

# TEST REPORT

ACCORDING TO: FCC part 27

FOR:

**Airspan Networks (Israel) Ltd.**

**Base station**

**Model: MicroMAX 1.4G TDD**

This report is in conformity with ISO/ IEC 17025. The "A2LA Accredited" symbol endorsement applies only to the tests and calibrations that are listed in the scope of Hermon Laboratories accreditation. The test results relate only to the items tested. This test report shall not be reproduced in any form except in full with the written approval of Hermon Laboratories Ltd.

## Table of contents

|     |                                                                |    |
|-----|----------------------------------------------------------------|----|
| 1   | Applicant information .....                                    | 3  |
| 2   | Equipment under test attributes .....                          | 3  |
| 3   | Manufacturer information .....                                 | 3  |
| 4   | Test details .....                                             | 3  |
| 5   | Tests summary .....                                            | 4  |
| 6   | EUT description .....                                          | 5  |
| 6.1 | General information .....                                      | 5  |
| 6.2 | Ports and lines .....                                          | 5  |
| 6.3 | Support and test equipment .....                               | 5  |
| 6.4 | Changes made in the EUT .....                                  | 5  |
| 6.5 | Test configuration .....                                       | 6  |
| 6.6 | Transmitter characteristics .....                              | 7  |
| 7   | Transmitter tests according to 47CFR part 27 requirements..... | 8  |
| 7.1 | Peak output power test.....                                    | 8  |
| 7.2 | Occupied bandwidth test .....                                  | 11 |
| 7.3 | Spurious emissions at RF antenna connector test .....          | 25 |
| 8   | APPENDIX A Test equipment and ancillaries used for tests.....  | 44 |
| 9   | APPENDIX B Measurement uncertainties .....                     | 45 |
| 10  | APPENDIX C Test laboratory description.....                    | 46 |
| 11  | APPENDIX D Specification references .....                      | 46 |
| 12  | APPENDIX E Test equipment correction factors.....              | 47 |
| 13  | APPENDIX F Abbreviations and acronyms .....                    | 48 |

## 1 Applicant information

**Client name:** Airspan Networks Inc.  
**Address:** 777 Yamato Rd, Suite 310, Boca Raton 33431, Florida, USA  
**Telephone:** +1 561 893 8686  
**Fax:** +1 561 893 8671  
**E-mail:** zlevi@airspan.com  
**Contact name:** Mr. Zion Levi

## 2 Equipment under test attributes

**Product name:** Base station  
**Product type:** P/N 90803041  
**Model(s):** MicroMAX 1.4G TDD  
**Serial number:** 922f7610159A  
**Hardware version:** B1  
**Software release:** 7.8.2.0  
**Receipt date:** 4/3/2011

## 3 Manufacturer information

**Manufacturer name:** Airspan Networks Inc.  
**Address:** 777 Yamato Rd, Suite 310, Boca Raton 33431, Florida, USA  
**Telephone:** +1 561 893 8686  
**Fax:** +1 561 893 8671  
**E-Mail:** zlevi@airspan.com  
**Contact name:** Mr. Zion Levi

## 4 Test details

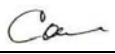
**Project ID:** 21822  
**Location:** Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel  
**Test started:** 4/3/2011  
**Test completed:** 4/5/2011  
**Test specification(s):** FCC part 27

## 5 Tests summary

| Test                                                           | Status                                            |
|----------------------------------------------------------------|---------------------------------------------------|
| <b>Transmitter characteristics</b>                             |                                                   |
| Section 27.50(e)(1), Peak output power at RF antenna connector | Pass                                              |
| Section 2.1091, 27.52, RF safety                               | NA, fixed equipment                               |
| Section 27.53(j), Spurious emissions at RF antenna connector   | Pass                                              |
| Section 27.53(j), Band edge emissions at RF antenna connector  | Pass                                              |
| Section 27.53(j), Radiated spurious emissions                  | Pass, refer to test report<br>AIRRAD_FCC.19957_MM |
| Section 27.54, Frequency stability                             | Pass, refer to test report<br>AIRRAD_FCC.19957_MM |
| Section 2.1049, Occupied bandwidth                             | Pass                                              |

This report presents the test results for additional frequency channels for Application for Class II permissive change, FCC ID:PIDMMAX15.

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>   | Mrs. E. Pittl, test engineer                 | April 5, 2011 |  |
|                     | Mr. S. Samokha, test engineer                |               |  |
| <b>Reviewed by:</b> | Mrs. M. Cherniavsky, certification engineer  | May 1, 2011   |  |
| <b>Approved by:</b> | Mr. M. Nikishin, EMC and Radio group manager | May 2, 2011   |  |

## 6 EUT description

### 6.1 General information

The EUT, base station radio, MicroMAX 1400 MHz TDD, is a part of a WiMAX broadband fixed cellular wireless access system. The system provides a radio link between an end-user (a subscriber) and a network to give high-speed data access. The MicroMAX's transceiver/receiver (up to 64 QAM modulation, data rate up to 18 Mbps) uses OFDM and operates in TDD duplexing mode, equipped with a 10 dBi internal or 18 dBi external antenna.

### 6.2 Ports and lines

| Port type | Port description | Connected from | Connected to       | Qty. | Cable type | Cable length | Indoor / outdoor |
|-----------|------------------|----------------|--------------------|------|------------|--------------|------------------|
| Power     | DC Power         | EUT            | SDA (+ DATA)       | 1    | UTP        | 10           | Outdoor          |
| Signal    | RS-232           | EUT            | Laptop             | 1    | UTP        | 0.2          | Outdoor          |
| RF        | Antenna          | EUT            | 50 Ohm Termination | 1    | Shielded   | NA           | NA               |

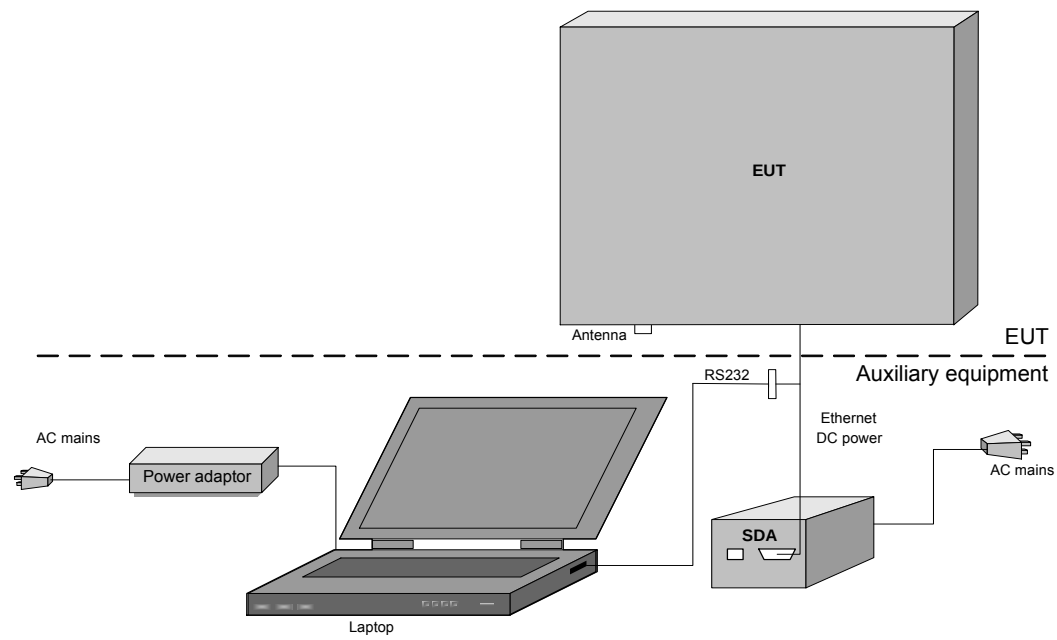
### 6.3 Support and test equipment

| Description    | Manufacturer | Model number     | Serial number       |
|----------------|--------------|------------------|---------------------|
| Laptop         | IBM          | X31              | 99-TXWYC            |
| Laptop adaptor | Lenovo       | 92P1014          | Z1ZD2N74T2LSN74T2LS |
| SDA            | Airspan      | SDA-4S/VL type 2 | 753D6A0086          |

### 6.4 Changes made in the EUT

No changes were implemented in the EUT.

## 6.5 Test configuration



## 6.6 Transmitter characteristics

|                                                         |                                                                                                          |                                                           |                                                                                                   |         |
|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------|
| <b>Type of equipment</b>                                |                                                                                                          |                                                           |                                                                                                   |         |
| <input checked="" type="checkbox"/>                     | Stand-alone (Equipment with or without its own control provisions)                                       |                                                           |                                                                                                   |         |
| <input type="checkbox"/>                                | Combined equipment (Equipment where the radio part is fully integrated within another type of equipment) |                                                           |                                                                                                   |         |
| <input type="checkbox"/>                                | Plug-in card (Equipment intended for a variety of host systems)                                          |                                                           |                                                                                                   |         |
| <b>Intended use</b>                                     |                                                                                                          | <b>Condition of use</b>                                   |                                                                                                   |         |
| <input checked="" type="checkbox"/>                     | fixed                                                                                                    | Always at a distance more than 2 m from all people        |                                                                                                   |         |
| <input type="checkbox"/>                                | mobile                                                                                                   | Always at a distance more than 20 cm from all people      |                                                                                                   |         |
| <input type="checkbox"/>                                | portable                                                                                                 | May operate at a distance closer than 20 cm to human body |                                                                                                   |         |
| <b>Assigned frequency range</b>                         |                                                                                                          | 1390 – 1395 MHz; 1432 - 1435 MHz                          |                                                                                                   |         |
| <b>Operating frequency</b>                              |                                                                                                          | 1391 - 1394 MHz; 1432.75 – 1434.25 MHz                    |                                                                                                   |         |
| <b>RF channel spacing</b>                               |                                                                                                          | 1.5 MHz, 2.5 MHz, 3.5 MHz, 5 MHz                          |                                                                                                   |         |
| <b>Maximum rated output power</b>                       |                                                                                                          | At transmitter 50 $\Omega$ RF output connector            | 27.26 dBm                                                                                         |         |
| <b>Is transmitter output power variable?</b>            |                                                                                                          | <input type="checkbox"/> No                               |                                                                                                   |         |
|                                                         |                                                                                                          | <input checked="" type="checkbox"/> Yes                   | <input type="checkbox"/> continuous variable                                                      |         |
|                                                         |                                                                                                          |                                                           | <input checked="" type="checkbox"/> stepped variable with stepsize                                | 0.5 dB  |
|                                                         |                                                                                                          |                                                           | minimum RF power                                                                                  | -30 dBm |
|                                                         |                                                                                                          | maximum RF power                                          | 27.26 dBm                                                                                         |         |
| <b>Antenna connection</b>                               |                                                                                                          |                                                           |                                                                                                   |         |
| <input type="checkbox"/> unique coupling                | <input checked="" type="checkbox"/> standard connector                                                   | <input type="checkbox"/> Integral                         | <input checked="" type="checkbox"/> with temporary RF connector<br>without temporary RF connector |         |
| <b>Antenna/s technical characteristics</b>              |                                                                                                          |                                                           |                                                                                                   |         |
| Type                                                    | Manufacturer                                                                                             | Model number                                              | Gain (maximum)                                                                                    |         |
| Internal                                                | MARS Antennas                                                                                            | MA-WC15-AS10                                              | 10 dBi                                                                                            |         |
| External                                                | Foshan Sanshui Shing Road Antenna Co., Ltd.                                                              | TDJ-SA1500-18-65                                          | 18 dBi                                                                                            |         |
| <b>Transmitter 99% power bandwidth</b>                  | <b>Transmitter aggregate data rate/s, MBps</b>                                                           | <b>Type of modulation</b>                                 |                                                                                                   |         |
| 1.5 MHz                                                 | 0.6285                                                                                                   | BPSK                                                      |                                                                                                   |         |
|                                                         | 1.2570                                                                                                   | QPSK                                                      |                                                                                                   |         |
|                                                         | 3.7695                                                                                                   | 16QAM                                                     |                                                                                                   |         |
|                                                         | 5.6550                                                                                                   | 64QAM                                                     |                                                                                                   |         |
| 2.5 MHz                                                 | 1.0475                                                                                                   | BPSK                                                      |                                                                                                   |         |
|                                                         | 2.095                                                                                                    | QPSK                                                      |                                                                                                   |         |
|                                                         | 6.2825                                                                                                   | 16QAM                                                     |                                                                                                   |         |
|                                                         | 9.425                                                                                                    | 64QAM                                                     |                                                                                                   |         |
| 3.5 MHz                                                 | 1.466                                                                                                    | BPSK                                                      |                                                                                                   |         |
|                                                         | 2.933                                                                                                    | QPSK                                                      |                                                                                                   |         |
|                                                         | 8.795                                                                                                    | 16QAM                                                     |                                                                                                   |         |
|                                                         | 13.195                                                                                                   | 64QAM                                                     |                                                                                                   |         |
| 5 MHz                                                   | 2.095                                                                                                    | BPSK                                                      |                                                                                                   |         |
|                                                         | 4.19                                                                                                     | QPSK                                                      |                                                                                                   |         |
|                                                         | 12.565                                                                                                   | 16QAM                                                     |                                                                                                   |         |
|                                                         | 18.85                                                                                                    | 64QAM                                                     |                                                                                                   |         |
| <b>Type of multiplexing</b>                             |                                                                                                          | OFDM                                                      |                                                                                                   |         |
| <b>Modulating test signal (baseband)</b>                |                                                                                                          | PRBS                                                      |                                                                                                   |         |
| <b>Maximum transmitter duty cycle in normal use</b>     |                                                                                                          | 100%                                                      |                                                                                                   |         |
| <b>Transmitter power source</b>                         |                                                                                                          |                                                           |                                                                                                   |         |
| <input checked="" type="checkbox"/>                     | DC                                                                                                       | <b>Nominal rated voltage</b>                              | Battery type                                                                                      |         |
|                                                         | AC mains                                                                                                 | <b>Nominal rated voltage</b>                              | 48 VDC via SDA                                                                                    |         |
|                                                         |                                                                                                          | <b>Nominal rated voltage</b>                              | 120 V                                                                                             |         |
|                                                         |                                                                                                          | Frequency                                                 | 60 Hz                                                                                             |         |
| <b>Common power source for transmitter and receiver</b> |                                                                                                          | <input checked="" type="checkbox"/> yes                   | <input type="checkbox"/> no                                                                       |         |

|                     |                                                      |                         |                        |
|---------------------|------------------------------------------------------|-------------------------|------------------------|
| Test specification: | Section 27.50(e)(1), Peak output power               |                         |                        |
| Test procedure:     | 47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1 |                         |                        |
| Test mode:          | Compliance                                           | Verdict: PASS           |                        |
| Date:               | 4/4/2011                                             |                         |                        |
| Temperature: 23 °C  | Air Pressure: 1011 hPa                               | Relative Humidity: 48 % | Power Supply: 120 V AC |
| Remarks:            |                                                      |                         |                        |

## 7 Transmitter tests according to 47CFR part 27 requirements

### 7.1 Peak output power test

#### 7.1.1 General

This test was performed to measure the peak output power at RF antenna connector. Specification test limits are given in Table 7.1.1.

Table 7.1.1 Peak output power limits for Fixed Base Station

| Assigned frequency range, MHz | Maximum peak output power, EIRP |      |
|-------------------------------|---------------------------------|------|
|                               | W                               | dBm  |
| 1390.0 – 1395.0               | 100                             | 50.0 |
| 1432.0 – 1435.0               | 2000                            | 63.0 |

#### 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 adjusted to produce maximum available to the end user RF output power.

