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***Consultation on the Technical and Policy Framework for
Radio Local Area Network Devices Operating in the
5150-5250 MHz Frequency Band***

**Comments of the
Public Interest Advocacy Centre**

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Glossary of Abbreviations

CRTC	Canadian Radio-television and Telecommunications Commission
e.i.r.p.	Equivalent Isotropically Radiated Power
FCC	U.S. Federal Communications Commission
HPOD	Higher Power and Outdoor RLAN Device
IoT	Internet of Things
ITU	International Telecommunication Union
RLAN	Radio Local Area Network
U-NII	Unlicensed National Information Infrastructure
WRC	World Radiocommunication Conferences

1. Introduction & Summary

1. The Public Interest Advocacy Centre (**PIAC**) is pleased to provide Innovation, Science and Economic Development Canada (the “**Department**”) with its comments on the *Consultation on the Technical and Policy Framework for Radio Local Area Network Devices Operating in the 5150-5250 MHz Frequency Band*.¹
2. PIAC is a non-profit organization and charity that provides legal and research services on behalf of consumer interests, and in particular vulnerable consumer interests, concerning the provision of important public services. While PIAC practices in various federally and provincially regulated services, it has represented Canadian communications users in telecommunications policy for the last forty years. PIAC specializes in public interest advocacy related to telecommunications networks, telecommunications law and policy, and access to communications services characterized by choice, equity and affordability.
3. PIAC generally supports the proposals to permit the outdoor use and increased power of RLAN devices, also referred to as “HPODs”, subject to certain conditions. Lifting restrictions on RLAN devices could be beneficial to Canadian consumers by facilitating digital innovation and access to important telecommunications services such as broadband.
4. However, PIAC submits specific conditions would be appropriate for the use of the 5150-5250 MHz band. For instance, the rules established by the FCC in the United States would be generally applicable to Canada. Furthermore, special attention, such as an administrative licensing regime, may be warranted for larger operators deploying a substantial number of HPODs.
5. Finally, PIAC believes the Department should move forward with this consultation process and the issuing of a final policy framework, even before WRC-19, to align the technical requirements in Canada with that in the U.S. Any significant changes or amendments which result from WRC-19 could be implemented by the Department in the future, particularly under a licensing regime.
6. PIAC provides its answers to the Consultation Paper questions below. PIAC is not in a technical position to provide a response to Question B at this time but reserves the right to reply to comments made by other parties on this question.

¹ Innovation, Science and Economic Development Canada, *Consultation on the Technical and Policy Framework for Radio Local Area Network Devices Operating in the 5150-5250 MHz Frequency Band* (January 2017), SMSE-002-17, online: ISED <[https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/SMSE-002-17-consultation-5150.pdf/\\$FILE/SMSE-002-17-consultation-5150.pdf](https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/SMSE-002-17-consultation-5150.pdf/$FILE/SMSE-002-17-consultation-5150.pdf)>. [Consultation Paper]

2. Promoting Use of 5150-5250 MHz Beneficial to Consumers

Question A. The demand for and benefit, if any, of allowing HPODs in the 5150-5250 MHz frequency band before WRC-19.

7. PIAC supports less restrictive and more flexible use of the 5150-5250 MHz band – including HPODs – particularly for Wi-Fi and other unlicensed uses. PIAC believes this would benefit Canadian consumers.
8. In Telecom Regulatory Policy CRTC 2016-496, the CRTC found that “access to scalable broadband networks is essential as the digital economy in Canada expands” and that “today, broadband Internet access services are vital to Canada’s economic, social, democratic, and cultural fabric.”² The CRTC also established a universal service objective:

