

# TEST REPORT

ACCORDING TO: FCC 47CFR part 90, subpart Z

FOR:

**Airspan Networks (Israel) Ltd.**

**Terminal station**

**Model: SSRM 3.65GHz**

**FCC ID:PIDASMAX3700**

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## 1 Applicant information

**Client name:** Airspan Networks Inc.  
**Address:** 777 Yamato, Road Suite 310 Boca Raton, FL 33431, USA  
**Telephone:** +1 561 893 8670  
**Fax:** +1 561 893 8671  
**E-mail:** zlevi@airspan.com  
**Contact name:** Mr. Zion Levi

## 2 Equipment under test attributes

**Product name:** Terminal station  
**Product type:** Transceiver  
**Model(s):** SSRM 3.65 GHz  
**Serial number:** A1AFC1D20130  
**Hardware version:** Ver.C  
**Software release:** 10.3.1.23  
**Receipt date:** 5/29/2012

## 3 Manufacturer information

**Manufacturer name:** Airspan Networks inc.  
**Address:** 777 Yamato, Road Suite 310 Boca Raton, FL 33431, USA  
**Telephone:** +1 561 893 8670  
**Fax:** +1 561 893 8671  
**E-mail:** zlevi@airspan.com  
**Contact name:** Mr. Mr. Zion Levi

## 4 Test details




**Project ID:** 23306  
**Location:** Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel  
**Test started:** 5/29/2012  
**Test completed:** 5/31/2012  
**Test specification:** FCC 47CFR part 90, subpart Z

## 5 Tests summary

Test	Status
<b>Transmitter characteristics</b>	
Section 90.1321, Maximum conducted output power	Pass
Section 90.1321, Peak EIRP power density	Pass
Section 90.209, Occupied bandwidth	Pass
Section 90.210(b), Emission mask	Pass
Section 90.1323, Spurious emissions at RF antenna connector	Pass
Section 90.1323, Radiated spurious emissions	Pass
Section 90.213, Frequency stability	Pass
Section 90.1335, RF exposure	Pass, exhibit provided in Application for certification

Testing was completed against all relevant requirements of the test standard. The results obtained indicate that the product under test complies in full with the requirements tested.

The test results relate only to the items tested. Pass/fail decision was based on nominal values.

	Name and Title	Date	Signature
<b>Tested by:</b>	Mr. S.Samokha , test engineer	May 31, 2012	
<b>Reviewed by:</b>	Ms. N. Averin, certification engineer	June 12, 2012	
<b>Approved by:</b>	Mr. M. Nikishin, EMC and Radio group leader	June 20, 2012	

## 6 EUT description

### 6.1 General information

The EUT, subscriber premises radio, SSRM 3.65 GHz TDD is 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 SSRM's transceiver/receiver (up to 64 QAM modulation, data rate up to 46 Mbps) uses OFDMA and operating in TDD duplexing mode.

### 6.2 Ports and lines

Port type	Port description	Connected from	Connected to	Qty.	Cable type	Cable length, m
Power	DC power	Power Supply	PC MCI Extender	1	Unshielded	1.5
Signal	Power/Data	PCI Extender	EUT	1	Flat cable 2x26	0.15
RF	Antenna	EUT	Open circuit	2	NA	NA

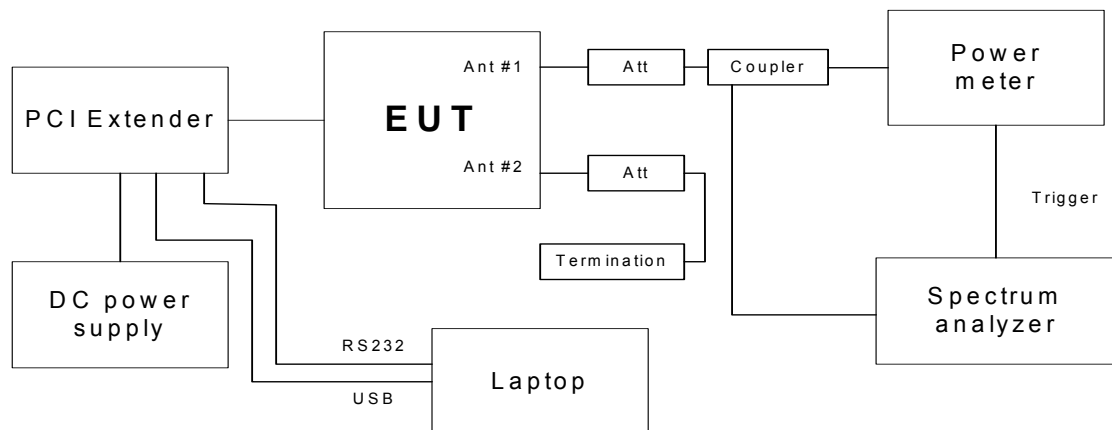
### 6.3 Support and test equipment

Description	Manufacturer	Model number	Serial number
5.5 VDC power supply	Fuhua	UE15WCP	0000298
Mini PCI Express Male to Female Extender	Orbit Micro	DRU-149-81772	NA
Laptop	IBM	ThinkPad T43	L3-AFKW5 05/09
AC/DC Adapter	IBM	08K8202	Z1ZAPW5940EL

### 6.4 Changes made in EUT

No changes were implemented in the EUT during testing.

### 6.5 Test configuration



## 6.6 Transmitter characteristics

<b>Type of equipment</b>				
<b>V</b>	Stand-alone (Equipment with or without its own control provisions)			
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)			
	Plug-in card (Equipment intended for a variety of host systems)			
<b>Intended use</b>		<b>Condition of use</b>		
<b>V</b>	fixed	Always at a distance more than 2 m from all people		
	mobile	Always at a distance more than 20 cm from all people		
	portable	May operate at a distance closer than 20 cm to human body		
<b>Assigned frequency range</b>		3650.0 – 3700.0 MHz		
<b>Operating frequency range</b>		3652.5 – 3697.5 MHz for 5 MHz OBW 3655.0 – 3695.0 MHz for 10 MHz OBW		
<b>RF channel spacing</b>		5, 10 MHz		
<b>Maximum rated output power</b>		At transmitter 50 $\Omega$ RF output connector (aggregate power of both RF chains)	26 dBm – 5 MHz OBW 26.8 dBm – 10 MHz OBW	
		EIRP, dBm (with 19.5 dBi antenna)	35.4 dBm – 5 MHz OBW 39.1 dBm – 10 MHz OBW	
<b>Is transmitter output power variable?</b>	<b>V</b>	Yes	No	
			continuous variable	
			stepped variable with stepsize	0.5 dB
			minimum RF power	-10 dBm
			maximum RF power	26.8 dBm
<b>Antenna connection</b>				
unique coupling	<b>V</b>	standard connector	Integral	
			with temporary RF connector	
			without temporary RF connector	
<b>Antenna/s technical characteristics</b>				
Type	Manufacturer	Model number	Gain	
Directional Panel Antenna	PCTEL	07-1161-01	19.5 dBi	
Direct Mount LPT Style Antenna	Pulse Electronics	W1982	5.6 dBi	
<b>Transmitter aggregate data rate/s, Mbps</b>				
Transmitter 99% power bandwidth	Type of modulation			
	QPSK	16QAM	64QAM	
5 MHz	7	14	23	
10 MHz	13	27	46	
Type of multiplexing	OFDM			
Modulating test signal (baseband)	PRBS			
Maximum transmitter duty cycle in normal use	Maximum 38 %			
<b>Transmitter power source</b>				
<b>V</b>	DC	Nominal rated voltage	5.5 VDC via PC MCI slot	
Common power source for transmitter and receiver		<b>V</b>	yes no	



<b>Test specification:</b>	<b>Section 90.1321, Maximum conducted 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(s):</b>	5/29/2012		
<b>Temperature:</b> 23.6 °C	<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

## 7 Transmitter tests according to FCC 47CFR part 90 requirements

### 7.1 Maximum output power

#### 7.1.1 General

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

**Table 7.1.1 Maximum output power limits**

Assigned frequency range, MHz	Occupied bandwidth, MHz	Maximum peak output power, EIRP	
		W	dBm
Base and fixed stations			
3650.0 – 3700.0	5	5	36.99
	10	10	40.00

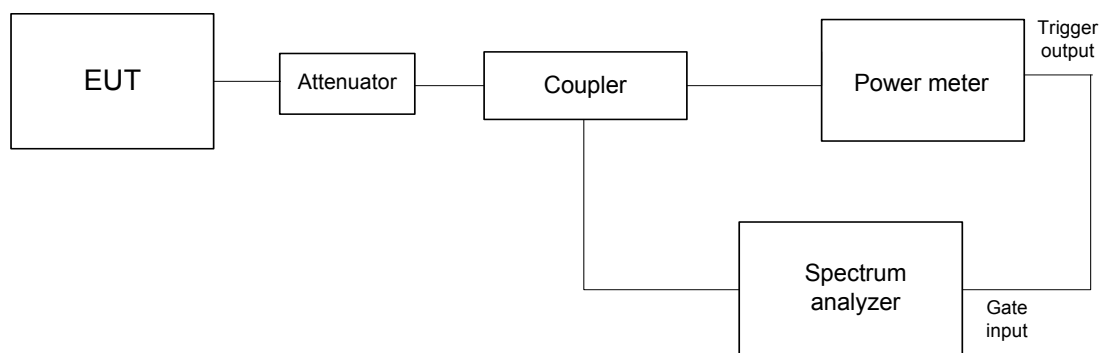
#### 7.1.2 Test procedure

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 for end user RF output power.

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

**Figure 7.1.1 Transmitter output power test setup**





<b>Test specification:</b>	<b>Section 90.1321, Maximum conducted 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(s):</b>	5/29/2012		
<b>Temperature:</b> 23.6 °C	<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

Table 7.1.2 Peak EIRP output power test results

ASSIGNED FREQUENCY RANGE: 3650.0 – 3700.0 MHz  
 DETECTOR USED: Average (Power Meter)  
 MODULATING SIGNAL: PRBS  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 ANTENNA GAIN: 19.5 dBi  
 EMISSION BANDWIDTH: 5 MHz

Modulation, Bit rate, Mbps	Power meter reading, dBm	Total power*, dBm	EIRP, dBm	Limit, dBm	Margin*, dB	Verdict
<b>5 MHz BW, Low channel 3652.5 MHz</b>						
QPSK, 7.0	12.63	15.6	35.1	37.0	-1.87	Pass
64QAM, 23.0	12.62	15.6	35.1	37.0	-1.88	Pass
<b>5 MHz BW, Mid channel 3675.0 MHz</b>						
QPSK, 7.0	12.53	15.5	35.0	37.0	-1.97	Pass
64QAM, 23.0	12.55	15.6	35.1	37.0	-1.95	Pass
<b>5 MHz BW, High channel 3697.5 MHz</b>						
QPSK, 7.0	12.88	15.9	35.4	37.0	-1.62	Pass
64QAM, 23.0	12.65	15.7	35.2	37.0	-1.85	Pass

EMISSION BANDWIDTH: 10 MHz

Modulation, Bit rate, Mbps	Power meter reading, dBm	Total power*, dBm	EIRP, dBm	Limit, dBm	Margin*, dB	Verdict
<b>10 MHz BW, Low channel 3655 MHz</b>						
QPSK, 13.0	16.14	19.1	38.6	40.0	-1.36	Pass
64QAM, 46.0	16.61	19.6	39.1	40.0	-0.89	Pass
<b>10 MHz BW, Mid channel 3675.0 MHz</b>						
QPSK, 13.0	16.43	19.4	38.9	40.0	-1.07	Pass
64QAM, 46.0	16.64	19.6	39.1	40.0	-0.86	Pass
<b>10 MHz BW, High channel 3695.0 MHz</b>						
QPSK, 13.0	16.48	19.5	39.0	40.0	-1.02	Pass
64QAM, 46.0	16.44	19.4	38.9	40.0	-1.06	Pass

\* - Total power, dBm = Power meter reading + 10\*log(N)

\*\* - EIRP, dBm = Total power\*, dBm + Antenna gain, dBi





<b>Test specification:</b>	<b>Section 90.1321, Maximum conducted 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(s):</b>	5/29/2012		
<b>Temperature:</b> 23.6 °C	<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 43 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

Table 7.1.3 Peak EIRP output power test results

ASSIGNED FREQUENCY RANGE: 3650.0 – 3700.0 MHz  
 DETECTOR USED: Average (Power Meter)  
 MODULATING SIGNAL: PRBS  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 ANTENNA GAIN: 5.6 dBi  
 EMISSION BANDWIDTH: 5 MHz

Modulation, Bit rate, Mbps	Power meter reading, dBm	Total power*, dBm	EIRP, dBm	Limit, dBm	Margin*, dB	Verdict
<b>5 MHz BW, Low channel 3652.5 MHz</b>						
QPSK, 7.0	22.53	25.5	31.1	37.0	-5.87	Pass
64QAM, 23.0	22.73	25.7	31.3	37.0	-5.67	Pass
<b>5 MHz BW, Mid channel 3675.0 MHz</b>						
QPSK, 7.0	22.86	25.9	31.5	37.0	-5.54	Pass
64QAM, 23.0	22.67	25.7	31.3	37.0	-5.73	Pass
<b>5 MHz BW, High channel 3697.5 MHz</b>						
QPSK, 7.0	22.75	25.8	31.4	37.0	-5.65	Pass
64QAM, 23.0	22.95	26.0	31.6	37.0	-5.45	Pass

EMISSION BANDWIDTH: 10 MHz

Modulation, Bit rate, Mbps	Power meter reading, dBm	Total power*, dBm	EIRP, dBm	Limit, dBm	Margin*, dB	Verdict
<b>10 MHz BW, Low channel 3655 MHz</b>						
QPSK, 13.0	23.41	26.4	32.0	40.0	-7.99	Pass
64QAM, 46.0	23.18	26.2	31.8	40.0	-8.22	Pass
<b>10 MHz BW, Mid channel 3675.0 MHz</b>						
QPSK, 13.0	23.49	26.5	32.1	40.0	-7.91	Pass
64QAM, 46.0	23.27	26.3	31.9	40.0	-8.13	Pass
<b>10 MHz BW, High channel 3695.0 MHz</b>						
QPSK, 13.0	23.82	26.8	32.4	40.0	-7.58	Pass
64QAM, 46.0	23.21	26.2	31.8	40.0	-8.19	Pass

\* - Total power, dBm = Power meter reading + 10\*log(N)

\*\* - EIRP, dBm = Total power\*, dBm + Antenna gain, dBi

## Reference numbers of test equipment used

HL 2214	HL 3301	HL 3302	HL 3818	HL 3903			
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Full description is given in Appendix A.



Test specification:	Section 90.1321, Peak EIRP power density		
Test procedure:	47 CFR, Sections 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/29/2012		
Temperature: 23.6 °C	Air Pressure: 1005 hPa	Relative Humidity: 46 %	Power Supply: 5.5VDC
Remarks:			

## 7.2 Peak EIRP power density

### 7.2.1 General

This test was performed to measure the peak EIRP density at the transmitter RF antenna connector. Specification test limits are given in Table 7.2.1.

Table 7.2.1 Peak power density limits

Assigned frequency range, MHz	Occupied bandwidth, MHz	Maximum peak power spectral density, EIRP	
		W/MHz	dBm/MHz
Base and fixed stations			
3650.0 – 3700.0	5	1	30
	10		

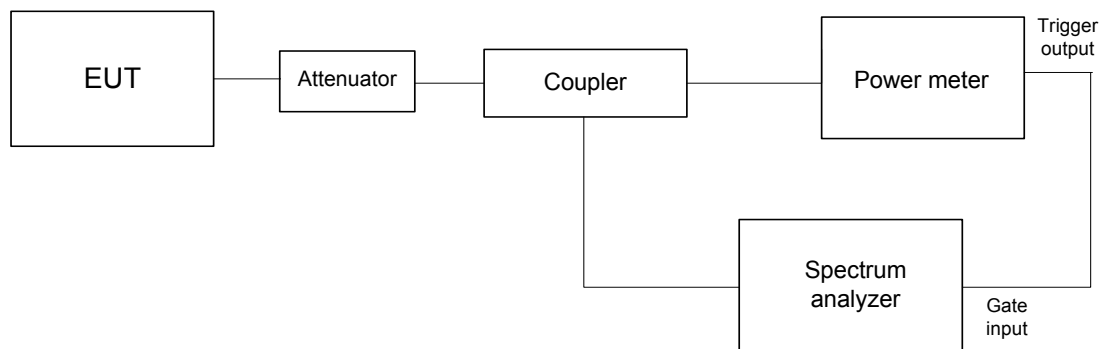
### 7.2.2 Test procedure

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

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

7.2.2.3 The peak output power density was measured with spectrum analyzer as provided in Table 7.2.2 and the associated plots.

Figure 7.2.1 Peak power density test setup





<b>Test specification:</b>	<b>Section 90.1321, Peak EIRP power density</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1046; TIA/EIA-603-C, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/29/2012		
<b>Temperature:</b> 23.6 °C	<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Table 7.2.2 Peak EIRP power density test results**

OPERATING FREQUENCY RANGE: 3650.0 – 3700.0 MHz  
 DETECTOR USED: Average (RMS)  
 RESOLUTION BANDWIDTH: 100 kHz with integration over a 1 MHz slice of spectrum  
 VIDEO BANDWIDTH: 300 kHz  
 MODULATING SIGNAL: PRBS  
 ANTENNA GAIN: 19.5 dBi  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

EMISSION BANDWIDTH: 5 MHz

Channel, MHz	Modulation	SA reading (RF#1), dBm/MHz	Total Power density *, dBm/MHz	Antenna gain, dBi	EIRP power density**, dBm/MHz	Limit, dBm/MHz	Margin, dB	Verdict
3652.5	QPSK	6.59	9.59	19.5	29.1	30.0	-0.91	Pass
3675.0	QPSK	6.65	9.65	19.5	29.2	30.0	-0.85	Pass
3697.5	QPSK	7.28	10.28	19.5	29.8	30.0	-0.22	Pass
3652.5	64QAM	6.66	9.66	19.5	29.2	30.0	-0.84	Pass
3675.0	64QAM	6.63	9.63	19.5	29.1	30.0	-0.87	Pass
3697.5	64QAM	6.95	9.95	19.5	29.5	30.0	-0.55	Pass

EMISSION BANDWIDTH: 10 MHz

Channel, MHz	Modulation	SA reading (RF#1), dBm/MHz	Total Power density *, dBm/MHz	Antenna gain, dBi	EIRP power density**, dBm/MHz	Limit, dBm/MHz	Margin, dB	Verdict
3655.0	QPSK	6.71	9.71	19.5	29.2	30.0	-0.79	Pass
3675.0	QPSK	7.16	10.16	19.5	29.7	30.0	-0.34	Pass
3695.0	QPSK	7.38	10.38	19.5	29.9	30.0	-0.12	Pass
3655.0	64QAM	7.29	10.29	19.5	29.8	30.0	-0.21	Pass
3675.0	64QAM	7.24	10.24	19.5	29.7	30.0	-0.26	Pass
3695.0	64QAM	7.20	10.20	19.5	29.7	30.0	-0.30	Pass

\* - Total Power density, dBm/MHz = SA reading, dBm/MHz + 10\*log(N)

\*\* - EIRP power density, dBm/MHz = Total Power density, dBm/MHz + Antenna gain, dBi



<b>Test specification:</b>	<b>Section 90.1321, Peak EIRP power density</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1046; TIA/EIA-603-C, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/29/2012		
<b>Temperature:</b> 23.6 °C	<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Table 7.2.3 Peak EIRP power density test results**

OPERATING FREQUENCY RANGE: 3650.0 – 3700.0 MHz  
 DETECTOR USED: Average (RMS)  
 RESOLUTION BANDWIDTH: 100 kHz with integration over a 1 MHz slice of spectrum  
 VIDEO BANDWIDTH: 300 kHz  
 MODULATING SIGNAL: PRBS  
 ANTENNA GAIN: 5.6 dBi  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

EMISSION BANDWIDTH: 5 MHz

Channel, MHz	Modulation	SA reading (RF#1), dBm/MHz	Total Power density *, dBm/MHz	Antenna gain, dBi	EIRP power density**, dBm/MHz	Limit, dBm/MHz	Margin, dB	Verdict
3652.5	QPSK	16.24	19.24	5.6	24.8	30.0	-5.16	Pass
3675.0	QPSK	16.60	19.60	5.6	25.2	30.0	-4.80	Pass
3697.5	QPSK	16.65	19.65	5.6	25.3	30.0	-4.75	Pass
3652.5	64QAM	16.68	19.68	5.6	25.3	30.0	-4.72	Pass
3675.0	64QAM	16.33	19.33	5.6	24.9	30.0	-5.07	Pass
3697.5	64QAM	16.97	19.97	5.6	25.6	30.0	-4.43	Pass

EMISSION BANDWIDTH: 10 MHz

Channel, MHz	Modulation	SA reading (RF#1), dBm/MHz	Total Power density *, dBm/MHz	Antenna gain, dBi	EIRP power density**, dBm/MHz	Limit, dBm/MHz	Margin, dB	Verdict
3655.0	QPSK	13.89	16.89	5.6	22.5	30.0	-7.51	Pass
3675.0	QPSK	13.85	16.85	5.6	22.5	30.0	-7.55	Pass
3695.0	QPSK	13.24	16.24	5.6	21.8	30.0	-8.16	Pass
3655.0	64QAM	13.81	16.81	5.6	22.4	30.0	-7.59	Pass
3675.0	64QAM	13.70	16.70	5.6	22.3	30.0	-7.70	Pass
3695.0	64QAM	13.67	16.67	5.6	22.3	30.0	-7.73	Pass

\* - Total Power density, dBm/MHz = SA reading, dBm/MHz + 10\*log(N)

\*\* - EIRP power density, dBm/MHz = Total Power density, dBm/MHz + Antenna gain, dBi

**Reference numbers of test equipment used**

HL 2214	HL 3301	HL 3302	HL 3818	HL 3901			
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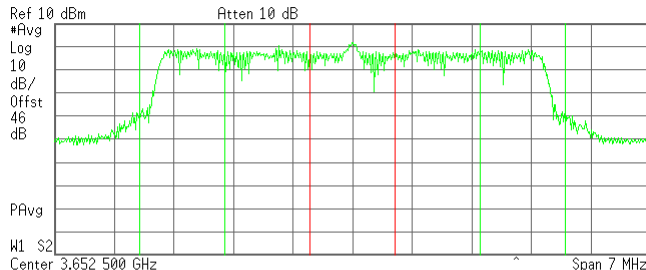
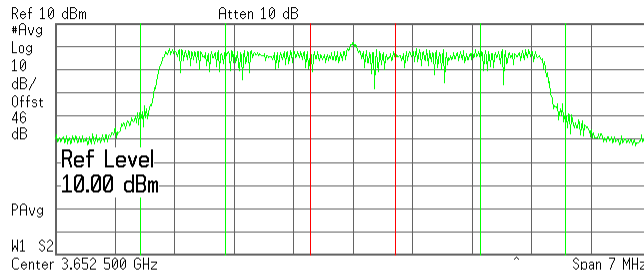
Full description is given in Appendix A.



