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Spectrum Management and Telecommunications

Radio Standards Specification

General Requirements for Compliance of Radio Apparatus

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Canada

Preface

Industry Canada's Radio Standard Specifications (RSSs) describe the various technical requirements and processes to be followed when demonstrating compliance of radio apparatus that is used for radiocommunication other than broadcasting.

This document will come into force upon publication on the Industry Canada website. Upon publication, the public will have 120 days to submit comments. Comments received will be taken into account in the preparation of the next version of this document.

List of Changes:

- (1) This new issue of RSS-Gen, Issue 4, has been entirely modified. There are numerous changes to the content including the numbering of each section. Consequently, all changes may not be captured in this list.
- (2) The title of the standard has changed from *General Requirements and Information for the Certification of Radio Apparatus* in Issue 3, to *General Requirements for Compliance of Radio Apparatus*.
- (3) Section 3: Normative reference publications have been added.
- (4) Section 4: Requirements to obtain an exemption have been added.
- (5) Section 5: The section on receiver requirements has been revised as per Regulatory Standards Notice 2012-DRS0126.
- (6) Section 8: Requirements for licence-exempt radio apparatus are now all included in one section of RSS-Gen, which is in addition to the specific requirements in an RSS-200 series standard.

Inquiries concerning regulatory radio standards may be directed to the following address:

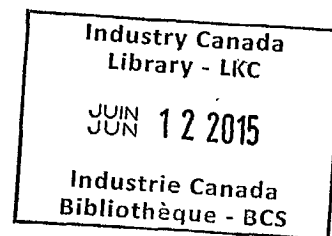
Industry Canada
Engineering, Planning and Standards Branch
Attention: Regulatory Standards
JETN, 235 Queen Street
Ottawa, Ontario K1A 0H5

E-mail: res.nmr@ic.gc.ca

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

Issued under the authority of
The Minister of Industry

Daniel Duguay
Acting Director General
Engineering, Planning and Standards Branch



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1. Scope

Radio Standards Specification RSS-Gen, Issue 4, *General Requirements for Compliance of Radio Apparatus* (formerly titled *General Requirements and Information for the Certification of Radiocommunication Equipment*), sets out the general requirements for radio apparatus used for radiocommunication other than broadcasting. This document must be used in conjunction with other Radio Standards Specifications (RSSs) for compliance with Industry Canada requirements.

2. Purpose and Application

This Radio Standards Specification (RSS-Gen) sets out the general requirements applicable to radio apparatus used for radiocommunication other than broadcasting.¹

RSS-Gen must be used in conjunction with the RSS containing the technical requirements applicable to the type of radio apparatus being tested. Except where otherwise specified in the applicable RSS and/or in a Regulatory Standards Notice, radio apparatus shall comply with the specifications and methods prescribed in RSS-Gen.

2.1 Certification of Radio Apparatus

The application for equipment certification shall be submitted in accordance with Industry Canada's Radio Standards Procedure RSP-100, *Radio Equipment Certification Procedure* which sets out the requirements for certification and labelling of radio apparatus. RSP-100 shall be used in conjunction with RSS-Gen and other Radio Standards Specifications (RSSs) specifically applicable to the type of radio apparatus for which certification is sought.

2.1.1 Certification Body (CB)

A Certification Body (CB)² is an independent domestic or foreign organization that is authorized by the Government of Canada to certify radio equipment to certain Canadian regulatory requirements. CBs are recognized under the terms of mutual recognition agreements/arrangements.³

2.2 Categories of Radio Equipment

Radio apparatus are classified into two categories, Category I equipment and Category II equipment.

¹ The term "broadcasting" refers to any radiocommunication in which the transmissions are intended for direct reception by the general public.

² A certification body (CB) is designated under an international agreement, convention or treaty — to which Canada is a party and that is recognized by Canada under that agreement, convention or treaty — as competent to certify equipment and issue a certificate, to the effect that the equipment complies with the applicable standards.

³ Agreements/arrangements are signed by Department of Foreign Affairs and Trade (DFATD) and are available on its [website](http://www.international.gc.ca), <http://www.international.gc.ca>, under *Trade Negotiations and Agreements*.

(i) **Category I Equipment**

Category I equipment, which is comprised of radio apparatus which requires a technical acceptance certificate (TAC), pursuant to subsections 4(2) of the *Radiocommunication Act* and 21(1) of the *Radiocommunication Regulations*. Either the Certification and Engineering Bureau of Industry Canada (the Bureau) or a recognized Certification Body (CB) may issue a TAC.

