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General Requirements and Information for the Certification of Radio Apparatus

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Preface

Radio Standards Specification-Gen, Issue 3, *General Requirements and Information for the Certification of Radio Apparatus* (formerly titled *General Requirements and Information for the Certification of Radiocommunication Equipment*), sets out general requirements for and provides information on the certification of apparatus that is used for radiocommunication other than broadcasting. This document must be used in conjunction with other Radio Standards Specifications (RSSs) specifically applicable to the type of radio apparatus for which certification is sought.

This document will be in force as of the publication date of *Canada Gazette* notice SMSE-016-10, after which the public has 120 days to make comments. Comments received will be considered, and a new issue or a revised version of this issue may be developed.

List of Changes:

(1)	**Title Page:**	The title of this RSS has been changed from *General Requirements and Information for the Certification of Radiocommunication Equipment* to *General Requirements and Information for the Certification of Radio Apparatus* to reflect the correct term as defined in the *Radiocommunication Act.* In various sections throughout the document, the term "radiocommunication equipment" was likewise replaced with "radio apparatus."
(2)	**Section 2.2:**	Classification of receivers has been revised for clarification.
(3)	**Section 3.2 Test Report:**	This section has been abolished and its contents merged with Section 4.3.
(4)	**Section 3.2.2 (new):**	New section added for modular transmitter approval general requirements.
(5)	**Section 4.1:**	Text has been amended to allow the use of either ANSI C63.4-2003 or later editions of that standard as reference for test facilities and methods.
(6)	**Section 4.2:**	Editorial changes have been made to clarify text.
(7)	**Section 4.3:**	Editorial changes have been made to clarify text. Paragraph (i) has been revised to harmonize measurement frequency selection with international standards and ANSI C63.4.
(8)	**Section 4.4:**	The measurement bandwidth of 200 Hz of a CISPR quasi-peak meter for the frequency range 9-150 kHz has been added.

(9)	**Section 4.6:**	Definitions of -20 dB and -10 dB emission bandwidths have been added (new sections 4.6.3 and 4.6.4).
(10)	**Section 4.7:**	The procedure has changed. The user is now required to report the method used.
(11)	**Section 4.8:**	Editorial changes have been made to clarify text.
(12)	**Section 4.9:**	Upper frequency measurement requirement has been revised to 100 GHz for unwanted emissions from transmitters operating above 10 GHz.
(13)	**Section 4.10:**	Receiver spurious emissions requirement has been revised to harmonize with international standards developments.
(14)	**Section 5.1:**	New text for quality control provisions has been added.
(15)	**Section 5.2:**	Editorial changes have been made to clarify text.
(16)	**Section 5.3 (new):**	This section mentions user manual statements and includes a line on bilingual statements, moved from the beginning of Section 2. Subsequent subsections within Section 5 have been renumbered accordingly.
(17)	**Section 6:**	Editorial changes have been made to clarify text.
(18)	**Section 7.1.3:**	Paragraph containing rules for adding antenna gain to output power for comparison with limits has been removed.
(19)	**Section 7.1.4:**	User manual requirements have been clarified.
(20)	**Section 7.1.8 (new):**	General information for radio frequency identification (RFID) devices transferred from RSS-210 and text has been clarified.
(21)	**Section 7.2.2:**	Table (restricted bands) has been transferred from RSS-210 and RSS-310 to RSS-Gen.
(22)	**Section 7.2.3:**	Text pertaining to detector function for measurement of low pulse repetition rate pulse transmitters for which quasi-peak limits are specified has been added.
(23)	**Section 7.2.4:**	This section for receiver spurious requirements is identical to Section 6; therefore, this section has been removed and merged with Section 6.

(24) **Section 7.2.5:** Tables (general field limits) have been transferred from RSS-210 and RSS-310 to RSS-Gen. Provision that spurious emissions must never exceed the level of the transmitter's fundamental emission has been added.

(25) **Section 8 (Glossary of Terms):** In the definition of Perimeter Protection System, the term "antenna" has been replaced with "radiating source."

Enquires may be directed to www.ic.gc.ca/res_general

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

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Contents

1. Scope

1.1 Application

This Radio Standards Specification (RSS) sets out general requirements applicable to Industry Canada certification of 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 concerned, and under which it must be certified. Except where otherwise specified in the applicable RSS, radio apparatus shall comply with the specifications and methods prescribed in RSS-Gen.

All sections of RSS-Gen except Section 7 generally apply both to radio apparatus that is subject to licensing and radio apparatus that is exempt from licensing. Section 7 generally applies only to radio apparatus that is exempt from licensing.

1.2 Exclusions

1.2.1 Broadcasting Equipment

RSSs, including RSS-Gen, do not apply to radio apparatus intended for general public broadcasting services. Such equipment is regulated by the Department's broadcasting equipment procedures and standards.

