



August 9, 2023

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(Submitted by email)

Subject: Technical Requirements for Wireless Broadband Services (WBS) in the Band 3650-3700 MHz (SRSP-303.65, Draft Issue 3)

Dear Josette Gallant,

In July 2023 the Department requested RABC to review draft Issue 3 of SRSP-303.65, *Technical Requirements for Wireless Broadband Services (WBS) in the Band 3650-3700 MHz*. The Board assigned the review to its Fixed Wireless Communications Committee (FWCC), and invited Transport Canada to participate as a guest.

The FWCC held two meetings to review the proposed changes to the standard. At the outset, the Department indicated that revisions reflected the moratorium in place on issuing new licences for wireless broadband services (WBS) and/or deployment of new WBS stations in the frequency band 3650-3700 MHz in certain areas, and the coexistence measures of WBS with other services. These changes were made in sections 2 and 6 of the new draft SRSP. The remainder of the SRSP remained mostly unchanged. As such, RABC limited its review to sections 2 and 6 of the WBS standard.

The FWCC developed some proposed modifications to section 6 of the SRSP to clarify the intent of some of the clauses. The proposed modifications are marked in the attached version of the SRSP for the Department's consideration.

In addition to the RABC proposed modifications, Transport Canada offered the following comment regarding Paragraph 42 ISED's draft. *Paragraph 42 indicates that interference with radio altimeters is not expected. However, Transport Canada (TC) is concerned that the operational requirements specified within SRSP-303.65 will not preclude interference with aircraft. The current fleet of aircraft operating in Canada has a wide range of tolerance to*

fundamental emissions in the 3650 - 3700 MHz frequency range. While TC is discussing SRSP-303.65 with ISED, at this time TC cannot conclude that interference with radio altimeters is not expected for all the current fleet of aircraft. TC is considering requiring minimum standards of radio altimeter tolerance to emissions such as these, which would significantly limit the risk of interference. As the deployments under this rule are mature, and no new deployments are expected, TC will not request changes to this rule. TC will instead assess the existing deployments, and will mitigate the risk through aviation restrictions for the applicable Radar Altimeter configurations where needed.

RABC has now completed its review. The Board recommends the Department publish issue 3 of the standard inclusive of the attached recommended revisions to section 6 of the standard.

We appreciate the opportunity to review the proposed updates to the standard.

Sincerely,

A handwritten signature in black ink, appearing to read "J. D. Farnes". The signature is written in a cursive style with a long horizontal stroke at the end.

J. David Farnes
General Manager

Attachment



Spectrum Management and Telecommunications

Standard Radio System Plan

Technical Requirements for Wireless Broadband Services (WBS) in the Band 3650-3700 MHz

Preface

Issue 3 of SRSP-303.65 reflects decisions specified in SLPB-002-21, [Decision on the Technical and Policy Framework for the 3650-4200 MHz Band and Changes to the Frequency Allocation of the 3500-3650 MHz Band](#).

Issued under the authority
of the Minister of Innovation, Science and Industry

Martin Proulx
Director General
Engineering, Planning and Standards Branch

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1. Intent

1. This Standard Radio System Plan (SRSP) sets out the minimum technical requirements for the efficient utilization of the band 3650-3700 MHz for Wireless Broadband Services (WBS).
2. This SRSP specifies the technical characteristics relating to efficient spectrum usage only and is not to be regarded as a comprehensive specification for equipment design and/or selection.
3. The Department will allow a full range of fixed and mobile applications e.g. point-to-multipoint: a system that establishes radio links between a single station located at a specified fixed point and a number of stations located at fixed points., point-to-point: a system that establishes a radio link between two end points only and point-to-area: a system that establishes bidirectional radio links between a station located at a specified point and any number of stations located at non-specified points in a given area) to be deployed in the band 3650-3700 MHz where there is no moratorium.

