




Nemko Test Report: 6L0791RUS1


Applicant: STEMCO, LP
300 Industrial Blvd.
Longview, Texas 75604
USA

**Equipment Under Test:
(E.U.T.)** Active TracBat Model 6049999

In Accordance With: **FCC Part 15, Subpart C, 15.247**
Digital Transmission System Transmitter

Tested By: Nemko USA, Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

TESTED BY:  **DATE:** 21 December 2006
David Light, Senior Wireless Engineer

APPROVED BY:  **DATE:** 21 December 2006
Abe Cox, Key Account Manager

Number of Pages: 31

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EQUIPMENT: Active TracBat

Section 1. Summary of Test Results

Manufacturer: STEMCO, LP

Model No.: Active TracBat 6049999

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C, Paragraph 15.247 for Digital Transmission Systems. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See "Summary of Test Data".



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EQUIPMENT: Active TracBat

Summary Of Test Data

| NAME OF TEST | PARA. NO. | RESULT |
|-------------------------------|---------------------|---------------|
| Powerline Conducted Emissions | 15.207(a) | NA |
| Minimum 6 dB Bandwidth | 15.247(a)(2) | Complies |
| Maximum Peak Power Output | 15.247(b)(3) | Complies |
| Spurious Emissions | 15.247(d)/15.209(a) | Complies |
| Peak Power Spectral Density | 15.247(e) | Complies |

Footnotes:

The EUT is battery powered.

EQUIPMENT: Active TracBat

Section 2. Equipment Under Test (E.U.T.)

General Equipment Information

| | | | |
|------------------------------|--------------------------|-------------------------------------|--------------------------|
| Frequency Band (MHz): | 902-928 | 2400-2483.5 | 5725-5850 |
| | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Operating Frequency of Test Sample: 2405 to 2481 MHz

6 dB Bandwidth: 900 kHz

Supply Voltage: 3.6 Vdc

User Frequency Adjustment: Software controlled

Description of EUT

The Active TracBat (mileage counter) operates by sending out a GFSK DSSS data stream which encodes the mileage and other pertinent data at a 1 MBit rate using a 64 bit PN sequence.

EQUIPMENT: Active TracBat

Section 3. Occupied Bandwidth

| | |
|----------------------------------|-------------------------|
| NAME OF TEST: Occupied Bandwidth | PARA. NO.: 15.247(a)(2) |
| TESTED BY: David Light | DATE: 21 Dec 2006 |

Test Results: Complies.

Measurement Data: See 6 dB BW plot

Measured 6 dB bandwidth:

900 KHZ

Test Conditions: 45 %RH
22 °C

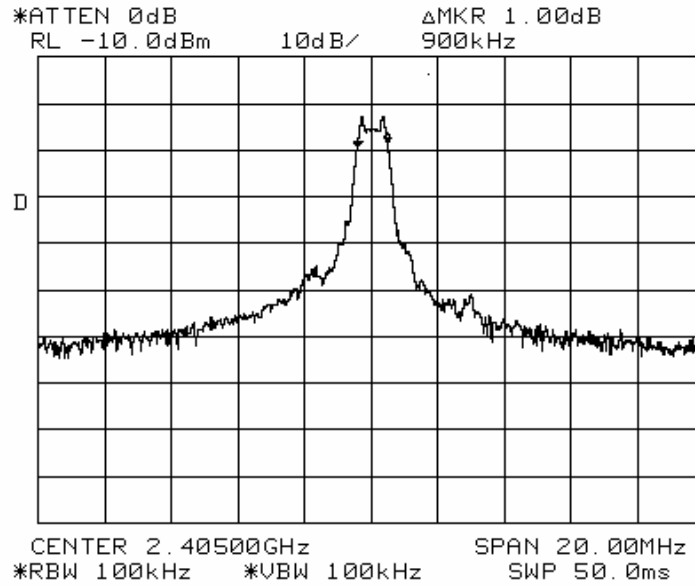
Measurement Uncertainty: +/-1x10⁻⁷ ppm

Test Equipment Used: 1464-1016-1484-1485-993

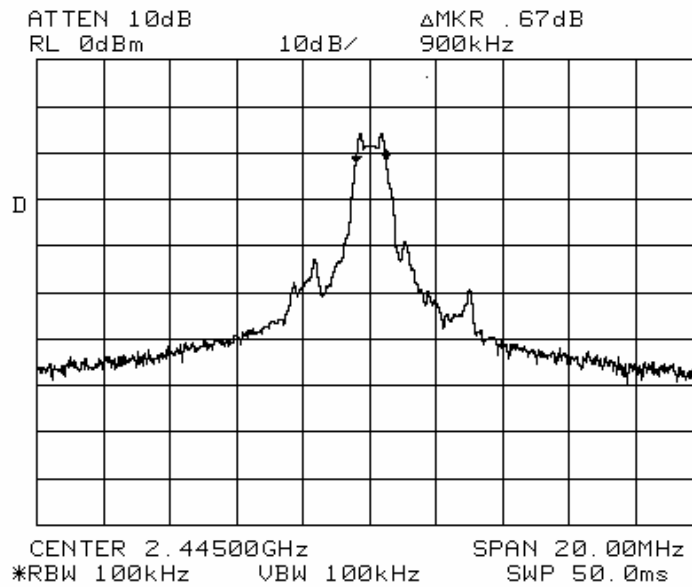
EQUIPMENT: Active TracBat

Test Data – Occupied Bandwidth

Low channel



Mid Channel



EQUIPMENT: Active TracBat

Section 4. Maximum Peak Output Power

| | |
|---|-------------------------|
| NAME OF TEST: Maximum Peak Output power | PARA. NO.: 15.247(b)(3) |
| TESTED BY: David Light | DATE: 21 Dec 2006 |

Test Results: Complies.

Measurement Data: Refer to attached data

Test Conditions: 45 %RH
22 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1464-1484-1485-1016-993

- This device was tested at +/- 15% input power per 15.31(e), with no variation in output power.
- For battery powered equipment, the device was tested with a fresh battery per 15.31(e).
- The device was tested on three channels per 15.31(l).
- This test was performed radiated.
- The device was tested on three orthogonal axis'.

EQUIPMENT: Active TracBat

Test Data – Peak Power

| Frequency (MHz) | Meter Reading (dBm) | Substitution Level (dBm) | | Pre-Amp Gain (dB) | Substitution Antenna Gain (dBd) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarity | Comments |
|--------------------|---------------------------|--------------------------------|--|-------------------------|---------------------------------------|---------------|----------------|----------------|----------|---------------|
| | | | | | | | | | | RBW=VBW=1 MHz |
| | | | | | | | | | | High Channel |
| 2481 | -13.7 | -11.6 | | 32.8 | 7.8 | -3.8 | 36.0 | -39.8200 | V | |
| 2481 | -18.0 | -14.0 | | 32.8 | 7.8 | -6.2 | 36.0 | -42.2200 | H | |
| | | | | | | | | | | Mid Channel |
| 2445 | -15.8 | -13.7 | | 32.8 | 7.8 | -5.9 | 36.0 | -41.9000 | V | |
| 2445 | -19.0 | -15.0 | | 32.8 | 7.8 | -7.2 | 36.0 | -43.2000 | H | |
| | | | | | | | | | | Low Channel |
| 2405 | -15.7 | -13.6 | | 32.8 | 7.8 | -5.8 | 36.0 | -41.8000 | V | |
| 2405 | -18.9 | -14.9 | | 32.8 | 7.8 | -7.1 | 36.0 | -43.1000 | H | |
| | | | | | | | | | | |
| Notes: _____ | | | | | | | | | | |

EQUIPMENT: Active TracBat

Section 5 Spurious Emissions

| | |
|---|-----------------------|
| NAME OF TEST: Spurious Emissions at Antenna Terminals | PARA. NO.: 15.247 (d) |
| TESTED BY: David Light | DATE: 21 Dec 2006 |

Test Results: Complies.

Measurement Data: See attached plots.

Test Conditions: 45 %RH
22 °C

Measurement Uncertainty: +/-3.6 dB

Test Equipment Used: 1464-1484-1485-1016-993791-759-1195

Notes:

- For handheld devices, the EUT was tested on three orthogonal axis'
- The device was tested from 30 MHz to the tenth harmonic of the highest fundamental frequency per 15.33
- The device was tested on three channels per 15.31(l).
- No emissions were detected within 20 dB of the specification limit therefore none are reported per 15.31(o). Band edge data is presented below.

Analyzer Settings:

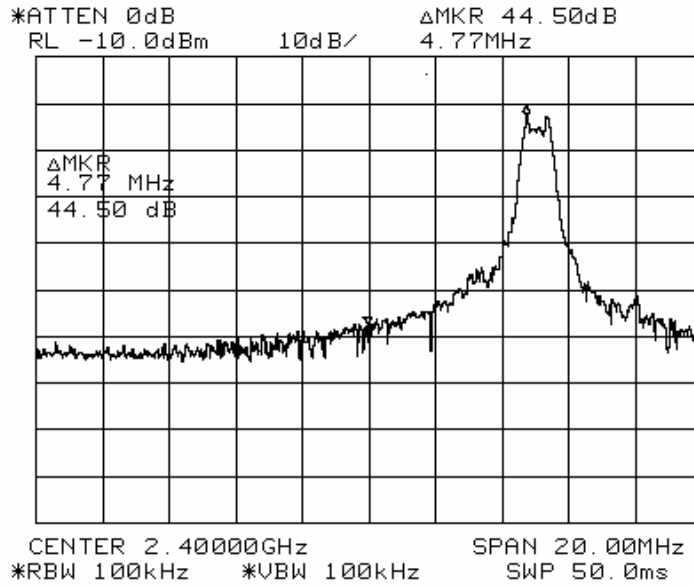
RBW=VBW=100 kHz below 1000 MHz
RBW=VBW=1 MHz above 1000 MHz
Peak Detector

Duty cycle correction = $20 \log (20.796/100) = -13.6 \text{ dB}$
See plots on page 16

EQUIPMENT: Active TracBat

Test Data – Spurious Emissions at Antenna Terminals

Lower Band Edge



EQUIPMENT: Active TracBat

Test Data – Spurious Emissions

Low Channel

| Measurement Data: | | | Test Distance: 3 Meters | | | | | | | | | |
|--------------------------|-------------------|------|-------------------------|-------------|-------------|------------|---------------|----------------|----------------|--------------|--------------|--|
| # | Freq | Rdng | Cable Duty Cycle | Cable dB | Pre-A dB | Horn dB | Dist Table | Corr dBµV/m | Spec dBµV/m | Margin dB | Polar Ant | |
| | MHz | dBµV | dB | dB | dB | dB | | | | | | |
| | 4804.670 | 59.0 | +1.0 | +3.2 | -32.5 | +33.1 | +0.0 | 63.8 | 74.0 | -10.2 | Vert | |
| | Peak – Lo Channel | | | | | | | | | | | |
| | 6400.826 | 47.8 | +1.3 | +3.9 | -30.9 | +35.0 | +0.0 | 57.1 | 74.0 | -16.9 | Vert | |
| | Peak – Lo Channel | | | | | | | | | | | |
| | 7210.145 | 54.8 | +1.2 | +3.9 | -32.1 | +35.8 | +0.0 | 63.6 | 74.0 | -10.4 | Vert | |
| | Peak – Lo Channel | | | | | | | | | | | |
| | 1601.333 | 60.2 | +0.6 | +1.9 | -32.0 | +25.3 | +0.0 | 42.4 | 54.0 | -11.6 | Vert | |
| | Avg. – Lo Channel | | | | | | | | | | | |
| | 4804.670 | 59.0 | +1.0 | +3.2 | -32.5 | +33.1 | +0.0 | 50.2 | 54.0 | -3.8 | Vert | |
| | Avg. – Lo Channel | | | | | | | | | | | |
| | 6400.826 | 47.8 | +1.3 | +3.9 | -30.9 | +35.0 | +0.0 | 43.5 | 54.0 | -10.5 | Vert | |
| | Avg. – Lo Channel | | | | | | | | | | | |
| | 7210.145 | 54.8 | +1.2 | +3.9 | -32.1 | +35.8 | +0.0 | 50.0 | 54.0 | -4.0 | Vert | |
| | Avg. – Lo Channel | | | | | | | | | | | |
| | 4804.670 | 60.0 | +1.0 | +3.2 | -32.5 | +33.1 | +0.0 | 64.8 | 74.0 | -9.2 | Horiz | |
| | Peak – Lo channel | | | | | | | | | | | |
| | 1600.167 | 54.3 | +0.6 | +1.9 | -32.0 | +25.2 | +0.0 | 36.4 | 54.0 | -17.6 | Horiz | |
| | Avg. – Lo Channel | | | | | | | | | | | |
| | 4804.670 | 60.0 | +1.0 | +3.2 | -32.5 | +33.1 | +0.0 | 51.2 | 54.0 | -2.8 | Horiz | |
| | Avg. – Lo Channel | | | | | | | | | | | |

