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Department of Communications Ministère des Communications

TRC - 68
PROVISIONAL
ISSUE 2

TELECOMMUNICATIONS REGULATION CIRCULAR

INFORMATION RELATED TO THE CERTIFICATION
REQUIREMENTS OF LICENCE-EXEMPT LOW POWER
CORDLESS TELEPHONES OPERATING ON FREQUENCIES
IN THE VICINITY OF 1.6 MHz, 46 MHz AND 49 MHz

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TELECOMMUNICATION REGULATORY SERVICE

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INFORMATION RELATED TO THE CERTIFICATION REQUIREMENTS OF
LICENCE-EXEMPT LOW POWER CORDLESS TELEPHONES OPERATING ON FREQUENCIES
IN THE VICINITY OF 1.6 MHz, 46 MHz and 49 MHz

1. INTRODUCTION

- 1.1 Under Section 6 of the Radio Act, the Department intends to introduce changes in the regulations governing the sale and operation of a certain class of radio apparatus designated as low power cordless telephones. The purpose of this Telecommunications Regulation Circular (TRC) is to inform manufacturers, distributors, retailers, as well as the general public of the technical standards and certification procedures which the Department intends to employ for this class of radio apparatus. The current issue of this TRC replaces the provisional issue of May 21, 1983.
- 1.2 This TRC is applicable to low power cordless telephones operating on frequencies in the vicinity of 1.6 MHz, 46 MHz and 49 MHz.
- 1.3 Cordless telephones must be moved out of the 1.6-1.8 MHz band due to the agreement reached at the 1979 World Administrative Radio Conference (WARC) to reallocate the band 1605-1705 KHz for AM broadcasting in Region 2.
- 1.4 Equipment certified as technically acceptable under this circular does not require a radio station licence for use in Canada.
- 1.5 Equipment must also be certified under the Department's Terminal Attachment Program for compliance with terminal equipment standards. The attachment of terminal equipment to the public switched telephone network is covered by the carriers' tariffs in their respective operating territory.
- 1.6 This interim provision applies to:
 - a) Cordless telephones operating on frequencies in the vicinity of 1.6 MHz and 49 MHz to be produced only until October 1, 1984;
 - b) Cordless telephones operating on frequencies in the vicinity of 46 MHz and 49 MHz to be produced only until February 15, 1989.

2. CORDLESS TELEPHONE DESCRIPTION

- 2.1 A cordless telephone is a two-way low power radio communication device, comprised of a base station and a portable handset. The portable handset is intended to operate as an extension of the base station by the elimination of the connecting handset cord of the standard telephone.

- 2.2 Cordless telephones operate in a full duplex mode which allows simultaneous conversation between both parties. This method of operation requires the use of two frequencies for each cordless telephone. The base station is designed for connection to a telephone line which has access to the public switched telephone network. The portable unit incorporates a low power transmitter and receiver using designated radio frequencies to interface with the base station. The portable unit may be capable of receiving telephone calls. It may also be capable of originating outgoing telephone calls by means of a tone dial signalling pad.
- 2.3 Cordless telephones are intended to be operated with a nominal operating range of up to 200 metres.

3. OPERATING FREQUENCIES:

3.1 Pursuant to the provisions of section 1.6, cordless telephones may operate:

- (a) In the frequency band 1.625 to 1.8 MHz and/or in the vicinity of 49 MHz on nominal frequencies 49.830 MHz, 49.845 MHz, 49.860 MHz, 49.875 MHz, 49.890 MHz;
- (b) In the vicinity of 46 MHz and 49 MHz, employing one or more of the following frequency pairs:

Channel	Base Unit Transmit	Portable Unit Transmit
1	46.610 MHz	49.670 MHz
2	46.630 MHz	49.845 MHz
3	46.670 MHz	49.860 MHz
4	46.710 MHz	49.770 MHz
5	46.730 MHz	49.875 MHz
6	46.770 MHz	49.830 MHz
7	46.830 MHz	49.890 MHz
8	46.870 MHz	49.930 MHz
9	46.930 MHz	49.990 MHz
10	46.970 MHz	49.970 MHz

4. GENERAL PROVISIONS

- 4.1 Application may be made by a manufacturer or representative under departmental procedures for certification.
- 4.2 The applicable technical requirements and a testing procedure for the radio frequency portion of the cordless telephone equipment are included in the Annex to this TRC.
- 4.3 The applicable technical requirements and a testing procedure for the attachment of the base station to the telephone network are included in the Terminal Attachment Program documentation.

