



Government
of Canada
Department of Communications

TRC 51
ISSUE 2

TELECOMMUNICATIONS REGULATION CIRCULAR

INFORMATION RELATED TO THE CERTIFICATION REQUIREMENTS
OF LICENCE - EXEMPT LOW POWER DEVICES USED IN CONTROL
AND SECURITY APPLICATIONS AND OPERATED IN CERTAIN
BANDS WITHIN THE 300 - 400 MHz FREQUENCY RANGE.

EFFECTIVE DATE. JUNE 12, 1980

TELECOMMUNICATION REGULATORY SERVICE

Telecommunications Regulation Circulars are issued from time to time to provide information to those engaged in telecommunications in Canada. The content of these circulars is subject to change at any time, in keeping with new developments. Further information on the contents of this circular is available from the nearest regional office of the Department or from the Telecommunication Regulatory Service at 300 Slater Street in Ottawa.

Telecommunications Regulation Circular, TRC-51 Issue 2, replaces TRC-51 Issue 1 dated February 21, 1978 and deals only with devices using certain bands within the 300-400 MHz frequency range. A Radio Standards Specification consolidating the technical requirements of all low power devices used for control and security applications will be issued at a later date.

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1. INTRODUCTION

- 1.1 This Telecommunications Regulation Circular (TRC) describes the process whereby an applicant can apply for certification of low power devices used in control and security operations on certain frequency bands within the 300-400 MHz frequency range. Pending the development of a Radio Standards Specification (RSS), equipment shall be certified under the provisions of this circular.
- 1.2 Equipment certified under this circular does not require licensing for use in Canada.
- 1.3 Previously, garage door controls, intrusion alarms and similar devices were certified for operation in the Industrial, Scientific and Medical (ISM) bands only. However, the first issue of TRC-51 (February 21, 1978) comments on a proposal to permit the use of additional bands in the 300-400 MHz frequency range on a non-interfering basis for low power devices used in control and security applications.
- 1.4 The principle of permitting the use of the additional spectrum was, in general, favourably received. However, the proposed levels of permissible radiation were generally criticized by the parties commenting, as being too low. Taking this into account, the Department has decided, as an interim measure, to increase the allowable levels to those values listed in this TRC.
- 1.5 The Department will be periodically reviewing the impact of this interim provision and will set down permanent guidelines in due course. Comments are welcome and should be forwarded to the address below:

Director,
Engineering Programs Branch,
Telecommunication Regulatory Service,
Department of Communications,
300 Slater St.,
Ottawa, Ontario, K1A 0C8

2. GENERAL PROVISIONS


- 2.1 Application may be made by a manufacturer or his representative under departmental Radio Standards Procedure RSP-103, for certification of a model of a low power device for control and security applications operating in certain frequency bands in the 300-400 MHz frequency range.
- 2.2 The applicable technical requirements and a testing procedure are included in Annex A to this TRC.
- 2.3 Equipment meeting the requirements listed in the Annex to this circular may be certified as technically acceptable and exempt from licensing.

3. RELATED DOCUMENTATION

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

RSP-103 - Information required to establish the technical acceptability of radio equipment.

TRC-49 - Fees for testing and assessment.


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ANNEX A TO TRC-51 ISSUE 2

CERTIFICATION REQUIREMENTS OF LOW POWER DEVICES USED IN
CONTROL AND SECURITY APPLICATIONS AND OPERATED IN
THE 300-400 MHz FREQUENCY RANGE

A.1 INTRODUCTION

This annex sets the interim technical requirements for certification of technical acceptability of low power devices for control and security operations, to be operated exempt from licensing in certain bands operating within the 300-400 MHz frequency range. Such equipment includes fire, burglar and medical alarms, remote control of garage doors and gates or similar operations, and devices used for the protection of life or property.

A.2 GENERAL

- A.2.1 Those seeking certification of equipment operating in the 300-400 MHz frequency range, shall satisfy the Department at their own expense that the equipment actually meets the requirements stated in this Annex.
- A.2.2 Notwithstanding the fact that a particular piece of equipment meets these 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. Protection from interference is not provided for low power exempt devices.
- A.2.3 These interim requirements will be modified as necessary and finalized in due course.
- A.2.4 The device must not be used for voice or data communications. This does not prohibit the use of digital coding which can uniquely identify the source of emission.
- A.2.5 Devices are not permitted to transmit continuously or at regular, predetermined intervals.
- A.2.6 Activation of the transmitter by manual or automatic means shall initiate a transmission of a maximum duration of two seconds. Continuous activation shall not cause a

continuous transmission. In the case of devices used for alarms to be carried on the person, the Department will consider, on a case by case basis, exemption from this clause.