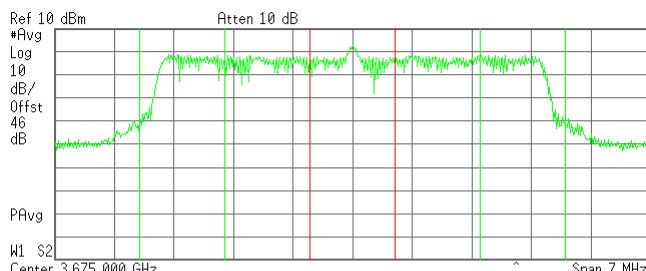
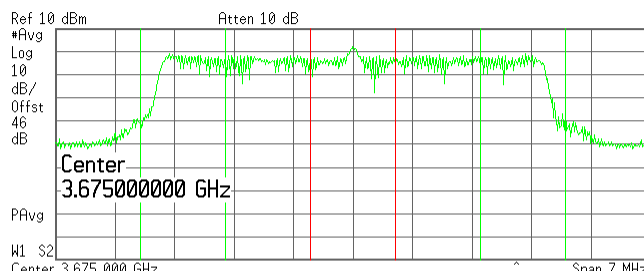
HERMON LABORATORIES

<b>Test specification:</b>		<b>Section 90.1321, Peak EIRP power density</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1046; TIA/EIA-603-C, Section 2.2.1	
<b>Test mode:</b>		Compliance	<b>Verdict:</b>  <b>PASS</b>
<b>Date(s):</b>		5/29/2012	
<b>Temperature:</b> 23.6 °C		<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %
			<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

Plot 7.2.1 EIRP spectral density test results at low frequency, antenna gain 19.5 dBi

CARRIER FREQUENCY:	3652.5 MHz																					
EMISSION BANDWIDTH:	5 MHz																					
RF OUTPUT:	Antenna #2																					
MODULATION: QPSK	MODULATION: 64QAM																					
* Agilent 13:36:55 May 29, 2012																						
* R																						
																						
* Agilent 12:31:23 May 29, 2012																						
* R																						
																						
<b>RMS Results</b>																						
<table><tr><th>Carrier Power</th><th>Freq Offset</th><th>Ref BW</th><th>dBc</th><th>Lower dBm</th><th>dBc</th><th>Upper dBm</th></tr><tr><td>6.59 dBm</td><td>1.000 MHz</td><td>1.000 MHz</td><td>-0.70</td><td>5.89</td><td>-0.66</td><td>5.93</td></tr><tr><td>1.00000 MHz</td><td>2.000 MHz</td><td>1.000 MHz</td><td>-1.22</td><td>5.37</td><td>-1.93</td><td>4.66</td></tr></table>		Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm	6.59 dBm	1.000 MHz	1.000 MHz	-0.70	5.89	-0.66	5.93	1.00000 MHz	2.000 MHz	1.000 MHz	-1.22	5.37	-1.93	4.66
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm																
6.59 dBm	1.000 MHz	1.000 MHz	-0.70	5.89	-0.66	5.93																
1.00000 MHz	2.000 MHz	1.000 MHz	-1.22	5.37	-1.93	4.66																
<b>RMS Results</b>																						
<table><tr><th>Carrier Power</th><th>Freq Offset</th><th>Ref BW</th><th>dBc</th><th>Lower dBm</th><th>dBc</th><th>Upper dBm</th></tr><tr><td>6.66 dBm</td><td>1.000 MHz</td><td>1.000 MHz</td><td>-0.70</td><td>5.96</td><td>-0.75</td><td>5.91</td></tr><tr><td>1.00000 MHz</td><td>2.000 MHz</td><td>1.000 MHz</td><td>-1.32</td><td>5.34</td><td>-1.91</td><td>4.75</td></tr></table>		Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm	6.66 dBm	1.000 MHz	1.000 MHz	-0.70	5.96	-0.75	5.91	1.00000 MHz	2.000 MHz	1.000 MHz	-1.32	5.34	-1.91	4.75
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm																
6.66 dBm	1.000 MHz	1.000 MHz	-0.70	5.96	-0.75	5.91																
1.00000 MHz	2.000 MHz	1.000 MHz	-1.32	5.34	-1.91	4.75																

Plot 7.2.2 EIRP spectral density test results at mid frequency, antenna gain 19.5 dBi

CARRIER FREQUENCY:	3675.0 MHz																					
EMISSION BANDWIDTH:	5 MHz																					
RF OUTPUT:	Antenna #2																					
MODULATION: QPSK	MODULATION: 64QAM																					
* Agilent 13:38:39 May 29, 2012																						
* R																						
																						
* Agilent 13:44:31 May 29, 2012																						
* R																						
																						
<b>RMS Results</b>																						
<table><tr><th>Carrier Power</th><th>Freq Offset</th><th>Ref BW</th><th>dBc</th><th>Lower dBm</th><th>dBc</th><th>Upper dBm</th></tr><tr><td>6.65 dBm</td><td>1.000 MHz</td><td>1.000 MHz</td><td>-1.08</td><td>5.57</td><td>-0.88</td><td>5.85</td></tr><tr><td>1.00000 MHz</td><td>2.000 MHz</td><td>1.000 MHz</td><td>-1.43</td><td>5.23</td><td>-1.97</td><td>4.68</td></tr></table>		Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm	6.65 dBm	1.000 MHz	1.000 MHz	-1.08	5.57	-0.88	5.85	1.00000 MHz	2.000 MHz	1.000 MHz	-1.43	5.23	-1.97	4.68
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm																
6.65 dBm	1.000 MHz	1.000 MHz	-1.08	5.57	-0.88	5.85																
1.00000 MHz	2.000 MHz	1.000 MHz	-1.43	5.23	-1.97	4.68																
<b>RMS Results</b>																						
<table><tr><th>Carrier Power</th><th>Freq Offset</th><th>Ref BW</th><th>dBc</th><th>Lower dBm</th><th>dBc</th><th>Upper dBm</th></tr><tr><td>6.63 dBm</td><td>1.000 MHz</td><td>1.000 MHz</td><td>-0.90</td><td>5.72</td><td>-0.86</td><td>5.77</td></tr><tr><td>1.00000 MHz</td><td>2.000 MHz</td><td>1.000 MHz</td><td>-1.42</td><td>5.21</td><td>-2.09</td><td>4.53</td></tr></table>		Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm	6.63 dBm	1.000 MHz	1.000 MHz	-0.90	5.72	-0.86	5.77	1.00000 MHz	2.000 MHz	1.000 MHz	-1.42	5.21	-2.09	4.53
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm																
6.63 dBm	1.000 MHz	1.000 MHz	-0.90	5.72	-0.86	5.77																
1.00000 MHz	2.000 MHz	1.000 MHz	-1.42	5.21	-2.09	4.53																



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<b>Test specification:</b>		<b>Section 90.1321, Peak EIRP power density</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1046; TIA/EIA-603-C, Section 2.2.1	
<b>Test mode:</b>		Compliance	<b>Verdict:</b> <b>PASS</b>
<b>Date(s):</b>		5/29/2012	
<b>Temperature:</b> 23.6 °C		<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %
<b>Remarks:</b>		<b>Power Supply:</b> 5.5VDC	

Plot 7.2.3 EIRP spectral density test results at high frequency, antenna gain 19.5 dBi

CARRIER FREQUENCY:	3697.5 MHz																																								
EMISSION BANDWIDTH:	5 MHz																																								
RF OUTPUT:	Antenna #2																																								
MODULATION: QPSK	MODULATION: 64QAM																																								
<div>Agilent 13:40:46 May 29, 2012</div> <div>R</div> <div><div>Ref 10 dBm</div><div>Atten 10 dB</div><div>Log</div><div>10</div><div>dB/</div><div>Offst</div><div>46</div><div>dB</div><div>PAvg</div><div>W1 S2</div><div>Center 3.697 500 GHz</div><div>Span 7 MHz</div><div>Res BW 100 kHz</div><div>VBW 1 MHz</div><div>Sweep 200 ms (601 pts)</div><div><div>RMS Results</div><table><tr><td></td><td>Freq</td><td>Offset</td><td>Ref BW</td><td>dBc</td><td>Lower</td><td>dBm</td><td>dBc</td><td>Upper</td><td>dBm</td></tr><tr><td>Carrier Power</td><td>1.000</td><td>MHz</td><td>1.000</td><td>MHz</td><td>-1.35</td><td>5.93</td><td>-1.25</td><td>6.03</td><td></td></tr><tr><td>7.28 dBm /</td><td>2.000</td><td>MHz</td><td>1.000</td><td>MHz</td><td>-1.73</td><td>5.55</td><td>-2.43</td><td>4.85</td><td></td></tr><tr><td>1.00000</td><td>MHz</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></div></div>			Freq	Offset	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm	Carrier Power	1.000	MHz	1.000	MHz	-1.35	5.93	-1.25	6.03		7.28 dBm /	2.000	MHz	1.000	MHz	-1.73	5.55	-2.43	4.85		1.00000	MHz								
	Freq	Offset	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm																																
Carrier Power	1.000	MHz	1.000	MHz	-1.35	5.93	-1.25	6.03																																	
7.28 dBm /	2.000	MHz	1.000	MHz	-1.73	5.55	-2.43	4.85																																	
1.00000	MHz																																								
<div>Agilent 13:43:25 May 29, 2012</div> <div>R</div> <div><div>Ref 10 dBm</div><div>Atten 10 dB</div><div>Log</div><div>10</div><div>dB/</div><div>Offst</div><div>46</div><div>dB</div><div>PAvg</div><div>W1 S2</div><div>Center 3.697 500 GHz</div><div>Span 7 MHz</div><div>Res BW 100 kHz</div><div>VBW 1 MHz</div><div>Sweep 200 ms (601 pts)</div><div><div>RMS Results</div><table><tr><td></td><td>Freq</td><td>Offset</td><td>Ref BW</td><td>dBc</td><td>Lower</td><td>dBm</td><td>dBc</td><td>Upper</td><td>dBm</td></tr><tr><td>Carrier Power</td><td>1.000</td><td>MHz</td><td>1.000</td><td>MHz</td><td>-1.17</td><td>5.78</td><td>-1.13</td><td>5.82</td><td></td></tr><tr><td>6.95 dBm /</td><td>2.000</td><td>MHz</td><td>1.000</td><td>MHz</td><td>-1.75</td><td>5.20</td><td>-2.40</td><td>4.55</td><td></td></tr><tr><td>1.00000</td><td>MHz</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></div></div>			Freq	Offset	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm	Carrier Power	1.000	MHz	1.000	MHz	-1.17	5.78	-1.13	5.82		6.95 dBm /	2.000	MHz	1.000	MHz	-1.75	5.20	-2.40	4.55		1.00000	MHz								
	Freq	Offset	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm																																
Carrier Power	1.000	MHz	1.000	MHz	-1.17	5.78	-1.13	5.82																																	
6.95 dBm /	2.000	MHz	1.000	MHz	-1.75	5.20	-2.40	4.55																																	
1.00000	MHz																																								

Plot 7.2.4 EIRP spectral density test results at low frequency, antenna gain 5.6 dBi

CARRIER FREQUENCY:	3652.5 MHz																																				
EMISSION BANDWIDTH:	5 MHz																																				
RF OUTPUT:	Antenna #2																																				
MODULATION: QPSK	MODULATION: 64QAM																																				
<div>Agilent 11:55:41 May 29, 2012 R</div> <div>Ref 20 dBm Atten 10 dB</div> <div>Log</div> <div>10</div> <div>dB/</div> <div>Offst</div> <div>46</div> <div>dB</div> <div>PAvg</div> <div>W1 S2</div> <div>Center 3.652 500 GHz Span 7 MHz</div> <div>Res BW 100 kHz VBW 1 MHz Sweep 200 ms (601 pts)</div> <div>RMS Results</div> <table><tr><td>Freq</td><td>Offset</td><td>Ref BW</td><td>dBc</td><td>Lower</td><td>dBm</td><td>dBc</td><td>Upper</td><td>dBm</td></tr><tr><td>Carrier Power</td><td>1.000 MHz</td><td>1.000 MHz</td><td>0.44</td><td>16.24</td><td>0.43</td><td>16.24</td><td></td><td></td></tr><tr><td>15.81 dBm /</td><td>2.000 MHz</td><td>1.000 MHz</td><td>-0.23</td><td>15.57</td><td>-1.10</td><td>14.71</td><td></td><td></td></tr><tr><td>1.00000</td><td>MHz</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>		Freq	Offset	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm	Carrier Power	1.000 MHz	1.000 MHz	0.44	16.24	0.43	16.24			15.81 dBm /	2.000 MHz	1.000 MHz	-0.23	15.57	-1.10	14.71			1.00000	MHz							
Freq	Offset	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm																													
Carrier Power	1.000 MHz	1.000 MHz	0.44	16.24	0.43	16.24																															
15.81 dBm /	2.000 MHz	1.000 MHz	-0.23	15.57	-1.10	14.71																															
1.00000	MHz																																				
<div>Agilent 11:53:45 May 29, 2012 R</div> <div>Ref 20 dBm Atten 10 dB</div> <div>Log</div> <div>10</div> <div>dB/</div> <div>Offst</div> <div>46</div> <div>dB</div> <div>PAvg</div> <div>W1 S2</div> <div>Center 3.652 500 GHz Span 7 MHz</div> <div>Res BW 100 kHz VBW 1 MHz Sweep 200 ms (601 pts)</div> <div>RMS Results</div> <table><tr><td>Freq</td><td>Offset</td><td>Ref BW</td><td>dBc</td><td>Lower</td><td>dBm</td><td>dBc</td><td>Upper</td><td>dBm</td></tr><tr><td>Carrier Power</td><td>1.000 MHz</td><td>1.000 MHz</td><td>0.53</td><td>16.68</td><td>0.20</td><td>16.34</td><td></td><td></td></tr><tr><td>16.14 dBm /</td><td>2.000 MHz</td><td>1.000 MHz</td><td>-0.17</td><td>15.97</td><td>-0.99</td><td>15.15</td><td></td><td></td></tr><tr><td>1.00000</td><td>MHz</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>		Freq	Offset	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm	Carrier Power	1.000 MHz	1.000 MHz	0.53	16.68	0.20	16.34			16.14 dBm /	2.000 MHz	1.000 MHz	-0.17	15.97	-0.99	15.15			1.00000	MHz							
Freq	Offset	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm																													
Carrier Power	1.000 MHz	1.000 MHz	0.53	16.68	0.20	16.34																															
16.14 dBm /	2.000 MHz	1.000 MHz	-0.17	15.97	-0.99	15.15																															
1.00000	MHz																																				



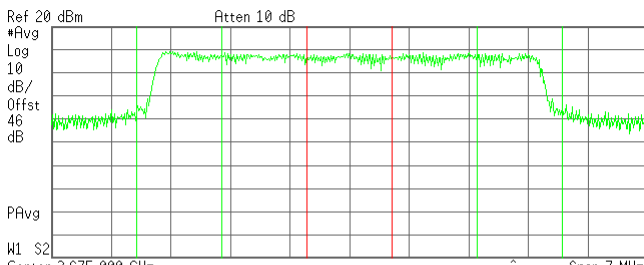
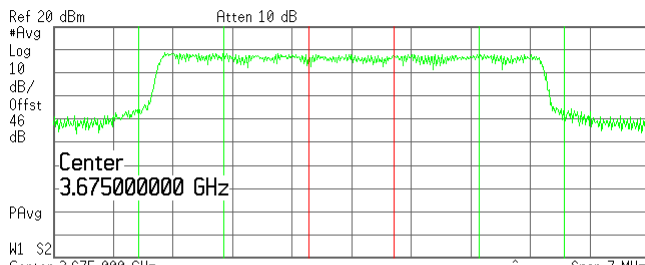
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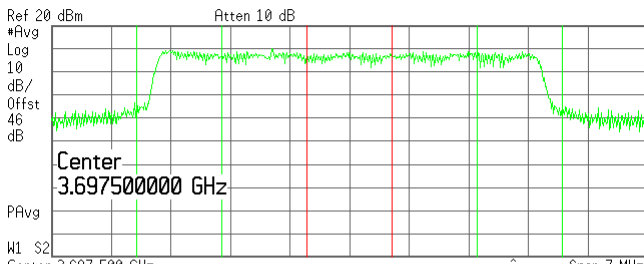
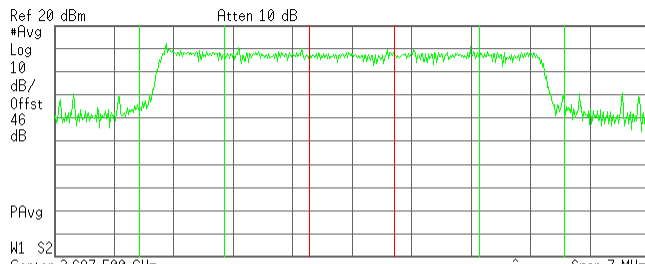
Date of Issue: 20-Jun-12

<b>Test specification:</b>		<b>Section 90.1321, Peak EIRP power density</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1046; TIA/EIA-603-C, Section 2.2.1	
<b>Test mode:</b>		Compliance	<b>Verdict:</b>  <b>PASS</b>
<b>Date(s):</b>		5/29/2012	
<b>Temperature:</b> 23.6 °C		<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %
			<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

Plot 7.2.5 EIRP spectral density test results at mid frequency, antenna gain 5.6 dBi

<b>CARRIER FREQUENCY:</b>		3675.0 MHz
<b>EMISSION BANDWIDTH:</b>		5 MHz
<b>RF OUTPUT:</b>		Antenna #2
<b>MODULATION: QPSK</b>		<b>MODULATION: 64QAM</b>
* Agilent 11:58:07 May 29, 2012		* Agilent 11:51:59 May 29, 2012
		
<b>RMS Results</b>		<b>RMS Results</b>
Carrier Power 1.000 MHz 1.000 MHz 0.35 16.60 0.19 16.44		Carrier Power 1.000 MHz 1.000 MHz 0.35 16.33 0.20 16.18
16.25 dBm / 2.000 MHz 1.000 MHz -0.17 16.08 -1.32 14.93		15.98 dBm / 2.000 MHz 1.000 MHz -0.18 15.79 -1.11 14.87
1.00000 MHz		1.00000 MHz

Plot 7.2.6 EIRP spectral density test results at high frequency, antenna gain 5.6 dBi

<b>CARRIER FREQUENCY:</b>		3697.5 MHz
<b>EMISSION BANDWIDTH:</b>		5 MHz
<b>RF OUTPUT:</b>		Antenna #2
<b>MODULATION: QPSK</b>		<b>MODULATION: 64QAM</b>
* Agilent 12:00:08 May 29, 2012		* Agilent 11:49:52 May 29, 2012
		
<b>RMS Results</b>		<b>RMS Results</b>
Carrier Power 1.000 MHz 1.000 MHz 0.50 16.65 0.32 16.48		Carrier Power 1.000 MHz 1.000 MHz 0.37 16.97 0.27 16.88
16.15 dBm / 2.000 MHz 1.000 MHz -0.17 15.99 -1.25 14.98		16.61 dBm / 2.000 MHz 1.000 MHz 0.08 16.69 -1.24 15.37
1.00000 MHz		1.00000 MHz



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Report ID: AIRRAD\_FCC.23306.doc

Date of Issue: 20-Jun-12

<b>Test specification:</b>		<b>Section 90.1321, Peak EIRP power density</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1046; TIA/EIA-603-C, Section 2.2.1	
<b>Test mode:</b>		Compliance	<b>Verdict:</b>  <b>PASS</b>
<b>Date(s):</b>		5/29/2012	
<b>Temperature:</b> 23.6 °C		<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %
<b>Remarks:</b>		<b>Power Supply:</b> 5.5VDC	

Plot 7.2.7 EIRP spectral density test results at low frequency, antenna gain 19.5 dBi

CARRIER FREQUENCY:		3655 MHz																																																																																				
EMISSION BANDWIDTH:		10 MHz																																																																																				
RF OUTPUT:		Antenna #2																																																																																				
MODULATION: QPSK		MODULATION: 64QAM																																																																																				
* Agilent 14:19:29 May 29, 2012		* Agilent 13:50:06 May 29, 2012																																																																																				
<table><tr><th>RMS Results</th><th>Freq Offset</th><th>Ref BW</th><th>dBc</th><th>Lower dBm</th><th>dBc</th><th>Upper dBm</th></tr><tr><td>Carrier Power</td><td>1.000 MHz</td><td>1.000 MHz</td><td>-1.00</td><td>5.71</td><td>-0.83</td><td>5.89</td></tr><tr><td>6.71 dBm /</td><td>2.000 MHz</td><td>1.000 MHz</td><td>-0.67</td><td>6.04</td><td>-0.54</td><td>6.17</td></tr><tr><td>1.00000 MHz</td><td>3.000 MHz</td><td>1.000 MHz</td><td>-0.35</td><td>6.37</td><td>-0.17</td><td>6.55</td></tr><tr><td></td><td>4.000 MHz</td><td>1.000 MHz</td><td>-0.68</td><td>6.03</td><td>-0.36</td><td>6.36</td></tr><tr><td></td><td>4.500 MHz</td><td>1.000 MHz</td><td>-3.06</td><td>3.65</td><td>-2.59</td><td>4.12</td></tr></table>		RMS Results	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm	Carrier Power	1.000 MHz	1.000 MHz	-1.00	5.71	-0.83	5.89	6.71 dBm /	2.000 MHz	1.000 MHz	-0.67	6.04	-0.54	6.17	1.00000 MHz	3.000 MHz	1.000 MHz	-0.35	6.37	-0.17	6.55		4.000 MHz	1.000 MHz	-0.68	6.03	-0.36	6.36		4.500 MHz	1.000 MHz	-3.06	3.65	-2.59	4.12	<table><tr><th>RMS Results</th><th>Freq Offset</th><th>Ref BW</th><th>dBc</th><th>Lower dBm</th><th>dBc</th><th>Upper dBm</th></tr><tr><td>Carrier Power</td><td>1.000 MHz</td><td>1.000 MHz</td><td>-0.78</td><td>6.35</td><td>-0.75</td><td>6.39</td></tr><tr><td>7.14 dBm /</td><td>2.000 MHz</td><td>1.000 MHz</td><td>-0.58</td><td>6.56</td><td>-0.51</td><td>6.63</td></tr><tr><td>1.00000 MHz</td><td>3.000 MHz</td><td>1.000 MHz</td><td>-0.18</td><td>6.95</td><td>0.15</td><td>7.29</td></tr><tr><td></td><td>4.000 MHz</td><td>1.000 MHz</td><td>-0.56</td><td>6.58</td><td>-0.21</td><td>6.93</td></tr><tr><td></td><td>4.500 MHz</td><td>1.000 MHz</td><td>-2.79</td><td>4.35</td><td>-2.66</td><td>4.48</td></tr></table>	RMS Results	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm	Carrier Power	1.000 MHz	1.000 MHz	-0.78	6.35	-0.75	6.39	7.14 dBm /	2.000 MHz	1.000 MHz	-0.58	6.56	-0.51	6.63	1.00000 MHz	3.000 MHz	1.000 MHz	-0.18	6.95	0.15	7.29		4.000 MHz	1.000 MHz	-0.56	6.58	-0.21	6.93		4.500 MHz	1.000 MHz	-2.79	4.35	-2.66	4.48
RMS Results	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm																																																																																
Carrier Power	1.000 MHz	1.000 MHz	-1.00	5.71	-0.83	5.89																																																																																
6.71 dBm /	2.000 MHz	1.000 MHz	-0.67	6.04	-0.54	6.17																																																																																
1.00000 MHz	3.000 MHz	1.000 MHz	-0.35	6.37	-0.17	6.55																																																																																
	4.000 MHz	1.000 MHz	-0.68	6.03	-0.36	6.36																																																																																
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7.14 dBm /	2.000 MHz	1.000 MHz	-0.58	6.56	-0.51	6.63																																																																																
1.00000 MHz	3.000 MHz	1.000 MHz	-0.18	6.95	0.15	7.29																																																																																
	4.000 MHz	1.000 MHz	-0.56	6.58	-0.21	6.93																																																																																
	4.500 MHz	1.000 MHz	-2.79	4.35	-2.66	4.48																																																																																

Plot 7.2.8 EIRP spectral density test results at mid frequency, antenna gain 19.5 dBi

