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Standard Radio System Plan

# Technical Requirements for Land Mobile and Fixed Radio Services Operating in the Band 220-222 MHz

Canada

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## 1. Intent

1.1 This Standard Radio System Plan (SRSP) states the minimum technical requirements for the purpose of efficient spectrum utilization for land mobile and multipoint communications systems operating in the band 220-222 MHz.

1.2 Radio systems conforming to the requirements of this SRSP will take priority in licensing and coordination over non-standard systems proposed for operation in this band. However, the use of more spectrally efficient technologies is strongly encouraged and different channellization from what is described herein may be considered if it results in increased spectrum efficiency. Such systems would likely be authorized on a standard basis.

1.3 This SRSP provides more detail regarding the technical parameters stated in Section 4.3 of the policy paper *Proposals and Changes to the Spectrum in Certain Bands Below 1.7 GHz*.

## 2. General

2.1 Equipment used for land mobile or fixed systems operating in the band 220-222 MHz must comply with RSS-119.

2.2 Although a radio system may conform to the requirements of this SRSP, the Department can require modifications to the system whenever harmful interference[1] is caused to other radio sites or systems, except when such interference is due to inadequate receiver selectivity as dealt with under Section 2.3.

2.3 The Department reserves the right to limit protection to licensed radio receivers only to the extent of the bandwidth of the transmitters whose emissions they are licensed to receive. Licensees and/or applicants should use receiver selectivity characteristics or filters that provide rejection of undesired signals.

2.4 Systems which employ a base station as an automatic repeater station shall transmit on frequencies identified as base transmit frequencies. Subscriber dispatcher stations (often referred to as control stations) operating through an automatic repeater station shall transmit on frequencies identified as mobile transmit frequencies.

2.5 For radiocommunication carriers and service providers, simplex frequency operation utilizing the base/repeater and mobile transmit frequencies (known as repeater talk around) is licensed

[1] Harmful interference means an adverse effect of electromagnetic energy from any emission, radiation or induction that (a) endangers the use or functioning of a safety-related radiocommunication system, or (b) significantly degrades or obstructs, or repeatedly interrupts, the use or functioning of radio apparatus or radiosensitive equipment.

within the authorized service area on a no-interference, no-protection basis.[2] Such operation may be licensed on a case-by-case basis beyond the service area of a duplex frequency system as an adjunct to operations. The public safety mutual aid channels are exempted from this restriction.

## 3. Related Documents

The current issues of the following documents are applicable, and available on the Spectrum Management and Telecommunications Web site at http://ic.gc.ca/spectrum.

| | |
|---|---|
| TRAA | *Interim Sharing Arrangement between the Canadian Department of Industry, the National Telecommunications and Information Administration, and the Federal Communications Commission Concerning the Use of the Band 220 to 222 MHz along the United States-Canada Border* |

*Canadian Table of Frequency Allocations 9 kHz to 275 GHz*

| | |
|---|---|
| RP-Gen | *General Spectrum Policy Principles and Other Information Related to Spectrum Utilization and Radio System Policies* |
| RP-003 | *Policy Guidelines for Mobile Radio Trunked Systems* |
| RP-004 | *Policy for the Licensing of Very Low Capacity Point to Point Links in the Band 30-890 MHz* |
| RP-013 | *Spectrum Utilization Policy on the Use of Certain Public Correspondence Bands in Canada* |
| SP-Gen | *General Information Related to Spectrum Utilization and Radio Systems Policies* |
| SP 30-896 MHz, Part II | *Spectrum Utilization Policy for the Mobile, Broadcasting and Amateur Services in the Frequency Range 30-896 MHz (Part II)* |
| Gazette Notice DGTP-004-05 | *Proposals and Changes to the Spectrum in Certain Bands Below 1.7 GHz* |
| RSS-Gen | *General Requirements and Information for the Certification of Radiocommunication Equipment* |
| RSS-102 | *Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)* |

[2] No-interference, no-protection basis means that a service or stations in a service cannot cause harmful interference to another service or to another station in the same service nor can the service which is subject to not causing interference claim protection from harmful interference caused by the other service or other station in the same service.

| | |
|---|---|
| RSS-119 | *Land Mobile and Fixed Radio Transmitters and Receivers Operating in the Frequency Range 27.4-960.0 MHz* |
| SRSP-502 | *Technical Requirements for Land Mobile and Fixed Radio Services Operating in the Bands 806-821/851-866 MHz and 821-824/866-869 MHz* |
| RSP-100 | *Radio Equipment Certification Procedure* |
| RSP-101 | *Application Procedure for Planned Radio Stations Operating on Frequencies below 960 MHz* |
| RIC-6 | *Spectrum Consumption and the Saturation Index* Rescinded 2007 |
| CPC-2-0-03 | *Environmental Process, Radiofrequency Fields and Land-Use Consultation* |
| GL-04 | *Channel Loading Guidelines* |

CPC - Client Procedures Circular
GL - Guidelines
RIC - Radiocommunication Information Circular
RP - Radio Systems Policy
RSP - Radio Standards Procedure
RSS - Radio Standards Specification
SP - Spectrum Utilization Policy
SRSP - Standard Radio System Plan
TRAA - Terrestrial Radiocommunication Agreements and Arrangement

## 4. General Guidelines

### 4.1 Channel Assignments for the Band 220-222 MHz

4.1.1 Frequency assignments shall be in accordance with Table B1 in Annex B.

4.1.2 This band is to be used on the basis of a two-frequency channelling plan. For land mobile service operations, the base station transmitters will normally operate in the band 220-221 MHz and the mobile station transmitters will normally operate in the band 221-222 MHz. A mobile station may also transmit on its associated base station frequency when operating in a simplex mode, provided that power limits for such transmissions are maintained in accordance with Section 6.3.