2. General

4. This SRSP is based on the current or planned technologies considered to implement wireless broadband type services in Canada under a WBS spectrum licence.
5. Notwithstanding the fact that a system satisfies the requirements of this SRSP, the Department shall require adjustment to radio and auxiliary equipment in radio stations whenever harmful interference is caused to any licensed radio station. For the purpose of this SRSP, harmful interference means interference that endangers the functioning of a radionavigation service or other safety services, or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with regulations and technical requirements laid down by Innovation, Science and Economic Development Canada (ISED) under the *Radiocommunication Act*.
6. Radio systems conforming to these technical requirements will be given priority in licensing over non-standard radio systems operating in these bands. The arrangements for non-standard systems are outlined in the document entitled Spectrum Utilization Policies Gen, *General Information Related to Spectrum Utilization and Radio Systems Policies (SP-Gen)*.
7. Airborne operations (e.g. drones) are not permitted in the 3650-3700 MHz band.
8. There is a moratorium in place on issuing new licences for WBS and/or deployment of new stations in the frequency band 3650-3700 MHz in certain areas as specified in SLPB-002-21, [*Decision on the Technical and Policy Framework for the 3650-4200 MHz Band and Changes to the Frequency Allocation of the 3500-3650 MHz Band*](#). However, new stations deployed under an existing WBS spectrum licence may be established, but are subject to displacement as per SLPB-002-21. Developmental licence applications will continue to be considered.
9. The displacement plan for WBS in the 3650-3700 MHz band is specified in [SLPB-002-21](#), Specifically, the following displacement deadlines apply:

- a. March 31, 2025 – for WBS operations in all metropolitan and urban Tier 5 service areas as specified in [SLPB-002-21](#); and
 - b. March 31, 2027 – for WBS operations in rural and remote Tier 5 service areas.
10. Revisions to this SRSP will be made as required

3. Related Documents

11. The current issues of the following documents are applicable and available on the [Spectrum Management and Telecommunications website](#).

SP Gen	<i>General Information Related to Spectrum Utilization and Radio Systems Policies</i>
DGTP-006-06	<i>Proposed Spectrum Utilization Policy, Technical and Licensing Requirements for Wireless Broadband Services (WBS) in the Band 3650-3700 MHz</i>
SP 3650 MHz	<i>Spectrum Utilization Policy, Technical and Licensing Requirements for Wireless Broadband Services (WBS) in the Band 3650-3700 MHz</i>
SP 3400 - 3700 MHz	<i>Spectrum Policy and Licensing Provisions for Fixed Wireless Access Systems in Rural Areas in the Frequency Range 3400-3700 MHz</i>
SP 1-20 GHz	<i>Revisions to Microwave Spectrum Utilization Policies in the Range of 1-20 GHz</i>
CPC-2-1-26	<i>Licensing Procedure for Wireless Broadband Services (WBS) in the Frequency Band 3650-3700 MHz</i>
RSS-197	<i>Wireless Broadband Access Equipment Operating in the Band 3650-3700 MHz</i>
TRC-43	<i>Designation of Emissions (Including Necessary Bandwidth and Classification), Class of Station and Nature of Service</i>
CPC-2-0-03	<i>Radiocommunications and Broadcasting Antenna Systems</i>
RIC-67	<i>Information for Operators of Digitally Modulated Radio Systems in Licence-Exempt Radio Frequency Bands</i>
SLPB-002-21	<i>Decision on the Technical and Policy Framework for the 3650-4200 MHz Band and Changes to the Frequency Allocation of the 3500-3650 MHz Band</i>
SMSE-008-22	<i>Decision on Updates to the Licensing and Fee Framework for Earth Stations and Space Stations in Canada</i>
	<i>3800 MHz Transition Manual and Licence Exchange Process for Flexible Use Licensees in the 3500/3800 MHz Bands [link to be updated shortly]</i>
SRSP-102	<i>Band-Specific Technical Requirements for Earth Stations in the Fixed-Satellite Service [link to be updated shortly]</i>
	<i>Decision on SRSP-520, issue 3 and RSS-192, issue 5</i>

CPC – Client Procedures Circular

SP – Spectrum Utilization Policy

SRSP – Standard Radio System Plan

TRC – Telecommunications Regulation Circular

RIC – Radiocommunication Information Circular

4. Band Plan

12. The band 3650-3700 MHz is divided into two sub-bands: the lower sub-band 3650-3675 MHz and the upper sub-band 3675-3700 MHz. See Figure 1 for the band plan.

