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Spectrum Management and Telecommunications Policy

Radio Standards Specification

Local Multipoint Communication Systems in the Band 25.35-28.35 GHz; Point-to-Point and Point-to-Multipoint Broadband Communication Systems in the Bands 24.25-24.45 GHz and 25.05-25.25 GHz; and Point-to-Multipoint Broadband Communications in the Band 38.6-40.0 GHz

Note (effective January 21, 2020): RSS-191 is currently under revision. Certification under RSS-191 for fixed systems, including local multipoint communication systems (LMCS), in the band 25.35-28.35 GHz is no longer required. However, the technical requirements contained in SRSP-325.25, Technical Requirements for Fixed Radio Systems Operating in the Bands 25.25-26.5 GHz and 27.5-28.35 GHz, continue to apply for all fixed systems in the relevant bands. In addition, there are moratoriums in place on issuing new terrestrial service licences in the frequency bands 26.5-27.5 GHz, 27.5-28.35 GHz and 37-40 GHz as described in SLPB-003-19, Decisions on Releasing Millimetre Wave Spectrum to Support 5G. Developmental licence applications will continue to be considered for these frequency bands. All relevant modifications will be incorporated in future issues of applicable RSS and/or SRSP.

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Preface

Radio Standards Specification 191, Issue 3, *Local Multipoint Communication Systems in the Band 25.35-28.35 GHz; Point-to-Point and Point-to-Multipoint Broadband Communication Systems in the Bands 24.25-24.45 GHz and 25.05-25.25 GHz*; *and Point-to-Multipoint Broadband Communications in the Band 38.6-40.0 GHz* replaces RSS-191, Issue 2 (Provisional) dated August 2002 entitled *Local Multipoint Communication Systems in the 28 GHz Band; Point-to-Point and Point-to-Multipoint Broadband Communication Systems in the 24 GHz and 38 GHz Band*s.

This document will be in force as of the publication date of Notice No. SMSE-002-08, in *Canada Gazette*, Part I. Upon publication, the public has 120 days to submit comments. Comments received will be considered and a new issue or a revised version of this issue may be developed.

Listed below are the changes:

1. Certification requirements for point-to-point broadband communications systems in the 38 GHz band have been removed. These requirements have been transferred to Standard Radio System Plan 338.6, *Technical Requirements for Fixed Radio Systems Operating in the Band 38.6-40.0 GHz* (SRSP-338.6). The certification requirements for point-to-multipoint broadband communications systems in the 38 GHz band are still retained in this RSS.

2. The title of the document has been changed to reflect the removal of certification requirements for point-to-point broadband communication systems in the 38 GHz band and to specify the frequency ranges applicable to equipment.

3. Section 3.1: The requirement that RSS-Gen be used in conjunction with this RSS is stated.

4. Section 4.2: The requirement that the measured occupied bandwidth instead of the manufacturer's specified emission bandwidth be used to measure transmitter unwanted emissions limit has been added.

5. Material common to most RSSs has been moved to RSS-Gen.

Issued under the authority
of the Minister of Industry

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1. Scope

This Radio Standard Specification (RSS) sets out requirements for the certification of for radio transmitters and receivers for local multipoint communication systems (LMCS) in the band 25.35-28.35 GHz, point-to-point and point-to-multipoint broadband systems in the bands 24.25-24.45 GHz and 25.05-25.25 GHz, and point-to-multipoint broadband systems in the band 38.6-40.0 GHz.

2. General Information

The equipment covered by this standard is classified as Category I equipment and a technical acceptance certificate (TAC), issued by the Certification and Engineering Bureau of Industry Canada, or a certificate issued by a Certification Body (CB) is required.

2.1 Licensing Requirements

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

2.2 Related Documents

In addition to related documents specified in RSS-Gen, *General Requirements and Information for the Certification of Radiocommunication Equipment*, the following documents should be consulted:

SRSP-324.25 *Technical Requirements for Fixed Radio Systems Operating in the Bands 24.25-24.45 GHz and 25.05-25.25 GHz*

SRSP-325.35 *Technical Requirements for Local Multipoint Communication Systems (LMCS) Operating in the Band 25.35-28.35 GHz*

SRSP-338.6 *Technical Requirements for Fixed Radio Systems Operating in the Band 38.6-40.0 GHz*

SRSP – Standard Radio System Plan

All Spectrum Management and Telecommunications publications are available on Industry Canada's website at http://ic.gc.ca/spectrum under *Official Publications*.

2.3 Definition of Bandwidth

For the purpose of this document, for transmitters in which there are multiple carriers, contiguous or non-contiguous in frequency, the occupied bandwidth is to be the sum of the occupied bandwidths of the individual carriers. The occupied bandwidth of a single carrier signal is defined in RSS-Gen.

3. General Requirements

3.1 RSS-Gen Compliance

RSS-191 shall be used in conjunction with RSS-Gen for general specifications and information relevant to the equipment for which this standard applies.

4. Measurement Methods

4.1 Transmitter Output Power

Transmitter output power measurements shall be carried out before the test for unwanted emissions. The transmitter output power value obtained from this test shall be used as the reference level to determine the attenuation of the transmitter unwanted emissions limits.

