Innovation, Science and Economic Development Canada
Innovation, Sciences et Développement économique Canada

RSS-Gen
Issue 5
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Amendment 1

Spectrum Management and Telecommunications

Radio Standards Specification

General Requirements for Compliance of Radio Apparatus

Amendment (March 2019)
A minor amendment has been made to section 3.6 Related documents to add a reference to Radio Standards Specification (RSS-HAC), *Hearing Aid Compatibility and Volume Control*, which shall be used in conjunction with applicable RSS(s).

Aussi disponible en français – CNR-Gen

Canada

Preface

Radio Standards Specification RSS-Gen, issue 5, *General Requirements for Compliance of Radio Apparatus* replaces RSS-Gen, issue 4, dated November 2014.

Listed below are the main changes:

1. New section 1.1 adds a provision for a transition period regarding RSS-Gen.

2. New section 2.5 adds a provision for a transition period regarding applicable RSSs.

3. Section 2.7.1 adds the requirement for certified devices to be listed in the radio equipment list (REL) before they can be leased, offered for sale, or sold.

4. New section 2.8 adds a provision for radio apparatus used for demonstration purposes.

5. Section 2.9 updates the provision for requesting a special authorization.

6. Section 4 incorporates labelling specifications from RSP-100, *Certification of Radio Apparatus*.

7. Section 5.3 clarifies that in the case of stand-alone receivers not operating in the band 30-960 MHz containing components which are covered by Interference-Causing Equipment Standards (ICES), the applicable ICES including its labelling requirement shall apply.

8. Section 6.2 adds a reference to the documents REC-LAB, *Procedure for the Recognition of Foreign Testing Laboratories*, and DES-LAB, *Procedure for Designation and Recognition of Canadian Testing Laboratories*, for requirements regarding test site facilities.

9. Section 6.6 adds applicable restrictions when measuring field strength above 30 MHz at a distance greater than 30 m from the equipment under test.

10. Section 6.8 modifies the transmit antenna section to apply to both licensed and licence-exempt equipment.

11. Section 6.9 clarifies the requirements for test frequencies versus operating frequency bands.

12. Section 6.10 adds a requirement for average detectors to comply with the characteristics given in Publication #16 of the International Special Committee on Radio Interference (CAN/CSA-CISPR) 16-1-1:15.

13. Section 6.11 clarifies the requirements for the power supply voltage to be used when measuring transmitter frequency stability.

14. Section 6.13.2 extends the frequency range for measuring unwanted emissions to 200 GHz and adds a provision on measurement for equipment containing digital devices at a higher frequency.

15. Section 8.7 clarifies the conditions for passive RFID tags to be exempt from any ISED certification, testing and labelling requirements.

16. Section 8.9 adds the frequency bands 0.495-0.505 MHz, 8.41425-8.41475 MHz, 149.9-150.05 MHz, 162.0125-167.17 MHz, 167.72-173.2 MHz and 2483.5-2500 MHz to the Table of Restricted Frequency Bands.

17. Section 8.11 clarifies a requirement for the frequency stability of unlicensed devices where the frequency stability limit is not specified.

18. Section 9 no longer includes definitions which are related to specific RSSs.

19. Editorial updates and improvements have been made.

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

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Martin Proulx
Director General
Engineering, Planning and Standards Branch

Contents

1. Scope

Radio Standards Specification RSS-Gen, *General Requirements for Compliance of Radio Apparatus*, sets out general and certification requirements for licensed and licence-exempt radio apparatus[1] used for radiocommunication other than broadcasting. "Broadcasting" refers to any radiocommunication in which the transmissions are intended for direct reception by the general public. Except where otherwise specified in the applicable Radio Standard Specification (RSS) (and/or in a Regulatory Standards Notice), radio apparatus shall comply with the specifications and methods prescribed in RSS-Gen.

1.1 Transition period

This document will be in force as of its publication on Innovation, Science and Economic Development Canada's (ISED) website. However, a transition period of six (6) months following its publication will be provided, within which compliance with RSS-Gen, issue 4 or issue 5, will be accepted. After this period, only applications for certification of equipment that complies with the requirements in RSS-Gen, issue 5, will be accepted.

2. General

2.1 Purpose and application

RSS-Gen must be used in conjunction with other RSSs, as applicable to the specific type of radio apparatus, for assessing its compliance with ISED requirements.

2.2 Inquiries related to radio standards specifications

Inquiries may be submitted online using the General Inquiry form. Select the Regulatory Standards Branch radio button and specify "RSS-Gen" in the General Inquiry field.

Inquiries can also be sent by email, or by mail to the following address:

Innovation, Science and Economic Development Canada
Engineering, Planning and Standards Branch
235 Queen Street
Ottawa, Ontario, K1A 0H5
Canada

Attention: Regulatory Standards Directorate

Comments and suggestions for amending RSSs may be submitted online using the Standard Change Request form or by mail to the above address.

[1] The term "radio apparatus" may also be referred to as "device" or "equipment."

2.3 Inquiries related to licensing

Inquiries related to licensing may be made through ISED's regional or district offices. Contact information for these offices is listed in Radio Information Circular RIC-66, *Addresses and Telephone Numbers of Regional and District Offices*.

2.4 Certification body

A certification body (CB) is an independent domestic or foreign organization that is authorized by the Government of Canada to certify radio equipment in accordance with Canadian regulatory requirements. CBs are recognized under the terms of mutual recognition agreements/arrangements[2] and are listed on ISED's Mutual Recognition Agreements/Arrangements website.

2.5 Transition period for applicable RSSs

The transition period specified in applicable RSSs shall apply for equipment compliance.

2.6 Categories of radio equipment

Radio apparatus are classified either as Category I or Category II equipment.

2.6.1 Category I equipment

Category I equipment consists of radio apparatus that require a technical acceptance certificate (TAC), issued by the Certification and Engineering Bureau of ISED, or a certificate issued by a recognized CB, pursuant to subsections 4(2) of the *Radiocommunication Act* and 21(1) of the *Radiocommunication Regulations*, respectively.

Certified Category I equipment shall be listed in ISED's radio equipment list (REL).

No person shall import, distribute, lease, offer for sale, or sell Category I radio apparatus in Canada unless they are listed on ISED's REL.[3]

2.6.2 Category II equipment

In the scope of this RSS, Category II equipment consists of radio apparatus that are exempt from certification (i.e. that do not require a TAC or a certificate issued by a CB). The manufacturer, importer and/or distributor shall, however, ensure that Category II equipment complies with all of ISED's applicable procedures and standards. The test report shall be retained for as long as the model is

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[2] Agreements/arrangements are signed by Global Affairs Canada (GAC) or ISED and are available on the GAC website, under *Trade Negotiations and Agreements*.

[3] Devices for which an application for a deferred REL listing date has been approved by ISED can be imported and distributed.

manufactured, imported, distributed, sold, offered for sale and/or leased in Canada. The test report shall be made available to ISED upon request.

