

Hermon Laboratories Ltd.  
Harakevet Industrial Zone, Binyamina 30500,  
Israel  
Tel. +972-4-6288001  
Fax. +972-4-6288277  
E-mail: mail@hermonlabs.com

# TEST REPORT

ACCORDING TO: FCC part 27 and part 15 subpart B

FOR:

**Airspan Networks (Israel) Ltd.**

**Base station**

**Model: MicroMAX 698-746M TDD Ext.**

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



## Table of contents

1	Applicant information.....	3
2	Equipment under test attributes .....	3
3	Manufacturer information .....	3
4	Test details.....	3
5	Tests summary.....	4
6	EUT description.....	5
6.1	General information.....	5
6.2	Ports and lines .....	5
6.3	Support and test equipment .....	5
6.4	Changes made in the EUT .....	5
6.5	Transmitter characteristics .....	6
6.6	Test configuration.....	7
7	Transmitter tests according to 47CFR part 27 requirements.....	8
7.1	Peak output power test.....	8
7.2	Occupied bandwidth test.....	21
7.3	Emission mask (band edge emissions) test .....	38
7.4	Radiated spurious emission measurements.....	52
7.5	Spurious emissions at RF antenna connector test .....	72
7.6	Frequency stability test.....	84
8	Emissions tests according to 47CFR part 15 subpart B requirements .....	87
8.1	Conducted emissions.....	87
8.2	Radiated emission measurements .....	91
8.3	Spurious emissions at receiver RF antenna connector .....	97
9	APPENDIX A Test equipment and ancillaries used for tests.....	100
10	APPENDIX B Measurement uncertainties.....	102
11	APPENDIX C Test laboratory description .....	103
12	APPENDIX D Specification references .....	103
13	APPENDIX E Test equipment correction factors.....	104
14	APPENDIX F Abbreviations and acronyms.....	114

## 1 Applicant information

**Client name:** Airspan Networks (Israel) Ltd.  
**Address:** 1, Hamelacha street, Lod 71293, Israel  
**Telephone:** +972 3977 7444  
**Fax:** +972 3977 7400  
**E-mail:** zlevi@airspan.com  
**Contact name:** Mr. Levi Zion

## 2 Equipment under test attributes

**Product name:** Base station  
**Product type:** Transceiver  
**Model(s):** MicroMAX 698-746M TDD Ext.  
**Serial number:** 4C7F8B35679A  
**Hardware version:** A1  
**Software release:** 7.7.0.3  
**Receipt date:** 1/11/2009

## 3 Manufacturer information

**Manufacturer name:** Airspan Networks (Israel) Ltd.  
**Address:** 1, Hamelacha street, Lod 71293, Israel  
**Telephone:** +972 3977 7444  
**Fax:** +972 3977 7400  
**E-Mail:** zlevi@airspan.com  
**Contact name:** Mr. Levi Zion




## 4 Test details

**Project ID:** 19382  
**Location:** Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel  
**Test started:** 1/11/2009  
**Test completed:** 1/28/2009  
**Test specification(s):** FCC part 27; part 15 subpart B

## 5 Tests summary

Test	Status
<b>Transmitter characteristics</b>	
Section 27.50(c)(3), Peak output power at RF antenna connector	Pass
Section 2.1091, 27.52, RF safety	NA, fixed equipment
Section 27.53(g), Spurious emissions at RF antenna connector	Pass
Section 27.53(g), Band edge emissions at RF antenna connector	Pass
Section 27.53(g), Radiated spurious emissions	Pass
Section 27.54, Frequency stability	Pass
Section 2.1049, Occupied bandwidth	Pass
<b>Unintentional emissions</b>	
Section 15.107, Conducted emission at AC power port	Pass
Section 15.109, Radiated emission	Pass
Section 15.111, Conducted emission at receiver antenna port	Pass