4.2 Transmitter Unwanted Emissions

Unwanted emissions are to be measured at the output of the final amplifier stage or referenced to that point. The measurement can be done at the transmitter's antenna connector as long as there is no frequency combiner in the equipment under test. It is important, however, that the point of measurement be the same as the one used to measure the transmitter output power. The point of measurement shall be stated in the test report with the occupied bandwidth (B_{occ}).

Single-carrier and multi-carrier tests are described below. If multi-carrier operations are intended, both tests are required.

Single-carrier and multi-carrier tests are to be carried out relative to a virtual block edge (see Table 1). The virtual block edge is located within the assigned band (see Figure 1). When a transmitter is designed to only operate in part of a band (e.g. because of frequency duplexing), the virtual block edge shall be inside the designed band of operation. The occupied bandwidth of the carrier(s) must be closer to the centre of the block than the virtual block edge. The virtual block edge is only to be used for testing and does not impact an actual implementation in any way. One virtual block edge (at frequency f_{VL}) shall be inside the lower edge of the designed or assigned band and the other virtual block edge (at frequency f_{VU}) shall be inside the upper edge of the designed or assigned band. The guard band is the frequency separation between the virtual block edge and the edge (99%) of the occupied emission.

Figure 1: Virtual Block Edges for Test Purposes

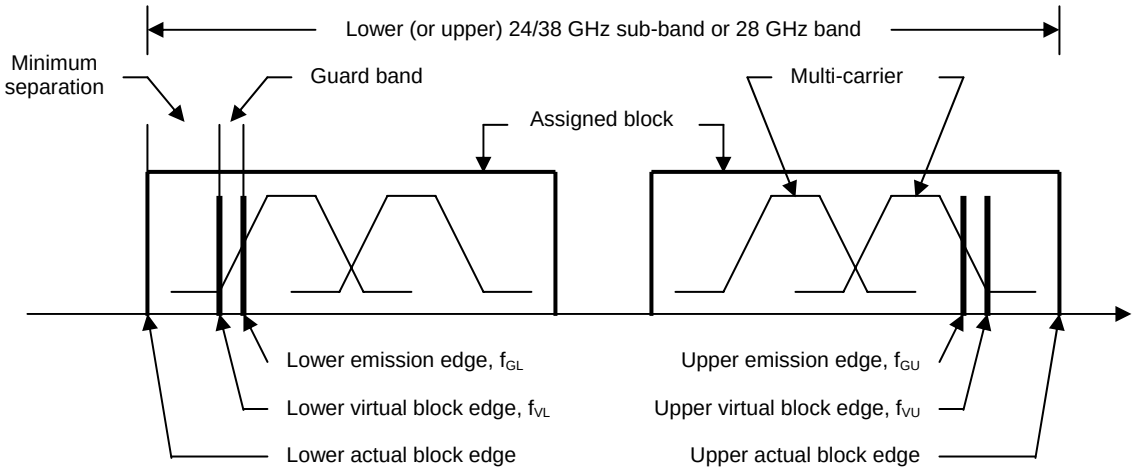

Table 1: Virtual Block Edges for Test Purposes

Band	**Minimum Separation Between Actual and Virtual Block Edge**
24 GHz	10 MHz
28 GHz	40 MHz
38 GHz	10 MHz

The purpose of specifying the tests relative to the virtual block edges is to avoid the attenuating effects of any radio frequency (RF) filters that may be included in the transmitter design, so that the spectrum mask limits are applicable to any channel block.

Note that although testing is specified relative to the virtual block edges, the transmitter is expected to perform similarly for all frequencies within the designed band. Therefore, to reduce the number of test runs, the lower virtual block edge should be in one assigned band or assigned block, and the upper virtual block edge should be in another (e.g. SRSP-324.25: blocks A and E' if the equipment is intended for blocks A to E and A' to E').

(a) **Single-Carrier Test**

For testing nearest the lower virtual block edge, set the carrier frequency f_L closest to the lower virtual block edge, taking into account any guard band used in the design of the equipment. Record the carrier frequency f_L, the virtual block edge frequency f_{VL}, the guard band (f_{GL}) and the RF spectrum plot. Likewise, perform the highest frequency test with the carrier frequency f_U nearest the upper virtual

block edge. Record the carrier frequency f_U, the virtual block edge frequency (f_{VU}), the guard band (f_{GU}) and the RF spectrum plot.

It is to be noted that the SRSPs permit licensees to have more than one frequency block for their systems. Equipment intended to have an occupied bandwidth wider than one frequency block per carrier shall be tested using a wideband test signal as wide as the occupied bandwidth for the single-carrier transmitter requirement.

(b) **Multi-Carrier Test**

This test is applicable for multi-carrier modulation and multi-transmitters connected into a common power amplifier. Note that the multi-carrier transmitter shall be subjected to the single-carrier testing, described above, in addition to the tests specified below.