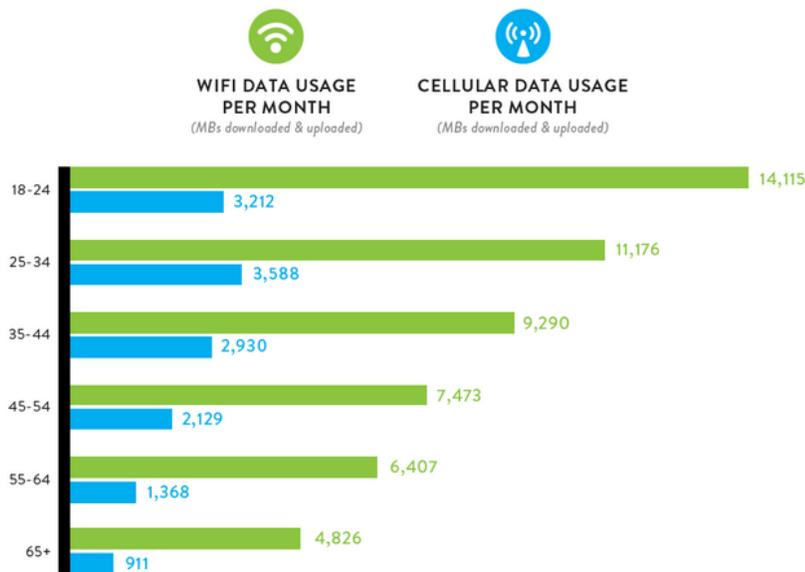
Canadians, in urban areas as well as in rural and remote areas, have access to voice services and broadband Internet access services, on both fixed and mobile wireless networks.³
9. Concerning access to broadband, consumer demand for Wi-Fi already dominates cellular data usage and will likely continue to grow. A 2016 Nielsen report on data usage in the United States found consumers used far more Wi-Fi data – in some cases four times more – than cellular data.⁴

² Telecom Regulatory Policy CRTC 2016-496, *Modern telecommunications services – The path forward for Canada’s digital economy* (21 December 2016) at paras 19 and 21.

³ *Ibid* at para 37.

⁴ Nielsen, *What Drives Data Usage?* (22 November 2016), online: Nielsen <<http://www.nielsen.com/us/en/insights/news/2016/what-drives-data-usage.html>>.

Figure 1. Average Data Usage Per Person by Age in U.S. (2016)



Cellular Data used while connected to your carrier's wireless data network. This data counts against a consumer's mobile data plan.
 Wi-Fi: Data used while connected to a public or private Wireless Hotspot/Network. This data does not count against a consumer's mobile data plan.

Read as: On average, people 18-24 used 14,115 MBs of WiFi data and 3,212 MBs of cellular data during the month of August 2016.

Source: Nielsen

Source: Nielsen, 2016

10. The 2015 ARRIS Consumer Entertainment Index also found 72% of global consumers considered a high-speed internet connection in every room of their house either “vitally important” or “very important”,⁵ and 54% said it was vitally important to have high-speed Wi-Fi that worked outside of its current range. Yet, 63% of consumers said they had experienced issues with Wi-Fi at home, particularly slow internet speeds which affected streaming and downloading of large files.⁶
11. Technical issues with Wi-Fi may also be connected to the growing number of connected devices. Gartner estimated the Internet of Things (IoT) reached 4.9 billion units in 2015 and would hit 20.7 billion connected units by 2020.⁷ The growing IoT economy, as well as further reliance on cloud storage, will also increase consumer Wi-Fi demand.

⁵ ARRIS, “2015 ARRIS Consumer Entertainment Index Reveals Disparity Between Expectation and Reality of Home Wi-Fi, as Consumers Demand Wi-Fi Without Limits” (22 July 2015), online: ARRIS <<http://ir.arris.com/phoenix.zhtml?c=87823&p=irol-newsArticle&ID=2069771>>.

⁶ *Ibid.*

⁷ Gartner, “Gartner Says 6.4 Billion Connected “Things” Will Be in Use in 2016, Up 30 Percent From 2015” (10 November 2015), online: Gartner <<http://www.gartner.com/newsroom/id/3165317>>.

