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Spectrum Management and Telecommunications

Radio Standards Specification

Broadband Radio Service (BRS) Equipment Operating in the Band 2500-2690 MHz

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Canada

Preface

Radio Standards Specification RSS-199, *Broadband Radio Service (BRS) Equipment Operating in the Band 2500–2690 MHz*, issue 4, replaces RSS-199, *Broadband Radio Service (BRS) Equipment Operating in the Band 2500–2690 MHz*, issue 3, dated December 2016.

The following are the main changes:

1. added the 2500-2690 MHz band plan for paired and unpaired spectrum in table 1 and table 2 respectively
2. added maximum transmit power requirements for fixed station and base station for non-AAS and AAS equipment in table 3
3. added total radiated power requirements for unwanted emissions in section 5.6
4. added definitions to clarify the terms used
5. modernized to reflect the current RSS structure
6. made editorial changes and clarifications, as appropriate

Inquiries may be submitted by one of the following methods:

1. Online using the General Inquiry form (in the form, select the Directorate of Regulatory Standards radio button and specify "RSS-199" in the General Inquiry field)

2. By mail to the following address:

   Innovation, Science and Economic Development Canada
   Engineering, Planning and Standards Branch
   Attention: Regulatory Standards Directorate
   235 Queen Street
   Ottawa ON K1A 0H5
   Canada

3. By email to consultationradiostandards-consultationnormesradio@ised-isde.gc.ca

Comments and suggestions for improving this standard may be submitted online using the Standard Change Request form, or by mail or email to the above addresses.

All Innovation, Science and Economic Development Canada publications related to spectrum and telecommunications are available on the Spectrum Management and Telecommunications website.

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

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Martin Proulx
Director General
Engineering, Planning and Standards Branch

Contents

1. Scope

This Radio Standards Specification (RSS) sets out the requirements for the certification of equipment used in broadband radio services (BRS) operating in the frequency band 2500-2690 MHz.

2. Purpose and application

This RSS applies to base station, fixed station and subscriber equipment operating in the band 2500-2690 MHz.

3. General requirements and references

This section sets out the general requirements and references related to this RSS.

3.1 Coming into force and transition period

This document will be in force as of the date of its publication on Innovation, Science and Economic Development Canada's (ISED) website.

However, a transition period of six months from the publication date will be provided. During this period, applications for certification under RSS-199, issue 4 or issue 3, will be accepted. After this period, only applications for the certification of equipment under RSS-199, issue 4, will be accepted, and equipment manufactured, imported, distributed, leased, offered for sale, or sold in Canada shall comply with this present issue.

A copy of RSS-199, issue 3, is available upon request by emailing consultationradiostandards-consultationnormesradio@ised-isde.gc.ca.

3.2 Certification requirements

Equipment covered by this standard is classified as Category I equipment and shall be certified. Either a technical acceptance certificate (TAC) issued by the Certification and Engineering Bureau (CEB) of ISED or a certificate issued by a recognized certification body (CB) is required.

3.3 Licensing requirements

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

3.4 RSS-Gen compliance

Equipment being certified under this standard shall comply with the general requirements set out in RSS-Gen, *General Requirements for Compliance of Radio Apparatus*.

3.5 Related documents

All ISED publications related to spectrum management and telecommunications are available on the Spectrum Management and Telecommunications website. In addition to related documents specified in RSS-Gen, refer to the following documents as needed:

- SRSP-517, *Technical Requirements for Broadband Radio Service (BRS) in the Band 2500-2690 MHz*

Acronyms

- SRSP: Standard Radio System Plan

4. Definitions

The following terms are used in this document:

Active antenna system (AAS)
An antenna system where the amplitude and/or phase between antenna elements is dynamically adjusted, resulting in an antenna pattern that varies in response to short-term changes in the radio environment. An AAS may be integrated into a fixed station or base station. An antenna system used for long-term beam shaping, such as fixed electrical down tilt, is not considered an AAS.

Active antenna system (AAS) base station equipment
Base station equipment using an AAS.

Base station equipment
Equipment that provides network connectivity to, as well as management and control of, the subscriber equipment.

Channel bandwidth
The equipment's operating bandwidth specified by the manufacturer that contains the information transmitted.

Channel frequency
The frequency at the center of the channel bandwidth.

Fixed station
A radio station authorized to operate at a fixed point.

Fixed subscriber equipment
Subscriber equipment that is used at a fixed location, by the nature of its design. Fixed station, portable, mobile, and nomadic equipment are not considered fixed subscriber equipment.

Frequency block
A portion of spectrum within a frequency band that can typically be assigned to operators.

Frequency block group
A continuous frequency range of one or multiple contiguous frequency blocks that contain the equipment's channel bandwidth specified by the manufacturer.

Non-active antenna system (non-AAS)
An antenna system that does not meet the definition of an AAS.

Non-AAS base station equipment
A base station equipment with a non-AAS.

Subscriber equipment
Equipment that provides connectivity between the user and the base station equipment. It includes, but is not limited to, mobile, portable, nomadic and fixed subscriber equipment.