(ii) **Category II Equipment**

Category II equipment⁴ is comprised of radio apparatus which must meet prescribed standards, but which does not require a TAC. Category II equipment is certification-exempt. The manufacturer, importer and/or distributor shall, however, ensure that Category II equipment complies with all applicable procedures and standards.

2.3 Exclusions

2.3.1 Broadcasting Equipment

Radio Standard Specifications do not apply to radio apparatus intended for general public broadcasting services. Furthermore, RSSs do not apply to broadcasting equipment, including broadcasting receivers and broadcast satellite receivers. Such equipment is regulated by the Department's Radio Standards Procedure (RSP-100) and its broadcasting equipment technical standards (BETS).

2.3.2 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 the Department's *Interference-Causing Equipment Standards* (ICES).

2.3.3 Radio Apparatus Containing Digital Circuits (ICES-003)

Any radio apparatus that is specifically subject to an Industry Canada Radio Standards Specification (RSS) requirement and contains information technology equipment (ITE device) is not subject to the Interference-Causing Equipment Standard ICES-003, *Information Technology Equipment (ITE) — Limits and Methods of Measurement*, provided that the ITE is used only to enable operation of the radio apparatus and that the ITE does not control additional functions or capabilities; otherwise, ICES-003 applies. In both cases, the labelling requirements of the applicable RSS apply, rather than the labelling requirements in ICES-003.

⁴ See *Radiocommunication Regulations* (SOR/96-484), December 11, 2011.

2.4 Determination of Interference

As per the *Radiocommunication Regulations*, the following applies to all radiocommunication equipment, regardless of whether the equipment complies with applicable standards and whether applicable standards exist for the equipment.

Where the Department determines that one or more product versions of equipment (with applicable product marketing name (PMN), hardware version identification (HVIN), firmware version identification number (FVIN) or host marketing name (HMN) cause or are likely to cause interference to radiocommunication or suffer from or are likely to suffer from adverse effects of electromagnetic energy, the Department 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 the Department determines that a unit of equipment causes or suffers from interference or adverse effects of electromagnetic energy, the Department 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 Reference Publications

This regulatory standard (RSS-Gen) refers to the following publications, and where such references are made, they shall be to the editions listed below. If there are discrepancies between the requirements stated in RSS-Gen or in the applicable RSS, on one hand, and in the relevant text of the publications referenced in this section, on the other, then the text in RSS-Gen and/or the applicable RSS shall take precedence. From time to time, the Department may release notices associated with the compliance requirements of radio apparatus. These notices will be posted at the following web link: http://www.ic.gc.ca/eic/site/ceb-bhst.nsf/eng/h_tt00096.html.

The Department may consider methods of measurement not covered by an Industry Canada RSS and/or a reference publication. Please consult the radio standards group and/or the certification bureau to determine the acceptability of any alternative method of measurement. Send an e-mail to the following address(es): res.nmr@ic.gc.ca and/or certification.bureau@ic.gc.ca.

(a) Reference Publication for Methods of Measurement

ANSI C63.4-2014, *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*

(b) Reference Publication for Licence-Exempt Radio Apparatus

ANSI C63.10-2013, *American National Standard for Testing Unlicensed Wireless Devices*

(c) Reference Publication for Licensed Radio Apparatus

The Accredited Standards Committee ASC C63 committee is currently developing ANSI C63.26 for licensed transmitters. Please continue to use the applicable RSS⁵ and for any additional enquiries regarding the method of measurement, send an e-mail to the following address: res.nmr@ic.gc.ca.

Note: Upon the release of ANSI C63.26, *American National Standard for Testing Licensed Transmitters*, this standard will be reviewed to determine if it should be adopted as a normative method of measurement for licensed transmitters.

A copy of each of these standards can be purchased online at: <http://www.ieee.org>.

3.1 Radio Standards Procedure RSP-100

RSP-100, which sets out the requirements for certification and labelling of radio apparatus, shall be used in conjunction with RSS-Gen. Compliance with the requirements in RSP-100 is mandatory to obtain equipment certification. See also Section 2.1 of this RSS-Gen.

3.2 Radio Frequency Exposure (RSS-102)

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

3.3 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.

3.4 Other Related Documents

Industry Canada documents are available on the Spectrum Management and Telecommunications website at <http://www.ic.gc.ca/spectrum> under *Official Publications*.

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

TRC-43 *Designation of Emissions (Including Necessary Bandwidth and Classification), Class of Station and Nature of Service*

A glossary of terms and definitions associated with technical requirements of radio apparatus is available in Section 9.

⁵ The measurement guidance and procedures provided in the latest versions of KDB 971168, June 7, 2013 may also be used, available at: <https://apps.fcc.gov/oetcf/kdb/index.cfm>.