1.2.2 Interference-Causing Equipment

Interference-causing equipment, which is equipment other than radio apparatus that is capable of causing interference to radiocommunication, is covered by the Department's Interference-Causing Equipment Standards (ICES). Examples of interference-causing equipment for which ICES are published are digital apparatus and industrial, medical and scientific (ISM) radio frequency generators.

2. General Information

2.1 Categories of Radio Equipment

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

2.1.1 Category I Equipment

Category I equipment comprises radio apparatus for which a technical acceptance certificate (TAC) is required pursuant to subsections 4(2) of the *Radiocommunication Act* and 21(1) of the *Radiocommunication Regulations*. A TAC may be issued by the Certification and Engineering Bureau

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

of Industry Canada (the Bureau) or a certificate may be issued by a recognized Certification Body (CB).[2]

2.1.2 Category II Equipment

Category II equipment comprises radio apparatus for which standards have been prescribed, but for which a TAC is not required. Category II equipment is certification exempt. Therefore, a TAC from Industry Canada or a certificate from a CB is not required, pursuant to subsection 4(3) of the *Radiocommunication Act*. The manufacturer and/or importer shall ensure compliance with all applicable procedures and standards for Category II equipment.

2.2 Receivers

Receivers that are used for radiocommunication other than broadcasting are defined as Category I equipment or Category II equipment, subject to compliance with applicable Industry Canada standards. Receivers shall be capable of operation only with transmitters for which RSSs are published. Receivers are classified as described in sections 2.2.1 and 2.2.2.

2.2.1 Category I Equipment Receivers

A receiver is classified as Category I equipment if it meets one of the following conditions:

(a) a stand-alone receiver (see **Note 1**, below), which operates on any frequency in the band 30-960 MHz, and is used for the reception of signals in that frequency band from a transmitter classified as Category I equipment;

(b) a Citizen's Band (CB) receiver (26.96-27.410 MHz);

(c) a scanner receiver.

Note 1: A *stand-alone receiver* is defined as any receiver that is not permanently combined together with a transmitter in a single case (transceiver), in which it functions as the receiver component of the transceiver.

Receivers classified as Category I equipment shall comply with the limits for receiver spurious emissions set out in RSS-Gen; however, equipment certification is granted under the applicable RSS standard along with the associated transmitter classified as Category I equipment. Scanner receivers are covered under their own specific RSS.

[2] The subject of a certificate issued by a foreign certification body that 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, to the effect that the equipment complies with the applicable standards; or the subject of a certificate issued by a Canadian Certification Body that meets the requirements set out in requirements for Certification Bodies, as amended from time to time, published by Industry Canada, to the effect that the equipment complies with the applicable standards.

2.2.2 Category II Equipment Receivers

A receiver is classified as Category II equipment if it does not meet any of the conditions of Section 2.2.1.

Category II receivers shall comply with the applicable testing, labelling and user manual requirements in RSS-310.

2.3 Licence-exempt Radio Apparatus

Certain types of radio apparatus are permitted to operate without licensing from Industry Canada. These are typically low output power devices that are intended primarily for consumer or commercial applications; however, some are intended for applications in law enforcement, medical and other specialized applications.

Licence-exempt radio apparatus shares spectrum with licensed radio services and must operate on a no-interference, no-protection basis. Licence-exempt radio apparatus may not cause radio interference to, and cannot claim protection from interference caused by, licensed radio services.

General requirements for licence-exempt radio apparatus are contained in Section 7.

2.4 Licensing of Radio Apparatus

Many types of radio apparatus require a radio licence issued by Industry Canada, which sets the terms and conditions under which the radio apparatus may be operated.

Ordinarily, radio apparatus subject to licensing is classified as Category I equipment (requiring equipment certification under an RSS), and certification must be obtained before the equipment is eligible to be licensed. Whether a type of radio apparatus is subject to licensing is stated in the applicable RSS.

Inquiries concerning licensing requirements should be directed to Industry Canada District and Regional Offices located in the geographical areas of Canada where the equipment is intended to be used.

2.5 Related Documents

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

The following documents should be consulted:

ANSI C63.4 *Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz*

CPC-2-0-03 *Radiocommunication and Broadcasting Systems*

CS-03 *Compliance Specification for Terminal Equipment, Terminal Systems, Network Protection Devices, Connection Arrangements and Hearing Aids Compatibility*

DC-01 *Procedure for Declaration of Conformity and Registration of Terminal Equipment*

ICES-003 *Digital Apparatus*

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

RSP-100 *Radio Apparatus Certification Procedure*

CB-03 *Requirements for the Certification of Radio Apparatus to Industry Canada's Standards and Specifications*

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

TRC-49 *Certification Service Fees*
Information on the Application of the Telecommunications Apparatus Technical Assessment and Testing Fees Order Made under the Financial Administration Act

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ANSI – American National Standards Institute
CB – Certification Body – Procedures for Conformity Assessment Bodies
CPC – Client Procedures Circular
CS – Compliance Specification
DC – Declaration of Conformity, Terminal Attachment Program Procedure
ICES – Interference-Causing Equipment Standard
RIC – Radiocommunication Information Circular
RSP – Radio Standards Procedure
TRC – Telecommunications Regulation Circular

3. Equipment Certification of Radio Apparatus

3.1 Application for Equipment Certification

The application for equipment certification shall be prepared and submitted in accordance with Industry Canada's procedural document RSP-100, *Radio Equipment Certification Procedure*, which describes the equipment certification procedure, or the equivalent Certification Body document. A test report shall be submitted with the application for certification.

