Industry Canada

RSS-Supplement
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Spectrum Management

Radio Standards Specification

Supplement 1993-1 to Radio Standards Specifications (RSSs) Nos. 118, 119, 120, 121, 122, and 182

Canada

Aussi disponible en français - CNR-supplément

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1. Intent

This supplement amends, where applicable, the above-mentioned documents by deleting some transmitter and receiver tests, and amending some other tests.

2. Transmitter Tests

2.1 Transmitter Tests To Be Deleted

(a) Transmitter audio frequency response and pre-emphasis test for audio frequencies below 3 KHz (i.e. in-band).

Note: Testing above 3 KHz is retained. Pre-emphasis of nominal 6 dB/octave requirement is also retained but testing is deleted.

(b) Hum and Distortion.

(c) Duty cycle test.

2.2 Transmitter Tests To Be Amended

(a) **Transmitter Emission Mask Test:**

Out-of-band emissions of a transmitter shall be measured using a spectrum analyzer of 300 Hz bandwidth for frequencies up to ± 45 KHz removed from the carrier frequency. For frequencies beyond ± 45 KHz from the carrier frequency, the spectrum analyzer bandwidth shall be 30 KHz or equivalent.

For cellular equipment, i.e. RSS-118, operating in the F1D wideband data mode or the F3D signaling tone mode, the spectrum analyzer bandwidth shall be 300 Hz for any emission less than or equal to 60 KHz removed from the carrier frequency, and the bandwidth shall be 30 KHz for any emission above 60 KHz removed from the carrier.

The shapes of the masks are to remain unchanged.

(b) **Transmitter Frequency Stability Test:**

The unmodulated carrier frequency stability is to be tested (in turn) under the following conditions:

(1) At room temperature (20 ±5 degrees Celsius) and 90% and 110% of rated power supply voltage.

(2) At rated power supply voltage and each of the temperatures specified in the corresponding RSSs.

Minimum standards: See the respective RSSs.

(c) **Transmitter RF Output Power Variation Test:**

The RF output power stability test versus temperature and supply voltage **variations** is deleted, except for RSS-118 equipment. The RF power will only be measured at one supply voltage (rated value) and at room temperature. (Note: RSS-118, however, is not amended and the test therein remains for cumulative temperature and voltage variations).

Minimum standard: The RF output power shall be within ± 1.0 dB of the manufacturer's rated power.

(d) **Modulation Techniques:**

Equipment employing modulation techniques other than FM (frequency modulation) can be certified as technically acceptable if the RF output spectrum meets the "data port" mask as well as the other relevant technical standards given in the RSSs. The test methods to demonstrate compliance should be detailed in the test report.

The above paragraph on modulation techniques does not apply to RSS-118.

3. Receiver Tests

3.1 Receiver Tests To Be Deleted

(a) Receiver audio frequency response test.

(b) De-emphasis: Receiver de-emphasis network becomes optional.

3.2 Receiver Tests To Be Amended

3.2.1 Receiver Spurious Emission Measurements

Receiver spurious emissions may be measured using a terminated measurement at the antenna terminals for detachable antennas, or by the radiated method. The measurement methods and the permissible limits are given below.

The equipment under test (EUT) shall be operated in its normal receive mode and on a frequency near the middle of the frequency range within which the equipment is designed to operate. The bandwidth of the spectrum analyzer shall be sufficient to capture the jitter components of the spurious frequency. The search for spurious emissions shall be made from the lowest frequency internally generated or used in the receiver (local oscillator frequency, intermediate frequency or carrier frequency) or 30 MHz, whichever is higher, to at least 5 times the highest channel frequency; this search frequency need not exceed 1000 MHz if Table 2 is used.

(a) **Receiver Spurious (Antenna Conducted Measurement):**

The receiver antenna shall be replaced by a spectrum analyzer of resistance equal to the design impedance of the antenna. The frequency band indicated in 3.2.1 shall be searched.

If the receiver incorporates a scanning mode of operation, the spurious measurement procedure shall be repeated with the receiver operating in the scanning mode at maximum scanning rate.

Minimum Standard: The power at any frequency shall not exceed 2 nanowatts.

(b) **Receiver Spurious (Radiated Measurement):**

For radiated measurements, an open field test site as described below shall be used. The frequency band indicated in 3.2.1 shall be searched.

If the receiver incorporates a scanning mode of operation, the spurious measurement procedure shall be repeated with the receiver operating in the scanning mode at maximum scanning rate.

Minimum Standard: The field strength of any receiver spurious frequency in each polarization (vertical and horizontal), measured at a horizontal distance (D in Fig. A) of 3 meters from the antenna, shall not exceed the limits of Table 1, except that equipment manufactured or imported **before** June 23, 1999, is permitted the limits of Table 2.