2.7 Exclusions

2.7.1 Broadcasting equipment

RSSs do not apply to broadcasting equipment, including broadcasting receivers and broadcast satellite receivers. Such equipment is regulated by ISED's Radio Standards Procedure RSP-100, *Certification of Radio Apparatus*, and Broadcasting Equipment Technical Standards (BETS), where applicable.

The above exemption also applies to the radio apparatus components which are used for broadcasting purposes. Other radio modules included in the radio apparatus are still subject to RSS-Gen and applicable RSSs.

2.7.2 Interference-causing equipment

Interference-causing equipment, which refers to any equipment other than radio apparatus that is capable of causing interference to radiocommunication, is covered by ISED's Interference-Causing Equipment Standards (ICES).

2.7.3 Radio apparatus containing components covered by ICES

Any radio apparatus that is subject to an RSS and contains components that are covered by an ICES does not need to be verified for compliance with the corresponding ICES requirements provided that these components are used only to enable the operation of the radio apparatus and do not control or constitute additional functions or capabilities. Otherwise, the corresponding ICES applies, in addition to the applicable RSS. In either case, the device does not need to comply with the labelling requirements of the applicable ICES; however, it shall comply with the applicable labelling requirements specified in RSS-Gen.

2.8 Radio apparatus used for developmental purposes

Radio apparatus used solely for the purpose of research and development, experimentation, demonstration or assessment of marketability are exempt from certification and labelling requirements but may be subject to a developmental licence (see section 2.3 of this document). These radio apparatus shall not be leased, sold, or offered for sale in Canada.

Developmental licences are issued to innovators if their project meets all of the following criteria:

- relates to research and development
- focuses on advancing technology
- is time-limited
- will not interfere with current or anticipated systems
- will not be used for a commercial trial that involves financial cost recovery from users

2.9 Radio apparatus covered by a special authorization

An applicant may seek a special authorization, in cases where it is in the best interest of Canadians, to have equipment:

(a) exempt from specific requirements of an RSS
(b) certified where a standard has not been established

In order for ISED to proceed with such a request, the applicant must provide the following information:

(a) the original submission for equipment certification with all associated correspondence, including an explanation as to why the equipment was rejected or not considered (if applicable);

(b) a detailed rationale as to why the equipment does not comply with the RSS requirements (if an RSS exists);

(c) a description of the radio apparatus or system including, but not limited to, the technical specifications (e.g. transmitted power levels, frequency bands of operation, emission masks, duty cycle, etc.), and operational specifications (e.g. identification of end-user, typical locations of use, frequency of use, etc.) including any additional information that may help in the evaluation;

(d) a detailed rationale of technical feasibility indicating why a special authorization would benefit consumers and the public;

(e) a detailed description as to the nature of the proposal;

(f) the make, product version (PMN, HVIN, FVIN, HMN as applicable);

(g) the estimated number of users, if available; and

(h) a detailed description for data rates and structure, where applicable, including:

  (i) the manufacturer-specified raw data rate and throughput;

  (ii) a description of which information is carried between equipment;

  (iii) the amount of time required to transmit and receive information between equipment; and

  (iv) the type of modulation technique used and the bandwidth required for each channel.

The required information must be sent to ISED's Regulatory Standards office by email, or by postal mail to:

Innovation, Science and Economic Development Canada
Regulatory Standards
Engineering, Planning and Standards Branch
Attention: Manager of Regulatory Standards
235 Queen Street

Ottawa, Ontario
K1A 0H5, Canada

Special authorizations granted by the Department with regards to equipment certification are posted online.

2.10 Determination of interference

As per PART VI of the *Radiocommunication Regulations*, the following applies to all radiocommunication equipment.

Where ISED determines that a model of equipment causes or is likely to cause interference to radiocommunication, or suffers from or is likely to suffer from adverse effects of electromagnetic energy, ISED shall give notice of this determination to persons who are likely to be affected by it. No person shall manufacture, import, distribute, lease, offer for sale, sell, install or use equipment for which such a notice has been given.

If ISED determines that a unit of equipment causes or suffers from interference or adverse effects of electromagnetic energy, ISED may order the person(s) in possession or control of the equipment to cease or modify operation of the equipment until such time as it can operate without causing or being affected by such interference or such adverse effects.

3. Normative publications and related documents

3.1 General

This regulatory standard (RSS-Gen) refers to and normatively adopts, as applicable, the publications in section 3. Where such a reference is made, it shall be to the edition specified, for dated references, or to the latest edition, for undated references.

3.2 Measurement methods, measurement instrumentation and test site validation

The requirements stated in RSS-Gen and in the applicable RSS shall take precedence if there are discrepancies between the requirements stated in these standards and those stated in the publications referenced in this section. The adopted editions of the ANSI standards listed below will be posted on the Certification and Engineering Bureau's (CEB) website.

The methods in ANSI C63.26, *American National Standard of Procedures for Compliance Testing of Licensed Transmitters*, and ANSI C63.10, *American National Standard for Testing Unlicensed Wireless Devices*, shall be used for measurement methods applicable to licensed and licence-exempt radio apparatus, respectively.

ANSI C63.4, *American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz*, shall be used for test site validation and testing receivers only.

From time to time, ISED may release notices associated with the compliance requirements of radio apparatus. These notices will be posted on the CEB's website.

Alternative methods of measurement not covered by an RSS or a reference publication may be considered by ISED for demonstrating the compliance of radio apparatus, provided they are determined to be acceptable by the CEB. Alternative methods of measurement may be submitted by email to the CEB, who will determine the acceptability of these methods.

A list of acceptable Federal Communications Commission (FCC) procedures and other acceptable procedures related to measurement for applicable RSSs is published and maintained on the CEB's website.

3.3 Radio standards procedure RSP-100

RSP-100, *Certification of Radio Apparatus*, which sets out the requirements for certification, shall be used in conjunction with RSS-Gen. Compliance with the requirements in RSP-100 is mandatory to obtain equipment certification.

3.4 Radio frequency exposure compliance

In addition to RSS-Gen, the requirements in RSS-102, *Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)*, shall be met.

3.5 Radiocommunication antenna systems

When installing or modifying an antenna system for radio equipment that may require the use of an external antenna system, or a supporting structure, the process outlined in Client Procedures Circular CPC-2-0-03, *Radiocommunication and Broadcasting Antenna Systems*, shall apply.

3.6 Other related documents

Radio Standards Specification (RSS-HAC), *Hearing Aid Compatibility and Volume Control*, sets out the compliance requirements for hearing aid compatibility and volume control features for specific radio apparatus. RSS-HAC shall be used in conjunction with the applicable RSS(s) listed on ISED's Certification and Engineering Bureau website.

