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RSS-141
Issue 2
June 2010

Spectrum Management and Telecommunications Policy

Radio Standards Specification

Aeronautical Radiocommunication Equipment in the Frequency Band 117.975-137 MHz

Preface

Radio Standard Specification RSS-141, Issue 2, *Aeronautical Radiocommunication Equipment in the Frequency Band 117.975-137 MHz*, replaces RSS-141, Issue 1, Revision 1, dated February 2004.

This document will be in force as of the publication date of Notice SMSE-004-10 in the *Canada Gazette*, Part I. Upon publication, the public has 120 days to make comments. Comments received will be taken into account in the preparation of the next version of the document.

The following are the changes:

1. General reformatting and editorial changes; material common to most RSSs has been moved to RSS-Gen, *General Requirements and Information for the Certification of Radiocommunication Equipment*.
2. **Sections 5.1 and 5.2.1:** The requirement for VHF digital equipment is included.
3. **Section 2.1:** The Licensing Requirements section has been updated to clarify that on-board aircraft equipment is exempt from licensing requirements.
4. **Section 2.3:** The Related Document section has been updated to remove references to documents that are now rescinded.
5. The spurious emission limit (using radiated measurement method) for receivers at frequencies above 1610 MHz has been removed. The 960-1610 MHz limit is now applicable to all receiver spurious emissions at frequencies above 960 MHz as per RSS-Gen.
6. **Section 3.1:** The requirement that RSS-Gen shall be used in conjunction with this issue of RSS-141 is stated.

Issued under the authority of
the Minister of Industry

Marc Dupuis
Director General
Engineering, Planning and Standards Branch

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1. Scope

This Radio Standards Specification (RSS) sets out requirements for the certification of radio transmitters and receivers in the aeronautical mobile (R) service operating in the band 117.975-137 MHz for the purpose of communication.

Emergency locator transmitter (ELT) beacons and other emergency transmitters operating on the 121.5 MHz frequency are covered by RSS-287.

2. General Information

Equipment covered by this standard is classified as Category I equipment. 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

Radio equipment covered by this standard that is not operated on board an aircraft is subject to licensing pursuant to subsection 4(1) of the *Radiocommunication Act*. Radio equipment that is operated on board an aircraft in the performance of the aeronautical service is exempt from licensing requirements pursuant to subsection 15.1 of the *Radiocommunication Regulations*. Regardless of this exemption, radio equipment on board an aircraft in the aeronautical service shall be operated in accordance with Regulation by Reference RBR-1, *Technical Requirements for the Operation of Mobile Stations in the Aeronautical Service*, issued by the Minister of Industry, as amended from time to time.

2.2 Inquiries Concerning Transport Canada Requirements

Inquires concerning aeronautical radiocommunication equipment airworthiness should be directed to:

[Manager, Aircraft Certification Regulatory Specialist](#)

Transport Canada - Aircraft Certification Branch (AARD)

330 Sparks Street, 3rd Floor, Tower C, Place de Ville

Ottawa, Ontario K1A 0N5

Telephone: 613-952-4328

E-mail: elghawabyg@tc.gc.ca

2.3 Related Documents

All Spectrum Management and Telecommunications publications are available on Industry Canada's website at <http://www.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:

RBR-1 *Technical Requirements for the Operation of Mobile Stations in the Aeronautical Service*

RSS-287 *Emergency Position Indicating Radio Beacons (EPIRB), Emergency Locator Transmitters (ELT), Personal Locator Beacons (PLB), and Maritime Survivor Locator Devices (MSLD)*

RBR – Regulation by Reference

RSS – Radio Standards Specification

3. General Requirements

3.1 RSS-Gen Compliance

This issue of RSS-141 shall be used in conjunction with RSS-Gen for general specifications and information relevant to the equipment for which this standard applies.

4. Measurement Methods

4.1 Transmitter Output Power

The transmitter output power shall be determined as below:

- (i) in terms of mean power for amplitude-modulated emissions and transmitting both side bands using unmodulated full carrier; and
- (ii) in terms of peak power for phase-modulated emissions.

4.2 Transmitter Unwanted Emissions (AM transmitter only)

The transmitter shall be operated into the standard output termination across the antenna terminals and modulated with a 2500 Hz sinusoidal signal at a level sufficient to produce 50% modulation. The level of the input modulation signal is then increased by 16 dB.

A sample of the radio frequency (RF) output shall be fed to an RF spectrum analyzer.

The unwanted emissions shall be measured as follows:

- (a) Set the carrier to the lowest settable or programmable frequency.
 - (i) Set the spectrum analyzer to a resolution bandwidth of 300 Hz.
 - (ii) Set video bandwidth to 1 kHz.

- (iii) Set the span to cover at least $\pm 250\%$ of the emission bandwidth and record the unwanted emissions against the unwanted emission limits specified in Section 5.2.2.
- (iv) Change the frequency span to cover the band from the lowest local oscillator frequency or from 30 MHz, whichever is the lower frequency, to at least the 5th harmonic of the highest local oscillator or tuning frequency, without exceeding 40 GHz.

Record and submit the spectrum plots.

- (b) Repeat (a), using the highest settable or programmable frequency. However, the search for spurious emissions (i.e. outside the $\pm 250\%$ bandwidth) of (a)(iv) need not be repeated.

5. Transmitter and Receiver Standard Specifications

5.1 Transmitter Specifications

Transmitters shall comply with the limits and requirements of Table 1 below.

