

# 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.

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## 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


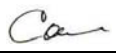


**Project ID:** 21822  
**Location:** Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel  
**Test started:** 4/3/2011  
**Test completed:** 4/5/2011  
**Test specification(s):** FCC part 27

## 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 AIRRAD_FCC.19957_MM
Section 27.54, Frequency stability	Pass, refer to test report 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

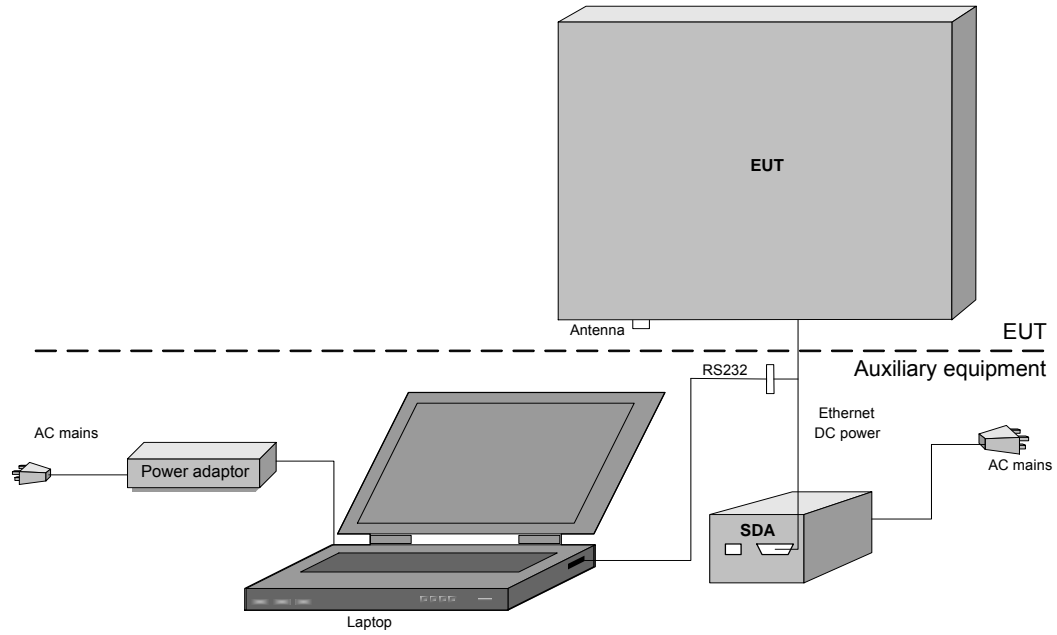
### 6.3 Support and test equipment

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>			
V	Stand-alone (Equipment with or without its own control provisions)		
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)		
	Plug-in card (Equipment intended for a variety of host systems)		
<b>Intended use</b>		<b>Condition of use</b>	
V	fixed	Always at a distance more than 2 m from all people	
	mobile	Always at a distance more than 20 cm from all people	
	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 Ω RF output connector	27.26 dBm
<b>Is transmitter output power variable?</b>			
		No	continuous variable
V	Yes	V	stepped variable with stepsize 0.5 dB
			minimum RF power -30 dBm
			maximum RF power 27.26 dBm
<b>Antenna connection</b>			
unique coupling	V	standard connector	Integral V with temporary RF connector 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>	
1.5 MHz		0.6285 1.2570 3.7695 5.6550	
2.5 MHz		1.0475 2.095 6.2825 9.425	
3.5 MHz		1.466 2.933 8.795 13.195	
5 MHz		2.095 4.19 12.565 18.85	
		<b>Type of modulation</b>	
		BPSK	
		QPSK	
		16QAM	
		64QAM	
		BPSK	
		QPSK	
		16QAM	
		64QAM	
		BPSK	
		QPSK	
		16QAM	
		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>			
		<b>Nominal rated voltage</b>	Battery type
V	DC	48 VDC via SDA	
	AC mains	120 V	Frequency 60 Hz
<b>Common power source for transmitter and receiver</b>		V	yes no

<b>Test specification:</b> Section 27.50(e)(1), Peak output power			
<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> 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 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> Section 27.50(e)(1), Peak output power	
<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> 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>	

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				
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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

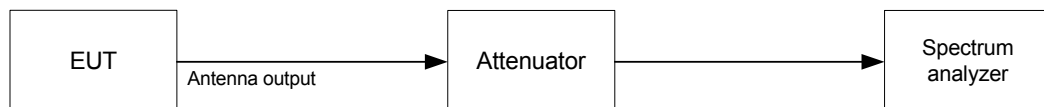
7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and its proper operation was checked.

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>		<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>					

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

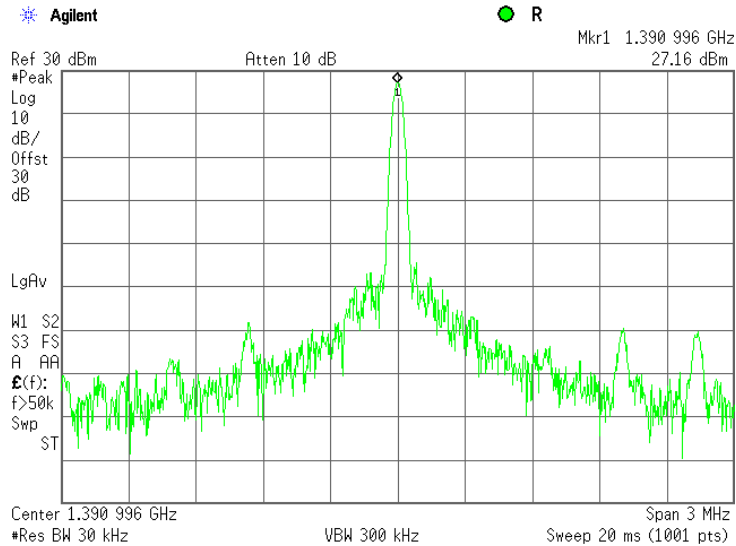
Reference numbers of test equipment used

HL 1906	HL 2951	HL 3301	HL 3302	HL 3763	HL 3787	HL 3818	
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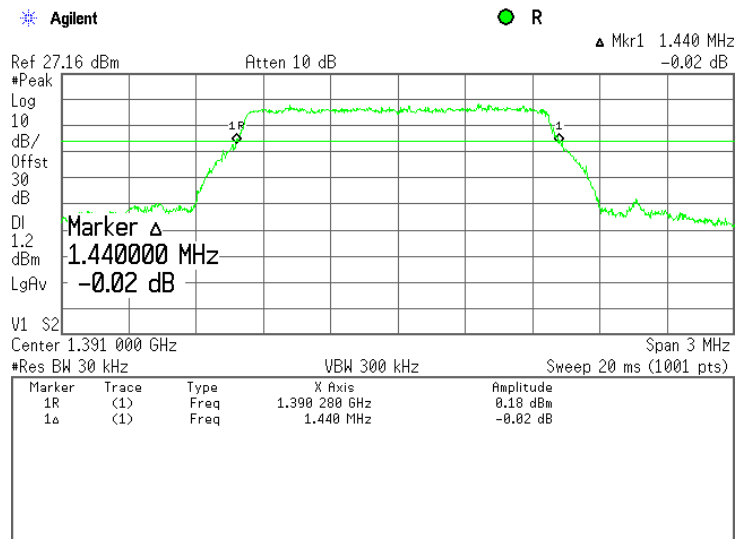
Full description is given in Appendix A.

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

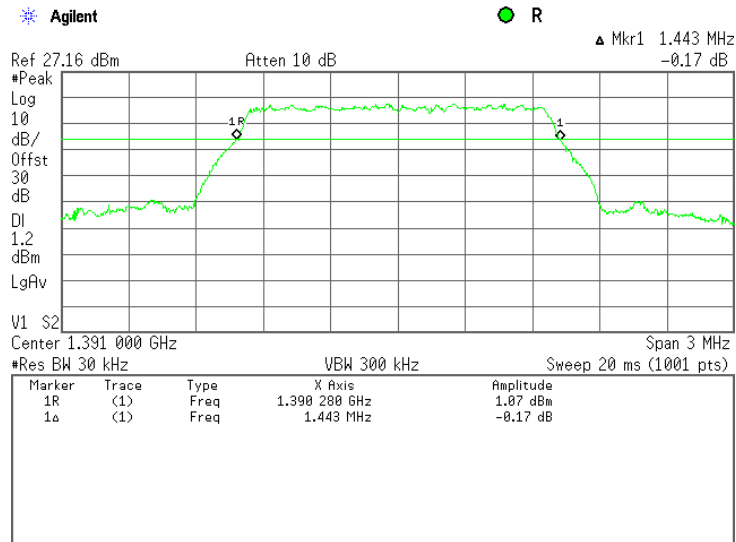


Plot 7.2.2 Occupied bandwidth test result at 1391.0 MHz, 1.5 MHz EBW, BPSK

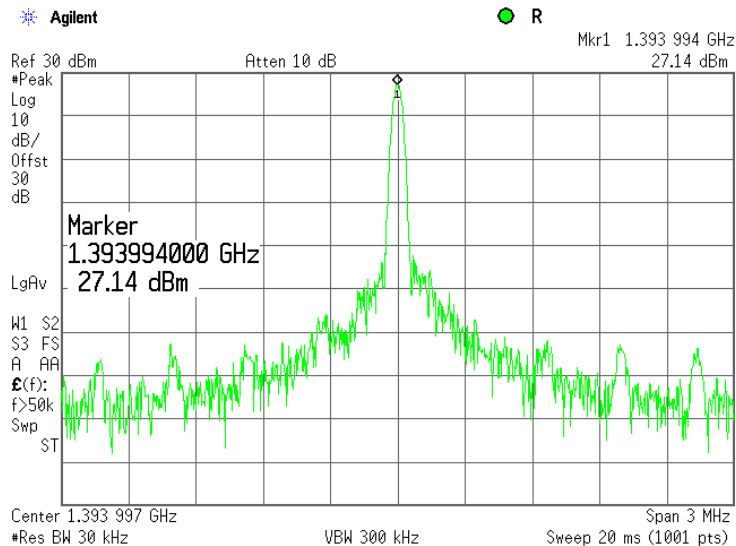


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date:</b>	4/5/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 49 %	<b>Power Supply:</b>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