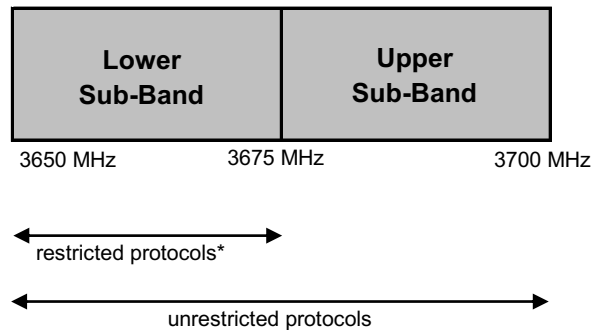


Figure 1: WBS Band Plan

* Except in low population areas, see paragraph 13 of section 4 for details.

[Description of figure 1: WBS Band Plan

The WBS band is divided into two parts. The lower sub-band runs from 3650 MHz to 3675 MHz and the upper sub-band runs from 3675 MHz to 3700 MHz. Systems using restricted protocols are only permitted to operate in the lower sub-band, with the exception of low population areas as described in paragraph 13 of section 4. Systems using unrestricted protocols may use both the lower and upper sub-bands.]

13. Equipment using restricted contention protocols (defined in Section 5.3) will only be permitted to operate in the lower sub-band. However, in low population areas - equipment incorporating restricted protocols will be permitted to operate through the entire 3650-3700 MHz band. In such cases, licensees are encouraged to use the lower sub-band first. For the purposes of this policy, 'low population areas' are defined as those Tier 4 areas that are subject to the minimum licence fee, as identified in CPC-2-1-26. Equipment making use of restricted contention protocols cannot be deployed in the band 3675-3700 MHz in the U.S. coordination zone. As well, equipment permitted to operate at an e.i.r.p. of 60 W/MHz cannot be deployed in the U.S. coordination zone, see Section 8
14. Equipment making use of unrestricted contention protocols (also defined in Section 5.3) will be allowed to operate in both sub-bands.
15. Note that equipment that is permitted to operate in both sub-bands may include channels that overlap the boundary between the upper and lower sub-bands (i.e. may include a channel that overlaps 3675 MHz).

5. Technical Criteria

5.1 Radiated Power

5.1.1 Fixed and Base Stations

16. Fixed or base stations (a fixed station is a station in the fixed service, whereas a base station is a station in the mobile service. A fixed station includes customer premises equipment for point-to-point and point-to-multipoint systems.) operating in this band are limited to a maximum equivalent isotropically radiated power (e.i.r.p.) density of 1 W/MHz.
17. However, in low population areas, a maximum e.i.r.p. density of 60 W/MHz is permitted.

5.1.2 Portable and Mobile Stations

18. Portable and mobile stations (including those operating in mobile-to-mobile mode) are only permitted to transmit if they have first received and decoded an enabling signal transmitted by a base station.
19. Portable and mobile stations will be permitted a maximum e.i.r.p. density of 40 mW/MHz.

5.2 Antenna Limits

20. Stations will be permitted to use any antenna that respects the e.i.r.p. limits specified.
21. In addition to complying with the provisions in the paragraphs of sections 5.1.1 and 5.1.2, transmitters operating in the 3650-3700 MHz band that emit multiple directional beams simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers, must comply with the following:
 - a. Different information must be transmitted to each receiver.
 - b. If the transmitter's antenna system emits non-simultaneous multiple directional beams, the total radiated power of the antenna system shall not exceed the limits specified in the paragraphs of sections 5.1.1 and 5.1.2, as applicable. The directional antenna gain shall be computed as follows:
 - i. The directional gain, in dBi, shall be calculated as the sum of 10 log (number of array elements or staves) plus the directional gain, in dBi, of the individual element or stave having the highest gain.
 - ii. A lower value for the directional gain than that calculated in paragraph 21.b. i of this section will be accepted if sufficient evidence is presented, e.g. due to shading of the array or coherence loss in the beam forming.
 - c. If the transmitter employs an antenna that operates simultaneously on multiple directional beams and if the transmitted beams overlap, the power shall be reduced to ensure that the

aggregate radiated power from the overlapping beams does not exceed the limit specified in paragraph 21.b of this section. In addition, the aggregate radiated power transmitted simultaneously on all beams in all directions shall not exceed the limits specified in paragraph 21.b of this section by more than 8 dB.

- d. Transmitters that emit a single directional beam shall operate under the provisions of paragraph 21.b of this section.

5.3 Use of Contention-based Protocols

22. Licensees are required to deploy equipment that uses contention-based protocols to manage interference between systems.