CARRIER FREQUENCY:	3675.0 MHz																																										
EMISSION BANDWIDTH:	10 MHz																																										
RF OUTPUT:	Antenna #2																																										
MODULATION: QPSK	MODULATION: 64QAM																																										
* Agilent 14:16:51 May 29, 2012																																											
Center 3.67500000 GHz																																											
*Res BW 100 kHz																																											
*Sweep 200 ms (601 pts)																																											
RMS Results																																											
<table><tr><th>Carrier Power</th><th>Freq Offset</th><th>Ref BW</th><th>dBc</th><th>Lower dBm</th><th>dBc</th><th>Upper dBm</th></tr><tr><td>7.16 dBm</td><td>1.000 MHz</td><td>1.000 MHz</td><td>-1.04</td><td>6.12</td><td>-1.04</td><td>6.12</td></tr><tr><td></td><td>2.000 MHz</td><td>1.000 MHz</td><td>-0.75</td><td>6.41</td><td>-0.71</td><td>6.45</td></tr><tr><td></td><td>3.000 MHz</td><td>1.000 MHz</td><td>-0.44</td><td>6.72</td><td>-0.34</td><td>6.82</td></tr><tr><td></td><td>4.000 MHz</td><td>1.000 MHz</td><td>-0.82</td><td>6.34</td><td>-0.48</td><td>6.68</td></tr><tr><td></td><td>4.500 MHz</td><td>1.000 MHz</td><td>-3.19</td><td>3.97</td><td>-2.79</td><td>4.37</td></tr></table>		Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm	7.16 dBm	1.000 MHz	1.000 MHz	-1.04	6.12	-1.04	6.12		2.000 MHz	1.000 MHz	-0.75	6.41	-0.71	6.45		3.000 MHz	1.000 MHz	-0.44	6.72	-0.34	6.82		4.000 MHz	1.000 MHz	-0.82	6.34	-0.48	6.68		4.500 MHz	1.000 MHz	-3.19	3.97	-2.79	4.37
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm																																					
7.16 dBm	1.000 MHz	1.000 MHz	-1.04	6.12	-1.04	6.12																																					
	2.000 MHz	1.000 MHz	-0.75	6.41	-0.71	6.45																																					
	3.000 MHz	1.000 MHz	-0.44	6.72	-0.34	6.82																																					
	4.000 MHz	1.000 MHz	-0.82	6.34	-0.48	6.68																																					
	4.500 MHz	1.000 MHz	-3.19	3.97	-2.79	4.37																																					

* Agilent 13:53:52 May 29, 2012																																											
Center 3.67500000 GHz																																											
*Res BW 100 kHz																																											
*Sweep 200 ms (601 pts)																																											
RMS Results																																											
<table><tr><th>Carrier Power</th><th>Freq Offset</th><th>Ref BW</th><th>dBc</th><th>Lower dBm</th><th>dBc</th><th>Upper dBm</th></tr><tr><td>7.24 dBm</td><td>1.000 MHz</td><td>1.000 MHz</td><td>-1.02</td><td>6.21</td><td>-1.11</td><td>6.12</td></tr><tr><td></td><td>2.000 MHz</td><td>1.000 MHz</td><td>-0.85</td><td>6.39</td><td>-0.82</td><td>6.42</td></tr><tr><td></td><td>3.000 MHz</td><td>1.000 MHz</td><td>-0.35</td><td>6.89</td><td>-0.19</td><td>7.04</td></tr><tr><td></td><td>4.000 MHz</td><td>1.000 MHz</td><td>-0.75</td><td>6.48</td><td>-0.57</td><td>6.67</td></tr><tr><td></td><td>4.500 MHz</td><td>1.000 MHz</td><td>-2.98</td><td>4.25</td><td>-3.00</td><td>4.24</td></tr></table>		Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm	7.24 dBm	1.000 MHz	1.000 MHz	-1.02	6.21	-1.11	6.12		2.000 MHz	1.000 MHz	-0.85	6.39	-0.82	6.42		3.000 MHz	1.000 MHz	-0.35	6.89	-0.19	7.04		4.000 MHz	1.000 MHz	-0.75	6.48	-0.57	6.67		4.500 MHz	1.000 MHz	-2.98	4.25	-3.00	4.24
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm																																					
7.24 dBm	1.000 MHz	1.000 MHz	-1.02	6.21	-1.11	6.12																																					
	2.000 MHz	1.000 MHz	-0.85	6.39	-0.82	6.42																																					
	3.000 MHz	1.000 MHz	-0.35	6.89	-0.19	7.04																																					
	4.000 MHz	1.000 MHz	-0.75	6.48	-0.57	6.67																																					
	4.500 MHz	1.000 MHz	-2.98	4.25	-3.00	4.24																																					





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<b>Test specification:</b>		<b>Section 90.1321, Peak EIRP power density</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1046; TIA/EIA-603-C, Section 2.2.1	
<b>Test mode:</b>		Compliance	<b>Verdict:</b>  <b>PASS</b>
<b>Date(s):</b>		5/29/2012	
<b>Temperature:</b> 23.6 °C		<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %
			<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

Plot 7.2.9 EIRP spectral density test results at high frequency, antenna gain 19.5 dBi

CARRIER FREQUENCY:	3695.0 MHz																																										
EMISSION BANDWIDTH:	10 MHz																																										
RF OUTPUT:	Antenna #2																																										
MODULATION: QPSK	MODULATION: 64QAM																																										
* Agilent 14:13:33 May 29, 2012																																											
* R																																											
<b>RMS Results</b>																																											
<table><tr><th>Carrier Power</th><th>Freq Offset</th><th>Ref BW</th><th>dBc</th><th>Lower dBm</th><th>dBc</th><th>Upper dBm</th></tr><tr><td>7.38 dBm / 1.00000 MHz</td><td>1.000 MHz</td><td>1.000 MHz</td><td>-1.35</td><td>6.03</td><td>-1.30</td><td>6.08</td></tr><tr><td></td><td>2.000 MHz</td><td>1.000 MHz</td><td>-1.06</td><td>6.32</td><td>-1.02</td><td>6.36</td></tr><tr><td></td><td>3.000 MHz</td><td>1.000 MHz</td><td>-0.73</td><td>6.65</td><td>-0.64</td><td>6.74</td></tr><tr><td></td><td>4.000 MHz</td><td>1.000 MHz</td><td>-1.11</td><td>6.27</td><td>-0.88</td><td>6.50</td></tr><tr><td></td><td>4.500 MHz</td><td>1.000 MHz</td><td>-3.48</td><td>3.90</td><td>-3.18</td><td>4.20</td></tr></table>		Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm	7.38 dBm / 1.00000 MHz	1.000 MHz	1.000 MHz	-1.35	6.03	-1.30	6.08		2.000 MHz	1.000 MHz	-1.06	6.32	-1.02	6.36		3.000 MHz	1.000 MHz	-0.73	6.65	-0.64	6.74		4.000 MHz	1.000 MHz	-1.11	6.27	-0.88	6.50		4.500 MHz	1.000 MHz	-3.48	3.90	-3.18	4.20
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm																																					
7.38 dBm / 1.00000 MHz	1.000 MHz	1.000 MHz	-1.35	6.03	-1.30	6.08																																					
	2.000 MHz	1.000 MHz	-1.06	6.32	-1.02	6.36																																					
	3.000 MHz	1.000 MHz	-0.73	6.65	-0.64	6.74																																					
	4.000 MHz	1.000 MHz	-1.11	6.27	-0.88	6.50																																					
	4.500 MHz	1.000 MHz	-3.48	3.90	-3.18	4.20																																					
* Agilent 13:57:08 May 29, 2012																																											
* R																																											
<b>RMS Results</b>																																											
<table><tr><th>Carrier Power</th><th>Freq Offset</th><th>Ref BW</th><th>dBc</th><th>Lower dBm</th><th>dBc</th><th>Upper dBm</th></tr><tr><td>7.20 dBm / 1.00000 MHz</td><td>1.000 MHz</td><td>1.000 MHz</td><td>-1.28</td><td>5.92</td><td>-1.42</td><td>5.78</td></tr><tr><td></td><td>2.000 MHz</td><td>1.000 MHz</td><td>-1.08</td><td>6.12</td><td>-1.11</td><td>6.09</td></tr><tr><td></td><td>3.000 MHz</td><td>1.000 MHz</td><td>-0.56</td><td>6.65</td><td>-0.45</td><td>6.75</td></tr><tr><td></td><td>4.000 MHz</td><td>1.000 MHz</td><td>-1.06</td><td>6.14</td><td>-0.82</td><td>6.38</td></tr><tr><td></td><td>4.500 MHz</td><td>1.000 MHz</td><td>-3.27</td><td>3.93</td><td>-3.32</td><td>3.88</td></tr></table>		Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm	7.20 dBm / 1.00000 MHz	1.000 MHz	1.000 MHz	-1.28	5.92	-1.42	5.78		2.000 MHz	1.000 MHz	-1.08	6.12	-1.11	6.09		3.000 MHz	1.000 MHz	-0.56	6.65	-0.45	6.75		4.000 MHz	1.000 MHz	-1.06	6.14	-0.82	6.38		4.500 MHz	1.000 MHz	-3.27	3.93	-3.32	3.88
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm																																					
7.20 dBm / 1.00000 MHz	1.000 MHz	1.000 MHz	-1.28	5.92	-1.42	5.78																																					
	2.000 MHz	1.000 MHz	-1.08	6.12	-1.11	6.09																																					
	3.000 MHz	1.000 MHz	-0.56	6.65	-0.45	6.75																																					
	4.000 MHz	1.000 MHz	-1.06	6.14	-0.82	6.38																																					
	4.500 MHz	1.000 MHz	-3.27	3.93	-3.32	3.88																																					

Plot 7.2.10 EIRP spectral density test results at low frequency, antenna gain 5.6 dBi

CARRIER FREQUENCY:	3655 MHz																																										
EMISSION BANDWIDTH:	10 MHz																																										
RF OUTPUT:	Antenna #2																																										
MODULATION: QPSK	MODULATION: 64QAM																																										
* Agilent 14:05:36 May 29, 2012																																											
* R																																											
<b>RMS Results</b>																																											
<table><tr><th>Carrier Power</th><th>Freq Offset</th><th>Ref BW</th><th>dBc</th><th>Lower dBm</th><th>dBc</th><th>Upper dBm</th></tr><tr><td>13.28 dBm / 1.00000 MHz</td><td>1.000 MHz</td><td>1.000 MHz</td><td>-0.18</td><td>13.10</td><td>-0.14</td><td>13.14</td></tr><tr><td></td><td>2.000 MHz</td><td>1.000 MHz</td><td>0.06</td><td>13.34</td><td>0.21</td><td>13.49</td></tr><tr><td></td><td>3.000 MHz</td><td>1.000 MHz</td><td>0.42</td><td>13.70</td><td>0.62</td><td>13.89</td></tr><tr><td></td><td>4.000 MHz</td><td>1.000 MHz</td><td>0.10</td><td>13.38</td><td>0.48</td><td>13.76</td></tr><tr><td></td><td>4.500 MHz</td><td>1.000 MHz</td><td>-2.22</td><td>11.05</td><td>-1.79</td><td>11.48</td></tr></table>		Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm	13.28 dBm / 1.00000 MHz	1.000 MHz	1.000 MHz	-0.18	13.10	-0.14	13.14		2.000 MHz	1.000 MHz	0.06	13.34	0.21	13.49		3.000 MHz	1.000 MHz	0.42	13.70	0.62	13.89		4.000 MHz	1.000 MHz	0.10	13.38	0.48	13.76		4.500 MHz	1.000 MHz	-2.22	11.05	-1.79	11.48
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm																																					
13.28 dBm / 1.00000 MHz	1.000 MHz	1.000 MHz	-0.18	13.10	-0.14	13.14																																					
	2.000 MHz	1.000 MHz	0.06	13.34	0.21	13.49																																					
	3.000 MHz	1.000 MHz	0.42	13.70	0.62	13.89																																					
	4.000 MHz	1.000 MHz	0.10	13.38	0.48	13.76																																					
	4.500 MHz	1.000 MHz	-2.22	11.05	-1.79	11.48																																					
* Agilent 14:02:50 May 29, 2012																																											
* R																																											
<b>RMS Results</b>																																											
<table><tr><th>Carrier Power</th><th>Freq Offset</th><th>Ref BW</th><th>dBc</th><th>Lower dBm</th><th>dBc</th><th>Upper dBm</th></tr><tr><td>13.13 dBm / 1.00000 MHz</td><td>1.000 MHz</td><td>1.000 MHz</td><td>-0.25</td><td>12.87</td><td>-0.31</td><td>12.82</td></tr><tr><td></td><td>2.000 MHz</td><td>1.000 MHz</td><td>-0.02</td><td>13.10</td><td>-0.02</td><td>13.11</td></tr><tr><td></td><td>3.000 MHz</td><td>1.000 MHz</td><td>0.43</td><td>13.55</td><td>0.68</td><td>13.81</td></tr><tr><td></td><td>4.000 MHz</td><td>1.000 MHz</td><td>0.03</td><td>13.16</td><td>0.35</td><td>13.47</td></tr><tr><td></td><td>4.500 MHz</td><td>1.000 MHz</td><td>-2.20</td><td>10.92</td><td>-2.08</td><td>11.05</td></tr></table>		Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm	13.13 dBm / 1.00000 MHz	1.000 MHz	1.000 MHz	-0.25	12.87	-0.31	12.82		2.000 MHz	1.000 MHz	-0.02	13.10	-0.02	13.11		3.000 MHz	1.000 MHz	0.43	13.55	0.68	13.81		4.000 MHz	1.000 MHz	0.03	13.16	0.35	13.47		4.500 MHz	1.000 MHz	-2.20	10.92	-2.08	11.05
Carrier Power	Freq Offset	Ref BW	dBc	Lower dBm	dBc	Upper dBm																																					
13.13 dBm / 1.00000 MHz	1.000 MHz	1.000 MHz	-0.25	12.87	-0.31	12.82																																					
	2.000 MHz	1.000 MHz	-0.02	13.10	-0.02	13.11																																					
	3.000 MHz	1.000 MHz	0.43	13.55	0.68	13.81																																					
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	4.500 MHz	1.000 MHz	-2.20	10.92	-2.08	11.05																																					



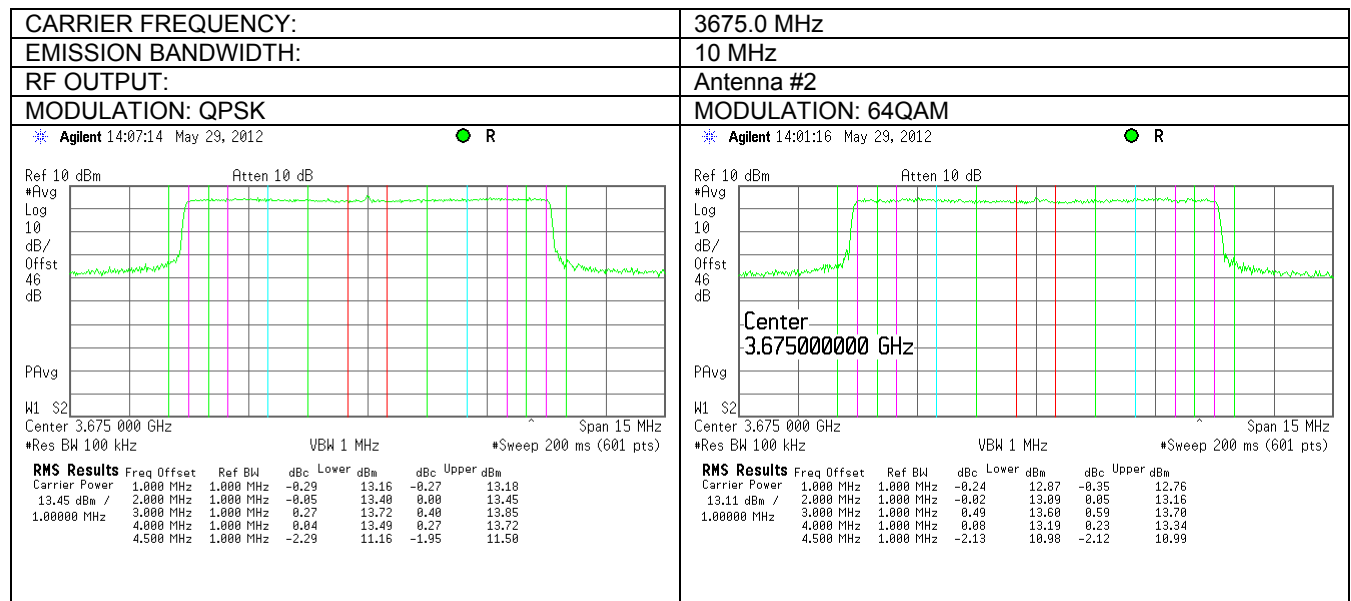
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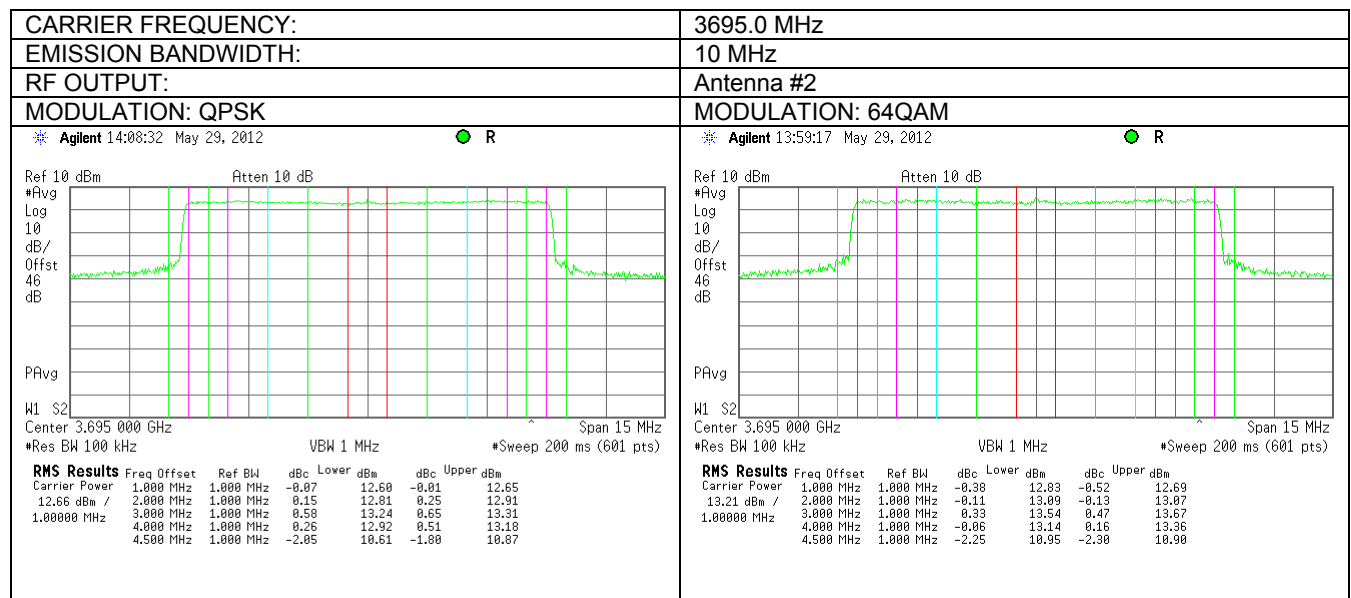
Date of Issue: 20-Jun-12

<b>Test specification:</b>	<b>Section 90.1321, Peak EIRP power density</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1046; TIA/EIA-603-C, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/29/2012		
<b>Temperature:</b> 23.6 °C	<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

Plot 7.2.11 EIRP spectral density test results at mid frequency, antenna gain 5.6 dBi



Plot 7.2.12 EIRP spectral density test results at high frequency, antenna gain 5.6 dBi





Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/29/2012		
Temperature: 23.6 °C	Air Pressure: 1005 hPa	Relative Humidity: 46 %	Power Supply: 5.5VDC
Remarks:			

## 7.3 Occupied bandwidth test

### 7.3.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Occupied bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points*, dBc	Maximum allowed bandwidth, MHz
3650.0 – 3700.0	26	NA

\* - Modulation envelope reference points are provided in terms of attenuation below the total average power.

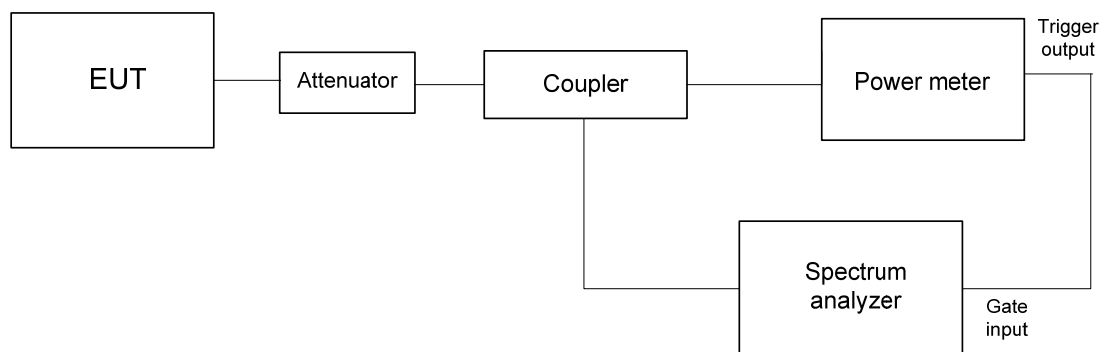
### 7.3.2 Test procedure

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 set to transmit the normally modulated carrier.

7.3.2.3 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and provided in Table 7.3.2 and the associated plots.

Figure 7.3.1 Occupied bandwidth test setup





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Date of Issue: 20-Jun-12

<b>Test specification:</b>	<b>Section 90.209, 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(s):</b>	5/29/2012		
<b>Temperature:</b> 23.6 °C	<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

Table 7.3.2 Occupied bandwidth test results

DETECTOR USED: Average  
 RESOLUTION BANDWIDTH: 0.5-2% of the Emission bandwidth  
 VIDEO BANDWIDTH: 3 times RBW  
 MODULATION ENVELOPE REFERENCE POINTS: 26 dB below total average power  
 MODULATING SIGNAL: PRBS  
 EMISSION BANDWIDTH: 5 MHz

Carrier frequency, MHz	Modulation	26 dBc Occupied bandwidth, MHz	Emission Bandwidth, MHz	Verdict
3652.5	QPSK	4.608	5.0	Pass
3675.0	QPSK	4.608	5.0	Pass
3697.5	QPSK	4.608	5.0	Pass
3652.5	64QAM	4.608	5.0	Pass
3675.0	64QAM	4.608	5.0	Pass
3697.5	64QAM	4.608	5.0	Pass

EMISSION BANDWIDTH: 10 MHz

Carrier frequency, MHz	Modulation	26 dBc Occupied bandwidth, MHz	Emission Bandwidth, MHz	Verdict
3655.0	QPSK	9.250	10.0	Pass
3675.0	QPSK	9.275	10.0	Pass
3695.0	QPSK	9.275	10.0	Pass
3655.0	64QAM	9.250	10.0	Pass
3675.0	64QAM	9.250	10.0	Pass
3695.0	64QAM	9.275	10.0	Pass

## Reference numbers of test equipment used

HL 2214	HL 3301	HL 3302	HL 3818	HL 3903			
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Full description is given in Appendix A.



