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Radio Standards Specification

Flexible Use Broadband Equipment Operating in the Band 3450-3900 MHz

Preface

Radio Standards Specification RSS-192, issue 5, *Flexible Use Broadband Equipment Operating in the Band 3450-3900 MHz*, replaces RSS-192, issue 4, *Flexible Use Broadband Equipment Operating in the Band 3450-3650 MHz*, dated May 2020.

Listed below are the main changes:

1. Extended the upper end of frequency range from 3650 to 3900 MHz to allow flexible use and updated the title of the standard accordingly.
2. Added and revised definitions to clarify the terms used.
3. Modified the transmitter output power for indoor base station and subscriber equipment other than fixed subscriber equipment.
4. Added out-of-frequency band unwanted emission requirements for equipment operating beyond 3900 MHz.
5. Removed the test report requirements as the requirement of identifying base station equipment as type 1 and type 2 classification has been removed.
6. Modernized to reflect the current RSS structure.
7. 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-192” 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

Martin Proulx

Director General
Engineering, Planning and Standards Branch

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1. Scope

This Radio Standard Specification (RSS) sets out the requirements for the certification of flexible use broadband equipment used in fixed and/or mobile services operating in the frequency band 3450-3900 MHz.

2. Purpose and application

This RSS applies to base station, point-to-point, point-to-multipoint, and subscriber equipment operating in the frequency band 3450-3900 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 transition period, applications for certification under either RSS-192, issue 5 or issue 4, will be accepted. After this period, only applications for the certification of equipment under RSS-192, issue 5, 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-192, issue 4, 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 ISSED 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-520, [Technical Requirements for Fixed and/or Mobile Systems, Including Flexible Use Broadband Systems, in the Band 3450-3900 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. Antenna systems used for long-term beam shaping such as fixed electrical down tilt are not considered an AAS. An AAS may be integrated in a point-to-multipoint (P-MP) hub station, base station and subscriber equipment.

AAS base station equipment

A base station equipment with an AAS.

Antenna

A radiating unit/component which contains all radiating elements forming a pattern.

Base station equipment

An 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 subscriber equipment

A fixed equipment that provides connectivity between the user and the base station equipment. Fixed subscriber equipment is used at a fixed location. Fixed point-to-point, fixed point-to-multipoint, portable, mobile, and nomadic equipment are not considered fixed subscriber equipment.

Frequency block

Portions of spectrum covered by this RSS, in the band 3450-3900 MHz (see section 5.2).

Frequency block group

A continuous frequency range of one or multiple contiguous frequency blocks that contains the equipment's channel bandwidth, as specified by the manufacturer.

Indoor base station equipment

A base station, by the nature of its design, which operates in locations completely enclosed by walls and a ceiling (e.g. a transmitter that must be connected to the alternate current (AC) power lines, an enclosure that is not waterproof, etc.)

Maximum effective isotropic radiated power (e.i.r.p._{max})

The maximum average channel power in dBm measured as e.i.r.p. across all antenna elements per channel.

Maximum total radiated power (TRP_{max})

The maximum average channel power in dBm measured as TRP across all antenna elements per channel.

Non-active antenna system (non-AAS)

An antenna system that does not meet the definition of AAS.

Non-AAS base station equipment

A base station equipment with a non-AAS.

Point-to-point (P-P) equipment

A fixed equipment with directional antenna and is used between two fixed locations installed to provide service such as backhaul.

Point-to-multipoint (P-MP) hub equipment

A fixed equipment to provide communication with multiple user equipment installed at fixed locations.

Subscriber equipment

An equipment that provides connectivity between the user and the base station equipment. It includes but 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 standard specifications

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

5.1 Measurement method

Unless otherwise specified, all measurements shall be performed in accordance with the requirements of RSS-Gen.

However, the alternate measurement procedure proposed in the 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.

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

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 1](#), 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 unwanted emissions.

5.2 Band plan

The band 3450-3900 MHz is divided into 10 MHz blocks as per Standard Radio System Plan SRSP-520, *Technical Requirements for Fixed and/or Mobile Systems, Including Flexible Use Broadband Systems, in the Band 3450-3900 MHz*. Blocks can be aggregated to form a frequency block group larger than 10 MHz. For equipment with channel bandwidths smaller than 10 MHz, the frequency block group is 10 MHz.

5.3 Type 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 at the temperature and supply voltage variations specified in RSS-Gen.

5.5 Transmitter output power

The maximum output power of the equipment measured in terms of average values shall comply with the limits specified in table 1.