Test reports submitted by the applicants should not be dated more than one year old from the date of the application for equipment certification. Test reports dated more than one year old should be revalidated to ensure compliance with current applicable Industry Canada standards. Before equipment certification is granted, the applicant shall demonstrate compliance with the applicable Industry Canada standards.

3.2 Modular Approval for Category I Equipment or Category II Equipment

Modular approval permits the installation of the same module in a host device or multiple host devices without the need to recertify the device. Equipment certification for a modular device may be sought for either Category I equipment or Category II equipment.

Transmitters designed as modules for the installation in a host device may obtain equipment certification as a modular device provided that the applicable RSS is met and the following conditions in this section are met.

3.2.1 Labelling Requirements for the Host device

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

The Industry Canada certification label of a module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labelled to display the Industry Canada 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
> where XXXXXX-YYYYYYYYYYY is the module’s certification number.

The applicant for equipment certification of the module shall provide with each unit of the module either a label such as described above, or an explanation and instructions to the user as to the host device labelling requirements.

3.2.2 Equipment Certification Requirements for Modular Transmitters

To obtain equipment certification for a modular device, the application for equipment certification shall include a cover letter in which the applicant requests modular approval for the transmitter concerned. The application for equipment certification shall also include the following completed checklist demonstrating that the modular transmitter complies with each of the following conditions:

Modular Approval Checklist:

Modular approval requirement	Yes	No *
(a) The radio elements must have the radio frequency circuitry must be shielded. Physical/discrete and tuning capacitors may be located external to the shield, but must be on the module assembly.		
(b) The module shall have buffered modulation/data input(s) (if such inputs are provided) to ensure that the module will comply with the requirements set out in the applicable RSS standard under conditions of excessive data rates or over-modulation.		
(c) The module shall have its own power supply regulation on the module. This is to ensure that the module will comply with the requirements set out in the applicable standard regardless of the design of the power supplying circuitry in the host device which houses the module.		
(d) The module shall comply with the provisions for external power amplifiers and antennas detailed in this standard. The equipment certification submission shall contain a detailed description of the configuration of all antennas that will be used with the module.		
(e) The module shall be tested for compliance with the applicable standard in a stand-alone configuration, i.e. the module must not be inside another device during testing.		
(f) The module shall comply with the Category I equipment labelling requirements.		
(g) The module shall comply with applicable RSS-102 exposure requirements, which are based on the intended use/configurations.		
(h) Is the modular device for an Industry Canada licensed exempt service?		

* Please provide a detailed explanation if the answer is “No.”

3.2.3 Limited Modular Approval (LMA)

LMA may be granted when one or more of the requirements in the table above cannot be demonstrated.

LMA will also be issued in those instances where applicants can demonstrate that they will retain control over the final installation of the device, such that compliance of the end product is assured. In such cases, an operating condition on the LMA for the module must state that the module is only approved for use when installed in devices produced by a specific manufacturer.

When LMA is sought, the application for equipment certification must specifically state how control of the end product into which the module will be installed, and will be maintained, such that full compliance of the end product is always ensured.

3.3 Connection with the Public Switched Network

Radio apparatus that is designed to connect to the public switched network must comply with the applicable RSS and CS-03. It must also be registered in accordance with DC-01.

4. Measurement Methods

4.1 Methods, Instrumentation, and Facilities for the Measurement of Radio Frequency (RF) Signals and Noise Emitted from Radio Apparatus

Test facilities, test methods for field strength radiated measurement and measurements of unwanted emissions into the AC power supply network shall comply with ANSI C63.4-2003 or later edition.

4.2 Open Area Test Site (OATS) and Alternative Site Registration

Compliance radiated measurements shall be performed on an Industry Canada-registered OATS or an alternative test site. Upon successful completion of the test site registration process, Industry Canada will provide the test site registration applicant a unique registration number that identifies the site.

To obtain or renew a unique registration number, the test site registration applicant shall demonstrate that the site has been accredited to ANSI C63.4-2003 or later edition. A scope of accreditation indicating the accreditation by a recognized accreditation body to ANSI C63.4-2003 or later edition shall be accepted.

