

Innovation, Science and Economic Development

Consultation on the Spectrum Outlook 2018 to 2022

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Submitted by:
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Chantal Davis

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Innovation, Science and Economic Development Canada

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Dear Ms Davis:

1. My name is Gregory Taylor and I am an Assistant Professor at the University of Calgary, where I specialize in communications policy. I am also the principal investigator of Canadian Spectrum Policy Research, a SSHRC-funded research project exploring the economic and social potentials of the public radio frequencies. I appreciate the opportunity to submit to this consultation for Innovation, Science and Economic Development Canada (ISED)'s Spectrum Outlook 2018-2022.
2. This assessment of Canada's spectrum policy is certainly timely. A long-term approach is required to navigate our current trajectory and reflect on regulatory options in the rapidly changing mobile sector. I am not an engineer and so will

respond to questions as one who has written about Canadian spectrum policy and done comparative analysis of spectrum policy in other countries, with a particular focus on the social benefits to be derived by spectrum regulation.

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?

3. In 2012, I co-authored a submission for the Consultation on a Licensing Framework for Broadband Radio Service (BRS) — 2500 MHz Band. Our point was straightforward: 20-year licenses are too long, hindering both growth and efficiencies in spectrum development. This point was reiterated in a submission I co-authored regarding the framework of the AWS-3 auction in 2014. I believe this point has proven accurate and has seen recent support in academic literature and regulatory announcements.
4. 20 year licenses do not encourage a vibrant and changing mobile sector. The technology simply changes too quickly to have any concept of how spectrum will be most efficiently utilized two decades from now. One way to ensure a more agile mobile sector is to reassess the license after a shorter period and renew licenses of those companies who demonstrate best practices.

5. I appreciate the investment required to build networks but for maximum return on private use of the public spectrum the license must be reassessed on a more regular basis, similar to over-the-air broadcasting, which is a seven year period. This will not necessarily mean a drastic loss of revenue for the government. The AWS spectrum was auctioned in 2008 with ten-year licenses and still received \$4.2 billion in bids.
6. The August 2014 Consultation on Policy Changes in the 3500 MHz Band (3475-3650 MHz) and a New Licensing Process in Rural Areas offers a clear example of the necessity of shorter licence terms. The reason that Industry Canada was able to make the required changes in these frequencies is that the 2003 ten-year licences had expired. Changes had happened in the industry and in technology over the previous decade that called for a reassessment of this resource and Industry Canada was able to give notice to those using the spectrum that their licences would not be renewed.
7. The movement to 20-year licenses is a policy error of the last decades that limits the regulatory flexibility required for the evolving wireless technology. As noted in a 2017 American study, the current licensing model “effectively give(s) incumbents control over critical parts of the spectrum, allowing them to demand a share of returns from new uses, which blocks or delays innovation. In contrast, unlicensed spectrum or short- term licenses for small geographic areas encourage entry and innovation, but

provide lower incentives for long-term investment.” (Milgrom, Weyl, & Zhang, Fall 2017).

8. I encourage ISED to conduct further research in this area with other international regulators to find the “sweet spot” for license terms that encourages investment and rewards providers who are making maximum use of the spectrum. The current ISED license plan for the 3500 band is for one year renewable licenses. It will be interesting to see if this new approach works. The FCC is currently exploring 3 year priority licenses for the 3.5 GHz band. The FCC notes “This regulatory adaptability should make the 3.5 GHz Band hospitable to a wide variety of users, deployment models, and business cases, including some solutions to market needs not adequately served by our conventional licensed or unlicensed rules” (Federal Communications Commission, 2015). It is precisely this issue, adaptability, that was the basis for our request for shorter license terms in 2012 and remains a stubborn problem in the Canadian licensing system. Shorter term limits keeps companies accountable to spectrum’s rightful owners: the public.

Recommendation 1: ISED needs to develop shorter spectrum license terms with renewal subject to performance.

9. Another problem with Canada's licensing approach is that the current framework encourages development in urban centres while vast reserves of spectrum in rural areas are underutilized. Quite simply, too much prime spectrum in Canada sits idle. In the recent 2500 MHz auction in 2015, the deployment requirements generally called for 30-50% population coverage in tier three zones. In most of the country that can easily be accommodated by simply providing service in the urban area, while that same provider maintains ownership and control over underutilized spectrum outside urban areas. Even major provider Telus noted that the 2500 MHz deployment plan was "not ambitious enough" (Industry Canada, Jan 2014 par 337).
10. The 700 MHz auction in 2014 made low frequency spectrum available that was particularly well suited to Canada's rural areas, given its strong propagation characteristics. However, once again Industry Canada's deployment conditions for Canada's rural areas were decidedly underwhelming. In its decision, Industry Canada decided that 700 MHz license holders were obliged
- a. to cover 90% of the population of its HSPA network footprint as of March 2012, within five years of the issuance of the initial 700 MHz licence; and
 - b. to cover 97% of the population of its HSPA network footprint as of March 2012, within seven years of the issuance of the initial 700 MHz licence
- (Industry Canada, 2013 par 305)

11. This condition of license did not expand service in Canada's rural areas, it only asked that license holders roughly equal the amount of service they already provided. This was a clear missed opportunity to expand broadband access in rural Canada. The decision made on the 3500 band had a more forward looking policy of "permitting flexible use throughout all licence areas" and was a move in the right direction. Previous licensing plans have done little to improve wireless access in rural Canada.
12. Broadband access in Canada's rural areas will be wireless – that just makes economic sense. However, Canada's spectrum licensing regime of the last 20 years does not benefit the rural regions of the country.

