Spectrum Management and Telecommunications

Consultation on the Technical, Policy and Licensing Framework for Wireless Microphones
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1. **Intent**

1. Through the release of this document, Innovation, Science and Economic Development Canada (ISED), on behalf of the Minister, is hereby initiating a consultation on the technical, policy and licensing framework for wireless microphones.

2. 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 national policies for spectrum resources use and for ensuring effective management of the radio frequency spectrum resource.

2. **Policy objectives**

3. An overarching objective of the *Spectrum Policy Framework for Canada* is to maximize the economic and social benefits that Canadians derive from the use of the radio frequency spectrum. This includes the development of technical, policy and licensing frameworks to ensure that Canadian consumers, businesses and public institutions benefit from the use of wireless devices for a variety of products and services in all regions of the country.

4. ISED endeavours to harmonize spectrum use with international allocations and standards, except where Canadian interests warrant a different determination. Harmonization leads to larger markets and low manufacturing costs of equipment due to economies of scale, which results in reduced costs and increased availability for Canadian consumers.

5. Through this consultation paper, ISED is proposing to update its policy and regulatory framework to continue providing spectrum access for the use of wireless microphones on a secondary basis. While this consultation makes reference to the use of white space devices in the 600 MHz band, considerations relating to white space devices should be addressed in the context of ISED’s separate consultation.

3. **Background**

6. For the purpose of this consultation, the term wireless microphones is used generically and is meant to include other uses and equipment which are also permitted under the current regulatory framework, such as systems for cue and control communications and synchronization of video camera signals.

7. Wireless microphones are used to transmit sound without need of a cable. Wireless microphones can be used in venues such as broadcast studios, on-location news, concerts, live theatre, houses of worship, convention and conference centres, film and television production studios and may be employed either indoor or outdoor. In situations of large sporting events or entertainment productions, hundreds of wireless microphones may be used in the same location. The main advantages of wireless microphones include the freedom of movement they provide and the ease of setup compared to running and securing cables.
8. There are a wide variety of wireless microphones available, ranging in cost from several hundred to several thousand dollars. Some meet high performance standards to achieve the sound quality required in a professional venue, while others are more consumer-oriented such as video game wireless microphones. Within this range of equipment, some devices are more frequency agile than others and may also operate in other frequency bands. Consumer-type wireless microphones are most often manufactured to operate as low-power and short-range applications of up to 100 metres, in licence-exempt frequency bands such as the very high frequency (VHF), ultra high frequency (UHF), 902-928 MHz, 2.4 GHz, and 5.8 GHz.

9. Wireless microphones have experienced the same technology advances as other wireless devices: more compact, better quality, reduced cost and improved battery life. This has resulted in increased use of wireless microphones in a variety of settings and venues from professional applications such as television and film making to speakers and performers at conferences, schools and churches.

10. Home karaoke machines and video game headsets often include consumer-type wireless microphones. These devices are normally of lower cost and quality compared to institutional (school) or professional-type devices (television production).

11. In 2014, ISED consulted on the possible repurposing of the 600 MHz band. As part of the consultation, a moratorium on the licensing of wireless microphone in the 600 MHz band was established, which is still in effect today.

12. In 2015, ISED issued its Decision on Repurposing the 600 MHz Band, (SLPB-004-15) in which a joint repurposing of the 600 MHz band with the United States (U.S.) was announced focusing on the technical aspects of repurposing spectrum that was used for broadcasting and other purposes. This decision indicated ISED’s intention to conduct a future consultation on issues related to secondary use in the 600 MHz band including wireless microphones.

13. Ultimately, the mobile service band plan, shown in figure 1, was adopted in alignment with the U.S. band plan. ISED has since launched its Consultation on a Technical, Policy and Licensing Framework for Spectrum in the 600 MHz Band (SLPB-005-17), which addressed issues related to the technical, policy and licensing rules pertaining to the repurposed spectrum intended for mobile use.
14. As noted in the repurposing decision, wireless microphones and mobile broadband systems will cause interference with each other if they operate in the same frequency range, and therefore wireless microphones will need to relocate to other frequencies.