EQUIPMENT: Active TracBat

Test Data – Spurious Emissions

Mid Channel

| Test Distance: 3 Meters | | | | | | | | | | | |
|--------------------------|------------------|------|------------------------|-------------|-------------|------------|---------------|----------------|----------------|--------------|--------------|
| Measurement Data: | | | | | | | | | | | |
| # | Freq | Rdng | Cable Duty Cycle | Cable dB | Pre-A dB | Horn dB | Dist Table | Corr dBµV/m | Spec dBµV/m | Margin dB | Polar Ant |
| | MHz | dBµV | dB | dB | dB | dB | | | | | |
| | 4887.101 | 59.2 | +1.0 | +3.3 | +32.6 | +33.4 | +0.0 | 64.3 | 74.0 | -9.7 | Vert |
| | Mid Ch - Peak | | | | | | | | | | |
| | 7337.538 | 53.3 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 62.0 | 74.0 | -12.0 | Vert |
| | Mid Ch - Peak | | | | | | | | | | |
| | 4887.101 | 59.2 | +1.0 | +3.3 | +32.6 | +33.4 | +0.0 | 50.7 | 54.0 | -3.3 | Vert |
| | Mid Ch - Average | | -13.6 | | | | | | | | |
| | 7337.538 | 53.3 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 48.4 | 54.0 | -5.6 | Vert |
| | Mid Ch - Average | | -13.6 | | | | | | | | |
| | 4887.101 | 61.5 | +1.0 | +3.3 | +32.6 | +33.4 | +0.0 | 66.6 | 74.0 | -7.4 | Horiz |
| | Mid Ch - Peak | | | | | | | | | | |
| | 7330.043 | 47.8 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 56.5 | 74.0 | -17.5 | Horiz |
| | Mid Ch - Peak | | | | | | | | | | |
| | 4887.101 | 61.5 | +1.0 | +3.3 | +32.6 | +33.4 | +0.0 | 53.0 | 54.0 | -1.0 | Horiz |
| | Mid Ch - Average | | -13.6 | | | | | | | | |
| | 7330.043 | 47.8 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 42.9 | 54.0 | -11.1 | Horiz |
| | Mid Ch - Average | | -13.6 | | | | | | | | |

EQUIPMENT: Active TracBat

Test Data – Spurious Emissions

High Channel

| Measurement Data: | | | Test Distance: 3 Meters | | | | | | | | | |
|--------------------------|-----------------|--------------|-------------------------|-------------|-------------|------------|---------------|----------------|----------------|--------------|--------------|--|
| # | Freq MHz | Rdng dBµV | Cable dB | Cable dB | Pre-A dB | Horn dB | Dist Table | Corr dBµV/m | Spec dBµV/m | Margin dB | Polar Ant | |
| | 1651.757 | 60.2 | +0.7 | +1.9 | +31.9 | +25.7 | +0.0 | 56.6 | 74.0 | -17.4 | Vert | |
| | Hi Ch - Peak | | | | | | | | | | | |
| | 2483.500 | 60.0 | +0.8 | +2.3 | +32.8 | +29.0 | +0.0 | 59.3 | 74.0 | -14.7 | Vert | |
| | Hi Ch – Peak | | | | | | | | Band edge | | | |
| | 4947.050 | 53.3 | +1.0 | +3.3 | +32.6 | +33.6 | +0.0 | 58.6 | 74.0 | -15.4 | Vert | |
| | Hi Ch – Peak | | | | | | | | | | | |
| | 7434.956 | 48.2 | +1.2 | +4.1 | +32.5 | +35.9 | +0.0 | 56.9 | 74.0 | -17.1 | Vert | |
| | Hi Ch – Peak | | | | | | | | | | | |
| | 1651.757 | 60.2 | +0.7 | +1.9 | +31.9 | +25.7 | +0.0 | 43.0 | 54.0 | -11.0 | Vert | |
| | Hi Ch - Average | | -13.6 | | | | | | | | | |
| | 2483.500 | 60.0 | +0.8 | +2.3 | +32.8 | +29.0 | +0.0 | 45.7 | 54.0 | -8.3 | Vert | |
| | Hi Ch – Average | | -13.6 | | | | | | Band edge | | | |
| | 4947.050 | 53.3 | +1.0 | +3.3 | +32.6 | +33.6 | +0.0 | 45.0 | 54.0 | -9.0 | Vert | |
| | Hi Ch – Average | | -13.6 | | | | | | | | | |
| | 7434.956 | 48.2 | +1.2 | +4.1 | +32.5 | +35.9 | +0.0 | 43.3 | 54.0 | -10.7 | Vert | |
| | Hi Ch – Average | | -13.6 | | | | | | | | | |
| | 4947.050 | 59.2 | +1.0 | +3.3 | +32.6 | +33.6 | +0.0 | 64.5 | 74.0 | -9.5 | Horiz | |
| | Hi Ch – Peak | | | | | | | | | | | |
| | 1652.750 | 56.8 | +0.7 | +1.9 | +31.9 | +25.7 | +0.0 | 39.6 | 54.0 | -14.4 | Horiz | |
| | Hi Ch – Average | | -13.6 | | | | | | | | | |
| | 4947.050 | 59.2 | +1.0 | +3.3 | +32.6 | +33.6 | +0.0 | 50.9 | 54.0 | -3.1 | Horiz | |
| | Hi Ch - Average | | -13.6 | | | | | | | | | |

EQUIPMENT: Active TracBat

Radiated Photographs



EQUIPMENT: Active TracBat

Section 6. Peak Power Spectral Density

| | |
|---|----------------------|
| NAME OF TEST: Peak Power Spectral Density | PARA. NO.: 15.247(e) |
| TESTED BY: David Light | DATE: 21 Dec 2006 |

Test Results: Complies.