4. Application for an Exemption

An applicant would only succeed in a request to be exempted from complying with the requirements of an RSS in cases of unique or unusual circumstances in which exemption would serve the best interests of consumers and the general public. The Department reserves the right to reject any application for an exemption based on its own determination.

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

1. 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);
2. a detailed rationale as to why the equipment does not comply with the RSS requirements;
3. the technical and operational specifications of the radio apparatus or system, including any additional information that may help in the evaluation;
4. a detailed rationale of technical feasibility indicating why an exemption would benefit consumers and the public;
5. a detailed description as to the nature of the proposal, including the geographic service boundaries;
6. the make, product version (PMN, HVIN, FVIN, HMN as applicable) and frequency range of the radio equipment being used, including how the interoperability works between the U.S. and Canada and outlining what minimum specifications are required;
7. the product version(s) (PMN, HVIN, FVIN, HMN as applicable) (statistical analysis, formulas, IEEE papers, etc.) and the variables used to calculate spectrum requirements;
8. a complete technical description of the proposed equipment, including the method of transmitter identification, augmented by block diagrams and system coverage maps;
9. a complete description of the operation of the technology chosen, including rationalization for the power levels, antenna types and antenna patterns;
10. the total number of data users, the total number of active users and the total number of mobile and base stations required; and
11. a detailed description for data rates and structure including:
 - a. the manufacturer-specified raw data rate and throughput;
 - b. a description of which information is carried from mobile-to-base and base-to-mobile;
 - c. the amount of time required to transmit and receive information from a mobile or portable data unit;

- d. a diagram of a sample packet, including overhead information as well as total and individual packet byte sizes; and
- e. the type of modulation technique used to modulate the carrier and the bandwidth required for each channel.

Please e-mail the required information to Industry Canada's Regulatory Standards office at the following address, res.mmr@ic.gc.ca, or send it by postal mail to:

Industry Canada
Regulatory Standards
Engineering, Planning and Standards Branch
Attention: Manager of Regulatory Standards
Industry Canada
365 Laurier Avenue West
Ottawa, Ontario
K1A 0C8 Canada

5. Receivers

Receiver emission limits are detailed in Section 7 of this standard.

5.1 Scanner Receivers

Scanner receivers (analog and digital) require equipment certification and are covered under a specific RSS.

5.2 Stand-Alone Receivers Operating in the Band 30-960 MHz (Category II)

A stand-alone receiver is defined as any receiver that is not permanently combined with a transmitter in a single case (a transceiver), in which it functions as the receiver component of the transceiver.

Stand-alone receivers that operate in the band 30 MHz-960 MHz shall comply with the limits for receiver-spurious emissions set out in RSS-Gen. Testing is required, and the manufacturer, importer or distributor shall ensure that the results are compiled into a test report to be made available to Industry Canada upon request. Equipment certification is not required for these receivers; however, labelling is required.

Text for the Industry Canada Compliance Label: **CAN RSS-Gen/CNR-Gen.**

5.3 Receivers Exempted From Industry Canada Requirements (Category II)

Only radiocommunication receivers operating in stand-alone mode within the band 30-960 MHz, as well as scanner receivers, are subject to Industry Canada requirements, as described above. All other receivers are exempted from any Industry Canada certification, testing, labelling and reporting requirements.

However, all receivers in all frequency bands shall comply with the limits set forth in RSS-Gen even in cases where testing, reporting and/or certification are not required.

6. Technical Requirements

Compliance with RSS-Gen and the limits set out in the applicable RSS shall be demonstrated using the methods of measurement described in the publication referenced in Section 3. Where there are discrepancies between the requirements as stated in RSS-Gen or the applicable RSS, and the requirements stated in the publications referenced in this section, the text in RSS-Gen and/or the applicable RSS shall take precedence.

Associated equipment that is 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 accessories configured so as to produce the maximum level of emissions within the range of variation that can be expected under normal operating conditions.

6.1 Test Site Facilities

Test site facilities performing measurements on radio apparatus shall be registered with Industry Canada. A test site registration number will be provided that identifies the specific test site facility where testing will take place. The renewal of the test site facility's registration shall be every three years.

