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2 GHz Personal Communications Services

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Preface

Radio Standards Specification 133 (RSS-133), Issue 5, *2 GHz Personal Communications Services*, replaces RSS-133, Issue 4, dated February 2008.

This document will be in force as of the publication date of Notice No. SMSE-003-09 in *Canada Gazette*, Part I. Upon publication, the public has 120 days to submit comments. Comments received will be taken into account in the preparation of the next version of the document.

Listed below are the changes:

1. **Section 4.1:** The transmitter power can be measured in peak or average value.
2. **Section 6.4:** The peak-to-average power ratio has been specified.

Issued under the authority of
the Minister of Industry

Marc Dupuis
Director General
Spectrum Engineering Branch

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1. Scope

This Radio Standards Specification (RSS) sets out requirements for the certification of transmitters and receivers used in radiocommunications systems to provide Personal Communications Services (PCS) in the bands 1850-1915 MHz and 1930-1995 MHz.

2. General Information

Equipment certified under this standard is classified as Category I equipment and 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 subject to licensing pursuant to subsection 4(1) of the *Radiocommunication Act*.

2.2 Related Documents

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

In addition to related documents specified in RSS-Gen, *General Requirements and Information for the Certification of Radiocommunication Equipment*, the following Industry Canada 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>
RSP-100	<i>Radio Equipment Certification Procedure</i>
RSS-210	<i>Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment</i>
SRSP-510	<i>Technical Requirements for Personal Communications Services in the Bands 1850-1915 MHz and 1930-1995 MHz</i>

CS – Compliance Specification

DC – Terminal Attachment Program Procedures

RSP – Radio Standards Procedure

RSS – Radio Standards Specification

SRSP – Standard Radio System Plan

2.3 Definition of Bandwidth

Emission bandwidth is, for the purpose of this document, defined as the width of the signal between two points, one below the carrier frequency and one above the carrier frequency, outside of which all

emissions are attenuated at least 20 dB below the transmitter power (i.e. -20 dBc), when measured with a resolution bandwidth of approximately 1% of the occupied bandwidth. In lieu of the -20 dBc bandwidth, the occupied bandwidth may be used.

3. General Requirements

3.1 RSS-Gen Compliance

RSS-133 shall be used in conjunction with RSS-Gen for general specifications and information relevant to the equipment for which this standard applies.

4. Measurement Method

4.1 Transmitter Output Power

The transmitter power can be measured in peak or average value. If the transmitter power to be measured is in peak value, the transmitter power shall be measured over any interval of continuous transmission using an instrument calibrated in terms of a root-mean-square-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitation, such as detector response times, sensitivity, limited resolution bandwidth capability when compared to the emission bandwidth, etc., so as to obtain the maximum transmit output power of the emission over the channel bandwidth.

4.2 Transmitter Unwanted Emissions

The emission limits shall be measured with the carrier frequency set at both the highest settable frequency and the lowest settable frequency permitted by the design of the equipment.

5. General Standard Specifications

5.1 Electronic Serial Number (ESN), Mobile Equipment Identifier (MEID), International Mobile Subscriber Identity (IMSI), or International Mobile Equipment Identity (IMEI)

The ESN is a 32-bit number that uniquely identifies a PCS mobile station to any PCS system.

(**Note:** Other ESN schemes may be considered by Industry Canada. However, it is the system designer's responsibility to ensure a secure ESN.) The 56-bit MEID developed in 3GPP2 (3rd Generation Partnership Project 2) and the IMSI and IMEI developed in 3GPP (3rd Generation Partnership Project) will be accepted by Industry Canada as complying with the requirements of this section.

- (a) Each mobile transmitter in service must have a unique ESN, MEID, IMSI or IMEI.
- (b) The ESN, MEID, IMSI or IMEI component must be permanently attached to a main circuit board of the mobile transmitter and the integrity of the unit's operating software must not be alterable. The ESN, MEID, IMSI or IMEI must be isolated from fraudulent contact and tampering. If the ESN, MEID, IMSI or IMEI component does not contain other information, that component must not be

removable and its electrical connections must not be accessible. If the ESN, MEID, IMSI or IMEI component contains other information, the ESN, MEID, IMSI or IMEI must be encoded using one or more of the following techniques:

- (i) multiplication or division by a polynomial;
 - (ii) cyclic coding;
 - (iii) the spreading of ESN, MEID, IMSI or IMEI bits over various non-sequential memory locations.
- (c) The ESN, MEID, IMSI or IMEI must be factory set and not alterable, transferable, removable or otherwise able to be manipulated. PCS mobile equipment must be designed such that any attempt to remove, tamper with, or change the ESN, MEID, IMSI or IMEI chip, its logic system or firmware, as originally programmed by the manufacturer, will render the mobile transmitter inoperative.

