



SMSE-013-17
May 2017

Spectrum Management and Telecommunications

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

Table of Contents

1. Intent.....	2
2. Legislative mandate.....	2
3. Policy objectives.....	2
4. Background.....	3
5. Comments received	3
6. Discussion	6
7. Decision.....	8
8. Obtaining copies	8
Annex A — Licensing application process for higher power RLAN devices operating in the 5150-5250 MHz.....	10
Annex B — Conditions of licence for higher power RLAN devices operating in the 5150-5250 MHz.....	14

1. Intent

1. Through the release of this document, Innovation, Science and Economic Development Canada (referred to hereinafter as the Department) hereby announces the decisions resulting from the consultation process in SMSE-002-17, *Consultation on the Technical and Policy Framework for Radio Local Area Network Devices Operating in the Band 5150-5250 MHz* (referred to hereinafter as the Consultation).

2. Comments and reply comments in response to the Consultation were received from 30 organizations, and are available at the Department's [Spectrum Management and Telecommunications](#) website.

2. Legislative mandate

3. The Minister of Innovation, Science and Economic Development, through the *Department of Industry Act*, the *Radiocommunication Act* and the *Radiocommunication Regulations*, with due regard to the objectives of the *Telecommunications Act*, is responsible for spectrum management in Canada. As such, the Minister is responsible for developing goals and national policies for spectrum resources use and for ensuring effective management of the radio frequency spectrum resource.

4. Under the *Radiocommunication Act*, the Minister also has the power to establish standards, rules, policies and procedures with regards to radiocommunication. The Governor in Council may make regulations with respect to spectrum management pursuant to section 6 of the *Radiocommunication Act*; these regulations have been prescribed under the *Radiocommunication Regulations*.

3. Policy objectives

5. The Department is guided by the policy objectives of the *Telecommunications Act*, and the *Spectrum Policy Framework for Canada* (SPFC), which has the objective to maximize the economic and social benefits that Canadians derive from the use of the radio frequency spectrum. The enabling guidelines of the SPFC state that spectrum management practices, including licensing methods, should respond to changing technology and marketplace demands. In addition, these guidelines state that spectrum policy and management should support the efficient functioning of markets by permitting the flexible use of spectrum to the extent possible, by making spectrum available for use in a timely fashion and by ensuring that appropriate interference protection measures are in place.

6. The Department endeavours to harmonize spectrum use with international allocations and standards, except where Canadian interests warrant a different determination. Harmonization leads to larger markets and lower manufacturing costs of equipment due to economies of scale, which results in reduced costs and increased availability for Canadian consumers. As well, spectrum harmonization with international allocations and standards ensures that Canada meets its obligations to comply with the international treaty, the International Telecommunication

Union (ITU) *Radio Regulations*, as amended by World Radiocommunication Conferences (WRCs) from time to time.

4. Background

7. The Department received expressions of interest from Canadian stakeholders to review the current Radio Local Area Network (RLAN) rules with a view to harmonizing its rules with those in the United States (U.S.), which allow both indoor and outdoor use of higher power RLAN devices (defined hereinafter as “higher power and outdoor RLAN devices or “HPODs”). Interested stakeholders highlighted that additional spectrum for outdoor use of RLAN devices operating at higher power would alleviate congestion in other RLAN bands (e.g. 2400 MHz and 5800 MHz). However, it was unclear whether there was widespread Canadian interest and support for authorizing HPOD use in the 5150-5250 MHz frequency band.

8. Accordingly, the Department launched a consultation in January 2017 to seek comments on whether it should consider departing from the international framework, the ITU Radio Regulations, but continue to abide by our international obligations, prior to WRC-19, and if so, what regulatory approach would best address the protection of incumbent licensed services.

9. Specifically, the Department sought comments on the following points:

- A. the demand for and benefit, if any, of allowing HPODs in the 5150-5250 MHz frequency band before WRC-19.**
- B. the potential impacts on domestic and foreign satellite systems in the 5150-5250 MHz frequency band of authorizing HPODs use prior to WRC-19 on the basis of a maximum e.i.r.p. of 4 W. Requirements for an elevation mask towards satellites and an exclusion zone of 25 km around receiving earth stations to protect all satellite systems would likely also apply.**
- 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.**

5. Comments received

10. Comments received were divided into two opposing views: those who believed the Department should wait until the determination of HPOD rules are made at WRC-19 before proceeding with their authorization and those who believed the Department should proceed with HPOD rules prior to WRC-19.

