

## TEST REPORT

ACCORDING TO: FCC CFR 47 PART 15 Subpart C, §15.247 and  
RSS-210, Issue 7, Annex 8

FOR:

**Bioness Neuromodulation Ltd. -  
A Bioness Inc Company  
Trade mark: NESS L300 Plus  
Model: Thigh RF Stimulation Unit**

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## 1 Applicant information

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## 2 Equipment under test attributes

**Product:** RF Stimulation Unit  
**Trade mark:** NESS L300 Plus  
**Model(s):** Thigh RF Stimulation Unit  
**Part number:** 502-00034-01  
**Serial number:** 00038  
**Hardware version:** 2.0 (120 mA/180 V)  
**Receipt date** 10/18/2010

## 3 Manufacturer information

**Manufacturer name:** Bioness Neuromodulation Ltd. - A Bioness Inc Company  
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
## 4 Test details

**Project ID:** 21179  
**Location:** Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel  
**Test started:** 10/18/2010  
**Test completed:** 12/02/2010  
**Test specification(s):** FCC 47CFR Part 15, subpart C, §15.247;  
RSS-210 Issue 7:2007, Annex 8; RSS-Gen Issue 2:2007

## 5 Tests summary

| Test   | Status  |
|--|---|
| <b>Transmitter characteristics</b>                                       |   |
| FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth        | Pass  |
| FCC section 15.247(b)(3), RSS-210 section A8.4(4), Peak output power     | Pass  |
| FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions | Pass  |
| FCC section 15.247(e), RSS-210 A8.2(b), Peak power density               | Pass  |
| FCC section 15.247(i)/ RSS-Gen, section 5.5, RF exposure                 | Pass, Exhibit provided in documentation for Application |
| FCC section 15.207(a), RSS-Gen section 7.2.2, Conducted emission         | Pass  |
| <b>Unintentional emissions</b>   |   |
| RSS-Gen section 7.2.3.2, Radiated emission                               | Pass  |

Testing was completed against all relevant requirements of the test standard. The results obtained indicate that the product under test complies in full with the requirements tested.  
The test results relate only to the items tested. Pass/ fail decision was based on nominal values.

|                     | Name and Title                               | Date             | Signature   |
|---------------------|--|------------------|---|
| <b>Tested by:</b>   | Mr. S. Samokha, test engineer                | December 2, 2010 |  |
| <b>Reviewed by:</b> | Mrs. M. Cherniavsky, certification engineer  | December 9, 2010 |  |
| <b>Approved by:</b> | Mr. M. Nikishin, EMC and Radio group manager | March 11, 2011   |  |

## 6 EUT description

### 6.1 General information

The EUT, "Thigh RF Stimulation Unit", is a transceiver, part of the Functional Electrical Stimulation system that is used to correct foot drop and/or knee weakness syndromes.

The EUT function is to generate electrical stimulation pulses. The "Thigh RFS" is a device comprised of custom designed electrical circuit and embedded SW. It utilizes an RF link to communicate with "L300 Plus Control Unit" and GS (Gait Sensor). The "Thigh RFS" consists of small PCB with an integrated RF transceiver, inside a plastic enclosure and is powered by rechargeable 3.7V Lilon battery. It is considered as internally powered unit (connected to AC/DC adaptor only in charging mode).

### 6.2 Ports and lines

| Port type       | Port description   | Conn. from     | Conn. to   | Qty. | Cable type | Cable length |
|-----------------|--------------------|----------------|------------|------|------------|--------------|
| Power           | DC power           | AC/DC adaptor* | EUT        | 1    | Unshielded | 2.2 m        |
| Patient-coupled | Stimulation signal | EUT            | Electrodes | 2    | Unshielded | 0.20 m       |

\* -for charging only

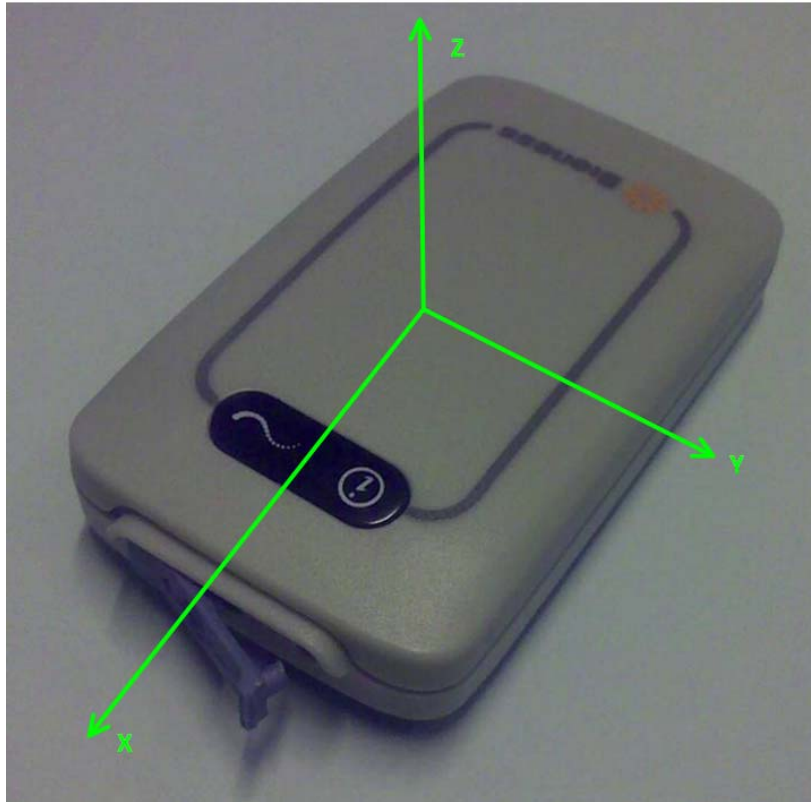
### 6.3 Support and test equipment

| Description             | Manufacturer | Model number | Serial number |
|-------------------------|--------------|--------------|---------------|
| AC/DC adaptor (charger) | Friwo        | FW7555M/05   | 809T          |

### 6.4 Changes made in the EUT

No changes were implemented.

## 6.5 Test configuration



## 6.6 Transmitter characteristics

|   |  |  |  |   |  |                                |  |                                |  |
|---|--|--|--|---|--|--------------------------------|--|--------------------------------|--|
| <b>Type of equipment</b>                                |  |  |  |   |  |                                |  |                                |  |
| <b>V</b>  |  | Stand-alone (Equipment with or without its own control provisions)                                       |  |   |  |                                |  |                                |  |
|   |  | Combined equipment (Equipment where the radio part is fully integrated within another type of equipment) |  |   |  |                                |  |                                |  |
|   |  | Plug-in card (Equipment intended for a variety of host systems)  |  |   |  |                                |  |                                |  |
| <b>Intended use</b>                                     |  |  |  | <b>Condition of use</b>                                   |  |                                |  |                                |  |
|   |  | fixed  |  | Always at a distance more than 2 m from all people        |  |                                |  |                                |  |
|   |  | mobile   |  | Always at a distance more than 20 cm from all people      |  |                                |  |                                |  |
| <b>V</b>  |  | portable   |  | May operate at a distance closer than 20 cm to human body |  |                                |  |                                |  |
| <b>Assigned frequency range</b>                         |  |  |  | 2400.0 – 2483.5 MHz                                       |  |                                |  |                                |  |
| <b>Operating frequency range</b>                        |  |  |  | 2401.0 – 2482.0 MHz                                       |  |                                |  |                                |  |
| <b>RF channel spacing</b>                               |  |  |  | 1000 kHz  |  |                                |  |                                |  |
| <b>Maximum rated output power</b>                       |  |  |  | At transmitter 50 $\Omega$ RF output connector            |  | NA                             |  |                                |  |
|   |  |  |  | Peak power  |  | 1.25 dBm                       |  |                                |  |
| <b>Is transmitter output power variable?</b>            |  |  |  | <b>V</b>  |  | No                             |  |                                |  |
|   |  |  |  | Yes   |  |                                |  | continuous variable            |  |
|   |  |  |  |   |  |                                |  | stepped variable with stepsize |  |
|   |  |  |  |   |  |                                |  | dB                             |  |
|   |  |  |  |   |  |                                |  | minimum RF power               |  |
|   |  |  |  | maximum RF power  |  | dBm                            |  |                                |  |
| <b>Antenna connection</b>                               |  |  |  |   |  |                                |  |                                |  |
| unique coupling   |  | standard connector   |  | <b>V</b>  |  | integral                       |  |                                |  |
|   |  |  |  | <b>V</b>  |  | with temporary RF connector    |  |                                |  |
|   |  |  |  |   |  | without temporary RF connector |  |                                |  |
| <b>Antenna/s technical characteristics</b>              |  |  |  |   |  |                                |  |                                |  |
| Type  |  | Manufacturer   |  | Model number  |  | Gain                           |  |                                |  |
| Chip  |  | Fractus  |  | FR05-S1-N-0-102   |  | 1.5 dBi                        |  |                                |  |
| <b>Transmitter aggregate data rate/s</b>                |  |  |  | 0.25 Mbps   |  |                                |  |                                |  |
| <b>Type of modulation</b>                               |  |  |  | FSK   |  |                                |  |                                |  |
| <b>Type of multiplexing</b>                             |  |  |  | NA  |  |                                |  |                                |  |
| <b>Modulating test signal (baseband)</b>                |  |  |  | Binary data message                                       |  |                                |  |                                |  |
| <b>Maximum transmitter duty cycle in normal use</b>     |  |  |  | Refer to the manufacturer declaration                     |  |                                |  |                                |  |
| <b>Transmitter duty cycle supplied for test</b>         |  |  |  | 100 %   |  | <b>Tx ON time</b>              |  |                                |  |
|   |  |  |  | NA  |  | <b>Period</b>                  |  |                                |  |
|   |  |  |  | NA  |  |                                |  |                                |  |
| <b>Transmitter power source</b>                         |  |  |  |   |  |                                |  |                                |  |
| <b>V</b>  |  | Battery  |  | <b>Nominal rated voltage</b>                              |  | 3.7 VDC                        |  |                                |  |
|   |  | DC   |  | <b>Nominal rated voltage</b>                              |  |                                |  |                                |  |
|   |  | AC mains   |  | <b>Nominal rated voltage</b>                              |  | Frequency                      |  |                                |  |
|   |  |  |  |   |  | Hz                             |  |                                |  |
| <b>Common power source for transmitter and receiver</b> |  |  |  | <b>V</b>  |  | yes                            |  |                                |  |
|   |  |  |  |   |  | no                             |  |                                |  |

|                      |   |                         |                       |
|----------------------|---|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth |                         |                       |
| Test procedure:      | FR Vol.62, page 26243, Section 15.247(a)2                         |                         |                       |
| Test mode:           | Compliance  | Verdict: PASS           |                       |
| Date:                | 10/18/2010  |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1012 hPa  | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |   |                         |                       |

## 7 Transmitter tests according to 47CFR part 15 subpart C and RSS-210 requirements

### 7.1 Minimum 6 dB bandwidth

#### 7.1.1 General

This test was performed to measure 6 dB bandwidth of the EUT carrier frequency. Specification test limits according to FCC part 15 section 15.247(a)(2) and RSS-210 section A8.2(a) are given in Table 7.1.1.

Table 7.1.1 The 6 dB bandwidth limits

| Assigned frequency, MHz | Modulation envelope reference points*, dBc | Minimum bandwidth, kHz |
|-------------------------|--|------------------------|
| 902.0 – 928.0           | 6.0  | 500.0                  |
| <b>2400.0 – 2483.5</b>  |  |                        |
| 5725.0 – 5850.0         |  |                        |

\* - Modulation envelope reference points provided in terms of attenuation below the peak of modulated carrier.

#### 7.1.2 Test procedure

7.1.2.1 The EUT was set up as shown in Figure 7.1.1, energized and its proper operation was checked.

7.1.2.2 The EUT was set to transmit modulated carrier.

7.1.2.3 The transmitter minimum 6 dB bandwidth was measured with spectrum analyzer as frequency delta between reference points on modulation envelope and provided in Table 7.1.2 and the associated plots.

Figure 7.1.1 The 6 dB bandwidth test setup





|                             |  |                                |                              |
|-----------------------------|--|--------------------------------|------------------------------|
| <b>Test specification:</b>  | <b>FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth</b> |                                |                              |
| <b>Test procedure:</b>      | FR Vol.62, page 26243, Section 15.247(a)2                                |                                |                              |
| <b>Test mode:</b>           | Compliance   | <b>Verdict:</b>                | <b>PASS</b>                  |
| <b>Date:</b>                | 10/18/2010   |                                |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1012 hPa  | <b>Relative Humidity:</b> 44 % | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |  |                                |                              |

**Table 7.1.2 The 6 dB bandwidth test results**

ASSIGNED FREQUENCY BAND: 2400.0 – 2483.5 MHz  
DETECTOR USED: Peak  
SWEEP MODE: Single  
SWEEP TIME: Auto  
RESOLUTION BANDWIDTH: 100 kHz  
VIDEO BANDWIDTH: 300 kHz  
MODULATION ENVELOPE REFERENCE POINTS: 6.0 dBc  
MODULATION: FSK  
MODULATING SIGNAL: Binary data message  
BIT RATE: 0.25 Mbps

| Carrier frequency, MHz | 6 dB bandwidth, kHz | Limit, kHz | Margin, kHz | Verdict |
|------------------------|---------------------|------------|-------------|---------|
| 2401.0                 | 648.0               | 500.0      | -148.0      | Pass    |
| 2441.0                 | 662.0               | 500.0      | -162.0      | Pass    |
| 2482.0                 | 650.0               | 500.0      | -150.0      | Pass    |

**Table 7.1.3 The 99% power bandwidth test results**

ASSIGNED FREQUENCY BAND: 2400.0 – 2483.5 MHz  
DETECTOR USED: Sample  
SWEEP MODE: Single  
SWEEP TIME: Auto  
RESOLUTION BANDWIDTH: 100 kHz  
VIDEO BANDWIDTH: 300 kHz  
MODULATION ENVELOPE REFERENCE POINTS: 99%  
MODULATION: FSK  
MODULATING SIGNAL: Binary data message  
BIT RATE: 0.25 Mbps

| Carrier frequency, MHz | 99% bandwidth, kHz | Limit, kHz | Margin, kHz | Verdict |
|------------------------|--------------------|------------|-------------|---------|
| 2401.0                 | 827.28             | NA         | NA          | Pass    |
| 2441.0                 | 834.63             | NA         | NA          | Pass    |
| 2483.0                 | 829.11             | NA         | NA          | Pass    |

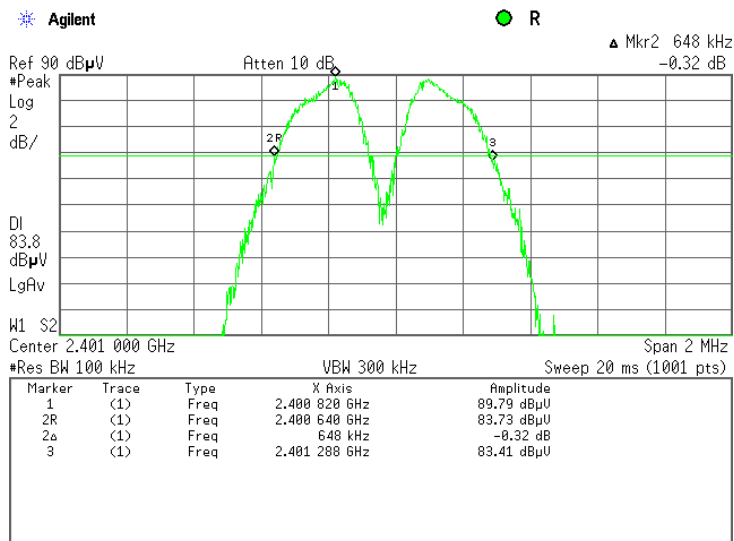
**Reference numbers of test equipment used**

|         |         |  |  |  |  |  |  |  |
|---------|---------|--|--|--|--|--|--|--|
| HL 0337 | HL 3818 |  |  |  |  |  |  |  |
|---------|---------|--|--|--|--|--|--|--|

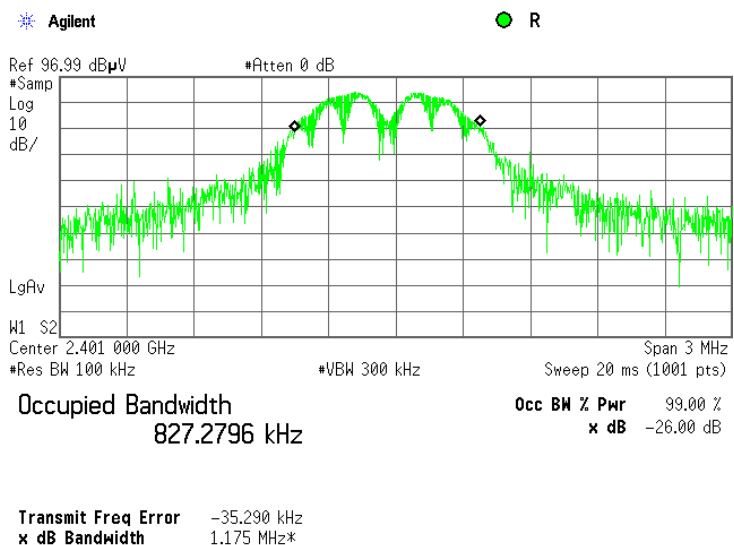
Full description is given in Appendix A.

|  |                                |
|--|--------------------------------|
| <b>Test specification:</b> FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth |                                |
| <b>Test procedure:</b> FR Vol.62, page 26243, Section 15.247(a)2                             |                                |
| <b>Test mode:</b> Compliance   | <b>Verdict:</b> PASS           |
| <b>Date:</b> 10/18/2010  |                                |
| <b>Temperature:</b> 23.4 °C  | <b>Air Pressure:</b> 1012 hPa  |
|  | <b>Relative Humidity:</b> 44 % |
| <b>Power Supply:</b> Battery   |                                |
| <b>Remarks:</b>  |                                |

Plot 7.1.1 The 6 dB bandwidth test result at low frequency

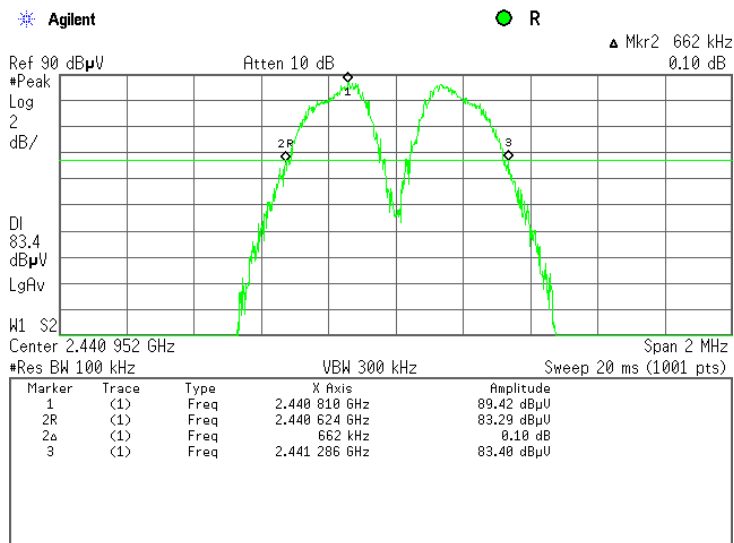


Plot 7.1.2 The 99% power bandwidth test result at low frequency

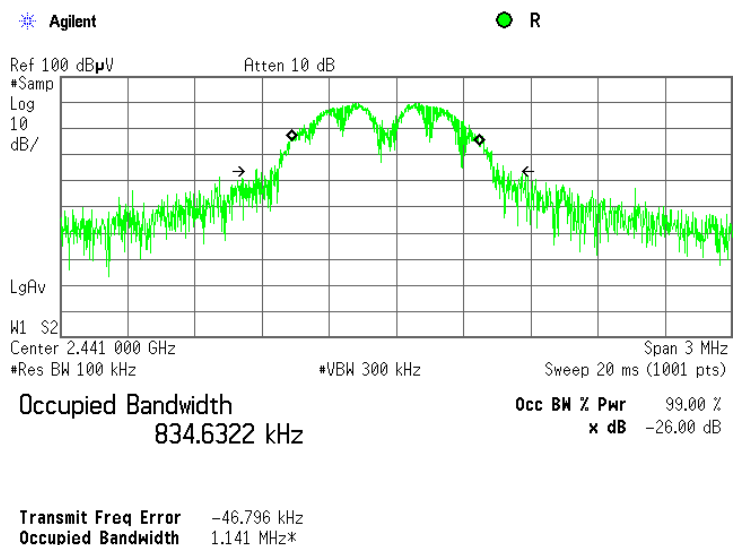


|  |                                |
|--|--------------------------------|
| <b>Test specification:</b> FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth |                                |
| <b>Test procedure:</b> FR Vol.62, page 26243, Section 15.247(a)2                             |                                |
| <b>Test mode:</b> Compliance   | <b>Verdict:</b> PASS           |
| <b>Date:</b> 10/18/2010  |                                |
| <b>Temperature:</b> 23.4 °C  | <b>Air Pressure:</b> 1012 hPa  |
|  | <b>Relative Humidity:</b> 44 % |
| <b>Power Supply:</b> Battery   |                                |
| <b>Remarks:</b>  |                                |

Plot 7.1.3 The 6 dB bandwidth test result at mid frequency

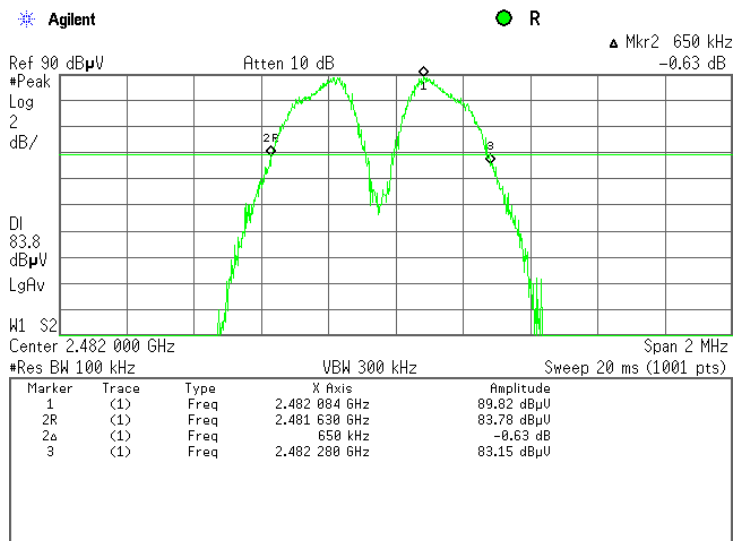


Plot 7.1.4 The 99% power bandwidth test result at mid frequency

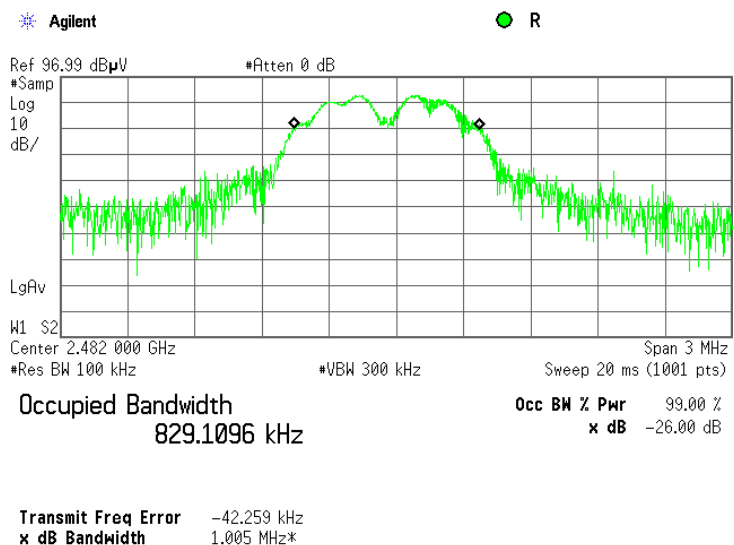


|  |                               |
|--|-------------------------------|
| <b>Test specification:</b> FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth |                               |
| <b>Test procedure:</b> FR Vol.62, page 26243, Section 15.247(a)2                             |                               |
| <b>Test mode:</b> Compliance   | <b>Verdict:</b> PASS          |
| <b>Date:</b> 10/18/2010  |                               |
| <b>Temperature:</b> 23.4 °C  | <b>Air Pressure:</b> 1012 hPa |
| <b>Relative Humidity:</b> 44 %   |                               |
| <b>Power Supply:</b> Battery   |                               |
| <b>Remarks:</b>  |                               |

Plot 7.1.5 The 6 dB bandwidth test result at high frequency



Plot 7.1.6 The 99% power bandwidth test result at high frequency



|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol.62, page 26243, Section 15.247(b)                                  |                              |
| <b>Test mode:</b>           | Compliance                    | <b>Verdict:</b>   | <b>PASS</b>                  |
| <b>Date:</b>                | 10/24/2010                    |   |                              |
| <b>Temperature:</b> 24.2 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 46 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

## 7.2 Peak output power

### 7.2.1 General

This test was performed to measure the maximum peak output power radiated by transmitter. Specification test limits according to FCC part 15 section 15.247(b)(3) and RSS-210 section A8.4(4) are given in Table 7.2.1.

Table 7.2.1 Peak output power limits

| Assigned frequency range, MHz | Maximum antenna gain, dBi | Peak output power* |      | Equivalent field strength limit @ 3m, dB(μV/m)** |
|-------------------------------|---------------------------|--------------------|------|--|
|                               |                           | W                  | dBm  |  |
| 2400.0 – 2483.5               | 6.0                       | 1.0                | 30.0 | 131.2  |

\*- The limit is provided in terms of conducted RF power at the antenna connector. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power limit shall be reduced below the stated value as follows:

by 1 dB for every 3 dB that the directional gain of antenna exceeds 6 dBi for fixed point-to-point transmitters operate in 2400-2483.5 MHz band;  
without any corresponding reduction for fixed point-to-point transmitters operate in 5725-5850 MHz band;  
by the amount in dB that the directional gain of antenna exceeds 6 dBi for the rest of transmitters.

\*\* - Equivalent field strength limit was calculated from the peak output power as follows:  $E = \sqrt{30 \times P \times G} / r$ , where P is peak output power in Watts, r is antenna to EUT distance in meters and G is transmitter antenna gain in dBi.