15. Following the similar repurposing of the 700 MHz band, which took place between 2010 and 2013, ISED worked with equipment manufacturers to ensure wireless microphones were transitioned out of the 698-806 MHz frequency band designated for mobile broadband and public safety. Many of these systems relocated their frequencies of operation from the 700 MHz band to the bands below 698 MHz.

16. As a result of the 600 MHz repurposing in Canada and the U.S., the environment in which wireless microphones operate has changed. This consultation will review the regulatory and technology context applicable to wireless microphones both domestically and internationally and propose changes to policies related to the spectrum utilization of wireless microphones.

4. Transition of wireless microphones from the frequency band 614-698 MHz

17. Taking into account its repurposing decision, Digital Television (DTV) Transition Schedule and the need to minimize interference ISED expects that repurposing of the 600 MHz band can be done in a similar fashion as the successful transition of wireless microphones out of the 700 MHz band. The success of the transition was due to the implementation of clear, gradual and timely steps that provided enough time to manufacturers to modify their equipment, resellers to adequately inform their customers and to users to plan equipment replacement or upgrade, if needed.
18. ISED is therefore adopting the following transition measures\(^1\) to clear wireless microphones from the 600 MHz mobile spectrum:

a) Applications for certification of wireless microphones able to operate in the frequency bands 617-652 MHz and 663-698 MHz will no longer be accepted as of May 11, 2018. This provides the minimum notification period of six (6) months as required under the Government of Canada’s World Trade Organization (WTO) and Mutual Recognition Arrangements (MRA) obligations.

b) The manufacturing, importation, distribution, lease, offer for sale or sale of wireless microphones able to operate in the frequency bands 617-652 MHz and 663-698 MHz will no longer be permitted as of November 2, 2018.

c) The use of wireless microphones authorized on a licensed-exempt basis within the 614-698 MHz band will be permitted to continue until the 600 MHz spectrum auction is completed. Licence-exempt operation is prohibited within the bands 617-652 MHz and 663-698 MHz following the completion of the auction.

d) The existing moratorium for the licensing of new wireless microphones in the 614-698 MHz band remains in effect.

e) The operation of existing wireless microphones authorized on a licensed basis within the 614-698 MHz band will be permitted to continue until 600 MHz mobile service deployment. The wireless microphone licensee will be afforded a three-month minimum notification period to relocate.

5. Status of wireless microphones in the United States

19. The FCC allows the use of wireless microphones on a licensed and unlicensed basis, depending on the frequency band. Most wireless microphones use spectrum in the VHF and UHF bands (TV channels 2 to 51, except channel 37). Wireless microphones are also permitted to operate on a co-primary basis along with other broadcasting auxiliary services in the frequency band 944-952 MHz, limited to broadcast licensees and broadcast network entities.

20. In preparation for the 600 MHz repurposing, the FCC released a Report and Order in 2015 to accommodate the long-term needs of wireless microphone users. This decision included additional spectrum bands for wireless microphones and the modification of some technical requirements. Wireless microphones are not permitted to operate in the 600 MHz mobile service bands after July 13, 2020.

\(^1\) SAB-003-17 Low-power Radiocommunication Devices, Including Wireless Microphones, in the Band 614-698 MHz and RSS-210 Issue 9 Amendment, Licence-Exempt Radio Apparatus: Category I Equipment, have been released to reflect these changes.
21. In the 600 MHz frequency range, wireless microphones are permitted to operate in a portion of the guard band (614-617 MHz) and duplex gap (652-663 MHz), limited to 20 mW e.i.r.p. (equivalent isotropically radiated power), as shown in figure 2. This includes a designation of 2 MHz in the guard band and 6 MHz in the duplex gap for shared use by licence-exempt wireless microphones and white space devices; 4 MHz for licensed wireless microphones use in the duplex gap; and a 1 MHz exclusion frequency range around the mobile downlink portion.