4.1.3 The lower edge of channel 1 starts at 220 MHz and is spaced 5 kHz apart from the next channel, for a total of 200 channels. The centre frequency of the channel corresponding to the channel number can be determined by the following formula, where n is the channel number:

$$F = 220.0025 + (n–1) \times (.005) \quad \text{where } n = 1 \text{ to } 200$$

**Note:** Only base station frequencies are listed in MHz. Paired mobile station frequencies are 1 MHz higher.

4.1.4 The geographic availability and channel designation plan are shown in Annexes A and B.

4.1.5 The standard channel width for this spectrum is 5 kHz and assignments of centre frequencies begin 2.5 kHz from the band edge. Channels may be aggregated, to accommodate, for example, 12.5 kHz systems, and priority of assignment will be given to the most spectrally efficient technologies.

4.1.6 To improve spectrum efficiency of wide-area systems or networks that re-use frequencies licensed to one holder, the assignment of frequencies to each particular site does not have to follow the allocation structure defined herein. Each frequency that may be used on a particular site must be approved by the regional director, as it will impact on the geographic re-assignment of that particular frequency, unless an arrangement has been made for the use of the frequencies within a specified geographical area.

4.1.7 Frequencies designated for duplex operation may be assigned for simplex operation where conditions warrant.

## 4.2 Conventional Mobile Radio Systems

Assignments for conventional systems[3] can be made from the available spectrum in a given area. In general, assignments will be made commencing at the upper end of the band and working downward.

## 4.3 Channel Groups

As outlined in Table B2 of Annex B the Department has listed, as a guideline, twenty 5-channel groups for system deployments in this band. However, assignments for use are at the discretion of the regional office depending on local requirements.

## 4.4 The Use of the Band 220-222 MHz

This band is used for radio applications such as public safety, railway, and utility telemetry operations. Other fixed and mobile radio applications will be permitted at the discretion of the regional director once these initial requirements have been addressed.

## 4.5 Public Safety - Hierarchy of Safety Service Providers

For the identification of public safety service providers, the Department recognizes the hierarchy of safety service provides as stated in Section 5.1.1 of SRSP-502. [Note: This reference is no longer current. See SRSP-502, Section 4.1.3 instead]

[3] Conventional Radio Systems are define as radio systems in which one or more radio frequency channels are assigned to mobile and base stations but are not used as a trunk group.

### 4.6 Multipoint Communications Systems (MCS)

4.6.1 Multipoint Communications Systems operation[4] can be authorized in this band. Two types of operation are permitted for MCS: one way (from master station[5] to remote sites[6] **or** from remote sites to master station); and two way (from master station to remote sites **and** from remote sites to master station). Assignments are licensed from available spectrum in a geographic area.

4.6.2 Mobile master station operation may be permitted with adequate justification and without expanding the service area and on a no-interference, no-protection basis.

4.6.3 Mobile remote stations would only be permitted ancillary to fixed remote stations. Such mobile remote stations would only be permitted to communicate with fixed MCS master stations and cannot expect the same degree of protection as fixed stations due to their varying operating environment.

4.6.4 Communications between master stations may be authorized on a case-by-case basis.

## 5. Spectrum Availability and Sub-allocation Plans

### 5.1 Sharing Arrangement along the Canada/United States Border

In the interest of equitable sharing of spectrum along the border and to reduce coordination and administrative effort and time, the governments of Canada and the United States have entered into an arrangement in which each country has unrestricted geographic use of certain portions of the band 220-222 MHz along the border, set aside on a block and zone basis as illustrated in Figure A1 of Annex A. The terms of this arrangement take into account the demographic differences that exist along the border between the two countries. Within 120 km of the Canada/United States border, the band is shared on a block and zone basis and the frequencies shall be used as specified in this section. The sharing zone is illustrated in Figure A2 of Annex A. Beyond 120 km from the Canada/United States border, each country shall have full use of the band 220-222 MHz. There are also power and height restrictions applicable as described in Section 6.3.1.

[Note: This section is partially superseded by the document, *Statement of Intent of the Federal Communications Commission of the United States of America and the Department of Industry of Canada Related to the Sharing and Use of Portions of the Frequency Band 220-222 MHz for Positive Train Control Systems along the United States–Canada Border*.]

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[4] MCS systems consist of a fixed central radio station (master station) communicating on a one or two-way basis with associated remote sites (stations).

[5] Master stations control, activate or interrogate multiple (three or more) remote sites (stations) and/or receive from multiple remote sites (stations).

[6] Remote sites (stations) are either controlled, activated, or interrogated by, and may respond to, a master station or transmit one way to a master station.

### 5.1.1 Distribution/Allotment of Frequencies

Table 5.1 below shows the channels allocated for Canadian and United States unrestricted use according to the Canada/United States arrangement concerning the use of the band 220-222 MHz.

