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RSS-199

Issue 23 Draft 1

~~October 2014~~ September 14, 2016

Spectrum Management and Telecommunications

Radio Standards Specification

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

Aussi disponible en français – CNR-199

Canada

Preface

Radio Standards Specification RSS-199, Issue 23, *Broadband Radio Service (BRS) Equipment Operating in the Band 2500-2690 MHz*, replaces RSS-199, Issue 12, dated ~~January 2010~~October 2014.

This document will be in force as of the publication on Innovation, Science and Economic Development Canada's (ISED's) website~~date of notice SMSE-016-14 in the *Canada Gazette*, Part I. Upon publication, the public has 120 days to submit comments. Comments received will be taken into account in the preparation of the next version of this document.~~

Listed below are the changes:

- ~~1. The equipment's unwanted emission mask is modified.~~
- ~~2. The method used to measure the equipment's frequency stability is added.~~
- ~~3. The compliance requirement for equipment with multiple antennas is added.~~
4. The requirement for receiver standard spurious emissions has been withdrawn following decisions made under Regulatory Standards Notice 2012-DRS0126.
 1. Permit the transmitter power to be measured in terms of average instead of peak value.
 2. Add a requirement for transmitter's Peak-to-Average Power Ratio (PAPR).
 3. Refer to ANSI C63.26-2015, *American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services*, for measurement method to determine output power and e.i.r.p of equipment with multiple antennas.

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

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~~Acting~~ Director General
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Contents

1.	Scope.....	1
2.	General Information	1
2.1	Licensing Requirements	1
2.2	Related Documents	1
2.3	Definitions.....	1
3.	General Requirements.....	21
3.1	RSS-Gen Compliance	2
4.	Transmitter and Receiver Standard Specifications.....	2
4.1	Types of Modulation	2
4.2	Channel Bandwidth.....	2
4.3	Transmitter Frequency Stability.....	2
4.4	Transmitter Output Power and Equivalent Isotropically Radiated Power (e.i.r.p.)	2
4.5	Transmitter Unwanted Emissions	3

1. Scope

This Radio Standards Specification (RSS) sets out certification requirements for BRS equipment in the [frequency](#) band 2500-2690 MHz.

2. General Information

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

2.1 Licensing Requirements

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

2.2 Related Documents

All Spectrum Management and Telecommunications publications are available [on the Department's website, in the under Official Publications, section on the following Industry Canada website: \[www.ic.gc.ca/spectrum\]\(http://www.ic.gc.ca/spectrum\)](#).

The following document should be consulted:

[ANSI C63.26-2015 American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services](#)

SRSP-517 [Technical Requirements for Broadband Radio Service \(BRS\) in the Band 2500-2690 MHz](#)

[ANSI – American National Standards Institute](#)
SRSP – Standard Radio System Plan

2.3 Definitions

For the purposes of this standard, the following terms are defined below:

Base station equipment is equipment that provides connectivity, management and control of the subscriber equipment.

Subscriber equipment is equipment that provides connectivity between the user's equipment and base station equipment.

Fixed subscriber equipment is subscriber equipment that is used at a fixed point and is not operational while in motion. Nomadic subscriber equipment is not considered to be fixed subscriber equipment.

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Mobile subscriber equipment is subscriber equipment that is intended to be used while in motion and during halts at unspecified points. Handheld, portable, and nomadic subscriber equipment is considered to be types of mobile subscriber equipment.

3. General Requirements

3.1 RSS-Gen Compliance

This issue of RSS-199 shall be used in conjunction with [RSS-Gen, General Requirements and Information for Compliance](#) ~~the Certification of Radio Apparatus~~, for general specifications and information relevant to the equipment to which this standard applies.

4. Transmitter and Receiver Standard Specifications

4.1 Types of Modulation

Equipment certified under this standard shall employ digital modulation.

4.2 Channel Bandwidth

The channel bandwidth shall be equal to or greater than 1 MHz and shall be reported by the certification applicant.

4.3 Transmitter Frequency Stability

The transmitter frequency stability limit shall be determined as follows:

- (a) The frequency offset shall be measured according to the procedure described in RSS-Gen and recorded;
- (b) Using a resolution bandwidth ~~equal~~ to that permitted within the 1MHz band immediately outside the channel edge, as found in clause 4.6, reference points will be selected at the unwanted emission levels which comply with the attenuation specified in 4.6, for the type of device under test, on the emission mask of the lowest and highest channels, and the frequency at these points shall be recorded as f_L and f_H respectively.

The applicant shall ensure [compliance with](#) frequency stability [requirement](#) by showing that f_L minus the frequency offset and f_H plus the frequency offset ~~shall be~~ [is](#) within the frequency range that the equipment is designed to operate.

4.4 Transmitter Output Power and Equivalent Isotropically Radiated Power (e.i.r.p.)

The transmitter output power shall be measured ~~using a peak detector~~ [in terms of average value](#).

For base station equipment, refer to SRSP-517 for the [maximum permissible](#) e.i.r.p.

For mobile subscriber equipment, the e.i.r.p. shall not exceed 2 watts. For fixed subscriber equipment, the transmitter output power shall not exceed 2 watts and the e.i.r.p. shall be limited to 40 watts.

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.

Equipment with multiple antennas shall have output power and e.i.r.p measured according to ANSI C63.26-2015.

4.5 — Equipment with Multiple Antennas

4.5.1 — Correlated Transmission

When multiple antennas are used to:

- (a) transmit the same digital data in a given symbol period (even with different coding or phase shifts) for transmit diversity; or
- (b) steer signal energy towards a particular direction for enhanced directional gain (i.e. beamforming); or
- (c) devise any other transmission mode;

and where signals from different antennas are correlated, the e.i.r.p. shall be calculated based on the aggregate power (conducted across all antennas) and the resulting directional gain dBi, $G_{\max} + 10 \log_{10} N$, with N as the number of antennas and G_{\max} as the highest gain in dBi among all antennas.

4.5.2 — Uncorrelated Transmission

When multiple transmitted antennas are used and each antenna:

- (a) transmits different digital data during any given symbol period (i.e. Space Time Block Codes or Space Time Codes); or
- (b) transmits independent parallel data stream over the same frequency bandwidth in order to increase data rates (i.e. spatial multiplexing); or
- (c) forms any other transmission mode;

and where signals from different antennas are completely uncorrelated, the e.i.r.p. shall be calculated based on the aggregate power (conducted across all antennas) and maximum antenna gain, G_{\max} .

4.6.5 Transmitter Unwanted Emissions

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In the 1 MHz band immediately outside and adjacent to the channel edge, the unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth for base station and fixed subscriber equipment and 2% for mobile subscriber equipment. Beyond the 1 MHz band, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth is allowed to be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1%/2% of the occupied bandwidth, as applicable.

Equipment shall comply with the following unwanted emissions limits:

- (a) For base station and fixed subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$
- (b) For mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:
 - i) $40 + 10 \log_{10} p$ from the channel edges to 5 MHz away,
 - ii) $43 + 10 \log_{10} p$ between 5 MHz and X MHz from the channel edges, and
 - iii) $55 + 10 \log_{10} p$ at X MHz and beyond from the channel edges.
 - iv) in addition, the attenuation shall be not be less than $43 + 10 \log_{10} p$ on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log_{10} p$ at or below 2490.5 MHz.

where p in (a) and (b) is the transmitter power measured in watts and X is 6 MHz or the equipment occupied bandwidth, whichever is greater.