Figure 2: U.S. band plan for guard band and duplex gap for wireless microphones

22. The FCC also provided additional spectrum for licensed wireless microphone operations, including in the 169-172 MHz band and portions of: the 900 MHz band, the 1435-1525 MHz, and the 6875-7125 MHz bands.

23. Wireless microphones are now permitted to operate within the 941.5-952 MHz, 952.85-956.25 MHz, 956.45-959.85 MHz, 6875-6900 MHz and 7100-7125 MHz bands, however eligibility is restricted to broadcasters and motion picture and television program production entities as well as large venue owner or operators and professional sound companies. Wireless microphones operate within these bands on a secondary basis and must not cause interference to other users.

6 Status of wireless microphones in the United Kingdom

24. Wireless microphones in the U.K. are generally used in the VHF (170-210 MHz) and UHF (470-790 MHz) frequency bands. In most cases, wireless microphone operations require a ‘Programme making and special events’ (PMSE) licence.

25. In 2014, Ofcom announced its decision to make spectrum between 694-790 MHz (the ‘700 MHz band’) available for mobile services. This decision included the transition of wireless microphones out of the new mobile service band. In order to provide long-term access to spectrum for wireless microphones, Ofcom released a decision in 2015 to use portions of the
frequency band 960-1164 MHz. Low power wireless microphones and other audio programme making and sound equipment will be licensed within the band on a coordinated basis with aeronautical radionavigation and aeronautical mobile systems.

7 Status of wireless microphones in Canada

26. In Canada, wireless microphones operate on a secondary basis in many frequency bands which are summarized in table 1.

<table>
<thead>
<tr>
<th>Frequency band (MHz)</th>
<th>Licensed/licence-exempt</th>
<th>Radio standard specification (RSS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>26.10-26.48 (HF)</td>
<td>Licensed</td>
<td>RSS-123</td>
</tr>
<tr>
<td>88-107.5 (FM)</td>
<td>Licensed/Licence-exempt</td>
<td>RSS-123/RSS-210</td>
</tr>
<tr>
<td>150-174 (VHF)</td>
<td>Licensed</td>
<td>RSS-123</td>
</tr>
<tr>
<td>54-72, 76-88, 174-216 (VHF)</td>
<td>Licence-exempt and Voluntary licensing</td>
<td>RSS-210</td>
</tr>
<tr>
<td>450-451, 455-456 (UHF)</td>
<td>Licensed</td>
<td>RSS-123</td>
</tr>
<tr>
<td>470-608, 614-698 (UHF)</td>
<td>Licence-exempt and Voluntary licensing</td>
<td>RSS-210</td>
</tr>
<tr>
<td>902-928, 2400-2483.5, 5725-5850</td>
<td>Licence-exempt</td>
<td>RSS-210/RSS-247</td>
</tr>
</tbody>
</table>

27. The use of wireless microphones in the bands 26.10-26.48 MHz, 88-107.5 MHz, 150-174 MHz, 450-451 MHz and 455-456 MHz is mature and ISED is not aware of any interference issues related to the use of wireless microphones in these bands and has not received any request to modify its technical rules.

28. ISED notes that the licence-exempt use of the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz includes a large array of consumer-type applications such as Radio Local Area Networks (RLAN). RLAN technologies include Wi-Fi, Bluetooth and similar technologies. Wireless microphones operating in these bands will make use of these technologies and operate on a no-interference, no-protection basis with other devices.

29. Wireless microphones operating within the UHF bands can access unused TV channels on a licence-exempt basis and are not protected from interference. Users can, however, voluntarily obtain a licence to get a measure of interference protection from other wireless microphones or white space devices. Currently, there are approximately 75 licensees that hold 450 licences for wireless microphone operation in the VHF and UHF broadcasting bands across
Canada. Roughly 100 wireless microphones are licensed each year on a short-term basis, from a few days to a few weeks. However, experience suggests that many more operate on a licence-exempt basis.