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

	Name and Title	Date	Signature
<b>Tested by:</b>	Mr. L. Markel, test engineer	January 28, 2009	
<b>Reviewed by:</b>	Mrs. M. Cherniavsky, certification engineer	February 4, 2009	
<b>Approved by:</b>	Mr. M. Nikishin, EMC and Radio group leader	February 4, 2009	



## 6 EUT description

### 6.1 General information

The EUT, base station radio, MicroMAX 700 MHz TDD Int., is a part of a WiMAX broadband fixed cellular wireless access system. The system provides a radio link between an end-user (a subscriber) and a network to give high-speed data access. The MicroMAX's transceiver/receiver (up to 64 QAM modulation, data rate up to 18 Mbps) uses OFDM and operates in TDD duplexing mode, equipped with a 15.3 dBi external antenna.

### 6.2 Ports and lines

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

### 6.3 Support and test equipment

Description	Manufacturer	Model number	Serial number
Laptop	IBM	X31	99-TXWYC
Laptop adaptor	IBM	NA	11S92P1014Z1ZD2N74T2LS
SDA	Airspan	SDA-4S/VL type 2	753D6A0086

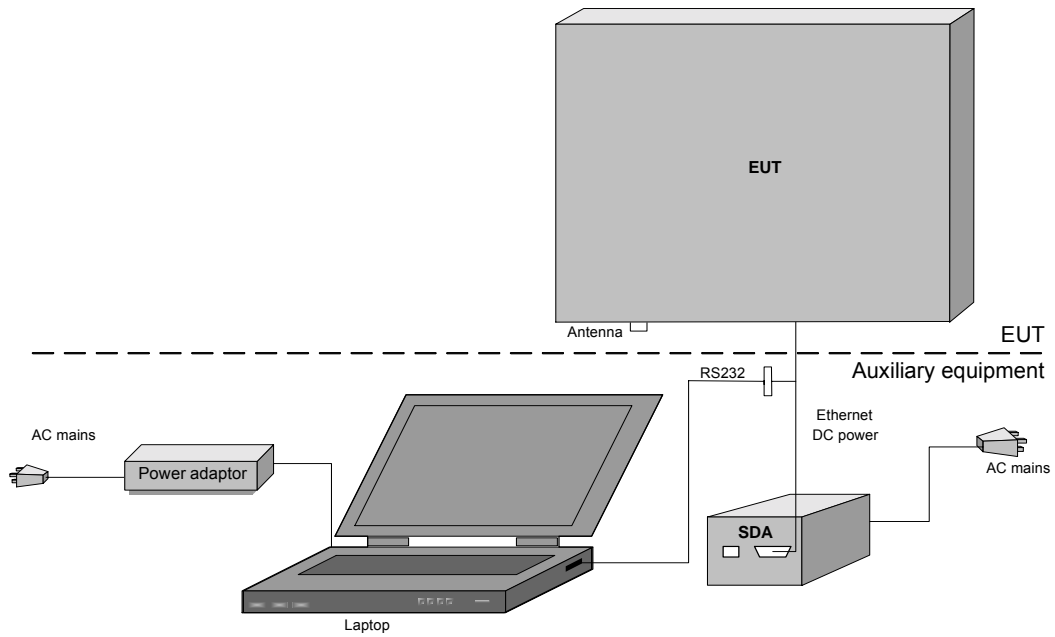
### 6.4 Changes made in the EUT

No changes were implemented in the EUT.

