



Spectrum Management and Telecommunications

# Decision on the Technical and Policy Framework for White Space Devices

Aussi disponible en français

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## 1. Intent

1. Through the release of this paper, Innovation, Science and Economic Development Canada (ISED) hereby announces the decisions resulting from the consultation process undertaken in *Canada Gazette* notice SMSE-018-17, [Consultation on the Technical and Policy Framework for White Space Devices](#) (referred to hereinafter as the Consultation).

2. The decisions are announced in *Canada Gazette* notice [SMSE-003-19] and address spectrum utilization by white space devices in the very-high frequency (VHF) and the ultra-high frequency (UHF) bands, namely the 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-698 MHz frequency ranges.

## 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.

4. Under the *Radiocommunication Act*, the Minister has the power to establish standards, rules, policies and procedures with regards to radiocommunication, including technical aspects related to broadcasting. 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. In developing this decision paper, the Minister has been guided by the policy objectives stated in the [Telecommunications Act](#), and the policy objectives of the [Spectrum Policy Framework for Canada](#) (SPFC), to maximize the economic and social benefits that Canadians derive from the use of the radio frequency spectrum resource.

6. The SPFC states that spectrum management practices should be responsive to changing technology and marketplace demands. In addition, spectrum policy and management should support the efficient functioning of markets by permitting the flexible use of spectrum to the extent possible and harmonizing spectrum use with international allocations and standards, except where Canadian interests warrant a different determination.

7. Making white space spectrum available is part of ongoing efforts to make spectrum accessible for service in a manner that accommodates smaller service providers, while also increasing the use of spectrum.

8. Further, in keeping with the Government of Canada's [Innovation and Skills Plan](#), ISED is committed to ensuring that Canadian consumers, businesses and public institutions in both urban and rural areas benefit from innovation in wireless technology and services.

#### 4. Background and context

9. White space refers to spectrum that is not being used by licensed radio services at particular times and in certain geographic areas thus making that spectrum available for use by other services. The key components for the provision of wireless broadband service using white space technology include white space devices, a white space database (WSDB), and a white space database administrator (WSDBA).

10. A white space device is a radio apparatus that operates in the white space designated frequency bands using opportunistic spectrum access techniques. The opportunistic use is controlled by databases that hold information on the location of licensed radio services, such as TV broadcasting, and white space devices to allow these latter devices access to the spectrum. Specifically, a white space device requests access to spectrum by providing its geographic location to a WSDB, which in return provides it with a list of channels available for use in that area. White space devices may operate at different power levels, are classified as either fixed or personal/portable, and operate on a licence-exempt basis.

11. A WSDB is a third-party database administered by a WSDBA. Each WSDB houses records of frequencies being used by all licensed services and white space devices that are operating within the frequency bands allowed for white space device use. Based on this information, the WSDB determines the list of channels that are unused and available for use at specific times and geographic locations. A WSDBA is a third-party database administrator designated by ISED to operate a WSDB. A list of WSDBAs, which are designated or under evaluation, is available on ISED's television [White space](#) web page, and will be regularly updated.

12. White space devices and wireless microphones have been permitted to operate in the broadcasting bands; these devices must not cause interference to, nor claim protection from the broadcasting service. In Canada, the white space regulatory framework was established in 2012 through *Canada Gazette* notice SMSE-012-12, [Framework for the Use of Certain Non-broadcasting Applications in the Television Broadcasting Bands Below 698 MHz](#). The framework allowed white space devices to operate on a licence-exempt basis in specific portions of the broadcasting frequency bands, namely 54-60 MHz, 76-88 MHz and 174-216 MHz, 470-608 and 614-698 MHz.

13. In 2014, ISED released an initial consultation towards the repurposing of the 600 MHz band (614-698 MHz) for commercial mobile services through *Canada Gazette* notice SLPB-005-14, [Consultation on Repurposing the 600 MHz Band](#). More recently in March 2018, through *Canada Gazette* notice SLPB-002-18, [Technical, Policy and Licensing Framework for Spectrum in the 600 MHz Band](#), ISED released its decisions on the technical, policy, and licensing framework, which will enable the auction of the 600 MHz band spectrum for commercial mobile services in March 2019. With the repurposing of the 600 MHz band from broadcasting to commercial mobile, a review of the white space framework was required.