Table 1: Maximum power of equipment

Equipment type	Maximum power
Non-AAS: base station (outdoor), fixed P-P station, P-MP hub station	68 dBm e.i.r.p./5 MHz
AAS: base station (outdoor), P-MP hub station	47 dBm TRP/5MHz
Indoor base station	39 dBm TRP/channel bandwidth
Fixed subscriber equipment	39 dBm e.i.r.p./channel bandwidth
Subscriber equipment other than fixed subscriber equipment	30 dBm e.i.r.p./channel bandwidth

In addition, the peak to average power ratio (PAPR) of the equipment shall not exceed 13 dB for more than 0.1% of the time, using a signal that corresponds to the highest PAPR during periods of continuous transmission.

5.6 Transmitter unwanted emissions

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.

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

5.6.1 Unwanted emission limits for outdoor base station, point-to-point and point-to-multipoint equipment

The unwanted emissions of base station, P-P and P-MP equipment shall comply with the following:

- the limits in table 2 for all frequencies between 3450-3900 MHz
- the limits in table 3 for all frequencies between 3400-3450 MHz
- a limit of -13 dBm TRP /MHz or conducted power (sum of conducted power across all antenna connectors), where applicable, for all frequencies below 3400 MHz
- the limits in table 4 for all frequencies above 3900 MHz
- a limit of -30 dBm TRP /MHz or conducted power (sum of conducted power across all antenna connector), where applicable, for all frequencies between 4200-4400 MHz

Table 2: Unwanted emission limits for outdoor base station, P-P, and P-MP equipment in the band 3450-3900 MHz

Offset frequency from the edge of the frequency block group (MHz)	Non-AAS e.i.r.p. (dBm/5 MHz) per antenna	AAS TRP (dBm/5 MHz)
0-5	Min {(e.i.r.p. _{max} - 40), 21}	Min {(TRP _{max} - 40), 16}
5-10	Min {(e.i.r.p. _{max} - 43), 15}	Min {(TRP _{max} - 43), 12}
>10	Min {(e.i.r.p. _{max} - 43), 13}	Min {(TRP _{max} - 43), 1}

Note: e.i.r.p._{max} and TRP_{max} are expressed in dBm

Table 3: Unwanted emission limits for outdoor base station, P-P, and P-MP equipment in the band 3400-3450 MHz

Frequency range (MHz)	Non-AAS e.i.r.p. (dBm/5 MHz) per antenna	AAS TRP (dBm/5 MHz)
3450-3445	Min {(e.i.r.p. _{max} - 40), 21}	Min {(TRP _{max} - 40), 16}
3445-3440	Min {(e.i.r.p. _{max} - 43), 15}	Min {(TRP _{max} - 43), 12}
3440-3400	Min {(e.i.r.p. _{max} - 43), 13}	Min {(TRP _{max} - 43), 1}

Note: e.i.r.p._{max} and TRP_{max} are expressed in dBm

Table 4: Unwanted emission limits for outdoor base station, P-P and P-MP equipment above 3900 MHz

Offset from 3900 MHz band edge	TRP or conducted power (sum of conducted power across all antenna connectors), where applicable
≤1 MHz	-13 dBm/1% of OB*
>1 MHz	-13 dBm/MHz

*OB is the occupied bandwidth

5.6.2 Unwanted emission limits for indoor base station equipment

Indoor base station equipment shall have the TRP or conducted power (per antenna), where applicable, of unwanted emission not exceeding:

- a. the limits in table 5
- b. a limit of -30 dBm/MHz for all frequencies below 3440 MHz and above 3980 MHz

Table 5: Unwanted emission limits for indoor base station equipment

Offset frequency from the edge of the frequency block group (MHz)	Unwanted emission limits (dBm/MHz)
0-5	$-20 - (1.4) * (\text{Offset frequency})$
>5	-27

5.6.3 Unwanted emission limits for subscriber equipment

Subscriber equipment shall have the TRP or conducted power (per antenna), where applicable, of unwanted emission not exceeding the following:

- a. the limits in table 6
- b. a limit of -30 dBm/MHz in the frequency range greater than (B+5) MHz from the edge of the frequency band

Table 6: Unwanted emission limits for subscriber equipment

Frequency block group (B)	Offset frequency from the edge of the frequency block group (MHz)			
	0 to 1	1 to 5	5 to B	>B
10 MHz, 20MHz, 30 MHz and 40 MHz	-13 dBm/1% of B	-10 dBm/MHz	-13 dBm/MHz	-25 dBm/MHz
> 40 MHz	-13 dBm/400 kHz	-10 dBm/MHz	-13 dBm/MHz	-25 dBm/MHz

6. Labelling requirement

Indoor base station equipment shall be labelled on the equipment or a statement shall be included in the user manual using the following text “For indoor use only”.