The following information shall be submitted to Industry Canada's Certification and Engineering Bureau to successfully register or renew an accredited test facility:

(a) cover letter;
(b) physical location of the site;
(c) copy of a valid accreditation certificate from a recognized accreditation body;
(d) copy of a scope of accreditation covering ANSI C63.4-2003 or later edition; and
(e) pictures of the site for which registration/renewal is sought.

If the test facility is not accredited to ANSI C63.4-2003 or later edition, the test facility shall submit test data demonstrating full compliance with the ANSI standard. The Department will evaluate the filing to determine if recognition shall be granted.

The following information shall be submitted to Industry Canada's Certification and Engineering Bureau to successfully register or renew a non-accredited test facility:

(a) cover letter;
(b) physical location of the site;
(c) detailed description of the site (e.g. dimensions, construction materials);
(d) complete site validation test report; and
(e) pictures of the site for which registration/renewal is sought.

Revalidation shall occur on an interval not to exceed three years. In the case of a renewal, please indicate in the cover letter the previously assigned site number and a brief description of the site in question (e.g. 2156A-1, 3 metre OATS or 2156A-1, 3 metre chamber).

There is no fee or form associated with test site registration. Submissions may be filed electronically or sent by mail to the Bureau. A list of Industry Canada-registered test sites can be found at the following website:

http://www.ic.gc.ca/app/sitt/tstFclts/lnchIndx.do?TF_ACTN=TF_INDX&TF_TYP=1&lang=eng.

4.3 Compliance Testing and Reporting – General Provisions

The following sets out general provisions regarding compliance testing conditions and information required to be documented in the test report.

(a) The following characteristics of the equipment shall be stated in the test report (a list or table should be prepared):

(i) the rated transmitter power;

(ii) the type of modulation with a brief description giving any information useful for the understanding of the device, such as (but not limited to) the bit rate and symbol rate;

(iii) the frequency band(s) of operation for which the device is to be approved;

(iv) the occupied bandwidth(s), channel bandwidth(s) and the emission designator(s);

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

(vi) the frequency stability and supporting information;

(vii) 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; and

(viii) any additional information that is needed to better understand the operation of the equipment for which certification is sought, such as the intended use of the product and the type of receiver being used (e.g. super-heterodyne or super-regenerative).

(b) The test report shall list all test instruments used, including relevant calibration information, and identify the instrument manufacturer, type and model number. The report shall also include all the measurement results and associated measurement procedures which address the requirements of the applicable RSSs.

(c) Either radiated measurements or conducted measurements made at the antenna terminals can be performed to show compliance with the applicable limits. However, radiated measurements are recommended when demonstrating compliance with transmitter unwanted emissions and receiver spurious requirements.

(d) Alternative measurement methods may be used provided that they are fully described in the test report. Industry Canada's Certification and Engineering Bureau shall be consulted to determine the acceptability of the method.

(e) Test results shall be presented in graphical form whenever possible. The graph shall also include the specification limits.

(f) Associated equipment that is normally used with the transmitter and/or receiver shall be so connected before the equipment is tested.

(g) 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. The power supply voltage and the characteristics of the modulating signal shall be stated in the test report. For transmitters with constant envelope modulation, RF output power and field strength measurements performed on the fundamental can be carried out with an unmodulated carrier. Special conditions apply for frequency stability testing (see Section 4.7).

(h) If the transmitter is capable of tuning over several bands, testing at more than one carrier frequency in each frequency band is required to verify any change in RF characteristics.

(i) 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 the Table 1 below:

Table 1: Frequency Range of Operation

Frequency Range over which the device operates	**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

The frequencies selected for measurements shall be reported in the test report.

(j) The emission tests shall be performed with the device and accessories configured in a manner which tends to produce the maximum level of emissions within the range of variation that can be expected under normal operating conditions.

(k) RF power and spurious emission measurements shall be performed with each antenna type supplied or specified by the manufacturer for use with the transmitter.

4.4 CISPR Quasi-peak Detector

The CISPR quasi-peak detector (also known as CISPR detector or quasi-peak detector in this standard) shall comply with the characteristics given in Publication #16 of the International Special Committee on Radio Interference (CISPR) of the International Electrotechnical Commission. It 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 30-1000 MHz.

4.5 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 seconds. 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 any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

4.6 Bandwidths

4.6.1 Occupied Bandwidth

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 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 shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual.

The trace data points are recovered and directly summed in linear 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. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

4.6.2 -6 dB Emission Bandwidth

Where indicated, the -6 dB emission bandwidth 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 6 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 equal to approximately 1.0% of the emission bandwidth.

4.6.3 -20 dB Emission Bandwidth

Where indicated, the -20 dB emission bandwidth 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 20 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 equal to approximately 1.0% of the emission bandwidth.