14. In November 2017, ISED released the Consultation to update the regulatory framework applicable to white space devices and facilitate their continued use in Canada. At the same time, ISED also released SMSE-019-17, [Consultation on the Technical, Policy and Licensing Framework for Wireless Microphones](#), to update the regulatory framework applicable to wireless microphones, which also operated in the 600 MHz band on a no protection, no interference basis. The decisions relating to the use of wireless microphones are addressed separately and can be found in SMSE-003-19, [Decision on the Technical, Policy and Licensing Framework for Wireless Microphones](#).

15. [Comments](#) and/or [reply comments](#) received on the Consultation are available on ISED's website and were received from:

- 6Harmonics
- Bell Mobility (Bell)
- Canadian Association of Broadcasters (CAB)
- CanWISP
- CBC/Radio-Canada (CBC)
- Dynamic Spectrum Alliance Limited (DSA)
- GE Healthcare
- Internet Society of Canada (ISOC) and Association for Progressive Communications (APC)
- Lenbrook Corp.
- Microsoft Corporation (Microsoft)
- National Research Council Canada (NRC)
- Nominet
- North Queens Business Hub
- Radio Advisory Board of Canada (RABC)
- Rogers Communications Canada Inc. (Rogers)
- Saskatchewan Telecommunications (SaskTel)
- Shaw Communications Inc. (Shaw)
- Wayne A. Stacey
- Wi-Fi Alliance

## 5. Spectrum access for white space devices

16. In the Consultation, ISED proposed updating the framework for white space devices to allow additional access to spectrum in the TV portions of the spectrum while eliminating access to the repurposed commercial mobile spectrum in the 600 MHz band.

## **5.1 Operation of white space devices in TV channels 3 and 4 (60-72 MHz) and 14 to 20 (470-512 MHz)**

17. In the Consultation, ISED proposed allowing the use of fixed white space devices in TV channels 3 and 4 and allowing the use of channels 14-20 by personal/portable white space devices in addition to the currently allowed fixed white space devices.

### **Summary of comments**

18. Most respondents including the Canadian Association of Broadcasters, CanWISP, CBC/Radio-Canada, DSA and Nominet generally supported ISED's proposal of allowing the use of fixed white space devices in TV channels 3 and 4 and allowing use of TV channels 14 to 20 by personal/portable white space devices. However, CBC/Radio-Canada mentioned that it was essential to have technical requirements in place that would protect licensed services from personal/portable white space devices in TV channels 14 to 20.

19. There was broad agreement that the risk of interference to older analog consumer electronic devices, such as videocassette recorders and analog television sets using channels 3 and 4 is low given the decreasing usage of these analog connectivity technologies. However, Rogers commented that white space devices using TV channels 3 and 4 could still affect some consumers who use older TVs with analog service.

20. Shaw proposed that ISED allocate only one of the frequency ranges for white space devices. After sufficient demand has been demonstrated, ISED could then consider allocating another frequency range for use by these devices. In Shaw's view, there is not sufficient evidence that white space spectrum demand currently exceeds the available capacity.

### **Discussion**

21. Regarding the use of TV channels 3 and 4, fixed white space devices are well suited for operation in these two channels given the ability of fixed devices or installations to support larger antennas required by those channels. In the United States (U.S.) these channels have been allocated for white space use which will support the development of the ecosystem for Canada while the rapidly decreasing use of analog consumer devices mitigates interference concerns.

22. Regarding the expanded use of personal/portable white space devices in TV channels 14 to 20, ISED notes that enabling access to these channels will not present an additional risk of interference to licensed users. The regulatory framework for fixed white space devices already protects licensed users from interference in these channels and will therefore also provide similar protection from personal/portable devices. Personal/portable devices will also rely on the same database to determine the list of available channels.

23. With respect to the comment made by Shaw on making additional frequency ranges available in phases, ISED notes that white space devices can only use spectrum that is available in any given area on an opportunistic, no protection, and no interference basis. As a result, it is important for white space devices to have access to a number of frequencies in order to

maximize the likelihood of finding an available channel. The U.S. has enabled the same types of use for channels 3 and 4, and 14 to 20. Harmonizing with the U.S. will increase the equipment availability and decrease the costs of white space devices for Canadians. If insufficient white space demand materializes alternate uses for these spectrum ranges may be considered in the future.