For any apparatus operating below 1 GHz, the test site shall comply with the requirements in ANSI C63.4-2014. For any apparatus operating above 1 GHz, the test site shall comply with site voltage standing wave ratio (VSWR) requirements specified in the International Special Committee on Radio Interference (CISPR) CISPR 16-1-4:2010 over the frequency range of 1 GHz to 18 GHz.⁶

6.1.1 Test Site Facilities – Accredited Site

The following information shall be submitted to Industry Canada to register or renew an accredited test site facility:

- (a) a cover letter describing the type of application (i.e. registration or renewal) and existing IC registration number, if applicable;
- (b) the physical location and the postal address of the test site;
- (c) the control number or asset number of the test site;
- (d) photos of the test site (inside and out) seeking registration/renewal;

⁶ A transition period ending December 31, 2015, is provided; within this period, compliance with ANSI C63.4-2009 will be accepted below and above 1 GHz. After this date, only compliance with ANSI C63.4-2014 and CISPR 16-1-4: 2010, respectively, will be accepted.

- (e) a copy of a valid accreditation certificate from a recognized accreditation body;⁷ and
- (f) a copy of the scope of accreditation including ANSI C63.4-2014 and/or CISPR 16-1-4: 2010, as applicable.

There is no fee or form associated with test site registration. Submissions may be filed electronically. The website address is: http://www.ic.gc.ca/eic/site/ceb-bhst.nsf/eng/h_tt00016.html.

6.1.2 Test Site Facilities – Non-Accredited Site

Applicants must submit the following information to Industry Canada to register or renew a non-accredited test site facility:

- (a) a cover letter describing the type of application (i.e. registration or renewal) and the existing IC registration number, if applicable;
- (b) the physical location and the postal address of the test site;
- (c) the control number or asset number of the test site;
- (d) photos of the test site (inside and out) seeking registration/renewal; and
- (e) a complete site validation test report demonstrating compliance with ANSI C63.4-2014 and/or CISPR 16-1-4: 2010, as applicable (for below and/or above 1 GHz, respectively).

After December 31, 2016, Industry Canada will no longer accept non-accredited test facility sites.

There is no fee or form associated with test site registration. Submissions may be filed electronically. The website address is: http://www.ic.gc.ca/eic/site/ceb-bhst.nsf/eng/h_tt00016.html.

6.2 Test Report

Persons applying for equipment certification must compile a test report reflecting the tests conducted at their facility and listing a record of the tests as well as how their results demonstrate compliance with the technical requirements in RSS-Gen and the applicable RSS. The test report, including all tests detailed within, shall not be older than 12 months at the time when the application for equipment certification is submitted.

The test report shall clearly state which reference publication from RSS-Gen, Section 3, provided the methods of measurement, including the test methods referenced in the applicable RSS. The test report contents shall be in accordance with Annex A of this standard, as well as the reference publication used from Section 3, along with the requirements in the applicable RSS.

In the test report, the applicant for equipment certification shall include the test site facility's IC registration number.

⁷ For these purposes, "recognized accreditation body" is an organization that has been recognized as a member of the International Laboratory Accreditation Cooperation (ILAC).

6.3 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 Industry Canada requirements must be made available only to service depots and agents of the equipment supplier, and NOT to the public.

6.4 Near Field Measurement Method Below 30 MHz

When field strength measurements are specified for frequencies below 30 MHz, the field strength may be measured in the near field [i.e. the measurement distance less than wavelength/(2π)]. 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 proper extrapolation formula instead of using 40 dB.

Below 1.705 MHz, measurements shall be taken in terms of magnetic field strength (H-field), using a loop antenna. Note that rod antennas are not permitted below 30 MHz. The permissible limits are given in microamperes per metre. The loop antenna's antenna factors in electric field terms can be calibrated to read in microvolts per metre where $E/H = 377\Omega$ is the formula used in the conversion.

6.5 Measurement Distance Above 30 MHz

At frequencies at or above 30 MHz, exploratory measurements may be performed at a distance other than what is specified in the normative reference publication from Section 3 of this standard. 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 normative reference publication.

Measurements shall not be performed at a distance greater than 30 metres unless it is possible to demonstrate that measurements taken at a distance of 30 metres or less are not practical. When performing measurements at a distance other than that which has been specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear 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 RSS.

6.6 Occupied Bandwidth

The emission bandwidth (x dB) is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated x dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth.

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

Note: Video averaging is not permitted.

A peak, or peak hold, may be used in place of the sampling detector as this may produce a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold may be necessary to determine the occupied bandwidth if the device is not transmitting continuously.

The trace data points are recovered and are 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 99% occupied bandwidth.

6.7 Transmitter Antenna for Licensed Radio Apparatus

As per RSP-100, each applicant for equipment certification must provide a list of all antenna types that may be used with the transmitter, indicating the maximum permissible antenna gain (in dBi).

When a measurement at the antenna connector is used to determine 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, including the antenna type used.

In addition, applicants shall perform RF power and spurious emission measurements with each antenna type supplied or specified by the manufacturer for use with the transmitter.