**7.1.2.3** The peak output power was measured with power meter as provided in Table 7.1.2.

Figure 7.1.1 Peak output power test setup



|                            |                                                      |                                |                               |
|----------------------------|------------------------------------------------------|--------------------------------|-------------------------------|
| <b>Test specification:</b> | <b>Section 27.50(e)(1), Peak output power</b>        |                                |                               |
| <b>Test procedure:</b>     | 47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1 |                                |                               |
| <b>Test mode:</b>          | Compliance                                           | <b>Verdict:</b>                | <b>PASS</b>                   |
| <b>Date:</b>               | 4/4/2011                                             |                                |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa                        | <b>Relative Humidity:</b> 48 % | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                                                      |                                |                               |

Table 7.1.2 Peak output power test results

ASSIGNED FREQUENCY RANGE: 1390.0 – 1395.0 MHz  
DETECTOR USED: Power Meter RMS  
MODULATION: BPSK, 64QAM  
MODULATING SIGNAL: PRBS  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
ANTENNA GAIN: 18 dBi  
DUTY CYCLE: 100%

| Carrier frequency, MHz | Power meter reading, dBm | External attenuation, dB | Cable loss, dB | RF output power*, EIRP dBm | Limit, EIRP, dBm | Margin, dB | Verdict |
|------------------------|--------------------------|--------------------------|----------------|----------------------------|------------------|------------|---------|
| <b>EBW 1.5 MHz</b>     |                          |                          |                |                            |                  |            |         |
| <b>BPSK</b>            |                          |                          |                |                            |                  |            |         |
| 1391.0                 | 27.15                    | Included                 | Included       | 45.15                      | 50               | -4.85      | Pass    |
| <b>64QAM</b>           |                          |                          |                |                            |                  |            |         |
| 1391.0                 | 27.25                    | Included                 | Included       | 45.25                      | 50               | -4.75      | Pass    |
| <b>BPSK</b>            |                          |                          |                |                            |                  |            |         |
| 1394.0                 | 27.20                    | Included                 | Included       | 45.20                      | 50               | -4.80      | Pass    |
| <b>64QAM</b>           |                          |                          |                |                            |                  |            |         |
| 1394.0                 | 27.26                    | Included                 | Included       | 45.26                      | 50               | -4.74      | Pass    |
| <b>EBW 2.5 MHz</b>     |                          |                          |                |                            |                  |            |         |
| <b>BPSK</b>            |                          |                          |                |                            |                  |            |         |
| 1391.25                | 22.01                    | Included                 | Included       | 40.01                      | 50               | -9.99      | Pass    |
| <b>64QAM</b>           |                          |                          |                |                            |                  |            |         |
| 1391.25                | 22.00                    | Included                 | Included       | 40.00                      | 50               | -10.00     | Pass    |
| <b>BPSK</b>            |                          |                          |                |                            |                  |            |         |
| 1393.750               | 21.98                    | Included                 | Included       | 39.98                      | 50               | -10.02     | Pass    |
| <b>64QAM</b>           |                          |                          |                |                            |                  |            |         |
| 1393.750               | 21.96                    | Included                 | Included       | 39.96                      | 50               | -10.04     | Pass    |
| <b>EBW 3.5 MHz</b>     |                          |                          |                |                            |                  |            |         |
| <b>BPSK</b>            |                          |                          |                |                            |                  |            |         |
| 1392.5                 | 26.80                    | Included                 | Included       | 44.80                      | 50               | -4.20      | Pass    |
| <b>64QAM</b>           |                          |                          |                |                            |                  |            |         |
| 1392.5                 | 26.88                    | Included                 | Included       | 44.88                      | 50               | -4.12      | Pass    |
| <b>EBW 5 MHz</b>       |                          |                          |                |                            |                  |            |         |
| <b>BPSK</b>            |                          |                          |                |                            |                  |            |         |
| 1392.5                 | 24.60                    | Included                 | Included       | 42.60                      | 50               | -7.40      | Pass    |
| <b>64QAM</b>           |                          |                          |                |                            |                  |            |         |
| 1392.5                 | 24.64                    | Included                 | Included       | 42.64                      | 50               | -7.36      | Pass    |

\* - RF output power, EIRP (dBm) = Power meter reading, dBm + Antenna gain, dBi

|                            |                                                      |                                |                               |
|----------------------------|------------------------------------------------------|--------------------------------|-------------------------------|
| <b>Test specification:</b> | <b>Section 27.50(e)(1), Peak output power</b>        |                                |                               |
| <b>Test procedure:</b>     | 47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1 |                                |                               |
| <b>Test mode:</b>          | Compliance                                           | <b>Verdict:</b>                | <b>PASS</b>                   |
| <b>Date:</b>               | 4/4/2011                                             |                                |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa                        | <b>Relative Humidity:</b> 48 % | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                                                      |                                |                               |

Table 7.1.2 Peak output power test results (continued)

ASSIGNED FREQUENCY RANGE: 1432.0 – 1435.0 MHz  
DETECTOR USED: Power Meter RMS  
MODULATION: BPSK, 64QAM  
MODULATING SIGNAL: PRBS  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
EBW: 1.5 MHz  
ANTENNA GAIN: 18 dBi  
DUTY CYCLE: 100 %

| Carrier frequency, MHz | Power meter reading, dBm | External attenuation, dB | Cable loss, dB | RF output power*, EIRP dBm | Limit, EIRP, dBm | Margin, dB | Verdict |
|------------------------|--------------------------|--------------------------|----------------|----------------------------|------------------|------------|---------|
| <b>BPSK</b>            |                          |                          |                |                            |                  |            |         |
| 1432.75                | 24.15                    | Included                 | Included       | 42.15                      | 63.0             | -20.85     | Pass    |
| <b>64QAM</b>           |                          |                          |                |                            |                  |            |         |
| 1432.75                | 24.22                    | Included                 | Included       | 42.22                      | 63.0             | -20.78     | Pass    |
| <b>BPSK</b>            |                          |                          |                |                            |                  |            |         |
| 1434.25                | 24.10                    | Included                 | Included       | 42.10                      | 63.0             | -20.90     | Pass    |
| <b>64QAM</b>           |                          |                          |                |                            |                  |            |         |
| 1434.25                | 24.14                    | Included                 | Included       | 42.14                      | 63.0             | -20.86     | Pass    |

\* - RF output power, EIRP (dBm) = Power meter reading, dBm + Antenna gain, dBi

**Reference numbers of test equipment used**

|         |         |         |  |  |  |  |  |
|---------|---------|---------|--|--|--|--|--|
| HL 3301 | HL 3302 | HL 3442 |  |  |  |  |  |
|---------|---------|---------|--|--|--|--|--|

Full description is given in Appendix A.

|                            |                               |                                           |                               |
|----------------------------|-------------------------------|-------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 2.1049, Occupied bandwidth</b> |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Section 2.1049                    |                               |
| <b>Test mode:</b>          |                               | Compliance                                | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/5/2011                                  |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1013 hPa | <b>Relative Humidity:</b> 49 %            | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                           |                               |

## 7.2 Occupied bandwidth test

### 7.2.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.2.1.

Table 7.2.1 Occupied bandwidth limits

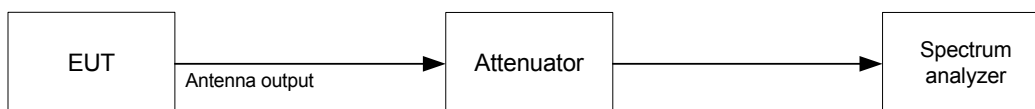
| Assigned frequency, MHz | Modulation envelope reference points*, dBc | Maximum allowed bandwidth, kHz |
|-------------------------|--------------------------------------------|--------------------------------|
| 1390.0 – 1395.0         | 26                                         | NA                             |
| 1432.0 – 1435.0         | 26                                         | NA                             |

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

### 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 set to transmit the unmodulated carrier and the reference peak power level was measured.
- 7.2.2.3 The EUT was set to transmit the normally modulated carrier.
- 7.2.2.4 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and provided in Table 7.2.2 and the associated plots.

Figure 7.2.1 Occupied bandwidth test setup



|                            |                               |                                           |                               |
|----------------------------|-------------------------------|-------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 2.1049, Occupied bandwidth</b> |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Section 2.1049                    |                               |
| <b>Test mode:</b>          | Compliance                    | <b>Verdict:</b> PASS                      |                               |
| <b>Date:</b>               | 4/5/2011                      |                                           |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1013 hPa | <b>Relative Humidity:</b> 49 %            | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                           |                               |

**Table 7.2.2 Occupied bandwidth test results**

DETECTOR USED: Peak hold  
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc  
MODULATION: BPSK

| Carrier frequency, MHz | Emission bandwidth, kHz | Occupied bandwidth, kHz | Limit, kHz | Margin, kHz | Verdict |
|------------------------|-------------------------|-------------------------|------------|-------------|---------|
| 1391.00                | 1500                    | 1440                    | NA         | NA          | NA      |
| 1394.00                |                         | 1449                    | NA         | NA          | NA      |
| 1432.75                |                         | 1419                    | NA         | NA          | NA      |
| 1434.25                |                         | 1464                    | NA         | NA          | NA      |
| 1391.25                | 2500                    | 2415                    | NA         | NA          | NA      |
| 1393.75                |                         | 2400                    | NA         | NA          | NA      |
| 1392.50                | 3500                    | 3409                    | NA         | NA          | NA      |
| 1392.50                | 5000                    | 4690                    | NA         | NA          | NA      |

DETECTOR USED: Peak hold  
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc  
MODULATION: 64 QAM

| Carrier frequency, MHz | Emission bandwidth, kHz | Occupied bandwidth, kHz | Limit, kHz | Margin, kHz | Verdict |
|------------------------|-------------------------|-------------------------|------------|-------------|---------|
| 1391.00                | 1500                    | 1443                    | NA         | NA          | NA      |
| 1394.00                |                         | 1440                    | NA         | NA          | NA      |
| 1432.75                |                         | 1431                    | NA         | NA          | NA      |
| 1434.25                |                         | 1422                    | NA         | NA          | NA      |
| 1391.25                | 2500                    | 2430                    | NA         | NA          | NA      |
| 1393.75                |                         | 2405                    | NA         | NA          | NA      |
| 1392.50                | 3500                    | 3402                    | NA         | NA          | NA      |
| 1392.50                | 5000                    | 4725                    | NA         | NA          | NA      |

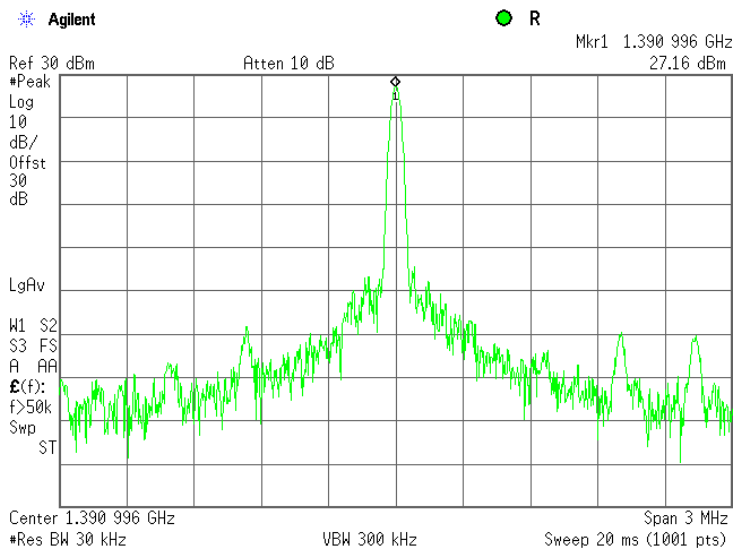
**Reference numbers of test equipment used**

|         |         |         |         |         |         |         |  |
|---------|---------|---------|---------|---------|---------|---------|--|
| HL 1906 | HL 2951 | HL 3301 | HL 3302 | HL 3763 | HL 3787 | HL 3818 |  |
|---------|---------|---------|---------|---------|---------|---------|--|

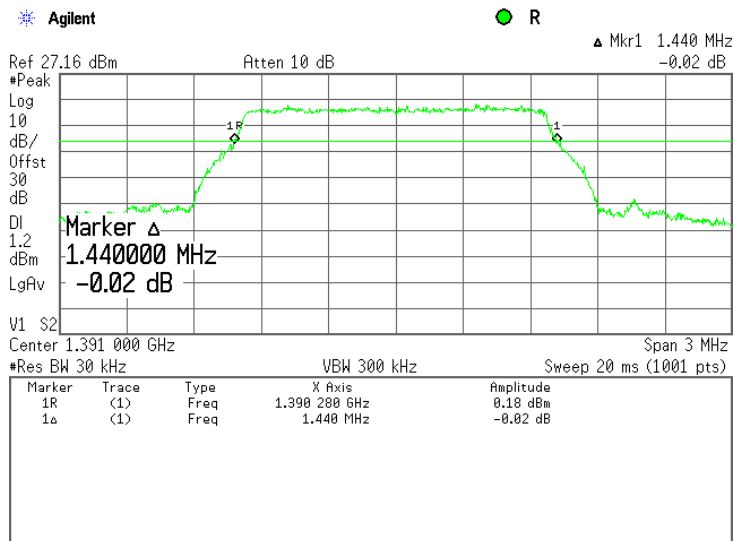
Full description is given in Appendix A.

|                            |                               |                                           |                               |
|----------------------------|-------------------------------|-------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 2.1049, Occupied bandwidth</b> |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Section 2.1049                    |                               |
| <b>Test mode:</b>          |                               | Compliance                                | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/5/2011                                  |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1013 hPa | <b>Relative Humidity:</b> 49 %            | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                           |                               |

Plot 7.2.1 Occupied bandwidth test result at 1391.0 MHz reference level, unmodulated, 1.5 MHz EBW

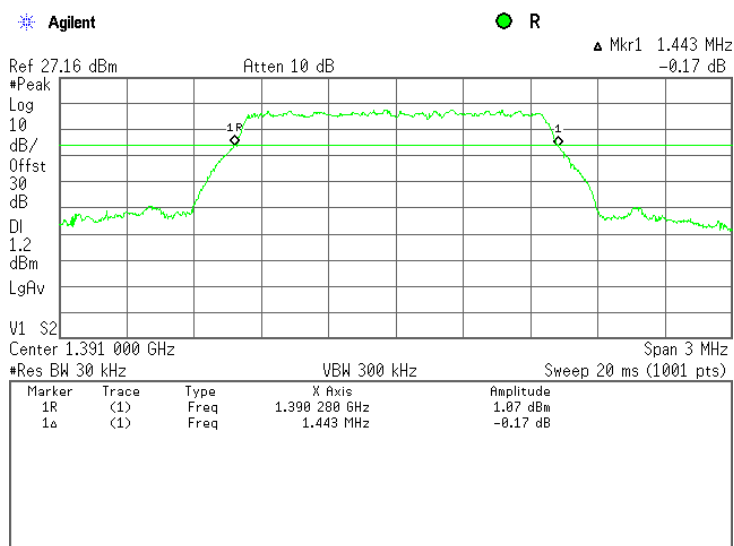


Plot 7.2.2 Occupied bandwidth test result at 1391.0 MHz, 1.5 MHz EBW, BPSK

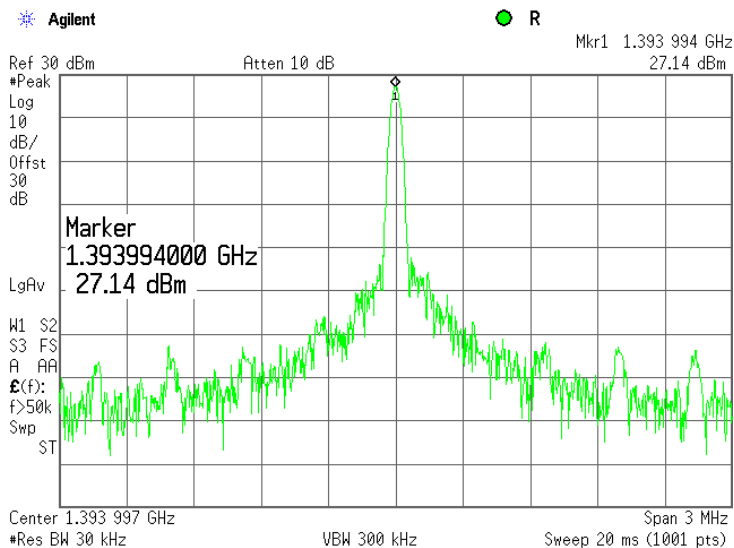


|                                                               |                               |                                |                               |
|---------------------------------------------------------------|-------------------------------|--------------------------------|-------------------------------|
| <b>Test specification:</b> Section 2.1049, Occupied bandwidth |                               |                                |                               |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                 |                               |                                |                               |
| <b>Test mode:</b> Compliance                                  |                               | <b>Verdict:</b> PASS           |                               |
| <b>Date:</b> 4/5/2011                                         |                               |                                |                               |
| <b>Temperature:</b> 23 °C                                     | <b>Air Pressure:</b> 1013 hPa | <b>Relative Humidity:</b> 49 % | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>                                               |                               |                                |                               |

Plot 7.2.3 Occupied bandwidth test result at 1391.0 MHz, 1.5 MHz EBW, 64QAM

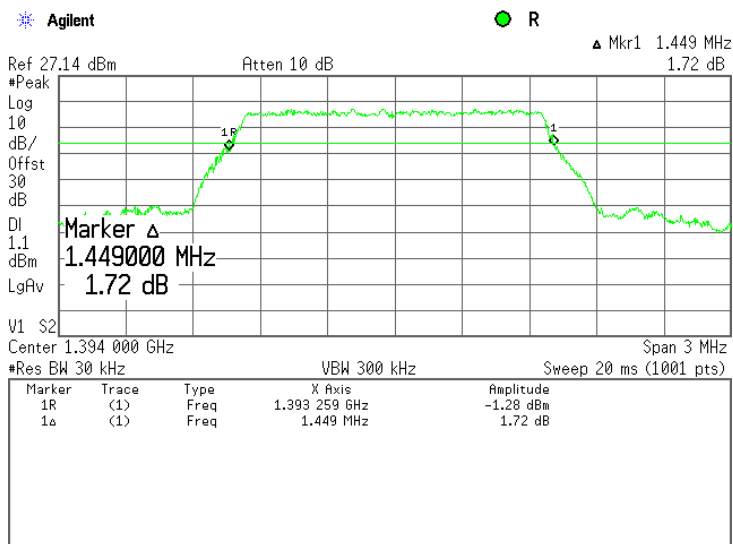


Plot 7.2.4 Occupied bandwidth test result at 1394.0 MHz reference level, unmodulated, 1.5 MHz EBW

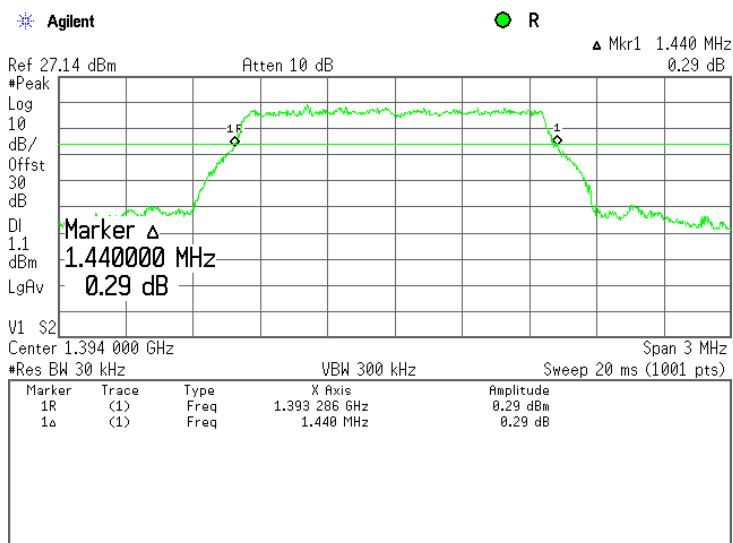


|                            |                                           |                                |                               |
|----------------------------|-------------------------------------------|--------------------------------|-------------------------------|
| <b>Test specification:</b> | <b>Section 2.1049, Occupied bandwidth</b> |                                |                               |
| <b>Test procedure:</b>     | 47 CFR, Section 2.1049                    |                                |                               |
| <b>Test mode:</b>          | Compliance                                | <b>Verdict:</b>                | <b>PASS</b>                   |
| <b>Date:</b>               | 4/5/2011                                  |                                |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1013 hPa             | <b>Relative Humidity:</b> 49 % | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                                           |                                |                               |