4.6.4 -10 dB Emission Bandwidth

In certain applications in which a very low-level fundamental emission is contained in a very wide bandwidth, such as ultra-wideband (UWB) devices and some radar devices, the -10 dB emission bandwidth is specified in the applicable RSS requirements. The -10 dB emission bandwidth is defined as the frequency range between the two points at which the spectral density is attenuated 10 dB below the maximum in-band average spectral density.

4.7 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.

Unless specified otherwise in the RSS that is applicable to the device, the reference temperature for transmitters is +20°C.

A hand-held device that is only capable of operating using internal batteries shall be tested using a new battery without any further requirement to vary the supply voltage. Alternatively, an external supply voltage can be used and set at the battery nominal voltage, and again at the battery operating end point voltage which must be specified by the equipment manufacturer.

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 environment 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 temperatures of -30°C, +20°C and +50°C, and at the manufacturer's rated supply voltage; and

(b) at a temperature of +20°C and at ±15 percent of the manufacturer's rated supply voltage.

If the frequency stability limits are only met at a different temperature range than specified in (a), the frequency stability requirement will be deemed met if the transmitter is automatically inhibited from operating outside this different temperature range and the published equipment operating characteristics are revised to reflect this different temperature range.

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

4.8 Transmitter Output Power

Transmitter output power measurements shall be carried out before the unwanted emissions test. The transmitter output power value, obtained from this test, serves as the reference level used to determine the unwanted emissions. For comparative purposes, the measurements of emission power and unwanted emissions can be in peak or average provided that the same parameter is used when measuring both.

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. If the spectrum analyzer selectivity or bandwidth is insufficient when measuring emission power, a resolution bandwidth, narrower than that specified, plus numerical integration, in terms of linear power to sum the transmitter output power, is permitted. 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.

4.9 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 output power measurement, shall be used for 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 in (a) and (b):

(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 shall be demonstrated using a CISPR quasi-peak detector and the related measurement bandwidth for emissions below 1000 MHz. 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.

4.10 Receiver Spurious Emissions

The receiver shall be operated in the normal receive mode near the mid-point of the band in which the receiver is designed to operate.

Radiated emission measurements are to be performed on a test site registered with Industry Canada. As an alternative, the conducted measurement method may be used when the antenna is detachable. In such a case, the receiver spurious signal may be measured at the antenna port.

If the receiver is super-regenerative, stabilize it by coupling to it an unmodulated carrier on the receiver frequency (antenna conducted measurement) or by transmitting an unmodulated carrier on the receiver frequency from an antenna in the proximity of the receiver (radiated measurement). Taking care not to overload the receiver, vary the amplitude and frequency of the stabilizing signal to obtain the highest level of the spurious emissions from the receiver.

For either method, 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 3 times the highest tuneable or local oscillator frequency, whichever is higher, without exceeding 40 GHz.

For emissions below 1000 MHz, measurements shall be performed using a CISPR quasi-peak detector and the related measurement bandwidth. As an alternative to CISPR quasi-peak measurement, 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 an equal or greater measurement bandwidth relative to the applicable CISPR quasi-peak bandwidth.

Above 1000 MHz, measurements shall be performed using an average detector with a minimum resolution bandwidth of 1 MHz.

4.11 Near-field Measurement Method Below 30 MHz

For measurement below 30 MHz, the field strength may be measured in its 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 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 40 dB.

Below 1.705 MHz, the magnetic or H-field shall be used in taking the measurement and the field intensity metre (FIM) is to be equipped with a loop antenna. The permissible limits are given in microamperes/m. The FIM can be calibrated to read in microvolts/m where E/H = 377 is used in the conversion.

5. General Requirements

5.1 Quality Control and Post-Certification Investigations/Audits

From time to time, Industry Canada will conduct market surveillance compliance audits and compliance investigations after certification of radio apparatus intended for sale in Canada. In the event of an investigation of non-compliance, the certificate holder will be asked to provide, to the Department, records of the quality control process, as well as any relevant information that would help to identify issues related to compliance. It is expected that all certificate holders will be able to demonstrate a quality control process used for production inspection and testing in accordance with good engineering practices.

5.2 Equipment Certification Numbers and Labels

Every unit of Category I radio apparatus certified for marketing and use in Canada shall bear a permanent label on which is indelibly displayed the model number and Industry Canada certification number of the equipment model (transmitter, receiver, or inseparable combination thereof). Each model shall be identified by a unique combination of a model number and a certification number, which are assigned as described below in this section.

The label shall be securely affixed to a permanently attached part of the device, in a location where it is visible or easily accessible to the user, and shall not be readily detachable. The label shall be sufficiently durable to remain fully legible and intact on the device in all normal conditions of use throughout the device's expected lifetime. These requirements may be met either by a separate label or nameplate permanently attached to the device or by permanently imprinting or impressing the label directly onto the device.

The label text shall be legible without the aid of magnification, but is not required to be larger than 8-point font size. If the device is too small to meet this condition, the label information may be included in the user manual upon agreement with Industry Canada.