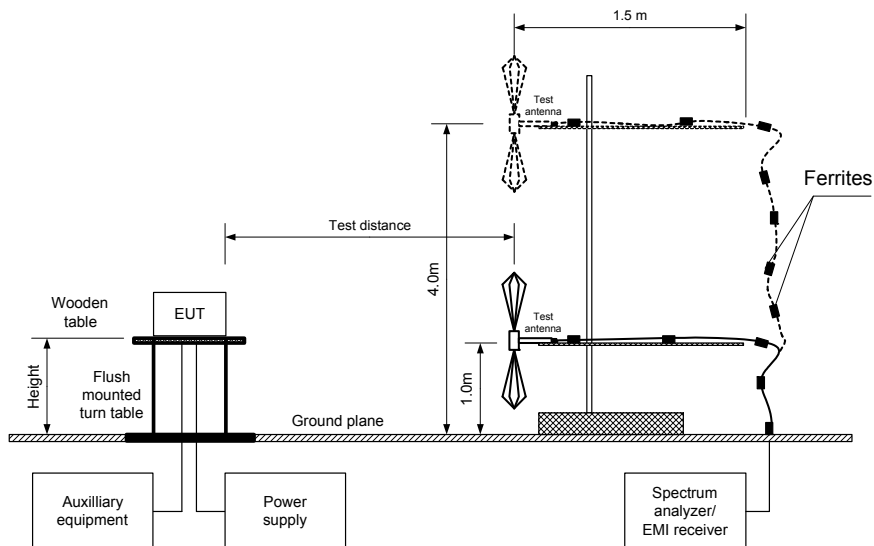
### 7.2.2 Test procedure

- 7.2.2.1** The EUT was set up as shown in Figure 7.2.1, energized and its proper operation was checked.
- 7.2.2.2** The EUT was adjusted to produce maximum available to end user RF output power.
- 7.2.2.3** The field strength of the EUT fundamental emission was measured in 3 orthogonal positions of the device.
- 7.2.2.4** The resolution bandwidth of spectrum analyzer was set wider than 6 dB bandwidth of the EUT and the field strength of the EUT carrier frequency was measured with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360° and the measuring antenna height was swept in both vertical and horizontal polarizations.
- 7.2.2.5** The maximum field strength of the EUT carrier frequency was measured as provided in Table 7.2.2 and associated plots.
- 7.2.2.6** The maximum peak output power was calculated from the field strength of carrier as follows:  

$$P = (E \times d)^2 / (30 \times G),$$
where P is the peak output power in W, E is the field strength in V/m, d is the test distance and G is the transmitter numeric antenna gain over an isotropic radiator.  
The above equation was converted in logarithmic units for 3 m test distance:  
Peak output power in dBm = Field strength in dB(μV/m) - Transmitter antenna gain in dBi – 95.2 dB
- 7.2.2.7** The worst test results (the lowest margins) were recorded in Table 7.2.2.

|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol.62, page 26243, Section 15.247(b)                                  |                              |
| <b>Test mode:</b>           |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>                |                               | 10/24/2010  |                              |
| <b>Temperature:</b> 24.2 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 46 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

Figure 7.2.1 Setup for carrier field strength measurements



|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol.62, page 26243, Section 15.247(b)                                  |                              |
| <b>Test mode:</b>           |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>                |                               | 10/24/2010  |                              |
| <b>Temperature:</b> 24.2 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 46 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

**Table 7.2.2 Peak output power test results**

ASSIGNED FREQUENCY RANGE: 2400.0 – 2483.5 MHz  
 TEST DISTANCE: 3 m  
 TEST SITE: Semi anechoic chamber  
 EUT HEIGHT: 0.8 m  
 DETECTOR USED: Peak  
 TEST ANTENNA TYPE: Double ridged guide (above 1000 MHz)  
 MODULATION: FSK  
 MODULATING SIGNAL: Binary data message  
 BIT RATE: 250 kbps  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 DETECTOR USED: Peak  
 EUT 6 dB BANDWIDTH: 648.0 kHz  
 RESOLUTION BANDWIDTH: 1 MHz  
 VIDEO BANDWIDTH: 3 MHz

| Frequency, MHz | Field strength, dB(μV/m) | Antenna polarization | Antenna height, m | Azimuth, degrees* | EUT antenna gain, dBi | Peak output power, dBm** | Limit, dBm | Margin, dB*** | Verdict |
|----------------|--------------------------|----------------------|-------------------|-------------------|-----------------------|--------------------------|------------|---------------|---------|
| 2400.690       | 88.23                    | V                    | 1.15              | 10                | 1.5                   | -8.50                    | 30.0       | -38.50        | Pass    |
| 2400.680       | 97.66                    | H                    | 1.2               | 340               | 1.5                   | 0.93                     | 30.0       | -29.07        | Pass    |
| 2441.165       | 88.12                    | V                    | 1.10              | 10                | 1.5                   | -8.61                    | 30.0       | -38.61        | Pass    |
| 2411.120       | 97.98                    | H                    | 1.2               | 340               | 1.5                   | 1.25                     | 30.0       | -28.75        | Pass    |
| 2482.230       | 86.80                    | V                    | 1.15              | 10                | 1.5                   | -9.93                    | 30.0       | -39.93        | Pass    |
| 2481.700       | 97.10                    | H                    | 1.2               | 340               | 1.5                   | 0.37                     | 30.0       | -29.63        | Pass    |

The recorded test results were obtained in the EUT X-axis position.

\*- EUT front panel refer to 0 degrees position of turntable.

\*\* - Peak output power was calculated from the field strength of carrier as follows:  $P = (E \times d)^2 / (30 \times G)$ , where P is the peak output power in W, E is the field strength in V/m, d is the test distance in meters and G is the transmitter numeric antenna gain over an isotropic radiator. The above equation was converted in logarithmic units for 3 m test distance: *Peak output power in dBm = Field strength in dB(μV/m) - Transmitter antenna gain in dBi – 95.2 dB*

\*\*\* - Margin = Peak output power – specification limit.

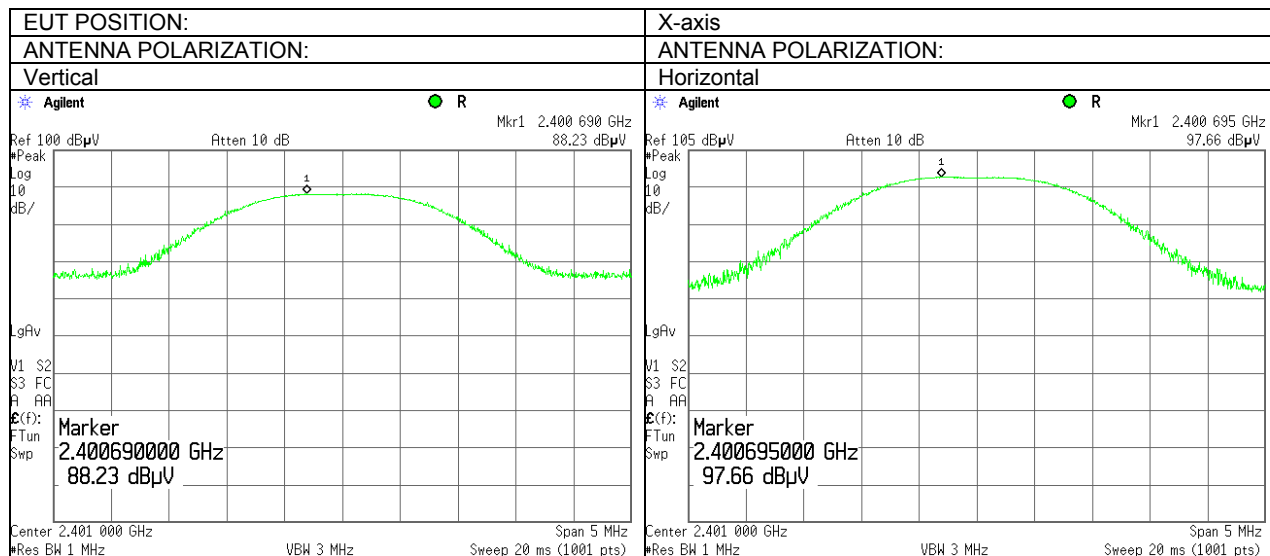
**Reference numbers of test equipment used**

|         |         |         |         |  |  |  |  |
|---------|---------|---------|---------|--|--|--|--|
| HL 1984 | HL 2870 | HL 2871 | HL 3818 |  |  |  |  |
|---------|---------|---------|---------|--|--|--|--|

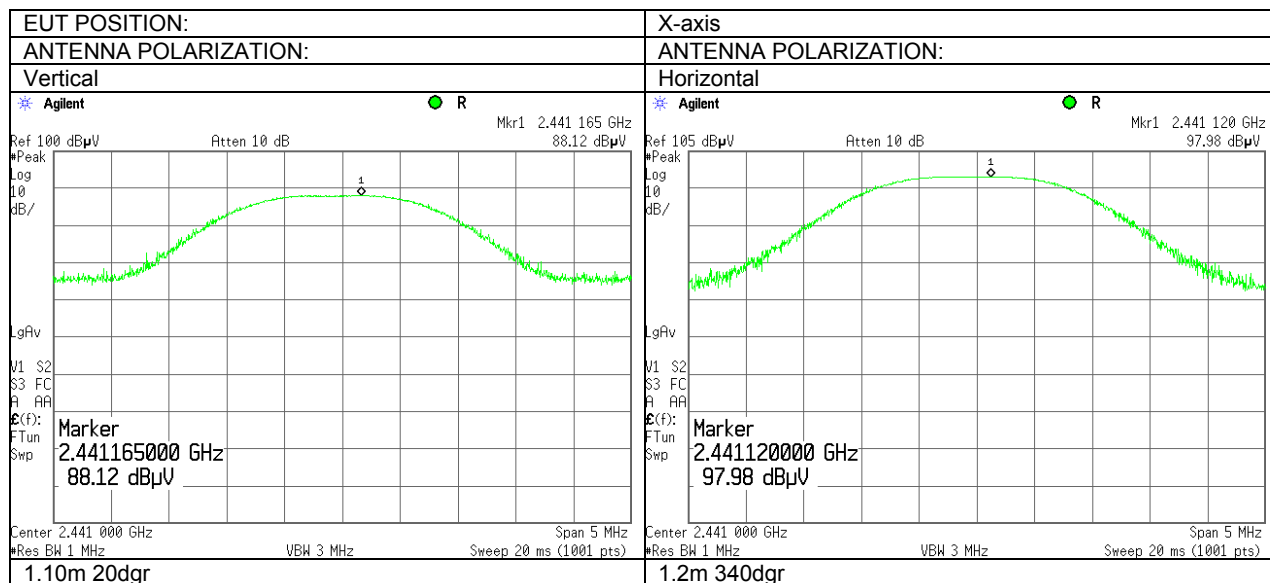
Full description is given in Appendix A.

|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power |                         |                       |
| Test procedure:      | FR Vol.62, page 26243, Section 15.247(b)                           |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/24/2010   |                         |                       |
| Temperature: 24.2 °C | Air Pressure: 1015 hPa   | Relative Humidity: 46 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

Plot 7.2.1 Field strength of carrier at low frequency and Unom



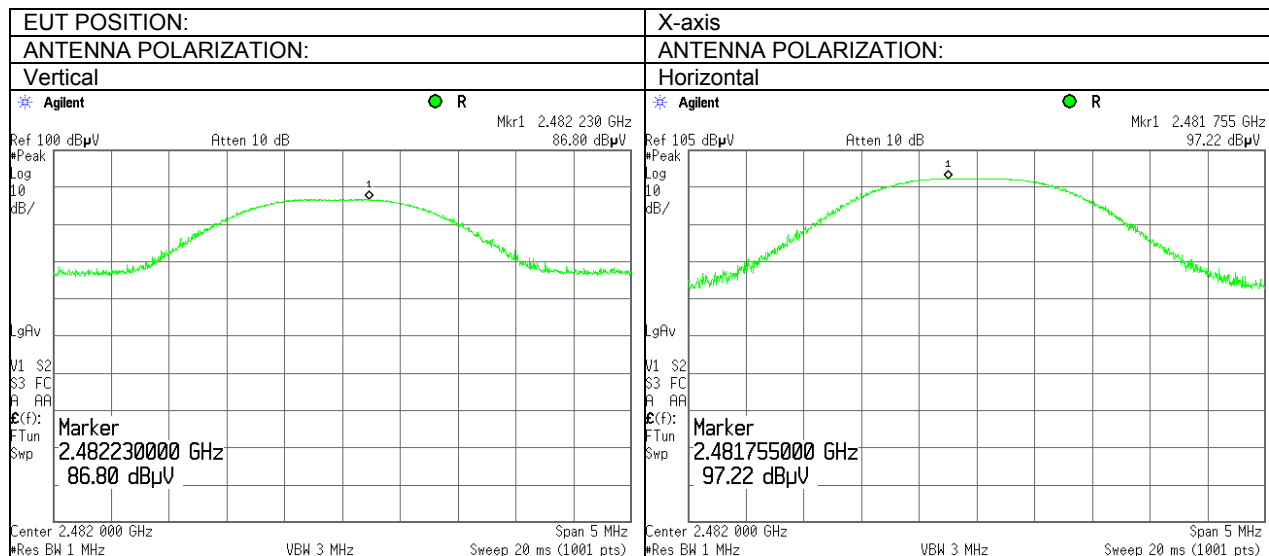
Plot 7.2.2 Field strength of carrier at mid frequency and Unom





|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power |                         |                       |
| Test procedure:      | FR Vol.62, page 26243, Section 15.247(b)                           |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/24/2010   |                         |                       |
| Temperature: 24.2 °C | Air Pressure: 1015 hPa   | Relative Humidity: 46 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

Plot 7.2.3 Field strength of carrier at high frequency and Unom



|                             |   |                                |                              |
|-----------------------------|---|--------------------------------|------------------------------|
| <b>Test specification:</b>  | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                                |                              |
| <b>Test procedure:</b>      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                                |                              |
| <b>Test mode:</b>           | Compliance  | <b>Verdict:</b>                | <b>PASS</b>                  |
| <b>Date:</b>                | 10/27/2010  |                                |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa   | <b>Relative Humidity:</b> 44 % | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |   |                                |                              |

## 7.3 Field strength of spurious emissions

### 7.3.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limits according to FCC part 15 section 15.247(c) and RSS-210 section 6.2.2(o)(e1) are given in Table 7.3.1.

Table 7.3.1 Radiated spurious emissions limits

| Frequency, MHz                   | Field strength at 3 m within restricted bands, dB(μV/m)* |                 |                 | Attenuation of field strength of spurious versus carrier outside restricted bands, dBc*** |
|----------------------------------|--|-----------------|-----------------|---|
|                                  | Peak   | Quasi Peak      | Average         |   |
| 0.009 – 0.090                    | 148.5 – 128.5  | NA              | 128.5 – 108.5** | 20.0  |
| 0.090 – 0.110                    | NA   | 108.5 – 106.8** | NA              |   |
| 0.110 – 0.490                    | 126.8 – 113.8  | NA              | 106.8 – 93.8**  |   |
| 0.490 – 1.705                    | NA   | 73.8 – 63.0**   | NA              |   |
| 1.705 – 30.0*                    |  | 69.5            |                 |   |
| 30 – 88                          |  | 40.0            |                 |   |
| 88 – 216                         |  | 43.5            |                 |   |
| 216 – 960                        |  | 46.0            |                 |   |
| 960 - 1000                       |  | 54.0            |                 |   |
| 1000 – 10 <sup>th</sup> harmonic | 74.0   | NA              | 54.0            |   |

\*- The limit for 3 m test distance was calculated using the inverse square distance extrapolation factor as follows:  

$$\text{Lim}_{S_2} = \text{Lim}_{S_1} + 40 \log(S_1/S_2),$$

where  $S_1$  and  $S_2$  – standard defined and test distance respectively in meters.

\*\* - The limit decreases linearly with the logarithm of frequency.

\*\*\* - The field strength limits applied from the lowest radio frequency generated in the device, without going below 9 kHz up to the tenth harmonic of the highest fundamental frequency.

### 7.3.2 Test procedure for spurious emission field strength measurements in 9 kHz to 30 MHz band

**7.3.2.1** The EUT was set up as shown in Figure 7.3.1, energized and the performance check was conducted.

**7.3.2.2** The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360° and the measuring antenna was rotated around its vertical axis.

**7.3.2.3** The worst test results (the lowest margins) were recorded and shown in the associated plots.

### 7.3.3 Test procedure for spurious emission field strength measurements above 30 MHz

**7.3.3.1** The EUT was set up as shown in Figure 7.3.2, energized and the performance check was conducted.

**7.3.3.2** The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360°, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal.

**7.3.3.3** The worst test results (the lowest margins) were recorded and shown in the associated plots.

|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                              |
| <b>Test mode:</b>           |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>                |                               | 10/27/2010  |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

Figure 7.3.1 Setup for spurious emission field strength measurements below 30 MHz

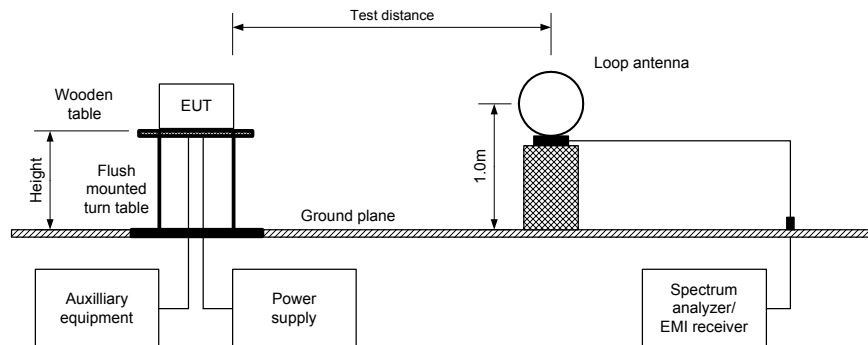
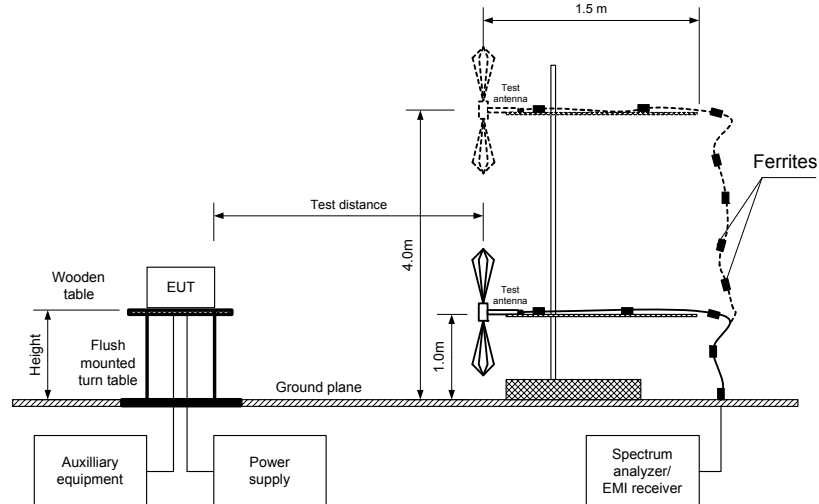


Figure 7.3.2 Setup for spurious emission field strength measurements above 30 MHz





|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                              |
| <b>Test mode:</b>           | Compliance                    | <b>Verdict:</b>   | <b>PASS</b>                  |
| <b>Date:</b>                | 10/27/2010                    |   |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

**Table 7.3.3 Field strength of spurious emissions above 1 GHz within restricted bands**

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz  
 INVESTIGATED FREQUENCY RANGE: 1000 - 25000 MHz  
 TEST DISTANCE: 3 m  
 MODULATION: FSK  
 MODULATING SIGNAL: Binary data message  
 BIT RATE: 250 kbps  
 DUTY CYCLE: 100 %  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 1000 kHz  
 TEST ANTENNA TYPE: Double ridged guide

| Antenna                |              |             |                    | Double sided guide             |                    |                 |                                   |                        |                    |                  |         |
|------------------------|--------------|-------------|--------------------|--------------------------------|--------------------|-----------------|-----------------------------------|------------------------|--------------------|------------------|---------|
| frequency<br>MHz       | polarization | height<br>m | Azimuth<br>degrees | Peak field strength(VBW=3 MHz) |                    |                 | Average field strength(VBW=10 Hz) |                        |                    |                  | Verdict |
|                        |              |             |                    | Measured<br>dB(μV/m)           | Limit,<br>dB(μV/m) | Margin,<br>dB** | Measured<br>dB(μV/m)              | Calculated<br>dB(μV/m) | Limit,<br>dB(μV/m) | Margin,<br>dB*** |         |
| Low carrier frequency  |              |             |                    |                                |                    |                 |                                   |                        |                    |                  |         |
| 2400.000               | Hor          | 1.25        | 340                | 70.94                          | 74.0               | -3.06           | 54.96                             | 36.55                  | 54.0               | -17.45           | Pass    |
| 4802.000               | Hor          | 1.0         | 180                | 51.67                          | 74.0               | -22.33          | 44.18                             | 25.77                  | 54.0               | -28.23           | Pass    |
| Mid carrier frequency  |              |             |                    |                                |                    |                 |                                   |                        |                    |                  |         |
| 4881.950               | Vert         | 1.1         | 170                | 52.80                          | 74.0               | -21.20          | 45.97                             | 27.56                  | 54.0               | -26.44           | Pass    |
| High carrier frequency |              |             |                    |                                |                    |                 |                                   |                        |                    |                  |         |
| 2483.500               | Hor          | 1.2         | 340                | 62.92                          | 74.0               | -11.08          | 65.13                             | 46.72                  | 54.0               | -7.28            | Pass    |
| 4963.975               | Vert         | 1.05        | 0                  | 54.24                          | 74.0               | -19.76          | 48.62                             | 30.21                  | 54.0               | -23.79           | Pass    |

\*- EUT front panel refers to 0 degrees position of turntable.

\*\*- Margin = Measured field strength - specification limit.

\*\*\*- Margin = Calculated field strength - specification limit,

where Calculated field strength = Measured field strength + average factor.

**Table 7.3.4 Average factor calculation**

| Transmission pulse                |            | Transmission burst |            | Transmission train duration, ms | Average factor, dB |
|-----------------------------------|------------|--------------------|------------|---------------------------------|--------------------|
| Duration, ms                      | Period, ms | Duration, ms       | Period, ms |                                 |                    |
| Refer to manufacturer declaration |            |                    |            |                                 | -18.41 dB          |

\*- Average factor was calculated as follows

for pulse train shorter than 100 ms:

$$\text{Average factor} = 20 \times \log_{10} \left( \frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{Burst duration}}{\text{Train duration}} \times \text{Number of bursts within pulse train} \right)$$

for pulse train longer than 100 ms:

$$\text{Average factor} = 20 \times \log_{10} \left( \frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{Burst duration}}{100\text{ms}} \times \text{Number of bursts within 100ms} \right)$$

|                             |   |                                |                              |
|-----------------------------|---|--------------------------------|------------------------------|
| <b>Test specification:</b>  | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                                |                              |
| <b>Test procedure:</b>      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                                |                              |
| <b>Test mode:</b>           | Compliance  | <b>Verdict:</b>                | <b>PASS</b>                  |
| <b>Date:</b>                | 10/27/2010  |                                |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa   | <b>Relative Humidity:</b> 44 % | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |   |                                |                              |

**Table 7.3.5 Field strength of spurious emissions below 1 GHz within restricted bands**

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz  
 TEST DISTANCE: 3 m  
 MODULATION: FSK  
 MODULATING SIGNAL: Binary data message  
 BIT RATE: 250 kbps  
 DUTY CYCLE: 100 %  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 RESOLUTION BANDWIDTH: 0.2 kHz (9 kHz – 150 kHz)  
 9.0 kHz (150 kHz – 30 MHz)  
 120 kHz (30 MHz – 1000 MHz)  
 VIDEO BANDWIDTH: > Resolution bandwidth  
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)  
 Biconical (30 MHz – 200 MHz)  
 Log periodic (200 MHz – 1000 MHz)  
 Biconilog (30 MHz – 1000 MHz)

| Frequency<br>MHz        | Peak<br>emission,<br>dB(μV/m) | Quasi-peak                     |                    |            | Antenna<br>polarization | Antenna<br>height, m | Turn-table<br>position**,<br>degrees | Verdict |
|-------------------------|-------------------------------|--------------------------------|--------------------|------------|-------------------------|----------------------|--------------------------------------|---------|
|                         |                               | Measured emission,<br>dB(μV/m) | Limit,<br>dB(μV/m) | Margin, dB |                         |                      |                                      |         |
| Low carrier frequency   |                               |                                |                    |            |                         |                      |                                      |         |
| No emissions were found |                               |                                |                    |            |                         |                      |                                      | Pass    |
| Mid carrier frequency   |                               |                                |                    |            |                         |                      |                                      |         |
| No emissions were found |                               |                                |                    |            |                         |                      |                                      | Pass    |
| High carrier frequency  |                               |                                |                    |            |                         |                      |                                      |         |
| No emissions were found |                               |                                |                    |            |                         |                      |                                      | Pass    |

\*- Margin = Measured emission - specification limit.

\*\*-. EUT front panel refer to 0 degrees position of turntable.