- 4.4 Cordless telephone equipment meeting the applicable technical requirements may be certified and will appear in the Department of Communications "Radio Equipment List" and "Terminal Equipment List".
- 4.5 Labelling, identification and fee requirements are outlined in the certification procedure documentation i.e. CP-01, RSP 100.
- 4.6 The following written statement shall accompany each certified cordless telephone unit offered for sale. This statement shall be included in the operating manual, or be enclosed on a separate sheet, and it shall also be shown on a label attached, in a conspicuous location, to the cordless telephone itself:

"Notice - This cordless telephone uses radio communications between the handset and the base unit, and may not ensure privacy of communication. Other devices including other cordless telephones may interfere with the operation of this cordless telephone or cause noise during operation. Units not containing coded access may be accessed by other radio communications systems. Cordless telephones must not cause interference to any licensed radio service."

5. RELATED DOCUMENTS

The following documents provide supplemental information with respect to certification procedure, testing and technical assessments of the equipment, and the fee structure applicable:

- RSP 100 - Certification Procedure, Radio Equipment;
- CP 01 - Certification Procedure, Terminal Equipment;
- CS-03 - Standard for Terminal Equipment, Systems and Connectors;
- TRC-49 - Telecommunications Apparatus Technical Assessment and Testing Fees;
- TRC-67 - Information Relating to the Assignments of Frequencies in the 1605 to 1705 kHz Band.

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ANNEX TO TRC-68, PROVISIONAL, ISSUE 2
TECHNICAL REQUIREMENTS
AND
METHODS OF MEASUREMENT

A.1 INTRODUCTION

This annex outlines the interim technical requirements and measurement methods for cordless telephones operating on frequencies in the vicinity of 1.6 MHz, 46 MHz and 49 MHz.

A.2 GENERAL

A.2.1 Those seeking certification of equipment shall satisfy the Department at their own expense that the equipment actually meets the requirements.

A.2.2 Notwithstanding the fact that a particular unit of equipment meets the requirements, the Department reserves the right to require that adjustments be made to that equipment whenever it causes interference within the meaning of the Radio Act.

A.3 FREQUENCY BANDS AND TECHNICAL REQUIREMENTS

A.3.1 For radio apparatus operating on frequencies in the vicinity of 1.6 MHz and 49 MHz, the following technical requirements must be met:

1.6 MHz

The R.F. currents on the power cord of the base unit shall not exceed:

- (a) 180 mA on any single power conductor;
- (b) 24 mA where measuring all power cord conductors together, including ground conductor.

Formulated as field strengths, the above limits are as follow. The field strength of the emitted electromagnetic waves shall not be greater than that which would be produced by feeding any single power conductor with radio frequency energy having a power of 1.62 watts, or all power conductors measured together, including the ground conductor, with radio frequency energy having a power of 0.029 watts, where the conductors are terminated in a load of 50 ohms. The method of measurement shall, however, be based on measurement of currents in the conductors as described in Section A.4.1;

49 MHz

- (i) The stability of the carrier frequency shall be maintained within +0.01 per cent over a range of:
 - (a) temperature from -20°C to +50°C at rated supply voltage;
 - (b) voltages that vary from 85 per cent to 115 per cent of the rated supply voltage at a temperature of +20°C;

- (ii) The radio apparatus shall not be capable of emitting electromagnetic waves of a field strength greater than 10,000 uV/m measured at a distance of 3 metres;
- (iii) Any emission that falls outside of a 20 kHz wide band of frequencies centred on the carrier frequency shall not have a field strength greater than 500 uV/m measured at a distance of 3 metres;
- (iv) It shall use an antenna that is permanently connected to the apparatus.