Table 1 - Specification Requirements for Transmitters

Emissions Types	A3E, A9W, G1D, G7D
Channel Bandwidth	25 kHz
Necessary Bandwidth	6 kHz for A3E emissions 13 kHz for A9W emissions 14 kHz for G1D and G7D emissions
Frequency Stability	Ground Equipment: ± 20 ppm for A3E and A9W emissions ± 2 ppm for G1D and G7D emissions Airborne Equipment: ± 30 ppm for A3E and A9W emissions ± 5 ppm for G1D and G7D emissions
Modulation Index for A3E and A9W Emissions	Shall not exceed 100%
Maximum Transmitter Power	Ground Equipment: 50 W for fixed equipment with A9W, G1D or G7D emissions 300 W for fixed equipment with A3E emissions 20 W for mobile, portable and transportable equipment with A3E emissions Airborne Equipment 55 W

5.2 Transmitter Unwanted Emissions

5.2.1 Transmitters with G1D or G7D Emissions

Transmitters with G1D or G7D emissions shall comply with the following:

- (a) the amount of transmitted peak power when measured over either of the first-adjacent 25 kHz channels shall not exceed 2 dBm;
- (b) the amount of transmitted peak power when measured across either of the second-adjacent 25 kHz channels shall not exceed -28 dBm;
- (c) the amount of transmitted peak power when measured across either of the third-adjacent 25 kHz channels shall not exceed -33 dBm; and
- (d) the amount of transmitted peak power measured across either of the fourth-adjacent 25 kHz channels shall not exceed -38 dBm; and from thereon the amount of power measured in any other adjacent channel shall monotonically decrease at a rate of at least 5 dB/octave, to a maximum value of -53 dBm.

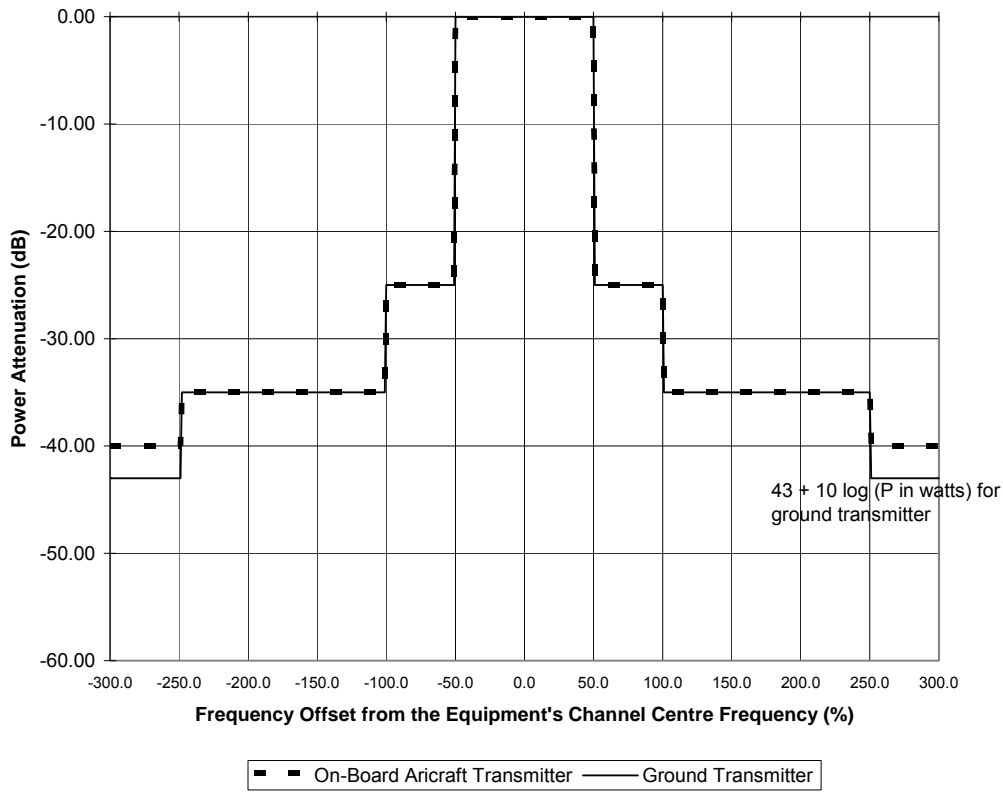
5.2.2 Transmitter with A3E or A9W Emissions

For transmitters with A3E or A9W emissions, the mean power of any emissions shall be attenuated below the mean power of the transmitter, P as follows:

- (a) When the frequency is removed from the equipment's channel centre frequency by more than 50% up to and including 100% of the channel bandwidth, the attenuation shall be at least 25 dB, measured with a bandwidth of 300 Hz;
- (b) When the frequency is removed from the equipment's channel centre frequency by more than 100% up to and including 250% of the channel bandwidth, the attenuation shall be at least 35 dB, measured with a bandwidth of 300 Hz;
- (c) When the frequency is removed from the equipment's channel centre frequency by more than 250% of the channel bandwidth, the attenuation for on-board aircraft transmitters shall be at least 40 dB; and the attenuation for ground transmitters shall be at least $43 + 10 \log_{10} P$ (in watts) dB, measured with a bandwidth of 3 kHz.

The emission mask is shown in Figure 1.

Figure 1 Unwanted Emissions Mask for Transmitters with A3E and A9W Emissions



5.3 Receiver Spurious Emissions

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