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

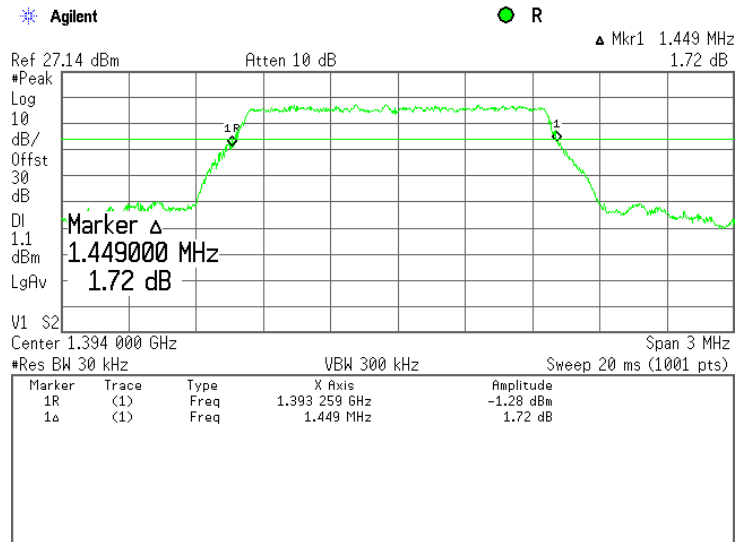


Plot 7.2.4 Occupied bandwidth test result at 1394.0 MHz reference level, unmodulated, 1.5 MHz EBW

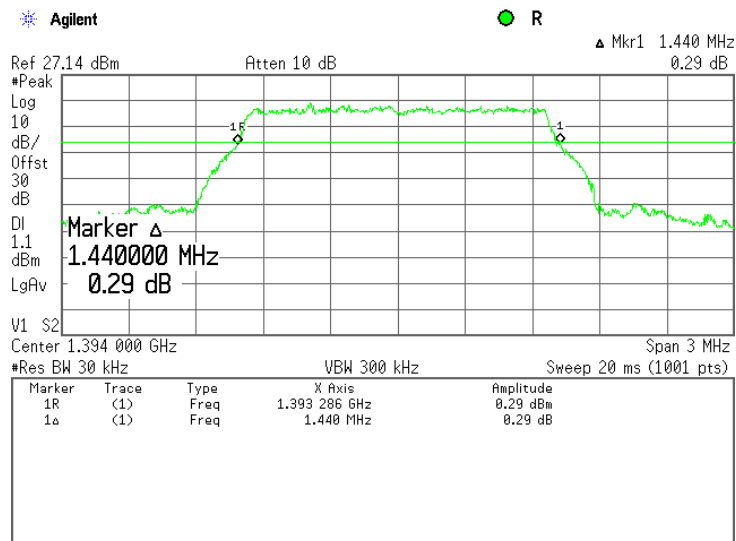


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	4/5/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 49 %	<b>Power Supply: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

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

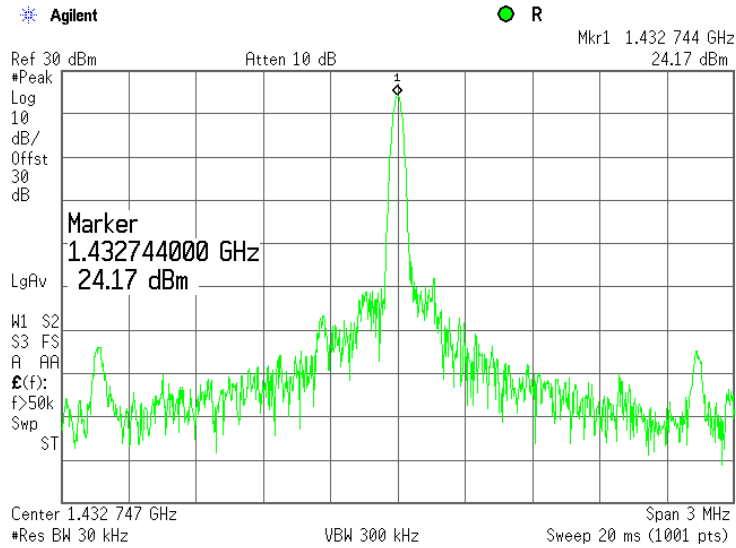


Plot 7.2.6 Occupied bandwidth test result at 1394 MHz 1.5 MHz EBW, 64QAM

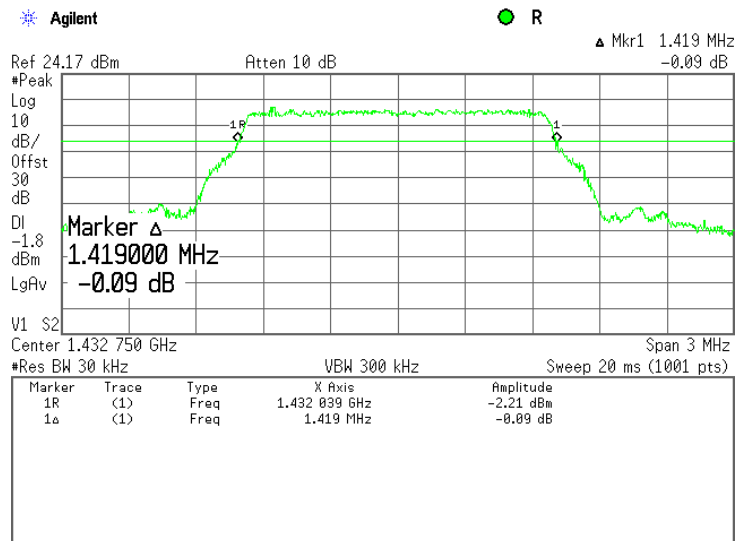


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	4/5/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 49 %	<b>Power Supply: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

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



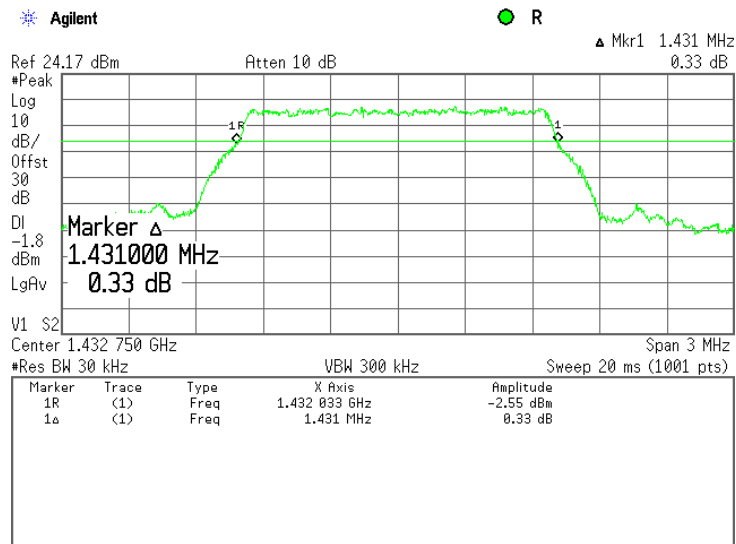
Plot 7.2.8 Occupied bandwidth test result at 1432.75 MHz, 1.5 MHz EBW, BPSK



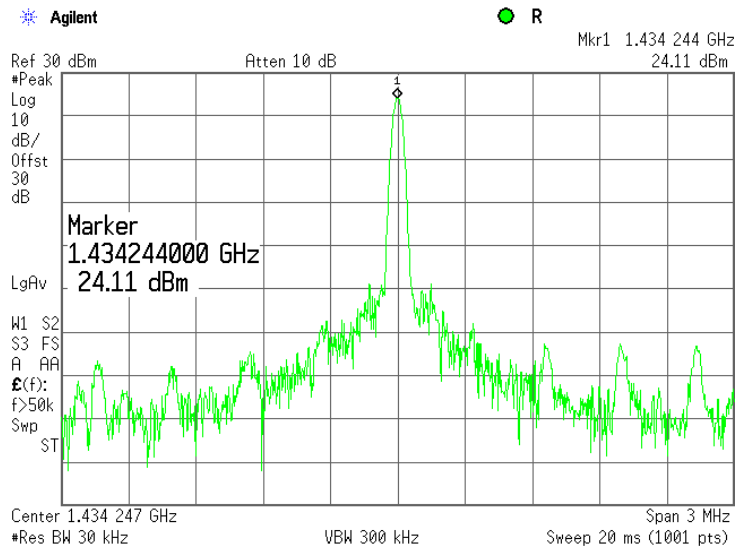


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	4/5/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 49 %	<b>Power Supply: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

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

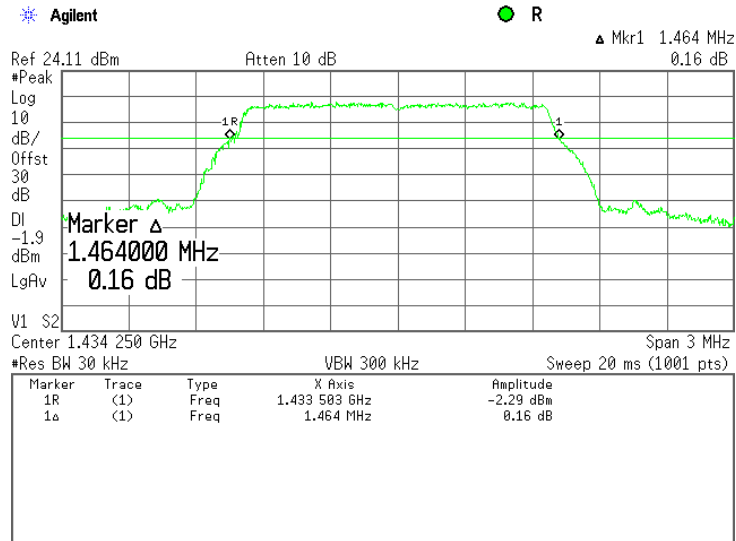


Plot 7.2.10 Occupied bandwidth test result at 1434.25 MHz reference level, unmodulated, 1.5 MHz EBW