A.2.7 Low power equipment for the remote control of models is not covered under this proposed standard.

A.2.8 The device shall be so constructed that there are no external or readily accessible controls which may be adjusted to permit operation in a manner inconsistent with the provision of these requirements.

A.3 SUBMISSION PROCEDURE

A.3.1 The Department will appraise submissions for certification of low power devices based on the requirements of this Annex. A submission consists of a letter which requests certification of an equipment type and either has an engineering brief (see para. A.3.3) attached or requests the Department to conduct equipment tests at the departmental laboratory. The submission should be forwarded to the address appearing in para. A.3.6.

A.3.2 Technical appraisal of the candidate equipment will be done by the Department of Communications (DOC), Equipment Approval Unit at DOC Headquarters in Ottawa, Ontario (address is listed in para. A.3.6).

A.3.3 To facilitate a technical appraisal it is necessary for the equipment to be tested. The testing may be done in one of two ways:

(a) the equipment may be tested at an appropriate industrial laboratory and documented by submitting an engineering brief as outlined in RSP 103; or,

(b) the equipment may be tested at the Department's laboratory in Ottawa by sending the equipment, at the applicant's expense, to the address noted in para. A.3.6. The equipment sample should be accompanied by a covering letter which requests testing and evaluation in support of certification.

A.3.4 The equipment forwarded to any testing facility should consist of one sample of the receiver and two of the

transmitter. One of the transmitters should be modified so as to facilitate continuous transmission (for testing purposes only).

- A.3.5 The testing service performed by the Department, as well as the examination of the engineering brief, is subject to fees, as outlined in TRC-49. The Department will return the equipment after a decision has been made regarding its certification.
- A.3.6 Requests for certification and equipment submitted for testing shall be addressed to:

Head, Equipment Approval Unit
Telecommunication Regulatory Service
Department of Communications
300 Slater Street
Ottawa, Ontario
K1A 0C8

(613) 996-2112 or 992-4558

A.4 IDENTIFICATION OF CERTIFIED EQUIPMENT

All radio equipment intended for use in Canada must permanently display on each transmitter, receiver, or inseparable combination thereof:

- (a) manufacturer's name, or the trade or brand name, if different from the manufacturer's name,
- (b) model identification,
- (c) serial number,
- (d) the DOC certificate number.

The identification label must be indelible, tamper-proof, and affixed in such a manner as not to be removable except by destruction or defacing.

A.5 FREQUENCY BANDS AND MAXIMUM PERMITTED RADIATION LEVELS

The standards specified in this TRC will apply only to devices operating in the three bands specified in A.5.1.

A.5.1 Transmitter Radiation Levels

Transmitter frequency and field strength levels must not exceed the limits given below when measured under open field conditions.

<u>Permitted Frequency Band Limits in MHz</u>	<u>Field Strength Limits In uV/m (average) at 3 Metres</u>
310-320	6000
350-360	7700
380-400	9200

Notwithstanding, the requirements of Section A.5.4, the transmitter spurious emissions shall be at least 20 dB below the modulated fundamental frequency level outside the permitted frequency bands of operation given in this section, or not greater than the limits prescribed for receiver spurious emissions in Section A.5.2.

A.5.2 Receiver Spurious

The receiver RF spurious output shall be within the limits provided in the table below.

<u>Frequency In MHz</u>	<u>Field Strength Limits In uV/m (average) at 3 Metres</u>
25-70	320
70-200	500
200-1500	500-5000 (linear interpolation)

A.5.3 Frequency Tolerance

The transmitter carrier frequency shall remain entirely within the operating band limits specified in Section A.5.1.

A.5.4 Band Restrictions

Notwithstanding the conditions imposed by paragraphs A.5.1 and A.5.2, emission of RF energy from low power exempt transmitters, as well as from their associated receivers, shall not fall within any of the frequency bands listed below: (Frequencies in MHz).

73-75.2	
108-136	406.1-410
242.8-243.4	608-614
328.6-335.4	960-1215

NOTE: A radiation level below 5 uV/m (average) at 3m will be considered as having met this requirement.