- **Contention-based Protocol:** *A protocol that allows multiple users to share the same spectrum by defining the events that must occur when two or more transmitters attempt to simultaneously access the same channel and by establishing rules by which a transmitter provides reasonable opportunities for other transmitters to operate. Such a protocol may consist of procedures for initiating new transmissions, procedures for determining the state of the channel (available or unavailable), and procedures for managing retransmissions in the event of a busy channel.*
- **Restricted Contention Protocols:** *Restricted contention protocols can prevent co-frequency interference only to radio equipment that uses the same or similar protocols. The IEEE 802.16 standard is an example of a restricted contention protocol. Equipment incorporating such a protocol relies on scheduling so as to avoid interference among multiple transmitters using the same protocol. Such equipment cannot, however, determine whether other equipment using a different protocol is operating co-channel, as it does not employ a sensing mechanism.*
- **Unrestricted Contention Protocols:** *Unrestricted contention protocols can prevent co-frequency interference to radio equipment that uses dissimilar contention protocols. The IEEE 802.11 standard is an example of an unrestricted contention protocol. Equipment incorporating such a protocol listens to the channel before transmitting. If the equipment senses that another radio is operating co-channel, it will not transmit, thereby avoiding co-channel interference to equipment using similar or dissimilar contention-based protocols.*

6. General Guidelines for Coexistence with other systems

23. Coexistence with other radio service licensees, both in-band and adjacent-band, is required. In this context, specific requirements are provided below, and in some cases, coordination may also be required. Coordination involves consultation between licensees to ensure coexistence with other systems including fixed-satellite services (FSS), Fixed Wireless Access (FWA) systems and flexible use systems.

24. Where an interference conflict occurs, licensees are directed to resolve the conflict through mutual arrangements between the affected parties following consultation and coordination.
25. When potential conflicts between systems cannot be resolved in a timely fashion, ISED shall be so advised, whereupon, following consultations with the parties concerned, ISED will determine the necessary course of action.

6.1 Coexistence between WBS Systems in the 3650-3700 MHz band and Fixed-Satellite Service in the 3700-4200 MHz band

26. Further to SMSE-008-22, [Decision on Updates to the Licensing and Fee Framework for Earth Stations and Space Stations in Canada](#), for earth stations in the 3700-4200 MHz range:
 - site-specific radio licences will be converted to site-approved earth station spectrum licences;
 - interim authorizations will be converted to generic earth station spectrum licences.
27. Coexistence between WBS and FSS systems differs depending on the frequency range in which FSS system operates and whether an FSS earth station is subject to transition.
28. For the purposes of this SRSP, “existing earth stations” that may continue to operate in the full 3700-4200 MHz range **before** the FSS transition deadline (March 31, 2025) are defined as:
 1. Site-approved earth stations **in all areas** that were licensed before the publication of [SLPB-002-21](#) (May 21, 2021) or generic earth stations **in all areas** that were uploaded to ISED’s [Spectrum Management System](#) under an interim authorization before October 22, 2021
 2. Site-approved earth stations operating at consolidated gateway sites as listed in Table [A2](#) of Annex [A](#) and
 3. Site-approved earth stations operated by Government of Canada at various locations, including in the North Bay area and in certain satellite-dependent areas (see paragraph [31](#) below)
29. In addition, “non-transitioned earth stations” that may continue to operate in the 3700-4200 MHz band **after** the FSS transition deadline (March 31, 2025) are defined as:
 1. Site-approved earth stations **in satellite-dependent areas** (see Table [A1](#) of Annex [A](#)) that were licensed before the publication of [SLPB-002-21](#) (May 21, 2021) or generic earth stations **in satellite-dependent areas** that were uploaded to ISED’s [Spectrum Management System](#) under an interim authorization before October 22, 2021;
 2. Site-approved earth stations operating at consolidated gateway sites as listed in Table [A2](#) of Annex [A](#); and

3. Site-approved earth stations operated by Government of Canada at various locations, including in the North Bay area and in certain satellite-dependent areas (see paragraph 31 below).
30. For locations of existing and non-transitioned earth stations, licensees are required to consult the list of licensed FSS earth stations in the 3700-4200 MHz band using ISED's [Spectrum Management System Data](#) search tool.
31. Further, station information for Government of Canada operations identified above are not available to the public. As such, licensees operating in tiers identified in Tables A3 and A4 in Annex A shall use ISED's [Protected Microwave Frequency Information Search](#) to obtain operator contact information of these existing and/or non-transitioned Government of Canada earth stations.
32. An earth station is ~~not~~ **no longer** considered as non-transitioned if its corresponding satellite operates only in the 4000-4200 MHz band.
33. Technical and operational requirements for earth stations in the 4000-4200 MHz band are addressed in SRSP-102, *Band-Specific Technical Requirements for Earth Stations in the Fixed-Satellite Service*.