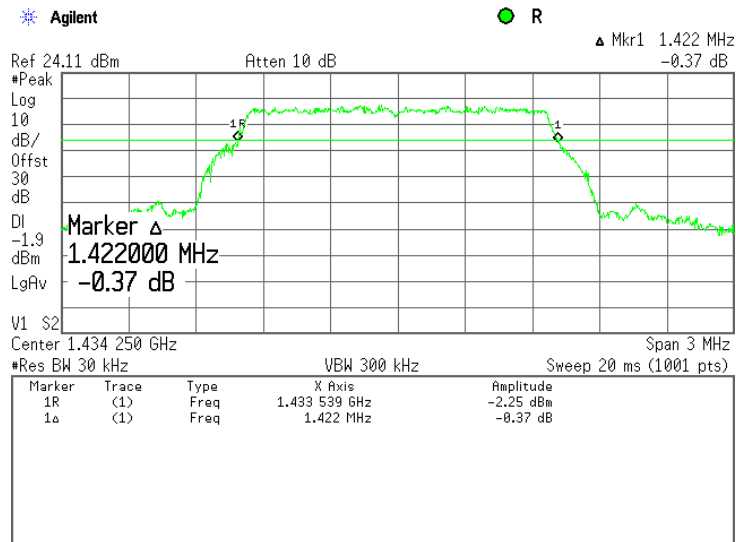


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date:</b>	4/5/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 49 %	<b>Power Supply:</b>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

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

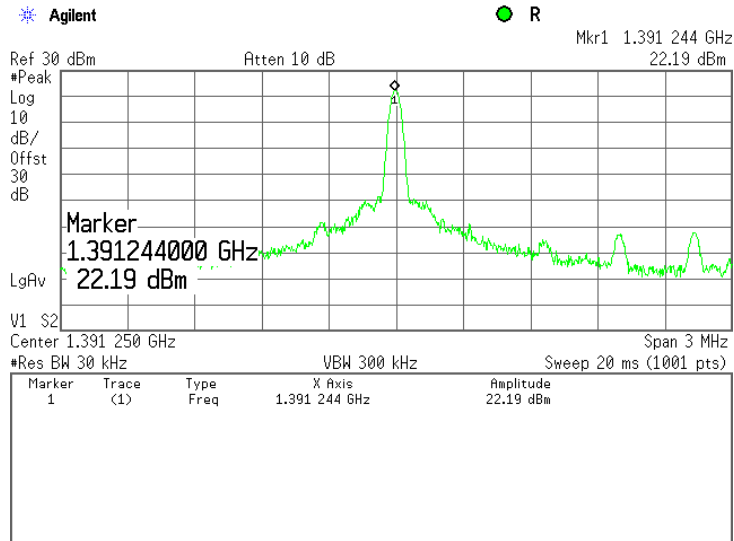


Plot 7.2.12 Occupied bandwidth test result at 1434.25 MHz, 1.5 MHz EBW, 64QAM

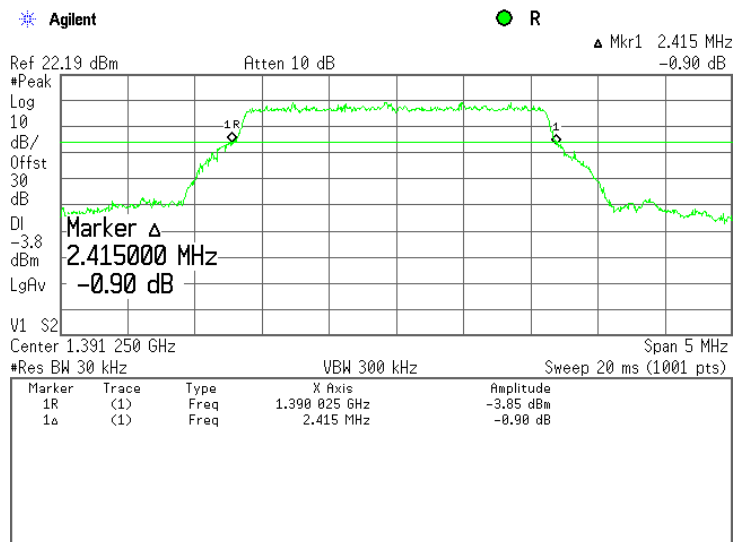


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	4/5/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 49 %	<b>Power Supply: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

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

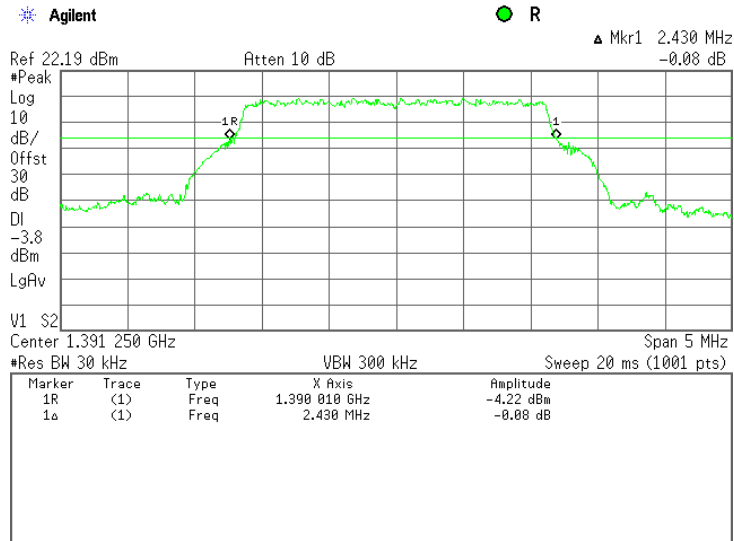


Plot 7.2.14 Occupied bandwidth test result at 1391.25 MHz, 2.5 MHz EBW, BPSK

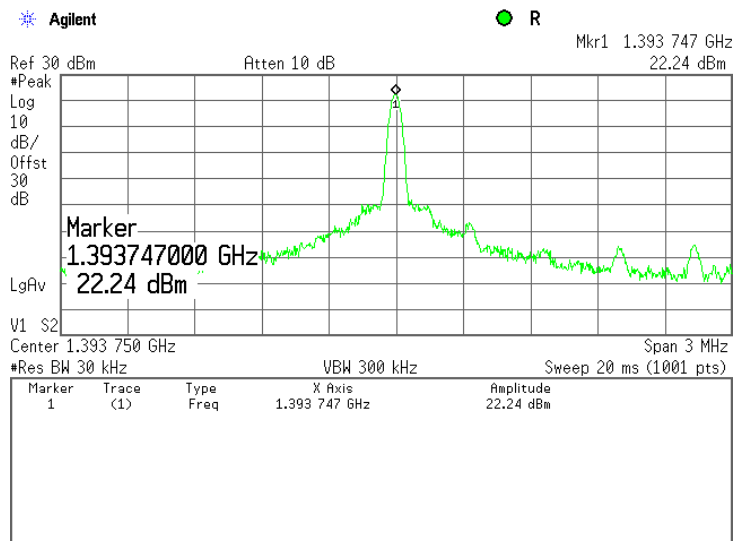


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	4/5/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 49 %	<b>Power Supply: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

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

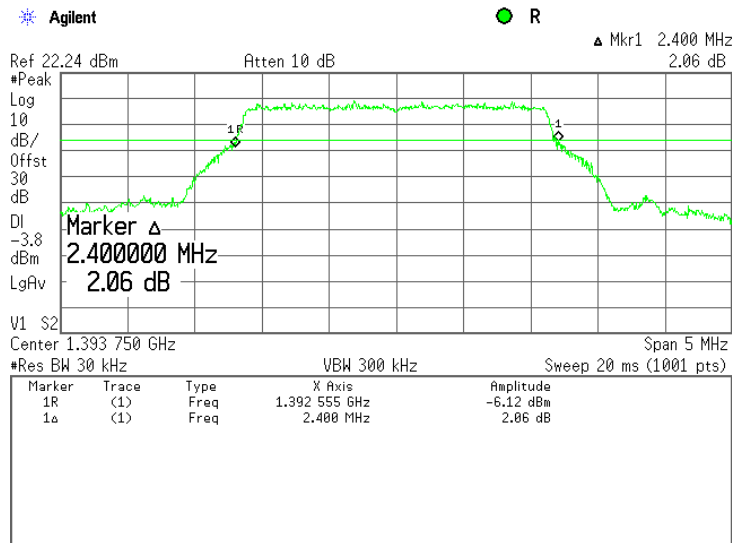


Plot 7.2.16 Occupied bandwidth test result at 1393.75 MHz reference level, unmodulated, 2.5 MHz EBW

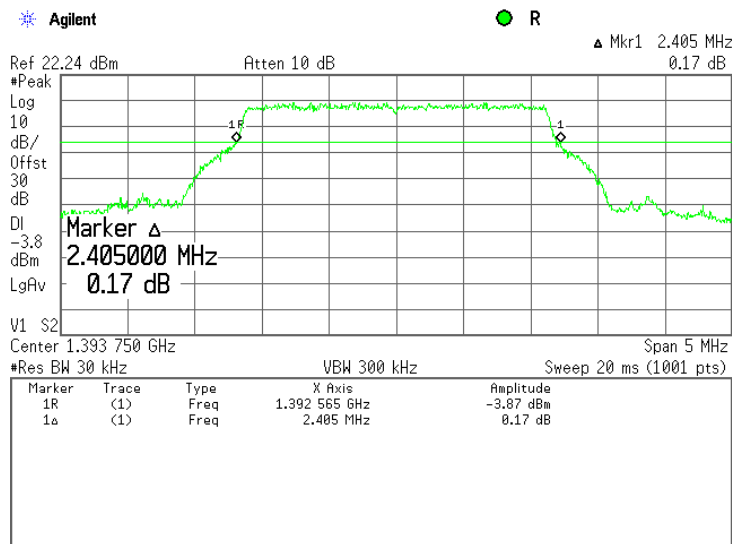


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	4/5/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 49 %	<b>Power Supply: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