30. As a result of repurposing the 600 MHz band, wireless microphones operating in the 470–608 MHz and 614–698 MHz ranges will be impacted by two elements. One element is the transition of wireless microphones out of the frequency band 614-698 MHz, as discussed in paragraph 13, which will reduce the amount of spectrum available to wireless microphones. The second element is the transition of existing TV stations from above 614 MHz to below 608 MHz, noting that the band 608-614 MHz is allocated to the radio astronomy service. As TV stations transition to lower frequencies, there may be less spectrum available for wireless microphones. This will largely depend on the relocation of TV stations to new channels within an area, which may change or reduce the list specific channels that are available.

8. Considerations for the future use of wireless microphones

31. Given the changes to the operating environment for wireless microphones in the 470-608 MHz and 614-698 MHz frequency ranges and the resulting spectrum reduction for their operations, ISED is undertaking this consultation to review its existing regulatory framework and propose new frequency bands for the operation of wireless microphones on a secondary basis. The operation of white space devices in the VHF and UHF bands, including the 600 MHz frequency band will be the focus of a separate consultation.

8.1 Spectrum availability

8.1.1 Operation of wireless microphones in the 26.10-26.48 MHz, 88-107.5 MHz, 150-174 MHz, 450-451 MHz, 455-456 MHz, 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz frequency bands

32. Given the technological maturity of these frequency bands, the absence of interference issues and the absence of any request to modify its technical rules, ISED does not see the need to propose changes to its framework for the use of wireless microphones operating in the 26.10-26.48 MHz, 88-107.5 MHz, 150-174 MHz, 450-451 MHz, 455-456 MHz, 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz frequency bands.

8.1.2 Operation of wireless microphones in the guard band (614-617 MHz) and duplex gap (652-663 MHz) of the mobile service band plan

33. In the band plan adopted by Canada for 600 MHz mobile services as shown in figure 1, there are two specific frequency ranges that could continue to be used by wireless microphones: the 3 MHz guard band between Channel 37 and the first mobile channel (614-617 MHz) and the 11 MHz duplex gap (652-663 MHz).

34. The U.S. plan for operations of wireless microphones in the duplex gap and the guard band is shown in figure 2 and discussed in paragraph 19. It includes a maximum transmit e.i.r.p. of 20 mW and a 1 MHz guard band between wireless microphone operations and the mobile service downlink in both 616-617 MHz and 652-653 MHz.
35. To allow the use of wireless microphones in the guard band and duplex gap it will be necessary to develop appropriate technical rules to prevent adjacent channel interference to new mobile services operating in the frequency bands 617-652 MHz and 663-698 MHz. A reduced maximum transmit e.i.r.p. such as that implemented in the U.S. is being considered. In terms of ecosystem, some existing devices certified in Canada operate with a transmit e.i.r.p. of 20 mW or less and could potentially already meet these technical requirements.

36. ISED is proposing to allow wireless microphone operations, on a secondary basis, in the guard band 614-617 MHz and duplex gap 652-663 MHz, in accordance with appropriate conditions to prevent interference to the mobile service operating in the adjacent channels. This could benefit users of wireless microphones that currently use the 600 MHz mobile service bands (617-652 MHz and 663-698 MHz) as they may be able to adjust their equipment to operate in the guard band or duplex gap.

Q1. ISED is seeking comments on its proposal to allow wireless microphones to use the 3 MHz guard band (614-617 MHz) and the 11 MHz duplex gap (652-663 MHz) subject to appropriate conditions to mitigate adjacent channel interference to mobile services.

A. Should technical rules be harmonized with those of the FCC to allow low power wireless microphones in the guard band (614-617 MHz) and duplex gap (653-663 MHz) with a maximum transmit e.i.r.p. of 20 mW?