6.8 Operating Bands and Selection of Test Frequencies

Except where otherwise specified, measurements shall be performed for each frequency band of operation for which the radio apparatus is to be certified, with the device operating at the frequencies in each band of operation shown in Table 1 below. The frequencies selected for measurements shall be reported in the test report.

Table 1 – Frequency Range of Operation

Frequency Range Over Which the Device Operates (in each Band)	Number of Measurement Frequencies Required	Location of Measurement Frequency in Band of Operation
1 MHz or less	1	centre
1 MHz to 10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near centre and 1 near low end

6.9 CISPR Quasi-peak Detector

The CISPR quasi-peak detector (also known as CISPR detector or quasi-peak detector) shall comply with the characteristics given in Publication #16 of the International Special Committee on Radio Interference (CISPR) of the International Electrotechnical Commission. The detector has a bandwidth of 200 Hz for the band 9 kHz-150 kHz, 9 kHz for the band 150 kHz-30 MHz, and 120 kHz for the band 30 MHz-1000 MHz.

6.10 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, including blanking intervals within the pulse train, as long as the pulse train does not exceed 0.1 second. In cases where the pulse train exceeds 0.1 second, the average value of field strength or output power shall be determined during a 0.1 second interval during which the field strength or power is at its maximum value.

The exact method of calculating the average field strength shall be submitted with the application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

6.11 Transmitter Frequency Stability

In circumstances when the transmitter frequency stability is not stated in the applicable RSS or reference measurement method, the following applies:

- 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. Unless specified otherwise in an RSS applicable to the device, the reference temperature for radio transmitters is +20°C (+68°F);
- 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 must be specified by the equipment manufacturer. For this test, either a battery or an external power supply can be used; and

- 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 shall be measured under the conditions specified below. A sufficient stabilization period at each temperature shall be used prior to each frequency measurement. The following temperatures and supply voltage ranges apply, unless specified otherwise in the applicable RSS:

- (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; and
- (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 -30°C to +50°C range specified in (a), 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.

In addition, if an unmodulated carrier is not available, the measurement method shall be described in the test report.

6.12 Transmitter Output Power

If the RF output power is internally or externally adjustable or remotely controllable, set or control the power to the maximum rating of the range for which equipment certification is sought.

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

If the spectrum analyzer's largest available resolution bandwidth is smaller than the emission bandwidth of the device under test, when measuring emission power, a resolution bandwidth narrower than that specified, plus numerical integration in linear power terms to sum the transmitter output power, are permitted. 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 calibrated open area test site or alternative test site.

The following formula may be used to convert field strength (FS) in volts/metre to transmitter output power (TP) in watts:

$$TP = (FS \times D)^2 / (30 \times G)$$

where D is the distance in metres between the two antennas and G is the antenna numerical gain referenced to isotropic gain. (Note: 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.)

Measure and record the transmitter output power using a measurement bandwidth equal to or greater than the emission bandwidth of the transmitter, or use power summation as described above. When power summation is used, the transmitter output power shall be integrated over the equipment's occupied bandwidth.

6.13 Transmitter Unwanted Emissions

The measurement method shall be described in the test report. When the applicable unwanted emissions limits are defined in relative terms, the same parameter, peak power or average power, used for the transmitter's output power measurement shall also be used for the unwanted emission measurements.

In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the 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: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

Particular attention should be paid to harmonics and sub-harmonics of the carrier frequency, as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value need not be reported.

When limits are expressed in absolute terms, compliance with the emission limits below 1000 MHz shall be demonstrated using a CISPR quasi-peak detector and the related measurement bandwidth. As an alternative to CISPR quasi-peak measurement, compliance with the emission limits can be demonstrated using measuring equipment employing a peak detector function properly adjusted for factors such as pulse desensitization as required, with an equal or greater measurement bandwidth relative to the applicable CISPR quasi-peak bandwidth.

Above 1000 MHz, compliance with the emission limits shall be demonstrated using an average detector with a minimum resolution bandwidth of 1 MHz.

7. Receiver Limits

Compliance with the limits set out in RSS-Gen, as well as in the applicable RSS for the device, shall be demonstrated using the method of measurement that is described in Section 3.

7.1 Receiver Emission Limits

Receivers, as defined in Section 5, are required to comply with the limits of spurious emissions as set out in this section. Receiver emission measurements are to be performed as per the normative test method referenced in Section 3.

For emissions at frequencies below 1 GHz, measurements shall be performed using a CISPR quasi-peak detector and the related measurement bandwidth. At frequencies above 1 GHz, measurements shall be performed using a linear average detector with a minimum resolution bandwidth of 1 MHz.