**Table 5.1 - Canada/United States Allocation of Frequencies**

| Area | Canada Unrestricted Use | United States Unrestricted Use |
|---|---|---|
| Outside Sharing Zone (beyond 120 km from Canada/U.S. border | All Channels | All Channels |
| Sharing Zone - (Outside Sectors 1 & 2) Within 120 km of the Canada/U.S. border area. | 1 to 20, 25, 26, 56 to 85, 121 to 145, 155, 156, 175 to 180, and 190 to 195 | 21 to 24, 27 to 55, 86 to 120, 146 to 154, 157 to 160, 171 to 174, 186 to 189 |
| Within Sector 1 (81°W to 85°W) | 121 to 140, 179, 180, and 193 to 195 | 1 to 120, 141 to 160, 171 to 178, and 186 to 192 |
| Within Sector 2 (71°W to 81°W) | 1 to 20, 24 to 27, 31 to 50, 54 to 87, 121 to 147, 154 to 157, 173 to 180, and 189 to 195 | 21 to 23, 28 to 30, 51 to 53, 88 to 120, 148 to 153, 158 to 160, 171, 172, and 186 to 188 |

**Note:** Within 120 km of the border channels 161 to 170, 181 to 185, and 196 to 200 will be for use by Canada and United States. Furthermore, channels 111, 113, 115, 117 and 119

available for Canada if used for Intelligent Transportation Systems/Intelligent Vehicle Highway Channels (ITS/IVHS).

## 5.2 'or the Canada/United States Arrangement Concerning the Use of the Band 220-222 MHz

### 5.2.1 Public Safety and Mutual Aid Channels

5.2.1.1 The following channels are available to public safety organizations in both Canada and the United States on a shared basis for the purpose of public safety and mutual aid within 120 km
of the Canada/United States border. These channels are available for assignment to operators eligible under Section 4.5.

**Table 5.2 - Public Safety and Mutual Aid Channels**

| Channel | Centre Frequency (MHz) |
|---|---|
| 161 | 220.8025 |
| 162 | 220.8075 |
| 163 | 220.8125 |
| 164 | 220.8175 |
| 165 | 220.8225 |
| 166 | 220.8275 |
| 167 | 220.8325 |
| 168 | 220.8375 |
| 169 | 220.8425 |
| 170 | 220.8475 |
| 181 | 220.9025 |
| 182 | 220.9075 |
| 183 | 220.9125 |
| 184 | 220.9175 |
| 185 | 220.9225 |

**Note:** Only base station frequencies are listed. Paired mobile station frequencies are 1 MHz higher.

5.2.1.2 The public safety mutual aid channels, 161-170 and 181-185 (also listed above in Section 5.2.1.1), are available on a non-restricted basis everywhere in Canada. Further, they are available to both the United States and Canada on a shared basis within the coordination zones. These channels are to be used only for coordination of tactical communications between different public safety agencies, or for other similar emergency communications.

5.2.1.3 The use of these channels in the border area may be locally coordinated in accordance with general sharing principles.

### 5.2.2 Use of Frequencies Allotted to the United States

5.2.2.1 Under the interim sharing arrangement between Canada and the United States, frequencies primarily allotted for unrestricted use by the United States may be assigned by Canada within 120 km of the border under the following conditions:

(a) The maximum power flux density (pfd) at any point at or beyond the border shall not exceed -108 dBW/$m^2$ in any 5 kHz bandwidth;

(b) Stations operating under this provision shall be considered as secondary and shall neither be granted protection against harmful interference from U.S. stations that have primary use of their authorized frequency, nor shall they cause harmful interference to U.S. primary stations, regardless of whether they meet the pfd value specified in Section 5.2.2.1(a);

(1) In the event that the actual signals at or beyond the border are found to exceed the specified value, the signal level should be reduced accordingly.

(2) If the actual signals are found to cause harmful interference to U.S. stations that have primary use of their authorized frequency, regardless of signal strength, the licensee shall take immediate action to eliminate such interference.

## 5.3 Intelligent Transportation Systems/Intelligent Vehicle Highway Systems Channels (ITS/IVHS)

The Department is keeping the following channels in reserve for the future implementation of ITS/IVHS:

**Table 5.3 - Intelligent Transportation System and Intelligent Vehicle Highway System Channels**

| Channel | Centre Frequency (MHz) |
|---|---|
| 111 | 220.5525 |
| 113 | 220.5625 |
| 115 | 220.5725 |
| 117 | 220.5825 |
| 119 | 220.5925 |

**Note:** Only base station frequencies are listed. Paired mobile station frequencies are 1 MHz higher.

## 5.4 Low-power Channels

The following are low-power channels and shall be available on an unprotected basis. See Section 6.3.1.2 for the technical limitations.

**Table 5.4 – Low-power Channels**

| Channel | Centre Frequency (MHz) |
|---|---|
| 196 | 220.9775 |
| 197 | 220.9825 |
| 198 | 220.9875 |
| 199 | 220.9925 |
| 200 | 220.9975 |

**Note:** Only base station frequencies are listed. Paired mobile station frequencies are 1 MHz higher.

## 5.5 Channels Designated to the Railway Association of Canada

5.5.1 The channels in Table 5.5 are available for the exclusive use by the Railway Association of Canada within the geographical area consisting of a corridor bounded by 70 km on each side of railway lines. Railway Association of Canada frequencies may be used for fixed and land

mobile services beyond this geographical area according to this SRSP, provided that the Railway Association of Canada is protected within their geographical area of operation bounding the railway lines.