A.6 GENERAL PROCEDURE FOR MEASUREMENT OF RADIATION LEVELS

A.6.1 INTRODUCTION

Equipment submitted to the DOC Laboratory through the Equipment Approval Unit at DOC Headquarters, will normally be tested in accordance with the procedure described herein. Applicants choosing to submit their test reports using other testing procedures may do so provided equivalence is demonstrated.

A.6.2 GENERAL

A.6.2.1 Either field strength meters (F.S.M.)'s or spectrum analysers may be used for field strength measurements. When a FSM is used, peak field strength measurements shall be taken with the FSM set to the peak detector position. The peak readings obtained from either the FSM or a spectrum analyser shall be converted to average values, mathematically, in accordance with the ON/OFF ratio of the transmission, or the duty cycle, as applicable.

A.6.2.2 In order to assess the accuracy of the peak-to-average calculations, the Department will require:

- (a) the peak-to-average ratio,
- (b) a rationalization for the derivation of this ratio, and

- (c) a sketch showing one complete device duty-cycle, pulse widths and amplitudes, in the time domain.

Note that incomplete test reports may cause inconvenient delays with respect to the evaluation of submissions.

- A.6.2.3 Regardless of test instrumentation used, all test reports shall include a brief description of the modulation and coding scheme, including a sketch showing one complete device duty cycle, pulse widths and amplitudes in the time domain.
- A.6.2.4 If the device is energized by a battery or batteries, new batteries (in a fully charged condition) will be used and will be the same kind as normally used in the equipment. If the device is energized from an external source, the power supply will be maintained within $\pm 2\%$ of the rated value stated by the manufacturer. Adequate isolation will be incorporated to prevent coupling signals into the test equipment via the power lines.
- A.6.2.5 Measurements will be made, using a calibrated dipole antenna, tunable over the frequency range 25 to 1000 megahertz (or useable down to 25 megahertz by applying correction factors) and calibrated horn antennae above 1000 megahertz. Measurements are required over the range 25-1500 MHz.
- A.6.2.6 Testing may be conducted either indoors or outdoors. 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. Excessive reflective interference may compromise the integrity of field strength measurements.

A.6.2.7 Conducting tests outdoors offers the general advantage of a more reflection-free environment. The disadvantage, however, is that the measurements are taken with equipment and personnel exposed to the elements. Exposure to extremes of temperature and humidity may lead to erroneous readings due to the device under test or the test equipment being operated outside their respective design limits. Precautions should be taken, when testing in an outdoor environment, to ensure that all electronic equipment is operated within design limits.

A.6.3 RADIATION LEVEL MEASUREMENTS

A.6.3.1 (a) This section describes the general procedure for measuring radiation levels outdoors. This procedure may be suitably modified and adopted for indoor testing as well. All measurements will be made at ambient temperature. The ambient temperature shall be recorded in degrees Celsius.

(b) The measuring site will be on level ground, free of any obstruction, and so located that the device under test and the antenna used with the measuring equipment are both at least 15 metres from any reflective objects. Any structure used to house the measuring equipment and personnel will be constructed largely of non-metallic materials, so as not to affect the measurements.

A.6.3.2 Positioning of Device Under Test

The device under test will be placed in the centre of a flat, non-metallic turntable, located at a height of 2 metres above ground level. For a device energized from an external source, the power supply cable will be fed through a hole in the centre of the table, extended vertically downward and connected to the power source located near the centre of rotation, not more than 30 centimetres above ground or floor level. Any excess cable shall be coiled (approximately 10 centimetres in diameter) and placed horizontally beside the power source. In case there are control signals carried over a cable, separate from the power supply cable, this cable will be attached to the device and extended horizontally for one wavelength of the carrier frequency. The diagram entitled, "Test Layout", labelled Figure 1, depicts a typical test arrangement. The location of the device under test is defined as point "A", for the purposes of this document.

A.6.3.3 Positioning of Sensor Equipment

(a) The location of the search antenna is defined as point "B". Point "B" is a location on the end of a mast-supported, horizontal, non-metallic boom where the search antenna is mounted. The boom should be adjustable horizontally such that the search antenna may be placed a distance of 3 metres from point "A" when measuring the distance in the horizontal plane. The height of the boom should be adjustable above ground between the heights of one and five metres.

