

ARRANGEMENT R

SHARING ARRANGEMENT BETWEEN THE DEPARTMENT OF INDUSTRY OF CANADA AND THE FEDERAL COMMUNICATIONS COMMISSION OF THE UNITED STATES OF AMERICA CONCERNING THE USE OF THE FREQUENCY BAND 3650 TO 3700 MHz BY THE FIXED AND MOBILE SERVICES ALONG THE CANADA-UNITED STATES BORDER

The Department of Industry of Canada (Industry Canada), and the Federal Communications Commission of the United States of America (FCC), hereinafter referred to as the "Agencies",

Have agreed to the following:

1. **Scope**

- 1.1. This Arrangement is done pursuant to the *Agreement concerning the coordination and use of radio frequencies above thirty megacycles per second*, with annex, done at Ottawa October 24, 1962, as amended, and governs the sharing and coordination of radio frequency spectrum for the establishment and operation of fixed and mobile radio services operating in the band 3650-3700 MHz along the Canada-United States border.
- 1.2. This Arrangement is subject to review at any time at the request of either Agency, the U.S. Department of State or the Department of Foreign Affairs and International Trade of Canada.

2. **Sharing Zone**

- 2.1. The sharing zone is adjacent to the Canada-United States border and is defined as follows:
 - a) 56 km on each side of the border for any radio station utilizing an antenna of which any part of the main beam, as determined by the half power points, looks within the 200° sector toward the border; or
 - b) 8 km on each side of the border for any radio station utilizing an antenna of which the entire main beam, as determined by the half power points, looks within the 160° sector away from the border.

3. General Sharing Arrangement

The frequency bands covered by this Arrangement are to be shared along the border, as indicated below.

3.1 Use of the band 3650-3675 MHz within the sharing zone

3.1.1 Canada primary band: 3650-3662.5 MHz

In the sharing zone within Canada, Canada has primary use of the frequency band 3650-3662.5 MHz.

3.1.2 United States primary band: 3662.5-3675 MHz

In the sharing zone within the United States, the United States has primary use of the frequency band 3662.5-3675 MHz.

3.2 Use of the band 3650-3700 MHz within the sharing zone

Canada and the United States shall have use of the entire band 3650-3700 MHz for radio stations employing “unrestricted contention-based protocols” in accordance with Section 5. In the 3675-3700 sub-band, stations in both countries operate on an equal basis with respect to radio stations of the other country and on the basis that they shall neither cause interference to, nor claim protection from, radio stations in the other country.

3.3 Use of the 3650-3700 MHz band outside the sharing zone

Beyond the sharing zone defined in Section 2 of this Arrangement, both countries have full use of this band. Nonetheless, in the event that radio stations operating in these bands experience harmful interference, both Agencies shall take appropriate action to eliminate such interference.

4. Use of Frequencies Allotted to One Administration by the Other Administration in the Band 3650-3675 MHz

4.1. Frequencies allotted for primary use, as described in Section 3.1, of one Agency may be assigned by the other Agency for use in its country within the sharing zone under the following conditions:

- a) The maximum power flux density (pfd) at and beyond the border of the primary user’s country does not exceed $-110 \text{ dBW/m}^2/\text{MHz}$. In cases where both the U.S.-Canada border and the neighbouring service area lie within a body of water, the power flux density shall be calculated at the shoreline of the neighbouring service area.

- b) In calculating the pfd, good engineering practice and generally accepted terrain-sensitive propagation models, with a location and time variability of 50% and 10%, respectively and at least standard 3 arc-second digitized terrain data, shall be used. All data and calculations used in determining compliance with this Arrangement shall be disclosed upon request by either Agency.
- c) Radio stations under this provision shall be considered as secondary with respect to stations of the other country having primary use of the spectrum and shall neither cause interference to, nor claim protection from, radio stations having primary use of the spectrum in the other country, regardless of whether or not they meet the pfd values specified in section 4.1 a) above.