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

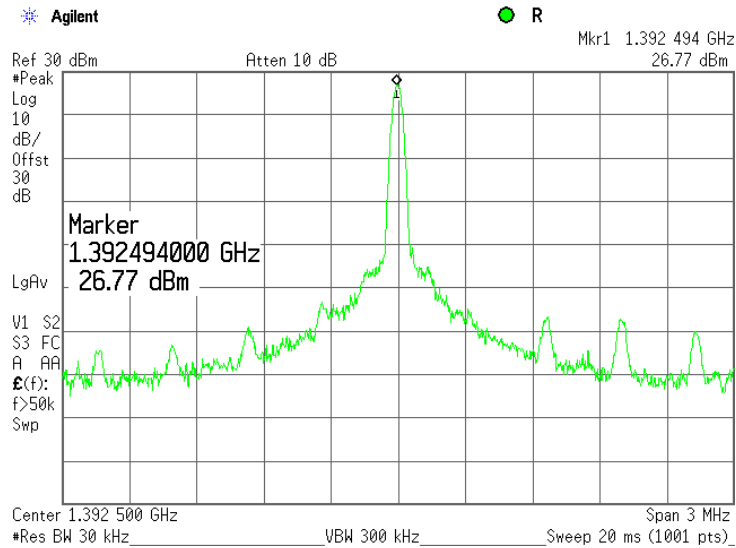


Plot 7.2.18 Occupied bandwidth test result at 1393.75 MHz, 2.5 MHz EBW, 64QAM

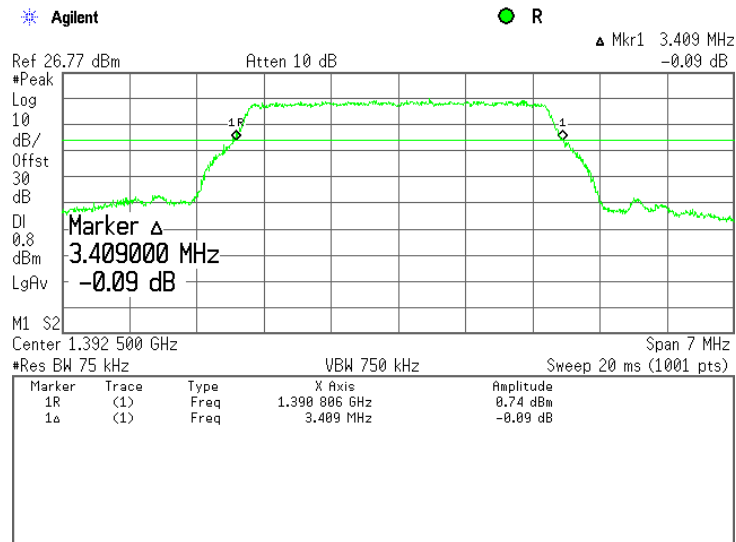


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	4/5/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 49 %	<b>Power Supply: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

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

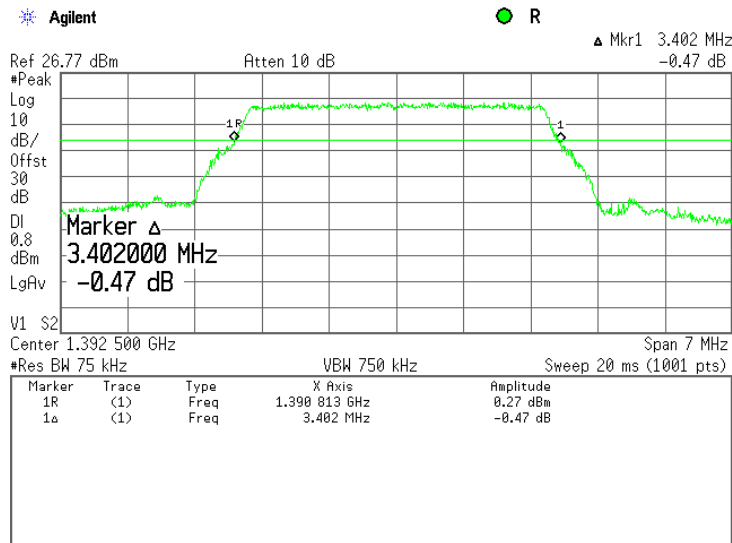


Plot 7.2.20 Occupied bandwidth test result at 1392.5 MHz, 3.5 MHz EBW, BPSK

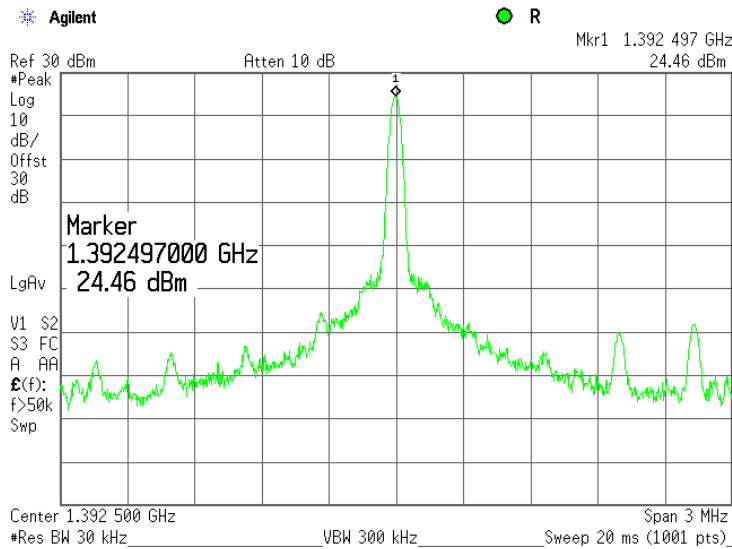


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	4/5/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 49 %	<b>Power Supply: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

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

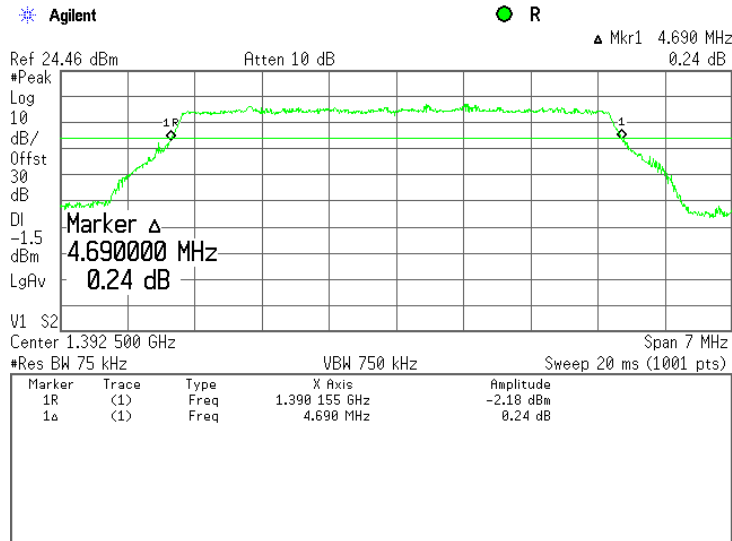


Plot 7.2.22 Occupied bandwidth test result at 1392.5 MHz reference level, unmodulated, 5 MHz EBW

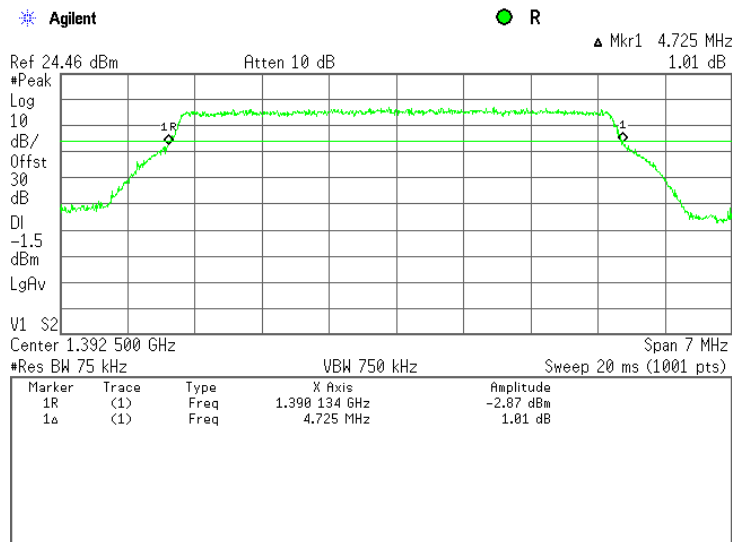


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	4/5/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 49 %	<b>Power Supply: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

Plot 7.2.23 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>	<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>			

### 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

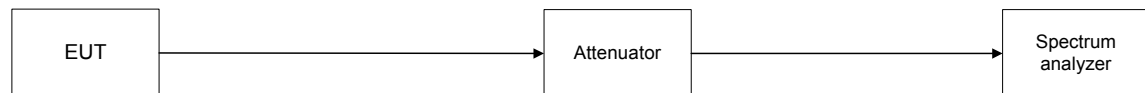
**7.3.2.1** The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.

**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



<b>Test specification:</b> Section 27.53(j), Conducted spurious emissions			
<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>			

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
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Full description is given in Appendix A.



HERMON LABORATORIES

<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
<b>EMISSION BANDWIDTH 3.5 MHz</b>								
<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> Section 27.53(j), Conducted spurious emissions	
<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>	

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

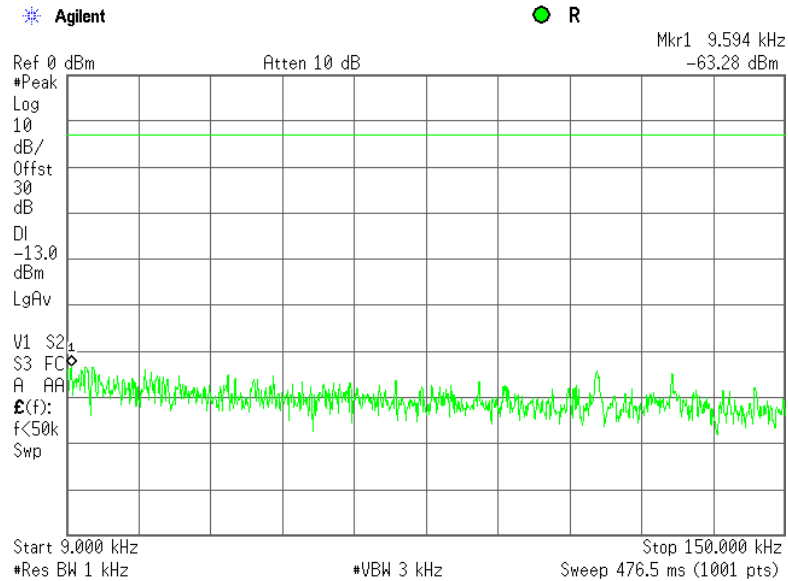
Reference numbers of test equipment used

HL 1906	HL 2951	HL 3301	HL 3302	HL 3763	HL 3787	HL 3818
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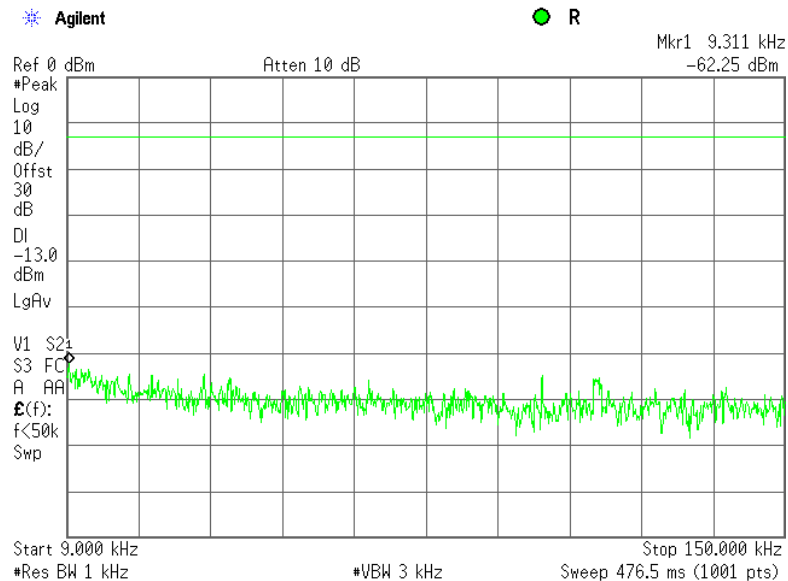
Full description is given in Appendix A.