## 6.5 Transmitter characteristics

<b>Type of equipment</b>					
V	Stand-alone (Equipment with or without its own control provisions)				
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)				
	Plug-in card (Equipment intended for a variety of host systems)				
<b>Intended use</b>		<b>Condition of use</b>			
V	fixed	Always at a distance more than 2 m from all people			
	mobile	Always at a distance more than 20 cm from all people			
	portable	May operate at a distance closer than 20 cm to human body			
<b>Assigned frequency range</b>		698.0 - 746.0 MHz			
<b>Operating frequency range</b>		699.5 - 744.5 MHz			
<b>RF channel spacing</b>		2.5, 5, 10 MHz			
<b>Maximum rated output power</b>		At transmitter 50 Ω RF output connector			28.61 dBm
<b>Is transmitter output power variable?</b>		No			
		V	Yes	continuous variable	
				stepped variable with stepsize	
				0.5 dB	
minimum RF power		-30 dBm			
maximum RF power		28.61 dBm			
<b>Antenna connection</b>					
unique coupling	V	standard connector	Integral	V with temporary RF connector without temporary RF connector	
<b>Antenna/s technical characteristics</b>					
Type	Manufacturer		Model number		Gain (maximum)
External	Trival Antene		UF-14C		15.3 dBi
<b>Transmitter 99% power bandwidth</b>		<b>Transmitter aggregate data rate/s, MBps</b>		<b>Type of modulation</b>	
2.5 MHz		1.0475		BPSK	
		2.095		QPSK	
		6.2825		16QAM	
		9.425		64QAM	
5 MHz		2.095		BPSK	
		4.19		QPSK	
		12.565		16QAM	
		18.85		64QAM	
10 MHz		4.19		BPSK	
		8.38		QPSK	
		25.13		16QAM	
		37.7		64QAM	
<b>Type of multiplexing</b>			OFDM		
<b>Modulating test signal (baseband)</b>			PRBS		
<b>Maximum transmitter duty cycle in normal use</b>		90%			
<b>Transmitter power source</b>					
	<b>Nominal rated voltage</b>		<b>Battery type</b>		
V	DC	<b>Nominal rated voltage</b>		48 VDC via SDA	
	AC mains	<b>Nominal rated voltage</b>		<b>Frequency</b>	60 Hz
<b>Common power source for transmitter and receiver</b>			V	yes	no

## 6.6 Test configuration



<b>Test specification:</b>	<b>Section 27.50(c)(3), Peak output power at RF antenna connector</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 &amp; Time:</b>	1/28/2009 5:34:08 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

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

### 7.1 Peak output power test

#### 7.1.1 General

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

Table 7.1.1 Peak output power limits

Assigned frequency range, MHz	Maximum peak output power (Fixed and Base Station)	
	W/MHz	dBm/MHz
698.0 – 746.0	1000	60.00

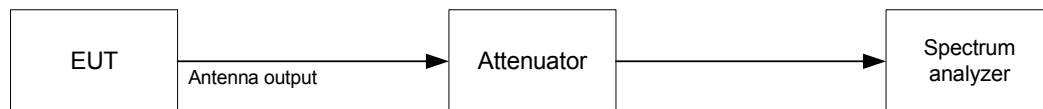
#### 7.1.2 Test procedure

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 to the end user RF output power.

7.1.2.3 The peak output power was measured with spectrum analyzer as provided in Table 7.1.2 and associated plots.

Figure 7.1.1 Peak output power test setup







<b>Test specification:</b>	<b>Section 27.50(c)(3), Peak output power at RF antenna connector</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 &amp; Time:</b>	1/28/2009 5:34:08 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Table 7.1.2 Peak output power test results

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Average  
RESOLUTION BANDWIDTH: 30 kHz (0.5 – 2% of OBW)  
VIDEO BANDWIDTH: 3000 kHz  
MODULATING SIGNAL: PRBS  
DUTY CYCLE: 100%  
TRANSMITTER OUTPUT POWER SETTINGS: 2500 (maximum)  
CHANNEL BANDWIDTH: 2.5 MHz  
MAXIMUM ANTENNA GAIN: 15.3 dBi (13.15 dBd)