5.2 Cordless-Mode Telephone Base Stations (CTBS)

CTBS are permitted and are intended to form a cordless telephone system in conjunction with a PCS handset or handsets. The communication between the handsets and the CTBS will use the PCS provider's frequency band. Such a cordless system is intended for short-range and/or in-building usage. When the CTBS is certified (using this RSS), operation will be permitted under the PCS provider's licence.

The CTBS shall comply with this RSS and be certified under Radio Equipment Certification Procedure RSP-100. In cases where the CTBS is connected to a public telephone network, the CTBS shall also comply with Compliance Specification CS-03 and be registered according to Terminal Attachment Program Procedures DC-01.

The CTBS and the handset shall incorporate a security code of a minimum of 8 bits or equivalent to prevent unintentional line seizure, dialling or ringing. Although a description of the implementation of the code is required, the implementation need not be tested. For further details, refer to the section on "Cordless Telephones (General Conditions)" in RSS-210.

The radio frequency (RF) output power shall not exceed a level that is required for reliable communication.

An authorization protocol shall be put in place to allow the operation of the CTBS, based on the following principles:

- (a) The CTBS must be controlled by the network of the PCS provider in order to receive permission to operate. Such a control mechanism may be provided by wireline or wireless facilities. The operation of a CTBS must be only on frequencies within the frequency sub-band assigned for use to the PCS provider and must operate only within the radio service coverage of the network that controls the CTBS.
- (b) Upon receiving permission from the network to operate, and under no other circumstances, a CTBS will enable its transmitter to communicate with any associated certified handsets and provide service using the frequency spectrum and operating parameters specified and/or permitted by the PCS provider.

- (c) Until authorized for service by the network, neither the CTBS nor the handset shall be able to transmit in the cordless mode.

The applicant for certification shall provide a letter from one of the appropriate PCS providers stating that the CTBS authorization protocol has been tested and found to work satisfactorily.

5.3 Digital Packet Data (DPD) Systems

DPD transmission systems are permitted in the PCS bands. The equipment shall comply with the relevant sections of this RSS and be certified by Industry Canada.

Note: Adaptation of a certified piece of equipment from voice-mode to data transmission, by means of a software change that does not violate the permissible output RF spectrum mask, does not require recertification provided that the model number of the equipment is unchanged.

6. Transmitter and Receiver Standard Specifications

6.1 Frequency Plan

The frequency plan is described in SRSP-510.

6.2 Types of Modulation

The devices may employ any type of modulation techniques. The type of modulation used must be reported.

6.3 Frequency Stability

The carrier frequency shall not depart from the reference frequency, in excess of ± 2.5 ppm for mobile stations and ± 1.0 ppm for base stations.

In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the emission bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

6.4 Transmitter Output Power

The average equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Moreover, base station transmitters operating in the band 1930-1995 MHz shall not have output power exceeding 100 watts.

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

6.5 Transmitter Unwanted Emissions

6.5.1 Out-of-Block Emissions (Mobile and Base Stations)

- (a) Mobile stations shall comply with subsection (i) below. Base stations shall comply with either subsection (i) or subsection (ii).
- (i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in watts) by at least $43 + 10 \log_{10}(P)$, dB.
- (ii) In the first 1.5 MHz immediately outside and adjacent to the equipment's operating frequency block, the emission power at offset dF shall be less than the maximum level specified in Table 1.

Table 1: Spectrum Emission Mask of Base Station

Frequency Distance from the Edge of the Frequency Block, dF	Maximum Level (dBm)	Measurement Bandwidth (kHz)
0 - 0.2 MHz	-14	30
0.2 - 1.0 MHz	$-(14 + 15(dF - 0.2))$	30
1.0 - 1.5 MHz	-26	30

- (b) After the first 1.0 MHz (for equipment that complies with (a)(i) of this subsection) or 1.5 MHz (for equipment that complies with (a)(ii) of this subsection), the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in watts) by at least $43 + 10 \log_{10}(P)$, dB. (**Note:** If the test result using 1% of the emission bandwidth is used, power integration over 1.0 MHz is required; alternatively, the spectrum analyzer resolution and video bandwidths can be increased to 1.0 MHz for this measurement).

6.5.2 Out-of-Sub-band Emissions

Outside the sub-bands 1850-1915 MHz and 1930-1995 MHz, the attenuation shall be equal to or greater than the out-of-block emission limits in Section 6.5.1.

6.6 Receiver Spurious Emissions

Receiver spurious emissions shall comply with the limits specified in RSS-Gen.