Licence-exempt Radio Apparatus (All Frequency Bands): Category II Equipment
Preface

Radio Standards Specification 310, Issue 3, Licence-exempt Radio Apparatus (All Frequency Bands): Category II Equipment (formerly entitled Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category II Equipment), sets out standard requirements for licence-exempt radio apparatus used for radiocommunication, other than broadcasting, that is exempt from certification.

RSS-310, Issue 3, must be used in conjunction with RSS-Gen for general specifications and information relevant to the equipment to which this standard applies.

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:** The title of this document has been changed from Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category II Equipment to Licence-exempt Radio Apparatus (All Frequency Bands): Category II Equipment, to employ the terminology defined in the Radiocommunication Act.

(2) **Terminology:** The term “radio apparatus” has replaced “radiocommunication device” in this document to align with the terms defined in the Radiocommunication Act.

(3) **Tables:** The following tables have been transferred from the previous RSS-310 (Issue 2) to RSS-Gen: Table 1: Restricted Frequency Bands; Table 2: General Field Strength Limits for Transmitters and Receivers at Frequencies Above 30 MHz; and Table 3: General Field Strength Limits for Transmitters at Frequencies Below 30 MHz.

(4) **Section 2.1:** Compliance Testing and Reporting: editorial changes to clarify text.

(5) **Section 2.2:** Equipment Labels: editorial changes; clarification of labelling implementation and options.

(6) **Section 3.10:** 24-24.25 GHz: The provision that the search for spurious emissions above 24.25 GHz is not required has been removed to comply with new requirements for frequency range of measurement in RSS-Gen.
Enquires may be directed to the following address:

Industry Canada
Engineering, Planning and Standards Branch
300 Slater Street
Ottawa, Ontario K1A 0C8
Attention: Regulatory Standards
E-mail: res.nmr@ic.gc.ca

All Spectrum Management and Telecommunications publications are available on the following website: http://www.ic.gc.ca/spectrum.

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_____________________________________
MARC DUPUIS
Director General
Engineering, Planning and Standards Branch
1. **Scope**

This Radio Standards Specification (RSS) sets out standard requirements for licence-exempt radio apparatus used for radiocommunication, other than broadcasting, that is exempt from certification.

2. **General Information**

2.1 **Compliance Testing and Reporting**

The manufacturer or importer of Category II radio apparatus subject to this RSS shall ensure that compliance with all applicable technical requirements has been demonstrated and the results compiled into a proper test report. Tests shall be performed and test reports prepared in accordance with the provisions of RSS-Gen (except those provisions applicable only to certification of Category I Equipment).

The test report shall be retained by the manufacturer or agent whose name appears on the equipment label for as long as the model is marketed in Canada, and shall be made available to Industry Canada upon request.

2.2 **Equipment Labels**

To indicate compliance of Category II radio apparatus with RSS-310, the manufacturer or importer shall ensure that each unit of the equipment model bears a permanent label on which is indelibly displayed the following information: the manufacturer’s name or brand name; the model number, preceded by the word “**Model:**”; and, the words “**Canada 310.**” The label shall appear as follows (this information can be shown in a different order):

**Manufacturer’s Name or Brand Name**

**Model:** (model number)

**Canada 310**

Model numbers shall conform to the provisions set out in the RSS-Gen requirements for equipment labels.

The label shall be securely affixed to a permanent 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 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 shall be included in the user manual (see Section 2.3).
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**Note:** The RSS-310 compliance label is not required on devices consisting of Category II radio apparatus (subject to RSS-310) housed together with Category I radio apparatus (e.g. a transceiver whose receiver is Category II radio apparatus and whose transmitter is Category I radio apparatus), these devices being subject to the labelling requirements applicable to Category I radio apparatus set out in RSS-Gen. However, compliance of such Category II radio apparatus with the applicable user manual, testing and reporting requirements set out in this RSS-310 Standard is mandatory.

### 2.3 User Manual

(a) Except as stated in paragraph (b) of this section, Category II radio apparatus shall comply with the user manual requirements of RSS-Gen.

For Category II transmitters, in addition to the user manual requirements of RSS-Gen, the carrier frequency and the RF output power (or field strength and measurement distance) shall be stated in the user manual.