ISED documents are available on the official publications section of the Spectrum Management and Telecommunications website. Refer to the following documents as needed:

RIC-66 *Addresses and Telephone Numbers of Regional and District Offices*

TRC-43 *Designation of Emissions, Class of Station and Nature of Service*

4. Labelling requirements

4.1 General

In addition to complying with the applicable RSSs and RSP-100, each unit of a product model (i.e. of a radio apparatus) shall meet the labelling requirements set out in this section prior to being marketed in Canada or imported into Canada.

If the dimensions of the product are extremely small or it is not practical to place the label or marking on the product, and if electronic labelling cannot be implemented, the label shall be placed in a prominent location in the user manual supplied with the product, as agreed upon with ISED prior to the certification application. The user manual may be in an electronic format; if it is not supplied to the user, the user manual must be readily available.

4.2 Labelling of certified products

The Product Marketing Name (PMN), Hardware Version Identification Number (HVIN), Firmware Version Identification Number (FVIN) and Host Marketing Name (HMN) are defined in section 9 of this document.

Every unit of a certified product model, for marketing and use in Canada, shall be identified as per the following requirements:

(a) The HVIN and ISED certification number shall be permanently indicated on the exterior of the product or displayed electronically according to e-labelling requirements (see section 4.4) as follows:
   (i) The HVIN and ISED certification number may be placed on a label, which shall be permanently affixed to the product
   (ii) The ISED certification number shall be preceded by "IC:"
   (iii) The HVIN may be listed or placed with or without any prefix (HVIN:, Model#, M/N:, P/N:, etc.)
   (iv) The HVIN and ISED certification number are not required to be adjacent to each other

(b) The PMN must be displayed electronically (see section 4.4), or indicated on the exterior of the product or on the product packaging, or in the product literature, which shall be supplied with the product or readily available online.

(c) The PMN, HVIN and ISED certification number are permitted to be etched, engraved, stamped, printed on the product, or placed on a label permanently affixed to a permanently attached part of the product.

(d) The PMN, HVIN and ISED certification number indicated on any product (including by electronic display) on the Canadian market must be listed in the REL.

(e) When the FVIN is the only differentiation between product versions (i.e. the PMN and HVIN remain the same for all versions) listed in the REL within a family certification, the FVIN shall be displayed electronically or stored electronically by the product and be easily retrievable.

(f) In all cases, the PMN, FVIN, HVIN and ISED certification number text shall be clearly legible.

The PMN, HVIN, ISED certification number and applicable FVIN are not required to be adjacent to each other.

The certification number is made up of a Company Number (CN) assigned by ISED's CEB, followed by the Unique Product Number (UPN) assigned by the applicant. The certification number format is:

IC: XXXXXX-YYYYYYYYYYY

The components of the certification number are explained as follows:

(a) "IC:" indicates that this is an ISED certification number, but is not part of the certification number. XXXXXX-YYYYYYYYYYY is the ISED certification number.

(b) XXXXXX is the CN assigned by ISED. Newly assigned CNs will be made up of five numeric characters (e.g. "20001") whereas existing CNs may consist of up to five numeric characters followed by an alphabetic character (e.g. "21A" or "15589J").

(c) YYYYYYYYYYY is the UPN assigned by the applicant, made up of a maximum of 11 alphanumeric characters.

(d) The CN and UPN are limited to numeric (0-9) and capital alphabetic (A-Z) characters only. The use of punctuation marks or other symbols, including "wildcard" characters, is not permitted.

(e) The HVIN may contain punctuation marks or symbols but they shall not represent any indeterminate ("wildcard") characters.

Example 1: A company has been assigned a CN of "21A" and wishes to use a UPN of "WILAN3" for one of its products. The full ISED certification number of this product would thus be: IC: 21A-WILAN3.

Example 2: A company has been assigned a CN of "20001" and wishes to use a UPN of "WILAN3" for one of its products. The full ISED certification number of this product would thus be: IC: 20001-WILAN3.

Example 3: A manufacturer wishes to use the characters "XX" as wildcards to indicate that these two characters are not fixed, but represent a range of characters decided by the manufacturer, where the HVIN would be 47XP-820K/A21XX or the ISED certification number would be IC: 21A-WILANXX. This practice is not permitted. However, this same sequence of symbols can be used as a valid HVIN if it identifies a single product version.

4.3 Module (Category I) and host product labelling requirements

Any product for which Modular Approval (MA) or Limited Modular Approval (LMA) is being sought shall meet the labelling requirements in section 4.2.

The Host Marketing Name (HMN) shall be displayed according to the e-labelling requirements of section 4.4 or indicated on the exterior of the host product or on the product packaging, or in the product literature, which shall be supplied with the host product or readily available online.

The host product shall be properly labelled to identify the modules within the host product.

The ISED certification label of a module shall be clearly visible at all times when installed in the host product; otherwise, the host product must be labelled to display the ISED certification number for the module, preceded by the word "contains" or similar wording expressing the same meaning, as follows:

Contains IC: XXXXXX-YYYYYYYYYY

In this case, XXXXXX-YYYYYYYYYY is the module's certification number.

For each certified module, the applicant shall provide the user with a host label as described above, or a description of the host product labelling requirements.

4.4 Electronic labelling (e-labelling)

Devices with an integrated display screen may have the required label information represented electronically in an e-label instead of on a physical label or nameplate.

Devices without an integrated display screen may have the labelling information represented through an audio message or a host device display screen connected by a physical connection, Bluetooth, Wi-Fi, or other, if the connection to a device with a display is mandatory for use.

Devices using e-labelling shall meet the requirements specified in annex B of this standard.

5. Receivers

5.1 Scanner receivers

Analog and digital scanner receivers require equipment certification and are covered under a specific RSS.

5.2 Stand-alone receivers operating in the band 30-960 MHz

A stand-alone receiver is defined as any receiver that is not permanently combined with a transmitter in a single case. (When in a transceiver, the receiver is a component of the transceiver and, therefore, is not a stand-alone receiver). Stand-alone receivers are classified as Category II equipment.

Stand-alone receivers that operate in the band 30-960 MHz shall comply with the limits for receiver–spurious emissions and AC power-line emissions set out in section 7 of this standard. Equipment certification is not required for these receivers. However, each unit shall bear the label "CAN RSS-Gen/CNR-Gen" and shall comply with the requirements in sections 4.1 and 4.4, as applicable.

5.3 Other receivers

All receivers that do not fall under sections 5.1 and 5.2 are exempt from any ISED certification, labelling and reporting requirements, but shall comply with the emission limits set forth in section 7 of this standard. Moreover, in the case of stand-alone receivers not operating in the band 30-960 MHz containing components which are covered by ICES, the applicable ICES shall apply, including its labelling requirement.

6. General administrative and technical requirements

Compliance with RSS-Gen and the limits set out in the applicable RSS shall be demonstrated using the methods of measurement specified in section 3.

6.1 Auxiliary equipment and accessories

Auxiliary equipment and accessories that are normally used with the transmitter and/or receiver shall be connected before the equipment is tested.