Table 1

Receiver Spurious Emission Limits

Frequency (MHz)	Field Strength (microvolts/m) at 3 meters
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

Table 2

Receiver Spurious Emission Limits - Before June 23, 1999

Frequency (MHz)	Field Strength (microvolts/m) at 3 meters
30 - 70	320
70 - 130	500
130 - 174	500 to 1500 (linear interpol.)
174 - 260	1500
260 - 470	1500 to 5000 (linear interpol.)
470 - 1000	5000
Above 1000	No limit

Note: Interpolations in Table 2 are to be linear field strength versus frequency.

4. Radiation Measurement Description

Open field tests may be performed at the prevailing ambient temperature, provided that the prevailing temperature is within the design range for the equipment.

4.1 Open Field Test Site

The following is a description of a "3-meter test site". Measurements using a calibrated site of greater dimensions are permitted.

The open field test site shall be an area clear of any obstructions, such as trees, bushes or metal fences, at least within an elliptical boundary of dimensions, as shown in Figure A(a). Objects outside this boundary may still affect the measurements and care shall be taken to choose a site as far as possible from large metallic objects of any sort.

The terrain shall be flat. Any conducting object inside the area of the ellipse shall be limited to dimensions less than one tenth of a wavelength at the highest frequency of measurement. A metal ground plane or wire mesh covering at least the area of the ellipse and keeping the same major and minor axes, as indicated in Figure A(a), is required. All electrical wires needed to service the equipment under test (EUT) shall be run under the ground plane.

All precautions shall be taken to ensure that reflections from surrounding structures are minimized. Engineering briefs shall include a detailed description of the test environment. They shall specifically indicate what precautions were taken to minimize reflections.

Weather protection enclosures may be constructed either partially or entirely over the site. Fibreglass, plastics, treated wood or fabric are suitable materials for construction of an enclosure.

4.2 Equipment Test Platform

The EUT shall be oriented in the manner in which it is designed to operate and placed on a nonconducting turntable 1.0 meter above ground. (Refer to Figure A(b)). The table should be capable of being rotated through 360 degrees in azimuth. The power supply and other external cables shall be fed through a hole in the centre of the table and extended downwards.

All available accessories shall be connected to the EUT, preferably by interconnection cables supplied by the manufacturer. If the cables are not supplied, cables 1.0 meter long and of similar construction with respect to shielding should be used. Excess cables shall be folded back and forth to form a bundle 30 to 40 cm in length and placed on the test platform. It may also be draped over the edge of the platform provided that it is kept at least 40 cm above the ground plane.

Unused terminals of the EUT, for optional accessories, such as external speakers, shall be fitted with cables 1.0 meter long. The cables shall be terminated by proper impedances, corresponding to the impedances of the designated accessories.

For an EUT with an extensible microphone, the microphone shall be extended vertically by not more than 1.5 meters using a non-conducting support. Excess cable shall be coiled (diameter approximately 25 cm) and placed on a non-conducting spacer 10 cm above the test sample.

4.3 Measurement Method

Extend the EUT antenna fully and operate the EUT in its normal mode of operation. The EUT's radiated spectrum shall be measured using a tuned dipole (or other standard antenna herein known as the measurement antenna) in the vertical plane of polarization. The tuned dipole shall be located horizontally 3 meters from the EUT and it shall be mounted on a non-conducting mast that permits the antenna height to be varied between 1.0 and 4.0 meters. The lower element of the vertical dipole shall be kept at least 25 centimeters above the ground plane for any measurement.

The received signal shall be coupled to a spectrum analyzer. The EUT shall be rotated through a total of 360 degrees in azimuth and the height of the measurement antenna varied between 1.0 and 4.0 meters to find the maximum field strength. Record the frequency and the field strength.

The above test is to be repeated with the measurement antenna in the horizontal polarization. In lieu of separate measurements, using the measurement antenna first in vertical and then in horizontal polarizations as described above, it is permissible that the measurement antenna polarization be rotated to maximize each field strength reading.

For hand-held or body-worn devices, the device shall be tested in three orthogonal planes: Lying on its side, back, and on its end.

The EUT shall be de-activated and the residual field strength due to the ambient RF noise measured. To ensure that the EUT field strength measurement is not significantly influenced by ambient RF noise, the latter level shall be at least 6 dB below that of the EUT signal.

Issued under the authority of the
Minister of Communications

S.N. Ahmed
Director General
Engineering Programs.