**Table 5.5 – Railway Channels**

| Channel | Centre Frequency (MHz) |
|---|---|
| 21 | 220.1025 |
| 22 | 220.1075 |
| 23 | 220.1125 |
| 24 | 220.1175 |
| 25 | 220.1225 |

**Note:** Only base station frequencies are listed. Paired mobile station frequencies are 1 MHz higher.

5.5.2 These channels are identified for the Railway Association of Canada in order to be interoperable with those of the Association of American Railroads (AAR) in the United States. It should be noted that, the use of these channels in the coordination zone is subject to the interim sharing arrangement between Canada and the United States for the band 220-222 MHz. They may be used by Canada within 120 km of the border under the conditions described in Section 5.2.2.1 of this SRSP.

## 5.6 Multipoint Communications Systems Channels

5.6.1 Master stations shall be licensed in the lower part of the band (220-221 MHz) and the remote stations in the upper part of the band (221-222 MHz).

5.6.2 Generally for distant remote stations, a directional antenna should be used. A minimum front-to-back ratio (F/B) of 15 dB will be assumed when a directional antenna is used. This F/B ratio will be the basis of the geographical distance between two master stations and carrier-to-interference (C/I) calculations. These assumptions are not applicable for MCS mobile remote antennas.

## 5.7 Canadian Radio Amateur Use in the Band 220-222 MHz

5.7.1 *Proposals and Changes to the Spectrum in Certain Bands Below 1.7 GHz* announced allocation changes in the band 220-222 MHz after January 25, 2006. Amateur service allocation has been reduced from primary to secondary radio service status to support public safety agencies for emergency and disaster relief communications, and fixed and mobile services are now allocated on a primary basis.

5.7.2 For radio amateur secondary use in the band 220-221 MHz, channels are permitted to be aggregated. The maximum effective radiated power (e.r.p.) allowable per 5 kHz, in any one 5 kHz segment, shall be the applicable maximum e.r.p. depending on antenna height above average terrain described in Table 6.1 of Section 6.3.1.1.

5.7.3 For radio amateur secondary use in the band 221-222 MHz, the maximum e.r.p. allowable shall be 50 watts per 5 kHz in any one 5 kHz segment, and up to the applicable maximum e.r.p. depending on antenna height above average terrain described in Table 6.1 of Section 6.3.1.1. Such transmissions from antennas that are higher than 7 metres above average terrain will be permitted if the effective radiated power is reduced below 50 watts per 5 kHz by $20 \log_{10}(h/7)$ dB, where h is the height of the antenna above average terrain, in metres.

# 6. Technical Criteria

## 6.1 Channel Sharing

The assignment of a frequency or frequencies to a holder of a radio authorization does not confer a monopoly on the use of the frequency or frequencies, nor shall a radio authorization be construed as conferring any right of continued tenure in respect of the frequency or frequencies (see section 40 of the *Radiocommunication Regulations*).

## 6.2 Loading Guidelines

6.2.1 Normally, the Department will apply the guidelines found in *Channel Loading Guidelines* (GL-04) in determining loading of communications channels, and thus, of radio channels.

6.2.2 In the frequency assignment process, these guidelines may be utilized in conjunction with current observed channel occupancy data (obtained with automatic occupancy measuring equipment) to determine whether additional channels are required. Such observations will also be used to assess the general loading criteria and the inherent trade-off between sound spectrum management and acceptable grades of service.

6.2.3 The Department is using this approach to make frequency assignments but may also take into account other considerations when assessing the number of radio channels to be assigned to a system. Applicants are encouraged to provide as much traffic related data as possible with their application.

## 6.3 Technical Requirements

### 6.3.1 Limits and Co-channel Assignments

6.3.1.1 Effective Radiated Power (e.r.p.) and Height Above Average Terrain (HAAT) limits, shall be limited to that necessary to provide the required service as determined by the system requirements and will be subject to the limitations below.

**Table 6.1 – 220-221 MHz Band – Maximum e.r.p. and antenna height limits**

| Antenna Height Above Average Terrain (metres) | e.r.p. (watts) |
|---|---|
| Up to 300 | 125 |
| Above 300 to 450 | 60 |
| Above 450 to 600 | 30 |
| Above 600 to 750 | 20 |
| Above 750 to 900 | 15 |
| Above 900 to 1,050 | 10 |
| Above 1,050 | 5 |

6.3.1.2 Low-power channels: Stations transmitting on the lower frequencies of channels 196 through 200 are limited to a maximum e.r.p. of 2 watts and a maximum antenna height of 6.1 metres above ground.

6.3.1.3 Station location limitations: The maximum e.r.p. for stations located 6 kilometres or less from the Canada/US border transmitting on the lower frequencies of channels 161 through 195 must be in accordance with Table 6.2 below unless otherwise provided for by special authorization. This table does not apply to the low-power channels (196-200).