B. Should a 1 MHz frequency separation be adopted for wireless microphones around the mobile service downlink spectrum (617-653 MHz) to protect mobile service operations?

In providing comments, respondents are requested to include supporting arguments and rationale.

8.1.3 New spectrum under consideration for wireless microphones within the 941-960 MHz, 6930-6955 MHz, and 7100-7125 MHz frequency bands

37. In its consideration of possible new frequency bands for the operation of wireless microphones on a secondary basis, ISED reviewed the wireless microphone usage and trends in other countries. The adoption of common industry equipment standards allows for economies of scale in equipment manufacturing and facilitates the availability of devices for the Canadian market. In the U.S., broadcasters and broadcast network entities are currently operating wireless microphones in the 944-952 MHz band. The 2015 FCC Report and Order expanded this use to the adjacent frequency bands 941.5-944 MHz, 952.85-956.25 MHz and 956.45-959.85 MHz. In addition, the U.S. now permits the use of wireless microphones in the frequency bands 6875-6900 MHz and 7100-7125 MHz, which is shared among aural and television broadcast auxiliary, cable relay service and fixed point-to-point microwave. Since Canada has similar incumbent services in these frequency bands and a wireless microphone ecosystem is currently being manufactured for use in other countries, ISED considers these frequency bands to have the greatest potential for future wireless microphone operations on a secondary basis.

38. The 941-960 MHz frequency band is divided into separate sub-bands according to its usage as shown in table 2.
39. Multipoint communications systems (MCS), used in the 941-941.5 MHz and 952-953 MHz frequency bands typically operate in two modes: one-way (from a master station to remote sites or from remote sites to a master station); and two-way. MCS systems are widely used in urban areas and master stations are permitted to operate anywhere within the service area of MCS licenses. Several thousand MCS licences have been issued to municipalities, utilities for supervisory control and data acquisition (SCADA) systems and meter reading, and security companies.

40. In considering the introduction of wireless microphones in the 941-941.5 MHz and 952-953 MHz bands, ISED recognizes that both MCS and wireless microphones would be used ubiquitously and that there is a risk of interference between the two systems if operated in close proximity to one another. The introduction of wireless microphones in this range would therefore require coordination to avoid interference. However, the ubiquitous nature of both deployments would make the likelihood of a successful coordination very low. Given these considerations, ISED is not proposing to provide for the introduction of wireless microphones in these two sub-bands.

41. The frequency band 941.5-944 MHz (paired with 932.5-935 MHz) is currently used by fixed, single or multi-hop point-to-point communication systems. Fixed point-to-point systems operating in these bands may be one-way or two-way, very low capacity, employing analogue or digital modulation techniques. This frequency band is used by utilities and municipalities. There are approximately 1,000 fixed links licensed in this frequency band.

42. The frequency band 944-952 MHz is very lightly used (9 licences). In SP-944 MHz — Spectrum Utilization Policy in the Frequency Range 944-960 MHz, ISED indicated its intention to review the 944-952 MHz band in the future as the designated use of the band for cordless telephones was terminated in 2002.
43. Studio-to-transmitter links (STL) in the fixed service using line-of-sight radio to convey sound signals for broadcast by radio broadcasting stations is the predominant usage in the frequency band 953-960 MHz with a small amount of fixed wireless access (FWA) including wireless local loop (WLL) systems. In some identified geographical areas, the demand for STL is high and they have priority over FWA links. Otherwise, the band is shared between STLs and FWA on a first-come, first-served basis. Overall, broadcasting STL use represents approximately 90% of 800 licences in this frequency band with FWA-type licences representing the remaining 10%.