The emission tests shall be performed with the device and auxiliary equipment and accessories configured so as to produce the maximum level of emissions that can be expected under normal operating conditions.

6.2 Testing laboratory requirements

Testing laboratories performing measurements for RSSs must be recognized and listed on ISED's website. The procedure for testing laboratories to be recognized and listed is described in DES-LAB and REC-LAB for Canadian labs and foreign labs, respectively. Test sites currently listed with the CEB Test Site filing program and newly registered test sites will remain registered for 12 months from March 15, 2018. After this time, the CEB Test Site filing program will only maintain a list of recognized testing laboratories.

Testing laboratories used for compliance measurements shall meet any requirements for construction and/or validation contained within the normative reference test methods, with the exception that ISED only accepts the site voltage standing wave ratio (Svswr) test site validation method of CISPR 16-1-4:2010 over the frequency range of 1 GHz to 18 GHz.

6.3 Test report

A test report showing compliance with applicable RSSs shall be compiled to list the tests conducted and provide a description of each test, with the results demonstrating compliance with the technical requirements in RSS-Gen and applicable RSSs.

The test report shall clearly state which standards (e.g. RSS, ANSI) were used for the methods of measurement. The test report contents shall be in accordance with annex A of this document and the applicable standards (e.g. RSS, ANSI).

For equipment certification, the test report shall not be dated more than 12 months before the application for equipment certification is submitted. The tests within the test report may have been conducted more than 12 months before this date but must remain valid with the applicable requirements. In addition, the test report shall include the test laboratory company number assigned by ISED or the Conformity Assessment Body Identifier (CABID).

6.4 External controls

The device shall not have any external controls accessible to the user that enable it to be adjusted, selected or programmed to operate in violation of the regulatory requirements, including RSS-Gen and the applicable RSSs. Furthermore, information on internal adjustments, reconfiguration or programmability of the device which would in any way enable or cause the equipment to operate in violation of ISED requirements must be made available only to service depots and agents of the equipment supplier, and not to the public.

6.5 Near field measurement method for frequencies below 30 MHz

Below 30 MHz, measurements shall be taken in terms of magnetic field strength (H-field), using a loop antenna. Rod antennas are not permitted below 30 MHz. The permissible limits are given in microamperes per metre. The loop antenna's antenna factors shall be calibrated relative to magnetic field strength, i.e. in dB(S/m), or dB[$(\Omega m)^{-1}$] units or the linear equivalent.

When field strength measurements are specified for frequencies below 30 MHz, the field strength may be measured in the near field (i.e. at a distance of less than two wavelengths). The measured field strength shall be extrapolated to the distance specified using the formula indicating that the field strength varies as the inverse distance square (40 dB per decade of distance). It is also permissible to take measurements at a minimum of two distances on at least one radial to determine the actual extrapolation formula instead of using 40 dB per decade of distance; however, in this case, the radial(s) selected for measurements shall include where the highest emissions from the equipment under test are measured.

6.6 Measurement distance for frequencies above 30 MHz

At frequencies at or above 30 MHz, measurements shall not be taken in the near field, except where it can be shown that near-field measurements are appropriate due to the characteristics of the device or where it can be demonstrated that the signal levels cannot be detected by the measurement equipment at the distance specified in the applicable RSSs.

Measurements shall not be performed at a distance greater than 30 metres unless it is demonstrated, in the test report, that measurements taken at a distance of 30 metres or less are not practical. In such a case, it shall be further demonstrated in the test report that the measuring instrument (receiver or spectrum analyzer) is able to detect equipment under test (EUT) emissions with sufficient signal to noise ratio and that the measuring instrument's noise floor is at least 10 dB below the applicable limit.

When performing measurements at a distance other than the distance specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB per decade of distance (inverse linearly with distance for field strength measurements).

Final measurements shall be performed in accordance with the normative reference publication from section 3 of this standard and the applicable RSSs.

6.7 Occupied bandwidth (or 99% emission bandwidth) and x dB bandwidth

The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the "x dB bandwidth" is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

- The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.

- The detector of the spectrum analyzer shall be set to "Sample". However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or "Max Hold") may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.

- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

  Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

6.8 Transmit antenna

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum

permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).
When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

> *This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.*

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

6.9 Operating bands and selection of test frequencies

Except where otherwise specified, measurements shall be performed for each frequency band of operation, with the device operating at the frequencies in each band of operation as shown in table 1. The frequencies selected for measurements shall be documented in the test report.

Table 1 – Test frequencies in each operating band

Frequency range over which the device operates[Note 1] in each operating band	Number of test frequencies required	Location of test frequencies inside the operating frequency range[Note 1, 2]
≤ 1 MHz	1	near centre
> 1 MHz and ≤ 10 MHz	2	1 near high end, 1 near low end
> 10 MHz	3	1 near high end, 1 near centre, and 1 near low end

Note 1: The frequency range over which the device operates in a given operating band is the difference between the highest and lowest frequencies on which the device can be tuned within that given operating band. The frequency range can be smaller than or equal to the operating band, but cannot be greater than the operating band.

Note 2: In the third column of table 1, "near" means as close as possible to or at the centre / low end / high end of the frequency range over which the device operates.

6.10 CISPR quasi-peak and CISPR average detectors

The CISPR quasi-peak detector (also known as quasi-peak detector) and CISPR average detector shall comply with the characteristics given in CAN/CSA-CISPR 16-1-1:15.

As an alternative to the CISPR quasi-peak or average measurement, compliance with emissions limits can be demonstrated using a measuring instrument employing a peak detector function properly adjusted for factors such as pulse desensitization, as required, with a measurement bandwidth equal to, or greater than, the applicable CISPR quasi-peak bandwidth or 1 MHz bandwidth, for measurement below or above 1 GHz, respectively.

6.11 Transmitter frequency stability

Frequency stability is a measure of frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at an appropriate reference temperature and the rated supply voltage.

When the measurement method of transmitter frequency stability is not stated in the applicable RSS or reference standards, the following conditions apply:

(a) The reference temperature for radio transmitters is +20°C (+68°F).

(b) A hand-held device that is only capable of operating using internal batteries shall be tested at the battery's nominal voltage, and again at the battery's operating end-point voltage, which shall be specified by the equipment manufacturer. For this test, either a battery or an external power supply can be used.

(c) The operating carrier frequency shall be set up in accordance with the manufacturer's published operation and instruction manual prior to the commencement of these tests. No adjustment of any frequency-determining circuit element shall be made subsequent to this initial set-up.

With the transmitter installed in an environmental test chamber, the unmodulated carrier frequency and frequency stability shall be measured under the conditions specified below for licensed and licence-exempt devices, unless specified otherwise in the applicable RSS. A sufficient stabilization period at each temperature shall be used prior to each frequency measurement.