Recommendation 2: Spectrum licensing frameworks must offer clear deployment requirements that benefit Canada's rural regions

13. Canada has tried to address the problem of rural access but one such initiative currently is in regulatory limbo. The Remote Rural Broadband System (RRBS) policy initiative is a bold regulatory approach to receive greater value from prime spectrum; however, it was not given enough regulatory support and now RRBS faces an unclear future. The RRBS policy is an original Canadian policy to help bridge the urban-rural digital divide using the abundant resource of vacant 600 MHz television spectrum. The overwhelming majority of RRBS providers are independent, small

ISPs who brought real competition into areas they served. The RRBS policy allows small entrepreneurs to gain a foothold in the competitive wireless market, deploying spectrum that was largely vacant. These fixed wireless providers make use of prime spectrum in areas often underserved by larger wireless companies (Taylor, 2018).

14. RRBS is a Canadian wireless policy initiative that still holds great promise: it encourages and supports new entrants into the wireless broadband sector; it makes use of spectrum that is by and large idle; and it explicitly seeks to expand service into underserved areas. It should have received great regulatory support, but that was not the case.

15. In the 2014 *Consultation on Repurposing the 600 MHz Band*, Industry Canada placed a moratorium on new licenses for RRBS and modifications to expand existing coverage under RRBS. The moratorium was the product of following the U.S. lead on auctioning the 600 MHz frequencies, an auction that decidedly underperformed in the United States, raising \$19 billion instead of the anticipated \$45 billion. The 2014 moratorium effectively froze the RRBS program in its tracks and small ISPs who were providing service via RRBS looked to other options such as 3500 MHz, or simply went out of business.

Recommendation 3: New licensing regimes should be designed to support small service providers who require spectrum access to provide service outside of Canada's urban centres.

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.

16. No one seems to have an accurate read on spectrum demand. The recent 600 MHz auction in the US resulted in far fewer industry participants and government revenue than anticipated. As I wrote in a 2017 study, spectrum scarcity in Canada (and elsewhere) is a highly contested theory (Taylor, Middleton, & Fernando, 2017). Contradictory claims of current spectrum capacity are often brought before the national regulator.
17. The government of Canada first announced the Spectrum Analytics Centre as part of the Digital 150 2.0 announcement in 2015 (Canada, 2015). It was announced again in 2017 by the Liberal government as part of the Big Data Analytics Centre (Jackson, May 8 2017). The Communications Research Centre in Ottawa has done good research for decades but to my knowledge there has still been no progress on what Minister Navdeep Bains announced as the new centre's ability "to understand exactly

how spectrum is currently being used” (Bains, May 8 2017) . Canada needs reliable data on spectrum use and deployment.

18. If spectrum capacity is truly at a crisis level, there are other areas to look to in order to maximize efficiencies. Current Canadian over-the-air television (OTA) spectrum licenses receive 6 MHz of spectrum and are terribly underused in Canada. OTA licenses should deploy multiple channels on 6 MHz, as is possible under the ATSC digital standard. Mobile broadband providers Bell and Rogers also have numerous OTA licenses via their vertically integrated television properties (CTV and CityTV respectively). Each of these broadcasters could easily carry another channel as a sub channel on their spectrum or perhaps offer to a community broadcaster. To not fully use the technical potential of digital broadcasting is an inefficient use of spectrum. The new ATSC-3 standard for OTA broadcasting is not yet mainstream but may offer great potential for advances in the traditional broadcasting market. The outlook for Canadian spectrum policy must include broadcasting for the foreseeable future.

Recommendation 4: Canada requires comprehensive, publicly accessible data on spectrum use in Canada.

Recommendation 5: Broadcasting will remain for the foreseeable future and broadcasters must deploy multiple channels on 6 MHz as a condition of their broadcasting license.

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?

19. The LTE (4G) standard allows for the option of either the traditional FDD approach or time-division duplex (TDD). This is an important technological shift, as TDD can allow for uplink and downlink on unpaired spectrum, vastly reducing the amount of spectrum required. TDD has proven benefits but has barely begun to make an impact in Canadian wireless infrastructure.
20. Of course the main new force in spectrum use is 5G technology, which is expected to be faster, provide greater capacity, provide a foundation for the Internet of Things (IoT), and potentially enable a range of new services via extremely fast links. While there will almost certainly be a new generation of mobile technology, the national regulator must be wary of hype on the part of service providers and hardware manufacturers. Prominent scholars in the field of spectrum policy have warned against the seemingly endless possibilities of 5G technology (Crawford, August 11 2016; Webb, 2016). The allocation of spectrum should be done in such a way that new technologies may grow and prosper but must recognize that 5G technologies are as yet unproven.

Recommendation 6: Spectrum policy should allow space for and encourage the development of TDD technologies and 5G wireless without long term spectrum commitments to these still unproven technologies.

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.

21. I fully agree that unlicensed spectrum has grown at a rapid pace and must be allowed room for further development over the next five years. I am currently co-editing a book on global spectrum policy with contributions from spectrum experts around the world. While there is no one size fits all solution to global spectrum issues, one matter seems clear: the future is unlicensed. Canadian spectrum policy must be prepared and set aside areas of spectrum for unlicensed technologies that are rapidly gaining momentum across the globe.

Recommendation 7: Canadian spectrum policy must move from 20 years of auctioning exclusive licenses to a new regime where unlicensed spectrum is given prominence.

I appreciate the opportunity to offer a contribution this outlook. I sincerely wish ISED the best in this difficult endeavor and thank you for this consultation on this essential matter for Canadian communications.

Yours Sincerely,



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