Plot 7.2.5 Occupied bandwidth test result at 1394 MHz, 1.5 MHz EBW, BPSK

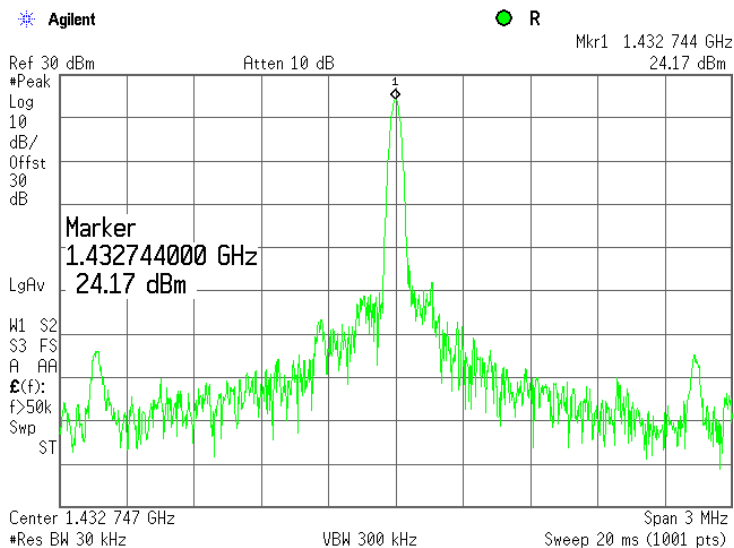


Plot 7.2.6 Occupied bandwidth test result at 1394 MHz 1.5 MHz EBW, 64QAM

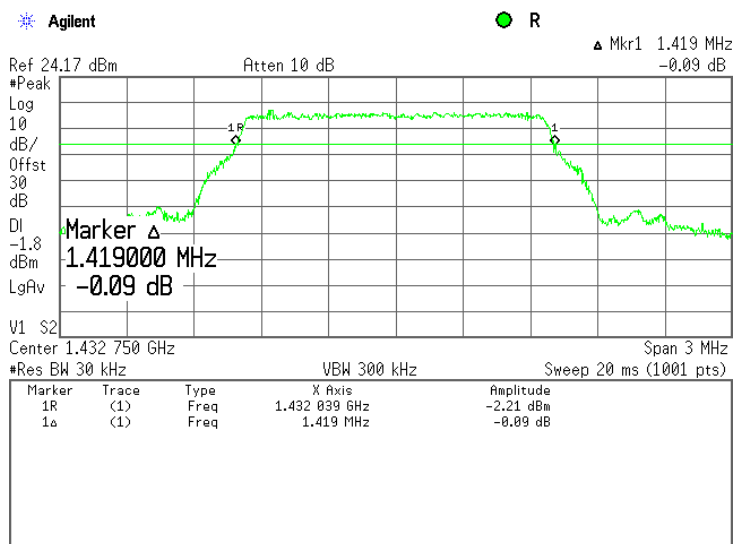


|                            |                               |                                           |                               |
|----------------------------|-------------------------------|-------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 2.1049, Occupied bandwidth</b> |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Section 2.1049                    |                               |
| <b>Test mode:</b>          |                               | Compliance                                | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/5/2011                                  |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1013 hPa | <b>Relative Humidity:</b> 49 %            | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                           |                               |

Plot 7.2.7 Occupied bandwidth test result at 1432.75 MHz reference level, unmodulated, 1.5 MHz EBW

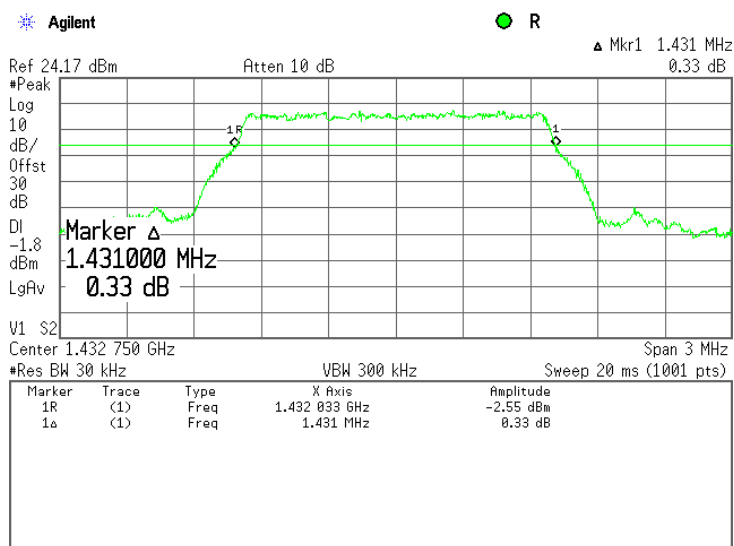


Plot 7.2.8 Occupied bandwidth test result at 1432.75 MHz, 1.5 MHz EBW, BPSK

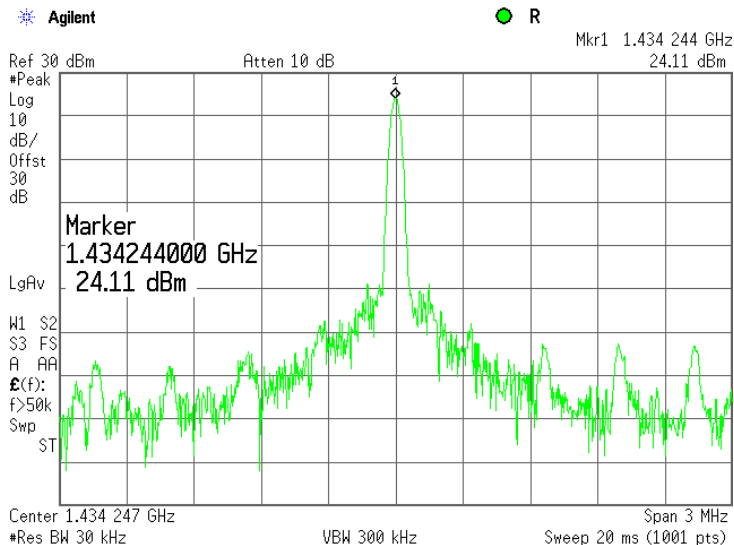


|                            |                                           |                                |                               |
|----------------------------|-------------------------------------------|--------------------------------|-------------------------------|
| <b>Test specification:</b> | <b>Section 2.1049, Occupied bandwidth</b> |                                |                               |
| <b>Test procedure:</b>     | 47 CFR, Section 2.1049                    |                                |                               |
| <b>Test mode:</b>          | Compliance                                | <b>Verdict:</b>                | <b>PASS</b>                   |
| <b>Date:</b>               | 4/5/2011                                  |                                |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1013 hPa             | <b>Relative Humidity:</b> 49 % | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                                           |                                |                               |

Plot 7.2.9 Occupied bandwidth test result at 1432.75 MHz, 1.5 MHz EBW, 64QAM

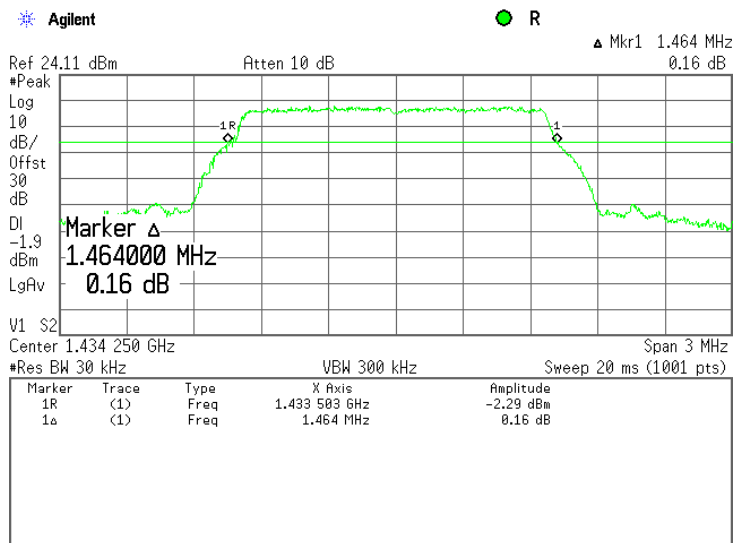


Plot 7.2.10 Occupied bandwidth test result at 1434.25 MHz reference level, unmodulated, 1.5 MHz EBW

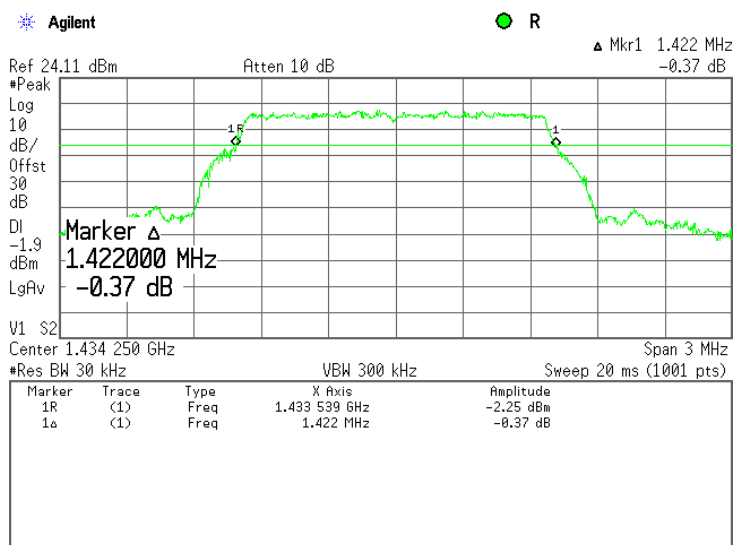


|                            |                                           |                                |                               |
|----------------------------|-------------------------------------------|--------------------------------|-------------------------------|
| <b>Test specification:</b> | <b>Section 2.1049, Occupied bandwidth</b> |                                |                               |
| <b>Test procedure:</b>     | 47 CFR, Section 2.1049                    |                                |                               |
| <b>Test mode:</b>          | Compliance                                | <b>Verdict:</b>                | <b>PASS</b>                   |
| <b>Date:</b>               | 4/5/2011                                  |                                |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1013 hPa             | <b>Relative Humidity:</b> 49 % | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                                           |                                |                               |

Plot 7.2.11 Occupied bandwidth test result at 1434.25 MHz, 1.5 MHz EBW, BPSK

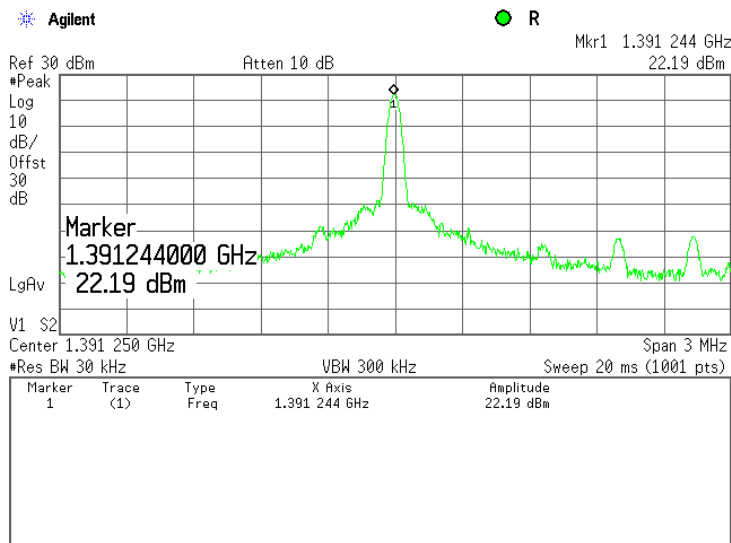


Plot 7.2.12 Occupied bandwidth test result at 1434.25 MHz, 1.5 MHz EBW, 64QAM

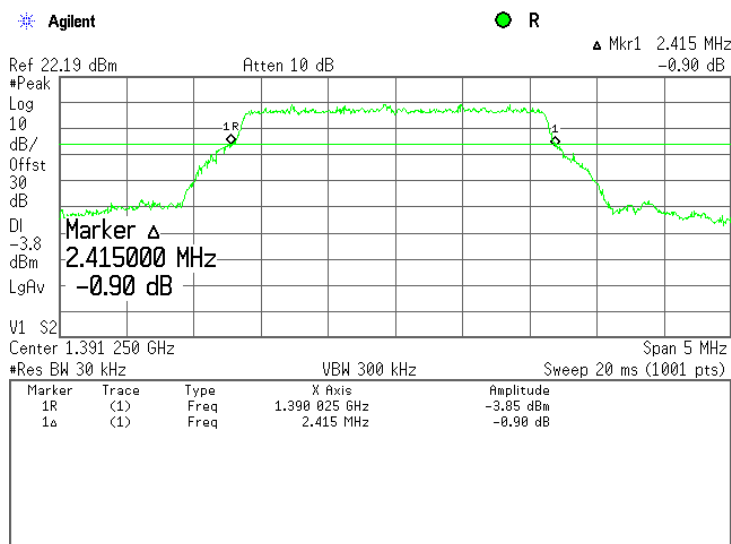


|                     |                                    |                         |                        |
|---------------------|------------------------------------|-------------------------|------------------------|
| Test specification: | Section 2.1049, Occupied bandwidth |                         |                        |
| Test procedure:     | 47 CFR, Section 2.1049             |                         |                        |
| Test mode:          | Compliance                         | Verdict:                | PASS                   |
| Date:               | 4/5/2011                           |                         |                        |
| Temperature: 23 °C  | Air Pressure: 1013 hPa             | Relative Humidity: 49 % | Power Supply: 120 V AC |
| Remarks:            |                                    |                         |                        |

Plot 7.2.13 Occupied bandwidth test result at 1391.25 MHz reference level, unmodulated, 2.5 MHz EBW

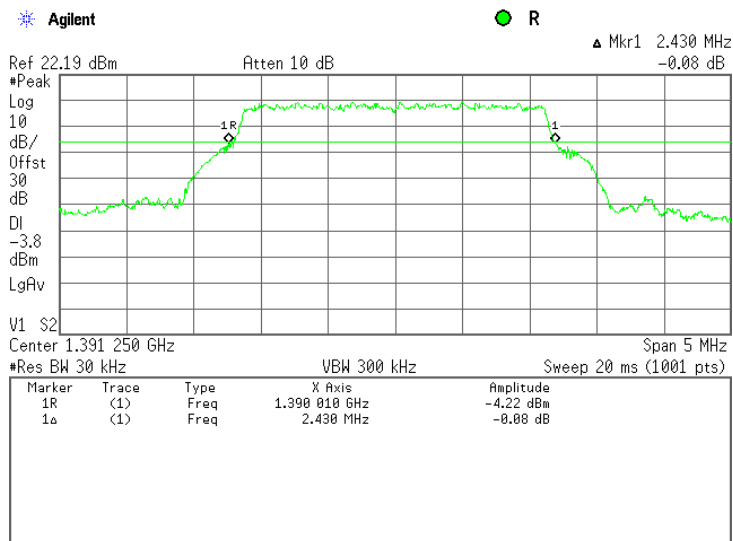


Plot 7.2.14 Occupied bandwidth test result at 1391.25 MHz, 2.5 MHz EBW, BPSK

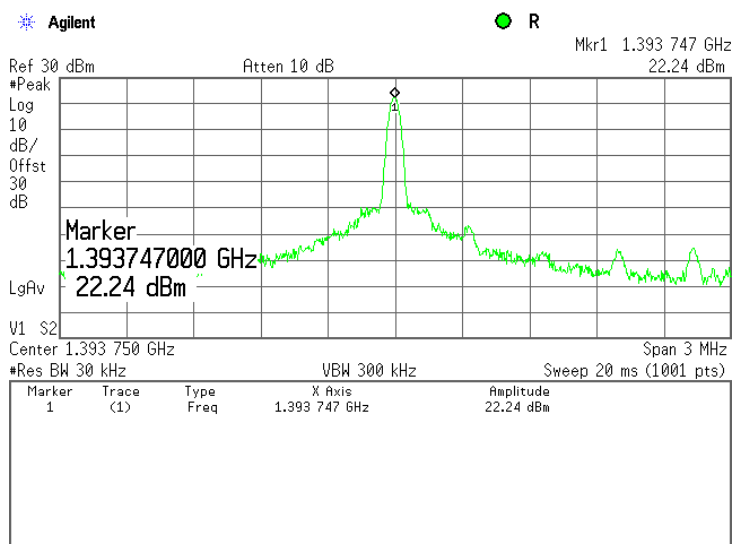


|                            |                                           |                                |                               |
|----------------------------|-------------------------------------------|--------------------------------|-------------------------------|
| <b>Test specification:</b> | <b>Section 2.1049, Occupied bandwidth</b> |                                |                               |
| <b>Test procedure:</b>     | 47 CFR, Section 2.1049                    |                                |                               |
| <b>Test mode:</b>          | Compliance                                | <b>Verdict:</b>                | <b>PASS</b>                   |
| <b>Date:</b>               | 4/5/2011                                  |                                |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1013 hPa             | <b>Relative Humidity:</b> 49 % | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                                           |                                |                               |