Satellite service providers, users from certain federal government departments, NAV CANADA and Parscom Management believe that the Department should defer the review of Canadian HPOD rules after WRC-19. The remaining responders representing terrestrial service providers, equipment and chip manufacturers, Wi-Fi and internet service provider associations, IEEE 802

LAN/MAN Standards Committee, the Public Interest Advocacy Center and the Canadian Urban Transit Association recommended that the Department proceed with the authorization of HPODs prior to WRC-19.

11. Parties in favor of allowing HPODs prior to WRC-19 stated that the congestion in higher power Wi-Fi bands (e.g. 2.4 GHz and 5.8 GHz) has become critical, rendering this spectrum virtually unusable to deliver ultra-high-speed internet services and applications, such as video streaming to Canadians. Allowing HPODs in the 5150-5250 MHz band would help meet the spectrum demand associated with the use of RLANs and enhance customer experience with evolving applications by increasing connectivity in rural areas as well as other locations such as municipal parks, outdoor stadiums and transit systems. Their support was also based on the economic benefit of licence-exempt spectrum; growth projection of Wi-Fi enabled devices as well as the increase in spectrum demand due to the introduction of new technologies such as Long Term Evolution-Unlicensed (LTE-U), License Assisted Access (LAA) and the deployment of the Internet of Things (IoT) devices.

12. Smaller carriers such as ABC Communication highlighted their dependence on licence-exempt frequencies to provide backhaul connections in rural areas given that their business models do not support the cost of licensed frequencies for microwave links in many rural communities. One of the objectives identified in the Canadian Radio-television and Telecommunications Commission Telecom Regulatory Policy 2016-496¹ is to provide all Canadians access to broadband services of 50 Mbps download and 10 Mbps upload. Additional spectrum for smaller operators is needed to meet this objective.

13. Several parties mentioned that the authorization of HPODs in the 5150-5250 MHz band would also enable the larger channel bandwidths, supported by Institute of Electrical and Electronics Engineers (IEEE) 802.11ac standard and the upcoming IEEE 802.1ax standard, which are needed to leverage the full capacity of next generation broadband connections.

14. Furthermore, Ruckus Wireless, Shaw and Microsoft mentioned that RLAN channels requiring Dynamic Frequency Selection (DFS) are not preferred because a significant percentage of client devices do not support these channels due to possible disruption by radar activity. They further mentioned that allowing the use of HPODs in the 5150-5250 MHz would almost double the 5 GHz spectrum that is available for higher power, outdoor usage without a radar detection requirement.

15. Parties wishing to wait until a determination is made at WRC-19 stated that the risk of potential harmful interference to current and future licensed services outweighs the potential benefit of allowing HPOD devices prior to WRC-19. They also questioned the accuracy of studies predicting the significant growth in outdoor and indoor devices, in particular the demand for outdoor services for RLAN devices. Furthermore, they stated that Canadian RLAN operators can already use the available 22 RLANs channels in Canada for indoor and outdoor use, and 4 channels for indoor only use. They further suggested that the proposed changes to the Canadian

¹ Canadian Radio-television and Telecommunications Commission, [Telecom Regulatory Policy 2016-496](#), 2016.

regulations would not increase the number of indoor RLAN channels, and as a result, the growth in Canadian RLAN demand, which is mainly indoor, can already be met with the current channels.

16. On the potential impact on domestic and foreign satellite systems in the 5150-5250 MHz frequency band, parties requesting that the Department defer the authorization of HPODs questioned whether licensed services would be adequately protected, even if the technical requirements established under the Federal Communications Commission (FCC) rules were followed. Certain studies² have shown that an increase in thermal noise to satellite systems would exceed the allowable interference level of 3% $\Delta T/T$ given in ITU-R Recommendation S.1427-1,³ which ensures adequate protection for non-geostationary mobile satellite service feeder links in the band 5 150-5250 MHz.