<b>Test specification:</b> Section 27.53(j), Conducted spurious emissions			
<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

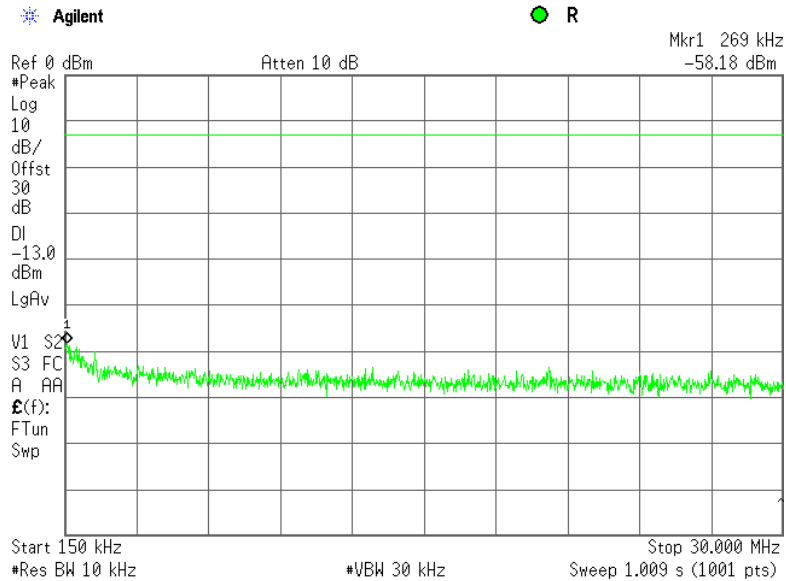


Plot 7.3.2 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency

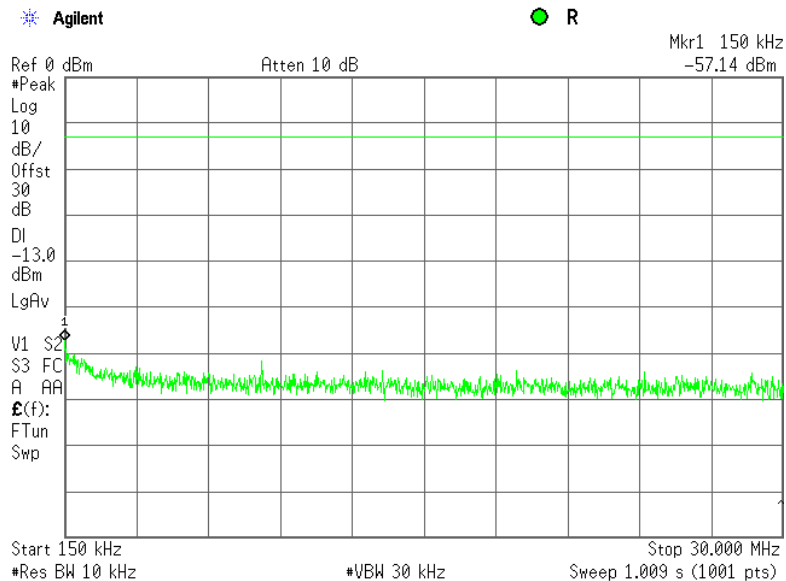


<b>Test specification:</b> Section 27.53(j), Conducted spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 4/4/2011			
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	<b>Relative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

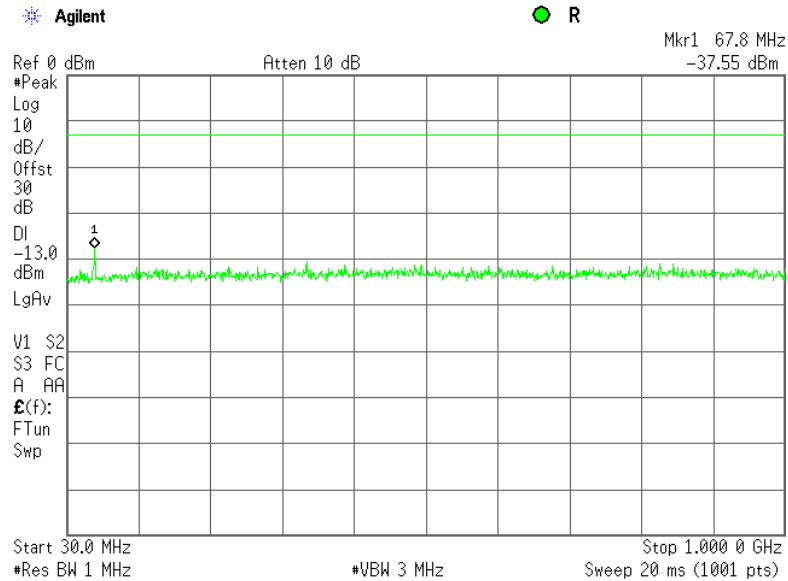


Plot 7.3.4 Spurious emission measurements in 0.15 - 30.0 MHz range at high carrier frequency

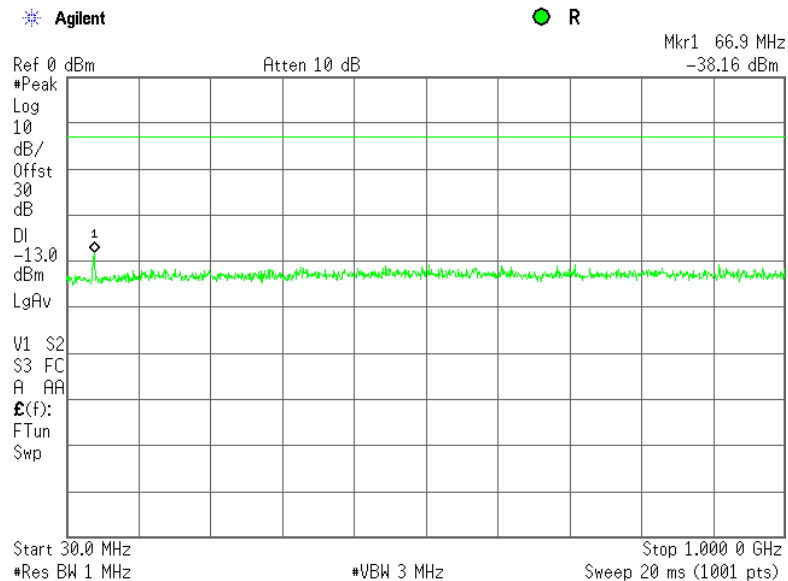


<b>Test specification:</b> Section 27.53(j), Conducted spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 4/4/2011			
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	<b>Relative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

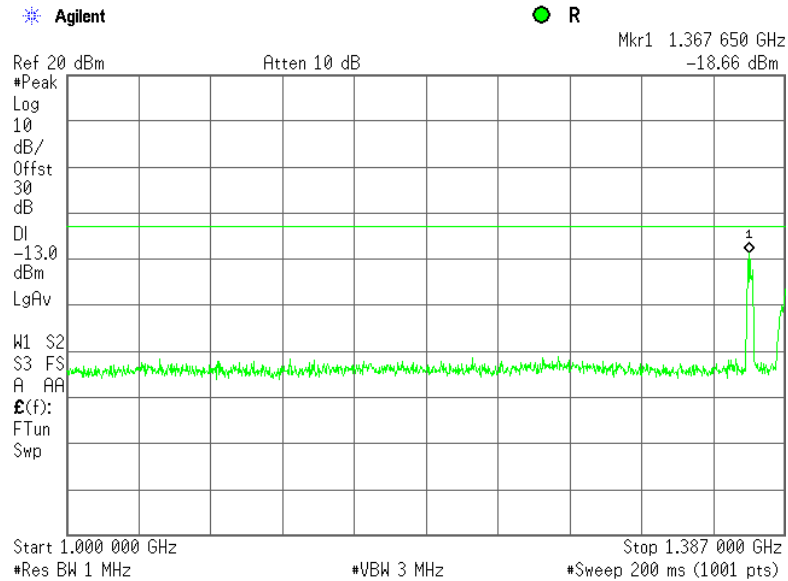


Plot 7.3.6 Spurious emission measurements in 30.0 - 1000 MHz range at high carrier frequency

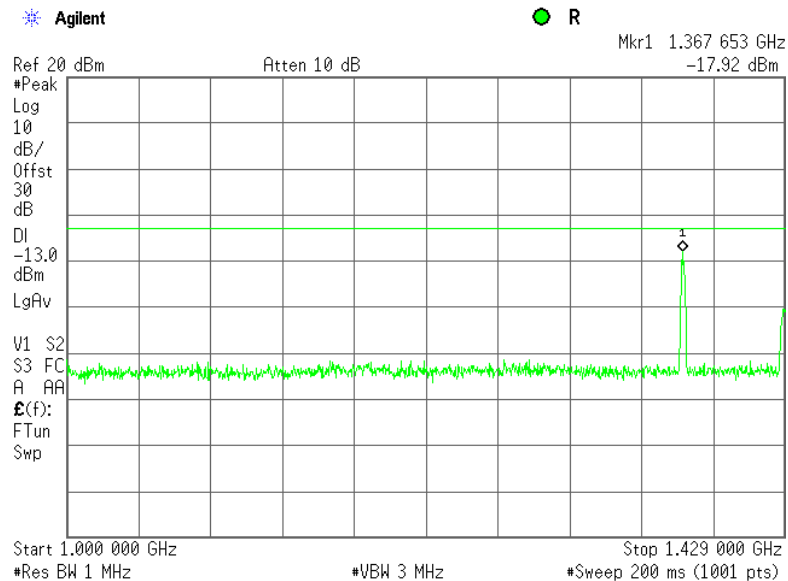


<b>Test specification:</b> Section 27.53(j), Conducted spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 4/4/2011			
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	<b>Relative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