Plot 7.2.15 Occupied bandwidth test result at 1391.25 MHz, 2.5 MHz EBW, 64QAM

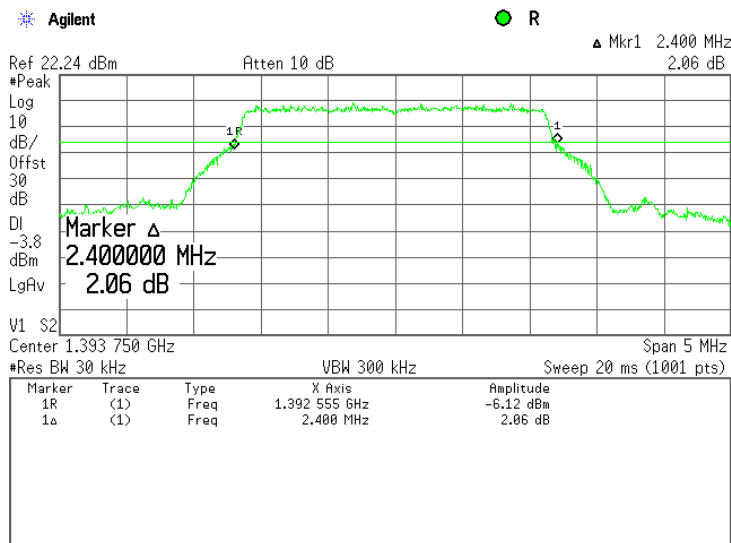


Plot 7.2.16 Occupied bandwidth test result at 1393.75 MHz reference level, unmodulated, 2.5 MHz EBW

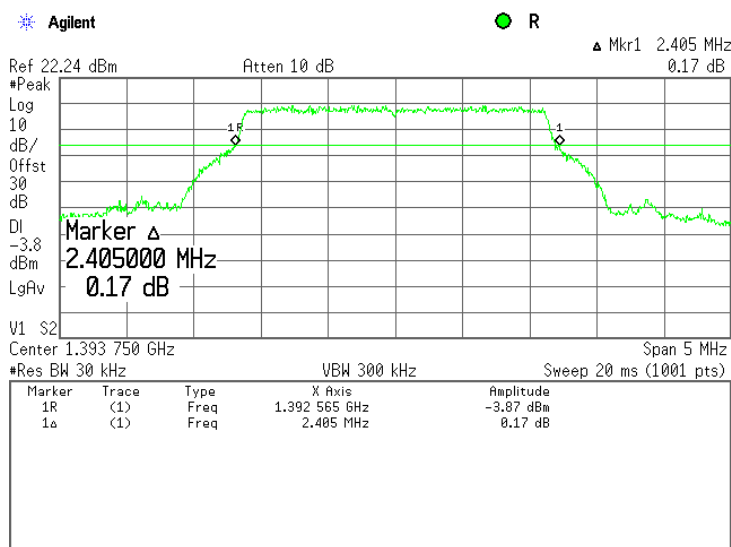


|                     |                                    |                         |                        |
|---------------------|------------------------------------|-------------------------|------------------------|
| Test specification: | Section 2.1049, Occupied bandwidth |                         |                        |
| Test procedure:     | 47 CFR, Section 2.1049             |                         |                        |
| Test mode:          | Compliance                         | Verdict:                | PASS                   |
| Date:               | 4/5/2011                           |                         |                        |
| Temperature: 23 °C  | Air Pressure: 1013 hPa             | Relative Humidity: 49 % | Power Supply: 120 V AC |
| Remarks:            |                                    |                         |                        |

Plot 7.2.17 Occupied bandwidth test result at 1393.75 MHz, 2.5 MHz EBW, BPSK

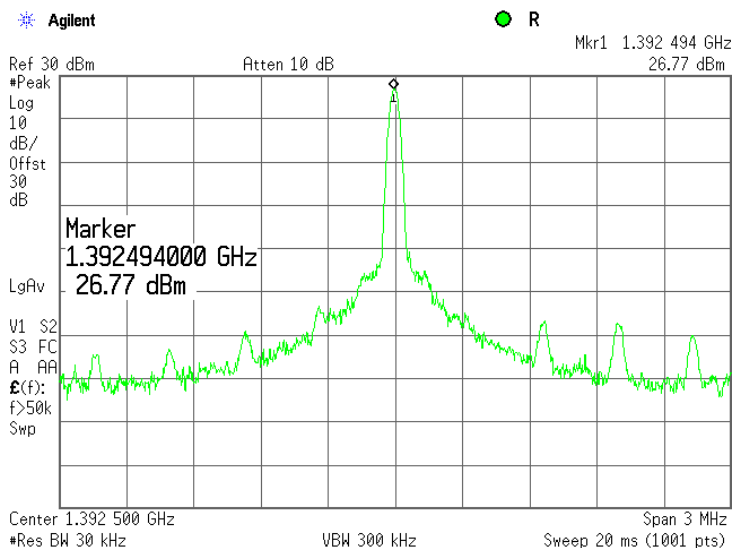


Plot 7.2.18 Occupied bandwidth test result at 1393.75 MHz, 2.5 MHz EBW, 64QAM

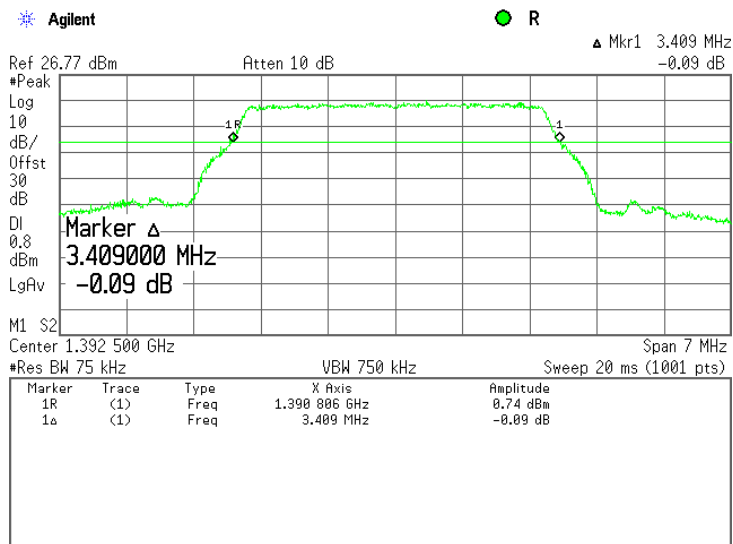


|                            |                               |                                           |                               |
|----------------------------|-------------------------------|-------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 2.1049, Occupied bandwidth</b> |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Section 2.1049                    |                               |
| <b>Test mode:</b>          |                               | Compliance                                | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/5/2011                                  |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1013 hPa | <b>Relative Humidity:</b> 49 %            | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                           |                               |

Plot 7.2.19 Occupied bandwidth test result at 1392.5 MHz reference level, unmodulated, 3.5 MHz EBW

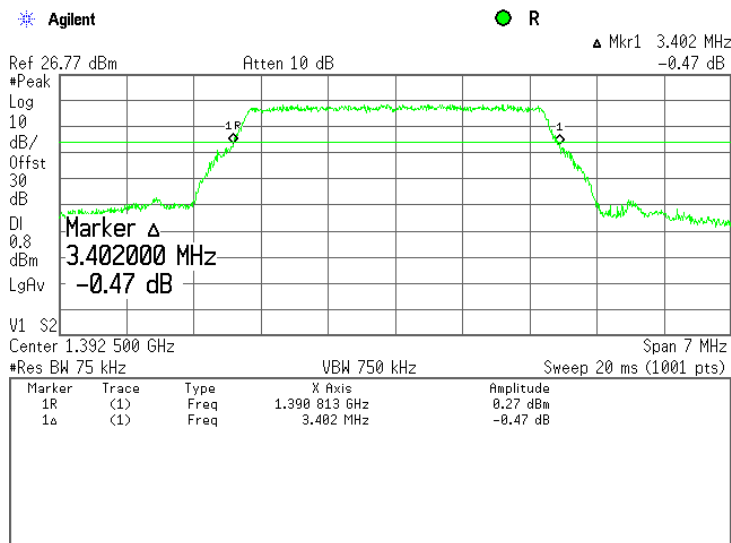


Plot 7.2.20 Occupied bandwidth test result at 1392.5 MHz, 3.5 MHz EBW, BPSK

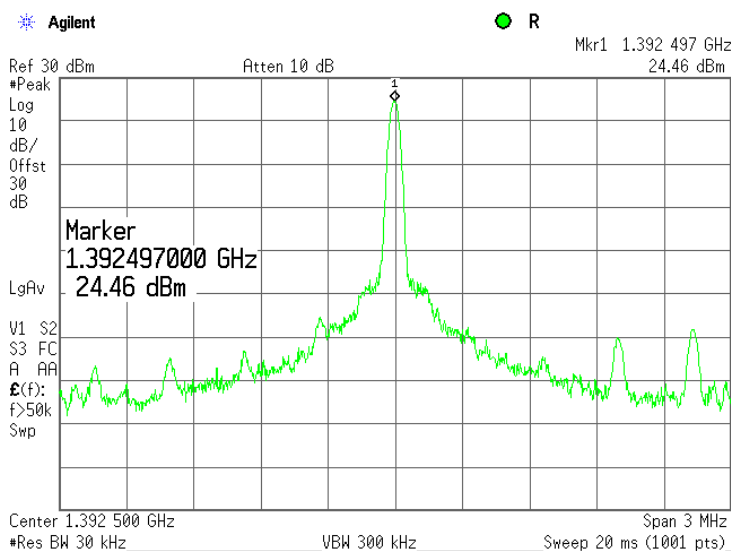


|                     |                                    |                         |                        |
|---------------------|------------------------------------|-------------------------|------------------------|
| Test specification: | Section 2.1049, Occupied bandwidth |                         |                        |
| Test procedure:     | 47 CFR, Section 2.1049             |                         |                        |
| Test mode:          | Compliance                         | Verdict:                | PASS                   |
| Date:               | 4/5/2011                           |                         |                        |
| Temperature: 23 °C  | Air Pressure: 1013 hPa             | Relative Humidity: 49 % | Power Supply: 120 V AC |
| Remarks:            |                                    |                         |                        |

Plot 7.2.21 Occupied bandwidth test result at 1392.5 MHz, 3.5 MHz EBW, 64QAM

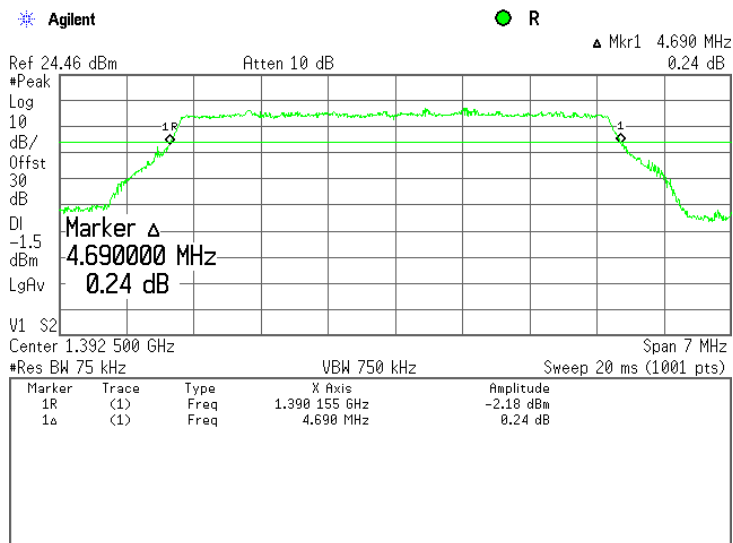


Plot 7.2.22 Occupied bandwidth test result at 1392.5 MHz reference level, unmodulated, 5 MHz EBW

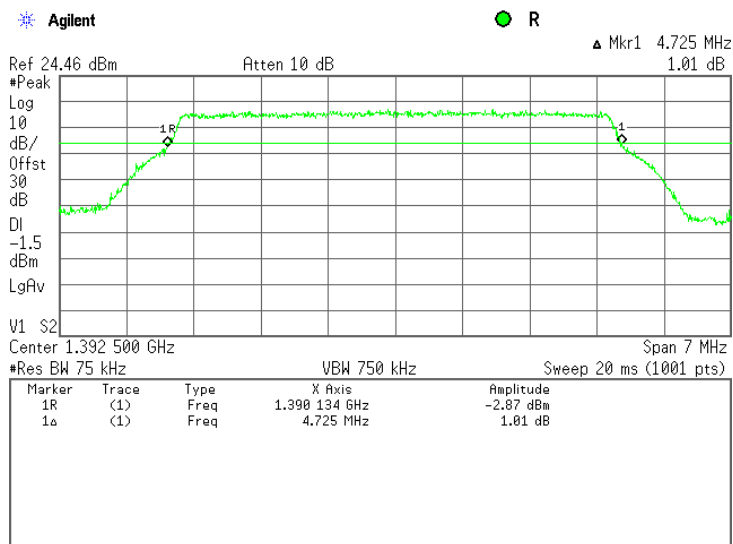


|                            |                               |                                           |                               |
|----------------------------|-------------------------------|-------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 2.1049, Occupied bandwidth</b> |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Section 2.1049                    |                               |
| <b>Test mode:</b>          |                               | Compliance                                | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/5/2011                                  |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1013 hPa | <b>Relative Humidity:</b> 49 %            | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                           |                               |

Plot 7.2.23 Occupied bandwidth test result at 1392.5 MHz, 5 MHz EBW, BPSK



Plot 7.2.24 Occupied bandwidth test result at 1392.5 MHz, 5 MHz EBW, 64QAM



|                            |                               |                                                        |                               |
|----------------------------|-------------------------------|--------------------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 27.53(j), Conducted spurious emissions</b>  |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                               |
| <b>Test mode:</b>          |                               | Compliance                                             | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/4/2011                                               |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa | <b>Relative Humidity:</b> 48 %                         | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                                        |                               |

## 7.3 Spurious emissions at RF antenna connector test

### 7.3.1 General

This test was performed to measure spurious emissions at RF antenna connector. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Spurious emission limits

| Frequency, MHz         | Attenuation below carrier, dBc | ERP of spurious, dBm |
|------------------------|--------------------------------|----------------------|
| 0.009 – 10th harmonic* | 43+10logP**                    | -13.0                |

\* - spurious emission limits do not apply to the in band emission of the authorized bandwidth

\*\* - P is transmitter output power in Watts

### 7.3.2 Test procedure

**7.3.2.1** The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.

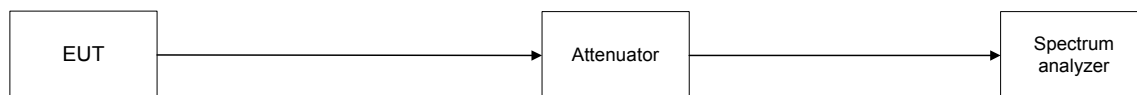
**7.3.2.2** The EUT was adjusted to produce maximum available for end user RF output power.

**7.3.2.3** The spurious emission was measured with spectrum analyzer as provided in Table 7.3.2, Table 7.3.3 and the associated plots.

Conducted spurious emissions were tested with EUT configured to transmit at 1.5 MHz EBW and 64QAM modulation assuming that this configuration produced the maximum RF power density.

However, the ranges 1387.0 – 1390.0 MHz, 1395-1398 MHz, 1429-1432 MHz, 1435-1438 MHz were tested with 1.5 MHz, 2.5 MHz, 3.5 MHz, 5.0 MHz EBW and 64 QAM; BPSK types of modulation.