## Decisions

**D.1 Fixed white space devices are permitted to operate in TV channels 3 and 4 (60-72 MHz).**

**D.2 The types of white space devices allowed to operate in TV channels 14 to 20 (470-512 MHz) is expanded to include personal/portable devices, in addition to fixed white space devices.**

### 5.2 Operation of white space devices in channel 37 (608-614 MHz)

24. Channel 37 (608-614 MHz) is currently used by the radio astronomy service (RAS) and wireless medical telemetry systems (WMTS). The Dominion Radio Astrophysical Observatory (DRAO) in Penticton, British Columbia is currently the only RAS facility in Canada operating on channel 37. This frequency band is used specifically to make scientific measurements on cosmic radio emissions. WMTS operate on a licence-exempt basis in hospitals and health care facilities to wirelessly monitor patient vital signs. The very low power operations of WMTS and the limited number of RAS sites facilitate spectrum sharing between these incumbent systems and also make this frequency band a possible candidate for white space device use.

25. In the U.S., some information on WMTS use is already known because WMTS users were obligated to register with a frequency coordination database. The Federal Communications Commission (FCC) is currently working through a process of enabling the registration of all necessary information such as location and other information associated with these WMTS installations in WSDBs. In Canada, information on users and locations of WMTS is unavailable as there has been no established requirement for WMTS users to register.

26. The Consultation sought views on continuing to prohibit the use of channel 37 (608-614 MHz) by white space devices because, as with other licence-exempt devices, there is no current information regarding the precise locations where WMTS devices operate in Canada.

### Summary of comments

27. Most respondents supported ISED's proposal to continue precluding the use of channel 37 by white space devices. For instance, GE Healthcare and the National Research Council Canada expressed concerns related to the dependability and security of white space devices and databases, which would need to protect the other radio services operating in channel 37.

28. GE Healthcare highlighted the safety-of-life nature of the applications that WMTS support, the risk of interference from white space devices if allowed to operate in channel 37 and

the need for a highly accurate, complete and dependable white space database in order to ensure that no impact to safety-of-life WMTS devices occurs.

29. Respondents such as 6Harmonics, DSA and ISOC advocated for reconsideration and harmonization with the permitted use of channel 37 in the U.S. The FCC framework permits white space devices to operate in channel 37 once the registration of WMTS operational locations is completed and some area-limited trials have successfully concluded. These respondents argued that the channel 37 spectrum could be available nearly nationwide and support the development of white space devices on a larger scale and at lower costs.

30. Microsoft also argued that the burden of registration on WMTS users is not greater in Canada compared to the U.S., since a new registration with the white space database would be required in both countries. Furthermore, Microsoft indicated that it would be beneficial for the locations of WMTS devices to be publicly available, given the important functions they provide to Canadians.

## **Discussion**

31. With respect to the comments provided by GE Healthcare and the National Research Council Canada on the dependability and security of white space devices, ISED notes that its technical standards require WSDBs to incorporate reliable measures to ensure white space devices do not cause harmful interference to incumbent services and that they must communicate with the database in a secure manner. Furthermore, ISED has an audit and evaluation framework in place for ensuring the compliance of equipment that has been certified against Canadian technical standards. As a result, ISED believes that its existing framework is robust enough to alleviate concerns with the security and dependability of white space device deployments.

32. Since DRAO is the only RAS facility operating in channel 37, the main challenge facing the use of channel 37 by white space devices relates to the dependability of WSDB location information for WMTS devices in Canada. Any data entry errors or missing information on the location of WMTS devices could result in harmful interference to WMTS applications and impact the safety-of-life of Canadians. The main solution proposed by respondents supporting white space deployment in channel 37 was for ISED to impose a new registration process in Canada.

33. ISED notes that the issue of how to ensure that all WMTS devices are accurately and completely registered in order for the WSDB to reliably protect them is still an ongoing issue in the U.S. The U.S. approach, although requiring new registrations from each WMTS user, is building on a previously established FCC registration process. Given the lack of any pre-existing registration process in Canada there is a risk of missing information in the WSDB as not all WMTS operators would be aware of the new registration requirement.