(b) The user manual requirements of RSS-Gen do not apply to Category II receivers that are for use in licensed radiocommunication services. As indicated in Section 2.2, the user manual shall display the following notice in a conspicuous location if it is not possible to affix a label to the device:

> This device complies with RSS-310 of Industry Canada. Operation is subject to the condition that this device does not cause harmful interference.

### 2.4 Emissions Falling Within Restricted Frequency Bands

Category II radio apparatus is required to comply with the provisions in RSS-Gen with respect to emissions falling within restricted frequency bands. These restricted frequency bands are listed in RSS-Gen.

### 2.5 RSS-Gen Compliance

RSS-310 shall be used in conjunction with RSS-Gen, *General Requirements and Information for the Certification of Radio Apparatus*, for general specifications and information.

### 3. Technical Standards

#### 3.1 Category II Receiver Requirements and Tests

Category II receivers shall comply with the applicable requirements set out in RSS-Gen. For the purpose of equipment certification, Category II receivers shall be certified under RSS-310 in accordance with the provisions of Section 2.
3.2 Underground and Tunnel Radios

Radio apparatus intended for installation in a fixed underground location or tunnel, or on a vehicle that is restricted to underground operation, is permitted under the following conditions:

(a) The equipment shall bear a label stating: “For underground installations only”. The user manual shall include a notice cautioning the user not to install the transmitter near any opening above ground and to provide instructions to comply with the requirements of (c) and (d) below.

(b) The fundamental components of modulation shall not fall within the restricted bands of RSS-Gen.

(c) The transmitter output power should not be greater than necessary for its intended function. Under no circumstances should the power exceed 110 W.

(d) The leakage of the RF field at the fundamental frequency shall be checked at each above-ground opening. The general field strength limits for leakage of the RF field are listed in RSS-Gen.

Note: Portable radio transceivers used in underground mines and structures are not classified as underground radios and are subject to other standards and/or certification requirements. They may also be subject to licensing.

3.3 Cable Locating Equipment (9-490 kHz)

This equipment is used to locate a buried cable or pipe by coupling a radio frequency signal onto the cable or pipe and using a receiver to detect its location. The equipment may operate on any frequency within the band 9-490 kHz, subject to the following power limits:

(a) 9-45 kHz: 10 W peak output power
(b) 45-490 kHz: 1.0 W peak output power

In addition to RSS-Gen user manual requirements, the user manual shall contain the following or equivalent notice:

Equipment is for use by trained operators only and not for general household use. Usage duration shall be as short as possible to prevent possible radio interference to authorized services, especially the 100 kHz LORAN-C frequency.

3.4 AC Wire Carrier Current Devices – Intentional Radiator Type (0-535 kHz, 535 kHz-30 MHz)

These devices are intended for use inside buildings, using the building’s AC wiring for radio frequency signal propagation. The signals are generated by a transmitter unit that is electrically connected to the building wiring. The wiring (intentionally) radiates RF emissions containing the signals, which are intended to be picked up over the air by receiving devices within the building. These systems shall comply with the limits set out in this section.
An AC wire carrier current device of the unintentional radiator type, for which both the exciter (transmitter) and the receiver are connected to the building wiring and any radiated emissions of radio frequency energy are unintentional, is considered to be interference-causing equipment and is regulated by Industry Canada’s Interference-Causing Equipment Standard 006, *AC Wire Carrier Current Devices (Unintentional Radiators)* (ICES-006).

### 3.4.1 Conducted Limits

**Note:** The limits for unwanted emissions conducted onto the public utility AC power lines prescribed in RSS-Gen do not apply to AC wire carrier current devices.

(1) **0-535 kHz:** For AC wire carrier current devices that have fundamental frequencies of 0-535 kHz, the harmonics and unwanted emission frequencies that fall within 535-1705 kHz shall not exceed 1000 microvolts, measured across a 50 ohm line impedance stabilization network (LISN).

Carrier current devices are permitted the output voltages listed in the table below when measured, in turn, with 5 ohm and 50 ohm resistive loads. If the duty cycle is not determined by the manufacturer of the device (i.e. duty cycle is system dependent), then the user manual shall provide clear instructions to the system designer about how to compute the permissible output voltage of the system, based on the table below.