Figure 7.3.1 Spurious emission test setup



|                     |                                                        |                         |                        |      |
|---------------------|--------------------------------------------------------|-------------------------|------------------------|------|
| Test specification: | Section 27.53(j), Conducted spurious emissions         |                         |                        |      |
| Test procedure:     | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                         |                        |      |
| Test mode:          | Compliance                                             | Verdict:                |                        | PASS |
| Date:               | 4/4/2011                                               |                         |                        |      |
| Temperature: 23 °C  | Air Pressure: 1011 hPa                                 | Relative Humidity: 48 % | Power Supply: 120 V AC |      |
| Remarks:            |                                                        |                         |                        |      |

**Table 7.3.2 Spurious emission test results**

ASSIGNED FREQUENCY RANGE: 1390.0 – 1395.0 MHz; 1432.0 – 1435.0 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 14500 MHz  
 DETECTOR USED: Peak/ RMS at bandedges  
 VIDEO BANDWIDTH: ≥ Resolution bandwidth  
 MODULATING SIGNAL: PRBS  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 EMISSION BANDWIDTH: 1.5 MHz

| Frequency, MHz                    | SA reading, dBm | Attenuator, dB | Cable loss, dB | RBW, kHz | Spurious emission, dBm | Limit, dBm | Margin, dB* | Verdict |
|-----------------------------------|-----------------|----------------|----------------|----------|------------------------|------------|-------------|---------|
| <b>Low frequency 1391.0 MHz</b>   |                 |                |                |          |                        |            |             |         |
| <b>BPSK</b>                       |                 |                |                |          |                        |            |             |         |
| 1387-1388                         | -30.50          | Included       | Included       | 1000     | -30.50                 | -13        | -17.50      | Pass    |
| 1388-1389                         | -26.80          | Included       | Included       | 1000     | -26.80                 | -13        | -13.80      | Pass    |
| 1389-1390                         | -17.78          | Included       | Included       | 1000     | -17.78                 | -13        | -4.78       | Pass    |
| <b>64QAM</b>                      |                 |                |                |          |                        |            |             |         |
| 1367.650                          | -18.66          | Included       | Included       | 1000     | -18.66                 | -13        | -5.66       | Pass    |
| 1387-1388                         | -30.29          | Included       | Included       | 1000     | -30.29                 | -13        | -17.29      | Pass    |
| 1388-1389                         | -26.11          | Included       | Included       | 1000     | -26.11                 | -13        | -13.11      | Pass    |
| 1389-1390                         | -17.30          | Included       | Included       | 1000     | -17.30                 | -13        | -4.30       | Pass    |
| <b>High frequency 1394 MHz</b>    |                 |                |                |          |                        |            |             |         |
| <b>BPSK</b>                       |                 |                |                |          |                        |            |             |         |
| 1395-1396                         | -18.70          | Included       | Included       | 1000     | -18.70                 | -13        | -5.70       | Pass    |
| 1396-1397                         | -27.29          | Included       | Included       | 1000     | -27.29                 | -13        | -14.29      | Pass    |
| 1397-1398                         | -30.41          | Included       | Included       | 1000     | -30.41                 | -13        | -17.41      | Pass    |
| <b>64QAM</b>                      |                 |                |                |          |                        |            |             |         |
| 1395-1396                         | -18.48          | Included       | Included       | 1000     | -18.48                 | -13        | -5.48       | Pass    |
| 1396-1397                         | -27.02          | Included       | Included       | 1000     | -27.02                 | -13        | -14.02      | Pass    |
| 1397-1398                         | -30.37          | Included       | Included       | 1000     | -30.37                 | -13        | -17.37      | Pass    |
| <b>Low frequency 1432.75 MHz</b>  |                 |                |                |          |                        |            |             |         |
| <b>BPSK</b>                       |                 |                |                |          |                        |            |             |         |
| 1429-1430                         | -34.42          | Included       | Included       | 1000     | -34.42                 | -13        | -21.42      | Pass    |
| 1430-1431                         | -29.33          | Included       | Included       | 1000     | -29.33                 | -13        | -16.33      | Pass    |
| 1431-1432                         | -13.61          | Included       | Included       | 1000     | -13.61                 | -13        | -0.61       | Pass    |
| <b>64QAM</b>                      |                 |                |                |          |                        |            |             |         |
| 1429-1430                         | -34.29          | Included       | Included       | 1000     | -34.29                 | -13        | -21.29      | Pass    |
| 1430-1431                         | -29.37          | Included       | Included       | 1000     | -29.37                 | -13        | -16.37      | Pass    |
| 1431-1432                         | -13.17          | Included       | Included       | 1000     | -13.17                 | -13        | -0.17       | Pass    |
| <b>High frequency 1434.25 MHz</b> |                 |                |                |          |                        |            |             |         |
| <b>BPSK</b>                       |                 |                |                |          |                        |            |             |         |
| 1435-1436                         | -13.08          | Included       | Included       | 1000     | -13.08                 | -13        | -0.08       | Pass    |
| 1436-1437                         | -30.61          | Included       | Included       | 1000     | -30.61                 | -13        | -17.61      | Pass    |
| 1437-1438                         | -34.28          | Included       | Included       | 1000     | -34.28                 | -13        | -21.28      | Pass    |
| <b>64QAM</b>                      |                 |                |                |          |                        |            |             |         |
| 1367.653                          | -17.92          | Included       | Included       | 1000     | -17.92                 | -13        | -4.92       | Pass    |
| 1435-1436                         | -13.78          | Included       | Included       | 1000     | -13.78                 | -13        | -0.78       | Pass    |
| 1436-1437                         | -30.54          | Included       | Included       | 1000     | -30.54                 | -13        | -17.54      | Pass    |
| 1437-1438                         | -34.03          | Included       | Included       | 1000     | -34.03                 | -13        | -21.03      | Pass    |

\*- Margin = Spurious emission – specification limit.

**Reference numbers of test equipment used**

|         |         |         |         |         |         |         |  |
|---------|---------|---------|---------|---------|---------|---------|--|
| HL 1906 | HL 2951 | HL 3301 | HL 3302 | HL 3763 | HL 3787 | HL 3818 |  |
|---------|---------|---------|---------|---------|---------|---------|--|

Full description is given in Appendix A.

|                            |                               |                                                        |                               |
|----------------------------|-------------------------------|--------------------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 27.53(j), Conducted spurious emissions</b>  |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                               |
| <b>Test mode:</b>          | Compliance                    | <b>Verdict:</b>                                        | <b>PASS</b>                   |
| <b>Date:</b>               | 4/4/2011                      |                                                        |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa | <b>Relative Humidity:</b> 48 %                         | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                                        |                               |

Table 7.3.3 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 1390.0 – 1395.0 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 14500 MHz  
 DETECTOR USED: Peak/ RMS at bandedges  
 VIDEO BANDWIDTH: ≥ Resolution bandwidth  
 MODULATING SIGNAL: PRBS  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

| EMISSION BANDWIDTH 2.5 MHz        |                 |                |                |          |                        |            |             |         |
|-----------------------------------|-----------------|----------------|----------------|----------|------------------------|------------|-------------|---------|
| Frequency, MHz                    | SA reading, dBm | Attenuator, dB | Cable loss, dB | RBW, kHz | Spurious emission, dBm | Limit, dBm | Margin, dB* | Verdict |
| <b>Low frequency 1391.25 MHz</b>  |                 |                |                |          |                        |            |             |         |
| <b>BPSK</b>                       |                 |                |                |          |                        |            |             |         |
| 1387-1388                         | -32.31          | Included       | Included       | 1000     | -32.31                 | -13        | -19.31      | Pass    |
| 1388-1389                         | -26.09          | Included       | Included       | 1000     | -26.09                 | -13        | -13.09      | Pass    |
| 1389-1390                         | -13.32          | Included       | Included       | 1000     | -13.32                 | -13        | -0.32       | Pass    |
| <b>64QAM</b>                      |                 |                |                |          |                        |            |             |         |
| 1387-1388                         | -32.50          | Included       | Included       | 1000     | -32.50                 | -13        | -19.50      | Pass    |
| 1388-1389                         | -26.24          | Included       | Included       | 1000     | -26.24                 | -13        | -13.24      | Pass    |
| 1389-1390                         | -13.48          | Included       | Included       | 1000     | -13.48                 | -13        | -0.48       | Pass    |
| <b>High frequency 1393.75 MHz</b> |                 |                |                |          |                        |            |             |         |
| <b>BPSK</b>                       |                 |                |                |          |                        |            |             |         |
| 1395-1396                         | -13.31          | Included       | Included       | 1000     | -13.31                 | -13        | -0.31       | Pass    |
| 1396-1397                         | -27.74          | Included       | Included       | 1000     | -27.74                 | -13        | -14.74      | Pass    |
| 1397-1398                         | -33.27          | Included       | Included       | 1000     | -33.27                 | -13        | -20.27      | Pass    |
| <b>64QAM</b>                      |                 |                |                |          |                        |            |             |         |
| 1395-1396                         | -14.83          | Included       | Included       | 1000     | -14.83                 | -13        | -1.83       | Pass    |
| 1396-1397                         | -27.86          | Included       | Included       | 1000     | -27.86                 | -13        | -14.86      | Pass    |
| 1397-1398                         | -33.30          | Included       | Included       | 1000     | -33.30                 | -13        | -20.30      | Pass    |
| EMISSION BANDWIDTH 3.5 MHz        |                 |                |                |          |                        |            |             |         |
| <b>Frequency 1392.5 MHz</b>       |                 |                |                |          |                        |            |             |         |
| <b>BPSK</b>                       |                 |                |                |          |                        |            |             |         |
| 1387-1388                         | -26.88          | Included       | Included       | 1000     | -26.88                 | -13        | -13.88      | Pass    |
| 1388-1389                         | -23.48          | Included       | Included       | 1000     | -23.48                 | -13        | -10.48      | Pass    |
| 1389-1390                         | -18.89          | Included       | Included       | 1000     | -18.89                 | -13        | -5.89       | Pass    |
| 1395-1396                         | -21.66          | Included       | Included       | 1000     | -21.66                 | -13        | -8.66       | Pass    |
| 1396-1397                         | -26.06          | Included       | Included       | 1000     | -26.06                 | -13        | -13.06      | Pass    |
| 1397-1398                         | -28.88          | Included       | Included       | 1000     | -28.88                 | -13        | -15.88      | Pass    |
| <b>64 QAM</b>                     |                 |                |                |          |                        |            |             |         |
| 1387-1388                         | -26.81          | Included       | Included       | 1000     | -26.81                 | -13        | -13.81      | Pass    |
| 1388-1389                         | -23.33          | Included       | Included       | 1000     | -23.33                 | -13        | -10.33      | Pass    |
| 1389-1390                         | -19.14          | Included       | Included       | 1000     | -19.14                 | -13        | -6.14       | Pass    |
| 1395-1396                         | -21.51          | Included       | Included       | 1000     | -21.51                 | -13        | -8.51       | Pass    |
| 1396-1397                         | -25.81          | Included       | Included       | 1000     | -25.81                 | -13        | -12.81      | Pass    |
| 1397-1398                         | -28.66          | Included       | Included       | 1000     | -28.66                 | -13        | -15.66      | Pass    |

|                            |                               |                                                        |                               |
|----------------------------|-------------------------------|--------------------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 27.53(j), Conducted spurious emissions</b>  |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                               |
| <b>Test mode:</b>          | Compliance                    | <b>Verdict:</b>                                        | <b>PASS</b>                   |
| <b>Date:</b>               | 4/4/2011                      |                                                        |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa | <b>Relative Humidity:</b> 48 %                         | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                                        |                               |

Table 7.3.3 Spurious emission test results (continued)

ASSIGNED FREQUENCY RANGE: 1390.0 – 1395.0 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 14500 MHz  
 DETECTOR USED: Peak/ RMS at bandedges  
 VIDEO BANDWIDTH: ≥ Resolution bandwidth  
 MODULATING SIGNAL: PRBS  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

| Frequency, MHz                  | SA reading, dBm | Attenuator, dB | Cable loss, dB | RBW, kHz | Spurious emission, dBm | Limit, dBm | Margin, dB* | Verdict |
|---------------------------------|-----------------|----------------|----------------|----------|------------------------|------------|-------------|---------|
| <b>EMISSION BANDWIDTH 5 MHz</b> |                 |                |                |          |                        |            |             |         |
| <b>Frequency 1392.5 MHz</b>     |                 |                |                |          |                        |            |             |         |
| <b>BPSK</b>                     |                 |                |                |          |                        |            |             |         |
| 1387-1388                       | -24.73          | Included       | Included       | 1000     | -24.73                 | -13        | -11.73      | Pass    |
| 1388-1389                       | -21.79          | Included       | Included       | 1000     | -21.79                 | -13        | -8.79       | Pass    |
| 1389-1390                       | -13.59          | Included       | Included       | 1000     | -13.59                 | -13        | -0.59       | Pass    |
| 1395-1396                       | -13.79          | Included       | Included       | 1000     | -13.79                 | -13        | -0.79       | Pass    |
| 1396-1397                       | -24.11          | Included       | Included       | 1000     | -24.11                 | -13        | -11.11      | Pass    |
| 1397-1398                       | -27.99          | Included       | Included       | 1000     | -27.99                 | -13        | -14.99      | Pass    |
| <b>64 QAM</b>                   |                 |                |                |          |                        |            |             |         |
| 1387-1388                       | -24.66          | Included       | Included       | 1000     | -24.66                 | -13        | -11.66      | Pass    |
| 1388-1389                       | -21.64          | Included       | Included       | 1000     | -21.64                 | -13        | -8.64       | Pass    |
| 1389-1390                       | -13.48          | Included       | Included       | 1000     | -13.48                 | -13        | -0.48       | Pass    |
| 1395-1396                       | -14.51          | Included       | Included       | 1000     | -14.51                 | -13        | -1.51       | Pass    |
| 1396-1397                       | -24.09          | Included       | Included       | 1000     | -24.09                 | -13        | -11.09      | Pass    |
| 1397-1398                       | -27.78          | Included       | Included       | 1000     | -27.78                 | -13        | -14.78      | Pass    |

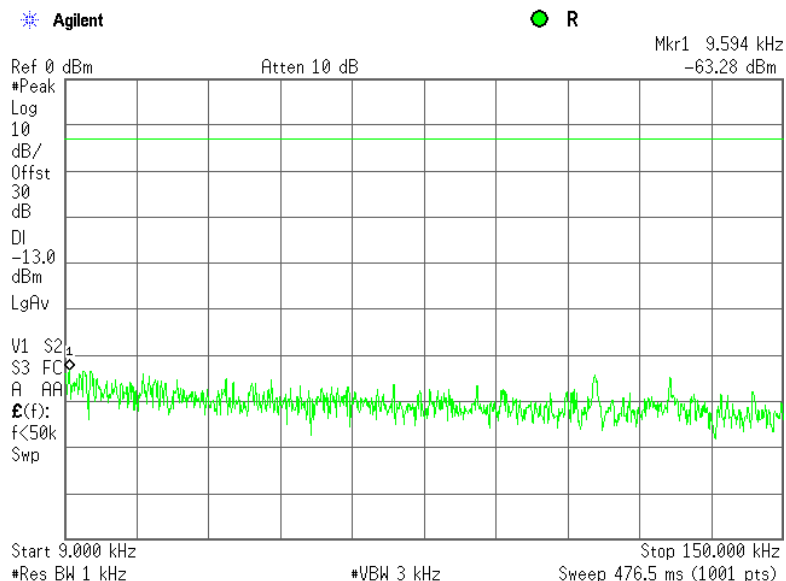
Reference numbers of test equipment used

|         |         |         |         |         |         |         |  |
|---------|---------|---------|---------|---------|---------|---------|--|
| HL 1906 | HL 2951 | HL 3301 | HL 3302 | HL 3763 | HL 3787 | HL 3818 |  |
|---------|---------|---------|---------|---------|---------|---------|--|

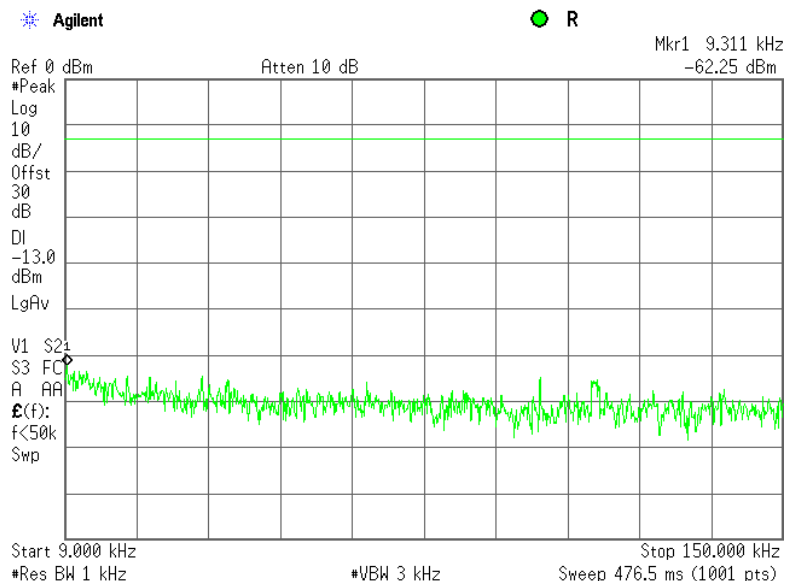
Full description is given in Appendix A.

|                            |                               |                                                        |                               |
|----------------------------|-------------------------------|--------------------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 27.53(j), Conducted spurious emissions</b>  |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                               |
| <b>Test mode:</b>          |                               | Compliance                                             | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/4/2011                                               |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa | <b>Relative Humidity:</b> 48 %                         | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                                        |                               |

Plot 7.3.1 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency

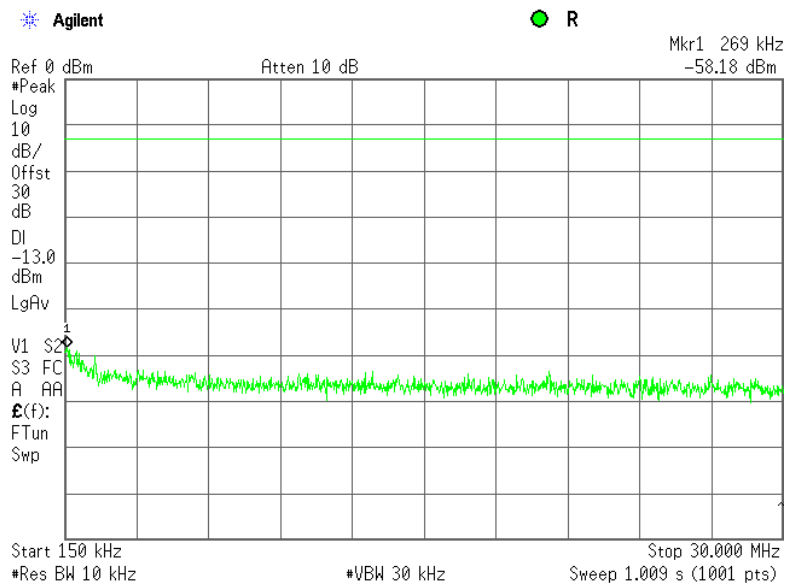


Plot 7.3.2 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency

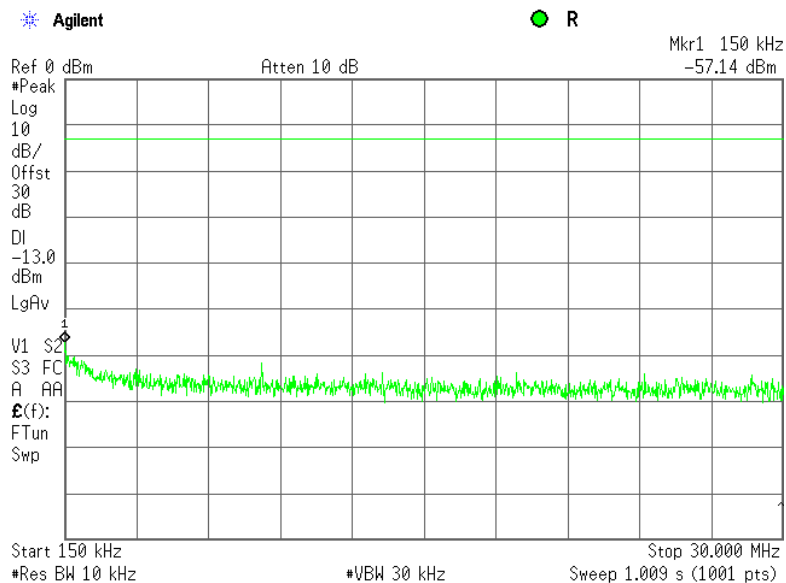


|                            |                               |                                                        |                               |
|----------------------------|-------------------------------|--------------------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 27.53(j), Conducted spurious emissions</b>  |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                               |
| <b>Test mode:</b>          |                               | Compliance                                             | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/4/2011                                               |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa | <b>Relative Humidity:</b> 48 %                         | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                                        |                               |