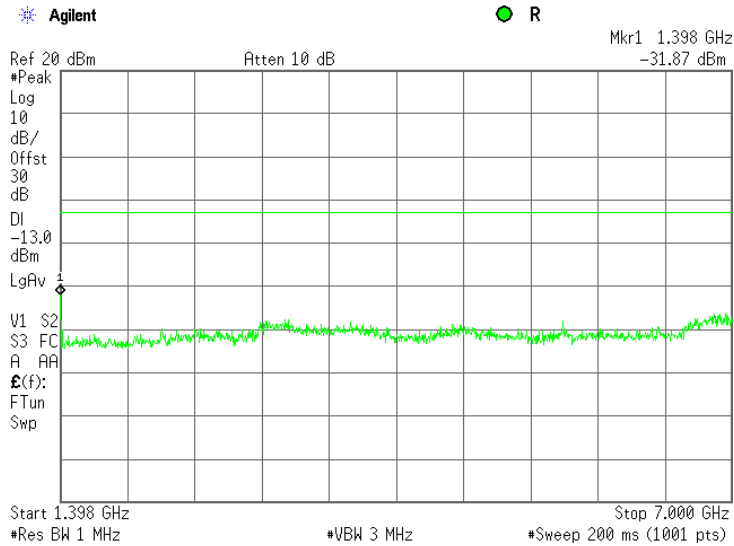
Plot 7.3.8 Spurious emission measurements in 1000 - 1429 MHz at high carrier frequency



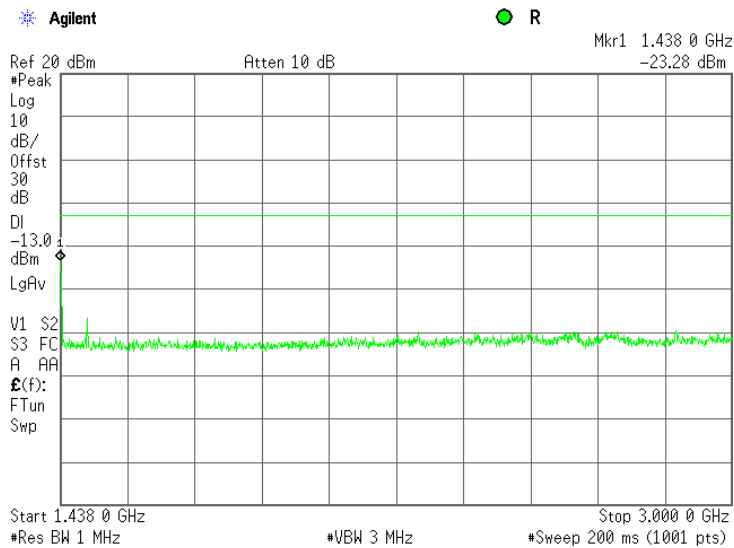


<b>Test specification:</b>	<b>Section 27.53(j), Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	4/4/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	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

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

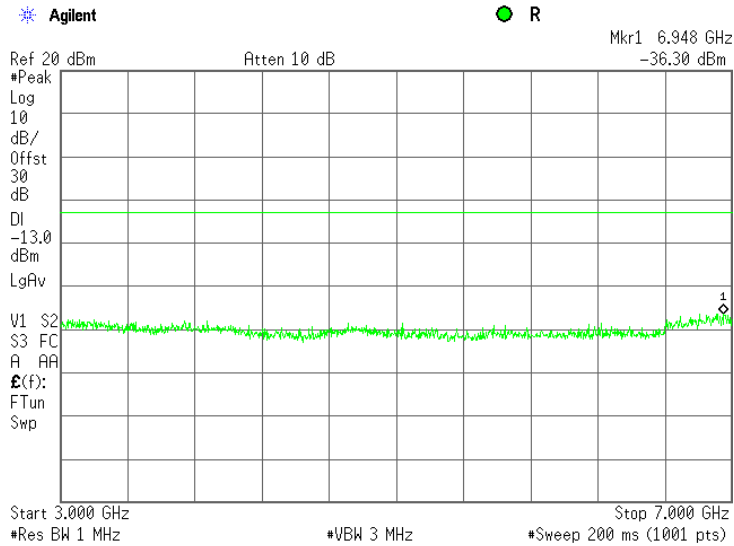


Plot 7.3.10 Spurious emission measurements in 1438 - 3000 MHz range at high carrier frequency

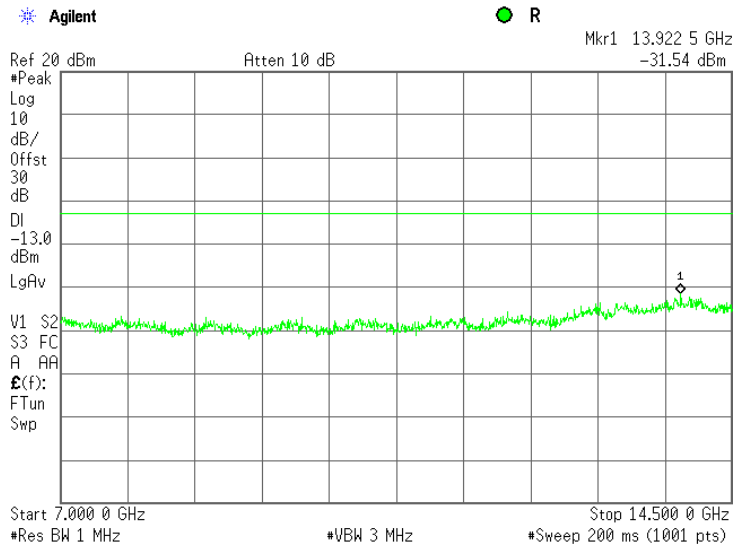


<b>Test specification:</b> Section 27.53(j), Conducted spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 4/4/2011			
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	<b>Relative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

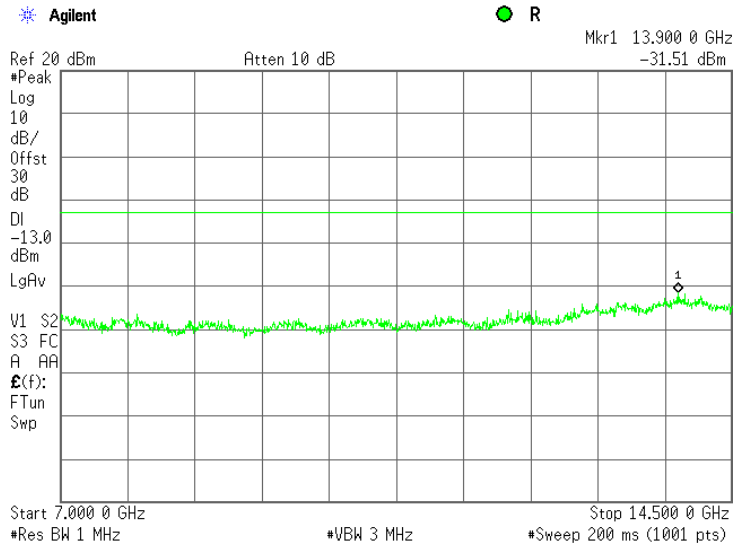


Plot 7.3.12 Spurious emission measurements in 7000-14500 MHz at low carrier frequency



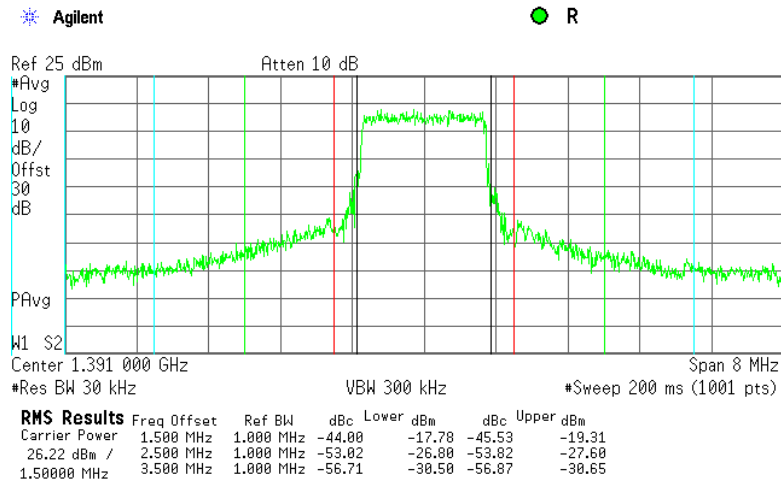
<b>Test specification:</b>		<b>Section 27.53(j), Conducted spurious emissions</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date:</b>	4/4/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	<b>Relative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

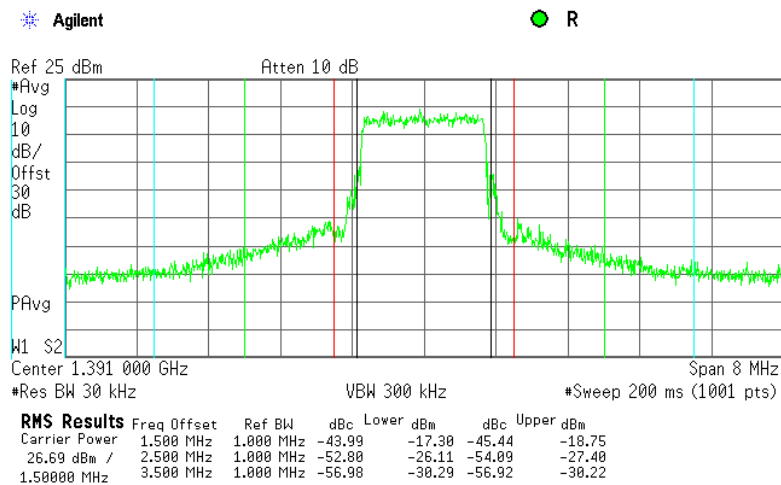


<b>Test specification:</b> Section 27.53(j), Conducted spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 4/4/2011			
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	<b>Relative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