**Table 6.2 – Station Location Limitations**

| Distance from border (km) | e.r.p. (watts) |
|---|---|
| Less than 0.3 | Operations not permitted |
| 0.3 - 0.5 | 5 |
| 0.5 - 0.6 | 10 |
| 0.6 - 0.8 | 20 |
| 0.8 - 2.0 | 25 |
| 2.0 - 4.0 | 50 |
| 4.0 - 5.0 | 100 |
| beyond 5.0 | 125 |

**Note:** The maximum e.r.p. for these stations cannot be greater than the maximum e.r.p. determined by their antenna height above average terrain.

6.3.1.4 In the band 221-222 MHz, the maximum e.r.p. allowable for mobile units shall be 50 watts. Portable units are considered mobile units. Fixed stations transmitting in this band are permitted up to 50 watts e.r.p. using an antenna with a maximum height of 7 metres above average terrain. Transmissions from antennas that are higher than 7 metres above average

terrain will be permitted if the e.r.p. is reduced below 50 watts e.r.p. by 20 $\log_{10}(h/7)$ dB, where h is the height of the antenna above average terrain, in metres.

6.3.1.5 Normally, in urban areas and areas of intensive mobile use, for stations of different networks, the minimum geographic separation between co-channel base stations will be calculated based on a non-overlap of the 36 dBμV/m protected contour of the existing station and the 19 dBμV/m interference contour of the proposed station. These criteria are not applicable to systems sharing the same channel at different times (vertical loading).

6.3.1.6 For public safety systems, a carrier to interference ratio (C/I) of 20 dB will be used to calculate the interference contour of the new station. The protected contour of the existing public safety base station will be 36 dBμV/m but the interference contour of the new station will be 16 dBμV/m.

6.3.1.7 The protected contour of the existing station is calculated based on a probability of service of 50% of the time for 50% of the locations at the edge of the contour.

6.3.1.8 The interference contour is calculated using the probability that the signal level used is not exceeded more than 10% of the time for 50% of the locations at the edge of the contour (i.e. 90% of the time, it is below the threshold for 50% of the locations).

6.3.1.9 It is recognized that coverage requirements are a function of operational characteristics and the technology deployed. The Department may accept the use of different methodologies to evaluate separation between co-channel base stations, on a case-by-case basis.

6.3.1.10 Applicants are invited to include adequate technical details in support of their proposed wireless networks to allow a compatibility analysis with existing and future assignments. These analyses should be prepared using terrain based propagation models.

6.3.1.11 These details should include, but not be limited to, the required service area, the predicted radio coverage, and the design parameters used including the minimum carrier to interference ratio.

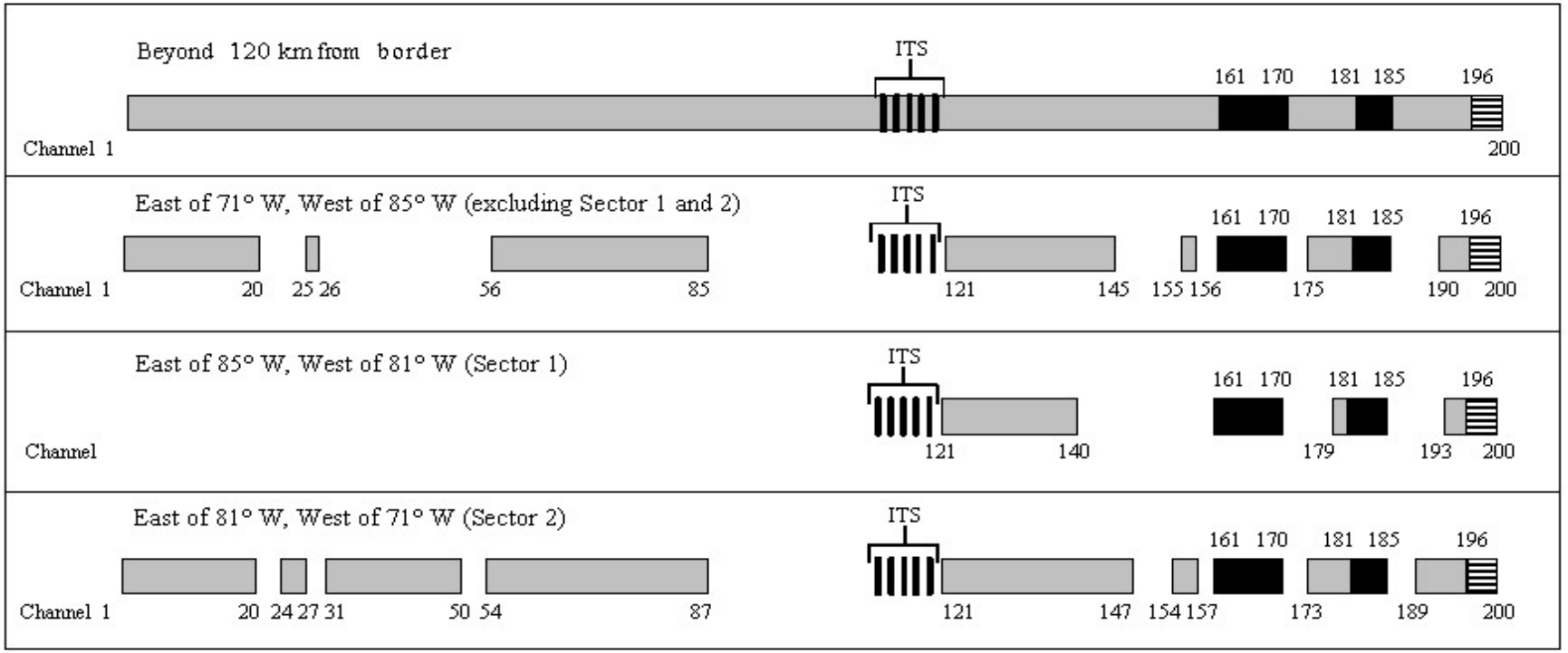
Issued under the authority
of the Minister of Industry