As an alternative to CISPR quasi-peak or average measurements, compliance with the emission limit can be demonstrated using measuring equipment 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, respectively.

7.1.2 Receiver Radiated Limits

Radiated emission measurements shall be performed with the receiver antenna connected to the receiver antenna terminals. 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 5x the highest tunable or local oscillator frequency, whichever is higher, without exceeding 40 GHz.

Spurious emissions from receivers shall not exceed the radiated limits shown in Table 2 below:

Table 2 – Receiver Radiated Limits

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3 metres)*
30-88	100
88-216	150
216-960	200
Above 960	500

* Measurements for compliance with limits in the above table may be performed at distances other than 3 metres, in accordance with Section 6.5.

7.1.3 Receiver Conducted 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 7.1.2 is preferred.⁸

The antenna-conducted test shall be performed with the antenna disconnected and with the receiver antenna terminals connected to a measuring instrument having equal impedance to that specified for the antenna.

The receiver-spurious emissions measured at the antenna terminals by the antenna-conducted method shall then comply with the following limits:

Receiver-spurious emissions at any discrete frequency shall not exceed 2 nW in the band 30-1000 MHz, nor 5 nW above 1000 MHz.

8. Licence-Exempt Radio Apparatus

Licence-exempt devices (a.k.a. unlicensed wireless devices) shall be measured using the method of measurement described in the publications referenced in Section 3 that are applicable to licence-exempt devices. Typically, technical requirements for licence-exempt radio apparatus are included in the 200 and 300 series of RSS standards.

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. The measurement bandwidth to be used with the CISPR detector function depends on frequency and is specified in CISPR 16-1-1 or ANSI C63.2. As an alternative to CISPR quasi-peak measurements, compliance with the limits can be demonstrated using a peak detector function, properly adjusted for factors such as pulse desensitization as required, with an equal or greater bandwidth relative to the applicable CISPR quasi-peak bandwidth.

Unless otherwise specified, for all frequencies greater than 1 GHz, the radiated emission limits for licence-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a linear average detector function having a minimum resolution bandwidth of 1 MHz.

⁸ Audit testing performed by the Department 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, the Department may require the party responsible for compliance to take corrective action. Therefore, it is recommended that the radiated method be employed.

If an average limit is specified for the equipment under test (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 emission bandwidth shall be used to make the measurement.

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

8.2 Amplifiers

Except as may be set out in a specific RSS, the marketing of RF power amplifiers for use with licence-exempt radio apparatus is prohibited.

8.3 Transmitter Antenna for Licence-Exempt Radio Apparatus

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level.⁹ When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

User manuals for transmitters equipped with detachable antennas shall also contain the following notice in a conspicuous location:

This radio transmitter (identify the device by certification number) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi).

⁹ Compliance is required under all operational combinations of transmitter output power and antenna gain.

8.4 User Manual Notice for Licence-Exempt Radio Apparatus

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 complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and*
- (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 equipment for which measurements are required to be performed at the end user's or manufacturer's location, the 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 in which it is able to select a channel and initiate a network by sending enabling signals to other devices. A network always has at least one device operating in master mode. A slave device is a device operating in a mode in which the transmissions of the device are under control of the master device. A device in slave mode is not able to initiate a network.

Slave devices operating in a master/slave network may be certified even if they are capable of operating outside the licence-exempt frequency bands permitted for the devices by the applicable RSS, provided that they operate only in their permitted licence-exempt frequency bands under the control of a master device. Master devices marketed within Canada must be capable of operating only in the licence-exempt frequency bands permitted for the device by applicable Industry Canada standards. 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 authorized for use upon acceptance by Industry Canada. 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 when interrogated by an RFID reader device, must comply with the applicable RSS standard.

Passive RFID tags that do not have their own source of power, but send identification data by passively returning energy received from an RFID reader's interrogating signal, may operate without approval from Industry Canada.

8.8 AC Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus

A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz-30 MHz, shall not exceed the limits in Table 3.

Unless the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in Table 3 below. The more stringent limit applies at the frequency range boundaries.

The conducted emissions shall be measured in accordance with the reference publication mentioned in Section 3.

Table 3 – AC Power Line Conducted Emissions Limits

Frequency (MHz)	Conducted limit (dB μ V)	
	Quasi-Peak	Average**
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* The level decreases linearly with the logarithm of the frequency.

** A linear average detector is required.

8.9 Transmitter Emission Limits for Licence-Exempt Radio Apparatus

Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in Table 4 or Table 5 below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

Table 4 – General Field Strength Limits for Licence-Exempt Transmitters at Frequencies Above 30 MHz

Frequency (MHz)	Field Strength (μ V/m at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960*	500

* Unless otherwise specified, for all frequencies greater than 1 GHz, the radiated emission limits for licence-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a linear average detector function having a minimum resolution bandwidth of 1 MHz. If an average limit is specified for the EUT, then the peak emission shall also be measured with instrumentation properly adjusted for such factors as pulse desensitization to ensure the peak emission is less than 20 dB above the average limit.