**Table 7.3.6 Restricted bands**

| MHz               | MHz                 | MHz                   | MHz             | MHz           | GHz           |
|-------------------|---------------------|-----------------------|-----------------|---------------|---------------|
| 0.09 - 0.11       | 8.37625 - 8.38675   | 73 - 74.6             | 399.9 - 410     | 2690 - 2900   | 10.6 - 12.7   |
| 0.495 - 0.505     | 8.41425 - 8.41475   | 74.8 - 75.2           | 608 - 614       | 3260 - 3267   | 13.25 - 13.4  |
| 2.1735 - 2.1905   | 12.29 - 12.293      | 108 - 121.94          | 960 - 1240      | 3332 - 3339   | 14.47 - 14.5  |
| 4.125 - 4.128     | 12.51975 - 12.52025 | 123 - 138             | 1300 - 1427     | 3345.8 - 3358 | 15.35 - 16.2  |
| 4.17725 - 4.17775 | 12.57675 - 12.57725 | 149.9 - 150.05        | 1435 - 1626.5   | 3600 - 4400   | 17.7 - 21.4   |
| 4.20725 - 4.20775 | 13.36 - 13.41       | 156.52475 - 156.52525 | 1645.5 - 1646.5 | 4500 - 5150   | 22.01 - 23.12 |
| 6.215 - 6.218     | 16.42 - 16.423      | 156.7 - 156.9         | 1660 - 1710     | 5350 - 5460   | 23.6 - 24     |
| 6.26775 - 6.26825 | 16.69475 - 16.69525 | 162.0125 - 167.17     | 1718.8 - 1722.2 | 7250 - 7750   | 31.2 - 31.8   |
| 6.31175 - 6.31225 | 16.80425 - 16.80475 | 167.72 - 173.2        | 2200 - 2300     | 8025 - 8500   | 36.43 - 36.5  |
| 8.291 - 8.294     | 25.5 - 25.67        | 240 - 285             | 2310 - 2390     | 9000 - 9200   | Above 38.6    |
| 8.362 - 8.366     | 37.5 - 38.25        | 322 - 335.4           | 2483.5 - 2500   | 9300 - 9500   |               |

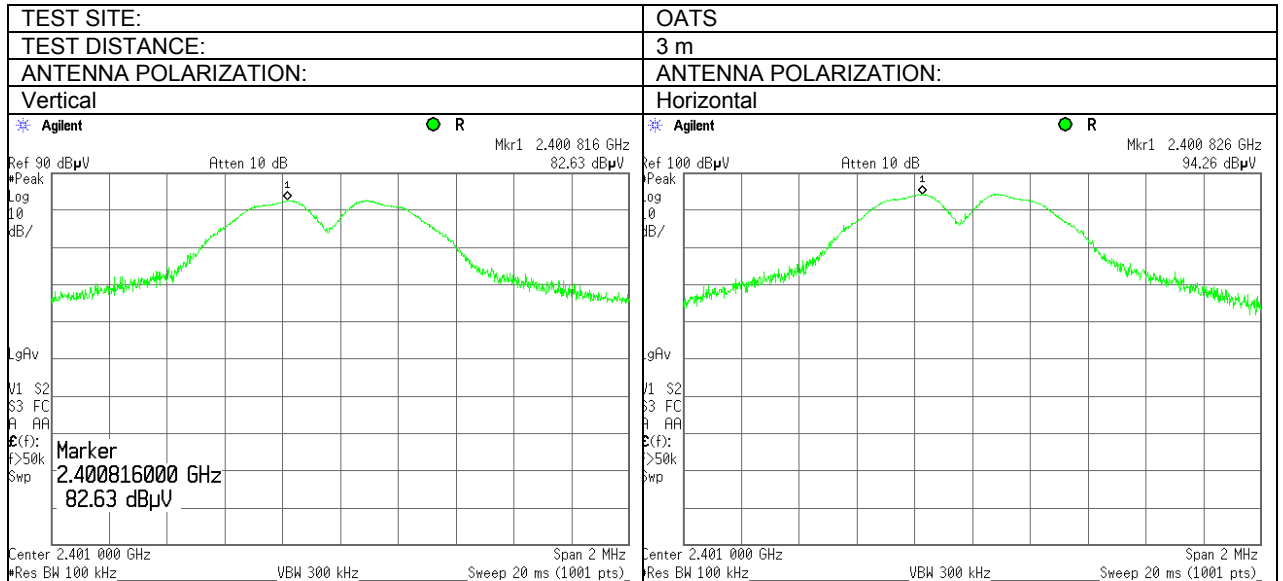
**Reference numbers of test equipment used**

|         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|
| HL 0446 | HL 0521 | HL 0604 | HL 1984 | HL 2870 | HL 2871 | HL 2909 | HL 3533 |
| HL 3818 | HL 3883 |         |         |         |         |         |         |

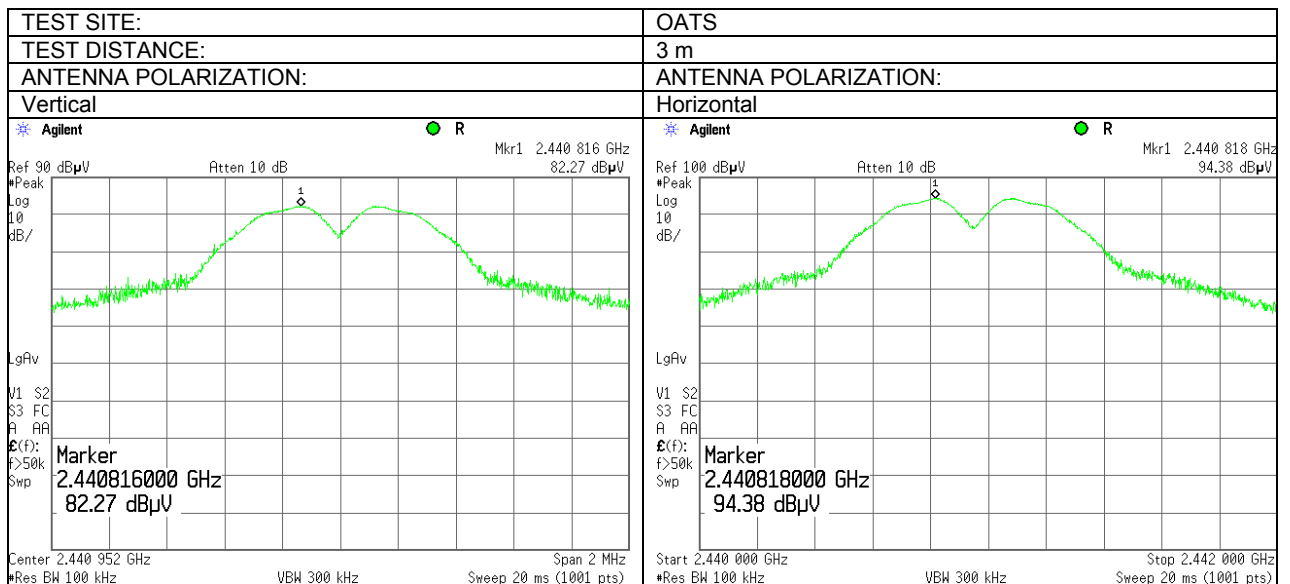
Full description is given in Appendix A.

|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                              |
| <b>Test mode:</b>           | Compliance                    | <b>Verdict:</b> PASS  |                              |
| <b>Date:</b>                | 10/27/2010                    |   |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

Plot 7.3.1 Radiated emission measurements at the low carrier frequency

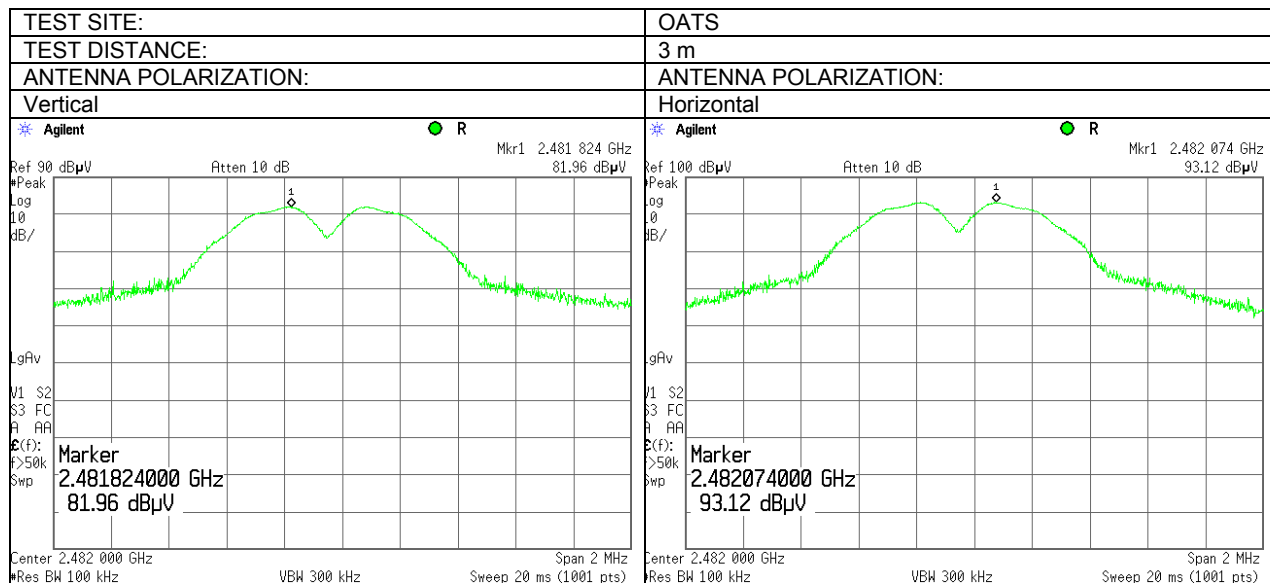


Plot 7.3.2 Radiated emission measurements at the mid carrier frequency



|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                              |
| <b>Test mode:</b>           | Compliance                    | <b>Verdict:</b> PASS  |                              |
| <b>Date:</b>                | 10/27/2010                    |   |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

Plot 7.3.3 Radiated emission measurements at the high carrier frequency

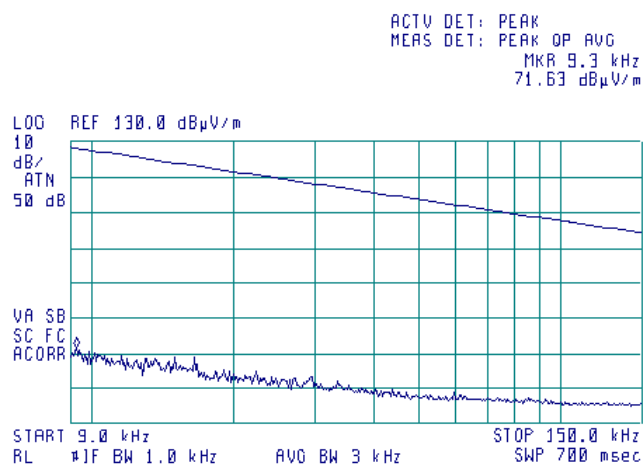




|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4   |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/27/2010   |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1015 hPa   | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

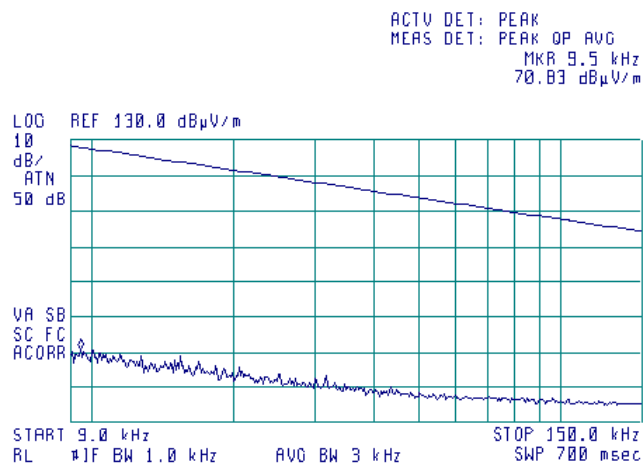
**Plot 7.3.4 Radiated emission measurements from 9 to 150 kHz at the low carrier frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical



**Plot 7.3.5 Radiated emission measurements from 9 to 150 kHz at the mid carrier frequency**

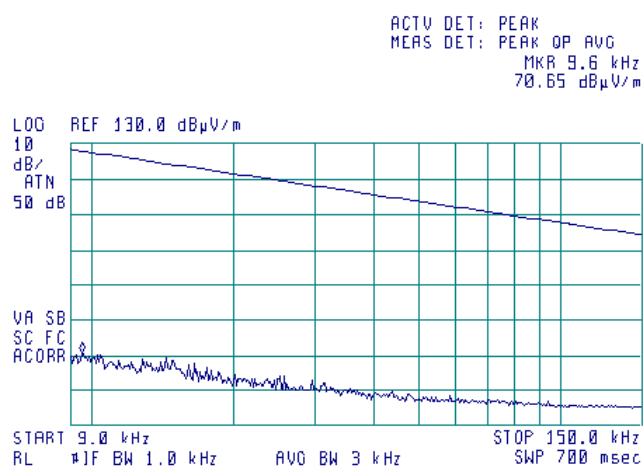
TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical



|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                              |
| <b>Test mode:</b>           |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>                |                               | 10/27/2010  |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

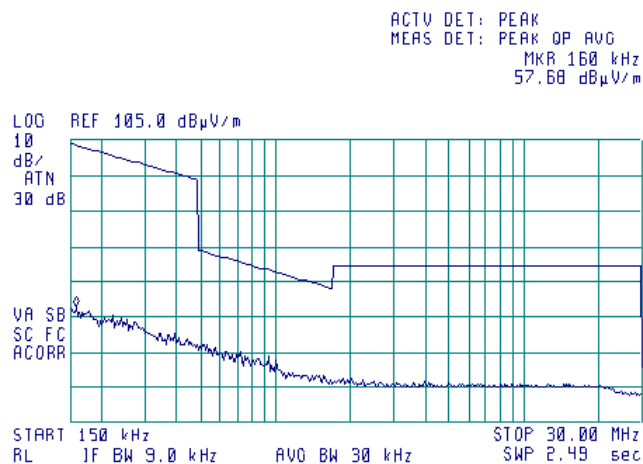
**Plot 7.3.6 Radiated emission measurements from 9 to 150 kHz at the high carrier frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical



**Plot 7.3.7 Radiated emission measurements from 0.15 to 30 MHz at the low carrier frequency**

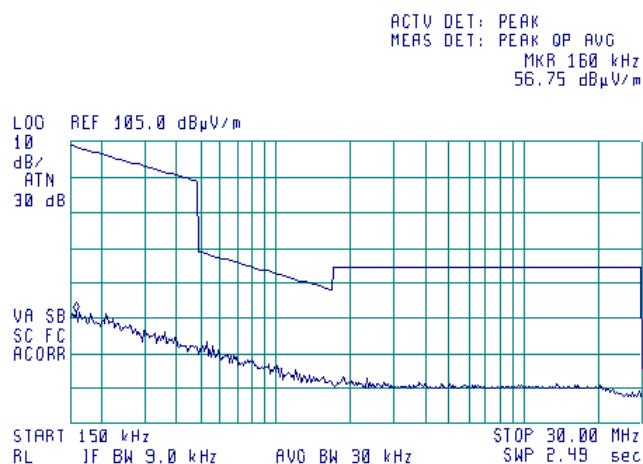
TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical



|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4   |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/27/2010   |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1015 hPa   | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

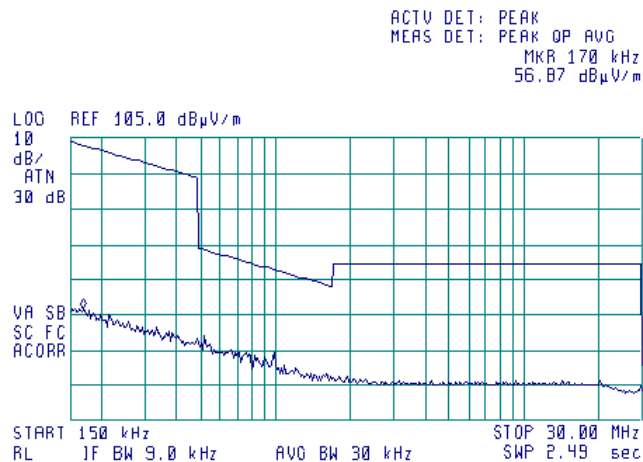
**Plot 7.3.8 Radiated emission measurements from 0.15 to 30 MHz at the mid carrier frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical



**Plot 7.3.9 Radiated emission measurements from 0.15 to 30 MHz at the high carrier frequency**

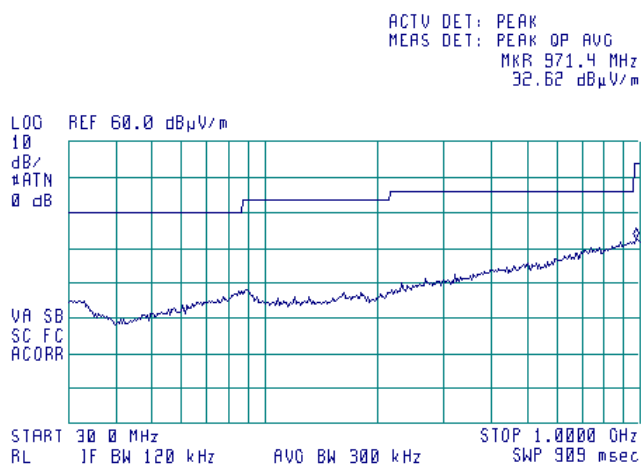
TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical



|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                              |
| <b>Test mode:</b>           |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>                |                               | 10/27/2010  |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

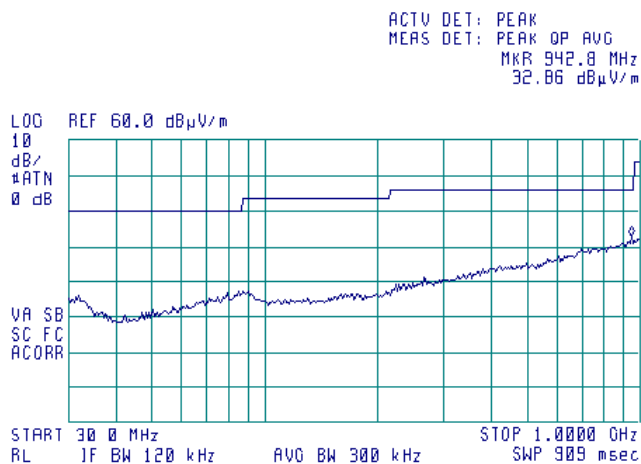
**Plot 7.3.10 Radiated emission measurements from 30 to 1000 MHz at the low carrier frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



**Plot 7.3.11 Radiated emission measurements from 30 to 1000 MHz at the mid carrier frequency**

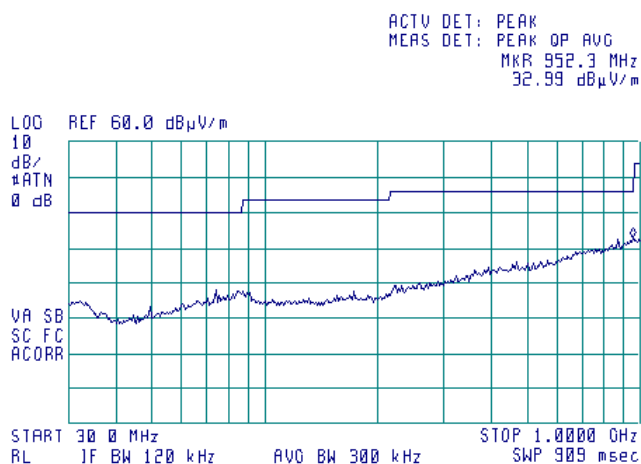
TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                              |
| <b>Test mode:</b>           |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>                |                               | 10/27/2010  |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

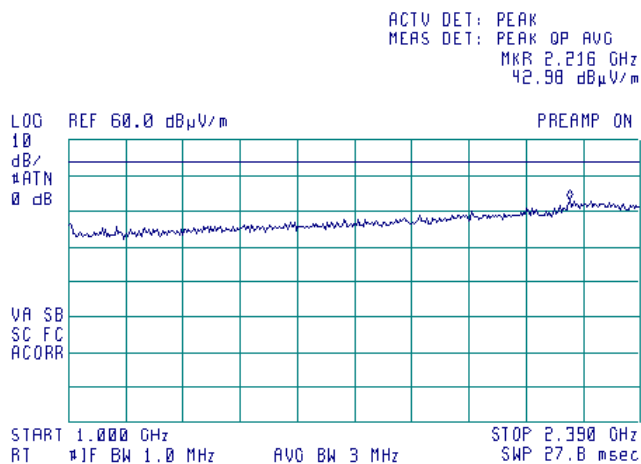
**Plot 7.3.12 Radiated emission measurements from 30 to 1000 MHz at the high carrier frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



**Plot 7.3.13 Radiated emission measurements from 1000 to 2390 MHz at the low carrier frequency**

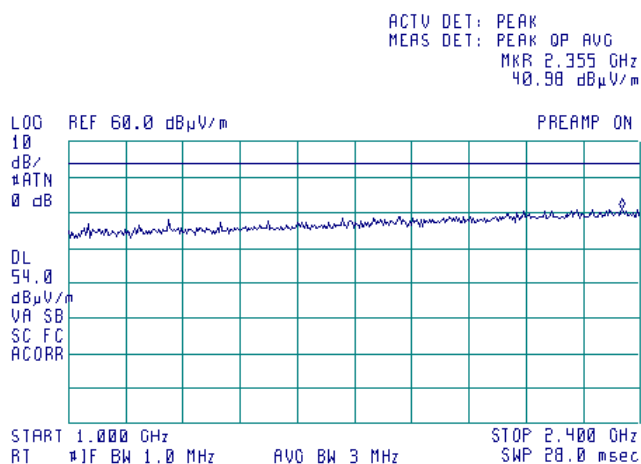
TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                              |
| <b>Test mode:</b>           |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>                |                               | 10/27/2010  |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

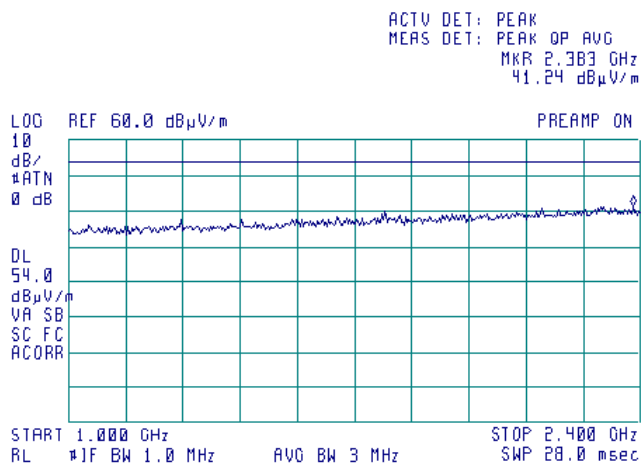
**Plot 7.3.14 Radiated emission measurements from 1000 to 2400 MHz at the mid carrier frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



**Plot 7.3.15 Radiated emission measurements from 1000 to 2400 MHz at the high carrier frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4   |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/27/2010   |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1015 hPa   | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

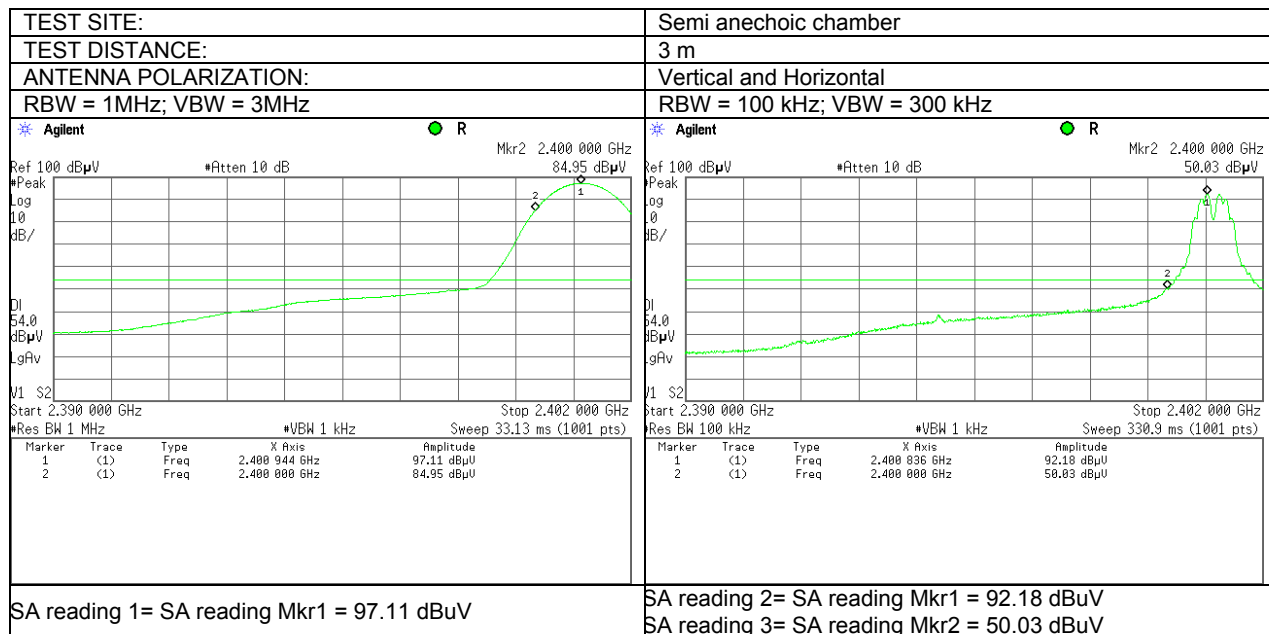
Plot 7.3.16 Radiated emission measurements from 2390 to 2402 MHz at the low carrier frequency

| TEST SITE:  |       | Semi anechoic chamber  |               |            |        |           |   |     |      |               |            |   |     |      |               |            |   |  |        |       |      |        |           |   |     |      |               |            |   |     |      |               |            |
|---|-------|--|---------------|------------|--------|-----------|---|-----|------|---------------|------------|---|-----|------|---------------|------------|---|--|--------|-------|------|--------|-----------|---|-----|------|---------------|------------|---|-----|------|---------------|------------|
| TEST DISTANCE:  |       | 3 m  |               |            |        |           |   |     |      |               |            |   |     |      |               |            |   |  |        |       |      |        |           |   |     |      |               |            |   |     |      |               |            |
| ANTENNA POLARIZATION:   |       | Vertical and Horizontal  |               |            |        |           |   |     |      |               |            |   |     |      |               |            |   |  |        |       |      |        |           |   |     |      |               |            |   |     |      |               |            |
| RBW = 1MHz; VBW = 3MHz  |       | RBW = 100 kHz; VBW = 300 kHz   |               |            |        |           |   |     |      |               |            |   |     |      |               |            |   |  |        |       |      |        |           |   |     |      |               |            |   |     |      |               |            |
| <div><div>Agilent</div><div>R</div><div><div>Ref 100 dBμV</div><div>Atten 10 dB</div><div>Mkr2 2.400 000 GHz</div><div>93.74 dBμV</div><div>Start 2.390 000 GHz</div><div>Stop 2.402 000 GHz</div><div>Res BW 1 MHz</div><div>VBW 3 MHz</div><div>Sweep 20 ms (1001 pts)</div><table><thead><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr></thead><tbody><tr><td>1</td><td>(1)</td><td>Freq</td><td>2.400 748 GHz</td><td>98.38 dBμV</td></tr><tr><td>2</td><td>(1)</td><td>Freq</td><td>2.400 000 GHz</td><td>93.74 dBμV</td></tr></tbody></table></div></div> |       | Marker   | Trace         | Type       | X Axis | Amplitude | 1 | (1) | Freq | 2.400 748 GHz | 98.38 dBμV | 2 | (1) | Freq | 2.400 000 GHz | 93.74 dBμV | <div><div>Agilent</div><div>R</div><div><div>Ref 100 dBμV</div><div>Atten 10 dB</div><div>Mkr2 2.400 000 GHz</div><div>66.70 dBμV</div><div>Start 2.390 000 GHz</div><div>Stop 2.402 000 GHz</div><div>Res BW 100 kHz</div><div>VBW 300 kHz</div><div>Sweep 20 ms (1001 pts)</div><table><thead><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr></thead><tbody><tr><td>1</td><td>(1)</td><td>Freq</td><td>2.401 076 GHz</td><td>94.06 dBμV</td></tr><tr><td>2</td><td>(1)</td><td>Freq</td><td>2.400 000 GHz</td><td>66.70 dBμV</td></tr></tbody></table></div></div> |  | Marker | Trace | Type | X Axis | Amplitude | 1 | (1) | Freq | 2.401 076 GHz | 94.06 dBμV | 2 | (1) | Freq | 2.400 000 GHz | 66.70 dBμV |
| Marker  | Trace | Type   | X Axis        | Amplitude  |        |           |   |     |      |               |            |   |     |      |               |            |   |  |        |       |      |        |           |   |     |      |               |            |   |     |      |               |            |
| 1   | (1)   | Freq   | 2.400 748 GHz | 98.38 dBμV |        |           |   |     |      |               |            |   |     |      |               |            |   |  |        |       |      |        |           |   |     |      |               |            |   |     |      |               |            |
| 2   | (1)   | Freq   | 2.400 000 GHz | 93.74 dBμV |        |           |   |     |      |               |            |   |     |      |               |            |   |  |        |       |      |        |           |   |     |      |               |            |   |     |      |               |            |
| Marker  | Trace | Type   | X Axis        | Amplitude  |        |           |   |     |      |               |            |   |     |      |               |            |   |  |        |       |      |        |           |   |     |      |               |            |   |     |      |               |            |
| 1   | (1)   | Freq   | 2.401 076 GHz | 94.06 dBμV |        |           |   |     |      |               |            |   |     |      |               |            |   |  |        |       |      |        |           |   |     |      |               |            |   |     |      |               |            |
| 2   | (1)   | Freq   | 2.400 000 GHz | 66.70 dBμV |        |           |   |     |      |               |            |   |     |      |               |            |   |  |        |       |      |        |           |   |     |      |               |            |   |     |      |               |            |
| SA reading 1= SA reading Mkr1 = 98.30 dBuV  |       | SA reading 2= SA reading Mkr1 = 94.06 dBuV<br>SA reading 3= SA reading Mkr2 = 66.70 dBuV |               |            |        |           |   |     |      |               |            |   |     |      |               |            |   |  |        |       |      |        |           |   |     |      |               |            |   |     |      |               |            |

$$\text{Test result} = \text{SA reading 1} - [(\text{SA reading 2}) - (\text{SA reading 3})] = 98.30 - (94.06 - 66.70) = 70.94 \text{ dBuV}$$

|                             |   |                                |                              |
|-----------------------------|---|--------------------------------|------------------------------|
| <b>Test specification:</b>  | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                                |                              |
| <b>Test procedure:</b>      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                                |                              |
| <b>Test mode:</b>           | Compliance  | <b>Verdict:</b> <b>PASS</b>    |                              |
| <b>Date:</b>                | 10/27/2010  |                                |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa   | <b>Relative Humidity:</b> 44 % | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |   |                                |                              |