34. Given the early stage of development of white space technology, the currently limited demand for white space spectrum, the risk of not being able to accurately register all WMTS in Canada and the inability at this time to evaluate the effectiveness of the U.S. approach to



allowing white space devices in channel 37, ISED believes that it is premature to allow white space access in channel 37.

35. ISED remains interested in stakeholder proposals and technical developments that would simplify future consideration of the use of channel 37 for additional applications or services.

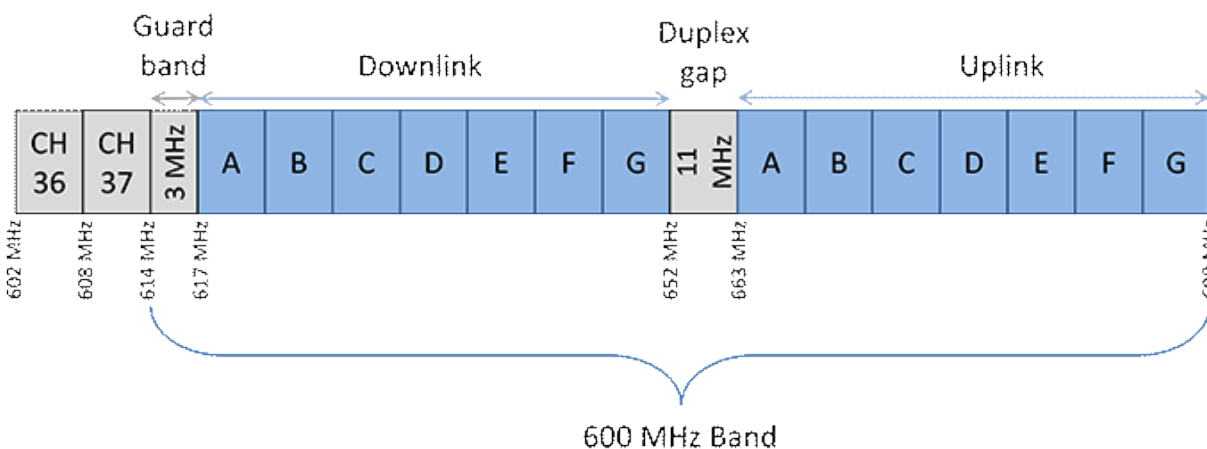
**Decision**

**D.3 White space devices will continue to be prohibited in channel 37 (608-614 MHz) at this time.**

**5.3 Operation of white space devices in the 600 MHz band (614-698 MHz)**

36. The frequency band 614-698 MHz has now been repurposed from television broadcasting and is designated for flexible use by commercial mobile, fixed, and broadcasting services. The mobile service band plan, shown in figure 1, includes seven paired blocks of 5+5 MHz totalling 70 MHz (617-652 MHz paired with 663-698 MHz), a guard band from 614-617 MHz, and a duplex gap from 652-663 MHz.

Figure 1: 600 MHz band plan showing the guard band and duplex gap



**5.3.1 Operation of white space devices in the commercial mobile service downlink (617-652 MHz) and uplink (663-698 MHz) bands**

37. Currently, white space devices are allowed to operate in the 600 MHz band (614-698 MHz), sharing the use of the spectrum with the broadcasting service. However, the repurposing of the 600 MHz band from the broadcasting service to commercial mobile services will significantly impact the number of white space channels available within the 617-652 MHz and 663-698 MHz bands going forward.

38. Since the DTV transition plan and schedule have already been published and few new broadcast channels are expected to be implemented, up to 210 MHz of spectrum for white space devices below 608 MHz, including 138 MHz situated above 470 MHz will be available on a stable and predictable basis.

39. In remote areas, a significant amount of spectrum below 608 MHz will continue to be available for white space devices due to the limited number of television stations in those areas.

40. Given the need for access to a stable and predictable amount of spectrum to support white space devices, ISED proposed to prohibit the use of white space devices in the commercial mobile service bands (617-652 MHz and 663-698 MHz).