17. Transport Canada and NAV CANADA mentioned that an aviation standards body is currently developing technical operating criteria for airborne systems that will be used to support unmanned aircraft systems (UAS) under the aeronautical radionavigation services (ARNS) allocation. One of the bands available for these systems is the 5150-5250 MHz. Furthermore, they stated that Article 4.10⁴ of the ITU Radio Regulations stipulates that “*radionavigation and other safety services require special measures to ensure their freedom from harmful interference.*” Without appropriate studies performed at the ITU, there is insufficient assurance that the proliferation of HPODs will not lead to an increase noise level and cause harmful interference, affecting the viability of the 5150-5250 MHz frequency band as an aeronautical band.

18. Canadian Space Agency and Environment and Climate Change Canada also expressed concern with out-of-band emissions into the 5250-5350 MHz frequency band that will be used by planned synthetic aperture radar (SAR) missions. They proposed that the Department refrain from deviating from the ITU-R Resolution 229.⁵

² CableLabs/University of Colorado Boulder, [Sophisticated Wireless Interference Analysis: A Case Study for Spectrum Sharing Policy](#).

Globalstar, [Presentation to RABC: Impact of Outdoor Wi-Fi in 5150-5250 on Globalstar Operations](#), 2015.

³ Methodology and criterion to assess interference from terrestrial wireless access system/radio local area network transmitters to non-geostationary-satellite orbit mobile-satellite service feeder links in the band 5 150-5 250 MHz (International Telecommunications Union, [Methodology and criterion to assess interference from terrestrial wireless access system/radio local area network transmitters to non-geostationary-satellite orbit mobile-satellite service feeder links in the band 5 150-5 250 MHz](#), 2006).

⁴ ITU RR 4.10 stipulates that *Member States recognize that the safety aspects of radionavigation and other safety services require special measures to ensure their freedom from harmful interference; it is necessary therefore to take this factor into account in the assignment and use of frequencies.*

⁵ International Telecommunication Union, Resolution 229 - Use of the bands 5 150-5 250 MHz, 5 250-5 350 MHz and 5 470-5 725 MHz by the mobile service for the implementation of wireless access systems including radio local area networks, 2012 (<https://www.itu.int/oth/R0A06000018>).

19. Parties in favor of the Department proceeding with the authorization of HPODs prior to WRC-19 mentioned they were not aware of any interference complaints received by the FCC since the rules were adopted in 2014; therefore the Department should adopt similar rules.

20. Most parties agreed that the satellite earth station in the 5150-5216 MHz frequency band located in Ottawa, Ontario should be protected. However, Ericsson, IEEE 802 LAN/MAN Standards Committee, Intel, Microsoft, Nokia and the Wi-Fi Alliance questioned whether the 25 km exclusion zone is over-protecting this earth station. Cogeco inquired whether the earth station could be displaced to a less populated area to ensure all Canadians could benefit from HPODs in the 5150-5250 MHz band.

21. Finally, on the regulatory approach to proceed with the authorization of HPODs prior to WRC-19, parties were divided between either a licensed or licence-exempt (LE) regime.

22. Parties recommending a licensed regime felt that this regulatory approach would be in the best interest of moving expeditiously with the authorization of HPODs. Parties favouring a licence-exempt regime recommended that the Department align with the U.S. by requesting user notification for deployments of over 1000 access points.

23. Parties requesting that the Department wait until WRC-19 stated that authorizing HPODs at this time would pre-judge the results of the World Radiocommunication Conference. They also questioned the usefulness of adopting domestic rules if they are likely to be revisited in two or three years.

24. Transport Canada and NAV CANADA mentioned that if the Department decides to proceed with the authorization of HPODs, they would favor a licensed approach to control emissions in the 5150-5250 MHz frequency band.

6. Discussion

25. As discussed in the Consultation, the Department received expressions of interest from Canadian stakeholders to review the current RLAN rules with a view of harmonizing them with those in the U.S. At the time, it was unclear whether there was widespread Canadian interest and support for authorizing the use of higher power RLAN devices both indoor and outdoor in the 5150-5250 MHz frequency band. The Department received submissions from 30 organizations. While comments were divided into two opposing views, most respondents are supportive of the Department enabling the use of HPODs prior to WRC-19.