Plot 7.3.3 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

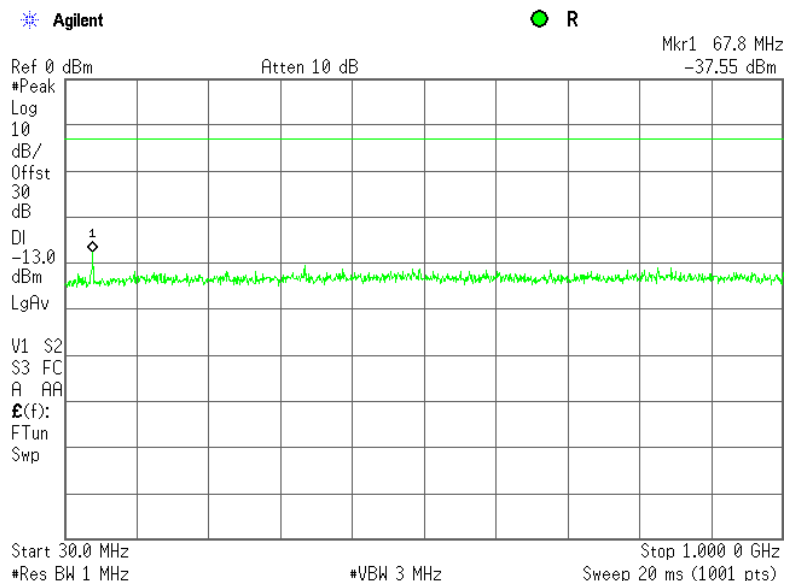


Plot 7.3.4 Spurious emission measurements in 0.15 - 30.0 MHz range at high carrier frequency

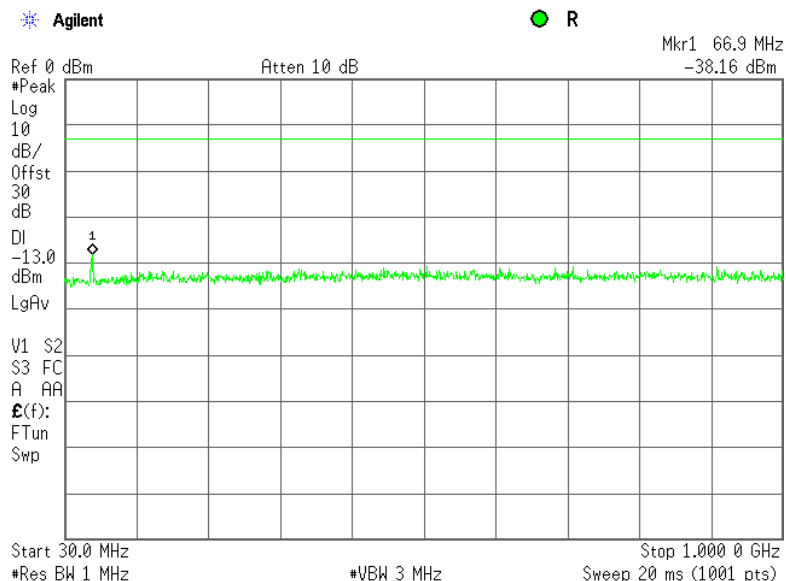


|                            |                               |                                                        |                               |
|----------------------------|-------------------------------|--------------------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 27.53(j), Conducted spurious emissions</b>  |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                               |
| <b>Test mode:</b>          |                               | Compliance                                             | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/4/2011                                               |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa | <b>Relative Humidity:</b> 48 %                         | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                                        |                               |

Plot 7.3.5 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency

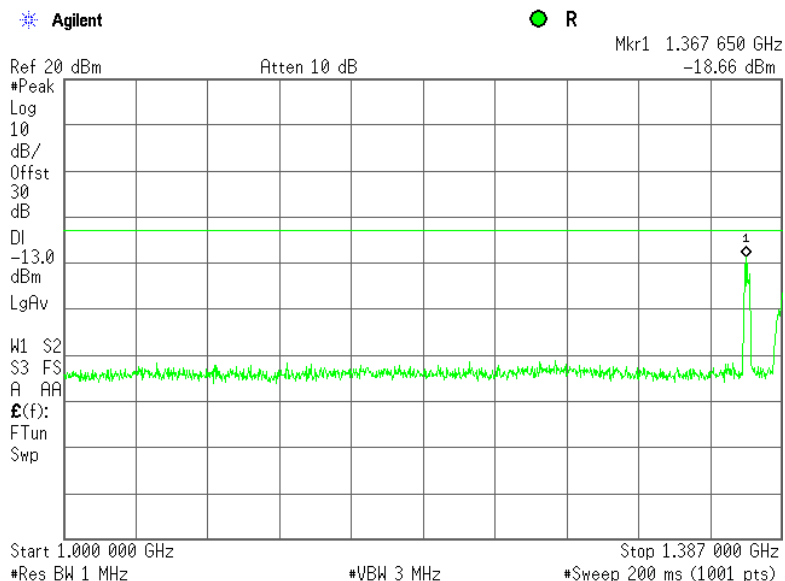


Plot 7.3.6 Spurious emission measurements in 30.0 - 1000 MHz range at high carrier frequency

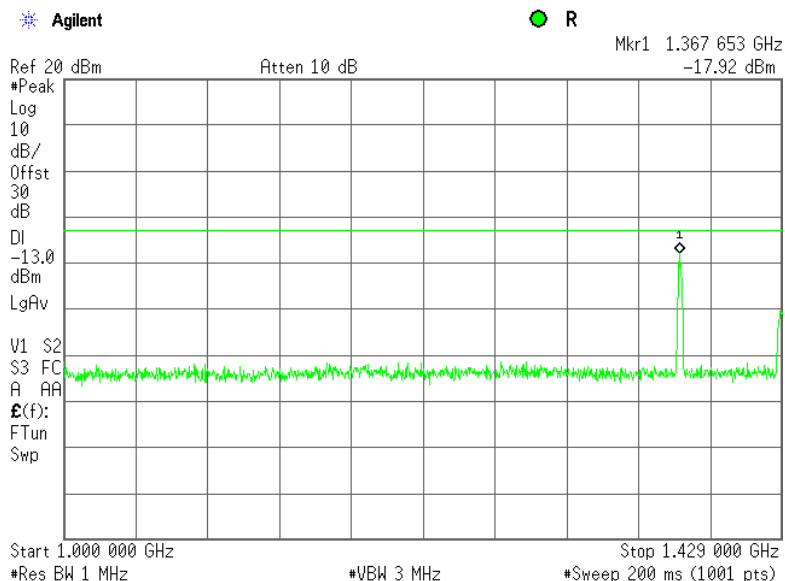


|                            |                               |                                                        |                               |
|----------------------------|-------------------------------|--------------------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 27.53(j), Conducted spurious emissions</b>  |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                               |
| <b>Test mode:</b>          |                               | Compliance                                             | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/4/2011                                               |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa | <b>Relative Humidity:</b> 48 %                         | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                                        |                               |

Plot 7.3.7 Spurious emission measurements in 1000 - 1387 MHz range at low carrier frequency

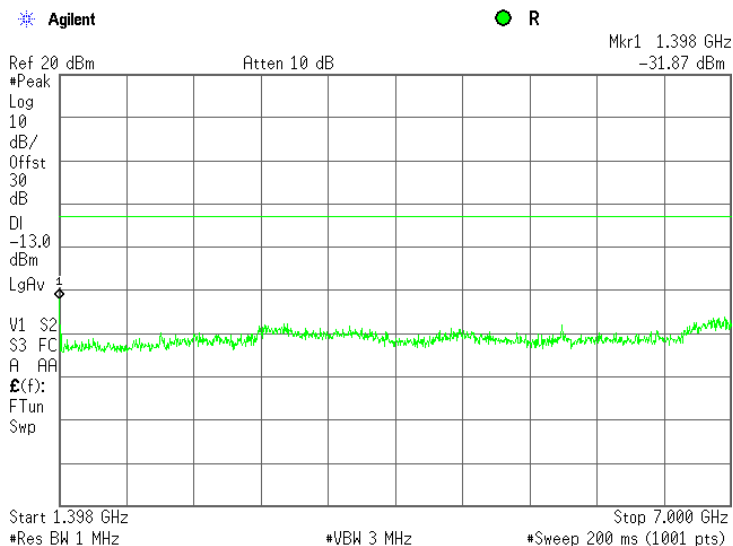


Plot 7.3.8 Spurious emission measurements in 1000 - 1429 MHz at high carrier frequency

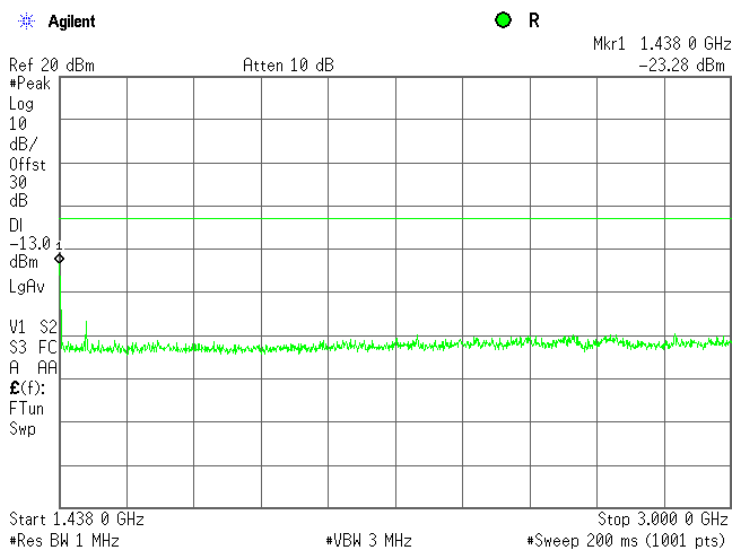


|                            |                               |                                                        |                               |
|----------------------------|-------------------------------|--------------------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 27.53(j), Conducted spurious emissions</b>  |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                               |
| <b>Test mode:</b>          |                               | Compliance                                             | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/4/2011                                               |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa | <b>Relative Humidity:</b> 48 %                         | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                                        |                               |

Plot 7.3.9 Spurious emission measurements in 1398 - 7000 MHz range at low carrier frequency

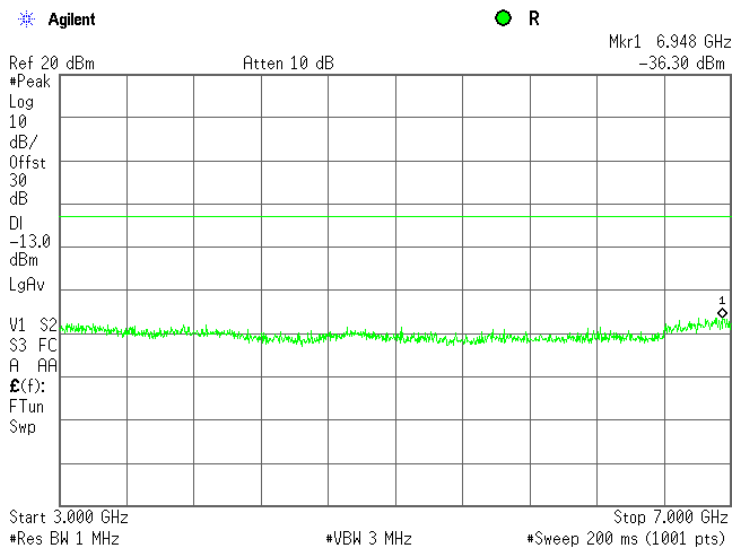


Plot 7.3.10 Spurious emission measurements in 1438 - 3000 MHz range at high carrier frequency

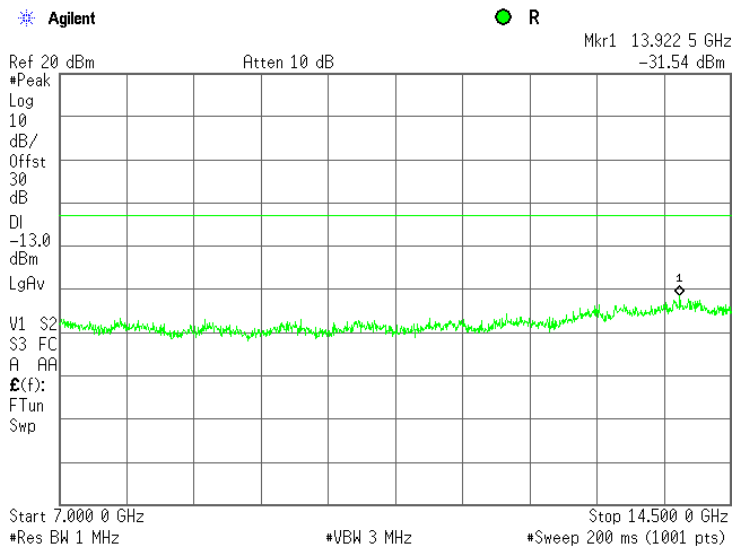


|                            |                               |                                                        |                               |
|----------------------------|-------------------------------|--------------------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 27.53(j), Conducted spurious emissions</b>  |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                               |
| <b>Test mode:</b>          |                               | Compliance                                             | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/4/2011                                               |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa | <b>Relative Humidity:</b> 48 %                         | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                                        |                               |

Plot 7.3.11 Spurious emission measurements in 3000-7000 MHz range at high carrier frequency

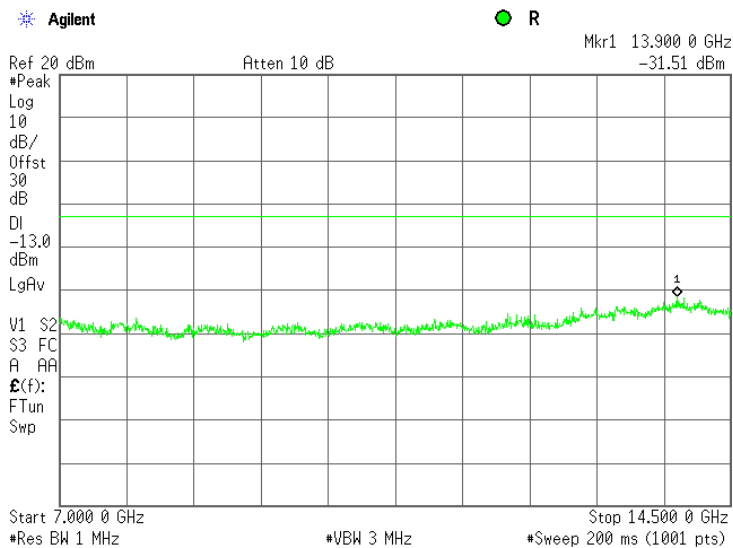


Plot 7.3.12 Spurious emission measurements in 7000-14500 MHz at low carrier frequency



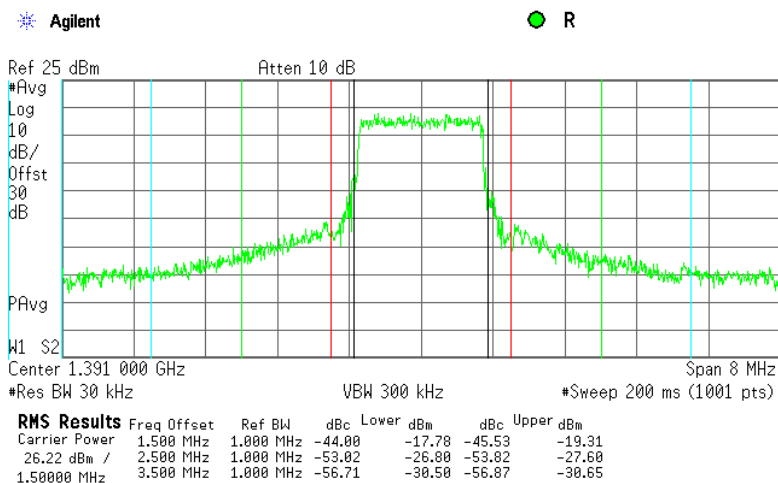
|                            |                               |                                                        |                               |
|----------------------------|-------------------------------|--------------------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 27.53(j), Conducted spurious emissions</b>  |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                               |
| <b>Test mode:</b>          |                               | Compliance                                             | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/4/2011                                               |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa | <b>Relative Humidity:</b> 48 %                         | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                                        |                               |