A.3.2 For radio apparatus operating on frequencies in the vicinity of 46 MHz and 49 MHz, the following technical requirements must be met:

- (i) The stability of the carrier frequency shall be maintained within +0.01 per cent over a range of:
 - (a) temperature from -20°C to +50°C at normal supply voltage;
 - (b) voltages that vary from 85 per cent to 115 per cent of the normal supply voltage at a temperature of +20°C;
- (ii) Emission shall be confined within a 20 kHz band centred on the authorized carrier frequency. Modulation products falling within 10 kHz above or below this 20 kHz band shall be attenuated at least 26 dB below the level of the unmodulated carrier;
- (iii) The field strength of the carrier frequency shall not exceed 10 000 uV/m at 3 metres;
- (iv) Harmonics and other out-of-band emissions, on any frequency more than 20 kHz removed from the authorized centre frequency, shall comply with the field strength limitations prescribed below.

<u>Frequency (MHz)</u>	<u>Field Strength (uV/m at 3 m)</u>
25-88	100
88-216	150
216-1000	200

The spectrum shall be scanned from 25 to 1000 MHz and all signals exceeding 20 uV/m at 3 metres shall be reported;

- (v) It shall use an antenna that is permanently connected to the apparatus. The manufacturer may design the unit so that broken antennae can be replaced by the user, but in so doing must ensure that the prescribed field strength limitations are not exceeded;

- (vi) A cordless telephone which receives electrical power from the public utility power lines shall limit the radio frequency voltage coupled back into the power lines to less than 100 μ V on any frequency below 30 MHz. A device which is designed to utilize a battery charger is subject to this requirement.

A.4 METHODS OF MEASUREMENT

A.4.1 R.F. Currents (Carrier Current Techniques)

A.4.1.1 General

This section describes the general procedure for measuring R.F. currents on the power cord when carrier current techniques are used.

A.4.1.2 Measurement

- (a) Within a shielded enclosure, the unit under test should be set up so that the power supply is fed through a Line Impedance Stabilization Network (LISN), as specified in IEEE Standard 213, and the telephone cord conductors are terminated in an appropriate resistive load to ground.
- (b) With the carrier unmodulated, measure current on individual power conductors and on all power conductors together with a clip-on-R.F. current probe in combination with a tuned R.F. voltmeter. Use an adapter provided with suitable male and female power connectors connected by individual wires (approx. 15 cm. in length), so that the probe may be applied separately to the ungrounded and grounded power conductors.

A.4.2 Carrier Frequency Stability

A.4.2.1 General

This section describes the general procedure for measuring the ability of the transmitter to maintain an assigned frequency within specified tolerances under operational conditions of variations in power supply voltages at specified extremes of temperature.

A.4.2.2 Measurement

- (a) The transmitter shall be adjusted for normal operation under standard test conditions, using a single standard test frequency. The transmitter shall be operated at a typical duty cycle for each temperature and voltage extreme. For each temperature condition, the equipment temperature shall be allowed to stabilize.
- (b) The frequency of the carrier shall be measured at least once per minute. All frequency measurements shall be recorded.

A.4.3 Radiation Level (Above 30 MHz)

A.4.3.1 General

This section describes the general procedure for measuring radiation levels outdoors. This procedure may be suitably modified and adopted for indoor testing as well. Precautions should be taken to ensure that reflections from surrounding structures are minimized. Engineering briefs should include a detailed description of the test environment. They should specifically indicate what precautions were taken to minimize reflections.

A.4.3.2 Positioning of Equipment

The device under test should be placed on a flat non-metallic turntable located at a height of 2 metres above ground level. The search antenna should be located at a distance of 3 metres from the location of the device under test. The search antenna should be connected via a calibrated cable to a field strength meter (FSM) or spectrum analyzer.

A.4.3.3 Measurements

- (a) With the device and measuring equipment warmed up, and operating, the turntable will be rotated until maximum radiation is indicated on the FMS/spectrum analyzer, which has been tuned to the frequency being measured. The height of the search antenna shall then be varied between 1 and 5 metres, measured to the centre of the antenna, for both horizontal and vertical polarization. The maximum reading shall be recorded. All readings will be taken with the device and search antenna oriented to yield maximum radiation.
- (b) The frequency of measurement, the field strength reading, the antenna factor and the cable attenuation shall be recorded for each measurement. The field strength expressed in microvolts per metre shall be calculated and recorded.