#### Permissible Carrier Current Output Voltages

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Permissible Carrier Current Output Voltages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 9 kHz</td>
<td>No limits</td>
</tr>
<tr>
<td>9-95 kHz (Note 1)</td>
<td>15.0 volts pk-pk (or 5.3 volts rms)</td>
</tr>
<tr>
<td>105-185 kHz (Note 1)</td>
<td>15.0 volts pk-pk (or 5.3 volts rms)</td>
</tr>
<tr>
<td>185-535 kHz</td>
<td>(i) 0.45(B/D)^2 volts pk-pk for devices intended for connection to 120 VAC lines, and</td>
</tr>
<tr>
<td></td>
<td>(ii) 0.90(B/D)^2 volts pk-pk for devices intended for connection to 240 VAC lines</td>
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<tr>
<td></td>
<td>or</td>
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<tr>
<td></td>
<td>15 volts pk-pk, whichever is the lesser voltage (for 120 VAC and 240 VAC systems)</td>
</tr>
<tr>
<td></td>
<td>Where:</td>
</tr>
<tr>
<td></td>
<td>B = -6 dB bandwidth in kHz. (When B is less than 4.8 kHz, B = 4.8 may be used)</td>
</tr>
<tr>
<td></td>
<td>D = duty cycle (e.g. D = 1.0 for continuous transmission)</td>
</tr>
</tbody>
</table>

**Note 1:** The frequency table above does not include 100 kHz because it is a restricted frequency; this is the LORAN-C time signal frequency. Carrier current devices using the band 95-105 kHz, or carrier current spread spectrum systems which include this band, may do so but shall cease operation if found to cause interference.
If the aggregate interference in any area or city is found to cause unacceptable interference to the authorized users, Industry Canada will review the permissible voltage levels given in the above table. Therefore, manufacturers should limit the duty cycle (transmission on-time) of their devices wherever possible.

(2) **535-1705 kHz**: The level of the fundamental or harmonics falling within this band shall not exceed 1000 microvolts when measured across a 50 ohm LISN.

(3) **Above 1705 kHz**: No conducted limits have been established.

### 3.4.2 Radiated Limits

A line impedance stabilization network shall not be used in this radiated emission test.

Emission of the fundamental frequencies from AC wire carrier current systems shall not exceed the general field strength limits in RSS-Gen, or the following:

(a) **1.705-10 MHz**: The field strength shall not exceed 100 microvolts/m measured at 30 metres with an averaging meter. However, if the -6 dB bandwidth of the emission is less than 10% of the centre frequency, the field strength in microvolts/m shall not exceed 15 or the bandwidth in kHz divided by the centre frequency in MHz, whichever is the higher level.

(b) **6.765-6.795 MHz**: The field strength measured at 30 metres shall not exceed the following limits:

- 15.5 millivolts/m (84 dBμV/m) for emissions within the band;
- 334 microvolts/m (50.5 dBμV/m) for emissions outside the band up to F<sub>c</sub> ± 150 kHz;
- 106 microvolts/m (40.5 dBμV/m) for emissions between F<sub>c</sub> ± 150 kHz and F<sub>c</sub> ± 450 kHz; and
- the general field strength limits listed in RSS-Gen, except for harmonics, which shall not exceed 316 microvolts/m for emissions outside F<sub>c</sub> ± 450 kHz.

Where F<sub>c</sub> = 6.78 MHz.

(c) **13.553-13.567 MHz**: The field strength measured at 30 metres shall not exceed the following limits:

- 15.5 millivolts/m (84 dBμV/m) for emissions within the band;
- 334 microvolts/m (50. dBμV/m) for emissions outside the band up to F<sub>c</sub> ± 150 kHz;
- 106 microvolts/m (40.5 dBμV/m) for emissions between F<sub>c</sub> ± 150 kHz and F<sub>c</sub> ± 450 kHz; and
- Tables 2 and 3 limits for emissions outside F<sub>c</sub> ± 450 kHz.

Where F<sub>c</sub> = 13.56 MHz.