26. In response to comments regarding the demand and benefit, the Department recognizes that allowing the use of higher power RLANs devices in the 5150-5250 MHz band, both indoors and outdoors, would help address the increasing spectrum congestion in the 2.4 GHz and 5 GHz bands. As noted by many of the respondents, key drivers included the explosion of Wi-Fi-enabled devices, the introduction of new technologies such as LTE-U and LAA, the deployment of IoT devices and the requirement for wider channels to support users' demand for bandwidth-intensive applications such as real time video.

27. Before considering a departure from the international framework, while continuing to abide to our international obligations, the Department is cognizant that appropriate interference protection measures must be in place to protect current and future licensed services, domestic and foreign, in the 5150-5250 MHz, including licensed systems in adjacent bands. The Department must also ensure that immediate actions can be taken to remedy harmful interference should it occur. The Department is unaware of harmful interference cases brought forth to the FCC since the adoption of the U.S. rules in 2014. Regardless of the absence of harmful interference issues, the Department believes that a risk management approach must be taken until international rules addressing HPODs are concluded for the 5150-5250 MHz band. As such, the Department considers that a licensed regime best ensures a balance of timely deployment and the protection of other existing and future services.⁶

28. The Department recognizes that the licensed regime entails a higher administrative burden for users. However, it will be more expeditious than amending the Canadian Radiocommunication Regulations to include enforceable operational requirements for users of devices operating under a licence-exempt regime. Moreover, the Department considers that international obligations would be better met under a licensed regime that includes technical requirements regarding placement and installation of the devices; obligations to take corrective measures such as reducing power or ceasing operation altogether in the case of harmful interference issues; and requirements to report deployments of HPODs and other technical information when requested by the Department. The Department considers that radiocommunication service providers, other businesses and government users currently have a requirement for the use of HPODs, a greater capacity to meet these licence conditions and the potential to develop innovative uses of the band. However, given the importance of monitoring and enforcing authorized uses, the Department does not consider that users operating for personal use should be eligible for a licence. These higher power RLAN devices would operate on a “no-interference, no-protection” basis. Furthermore, the Department considers that a licensed regime will facilitate notification to users if any domestic rule changes occur after WRC-19 requiring technical and operational modifications to already deployed HPODs.

29. The spectrum licence, issued as Tier 1 national service area, will be given a one-year term. No licence fee will apply. However, fees may be applied in the future should an applicable fee order be established. The Department will not create specific equipment standards for HPODs. However, all users of HPODs will be required to obtain an authorization and to follow technical requirements that will be incorporated in the conditions of licence, including a vertical elevation mask towards satellites. The technical requirements will be similar to those adopted in the U.S. and are identified in table 1. Furthermore, users of HPODs will be required to coordinate with existing and future licensed earth station operators to determine appropriate exclusion zones if HPODs deployments are within 25 km of a licensed earth station.

⁶ The equipment standards in RSS-247 will continue to apply to low-power devices designed for indoor use under a licence-exempt regime.

Table 1: Technical requirements for HPODs

Type of device	Maximum conducted power	Maximum antenna gain	Maximum power spectral density	Vertical elevation mask (from the horizon)	Maximum out-of-band emission
Outdoor	1 Watt	6 dBi	17 dBm/MHz	Maximum 125 mW (e.i.r.p.) above 30 degrees	-27 dBm/MHz e.i.r.p
Indoor	1 Watt	6 dBi	17 dBm/MHz	N/A	-27 dBm/MHz e.i.r.p
Point-to-Point System	1 Watt	23 dBi	17 dBm/MHz	Maximum 125 mW (e.i.r.p.) above 30 degrees	-27 dBm/MHz e.i.r.p

7. Decision

30. In light of the discussion above, the Department will authorize the use of higher power RLAN devices (HPODs), both indoor and outdoor, in the 5150-5250 MHz frequency band under a licensed regime.