For licensed devices, the following measurement conditions apply:

(a) at the temperatures of -30°C (-22°F), +20°C (+68°F) and +50°C (+122°F), and at the manufacturer's rated supply voltage

(b) at the temperature of +20°C (+68°F) and at ±15% of the manufacturer's rated supply voltage

For licence-exempt devices, the following conditions apply:

(a) at the temperatures of -20°C (-4°F), +20°C (+68°F) and +50°C (+122°F), and at the manufacturer's rated supply voltage

(b) at the temperature of +20°C (+68°F) and at ±15% of the manufacturer's rated supply voltage

If the frequency stability limits are only met within a temperature range that is smaller than the range specified in (a) for licensed or licence-exempt devices, the frequency stability requirement will be deemed to be met if the transmitter is automatically prevented from operating outside this smaller temperature range and if the published operating characteristics for the equipment are revised to reflect this restricted temperature range.

If the device contains both licence and licence-exempt transmitter modules, the device's frequency stability shall be measured under the most stringent condition specified in the applicable RSS of the transmitter module.

In addition, if an unmodulated carrier is not available, the method used to measure frequency stability shall be described in the test report.

6.12 Transmitter output power

Before performing this measurement, the power of the EUT shall be set or controlled to the maximum rating of the range for which equipment certification or verification is sought.

Except where otherwise specified, tests shall be performed at the ambient temperature, at the manufacturer's rated supply voltage, and with the transmitter modulating signal representative (i.e. typical) of those encountered in a real system operation.

The spectrum analyzer shall be configured with a resolution bandwidth that encompasses the entire occupied bandwidth (see section 6.7) of the EUT. If the spectrum analyzer's largest available resolution bandwidth is smaller than the occupied bandwidth of the EUT, it is permitted to use a narrower resolution bandwidth plus numerical integration, in linear power terms, over the occupied bandwidth of the transmitter in order to measure its output power, except when the emission is a wideband noise-like signal and being measured for peak power. For transmitters with constant envelope modulation, RF output power and field strength measurements performed on the fundamental frequency can be carried out with an unmodulated carrier. The method used shall be described in the test report.

If the antenna is detachable, the transmitter output power may be measured at the antenna port using conducted measurement.

If the antenna is not detachable, field strength measurements shall be made using a test site that complies with the appropriate normative reference.

The following formula[Notes 1,2] may be used to convert measured electric field strength (FS), in Volts/metre, to transmitter output power delivered to the antenna (TP), in Watts:

$$TP = \frac{(FS \times D)^2}{30 \times G}$$

where *D* is the distance in metres between the measurement antenna and the transmit antenna (of the EUT) and *G* is the numerical gain of the transmit antenna, referenced to isotropic gain, in dBi.

Note 1: When performing radiated measurements on an open area test site or alternative test site, the influence of the metal ground plane on the maximum field strength value should be considered before calculating TP.

Note 2: The above formula is only valid if the measurement is performed under far-field conditions.

6.13 Transmitter unwanted emissions

6.13.1 Detector

When the unwanted emissions limits are defined in relative terms, the same parameter, peak power or average power, shall be used as the reference for both the transmitter's output power and the unwanted emissions measurements.

When the unwanted emissions limits are expressed in absolute terms, unless otherwise stated in the applicable RSS, the following conditions shall apply:

(a) Below 1 GHz, compliance with the limits shall be demonstrated using a CISPR quasi-peak detector and the related measurement bandwidth (see section 6.10).

(b) Above 1 GHz, compliance with the limits shall be demonstrated using a linear average detector (see section 6.10) with a minimum resolution bandwidth of 1 MHz.

6.13.2 Frequency range for measuring unwanted emission

In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated or used in the equipment, whichever is lower, without going below 9 kHz, up to at least the applicable frequency given below:

(a) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(b) If the equipment operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

(c) If the equipment operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise in the applicable RSS.

(d) If the equipment contains a digital device that is exclusively used for enabling the operation of the radio apparatus: the spectrum shall be investigated according to the conditions specified in paragraphs (a) through (c) of this section or the range applicable to the digital device, as shown in table 2, whichever is the higher frequency range of investigation.

Table 2 – Frequency range for radiated measurement for equipment with a digital device

Highest frequency generated, operated or used in the equipment (MHz)	Upper frequency limit of measurement range (MHz)
< 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
> 1000	5^{th} harmonic of the highest frequency or 40 GHz, whichever is lower

It is not necessary to report the amplitude of spurious emissions attenuated more than 20 dB below the permissible value.

7. Receiver emissions limits

7.1 General

Compliance with the limits set out in this section shall be demonstrated using the method of measurement described in ANSI C63.4, as per section 3.2 of this standard.

For emissions at frequencies below 1 GHz, measurements shall be performed using a CISPR quasi-peak detector and the related measurement bandwidth (see section 6.9). At frequencies above 1 GHz, measurements shall be performed using a linear average detector with a minimum resolution bandwidth of 1 MHz (see section 6.10). For AC power-line conducted emissions, both quasi-peak and average detectors having the characteristics specified in CAN/CSA-CISPR 16-1-1:15 for the 150 kHz to 30 MHz frequency range shall be employed, as per table 4.

7.2 AC power-line conducted emissions limits

The receiver shall comply with the conducted emissions limits specified in section 8.8 on its AC power-line input cable(s), or on the AC power-line input cable(s) of the device powering the receiver under test, when the receiver has no provisions for direct connection to the AC power network and is instead powered through another device.

7.3 Receiver radiated emissions limits

Radiated emission measurements shall be performed with the receiver antenna connected to the receiver antenna ports. The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is higher, to at least five times the highest tunable or local oscillator frequency, whichever is higher, without exceeding 40 GHz.

Spurious emissions from receivers shall not exceed the radiated emissions limits shown in table 3.

Table 3 – Receiver radiated emissions limits

Frequency (MHz)	Field strength (µV/m at 3 metres)[Note 1]
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Note 1: Measurements for compliance with the limits in table 3 may be performed at distances other than 3 metres, in accordance with section 6.6.

7.4 Receiver conducted emissions limits

If the receiver has a detachable antenna of known impedance, an antenna-conducted spurious emissions measurement is permitted as an alternative to radiated measurement. However, the radiated method of section 7.3 is preferred.[4]

The antenna-conducted test shall be performed with the antenna disconnected and with the receiver antenna port connected to a measuring instrument having equal input impedance to that specified for the antenna. The RF cable connecting the receiver under test to the measuring instrument shall also have the same impedance to that specified for the receiver's antenna.

The spurious emissions from the receiver at any discrete frequency, measured at the antenna port by the antenna-conducted method, shall not exceed 2 nW in the frequency range 30-1000 MHz and 5 nW above 1 GHz.

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[4] Audit testing performed by ISED to confirm compliance will use the radiated method for measuring receiver-spurious emissions. If the radiated limits are exceeded or, as a result of an interference complaint, it is determined that the device's spurious emissions cause harmful interference to other authorized users of the spectrum, ISED may require the party responsible for compliance to take corrective action. Therefore, it is recommended that the radiated method be employed.