The label for medical implants designed to be used within the human body shall be placed on the package and in the user manual.

The model number is assigned by the applicant and shall be unique to each model of radio apparatus under that applicant's responsibility. The model number shall be displayed on the label preceded by the text: "Model:", so it appears as follows:

Model: model number assigned by applicant

The certification number is made up of a Company Number (CN) assigned by Industry Canada's Certification and Engineering Bureau followed by the Unique Product Number (UPN), assigned by the applicant.

The certification number shall appear as follows:

IC: XXXXXX-YYYYYYYYYYY

where:

- XXXXXX-YYYYYYYYYYY is the certification number;
- XXXXXX is the Company Number (CN) assigned by Industry Canada, made of at most 6 alphanumeric characters (A-Z, 0-9), including a letter at the end of the CN to distinguish between different company addresses;
- YYYYYYYYYYY is the Unique Product Number (UPN) assigned by the applicant, made of at most 11 alphanumeric characters (A-Z, 0-9); and

the letters "IC" (Industry Canada) are to indicate the Industry Canada certification number, but are not part of the certification number.

Permitted alphanumerical characters used in the CN and UPN are limited to capital letters (A-Z) and numerals (0-9). **Example:** A company has been assigned a CN of "21A" and wishes to use a UPN of "WILAN3" for one of its products. The full Industry Canada certification number of this product would thus be: IC: 21A-WILAN3.

The use of symbols to represent characters in the certification number or the model number that are to be considered indeterminate ("wildcard" characters) is not permitted. **Example:** In the hypothetical model number 47XP-820K/A21xx, a manufacturer wishes to use the characters "xx" as wildcards to indicate that these two characters in the model number are not fixed but represent a range of characters decided by the manufacturer. This practice is not permitted. However, this same sequence of symbols can be used as a valid model number, if it identifies a single equipment model.

Category I equipment that is not labelled with the model number and the certification number as described above is not considered certified.

Category II equipment shall be labelled in accordance with the requirements of RSS-310. Note that the provisions regarding model numbers in this section also apply to the RSS-310 labelling requirements.

5.3 Required Notices to the User

Radio apparatus shall comply with the requirements to include required notices or statements to the user of equipment with each unit of equipment model offered for sale.

The required notices are specified in the RSS documents (including RSS-Gen) applicable to the equipment model. These notices are required to be shown in a conspicuous location in the user manual for the equipment, or to be displayed on the equipment model. If more than one notice is required, the equipment model(s) to which each notice pertains should be identified. Suppliers of radio apparatus shall provide notices and user information in both English and French.

5.4 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 requirements used to certify the equipment under the applicable RSSs. Furthermore, information on internal adjustments, reconfiguration or programmability of the device must be made available only to service depots and agents of the equipment supplier, and NOT to the public.

5.5 Multiple Band Operation

Equipment which can operate in a set of multiple frequency bands shall comply with the requirements of each of the bands in which it operates. Specifically, any active or spurious emissions shall comply with the limits prescribed for those bands in which the equipment is active. When transitioning between bands, the equipment shall not actively transmit.

5.6 Exposure of Humans to RF Fields

Category I and Category II equipment shall comply with the applicable requirements of RSS-102.

5.7 Radiocommunication Antenna Systems

Some equipment will require the use of an external antenna system and supporting structure. The Minister has established as a standard that all antennas, masts, towers or other antenna supporting structures are required to be compliant with the terms of CPC-2-0-03.

6. Receiver Spurious Emission Limits

Receivers shall comply with the limits of spurious emissions set out in this section, measured over the frequency range determined in accordance with Section 4.10.

6.1 Radiated Limits

Radiated spurious emission measurements shall be performed with the receiver antenna connected to the receiver antenna terminals.

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

Table 2: Radiated Limits of Receiver Spurious Emissions

Frequency (MHz)	Field Strength (microvolts/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 7.2.7.

6.2 Antenna Conducted Limits

If the receiver has a detachable antenna of known impedance, antenna conducted spurious emissions measurement is permitted as an alternative to radiated measurement. However, the radiated method of Section 6.1 is recommended: see **Note** below.

The antenna conducted test shall be performed with the antenna disconnected and 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 nanowatts in the band 30-1000 MHz, and 5 nanowatts above 1000 MHz.

Note: Audit testing by the Department to confirm compliance will use the radiated method of 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 that the party responsible for compliance take corrective action. Therefore, it is recommended that the radiated method be employed.

7. Licence-exempt Radio Apparatus

The requirements set out in this section apply to radio apparatus that can operate exempt from licensing. Specific requirements for licence-exempt radio devices are published in the 200 Series of RSS standards (e.g. RSS-210), which are for licence-exempt radio apparatus that is Category I equipment, or in the 300 Series of RSS standards (e.g. RSS-310), for licence-exempt radio apparatus that is Category II equipment.