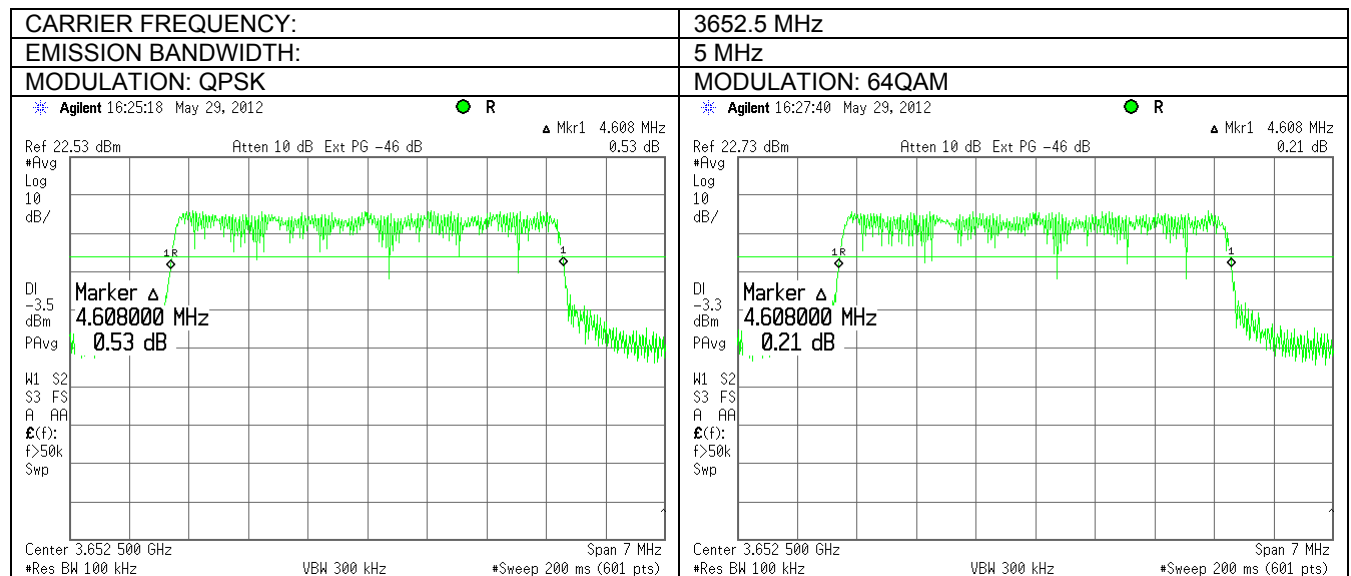
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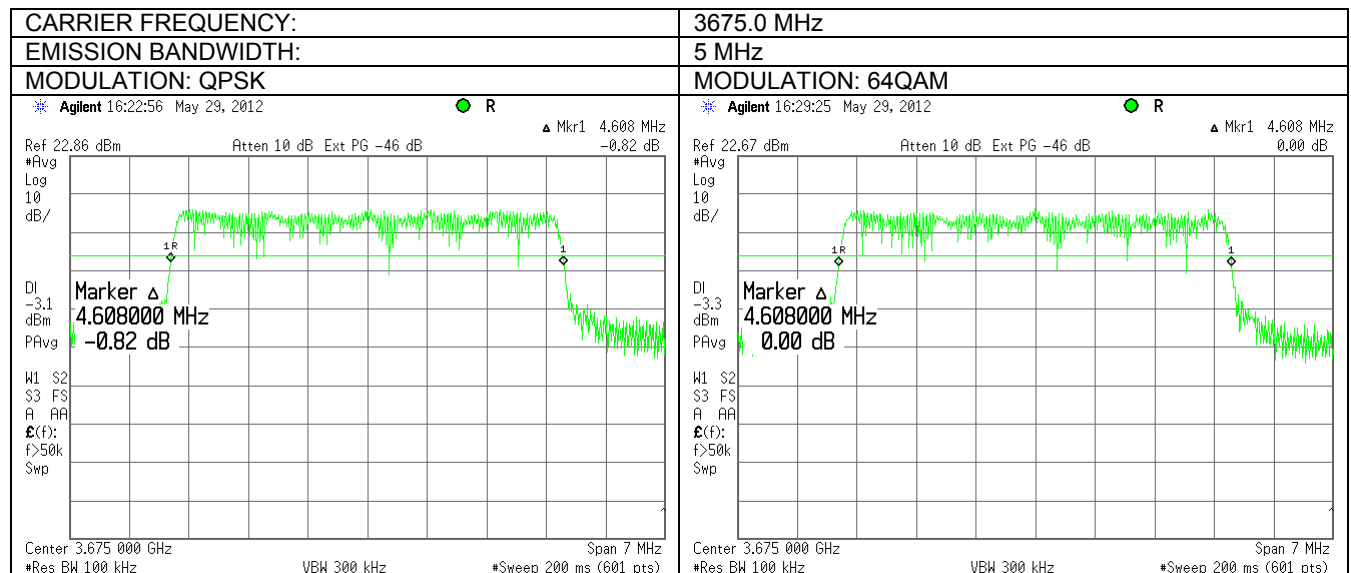
Date of Issue: 20-Jun-12

Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/29/2012		
Temperature: 23.6 °C	Air Pressure: 1005 hPa	Relative Humidity: 46 %	Power Supply: 5.5VDC
Remarks:			

Plot 7.3.1 Occupied bandwidth test result at low frequency



Plot 7.3.2 Occupied bandwidth test result at mid frequency





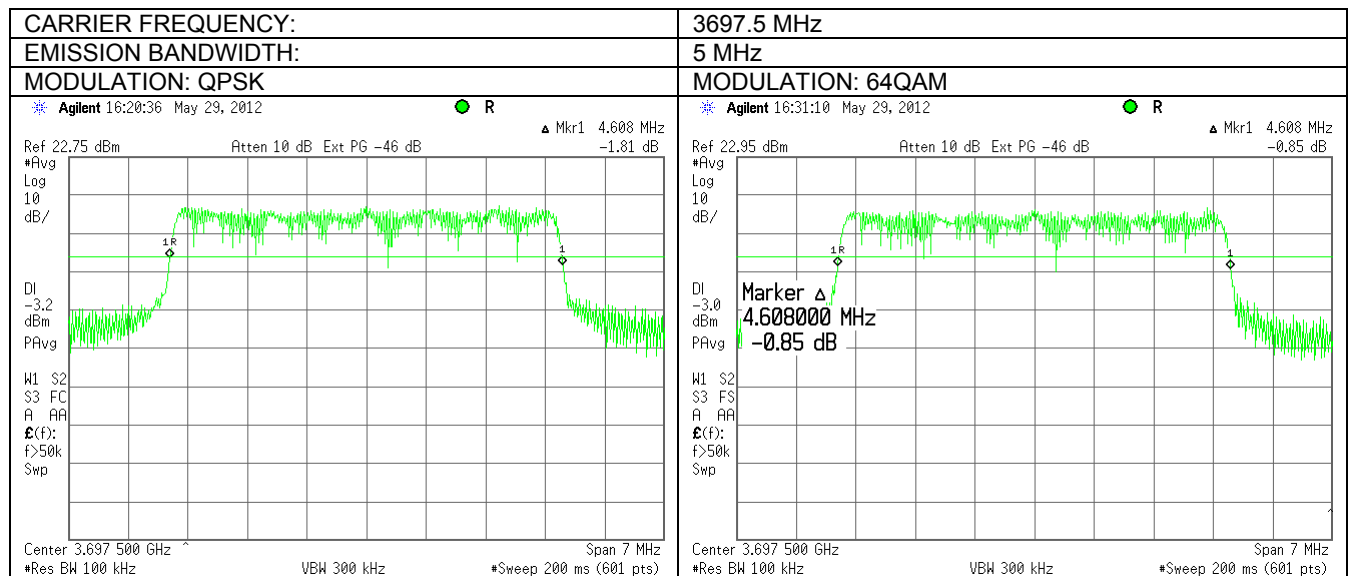
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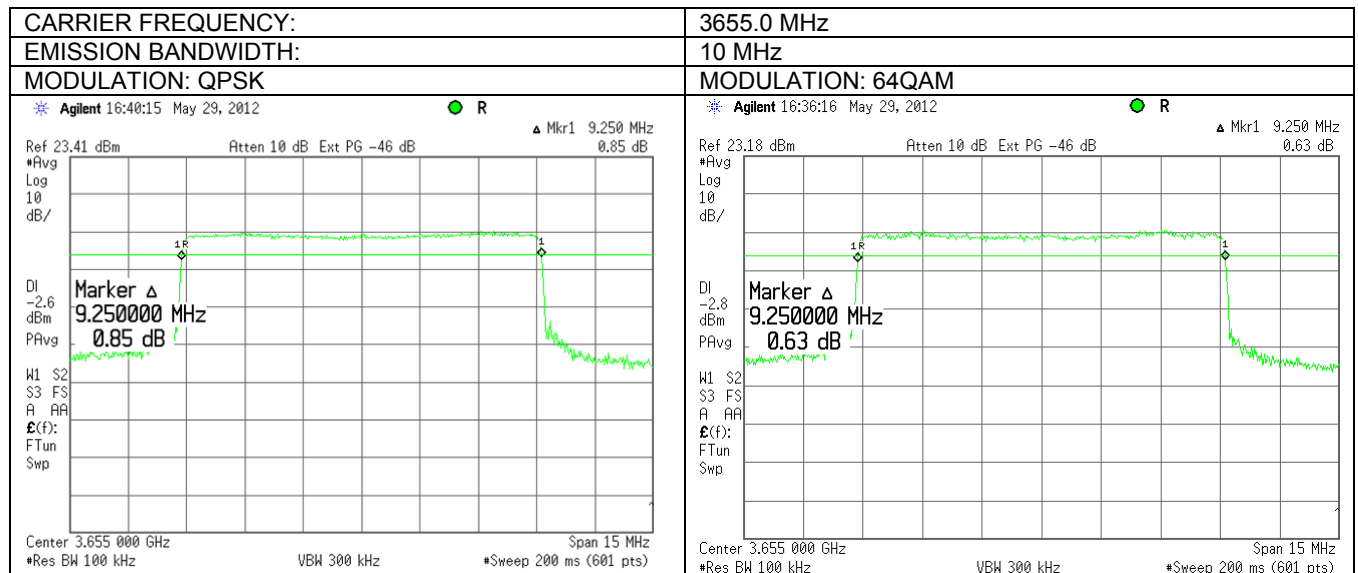
Date of Issue: 20-Jun-12

<b>Test specification:</b>		<b>Section 90.209, 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(s):</b>		5/29/2012	
<b>Temperature:</b> 23.6 °C		<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %
<b>Remarks:</b>		<b>Power Supply:</b> 5.5VDC	

Plot 7.3.3 Occupied bandwidth test result at high frequency



Plot 7.3.4 Occupied bandwidth test result at low frequency





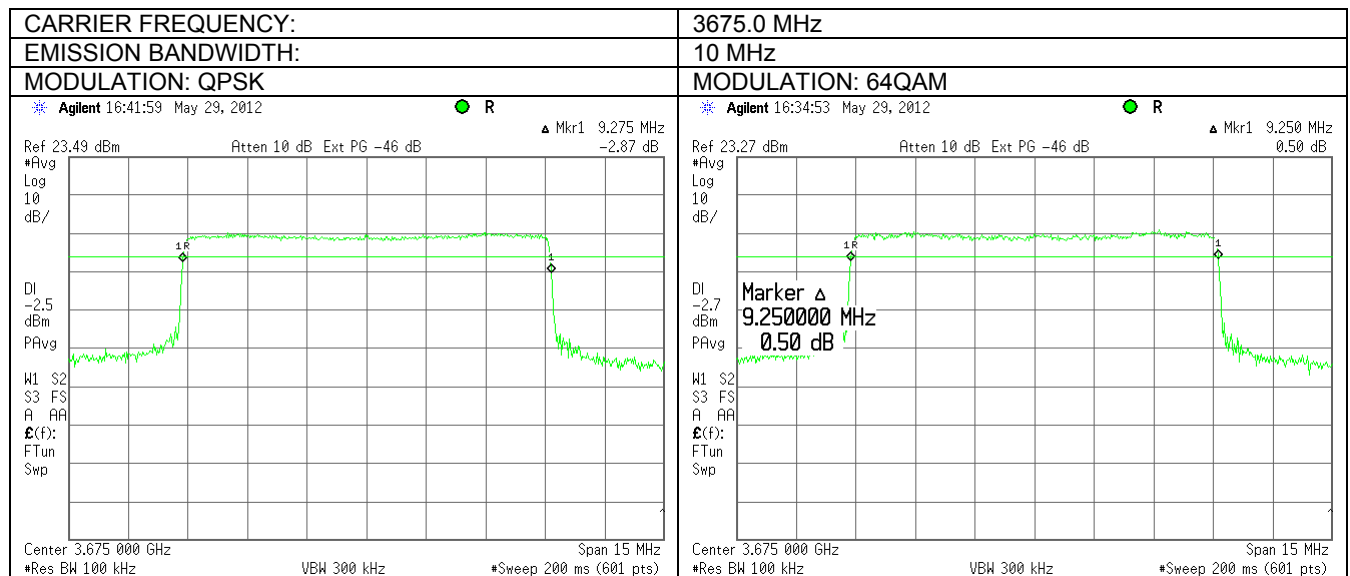
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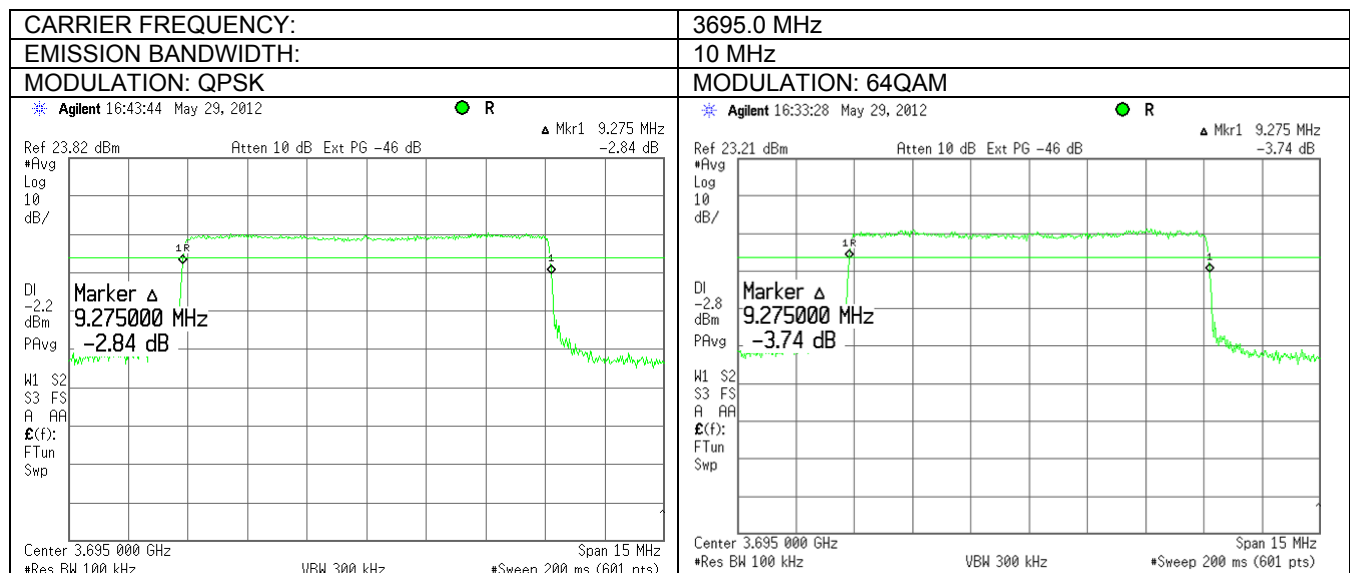
Date of Issue: 20-Jun-12

<b>Test specification:</b>		<b>Section 90.209, 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(s):</b>		5/29/2012	
<b>Temperature:</b> 23.6 °C		<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %
<b>Remarks:</b>		<b>Power Supply:</b> 5.5VDC	

Plot 7.3.5 Occupied bandwidth test result at mid frequency



Plot 7.3.6 Occupied bandwidth test result at high frequency



<b>Test specification:</b>	<b>Section 90.210(b), Emission mask</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051, 2.1047, 90.210; TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/29/2012		
<b>Temperature:</b> 23.63 °C	<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

## 7.4 Emission mask test

### 7.4.1 General

This test was performed to measure emission mask at RF antenna connector. Specification test limits are given in Table 7.4.1.

**Table 7.4.1 Emission mask limits**

Frequency displacement from carrier	Attenuation below carrier, dBc
Emission mask B (Emission bandwidth 5 MHz)	
0 – 2.5 MHz	0
2.5 – 5.0 MHz	25
5.0 – 12.5 MHz	35
More than* 12.5 MHz	43 + 10 log(P)
Emission mask B (Emission bandwidth 10 MHz)	
0 – 5 MHz	0
5 – 10.0 MHz	25
10.0 – 25.0 MHz	35
More than* 25.0 MHz	43 + 10 log(P)

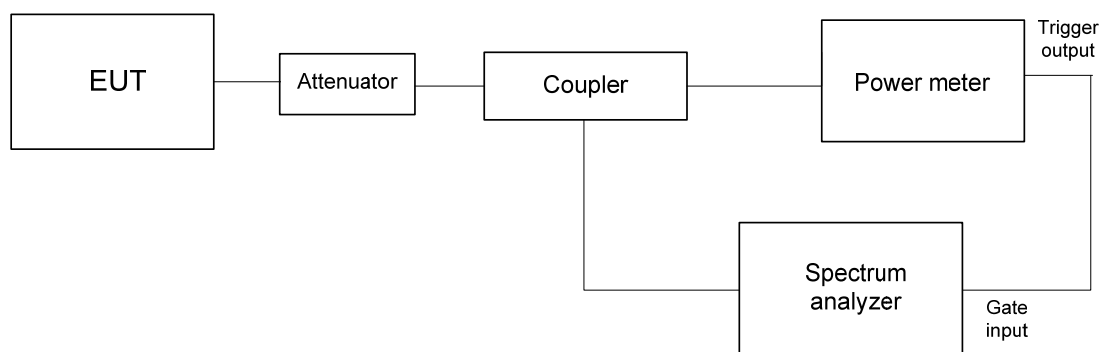
\* - emission mask includes carrier modulation envelope within  $\pm 250$  % of the authorized bandwidth; the frequency range removed beyond  $\pm 250$  % of the authorized bandwidth from carrier was investigated as spurious emission

### 7.4.2 Test procedure

**7.4.2.1** The EUT was set up as shown in Figure 7.4.1, energized and its proper operation was checked.

**7.4.2.2** The emission mask was measured with spectrum analyzer as provided in the associated plots. The test results recorded in Table 7.4.2.

**Figure 7.4.1 Emission mask test setup**







<b>Test specification:</b>	<b>Section 90.210(b), Emission mask</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051, 2.1047, 90.210; TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/29/2012		
<b>Temperature:</b> 23.63 °C	<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

Table 7.4.2 Emission mask test results

EMISSION BANDWIDTH: 5 MHz

Carrier frequency, MHz	Limit	Reference to Plot	Verdict
3652.5	Emission mask B	Plot 7.4.1	Pass
3675.0		Plot 7.4.2	
3697.5		Plot 7.4.3	

EMISSION BANDWIDTH: 10 MHz

Carrier frequency, MHz	Limit	Reference to Plot	Verdict
3655.0	Emission mask B	Plot 7.4.4	Pass
3675.0		Plot 7.4.5	
3695.0		Plot 7.4.6	

NOTE1: Attenuation below carrier provided in terms of attenuation below total average power within occupied bandwidth. Measurement was performed with RBW set to 100 kHz and the limit mask was reduced by 10 dB to compensate the lower RBW [ $10 \cdot \log(1 \text{ MHz} / 100 \text{ kHz}) = 10 \text{ dB}$ ];

**Reference numbers of test equipment used**

HL 2214	HL 3301	HL 3302	HL 3818	HL 3903			
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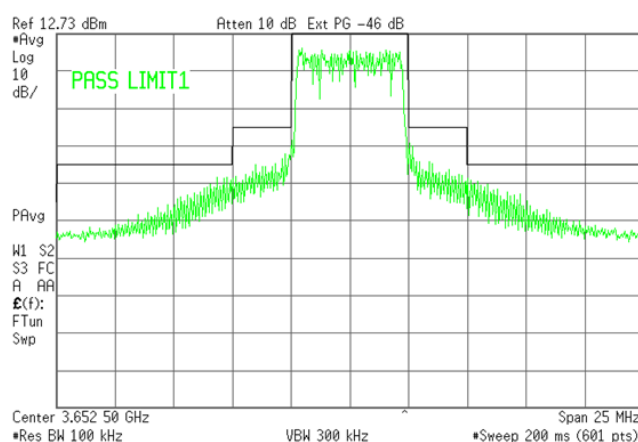
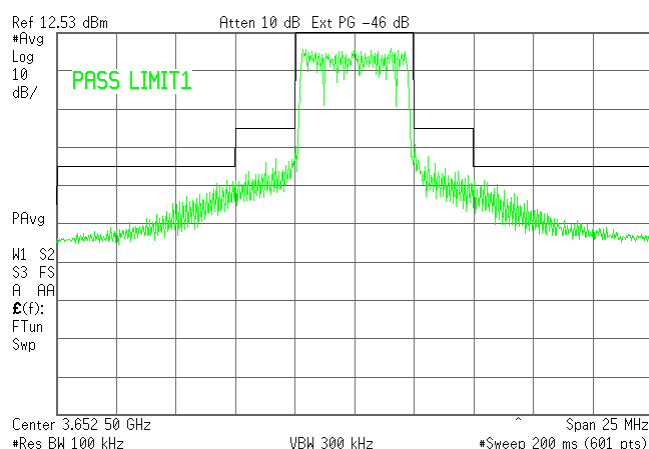
Full description is given in Appendix A.