8. Licence-exempt radio apparatus

In addition to meeting the requirements in other sections of this standard, licence-exempt radio apparatus in the 200 and 300 series of RSSs shall meet the requirements of this section 8 where applicable.

8.1 Measurement bandwidths and detector functions

Unless otherwise specified, for all frequencies equal to or less than 1 GHz, the emission limits for licence-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a CISPR quasi-peak detector function, with the exception of the frequency ranges 9-90 kHz and 110-490 kHz, where the emission limits are based on measurements employing a linear average detector. The measurement bandwidth to be used depends on the measured frequency and shall be as specified in CAN/CSA-CISPR 16-1-1:15 for the required type of detector to be used for measurements.

If an average limit is specified for the EUT, then the peak emission shall also be measured with instrumentation properly adjusted for factors such as pulse desensitization to ensure that the peak emission is less than 20 dB above the average limit.

If an average measurement is specified for wanted emissions, a linear average detector having a bandwidth equal to or greater than the occupied bandwidth shall be used to make the measurement.

8.2 Pulsed operation

When the field strength or envelope power is not constant or it is in pulses, and an average detector is specified to be used, the value of field strength or power shall be determined by averaging over one complete pulse train during which the field strength or power is at its maximum value, including blanking intervals within the pulse train, provided that the pulse train does not exceed 0.1 seconds. In cases where the pulse train exceeds 0.1 seconds, the average value of field strength or output power shall be determined during a 0.1 seconds interval during which the field strength or power is at its maximum value.

The exact method of calculating the average field strength shall be described in the test report.

For pulse modulated devices with a pulse-repetition frequency of 20 Hz or less and for which CISPR quasi-peak measurements are specified, compliance shall be demonstrated using measuring instrumentation employing a peak detector function, properly adjusted for such factors as pulse desensitization, using the same measurement bandwidths that are indicated for CISPR quasi-peak measurements.

8.3 Prohibition of amplifiers

Unless otherwise specified in the applicable RSS, the manufacture, importation, distribution, lease, sale or offering for sale of RF power amplifiers for use with licence-exempt radio apparatus is prohibited.

8.4 User manual notice

In addition to containing other required statements specified elsewhere in this standard or in the applicable RSS, user manuals for licence-exempt radio apparatus shall contain the following text, or an equivalent notice, that shall be displayed in a conspicuous location, either in the user manual or on the device, or both:

> *This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:*
>
> *(1) This device may not cause interference.*
> *(2) This device must accept any interference, including interference that may cause undesired operation of the device.*

8.5 Measurement of licence-exempt devices on-site (in-situ)

In the case of licence-exempt devices for which measurements are required to be performed at the end user's or manufacturer's location, such as perimeter protection systems and level probing sensors, the on-site / in-situ method of measurement in ANSI C63.10 shall be used.

8.6 Operating frequency range of devices in master/slave networks

A master device is a device that can operate in a mode in which it is able to transmit without first receiving an enabling signal, and to select a channel and initiate a network by sending enabling signals to other devices. A slave device is a device operating in a mode in which the transmissions of the device are under the control of the master device. A device in slave mode is not able to initiate a network.

Slave devices may be certified outside the designated licence-exempt frequency band specified in the applicable RSS, provided that they operate only under the control of a master device. This provision does not apply to master devices. Slave devices that can also act as master devices must meet the requirements of a master device.

Master devices that use location awareness technology, such as GPS, or those that can connect to a GPS device or use remote technology, such as a secure database, to auto-configure a certified device for the correct frequency and power levels—all without user interaction—are also permitted to be certified. Such configurations must be capable of "locking in" the correct frequencies and operating at the appropriate power levels without requiring user override.

8.7 Radio frequency identification (RFID) devices

Active RFID tags that operate from their own source of power and actively transmit identification data shall comply with the applicable RSS.

Passive RFID tags that do not use their own source of power for transmission, but send identification data by passively returning energy received from an RFID reader's interrogating signal, are exempt from any ISED certification, testing and labelling requirements. In order to qualify for this exemption, the RFID tag shall either have no battery or other source of power, or, if it does, it shall not use its own

source of power for its radio transmission function (i.e. the passive RFID tag is permitted to use its own source of power for other functions, such as temperature monitoring or memory management, or for improving its receiving sensitivity).

8.8 AC power-line conducted emissions limits

Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the limits in table 4, as measured using a 50 μH / 50 Ω line impedance stabilization network. This requirement applies for the radio frequency voltage measured between each power line and the ground terminal of each AC power-line mains cable of the EUT.

For an EUT that connects to the AC power lines indirectly, through another device, the requirement for compliance with the limits in table 4 shall apply at the terminals of the AC power-line mains cable of a representative support device, while it provides power to the EUT. The lower limit applies at the boundary between the frequency ranges. The device used to power the EUT shall be representative of typical applications.

Table 4 – AC power-line conducted emissions limits

Frequency (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56[1]	56 to 46[1]
0.5 – 5	56	46
5 – 30	60	50

Note 1: The level decreases linearly with the logarithm of the frequency.

For an EUT with a permanent or detachable antenna operating between 150 kHz and 30 MHz, the AC power-line conducted emissions must be measured using the following configurations:

(a) Perform the AC power-line conducted emissions test with the antenna connected to determine compliance with the limits of table 4 outside the transmitter's fundamental emission band.

(b) Retest with a dummy load instead of the antenna to determine compliance with the limits of table 4 within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network that simulates the antenna in the fundamental frequency band.

8.9 Transmitter emission limits

Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter’s fundamental emission.

Table 5 – General field strength limits at frequencies above 30 MHz

Frequency (MHz)	Field strength (µV/m at 3 m)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Table 6 – General field strength limits at frequencies below 30 MHz

Frequency	Magnetic field strength (H-Field) (µA/m)	Measurement distance (m)
9 - 490 kHz [1]	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

8.10 Restricted frequency bands

Restricted frequency bands, identified in table 7, are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following conditions related to the restricted frequency bands apply:

(a) The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands listed in table 7 except for apparatus compliant with RSS-287, *Emergency Position Indicating Radio Beacons (EPIRB), Emergency Locator Transmitters (ELT), Personal Locator Beacons (PLB), and Maritime Survivor Locator Devices (MSLD)*.

(b) Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.

(c) Unwanted emissions that do not fall within the restricted frequency bands listed in table 7 shall comply either with the limits specified in the applicable RSS or with those specified in table 5 and table 6.

Table 7 – Restricted frequency bands*

MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 - 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138	--	

* Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

8.11 Frequency stability

If the frequency stability of the licence-exempt radio apparatus is not specified in the applicable RSS, the fundamental emissions of the radio apparatus should be kept within at least the central 80% of its permitted operating frequency band in order to minimize the possibility of out-of-band operation. In addition, its occupied bandwidth shall be entirely outside the restricted bands and the prohibited TV bands of 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-602 MHz, unless otherwise indicated.