Note: Transmitting devices are not permitted in restricted frequency bands unless stated otherwise in the specific RSS.

Table 5 – General Field Strength Limits for Licence-Exempt Transmitters at Frequencies Below 30 MHz

Frequency	Electric Field Strength ($\mu\text{V/m}$)	Magnetic Field Strength (H-Field) ($\mu\text{A/m}$)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/377F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1,705-30 MHz	30	N/A	30

Note: The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector. Transmitting devices are not permitted in restricted frequency bands unless stated otherwise in the relevant RSS.

8.10 Restricted Frequency Bands

Restricted bands, identified in Table 6, are designated primarily for safety-of-life services (distress calling and certain aeronautical bands), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following restrictions apply:

- Fundamental components of modulation of licence-exempt radio apparatus shall not fall within the restricted bands of Table 6 except for apparatus complying under RSS-287;
- Unwanted emissions that fall into restricted bands of Table 6 shall comply with the limits specified in RSS-Gen; and
- Unwanted emissions that do not fall within the restricted frequency bands of Table 6 shall comply either with the limits specified in the applicable RSS or with those specified in this RSS-Gen.

Table 6 – Restricted Frequency Bands *

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

* Certain frequency bands listed in Table 6 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in the 200- and 300-series of RSSs, such as RSS-210 and RSS-310, which contain the requirements that apply to licence-exempt radio apparatus.

8.11 Frequency Stability for Licence-Exempt Transmitters

Transmitter frequency stability for licence-exempt radio apparatus shall be measured in accordance with Section 6.11. For licence-exempt radio apparatus, the frequency stability shall be measured at temperatures of -20°C (-4°F), +20°C (+68°F) and +50°C (+122°F) instead of at the temperatures specified in Section 6.11.

If the frequency stability of the licence-exempt radio apparatus is not specified in the applicable standard (RSS), measurement of the frequency stability is not required provided that the occupied bandwidth of the licence-exempt radio apparatus lies entirely outside the restricted bands and the prohibited TV bands of 54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-806 MHz.

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. These definitions are to be used only with RSSs.

Term	Definition
AC wire carrier current device	A device that is intended for and which transmits RF energy via the AC wire lines in residential and/or office buildings.
Auditory assistance device	A device used to provide auditory assistance to a person with a hearing impairment, or for auditory assistance in theatres, churches, etc.
Authorized bandwidth	The maximum width of the band of frequencies used to derive spectrum masks:
Active average power (single phase)	The time average of the values of active power when the active power varies slowly over a specified period of time. This situation is normally encountered because electric system voltages or currents or both are regularly quasi-periodic. The average active power is readily obtained by dividing the energy flow during the specified period of time, by the time.
Class A digital apparatus	Digital apparatus that is marketed for use in commercial, industrial or business environments, and not intended for use in homes.
Class B digital apparatus	Digital apparatus that is marketed for use in any environment (e.g. in residential, commercial, business and industrial environments).
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	Radiation produced, or the production of radiation, by a radio transmitting station.

Term	Definition
Emission designator	The designation of a set of characteristics of an emission 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 bandwidth of 20.0 kHz, uses frequency modulation, is single channel and is in the data/digital format.
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.
Field disturbance sensor	A device that establishes an RF field in its vicinity and detects changes in that field resulting from the movement of persons or objects within its range (e.g. motion detector or burglar alarm).
Harmonic emissions	Emissions located at frequencies that are whole multiples of the centre frequency emissions of the transmitted signal.
Intentional radiator	A device that intentionally generates and emits radio frequency energy by radiation or induction.
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 deviation in excess of rated system deviation.
Necessary bandwidth	The width of the frequency band which 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 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 emitted power. This is also known as the <i>99% emission bandwidth</i> . 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 average power supplied to an antenna transmission line by a transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions.

