



October 26, 2020

Senior Director, Spectrum Licensing and Auction Operations Spectrum,
Information Technologies and Telecommunications Sector,
Innovation, Science and Economic Development Canada
235 Queen Street, 6th Floor
Ottawa, ON, K1A 0H5
ic.spectrumauctions-encheresduspectre.ic@canada.ca

Subject: Notice No. SLPB-002-20: Consultation on the Technical and Policy Framework for the 3650-4200 MHz Band and Changes to the Frequency Allocation of the 3500-3650 MHz Band

1. Founded in 1891, the Canadian Electricity Association (CEA) is the voice of more than 40 Canadian electrical utilities. CEA members include electrical generation, transmission, and distribution companies from all provinces and territories.
2. The electrical infrastructure that Canadian utilities operate is critical to the safety, security, and economy of Canada, and is also a key enabler of Canada's decarbonization goals. As reliance on the grid has grown, and the complexity of the generation, transmission, and distribution systems increase, resilient communications networks with access to broadband spectrum are becoming increasingly critical to the safe and reliable operation of the electric system.
3. Electric utilities use telecommunications networks to: 1) maintain secure and dependable tele-protection systems, 2) monitor and control electric infrastructure, and 3) enable the safe and efficient dispatch of their field workforce for routine and recovery operations. Utilities typically make use of both commercial services and private networks. This combination often provides the best overall cost, performance, resiliency, and coverage. CEA members operate infrastructure across Canada. This includes both in the largest cities, and in support of electrification mandates, in the most remote populated regions.
4. To continue to provide resilient and safe electricity to urban and remote regions alike, utilities require a range of telecommunications options to overcome the challenges seen in this diverse geography. Enabling these options, and in so doing, assuring the proper functioning of modern electricity grids in all regions of Canada, should be a key outcome for spectrum policy. CEA's responses to the Department's notice of consultation SLPB-002-20-2020, dated August 31, 2020, are made with these goals in mind.

Alternative Mechanisms for Spectrum Allocation Needed

5. This consultation focuses on allocating spectrum for Mobile Use by Mobile Network Operators (MNOs) to serve the consumer market. It is important that MNOs have access to spectrum just as it is important that other stakeholders are recognized as needing spectrum access. If Canada only uses the 3650-4000 MHz spectrum for MNOs that would not only be a missed opportunity for innovation, but an oversight that skipped diverse stakeholder needs for spectrum –most notably the industrial/enterprise user and Wireless Internet Service Providers (WISPs, also called local area operators) stakeholder groups charged with assuring key outcomes for Canadians. If this consultation is to achieve all three of its policy goals, namely (bold text added)
 - a. *foster investment and the evolution of wireless networks by enabling the development of high quality 5G networks and technology (**innovation**);*
 - b. *support sustained competition in the provision of wireless services so that all consumers and businesses benefit from greater choice and competitive prices (**competition**);*





- c. *facilitate the deployment and timely availability of services across the country, including in rural, remote, and Northern regions (timely/broad deployment);*

then the Minister must ensure a framework that allows diverse stakeholders including MNOs, industrial users, & WISPs all to deliver their key services to Canadians and, in so doing, to contribute to Canadian security and prosperity.

6. CEA's telecommunication experts, in concert with other contributors to this process, note that this consultation is largely silent on private networks. Private networks, especially for use-cases to be delivered by large industry are one of the defining use cases for 5G. As such, 5G spectrum policy must consider how to offer private network opportunities, or the full innovation value of 5G spectrum will be lost to Canada. The 3650 to 3800 MHz spectrum is particularly important for industrial operators as an enabler for private 4G and 5G for in-plant and local area mobile broadband critical to Canada's economy and innovation.
7. Without spectrum policy that allows for private networks, Canadian industry will be forced to use networks, both 5G and LTE, owned by others, which will stifle innovation and put Canada out of step with the trend towards enabling private networks as a key spectrum policy outcome. Just as a renter may not be able to modify occupied property to best suit their needs, a network owned by an MNO may not be customizable to the degree a non-MNO stakeholder needs. Stakeholders should not be bound to renting if they are willing to invest in buying. Furthermore, there is definite inequity if groups, especially WISPs serving remote communities that already face internet connectivity challenges, are forced to abandon their current spectrum and have their own investments invalidated just to have to rebuy rights for use from a third party.
8. CEA notes that ISED has put forward an option to displace WBS users to higher spectrum but a healthy device ecosystem for 3900-3980 GHz is at least 4-5 years away as there are very few mainstream components available that support 3900-4000 GHz. In the meantime, radio solutions can be built, but the extra cost for the custom components in the radio, installation cost of these new devices, and the engineering cost to redesign the network will be transferred to the end-user thus increasing costs.
9. Also of note, and important to understand, is that spectrum allocations as proposed in this consultation would be done at the Tier 4 level (the smallest areas mentioned). However these areas are much too large for any non-MNO company to reasonably acquire at auction. To return to the rental analogy, this consultation posits that in order to acquire spectrum one must either rent and pay a landlord, or buy a 50 acre plot of land with no middle ground between these extremes. For all of the reasons cited above, ISED must consider alternative methods to determining who has access to the 3650-4000 MHz spectrum.

