumers' growing demands for bandwidth.

Q17 – Is there a range or ranges of frequencies that will be in higher demand over the next five years? Why is higher demand anticipated for these frequency ranges?

- 46 The BCBA expects that there will be increased demand for higher backhaul frequencies (15 GHz and above) as a result of densification of networks, and the small cells associated with 5G systems.
- 47 A fee structure with higher costs for lower frequencies will encourage users to deploy backhaul links in higher frequency bands for shorter links, promoting the efficient use of spectrum.

Q18 – Will allowing flexible fixed and mobile services within the same frequency band change how backhaul is planned and used?

- 48 The BCBA supports the use of flexible fixed and mobile licences. The BCBA does not think that flexible fixed/mobile licences will significantly impact backhaul demands. In some small-cell cases, backhaul demands may be offloaded onto flexible-use spectrum.

#### **Potential frequency bands to be released in the period 2018-2022**

Q19 – Provide, with rationale, your view of the above assessments on the bands being considered internationally for commercial mobile, fixed, satellite, or licence-exempt.

- 49 The BCBA supports ISED's intention to expand a consideration the 3500 MHz band to include a review of 3400-4200 MHz. This band presents a significant opportunity to rural consumers in Canada.
- 50 In rural communities where regional carriers have access to licensed FWA (3.5 GHz) spectrum, consumers have benefitted from the availability of reliable, competitively priced broadband connectivity. An expansion of the availability of spectrum in this band will enable rural providers to offer higher speeds to more communities.
- 51 Given the impact of the FWA spectrum on broadband connectivity in rural communities and small cities, the BCBA encourages ISED to consider models that combine licensed and lightly-licensed models, and urban and rural geographical areas in the assignment of this spectrum.



- 52 The BCBA believes that, in its assessment of the 3500 MHz band use, ISED has not given sufficient weight to the transformative effects of the 3.5 GHz FWA and the 3.65 GHz WBS bands on rural connectivity.

Q20 – ISED is seeking comments on the potential frequency bands for release in table 7:

- a. the proposed services and/or applications for each frequency band
- b. the potential timing of releasing for each frequency band
- c. the priority of the release of the frequency bands

- 53 Bands below 1 GHz, in particular the 600 MHz and 800 MHz bands, have the potential to fill very specific needs in rural connectivity. With the propagation characteristics of these bands, wireless systems can reach consumers cost-effectively in very sparsely populated areas (such as prairie regions) and in areas with dense tree cover (for example, along the west coast). These considerations are, in many cases, unique to Canada's remote and rural communities, and may not be reflected in other countries' band plans.
- 54 In areas outside of major cities, the proposed TV White Space licensing process or light-licensing process should be extended to some spectrum blocks that may be used for mobile in urban areas.
- 55 The BCBA encourages the designation of more licence-exempt spectrum in the millimetre-wave bands (24 GHz and above).

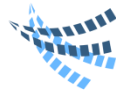
Q21 – Are there any other bands that should be considered for release in the next five years for commercial mobile, fixed, satellite, or licence-exempt that are not discussed above? Provide rationale for your response.

- 56 The BCBA has no comment on additional bands.

Q22 – Are there specific frequency ranges/spectrum bands that should be made available for specific applications?

- 57 The BCBA re-iterates our response to questions 19 and 20. The 3400-4200 MHz band and sub-1 GHz bands have the potential to further expand 50 Mbps and faster connectivity into rural areas.





Q23 – Are there any factors that would impact the potential release of these frequency bands between 2018 and 2022?

58 The BCBA has no comment.

**Closing Remarks**

59 The BCBA thanks ISED for the opportunity to comment on this consultation.

Kind regards,

**Rey Sonico**  
Secretary  
BC Broadband Association