- The licensing application process is described in Annex A.
- Applications will be accepted from radiocommunication service providers and radiocommunication users as defined by the *Radiocommunication Regulations*, but will not be accepted from radiocommunication users who wish to operate HPODs for personal use.
- Licensing will be on an all-come all-served basis, and all licences will have equal access to the spectrum.
- Licensing for spectrum licences will be issued on a Tier 1 basis (i.e. Canada-wide), and will be given a one-year term.
- No licence fee will apply. Fees may be applied in the future should a fee be established following a consultation.
- The conditions of licence in annex B will apply to all licences for HPODs in the 5150-5250 MHz band. These conditions include an obligation to comply with technical requirements and with any technical directions issued by the Department during the licence term.

8. Obtaining copies

31. All spectrum-related documents referred to in this paper are available on the [Spectrum Management and Telecommunications](#) website.

32. For further information concerning the decision outlined in this document or related matters, contact:

Senior Director
Spectrum Planning and Engineering
Engineering, Planning and Standards Branch
Innovation, Science and Economic Development Canada
235 Queen Street, 6th Floor
Ottawa, Ontario K1A 0H5

Telephone: 343-291-1920

Fax: 343-291-1906

Email: ic.spectrumengineering-genieduspectre.ic@canada.ca

Annex A — Licensing application process for higher power RLAN devices operating in the 5150-5250 MHz

1. Intent

This procedure addresses the principal issues governing the implementation of high power RLAN devices, either indoors or outdoors, in the band 5150-5250 MHz, including eligibility, the licensing approach, an annual licensing fee, as well as technical and service rules. For the purposes of this procedure a high power RLAN device is any RLAN device that can exceed an output of 200 mW (defined hereinafter as “higher power and outdoor RLAN devices or “HPODs”).

Anyone wishing to operate HPODs in the band, either indoors or outdoors, must obtain a licence in accordance with this process, including all the appropriate conditions of licence.

Low power devices with an e.i.r.p. of less than 200 mW and that meet the standards in RSS-247, *Digital Transmission Systems (DTSs)*, *Frequency Hopping Systems (FHSs)* and *Licence-Exempt Local Area Network (LE-LAN) Devices* may continue to be used on a licence-exempt basis in the band.

2. Use of the band

Fixed and mobile services (e.g. point-to-multipoint and point-to-point) are permitted to be deployed in the band 5150-5250 MHz.

3. Licensing

3.1 Licence term

Spectrum licences for HPODs in the band 5150-5250 MHz will be issued for a term of up to one year expiring on March 31st of each year in accordance with the Conditions of Licence in annex B.

A licensee must apply for a licence each year by submitting an application to the Department along with the annual fee (if applicable) and provide any other required technical and operational information requested by the Department.

Licensees may apply at any time during the year; however, once a licensee has established its operations, it is strongly encouraged to apply well in advance of March 31st to ensure that it is properly licensed into the next year.

3.2 Service Areas

The Department has developed a four-tier service area structure and all tiers are based on spectrum grid cells.

- Tier 1 is a single national service area.
- Tier 2 consists of eight provincial and six large regional service areas in Ontario and Quebec.
- Tier 3 contains 59 smaller regional service areas.
- Tier 4 comprises 172 localized service areas.

Details are available in the Department's publication entitled [Service Areas for Competitive Licensing](#).

Spectrum licences for HPODs in the band 5150-5250 MHz will be issued as Tier 1 national service area. Any indoor and outdoor HPODs, which is transmitting above the maximum power limits set in RSS-247, requires a spectrum licence.

3.3 Eligibility

Entities applying for RLAN spectrum licences must meet the definition of a “radiocommunications service provider” or “radiocommunication user” and the eligibility criteria set out in section 9(1) of the *Radiocommunication Regulations* prior to being issued a licence. However, please note that radiocommunication users who wish to operate HPODs for personal use are **not eligible** to be licensed.

It should be noted that persons or entities that own or operate wireless transmission facilities and that provide telecommunications services are also subject to regulation under the *Telecommunications Act*.