<b>Test specification:</b>	<b>Section 90.210(b), Emission mask</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051, 2.1047, 90.210; TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/29/2012		
<b>Temperature:</b> 23.63 °C	<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Plot 7.4.1 Emission mask test results at low carrier frequency**

ASSIGNED FREQUENCY RANGE:  
DETECTOR USED:  
MODULATING SIGNAL:  
EMISSION BANDWIDTH:  
TRANSMITTER OUTPUT POWER: 22.53 dBm  
MODULATION: QPSK  
\* Agilent 15:59:54 May 29, 2012

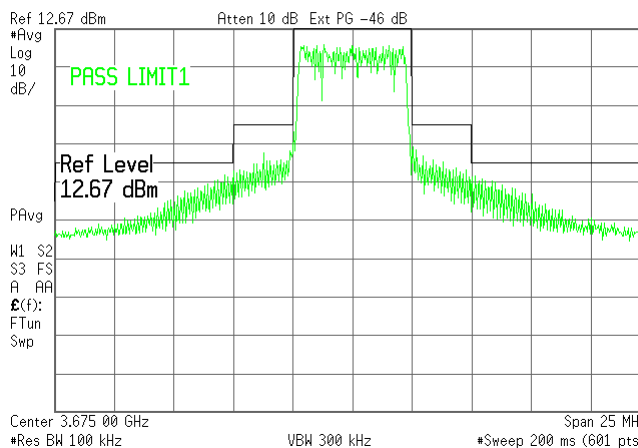
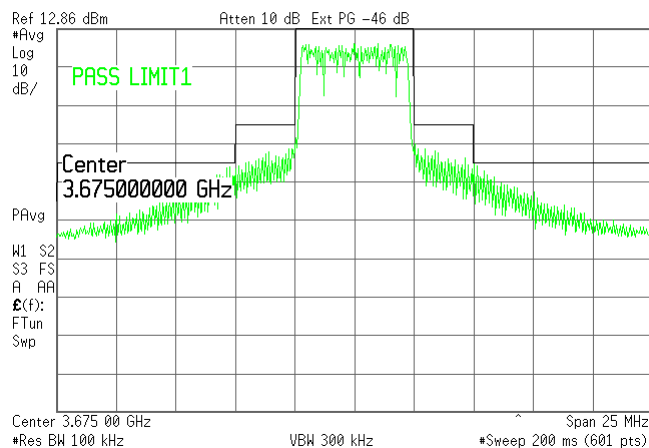
3650.0 - 3700.0 MHz  
Average  
PRBS  
5 MHz  
TRANSMITTER OUTPUT POWER: 22.73 dBm  
MODULATION: 64QAM  
\* Agilent 15:45:45 May 29, 2012



**Plot 7.4.2 Emission mask test results at mid carrier frequency**

ASSIGNED FREQUENCY RANGE:  
DETECTOR USED:  
MODULATING SIGNAL:  
EMISSION BANDWIDTH:  
TRANSMITTER OUTPUT POWER: 22.86 dBm  
MODULATION: QPSK  
\* Agilent 15:55:03 May 29, 2012

3650.0 - 3700.0 MHz  
Average  
PRBS  
5 MHz  
TRANSMITTER OUTPUT POWER: 22.67 dBm  
MODULATION: 64QAM  
\* Agilent 15:49:56 May 29, 2012

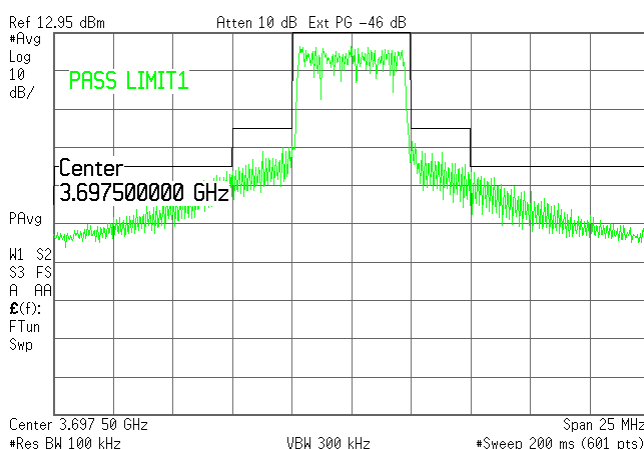
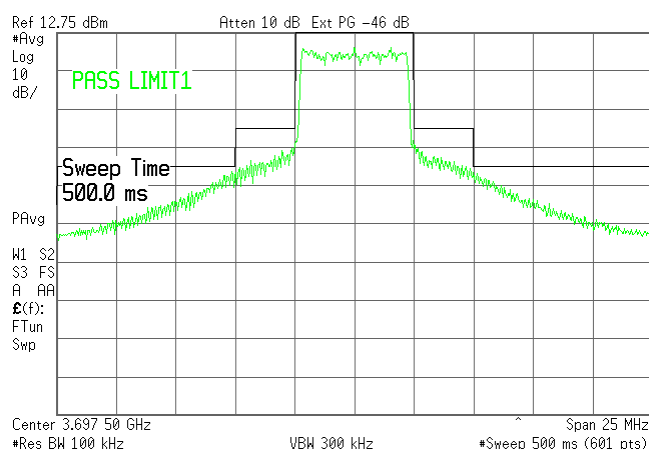


<b>Test specification:</b>	<b>Section 90.210(b), Emission mask</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051, 2.1047, 90.210; TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/29/2012		
<b>Temperature:</b> 23.63 °C	<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Plot 7.4.3 Emission mask test results at high carrier frequency**

ASSIGNED FREQUENCY RANGE:  
DETECTOR USED:  
MODULATING SIGNAL:  
EMISSION BANDWIDTH:  
TRANSMITTER OUTPUT POWER: 22.75 dBm  
MODULATION: QPSK  
\* Agilent 16:02:16 May 29, 2012

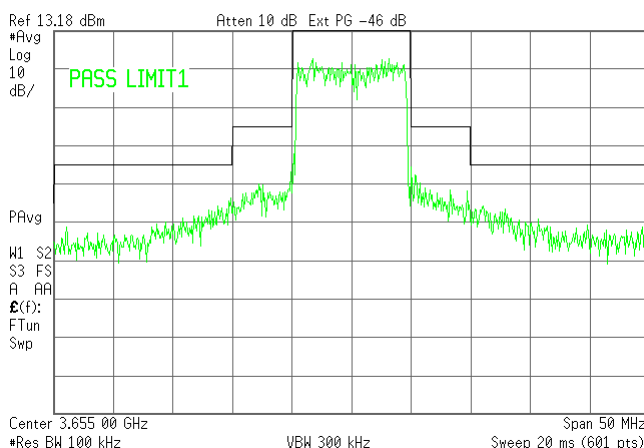
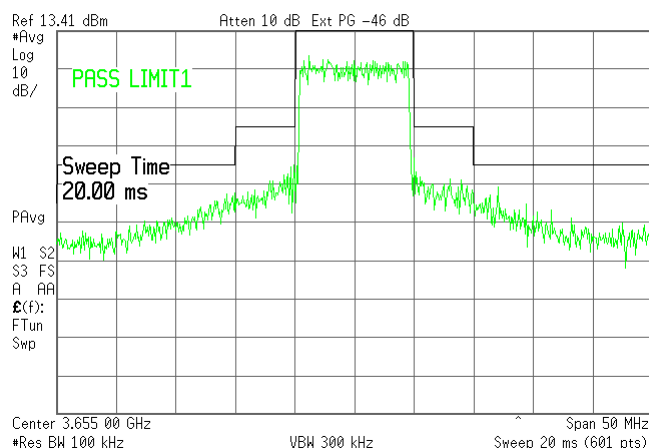
3650.0 - 3700.0 MHz  
Average  
PRBS  
5 MHz  
TRANSMITTER OUTPUT POWER: 22.95 dBm  
MODULATION: 64QAM  
\* Agilent 15:51:04 May 29, 2012



**Plot 7.4.4 Emission mask test results at low carrier frequency**

ASSIGNED FREQUENCY RANGE:  
DETECTOR USED:  
MODULATING SIGNAL:  
EMISSION BANDWIDTH:  
TRANSMITTER OUTPUT POWER: 23.41 dBm  
MODULATION: QPSK  
\* Agilent 15:40:30 May 29, 2012

3650.0 - 3700.0 MHz  
Average  
PRBS  
10 MHz  
TRANSMITTER OUTPUT POWER: 23.18 dBm  
MODULATION: 64QAM  
\* Agilent 15:29:09 May 29, 2012

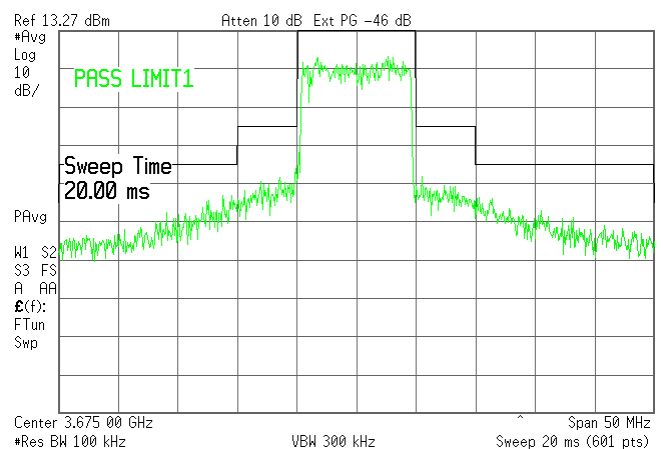
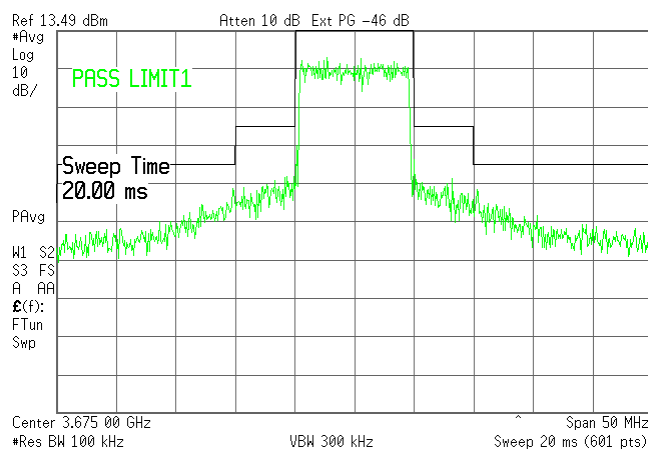


<b>Test specification:</b>	<b>Section 90.210(b), Emission mask</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051, 2.1047, 90.210; TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/29/2012		
<b>Temperature:</b> 23.63 °C	<b>Air Pressure:</b> 1005 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Plot 7.4.5 Emission mask test results at mid carrier frequency**

ASSIGNED FREQUENCY RANGE:  
DETECTOR USED:  
MODULATING SIGNAL:  
EMISSION BANDWIDTH:  
TRANSMITTER OUTPUT POWER: 23.49 dBm  
MODULATION: QPSK  
\* Agilent 15:39:19 May 29, 2012

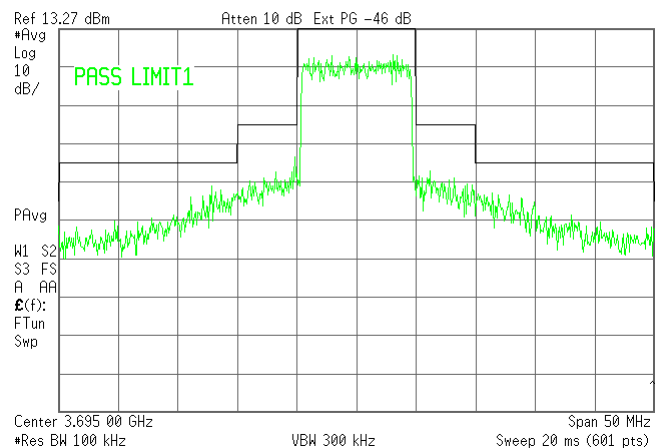
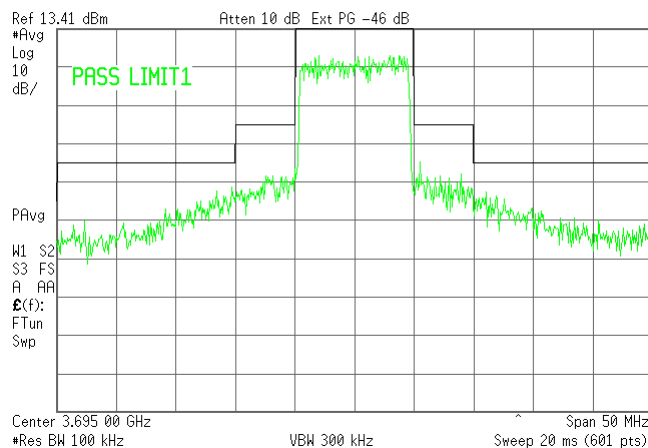
3650.0 - 3700.0 MHz  
Average  
PRBS  
10 MHz  
TRANSMITTER OUTPUT POWER: 23.27 dBm  
MODULATION: 64QAM  
\* Agilent 15:34:54 May 29, 2012



**Plot 7.4.6 Emission mask test results at high carrier frequency**

ASSIGNED FREQUENCY RANGE:  
DETECTOR USED:  
MODULATING SIGNAL:  
EMISSION BANDWIDTH:  
TRANSMITTER OUTPUT POWER: 23.41 dBm  
MODULATION: QPSK  
\* Agilent 15:37:44 May 29, 2012

3650.0 - 3700.0 MHz  
Average  
PRBS  
10 MHz  
TRANSMITTER OUTPUT POWER: 23.27 dBm  
MODULATION: 64QAM  
\* Agilent 15:35:45 May 29, 2012





<b>Test specification:</b>	<b>Section 90.1323, Spurious emissions at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051, 90.1323; TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/30/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 47 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

## 7.5 Spurious emissions at RF antenna connector test

### 7.5.1 General

This test was performed to measure spurious emissions at RF antenna connector. Specification test limits are given in Table 7.5.1.

**Table 7.5.1 Spurious emission limits**

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

\* - spurious emission limits do not apply to the in band emission within  $\pm 250$  % of the authorized bandwidth from the carrier; investigated in course of emission mask testing

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

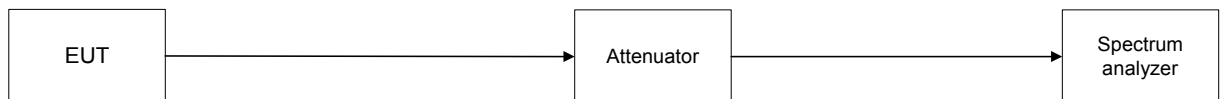
### 7.5.2 Test procedure

**7.5.2.1** The EUT was set up as shown in Figure 7.5.1, energized and its proper operation was checked.

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

**7.5.2.3** The spurious emission was measured with spectrum analyzer as provided in Table 7.5.2 and associated plots.

**Figure 7.5.1 Spurious emission test setup for single antenna mode**





<b>Test specification:</b>	<b>Section 90.1323, Spurious emissions at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051, 90.1323; TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/30/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 47 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Table 7.5.2 Spurious emission test results**

ASSIGNED FREQUENCY RANGE: 3650.0 – 3700.0 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 37000 MHz  
 DETECTOR USED: Peak  
 VIDEO BANDWIDTH: ≥ Resolution bandwidth  
 MODULATION: 64QAM  
 MODULATING SIGNAL: PRBS  
 NUMBER OF OUTPUTS: N = 2  
 EMISSION BANDWIDTH: 5 MHz (worst case output power and density)

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm*	Limit, dBm	Margin, dB**	Verdict
<b>Low carrier frequency 3652.5 MHz</b>								
10954.92	-25.52	Included	Included	1000	-22.52	-13.0	-9.52	Pass
<b>Mid carrier frequency 3675.0 MHz</b>								
11022.50	-25.96	Included	Included	1000	-22.96	-13.0	-9.96	Pass
<b>High carrier frequency 3697.5 MHz</b>								
11090.13	-27.19	Included	Included	1000	-24.19	-13.0	-11.19	Pass

\*- Spurious emission = SA Reading + 10\*log(N) = . SA Reading + 3dB

\*\* - Margin = Spurious emission – specification limit.

**Reference numbers of test equipment used**

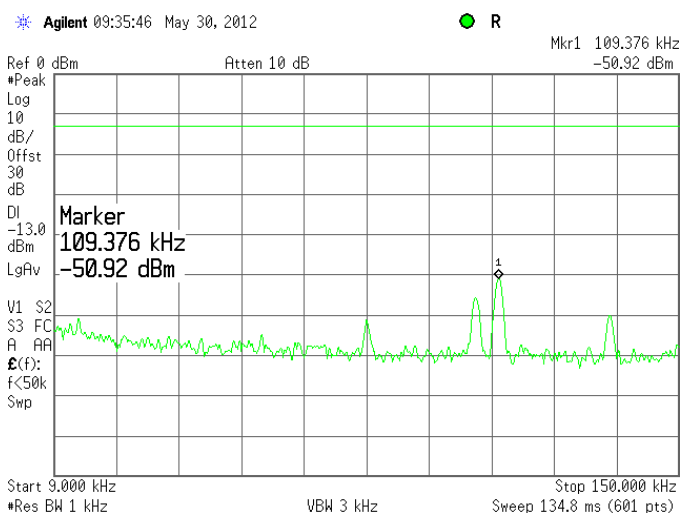
HL 3455	HL 3787	HL 3818	HL 3903				
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Full description is given in Appendix A.

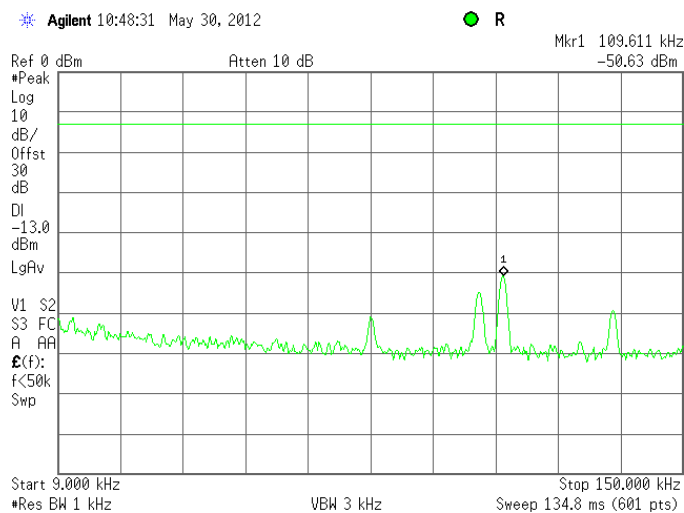


Test specification:	Section 90.1323, Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1051, 90.1323; TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/30/2012		
Temperature: 24.2 °C	Air Pressure: 1013 hPa	Relative Humidity: 47 %	Power Supply: 5.5VDC
Remarks:			

Plot 7.5.1 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency



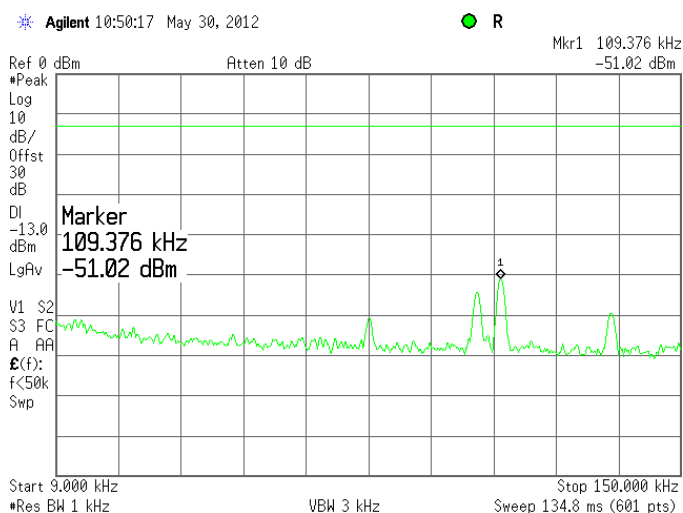
Plot 7.5.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency



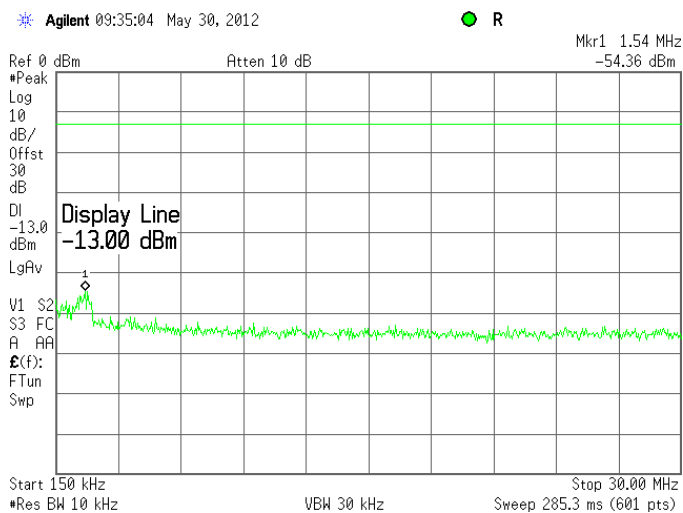


Test specification:	Section 90.1323, Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1051, 90.1323; TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/30/2012		
Temperature: 24.2 °C	Air Pressure: 1013 hPa	Relative Humidity: 47 %	Power Supply: 5.5VDC
Remarks:			

Plot 7.5.3 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency



Plot 7.5.4 Spurious emission measurements in 0.150 - 30.0 MHz range at low carrier frequency

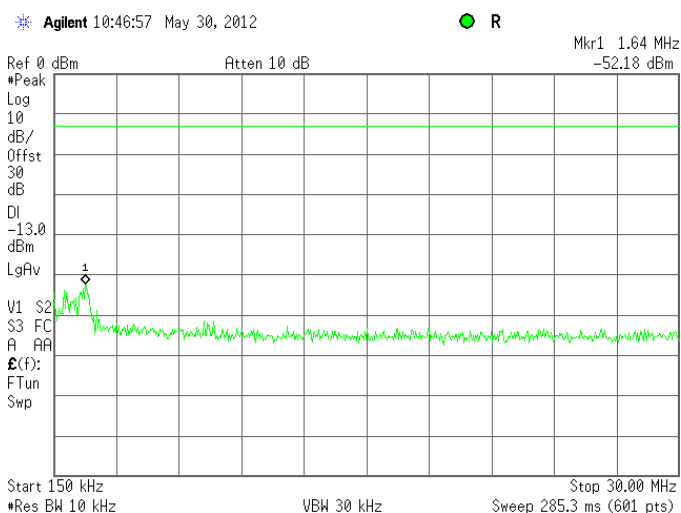




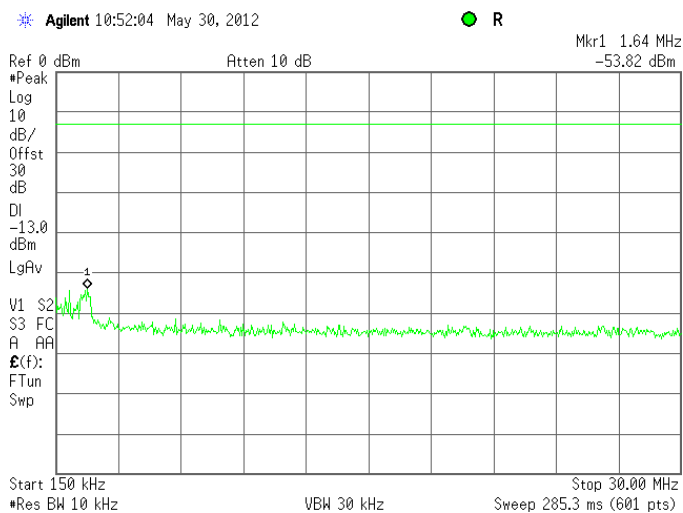


Test specification:	Section 90.1323, Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1051, 90.1323; TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/30/2012		
Temperature: 24.2 °C	Air Pressure: 1013 hPa	Relative Humidity: 47 %	Power Supply: 5.5VDC
Remarks:			

Plot 7.5.5 Spurious emission measurements in 0.150 - 30.0 MHz range at mid carrier frequency



Plot 7.5.6 Spurious emission measurements in 0.150 - 30.0 MHz range at high carrier frequency





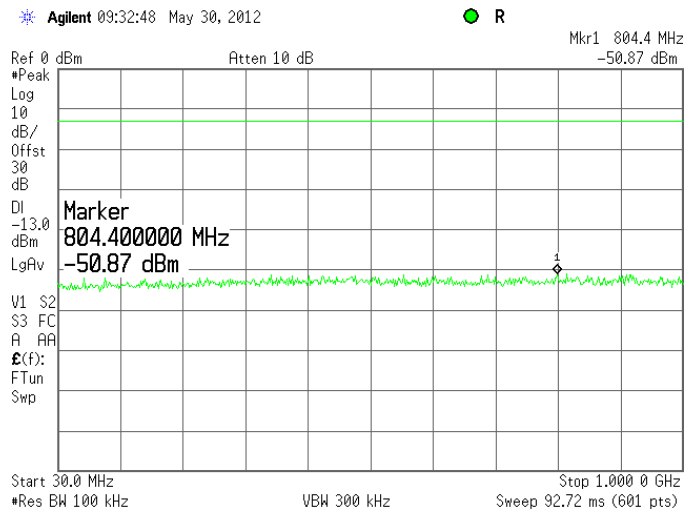
HERMON LABORATORIES

Report ID: AIRRAD\_FCC.23306.doc

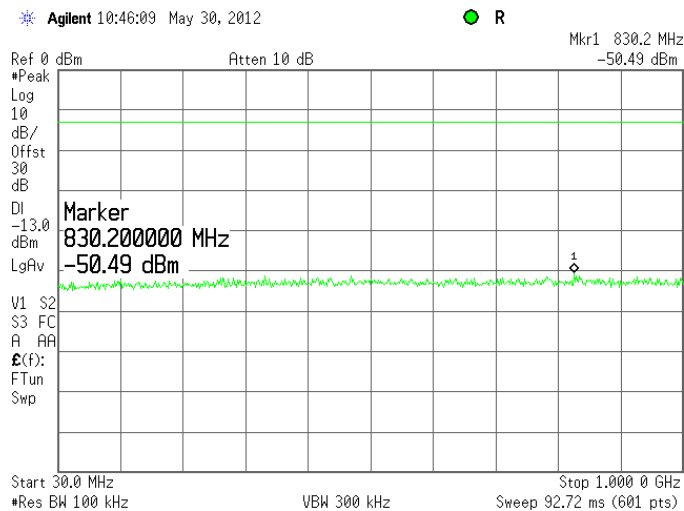
Date of Issue: 20-Jun-12

Test specification:	Section 90.1323, Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1051, 90.1323; TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/30/2012		
Temperature: 24.2 °C	Air Pressure: 1013 hPa	Relative Humidity: 47 %	Power Supply: 5.5VDC
Remarks:			