6.1.1 Prior to March 31, 2025

34. WBS licensees planning to establish a station, **noting paragraph 5 above**, must notify the FSS operator of site-approved existing earth stations (as defined above) at least 6 weeks in advance, if the WBS base station is within 25 km of a site-approved existing earth station.

6.1.2 After March 31, 2025

35. WBS licensees planning to establish a station (where permitted, see Section 2 above), **noting paragraph 5 above**, must notify the FSS operator of a site-approved non-transitioned earth station (as defined in paragraph 29 above) at least 6 weeks in advance, if the WBS base station is within 25 km of the non-transitioned site approved earth station.

6.2 Coexistence between WBS Systems in the 3650-3700 MHz band and Fixed Wireless Access (FWA) Systems Below 3650 MHz

36. FWA systems operate in the band 3475-3650 MHz in accordance with SRSP-303.4, *Technical Requirements for Fixed Wireless Access Systems Operating in the Band 3475-3650 MHz*.
37. WBS licensees operating at the power limits specified in paragraph 16 of Section 5.1.1 of SRSP-303.65 are not required to provide a guard band to minimize the potential for interference to FWA systems. In low population areas where WBS licensees are allowed to operate at power limits specified in paragraph 17 of Section 5.1.1, WBS operators are required to provide a guard band of 5 MHz (from 3650 MHz up to 3655 MHz) to minimize the potential of interference to FWA systems operating in block K. In the event that there are no deployed stations offering service in

block K in the same or adjacent geographic area, WBS operators are not required to implement a guard band. Network operators are encouraged to enter into agreements to implement less stringent guard bands while ensuring coexistence among systems.

6.3 Coexistence between WBS Systems in the 3650-3700 MHz band and Flexible Use Systems in 3450-3900 MHz band

38. Flexible use systems operate in the band 3450-3900 MHz in accordance with SRSP 520, Technical Requirements for Fixed and/or Mobile Systems, Including Flexible Use Broadband Systems, in the band 3450-3900 MHz.
39. As per [SLPB-002-21](#), prior to the applicable WBS displacement deadlines:
 - a. WBS licensees will be required to coordinate any new/modified WBS stations (where permitted to operate) with flexible use licensees operating in 3450-3650 MHz.
 - b. Existing, new, and/or modified WBS operations (where permitted to operate) will be protected from harmful interference from flexible use operations in 3650-3980 MHz.
40. WBS licensees of new/modified stations are encouraged to contact the flexible use licensees that may impact its operations to ensure its WBS system is protected. The flexible use coexistence requirements with WBS are specified in the *3800 MHz Transition Manual and Licence Exchange Process for Flexible Use Licensees in the 3500/3800 MHz Bands* [insert link when available].
41. After the applicable [WBS](#) displacement deadlines [referenced above](#), WBS operations will no longer be protected from other services, including flexible use systems and must cease operation.

6.4 Coexistence between WBS Systems in the 3650-3700 MHz band and radio altimeters in the 4200-4400 MHz band

42. Given the technical requirements of WBS systems as specified in this SRSP, and the out-of-band emission limit set forth in RSS-197, interference to radio altimeters is not expected. In the event of interference conflicts to radio altimeters, WBS systems are required to implement appropriate mitigation measures to resolve interference conflicts or cease operation.

7. General Guidelines for Coexistence of WBS Systems

43. Licensees are required to deploy equipment that makes use of contention-based protocols as per Section [5.3](#). Moreover, to further reduce the potential for interference and to facilitate shared use of this band, all WBS licensees are required to provide site-specific data and contact information, including any additional information outlined in CPC-2-1-26, to the Department. A licensee shall notify other licensed WBS operators defined in the database and offering service in the same area and in neighbouring service areas, at least six weeks before putting a site in service. Licensees are required to keep this information up-to-date.
44. Although interference may still occur, the Department expects that it can be managed. As such, the Department will not be involved in coordinating station assignments or resolving interference

problems between WBS licensees. The resolution of potential interference conflicts should be achieved through good faith discussions and mutual agreement between the affected parties.