_____

R.W. McCaughern
Director General
Spectrum Engineering

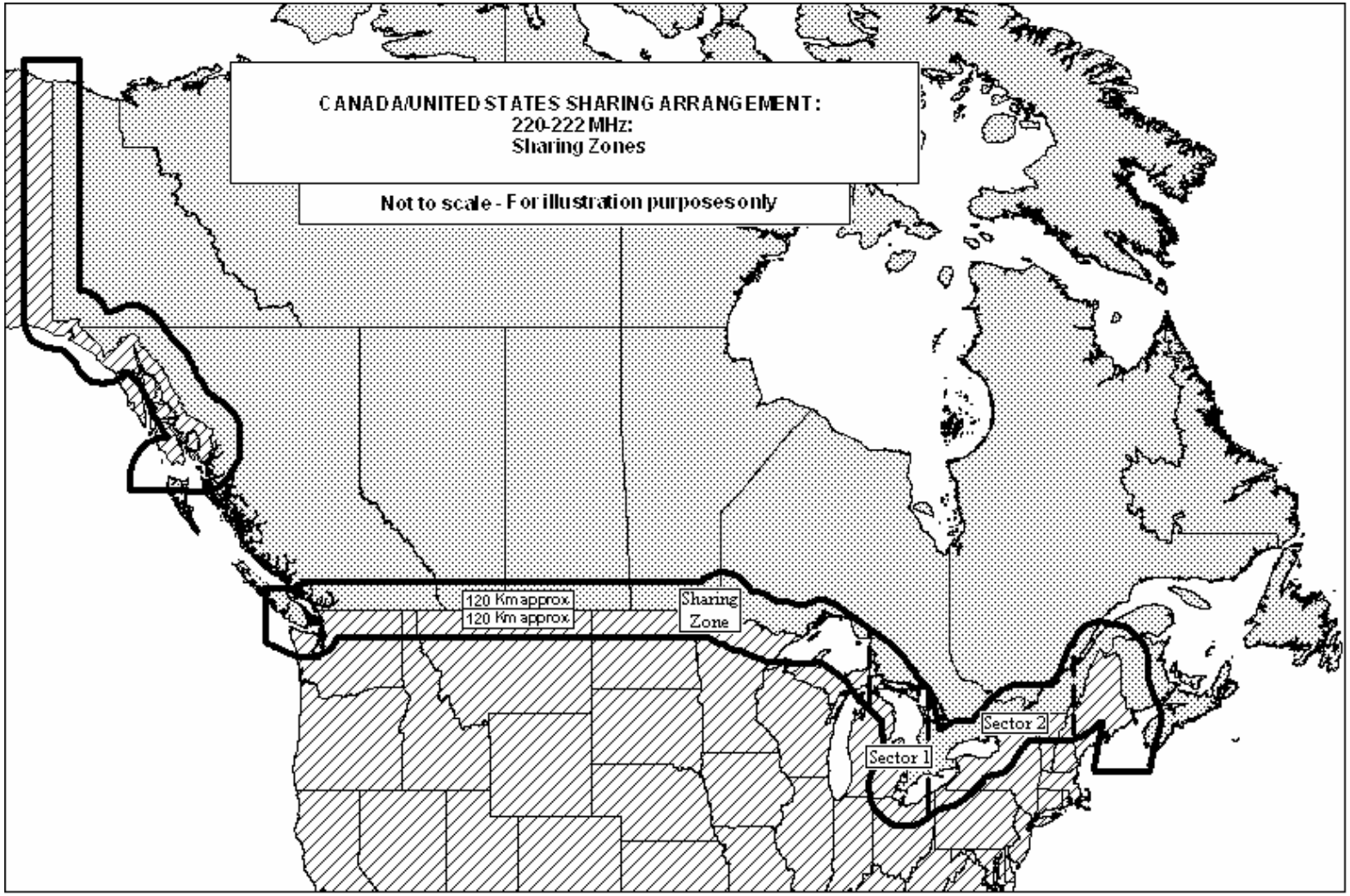
## Annex A - Frequency Channelling Plan for the Band 220-222 MHz

### Figure A1: Spectrum Availability for the Band 220-222 MHz




Note: ITS/IVHS channels (111,113, 115, 117, 119) shared with US within 120 km of the border