44. The frequency bands 6930-6955 MHz and 7100-7125 MHz are currently used by one-way line-of-sight radio systems in the fixed service to provide television auxiliary services. These systems are used to relay television program material from an off-air pickup site to the transmitter site of a television rebroadcasting station, between a remote studio and a principal studio, for temporary TV links, or for the direct pick up of television programs for transmission to a television broadcasting studio. These frequency bands are lightly used with approximately 64 licences in the lower portion and 157 licences in the upper portion.

45. Some of these frequency bands are already used by broadcasting entities that are also experienced in the coordination and deployment of wireless microphones. Wireless microphone equipment is currently available in the 944-952 MHz and 7 GHz ranges, so equipment could be brought to market relatively quickly for the proposed ranges.

46. Fixed service applications are typically point-to-point systems using directional antennas with relatively high effective isotropic radiated power, while wireless microphones are typically low power and operate on short distances. The different nature of the two applications makes sharing feasible through coordinated use. ISED also believes that fixed use in the band should be given priority given the established nature of the infrastructure, the services it provides and the ability of wireless microphones to take immediate action to resolve interference issues. Wireless microphone use in these bands is therefore possible subject to appropriate conditions to protect existing fixed services.

Q2. ISED is seeking comments on its proposal to introduce the use of wireless microphones, on a secondary basis, into the frequency bands 941.5-952 MHz, 953-960 MHz, 6930-6955 MHz and 7100-7125 MHz with appropriate conditions to prevent interference to fixed services.

In providing comments, respondents are requested to include supporting arguments and rationale.

8.1.4 Consideration of the use of wireless microphones within the 960-1164 MHz frequency range

47. As discussed previously, in the United Kingdom, the spectrum currently used by wireless microphones in 694-790 MHz is being repurposed for mobile wireless broadband. In order to mitigate this loss of spectrum, Ofcom has identified 960-1164 MHz as a frequency band for wireless microphone applications. Access to this frequency range would be on a licensed, coordinated basis with aeronautical systems, similar to the current coordination arrangement with
digital terrestrial television in the U.K. Ofcom believes this band offers long-term stability for the wireless microphone sector and affords the potential for a harmonized approach in other countries.

48. The 960-1164 MHz frequency band is globally allocated to the aeronautical radionavigation service, aeronautical mobile (route) service, and in part to the aeronautical mobile satellite (route) service in the Earth-to-space direction. In addition, the adjacent band (1164-1215 MHz) is allocated and used by the radionavigation satellite service. These systems support functions of aircraft navigation, surveillance and communication as well as air traffic management in accordance with designated airspace requirements and civil aviation regulations.

49. A military communication system known as Joint Tactical Information Distribution System (JTIDS) is an application operated by the Department of National Defence, and militaries in other countries, in the frequency band 960-1164 MHz under a coordination agreement with civil aviation. The system is used by military aircraft, ships and ground vehicles.

50. Following its initial decision in 2015, the U.K. announced a set of spectrum management rules in 2016 that were agreed between Ofcom and the U.K. Civil Aviation Authority (CAA) to allow wireless microphone operation in portions of the frequency band 960-1164 MHz. The U.K. spectrum management rules include interference thresholds, protection criteria and the modelling approach required to minimize the risk of harmful interference to incumbent aeronautical systems. The rules are designed to allow wireless microphones to operate temporarily in the band while ensuring a very low risk of harmful interference occurs to the incumbent aeronautical systems. Under these rules Ofcom will develop a ‘spectrum map’ for each location/venue, which will clearly identify the spectrum that can be licensed for wireless microphone use. This spectrum map will be subject to change on advice from, and with the agreement of, the CAA. Access to the spectrum will be authorized on a coordinated, licensed basis, which will be location, frequency and time/date specific for that particular frequency assignment.

51. Ofcom considered that military use of the frequency band 960-1164 MHz for JTIDS would occur in areas where wireless microphones are not being used, and therefore has not implemented a coordination mechanism between the two user groups.

