



Spectrum Management and Telecommunications

Radio Standards Specification

Licence-Exempt Radio Apparatus: Category I Equipment

Annex G: Low-Power Radio Apparatus Operating in the Television Bands

Effective May 25, 2018, the Department will no longer accept applications for the certification of new low-power apparatus that operate in the bands 617-652 MHz and 663-698 MHz. Furthermore, as of November 15, 2018, no low-power apparatus in the bands 617-652 MHz and 663-698 MHz may be sold, offered for sale, manufactured, imported, distributed or leased on the Canadian market.

Preface

Radio Standards Specification RSS-210, Issue 9, *Licence-Exempt Radio Apparatus: Category I Equipment*, replaces RSS-210, Issue 8, *Licence-Exempt Radio Apparatus (All Frequency Bands): Category I Equipment*, dated December 2010.

This document will be in force upon publication on Innovation, Science and Economic Development Canada's (ISED's) website.

Listed below are the changes:

- (a) Remove requirements for receivers, as these requirements are included in RSS-Gen, [*General Requirements for Compliance of Radio Apparatus*](#).
- (b) Remove annexes that are no longer covered in RSS-210.
- (c) Specify that frequency bands which are exclusively used by the Government of Canada are added to Note 1 in Annex A.
- (d) Remove requirements for momentarily operated and remote control devices in the band 40.66-40.77 MHz, as these requirements are covered in Annex B.
- (e) Modify out-of-band emission limits for equipment operating in the band 13.110-14.010 MHz (Annex B).
- (f) Incorporate requirements for cordless telephones operating in the band 44/49 MHz (Annex 3 of Issue 8) into Annex B, as these requirements will apply to any type of communication.
- (g) Remove Section A4.2 of Issue 8, Band 174-216 MHz (*Medical Telemetry*), as this band is no longer permitted for the Wireless Medical Telemetry System.
- (h) Remove repeater frequency bands for General Mobile Radio Service (GMRS) equipment.
- (i) Add requirements for GMRS-M in the frequency range 462.55-462.875 MHz in Annex E.
- (j) Amend the specifications for speed radar meters to include the band 33.4–36.0 GHz in Annex F. These devices were previously covered under Annex 7 of Issue 8 for frequency bands 10.5-10.55 GHz and 24.075-24.175 GHz.
- (k) Remove Annex 8 of Issue 8, Frequency Hopping and Digital Modulation Systems Operating in the Bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, and Annex 9 of Issue 8, Local Area Network Devices, as these annexes are covered in RSS-247 (published May 2015).

- (l) Incorporate RSS-210, Amendment 1, [*Licence-Exempt, Low-Power Radio Apparatus Operating in the Television Bands*](#) (published Feb 2015) into Annex G of this issue.
- (m) Remove Annex 11 of Issue 8, *Level Probing Radar Devices Enclosed in Containers and Still Pipes*, as this annex is covered in RSS-211 (published March 2015).
- (n) Remove Section 13.1 of Annex 13 Issue 8, *Vehicle-Mounted Field Disturbance Sensors in the Bands 46.7-46.9 GHz and 76-77 GHz*, as this section is covered in RSS-251, [*Field Disturbance Sensors in the Bands 46.7-46.9 GHz \(Vehicular Radar\) and 76-77 GHz \(Vehicular and Airport Fixed Radar\)*](#) (published March 2015).
- (o) Specify emission limits for devices in the band 57-64 GHz (in Annex J) in terms of equivalent isotropically radiated power (e.i.r.p.) instead of power density and increase the e.i.r.p. limit for outdoor fixed point-to-point equipment.
- (p) Adopt measurement method and emission mask in ETSI EN 300 422 for low-power radio apparatus operating in the TV bands.
- (q) Clarify limits for emissions radiated from digital circuitry contained within wideband devices (Annex K).

Issued under the authority of
the Minister of Innovation, Science and Economic Development.

MARTIN PROULX
Acting Director General
Engineering, Planning and Standards Branch

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1. Scope

Radio Standard Specification RSS-210, [Licence-Exempt Radio Apparatus: Category I Equipment](#) sets out the requirements for equipment certification of several types of licence-exempt radio apparatus.

Radio apparatus covered under this standard are primarily low-power and are mainly reserved for consumer or commercial purposes, applicable in all frequency bands. The requirements for equipment operating in specific frequency bands are described in the annexes of this RSS.

2. General Information

Equipment covered by this standard is classified as Category I equipment and requires a technical acceptance certificate (TAC) issued by the Certification and Engineering Bureau (CEB) of Innovation, Science and Economic Development Canada (ISED), or a certificate issued by a recognized Certification Body (CB).

2.1 Licensing Requirements

Equipment covered by this standard is exempt from licensing requirements, pursuant to Section 15 of the [Radiocommunication Regulations](#).

2.2 Related Documents

All Spectrum Management and Telecommunications publications are available on the Department's website, under [Official Publications](#).

The following ISED document should be consulted:

Client Circular Procedure CPC-2-1-28, [Voluntary Licensing of Licence-Exempt Low-Power Radio Apparatus in the TV Bands](#).

The following publication is referenced in this Standard.

European Telecommunications Standards Institute ETSI EN 300 422-1 V1.4.2 (2011-08), [Electromagnetic compatibility and Radio spectrum Matters \(ERM\); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement](#).

3. General Requirements

3.1 RSS-Gen Compliance

This issue of RSS-210 shall be used in conjunction with RSS-Gen, [General Requirements for Compliance of Radio Apparatus](#).

4. Technical Specifications

4.1 Emissions Falling Within Restricted Frequency Bands

Unless otherwise indicated, equipment for which emissions fall within the restricted frequency bands listed in [RSS-Gen](#) shall comply with the provisions set forth in [RSS-Gen](#).

4.2 Cordless Telephones (General Conditions)

This section sets out the general conditions applicable to all cordless telephones, regardless of the frequency band of operation. In addition, there are standards specific to those bands that can be used for cordless telephones, as specified in the annexes of this RSS or in other RSSs, depending on the frequency bands.

A cordless telephone comprises a base station and a portable handset. The handset is intended to operate as an extension of the base station by eliminating the connecting handset cord of the standard telephone. The base station is intended to be connected to a telephone line that has access to a public switched telephone network (PSTN). Cordless telephones operate in full-duplex mode, which allows simultaneous conversations between both parties.

4.2.1 CS-03 Compliance

A cordless telephone's base station shall comply with both RSS-210 and Compliance Specifications CS-03, [Compliance Specification for Terminal Equipment, Terminal Systems, Network Protection Devices, Connection Arrangements and Hearing Aids Compatibility](#), and shall be certified under both documents.

4.3 General Field Strength Limits

[RSS-Gen](#) includes the general field strength limits of unwanted emissions, where applicable, for transmitters and receivers operating in accordance with the provisions specified in this standard.

Unwanted emissions of transmitters and receivers are permitted to fall within the restricted bands listed in [RSS-Gen](#) and TV bands 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-698 MHz; however, fundamental emissions are prohibited in these bands.

4.4 Transmitters With Wanted Emissions That are Within the General Field Strength Limits

Transmitters whose wanted and unwanted emissions fall within the general field strength limits specified in [RSS-Gen](#) may operate in any of the frequency bands, other than the restricted bands listed in [RSS-Gen](#) and the TV bands, and shall be certified under RSS-210. Under no circumstance shall the level of any unwanted emissions exceed the level of the fundamental emissions.

Devices operating below 490 kHz for which all emissions are at least 40 dB below the general field strength limit listed in [RSS-Gen](#) (for transmitters at frequencies below 30 MHz) are Category II devices and are subject to the requirements specified in RSS-310, [Licence-Exempt Radio Apparatus: Category II Equipment](#).

Annex A — Momentarily Operated and Remote Control Devices

The requirements of this annex are specific to momentarily operated¹ transmitters and receivers, as well as remote control devices.

The operation of momentarily operated devices is permitted in the bands specified in tables A1 and A2, including TV bands 54-72 MHz, 76-88 MHz, 174-216 MHz and 470-698 MHz, but is prohibited in the restricted bands listed in [RSS-Gen](#).

A.1 Momentarily Operated Devices

The frequency bands and field strength limits in tables A1 and A2 of this annex are reserved exclusively for the transmission of a control signal, such as that used with alarm systems, door openers, remote switches, etc. Data may be sent with a control signal. Radio control of toys or model aircraft, as well as continuous transmissions, such as voice or video, are not permitted, except as provided in Section A.1.4 below.