For multi-carrier testing, the single-carrier test method is to be used with the exception that the single carrier is to be replaced by a multi-carrier modulated signal that is representative of an actual transmitter. The number of carriers shall be representative of the maximum number expected from the transmitter, and be grouped side by side, nearest the lower virtual block edge, with lower guard band f_{GL} , if required by the design of the equipment for testing at the lower frequency block edge. Likewise, perform a similar test nearest the upper virtual block edge, for testing at the upper frequency block edge. Record the spectrum plots, the number of carriers used and the guard band sizes (f_{GL}, f_{GU}), the carrier frequencies and the virtual block edge frequencies.

Notwithstanding the requirements in Table 1, *Virtual Block Edges for Test Purposes*, any equipment which uses the complete block or multiple blocks for a single licensee can include the attenuating effect of any RF filters in the transmitter design within the multi-carrier test, in which case the virtual and actual block edge frequencies will be the same.

5. General Standard Specifications

5.1 User Manuals

(a) The user manual shall contain instructions, such as details on the minimum guard band sizes required and the maximum number of carriers or multi-transmitters permitted, to ensure that the radio apparatus remains compliant to this RSS.

(b) The user manual of equipment designed to operate in the bands 24.25-24.45 GHz and 25.05-25.25 GHz, using block arrangements other than those specified in SRSP-324.25, shall clearly state the following text: "**CERTIFICATION NOTE FROM INDUSTRY CANADA: While this equipment meets the technical requirements for its operation in its rated paired block arrangement, this block arrangement is different than the 40 + 40 MHz block arrangement prescribed in documents RSS-191 and SRSP-324.25. The operation of this equipment IS NOT permitted if the out-of-band and spurious emission limits are not met at the edge of any contiguous licensed spectrum. It should be noted that all current relevant spectrum policies,**

licensing procedures and technical requirements are still applicable. For additional information, please contact the local Industry Canada office."

6. Transmitter and Receiver Standard Specifications

6.1 Frequency Block Arrangement

Equipment certified under this standard shall conform to the applicable frequency block arrangements specified in SRSP-324.25, SRSP-325.35 and SRSP-338.6.

Note: Equipment, both transmitter and receiver, operating in this frequency band, but using block arrangements other than those specified in SRSP-324.25 can be certified under this standard provided that, taking into account the different block arrangement size, the equipment meets all of the other requirements of this standard, including the additional text to be included in the user manual.

6.2 Types of Modulation

Equipment certified under this standard shall use digital modulation; however, supervisory and other control function signals may use any modulation technique. The type of modulation used shall be reported.

6.3 Frequency Stability

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

In lieu of meeting the above stability value, the test report may show that the frequency stability is sufficient to ensure that the occupied bandwidth stays within the licensee's frequency band, when tested to the temperature and supply voltage variations specified in RSS-Gen.

6.4 Transmitter Output Power

The output power shall be within ±1.0 dB of the manufacturer's rated power and shall not exceed the power limits given in the related SRSPs.

6.5 Transmitter Unwanted Emissions

6.5.1 Single-Carrier Transmitter

Unwanted emissions shall be attenuated by at least A (dB) below the total mean output power, P_{mean}, as follows:

(a) In any 1.0 MHz band, outside and removed from the virtual block edge frequency by up to and including ±200% of the occupied bandwidth:

(i) $A = 11 + 10 \log_{10}(B_{occ}) + 40 (f_{offset}/B_{occ})$ dB, for emissions in which the occupied bandwidth is equal or greater than 1 MHz; or

(ii) $A = 11 + 40 (f_{offset}/B_{occ})$ dB, for emissions in which the occupied bandwidth is less than 1 MHz.

Attenuation greater than $56 + 10 \log_{10} (B_{occ})$ dB, or to an absolute level lower than -43 dBW/MHz, whichever is less stringent, is not required.

Where:

$B_{occ:}$ occupied bandwidth in MHz

f_{offset} ; frequency offset from the virtual block edge in MHz.

(b) In any 1.0 MHz band which is removed from the virtual block edge frequency by more than ±200% of the occupied bandwidth:

$A = 43 + 10\log_{10} (P_{mean})$ in dB, or 80 dB below P_{mean}, whichever is less stringent. P_{mean} is the mean output power of the transmitter in watts.

6.5.2 Multi-carrier Transmitter or Multi-Transmitters

For a multi-carrier transmitter or multi-transmitters connected into a common final stage amplifier, the emission mask is to be the same as for single-carrier transmitters, but using the occupied bandwidth that is defined for multi-carrier transmitters. The total mean power shall be the sum of the individual carrier/transmitter powers. Guard bands, if used in the equipment design, shall also be used in testing the spectrum mask.

Note: Several transmitters connected into a common non-active antenna cannot use the multi-carrier mask for the composite signal. In this case, the appropriate mask applies to the individual transmitter.

6.6 Receiver Spurious Emissions

Receiver spurious emissions shall not exceed -70 dBW below 21.2 GHz and -60 dBW above 21.2 GHz, at the antenna connector. The resolution bandwidth of the spectrum analyzer shall be 100 kHz for measuring spurious emissions below 1.0 GHz, and 1.0 MHz for above 1.0 GHz.