



Spectrum Management and Telecommunications

Radio Standards Specification

Advanced Wireless Services Equipment Operating in the Bands 1710-1780 MHz and 2110-2200 MHz

Amendment (October 2022)

Correction to the unwanted emission limits in Table 6 to align with the measurement methods of section 5.1

Preface

Radio Standards Specification RSS-139, *Advanced Wireless Services Equipment Operating in the Bands 1710-1780 MHz and 2110-2200 MHz*, issue 4, replaces RSS-139, *Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz*, issue 3, dated July 16, 2015.

The following are the main changes:

1. Added the frequency range 2180-2200 MHz and updated the title accordingly.
2. Added definitions to clarify the terms used.
3. Removed the requirements related to the mobile equipment identifier and the international mobile equipment identity number as they are no longer required.
4. Incorporated some requirements previously contained in Standard Radio System Plan SRSP-513, *Technical Requirements for Advanced Wireless Services (AWS) in the Bands 1710-1780 MHz and 2110-2180 MHz*, and SRSP-519, *Technical Requirements for the Ancillary Terrestrial Component (ATC) of Mobile-Satellite Service (MSS) Systems Operating in the Bands 2000-2020 MHz and 2180-2200 MHz*.
5. Modernized to reflect the current RSS structure.
6. Made editorial changes and clarifications, as appropriate.

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1. Online using the [General Inquiry](#) form (in the form, select the Directorate of Regulatory Standards radio button and specify “RSS-139” 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
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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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Director General
Engineering, Planning and Standards Branch

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1. Scope

This Radio Standards Specification (RSS) sets out the requirements for the certification of transmitters used in radiocommunication systems to provide advanced wireless services (AWS) in the bands 1710-1780 MHz and 2110-2200 MHz.

2. Purpose and application

This RSS applies to base station, fixed station and subscriber equipment operating in the bands 1710-1780 MHz and 2110-2180 MHz, with the frequency blocks specified in section 5.2, and ancillary terrestrial component (ATC) base station equipment operating in the band 2180-2200 MHz (AWS-4).

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-139 issue 3 or issue 4 will be accepted. After this period, only applications for the certification of equipment under RSS-139, 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-139, 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 issued by the Certification and Engineering Bureau of ISED or a certificate issued by a recognized certification body is required.

ATC equipment operating in the band 2000-2020 MHz, as well as mobile-satellite service equipment, shall be certified under RSS-170, [Mobile Earth Stations and Ancillary Terrestrial Component Equipment Operating in the Mobile-Satellite Service Bands](#).

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 also 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-513, [Technical Requirements for Advanced Wireless Services in the Bands 1710-1780 MHz and 2110-2180 MHz](#)
- SRSP-519, [Technical Requirements for the Ancillary Terrestrial Component of Mobile-Satellite Service Systems Operating in the Bands 2000-2020 MHz and 2180-2200 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.

Fixed subscriber equipment

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 equipment, portable, mobile, and nomadic equipment are not considered fixed subscriber equipment.

Frequency block

In the bands covered by this RSS, 1710-1780 MHz and 2110-2200 MHz, frequency blocks are portions of spectrum as defined in tables 1 and 2.

Frequency block group

A continuous frequency range of multiple frequency blocks that contains the equipment's channel bandwidth.

Non-active antenna system (non-AAS)

An antenna system that does not meet the criteria of an AAS.

Non-active antenna system (non-AAS) base station

A base station using a non-AAS.

Subscriber equipment

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 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.

The equipment measurement shall be performed for all operating channel bandwidths. In addition, for the unwanted emissions, the carrier frequency shall be set at both the highest and lowest channels in which the equipment is designed to operate.

A narrower resolution bandwidth may be used, provided that the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1% of the occupied bandwidth, as applicable).

5.2 Band plan

The bands 1710-1780 MHz and 2110-2180 MHz are divided into 11 paired blocks as shown in table 1. Standard Radio System Plan SRSP-513, [Technical Requirements for Advanced Wireless Services in the Bands 1710-1780 MHz and 2110-2180 MHz](#), contains the detailed band plan.

Table 1: Frequency blocks in the bands 1710-1780 MHz and 2110-2180 MHz

Block	Lower sub-band (MHz)	Upper sub-band (MHz)	Total block size (MHz)
Block A	1710-1720	2110-2120	20
Block B	1720-1730	2120-2130	20
Block C	1730-1735	2130-2135	10
Block D	1735-1740	2135-2140	10

Block	Lower sub-band (MHz)	Upper sub-band (MHz)	Total block size (MHz)
Block E	1740-1745	2140-2145	10
Block F	1745-1755	2145-2155	20
Block G	1755-1760	2155-2160	10
Block H	1760-1765	2160-2165	10
Block I	1765-1770	2165-2170	10
Block J1	1770-1775	2170-2175	10
Block J2	1775-1780	2175-2180	10

The band 2180-2200 MHz is divided into two downlink-only blocks, as shown in table 2. SRSP-519, [*Technical Requirements for the Ancillary Terrestrial Component of Mobile-Satellite Service Systems Operating in the Bands 2000-2020 MHz and 2180-2200 MHz*](#), contains the detailed band plan. In this RSS, AWS-4 is referred to as ATC band 2180-2200 MHz.

Table 2: Frequency blocks in the bands 2180-2200 MHz

Block	Frequency range (MHz)	Block size (MHz)
Block C	2180-2190	10
Block D	2190-2200	10

The blocks listed in tables 1 and 2 can be aggregated to form a larger channel.

5.3 Types of modulation

Devices may use any type of modulation technique. The type of modulation shall be documented in the test report.

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 output power

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

The limits in this RSS are specified for the purpose of certification and may not apply to all deployment scenarios. Consult SRSP-513 and SRSP-519 for more details on the bands 2110-2180 MHz and 2180-2200 MHz respectively.

Table 3: Maximum power of equipment in the band 1710-1780 MHz

Equipment type	Maximum power
Fixed station and base station	30 dBm e.i.r.p./channel bandwidth
Subscriber equipment	30 dBm e.i.r.p./channel bandwidth

Table 4: Maximum power of equipment in the band 2110-2180 MHz

Equipment type	Maximum power
Non-AAS fixed station and base station	65 dBm e.i.r.p./MHz
AAS fixed station and base station	46 dBm TRP/MHz
Subscriber equipment	30 dBm e.i.r.p./channel bandwidth

Table 5: Maximum power of equipment in the band 2180-2200 MHz

Equipment type	Maximum power
Non-AAS base station	65 dBm e.i.r.p./MHz
AAS base station	46 dBm TRP/MHz

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 Unwanted emission limits

Unwanted emissions shall be measured in terms of average values.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors) of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in table 6.

Table 6: Unwanted emission limits

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

*OB is the occupied bandwidth.

In addition to complying with the above limits, equipment operating in the band 2180-2200 MHz may require additional filtering (see SRSP-519).

5.7 Additional requirements for subscriber equipment

Subscriber equipment other than fixed subscriber equipment shall use transmitter power control to limit power. The applicant shall include, with the application for certification, a declaration of compliance that confirms the control requirement was met and that includes a description of how the requirement was met. The declaration of compliance may be included as a separate document or attached (e.g. as an annex) to the test report.

Subscriber equipment operating in the band 1755-1780 MHz shall operate only when under the control of a base station. The applicant shall include, with the application for certification, a declaration of compliance that confirms the control requirement was met and that includes a description of how the requirement was met. The declaration of compliance may be included as a separate document or attached (e.g. as an annex) to the test report.