**Figure A2: Canada/United States 120 km Sharing Zones**



# Annex B - Channel Designations and Preferred Channel Groupings

## Table B1 - Channel Designations in the Band 220-222 MHz

**Note:** Only base station frequencies are listed in MHz. Paired mobile station frequencies are 1 MHz higher

| Channel Number | Centre Frequency | Channel Number | Centre Frequency | Channel Number | Centre Frequency | Channel Number | Centre Frequency |
|---|---|---|---|---|---|---|---|
| 1 | 220.0025 | 51 | 220.2525 | 101 | 220.5025 | 151 | 220.7525 |
| 2 | 220.0075 | 52 | 220.2575 | 102 | 220.5075 | 152 | 220.7575 |
| 3 | 220.0125 | 53 | 220.2625 | 103 | 220.5125 | 153 | 220.7625 |
| 4 | 220.0175 | 54 | 220.2675 | 104 | 220.5175 | 154 | 220.7675 |
| 5 | 220.0225 | 55 | 220.2725 | 105 | 220.5225 | 155 | 220.7725 |
| 6 | 220.0275 | 56 | 220.2775 | 106 | 220.5275 | 156 | 220.7775 |
| 7 | 220.0325 | 57 | 220.2825 | 107 | 220.5325 | 157 | 220.7825 |
| 8 | 220.0375 | 58 | 220.2875 | 108 | 220.5375 | 158 | 220.7875 |
| 9 | 220.0425 | 59 | 220.2925 | 109 | 220.5425 | 159 | 220.7925 |
| 10 | 220.0475 | 60 | 220.2975 | 110 | 220.5475 | 160 | 220.7975 |
| 11 | 220.0525 | 61 | 220.3025 | 111 [2] | 220.5525 | 161 [3] | 220.8025 |
| 12 | 220.0575 | 62 | 220.3075 | 112 | 220.5575 | 162 [3] | 220.8075 |
| 13 | 220.0625 | 63 | 220.3125 | 113 [2] | 220.5625 | 163 [3] | 220.8125 |
| 14 | 220.0675 | 64 | 220.3175 | 114 | 220.5675 | 164 [3] | 220.8175 |
| 15 | 220.0725 | 65 | 220.3225 | 115 [2] | 220.5725 | 165 [3] | 220.8225 |
| 16 | 220.0775 | 66 | 220.3275 | 116 | 220.5775 | 166 [3] | 220.8275 |
| 17 | 220.0825 | 67 | 220.3325 | 117 [2] | 220.5825 | 167 [3] | 220.8325 |
| 18 | 220.0875 | 68 | 220.3375 | 118 | 220.5875 | 168 [3] | 220.8375 |
| 19 | 220.0925 | 69 | 220.3425 | 119 [2] | 220.5925 | 169 [3] | 220.8425 |
| 20 | 220.0975 | 70 | 220.3475 | 120 | 220.5975 | 170 [3] | 220.8475 |
| 21 [1] | 220.1025 | 71 | 220.3525 | 121 | 220.6025 | 171 | 220.8525 |
| 22 [1] | 220.1075 | 72 | 220.3575 | 122 | 220.6075 | 172 | 220.8575 |
| 23 [1] | 220.1125 | 73 | 220.3625 | 123 | 220.6125 | 173 | 220.8625 |
| 24 [1] | 220.1175 | 74 | 220.3675 | 124 | 220.6175 | 174 | 220.8675 |
| 25 [1] | 220.1225 | 75 | 220.3725 | 125 | 220.6225 | 175 | 220.8725 |
| 26 | 220.1275 | 76 | 220.3775 | 126 | 220.6275 | 176 | 220.8775 |
| 27 | 220.1325 | 77 | 220.3825 | 127 | 220.6325 | 177 | 220.8825 |
| 28 | 220.1375 | 78 | 220.3875 | 128 | 220.6375 | 178 | 220.8875 |
| 29 | 220.1425 | 79 | 220.3925 | 129 | 220.6425 | 179 | 220.8925 |
| 30 | 220.1475 | 80 | 220.3975 | 130 | 220.6475 | 180 | 220.8975 |
| 31 | 220.1525 | 81 | 220.4025 | 131 | 220.6525 | 181 [3] | 220.9025 |
| 32 | 220.1575 | 82 | 220.4075 | 132 | 220.6575 | 182 [3] | 220.9075 |
| 33 | 220.1625 | 83 | 220.4125 | 133 | 220.6625 | 183 [3] | 220.9125 |
| 34 | 220.1675 | 84 | 220.4175 | 134 | 220.6675 | 184 [3] | 220.9175 |
| 35 | 220.1725 | 85 | 220.4225 | 135 | 220.6725 | 185 [3] | 220.9225 |
| 36 | 220.1775 | 86 | 220.4275 | 136 | 220.6775 | 186 | 220.9275 |
| 37 | 220.1825 | 87 | 220.4325 | 137 | 220.6825 | 187 | 220.9325 |
| 38 | 220.1875 | 88 | 220.4375 | 138 | 220.6875 | 188 | 220.9375 |
| 39 | 220.1925 | 89 | 220.4425 | 139 | 220.6925 | 189 | 220.9425 |
| 40 | 220.1975 | 90 | 220.4475 | 140 | 220.6975 | 190 | 220.9475 |
| 41 | 220.2025 | 91 | 220.4525 | 141 | 220.7025 | 191 | 220.9525 |
| 42 | 220.2075 | 92 | 220.4575 | 142 | 220.7075 | 192 | 220.9575 |
| 43 | 220.2125 | 93 | 220.4625 | 143 | 220.7125 | 193 | 220.9625 |
| 44 | 220.2175 | 94 | 220.4675 | 144 | 220.7175 | 194 | 220.9675 |
| 45 | 220.2225 | 95 | 220.4725 | 145 | 220.7225 | 195 | 220.9725 |
| 46 | 220.2275 | 96 | 220.4775 | 146 | 220.7275 | 196 [4] | 220.9775 |
| 47 | 220.2325 | 97 | 220.4825 | 147 | 220.7325 | 197 [4] | 220.9825 |
| 48 | 220.2375 | 98 | 220.4875 | 148 | 220.7375 | 198 [4] | 220.9875 |
| 49 | 220.2425 | 99 | 220.4925 | 149 | 220.7425 | 199 [4] | 220.9925 |
| 50 | 220.2475 | 100 | 220.4975 | 150 | 220.7475 | 200 [4] | 220.9975 |

