



Spectrum Management and Telecommunications

Radio Standards Specification

Equipment Operating in the Frequency Bands 617-652 MHz, 663-698 MHz, 698-756 MHz and 777-787 MHz

Preface

Radio Standards Specification 130, issue 2, *Equipment Operating in the Frequency Bands 617-652 MHz, 663-698 MHz, 698-756 MHz and 777-787 MHz*, replaces RSS-130, issue 1, *Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz*, dated October 2013.

Changes are listed below:

- Add the frequency bands 617-652 MHz and 663-698 MHz and the related requirements to the standard.
- Add a provision for a transition period regarding RSS-130 issue 1.
- Change equipment's equivalent isotropically radiated power (e.i.r.p.) to effective radiated power (e.r.p.).
- Clarify that the equipment's unwanted emission limit shall be met at the highest and lowest frequency of the frequency block range that contains the equipment operating frequencies.
- Clarify that equipment's measurement shall be performed only with the carrier frequency set at the lowest frequency and highest frequency in each frequency bands.
- Add guidance on determining the occupied bandwidth when measuring frequency stability limits for equipment able to transmit numerous channels simultaneously.
- Remove measurement section on multiple antennas since the measurement method is defined in ANSI C63.26, [*American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Service*](#) (referenced in RSS-Gen, [*General Requirements for Compliance of Radio Apparatus*](#)).

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

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1. Scope

This Radio Standard Specification (RSS) sets out certification requirements for all equipment operating in the frequency bands 617-652 MHz, 663-698 MHz, 698-756 MHz and 777-787 MHz.

2. Transition period

This document will be in force upon publication on Innovation, Science and Economic Development Canada's (ISED) website. However, a transition period of six (6) months following its publication will be provided, within which certification under RSS-130, issue 1, or issue 2, will be accepted. After this period, only applications for certification of equipment under RSS-130, issue 2, will be accepted and equipment manufactured, imported, distributed, leased, offered for sale, or sold in Canada, shall comply with this issue.

A copy of RSS-130, issue 1, may be requested by [email](#).

3. General information and requirements

3.1 Certification

Equipment covered by this standard is classified as Category I equipment and requires a technical acceptance certificate (TAC) issued by ISED's [Certification and Engineering Bureau](#) (CEB), or a certificate issued by a recognized certification body (CB).

3.2 Licensing requirements

Equipment covered by this standard is subject to licensing pursuant to subsection 4(1) of the [Radiocommunication Act](#).

3.3 RSS-Gen compliance

RSS-130 shall be used in conjunction with RSS-Gen, [General Requirements for Compliance of Radio Apparatus](#), for general specifications and information relevant to the equipment covered by this standard.

3.4 Related documents

ISED documents are available on the [Official publications](#) section of the Spectrum Management and Telecommunications website.

The following document should be consulted in conjunction with this RSS:

SRSP-518 [Technical Requirements in the Bands 617-652 MHz, 663-698 MHz, 698-756 MHz and 777-787 MHz](#)

3.5 Definitions

Equipment operating frequency range is the range of frequencies that the equipment is designed to operate.

Fixed subscriber equipment is fixed equipment that provides connectivity between the user's equipment and base station equipment. Fixed subscriber equipment is used at a fixed point and is not operational while in motion.

Frequency band is the frequency range assigned for the service to be provided by the equipment (e.g. 617-652 MHz, 663-698 MHz, etc.)

Frequency block range is the range of each group of frequency block(s) that contains the equipment's operating frequency range.

Mobile equipment is equipment that is designed for use while in motion as well as during halts at unspecified points in which the radiating antenna is at least 20 cm apart from the human body.

Portable equipment is equipment with an embedded radiating antenna having direct contact with or within 20 cm of the human body.

4. Transmitter standard specifications

4.1 General

Measurement shall be performed with the equipment's carrier frequency set at the highest settable frequency and at the lowest settable frequency permitted by the design of the equipment in each frequency block range.

4.2 Types of modulation

Equipment certified under this standard shall employ digital modulation.

4.3 Frequency block

The frequency bands 617-652 MHz, 663-698 MHz, 698-756 MHz and 777-787 MHz are divided into small frequency blocks as per [SRSP-518](#). Equipment shall operate according to the frequency plan given in the SRSP.

4.4 Interoperability requirement

Mobile and portable stations in the bands 617-652 MHz and 663-698 MHz must be capable of operating on all frequencies in these bands.

4.5 Transmitter frequency stability

For equipment that is capable of transmitting numerous channels simultaneously for different applications (e.g. LTE and narrowband – internet of things (IoT)), the occupied bandwidth shall be the bandwidth representing the sum of the occupied bandwidths of these channels.