Measurement Data: See attached data..

Test Conditions: 45 %RH
22 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1464-1484-1485-1016-993

Note: This test was performed radiated.

EQUIPMENT: Active TracBat

Peak Power Spectral Density

| Frequency (MHz) | Meter Reading (dBm) | Substitution Level (dBm) | | Pre-Amp Gain (dB) | Substitution Antenna Gain (dBd) | EIRP (dBm) | | | Polarity | Comments |
|--------------------|---------------------------|--------------------------------|--|-------------------------|---------------------------------------|---------------|--|--|----------|---------------------|
| | | | | | | | | | | Density |
| | | | | | | | | | | RBW=VBW=3 kHz |
| | | | | | | | | | | Span = 1 MHz |
| | | | | | | | | | | Sweep = 350 seconds |
| 2478 | -27.5 | -25.4 | | 32.8 | 7.8 | -17.6 | | | V | High Channel |
| 2445 | -27.8 | -25.7 | | 32.8 | 7.8 | -17.9 | | | V | Mid Channel |
| 2405 | -29.2 | -27.1 | | 32.8 | 7.8 | -19.3 | | | V | Low Channel |
| Notes: _____ | | | | | | | | | | |

EQUIPMENT: Active TracBat

Section 7. Test Equipment List

| Nemko ID | Description | Manufacturer Model Number | Serial Number | Calibration Date | Calibration Due |
|----------|-----------------------|------------------------------|---------------|---------------------|--------------------|
| 1464 | Spectrum analyzer | Hewlett Packard 8563E | 3551A04428 | 01/14/05 | 01/15/07 |
| 1484 | Cable | Storm PR90-010-072 | N/A | 10/02/06 | 10/02/07 |
| 1485 | Cable | Storm PR90-010-216 | N/A | 10/02/06 | 10/02/07 |
| 1016 | Pre-Amp | HEWLETT PACKARD 8449A | 2749A00159 | 04/20/06 | 04/20/07 |
| 791 | PREAMP, 25dB | Nemko USA, Inc. LNA25 | 398 | 04/20/06 | 04/20/07 |
| 759 | ANTENNA, LOG PERIODIC | A.H. SYSTEMS SAS-200/510 | 556 | 02/13/06 | 02/13/07 |
| 1195 | ANTENNA,BICONICAL | A.H. SYSTEMS SAS-200/542 | 235 | 02/10/06 | 02/10/07 |
| 993 | Horn antenna | A.H. Systems SAS-200/571 | XXX | 08/01/05 | 08/02/07 |

ANNEX A - TEST DETAILS

| | |
|---|----------------------|
| NAME OF TEST: Powerline Conducted Emissions | PARA. NO.: 15.207(a) |
|---|----------------------|

Minimum Standard: §15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 mH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| Frequency of Conducted Emission (MHz) | Limit (dBmV) | |
|---------------------------------------|--------------|-----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current systems containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 mV within the frequency band 535-1705 kHz, as measured using a 50 mH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits as provided in §15.205 and §§15.209, 15.221, 15.223, 15.225 or 15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provision for, the use of battery chargers which permit operating while charging, AC adaptors or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

Nemko USA, Inc.

FCC PART 15, SUBPART C
Digital Transmission Systems
Test Report No.: 6L0791RUS1

EQUIPMENT: Active TracBat

| | |
|----------------------------------|-------------------------|
| NAME OF TEST: Occupied Bandwidth | PARA. NO.: 15.247(a)(2) |
|----------------------------------|-------------------------|

Minimum Standard: The minimum 6 dB bandwidth shall be at least 500 kHz

| | |
|---|-------------------------|
| NAME OF TEST: Maximum Peak Output Power | PARA. NO.: 15.247(b)(3) |
|---|-------------------------|

Minimum Standard: The maximum peak output power shall not exceed 1 watt.

If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point to point operation may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceed 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operation may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Direct Measurement Method For Detachable Antennas:

If the antenna is detachable, a peak power meter is used to measure the power output with the transmitter operating into a 50 ohm load. The dBi gain of the antenna(s) employed shall be reported.