12. Likewise, network providers will attempt to meet higher consumer demand. According to Cisco, of all IP traffic in Canada in 2016, 42% was Wi-Fi, 54% was wired, and only 4% was mobile.⁸ Cisco projects IP traffic in 2021 will be 55% Wi-Fi, 38% wired, and 7% mobile.⁹ And, 71% of mobile data traffic is already offloaded onto Wi-Fi.¹⁰ Similarly, the number of Wi-Fi hotspots is also growing. Cisco notes the number of public Wi-Fi hotspots in Canada will increase sixteen fold from 0.59 million in 2016 to 11.2 million in 2021.¹¹ Home Wi-Fi spots are also projected to increase from 0.45 million to 10.9 million in 2021.
13. Canadian telecommunications service providers are also investing heavily in Wi-Fi hotspots. TELUS and Shaw have both launched public Wi-Fi networks in Western Canada—TELUS now has more than 8,000 hotspots used to offload data usage from its mobile users,¹² and Shaw has around 85,000 hotspots offered to all Shaw Internet customers.¹³
14. Therefore, permitting more flexible use of the 5150-5250 MHz frequency band for Wi-Fi in particular would benefit consumers by meeting growing consumer needs, expectations and demands for broadband access.
15. PIAC believes reducing restrictions on use of the 5150-5250 MHz frequency band would further the objectives and guidelines set out in the Department's *Spectrum Policy Framework for Canada*,¹⁴ including as pointed out in the Consultation Paper, "maximizing the economic and social benefits" of spectrum and being "responsive to changing technology and market place demands." Guideline (h) also specifies that spectrum policy and management should permit the flexible use of spectrum.

⁸ Cisco, "Canada - Device Growth Traffic Profiles," *VNI Mobile Forecast Highlights, 2016-2021*, online: Cisco
<http://www.cisco.com/c/dam/assets/sol/sp/vni/forecast_highlights_mobile/index.html#~Country> (accessed 17 March 2017).

⁹ *Ibid.*

¹⁰ *Ibid.*

¹¹ Cisco, "Canada – Accelerating Network Speeds," *VNI Mobile Forecast Highlights, 2016-2021*, online: Cisco
<http://www.cisco.com/c/dam/assets/sol/sp/vni/forecast_highlights_mobile/index.html#~Country> (accessed 17 March 2017).

¹² TELUS Corporation, *2015 Annual Report (2016)*, online:
<<http://about.telus.com/investors/annualreport2015/files/pdf/en/ar.pdf>> at p 47.

¹³ Shaw Communications Inc, *2016 Annual Report (2016)*, online:
<https://www.shaw.ca/uploadedFiles/Corporate/Investors/Financial_Reports/2016-Annual-Report.pdf> at p 16.

¹⁴ Industry Canada, *Spectrum Policy Framework for Canada* (June 2007), DGTP-001-07, online: ISED <[https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapi/spf2007e.pdf/\\$FILE/spf2007e.pdf](https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapi/spf2007e.pdf/$FILE/spf2007e.pdf)>.

16. The Spectrum Policy Framework does set out other guidelines and objectives which must be balanced against “efficient” regulatory measures and flexible uses of spectrum, including:
 - Harmonizing spectrum use with international allocations and standards, and
 - Ensuring that appropriate interference protection measures are in place.¹⁵
17. Therefore, PIAC will discuss potentially appropriate conditions of use, or basic licences in regards to larger operators, below.

3. Conditions of Use

Question C. Should the Department proceed to authorize HPODs use prior to WRC-19, what regulatory approach would best ensure a balance of timely deployment and the protection of other existing and future services in the 5150-5250 MHz frequency band? Also, indicate any and all considerations that should be given to equipment standards, technical requirements, eligibility criteria and/or conditions of licence depending on the relevant approach.