### **Summary of comments**

41. The views expressed by respondents were divided. Respondents from the mobile and broadcasting industries, as well as National Research Council Canada were in support of the proposed prohibition. They indicated the importance of protecting the mobile service from any potential harmful interference risks from white space devices. Some of these respondents advocated for greater caution by waiting until sufficient evidence is obtained from the U.S. experience on the risks to mobile users, as well as increasing market surveillance to ensure white space devices meet all regulatory requirements.

42. Supporters of the white space ecosystem including CanWISP, 6Harmonics, Microsoft, Wi-Fi Alliance, DSA, North Queens Business Hub, Lenbrook, ISOC, APC, and Nominet opposed a prohibition on white space device use of the 600 MHz commercial mobile spectrum. These respondents indicated that white space systems could use the 600 MHz spectrum for several years before mobile licensees would make deployments in rural areas, and that some remote and low population areas may never have mobile deployments in this frequency range. They also advocated for full harmonization with the U.S. rules, which support the use of these frequencies by white space devices.

43. Lenbrook asserted that ISED's concerns on the lack of stability in areas with unused spectrum above 614 MHz are not an issue since white space devices and WSDBs are dynamic and frequency tunable. ISOC and APC stated that reducing the available spectrum would impede investments in rural broadband, where smaller-scale wireless Internet service providers require some degree of confidence that white space will have sufficient spectrum. CanWISP added that commercial mobile services will not be deployed in many low-population areas of interest for white space rural broadband. Moreover, CanWISP suggested that a six-month notice period should be provided to white space users in advance of mobile deployments to allow enough time for customer migration.

### **Discussion**

44. The level of certainty in the availability of spectrum is a key issue for investment that is considered by all service providers using wireless technologies, including both white space device manufacturers and commercial mobile service providers.

45. The forthcoming rollout of commercial mobile services in the 600 MHz band will affect many rural areas where this spectrum is currently unused. In particular, greater commercial mobile coverage is anticipated in rural locations due to the favourable propagation characteristics of this frequency range. ISED considers the substantial investments that commercial mobile service providers will undertake for 600 MHz implementation warrant a high degree of certainty to allow for efficient deployment.

46. White space deployments have the potential to address the need for broadband access in rural and remote areas. However, at this time, the technology is still at an early development stage with ongoing trials in various parts of the country. For white space to be used to deliver significant broadband service to Canadians in rural and remote regions of Canada, the pool of available channels must have predictable and stable enough availability to provide white space operators and users with the confidence that a minimum level of ongoing service quality and availability can be delivered.

47. ISED is of the view that prohibiting use of 600 MHz will have limited impact on the white space market in Canada at this time. Urban markets would not contribute to economies of scale for white space technology since these areas are expected to have early 600 MHz mobile deployments. Furthermore, very low population areas where mobile deployments are challenging are likely to already have a significant number of available white space channels in the television portion of the spectrum. Moreover, the development of a white space ecosystem is nascent, and the demand for white space devices has yet to be demonstrated; which limits the need to provide access to 600 MHz at this time.

48. The use of 210 MHz of broadcast spectrum will allow white space business and deployment plans to develop using frequencies where availability is relatively stable. The deployment of commercial mobile services in the 600 MHz band will take place and the network footprint will stabilize over time. Should the demand for white space spectrum increase, ISED could then reconsider the possibility of white space use in 600 MHz or other frequency bands.

49. Consequently, ISED will prohibit white space devices from operating in the 600 MHz commercial mobile downlink and uplink spectrum at this time. ISED will continue to monitor white space developments internationally and may further review once commercial mobile services in the band are deployed and the white space ecosystem has further developed.

## **Decision**

**D.4 White space devices will not be permitted to operate in the 600 MHz commercial mobile bands (617-652 MHz and 663-698 MHz) at this time.**

### **5.3.2 Operation of white space devices in the guard band (614-617 MHz) and the duplex gap (652-663 MHz)**

50. In the Consultation, ISED proposed to limit the use of white space devices to spectrum below 608 MHz, thus prohibiting the use of white space devices in the guard band (614-617 MHz) and in the duplex gap (652-663 MHz).