Plot 7.5.7 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency

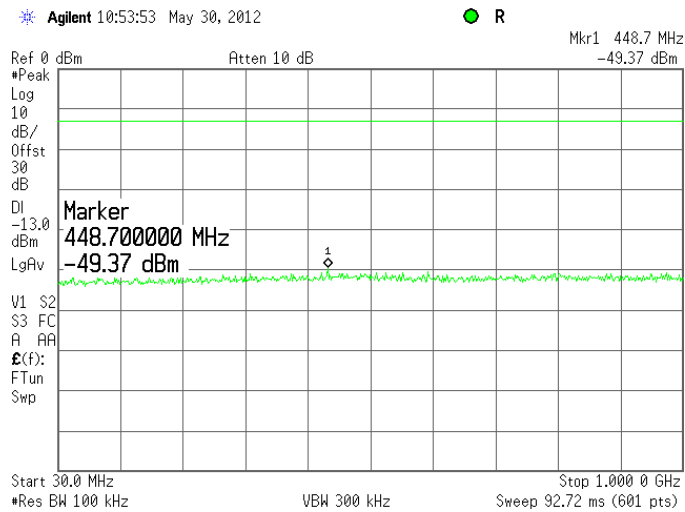
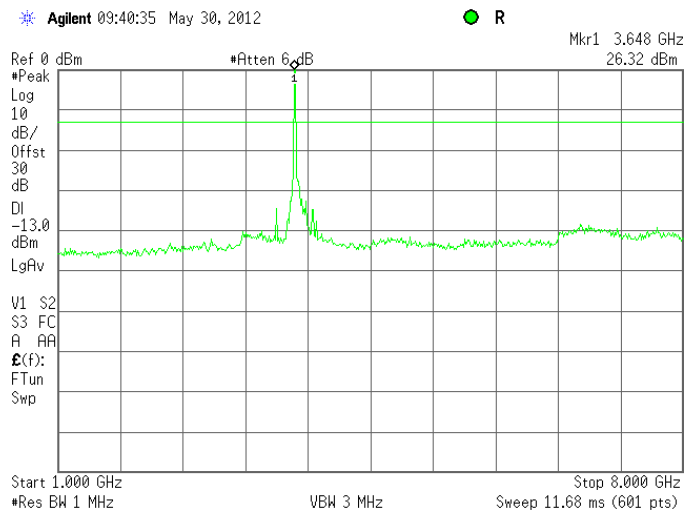


Plot 7.5.8 Spurious emission measurements in 30.0 - 1000 MHz range at mid carrier frequency





<b>Test specification:</b>	<b>Section 90.1323, Spurious emissions at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051, 90.1323; TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/30/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 47 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Plot 7.5.9 Spurious emission measurements in 30.0 - 1000 MHz range at high carrier frequency****Plot 7.5.10 Spurious emission measurements in 1000 - 8000 MHz range at low carrier frequency**

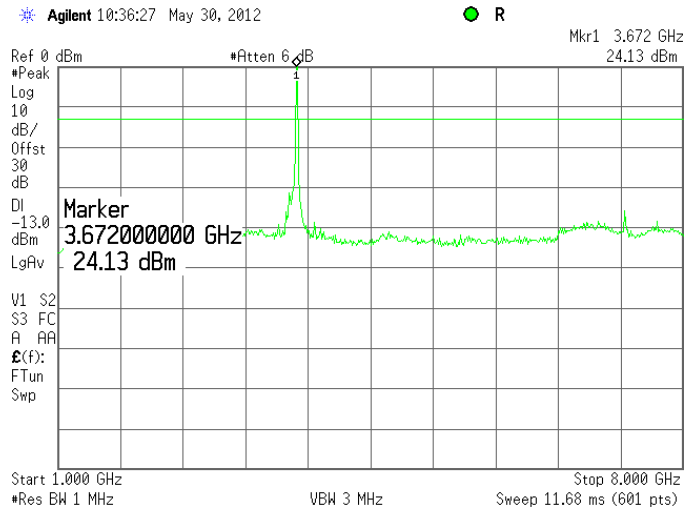


HERMON LABORATORIES

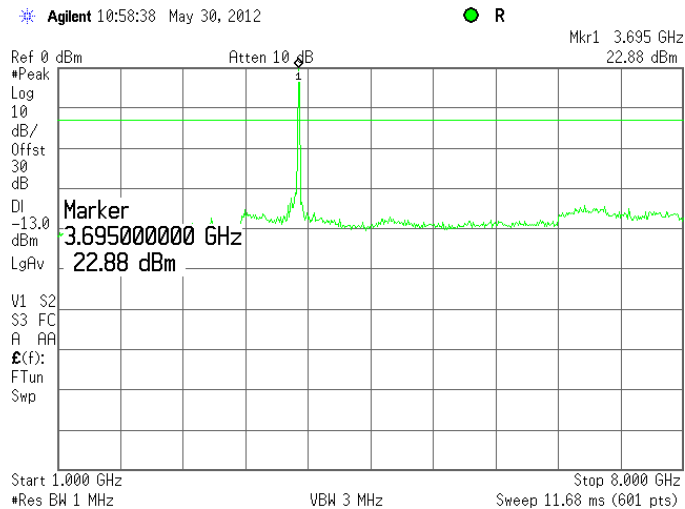
Report ID: AIRRAD\_FCC.23306.doc  
Date of Issue: 20-Jun-12

<b>Test specification:</b>	<b>Section 90.1323, Spurious emissions at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051, 90.1323; TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/30/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 47 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Plot 7.5.11 Spurious emission measurements in 1000 - 8000 MHz at mid carrier frequency**



**Plot 7.5.12 Spurious emission measurements in 1000 - 8000 MHz at high carrier frequency**



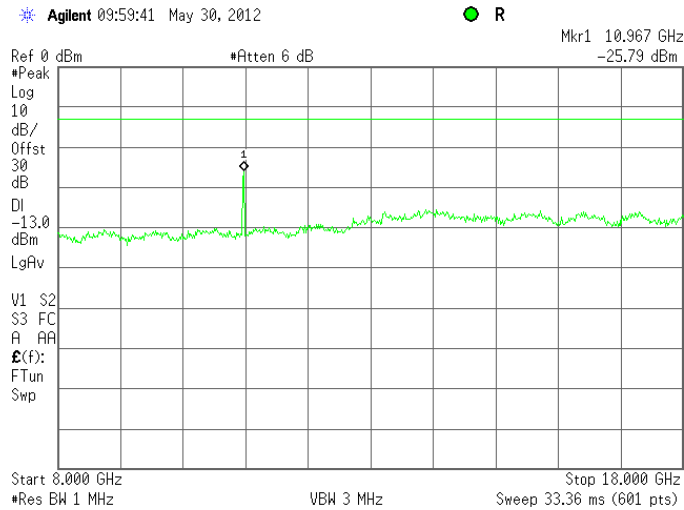


HERMON LABORATORIES

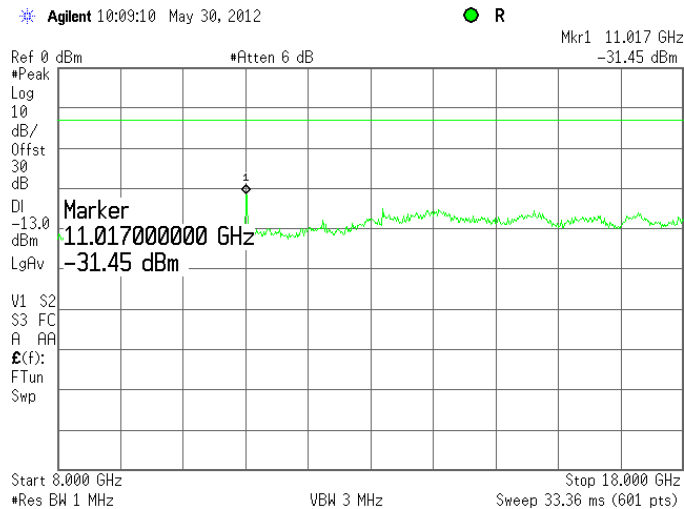
Report ID: AIRRAD\_FCC.23306.doc  
Date of Issue: 20-Jun-12

Test specification:	Section 90.1323, Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1051, 90.1323; TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/30/2012		
Temperature: 24.2 °C	Air Pressure: 1013 hPa	Relative Humidity: 47 %	Power Supply: 5.5VDC
Remarks:			

Plot 7.5.13 Spurious emission measurements in 8000 - 18000 MHz range at low carrier frequency

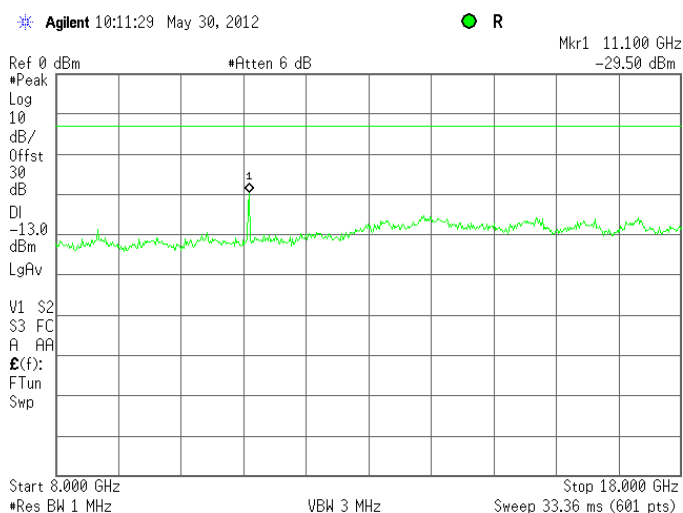
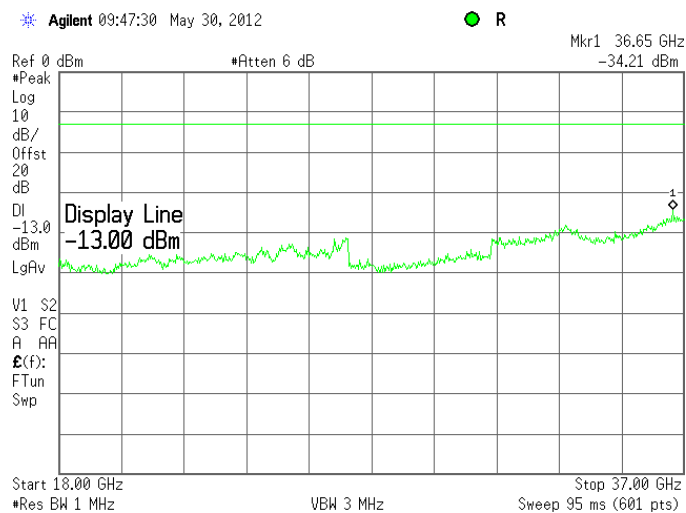


Plot 7.5.14 Spurious emission measurements in 8000 - 18000 MHz at mid carrier frequency



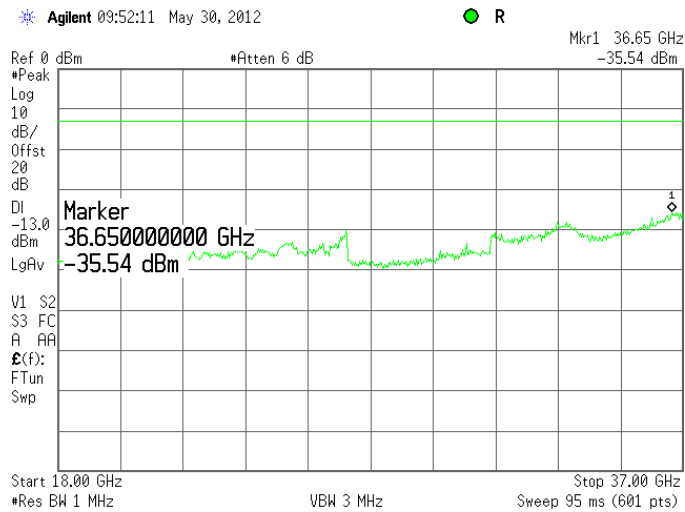
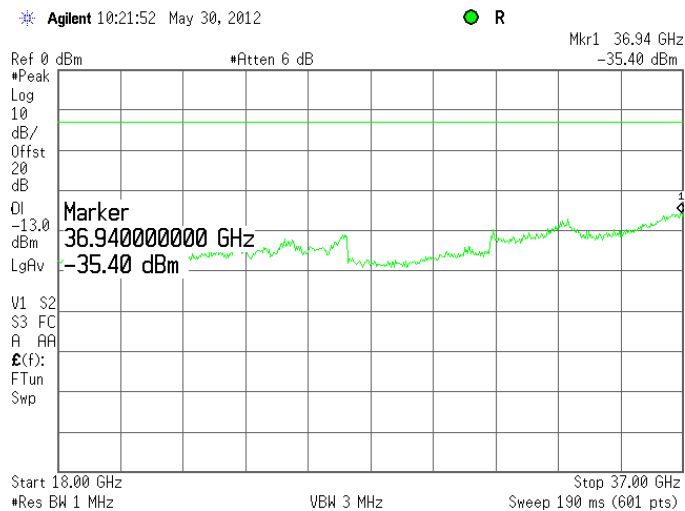


<b>Test specification:</b>	<b>Section 90.1323, Spurious emissions at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051, 90.1323; TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/30/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 47 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Plot 7.5.15 Spurious emission measurements in 8000 - 18000 MHz at high carrier frequency****Plot 7.5.16 Spurious emission measurements in 18000 – 37000 MHz range at low carrier frequency**

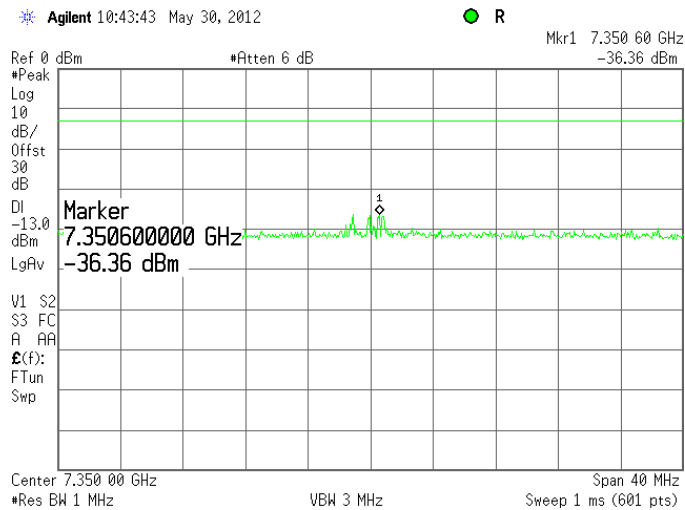
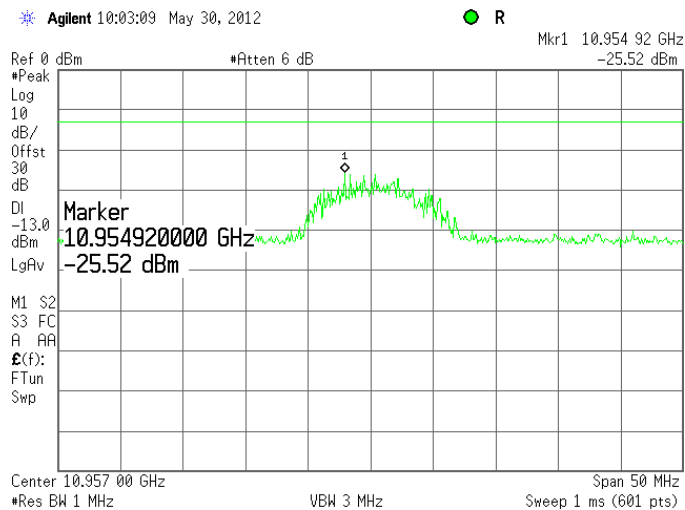


<b>Test specification:</b>	<b>Section 90.1323, Spurious emissions at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051, 90.1323; TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/30/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 47 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Plot 7.5.17 Spurious emission measurements in 18000 – 37000 MHz at mid carrier frequency****Plot 7.5.18 Spurious emission measurements in 18000 – 37000 MHz at high carrier frequency**



Test specification:	Section 90.1323, Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1051, 90.1323; TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/30/2012		
Temperature: 24.2 °C	Air Pressure: 1013 hPa	Relative Humidity: 47 %	Power Supply: 5.5VDC
Remarks:			

Plot 7.5.19 Conducted spurious emission measurements at the 2<sup>nd</sup> harmonic of mid carrier frequencyPlot 7.5.20 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of low carrier frequency





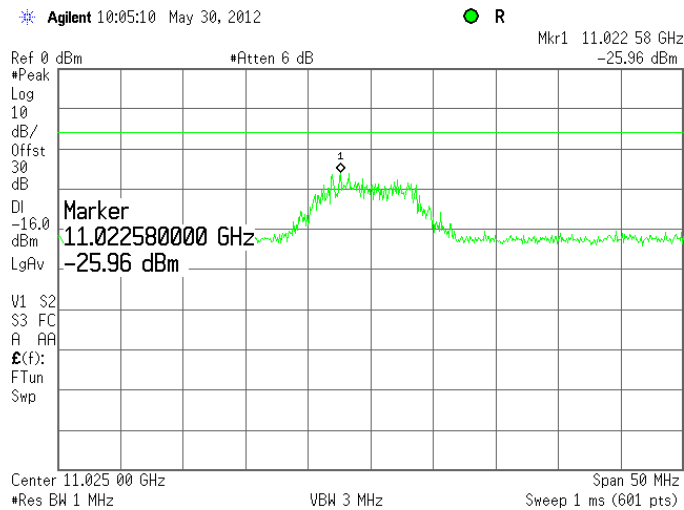
HERMON LABORATORIES

Report ID: AIRRAD\_FCC.23306.doc

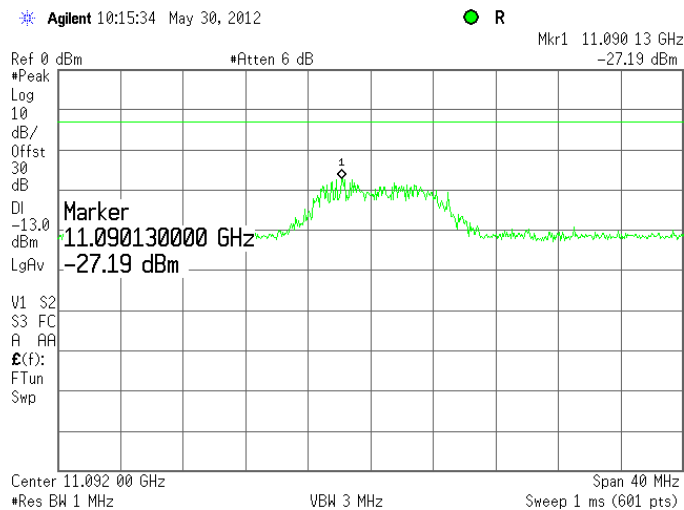
Date of Issue: 20-Jun-12

Test specification:	Section 90.1323, Spurious emissions at RF antenna connector		
Test procedure:	47 CFR, Sections 2.1051, 90.1323; TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/30/2012		
Temperature: 24.2 °C	Air Pressure: 1013 hPa	Relative Humidity: 47 %	Power Supply: 5.5VDC
Remarks:			

Plot 7.5.21 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of mid carrier frequency



Plot 7.5.22 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of high carrier frequency



<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

## 7.6 Radiated spurious emission measurements

### 7.6.1 General

This test was performed to measure radiated spurious emissions from the EUT. Specification test limits are given in Table 7.6.1.

Table 7.6.1 Radiated spurious emission test limits

Frequency, MHz	Attenuation below carrier, dBc	ERP of spurious, dBm	Equivalent field strength limit @ 3m, dB(μV/m)***
0.009 – 10 <sup>th</sup> harmonic*	43+10logP**	-13	84.4

\* - Excluding the in band emission within ± 250 % of the authorized bandwidth from the carrier

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

\*\*\* - Equivalent field strength limit was calculated from maximum allowed ERP of spurious as follows:  $E = \sqrt{30 \times P \times 1.64} / r$ , where P is ERP in Watts, 1.64 is numeric gain of ideal dipole and r is antenna to EUT distance in meters

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

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

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

7.6.2.3 The worst test results (the lowest margins) were recorded in Table 7.6.2 and shown in the associated plots.

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

7.6.3.1 The EUT was set up as shown in Figure 7.6.2, energized and the performance check was conducted.

7.6.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360° and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal, polarizations.

7.6.3.3 The worst test results (the lowest margins) were recorded in Table 7.6.2 and shown in the associated plots.

### 7.6.4 Test procedure for substitution ERP measurements of spurious

7.6.4.1 The test equipment was set up as shown in Figure 7.6.3 and energized.

7.6.4.2 RF signal generator was set to the frequency of investigated spurious emission and the RF output level was preliminary adjusted to produce the same field strength as it was measured from the EUT.

7.6.4.3 The test antenna height was swept from 1 to 4 m to find maximum emission from substitution antenna and RF signal generator output was fine adjusted to produce the same field strength as it was measured from the EUT.

7.6.4.4 The above procedure was performed in both, horizontal and vertical, polarizations of the test and substitution antennas.

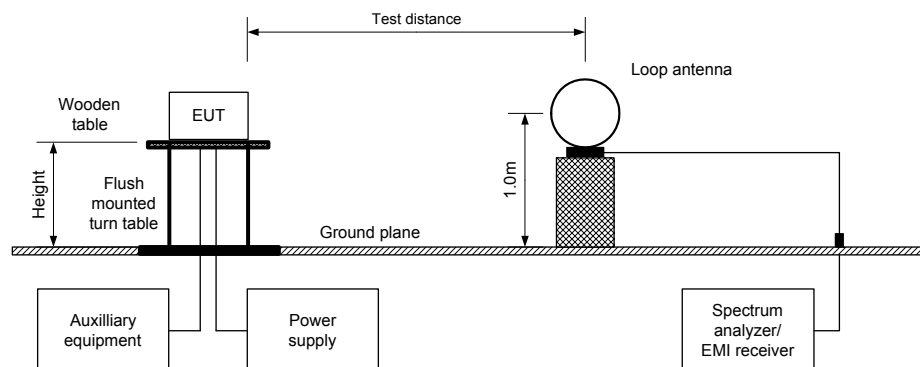
7.6.4.5 The ERP of spurious emissions was calculated as a sum of signal generator output power in dBm and antenna gain in dBd reduced by cable loss in dB.

7.6.4.6 The above procedure was repeated at the rest of investigated frequencies.

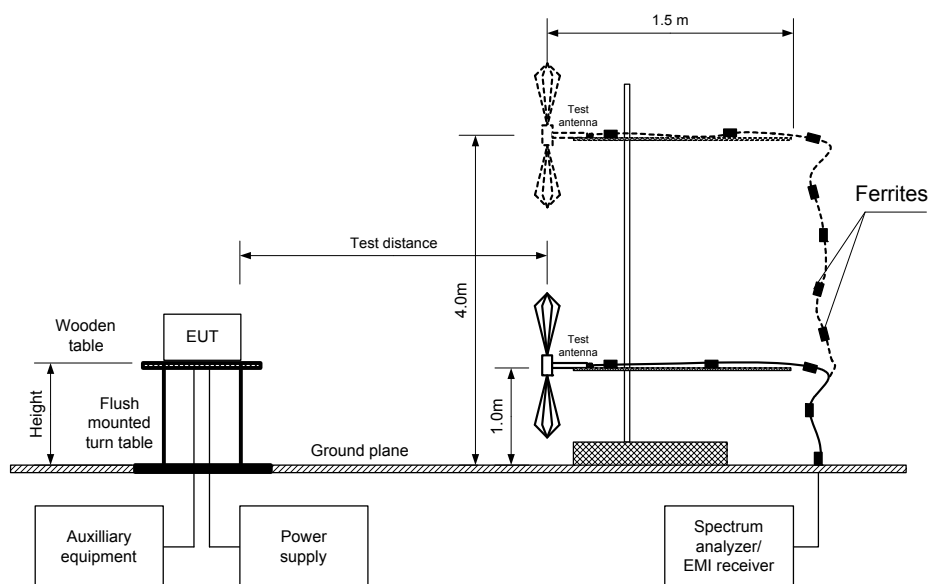
7.6.4.7 The worst test results (the lowest margins) were recorded in Table 7.6.3.