While Section 7 applies generally only to licence-exempt radio apparatus, various requirements in this section may also be specified in some RSSs for radio apparatus subject to licensing.

7.1 General Information

7.1.1 External Amplifiers

Except as set out below, the marketing of RF power amplifiers for use with licence-exempt radio apparatus is prohibited.

External RF power amplifiers may be marketed separately for use with devices certified under RSS-210, Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the Bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz) or devices in the band 5725-5825 MHz certified under Annex 9 (Local Area Network Devices), under the following conditions:

(i) The RF power amplifier shall be certified with the device with which it is intended to be used, such that the amplifier-device combination does not exceed any of the limits specified for the device alone; and

(ii) The RF power amplifier shall be marketed only for use with the device with which it has been certified, so long as the following statement is included on the packaging and in the user manual:

> *Under Industry Canada regulations, this radio frequency power amplifier (insert Industry Canada certification number of radio frequency power amplifier) may only be used with the transmitter with which the amplifier has been certified by Industry Canada. The certification number for the transmitter with which this amplifier is permitted to operate is IC:XX…X-YY…Y.*

7.1.2 Transmitter Antenna

A transmitter can only be sold or operated with antennas with which it was approved. Transmitter may be approved with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest gain antenna of each combination of transmitter and antenna type for which approval is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type having equal or lesser gain as an antenna that had been successfully tested with the transmitter, will also be considered approved with the transmitter, and may be used and marketed with the transmitter. For Category I transmitters, the manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

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 measurement or on data from the antenna manufacturer. For transmitters of RF output power of 10 milliwatts or less, only the portion of the antenna gain that is in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power to demonstrate compliance with the radiated power limits specified in the applicable standard. For transmitters of output power greater than 10 milliwatts, the total antenna gain shall be added to the measured RF output power to demonstrate compliance to the specified radiated power limits.
User manuals for transmitters shall display the following notice in a conspicuous location:

> *Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.*

The above notice may be affixed to the device instead of displayed in the user manual.

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, or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type 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) and required impedance for each.

7.1.3 User Manual Notice for Licence-Exempt Radio Apparatus

User manuals for licence-exempt radio apparatus shall contain the following or equivalent notice in a conspicuous location in the user manual or alternatively on the device or both.

> *This device complies with Industry Canada licence-exempt RSS standard(s). 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.*

7.1.4 Radio Apparatus Containing Digital Circuits (ICES-003)

Radio apparatus containing digital circuitry which can function separately from the operation of a transmitter or an associated transmitter, shall comply with ICES-003. In such cases, the labelling requirements of the applicable RSS apply, rather than the labelling requirements in ICES-003.

7.1.5 Measurement After Installation

In the case of licence-exempt equipment for which measurements can be performed only after installation, such as perimeter protection systems, and systems employing a leaky cable as an antenna, measurements for compliance shall be performed at a minimum of three installations that can be demonstrated to be representative of typical installation sites.

7.1.6 Operating Frequency Range of Devices in Master/Slave Networks

Slave devices operating in a master/slave network may be certified if they have the capability of operating outside the licence-exempt frequency bands permitted for the device 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 only be capable of operating in 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. 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. A device in slave mode is not able to initiate a network.

7.1.7 Home-Built Devices

Except scanner receivers, home built devices (not from a kit) in quantities of five or less, for personal use and not to be marketed, are not required to be certified or labelled by Industry Canada. Home-built devices must conform to all the technical requirements set out in the applicable standard(s).

7.1.8 Radio Frequency Identification (RFID) Devices

Radio apparatus designed for RFID applications includes devices called tags, which are attached to the items to be identified, and readers, which transmit a signal to interrogate a tag and receive identification data back from the tag.

RFID tags are of two types: active and passive. Active RFID tags operate from their own source of power and actively transmit identification data when interrogated by an RFID reader device. Passive RFID tags do not have their own source of power, but send identification data by passively returning energy received from an RFID reader's interrogating signal. Passive RFID tags may operate without approval from Industry Canada.

7.2 Measurement Methods and Standard Specifications

7.2.1 Measurement Bandwidths and Detector Functions

Unless otherwise specified, for all frequencies equal to or less than 1000 MHz, 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 RSS-Gen, Section 4.4. 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.

If an average measurement is specified for wanted emissions, an average meter having a bandwidth equal to or greater than the emission bandwidth shall be used.

Unless otherwise specified, for all frequencies greater than 1000 MHz, the radiated emission limits for licence-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using an average detector function having a minimum resolution bandwidth of 1 MHz.

7.2.2 Emissions Falling Within Restricted Frequency Bands

Restricted bands, identified in Table 3, 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:

(a) fundamental components of modulation of licence-exempt radio apparatus shall not fall within the restricted bands of Table 3;

(b) unwanted emissions falling into restricted bands of Table 3 shall comply with the limits specified in RSS-Gen;

(c) unwanted emissions not falling within restricted frequency bands shall either comply with the limits specified in the applicable RSS, or with those specified in RSS-Gen.