Plot 7.3.13 Spurious emission measurements in 7000-14500 MHz at high carrier frequency

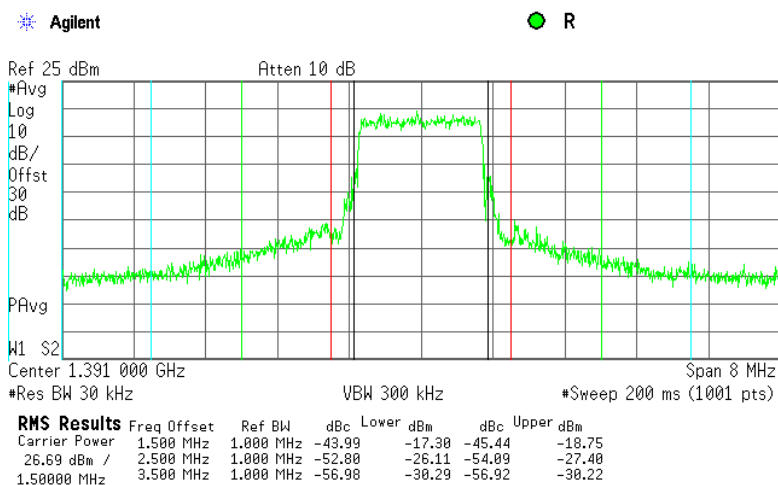


|                            |                                                        |                                |                               |
|----------------------------|--------------------------------------------------------|--------------------------------|-------------------------------|
| <b>Test specification:</b> | <b>Section 27.53(j), Conducted spurious emissions</b>  |                                |                               |
| <b>Test procedure:</b>     | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                                |                               |
| <b>Test mode:</b>          | Compliance                                             | <b>Verdict:</b>                | <b>PASS</b>                   |
| <b>Date:</b>               | 4/4/2011                                               |                                |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa                          | <b>Relative Humidity:</b> 48 % | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                                                        |                                |                               |

Plot 7.3.14 Spurious emission measurements in 1387-1388 MHz, 1388 – 1389 MHz, 1389 – 1390 MHz ranges at low carrier frequency 1391 MHz, 1.5 MHz EBW, BPSK

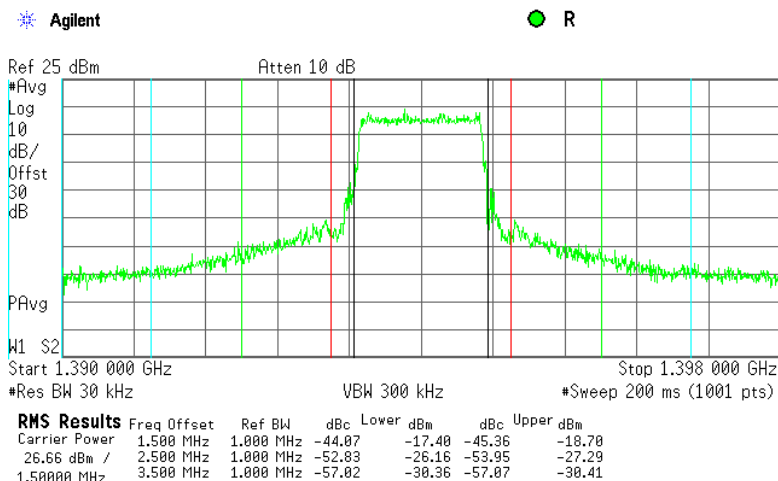


Plot 7.3.15 Spurious emission measurements in 1387-1388 MHz, 1388 – 1389 MHz, 1389 – 1390 MHz ranges, at low carrier frequency 1391 MHz, 1.5 MHz EBW, 64QAM

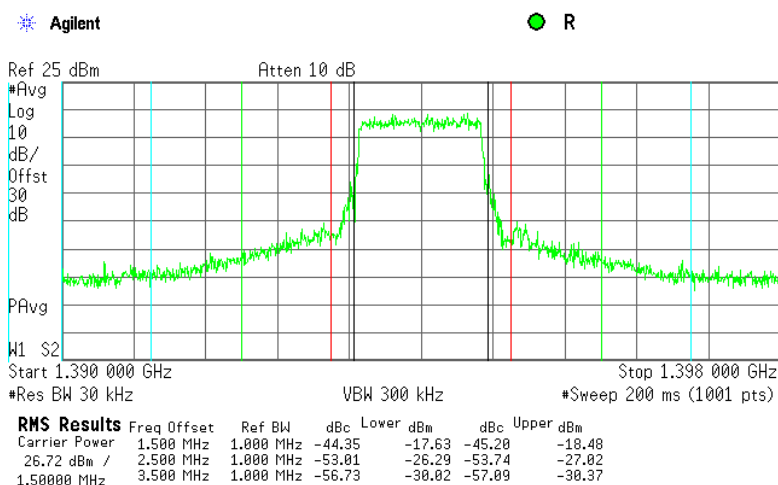


|                     |                                                        |                         |                        |
|---------------------|--------------------------------------------------------|-------------------------|------------------------|
| Test specification: | Section 27.53(j), Conducted spurious emissions         |                         |                        |
| Test procedure:     | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                         |                        |
| Test mode:          | Compliance                                             | Verdict: PASS           |                        |
| Date:               | 4/4/2011                                               |                         |                        |
| Temperature: 23 °C  | Air Pressure: 1011 hPa                                 | Relative Humidity: 48 % | Power Supply: 120 V AC |
| Remarks:            |                                                        |                         |                        |

Plot 7.3.16 Spurious emission measurements in 1395-1396 MHz, 1396-1397 MHz, 1397-1398 MHz ranges at high carrier frequency 1394 MHz, 1.5 MHz EBW, BPSK

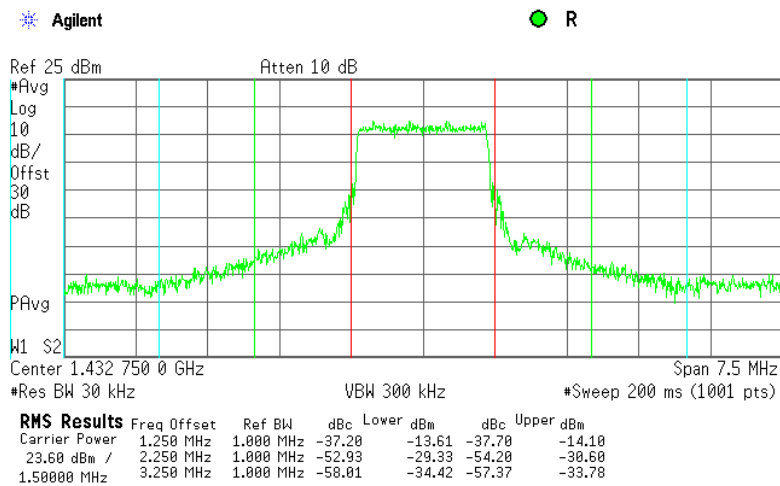


Plot 7.3.17 Spurious emission measurements in 1395-1396 MHz, 1396-1397 MHz, 1397-1398 MHz ranges at high carrier frequency 1394 MHz, 1.5 MHz EBW, 64QAM

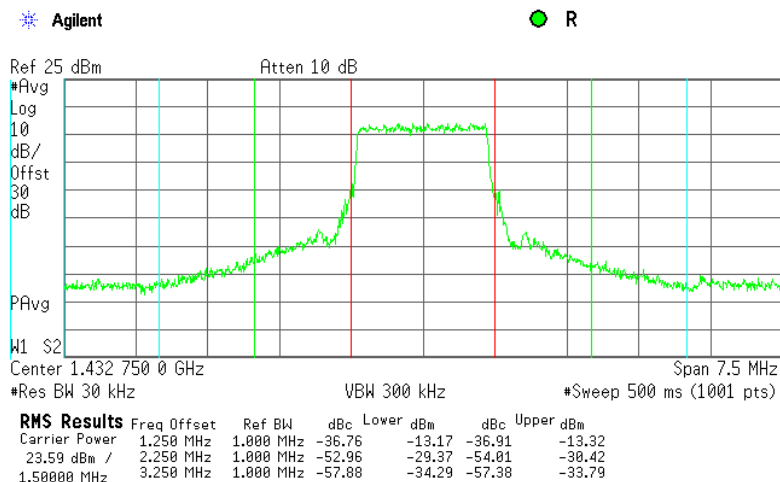


|                            |                                                        |                                |                               |
|----------------------------|--------------------------------------------------------|--------------------------------|-------------------------------|
| <b>Test specification:</b> | <b>Section 27.53(j), Conducted spurious emissions</b>  |                                |                               |
| <b>Test procedure:</b>     | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                                |                               |
| <b>Test mode:</b>          | Compliance                                             | <b>Verdict:</b>                | <b>PASS</b>                   |
| <b>Date:</b>               | 4/4/2011                                               |                                |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa                          | <b>Relative Humidity:</b> 48 % | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                                                        |                                |                               |

**Plot 7.3.18 Spurious emission measurements in 1429-1430 MHz, 1430-1431 MHz, 1431-1432 MHz ranges at low carrier frequency 1432.75 MHz, 1.5 MHz EBW, BPSK**

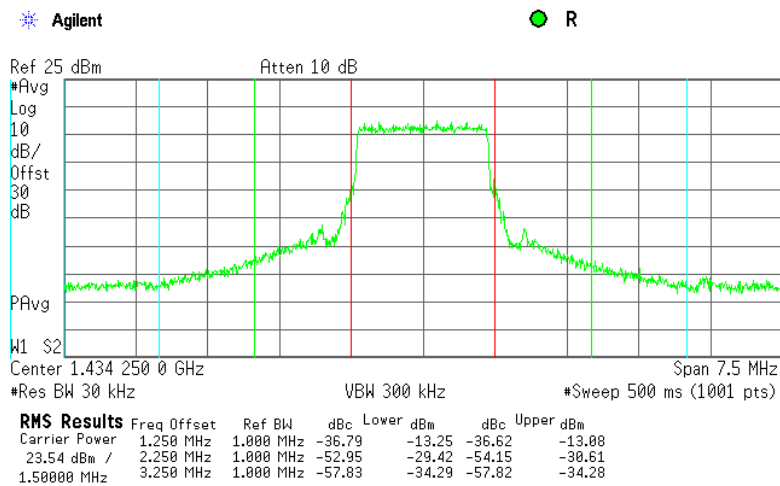


**Plot 7.3.19 Spurious emission measurements in 1435-1436 MHz, 1436-1437 MHz, 1437-1438 MHz ranges at low carrier frequency 1432.75 MHz, 1.5 MHz EBW, 64 QAM**

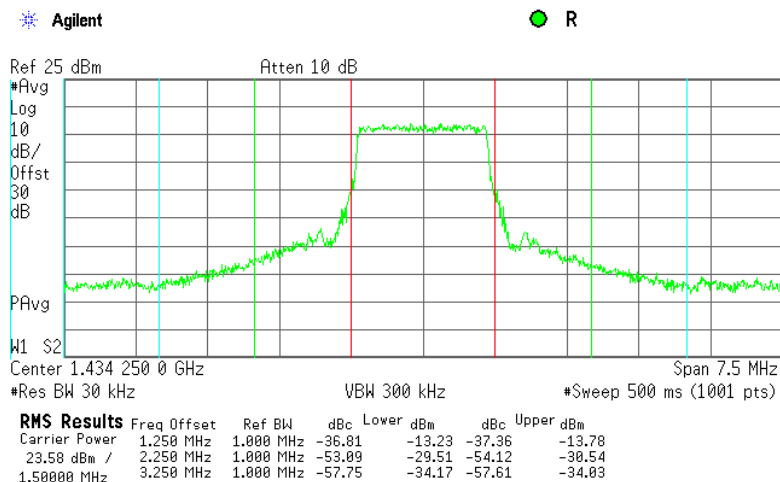


|                            |                               |                                                        |                               |
|----------------------------|-------------------------------|--------------------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 27.53(j), Conducted spurious emissions</b>  |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                               |
| <b>Test mode:</b>          |                               | Compliance                                             | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/4/2011                                               |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa | <b>Relative Humidity:</b> 48 %                         | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                                        |                               |

**Plot 7.3.20 Spurious emission measurements in 1429-1430 MHz, 1430-1431 MHz, 1431-1432 MHz ranges at high carrier frequency 1434.25 MHz, 1.5 MHz EBW, BPSK**

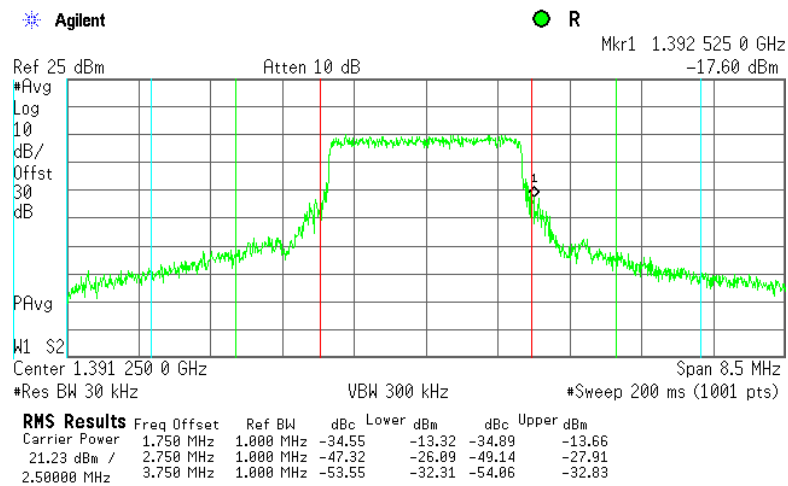


**Plot 7.3.21 Spurious emission measurements in 1435-1436 MHz, 1436-1437 MHz, 1437-1438 MHz ranges at high carrier frequency 1434.25 MHz, 1.5 MHz EBW, 64 QAM**

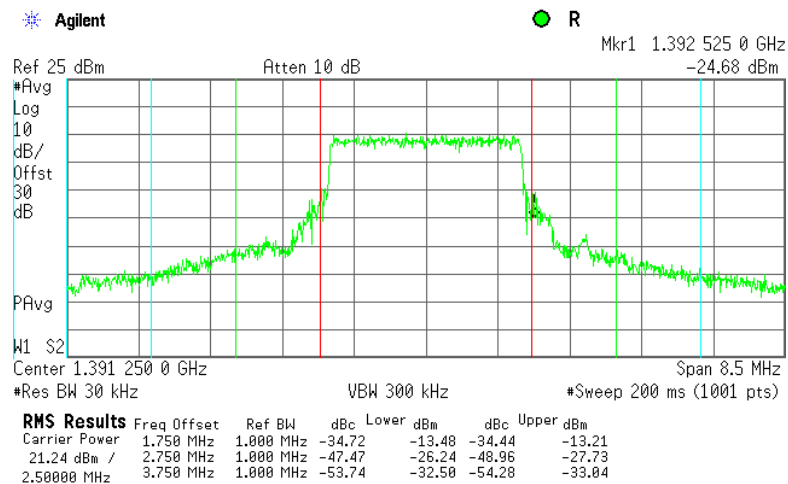


|                            |                               |                                                        |                               |
|----------------------------|-------------------------------|--------------------------------------------------------|-------------------------------|
| <b>Test specification:</b> |                               | <b>Section 27.53(j), Conducted spurious emissions</b>  |                               |
| <b>Test procedure:</b>     |                               | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                               |
| <b>Test mode:</b>          |                               | Compliance                                             | <b>Verdict:</b> PASS          |
| <b>Date:</b>               |                               | 4/4/2011                                               |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa | <b>Relative Humidity:</b> 48 %                         | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                               |                                                        |                               |

**Plot 7.3.22 Spurious emission measurements in 1387-1388 MHz, 1388-1389 MHz, 1389-1390 MHz ranges at low carrier frequency 1391.25 MHz, 2.5 MHz EBW, BPSK**

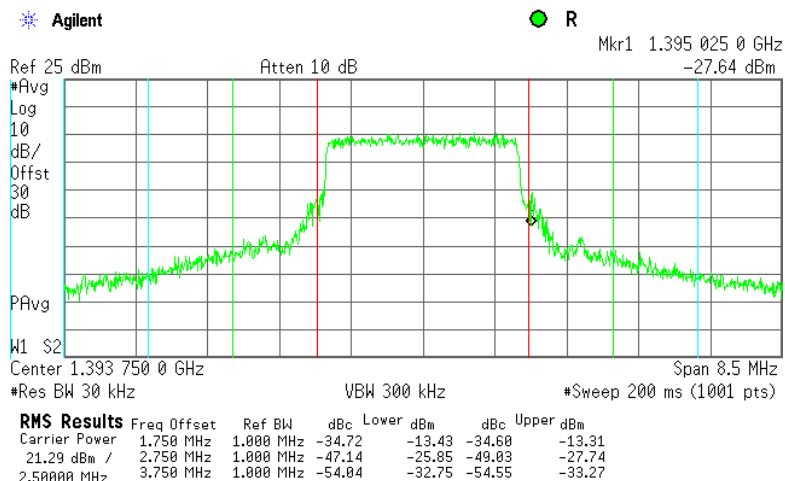


**Plot 7.3.23 Spurious emission measurements in 1387-1388 MHz, 1388-1389 MHz, 1389-1390 MHz ranges at low carrier frequency 1391.25 MHz, 2.5 MHz EBW, 64 QAM**