A.1.1 Types of Momentarily Operated Devices

Devices shall comply with the following for momentary operation:

- (a) A manually operated transmitter shall be equipped with a push-to-operate switch and be under manual control at all times during transmission. When released, the transmitter shall cease transmission within no more than 5 seconds of being released.
- (b) A transmitter that has been activated automatically shall cease transmission within 5 seconds of activation.
- (c) Periodic transmissions at regular, predetermined intervals are not permitted, except as specified in Section A.1.4. However, polling or supervision transmissions that determine system integrity of transmitters used in security or safety applications are permitted, provided the total duration of transmission does not exceed 2 seconds per hour for each transmitter.
- (d) Intentional radiators used for radio control during emergencies involving fire, security of goods (e.g. burglar alarms), and safety-of-life, when activated to signal an alarm, may operate during the interval of the alarm condition.

A.1.2 Field Strengths

Following are the requirements for field strength of emissions:

- (a) The field strength of emissions from momentarily operated intentional radiators shall not exceed the limits outlined in Table A1, based on the average value of the measured

¹ Momentary operation may also mean periodic operation.

emissions. The requirements of the Pulsed Operation section of [RSS-Gen](#) apply for averaging pulsed emissions and limiting peak emissions.

Alternatively, compliance with the limits in Table A1 may be demonstrated using an International Special Committee on Radio Interference (CISPR) quasi-peak detector.

- (b) Unwanted emissions shall be 10 times below the fundamental emissions field strength limits in Table A1 or comply with the limits specified in [RSS-Gen](#), whichever is less stringent.

Table A1— Permissible Field Strength Limits for Momentarily Operated Devices

Fundamental Frequency (MHz), Excluding Restricted Frequency Bands Specified in RSS-Gen	Field Strength of the Fundamental Emissions ($\mu\text{V/m}$ at 3 m)
70-130	1,250
130-174	1,250 to 3,750*
174-260 ^(Note 1)	3,750
260-470 ^(Note 1)	3,750 to 12,500*
Above 470	12,500

* Linear interpolation with frequency, f , in MHz:

For 130-174 MHz: Field Strength ($\mu\text{V/m}$) = $(56.82 \times f) - 6136$

For 260-470 MHz: Field Strength ($\mu\text{V/m}$) = $(41.67 \times f) - 7083$

Note 1: Frequency bands 225-328.6 MHz and 335.4-399.9 MHz are designated for the exclusive use of the Government of Canada. Manufacturers should be aware of possible harmful interference and degradation of their licence-exempt radio equipment in these frequency bands.

A.1.3 Bandwidth of Momentary Signals

The 99% bandwidth of momentarily operated devices shall be less or equal to 0.25% of the centre frequency for devices operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the 99% bandwidth shall be less or equal to 0.5% of the centre frequency.

A.1.4 Reduced Field Strengths

Following are the requirements for devices with reduced field strengths:

- (a) Devices may not meet the requirements in Section A.1.1 and may be employed for any type of operation, provided the device complies with the requirements of Section A.1.3 and the field strength corresponds with the limits specified in Table A2.
- (b) In addition, devices operated under the provisions of this section shall be capable of

automatically limiting their operation so that the duration of each transmission is not greater than 1 second and the silent period between transmissions is at least 30 times the duration of the transmission, but not less than 10 seconds under any circumstances.

However, devices that are designed for limited use for the purpose of initial programming, reprogramming or installing, and not for regular operations, may operate for up to 5 seconds, provided such devices are used only occasionally in connection with each unit being programmed or installed.

- (c) The field strength limits shown in Table A2 are based on the average value of the measured emissions. As an alternative, compliance with the limits in this table may be based on the use of measurement instruments with an International Special Committee on Radio Interference (CISPR) quasi-peak detector.
- (d) Unwanted emissions shall comply with the general field strength limits specified in [RSS-Gen](#) or 10 times below the fundamental emissions field strength limit in Table A2, whichever is less stringent.

Table A2— Reduced Field Strength Limits for Momentarily Operated Devices

Fundamental Frequency (MHz), Excluding Restricted Band Frequencies of RSS-Gen (See Note 1 above)	Field Strength of the Fundamental ($\mu\text{V/m}$ at 3 m)
70-130	500
130-174	500 to 1,500*
174-260	1,500
260-470	1,500 to 5,000*
Above 470	5,000

* Linear interpolation with frequency, f , in MHz:

For 130-174 MHz: Field Strength ($\mu\text{V/m}$) = $(22.73 \times f) - 2454.55$

For 260-470 MHz: Field Strength ($\mu\text{V/m}$) = $(16.67 \times f) - 2833.33$

A.2 Remote Control

A.2.1 Band 26.99-27.255 MHz

This band is reserved for one-way, non-voice usage for remote controls, under the following conditions:

- (a) For single sideband (SSB) modulation, the transmitter radio frequency (RF) peak envelope power shall not exceed 4 W.

- (b) Only the following channel carrier frequencies are permitted: 26.995; 27.045; 27.095; 27.145; 27.195 and 27.255 MHz.
- (c) For double sideband (amplitude), digital or frequency modulation, the transmitter unmodulated carrier power shall not exceed 4 W.
- (d) An antenna gain not exceeding that of a half-wave dipole shall be used.
- (e) The authorized bandwidth is 8 kHz for double sideband, digital or FM, and 4 kHz for SSB modulations. For SSB modulations, either upper or lower sideband may be used.
- (f) Carrier frequency stability shall be maintained to $\pm 0.005\%$ (± 50 ppm). However, devices with output powers of 2.5 W or less can have a frequency stability of $\pm 0.01\%$ (± 100 ppm).
- (g) The power of unwanted emissions measured by an average meter with a resolution bandwidth of 300 Hz for (i) and (ii), and 3 kHz for (iii), shall be less than the mean transmitter power, P (dBW), by at least:
 - (i) 25 dB on any frequency removed from the centre of the authorized bandwidth by more than 50%, up to and including 100% of the authorized bandwidth;
 - (ii) 35 dB on any frequency removed from the centre of the authorized bandwidth by more than 100%, up to and including 250% of the authorized bandwidth;
 - (iii) $43 + 10 \log_{10} p(\text{watts})$ dB or to the general field strength limits specified in [RSS-Gen](#), whichever is less stringent, on any frequency removed from the centre of the authorized bandwidth by more than 250% of the authorized bandwidth.

A.2.2 Band 47 MHz Road Traffic Controllers

The requirements in this section are reserved for self-powered vehicle detector transmitters. These transmitters are one-way communication devices, buried beneath the asphalt, that use 100 mW power or less to change traffic lights. These devices are used by municipalities and traffic departments.

Each transmitter is turned on for approximately 28 milliseconds (ms) on the approach of a vehicle and on again for another 28 ms at the tail of that vehicle (i.e. 56 ms per vehicle). The transmitter output power during transmission must not exceed 100 mW.

The following list of frequencies (in MHz) can be used.

47.02	47.11	47.23	47.30
47.03	47.13	47.25	47.31
47.05	47.15	47.27	47.33
47.07	47.17	47.29	47.35

Although there is no specification on transmitter carrier frequency stability, the equipment design should be based on good engineering principles that take into account the severity of Canadian weather

conditions. Emission spectral density beyond a nominal bandwidth of 12.5 kHz shall be suppressed by at least 20 dB relative to the in-band emission spectral density.

A.2.3 72-73 MHz (Model Aircraft) and 75.4-76 MHz (General Remote Control)

A.2.3.1 Carrier Frequencies

The following frequencies are for general usage of remote controls and for control of a model aircraft.

(a) 72-73 MHz Model Aircraft

Radio control of model aircraft is restricted to the following carrier frequencies (in MHz).

72.01	72.21	72.41	72.61	72.81
72.03	72.23	72.43	72.63	72.83
72.05	72.25	72.45	72.65	72.85
72.07	72.27	72.47	72.67	72.87
72.09	72.29	72.49	72.69	72.89
72.11	72.31	72.51	72.71	72.91
72.13	72.33	72.53	72.73	72.93
72.15	72.35	72.55	72.75	72.95
72.17	72.37	72.57	72.77	72.97
72.19	72.39	72.59	72.79	72.99

(b) 75.4-76 MHz General Remote Control

The following frequencies (in MHz) are for general usage of any type of remote control other than for control of a model aircraft. Voice communication is permitted for emergency use if it is of the push-to-talk type. The centre or carrier frequencies are spaced in 20 kHz steps as follows:

75.41	75.53	75.65	75.77	75.89
75.43	75.55	75.67	75.79	75.91
75.45	75.57	75.69	75.81	75.93
75.47	75.59	75.71	75.83	75.95
75.49	75.61	75.73	75.85	75.97
75.51	75.63	75.75	75.87	75.99

A.2.3.2 Standards Specifications

Following is a list of specifications for devices under this section

- (a) For SSB modulation, the transmitter peak envelope power shall not exceed 0.75 W.
- (b) For double sideband (DSB), digital or frequency modulation, the transmitter unmodulated carrier power shall not exceed 0.75 W.