45. Detailed information on interference reduction techniques can be found in Appendix A of Radiocommunication Information Circular RIC-67 at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09491.html#TOC1_9.

46. Some techniques are:

- changing operating frequencies;
- changing polarization;
- using a higher gain transmit/receive antenna;
- adjusting the receive antenna to minimize interference;
- blocking interference at the receive antenna; and
- synchronizing upstream and downstream transmissions.

8. International Coordination

47. Canada has concluded an Arrangement with the United States for the sharing of the 3650-3700 MHz frequency band along the border regions. The Arrangement permits the operation of equipment using both restricted and unrestricted protocols and is the basis for shared use of this spectrum in the border area. Final adoption of the Arrangement is subject to the treaty adoption processes of both Canada and the United States.

48. Operators are bound by the following conditions for the deployment of fixed stations in the coordination zone along the border. With respect to coordination between terrestrial services, a station is considered to be in the coordination zone if:

- it is a fixed station within 8 km of the border and the antenna looks within the 160° sector away from the border;
- it is a fixed station within 56 km of the border and the antenna looks within the 200° sector towards the border, or is omnidirectional;

49. For stations in the coordination zone, the following conditions apply:

- Equipment using restricted contention protocols:
 - can operate in the sub-band 3650-3662.5 MHz;
 - can operate in the sub-band 3662.5-3675 MHz, on a secondary basis to U.S. operations, only if the equipment does not produce a power flux density at or beyond the border in excess of -110 dBw/m²/MHz;
 - cannot operate in the band 3675-3700 MHz.

- Equipment using unrestricted contention protocols:
 - can operate in the entire 3650-3700 MHz band;
 - can operate in the sub-band 3662.5-3675 MHz, on a secondary basis to U.S. operations.
50. The provisions for low population areas in paragraph 13 of section 4 and paragraph 17 of section 5.1.1 do not apply within the U.S. coordination zone. With respect to coordination with FSS stations, any proposed use within 150 km of a licensed U.S. earth station in the band 3650-3700 MHz will require coordination regardless of the type of protocol used. In such a case, licensees should contact ISED to arrange for coordination prior to deployment.
51. Licensees will be subject to any future agreements between Canada and the United States regarding use of these systems in the border regions, which may include obtaining departmental approval before allowing certain stations to operate. The arrangement for this band will be available at <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01238.html>.

Annex A: Lists of satellite dependent tiers, consolidated gateway sites, and tiers impacted by Government of Canada’s FSS operations

Table A1: Tier 4 Satellite dependent areas	
Tier	Service Area Name
4-005	Labrador
4-062	Val-d'Or
4-066	Chibougamau
4-103	Kapuskasing
4-104	Kenora/Sioux Lookout
4-105	Iron Bridge
4-107	Marathon
4-109	Fort Frances
4-112	Lac du Bonnet
4-115	Portage la Prairie
4-117	Creighton/Flin Flon
4-118	Thompson
4-130	Northern Saskatchewan
4-147	Peace River
4-157	Powell River
4-161	Ashcroft
4-164	Williams Lake

4-165	Quesnel/Red Bluff
4-166	Skeena
4-168	Smithers
4-169	Dawson Creek
4-170	Yukon
4-171	Nunavut
4-172	Northwest Territories

Table A2: Consolidated gateway sites in the 3700-4200 MHz band

Licensee information	Latitude	Longitude
Allan Park (Telesat)	44° 10' 25.32" N	80° 56' 7.98" W
Weir (Inmarsat)	45° 56' 40.67" N	74° 32' 0.97" W

Table A3: Tier 4 non-satellite dependent areas impacted tiers by Government of Canada operation in the North bay are in the 3700-4000 MHz band

Licensee information	Tier	Service Area name
Government of Canada	4-097	North Bay
Government of Canada	4-098	Parry Sound

Government of Canada	4-100	Sudbury
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Table A4: Tier 4 satellite dependent areas impacted by Government of Canada earth stations in the 3700-4200 MHz

Tier	Service Area Name
4-005	Labrador
4-066	Chibougamau
4-117	Creighton/Flin Flon
4-118	Thompson
4-130	Northern Saskatchewan
4-170	Yukon
4-171	Nunavut
4-172	Northwest Territories