Plot 7.3.17 Radiated emission measurements from 2390 to 2402 MHz at the low carrier frequency



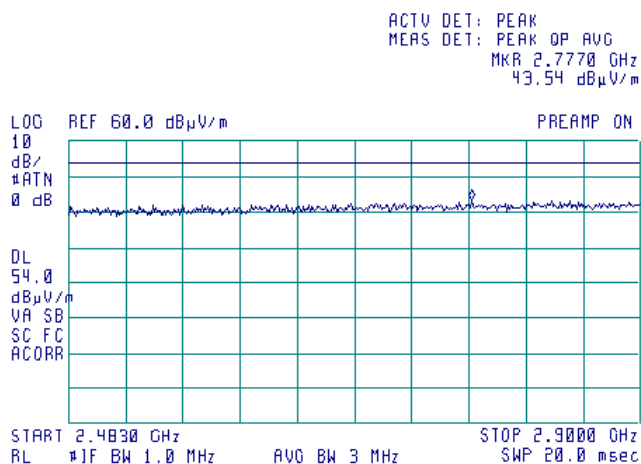
$$\begin{aligned} \text{Test result} &= \text{SA reading 1} - [(\text{SA reading 2}) - (\text{SA reading 3})] = \\ &= 97.11 - (92.18 - 50.03) = 54.96 \text{ dBuV} \end{aligned}$$



|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                              |
| <b>Test mode:</b>           |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>                |                               | 10/27/2010  |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

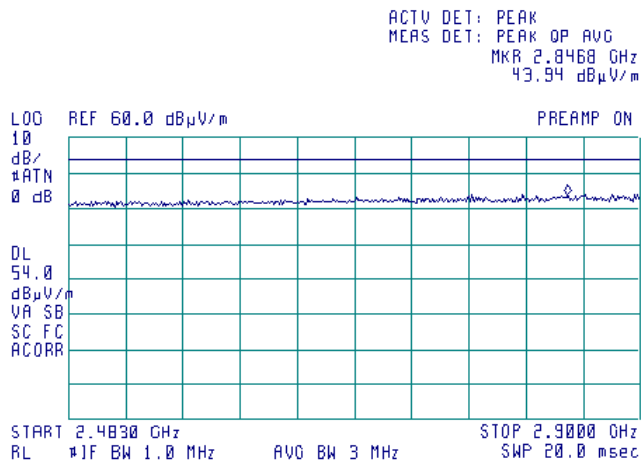
**Plot 7.3.18 Radiated emission measurements from 2483.5 to 2900 MHz at the low carrier frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR / LIMIT: Peak / Average



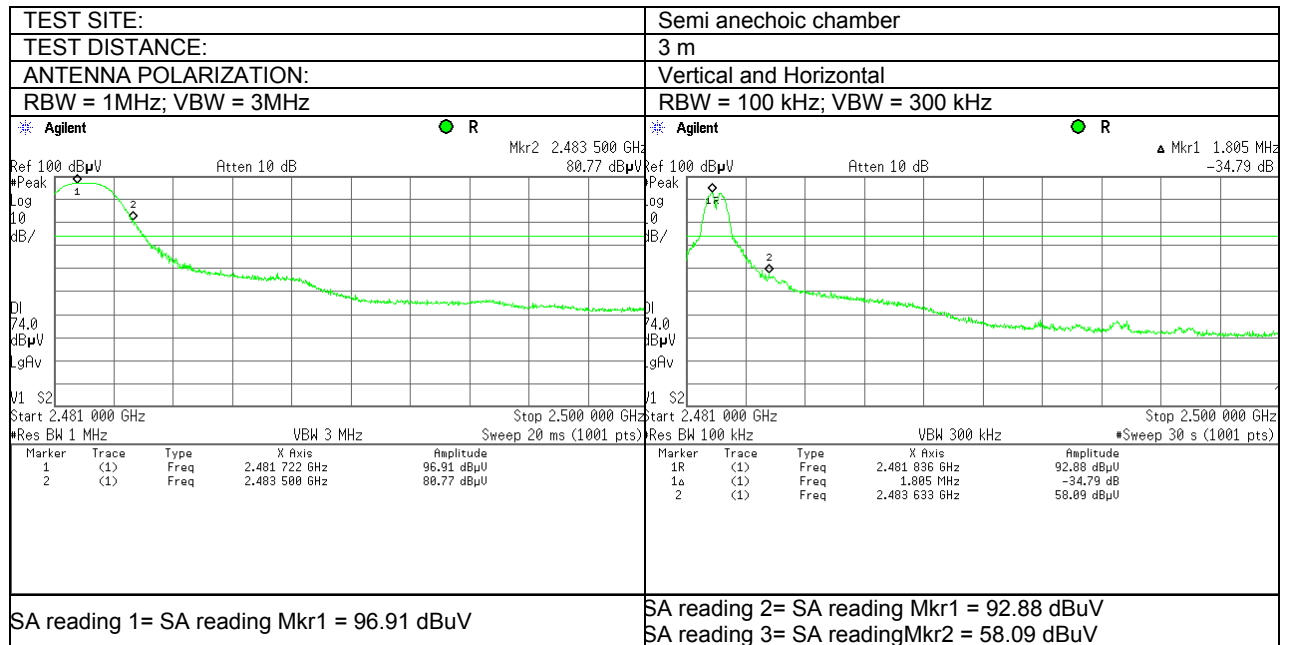
**Plot 7.3.19 Radiated emission measurements from 2483.5 to 2900 MHz at the mid carrier frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR / LIMIT: Peak / Average



|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                              |
| <b>Test mode:</b>           | Compliance                    | <b>Verdict:</b> PASS  |                              |
| <b>Date:</b>                | 10/27/2010                    |   |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

Plot 7.3.20 Radiated emission measurements from 2481 to 2500 MHz at the high carrier frequency



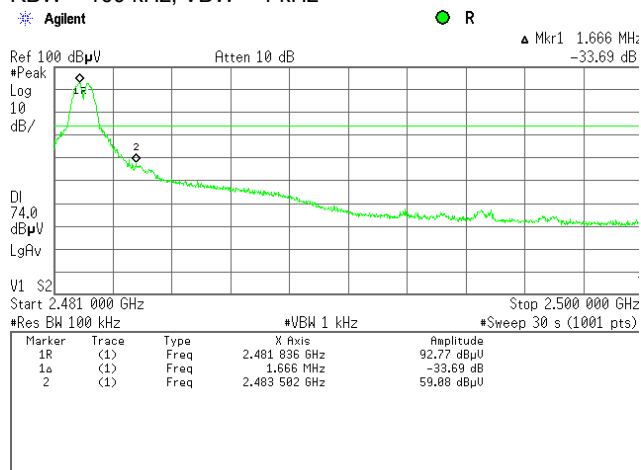
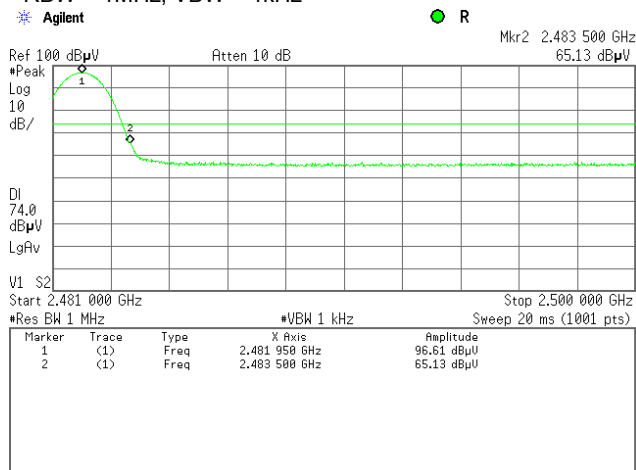
$$\text{Test result} = \text{SA reading 1} - [(\text{SA reading 2}) - (\text{SA reading 3})] = 96.91 - (92.88 - 58.09) = 62.92 \text{ dBuV}$$

|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4   |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/27/2010   |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1015 hPa   | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

Plot 7.3.21 Radiated emission measurements from 2481 to 2500 MHz at the high carrier frequency

TEST SITE:  
TEST DISTANCE:  
ANTENNA POLARIZATION:  
RBW = 1MHz; VBW = 1kHz

Semi anechoic chamber  
3 m  
Vertical and Horizontal  
RBW = 100 kHz; VBW = 1 kHz



SA reading 1= SA reading Mkr1 = 96.61 dBuV

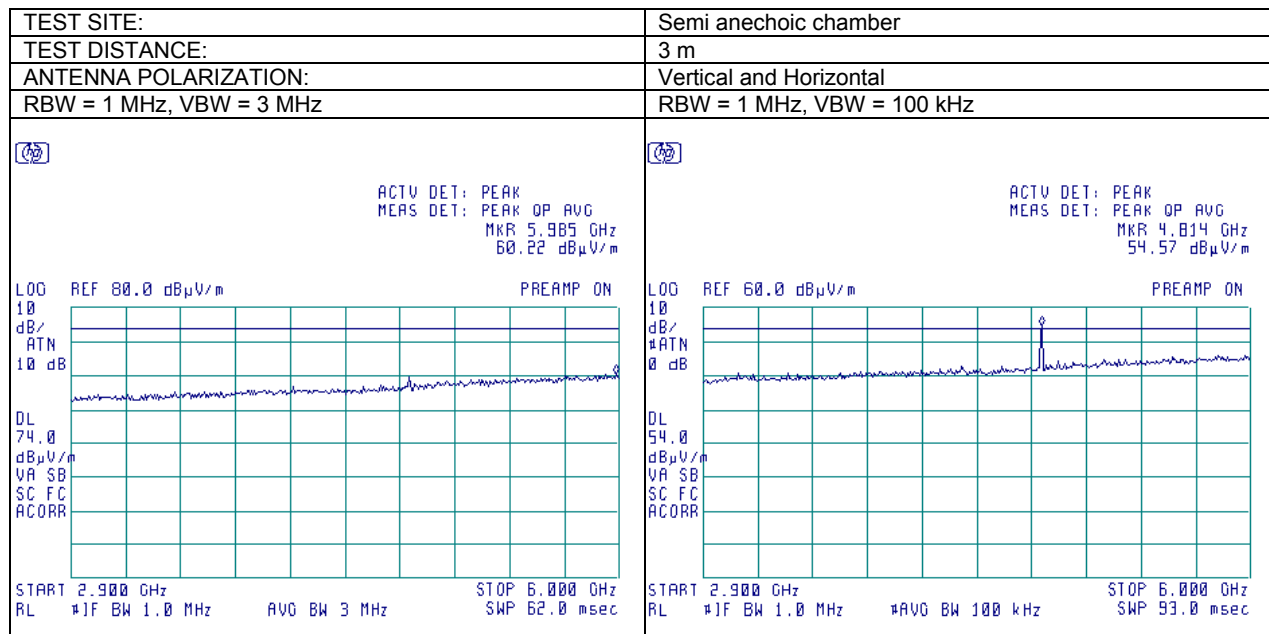
SA reading 2= SA reading Mkr1 = 92.77 dBuV

SA reading 3= SA reading Mkr2 = 59.08 dBuV

Test result = SA reading 1 – [(SA reading 2)- SA reading 3]] =  
= 96.91 – (92.77 – 59.08) = 55.24 dBuV

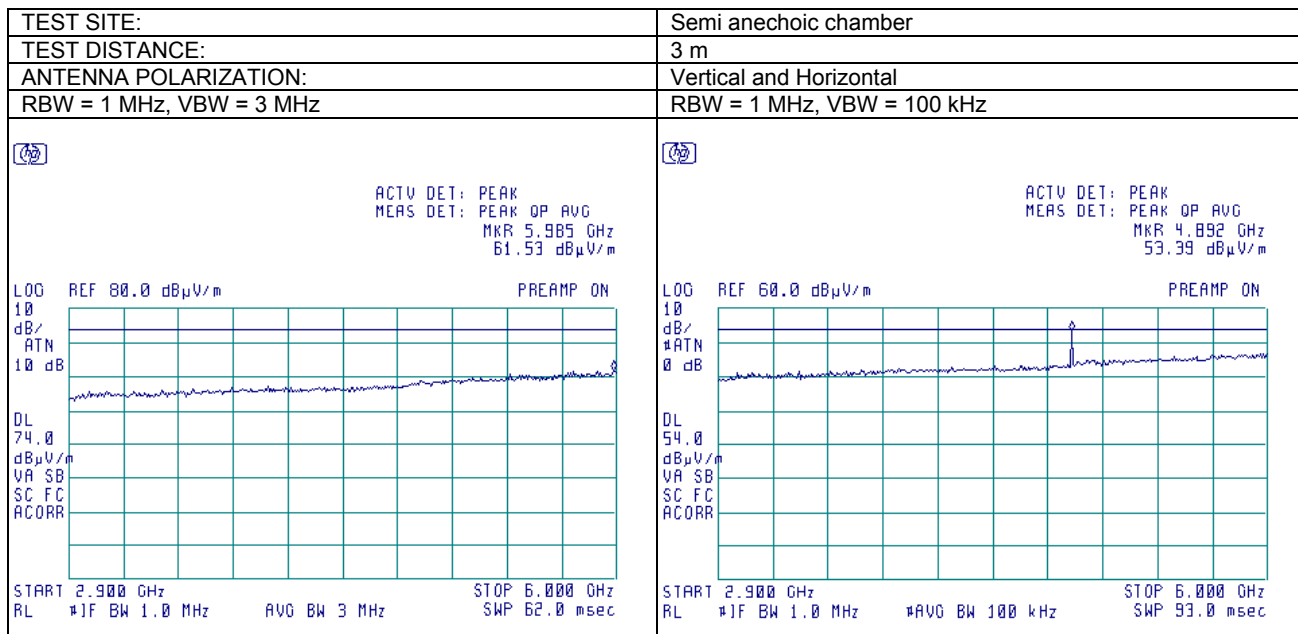
|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4   |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/27/2010   |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1015 hPa   | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

Plot 7.3.22 Radiated emission measurements from 2900 to 6000 MHz at the low carrier frequency



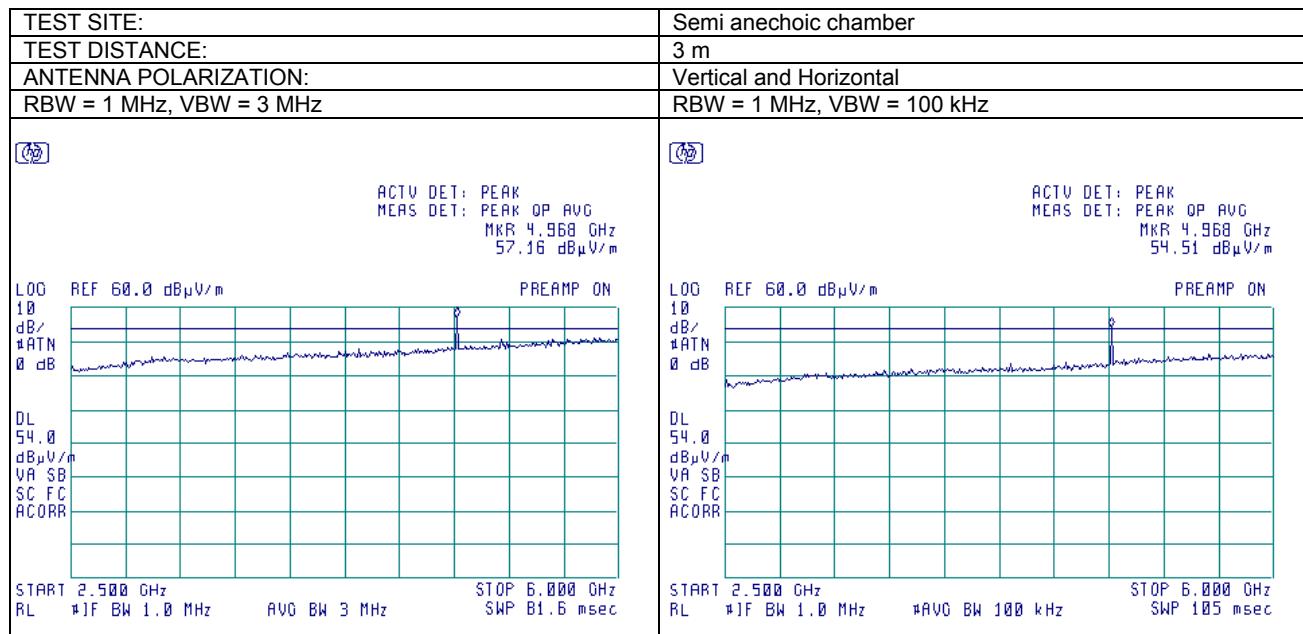
|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4   |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/27/2010   |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1015 hPa   | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

Plot 7.3.23 Radiated emission measurements from 2900 to 6000 MHz at the mid carrier frequency



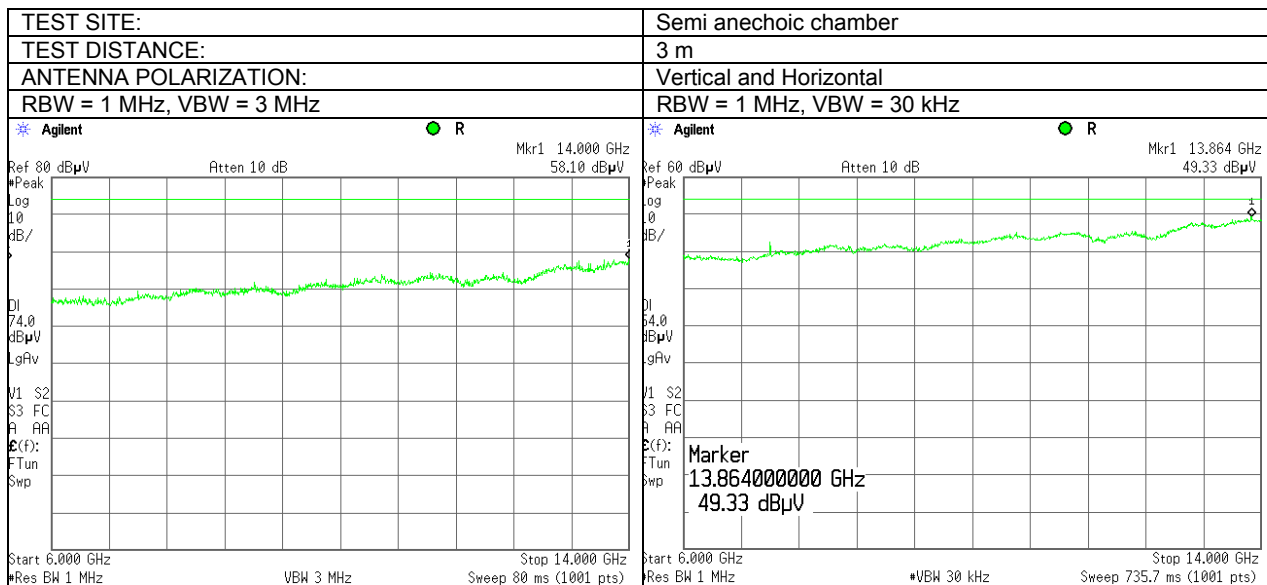
|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4   |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/27/2010   |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1015 hPa   | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

Plot 7.3.24 Radiated emission measurements from 2500 to 6000 MHz at the high carrier frequency



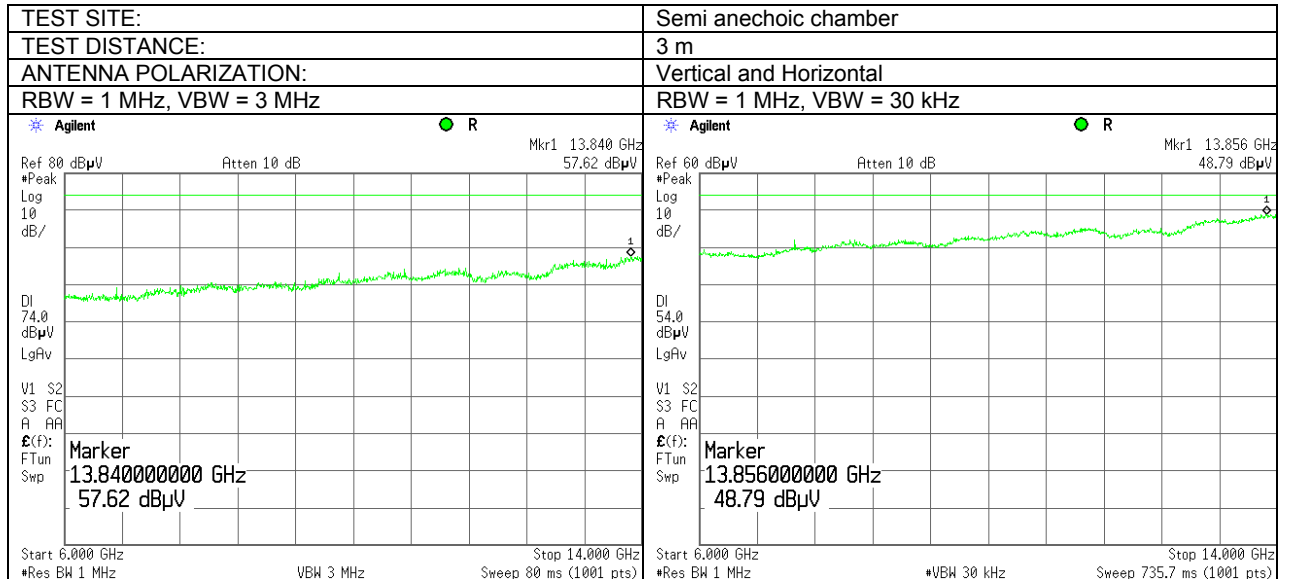
|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4   |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/27/2010   |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1015 hPa   | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

Plot 7.3.25 Radiated emission measurements from 6000 to 14000 MHz at the low carrier frequency

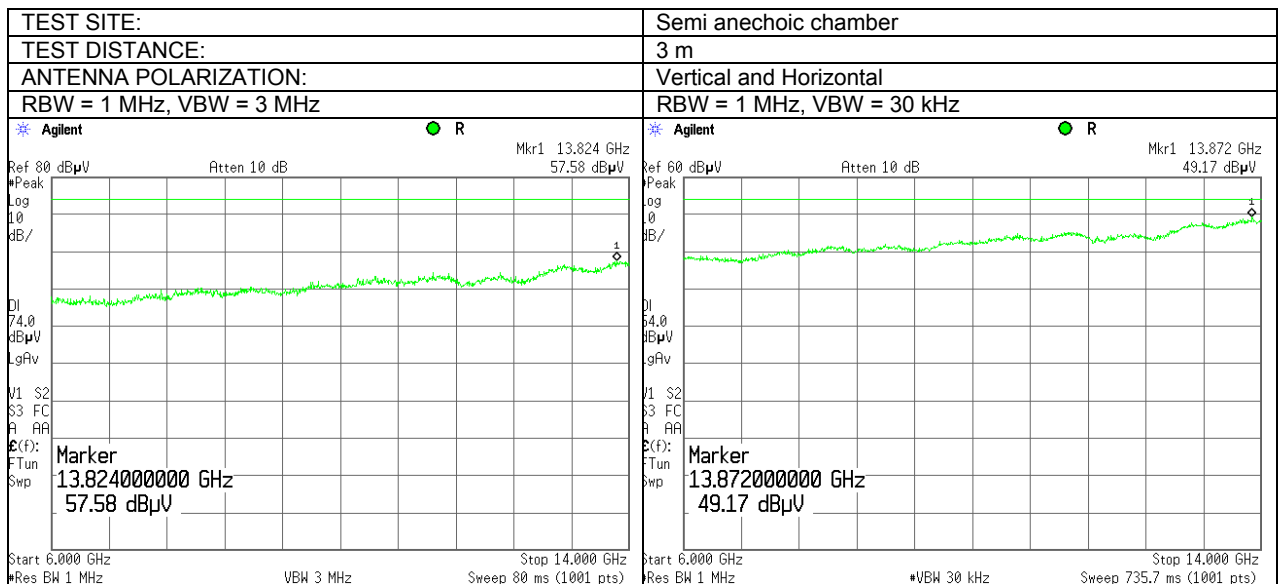


|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4   |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/27/2010   |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1015 hPa   | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