Substitution Antenna Method for Integral Antennas:

The peak field strength of the carrier is measured in a worst-case configuration with a RBW > 5 times the occupied bandwidth of the transmitted waveform. For cases where the RBW of the test instrument is not sufficient, the power is measured using a peak power meter instead of the spectrum analyzer.

The RBW of the spectrum analyzer shall be set to a value greater than the measured 6 dB occupied bandwidth of the E.U.T.

Number of channels tested:

| Tuning range | Number of channels tested | Channel location in band |
|------------------|---------------------------|--------------------------|
| 1 MHz or less | 1 | middle |
| 1 to 10 MHz | 2 | top and bottom |
| more than 10 MHz | 3 | top, middle, bottom |

EQUIPMENT: Active TracBat

| | |
|----------------------------------|-------------------------|
| NAME OF TEST: Occupied Bandwidth | PARA. NO.: 15.247(a)(2) |
|----------------------------------|-------------------------|

Minimum Standard: Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Method Of Measurement:

The spectrum analyzer is set as follows:

RBW = VBW = 100 kHz.
Span: Sufficient to display 6 dB bandwidth
LOG dB/div.: 10 dB
Sweep: Auto

Number of channels tested:

| Tuning range | Number of channels tested | Channel location in band |
|------------------|---------------------------|--------------------------|
| 1 MHz or less | 1 | middle |
| 1 to 10 MHz | 2 | top and bottom |
| more than 10 MHz | 3 | top, middle, bottom |

EQUIPMENT: Active TracBat

| | |
|---|----------------------|
| NAME OF TEST: Spurious Emissions(conducted) | PARA. NO.: 15.247(d) |
|---|----------------------|

Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits. Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

| Frequency (MHz) | Field Strength ($\mu\text{V/m}$ @ 3m) | Field Strength (dB @ 3m) |
|-----------------|--|--------------------------|
| 30 - 88 | 100 | 40.0 |
| 88 - 216 | 150 | 43.5 |
| 216 - 960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

THE SPECTRUM IS SEARCHED TO THE 10th HARMONIC OF THE HIGHEST FREQUENCY GENERATED IN THE EUT.

Method Of Measurement:

30 MHz - 10th harmonic plot

RBW: 100 kHz
 VBW: 300 kHz
 Sweep: Auto
 Display line: -20 dBc

Lower Band Edge

RBW: At least 1% of span/div.
 VBW: >RBW
 Span: As necessary to display any spurious at band edge.
 Sweep: Auto
 Center Frequency: 902 MHz, 2400 MHz, or 5725 MHz
 Marker: Peak of fundamental emission
 Marker Δ : Peak of highest spurious level below center frequency.

Upper Band Edge

RBW: At least 1% of span/div.
 VBW: >RBW
 Span: As necessary to display any spurious at band edge.
 Sweep: Auto
 Center Frequency: 928 MHz, 2483.5 MHz, or 5850 MHz
 Marker: Peak of fundamental emission
 Marker Δ : Peak of highest spurious level above center frequency.

Number of channels tested:

| Tuning range | Number of channels tested | Channel location in band |
|------------------|---------------------------|--------------------------|
| 1 MHz or less | 1 | middle |
| 1 to 10 MHz | 2 | top and bottom |
| more than 10 MHz | 3 | top, middle, bottom |

EQUIPMENT: Active TracBat

| | |
|---|----------------------|
| NAME OF TEST: Radiated Spurious Emissions | PARA. NO.: 15.247(c) |
|---|----------------------|

Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits:

Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

| Frequency (MHz) | Field Strength (µV/m @ 3m) | Field Strength (dB @ 3m) |
|-----------------|----------------------------|--------------------------|
| 30 - 88 | 100 | 40.0 |
| 88 - 216 | 150 | 43.5 |
| 216 - 960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC

15.205 Restricted Bands

| MHz | MHz | MHz | GHz |
|-------------------|---------------------|---------------|-------------|
| 0.09-0.11 | 16.42-16.423 | 399.9-410 | 4.5-5.25 |
| 0.495-0.505 | 16.69475-16.69525 | 608-614 | 5.35-5.46 |
| 2.1735-2.1905 | 16.80425-16.80475 | 960-1240 | 7.25-7.75 |
| 4.125-4.128 | 25.5-25.67 | 1300-1427 | 8.025-8.5 |
| 4.17725-4.17775 | 37.5-38.25 | 1435-1626.5 | 9.0-9.2 |
| 4.20725-4.20775 | 73-74.6 | 1645.5-1646.5 | 9.3-9.5 |
| 6.125-6.218 | 74.8-75.2 | 1660-1710 | 10.6-12.7 |
| 6.26775-6.26825 | 108-121.94 | 1718.8-1722.2 | 13.25-13.4 |
| 6.31175-6.31225 | 123-138 | 2200-2300 | 14.47-14.5 |
| 8.291-8.294 | 149.9-150.05 | 2310-2390 | 15.35-16.2 |
| 8.362-8.366 | 156.52475-156.52525 | 2483.5-2500 | 17.7-21.4 |
| 8.37625-8.38675 | 156.7-156.9 | 2655-2900 | 22.01-23.12 |
| 8.41425-8.41475 | 162.0125-167.17 | 3260-3267 | 23.6-24.0 |
| 12.29-12.293 | 167.72-173.2 | 3332-3339 | 31.2-31.8 |
| 12.51975-12.52025 | 240-285 | 3345.8-3358 | 36.43-36.5 |
| 12.57675-12.57725 | 322-335.4 | 3600-4400 | Above 38.6 |
| 13.36-13.41 | 1718 | | |

Number of channels tested:

| Tuning range | Number of channels tested | Channel location in band |
|------------------|---------------------------|--------------------------|
| 1 MHz or less | 1 | middle |
| 1 to 10 MHz | 2 | top and bottom |
| more than 10 MHz | 3 | top, middle, bottom |

| | |
|---|----------------------|
| NAME OF TEST: Transmitter Power Density | PARA. NO.: 15.247(d) |
|---|----------------------|

Minimum Standard: The transmitted power density averaged over any 1 second interval shall not be greater than +8 dBm in any 3 kHz bandwidth.

Method Of Measurement: The spectrum analyzer is set as follows:

- RBW: 3 kHz
- VBW: >3 kHz
- Span: => measured 6 dB bandwidth
- Sweep: Span(kHz)/3 (i.e. for a span of 1.5 MHz the sweep rate is 1500/3 = 500 sec.
- LOG dB/div.: 2 dB

Note: For devices with spectrum line spacing ≤ 3 kHz, the RBW of the analyzer is reduced until the spectral lines are resolved. The measurement data is normalized to 3 kHz by summing the power of all the individual spectral lines within a 3 kHz band in linear power units.

For Devices With Integral Antenna:

For devices with non-detachable antennas, the received field strength is peaked and the spectrum analyzer is set as above. The peak emission level is then measured and converted to a field strength by adding the appropriate antenna factor and cable loss. This field strength is then converted to an equivalent isotropic radiated power using the same method as described for Peak Power output.

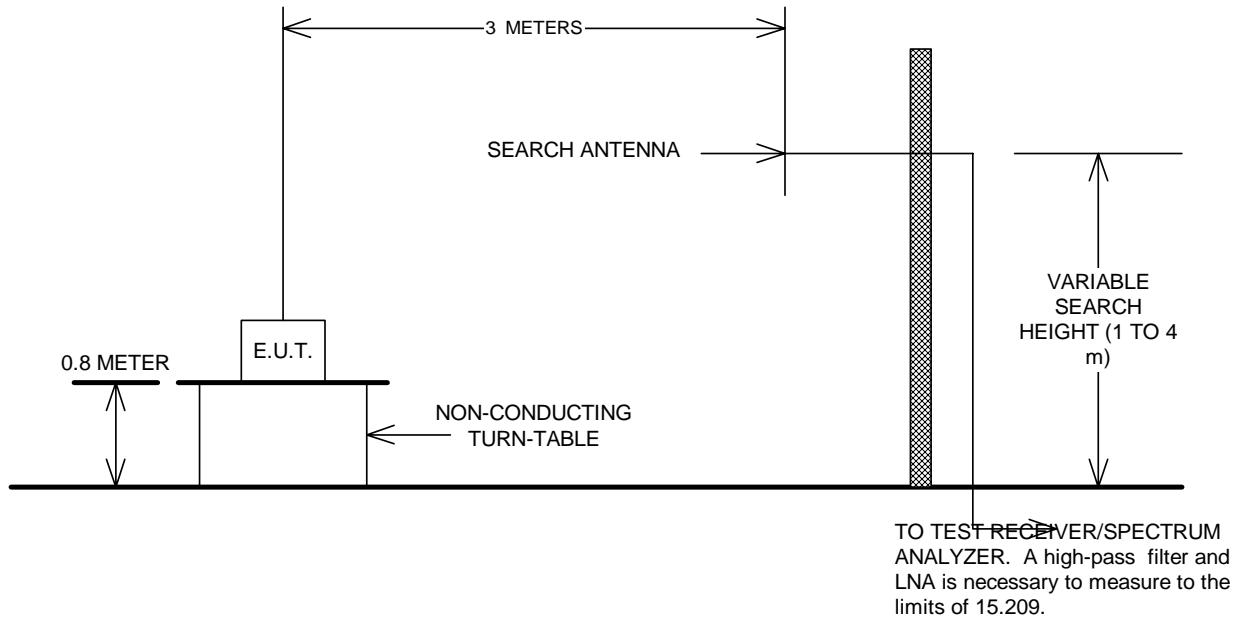
Number of channels tested:

| Tuning Range | Number Of Channels Tested | Channel Location In Band |
|------------------|---------------------------|--------------------------|
| 1 MHz or Less | 1 | Middle |
| 1 to 10 MHz | 2 | Top And Bottom |
| More Than 10 MHz | 3 | Top, Middle, Bottom |

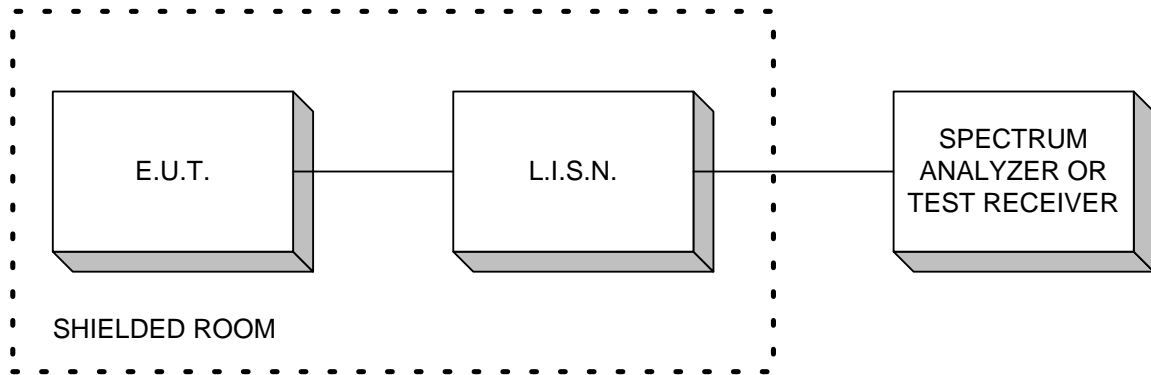
ANNEX B - TEST DIAGRAMS

EQUIPMENT: Active TracBat

Test Site For Radiated Emissions

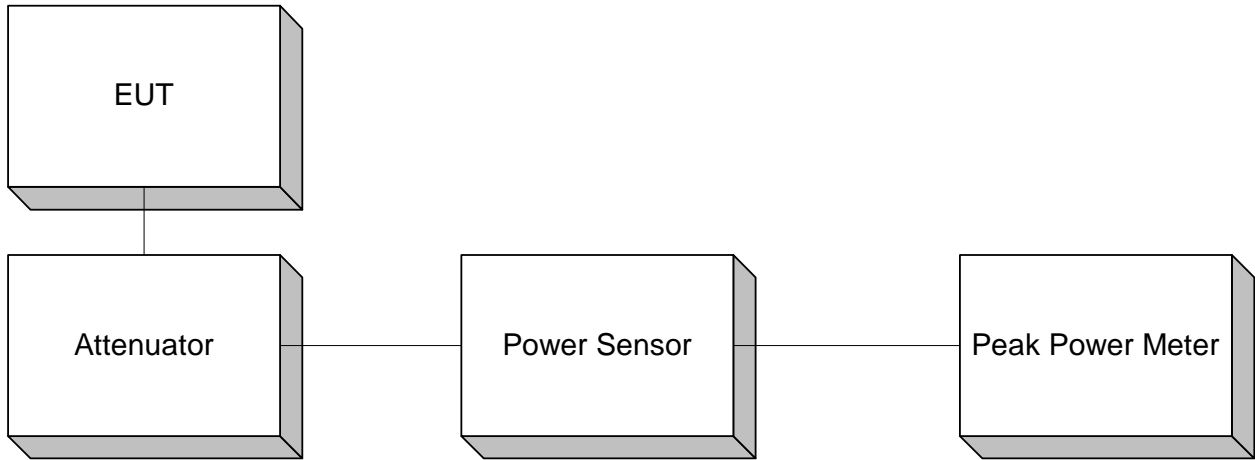


Conducted Emissions



EQUIPMENT: Active TracBat

Peak Power At Antenna Terminals



Note: A spectrum analyzer may be substituted for Peak Power Meter given that the measurement bandwidth is sufficient to capture the 60 dB bandwidth of the transmitter.

**Minimum 6 dB Bandwidth
Peak Power Spectral Density
Spurious Emissions (conducted)**