Table 3: Restricted Frequency Bands (Note)

MHz
0.090-0.110
2.1735-2.1905
3.020-3.026
4.125-4.128
4.17725-4.17775
4.20725-4.20775
5.677-5.683
6.215-6.218
6.26775-6.26825
6.31175-6.31225
8.291-8.294
8.362-8.366
8.37625-8.38675
8.41425-8.41475
12.29-12.293
12.51975-12.52025
12.57675-12.57725
13.36-13.41
16.42-16.423
16.69475-16.69525
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

MHz
240-285
322-335.4
399.9-410
608-614
960-1427
1435-1626.5
1645.5-1646.5
1660-1710
1718.8-1722.2
2200-2300
2310-2390
2655-2900
3260-3267
3332-3339
3345.8-3358
3500-4400
4500-5150
5350-5460
7250-7750
8025-8500

GHz
9.0-9.2
9.3-9.5
10.6-12.7
13.25-13.4
14.47-14.5
15.35-16.2
17.7-21.4
22.01-23.12
23.6-24.0
31.2-31.8
36.43-36.5
Above 38.6

Note: Certain frequency bands listed in Table 3 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 RSSs, such as RSS-210 and RSS-310, which contain the requirements that apply to licence-exempt radio apparatus.

7.2.3 Devices Employing Pulsed Operation

For licence-exempt transmitters employing pulsed operation for which an average power limit is specified, a peak power limit also applies. Unless otherwise specified, the peak power limit is 20 dB above the average power limit. The average power measurement of the fundamental shall be performed according to the method described in Section 4.5. The methodology described in Section 4.5 is also applicable to unwanted emission measurements provided that they exhibit similar pulse characteristics as the fundamental.

For devices employing pulsed operation with a pulse repetition frequency of 20 Hz or less and for which radiated emission measurements using a CISPR quasi-peak detector are specified, compliance shall be demonstrated using measuring equipment that employs a peak detector function, properly adjusted for factors such as pulse desensitization, and that has the same or larger measurement bandwidths as those specified for CISPR quasi-peak measurements.

7.2.4 AC Power Line Conducted Emissions Limits

Except when 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 the table below. The more stringent limit applies at the frequency range boundaries.

The conducted emissions shall be measured with a 50 ohm/50 microhenry line impedance stabilization network (LISN).

Table 4: AC Power Line Conducted Emissions Limits

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

*Decreases with the logarithm of the frequency.

7.2.5 Transmitter Spurious Emission Limits

Spurious emissions from licence-exempt transmitters shall comply with the field strength limits shown below. Additionally, the level of any transmitter spurious emission shall not exceed the level of the transmitter's fundamental emission.

Table 5: General Field Strength Limits for Transmitters at Frequencies Above 30 MHz

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

Note: Transmitting devices are not permitted in restricted frequency bands or, unless stated otherwise, in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-806 MHz).

Table 6: General Field Strength Limits for Transmitters at Frequencies Below 30 MHz (Transmit)

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/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 an average detector.

7.2.6 Transmitter Frequency Stability

Transmitter frequency stability for licence-exempt radio apparatus shall be measured in accordance with Section 4.7. Also, for licence-exempt radio apparatus, the frequency stability shall be measured at temperatures of -20°C, +20°C and +50°C instead of at the temperatures specified in Section 4.7(a).

If the frequency stability of the licence-exempt radio apparatus is not specified in the applicable standards, 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.

7.2.7 Measurement Distance

For the field strength limits specified in this document, the following conditions apply:

(a) For frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided that:

(i) measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and

(ii) it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment.

Measurements shall not be performed at a distance greater than 30 metres unless it can be further demonstrated that measurements at a distance of 30 metres or less are impractical. The results of measurements performed at a distance other than that specified shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear distance for field strength measurement; inverse linear distance-squared for power density measurements).

(b) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in this standard. However, an attempt should be made to avoid taking measurements in the near field. Pending the development of an appropriate procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either taking measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor, or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

The extrapolation method used shall be described in the test report.

8. 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, and do not necessarily cohere with other departmental documents.

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.

Term	Definition
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 homes, 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.
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 a radio frequency (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 that are located at frequencies which are whole multiples of the centre frequency emissions of the transmitted signal.
Intentional radiator	A device that generates RF energy which is intended to be received off-air by a radio receiver.
Mean power (of a radio transmitter)	The average power supplied to an antenna transmission line by

Term	Definition
	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 *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 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.
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.

Term	Definition
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 multicoupling, filtering and preamplification 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 multicoupling-preamplification 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.
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 ± 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 ± 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	Comprises of out-of-band emissions (i.e. emissions on a frequency or frequencies immediately outside the necessary bandwidth), harmonic emissions and spurious emissions.