Plot 7.3.26 Radiated emission measurements from 6000 to 14000 MHz at the mid carrier frequency



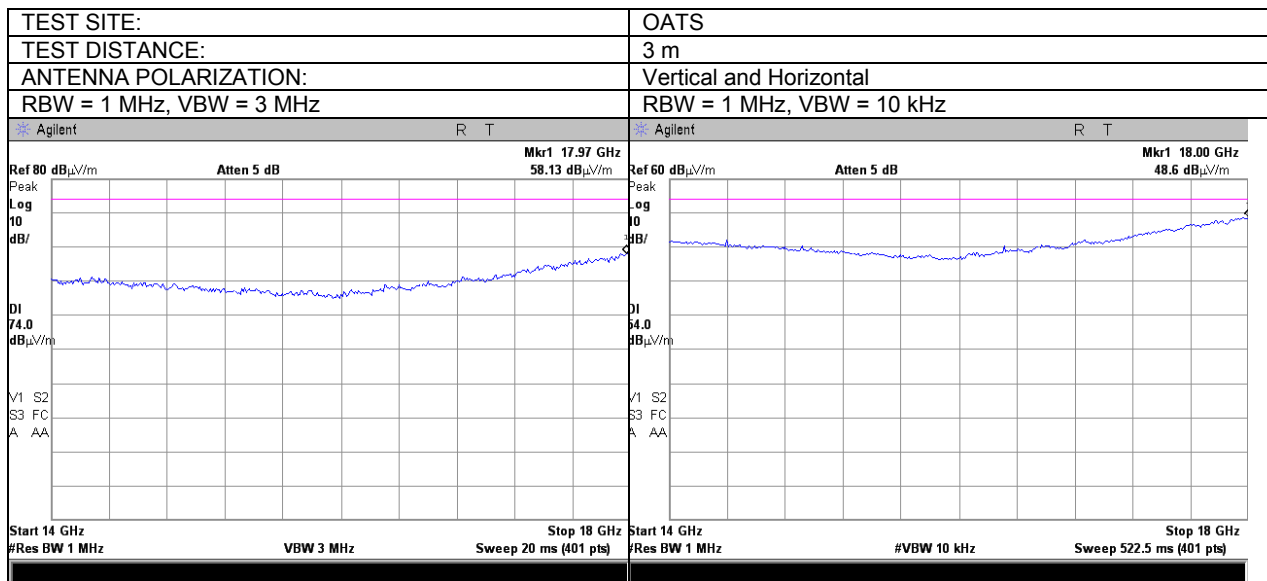
Plot 7.3.27 Radiated emission measurements from 6000 to 14000 MHz at the high carrier frequency



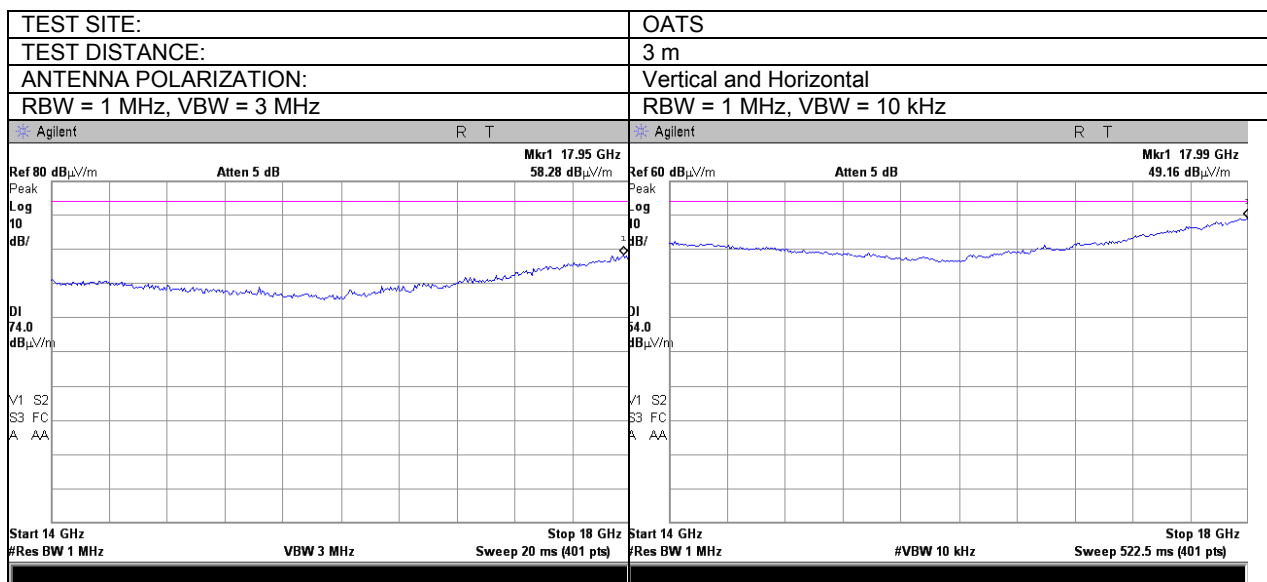


|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4   |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/27/2010   |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1015 hPa   | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

Plot 7.3.28 Radiated emission measurements from 14000 to 18000 MHz at the low carrier frequency

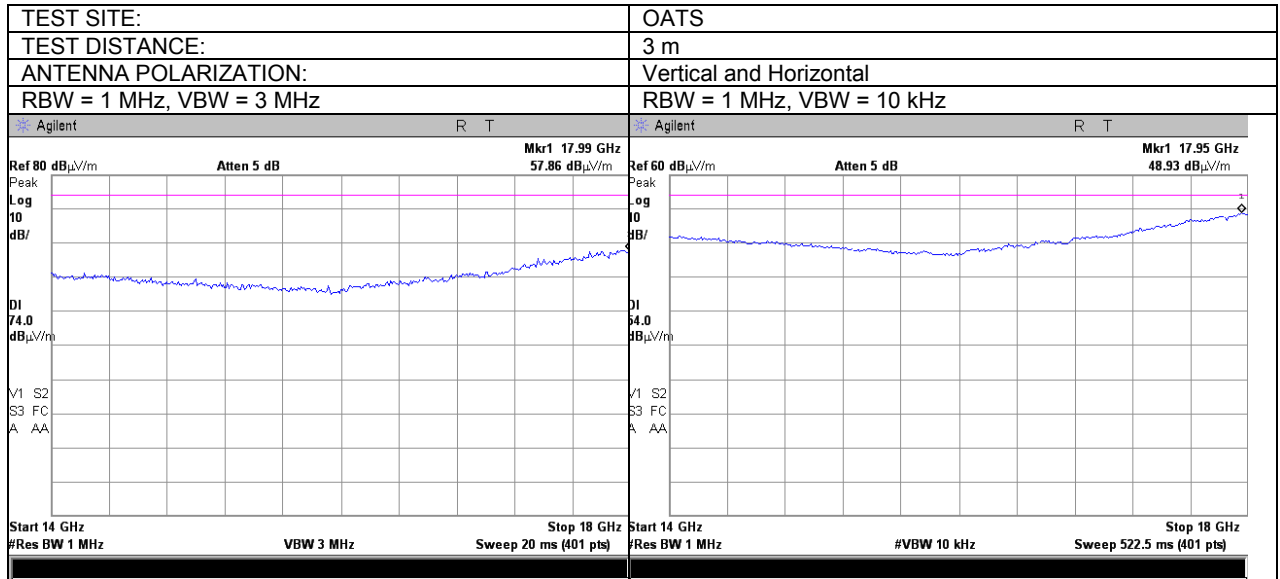


Plot 7.3.29 Radiated emission measurements from 14000 to 18000 MHz at the mid carrier frequency



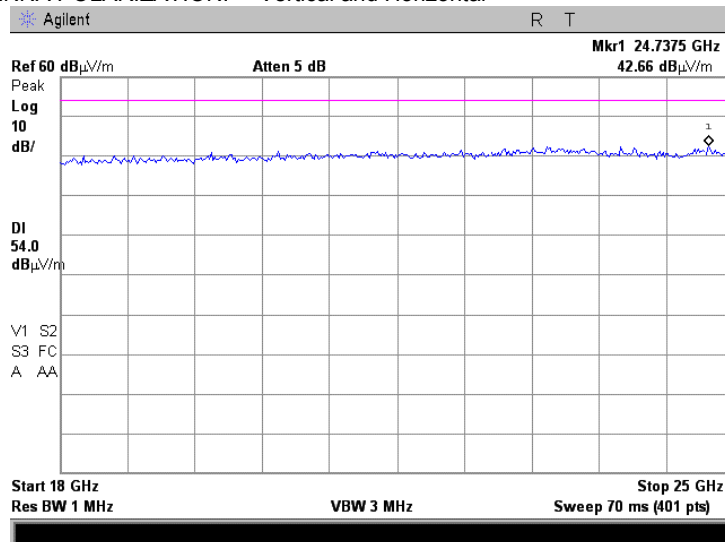
|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                              |
| <b>Test mode:</b>           | Compliance                    | <b>Verdict:</b> PASS  |                              |
| <b>Date:</b>                | 10/27/2010                    |   |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

Plot 7.3.30 Radiated emission measurements from 14000 to 18000 MHz at the high carrier frequency



Plot 7.3.31 Radiated emission measurements from 18000 to 25000 MHz at the low carrier frequency

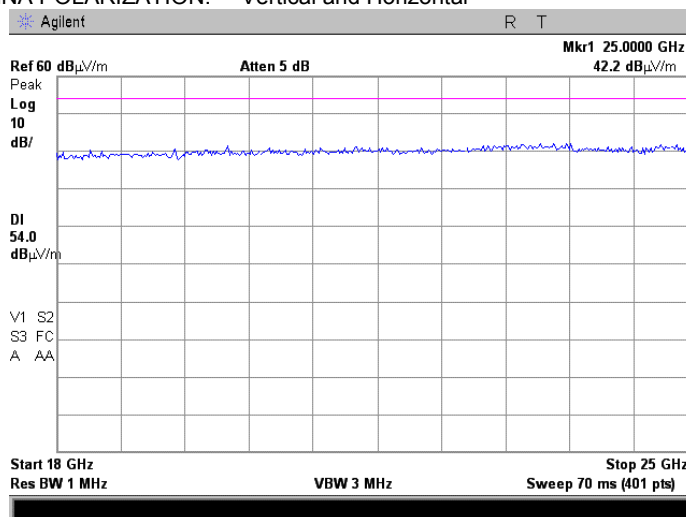
TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                              |
| <b>Test mode:</b>           |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>                |                               | 10/27/2010  |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

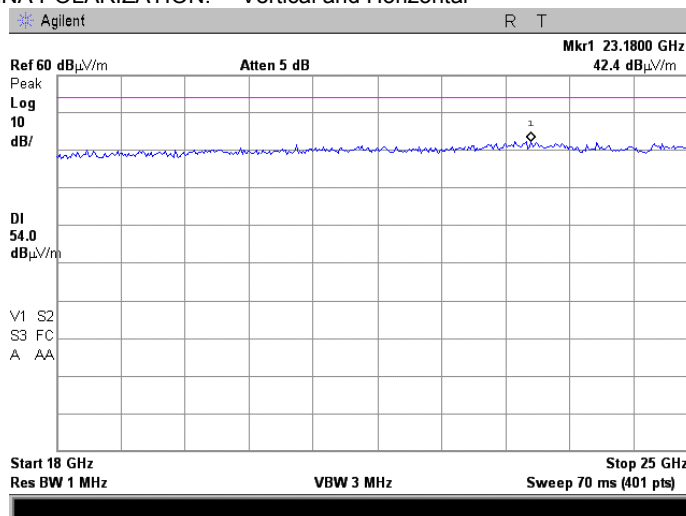
Plot 7.3.32 Radiated emission measurements from 18000 to 25000 MHz at the mid carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal



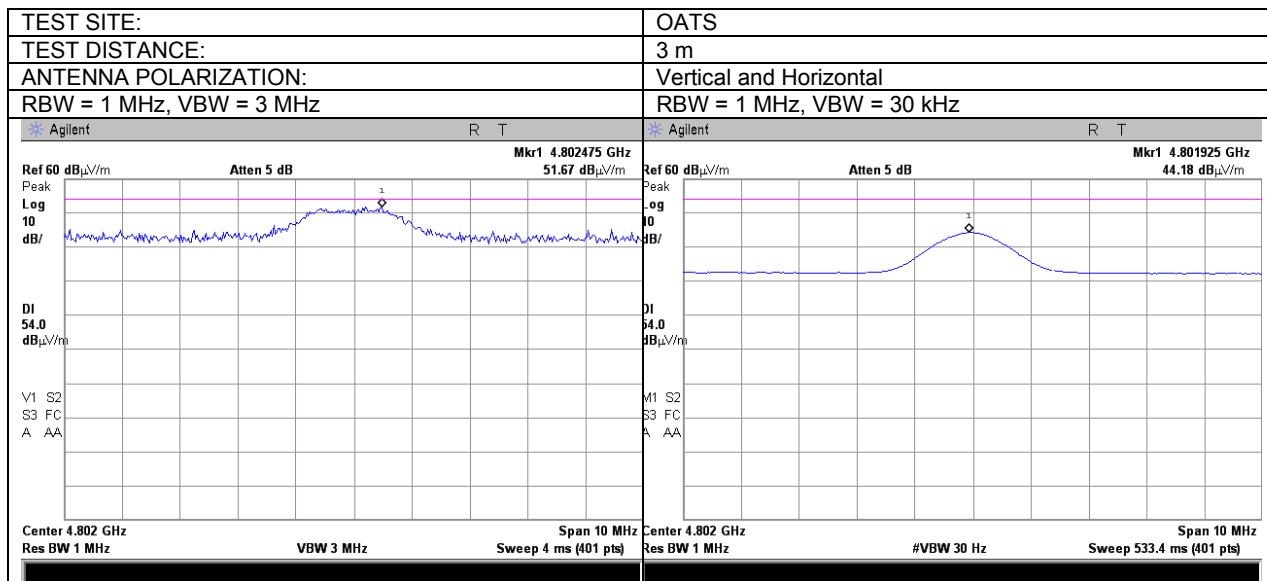
Plot 7.3.33 Radiated emission measurements from 18000 to 25000 MHz at the high carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal

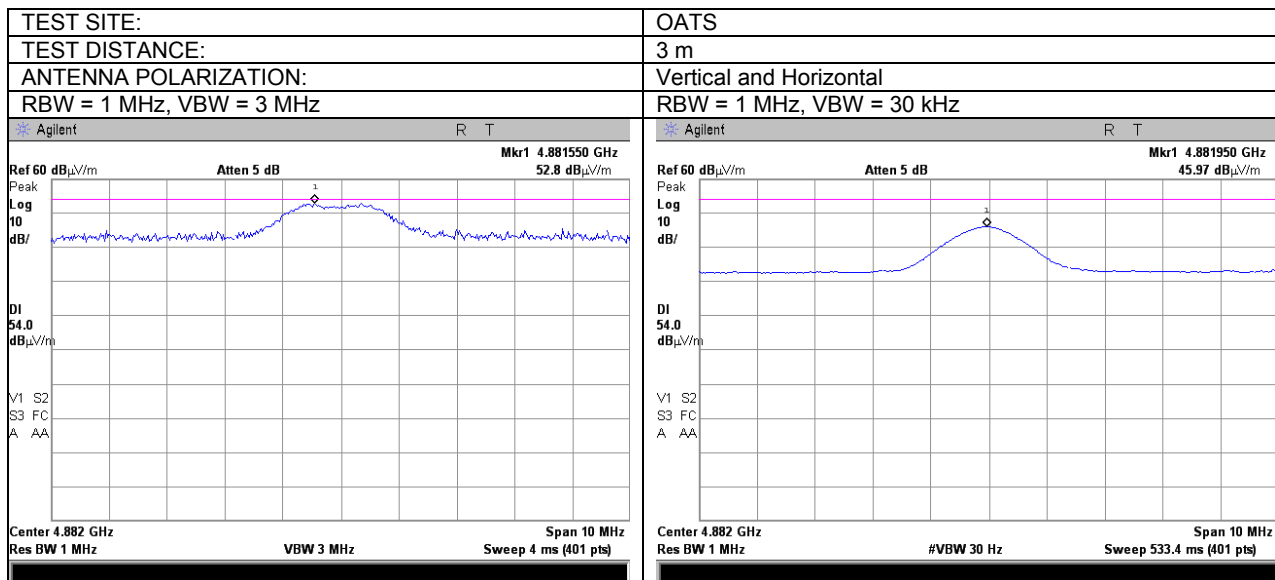


|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4   |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/27/2010   |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1015 hPa   | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

Plot 7.3.34 Radiated emission measurements at the second harmonic of low carrier frequency

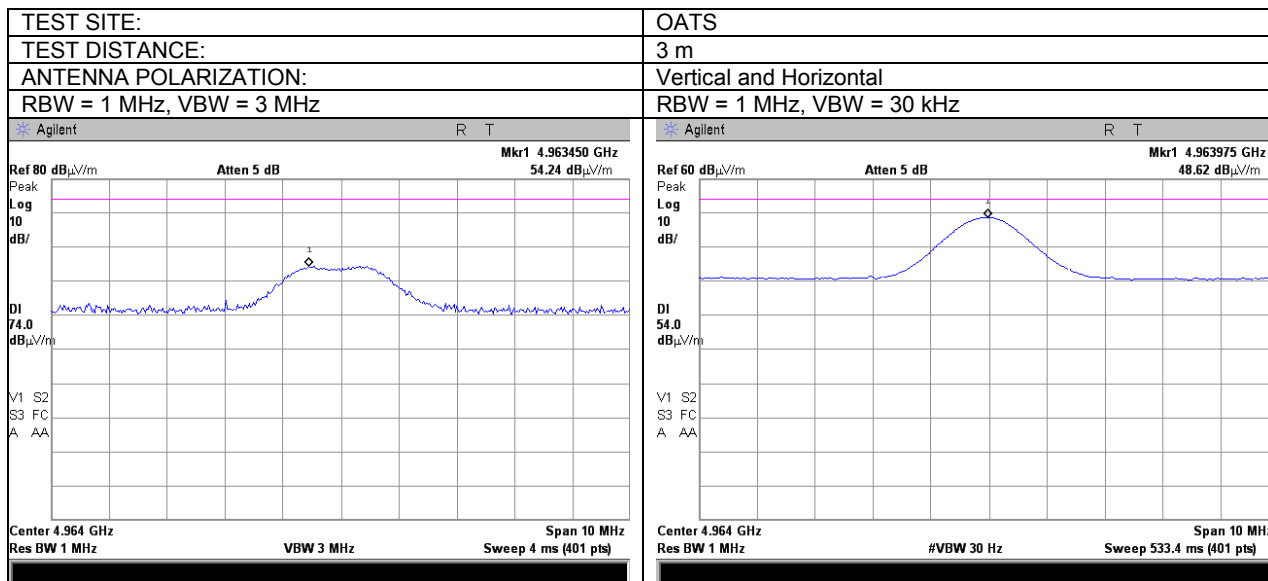


Plot 7.3.35 Radiated emission measurements at the second harmonic of mid carrier frequency



|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4   |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 10/27/2010   |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1015 hPa   | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

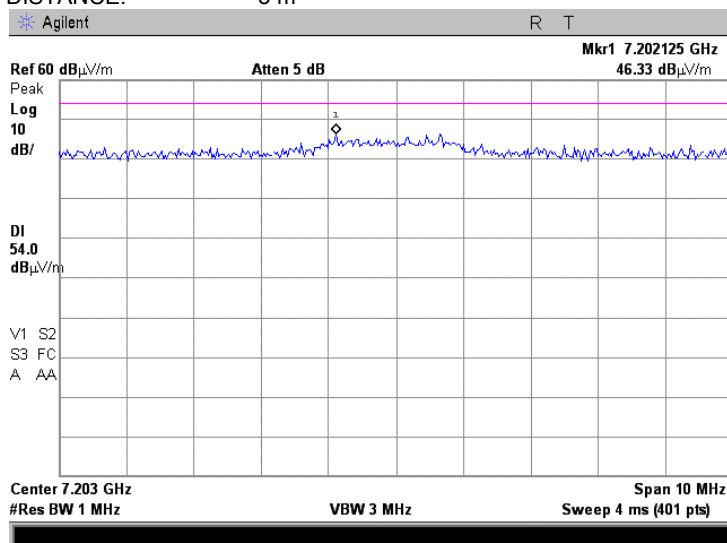
Plot 7.3.36 Radiated emission measurements at the second harmonic of high carrier frequency



|                             |   |                                |                              |
|-----------------------------|---|--------------------------------|------------------------------|
| <b>Test specification:</b>  | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                                |                              |
| <b>Test procedure:</b>      | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                                |                              |
| <b>Test mode:</b>           | Compliance  | <b>Verdict:</b>                | <b>PASS</b>                  |
| <b>Date:</b>                | 10/27/2010  |                                |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa   | <b>Relative Humidity:</b> 44 % | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |   |                                |                              |

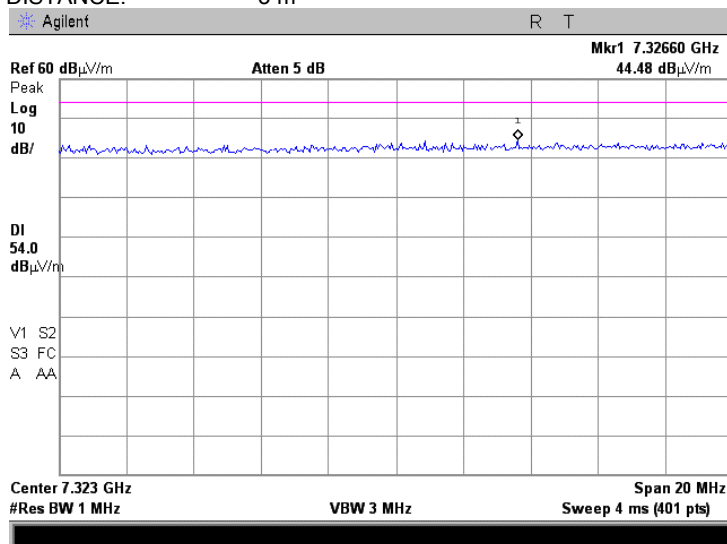
Plot 7.3.37 Radiated emission measurements at the third harmonic of low carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m



Plot 7.3.38 Radiated emission measurements at the third harmonic of mid carrier frequency

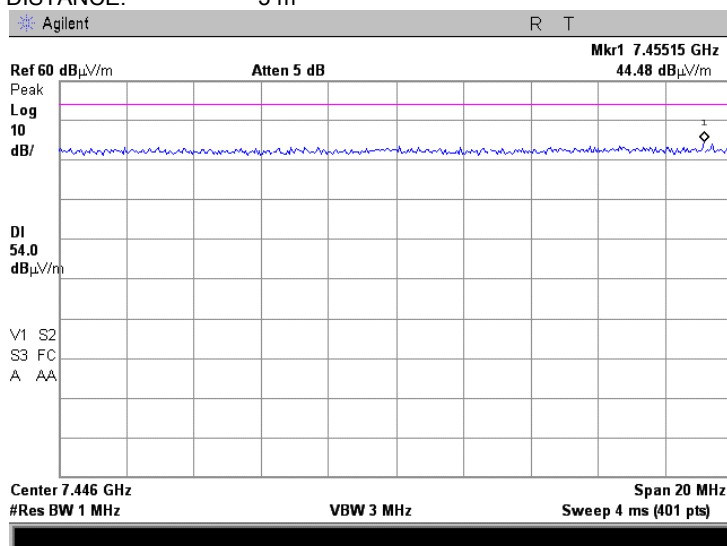
TEST SITE: OATS  
TEST DISTANCE: 3 m



|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4          |                              |
| <b>Test mode:</b>           |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>                |                               | 10/27/2010  |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %  | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

Plot 7.3.39 Radiated emission measurements at the third harmonic of high carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m



|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(e), RSS-210 A8.2(b), Peak power density</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(d)                         |                              |
| <b>Test mode:</b>           |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>                |                               | 11/2/2010   |                              |
| <b>Temperature:</b> 23.2 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 45 %                                    | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

## 7.4 Peak spectral power density

### 7.4.1 General

This test was performed to measure the peak spectral power density radiated by the transmitter RF antenna. Specification test limits according to FCC part 15 section 15.247(d) and RSS-210 section A8.2(b) are given in Table 7.4.1.

Table 7.4.1 Peak spectral power density limits

| Assigned frequency range, MHz | Measurement bandwidth, kHz | Peak spectral power density, dBm | Equivalent field strength limit @ 3m, dB(μV/m)* |
|-------------------------------|----------------------------|----------------------------------|---|
| 2400.0 – 2483.5               | 3.0                        | 8.0                              | 103.2   |

\* - Equivalent field strength limit was calculated from the peak spectral power density as follows:  $E = \sqrt{30 \times P} / r$ , where P is peak spectral power density and r is antenna to EUT distance in meters.