- (c) An antenna gain not exceeding that of a half-wave dipole shall be used.
- (d) The authorized bandwidth is 8 kHz for DSB, digital or frequency modulation, and 4 kHz for SSB modulations. For SSB modulation, either upper or lower sideband may be used.
- (e) Carrier frequency stability shall be maintained to $\pm 0.002\%$ (± 20 ppm).
- (f) The power of unwanted emissions, measured by an average meter with a resolution bandwidth of 300 Hz for (i), (ii) and (iii), and 3 kHz for (iv), shall be less than the mean transmitter power, P_{mean} (dBW), by at least:
 - (i) 25 dB on any frequency removed from the centre of the authorized bandwidth by more than 50%, up to and including 100% of the authorized bandwidth;
 - (ii) 45 dB on any frequency removed from the centre of the authorized bandwidth by more than 100%, up to and including 125% of the authorized bandwidth;
 - (iii) 55 dB on any frequency removed from the centre of the authorized bandwidth by more than 125%, up to and including 250% of the authorized bandwidth; and
 - (iv) $56 + 10 \log_{10} p_{\text{mean}}$ (watts) dB, or to the general field strength limits specified in [RSS-Gen](#), whichever is less stringent, on any frequency removed from the centre of the authorized bandwidth by more than 250% of the authorized bandwidth.

Annex B — Devices Operating in Frequency Bands for any Application

This annex provides the technical requirements for devices operating in various frequency bands for any application.

B.1 Band 160-190 kHz

Devices using this band shall limit the total input power to the final radio frequency stage to a maximum of 1.0 W and the total length of transmission line, antenna and ground lead (if used) to a maximum of 15 m.

Example: A coaxial or twin-wire transmission line of L metres in length has a wire length of 2L. If a loop antenna of N turns is used with this transmission line, compute the length of wire used by the N turns, and add the result to 2L. The total shall not exceed 30 m.

Emissions outside of this band shall be attenuated by at least 20 dB below the mean transmitter output power or to the general field strength limits listed in [RSS-Gen](#), whichever is less stringent.

B.2 Band 510-1705 kHz

Devices using this band shall comply with one of the following requirements:

- (a) The total input power to the final radio frequency stage shall not exceed 100 mW, and the total length of transmission line, antenna and ground lead (if used) shall not exceed 3 m.
- (b) The field strength of radiated emissions shall not exceed 250 $\mu\text{V/m}$ measured at 30 m
- (c) Transmitters that employ a leaky coaxial cable as a radiating antenna may meet the field strength limit of 15 $\mu\text{V/m}$, as measured at a distance of $47715/(\text{frequency in kHz})$ m (equivalent to $\text{wavelength}/2\pi$) from the coaxial cable.
- (d) Emissions outside of this band shall be attenuated by at least 20 dB below the mean transmitter output power, or to the general field strength limits specified in [RSS-Gen](#), whichever is less stringent.

B.3 Band 1.705-10 MHz

Devices shall comply with the following requirements:

- (a) The field strength of any emission within the band shall not exceed 100 $\mu\text{V/m}$ measured at 30 m with an average meter;
- (b) If the 6 dB bandwidth of the emission is less than 10% of the centre frequency, the field strength shall not exceed 15 $\mu\text{V/m}$ at 30 m or (the bandwidth of the device in kHz) divided by (the centre frequency of the device in MHz) $\mu\text{V/m}$ at 30 m, whichever is the higher level; and
- (c) Emissions outside of this band shall comply with the general field strength limits

specified in [RSS-Gen](#).

B.4 Band 1.705-37 MHz Swept Frequency

Notwithstanding that this band encompasses some restricted bands listed in [RSS-Gen](#), swept frequency devices are permitted when all the following conditions are met:

- (a) The sweep is never stopped with the fundamental emission within any restricted band listed in [RSS-Gen](#);
- (b) The field strength shall not exceed the limits specified in sections B.3, B.5, B.6, or the general field strength limits specified in [RSS-Gen](#), whichever is less stringent, when measured while sweeping is stopped in those bands;
- (c) The fundamental emission dwelling on any restricted band listed in [RSS-Gen](#) shall not exceed 1.0% of the time that the device is actively transmitting, without compensation for duty cycle; and
- (d) Outside of the swept frequency band, the out-of-band emission limits in sections B5 and B6, or the general field strength limits listed in [RSS-Gen](#), shall apply, whichever are less stringent. This test is to be carried out while the frequency sweep is in operation.

B.5 Band 6.765-6.795 MHz

The field strength of any emission shall not exceed the following limits:

- (a) 15.5 mV/m (84 dB μ V/m) at 30 m, inside the allocated band;
- (b) 334 μ V/m (50.5 dB μ V/m) at 30 m, outside the allocated band up to $F_c \pm 150$ kHz;
- (c) 106 μ V/m (40.5 dB μ V/m) at 30 m, between $F_c \pm 150$ kHz and $F_c \pm 450$ kHz; and
- (d) [RSS-Gen](#) general field strength limits for frequencies outside $F_c \pm 450$ kHz, except for harmonic emissions, which shall not exceed 316 μ V/m at 30 m.

where: $F_c = 6.78$ MHz.

Carrier frequency stability shall be maintained to $\pm 0.01\%$ (± 100 ppm).

B.6 Band 13.110-14.010 MHz

The field strength of any emission shall not exceed the following limits:

- (a) 15.848 mV/m (84 dB μ V/m) at 30 m, within the band 13.553-13.567 MHz;
- (b) 334 μ V/m (50.5 dB μ V/m) at 30 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz;
- (c) 106 μ V/m (40.5 dB μ V/m) at 30 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz; and

- (d) [RSS-Gen](#) general field strength limits for frequencies outside the band 13.110-14.010 MHz.

Carrier frequency stability shall be maintained to $\pm 0.01\%$ (± 100 ppm).

B.7 Band 40.66-40.70 MHz

Devices shall comply with the following requirements:

- (a) The field strength of any emissions within this band shall not exceed 10 mV/m (80 dB μ V/m) measured at 3 m with an average meter. Alternatively, it shall not exceed 233 mV/m measured with a quasi-peak meter;

Note: The above does not apply when converting average meter readings to quasi-peak values.

- (b) The 6 dB bandwidth of the emission shall be confined within the 40.66-40.70 MHz band edges;
- (c) The field strength of harmonic emissions shall not exceed 225 μ V/m at 3 m measured with a quasi-peak detector;
- (d) The field strength of any emissions outside the band 40.65-40.71 MHz, except harmonic emissions, shall not exceed the general field strength limits specified in [RSS-Gen](#); and
- (e) Carrier frequency stability shall be maintained to $\pm 0.01\%$ (± 100 ppm).

B.8 Band 44-49 MHz

Devices shall comply with the following requirements:

- (a) Devices used as part of a communication system shall operate on one of the following carrier frequency pairs listed in Table B1, except as provided in (b) below:

Table B1 — Channel Frequencies for Devices Operating in the Band 44-49 MHz

Channel	Transmit Frequencies (MHz)	
	Base	Handset/Portable
1	43.720	48.760
2	43.740	48.840
3	43.820	48.860
4	43.840	48.920
5	43.920	49.020
6	43.960	49.080
7	44.120	49.100
8	44.160	49.160
9	44.180	49.200
10	44.200	49.240
11	44.320	49.280
12	44.360	49.360
13	44.400	49.400
14	44.460	49.460
15	44.480	49.500
16	46.610	49.670
17	46.630	49.845
18	46.670	49.860
19	46.710	49.770
20	46.730	49.875
21	46.770	49.830
22	46.830	49.890
23	46.870	49.930
24	46.930	49.990
25	46.970	49.970

- (b) Frequencies shall be paired as shown in Table B1; however, pairing for channels 1 through 15 may be accomplished by pairing any of the 15 base transmitter frequencies with any of the 15 handset/portable transmitter frequencies (flexible pairing).
- (c) Devices operating on channels 1 through 15 shall incorporate an automatic channel selection mechanism that will prevent the establishment of a link on any occupied frequency. A description of the means and procedures used to achieve automatic channel selection shall be provided in the application for equipment certification.
- (d) The field strength shall not exceed 10 mV/m measured at 3 m with an average meter.
- (e) The occupied bandwidth shall not exceed the 20 kHz authorized bandwidth, centred on the test carrier frequency. Outside of this 20 kHz authorized bandwidth, emissions shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general field strength limits specified in [RSS-Gen](#), whichever is less stringent. A spectrum analyzer resolution bandwidth of at least 300 Hz and in the averaging mode must be

used.

- (f) The field strength of any emission on any frequency that is removed from the centre of the authorized bandwidth by more than ± 20 kHz shall not exceed the general field strength limits specified in [RSS-Gen](#).
- (g) Carrier frequency stability shall be maintained to within $\pm 0.01\%$ (± 100 ppm).