The frequency stability shall be sufficient to ensure that the occupied bandwidth remains within each frequency block range when tested at the temperature and supply voltage variations specified in RSS-Gen.

4.6 Transmitter output power and effective radiated power (e.r.p.)

4.6.1 General

The transmitter output power shall be measured in terms of average power. In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

4.6.2 Frequency bands 617-652 MHz and 663-698 MHz

The e.r.p. shall not exceed 3 watts for mobile equipment, fixed subscriber equipment and portable equipment.

For base and fixed equipment other than fixed subscriber equipment, refer to SRSP-518 for the equivalent isotropically radiated power (e.i.r.p.) limits.

4.6.3 Frequency bands 698-756 MHz and 777-787 MHz

The e.r.p. shall not exceed 30 watts for mobile equipment and outdoor fixed subscriber equipment. The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment.

For base and fixed equipment other than fixed subscriber equipment, refer to SRSP-518 for the e.i.r.p. limits.

4.7 Transmitter unwanted emissions

4.7.1 General unwanted emissions limits

The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

4.7.2 Additional unwanted emissions limits

In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:

- a) The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:
 - (i) $76 + 10 \log_{10} p$ (watts), dB, for base and fixed equipment, and
 - (ii) $65 + 10 \log_{10} p$ (watts), dB, for mobile and portable equipment.
- b) The e.i.r.p. in the band 1559-1610 MHz shall not exceed -70 dBW/MHz for wideband signal and -80 dBW for discrete emission with bandwidth less than 700 Hz.



Spectrum Management and Telecommunications

Radio Standards Specification

Point-to-Multipoint Broadband Equipment Operating in the Band 512-608 MHz for Rural Remote Broadband Systems (RRBS) (TV Channels 21 to 36)

Note: a moratorium on new applications for licensing RRBS is in place (see [Consultation on Repurposing the 600 MHz Band](#))

Aussi disponible en français – CNR-196

Preface

Radio Standards Specification 196 (RSS-196), issue 2, *Point-to-Multipoint Broadband Equipment Operating in the Band 512-608 MHz for Rural Remote Broadband Systems (RRBS) (TV Channels 21 to 36)*, replaces RSS-196, issue 1, *Point-to-Multipoint Broadband Equipment Operating in the Bands 512-608 and 614-698 MHz for Rural Remote Broadband Systems (RRBS) (TV Channels 21 to 51)* dated March 2010.

Changes are listed below:

- Remove the band 614-698 MHz as per the policy decision in the document SLPB-004-15, [Decision on Repurposing the 600 MHz Band](#).
- Remove the section on receiver spurious emission as it is covered in RSS-Gen, [General Requirements for Compliance of Radio Apparatus](#).
- Refer to RSS-Gen instead of RSS-210, [Licence-Exempt Radio Apparatus: Category I Equipment](#), for the general field strength limit.

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1. Scope

This Radio Standard Specification (RSS) sets out certification requirements for equipment employed in Rural Remote Broadband Systems (RRBS) to provide point-to-multipoint fixed wireless access broadband radiocommunication in the band 512-608 MHz (TV channels 21 to 36).

2. Transition period

This document will be in force upon its publication on Innovation, Science and Economic Development Canada's (ISED) website. Effective immediately, no application for certification of equipment operating in the band 614-698 MHz is accepted as per Innovation, Science and Economic Development (ISED)'s decision in the SPLB-004-15, [Decision on Repurposing the 600 MHz Band](#) document.

A copy of RSS-196, issue 1, may be requested by [email](#).

3. General requirements and information

3.1 Certification

Equipment covered by this standard is classified as Category I equipment and requires a technical acceptance certificate (TAC) issued by ISED's [Certification and Engineering Bureau](#) or a certificate issued by a recognized certification body (CB).

3.2 Licensing requirements

The equipment covered by this standard is subject to licensing pursuant to subsection 4(1) of the [Radiocommunication Act](#).

3.3 RSS-Gen compliance

RSS-196 shall be used in conjunction with RSS-Gen, [General Requirements for Compliance of Radio Apparatus](#), for general specifications and information relevant to the equipment covered by this standard.

3.4 Related documents

ISED documents are available on the [official publications](#) section of the Spectrum Management and Telecommunications website.