4.2 Either Agency may initiate special coordination with the other Agency through an exchange of correspondence concerning exceptional circumstances in which the technical conditions stated in section 4.1 must be exceeded for more efficient operation of the services authorized under this Arrangement. Such variation(s) may be authorized only upon the approval of both Agencies.

5. Equipment using “Unrestricted Contention-based Protocols” in the Band 3650-3700 MHz

5.1 For the purposes of this Arrangement, contention-based protocols are defined as follows:

5.1.1 In general, contention-based protocols allow multiple users to share the same spectrum by defining the events that must occur when two or more radio stations attempt to simultaneously access the same channel and establishing rules by which a radio station provides reasonable opportunities for other radio stations 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.

Unrestricted contention-based protocols function to prevent interference with radio stations even when those radio stations employ different or dissimilar protocols, whereas restricted contention-based protocols generally only function to prevent interference to radio stations employing the same protocol.

5.2 The Agencies may only authorize radio stations using unrestricted contention-based protocols to operate on a secondary basis with respect to radio stations of the other country having primary use of the spectrum in accordance with section 3.1 and on the basis that they shall neither cause interference to, nor claim protection from, radio stations having primary use of the spectrum in the other country.

6. Technical Limits Applicable in the Sharing Zone

- 6.1. The Agencies shall require, to the extent possible, licensees to take full advantage of interference mitigation techniques such as antenna directivity, polarization, frequency selection, shielding, site selection, power control and/or the use of contention-based protocols to facilitate the deployment, operation and compatibility of radio stations on each side of the border.
- 6.2. In the sharing zone, the Agencies shall authorize frequency assignments up to a maximum equivalent isotropic radiated power (EIRP) of 25 W per 25 MHz for base and fixed radio stations. In any event, the peak EIRP power density shall not exceed 1 Watt in one megahertz of spectrum.
- 6.3. In addition to the provisions in section 6.2, radio stations 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 may only be authorized by the Agencies provided that these operations comply with the following:
- a) Different information must be transmitted to each receiver;
 - b) If the radio station employs an antenna system that emits multiple directional beams but does not emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device, i.e., the sum of the power supplied to all antennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limits specified in section 6.2 of this section, 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 section 6.3.b)(i) of this section shall 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 radio station employs an antenna that operates simultaneously on multiple directional beams using the same or different frequency channels and if transmitted beams overlap, the power shall be reduced to ensure that the aggregate power from the overlapping beams does not exceed the limit specified in section 6.3.b) of this section. In addition, the aggregate power transmitted simultaneously on all beams shall not exceed the limits specified in section 6.3.b) of this section by more than 8 dB;

d) Radio stations that emit a single directional beam shall operate under the provisions of section 6.3.b) of this section.

6.4 Mobile and portable radio stations are limited to 1 W EIRP per 25 MHz. In any event, the peak EIRP density shall not exceed 40 milliwatts in one megahertz of spectrum.

7. Protection of Existing Fixed Satellite Service (FSS) Earth Stations

7.1 It is recognized that Industry Canada and the FCC have FSS earth stations licensed in the band 3650-3750 MHz at specific locations which require protection from fixed and mobile radio stations. In light of this, it is agreed that if either country wishes to deploy terrestrial stations in this band which are located within 150 km of these existing fixed-satellite service (FSS) earth stations, coordination must first be carried out between our two agencies. Annex A to this arrangement provides information regarding the location of existing FSS stations within 150 km of the Canada/US border which must be protected.

8. Information Exchange

To facilitate the sharing requirements of this Arrangement, the Agencies shall exchange information including, but not limited to: (1) licensee name(s); (2) licensee radio station locations (for fixed stations); and (3) licensee point(s) of contact; or shall provide to one another alternative means to obtain that information.

Annex A

Location of Existing FSS Stations in the Band 3650-3700 MHz Within 150 km of the Canada/US Border Which Require Continued Protection

USA

Andover, ME	44 38 01N 070 41 51W (NAD83)
Brewster, WA	48 08 51N 119 41 29W (NAD83)

Canada

Weir, QC	45 56 40N 074 31 58W (NAD83)
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