Term	Definition
Perimeter protection system	A field disturbance sensor that employs a leaky transmission line as the radiating source and allows detection of movement within the protected range.
Power line carrier system	A system employing radio frequencies used by an electric power utility company on AC transmission lines for protective relaying, telemetry, etc., for general supervision of the power system. It excludes the electric lines which connect the distribution transformer to the customer's premises.
Power spectral density	The power per unit bandwidth.
Radiation	The outward flow of energy from any source in the form of radio waves.
Receiver-spurious emissions	The radio frequency signals generated within the receiver which may cause interference to other equipment. This includes the period during which the equipment is scanning or switching channels.
Receiver-spurious emissions – antenna conducted	Those emissions generated in a receiver and appearing at receiver antenna terminals. The manufacturer may or may not include the receiver multi-coupling, filtering and pre-amplification equipment for the measurement, depending on whether the receiver is to be certified as a stand-alone component or as a part of an overall multi-coupling/pre-amplification system.
Receiver-spurious emissions – antenna radiated	Those emissions generated in a receiver and radiated from the receiver either via the antenna path or via the control, power, and audio cables that may be used with the receiver.
Remote control device	A radiocommunication device that transmits one-way, non-voice signals for control of an associated receiving device located at a distance from the transmitter.
Scanner receiver	Receivers which scan a frequency band or bands and demodulate and/or decode the signals. Receivers used for the purpose of detecting RF energy and avoiding 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. Its value shall be specified by the manufacturer or applicant and recorded in the test report.

Term	Definition
Standard output termination	Standard output termination consists of a termination equal to the load into which the transmitter is designed to operate. Its value shall be specified by the manufacturer or applicant and recorded in the test report.
Standard temperature	Standard temperature shall be 25 degrees Celsius \pm 5 degrees Celsius.
Standard test voltage	The primary voltage applied to the input end of the power cable normally connected to the equipment. It shall be within \pm 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 rated duty cycle selected by the applicant for approval.
Unintentional radiator	A device that generates RF energy which is not intended to be radiated for reception by a radio receiver.
Unwanted emissions	Comprised of out-of-band emissions (i.e. emissions on a frequency or frequencies immediately outside the necessary bandwidth), harmonic emissions and spurious emissions.

Annex A – Test Report Contents (Normative)

The following list is from ASC C63 and has been amended. The test report shall contain at a minimum the following:

- (a) a title (identifying the equipment, the product version (PMN, HVIN, FVIN, HMN as applicable) and the RSS providing the most relevant testing instructions);
- (b) the date of the report;
- (c) the name and postal address of the test facility and the location (postal address) where the tests were actually carried out;
- (d) the name and postal address of the manufacturer of the EUT;
- (e) the name(s), function(s) and signature(s), or equivalent identification, of (a) person(s) responsible for the test report;
- (f) a unique identifier on the test report (such as a test report number);
- (g) a table of contents and on every page, an identifier that indicates that a page is part of the test report. Furthermore, the end of the test report shall be clearly identified;
- (h) a description along with unambiguous identification of the EUT. If more than one sample is required, for such technical reasons as the need to use connected units (i.e. systems) for the purpose of conducted output power testing — and where the product units will have integral antennas — each specific test shall identify which unit was tested;
- (i) a summary of all the tests listed in the RSS and a reference to the test method that applies to a specific EUT. The summary should also note whether the EUT passed or failed in the following areas
 - (1) the rated transmitter power;
 - (2) 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;
 - (3) all frequency band(s) of operation;
 - (4) the occupied bandwidth(s), channel bandwidth(s) and the emission designator(s);
 - (5) 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;
 - (6) the frequency stability and supporting information; and

- (7) a list of all antennas — including relevant information such as (but not limited to) the antenna type and the antenna gain — intended for use and to be tested with the device.
- (j) 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;
- (k) 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;
- (l) a statement to the effect that the results relate only to the items tested;
- (m) the measurement uncertainty of the instruments;
- (n) the following information for each test provision, as deemed applicable:
 - (1) all requirements for which the device is tested;
 - (2) operating conditions for the device under test (including firmware, specific software settings, and input/output signal levels to the EUT);
 - (3) a description of the firmware or software used to operate the EUT for testing purposes;
 - (4) the results of each test in the form of tables, spectrum analyzer plots, charts, sample calculations, and so on, as appropriate;
 - (5) 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;
 - (6) any modifications made to the device;
 - (7) a description and a block diagram of the test setup;
 - (8) 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; and
 - (9) the name(s) of the person(s) who has(have) performed the tests;
- (o) except where otherwise specified, measurements shall be performed for each frequency band of operation for which the radio apparatus is to be certified, with the device operating at the frequencies in each band of operation shown in Table A1 below. The frequencies selected for measurement shall be reported in the test report; and

Table A1 – Frequency Range of Operation

Operating Frequency Range (in each Band)	Number of Measurement Frequencies Required	Location of Measurement Frequency in Band of Operation
1 MHz or less	1	centre
1 MHz to 10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near centre and 1 near low end

(p) additional requirements as indicated from any applicable RSS.

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General requirements for compliance of
radio apparatus

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