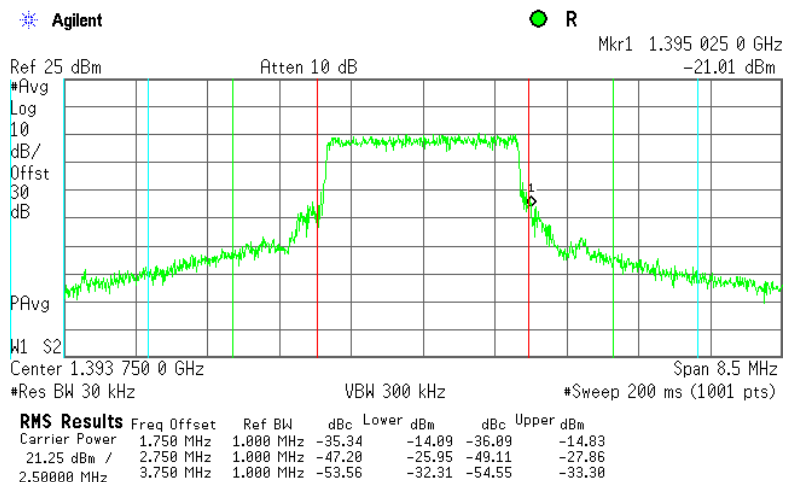


|                            |                                                        |                                |                               |
|----------------------------|--------------------------------------------------------|--------------------------------|-------------------------------|
| <b>Test specification:</b> | <b>Section 27.53(j), Conducted spurious emissions</b>  |                                |                               |
| <b>Test procedure:</b>     | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                                |                               |
| <b>Test mode:</b>          | Compliance                                             | <b>Verdict:</b>                | <b>PASS</b>                   |
| <b>Date:</b>               | 4/4/2011                                               |                                |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa                          | <b>Relative Humidity:</b> 48 % | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                                                        |                                |                               |

**Plot 7.3.24 Spurious emission measurements in 1395-1396 MHz, 1396-1397 MHz, 1397-1398 MHz ranges at high carrier frequency 1393.75 MHz, 2.5 MHz EBW, BPSK**

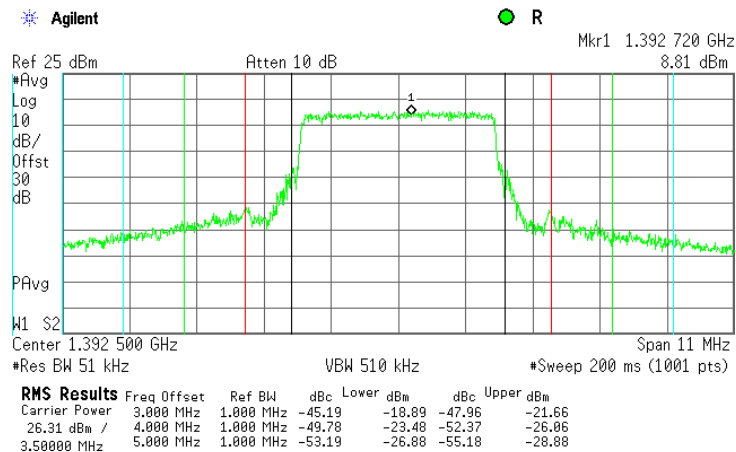


**Plot 7.3.25 Spurious emission measurements in 1395-1396 MHz, 1396-1397 MHz, 1397-1398 MHz ranges at high carrier frequency 1393.75 MHz, 2.5 MHz EBW, 64 QAM**

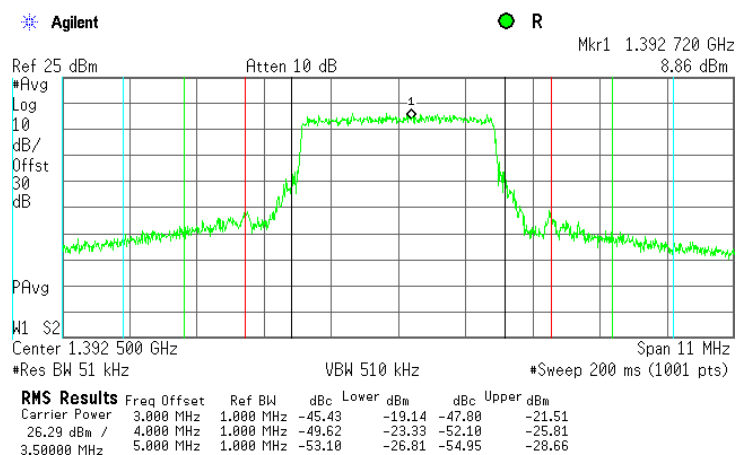


|                            |                                                        |                                |                               |
|----------------------------|--------------------------------------------------------|--------------------------------|-------------------------------|
| <b>Test specification:</b> | <b>Section 27.53(j), Conducted spurious emissions</b>  |                                |                               |
| <b>Test procedure:</b>     | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                                |                               |
| <b>Test mode:</b>          | Compliance                                             | <b>Verdict:</b>                | <b>PASS</b>                   |
| <b>Date:</b>               | 4/4/2011                                               |                                |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa                          | <b>Relative Humidity:</b> 48 % | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                                                        |                                |                               |

**Plot 7.3.26 Spurious emission measurements in 1387-1388 MHz, 1388-1389 MHz, 1389-1390 MHz, 1395-1396 MHz, 1396-1397 MHz, 1397-1398 MHz ranges at carrier frequency, 3.5 MHz EBW, BPSK**

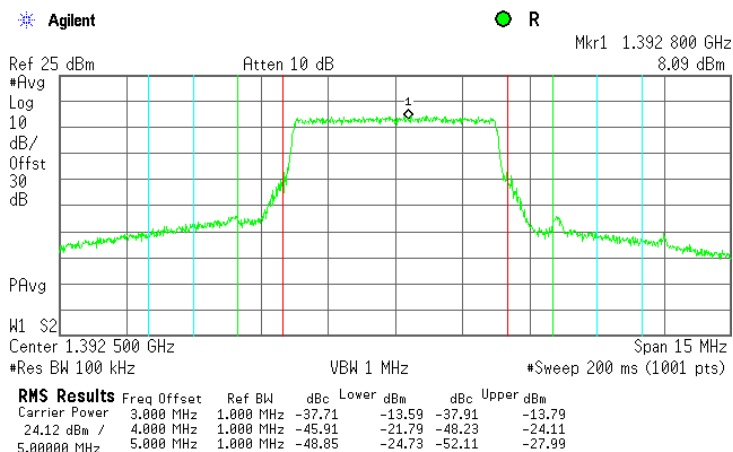


**Plot 7.3.27 28 Spurious emission measurements in 1387-1388 MHz, 1388-1389 MHz, 1389-1390 MHz, 1395-1396 MHz, 1396-1397 MHz, 1397-1398 MHz ranges at carrier frequency, 3.5 MHz EBW, 64 QAM**

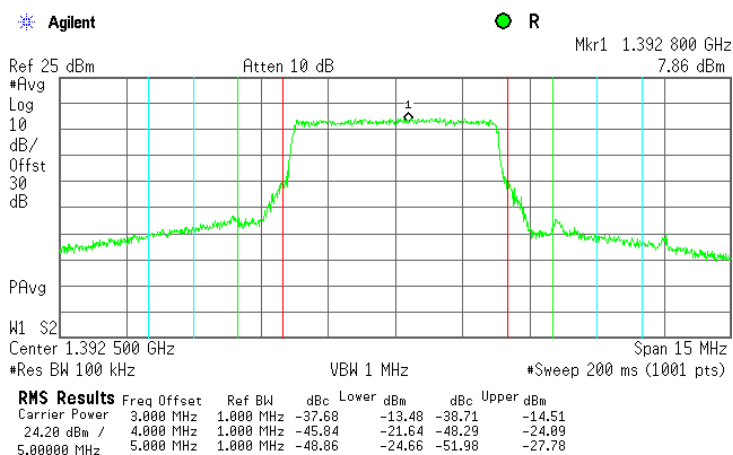


|                            |                                                        |                                |                               |
|----------------------------|--------------------------------------------------------|--------------------------------|-------------------------------|
| <b>Test specification:</b> | <b>Section 27.53(j), Conducted spurious emissions</b>  |                                |                               |
| <b>Test procedure:</b>     | 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13 |                                |                               |
| <b>Test mode:</b>          | Compliance                                             | <b>Verdict:</b>                | <b>PASS</b>                   |
| <b>Date:</b>               | 4/4/2011                                               |                                |                               |
| <b>Temperature:</b> 23 °C  | <b>Air Pressure:</b> 1011 hPa                          | <b>Relative Humidity:</b> 48 % | <b>Power Supply:</b> 120 V AC |
| <b>Remarks:</b>            |                                                        |                                |                               |

**Plot 7.3.29 Spurious emission measurements in 1387-1388 MHz, 1388-1389 MHz, 1389-1390 MHz, 1395-1396 MHz, 1396-1397 MHz, 1397-1398 MHz ranges at carrier frequency, 5 MHz EBW, BPSK**



**Plot 7.3.30 Spurious emission measurements in 1387-1388 MHz, 1388-1389 MHz, 1389-1390 MHz, 1395-1396 MHz, 1396-1397 MHz, 1397-1398 MHz ranges at carrier frequency, 5 MHz EBW, 64 QAM**



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

| HL No | Description                                                  | Manufacturer         | Model        | Ser. No.   | Last Cal. | Due Cal.  |
|-------|--------------------------------------------------------------|----------------------|--------------|------------|-----------|-----------|
| 1906  | Power Divider, 0.5-18.0 GHz, 80 W                            | Omni Spectra         | 2090-6204-00 | 1906       | 01-Dec-10 | 01-Dec-12 |
| 2951  | Cable, RF, 18 GHz, 0.9 m, SMA-SMA                            | Gore                 | 10020014     | NA         | 04-Oct-10 | 04-Oct-11 |
| 3301  | Power Meter, P-series, 50 MHz to 40 GHz                      | Agilent Technologies | N1911A       | MY45101057 | 13-Dec-10 | 13-Dec-11 |
| 3302  | Power sensor, P-Series, 50 MHz to 40 GHz, -35/30 to 20 dBm   | Agilent Technologies | N1922A       | MY45240586 | 13-Dec-10 | 13-Dec-11 |
| 3442  | Precision Fixed Attenuator, 50 Ohm, 5 W, 20 dB, DC to 18 GHz | Mini-Circuits        | BW-S20W5+    | NA         | 07-Mar-11 | 07-Mar-12 |
| 3763  | Precision Fixed Attenuator, 50 Ohm, 5 W, 20 dB, DC to 18 GHz | Mini-Circuits        | BW-S20W5+    | NA         | 07-Dec-10 | 07-Dec-11 |
| 3787  | Precision Fixed Attenuator, 50 Ohm, 5 W, 10 dB, DC to 18 GHz | Mini-Circuits        | BW-S10W5+    | NA         | 07-Dec-10 | 07-Dec-11 |
| 3818  | PSA Series Spectrum Analyzer, 3 Hz- 44 GHz                   | Agilent Technologies | E4446A       | MY48250288 | 25-Sep-09 | 25-Sep-11 |

## 9 APPENDIX B Measurement uncertainties

### Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

| Test description                                                  | Expanded uncertainty                                                                                                                                                                                                        |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Transmitter tests</b>                                          |                                                                                                                                                                                                                             |
| Carrier power conducted at antenna connector                      | $\pm 1.7$ dB                                                                                                                                                                                                                |
| Carrier power radiated (substitution method)                      | $\pm 4.5$ dB                                                                                                                                                                                                                |
| Occupied bandwidth                                                | $\pm 8\%$                                                                                                                                                                                                                   |
| 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 |
| Spurious emissions radiated 30 MHz – 40 GHz (substitution method) | $\pm 4.5$ dB                                                                                                                                                                                                                |
| Frequency error                                                   | 30 – 300 MHz: $\pm 50.5$ Hz (1.68 ppm)<br>300 – 1000 MHz: $\pm 168$ Hz (0.56 ppm)                                                                                                                                           |
| Transient frequency behaviour                                     | 187 Hz<br>$\pm 13.9\%$                                                                                                                                                                                                      |
| Duty cycle, timing (Tx ON / OFF) and average factor measurements  | $\pm 1.0\%$                                                                                                                                                                                                                 |

Hermon Laboratories is accredited by A2LA for calibration according to present requirements of ISO/IEC 17025 and NCSL Z540-1. The accreditation is granted to perform calibration of parameters that are listed in the Scope of Hermon Laboratories Accreditation.

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), Registration Numbers 90624 for OATS and 90623 for the anechoic chamber; by Industry Canada for electromagnetic emissions (file numbers IC 2186A-1 for OATS, IC 2186A-2 for anechoic chamber, IC 2186A-3 for full-anechoic chamber for RE measurements above 1 GHz), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, G-27 for full-anechoic chamber for RE measurements above 1 GHz, C-845 for conducted emissions site, T-1606 for conducted emissions at telecommunication ports), has a status of a Telefication - Listed Testing Laboratory, Certificate No. L138/00. 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). The FCC Designation Number is US1003.

Address: P.O. Box 23, Binyamina 30500, Israel.  
Telephone: +972 4628 8001  
Fax: +972 4628 8277  
e-mail: mail@hermonlabs.com  
website: www.hermonlabs.com

Person for contact: Mr. Alex Usoskin, CEO.

## 11 APPENDIX D Specification references

|                         |                                                                                                                                                                      |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FCC 47CFR part 27: 2010 | Miscellaneous wireless communications services                                                                                                                       |
| FCC 47CFR part 1: 2010  | Practice and procedure                                                                                                                                               |
| FCC 47CFR part 2: 2010  | Frequency allocations and radio treaty matters; general rules and regulations                                                                                        |
| 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. |
| ANSI/TIA/EIA-603-C:2004 | Land Mobile FM or PM Communications Equipment Measurement and Performance Standards                                                                                  |

## 12 APPENDIX E Test equipment correction factors

Cable loss  
Cable coaxial, Gore, 18 GHz, 0.9 m, SMA-SMA, S/N 10020014  
HL 2951

| Frequency,<br>MHz | Cable loss,<br>dB | Frequency,<br>MHz | Cable loss,<br>dB | Frequency,<br>MHz | Cable loss,<br>dB |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 10                | 0.07              | 5750              | 0.77              | 12000             | 1.23              |
| 30                | 0.06              | 6000              | 0.78              | 12250             | 1.25              |
| 100               | 0.09              | 6250              | 0.81              | 12500             | 1.26              |
| 250               | 0.15              | 6500              | 0.83              | 12750             | 1.26              |
| 500               | 0.21              | 6750              | 0.84              | 13000             | 1.30              |
| 750               | 0.27              | 7000              | 0.85              | 13250             | 1.30              |
| 1000              | 0.31              | 7250              | 0.88              | 13500             | 1.30              |
| 1250              | 0.36              | 7500              | 0.88              | 13750             | 1.29              |
| 1500              | 0.38              | 7750              | 0.93              | 14000             | 1.23              |
| 1750              | 0.42              | 8000              | 0.92              | 14250             | 1.32              |
| 2000              | 0.44              | 8250              | 0.94              | 14500             | 1.27              |
| 2250              | 0.47              | 8500              | 0.99              | 14750             | 1.27              |
| 2500              | 0.50              | 8750              | 0.97              | 15000             | 1.34              |
| 2750              | 0.52              | 9000              | 1.01              | 15250             | 1.36              |
| 3000              | 0.54              | 9250              | 1.05              | 15500             | 1.35              |
| 3250              | 0.57              | 9500              | 1.08              | 15750             | 1.36              |
| 3500              | 0.58              | 9750              | 1.10              | 16000             | 1.43              |
| 3750              | 0.61              | 10000             | 1.09              | 16250             | 1.38              |
| 4000              | 0.63              | 10250             | 1.09              | 16500             | 1.42              |
| 4250              | 0.66              | 10500             | 1.07              | 16750             | 1.49              |
| 4500              | 0.68              | 10750             | 1.10              | 17000             | 1.53              |
| 4750              | 0.70              | 11000             | 1.09              | 17250             | 1.59              |
| 5000              | 0.71              | 11250             | 1.09              | 17500             | 1.65              |
| 5250              | 0.74              | 11500             | 1.13              | 17750             | 1.82              |
| 5500              | 0.77              | 11750             | 1.12              | 18000             | 2.09              |

## 13 APPENDIX F Abbreviations and acronyms

|                |                                             |
|----------------|---------------------------------------------|
| A              | ampere                                      |
| AC             | alternating current                         |
| A/m            | ampere per meter                            |
| AM             | amplitude modulation                        |
| AVRG           | average (detector)                          |
| CBW            | channel bandwidth                           |
| 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         |
| dB $\Omega$    | decibel referred to one Ohm                 |
| DC             | direct current                              |
| EBW            | emission bandwidth                          |
| EIRP           | equivalent isotropically radiated power     |
| ERP            | effective radiated power                    |
| EUT            | equipment under test                        |
| F              | frequency                                   |
| GHz            | gigahertz                                   |
| GND            | ground                                      |
| H              | height                                      |
| HL             | Hermon laboratories                         |
| Hz             | hertz                                       |
| k              | kilo                                        |
| kHz            | kilohertz                                   |
| LO             | local oscillator                            |
| m              | meter                                       |
| MHz            | megahertz                                   |
| min            | minute                                      |
| mm             | millimeter                                  |
| ms             | millisecond                                 |
| $\mu$ s        | microsecond                                 |
| NA             | not applicable                              |
| NB             | narrow band                                 |
| NT             | not tested                                  |
| OATS           | open area test site                         |
| $\Omega$       | Ohm                                         |
| QP             | quasi-peak                                  |
| PM             | pulse modulation                            |
| PS             | power supply                                |
| RE             | radiated emission                           |
| RF             | radio frequency                             |
| rms            | root mean square                            |
| Rx             | receive                                     |
| s              | second                                      |
| T              | temperature                                 |
| Tx             | transmit                                    |
| V              | volt                                        |
| VA             | volt-ampere                                 |

END OF DOCUMENT