3.1 FCC Rules

18. The Department’s consultation follows a decision¹⁶ made by the FCC in 2014 to lift certain restrictions on the use of U-NII devices in several 5 GHz frequency bands, including the 5.15-5.25 GHz frequencies.
19. The FCC eliminated the indoor-only restrictions on U-NII devices and increased the maximum conducted output power permitted to 1 W (or 4 W e.i.r.p.). The FCC also limited the maximum e.i.r.p. to 125 mW above any elevation angle of 30 degrees and included additional technical requirements such as those concerning maximum power spectral density and transmitting antennas.¹⁷ Finally, different requirements were set depending on whether a U-NII device was an access point (or “master” device) or a “client” device.
20. The FCC also imposed other regulatory requirements on U-NII devices. U-NII devices are required to contain certain security features “to protect against

¹⁵ *Ibid*, Guideline (h).

¹⁶ Federal Communications Commission, *In the Matter of Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band* (31 March 2014), FCC 14-30.

¹⁷ *Ibid*. See also: Electronic Code of Federal Regulations, Title 47, Chapter I, Subchapter A, Part 15, Subchapter E, §15.407.

modification of software by unauthorized parties”¹⁸ and U-NII operators must file a letter with the FCC if they deploy more than one thousand outdoor access points.

21. PIAC submits these obligations would generally be appropriate for the use of the 5150-5250 MHz frequency band in Canada as well. These requirements appear to address harmful interference concerns with other operators such as Globalstar Canada (the same party whose concerns were addressed by the FCC). The reporting requirement would also give the Department the tools to monitor HPOD deployments in the event of harmful interference, or other dispute or compliance matters.

22. The only FCC requirement which has raised certain consumer concerns in the U.S. is the security features requirement. More specifically, there have been concerns the FCC’s rule, and its subsequent Notice of Proposed Rulemaking,¹⁹ has prompted manufacturers to “lock down” Wi-Fi routers and prevent users from installing open source firmware.²⁰ Open source supporters, which inspired a “Save Wifi” campaign,²¹ argued that thousands of private users, academic researchers and developers “rely on having wireless routers that are capable of modification”²² and that the FCC’s rules could unintentionally stifle user innovation. Therefore, PIAC would urge the Department to be cautious in considering whether a similar rule should apply in Canada. If the Department does decide to adopt a similar rule, creating exceptions in certain cases may be appropriate.

¹⁸ Electronic Code of Federal Regulations, Title 47, Chapter I, Subchapter A, Part 15, Subchapter E, §15.407(i).

¹⁹ Federal Communications Commission, *In the Matter of Amendment of Parts 0, 1, 2, 15 and 18 of the Commission’s Rules regarding Authorization of Radiofrequency Equipment and Request for the Allowance of Optional Electronic Labeling for Wireless Devices*, FCC 15-92.

²⁰ See: Kyle Wiens, “Way to Go, FCC. Now Manufacturers Are Locking Down Routers” (23 March 2016), online: Wired <<https://www.wired.com/2016/03/way-go-fcc-now-manufacturers-locking-routers/>>;

John Brodtkin, “FCC Accused of Locking Down Wi-Fi Routers, But the Truth is a Bit Murkier” (4 September 2015), online: Ars Technica <<https://arstechnica.com/information-technology/2015/09/fcc-accused-of-locking-down-wi-fi-routers-but-the-truth-is-a-bit-murkier/>>;

Mark Gibbs, “Manufacturers Start to Lock Down Wi-Fi Router Firmware. Thanks, FCC.” (27 February 2016), online: Network World <<http://www.networkworld.com/article/3038722/mobile-wireless/manufacturers-start-to-lock-down-wi-fi-router-firmware-thanks-fcc.html>>; and

Eric Schultz, “Seriously, the FCC might still ban your operating system” (9 December 2015), online: wwwahammy.com <<https://wwwahammy.com/seriously-the-fcc-might-still-ban-your-operating-system/>>.

²¹ “Save WiFi”, online: Libre Planet <https://libreplanet.org/wiki/Save_WiFi> (accessed 17 March 2017).

²² Mark Gibbs, “Manufacturers start to lock down Wi-Fi router firmware. Thanks, FCC.” (27 February 2016), online: Network World <<http://www.networkworld.com/article/3038722/mobile-wireless/manufacturers-start-to-lock-down-wi-fi-router-firmware-thanks-fcc.html>>.