[1] Available to the Railway Association of Canada (refer to Section 5.5)
[2] Available to Canada for ITS/IVHS operations on a shared basis within the coordination zone (refer to Section 5.3)
[3] Available for public safety and mutual aid operations (refer to Section 5.2.1)
[4] Available for low-power operations in both countries (refer to Section 5.4)

## Table B2 - Preferred Channel Groupings

| Channel | Centre Frequency (MHz) |
|---|---|
| Group 1 | |
| 1 | 220.0025 |
| 31 | 220.1525 |
| 61 | 220.3025 |
| 91 | 220.4525 |
| 121 | 220.6025 |

| Channel | Centre Frequency (MHz) |
|---|---|
| Group 2 | |
| 2 | 220.0075 |
| 32 | 220.1575 |
| 62 | 220.3075 |
| 92 | 220.4575 |
| 122 | 220.6075 |

| Channel | Centre Frequency (MHz) |
|---|---|
| Group 3 | |
| 3 | 220.0125 |
| 33 | 220.1625 |
| 63 | 220.3125 |
| 93 | 220.4625 |
| 123 | 220.6125 |

| Channel | Centre Frequency (MHz) |
|---|---|
| Group 4 | |
| 4 | 220.0175 |
| 34 | 220.1675 |
| 64 | 220.3175 |
| 94 | 220.4675 |
| 124 | 220.6175 |

| Channel | Centre Frequency (MHz) |
|---|---|
| Group 5 | |
| 5 | 220.0225 |
| 35 | 220.1725 |
| 65 | 220.3225 |
| 95 | 220.4725 |
| 125 | 220.6225 |

| Group 6 | |
|---|---|
| 6 | 220.0275 |
| 36 | 220.1775 |
| 66 | 220.3275 |
| 96 | 220.4775 |
| 126 | 220.6275 |

| Group 7 | |
|---|---|
| 7 | 220.0325 |
| 37 | 220.1825 |
| 67 | 220.3325 |
| 97 | 220.4825 |
| 127 | 220.6325 |

| Group 8 | |
|---|---|
| 8 | 220.0375 |
| 38 | 220.1875 |
| 68 | 220.3375 |
| 98 | 220.4875 |
| 128 | 220.6375 |

| Group 9 | |
|---|---|
| 9 | 220.0425 |
| 39 | 220.1925 |
| 69 | 220.3425 |
| 99 | 220.4925 |
| 129 | 220.6425 |

| Group 10 | |
|---|---|
| 10 | 220.0475 |
| 40 | 220.1975 |
| 70 | 220.3475 |
| 100 | 220.4975 |
| 130 | 220.6475 |

| Group 11 | |
|---|---|
| 11 | 220.0525 |
| 41 | 220.2025 |
| 71 | 220.3525 |
| 101 | 220.5025 |
| 131 | 220.6525 |

| Group 12 | |
|---|---|
| 12 | 220.0575 |
| 42 | 220.2075 |
| 72 | 220.3575 |
| 102 | 220.5075 |
| 132 | 220.6575 |

| Group 13 | |
|---|---|
| 13 | 220.0625 |
| 43 | 220.2125 |
| 73 | 220.3625 |
| 103 | 220.5125 |
| 133 | 220.6625 |

| Group 4 | |
|---|---|
| 14 | 220.0675 |
| 44 | 220.2175 |
| 74 | 220.3675 |
| 104 | 220.5175 |
| 134 | 220.6675 |

| Group 15 | |
|---|---|
| 15 | 220.0725 |
| 45 | 220.2225 |
| 75 | 220.3725 |
| 105 | 220.5225 |
| 135 | 220.6725 |

| Group 16 | |
|---|---|
| 16 | 220.0775 |
| 46 | 220.2275 |
| 76 | 220.3775 |
| 106 | 220.5275 |
| 136 | 220.6775 |

| Group 17 | |
|---|---|
| 17 | 220.0825 |
| 47 | 220.2325 |
| 77 | 220.3825 |
| 107 | 220.5325 |
| 137 | 220.6825 |

| Group 18 | |
|---|---|
| 18 | 220.0875 |
| 48 | 220.2375 |
| 78 | 220.3875 |
| 108 | 220.5375 |
| 138 | 220.6875 |

| Group 19 | |
|---|---|
| 19 | 220.0925 |
| 49 | 220.2425 |
| 79 | 220.3925 |
| 109 | 220.5425 |
| 139 | 220.6925 |

| Group 20 | |
|---|---|
| 20 | 220.0975 |
| 50 | 220.2475 |
| 80 | 220.3975 |
| 110 | 220.5475 |
| 140 | 220.6975 |