Total radiated power (TRP)
The integral of the power transmitted by an antenna (all radiating elements) in different directions over the entire radiation sphere.

5. Transmitter requirements

This section sets out the requirements applicable to radio transmitters subject to this standard.

5.1 Measurement methods

Unless otherwise specified, all measurements shall be performed in accordance with the requirements of RSS-Gen. However, the alternate measurement procedure proposed in Notice 2020-DRS0014 or alternate standards listed on ISED's Normative Test Standards And Acceptable Alternate Procedures web page can be used to demonstrate compliance with TRP limits.

AAS equipment with eight antenna elements or less can demonstrate compliance with the e.i.r.p. limits specified for non-AAS equipment in Table 3, using the standardized measurements procedures specified in RSS-Gen instead of the TRP limits.

All equipment with more than eight antenna connectors/elements shall demonstrate compliance with the TRP limits for the unwanted emissions.

The equipment shall comply with the specified requirements while performing measurements for all operating channel bandwidths specified by the manufacturer.

If the transmitter is designed for a multi-carrier operation, the tests shall be carried out using both the maximum and minimum number of carriers intended for the equipment.

5.2 Band plan

The band 2500-2690 MHz is divided into 7 paired blocks and 2 unpaired blocks as shown in table 1 and 2. SRSP-517 contains the detailed band plan. Frequency blocks can be aggregated to form a frequency block group.

Table 1: Paired frequency blocks in the band 2500-2690 MHz

Block	Uplink frequencies (MHz)	Block	Downlink frequencies (MHz)	Total spectrum (MHz)
A	2500-2510	A’	2620-2630	10+10
B	2510-2520	B’	2630-2640	10+10
C	2520-2530	C’	2640-2650	10+10
D	2530-2540	D’	2650-2660	10+10
E	2540-2550	E’	2660-2670	10+10
F	2550-2560	F’	2670-2680	10+10
G	2560-2570	G’	2680-2690	10+10

Table 2: Unpaired frequency blocks in the band 2500-2690 MHz

Block	Frequencies (MHz)	Total spectrum (MHz)
H	2570-2595	25
I	2595-2620	25

5.3 Types of modulation

The modulation used shall be digital.

5.4 Frequency stability

The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block or frequency block group when tested to the temperature and supply voltage variations specified in RSS-Gen.

5.5 Transmitter power

The maximum output power of the equipment shall comply with the limits specified in table 3. In this table, maximum power refers to the equivalent isotropically radiated power (e.i.r.p.) or total radiated power (TRP), measured in terms of average values.

Subscriber equipment other than fixed subscriber equipment shall not exceed an e.i.r.p of 2W per channel bandwidth.

Fixed subscriber equipment shall not exceed the following:

i. conducted power of 2W per channel bandwidth for all ports
ii. e.i.r.p of 40 W per channel bandwidth

The maximum power limits for fixed station and base station are provided in Table 3. The limits in this RSS are specified for the purpose of certification and may not apply to all deployment scenarios. Consult SRSP-517 for more deployment details in the band 2500-2690 MHz.

Table 3: Maximum power of fixed station and base station in the band 2500-2690 MHz

Equipment type	Maximum power
Non-AAS fixed station and base station	e.i.r.p of 1640 W /MHz
AAS fixed station and base station	TRP of 43 dBm /MHz

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.

5.6 Unwanted emissions limits

Unwanted emissions shall be measured in terms of average values when the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.
Equipment shall meet the unwanted emission limits, specified below, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment’s operating frequency range.

For the unwanted emission limits, in the 1 MHz band immediately outside and adjacent to the frequency block group, the power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth for fixed stations, base stations, and fixed subscriber equipment, and 2% for subscriber equipment other than fixed subscriber equipment. Beyond this 1 MHz band, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth can be used, provided that the

measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1% or 2% of the occupied bandwidth, as applicable.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors), where applicable, of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in the tables below.

Table 4: Unwanted emission limits for fixed station, base station and fixed subscriber equipment

Offset from the edge of the frequency block or frequency block group (MHz)	**Unwanted emission limits**
≤ 1	-13 dBm/(1% of OB*)
> 1	-13 dBm/MHz

*OB is the occupied bandwidth

Table 5: Unwanted emission limits for subscriber equipment other than fixed subscriber equipment

Offset from the edge of the frequency block or frequency block group (MHz)	**Unwanted emission limits**
0-1	-10 dBm/(2% of OB*)
1-5	-10 dBm/MHz
5-X**	-13 dBm/MHz
≥ X	-25 dBm/MHz

*OB is the occupied bandwidth
** X is 6 MHz or the equipment occupied bandwidth, whichever is greater

In addition to complying with the limits in table 5, subscriber equipment other than fixed subscriber equipment shall not exceed -13 dBm/MHz on all frequencies between 2490.5 MHz and 2496 MHz, and -25 dBm/MHz at or below 2490.5 MHz.