Innovation Opportunities Created by a Citizens Broadband Radio Service

10. We propose that for ISED to best achieve its three goals for this 3650-4000 MHz-spectrum, *innovation, competition, and timely/broad deployment*, the department should follow a system similar to the Citizens Broadband Radio Service (CBRS) in the United States. While CBRS is more complex than a dedicated single-user spectrum allocation (i.e. MNO only), this tiered spectrum authorization interference protection model has been deployed in the US and has allowed for significant innovation in both industrial and enterprise deployments as well as fostering a rapidly emerging equipment ecosystem.
11. CBRS is a system that serves MNOs, WISPs and Industry/Enterprise. No one stakeholder gets everything, and everyone has to work a little harder to get access and coordinate spectrum but the net benefits are many. Those benefits include efficient spectrum utilization, an expansive device ecosystem that promotes





all manner of deployments (the 3650-3800 MHz spectrum has four separate 3GPP bands: LTE band 43 & band 48; 5G n77 & n78), as well as significant revenue to the Canadian taxpayer both through indirect economic growth as well as direct funds collected from spectrum auction. To date the US CBRS auction has drawn investment of over \$3.95 billion (Canadian)¹ with proceeds still growing as the market continues to develop.

12. The high level details of our CBRS style recommendation are as follows:

- 3650 to 4000 MHz be designated shared access flexible use (fixed and mobile) spectrum in 10 MHz Channels. 10 MHz channels are proposed by ISED and we agree that they are reasonable.
- The 30 x 10 MHz channels from 3700 to 4000 MHz are eligible for Priority Access Licenses (PAL) to be allocated by auction **on a Tier 5 licensing area basis**. ISED has already created policy for Tier 5 licenses and this spectrum would be an ideal place to put that policy into practice.
- The 5 x 10 MHz channels from 3650 to 3700 are not eligible for Priority Access Licenses (PAL) and remain all-come-all-serve available to General Authorized Access (GAA) operators and GAA operators, similar to the existing Wide Band Spectrum (WBS), must register their fixed stations.
- GAA operators are able to operate within the band from 3650 MHz to 4000 MHz provided there is non-interference to PAL operators, and other GAA operators; and provided they participate in the Spectrum Access System (SAS), which is a central database coordinating spectrum access.
- PAL licensees have assured access to the channel they purchase in auction, GAA operators are not able to use PAL channels of that operator once they put into service their fixed stations (forming an active coverage area).
- PAL licensees are only granted priority for their owned channels, and other GAA or PAL operators are only prevented from using those channels after the PAL licensee has deployed equipment forming a coverage areas registered with the SAS.
- PAL and GAA operators have equal opportunity to operate within the entire 3650 to 3700 MHz band, as well as on other PAL operators channels (if the other PAL operator has not yet deployed).

13. Taken collectively the above recommendations form a system that allows MNOs, Industry/Enterprise, and WISPs to invest in spectrum and technology that will serve each best. All three groups have the ability to acquire spectrum and are protected from signal interference. The CBRS system allows innovation in private networks, it helps bridge the digital divide by supporting WISPs operating in rural & remote regions, it allows MNOs to provide world leading services through 300 MHz of available spectrum and it enriches the Canadian taxpayer by doing all of this through a competitive market mechanism (auctions).

Strengths of a Citizens Broadband Radio Service

14. To proactively address detractors of the CBRS system, we suggest that any arguments that ‘the SAS is detrimental because it slows network deployment’ are unfounded. CEA and other groups have seen from the CBRS roll-out in the US that an SAS provides mechanisms to improve the radio performance of everyone using the spectrum and does not materially delay the rollout of infrastructure. **A centrally managed database is a catalyzer, not a barrier, and would be a way that ISED could add value to all spectrum participants by ensuring spectrum optimization and non-interference of signals.** The

¹ <https://connectedremag.com/das-in-building-wireless/cbrs-pal-auction-hits-3b-in-bids-and-is-still-climbing/#:~:text=How%20does%20the%20PAL%20auction,at%203.55%20to%203.65%20GHz.>



department is well suited both technically and from a regulatory authority perspective to perform this role.