B.9 Band 88-108 MHz

Devices shall comply with the following requirements:

- (a) The occupied bandwidth shall not exceed the 200 kHz authorized bandwidth.
- (b) The field strength of any emissions within the authorized bandwidth shall not exceed 250 $\mu\text{V/m}$ measured at 3 m with an average meter. Any type of modulation can be used.
- (c) The field strength of any emissions outside the 200 kHz authorized bandwidth or outside the band 88-108 MHz shall not exceed the general field strength limits specified in [RSS-Gen](#).
- (d) If the input signal is audio and the transmitter is frequency modulated, compliance with the above requirements shall be demonstrated by modulating the transmitter with a 2.5 kHz tone at a level 16 dB higher than the required level in order to produce a frequency deviation of 75 kHz, or 50% of the manufacturer's rated deviation, whichever is less.

B.10 Bands 902-928 MHz, 2400-2483.5 MHz and 5725-5875 MHz

Devices shall comply with the following requirements:

- (a) The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively.

The field strength limits shall be measured using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using an International Special Committee on Radio Interference (CISPR) quasi-peak detector.

- (b) Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in [RSS-Gen](#), whichever is less stringent.

The provisions of [RSS-Gen](#) regarding pulsed operation do not apply to CISPR measurement for the band 902-928 MHz.

B.11 Bands 17.15 GHz and 94 GHz

The following carrier frequencies are available for use by radar and other mobile devices.

(a) 17.15 GHz: 0.3 W e.i.r.p.

(b) 94 GHz: 0.4 W e.i.r.p.

Parameters, such as occupied bandwidth and permissible out-of-band emissions, will be evaluated on a case-by-case basis.

Annex C — Medical Telemetry, Wireless Microphones, Auditory Assistance, Goods Tracking and Law Enforcement**C.1 Bands 72-73 MHz, 74.6-74.8 MHz, and 75.2-76.0 MHz (Auditory Assistance and Wireless Microphones)**

These bands are used exclusively for auditory assistance and wireless microphones. The device shall comply with the following conditions:

- (a) The occupied bandwidth shall not exceed the 200 kHz authorized bandwidth and shall lie within each permitted band.
- (b) The field strength of any emission within the 200 kHz authorized bandwidth shall not exceed 80 mV/m measured at 3 metres with an average meter.
- (c) The field strength of any emissions on any frequency outside of the 200 kHz authorized bandwidth shall not exceed 1.5 mV/m at 3 metres measured with an average meter.

C.2 Band 216-217 MHz (Auditory Assistance, Medical Telemetry, Goods Tracking and Law Enforcement Devices)

This band is available for one-way voice and two-way data transmission for auditory assistance, medical telemetry, goods tracking and law enforcement devices. Law enforcement agencies have exclusive use of the sub-band 216.45-216.50 MHz. The sub-bands 216-216.45 and 216.50-217 MHz are permitted for any user.

All transmissions are on a no-interference, no-protection basis, especially with respect to TV channel 13 (of 210-216 MHz). However, it is advisable to avoid the band 216-216.3 MHz where TV channel 13's sound carrier image frequency is located.

The equipment shall comply with the following conditions:

- (a) The peak output power and e.i.r.p. shall not exceed 100 mW and 160 mW respectively.
- (b) The channeling plan, frequency stability limits and unwanted emission masks are given in Table C1.

Table C1 – Channel Plan, Frequency Stability and Unwanted Emission Mask for Devices Operating in the Band 216-217 MHz

Channel Spacing (kHz)	Centre Frequencies	Frequencies Stability (ppm)	Unwanted Emissions
5	215.9975+0.005n, n = 1 to 200	±1.5	Mask A
12.5	215.99375+0.0125n, n = 1 to 80	±5.0	Mask B
25	215.9875+0.025n, n = 1 to 40	±50	Mask C
50	215.975+0.05n, n = 1 to 20	±50	Mask D

- (c) The provisions of [RSS-Gen](#) for restricted frequency bands do not apply to 216-217 MHz medical telemetry devices in health care institutions. However, Innovation, Science and Economic Development Canada may, if deemed necessary, impose more attenuation than masks A to D for some restricted bands.
- (d) The power of any unwanted emissions shall be measured in peak mode with a bandwidth of at least 300 Hz. Unwanted emissions shall be attenuated below the peak transmitter output power P (dBW) in accordance with the following masks, where “ f_d ” is the difference between the channel frequency and the emission component frequency expressed in kHz, and “p” is the transmitter output power in Watts :

Mask A

- (i) $30 + 20 (f_d - 2)$ dB, or $55 + 10 \log_{10} p$ dB, or 65 dB, whichever is less stringent, for emissions at f_d that are greater than 2 kHz and less than or equal to 3.75 kHz; and
- (ii) $55 + 10 \log_{10} p$ dB, or to the general field strength limits specified in [RSS-Gen](#), whichever is less stringent, for emissions at f_d that are greater than 3.75 kHz.

Mask B

- (i) 25 dB for emissions at frequencies away from the channel centre frequency by more than 50% and less than 100% of the authorized bandwidth;
- (ii) 35 dB for emissions at frequencies away from the channel centre frequency by more than 100% and less than 250% of the authorized bandwidth; and
- (iii) $55 + 10 \log_{10} p$ dB or to the limits specified in [RSS-Gen](#), whichever is less stringent, for emissions at frequencies away from the channel centre frequency by more than 250% of the authorized bandwidth, where the authorized bandwidth is 11.25 kHz.

Mask C

- (i) 30 dB for emissions at 12.5 kHz to 22.5 kHz away from the channel centre frequency; and
- (ii) $55 + 10 \log_{10} p$ dB or to the general field strength limits specified in [RSS-Gen](#), whichever is less stringent, for emissions at frequencies greater than 22.5 kHz away from the channel centre frequency.

Mask D

- (i) 30 dB for emissions at 25 kHz to 35 kHz away from the channel centre frequency; and
- (ii) $55 + 10 \log_{10} p$ dB or to the general field strength limits specified in [RSS-Gen](#), whichever is less stringent, for emissions at frequencies more than 35 kHz away from the channel centre frequency.
- (iii) The device's user manual, in addition to the user manual requirements of [RSS-Gen](#), shall contain the following or equivalent notice:

*If TV channel 13 (210-216 MHz) is used in the area, the installer shall reduce or adjust the radio frequency radiated power so that nearby TV channel 13 receivers do not receive radio interference from the system installed. **Suggestions:** A test with a TV receiver equipped with a "rabbit-ear antenna" and tuned to channel 13 should be conducted at the perimeter of the user's intended coverage area and should not overlap other users' areas without the user's consent. If this does not resolve the problem, a channel near the 217 MHz edge and not near 216 MHz should be used.*

C.3 Band 608-614 MHz (Medical Telemetry)

Operation in this band is reserved for medical telemetry devices in hospitals and health care facilities.

The equipment shall comply with the following:

- (a) The field strength of the fundamental emissions shall not exceed 200 mV/m, measured with a quasi-peak detector (nominal 120 kHz bandwidth) at a distance of 3 m. Systems using bandwidth wider than 120 kHz are permitted to have output power proportionate to its bandwidth. Accordingly, the total maximum permissible field strength is as follows:

$$\text{field strength} = 200 \times \text{square root} (B/120), \text{ mV/m at 3 m,}$$

where: bandwidth B is measured in kHz.

Note: the full value of the field strength will not show on a quasi-peak detector because of the limited bandwidth of the detector. Details of the measurement shall be reported.

- (b) Emissions outside of the band 608-614 MHz shall not exceed the general field strength

limits specified in [RSS-Gen](#).

- (c) In addition to the user manual requirements of [RSS-Gen](#), the user manual for the device shall contain the following or equivalent notice:

Installation of this telemetry device is permitted in hospitals and health care facilities only. This device shall not be operated in mobile vehicles (including ambulances and other vehicles associated with health care facilities). The installer/user of this device shall ensure that it is at least 80 km from the Dominion Radio Astrophysical Observatory (DRAO) near Penticton, British Columbia. The coordinates of DRAO are: latitude N 49 E 19' 15", longitude W 119°37' 12". For medical telemetry systems not meeting this 80 km separation (e.g. the Okanagan Valley, British Columbia) the installer/user must coordinate with, and obtain the written concurrence of, the Director of DRAO prior to installing or operating the equipment.

C.4 Bands 1395-1400 MHz and 1427-1429.5 MHz (Medical Telemetry)

Operation in these bands is reserved for medical telemetry devices used in hospitals and health care facilities in Canada, except in the areas of Sydney, Nova Scotia, or Gander, Newfoundland and Labrador, due to possible interference from government radar operations.