<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Figure 7.6.1 Setup for spurious emission field strength measurements in 9 kHz to 30 MHz band**

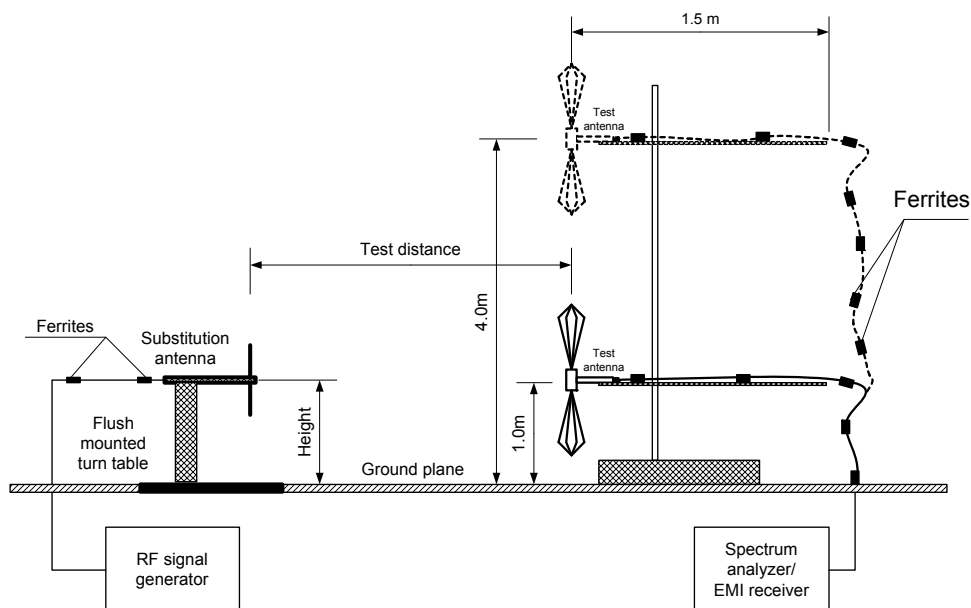


**Figure 7.6.2 Setup for spurious emission field strength measurements above 30 MHz**



<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Figure 7.6.3 Setup for substitution ERP measurements of spurious**



<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Table 7.6.2 Spurious emission field strength test results**

ASSIGNED FREQUENCY RANGE: 3650.0 – 3700.0 MHz  
 TEST DISTANCE: 3 m  
 TEST SITE: Semi anechoic chamber  
 EUT HEIGHT: 0.8 m  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 37000 MHz  
 DETECTOR USED: Peak  
 VIDEO BANDWIDTH: > Resolution bandwidth  
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)  
 Biconilog (30 MHz – 1000 MHz)  
 Double ridged guide (above 1000 MHz)  
 MODULATION: 64QAM  
 MODULATING SIGNAL: PRBS  
 BIT RATE: 23 Mbps  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 EMISSION BANDWIDTH: 5 MHz (worst case output power and density)

Frequency, MHz	Field strength, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	RBW, kHz	Antenna polarization	Antenna height, m	Turn-table position**, degrees
<b>Low carrier frequency 3652.5 MHz</b>							
10959.25	74.20	84.4	-10.2	1000	Vertical	1.3	89
<b>Mid carrier frequency 3675.0 MHz</b>							
11022.25	72.95	84.4	-11.45	1000	Vertical	1.3	91
<b>High carrier frequency 3697.5 MHz</b>							
11094.50	68.71	84.4	-15.69	1000	Vertical	1.3	93

\*- Margin = Field strength of spurious – calculated field strength limit.

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



<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Table 7.6.3 Substitution ERP of spurious test results**

ASSIGNED FREQUENCY RANGE: 3650.0 – 3700.0 MHz  
 TRANSMITTER CARRIER ERP: 22.73 dBm at low frequency  
 22.86 dBm at mid frequency  
 22.95 dBm at high frequency  
 TEST SITE: OATS  
 TEST DISTANCE: 3 m  
 SUBSTITUTION ANTENNA HEIGHT: 0.8 m  
 DETECTOR USED: Peak  
 VIDEO BANDWIDTH: > Resolution bandwidth  
 SUBSTITUTION ANTENNA TYPE: Double ridged guide (above 1000 MHz)

Frequency, MHz	Field strength, dB(μV/m)	RBW, kHz	Antenna polarization	RF generator output, dBm	Ant gain, dBd	Cable loss, dB	ERP, dBm	Limit, dBm	Margin, dB*	Verdict
<b>Low carrier frequency 3652.5 MHz</b>										
10959.25	74.20	1000	Vertical	-32.56	10.38	3.51	-25.69	-13.00	-12.69	Pass
<b>Mid carrier frequency 3675.0 MHz</b>										
11022.25	72.95	1000	Vertical	-34.01	10.45	3.51	-27.07	-13.00	-14.07	Pass
<b>High carrier frequency 3697.5 MHz</b>										
11094.50	68.71	1000	Vertical	-38.17	10.32	3.53	-31.38	-13.00	-18.38	Pass

\*- Margin = Spurious emission – specification limit.

**Reference numbers of test equipment used**

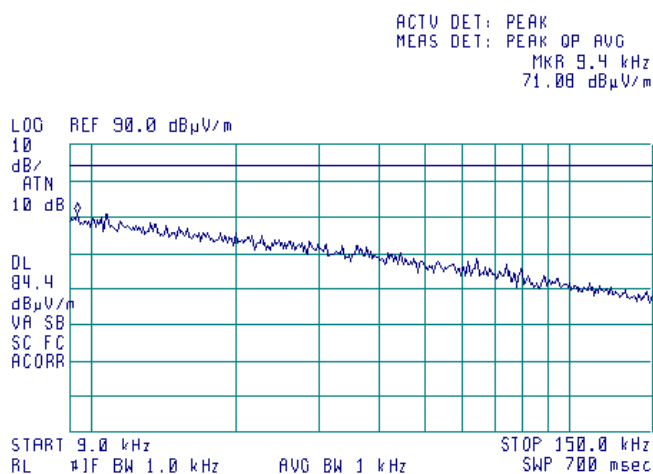
HL 0446	HL 0465	HL 0521	HL 0604	HL 0768	HL 0769	HL 1984	HL 2871
HL 3533	HL 3535	HL 3623	HL 3818	HL 3901	HL 4114	HL 4150	

Full description is given in Appendix A.

<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

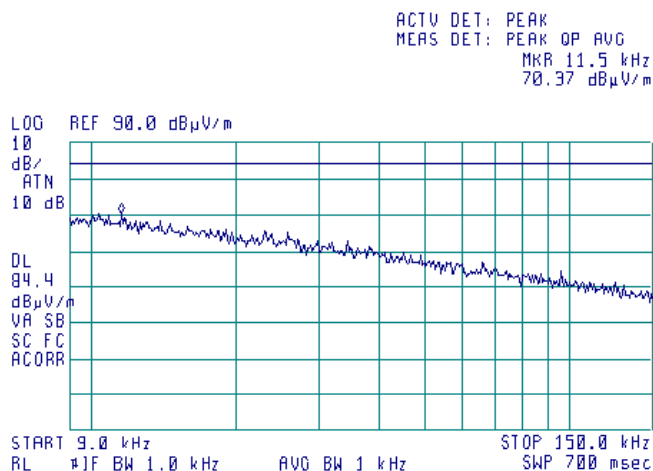
**Plot 7.6.1 Radiated emission measurements in 9 - 150 kHz range**

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



**Plot 7.6.2 Radiated emission measurements in 9 - 150 kHz range**

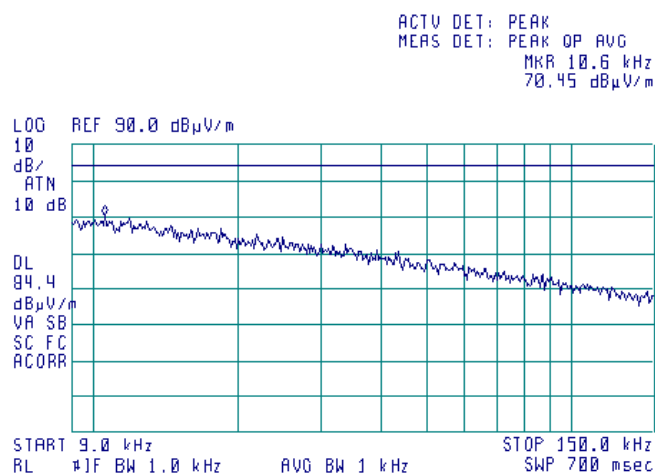
TEST SITE: Semi anechoic chamber  
CARRIER FREQUENCY: Mid  
ANTENNA POLARIZATION: Vertical and Horizontal  
TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

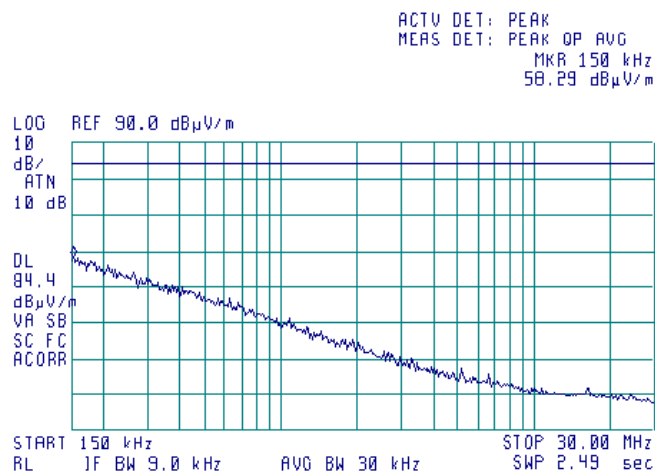
**Plot 7.6.3 Radiated emission measurements in 9 - 150 kHz range**

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



**Plot 7.6.4 Radiated emission measurements in 0.15 - 30 MHz range**

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

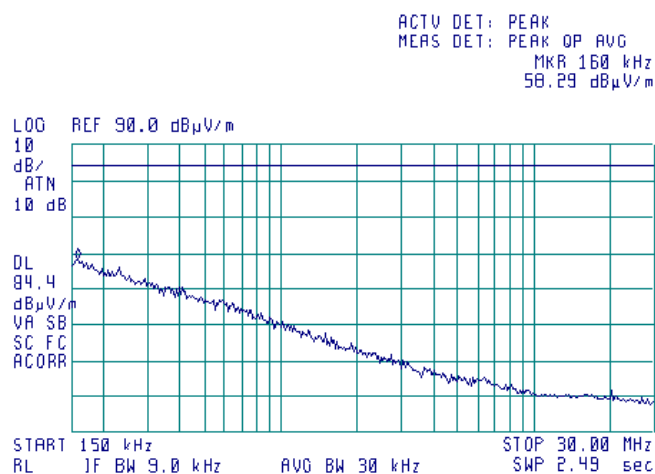




<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

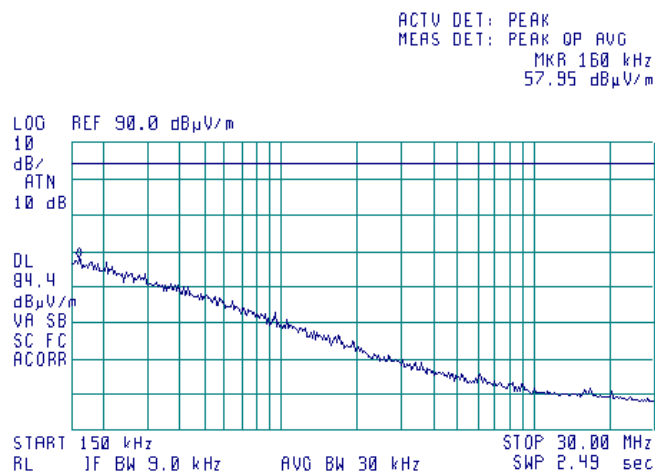
#### Plot 7.6.5 Radiated emission measurements in 0.15 - 30 MHz range

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



#### Plot 7.6.6 Radiated emission measurements in 0.15 - 30 MHz range

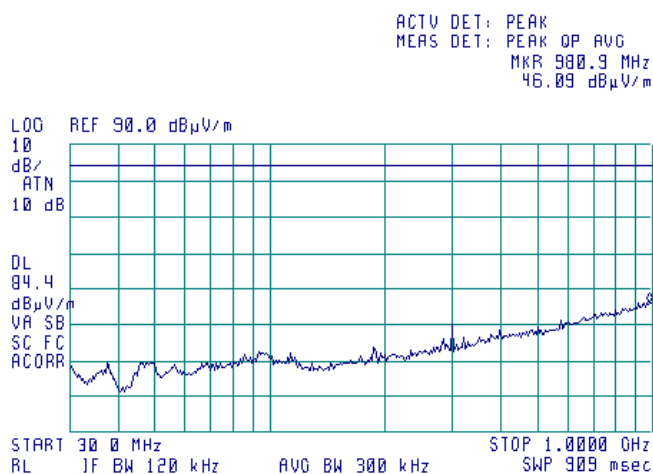
TEST SITE: Semi anechoic chamber  
CARRIER FREQUENCY: High  
ANTENNA POLARIZATION: Vertical and Horizontal  
TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

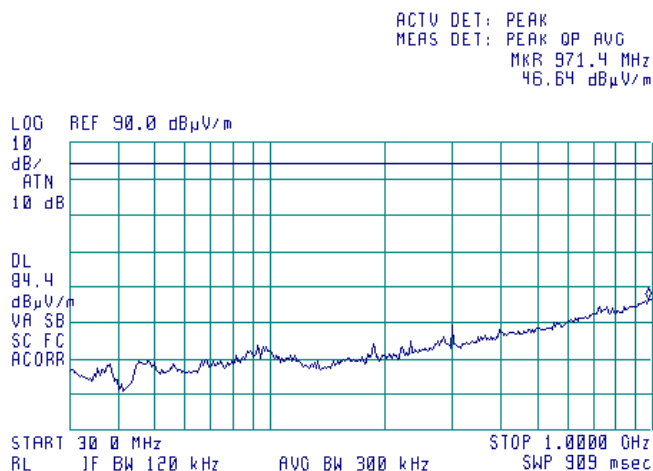
**Plot 7.6.7 Radiated emission measurements in 30 - 1000 MHz range**

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



**Plot 7.6.8 Radiated emission measurements in 30 - 1000 MHz range**

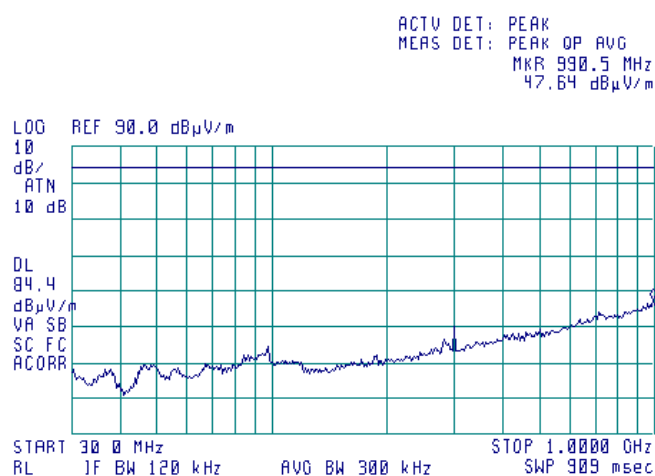
TEST SITE: Semi anechoic chamber  
CARRIER FREQUENCY: Mid  
ANTENNA POLARIZATION: Vertical and Horizontal  
TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

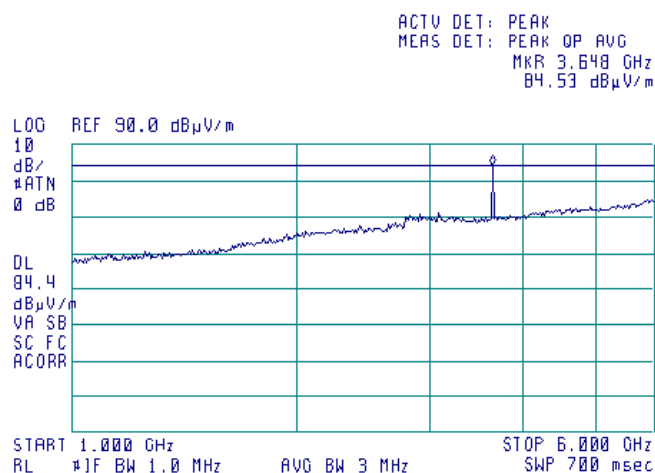
**Plot 7.6.9 Radiated emission measurements in 30 - 1000 MHz range**

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



**Plot 7.6.10 Radiated emission measurements in 1000 – 6000 MHz range**

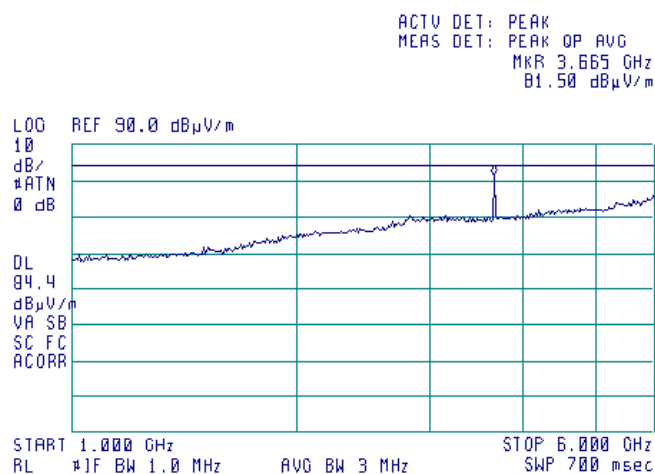
TEST SITE: Semi anechoic chamber  
CARRIER FREQUENCY: Low  
ANTENNA POLARIZATION: Vertical and Horizontal  
TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

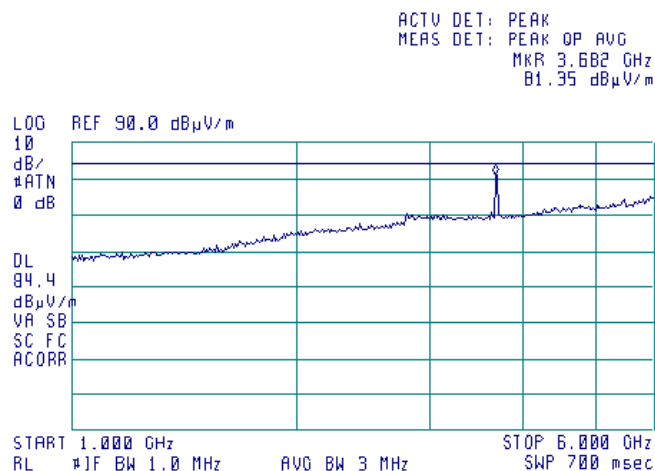
**Plot 7.6.11 Radiated emission measurements in 1000 – 6000 MHz range**

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



**Plot 7.6.12 Radiated emission measurements in 1000 – 6000 MHz range**

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



<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Plot 7.6.13 Radiated emission measurements in 6000 – 18000 MHz range**

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

Agilent 13:05:47 May 31, 2012

R

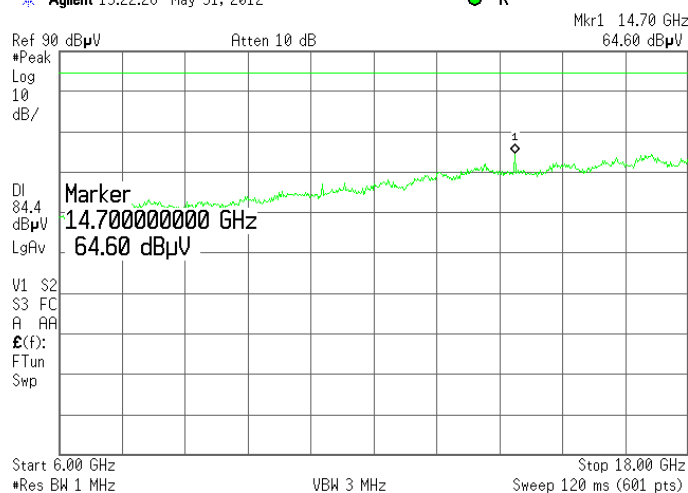


**Plot 7.6.14 Radiated emission measurements in 6000 – 18000 MHz range**

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

Agilent 13:22:26 May 31, 2012

R



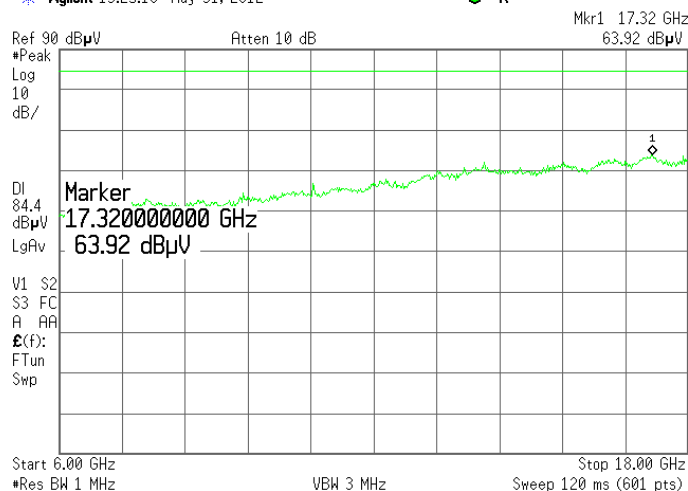
<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Plot 7.6.15 Radiated emission measurements in 6000 – 18000 MHz range**

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

Agilent 13:25:19 May 31, 2012

R

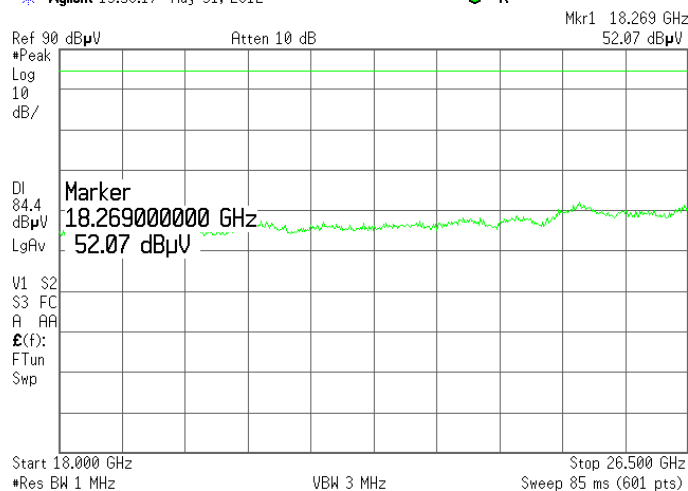


**Plot 7.6.16 Radiated emission measurements in 18000 – 26500 MHz range**

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

Agilent 13:50:17 May 31, 2012

R



<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Plot 7.6.17 Radiated emission measurements in 18000 – 26500 MHz range**