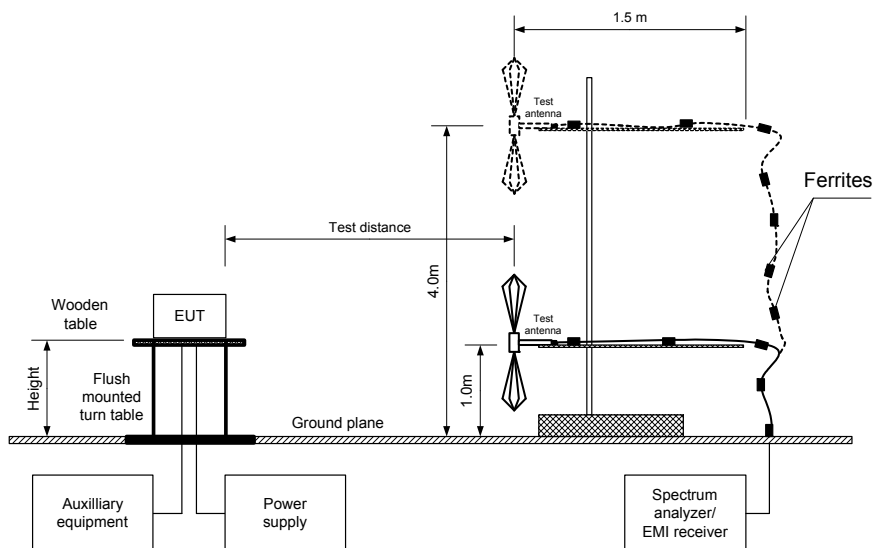
### 7.4.2 Test procedure for field strength measurements

- 7.4.2.1 The EUT was set up as shown in Figure 7.4.1, energized and its proper operation was checked.
- 7.4.2.2 The EUT was adjusted to produce maximum available to end user RF output power.
- 7.4.2.3 The field strength of the EUT carrier frequency was measured with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360° and the measuring antenna height was swept in both vertical and horizontal polarizations.
- 7.4.2.4 The frequency span of spectrum analyzer was set to capture the entire 6 dB band of the transmitter, in peak hold mode with resolution bandwidth set to 3.0 kHz, video bandwidth wider than resolution bandwidth, auto sweep time and sufficient number of sweeps was allowed for trace stabilization. The spectrum lines spacing was verified to be wider than 3 kHz. Otherwise the resolution bandwidth was reduced until individual spectrum lines were resolved and the power of individual spectrum lines was integrated over 3 kHz band.
- 7.4.2.5 The peak of emission was zoomed with span set just wide enough to capture the emission peak area and sweep time was set equal to span width divided by resolution bandwidth. Spectrum analyzer was set in peak hold mode, sufficient number of sweeps was allowed for trace stabilization and peak spectral power density was measured as provided in Table 7.4.2, Table 7.4.3 and the associated plots.



|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(e), RSS-210 A8.2(b), Peak power density</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(d)                         |                              |
| <b>Test mode:</b>           | Compliance                    | <b>Verdict:</b>   | <b>PASS</b>                  |
| <b>Date:</b>                | 11/2/2010                     |   |                              |
| <b>Temperature:</b> 23.2 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 45 %                                    | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

Figure 7.4.1 Setup for carrier field strength measurements



|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(e), RSS-210 A8.2(b), Peak power density |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(d)                  |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 11/2/2010  |                         |                       |
| Temperature: 23.2 °C | Air Pressure: 1015 hPa                                     | Relative Humidity: 45 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

**Table 7.4.2 Field strength measurement of peak spectral power density**

ASSIGNED FREQUENCY RANGE: 2400.0 – 2483.5 MHz  
TEST DISTANCE: 3 m  
TEST SITE: OATS  
EUT HEIGHT: 0.8 m  
DETECTOR USED: Peak  
RESOLUTION BANDWIDTH: 3 kHz  
VIDEO BANDWIDTH: 10 kHz  
TEST ANTENNA TYPE: Double ridged guide (above 1000 MHz)  
MODULATION: FSK  
MODULATING SIGNAL: Binary data message  
BIT RATE: 250 kbps  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
TRANSMITTER OUTPUT POWER: 0.93 dBm at low carrier frequency  
1.25 dBm at mid carrier frequency  
0.37 dBm at high carrier frequency

| Frequency, MHz | Field strength, dB(μV/m) | EUT antenna gain, dBi | Limit, dB(μV/m) | Margin, dB* | Antenna polarization | Antenna height, m | Turn-table position**, degrees |
|----------------|--------------------------|-----------------------|-----------------|-------------|----------------------|-------------------|--------------------------------|
| 2400.833       | 89.21                    | 1.5                   | 103.23          | -15.52      | Hor                  | 1.2               | 340                            |
| 2440.826       | 88.69                    | 1.5                   | 103.23          | -16.04      | Hor                  | 1.2               | 340                            |
| 2482.076       | 88.65                    | 1.5                   | 103.23          | -16.08      | Hor                  | 1.2               | 340                            |

\*- Margin = Field strength - EUT antenna gain - calculated field strength limit.

\*\*-. EUT front panel refer to 0 degrees position of turntable.

**Table 7.4.3 Substitution measurement of peak spectral power density**

ASSIGNED FREQUENCY RANGE: 2400 – 2483.5 MHz  
TEST DISTANCE: 3 m  
SUBSTITUTION ANTENNA HEIGHT: 0.8 m  
DETECTOR USED: Peak  
RESOLUTION BANDWIDTH: 3 kHz  
VIDEO BANDWIDTH: 10 kHz  
SUBSTITUTION ANTENNA TYPE: Double ridged guide (above 1000 MHz)

| Frequency, MHz | Field strength, dB(μV/m) | Antenna polarization | RF generator output, dBm | Antenna gain, dBi | Cable loss, dB | EUT ant. gain, dBi | Peak power density*, dB(mW/3 kHz) | Limit, dBm | Margin, dB** | Verdict |
|----------------|--------------------------|----------------------|--------------------------|-------------------|----------------|--------------------|-----------------------------------|------------|--------------|---------|
| 2400.833       | 89.21                    | Hor                  | -15.63                   | 9.17              | 1.46           | 1.5                | -7.92                             | 8.00       | -15.92       | Pass    |
| 2440.826       | 88.69                    | Hor                  | -16.06                   | 9.21              | 1.47           | 1.5                | -8.32                             | 8.00       | -16.32       | Pass    |
| 2482.076       | 88.65                    | Hor                  | -16.48                   | 9.24              | 1.48           | 1.5                | -8.72                             | 8.00       | -16.72       | Pass    |

\*- Peak power density provided in terms of conducted power density at antenna connector and was calculated as follows:

Peak power density = RF generator output in dBm – Cable loss in dB + Substitution antenna gain in dBi - Transmitter antenna gain in dBi

\*\*-. Margin = Peak power density - EUT antenna gain - specification limit.

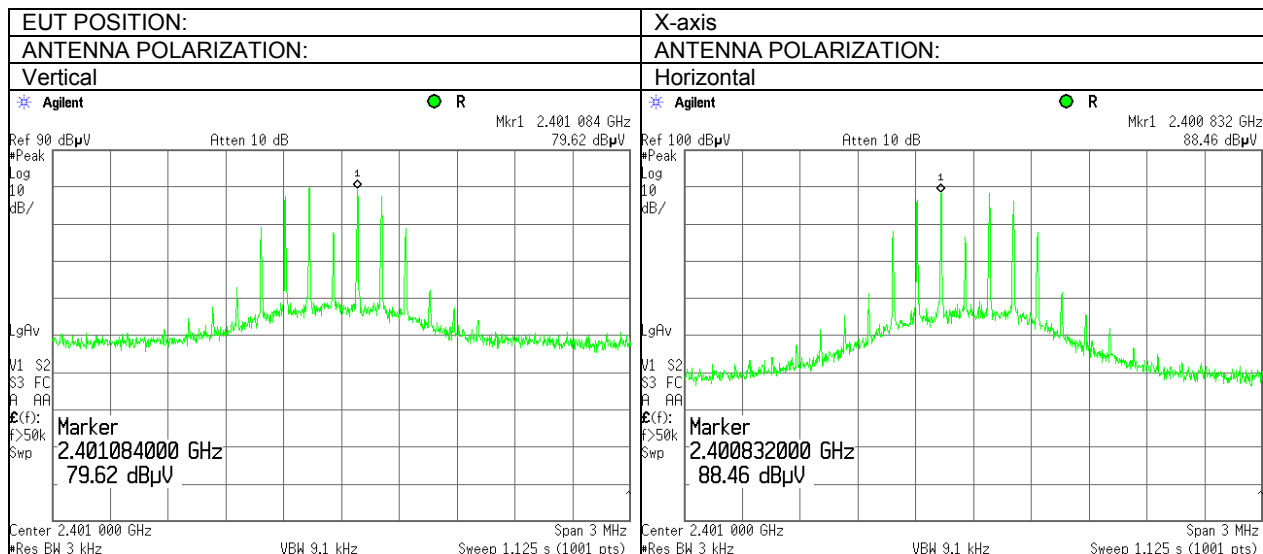
**Reference numbers of test equipment used**

|         |         |         |         |         |         |  |  |
|---------|---------|---------|---------|---------|---------|--|--|
| HL 0661 | HL 1984 | HL 2432 | HL 2870 | HL 3818 | HL 3901 |  |  |
|---------|---------|---------|---------|---------|---------|--|--|

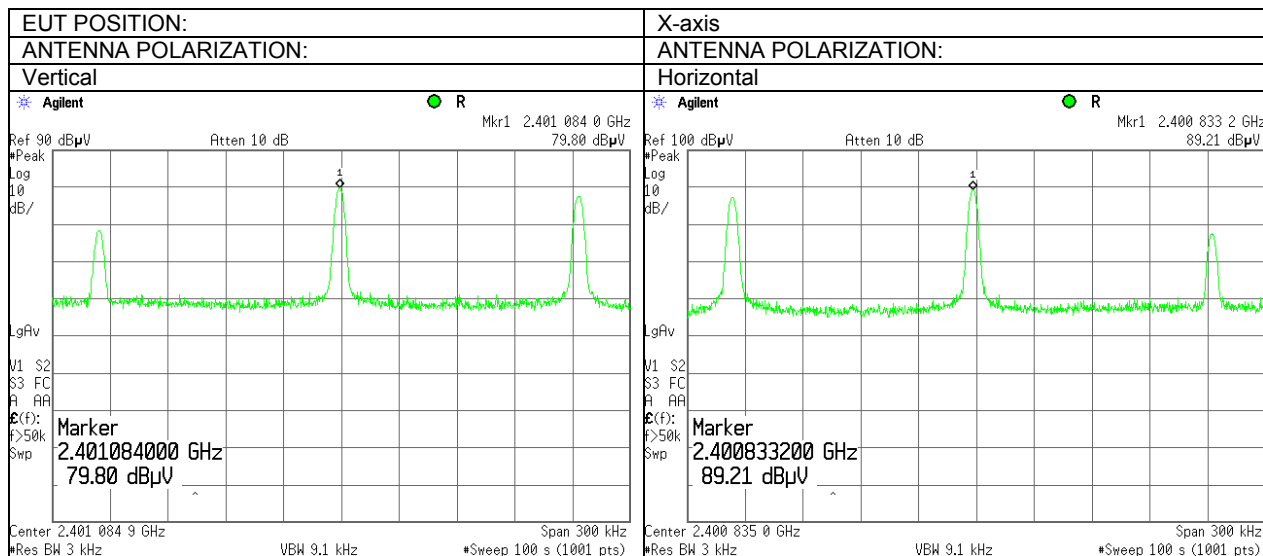
Full description is given in Appendix A.

|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | FCC section 15.247(e), RSS-210 A8.2(b), Peak power density |                         |                       |
| Test procedure:      | FR Vol. 62, page 26243, Section 15.247(d)                  |                         |                       |
| Test mode:           | Compliance   | Verdict: PASS           |                       |
| Date:                | 11/2/2010  |                         |                       |
| Temperature: 23.2 °C | Air Pressure: 1015 hPa                                     | Relative Humidity: 45 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

Plot 7.4.1 Peak spectral power density at low frequency 2401 MHz within 6 dB band

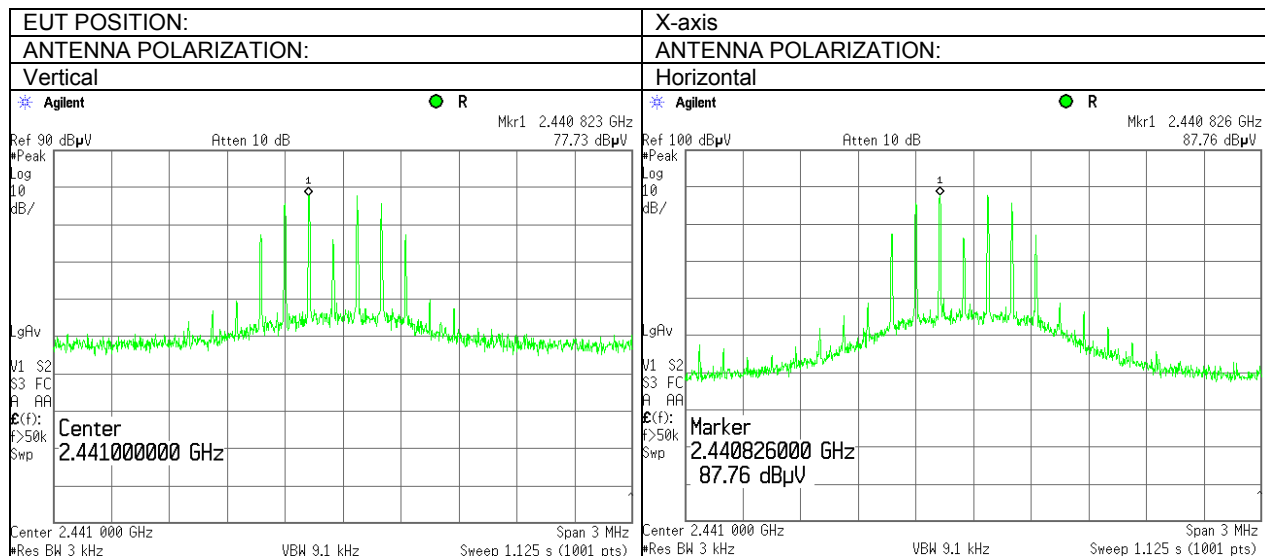


Plot 7.4.2 Peak spectral power density at low frequency 2401 MHz zoomed at the peak

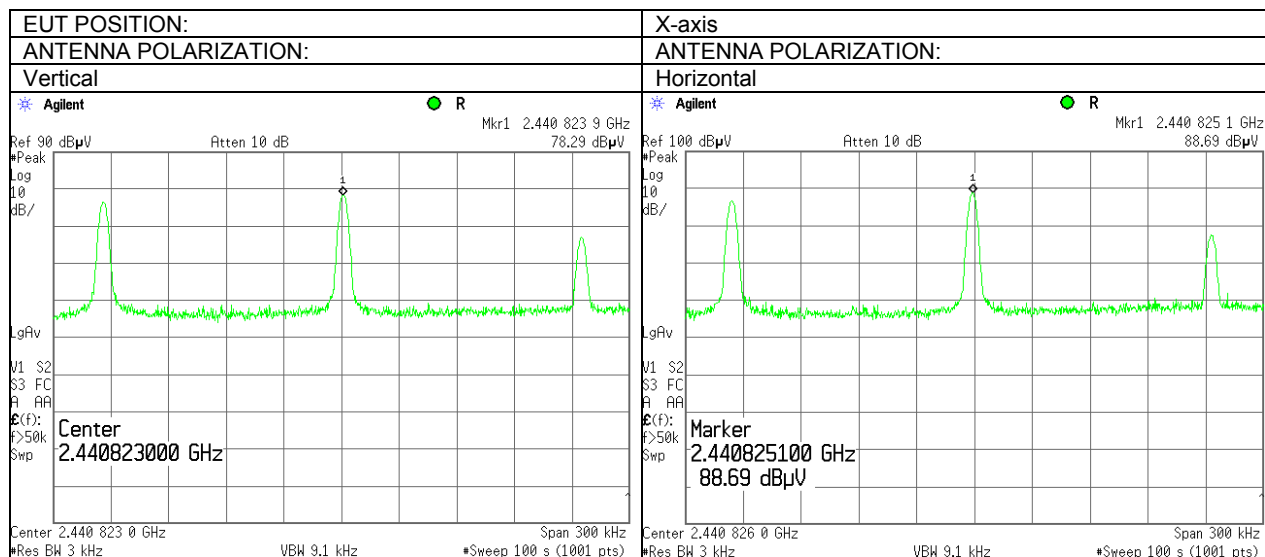


|                      |                        |  |                       |
|----------------------|------------------------|--|-----------------------|
| Test specification:  |                        | FCC section 15.247(e), RSS-210 A8.2(b), Peak power density |                       |
| Test procedure:      |                        | FR Vol. 62, page 26243, Section 15.247(d)                  |                       |
| Test mode:           | Compliance             | Verdict: PASS  |                       |
| Date:                | 11/2/2010              |  |                       |
| Temperature: 23.2 °C | Air Pressure: 1015 hPa | Relative Humidity: 45 %                                    | Power Supply: Battery |
| Remarks:             |                        |  |                       |

Plot 7.4.3 Peak spectral power density at mid frequency 2441 MHz within 6 dB band

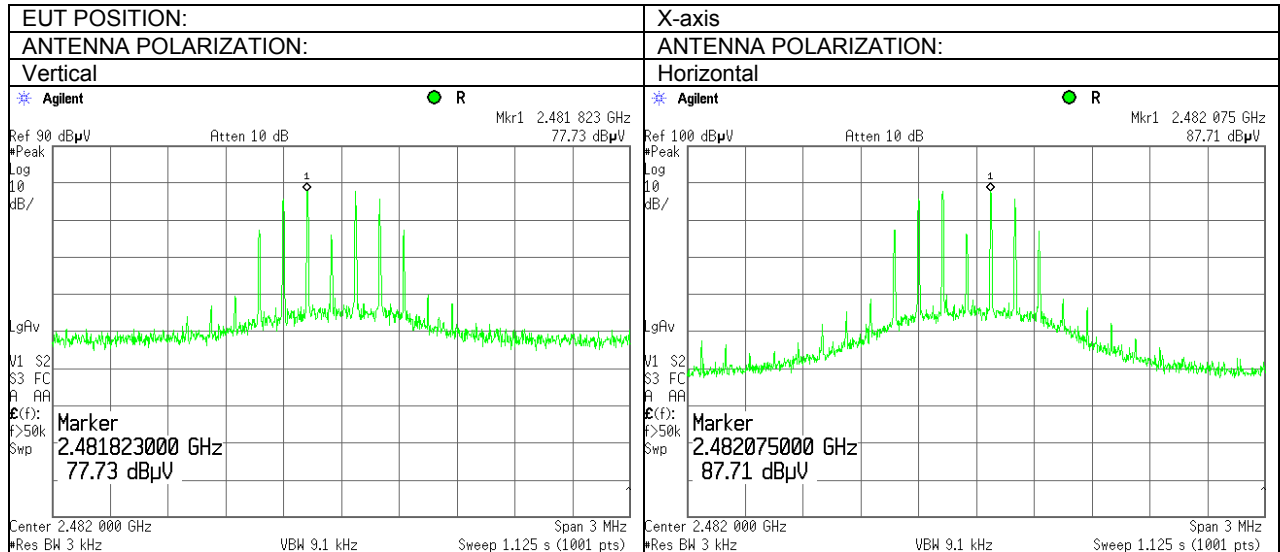


Plot 7.4.4 Peak spectral power density at mid frequency 2441 MHz zoomed at the peak

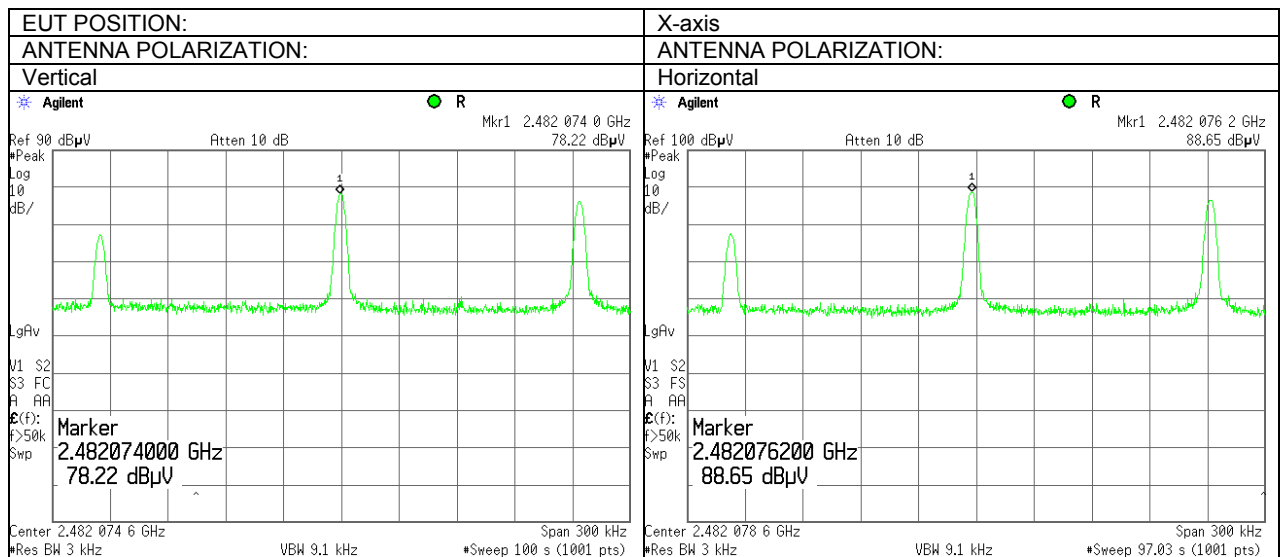


|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>FCC section 15.247(e), RSS-210 A8.2(b), Peak power density</b> |                              |
| <b>Test procedure:</b>      |                               | FR Vol. 62, page 26243, Section 15.247(d)                         |                              |
| <b>Test mode:</b>           | Compliance                    | <b>Verdict:</b> PASS  |                              |
| <b>Date:</b>                | 11/2/2010                     |   |                              |
| <b>Temperature:</b> 23.2 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 45 %                                    | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

Plot 7.4.5 Peak spectral power density at high frequency 2482 MHz within 6 dB band



Plot 7.4.6 Peak spectral power density at high frequency 2482 MHz zoomed at the peak



|                     |  |                        |                       |
|---------------------|--|------------------------|-----------------------|
| Test specification: | FCC section 15.207(a), RSS-Gen section 7.2.2, Conducted emission |                        |                       |
| Test procedure:     | ANSI C63.4, Section 13.1.3                                       |                        |                       |
| Test mode:          | Compliance   | Verdict: PASS          |                       |
| Date:               | 10/31/2010   |                        |                       |
| Temperature: 24.4°C | Air Pressure: 1016 hPa   | Relative Humidity: 47% | Power Supply: 120 VAC |
| Remarks:            |  |                        |                       |

## 7.5 Conducted emissions

### 7.5.1 General

This test was performed to measure common mode conducted emissions at the power port. Specification test limits are given in Table 7.5.1.

Table 7.5.1 Limits for conducted emissions

| Frequency, MHz | Class B limit, dB( $\mu$ V) |          |
|----------------|-----------------------------|----------|
|                | QP                          | AVRG     |
| 0.15 - 0.5     | 66 - 56*                    | 56 - 46* |
| 0.5 - 5.0      | 56                          | 46       |
| 5.0 - 30       | 60                          | 50       |

\* - The limit decreases linearly with the logarithm of frequency.

### 7.5.2 Test procedure

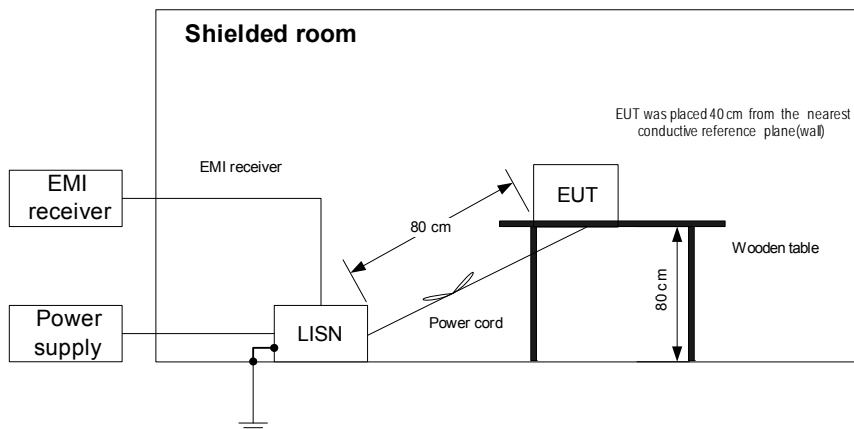
**7.5.2.1** The EUT was set up as shown in Figure 7.5.1, energized and the performance check was conducted.

**7.5.2.2** The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer while unused coaxial connector of the LISN was terminated with 50 Ohm.