52. Given the amount of existing licensed and licence-exempt spectrum for the operation of wireless microphones in Canada, the additional frequency bands for wireless microphones proposed in this consultation, and the challenges associated with the sharing situation in the band, ISED does not see an immediate need for making the frequency band 960-1164 MHz available for the operations of wireless microphones at this time. ISED will continue to monitor international trends and developments regarding wireless microphone operations in this, and other frequency bands.
8.2 Licensing mechanisms for wireless microphones

53. ISED currently uses the following two approaches for authorizing wireless microphones in Canada:

   a) licence-exempt,
   b) radio licensing.

54. Licence-exempt use of the spectrum facilitates increased use and ease of access to the spectrum due to the low barrier to entry, and the generally low regulatory burden. Licence-exempt radio equipment users are not required to pay annual licence fees and can operate anywhere in Canada provided that applicable regulatory and technical standards are met.

55. A licence-exempt approach is feasible when the risk of radiocommunication interference is relatively low. Wireless microphones operate at low power over short distances. This is particularly true of those systems that operate completely indoors. Given the lower power of these types of devices, the short distance the signals would travel improves the ability to re-use spectrum, allowing many users to operate relatively close to each other.

56. Radio licensing is used to meet the needs of various wireless microphone users with diverse requirements. For instance, users of electronic news gathering systems may roam within metropolitan areas, a province or even across the country, covering news events in the field. These and large venue operators/owners tend to use commercial grade equipment for their productions as their usage and quality requirements are different than consumers.

57. With a licensed approach, a licence is issued for each radio apparatus used. A fee is charged for each transmit and receive channel being used, as prescribed under the Radiocommunication Regulations. The licence term is for one year; rights and privileges are limited. Licences are typically issued through a first-come, first-served process. Generally, users of radio devices that require a licence must first provide detailed technical information, and then undergo a thorough interference and operational assessment. Licensing affords wireless microphones protection from whitespace devices and other wireless microphones operating on a licence exempt basis.

58. Licensing can also help facilitate coordination between these types of users. Given the varied nature of some operations, licensing can provide licensees with a degree of channel availability certainty and a means to coordinate.

8.2.1 Authorization of wireless microphones on a secondary basis in the TV broadcasting VHF and UHF bands

59. As there will be less spectrum available for wireless microphones within the TV broadcasting VHF and UHF bands, ISED is reconsidering the current licensing approach within the band. Within these bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz, and 614-698 MHz), although not required to obtain a radio licence to operate, wireless microphone users may voluntarily apply for a licence in order to minimize the likelihood of interference from other licensed wireless microphones or white space devices operating within the same spectrum.
Given the amount of spectrum available and the low number of existing licences (approximately 450), ISED estimates the majority of users opt to operate on a licence-exempt basis.

60. While it is advantageous for wireless microphones to be able to access the TV broadcasting VHF and UHF bands on a licence-exempt basis, licensing enables deployments to be coordinated with existing users. The added reliability provided by coordinated deployments is an important consideration for professional users.

61. Given the above, ISED does not see the need to change the current authorization framework and proposes to continue allowing wireless microphones to operate on a licence-exempt basis within the available TV broadcasting VHF and UHF bands, and to voluntarily license wireless microphones needing additional reliability.

62. ISED proposes to change the eligibility criteria to professional users only. Eligible users are defined as broadcasters and other program producers, as well as large venue operators/owners and professional sound companies employing a significant number of wireless microphones as part of their productions/events. Licensing would improve the ability for these wireless microphones users to coordinate and re-use spectrum, while providing them with a degree of certainty.

63. Given that the bands below 614 MHz are also used by licence-exempt white space devices, licensed wireless microphone users would continue to register their geographic coordinates, operating parameters and intended period(s) of operation with an ISED-designated white space database as per DBS-01 — White Space Database Specifications to be protected from white space device operations. Licence-exempt users and white space devices would continue to operate on a no-protection, no-interference basis with respect to each other.