Devices shall comply with the following:

- (a) A wireless medical telemetry device may transmit any emission type appropriate for communications which are related to the provision of medical care, except for video and voice. Waveforms such as electrocardiograms (ECGs) are not considered video.
- (b) The field strength shall not exceed 740 mV/m at a distance of 3 m, measured with an averaging detector and a 1 MHz bandwidth.
- (c) Out-of-band emissions below 960 MHz shall not exceed 200 μ V/m at a distance of 3 m, measured with an International Special Committee on Radio Interference (CISPR) quasi-peak detector.
- (d) Out-of-band emissions above 960 MHz shall not exceed 500 μ V/m at a distance of 3 m, measured with an averaging detector and a 1 MHz measurement bandwidth.
- (e) The emission bandwidth shall be contained within the bands of operation under all normal operating conditions, as specified in the user's manual.
- (f) In addition to the user manual requirements of [RSS-Gen](#), the user manual for the device shall conspicuously contain the following:

This equipment shall not be operated in the areas of Sydney, Nova Scotia, or Gander, Newfoundland and Labrador. Please contact your local Innovation, Science and Economic Development office for further information.

Alternatively, the notice may be printed on a separate insert to be included in the equipment packaging, which shall be highly visible upon opening the packaging.

Annex D — Radio Frequency Identification (RFID) Devices in the Band 433.5-434.5 MHz

The provisions of this annex are for Radio Frequency Identification (RFID) devices used to identify the contents of commercial shipping containers. Operation shall be limited to commercial and industrial areas such as ports, rail terminals and warehouses. Two-way operation is permitted in order to interrogate and load data into devices. Voice communication is prohibited.

Devices shall comply with the following conditions:

- (a) Devices shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than 60 seconds and be permitted only to reinitiate an interrogation in the case of transmission error. Under normal circumstances (no transmission error), the silent period between transmissions shall not be less than 10 seconds;
- (b) The field strength of any emissions radiated within the band 433.5-434.5 MHz shall not exceed 11,000 $\mu\text{V}/\text{m}$ measured at 3 m with an average detector. The peak level of any emission within this specified frequency band shall not exceed 55,000 $\mu\text{V}/\text{m}$ measured at 3 m; and
- (c) The field strength of emissions on any frequencies outside this specified band shall not exceed the general field strength limits specified in [RSS-Gen](#).

Annex E — Family Radio Service (FRS), General Mobile Radio Service (GMRS) and General Mobile Radio Service-M (GMRS-M)

E.1 Restriction

The following restrictions shall be met by equipment, unless otherwise indicated.

(a) Non-Voice Emission

(i) For FRS and GMRS (not applicable to GMRS-M)

FRS and GMRS devices are permitted to transmit non-voice emission exclusively for selective calling or tone-operated squelch to establish or continue a voice communication, digital data transmission of location information or text messaging, and is subject to the following restrictions:

- (1) An FRS or GMRS unit may transmit tones to make contact or to continue communications with a particular FRS or GMRS unit. If the tone is audible (greater than 300 Hz), it may be transmitted continuously for periods not exceeding 15 seconds at a time. If the tone is inaudible (300 Hz or less), it may be transmitted continuously only while the user is talking.
- (2) An FRS or GMRS unit may transmit digital data containing location information, or requesting location information from one or more other FRS or GMRS units, or containing a brief text message to another specific FRS or GMRS unit. Digital data transmissions must be initiated by the user using a manual action or command. However, an FRS or GMRS unit receiving an interrogation request may automatically respond with its location. Digital data transmissions shall not exceed 1 second, and shall be limited to one transmission within a 30-second period. However, an FRS or GMRS unit may automatically respond to more than one interrogation request received within a 30-second period.

(ii) For GMRS-M, a single digital data transmission from a GMRS-M device shall not exceed 250 ms, and the total digital data transmission time from an individual GMRS-M device shall not exceed 1 second within a 30-second period.

(b) The antenna of FRS devices must be an integral part of the unit.

(c) Devices shall not be designed to interconnect to public switched telephone networks (PSTNs).

(d) Devices shall not be designed to transmit data in store-and-forward packet operation mode.

(e) All frequency determining circuitry, including crystals and programming controls, must be internal to the transmitter and made inaccessible to the user from the exterior of the unit.

- (f) GMRS-M devices shall not be designed in the continuous carrier transmit mode.

E.2 Family Radio Service (FRS) Devices**E.2.1 Channel Frequencies**

The 14 simplex channel carrier frequencies for use in the FRS are provided in Table E1.

Table E1 — Channel Carrier Frequencies

Channel	Channel Carrier Frequency (MHz)
1	462.5625
2	462.5875
3	462.6125
4	462.6375
5	462.6625
6	462.6875
7	462.7125
8	467.5625
9	467.5875
10	467.6125
11	467.6375
12	467.6625
13	467.6875
14	467.7125

E.2.2 Emission Types and Modulation Requirements

FRS devices shall transmit only emission types F3E, F1D and F2D.

The peak frequency deviation shall not exceed ± 2.5 kHz. The limiter shall be followed by a low-pass filter to remove unwanted harmonic emissions.

E.2.3 Authorized Bandwidth

The authorized bandwidth for an FRS unit is 12.5 kHz.

E.2.4 Transmitter Output Power and Effective Radiated Power (e.r.p)

Transmitter output power shall be measured as average carrier power during one unmodulated cycle.

The maximum permissible transmitted ERP of the equipment under any operating conditions shall not exceed 0.5 W.

E.2.5 Unwanted Emissions

Unwanted emissions shall be attenuated below the transmitter power in accordance with the following conditions:

- (a) 25 dB, measured with a bandwidth of 300 Hz, in the band 6.25 kHz to 12.5 kHz removed from the channel centre frequency;
- (b) 35 dB, measured with a bandwidth of 300 Hz, in the band 12.5 kHz to 31.25 kHz removed from the channel centre frequency; and
- (c) $43 \text{ dB} + 10 \log_{10}(\text{transmitter power in watts}) \text{ dB}$, measured with a bandwidth of 30 kHz for frequencies beyond 31.25 kHz removed from the channel centre frequency.

Unwanted emissions falling within the restricted bands of [RSS-Gen](#) shall be attenuated to the limits provided in this section or to the general field strength limits shown in [RSS-Gen](#), whichever are less stringent.

E.2.6 Frequency Stability

The carrier frequency stability shall be better than ± 5 ppm.

E.3 General Mobile Radio Service (GMRS) Devices**E.3.1 Channel Frequencies**

The 15 simplex channel carrier frequencies for GMRS devices are given in Table E2.

Table E2 — Channeling Plan for GMRS Devices

Channel	Channel Carrier Frequency (MHz)
1	462.5500
2	462.5625
3	462.5750
4	462.5875
5	462.6000
6	462.6125
7	462.6250
8	462.6375
9	462.6500
10	462.6625
11	462.6750
12	462.6875
13	462.7000
14	462.7125
15	462.7250

E.3.2 Emission Types and Modulation Requirements

GMRS transmitters are permitted to transmit only the following emission types: A1D, F1D, G1D, H1D, J1D, R1D, A3E, F3E, G3E, H3E, J3E, R3E or F2D.

For emission types F1D, G1D, G3E, F3E or F2D, the peak frequency deviation shall not exceed ± 5 kHz.

For emission type A3E, the modulation shall be greater than 85% and shall not exceed 100%. For all other amplitude modulation, the modulation shall not exceed 100%.

E.3.3 Audio Frequency Filter

GMRS transmitters shall include an audio frequency low-pass filter, unless they comply with the emission masks without filter in Section E.3.6. The filter must be between the modulation limiter and the modulated stage of the transmitter and its attenuation shall comply with the limits in Table E3.

Table E3 — Audio Frequency Filter Attenuation for GMRS Devices

Frequency, f (kHz)	Attenuation Greater Than the Attenuation at 1 kHz (dB)
$3 \leq f \leq 20$	$60 \log_{10}(f/3)$
$f > 20$	50

E.3.4 Authorized Bandwidth

The authorized bandwidth is 4 kHz for emission types H1D, J1D, R1D, H3E, J3E and R3E; 8 kHz for emission types A1D and A3E; and 20 kHz for emission types F1D, G1D, F3E, G3E and F2D.

E.3.5 Transmitter Output Power and ERP

Transmitter output power shall be measured as average carrier power during one unmodulated cycle when transmitting emission type A1D, F1D, G1D, A3E, F3E, G3E, or F2D and as peak envelope power transmitting emission type H1D, J1D, R1D, H3E, J3E, or R3E.

A GMRS transmitter ERP shall not exceed 2.0 W.

E.3.6 Unwanted Emissions

Unwanted emissions falling within the restricted bands of [RSS-Gen](#) shall be attenuated to the limits provided in this section or to the general field strength limits specified in [RSS-Gen](#), whichever is less stringent.

Unwanted emissions shall be attenuated below the transmitter output power in accordance with the following where “ f_d ” is the difference between the channel frequency and the emission component frequency expressed in kHz and “ p ” is the transmitter output power in Watts.