(d) **26.96-27.28 MHz**: Section 3.8 limits shall apply.
3.5 **Transmitters with Input Power of 6 Nanowatts or Less**

Any transmitter that has a power consumption (total input power into the device) not exceeding 6 nanowatts is excluded from any Industry Canada requirements and may operate on any radio frequency, including in the restricted frequency bands listed in RSS-Gen.

3.6 **0-9 kHz and Infra-red Frequencies**

Radio apparatus operating at 9 kHz or less and at infra-red frequencies are excluded from any Industry Canada requirements.

3.7 **Very Low-power Devices Operating Below 490 kHz**

Transmitters whose fundamental emission lies below 490 kHz and for which it is shown that all emissions are at least 40 dB below the general field strength limits listed in RSS-Gen, shall need to comply only with the general provisions of RSS-310 and the applicable provisions of RSS-Gen.

3.8 **26.96-27.28 MHz**

The field strength shall not exceed 10 millivolts/m measured at 3 metres with an average or a CISPR quasi-peak detector.

Outside this band, the general field strength limits listed in RSS-Gen shall apply.

3.9 **49.82-49.90 MHz**

The field strength shall not exceed 10 millivolts/m measured at 3 metres with an average or a CISPR quasi-peak detector.

Outside this band, the general field strength limits listed in RSS-Gen shall apply.

Cordless telephones are not permitted to operate under the above provisions.

3.10 **24-24.25 GHz**

The field strength shall not exceed 250 millivolts/m measured at 3 metres with an average detector.

The fundamental components of modulation shall lie within this band.

Emissions radiated outside the specified frequency band shall be attenuated by at least 50 dB below the level of the fundamental or to the general field strength limits listed in RSS-Gen, whichever is the less stringent.

The peak field strength of any emission shall not exceed the maximum permitted average limit specified above by more than 20 dB under any condition of modulation.
3.11 Data Modems

For data modems, unwanted emissions outside their intended bandwidth shall be adequately suppressed. Modems may be classified as one of two classes described below.

3.11.1 Data Modems for Connection to the Public Switched Network

Data modems intended to be connected to a public switched network (PSN) shall comply with the standard Compliance Specification 03 (CS-03).

3.11.2 Data Modem for Connection to Radio Transmitter

If the data modem is a stand-alone unit (or part of a radio transmitter) and is intended for connection to the data port of a radio transmitter, it shall be tested to comply with Interference-Causing Equipment Standard 003, *Digital Apparatus* (ICES-003), as well as with the test described below. The data modem must also contain suitable audio filters or employ pulse shaping to limit the frequency spectrum, and have a level adjustment capability so that the user can set the frequency deviation of the radio transmitter. It should also have impedance that matches the radio transmitter data port. A suitable test method is given below. The purpose of the test is for the modem manufacturer to ascertain whether the pulse shaping/audio filtering, together with the appropriate frequency deviation, will limit the wanted signal bandwidth; and for the modem manufacturer to issue proper instructions to the user to adjust the frequency deviation.

3.11.2.1 Method of Measurement

Connect a data generator to the modem.

Connect the modem to the data port of any type of radio transmitter that has been certified by Industry Canada. Connect a spectrum analyzer to the RF output point of the transmitter.

Set the data generator rate to the maximum for which the modem is rated, with a pseudo-random pattern of at least 2047 bits.

The following information should be marked on the spectrum plots and kept by the manufacturer with the test report: data bit and symbol rates, input voltage to the radio transmitter data port, manufacturer's name and model number.

3.11.2.2 Unwanted Emissions Requirement

The spectral density of unwanted emissions outside the intended passband of the radio channel shall be at least 20 dB below the in-band (or passband) spectral density as measured by a spectrum analyzer with a resolution bandwidth of approximately 1.0% of the radio transmitter's occupied bandwidth.
3.11.3 Labelling and Data Modem User Manual

Labelling shall comply with the CS-03 or ICES-003 standard mentioned above, as appropriate. In addition, the data modem user manual shall contain instructions on how to adjust the frequency deviation, and shall notify the user regarding the maximum bit and symbol rates that the modem is capable of handling.