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

Agilent 14:05:43 May 31, 2012

R

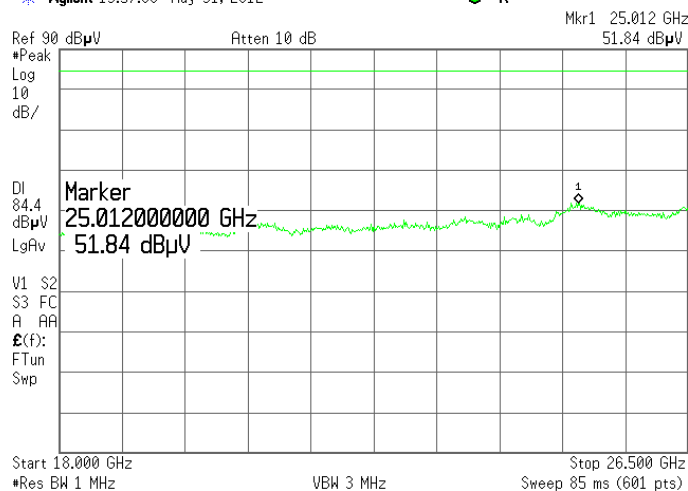


**Plot 7.6.18 Radiated emission measurements in 18000 – 26500 MHz range**

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

Agilent 13:57:08 May 31, 2012

R



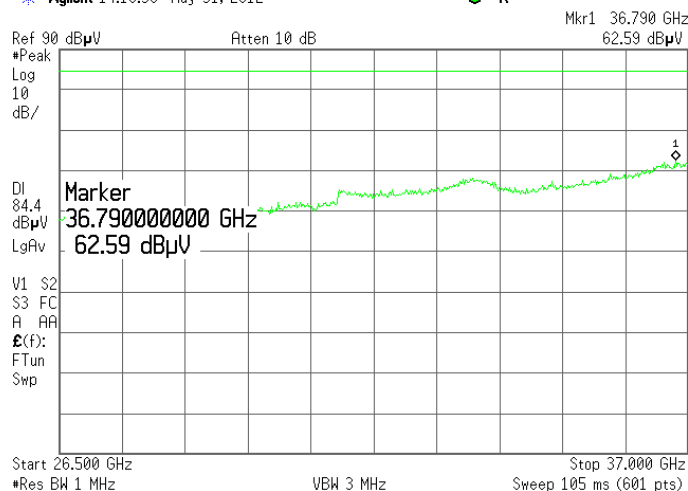
<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Plot 7.6.19 Radiated emission measurements in 26500 – 37000 MHz range**

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

\* Agilent 14:16:30 May 31, 2012

● R

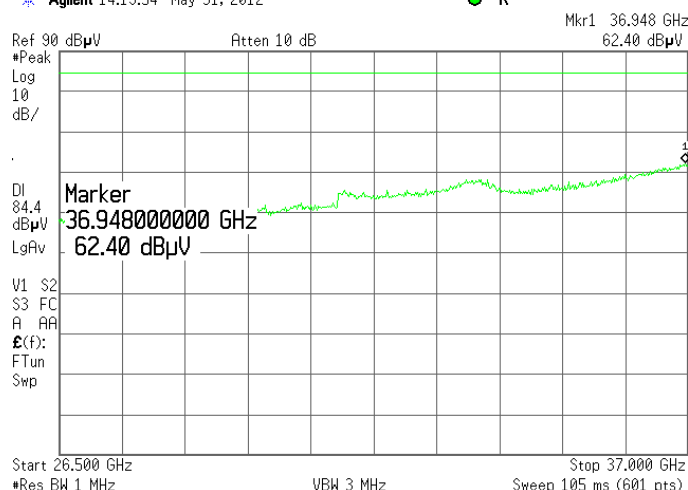


**Plot 7.6.20 Radiated emission measurements in 26500 – 37000 MHz range**

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

\* Agilent 14:19:54 May 31, 2012

● R





<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

**Plot 7.6.21 Radiated emission measurements in 26500 – 37000 MHz range**

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

Agilent 14:30:30 May 31, 2012

R

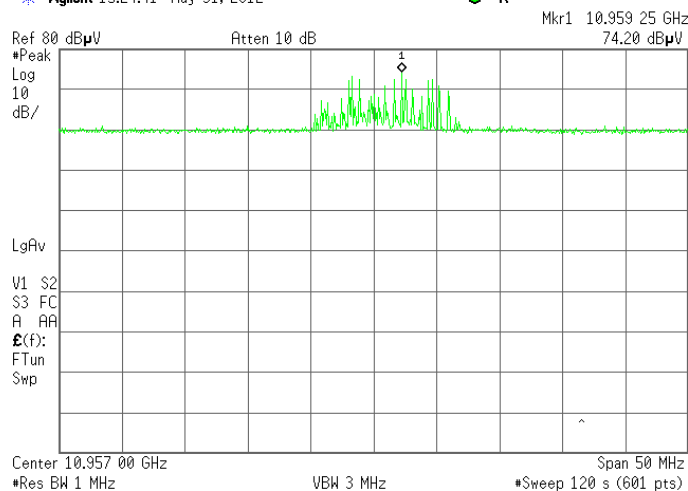


**Plot 7.6.22 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

TEST SITE: OATS  
CARRIER FREQUENCY: Low  
ANTENNA POLARIZATION: Vertical  
TEST DISTANCE: 3 m

Agilent 15:24:41 May 31, 2012

R



<b>Test specification:</b>	<b>Section 90.1323, Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053, 90.1323; TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/31/2012		
<b>Temperature:</b> 24.2 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

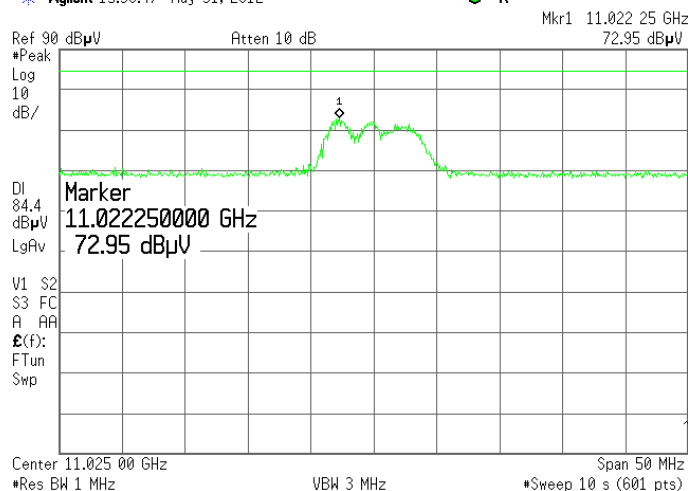
**Plot 7.6.23 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

TEST SITE:  
CARRIER FREQUENCY:  
ANTENNA POLARIZATION:  
TEST DISTANCE:

OATS  
Mid  
Vertical  
3 m

Agilent 15:36:47 May 31, 2012

R



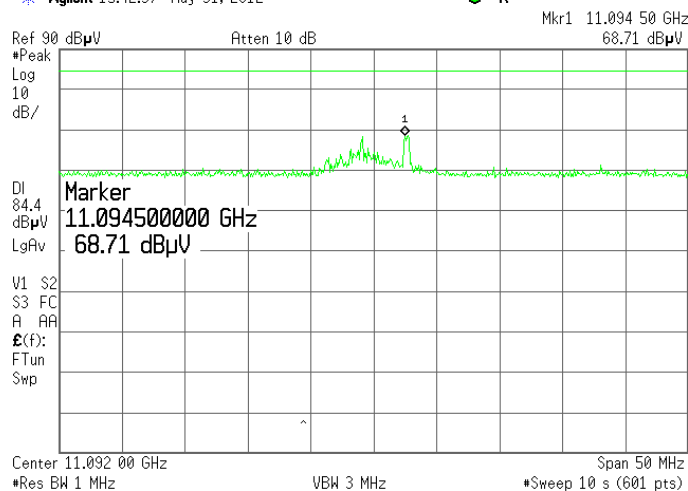
**Plot 7.6.24 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

TEST SITE:  
CARRIER FREQUENCY:  
ANTENNA POLARIZATION:  
TEST DISTANCE:

OATS  
High  
Vertical  
3 m

Agilent 15:42:37 May 31, 2012

R



<b>Test specification:</b>	<b>Section 90.213, Frequency stability</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1055; TIA/EIA-603-C Section 2.2.2		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/30/2012 - 5/31/2012		
<b>Temperature:</b> 23.9 °C	<b>Air Pressure:</b> 1013 hPa	<b>Relative Humidity:</b> 46 %	<b>Power Supply:</b> 5.5VDC
<b>Remarks:</b>			

## 7.7 Frequency stability test

### 7.7.1 General

This test was performed to measure frequency stability of transmitter RF carrier. Specification test limits are given in Table 7.7.1.

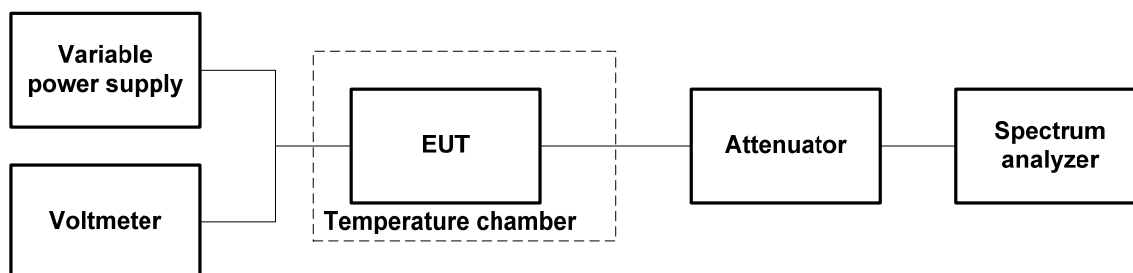
**Table 7.7.1 Frequency stability limits**

Assigned frequency, MHz	Maximum allowed frequency displacement	
	ppm	Hz
3650.0 – 3700.0	NA	

### 7.7.2 Test procedure

- 7.7.2.1 The EUT was set up as shown in Figure 7.7.1, energized and its proper operation was checked.
- 7.7.2.2 The EUT power was turned off. Temperature within test chamber was set to +30°C and a period of time sufficient to stabilize all of the oscillator circuit components was allowed.
- 7.7.2.3 The EUT was powered on and carrier frequency was measured at start up moment and then every minute until frequency had been stabilized or 10 minutes elapsed whichever reached the last. The EUT was powered off.
- 7.7.2.4 The above procedure was repeated at 0°C and at the lowest test temperature.
- 7.7.2.5 The EUT was powered on and carrier frequency was measured at start up moment and at the end of stabilization period at the rest of test temperatures and voltages. The EUT was powered off.
- 7.7.2.6 Frequency displacement was calculated and compared with the limit as provided in Table 7.7.2.

**Figure 7.7.1 Frequency stability test setup**



<b>Test specification:</b>	<b>Section 90.213, Frequency stability</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1055; TIA/EIA-603-C Section 2.2.2		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date(s):</b>	5/30/2012 - 5/31/2012		
<b>Temperature: 23.9 °C</b>	<b>Air Pressure: 1013 hPa</b>	<b>Relative Humidity: 46 %</b>	<b>Power Supply: 5.5VDC</b>
<b>Remarks:</b>			

**Table 7.7.2 Frequency stability test results**

ASSIGNED FREQUENCY RANGE: 3650.0 – 3700.0 MHz  
 NOMINAL POWER VOLTAGE: 5.5 VDC  
 TEMPERATURE STABILIZATION PERIOD: 20 min  
 POWER DURING TEMPERATURE TRANSITION: Off  
 SPECTRUM ANALYZER MODE: Counter  
 RESOLUTION BANDWIDTH: 1 kHz  
 VIDEO BANDWIDTH: 3 kHz  
 MODULATION: Unmodulated

T, °C		Voltage, VDC	Frequency, MHz							Max frequency drift, Hz		Max frequency drift, ppm	
			Start up	1st min	2nd min	3rd min	4th min	5th min	10th min	Positive	Negative	Positive	Negative
Low channel													
-30	nominal	3652.490251	3652.490833	3652.491241	3652.491662	3652.491707	3652.491687	3652.491728	0	-3678	0.00	-1.01	
-20	nominal	3652.491989	NA	NA	NA	NA	NA	3652.492863	0	-1940	0.00	-0.53	
-10	nominal	3652.491674	NA	NA	NA	NA	NA	3652.494797	868	-2255	0.24	-0.62	
0	nominal	3652.494195	3652.494566	3652.494981	3652.495522	3652.495641	3652.495673	3652.495626	1744	0	0.48	0.00	
10	nominal	3652.495315	NA	NA	NA	NA	NA	3652.495323	1394	0	0.38	0.00	
20	+15%	3652.494841	NA	NA	NA	NA	NA	3652.493891	912	-38	0.25	-0.01	
20	nominal	3652.493948	NA	NA	NA	NA	NA	3652.493929	19	0	0.01	0.00	
20	-15%	3652.495323	NA	NA	NA	NA	NA	3652.495023	1394	0	0.38	0.00	
30	nominal	3652.494381	3652.493765	3652.493117	3652.493008	3652.492877	3652.492659	3652.492492	452	-1437	0.12	-0.39	
40	nominal	3652.493647	NA	NA	NA	NA	NA	3652.491298	0	-2631	0.00	-0.72	
50	nominal	3652.492217	NA	NA	NA	NA	NA	3652.491388	0	-2541	0.00	-0.70	
Mid channel													
-30	nominal	3674.991428	3674.991477	3674.991513	3674.991587	3674.991633	3674.991699	3674.991668	0	-2514	0.00	-0.68	
-20	nominal	3674.992159	NA	NA	NA	NA	NA	3674.992852	0	-1783	0.00	-0.49	
-10	nominal	3674.993459	NA	NA	NA	NA	NA	3674.994786	844	-483	0.23	-0.13	
0	nominal	3674.994555	3674.994878	3674.995161	3674.995487	3674.995609	3674.995617	3674.995614	1675	0	0.46	0.00	
10	nominal	3674.995498	NA	NA	NA	NA	NA	3674.995299	1556	0	0.42	0.00	
20	+15%	3674.994721	NA	NA	NA	NA	NA	3674.993849	779	-93	0.21	-0.03	
20	nominal	3674.992052	NA	NA	NA	NA	NA	3674.993942	0	-1890	0.00	-0.51	
20	-15%	3674.995285	NA	NA	NA	NA	NA	3674.995022	1343	0	0.37	0.00	
30	nominal	3674.994192	3674.993412	3674.992801	3674.992713	3674.992636	3674.992562	3674.992544	250	-1398	0.07	-0.38	
40	nominal	3674.992832	NA	NA	NA	NA	NA	3674.991251	0	-2691	0.00	-0.73	
50	nominal	3674.991349	NA	NA	NA	NA	NA	3674.991337	0	-2605	0.00	-0.71	
High channel													
-30	nominal	3697.491483	3697.491533	3697.491576	3697.491599	3697.491621	3697.491644	3697.491625	0	-2491	0.00	-0.67	
-20	nominal	3697.492561	NA	NA	NA	NA	NA	3697.492792	0	-1413	0.00	-0.38	
-10	nominal	3697.493930	NA	NA	NA	NA	NA	3697.494752	778	-44	0.21	-0.01	
0	nominal	3697.495398	3697.495486	3697.495534	3697.495577	3697.495609	3697.495610	3697.495578	1636	0	0.44	0.00	
10	nominal	3697.495528	NA	NA	NA	NA	NA	3697.495263	1554	0	0.42	0.00	
20	+15%	3697.494019	NA	NA	NA	NA	NA	3697.493786	45	-188	0.01	-0.05	
20	nominal	3697.491447	NA	NA	NA	NA	NA	3697.493974	0	-2527	0.00	-0.68	
20	-15%	3697.495131	NA	NA	NA	NA	NA	3697.494965	1157	0	0.31	0.00	
30	nominal	3697.493296	3697.492921	3697.492681	3697.492577	3697.492532	3697.492486	3697.491505	0	-2469	0.00	-0.67	
40	nominal	3697.491758	NA	NA	NA	NA	NA	3697.491202	0	-2772	0.00	-0.75	
50	nominal	3697.491153	NA	NA	NA	NA	NA	3697.491269	0	-2821	0.00	-0.76	

\* - Reference frequency

Note1: As no limit is specified by the standard for 3650.0 – 3700.0 MHz band the worst case test results are given for information purpose only.

**Reference numbers of test equipment used**

HL 2634	HL 2988	HL 3787	HL 3818				
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Full description is given in Appendix A.

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

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal./Check	Due Cal./Check
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	03-Jul-11	03-Jul-12
0465	Anechoic Chamber 9(L) x 6.5(W) x 5.5(H) m	Hermon Laboratories	AC - 1	023	03-Feb-11	03-Feb-14
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard	8546A	3617A00319, 3448A00253	29-Aug-11	29-Sep-12
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	11-Jan-11	11-Jan-13
0768	Antenna Standard Gain Horn, 18-26.5 GHz, WR-42, 25 dB gain	Quinstar Technology	QWH-4200-BA	110	03-Feb-12	03-Feb-15
0769	Antenna Standard Gain Horn, 26.5-40 GHz, WR28, 25 dB gain	Quinstar Technology	QWH-2800-BA	112	03-Feb-12	03-Feb-15
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W	EMC Test Systems	3115	9911-5964	25-Nov-11	25-Nov-12
2214	Directional Coupler 1.7-26.5 GHz	Krytar	2616	31354	31-Aug-11	31-Aug-12
2634	Power Supply, 0-36.0 VDC, 0-12.0 A	NEMIC-LAMBDA	UP36-12	2634	03-Aug-11	03-Aug-12
2871	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-8155-00	2871	15-Jan-12	15-Jan-13
2988	Cable RF, 6 m, SMA-SMA	Harbour Industries	CRF-1	2988	01-Sep-11	01-Sep-12
3301	Power Meter, P-series, 50 MHz to 40 GHz	Agilent Technologies	N1911A	MY45101057	14-Dec-11	14-Dec-12
3302	Power sensor, P-Series, 50 MHz to 40 GHz, -35/30 to 20 dBm	Agilent Technologies	N1922A	MY45240586	14-Dec-11	14-Dec-12
3455	Medium Power Fixed Coaxial Attenuator DC to 40 GHz, 20 dB, 5 W	Aeroflex / Weinschel	75A-20-12	1182	19-Mar-12	19-Mar-13
3533	Amplifier, low noise, 6 to 18 GHz	Quinstar Technology	QLJ-0618 4040-J0	11159001001	25-Dec-11	25-Dec-12
3535	Amplifier, low noise, 18 to 40 GHz	Quinstar Technology	QLJ-1840 4537-J0	11159003001	11-Jun-12	11-Jun-13
3623	Cable RF, 6.0 m, N type-N type, DC-6.5 GHz	Belden	MIL C-17	NA	09-May-12	09-May-13
3787	Precision Fixed Attenuator, 50 Ohm, 5 W, 10 dB, DC to 18 GHz	Mini-Circuits	BW-S10W5+	NA	19-Dec-11	19-Dec-12
3818	PSA Series Spectrum Analyzer, 3 Hz- 44 GHz	Agilent Technologies	E4446A	MY48250288	16-Feb-12	16-Feb-13
3901	Microwave Cable Assembly, 40.0 GHz, 3.5 m, SMA/SMA	Huber-Suhner	SUCOFLEX 102A	1225/2A	08-Feb-12	08-Feb-13
3903	Microwave Cable Assembly, 40.0 GHz, 1.5 m, SMA/SMA	Huber-Suhner	SUCOFLEX 102A	1226/2A	08-Feb-12	08-Feb-13
4114	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz	ETS Lindgren	3117	00123515	23-Jan-12	23-Jan-13
4150	Preamplifier, 0.1 to 18 GHz, Gain 25 dB, N-type(f) in, N-type(m) out.	Agilent Technologies	87405C	MY47010591	14-Jun-11	14-Jun-12

## 9 APPENDIX B 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.

## 10 APPENDIX C Abbreviations and acronyms

A	ampere
AC	alternating current
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
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
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

## 11 APPENDIX D Test equipment correction factors

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

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

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

**Antenna factor**  
**Standard gain horn antenna**  
**Quinstar Technology**  
**Model QWH**  
**Ser.No.112, HL 0768, 0769**

Frequency min, GHz	Frequency max, GHz	Antenna factor, dB(1/m)
18.000	26.500	32.01
26.500	40.000	35.48

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



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

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

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

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

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

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

**Antenna factor**  
**Double-ridged waveguide horn antenna**  
**ETS Lindgren, Model 3117, serial number: 00123515, HL 4114**

Frequency, MHz	Antenna factor, dB/m		
	Measured	Manufacturer	Deviation
1000	28.0	28.4	-0.4
1500	28.0	27.4	0.6
2000	31.2	30.9	0.3
2500	32.5	33.4	-0.9
3000	32.9	32.6	0.3
3500	32.7	32.8	-0.1
4000	33.1	33.4	-0.3
4500	33.8	33.9	-0.1
5000	33.8	34.1	-0.3
5500	34.4	34.5	-0.1
6000	35.0	35.2	-0.2
6500	35.4	35.5	-0.1
7000	35.7	35.7	0.0
7500	35.9	35.7	0.2
8000	35.8	35.8	0.0
8500	35.9	35.8	0.1
9000	36.3	36.2	0.1
9500	36.6	36.6	0.0
10000	37.1	37.1	0.0
10500	37.6	37.5	0.1
11000	37.9	37.7	0.2
11500	38.5	38.1	0.4
12000	39.2	38.7	0.5
12500	39.0	38.9	0.1
13000	39.1	39.1	0.0
13500	38.9	38.8	0.1
14000	39.0	38.8	0.2
14500	39.6	39.9	-0.3
15000	39.9	39.7	0.2
15500	39.9	40.1	-0.2
16000	40.7	40.8	-0.1
16500	41.3	41.8	-0.5
17000	42.5	42.1	0.4
17500	41.3	41.2	0.1
18000	41.4	40.9	0.5

Antenna factor is to be added to receiver meter reading in dB( $\mu$ V) to convert to field strength in dB( $\mu$ V/meter)

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

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

**Cable loss**  
**Cable coaxial, MIL C-17, N type-N type, 6 m**  
**Belden, HL 3623**

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.10	2600	4.35	5300	7.67
50	0.30	2700	4.54	5400	7.79
100	0.45	2800	4.70	5500	7.89
200	0.69	2900	4.87	5600	7.94
300	0.89	3000	5.04	5700	8.01
400	1.06	3100	5.19	5800	8.12
500	1.24	3200	5.35	5900	8.19
600	1.38	3300	5.50	6000	8.30
700	1.54	3400	5.65	6100	8.35
800	1.69	3500	5.79	6200	8.45
900	1.83	3600	5.92	6300	8.55
1000	1.96	3700	6.07	6400	8.65
1100	2.14	3800	6.17	6500	8.75
1200	2.31	3900	6.30		
1300	2.38	4000	6.43		
1400	2.51	4100	6.53		
1500	2.63	4200	6.65		
1600	2.76	4300	6.75		
1700	2.90	4400	6.85		
1800	3.04	4500	7.01		
1900	3.19	4600	7.09		
2000	3.35	4700	7.20		
2100	3.51	4800	7.24		
2200	3.67	4900	7.31		
2300	3.84	5000	7.41		
2400	4.01	5100	7.48		
2500	4.18	5200	7.56		

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

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

**Cable loss**  
**Microwave Cable Assembly, Huber-Suhner, 40 GHz, 1.5 m, SMA-SMA, S/N 1226/2A**  
**HL 3903**

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	-0.02	9500	1.84	21000	2.98
100	0.15	10000	1.86	22000	3.07
500	0.38	10500	1.93	23000	3.13
1000	0.56	11000	1.99	24000	3.21
1500	0.69	11500	2.04	25000	3.26
2000	0.82	12000	2.10	26000	3.48
2500	0.90	12500	2.15	27000	3.44
3000	0.98	13000	2.21	28000	3.53
3500	1.06	13500	2.25	29000	3.59
4000	1.11	14000	2.29	30000	3.66
4500	1.17	14500	2.34	31000	3.70
5000	1.24	15000	2.36	32000	3.79
5500	1.32	15500	2.40	33000	3.88
6000	1.40	16000	2.45	34000	3.94
6500	1.50	16500	2.48	35000	3.91
7000	1.56	17000	2.56	36000	4.05
7500	1.62	17500	2.58	37000	4.22
8000	1.68	18000	2.60	38000	4.25
8500	1.74	19000	2.84	39000	4.27
9000	1.78	20000	2.88	40000	4.33

## 12 APPENDIX E 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 2.9 GHz to 6.46 GHz: $\pm 3.5$ dB 6.46 GHz to 13.2 GHz: $\pm 4.3$ dB 13.2 GHz to 22.0 GHz: $\pm 5.0$ dB 22.0 GHz to 26.8 GHz: $\pm 5.5$ dB 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) 300 – 1000 MHz: $\pm 168$ Hz (0.56 ppm)
Transient frequency behaviour	187 Hz $\pm 13.9\%$
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.

## 13 APPENDIX F Specification references

FCC 47CFR part 90: 2011	Private land mobile radio services
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

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