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Radio Standards Specification

2 GHz Licence-Exempt Personal Communications Services (LE-PCS) Devices

Preface

Radio Standards Specification RSS-213, Issue 3, *2 GHz License-Exempt Personal Communications Services (LE-PCS) Devices*, replaces Issue 2 of RSS-213, *2 GHz Licence-exempt Personal Communications Service Devices (PCS)*, dated December 2005.

This document will be in force upon publication on the Industry Canada website.

Listed below are the changes:

- (1) The title of the document has been changed from *2 GHz Licence-exempt Personal Communications Services Devices (LE-PCS)* to *2 GHz Licence-Exempt Personal Communications Services (LE-PCS) Devices*.
- (2) The number of duplex system access channels has been reduced from 40 to 20.
- (3) The latest version of the ANSI C63.17-2013 standard is referenced as normative.

Issued under the authority of
the Minister of Industry

Daniel Duguay
Director General
Engineering, Planning and Standards Branch

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1. Scope

This Radio Standards Specification (RSS) sets out the certification requirements for licensed-exempt personal communications services (LE-PCS) devices operating in the band 1920-1930 MHz.

2. General Information

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

2.1 Licensing Requirements

Equipment covered by this standard is exempt from licensing requirements pursuant to section 15 of the *Radiocommunication Regulations*.

2.2 Applicable Standards and Related Documents

2.2.1 Industry Canada Documents

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

The following documents should be consulted:

- | | |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CS-03 | <i>Compliance Specification for Terminal Equipment, Terminal Systems, Network Protection Devices, Connection Arrangements and Hearing Aids Compatibility</i> |
| DC-01 | <i>Procedure for Declaration of Conformity and Registration of Terminal Equipment</i> |
| SAB-001-05 | <i>Policy Provisions to Support Licence-exempt Personal Communications Services (LE PCS) in the Band 1920-1930 MHz and a Moratorium Imposed on the Band 1910-1920 MHz</i> |

SAB – Spectrum Advisory Bulletin

2.2.2 Reference Documents

- | | |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANSI C63.17-2013 | <i>American National Standard Methods of Measurement of the Electromagnetic and Operational Compatibility of Unlicensed Personal Communications Services (UPCS) Devices</i> |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The above document can be obtained from [IEEE](http://www.ieee.org)'s website at <http://www.ieee.org>.

3. Equipment Certification Requirements

3.1 RSS-Gen Compliance

RSS-213 shall be used in conjunction with RSS-Gen, *General Requirements for Compliance of Radio Apparatus*, for general specifications and information relevant to the equipment for which this standard applies.

3.2 Reference Measurement Method

This standard refers to ANSI C63.17-2013 for measurement methods, and where there are discrepancies between the requirements stated in the RSS-213 text and the relevant text of ANSI C63.17-2013, the RSS-213 text shall take precedence.

3.3 Cordless Telephone

If the equipment is a cordless telephone, the base station shall comply with this standard and with the applicable requirements of CS-03.

4. Measurement Method

In addition to the requirements in RSS-Gen, the limits and requirements set out in this standard and in associated Industry Canada standards shall apply. Compliance with these limits shall be demonstrated using the method of measurement described in Section 3 of this standard.

A test report shall be prepared in accordance with RSS-Gen and ANSI C63.17-2013.

5. Equipment Standard Specifications

5.1 Types of Modulation

Equipment certified under this standard shall use digital modulation. Both asynchronous and isochronous operations are permitted within the band 1920-1930 MHz.

5.2 Verification of Access Protocols

In order to provide equitable access to the radio frequency spectrum, the LE-PCS device must possess an access protocol as described below.

LE-PCS devices shall automatically discontinue transmission in case of absence of information to transmit or operational failure. This is not intended to preclude the transmission of control and signalling information or the use of repetitive codes employed by certain digital technologies to complete frame or burst intervals.

Devices must incorporate a mechanism for monitoring the time and spectrum windows that their transmission is intended to occupy. The following criteria must be met:

- (1) Immediately prior to initiating a transmission, devices must monitor the combined time and spectrum window that they intend to use to verify if the channel is free for at least 10 ms for systems designed to use a 10 ms or shorter frame period, or at least 20 ms for systems designed to use a 20 ms frame period.
- (2) The monitoring threshold must not be more than 30 dB above the thermal noise power (KTB) of a bandwidth equivalent to the occupied bandwidth of the device.
- (3) If no signal above the threshold level is detected, transmission may commence and continue with the same bandwidth in the monitored time and spectrum windows without further monitoring. Occupation of the same combined time and spectrum windows by a device or group of cooperating devices continuously over a period of time longer than 8 h is not permitted without repeating the access criteria.
- (4) Once access to specific combined time and spectrum windows is obtained, an acknowledgement from a system participant must be received by the initiating transmitter within 1 s or transmission must cease.

Periodic acknowledgements must be received at least every 30 s or transmission must cease.

Channels used exclusively for control and signalling information may transmit continuously for 30 s without receiving an acknowledgement, at which time the access criteria must be repeated.

- (5) If access to spectrum is not available as determined by the above, and a minimum of 20 duplex system access channels are defined for the system, the time and spectrum windows with the lowest power level may be accessed.

A device utilizing the provisions of this paragraph 5.2(5) must have monitored all access channels defined for its system within the last 10 s and must verify, within the 20 ms (40 ms for devices designed to use a 20 ms frame period) immediately preceding actual channel access, that the detected power of the selected time and spectrum windows is no higher than the previously detected value.