8.2.2 Authorization of wireless microphones on a secondary basis in the guard band (614-617 MHz) and duplex gap (652-663 MHz)

64. As discussed in section 6.1.1, ISED is proposing to allow the use of wireless microphones, on a secondary basis, in the guard band (614-617 MHz) and duplex gap (652-663 MHz) of the 600 MHz spectrum.

65. The same approach is proposed of licence-exempt and voluntary licensing of eligible users’ wireless microphones. This approach would provide a uniform regulatory framework for wireless microphones in the sub-bands in which they are allowed to operate in the frequency range 470-663 MHz. As such, ISED is proposing that the entire duplex gap and guard band be shared between voluntarily licensed eligible and licence-exempt wireless microphones.

Q3. ISED is seeking comments on its proposal to allow wireless microphones to access the broadcasting bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz), the duplex gap (652-663 MHz) and the guard band (614-617 MHz) on a licence-exempt basis, and the voluntary licensing of eligible users’ wireless microphones.

A. ISED is seeking comments on the eligibility criteria to determine who should be permitted to voluntarily license their systems (see paragraph 62).
B. Should ISED consider a licence-exempt approach for wireless microphones within the broadcasting or 600 MHz bands (614-617 MHz and 652-663 MHz)?

In providing comments, respondents are requested to include supporting arguments and rationale.

8.2.3 Authorization of wireless microphones on a secondary basis in the frequency bands 941.5-952 MHz, 953-960 MHz, 6930-6955 MHz and 7100-7125 MHz

66. As discussed in section 6.1.2, ISED is proposing to allow the use of wireless microphones, on a secondary basis, in the frequency bands 941.5-952 MHz, 953-960 MHz, 6930-6955 MHz and 7100-7125 MHz.

67. Licensing of wireless microphones in the above-mentioned frequency ranges would help facilitate coordination between wireless microphone users and incumbent licensees, especially given the transient and intermittent use of some of their operations. New wireless microphone licensees would know who they need to coordinate with prior to operating.

68. Given the amount of spectrum already available on a licence-exempt basis, the need to coordinate with other licensed users within the band, and the commonality between wireless microphone users and some of the existing licensees (e.g. broadcast entities) operating within the newly proposed bands, ISED proposes to license eligible microphone users on a secondary basis within the above-noted bands. The eligibility proposed is the same as was previously defined in paragraph 62.

Q4. ISED is seeking comments on its proposal to license the operations of wireless microphones on a secondary basis in the frequency bands 941.5-952 MHz and 953-960 MHz, 6930-6955 MHz and 7100-7125 MHz, based on its eligibility criteria.

A. ISED is also seeking comments on the eligibility criteria (see paragraph 62).

In providing comments, respondents are requested to include supporting arguments and rationale.

69. Regardless of frequency band, wireless microphone licensees continue to be responsible in resolving interference problems affecting other spectrum users. As secondary users wireless microphone licensees would still operate on a no-protection, non-interference basis to primary users within the bands in which they operate.

9. Next steps

70. ISED will review the comments received and publish a decision on the questions raised in this consultation paper.
10. **Submitting comments**

71. Respondents are requested to provide their comments (in Microsoft Word or Adobe PDF) by email.

72. In addition, respondents are asked to specify question numbers for ease of referencing.

73. All submissions should cite the *Canada Gazette*, Part I, the publication date, the title and the notice reference number (SMSE-019-17). Parties should submit their comments no later than January 15, 2018 to ensure consideration. Soon after the close of the comment period, all comments received will be posted on ISED's Spectrum Management and Telecommunications website.

74. ISED will also provide interested parties with the opportunity to reply to comments from other parties. Reply comments will be accepted no later than January 31, 2018.

75. Following the initial comment period, ISED may, at its discretion, request additional information if needed to clarify significant positions or new proposals. In such a case, the reply comment deadline would be extended.

11. **Obtaining copies**

76. All ISED spectrum-related documents referred to in this paper are available on the Spectrum Management and Telecommunications website.

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

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