FIG. A(a): PLAN VIEW

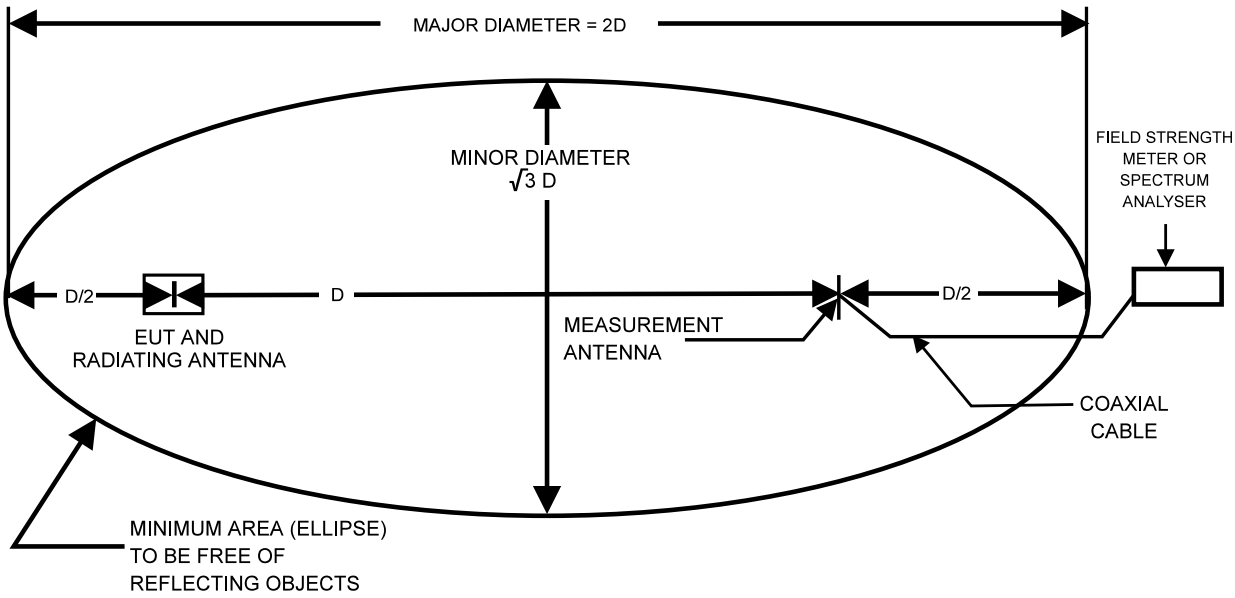
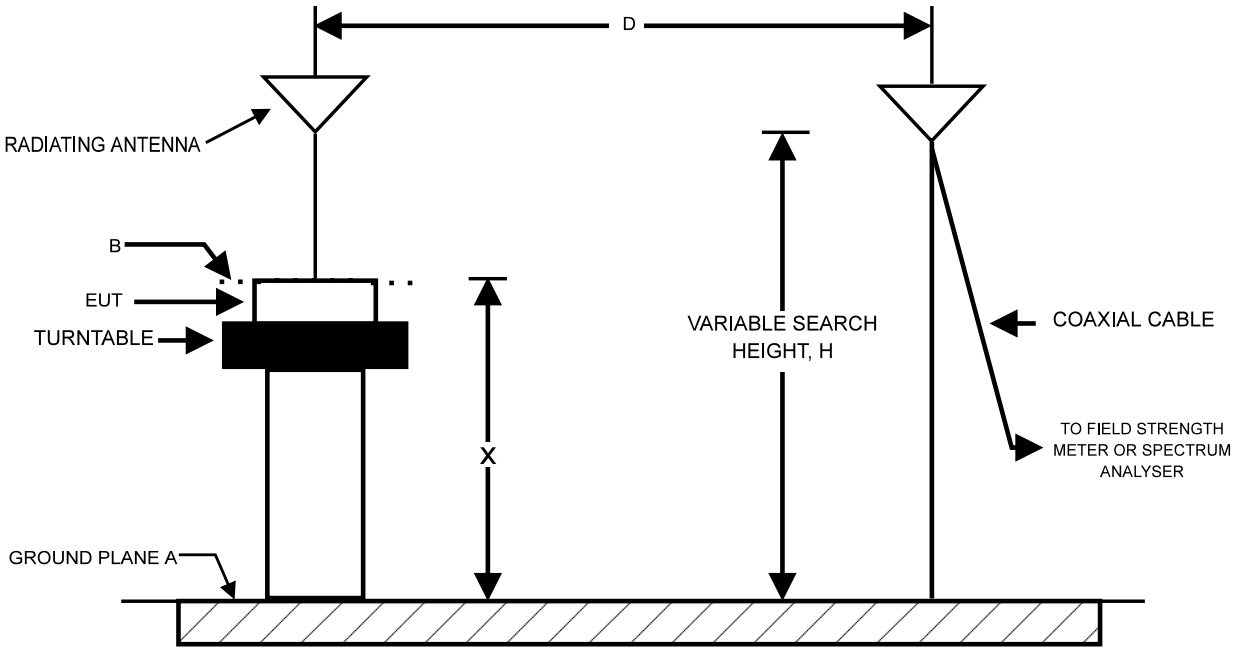


FIG. A(b): SIDE VIEW



D = 3 METRES = DISTANCE BETWEEN EQUIPMENT UNDER TEST (EUT) AND FIELD MEASUREMENT ANTENNA
X = HEIGHT OF EUT ANTENNA BASE ABOVE GROUND PLANE A
H = HEIGHT OF MEASUREMENT ANTENNA ABOVE GROUND PLANE A
h = H - X
B = AUXILIARY GROUND PLANE, WHEN REQUIRED

Figure A: Equipment Arrangement for Radiation Test Site