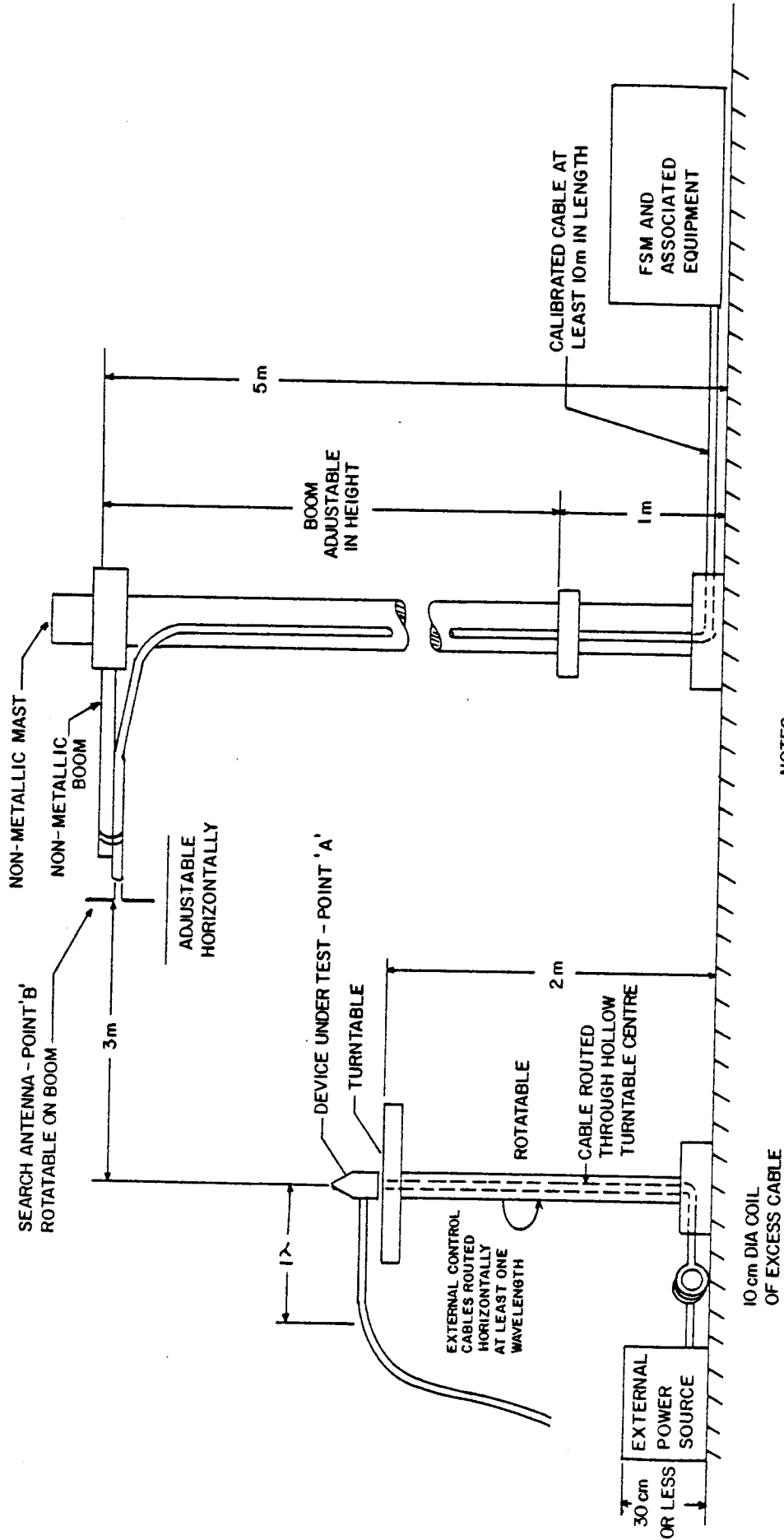
(b) The search antenna will be connected via a calibrated cable (or a cable whose attenuation at the test frequency is known), at least 10 metres in length, to a field strength meter (FSM) or spectrum analyser. The interconnecting cable between the search antenna and the FSM/spectrum analyser will be deployed along the boom and the FSM/spectrum analyser will be placed to the rear of the antenna, as remote from point "A" as the interconnecting cable will permit. Figure 1 depicts the arrangement.

A.6.3.4 Measurement

(a) With the device and measuring equipment warmed up and operating, the turntable will be rotated until maximum radiation is indicated on the FSM/spectrum analyser, 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 so as 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.

FIGURE 1 - TEST LAYOUT
SIDE VIEW



NOTES

1. M = METRES
2. BOTH POINTS A AND B AT LEAST 15 METRES FROM ANY REFLECTIVE OBJECTS

NOT TO SCALE