#### **Summary of comments**

51. Supporters of the white space ecosystem (6Harmonics, CanWISP, Dynamic Spectrum Alliance, ISOC, APC, Lenbrook, Microsoft, Nominet, North Queens Business Hub and Wi-Fi Alliance) opposed ISED's proposal to limit the use of white space devices to spectrum below 608 MHz. These respondents proposed that ISED harmonize its rules with the U.S., where white space devices are permitted in spectrum above 608 MHz, including in the guard band and in the duplex gap.

52. Microsoft, Nominet, Wi-Fi Alliance, Dynamic Spectrum Alliance and North Queens Business Hub suggested that ISED reconsider its proposal to prohibit white space use in the duplex gap. A subset of these respondents also suggested reconsideration of use in the guard band. The respondents indicated that white space devices with low power levels and with sufficient frequency separation from adjacent mobile services could operate without causing harmful interference. They argued that the duplex gap and guard band could provide additional spectrum for personal/portable white space devices and support the development of the white space ecosystem on a larger scale.

53. With respect to the duplex gap, most of the white space ecosystem respondents proposed that ISED allow operation in the upper 6 MHz portion (657-663 MHz); the same sub-band of the duplex gap adopted by the U.S. FCC.

54. Respondents from the mobile and broadcast industries (Rogers, Shaw, Bell, SaskTel, CAB, CBC/Radio-Canada, and mobile and broadcast members of the RABC), as well as the National Research Council Canada, supported ISED's proposal to limit the use of white space devices to spectrum below 608 MHz. Rogers proposed that white space devices be precluded from the duplex gap and guard band until there is sufficient evidence that demonstrates there is no risk of harmful interference to licensed users.

55. Restricting use of the duplex gap and the guard band to wireless microphones was supported by the CAB and CBC/Radio-Canada. CBC/Radio-Canada also pointed out that this would preserve the previous equipment investment resulting from the prior displacement of wireless microphones from the 700 MHz to the 600 MHz band.

#### **Discussion**

56. The main issues surrounding use of the guard band and duplex gap by white space devices relate to the protection of commercial mobile services in the adjacent spectrum.

57. ISED considers that it is not necessary to wait for further evidence on the risk of interference to licensed commercial mobile users to determine whether white space requirements can be defined, since the technical characteristics and protection criteria needed for the reliable operation of commercial mobile systems are already known.

58. ISED notes that the FCC's proceeding for unlicensed operations in the TV and the 600 MHz bands ([\*FCC Adopts Rules For Unlicensed Services In TV And 600 MHz Bands\*](#)) concluded that at least a 3 MHz frequency separation would be required between the mobile downlink spectrum and a low power white space device operating at a maximum equivalent isotropic radiated power (e.i.r.p.) of 40 mW. The FCC's proceedings also concluded that no frequency separation would be required between the mobile uplink spectrum and a 40 mW white space device.

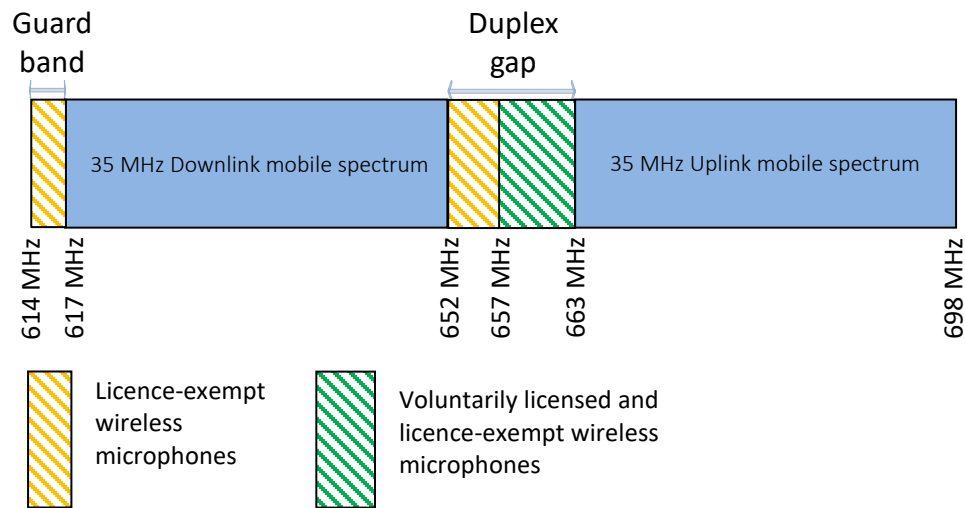
59. The U.S. adoption of the 40 mW e.i.r.p. power limit for personal/portable devices is expected to lead to the development of a white space device local connectivity ecosystem similar to Wi-Fi devices. The adoption of similar technical requirements would enable Canadians to take advantage of a common North American ecosystem. Building on this ecosystem will benefit Canadian users by reducing overall costs and increasing availability of white space devices and technology.