The following documents should be consulted in conjunction with this RSS:

IEEE Std. 1631: [*IEEE Recommended Practice for Measurement of 8-VSB Digital Television Transmission Mask Compliance for the USA*](#)

SRSP-300.512: [*Technical Requirements for Remote Rural Broadband Systems \(RRBS\) Operating in the Bands 512-608 MHz \(TV Channels 21 to 36\)*](#)

IEEE Std – The Institute of Electrical and Electronics Engineers Standard
SRSP – Standard Radio System Plan

3.5 Definition

Nominal channel bandwidth, for the purpose of this document, is defined as follows:

- For equipment having an occupied bandwidth less than or equal to 6 MHz, the nominal channel bandwidth is 6 MHz, the channel being a 6 MHz block as specified in the radio frequency channel arrangement in [SRSP-300.512](#).
- For equipment having an occupied bandwidth greater than 6 MHz, up to a maximum of 12 MHz, the nominal channel bandwidth is 12 MHz, the channel being formed by two contiguous 6 MHz blocks as specified in the radio frequency channel arrangement in [SRSP-300.512](#).

4. Transmitter specifications

4.1 Frequency plan

The radio frequency channel arrangements are defined in [SRSP-300.512](#).

4.2 Type of modulation

Equipment certified under this standard shall use digital modulation.

4.3 Nominal channel bandwidth and occupied bandwidth

Equipment having an occupied bandwidth of less than or equal to 6 MHz shall comply with the standard specified for a 6 MHz nominal channel bandwidth, i.e. the occupied bandwidth shall be contained in the 6 MHz nominal channel bandwidth as defined in section 3.5 and the specifications shall meet all requirements applicable to 6 MHz channel bandwidth equipment.

The maximum permissible nominal channel bandwidth is 12 MHz.

The occupied bandwidth shall be greater than or equal to 500 kHz and shall not exceed the nominal channel bandwidth.

4.4 Frequency stability

The carrier frequency shall not depart from the reference frequency in excess of ± 10 ppm.

4.5 Transmitter output power

The average transmitter output power for the subscriber equipment shall not exceed 1 watt in a 6 MHz bandwidth and the average transmitter power spectral density shall not exceed -7 dBW/100 kHz.

The average transmitter output power for the base station equipment shall not exceed 125 watts in a 6 MHz bandwidth and the average transmitter power spectral density shall not exceed 14 dBW/100 kHz.

The equivalent isotropically radiated power (e.i.r.p.) limits for the subscriber and base stations are specified in [SRSP-300.512](#).

4.6 Transmitter unwanted emissions

The transmitter unwanted emissions shall be measured using an average detector and a resolution bandwidth equal to the measurement bandwidth specified in table 1. A lower resolution bandwidth may be employed near the channel edge, provided the power is integrated over a 100 kHz bandwidth. Any suitable method of measurement can be used provided that it is fully described in the test report. ISED's Certification and Engineering Bureau shall be consulted to determine the acceptability of the method. The [IEEE 1631](#) document can be used for guidance while measuring this emission mask.

The power of unwanted emissions in the measurement bandwidth shall be attenuated below the average transmitted power in a 6 MHz bandwidth, P (dBW), by the limits specified in table 1 below, or shall comply with the field strength limits indicated in RSS-Gen table 5, [General field strength limits at frequencies above 30 MHz](#), where applicable.

Δf (MHz) is the frequency separation from the edge of the nominal channel used by the equipment to the centre of the measurement bandwidth. Figure 1 shows the unwanted emissions limits for a 100 kHz measurement bandwidth with Δf less than 18 MHz.

Table 1: Unwanted emission limits

Frequency separation, Δf (MHz)	Out-of-channel attenuation (dB) or field strength	Measurement bandwidth
$0.05 \leq \Delta f \leq 6$	$44.9 + 1.1 * (\Delta f)^{1.6}$	100 kHz
$6 \leq \Delta f \leq 12$	$37.8 + 4.4 * \Delta f$	
$12 \leq \Delta f \leq 18$	$70.2 + 1.7 * \Delta f$	
$\Delta f > 18$ and within 54-72 MHz, 76-88 MHz, 174-216 MHz and 470-608 MHz	100.8	
Outside the above cases	Base station equipment: $43 + 10 * \log_{10}(p)$ Where p is the transmitter power in a 6 MHz bandwidth expressed in watts Subscriber equipment: As per RSS-Gen, table 5, General field strength limits at frequencies above 30 MHz	100 kHz for $f_m \leq 1$ GHz 1 MHz for $f_m > 1$ GHz 120 kHz for $f_m \leq 1$ GHz 1 MHz for $f_m > 1$ GHz Where f_m is the measurement frequency

Note: As per [SRSP-300.512](#), subscriber equipment certified with this emission mask shall employ only vertical polarization for the transmit antenna, while any polarization can be used for reception. The vertically polarized antenna needs to meet the requirements specified in SRSP-300.512.

Base station equipment certified with this emission mask can employ any type of signal polarization, provided that the RRBS siting restrictions, specified in SRSP-300.512, are observed.

Figure 1 Unwanted Emissions Limits with $\Delta f < 18$ MHz