9. Glossary of commonly used RSS terms and definitions

This list of terms and definitions covers the commonly used measurement terminology in all Radio Standards Specifications.

Term	Definition
Authorized bandwidth	The maximum width of the band of frequencies used to derive spectrum masks.
Average power (transmitter)	The value of the power supplied to an antenna transmission line by a transmitter, averaged over the modulation period. This is the power that would be indicated by a thermal power metre.
Class A digital apparatus / information technology equipment (ITE)	A digital apparatus or ITE that is by virtue of its characteristics, highly unlikely to be used in a residential environment, including a home business. Characteristics considered in this assessment include price, marketing and advertising methodology, the degree to which the functional design inhibits applications suitable to residential environments, or any combination of features that would effectively preclude the use of such equipment in a residential environment.
Class B digital apparatus / ITE	A digital apparatus or ITE that cannot be classified as Class A.
Effective radiated power (ERP or e.r.p.)	The product of the power supplied to the antenna and its gain relative to a half wave dipole in a given direction.
Emission	Electromagnetic transmission through radiated means by an electric or electronic device, or conducted by such a device through its attached wired interfaces. These emissions can be either intentional or non-intentional.
Emission designator	The designation of a set of characteristics of the intentional radiated emission of a radio transmitter by standard symbols (e.g. type of modulation of the main carrier, modulating signal, type of information to be transmitted and also, if appropriate, any additional signal characteristics). For example, designator 20K0FID means a necessary bandwidth (or occupied bandwidth) of 20.0 kHz, uses frequency modulation, is single channel and is in the data/digital format.
Envelope power (transmitter)	The value of the power supplied to an antenna transmission line by a transmitter, averaged over the period of the carrier. The envelope power varies in time with the modulation frequency.

Term	Definition
Equivalent isotropically radiated power (EIRP or e.i.r.p.)	The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.
Firmware Version Identification Number (FVIN)	The FVIN identifies the firmware version used by the product, which controls/affects the RF characteristics of the product.
Hardware Version Identification Number (HVIN)	The HVIN identifies hardware specifications of a product version. The HVIN replaces the Model Number in the legacy E-filing System. An HVIN is required for all products for certification applications.
Harmonic emissions	Emissions located at frequencies that are integer multiples of the fundamental frequency emissions of the transmitted signal.
Host Marketing Name (HMN)	The HMN is the name or model number of a final product, which contains a certified radio module.
Intentional radiator	A device that intentionally generates and emits radio frequency energy by radiation, induction or conduction.
Mean power (of a radio transmitter)	The average power supplied to an antenna transmission line by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions.
Modulation deviation limiting	The ability of a transmitter circuit to prevent the transmitter from producing modulation deviation in excess of rated system deviation.
Necessary bandwidth	The width of a frequency band that is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions for a given class of intentional emission.
Occupied bandwidth	The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to 0.5% of the total emitted power. This is also known as the “99% emission bandwidth”. 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.
Out-of-band emissions	Emissions on a frequency or frequencies immediately outside the necessary bandwidth, which result from the modulation process, but exclude spurious emissions.
Parasitic emissions	Spurious emissions accidentally generated at frequencies which are independent of the carrier or characteristic frequency of an emission and of frequencies of oscillations resulting from the generation of the carrier or characteristic frequency.
Peak envelope power	The maximum value of the envelope power, over all possible normal operating conditions of the transmitter.
Power spectral density	The power per unit bandwidth.

Term	Definition
Product Marketing Name (PMN)	The PMN is the name or model number under which the product will be marketed / offered for sale in Canada. If the product has a PMN, it must be provided.
Radiation	The outward flow of electromagnetic energy from any source in the form of radio waves.
Radio apparatus module	A radio apparatus that cannot function by itself and must be incorporated in another (host) device to be able to operate. Such a module could be manufactured, and marketed and certified (if it is Category I) by a third party.
Radio apparatus subassembly/subcircuit	A circuit or assembly that provides a radio apparatus function to a more complex device (i.e. which also includes functions other than radiocommunication) and is an integral and inseparable part of that device (e.g. on the same printed circuit board as the rest of the device circuitry).
Receiver spurious emissions	The radio frequency signals generated or used within the receiver that may cause interference to other equipment, under all normal operating conditions, including the period during which the receiver is scanning or switching channels.
Receiver spurious emissions – conducted	Those emissions generated or used in a receiver and appearing at the receiver's antenna port. The manufacturer may or may not include the receiver's multi-coupling, filtering and pre-amplification equipment into the measurement, depending on whether the receiver is to be certified as a stand-alone component or as part of an overall multi-coupling/pre-amplification system.
Receiver spurious emissions – radiated	Those emissions generated or used in a receiver and radiated from the receiver either via its antenna, from its enclosure, and/or via the control, power, audio cables or any other cables attached to the wired interfaces of the receiver.
Scanner receiver	Receivers that scan a frequency band or bands and demodulate and/or decode the signals. Receivers used in some devices (e.g. devices with listen-before-talk feature) for the purpose of detecting existing RF energy in order to avoid transmission on occupied frequencies are not classified as scanner receivers.
Spurious emissions	Emissions on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.
Standard input termination	Standard input termination consists of a termination equal to the load into which the receiver is designed to operate.
Standard output termination	Standard output termination consists of a termination equal to the load into which the transmitter is designed to operate.

Term	Definition
Standard test voltage	The primary voltage applied to the input end of the power cable normally connected to the equipment. It shall be within ± 2% of the value stated by the manufacturer to be the normal working voltage.
Transient frequency behaviour	The measure of the difference, as a function of time, of the actual transmitter frequency to the assigned transmitter frequency when the transmitted RF output power is switched on or off.
Transmitter output power	The RF power dissipated in the standard output termination when operating under the maximum power setting and in all typical operating conditions, as declared by the applicant for approval.
Unintentional radiator	A device that generates RF energy that is not intended to be radiated for reception by a radio receiver.
Unique Product Number (UPN)	The UPN is assigned by the applicant and made up of a maximum of 11 alphanumeric characters (A-Z, 0-9).
Unwanted emissions	Comprised of out-of-band emissions (i.e. emissions on a frequency or frequencies immediately outside the necessary bandwidth) and spurious emissions.

Annex A (normative) – Test report contents

The test report shall contain, at a minimum, the following components:

(1) a title identifying the equipment, the product version (PMN, HVIN, FVIN, HMN as applicable) and the applicable RSSs

(2) the date of the report

(3) the name, Conformity Assessment Body Identifier (CABID), postal address of the test facility, and location (postal address) where the tests were actually carried out

(4) the name and postal address of the manufacturer of the EUT

(5) the name(s), function(s) and signature(s), or equivalent identification, of the person(s) responsible for the test report

(6) a unique identifier on the test report (such as a test report number)

(7) a table of contents, an identifier on every page indicating that the page is part of the test report, and a clear mention on the last page of the test report indicating the end

(8) a description along with unambiguous identification of the EUT, i.e. model and serial numbers (If for any reason more than one sample is required, each specific test shall identify which unit was tested.)