3.4 Spectrum licence application

Licence applications can be submitted to the nearest ISED office. A list of regional and district offices can be found in [Radiocommunication Information Circular RIC-66](#). A sample application form may be found in Annex C of [CPC-2-1-23](#). In addition to the information outlined in the sample form, applicants are asked to provide a description of the radiocommunication services that they intend to provide or the details of their intended operation of the spectrum for business or government use.

3.5 Licence fees

Fees for these spectrum licences will be prescribed in a future consultation regarding fees for spectrum in the radio frequency band 5150-5250 MHz for HPODs. In the interim, the Department will accept applications and issue licences pending the establishment of the fee.

3.6 Spectrum structure

Spectrum licences will be issued for use of the band 5150-5250 MHz on a shared, all-come all-served basis and all licensees will have equal access to the spectrum. There will be no

limitation on the number of licences that may be issued and priority access will not be given to any operations. Operation is granted on a no-interference, no-protection basis.

3.7 Domestic coordination

Equipment deployed in the band 5150-5250 MHz must incorporate contention-based protocols to manage the interference between HPOD devices. The number of licences awarded within an area will not be restricted and licensees will not have the same interference protection rights commonly associated with licensed systems. HPOD licensees should note that, although interference may still be possible, it is expected to be manageable.

The Department will not be involved in the coordination of HPOD station assignments or resolving interference problems between HPODs. HPOD licensees are expected to cooperate in order to identify and resolve possible interference issues among themselves.

RLAN operators will be required to coordinate with existing and future licensed earth station operators to determine appropriate exclusion zones if HPOD deployments will be located within 25 km of a licensed earth station. Upon request by the Department, the HPOD operators must provide proof of agreement with the licensed earth station operator.

3.8 Provision of technical information

Upon request by the Department, the licensee is required to provide up-to-date site-specific data. Specific details describing every station and antenna in operation under a spectrum licence will be required to be made available to the Department in a timely fashion

3.9 Technical considerations

The licensee may only deploy devices operating in the 5150-5250 MHz frequency band in accordance with the technical requirements set forth in the table below.

Table A.1: Technical requirements for HPODs

Type of device	Maximum conducted power	Maximum antenna gain	Maximum power spectral density	Vertical elevation mask (from the horizon)	Maximum out-of-band emission
Outdoor	1 Watt	6 dBi	17 dBm/MHz	Maximum 125 mW (e.i.r.p.) above 30 degrees	-27 dBm/MHz e.i.r.p
Indoor	1 Watt	6 dBi	17 dBm/MHz	N/A	-27 dBm/MHz e.i.r.p
Point-to-point system	1 Watt	23 dBi	17 dBm/MHz	Maximum 125 mW (e.i.r.p.) above 30 degrees	-27 dBm/MHz e.i.r.p

4. Related Documents

Current issues of the following documents are available on Innovation, Science and Economic Development Canada's [Spectrum Management and Telecommunications](#) website under Official Publications.

CPC-2-1-23—[*Licensing Procedure for Spectrum Licences for Terrestrial Services*](#)

RSS-247—[*Digital Transmission Systems \(DTSs\), Frequency Hopping Systems \(FHSs\) and Licence-Exempt Local Area Network \(LE-LAN\) Devices*](#)

RIC-66—[*Addresses and Telephone Numbers of Regional and District Offices*](#)

5. Contact Information

Questions concerning the licensing application process should be directed to:

Manager, Emerging Networks
Spectrum Management Operations Branch
Innovation, Science and Economic Development Canada
235 Queen Street, 6th Floor
Ottawa, Ontario K1A 0H5

Annex B — Conditions of licence for higher power RLAN devices operating in the 5150-5250 MHz

This licence authorizes the use of higher power and outdoor RLAN devices (HPODs) in the 5150-5250 MHz frequency band.

1. Licence term

The term of this licence will expire on March 31 of each year.

In order to maintain operations into a new term, the licensee must submit a new application to the Minister of Innovation, Science and Economic Development on a timely basis.

2. Licence fees

Where a licence fee is applicable the licensee must pay the annual licence fee with its application for a licence.