- (a) For emission types A1D, A3E, F1D, G1D, F3E, G3E and F2D with filtering:

- (i) 25 dB, measured with a bandwidth of 300 Hz, on any frequency removed from the centre frequency of the authorized bandwidth by more than 50%, up to and including 100% of the authorized bandwidth;
 - (ii) 35 dB, measured with a bandwidth of 300 Hz, on any frequency removed from the centre frequency of the authorized bandwidth by more than 100%, up to and including 250% of the authorized bandwidth; and
 - (iii) $43 \text{ dB} + 10 \log_{10} p \text{ dB}$, measured with a bandwidth of at least 30 kHz, on any frequency removed from the centre frequency of the authorized bandwidth by more than 250% of the authorized bandwidth.
- (b) For emission types A1D, A3E, F1D, G1D, F3E, G3E and F2D without filtering:
- (i) $83 \log_{10}(f_d/5) \text{ dB}$, measured with a bandwidth of 300 Hz, on any frequency removed from the centre frequency of the authorized bandwidth by a displacement frequency f_d of more than 5 kHz, up to and including 10 kHz;
 - (ii) $116 \log_{10}(f_d/6.1) \text{ dB}$, measured with a bandwidth of 300 Hz, or $50 + 10 \log_{10} p \text{ dB}$ on any frequency removed from the centre of the authorized bandwidth by a displacement frequency f_d of more than 10 kHz, up to and including 250% of the authorized bandwidth; whichever is less stringent; and
 - (iii) $43 \text{ dB} + 10 \log_{10} p \text{ dB}$, measured with a bandwidth of at least 30 kHz, on any frequency removed from the centre frequency of the authorized bandwidth by more than 250% of the authorized bandwidth.
- (c) For emission types H1D, J1D, R1D, H3E, J3E and R3E:
- (i) 25 dB, measured with a bandwidth of 300 Hz, on any frequency removed from the centre frequency of the authorized bandwidth by more than 50%, up to and including 150% of the authorized bandwidth;
 - (ii) 35 dB, measured with a bandwidth of 300 Hz, on any frequency removed from the centre frequency of the authorized bandwidth by more than 150%, up to and including 250% of the authorized bandwidth; and
 - (iii) $43 \text{ dB} + 10 \log_{10} p \text{ dB}$, measured with a bandwidth of at least 30 kHz, on any frequency removed from the centre frequency of the authorized bandwidth by more than 250% of the authorized bandwidth.

E.3.7 Frequency Stability

The carrier frequency stability shall be better than ± 5 ppm.

E.4 General Mobile Radio Service-M (GMRS-M) Devices

E.4.1 Channel Frequencies

The following 5 channel carrier frequencies which are shared with GMRS/FRS are available for GMRS-M operation:

Table E4 — Channel Frequencies for GMRS-M Devices

Channel	Channel Carrier Frequency (MHz)
1	462.5500
2	462.6125
3	462.6375
4	462.6625
5	462.6875

E.4.2 Listen-Before-Talk

GMRS-M devices shall employ a Listen-Before-Talk (LBT) mechanism to detect the presence of any emission on the channel it intends to occupy. If an emission is present the GMRS-M device shall not transmit.

GMRS-M devices may utilize a protocol which enables it to automatically select any 1 of the 5 available GMRS-M channels; however, the device shall only be capable of transmitting on one channel at any given time.

E.4.3 Emission Types and Modulation Requirements

GMRS-M devices are permitted to transmit only the following emission types: A1D, A2B, A2D, A3E, F1D, F2B, F2D, F3E, and G3E. Simultaneous amplitude modulation and frequency or phase modulation of a transmitter are not required.

For emission types F1D, F2B, F2D, or F3E, the peak frequency deviation shall not exceed ± 5 kHz.

For emission type A3E, the modulation shall be greater than 85% and shall not exceed 100%. For all other amplitude modulation, the modulation shall not exceed 100%.

E.4.4 Audio Frequency Filter

GMRS-M devices shall comply with the requirement of employing audio frequency filter in Section E.3.4.

E.4.5 Authorized Bandwidth

The authorized bandwidth is 8 kHz for emission types A1D, A2B, A2D, and A3E; 20 kHz for emission types F1D, F2B, F2D, F3E, and G3E.

E.4.6 Transmitter Output Power and ERP

Transmitter output power shall be measured as average carrier power during one unmodulated cycle.

A GMRS-M transmitter ERP shall not exceed 2.0 W.

E.4.7 Transmitter Unwanted Emissions

Unwanted emissions falling within the restricted bands of [RSS-Gen](#) shall be attenuated to the limits provided in this section or to the general field strength limits specified in [RSS-Gen](#), whichever is less stringent.

Unwanted emissions shall be attenuated below the transmitter output power in accordance with the following where “ f_d ” is the difference between the channel frequency and the emission component frequency expressed in kHz and “ p ” is the transmitter output power in Watts:

- (a) For emission types A1D, A2B, A2D, A3E, F1D, F2B, F2D, F3E and G3E with filtering:
 - (i) 25 dB, measured with a bandwidth of 300 Hz, on any frequency removed from the centre frequency of the authorized bandwidth by more than 50%, up to and including 100% of the authorized bandwidth;
 - (ii) 35 dB, measured with a bandwidth of 300 Hz, on any frequency removed from the centre frequency of the authorized bandwidth by more than 100%, up to and including 250% of the authorized bandwidth; and
 - (iii) $43 \text{ dB} + 10 \log_{10} p \text{ dB}$, measured with a bandwidth of at least 30 kHz, on any frequency removed from the centre frequency of the authorized bandwidth by more than 250% of the authorized bandwidth.
- (b) For emission types A1D, A2B, A2D, A3E, F1D, F2B, F2D, F3E and G3E without filtering:
 - (i) $83 \log_{10}(f_d/5) \text{ dB}$, measured with a bandwidth of 300 Hz, on any frequency removed from the centre frequency of the authorized bandwidth by a displacement frequency f_d of more than 5 kHz, up to and including 10 kHz;
 - (ii) $116 \log_{10}(f_d/6.1) \text{ dB}$, measured with a bandwidth of 300 Hz, or $50 + 10 \log_{10} p \text{ dB}$ on any frequency removed from the centre of the authorized bandwidth by a displacement frequency f_d of more than 10 kHz, up to and including 250% of the authorized bandwidth; whichever is less stringent; and
 - (iii) $43 \text{ dB} + 10 \log_{10} p \text{ dB}$, measured with a bandwidth of at least 30 kHz, on any frequency removed from the centre frequency of the authorized bandwidth by more than 250% of the authorized bandwidth.

E.4.8 Transmitter Frequency Stability

The carrier frequency stability shall not exceed ± 5 ppm.

Annex F — Devices Operating in the Bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10.5-10.55 GHz, 24.075-24.175 GHz and 33.4-36 GHz

F.1 Field Disturbance Sensors

This section sets out requirements for field disturbance sensors operating in the frequency bands shown in Table F1.

Perimeter protection systems, which employ a leaky transmission line as the radiating source, are excluded from the requirements of this annex.

The equipment shall comply with the following emission limits:

- (a) The average field strength measured at 3 m shall not exceed the limits shown in Table F1:

Table F1 — Field Strengths for Field Disturbance Sensors Operating at Different Frequencies

Fundamental Frequencies (MHz)	Field Strength (mV/m)	
	Fundamental Emissions	Harmonic Emissions
902-928	500	1.6
2435-2465	500	1.6
5785-5815	500	1.6
10500-10550	2500	25
24075-24175	2500	25

- (b) Additionally, harmonic emissions falling into restricted bands listed in [RSS-Gen](#), and which are below 17.7 GHz shall meet the general field strength limits specified in [RSS-Gen](#).
- (c) Harmonic emissions falling into restricted bands listed in [RSS-Gen](#) and which are at and above 17.7 GHz shall not exceed the following field strength limits measured at a distance of 3 m:
- (i) 25 mV/m for the second and third harmonic emissions of field disturbance sensors operating in the band 24075-24175 MHz and for devices designed for use only within buildings or for intermittent use, such as to open building doors; and
- (ii) 7.5 mV/m for all other devices.
- (d) Field disturbance sensors designed to be used in motor vehicles or aircraft must include features to prevent continuous operation, unless their emissions in the restricted bands

as listed in [RSS-Gen](#), other than the second and third harmonic emissions from devices operating in the band 24075-24175 MHz, comply with the general field strength limits specified in [RSS-Gen](#).

Continuous operation of field disturbance sensors designed to be used in farm equipment (i.e. fork lifts that are intended primarily for use indoors or for very specialized operations), or railroad locomotives, railroad cars, and other equipment which travel on fixed tracks, is permitted. A field disturbance sensor is considered not to be operating in a continuous mode if its operation is limited to specific activities of limited duration (e.g. putting a vehicle into reverse gear, activating a turn signal, etc.).

- (e) Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits specified in [RSS-Gen](#), whichever is less stringent.