**7.5.2.3** The position of the device cables was varied to determine maximum emission level.

**7.5.2.4** The worst test results (the lowest margins) were recorded in Table 7.5.2 and shown in the associated plots.

Figure 7.5.1 Setup for conducted emission measurements, table-top equipment



|                            |                               |   |                              |
|----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b> |                               | <b>FCC section 15.207(a), RSS-Gen section 7.2.2, Conducted emission</b> |                              |
| <b>Test procedure:</b>     |                               | ANSI C63.4, Section 13.1.3  |                              |
| <b>Test mode:</b>          |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>               |                               | 10/31/2010  |                              |
| <b>Temperature:</b> 24.4°C | <b>Air Pressure:</b> 1016 hPa | <b>Relative Humidity:</b> 47%   | <b>Power Supply:</b> 120 VAC |
| <b>Remarks:</b>            |                               |   |                              |

Table 7.5.2 Conducted RF emission test results

LINE: AC power  
 EUT OPERATING MODE: Transmit  
 EUT SET UP: TABLE-TOP  
 TEST SITE: SHIELDED ROOM  
 DETECTORS USED: PEAK / QUASI-PEAK / AVERAGE  
 FREQUENCY RANGE: 150 kHz - 30 MHz  
 RESOLUTION BANDWIDTH: 9 kHz

| Frequency, MHz | Peak emission, dB(μV) | Quasi-peak                |               |             | Average                   |               |             | Line ID | Verdict |
|----------------|-----------------------|---------------------------|---------------|-------------|---------------------------|---------------|-------------|---------|---------|
|                |                       | Measured emission, dB(μV) | Limit, dB(μV) | Margin, dB* | Measured emission, dB(μV) | Limit, dB(μV) | Margin, dB* |         |         |
| 0.176463       | 49.23                 | 48.22                     | 64.71         | -16.49      | 32.54                     | 54.71         | -22.17      | L1      | Pass    |
| 0.264213       | 41.18                 | 39.84                     | 61.36         | -21.52      | 24.31                     | 51.36         | -27.05      |         |         |
| 0.352225       | 39.11                 | 37.75                     | 58.97         | -21.22      | 23.50                     | 48.97         | -25.47      |         |         |
| 0.442538       | 37.16                 | 35.97                     | 57.07         | -21.10      | 23.93                     | 47.07         | -23.14      |         |         |
| 0.706038       | 35.59                 | 33.96                     | 56.00         | -22.04      | 25.20                     | 46.00         | -20.80      |         |         |
| 1.149800       | 34.65                 | 32.55                     | 56.00         | -23.45      | 21.77                     | 46.00         | -24.23      | L2      | Pass    |
| 0.176463       | 46.61                 | 45.76                     | 64.71         | -18.95      | 32.23                     | 54.71         | -22.48      |         |         |
| 0.263600       | 39.49                 | 38.27                     | 61.38         | -23.11      | 23.48                     | 51.38         | -27.90      |         |         |
| 0.441200       | 36.46                 | 35.25                     | 57.10         | -21.85      | 22.90                     | 47.10         | -24.20      |         |         |
| 0.529400       | 35.12                 | 33.37                     | 56.00         | -22.63      | 23.31                     | 46.00         | -22.69      |         |         |

\*- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

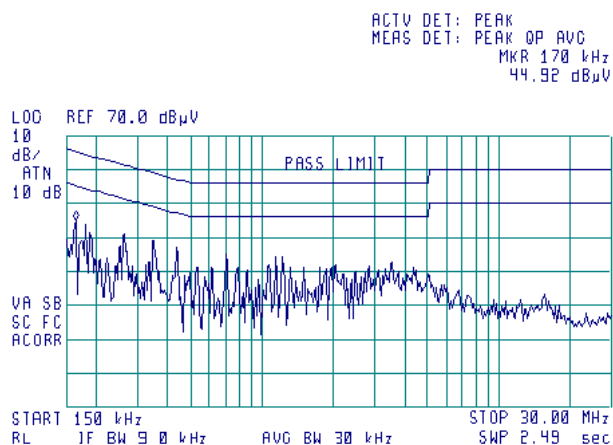
|         |        |         |         |         |  |  |  |
|---------|--------|---------|---------|---------|--|--|--|
| HL 0887 | HL1425 | HL 1513 | HL 2888 | HL 3612 |  |  |  |
|---------|--------|---------|---------|---------|--|--|--|

Full description is given in Appendix A.

|                     |  |                        |                       |
|---------------------|--|------------------------|-----------------------|
| Test specification: | FCC section 15.207(a), RSS-Gen section 7.2.2, Conducted emission |                        |                       |
| Test procedure:     | ANSI C63.4, Section 13.1.3                                       |                        |                       |
| Test mode:          | Compliance   | Verdict: PASS          |                       |
| Date:               | 10/31/2010   |                        |                       |
| Temperature: 24.4°C | Air Pressure: 1016 hPa   | Relative Humidity: 47% | Power Supply: 120 VAC |
| Remarks:            |  |                        |                       |

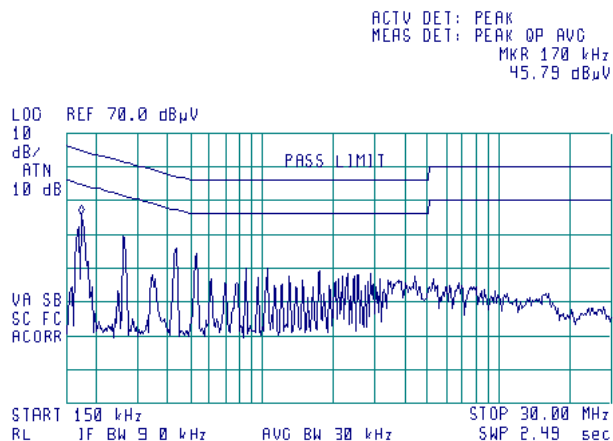
#### Plot 7.5.1 Conducted RF emission measurements

LINE: L1  
EUT OPERATING MODE: Transmit  
LIMIT: QUASI-PEAK, AVERAGE  
DETECTOR: PEAK



#### Plot 7.5.2 Conducted RF emission measurements

LINE: L2  
EUT OPERATING MODE: Transmit  
LIMIT: QUASI-PEAK, AVERAGE  
DETECTOR: PEAK





|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>RSS-Gen section 7.2.3.2, Radiated emission</b> |                              |
| <b>Test procedure:</b>      |                               | ANSI C63.4, Sections 11.6 and 12.1.4              |                              |
| <b>Test mode:</b>           |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>                |                               | 10/27/2010  |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %                    | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

## 7.6 Radiated emission measurements

### 7.6.1 General

This test was performed to measure radiated emissions from the EUT enclosure. Specification test limits according to RSS-Gen, Section 6 are given in Table 7.6.1.

**Table 7.6.1 Radiated emission limits according to RSS-Gen, Section 6**

| Frequency, MHz                   | Field strength limit at 3 m test distance, dB(μV/m) |
|----------------------------------|---|
| 30 - 88                          | 40.0  |
| 88 - 216                         | 43.5  |
| 216 - 960                        | 46.0  |
| 960 - 3 <sup>rd</sup> harmonic** | 54.0  |

\*\* - harmonic of the highest frequency the EUT generates, uses, operates or tunes to.

### 7.6.2 Test procedure for measurements in semi-anechoic chamber

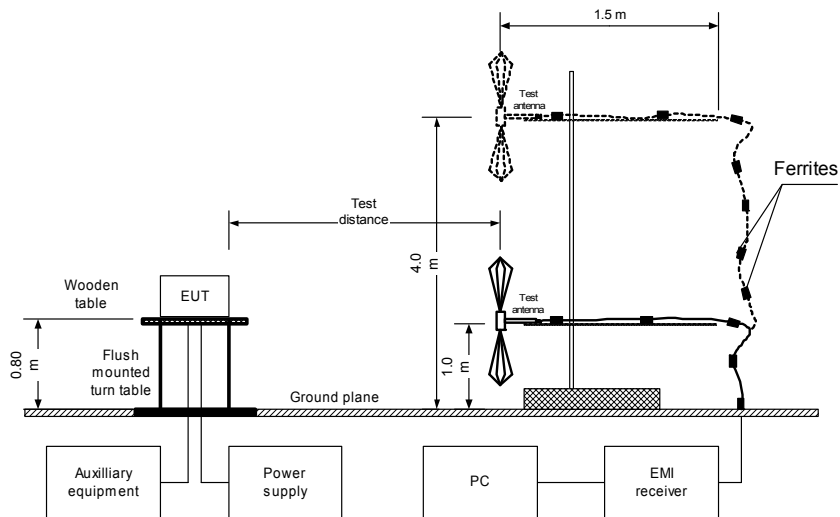
**7.6.2.1** The EUT was set up as shown in Figure 7.6.1, energized and the performance check was conducted.

**7.6.2.2** The specified frequency range was investigated with biconilog antenna connected to EMI receiver. To find maximum radiation the turntable was rotated 360°, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal and the EUT cables position was varied.

**7.6.2.3** The worst test results (the lowest margins) were provided in the associated tables and plots.

|   |                               |                                |                              |
|---|-------------------------------|--------------------------------|------------------------------|
| <b>Test specification:</b> RSS-Gen section 7.2.3.2, Radiated emission |                               |                                |                              |
| <b>Test procedure:</b> ANSI C63.4, Sections 11.6 and 12.1.4           |                               |                                |                              |
| <b>Test mode:</b> Compliance  |                               | <b>Verdict:</b> PASS           |                              |
| <b>Date:</b> 10/27/2010   |                               |                                |                              |
| <b>Temperature:</b> 23.4 °C   | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 % | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>   |                               |                                |                              |

Figure 7.6.1 Setup for radiated emission measurements at anechoic chamber, table-top equipment





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|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>RSS-Gen section 7.2.3.2, Radiated emission</b> |                              |
| <b>Test procedure:</b>      |                               | ANSI C63.4, Sections 11.6 and 12.1.4              |                              |
| <b>Test mode:</b>           | Compliance                    | <b>Verdict:</b>                                   | <b>PASS</b>                  |
| <b>Date:</b>                | 10/27/2010                    |   |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %                    | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

Table 7.6.2 Radiated emission test results according to RSS-Gen, Section 6

EUT SET UP: TABLE-TOP  
 EUT OPERATING MODE: Receive  
 TEST SITE: SEMI ANECHOIC CHAMBER  
 TEST DISTANCE: 3 m  
 FREQUENCY RANGE: 30 MHz – 1000 MHz  
 RESOLUTION BANDWIDTH: 120 kHz

| Frequency,<br>MHz       | Peak<br>emission,<br>dB(μV/m) | Quasi-peak                        |                    |                | Antenna<br>polarization | Antenna<br>height,<br>m | Turn-table<br>position**,<br>degrees | Verdict |
|-------------------------|-------------------------------|-----------------------------------|--------------------|----------------|-------------------------|-------------------------|--------------------------------------|---------|
|                         |                               | Measured<br>emission,<br>dB(μV/m) | Limit,<br>dB(μV/m) | Margin,<br>dB* |                         |                         |                                      |         |
| No emissions were found |                               |                                   |                    |                |                         |                         |                                      | Pass    |

TEST SITE: SEMI ANECHOIC CHAMBER  
 TEST DISTANCE: 3 m  
 FREQUENCY RANGE: 1000 MHz – 12500 MHz  
 RESOLUTION BANDWIDTH: 1000 kHz

| Frequency,<br><br>MHz   | Peak                              |                    |                | Average                           |                    |                | Antenna<br>polariz | Antenna<br>height,<br>m | Turn-table<br>position**,<br>degrees | Verdict |
|-------------------------|-----------------------------------|--------------------|----------------|-----------------------------------|--------------------|----------------|--------------------|-------------------------|--------------------------------------|---------|
|                         | Measured<br>emission,<br>dB(μV/m) | Limit,<br>dB(μV/m) | Margin,<br>dB* | Measured<br>emission,<br>dB(μV/m) | Limit,<br>dB(μV/m) | Margin,<br>dB* |                    |                         |                                      |         |
| No emissions were found |                                   |                    |                |                                   |                    |                |                    |                         |                                      | Pass    |

Note: EUT was in X-axis orthogonal position.

\*- Margin = Measured emission - specification limit.

\*\*- EUT front panel refer to 0 degrees position of turntable.

## Reference numbers of test equipment used

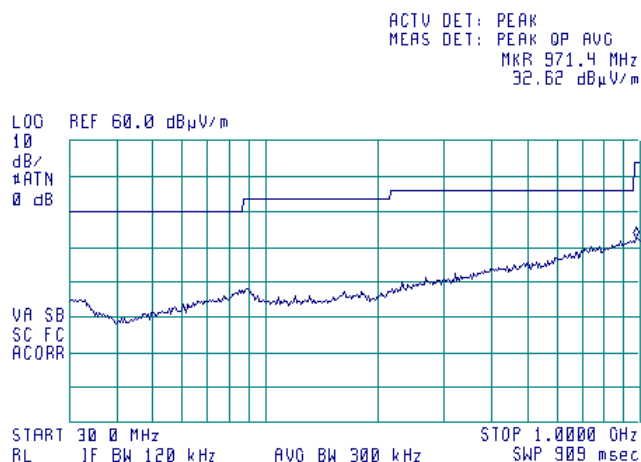
|         |         |         |         |         |         |         |  |
|---------|---------|---------|---------|---------|---------|---------|--|
| HL 0521 | HL 0604 | HL 1984 | HL 2871 | HL 3532 | HL 3616 | HL 3818 |  |
|---------|---------|---------|---------|---------|---------|---------|--|

Full description is given in Appendix A.

|                      |  |                         |                       |
|----------------------|--|-------------------------|-----------------------|
| Test specification:  | RSS-Gen section 7.2.3.2, Radiated emission |                         |                       |
| Test procedure:      | ANSI C63.4, Sections 11.6 and 12.1.4       |                         |                       |
| Test mode:           | Compliance                                 | Verdict: PASS           |                       |
| Date:                | 10/27/2010                                 |                         |                       |
| Temperature: 23.4 °C | Air Pressure: 1015 hPa                     | Relative Humidity: 44 % | Power Supply: Battery |
| Remarks:             |  |                         |                       |

Plot 7.6.1 Radiated emission measurements in 30 - 1000 MHz range, vertical and horizontal antenna polarization

TEST SITE: Semi anechoic chamber  
LIMIT: Class B  
TEST DISTANCE: 3 m  
EUT OPERATING MODE: Receive / Stand-by

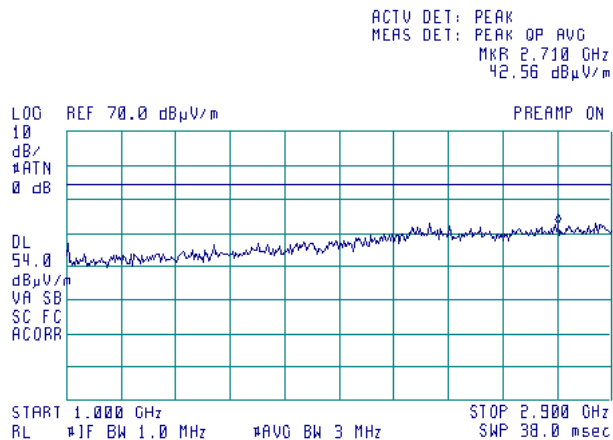


Plot 7.6.2 Radiated emission measurements in 1000 – 2900 MHz range, vertical and horizontal antenna polarization

TEST SITE: Semi anechoic chamber  
LIMIT: Class B  
TEST DISTANCE: 3 m  
EUT OPERATING MODE: Receive / Stand-by



15:05:00 NOV 19, 2009

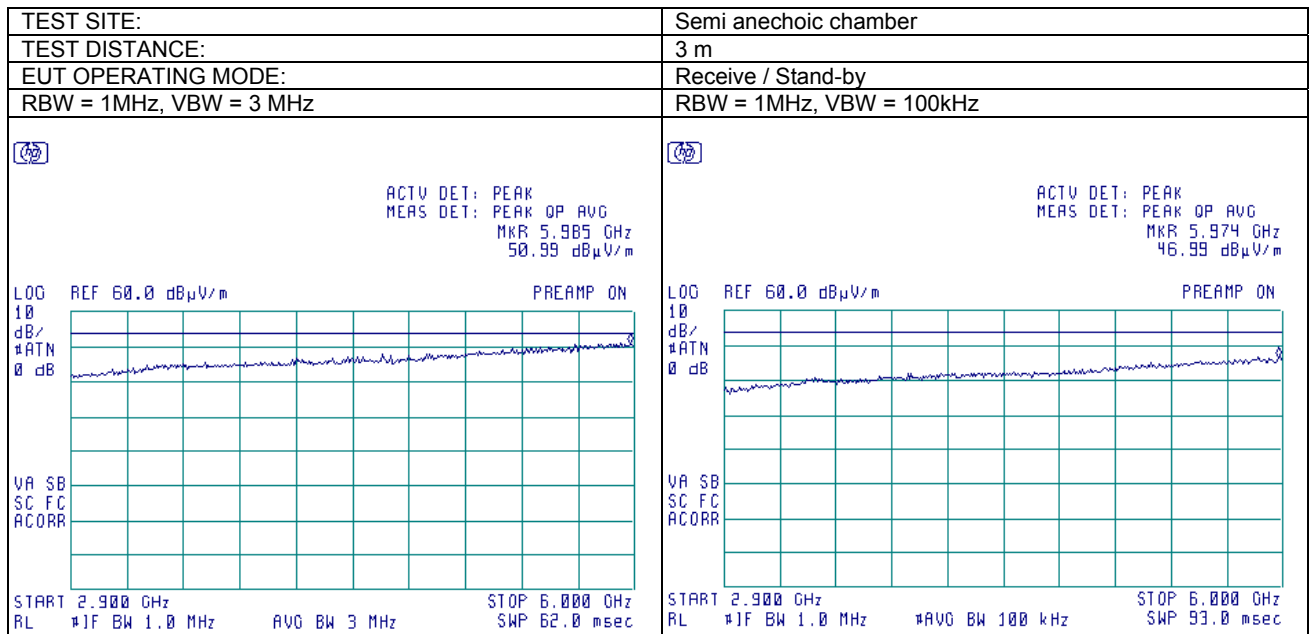




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|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>RSS-Gen section 7.2.3.2, Radiated emission</b> |                              |
| <b>Test procedure:</b>      |                               | ANSI C63.4, Sections 11.6 and 12.1.4              |                              |
| <b>Test mode:</b>           |                               | Compliance  | <b>Verdict:</b> PASS         |
| <b>Date:</b>                |                               | 10/27/2010  |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %                    | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

Plot 7.6.3 Radiated emission measurements in 2900 – 6000 MHz range, vertical and horizontal antenna polarization

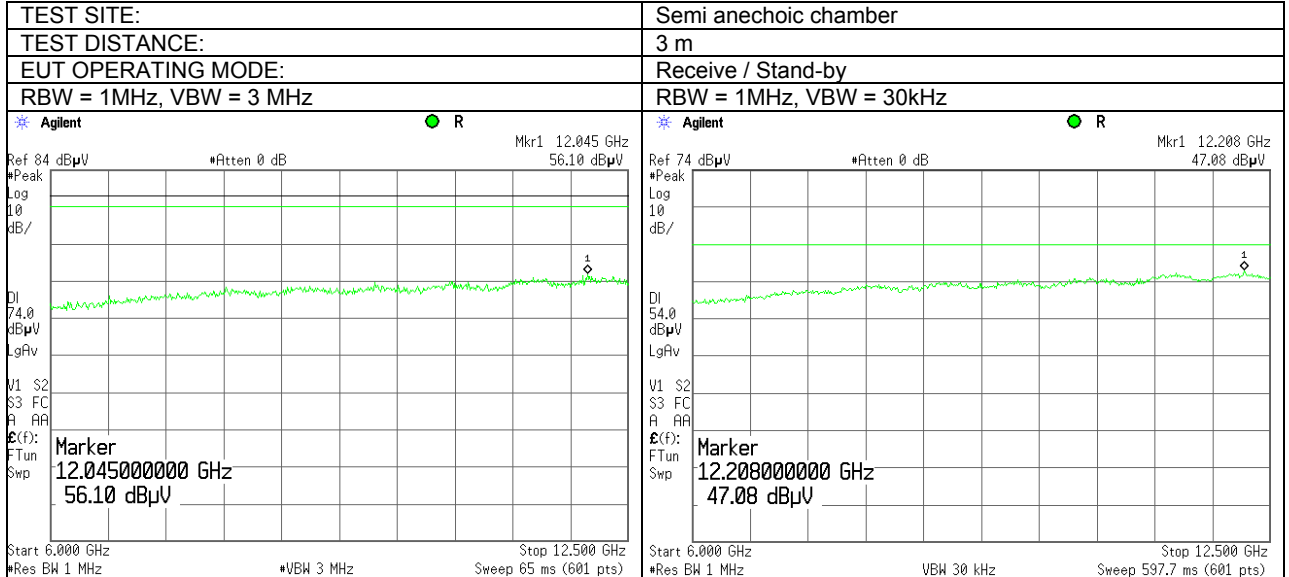




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|                             |                               |   |                              |
|-----------------------------|-------------------------------|---|------------------------------|
| <b>Test specification:</b>  |                               | <b>RSS-Gen section 7.2.3.2, Radiated emission</b> |                              |
| <b>Test procedure:</b>      |                               | ANSI C63.4, Sections 11.6 and 12.1.4              |                              |
| <b>Test mode:</b>           | Compliance                    | <b>Verdict:</b> PASS                              |                              |
| <b>Date:</b>                | 10/27/2010                    |   |                              |
| <b>Temperature:</b> 23.4 °C | <b>Air Pressure:</b> 1015 hPa | <b>Relative Humidity:</b> 44 %                    | <b>Power Supply:</b> Battery |
| <b>Remarks:</b>             |                               |   |                              |

Plot 7.6.4 Radiated emission measurements in 6000 – 12500 MHz range, vertical and horizontal antenna polarization



## 8 APPENDIX A Test equipment and ancillaries used for tests

| HL No | Description   | Manufacturer          | Model               | Ser. No.                          | Last Cal./Check | Due Cal./Check |
|-------|---|-----------------------|---------------------|-----------------------------------|-----------------|----------------|
| 0337  | Probe Set, Hand held, 5 probes  | Electro-Metrics       | EHFP-30             | 238                               | 08-Jun-10       | 08-Jun-11      |
| 0446  | Antenna, Loop, Active, 10 kHz - 30 MHz  | EMCO                  | 6502                | 2857                              | 29-Jun-10       | 29-Jun-11      |
| 0521  | EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz         | Hewlett Packard       | 8546A               | 3617A<br>00319,<br>3448A002<br>53 | 25-Aug-10       | 25-Aug-11      |
| 0604  | Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz                       | EMCO                  | 3141                | 9611-1011                         | 11-Jan-10       | 11-Jan-11      |
| 0661  | Generator Swept Signal, 10 MHz to 40 GHz, + 10 dBm                            | HP                    | 83640B              | 3614A002<br>66                    | 17-Dec-09       | 17-Dec-10      |
| 0887  | Attenuator Coaxial, 30 dB, 100 W, 50 Ohm                                      | Bird Electronic Corp. | 8323                | 1639                              | 03-Feb-10       | 03-Feb-11      |
| 1425  | EMI Receiver, 9 kHz - 2.9 GHz, System: HL1426, HL1427                         | Agilent Technologies  | 8542E               | 3710A002<br>22,<br>3705A002<br>04 | 24-Aug-10       | 24-Aug-11      |
| 1513  | Cable RF, 8 m, BNC/BNC  | Belden                | M17/167<br>MIL-C-17 | 1513                              | 01-Sep-10       | 01-Sep-11      |
| 1984  | Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W                        | EMC Test Systems      | 3115                | 9911-5964                         | 11-Jun-10       | 11-Jun-11      |
| 2432  | Antenna, Double-Ridged Waveguide Horn 1-18 GHz                                | EMC Test Systems      | 3115                | 00027177                          | 11-Jun-10       | 11-Jun-11      |
| 2870  | Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA                            | Huber-Suhner          | 198-9155-00         | 2870                              | 04-Aug-10       | 04-Aug-11      |
| 2871  | Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA                            | Huber-Suhner          | 198-8155-00         | 2871                              | 14-Sep-10       | 14-Sep-11      |
| 2888  | LISN Two-line V-Network 50 Ohm / 50 uH + 5 Ohm, 16A, MIL STD 461E, CISPR 16-1 | Rolf Heine            | NNB-2/16Z           | 02/10018                          | 07-Jul-10       | 07-Jul-11      |
| 2909  | Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz                                  | Agilent Technologies  | E4407B              | MY414447<br>62                    | 07-May-10       | 07-May-11      |
| 3532  | Amplifier, low noise, 2 to 8 GHz  | Quinstar Technology   | QLJ-02084040<br>-J0 | 111590020<br>01                   | 01-Jan-10       | 01-Jan-11      |
| 3533  | Amplifier, low noise, 6 to 18 GHz   | Quinstar Technology   | QLJ-06184040<br>-J0 | 111590010<br>01                   | 01-Jan-10       | 01-Jan-11      |
| 3612  | Cable RF, 17.5 m, N type-N type   | Teldor                | RG-214/U            | NA                                | 01-Dec-10       | 01-Dec-11      |
| 3616  | Cable RF, 6.5 m, N type-N type, DC-6.5 GHz                                    | Suhner Switzerland    | Rg 214/U            | NA                                | 27-May-10       | 27-May-11      |
| 3818  | PSA Series Spectrum Analyzer, 3 Hz-44 GHz                                     | Agilent Technologies  | E4446A              | MY482502<br>88                    | 26-Sep-10       | 26-Sep-11      |
| 3883  | Preamplifier, 0.1 to 18 GHz, Gain 25 dB, N-type (f) in, N-type (m) out.       | Agilent Technologies  | 87405C              | MY470104<br>06                    | 13-Jan-10       | 13-Jan-11      |
| 3901  | Microwave Cable Assembly, 40.0 GHz, 3.5 m, SMA/SMA                            | Huber-Suhner          | SUCOFLE<br>X 102A   | 1225/2A                           | 07-Feb-10       | 07-Feb-11      |

## 9 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

| Test description   | Expanded uncertainty   |
|--|--|
| Conducted carrier power at RF antenna connector  | Below 12.4 GHz: $\pm 1.7$ dB<br>12.4 GHz to 40 GHz: $\pm 2.3$ dB   |
| Conducted emissions at RF antenna connector  | 9 kHz to 2.9 GHz: $\pm 2.6$ dB<br>2.9 GHz to 6.46 GHz: $\pm 3.5$ dB<br>6.46 GHz to 13.2 GHz: $\pm 4.3$ dB<br>13.2 GHz to 22.0 GHz: $\pm 5.0$ dB<br>22.0 GHz to 26.8 GHz: $\pm 5.5$ dB<br>26.8 GHz to 40.0 GHz: $\pm 4.8$ dB  |
| Occupied bandwidth   | $\pm 8.0$ %  |
| Duty cycle, timing (Tx ON / OFF) and average factor measurements                                     | $\pm 1.0$ %  |
| Conducted emissions with LISN  | 9 kHz to 150 kHz: $\pm 3.9$ dB<br>150 kHz to 30 MHz: $\pm 3.8$ dB  |
| Radiated emissions at 3 m measuring distance<br>Horizontal polarization<br><br>Vertical polarization | Biconilog antenna: $\pm 5.3$ dB<br>Biconical antenna: $\pm 5.0$ dB<br>Log periodic antenna: $\pm 5.3$ dB<br>Double ridged horn antenna: $\pm 5.3$ dB<br>Biconilog antenna: $\pm 6.0$ dB<br>Biconical antenna: $\pm 5.7$ dB<br>Log periodic antenna: $\pm 6.0$ dB<br>Double ridged horn antenna: $\pm 6.0$ dB |

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Hermon Laboratories calibrates its reference and transfer standards by calibration laboratories accredited to ISO/IEC 17025 by a mutually recognized Accreditation Body or by a recognized national metrology institute. All reference and transfer standards used in the calibration system are traceable to national or international standards.

In-house calibration of all test and measurement equipment is performed on a regular basis according to Hermon Laboratories calibration procedures, manufacturer calibration/verification procedures or procedures defined in the relevant standards. The Hermon Laboratories test and measurement equipment is calibrated within the tolerances specified by the manufacturers and/or by the relevant standards.