Plot 7.3.14 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

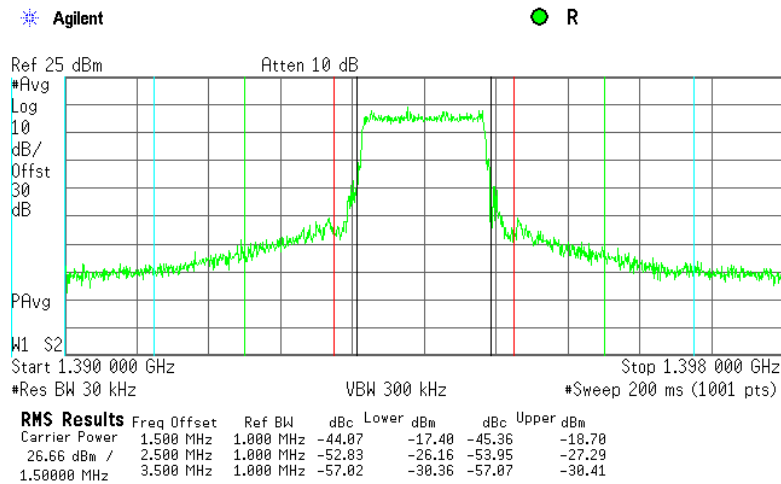


Plot 7.3.15 Spurious emission measurements in 1387-1388 MHz, 1388 – 1389 MHz, 1389 – 1390 MHz ranges, at low carrier frequency 1391 MHz, 1.5 MHz EBW, 64QAM

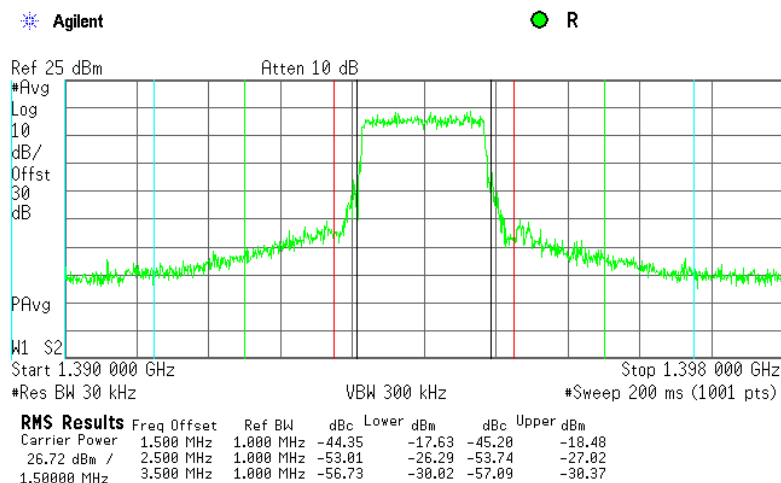


<b>Test specification:</b> Section 27.53(j), Conducted spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 4/4/2011			
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	<b>Relative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

Plot 7.3.16 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

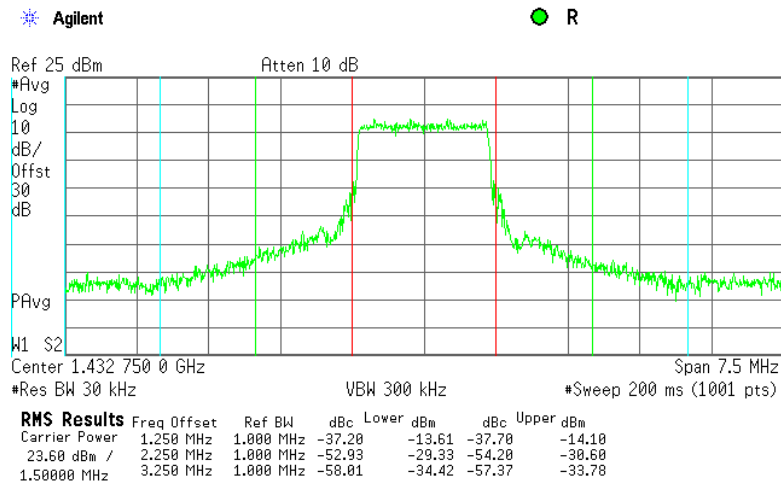


Plot 7.3.17 Spurious emission measurements in 1395-1396 MHz, 1396-1397 MHz, 1397-1398 MHz ranges at high carrier frequency 1394 MHz, 1.5 MHz EBW, 64QAM

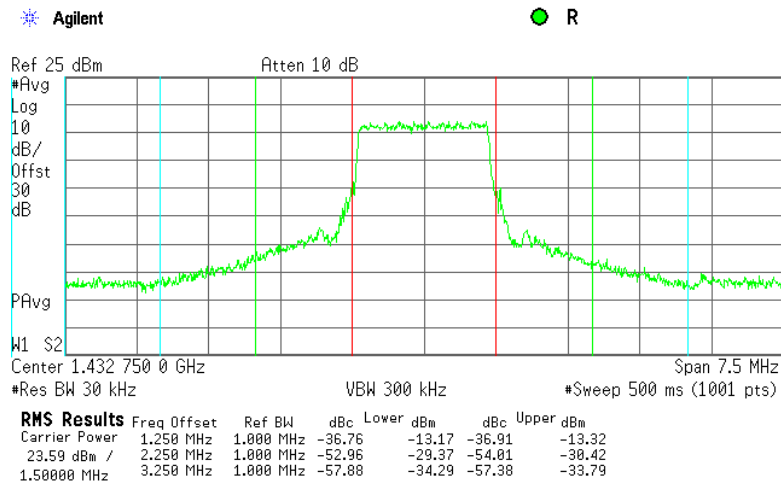


<b>Test specification:</b> Section 27.53(j), Conducted spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 4/4/2011			
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	<b>Relative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

Plot 7.3.18 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

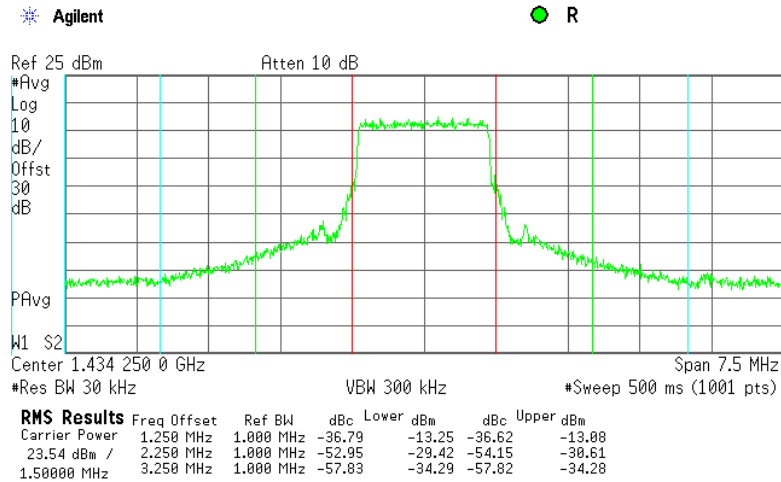


Plot 7.3.19 Spurious emission measurements in 1435-1436 MHz, 1436-1437 MHz, 1437-1438 MHz ranges at low carrier frequency 1432.75 MHz, 1.5 MHz EBW, 64 QAM

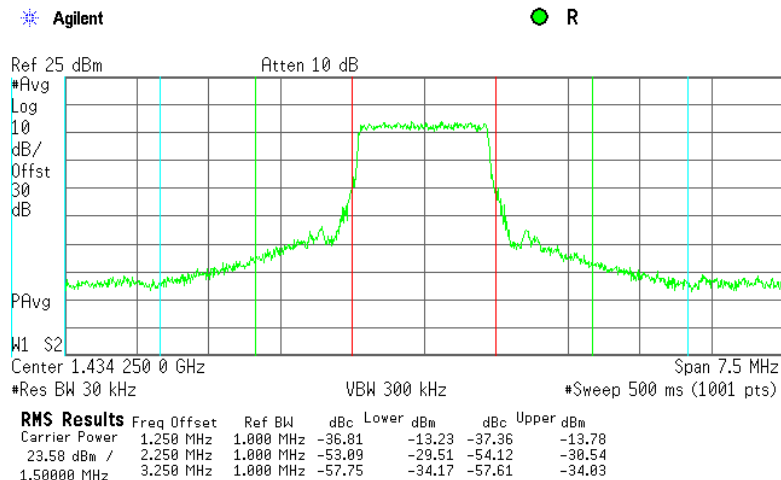


<b>Test specification:</b>	<b>Section 27.53(j), Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	4/4/2011		
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	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

**Plot 7.3.20 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**

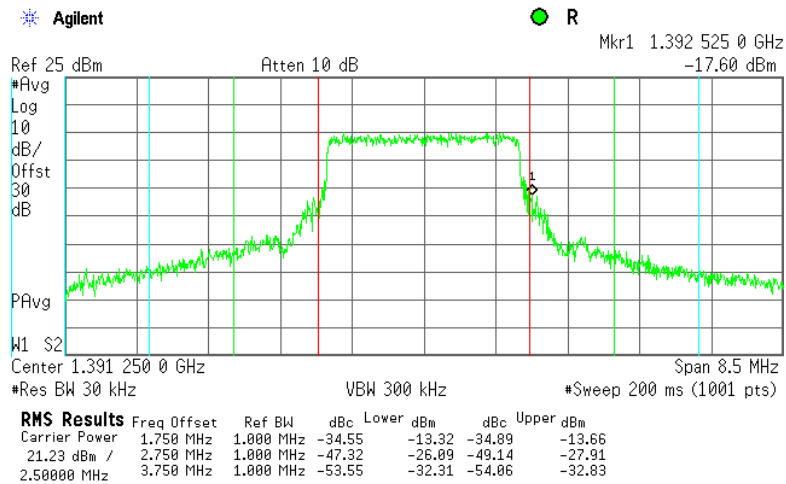


**Plot 7.3.21 Spurious emission measurements in 1435-1436 MHz, 1436-1437 MHz, 1437-1438 MHz ranges at high carrier frequency 1434.25 MHz, 1.5 MHz EBW, 64 QAM**