The power measurement resolution bandwidth for this comparison must be accurate to within 6 dB.

No device or group of cooperating devices located within 1 m of each other shall during any frame period occupy more than 6 MHz of aggregate bandwidth, or alternatively, more than one third of the time and spectrum windows defined by the system.

- (6) If the selected combined time and spectrum windows are unavailable, the device may either monitor and select different windows or seek to use the same windows after waiting an amount of time, randomly chosen from a uniform random distribution between 10 and 150 ms, commencing from the time when the channel becomes available.
- (7) The monitoring system bandwidth must be equal to or greater than the occupied bandwidth of the intended transmission. **Note:** Testing of the monitoring system bandwidth is not required if the

designed bandwidth from the manufacturer is available and given in the test report.

The maximum reaction time of the monitor shall be less than $50\sqrt{1.25/\text{occupied bandwidth in MHz}}$ μs for signals at the applicable threshold level but shall not be required to be less than 50 μs .

If a signal of 6 dB or more above the threshold level is detected, the maximum reaction time shall be $35\sqrt{1.25/\text{occupied bandwidth in MHz}}$ μs but shall not be required to be less than 35 μs .

- (8) The monitoring system shall use the same antenna used for transmission, or an antenna that yields equivalent reception at that location. **Note:** A monitoring antenna of the same model (and manufacturer) as the transmitting antenna is considered equivalent. An antenna not of the same model but of the same type (e.g. both are horn antennas of different manufacturers) is considered equivalent if the main beam antenna gains are within 3 dB of each other. Both antennas are to be installed to point at the same general coverage area.
- (9) Devices that have a power output lower than the maximum permitted under this standard may increase their detection threshold by 1 dB for each 1 dB that the transmitter power is below the maximum permitted.
- (10) A device initiating a communication (hereafter called an initiating device) may attempt to establish a duplex connection by monitoring both its intended transmit and receive time and spectrum windows.

If both the intended transmit and receive time and spectrum windows meet the access criteria, then the initiating device can initiate a transmission in the intended transmit time and spectrum window.

If the power detected by the responding device can be decoded as a duplex connection signal from the initiating device, then the responding device may immediately begin transmitting in the receive time and spectrum window monitored by the initiating device.

- (11) An initiating device that is prevented from monitoring during its intended transmit window due to monitoring system blocking from the transmissions of a co-located (within 1 m) transmitter of the same system, may monitor the portions of the time and spectrum window in which they are to receive over a period of at least 10 ms.

The monitored time and spectrum window must total at least 50% of the 10 ms frame interval and the monitored spectrum must be within 1.25 MHz of the centre frequency of channel(s) already occupied by that device or co-located cooperating devices.

If the access criteria are met for the intended receive time and spectrum window under the above conditions, then transmission in the intended transmit window by the initiating device may commence.

- (12) The provisions of paragraphs 5.2(10) and (11) shall not be used to extend the range of spectrum occupied over space or time for the purpose of denying fair access to spectrum to other devices.
- (13) The frame period (a set of consecutive time slots in which the position of each time slot can be identified by reference to a synchronizing source) of an intentional radiator operating in this sub-band shall be 20 ms/X where X is a positive whole number.

Each device that implements time division for the purpose of maintaining a duplex connection on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 50 parts per million (ppm).

Each device that further divides access in time in order to support multiple communication links on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 10 ppm.

The jitter (time-related, abrupt, spurious variations in the duration of the frame interval) introduced at the 2 ends of such a communication link shall not exceed 25 μ s for any 2 consecutive transmissions.

Transmissions shall be continuous in every time and spectrum window during the frame period defined for the device.

5.3 Frequency Stability

The carrier frequency stability shall be maintained within ± 10 ppm ($\pm 0.001\%$).

5.4 AC Power Line Conducted Emissions Limits

The limits of AC power line conducted emissions are given in RSS-Gen.

5.5 Emission Bandwidth

The emission bandwidth shall not be less than 50 kHz nor more than 2.5 MHz.

5.6 Peak Transmit Power

Peak transmit power shall not exceed 100 μ W multiplied by the square root of the occupied bandwidth in hertz. The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

5.7 Transmitter Power Spectral Density

The peak-hold power spectral density of transmitters shall not exceed 12 mW per any 3 kHz bandwidth.

As an alternative to the peak-hold power spectral density, the time-averaged power spectral density may be measured and it shall not exceed 3 mW per any 3 kHz bandwidth.

5.8 Transmitter Unwanted Emissions

5.8.1 Emissions Outside the Band 1920-1930 MHz

Emissions outside the band 1920-1930 MHz shall be attenuated below a reference power of 112 mW (-9.5 dBW) by at least:

- 30 dB between the band edges and 1.25 MHz above and below the band edges;
- 50 dB between 1.25 MHz and 2.5 MHz above or below the band edges; and
- 60 dB at 2.5 MHz or greater above or below the band edges.

5.8.2 Emissions Inside the Band 1920-1930 MHz

Emissions inside the band 1920-1930 MHz shall be attenuated below the transmit power permitted for that device, as follows:

- 30 dB between the frequencies 1B and 2B measured from the centre of the occupied bandwidth;
- 50 dB between the frequencies 2B and 3B measured from the centre of the occupied bandwidth;
- 60 dB between the frequencies 3B and band edges;

where B is the occupied bandwidth in hertz.