23. PIAC will address more Canadian-specific conditions, including the use of the band by the Canadian Space Agency and Department of National Defence, below.

3.2 *Canada-specific Conditions*

24. The Department explores a number of additional proposals in the Consultation Paper, including exclusion zones, a detailed licence-exempt regime for HPODs, and a basic HPOD licensing framework.
25. PIAC would not be opposed to the establishment of “exclusion zones” if the Department’s statement that it only expected a “small number of earth stations... to be deployed in the 5150-5250 MHz frequency band”²³ is accurate. Exclusion zones generally are not consumer-friendly in that they impede any outdoor use of Wi-Fi frequencies in an entire geographic area and could therefore impede access to important telecommunications services.
26. The proposed 25 km exclusion zone surrounding the Canadian Space Agency and the Department of National Defence in Ottawa, Ontario, for instance, creates a significant HPOD-prohibited zone in a fairly densely-populated region. With a population of about 1.35 million residents,²⁴ Ottawa-Gatineau is still one of the largest urban centres – and the capital city – of Canada. Establishing an exclusion zone would result in the exclusion of a significant number of HPOD users in the outdoor Ottawa area. Therefore, the Department must carefully consider the necessity and benefits of establishing exclusion zones.
27. Furthermore, PIAC would support the establishment of a basic HPOD licensing regime, in particular for large operators deploying a substantial number of HPODs.
28. PIAC encourages less restrictive use of the 5150-5250 MHz frequency band but also recognizes, as set out in the Spectrum Policy Framework, that spectrum is a “unique” and “finite” resource, as well as a public good. Where an operator is therefore taking advantage of a considerable amount of spectrum, PIAC submits a basic, administrative licence requirement would be both an efficient and effective mechanism of oversight and enforcement. While the FCC did not implement a licensing regime in the U.S., it did decide to impose additional obligations on operators deploying more than 1,000 outdoor Wi-Fi transceivers. The Department could also consider imposing specific obligations on licensed

²³ Consultation Paper at para 25.

²⁴ Statistics Canada, *Population of Census Metropolitan Areas*, online: StatCan <<http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/demo05a-eng.htm>> (accessed 17 March 2017).

HPOD operators where appropriate. Limiting the licensing requirement to large Wi-Fi operators should not stifle or discourage innovative use of the 5150-5250 MHz by individual users or smaller entities or developers.

29. Therefore, PIAC submits it would be appropriate to require operators deploying a large number of HPODs to apply for basic licences. The licence should not, however, grant an operator exclusive use in a particular geographic area or prevent the installation of other HPODs in that area.

4. WRC-19

30. In the Consultation Paper, the Department also asked whether the Department should defer the review of HPOD rules until 2020, after the ITU World Radiocommunication Conferences in 2019.
31. In PIAC's view, the Department should move forward in developing and publishing a policy framework for use of the 5150-5250 MHz band in Canada now. This would be beneficial for consumers, with a small risk of any foreseeable harm at this time, and would align Canada's regulatory framework with that in the U.S. Where the Department decides to implement a licensing regime, it would also have a regulatory tool should any dispute or issue arise.
32. Should WRC-19 result in any significant changes, the Department would not be precluded from implementing any necessary amendments to its policy framework and any respective licences at that time.

5. Conclusion

33. In sum, PIAC supports the Department's ongoing consultation as well as more flexible use of the 5150-5250 MHz spectrum band through the permitted use of HPODs, subject to certain conditions as outlined above. PIAC believes increased Wi-Fi use of this band would benefit consumers by promoting access to broadband, which is quickly becoming an essential service. PIAC also submits the establishment of an administrative licensing regime for large Wi-Fi operators would be an appropriate mechanism of oversight.
34. PIAC thanks the Department for the opportunity to participate in this consultation and looks forward to reviewing and responding to comments provided by other parties in this process.

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