## 10 APPENDIX C Test laboratory description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, safety, environmental and telecommunication testing facility. Hermon Laboratories is listed by the Federal Communications Commission (USA) for all parts of Code of Federal Regulations 47 (CFR 47) and by Industry Canada for electromagnetic emissions (file numbers IC 2186-1 for OATS and IC 2186-2 for anechoic chamber), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, C-845 for conducted emissions site), assessed by TNO Certification EP&S (Netherlands) for a number of EMC, telecommunications, environmental, safety standards, and by AMTAC (UK) for safety of medical devices. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing and environmental simulation (for exact scope please refer to Certificate No. 839.01) and approved by Israel Ministry of environmental protection, radiation hazards department (Permit number 1158). The FCC Designation Number is US1003.

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Person for contact: Mr. Alex Usoskin, CEO.

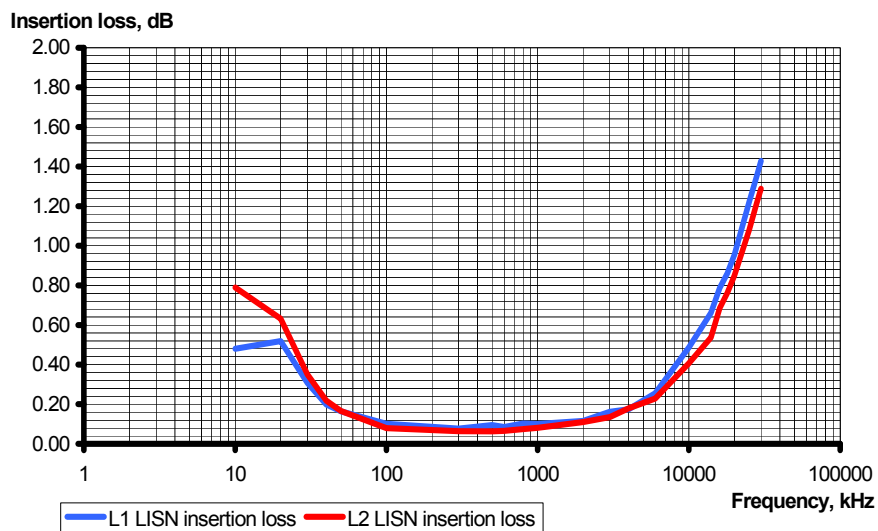
## 11 APPENDIX D Specification references

|                         |  |
|-------------------------|--|
| FCC 47CFR part 15: 2009 | Radio Frequency Devices.   |
| FR Vol.62               | Federal Register, Volume 62, May 13, 1997  |
| FCC New Guidance:2004   | FCC New Guidance on Measurements for DTS   |
| ANSI C63.2: 1996        | American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.  |
| ANSI C63.4: 2003        | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. |
| RSS-210 Issue 7: 2007   | Low Power Licence- Exempt Radiocommunication Devices   |
| RSS-Gen Issue 2: 2007   | General Requirements and Information for the Certification of Radiocommunication Equipment   |

## 12 APPENDIX E Test equipment correction factors

### Correction factor Line impedance stabilization network Model NNB-2/16Z, Rolf Heine, HL 2888

| Frequency, kHz | Insertion loss, dB |      | Measurement<br>Uncertainty, dB |
|----------------|--------------------|------|--------------------------------|
|                | L1                 | N    |                                |
| 10             | 0.48               | 0.79 | ±0.6                           |
| 20             | 0.52               | 0.63 |                                |
| 30             | 0.31               | 0.35 |                                |
| 40             | 0.20               | 0.22 |                                |
| 50             | 0.16               | 0.17 |                                |
| 100            | 0.10               | 0.08 |                                |
| 300            | 0.08               | 0.06 |                                |
| 500            | 0.10               | 0.06 |                                |
| 600            | 0.09               | 0.07 |                                |
| 800            | 0.10               | 0.07 |                                |
| 1000           | 0.10               | 0.08 |                                |
| 2000           | 0.12               | 0.11 |                                |
| 3000           | 0.16               | 0.14 |                                |
| 4000           | 0.17               | 0.18 |                                |
| 6000           | 0.26               | 0.23 |                                |
| 10000          | 0.49               | 0.41 |                                |
| 14000          | 0.66               | 0.54 |                                |
| 16000          | 0.79               | 0.69 |                                |
| 18000          | 0.86               | 0.76 |                                |
| 20000          | 0.96               | 0.85 |                                |
| 25000          | 1.22               | 1.08 |                                |
| 28000          | 1.35               | 1.21 |                                |
| 30000          | 1.43               | 1.29 |                                |



**Antenna factor**  
**Active loop antenna**  
**Model 6502, S/N 2857, HL 0446**

| Frequency,<br>MHz | Magnetic antenna factor,<br>dB | Electric antenna factor,<br>dB |
|-------------------|--------------------------------|--------------------------------|
| 0.009             | -32.8                          | 18.7                           |
| 0.010             | -33.8                          | 17.7                           |
| 0.020             | -38.3                          | 13.2                           |
| 0.050             | -41.1                          | 10.4                           |
| 0.075             | -41.3                          | 10.2                           |
| 0.100             | -41.6                          | 9.9                            |
| 0.150             | -41.7                          | 9.8                            |
| 0.250             | -41.6                          | 9.9                            |
| 0.500             | -41.8                          | 9.8                            |
| 0.750             | -41.9                          | 9.7                            |
| 1.000             | -41.4                          | 10.1                           |
| 2.000             | -41.5                          | 10.0                           |
| 3.000             | -41.4                          | 10.2                           |
| 4.000             | -41.4                          | 10.1                           |
| 5.000             | -41.5                          | 10.1                           |
| 10.000            | -41.9                          | 9.6                            |
| 15.000            | -41.9                          | 9.6                            |
| 20.000            | -42.2                          | 9.3                            |
| 25.000            | -42.8                          | 8.7                            |
| 30.000            | -44.0                          | 7.5                            |

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB( $\mu$ V) to convert it into field intensity in dB( $\mu$ V/m).

**Antenna factor**  
**Biconilog antenna EMCO Model 3141**  
**Ser.No.1011, HL 0604**

| Frequency, MHz | Antenna Factor, dB(1/m) | Frequency, MHz | Antenna Factor, dB(1/m) |
|----------------|-------------------------|----------------|-------------------------|
| 26             | 7.8                     | 940            | 24.0                    |
| 28             | 7.8                     | 960            | 24.1                    |
| 30             | 7.8                     | 980            | 24.5                    |
| 40             | 7.2                     | 1000           | 24.9                    |
| 60             | 7.1                     | 1020           | 25.0                    |
| 70             | 8.5                     | 1040           | 25.2                    |
| 80             | 9.4                     | 1060           | 25.4                    |
| 90             | 9.8                     | 1080           | 25.6                    |
| 100            | 9.7                     | 1100           | 25.7                    |
| 110            | 9.3                     | 1120           | 26.0                    |
| 120            | 8.8                     | 1140           | 26.4                    |
| 130            | 8.7                     | 1160           | 27.0                    |
| 140            | 9.2                     | 1180           | 27.0                    |
| 150            | 9.8                     | 1200           | 26.7                    |
| 160            | 10.2                    | 1220           | 26.5                    |
| 170            | 10.4                    | 1240           | 26.5                    |
| 180            | 10.4                    | 1260           | 26.5                    |
| 190            | 10.3                    | 1280           | 26.6                    |
| 200            | 10.6                    | 1300           | 27.0                    |
| 220            | 11.6                    | 1320           | 27.8                    |
| 240            | 12.4                    | 1340           | 28.3                    |
| 260            | 12.8                    | 1360           | 28.2                    |
| 280            | 13.7                    | 1380           | 27.9                    |
| 300            | 14.7                    | 1400           | 27.9                    |
| 320            | 15.2                    | 1420           | 27.9                    |
| 340            | 15.4                    | 1440           | 27.8                    |
| 360            | 16.1                    | 1460           | 27.8                    |
| 380            | 16.4                    | 1480           | 28.0                    |
| 400            | 16.6                    | 1500           | 28.5                    |
| 420            | 16.7                    | 1520           | 28.9                    |
| 440            | 17.0                    | 1540           | 29.6                    |
| 460            | 17.7                    | 1560           | 29.8                    |
| 480            | 18.1                    | 1580           | 29.6                    |
| 500            | 18.5                    | 1600           | 29.5                    |
| 520            | 19.1                    | 1620           | 29.3                    |
| 540            | 19.5                    | 1640           | 29.2                    |
| 560            | 19.8                    | 1660           | 29.4                    |
| 580            | 20.6                    | 1680           | 29.6                    |
| 600            | 21.3                    | 1700           | 29.8                    |
| 620            | 21.5                    | 1720           | 30.3                    |
| 640            | 21.2                    | 1740           | 30.8                    |
| 660            | 21.4                    | 1760           | 31.1                    |
| 680            | 21.9                    | 1780           | 31.0                    |
| 700            | 22.2                    | 1800           | 30.9                    |
| 720            | 22.2                    | 1820           | 30.7                    |
| 740            | 22.1                    | 1840           | 30.6                    |
| 760            | 22.3                    | 1860           | 30.6                    |
| 780            | 22.6                    | 1880           | 30.6                    |
| 800            | 22.7                    | 1900           | 30.6                    |
| 820            | 22.9                    | 1920           | 30.7                    |
| 840            | 23.1                    | 1940           | 30.9                    |
| 860            | 23.4                    | 1960           | 31.2                    |
| 880            | 23.8                    | 1980           | 31.6                    |
| 900            | 24.1                    | 2000           | 32.0                    |
| 920            | 24.1                    |                |                         |

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB( $\mu$ V) to convert it into field intensity in dB( $\mu$ V/m).

**Antenna factor**  
**Double-ridged wave guide horn antenna**  
**Model 3115, S/N 9911-5964, HL1984**

| Frequency,<br>MHz | Antenna factor,<br>dB(1/m) |
|-------------------|----------------------------|
| 1000.0            | 24.7                       |
| 1500.0            | 25.7                       |
| 2000.0            | 27.6                       |
| 2500.0            | 28.9                       |
| 3000.0            | 31.2                       |
| 3500.0            | 32.0                       |
| 4000.0            | 32.5                       |
| 4500.0            | 32.7                       |
| 5000.0            | 33.6                       |
| 5500.0            | 35.1                       |
| 6000.0            | 35.4                       |
| 6500.0            | 34.9                       |
| 7000.0            | 36.1                       |
| 7500.0            | 37.8                       |
| 8000.0            | 38.0                       |
| 8500.0            | 38.1                       |
| 9000.0            | 39.1                       |
| 9500.0            | 38.3                       |
| 10000.0           | 38.6                       |
| 10500.0           | 38.2                       |
| 11000.0           | 38.7                       |
| 11500.0           | 39.5                       |
| 12000.0           | 40.0                       |
| 12500.0           | 40.4                       |
| 13000.0           | 40.5                       |
| 13500.0           | 41.1                       |
| 14000.0           | 41.6                       |
| 14500.0           | 41.7                       |
| 15000.0           | 38.7                       |
| 15500.0           | 38.2                       |
| 16000.0           | 38.8                       |
| 16500.0           | 40.5                       |
| 17000.0           | 42.5                       |
| 17500.0           | 45.9                       |
| 18000.0           | 49.4                       |

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB( $\mu$ V) to convert it into field intensity in dB( $\mu$ V/m).

**Antenna factor**  
**Double-ridged guide horn antenna**  
**Model 3115, serial number: 00027177, HL 2432**

| Frequency,<br>MHz | Antenna factor.<br>dB(1/m) |
|-------------------|----------------------------|
| 1000.0            | 24.7                       |
| 1500.0            | 25.7                       |
| 2000.0            | 27.8                       |
| 2500.0            | 28.9                       |
| 3000.0            | 30.7                       |
| 3500.0            | 31.8                       |
| 4000.0            | 33.0                       |
| 4500.0            | 32.8                       |
| 5000.0            | 34.2                       |
| 5500.0            | 34.9                       |
| 6000.0            | 35.2                       |
| 6500.0            | 35.4                       |
| 7000.0            | 36.3                       |
| 7500.0            | 37.3                       |
| 8000.0            | 37.5                       |
| 8500.0            | 38.0                       |
| 9000.0            | 38.3                       |
| 9500.0            | 38.3                       |
| 10000.0           | 38.7                       |
| 10500.0           | 38.7                       |
| 11000.0           | 38.9                       |
| 11500.0           | 39.5                       |
| 12000.0           | 39.5                       |
| 12500.0           | 39.4                       |
| 13000.0           | 40.5                       |
| 13500.0           | 40.8                       |
| 14000.0           | 41.5                       |
| 14500.0           | 41.3                       |
| 15000.0           | 40.2                       |
| 15500.0           | 38.7                       |
| 16000.0           | 38.5                       |
| 16500.0           | 39.8                       |
| 17000.0           | 41.9                       |
| 17500.0           | 45.8                       |
| 18000.0           | 49.1                       |

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB( $\mu$ V) to convert it into field intensity in dB( $\mu$ V/m).

**Cable loss**  
**Cable coaxial, Huber-Suhner, 18 GHz, 6.4 m, SMA - SMA, model 198-9155-00,**  
**HL 2870**

| Frequency,<br>MHz | Cable loss,<br>dB | Frequency,<br>MHz | Cable loss,<br>dB | Frequency,<br>MHz | Cable loss,<br>dB |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 10                | 0.09              | 5750              | 2.49              | 12000             | 3.71              |
| 30                | 0.17              | 6000              | 2.53              | 12250             | 3.81              |
| 100               | 0.32              | 6250              | 2.58              | 12500             | 3.84              |
| 250               | 0.49              | 6500              | 2.64              | 12750             | 3.88              |
| 500               | 0.70              | 6750              | 2.69              | 13000             | 3.92              |
| 750               | 0.86              | 7000              | 2.75              | 13250             | 3.96              |
| 1000              | 1.00              | 7250              | 2.80              | 13500             | 3.98              |
| 1250              | 1.11              | 7500              | 2.87              | 13750             | 4.01              |
| 1500              | 1.23              | 7750              | 2.93              | 14000             | 4.03              |
| 1750              | 1.34              | 8000              | 2.94              | 14250             | 4.09              |
| 2000              | 1.41              | 8250              | 3.00              | 14500             | 4.08              |
| 2250              | 1.51              | 8500              | 3.04              | 14750             | 4.10              |
| 2500              | 1.59              | 8750              | 3.08              | 15000             | 4.15              |
| 2750              | 1.68              | 9000              | 3.14              | 15250             | 4.22              |
| 3000              | 1.76              | 9250              | 3.16              | 15500             | 4.31              |
| 3250              | 1.83              | 9500              | 3.22              | 15750             | 4.42              |
| 3500              | 1.91              | 9750              | 3.26              | 16000             | 4.48              |
| 3750              | 1.97              | 10000             | 3.36              | 16250             | 4.54              |
| 4000              | 2.05              | 10250             | 3.41              | 16500             | 4.56              |
| 4250              | 2.11              | 10500             | 3.46              | 16750             | 4.57              |
| 4500              | 2.18              | 10750             | 3.50              | 17000             | 4.59              |
| 4750              | 2.24              | 11000             | 3.54              | 17250             | 4.66              |
| 5000              | 2.30              | 11250             | 3.58              | 17500             | 4.70              |
| 5250              | 2.36              | 11500             | 3.63              | 17750             | 4.76              |
| 5500              | 2.43              | 11750             | 3.66              | 18000             | 4.72              |

**Cable loss**  
**Cable coaxial, Huber-Suhner, 18 GHz, 6.4 m, SMA - SMA, model 198-8155-00,**  
**HL 2871**

| Frequency,<br>MHz | Cable loss,<br>dB | Frequency,<br>MHz | Cable loss,<br>dB | Frequency,<br>MHz | Cable loss,<br>dB |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 10                | 0.12              | 5750              | 2.34              | 12000             | 3.55              |
| 30                | 0.14              | 6000              | 2.39              | 12250             | 3.61              |
| 100               | 0.27              | 6250              | 2.46              | 12500             | 3.67              |
| 250               | 0.45              | 6500              | 2.52              | 12750             | 3.74              |
| 500               | 0.63              | 6750              | 2.58              | 13000             | 3.79              |
| 750               | 0.76              | 7000              | 2.64              | 13250             | 3.82              |
| 1000              | 0.89              | 7250              | 2.68              | 13500             | 3.83              |
| 1250              | 1.01              | 7500              | 2.73              | 13750             | 3.83              |
| 1500              | 1.12              | 7750              | 2.78              | 14000             | 3.88              |
| 1750              | 1.23              | 8000              | 2.83              | 14250             | 3.93              |
| 2000              | 1.32              | 8250              | 2.88              | 14500             | 3.96              |
| 2250              | 1.41              | 8500              | 2.94              | 14750             | 4.01              |
| 2500              | 1.49              | 8750              | 2.97              | 15000             | 4.00              |
| 2750              | 1.58              | 9000              | 3.02              | 15250             | 4.01              |
| 3000              | 1.66              | 9250              | 3.07              | 15500             | 4.00              |
| 3250              | 1.73              | 9500              | 3.13              | 15750             | 4.13              |
| 3500              | 1.80              | 9750              | 3.18              | 16000             | 4.22              |
| 3750              | 1.87              | 10000             | 3.21              | 16250             | 4.29              |
| 4000              | 1.93              | 10250             | 3.26              | 16500             | 4.29              |
| 4250              | 2.01              | 10500             | 3.30              | 16750             | 4.32              |
| 4500              | 2.06              | 10750             | 3.36              | 17000             | 4.37              |
| 4750              | 2.12              | 11000             | 3.39              | 17250             | 4.45              |
| 5000              | 2.17              | 11250             | 3.44              | 17500             | 4.49              |
| 5250              | 2.24              | 11500             | 3.48              | 17750             | 4.53              |
| 5500              | 2.29              | 11750             | 3.52              | 18000             | 4.55              |



**Cable loss**  
**Cable coaxial, RG-214/U, N type-N type, 17 m**  
**Teldor, HL 3612**

| Frequency, GHz | Cable loss, dB |
|----------------|----------------|
| 0.1            | 0.05           |
| 0.5            | 0.07           |
| 1              | 0.10           |
| 3              | 0.22           |
| 5              | 0.29           |
| 10             | 0.39           |
| 30             | 0.68           |
| 50             | 0.90           |
| 100            | 1.27           |
| 150            | 1.58           |
| 200            | 1.80           |
| 250            | 2.12           |
| 300            | 2.36           |
| 350            | 2.60           |
| 400            | 2.82           |
| 450            | 2.99           |
| 500            | 3.23           |
| 550            | 3.40           |
| 600            | 3.56           |
| 650            | 3.71           |
| 700            | 3.90           |
| 750            | 4.04           |
| 800            | 4.23           |
| 850            | 4.39           |
| 900            | 4.55           |
| 950            | 4.65           |
| 1000           | 4.79           |

**Cable loss**  
**Cable coaxial, RG-214/U, N type-N type, 6.5 m**  
**Suhner Switzerland, HL 3616**

| Frequency,<br>MHz | Cable loss,<br>dB | Frequency,<br>MHz | Cable loss,<br>dB | Frequency,<br>MHz | Cable loss,<br>dB | Frequency,<br>MHz | Cable loss,<br>dB |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 10                | 0.13              | 1750              | 2.66              | 3550              | 4.44              | 5350              | 6.08              |
| 30                | 0.25              | 1800              | 2.72              | 3600              | 4.46              | 5400              | 6.12              |
| 50                | 0.32              | 1850              | 2.78              | 3650              | 4.59              | 5450              | 6.17              |
| 100               | 0.48              | 1900              | 2.81              | 3700              | 4.60              | 5500              | 6.25              |
| 150               | 0.60              | 1950              | 2.86              | 3750              | 4.72              | 5550              | 6.31              |
| 200               | 0.71              | 2000              | 2.94              | 3800              | 4.72              | 5600              | 6.35              |
| 250               | 0.81              | 2050              | 2.97              | 3850              | 4.86              | 5650              | 6.41              |
| 300               | 0.91              | 2100              | 3.01              | 3900              | 4.85              | 5700              | 6.50              |
| 350               | 1.00              | 2150              | 3.06              | 3950              | 4.99              | 5750              | 6.52              |
| 400               | 1.07              | 2200              | 3.11              | 4000              | 4.90              | 5800              | 6.57              |
| 450               | 1.14              | 2250              | 3.16              | 4050              | 5.04              | 5850              | 6.61              |
| 500               | 1.23              | 2300              | 3.21              | 4100              | 5.01              | 5900              | 6.71              |
| 550               | 1.30              | 2350              | 3.26              | 4150              | 5.10              | 5950              | 6.70              |
| 600               | 1.37              | 2400              | 3.31              | 4200              | 5.08              | 6000              | 6.75              |
| 650               | 1.44              | 2450              | 3.35              | 4250              | 5.18              | 6050              | 6.74              |
| 700               | 1.50              | 2500              | 3.39              | 4300              | 5.14              | 6100              | 6.84              |
| 750               | 1.58              | 2550              | 3.46              | 4350              | 5.22              | 6150              | 6.87              |
| 800               | 1.64              | 2600              | 3.48              | 4400              | 5.21              | 6200              | 6.93              |
| 850               | 1.69              | 2650              | 3.55              | 4450              | 5.29              | 6250              | 6.96              |
| 900               | 1.77              | 2700              | 3.59              | 4500              | 5.31              | 6300              | 7.02              |
| 950               | 1.79              | 2750              | 3.66              | 4550              | 5.39              | 6350              | 7.04              |
| 1000              | 1.87              | 2800              | 3.68              | 4600              | 5.41              | 6400              | 7.10              |
| 1050              | 1.92              | 2850              | 3.75              | 4650              | 5.49              | 6450              | 7.11              |
| 1100              | 1.98              | 2900              | 3.79              | 4700              | 5.52              | 6500              | 7.19              |
| 1150              | 2.05              | 2950              | 3.86              | 4750              | 5.60              |                   |                   |
| 1200              | 2.09              | 3000              | 3.89              | 4800              | 5.64              |                   |                   |
| 1250              | 2.15              | 3050              | 3.94              | 4850              | 5.73              |                   |                   |
| 1300              | 2.21              | 3100              | 3.98              | 4900              | 5.70              |                   |                   |
| 1350              | 2.27              | 3150              | 4.03              | 4950              | 5.73              |                   |                   |
| 1400              | 2.33              | 3200              | 4.06              | 5000              | 5.75              |                   |                   |
| 1450              | 2.38              | 3250              | 4.12              | 5050              | 5.83              |                   |                   |
| 1500              | 2.44              | 3300              | 4.14              | 5100              | 5.82              |                   |                   |
| 1550              | 2.48              | 3350              | 4.22              | 5150              | 5.91              |                   |                   |
| 1600              | 2.52              | 3400              | 4.24              | 5200              | 5.92              |                   |                   |
| 1650              | 2.56              | 3450              | 4.31              | 5250              | 5.98              |                   |                   |
| 1700              | 2.62              | 3500              | 4.35              | 5300              | 6.01              |                   |                   |

**Cable loss**  
**Microwave Cable Assembly, Huber-Suhner, 40 GHz, 3.5 m, SMA-SMA, S/N 1225/2A**  
**HL 3901**

| Frequency,<br>MHz | Cable loss,<br>dB | Frequency,<br>MHz | Cable loss,<br>dB | Frequency,<br>MHz | Cable loss,<br>dB |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 10                | 0.09              | 9500              | 4.29              | 21000             | 6.67              |
| 100               | 0.41              | 10000             | 4.40              | 22000             | 6.92              |
| 500               | 0.93              | 10500             | 4.52              | 23000             | 7.00              |
| 1000              | 1.33              | 11000             | 4.64              | 24000             | 7.18              |
| 1500              | 1.63              | 11500             | 4.76              | 25000             | 7.29              |
| 2000              | 1.90              | 12000             | 4.87              | 26000             | 7.55              |
| 2500              | 2.12              | 12500             | 4.99              | 27000             | 7.70              |
| 3000              | 2.33              | 13000             | 5.11              | 28000             | 7.88              |
| 3500              | 2.50              | 13500             | 5.20              | 29000             | 8.02              |
| 4000              | 2.67              | 14000             | 5.31              | 30000             | 8.15              |
| 4500              | 2.82              | 14500             | 5.42              | 31000             | 8.35              |
| 5000              | 2.99              | 15000             | 5.51              | 32000             | 8.40              |
| 5500              | 3.16              | 15500             | 5.58              | 33000             | 8.62              |
| 6000              | 3.32              | 16000             | 5.68              | 34000             | 8.73              |
| 6500              | 3.51              | 16500             | 5.78              | 35000             | 8.78              |
| 7000              | 3.65              | 17000             | 5.91              | 36000             | 8.94              |
| 7500              | 3.79              | 17500             | 5.99              | 37000             | 9.21              |
| 8000              | 3.92              | 18000             | 6.07              | 38000             | 9.37              |
| 8500              | 4.04              | 19000             | 6.36              | 39000             | 9.45              |
| 9000              | 4.18              | 20000             | 6.49              | 40000             | 9.52              |

## 13 APPENDIX F Abbreviations and acronyms

|                |   |
|----------------|---|
| A              | ampere                                      |
| AC             | alternating current                         |
| A/m            | ampere per meter                            |
| AM             | amplitude modulation                        |
| AVRG           | average (detector)                          |
| cm             | centimeter                                  |
| dB             | decibel                                     |
| dBm            | decibel referred to one milliwatt           |
| dB( $\mu$ V)   | decibel referred to one microvolt           |
| dB( $\mu$ V/m) | decibel referred to one microvolt per meter |
| dB( $\mu$ A)   | decibel referred to one microampere         |
| DC             | direct current                              |
| EMC            | electromagnetic compatibility               |
| EUT            | equipment under test                        |
| GHz            | gigahertz                                   |
| GND            | ground                                      |
| H              | height                                      |
| HL             | Hermon laboratories                         |
| Hz             | hertz                                       |
| k              | kilo  |
| kHz            | kilohertz                                   |
| kV             | kilovolt                                    |
| L              | length                                      |
| LISN           | line impedance stabilization network        |
| m              | meter                                       |
| MHz            | megahertz                                   |
| min            | minute                                      |
| mm             | millimeter                                  |
| ms             | millisecond                                 |
| $\mu$ s        | microsecond                                 |
| NA             | not applicable                              |
| OATS           | open area test site                         |
| $\Omega$       | Ohm   |
| QP             | quasi-peak                                  |
| PS             | power supply                                |
| RE             | radiated emission                           |
| RF             | radio frequency                             |
| rms            | root mean square                            |
| s              | second                                      |
| V              | volt  |
| VA             | volt-ampere                                 |
| W              | width                                       |

END OF DOCUMENT