60. For the duplex gap, the U.S. identified a 1 MHz frequency separation at the bottom end of the duplex gap (652-653 MHz) to protect the mobile downlink, 4 MHz (653-657 MHz) for use by licensed wireless microphones and 6 MHz (657-663 MHz) shared between white space devices and licence-exempt wireless microphones.

61. ISED's technical analysis supports that low power white space devices could, under the appropriate technical conditions, such as limiting power levels, limiting out-of-band emissions and providing for frequency separation, operate in the duplex gap while protecting commercial mobile service operations. With the 40mW equipment the upper portion of the duplex gap (657-663 MHz) provides sufficient frequency separation from the mobile downlink (617-652 MHz) to avoid harmful interference from white space devices, while no separation is required from the mobile uplink (663-698 MHz). In the future, as white space technology develops and equipment performance improves, higher power levels could be considered, provided the protection of mobile uplink operations continues to be achieved.

62. The operation of wireless microphones in the duplex gap was also considered in the concurrent decision SMSE-003-19, [\*Decision on the Technical, Policy and Licensing Framework for Wireless Microphones\*](#). That decision permits wireless microphones to operate in the entire duplex gap on a licence-exempt basis and in the upper 6 MHz portion of the duplex gap on a voluntarily licensed basis, as shown in figure 2. With respect to concurrent use of the duplex gap by wireless microphones and white space devices, voluntary licensing of wireless microphones will protect them from white space devices through registration in the WSDB, which addresses the concerns expressed by broadcasters.

Figure 2: Wireless microphones in the guard band and duplex gap



63. Based on its technical analysis and the comments received, ISED will permit white space devices to operate in the upper 6 MHz portion of the duplex gap (657-663 MHz). Updates to technical rules applicable to the use of white space devices in this spectrum will be developed in consultation with stakeholders, including the RABC, and established by ISED through updates to the relevant technical standards.

64. In the U.S., the FCC allowed white space devices to use both channel 37 (608-614 MHz) and the mobile downlink band (617-652 MHz). The U.S. also allowed white space device use of the guard band (614-617 MHz) permitting white space devices to operate throughout 608-652 MHz. In Canada, with the decisions to disallow white space device use in channel 37 and in the mobile downlink, as discussed above, only the 3 MHz (614-617 MHz) guard band is available for potential white space device use.

65. The current low power (40 mW) white space equipment ecosystem requires a 3 MHz frequency separation to protect mobile service downlink operations. Since 3 MHz is required to ensure protection of adjacent services operating in channel 37 and the mobile downlink band, it consumes the full guard band spectrum, therefore leaving none available for the operation of white space devices at this time. A lower power equipment ecosystem than what is currently available, including other technical restrictions would be required to protect channel 37 and the adjacent mobile downlink band without geographical separation.

## Decisions

**D.5 White space devices will not be permitted to operate in the guard band (614-617 MHz) or in the lower 5 MHz portion of the duplex gap (652-657 MHz).**

**D.6 Low power personal/portable white space devices will be permitted to operate in the upper 6 MHz portion of the duplex gap (657-663 MHz).**

## 6 Next steps

66. ISED will update the appropriate regulatory and technical standards to reflect the decisions made in this paper. The revisions will include changes to technical rules that reflect ongoing improvement in the characteristics of white space technology, while also ensuring appropriate protection for licensed systems. The update of these technical standards will be done in consultation with stakeholders including the RABC. Any technical comments received during the Consultation will also be taken into consideration during the standards revision process.

## 7 Obtaining copies

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

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

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