F.2 Speed Radar Meters

This section sets out requirements for speed radar meters operating in the frequency bands 10.5-10.55 GHz, 24.075-24.175 GHz and 33.4-36 GHz.

F.2.1 Radiated Emissions

The average field strength of emissions measured at 3m shall not exceed:

- (a) 2500 mV/m for fundamental emissions for devices operating in all frequency bands; and
- (b) 25 mV/m for harmonic emissions for devices operating in the bands 10.5-10.55 GHz, 24.075-24.175 GHz and 80 mV/m for harmonic emissions for devices operating in the band 33.4-36 GHz.

Harmonic emissions falling into restricted bands listed in [RSS-Gen](#) and which are below 17.7 GHz shall meet the general field strength limits specified in [RSS-Gen](#).

Harmonic emissions falling into restricted bands listed in [RSS-Gen](#) and which are at and above 17.7 GHz shall not exceed the following strength limits measured at a distance of 3 m:

- (a) 25 mV/m for the second and third harmonic emissions of devices operating in the band 24.075-24.175 GHz and for the second harmonic emission of devices operating in the band 33.4-36.0 GHz; and
- (b) 7.5 mV/m for all other devices.

Emissions radiated outside of these specified operating frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits specified in [RSS-Gen](#), whichever is less stringent.

F.2.2 Frequency Stability

The frequency stability shall be sufficient to ensure that the 40 dB bandwidth stays within the operating frequency band when tested at the temperature and supply voltage variations specified the frequency stability measurement in [RSS-Gen](#).

Annex G — Low-Power Radio Apparatus Operating in the Television Bands

This annex sets out the technical requirements for low power radio apparatus operating in the 54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-698 MHz^{Note} frequency bands.

Low-power radio apparatus refers to wireless microphones, cue and control communications and synchronization of video camera signals.

G.1 User Manual

The following text shall be included in the equipment's user manual:

This device operates on a no-protection, no-interference basis. Should the user seek to obtain protection from other radio services operating in the same TV bands, a radio licence is required. For further details, consult Innovation, Science and Economic Development Canada's document Client Procedures Circular CPC-2-1-28, [Voluntary Licensing of Licence-Exempt Low-Power Radio Apparatus in the TV Bands](#).

G.2 Measurement Method

In conjunction with the measurement method described in [RSS-Gen](#) for the measurement of the output power, the measurement method described in ETSI EN 300 422-1 shall be used.

G.3 Transmitter and Receiver Standard Specifications

G.3.1 Frequency Band, Transmit Power, Authorized Bandwidth and Frequency Stability

The transmit power shall be measured in average value (p_{MEAN}) as a conducted emission over any period of continuous transmission.

The frequency bands, transmit power, authorized bandwidths and frequency stability limits are provided in Table G1.

Table G1 — Specification for Low-Power Radio Apparatus

Frequency Bands (MHz)	Transmit e.i.r.p. (mW)	Authorized Bandwidth (kHz)	Frequency Stability (ppm)
54-72 76-88 174-216	50	200	± 50
470-608 614-698 ^{Note}	250	200	± 50

Note: Effective May 25, 2018, the Department will no longer accept applications for the certification of new low-power apparatus that operate in the bands 617-652 MHz and 663-698 MHz. Furthermore, as of November 15, 2018, no low-power apparatus in the bands 617-652 MHz and 663-698 MHz may be sold, offered for sale, manufactured, imported, distributed or leased on the Canadian market.

G.3.2 Occupied Bandwidth

The occupied bandwidth for low-power radio apparatus shall not exceed the authorized bandwidth specified in Table G1.

G.3.3 Transmitter Frequency Stability

The frequency stability of equipment shall comply with the limits specified in Table G1, when tested under the frequency stability testing condition specified in [RSS-Gen](#).

G.3.4 Transmitter Unwanted Emissions

The transmitter unwanted emissions shall meet the requirements in sections 8.3 and 8.4 of ETSI EN 300 422-1 v1.4.2 (2011-08), [Electromagnetic compatibility and radio spectrum matters \(ERM\); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement](#).

G.3.5 Modulation

The devices may employ any type of modulation. The type of modulation used shall be recorded in the test report.

G.3.5.1 Amplitude Modulation

Equipment employing amplitude modulation (AM) shall have a modulation index that does not exceed 100%.

G.3.5.2 Frequency Modulation

Equipment employing frequency measurement (FM) modulation shall have a frequency deviation that does not exceed ± 75 kHz.

Annex H — Vehicle Identification

This annex sets out the technical requirements for automatic vehicle identification systems (AVIS) which employ swept frequency techniques to automatically identify transportation vehicles (cars, trucks or train). The devices shall operate in the frequency bands 2900-3260 MHz, 3267-3332 MHz, 3339-3345.8 MHz and 3358-3600 MHz and shall comply with the following conditions:

- (a) The field strength in the antenna main beam shall not exceed 3 mV/m/MHz bandwidth, measured at 3 m using an average detector;
- (b) The AVIS shall employ a horn antenna or other comparable directional antenna pointing upwards to attenuate the radio frequency field in the horizontal direction. The field strength shall not be greater than 400 μ V/m/MHz at 3 m in any direction within ± 10 degrees of the horizontal plane of the antenna;
- (c) The user manual shall provide proper installation instructions to comply with this requirement. A copy of the installation instructions shall be included with equipment certification application;
- (d) The field strength of emissions falling into the restricted bands listed in RSS-Gen shall meet the general field strength limits specified in RSS-Gen. The field strength of emissions outside the frequency range swept by the signal shall not exceed 100 μ V/m/MHz measured at 3 m using an average detector;
- (e) The signal sweep rate shall be between 4,000 and 50,000 sweeps per second;
- (f) Signal emission from the AVIS shall only occur when the vehicle to be identified is within the radiated field of the system; and
- (g) In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to 20 GHz.

Note: The sub-band 3500-3600 MHz is within the restricted bands of [RSS-Gen](#), and Innovation, Science and Economic Development Canada may impose further restrictions if necessary.

Annex I — Fixed Point-to-Point Systems in the Band 24.05-24.25 GHz

This annex sets out technical requirements for fixed point-to-point systems operating in the frequency band 24.05-24.25 GHz. Fixed point-to-point operation is limited to systems employing a fixed transmitter that transmits to a fixed location. Point-to-multipoint systems, omnidirectional applications and multiple co-located transmitters transmitting the same information are prohibited.

Note: Devices operating in band 24.0-24.25 GHz with a field strength not exceeding 250 mV/m at 3 m are classified as Category II, the requirements of which are found in [RSS-310](#).

Equipment shall comply with the following:

- (a) The field strength of emissions in this band shall not exceed 25 V/m measured at a distance of 3 m. The power delivered to the antenna shall not exceed 1 mW;
- (b) The carrier frequency is maintained within a tolerance of $\pm 0.001\%$;
- (c) The antenna gain must be at least 33 dBi. Alternatively, the beam width of the main lobe shall not exceed 3.5 degrees in the azimuth and elevation planes. For antenna gains greater than 53 dBi, the output power must be reduced as necessary, such that the field strength limit is not exceeded;
- (d) Except for harmonic emissions, out-of-band emissions shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits specified in [RSS-Gen](#), whichever is less stringent. Harmonic emissions shall not exceed 2.5 mV/m measured at 3 m; and
- (e) The field strength limit in (a) of this section is based on average limit. However, the peak field strength shall not exceed 25 V/m measured at 3 m along the antenna boresight.

Annex J — Devices Operating in the Band 57-64 GHz

J.1 General Restrictions

Operation within the band 57-64 GHz is not permitted for the following products:

- (a) Equipment used on aircraft or satellites; and
- (b) Field disturbance sensors, including vehicle radar systems, unless the field disturbance sensors are employed for fixed operation. For the purposes of this section, reference to fixed operation includes field disturbance sensors installed in fixed equipment, even if the sensor itself moves within the equipment.

Equipment designed to operate outdoors shall not be marketed and operated with antennas other than those are listed in the certification application with which the equipment is certified.

J.2 Limits of Radiated Emissions Within the Band 57-64 GHz

Within the band 57-64 GHz, the power of any emissions, measured during in the transmit interval, shall comply with the e.i.r.p. limits in this section.

For the purpose of this standard, the terms “average e.i.r.p.” and “peak e.i.r.p.” refer to e.i.r.p. with transmitter output power measured in terms of average value or peak value respectively.

J.2.1 Fixed Field Disturbance Sensor

Following are the conditions for fixed field disturbance sensors:

- (a) For fixed field disturbance sensors that occupy a bandwidth of 500 MHz or less and for which the bandwidth is contained wholly within the frequency band 61.0-61.5 GHz, the average and peak e.i.r.p. of any emission shall not exceed 40 dBm and 43 dBm respectively.
- (b) In addition, the average and peak e.i.r.p. of any emission outside of the band 61.0-61.5 GHz but still within the band 57-64 GHz, shall not exceed 10 dBm and 13 dBm respectively.
- (c) For fixed field disturbance sensors other than those operating under the provisions of (a) above, the peak transmitter output power shall not exceed -10 dBm, and the peak e.i.r.p. shall not exceed 10 dBm.