(9) for each EUT, a description of its physical configuration (e.g. connected wired interfaces and corresponding arrangement during testing) and operation (e.g. external and internal exercising method, including software configuration and firmware number—see also item (12) below)

(10) a summary of all the tests listed in the RSS and a reference to the test method that applies to the specific EUT. The summary should also note whether the EUT passed or failed each applicable requirement, in particular in the following areas:

   (a) the rated transmitter power

   (b) the type of modulation, with a brief description giving any useful information to aid prospective users in understanding the device, such as but not limited to the bit rate and symbol rate

   (c) all frequency band(s) of operation

   (d) the occupied bandwidth(s), channel bandwidth(s) and the emission designator(s)

   (e) if the device is pulsed, a graphical representation shall be reported, depicting a typical encoded pulse train, showing pulse widths and amplitudes in the time domain, as well as the method of power calculation and the type of detector used during testing

(f) the frequency stability and supporting information

(g) a list of all antennas—including relevant information such as but not limited to the antenna type, the antenna gain, and the antenna input impedance—intended for use with the device. The test report shall also clearly identify the specific antenna (by description, model and serial numbers) used for each test.

(11) photographs of the EUT and any manufacturer-supplied accessories that are used with the EUT under normal operating conditions and that are relevant to the purpose of performing the testing of the EUT

(12) any tune-up or adjustment procedures employed during the testing of the EUT, along with the identification and description of any operating software/firmware used in both the normal operating mode and the special test modes for compliance testing

(13) the measurement uncertainty for each test case, as applicable

(14) the following information for each test provision, as deemed applicable:

(a) all requirements for which the device is tested

(b) operating conditions for the EUT (including firmware, specific software settings, and input/output signal levels to/from the EUT)

(c) a description of the firmware or software used to operate the EUT for testing purposes

(d) the results of each test in the form of tables, spectrum analyzer plots, charts, sample calculations, and so on, as appropriate

(e) the test equipment used, identified by type, manufacturer, serial number or other identifier and the date on which the next calibration or service check is due

(f) any modifications made to the device

(g) a description and a block diagram of the test setup

(h) photographs of the test setup if they are relevant to the ability to reproduce the test results; the information provided must clearly indicate the configuration of all EUT and all support equipment used during testing

(i) the name(s) of the person(s) who has (have) performed the tests

(15) except where otherwise specified, measurements shall be performed for each frequency band of operation for which the radio apparatus is to be certified, or in which it operates (for Category II apparatus), with the device operating at the frequencies in each band of operation as per the requirements in section 6.9, table 1. The frequencies selected for measurements shall be reported in the test report

(16) additional requirements as indicated in the applicable RSSs or in the applicable test method standard as per section 3

Annex B (normative) – Electronic labelling (e-labelling) requirements

The sections below detail the requirements that apply to e-labelling.

B1. Information to be displayed

The e-label must display the following regulatory information:

(a) the ISED certification number and the model identification number for radio equipment

(b) any other information required to be provided on the surface of the device, unless such information is permitted to be included in the user manual or other packaging inserts

B2. Accessibility of the e-label

Users shall be provided with clear instructions on how to access the regulatory information stored electronically (e-label). These instructions shall meet the following requirements:

(a) be provided in the user manual, operating instructions or packaging material (e.g. on the bags used to pack the device or on accompanying leaflets), or on a website related to the product

(b) not require the use of special access codes or accessories (e.g. SIM/USIM cards)

(c) not include more than three steps from the device's main menu

The e-label shall meet the following requirements:

(a) be easily accessible by the user

(b) not be modifiable by the user (e.g. if stored in the firmware or software menus)

The equipment authorization application must clearly include the instructions for accessing regulatory information, as per section B1, stored electronically.

B3. Labelling for importation and purchasing

Products utilizing e-labels are required to have a physical label on the product packaging at the time of importation, marketing and sales. The following conditions shall apply:

(a) For devices imported in bulk (not packaged individually), a removable adhesive label or, for devices in protective bags, a label on the bags is acceptable to meet the physical label requirement.

(b) Any removable label used shall survive normal shipping and handling and must only be removed by the customer after purchase. For devices already imported in individual packages ready for sale, the information may alternatively be provided on the package and shall contain:

(i) The ISED certification number and the model identification number

(ii) Any other information required to be provided on the surface of the product unless such information is permitted to be included in the user manual or other packaging inserts.

B4. Security

The information to be displayed on the e-label, as per section B1, shall meet the following security requirements:

(a) be programmed by the responsible party (e.g. manufacturer)

(b) not be modifiable or removable during the course of normal authorized activities by a third party (i.e. the typical user), such as installing applications or accessing menus

B5. User manual and packaging

All information required to be on the packaging or in the user manual as per the applicable standards (e.g. RSSs) must be provided, even if the user manual and packaging components are provided electronically. Such information may be included in the device's e-label. The following considerations must be taken into account when providing such information on the e-label:

(a) If the user manual is provided by other electronic (e.g., on CD or online), then as an option the required information may also be provided as part of the e-label.

(b) The e-label format must clearly differentiate between the information required to be on the surface of the device and the information required to be in the user manual or on the packaging.

B6. Devices approved as certified transmitter modules

Devices approved as certified transmitter modules may have their ISED certification number displayed electronically if the module or the host in which it is integrated has a display screen. In such cases, all e-labelling requirements apply.

If the certified transmitter module provides a secure electronic exchange interface with authentication between the host with integrated display and the module to identify the correct ISED certification, then the host may display the module's ISED certification number on the host's built-in display. In such cases, the following conditions apply:

(a) The module may be either user-installable or factory-installed.

(b) The application for equipment authorization for such modules shall include a description of the secure electronic exchange protocol and the security of such an arrangement.

(c) The module must bear a physical label with its own ISED certification number unless it also has an integrated display.

If the certified transmitter module does not provide a secure electronic exchange interface with authentication, the host manufacturer may electronically display the module's ISED certification number

on the host by factory-encoding the ISED certification number of the module. In such cases, the following conditions apply:

(a) Factory encoding must be secure and locked by the host manufacturer, and not modifiable by any third parties.

(b) The programmed information must display the ISED certification number of the module, preceded by the words "contains transmitter module", or the word "contains", or similar wording expressing the same meaning, as follows:

“Contains transmitter module IC: XXXXXX-YYYYYYYYYYY”

In this case, XXXXXX-YYYYYYYYYYY is the module's certification number.

Multiple modules in a host can be electronically displayed as “Contains transmitter modules IC: XXXXXX-YYYYYYYYYYY1, XXXXXX-YYYYYYYYYYY2”, etc.