15. Additionally, the relatively short propagation range of the proposed CBRS spectrum makes interference management between multiple adjacent and even overlapping license holders very manageable. To give time for an SAS to be established and to reduce the burden on existing operational systems the SAS requirement could be delayed to on or about 2025, or exemptions provided as nonstandard license conditions; particularly in the proposed GAA only operation of the band from 3650 to 3700 MHz.
16. The argument that '100MHz of contiguous spectrum is required for 5G', and that more flexible models that maximize spectrum usage and minimize hoarding are therefore to be avoided, are belied by already-existing technologies. Carrier aggregation of disparate channels is a mature technology and can be easily used in 5G to aggregate smaller channels. This is evidenced by the CBRS auction in the US where many MNOs purchased 10MHz PAL licenses and will be aggregating that spectrum to reach the peak speeds possible in sub-6GHz 5G.
17. Carrier aggregation in LTE has been happening since 3GPP release 10, published more than 10 years ago. Given this, aggregation technology is widely available in high-end and low-cost ENodeB configurations – including equipment optimized for the CBRS market. Indeed, CEA member companies operate carrier aggregation relevant to 5G today. For instance, a BC Hydro/Powertech Labs LTE innovation centre includes a system combining Band 14 with Band 43, further making use of intra-band carrier aggregation in band 43. Hydro-Québec's research center (IREQ) is building a multi-core 3GPP lab covering private network use cases for critical infrastructure applications using LTE Bands 14, 43 as well as 5G n77.
18. The argument that 'a CBRS system is a poor way to allocate spectrum' is similarly unconvincing, particularly given the longstanding challenge of under-used spectrum that decreases efficiencies. This real challenge has already led ISED to adopt "use it or lose it" policies that resulted in substantial deployment increases² and, more broadly, to underline the need for spectrum management that is "minimally restrictive (e.g. flexible use) and facilitates provision of" innovative 5G services.³
19. The CBRS system has proven a good solution to this challenge, and an important step towards the kinds of minimally-restrictive enabling environment that Canada's spectrum policy mandates and that facilitates broader connectivity. If the PAL operators deploy in all of their service area, then the spectrum is used, and likely the GAA spectrum as well because the PAL operator can use it to increase their operations. If PAL operators don't deploy in all of their service area, then a GAA operator is able to use that under-utilized spectrum to augment their GAA networks. GAA network operators are always able to participate in the marketplace, even after PAL deployments occur. These features allow industrial in-plant, and local area operators such as WISPs to continue deployments even after Canada develops ubiquitous commercial 5G coverage. As such CBRS brings certainty for operators that the dedicated spectrum they require will be available, certainty of a shared spectrum business model between GAAs & PALs, and opportunity for smaller rural-focused operators to have more spectrum access in underserved areas. In these ways the CBRS model will use market mechanisms to, among other things, help bridge the digital divide in rural

² *Decisions Regarding Policy Changes in the 3500 MHz Band (3475–3650 MHz) and a New Licensing Process*, IC DGSO-007-14, December 2014, paragraph 50 ("Deployment in the 3500 MHz band has increased substantially since the 'use it or lose it' policy was established in the renewal decision, to the benefit of Canadians").

³ *Spectrum Outlook 2019-22*, ISED SLPB-003-18, 6 June 2018, paragraph 33. See also, e.g., K. Joseph, *Analysis of Canadian Wireless Spectrum Auctions: License Ownership and Deployment in the 700 MHz, 2500 MHz and 3500 MHz Frequency Ranges*, finding large swathes of spectrum under-utilized and locked up by licensees which does not serve the goals of effective use of the scarce spectrum resource. See <https://crtc.gc.ca/eng/acrtc/prx/2018joseph.htm>.



and remote communities, which is a key priority of ISED⁴.

The Multi-Stakeholder Balance of Citizens Broadband Radio Service

20. A CBRS model in 3650-4000 GHz is a win-win for all stakeholders because no one party receives all the spectrum. Rather, all stakeholders have the opportunity to acquire spectrum, and the needs of each stakeholder is recognized, and all stakeholders must work together. Anyone using WBS (especially including WISPs) today wins, as it will be a simple software upgrade to their existing equipment to support the new CBRS model (this is what occurred in the US). Anyone interested in priority access can get it with the 300 MHz going up for a PAL auction, ISED supports innovation in Canada by opening up a critical 5G bands for industrial and non-industrial use cases, and of course the Canadian taxpayer wins as 300 MHz will be auctioned which will undoubtedly bring in significant proceeds as there will be many Canadian entities competing via market mechanisms for the spectrum.
21. To summarize, the **goals of innovation, competition, and timely/broad deployment to the benefit of Canada are accomplished by this CBRS style recommendation.** The promise of 5G can be realized but new challenges require innovative solutions otherwise innovation is only a label used to paper over an old system.

All of which is respectfully submitted.

Sol Lancashire
Manager Telecom Engineering, BC Hydro
Chair, CEA Operating Technology & Telecommunications Committee

Channa Perera
Vice President, Regulatory Affairs and Best Practices
Canadian Electricity Association

⁴ <https://pm.gc.ca/en/mandate-letters/2019/12/13/minister-innovation-science-and-industry-mandate-letter>