J.2.2 Devices Other Than Fixed Field Disturbance Sensors

For devices located outdoors, the average e.i.r.p. of any emission shall not exceed 82 dBm minus 2 dB for every dB for which the antenna gain is less than 51 dBi. The peak e.i.r.p. of any emission shall not exceed 85 dBm minus 2 dB for every dB that the antenna gain is less than 51 dBi. Compliance testing shall be performed using the highest gain and the lowest gain antennas with which the equipment is certified.

For other devices, the average and peak e.i.r.p., of any emission shall not exceed 40 dBm and 43 dBm, respectively.

J.3 Spurious Emissions

Following are the conditions for spurious emissions:

- (a) The power of any emissions outside the band 57-64 GHz shall consist solely of spurious emissions and shall not exceed:
 - (i) the general field strength limits specified in [RSS-Gen](#) for emissions below 40 GHz; and
 - (ii) 90 pW/cm^2 at a distance of 3 m for emissions between 40 GHz and 200 GHz;
- (b) The levels of spurious emissions shall not exceed fundamental emission levels.

J.4 Peak Transmitter Output Power

Following are the conditions for peak transmitter output power:

- (a) For devices with an emission bandwidth greater than or equal to 100 MHz, the peak transmitter output power shall not exceed 500 mW. For devices with an emission bandwidth less than 100 MHz, the peak transmitter output power shall be less than the product of 500 mW times their emission bandwidth divided by 100 MHz.
- (b) For the purposes of demonstrating compliance with this RSS, corrections to the transmitter output power may be made to compensate for antenna and circuit loss.
- (c) For the purpose of this standard, emission bandwidth is defined as the instantaneous frequency range occupied by a steady radiated signal with modulation, outside which the radiated power spectral density shall be 6 dB below the maximum radiated power spectral density in the band, as measured with a 100 kHz resolution bandwidth. The center frequency must be stationary during the measurement interval, even if not stationary normally.

J.5 Measurement Requirements

Following are the measurement requirements for emissions:

- (a) Emissions shall be measured to the fifth harmonic emission of the highest operating frequency or up to 200 GHz, whichever is lower.
- (b) Peak power density and peak transmitter output power shall be measured with a radio frequency (RF) detector that has a detection bandwidth encompassing the band 57-64 GHz and a video bandwidth of at least 10 MHz, or using an equivalent measurement method.
- (c) Conducted measurement for emissions above 40 GHz will be permitted provided the

antenna characteristics can be determined accurately.

- (d) The average emission limits shall be calculated based on the measured peak levels over the time period during which transmission occurs.

J.6 Frequency Stability

Fundamental emissions shall be contained within the frequency bands specified in this section during all conditions of operation.

J.7 Group Installations

Any transmitter that is certified under this RSS may be mounted in a group installation for simultaneous operation with one or more certified transmitters, without any additional equipment authorization. However, no transmitter operating under the provisions of this section shall be equipped with external phase-locking inputs that permit beam-forming arrays to be realized.

Annex K — Wideband Devices Operating Within the Band 5925-7250 MHz

This annex applies to wideband devices operating in the band 5925-7250 MHz.

The provisions of this annex are not applicable to ultra-wideband (UWB) devices, which shall comply with Radio Standards Specification RSS-220, [Devices Using Ultra-Wideband \(UWB\) Technology](#).

K.1 Prohibitions on Use

Devices subject to this annex are not permitted for operation onboard aircraft or satellites and shall also not be used for operating toys.

The use of a fixed outdoor infrastructure, including antennas mounted on outdoor structures such as poles or buildings, is not permitted, except for operation onboard ships or land vehicles.

K.2 Specifications

K.2.1 Bandwidth

Following are the requirements for bandwidth measurements:

- (a) The 10 dB bandwidth of the device shall be within the band 5925-7250 MHz under all conditions of operation, including the effects from stepped frequency, frequency hopping or other modulation techniques that may be employed, as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage.
- (b) The 10 dB bandwidth of the device shall be at least 50 MHz. For transmitters that employ frequency hopping, stepped frequency or similar modulation types, measurement of the 10 dB bandwidth specified in this paragraph shall be made with the frequency hop or step function disabled, and with the transmitter operating continuously at a frequency chosen in accordance with the provisions of [RSS-Gen](#) for determining measurement frequencies.

K.2.2 Limits of Radiated Emissions

Transmitter radiated emissions shall comply with the following e.i.r.p. limits:

- (a) The e.i.r.p. of radiated emissions above 960 MHz shall not exceed the limits in Table K1, and shall be measured using root-mean-square (RMS) average detector and a 1 MHz resolution bandwidth:

Table K1 — Radiated Emissions for Wideband Devices Operating in the Band 5925-7250 MHz

Frequency (MHz)	e.i.r.p. (dBm)
960-1610	-75.3
1610-1990	-63.3
1990-3100	-61.3
3100-5925	-51.3
5925-7250	-41.3
7250-10600	-51.3
Above 10600	-61.3

- (b) In addition to the radiated emission limits specified in Table K1, the transmitters' e.i.r.p. shall not exceed the RMS average limits specified in Table K2 when measured using a resolution bandwidth of no less than 1 kHz.

Table K2 — Additional e.i.r.p. Limits for Wideband Devices Operating in the Band 5925-7250 MHz

Frequency (MHz)	e.i.r.p. (dBm)
1164-1240	-85.3
1559-1610	-85.3

- (c) In a 50 MHz bandwidth contained within the band 5925-7250 MHz and centred on the frequency at which the highest radiated emission level occurs, the peak e.i.r.p. level of the emissions in this 50 MHz bandwidth shall not exceed $20 \log(\text{RBW}/50)$ dBm, where "RBW" is the resolution bandwidth in MHz that is employed by the measurement instrument. The RBW shall not be lower than 1 MHz or greater than 50 MHz. The video bandwidth of the measurement instrument shall not be less than the RBW. If the RBW is greater than 3 MHz, the application for certification shall contain a detailed description of the test procedure, calibration of the test setup, and the instrumentation employed during testing.
- (d) Radiated emissions at or below 960 MHz shall not exceed the emission levels in [RSS-Gen](#).
- (e) Emissions from associated digital circuits used to control additional functions or capabilities other than the operation of the transmitter shall not be employed in determining the 10 dB bandwidth of the fundamental emissions or the frequency at which the highest emission level occurs. Those emissions shall meet the general field strength limits specified in [RSS-Gen](#).
- (f) Emissions from digital circuitry used exclusively for enabling the operation of the wide band transmitter and which does not control additional functions or capabilities may comply with the general field strength limits specified in [RSS-Gen](#), provided it can be clearly demonstrated that those emissions are due solely to emissions from digital

circuitry contained within the device, and that the emissions are not intended to be radiated from the device's antenna.

K.3 Measurement Procedures

Following are the procedures for measuring peak emission levels:

- (a) All emissions at or below 960 MHz are based on measurements employing an International Special Committee on Radio Interference (CISPR) quasi-peak detector. Unless otherwise specified, all RMS average emission levels specified in this section shall be measured using a 1 MHz resolution bandwidth with a 1 ms dwell over each 1 MHz segment. The frequency span of the analyzer should equal the number of sampling bins multiplied by 1 MHz, and the sweep rate of the analyzer should equal the number of sampling bins multiplied by 1 ms. The provisions outlined in the Pulsed Operation section of [RSS-Gen](#) that allow emissions to be averaged over a period of 100 ms do not apply to devices covered by this annex. The video bandwidth of the measurement instrument shall not be less than the resolution bandwidth, and trace averaging shall not be employed. The RMS average emission measurement shall be repeated over multiple sweeps, with the analyzer set for maximum hold until the amplitude stabilizes.
- (b) The peak emission level measurement shall be repeated over multiple sweeps, with the analyzer set for maximum hold until the amplitude stabilizes.
- (c) For transmitters that employ frequency hopping, stepped frequency or similar modulation types, the peak emission level measurement, the RMS average emission levels, and the frequency at which the highest level emission occurs shall be made with the frequency hop or step function active. Gated signals may be measured with the gating active. For transmitters that employ swept frequency modulation, measurements shall be made with the frequency sweep stopped at the measurement frequencies chosen according to the provisions of [RSS-Gen](#).
- (d) The 10 dB bandwidth is based on measurement using a peak detector, a 1 MHz resolution bandwidth and a video bandwidth greater than or equal to the resolution bandwidth.
- (e) Alternative measurement procedures may be considered by the Department.