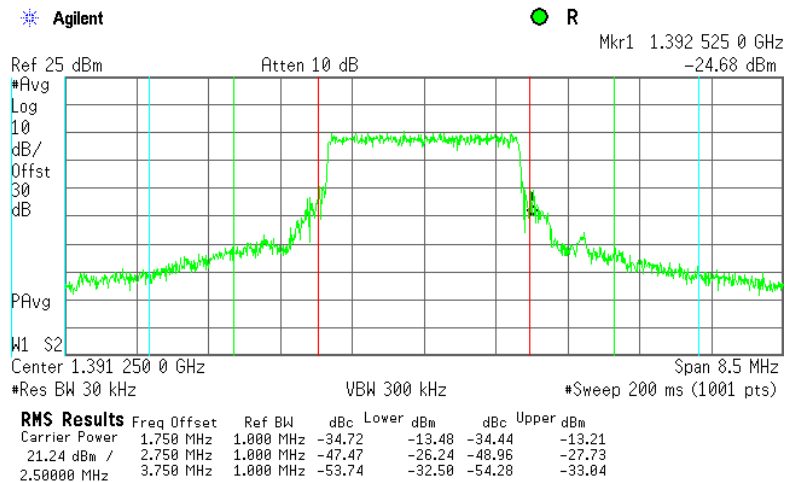


<b>Test specification:</b> Section 27.53(j), Conducted spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 4/4/2011			
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	<b>Relative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



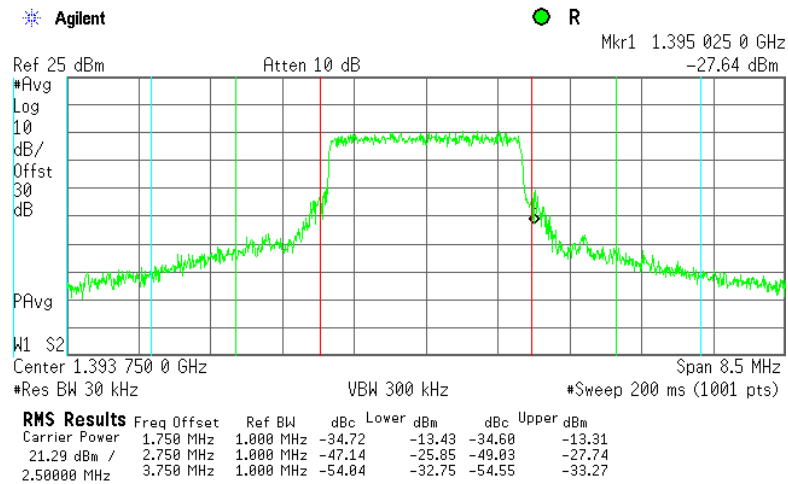
Plot 7.3.23 Spurious emission measurements in 1387-1388 MHz, 1388-1389 MHz, 1389-1390 MHz ranges at low carrier frequency 1391.25 MHz, 2.5 MHz EBW, 64 QAM



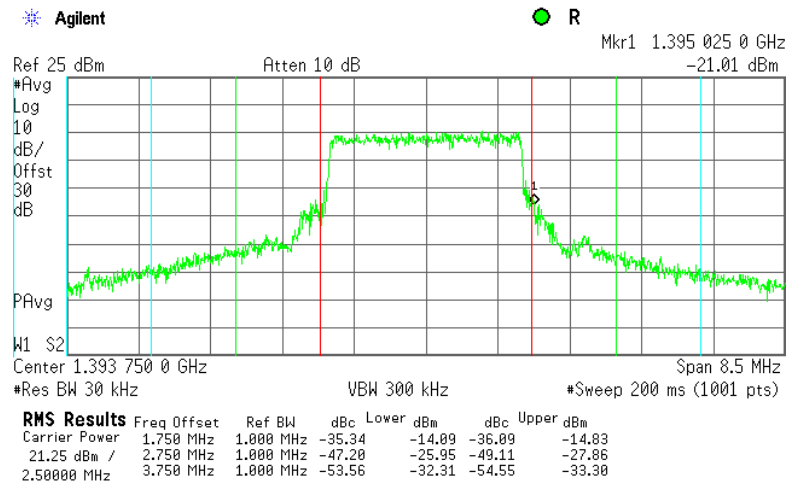


<b>Test specification:</b> Section 27.53(j), Conducted spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 4/4/2011			
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	<b>Relative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

Plot 7.3.24 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

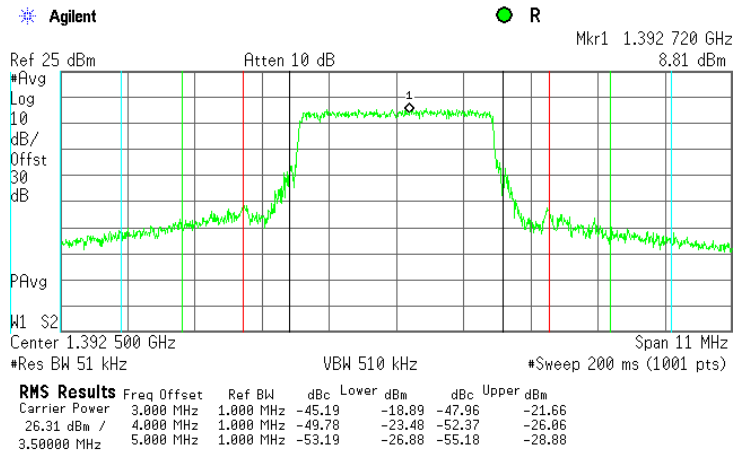


Plot 7.3.25 Spurious emission measurements in 1395-1396 MHz, 1396-1397 MHz, 1397-1398 MHz ranges at high carrier frequency 1393.75 MHz, 2.5 MHz EBW, 64 QAM

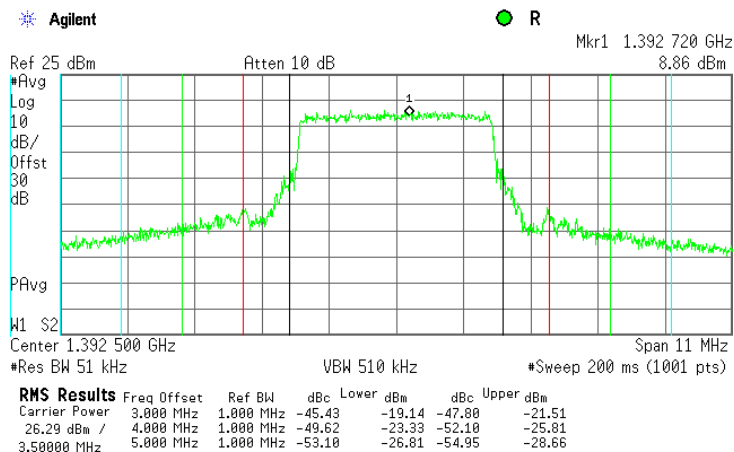


<b>Test specification:</b> Section 27.53(j), Conducted spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 4/4/2011			
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	<b>Relative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

Plot 7.3.26 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

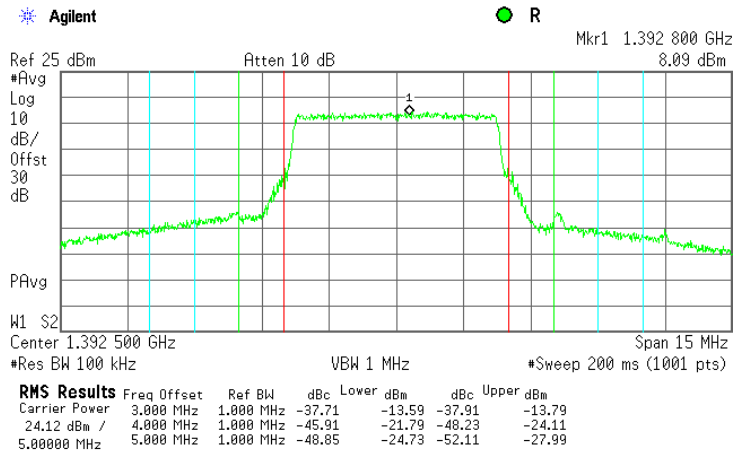


Plot 7.3.27 28 Spurious emission measurements in 1387-1388 MHz, 1388-1389 MHz, 1389-1390 MHz, 1395-1396 MHz, 1396-1397 MHz, 1397-1398 MHz ranges at carrier frequency, 3.5 MHz EBW, 64 QAM

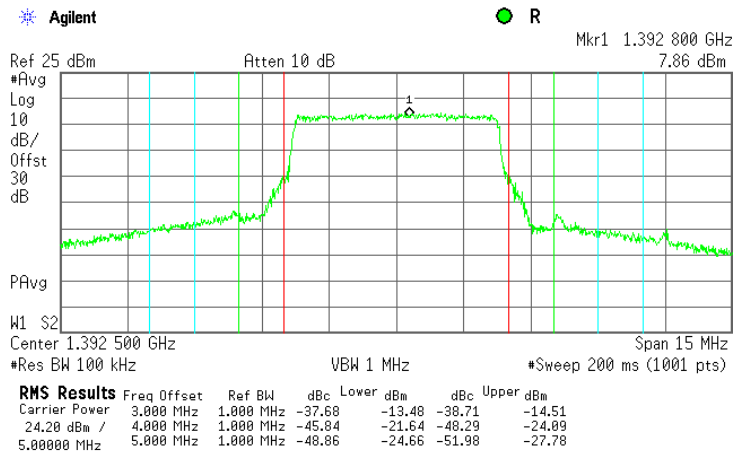


<b>Test specification:</b> Section 27.53(j), Conducted spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1051; TIA/EIA-603-C, Section 2.2.13			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 4/4/2011			
<b>Temperature:</b> 23 °C	<b>Air Pressure:</b> 1011 hPa	<b>Relative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

Plot 7.3.29 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	± 1.7 dB
Carrier power radiated (substitution method)	± 4.5 dB
Occupied bandwidth	±8%
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB 2.9 GHz to 6.46 GHz: ± 3.5 dB 6.46 GHz to 13.2 GHz: ± 4.3 dB 13.2 GHz to 22.0 GHz: ± 5.0 dB 22.0 GHz to 26.8 GHz: ± 5.5 dB 26.8 GHz to 40.0 GHz: ± 4.8 dB
Spurious emissions radiated 30 MHz – 40 GHz (substitution method)	± 4.5 dB
Frequency error	30 – 300 MHz: ± 50.5 Hz (1.68 ppm) 300 – 1000 MHz: ± 168 Hz (0.56 ppm)
Transient frequency behaviour	187 Hz ± 13.9 %
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 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.

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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, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, 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