3. Eligibility

The licensee must comply on an ongoing basis with the applicable eligibility criteria in subsection 9(1) of the *Radiocommunication Regulations* and operate as a radiocommunication service provider or a radiocommunication user operating a business or government use as defined by the *Radiocommunication Regulations*. Radiocommunication users who operate HPODs for personal use are not eligible to hold or maintain a licence.

4. Treatment of existing and future spectrum users

The operation of devices operated by the licensee in accordance with this licence must not cause interference to existing and future protected licensed systems, and will not be protected from interference.

The licensee must immediately implement corrective measures or cease operation altogether when notified by Innovation, Science and Economic Development Canada. Failure to do so will be considered a breach of the conditions of licence, which may lead to suspension or revocation of the authorization.

5. Radio station installations

The licensee must comply with Client Procedures Circular CPC-2-0-03, [Radiocommunication and Broadcasting Antenna Systems](#), as amended from time to time, which includes ongoing compliance with Health Canada's radiofrequency exposure guidelines also known as Safety Code 6.

6. Mandatory antenna tower and site sharing

A licensee must comply with the mandatory antenna tower and site sharing requirements set out in [CPC-2-0-17, Conditions of Licence for Mandatory Roaming and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements](#), as amended from time to time.

7. Provision of technical information

Upon request by Innovation, Science and Economic Development Canada, the licensee must provide technical and operational information of the station(s) or network(s) in accordance with the definitions, criteria, frequency and timelines specified in the request. Licensees are required to keep technical and operational information up-to-date, including, for example, maintaining a listing of the location and technical characteristics of all RLAN devices operated by the licensee.

8. Compliance with legislation, regulations, directions and other obligations

The licensee is subject to, and must comply with, the [Radiocommunication Act](#) and the [Radiocommunication Regulations](#), as amended from time to time. The licence is issued on condition that all representations made in relation to obtaining this licence are all true and complete in every respect. The licensee must also operate in accordance with any technical considerations set out in this licence, with the technical aspects of the appropriate Radio Standards Specifications (RSS) and Standard Radio System Plans (SRSP), if applicable.

In addition, the licensee must immediately follow any technical directions issued by the Department through notification. These directions may include modifications to the allowable technical requirements, instructions on coordination, a requirement to implement corrective measures or a direction to suspend operations.

Failure to comply with any obligation will be considered a breach of the conditions of licence, which may lead to suspension or revocation of the authorization.

9. Technical considerations

The licensee must deploy devices operating in the 5150-5250 MHz frequency band in accordance with the technical requirements set forth in the table B.1 below.

Table B.1: Technical requirements for HPODs

Type of device	Maximum conducted power	Maximum antenna gain	Maximum power spectral density	Vertical elevation mask (from the horizon)	Maximum out-of-band emission
Outdoor	1 Watt	6 dBi	17 dBm/MHz	Maximum 125 mW (e.i.r.p.) above 30 degrees	-27 dBm/MHz e.i.r.p
Indoor	1 Watt	6 dBi	17 dBm/MHz	N/A	-27 dBm/MHz e.i.r.p
Point-to-point	1 Watt	23 dBi	17 dBm/MHz	Maximum 125 mW (e.i.r.p.) above 30	-27 dBm/MHz e.i.r.p

system				degrees	
--------	--	--	--	---------	--

10. Domestic and international coordination

Equipment deployed in the band 5150-5250 MHz must incorporate contention-based protocols to manage the interference between HPOD devices.

Where applicable, the licensee must use its best efforts to enter into mutually acceptable agreements with other parties for facilitating the reasonable and timely development of their respective systems, and to coordinate with other protected licensed users in Canada and internationally, if applicable.

In particular, the licensee must coordinate with operators of existing and future licensed earth stations to determine appropriate exclusion zones if the licensee's devices are deployed within 25 km of a licensed earth station. Upon request by the Department, the RLAN operators must provide proof of agreement with the licensed earth station operator.

The licensee must comply with the obligations arising from current and future frequency coordination agreements established between Canada and other countries and shall be required to provide information or take actions to implement these obligations as directed by the Department through notification to a licensee or through an SRSP, as applicable.

11. Amendments

The Minister of Innovation, Science and Economic Development retains the discretion to amend these terms and conditions of licence at any time.