Carrier frequency, MHz	Spectrum analyzer reading, dBm/Hz	External attenuation, dB	Cable loss, dB	ERP, dBm/MHz*	Limit, dBm/MHz	Margin, dB	Verdict	Total RF power, dBm
<b>BPSK 1.0745 Mbps</b>								
699.5	-37.40	Included	Included	35.75	60.00	-24.25	Pass	26.58
719.0	-36.19	Included	Included	36.96	60.00	-23.04	Pass	27.79
744.5	-37.14	Included	Included	36.01	60.00	-23.99	Pass	26.84
<b>64 QAM 9.425 Mbps</b>								
699.5	-37.15	Included	Included	36.00	60.00	-24.00	Pass	26.83
719.0	-36.06	Included	Included	37.09	60.00	-22.91	Pass	27.92
744.5	-37.03	Included	Included	36.12	60.00	-23.88	Pass	26.95

\* - RF output power, dBm/MHz (ERP) = Spectrum analyzer reading, dBm/Hz + Integration factor\*\* + Antenna gain (dBd)

\*\* - Integration factor =  $10 \log (1\text{MHz}/1 \text{ Hz}) = 10 \log (1000000) = 60 \text{ dB}$

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Average  
RESOLUTION BANDWIDTH: 100 kHz (0.5 – 2% of OBW)  
VIDEO BANDWIDTH: 3000 kHz  
MODULATING SIGNAL: PRBS  
DUTY CYCLE: 100%  
TRANSMITTER OUTPUT POWER SETTINGS: 2500 (maximum)  
CHANNEL BANDWIDTH: 5 MHz  
MAXIMUM ANTENNA GAIN: 15.3 dBi (13.15 dBd)

Carrier frequency, MHz	Spectrum analyzer reading, dBm/Hz	External attenuation, dB	Cable loss, dB	ERP, dBm/MHz*	Limit, dBm/MHz	Margin, dB	Verdict	Total RF power, dBm
<b>BPSK 4.19 Mbps</b>								
701.0	-39.33	Included	Included	33.82	60.00	-26.18	Pass	27.66
719.0	-38.49	Included	Included	34.66	60.00	-25.34	Pass	28.50
743.0	-39.22	Included	Included	33.93	60.00	-26.07	Pass	27.77
<b>64 QAM 18.85 Mbps</b>								
701.0	-39.27	Included	Included	33.88	60.00	-26.12	Pass	27.72
719.0	-38.38	Included	Included	34.77	60.00	-25.23	Pass	28.61
743.0	-39.15	Included	Included	34.00	60.00	-26.00	Pass	27.84

\* - RF output power, dBm/MHz (ERP) = Spectrum analyzer reading, dBm/Hz + Integration factor\*\* + Antenna gain (dBd)

\*\* - Integration factor =  $10 \log (1\text{MHz}/1 \text{ Hz}) = 10 \log (1000000) = 60 \text{ dB}$



<b>Test specification:</b>		<b>Section 27.50(c)(3), Peak output power at RF antenna connector</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 &amp; Time:</b>	1/28/2009 5:34:08 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Table 7.1.2 Peak output power test results (continued)

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
 DETECTOR USED: Average  
 RESOLUTION BANDWIDTH: 100 kHz (0.5 – 2% of OBW)  
 VIDEO BANDWIDTH: 3000 kHz  
 MODULATING SIGNAL: PRBS  
 DUTY CYCLE: 100%  
 TRANSMITTER OUTPUT POWER SETTINGS: 2500 (maximum)  
 CHANNEL BANDWIDTH: 10 MHz  
 MAXIMUM ANTENNA GAIN: 15.3 dBi (13.15 dBd)

Carrier frequency, MHz	Spectrum analyzer reading, dBm/Hz	External attenuation, dB	Cable loss, dB	ERP, dBm/MHz*	Limit, dBm/MHz	Margin, dB	Verdict	Total RF power, dBm
<b>BPSK 8.38 Mbps</b>								
704.0	-42.22	Included	Included	30.93	60.00	-29.07	Pass	27.78
722.0	-42.47	Included	Included	30.68	60.00	-29.32	Pass	27.53
740.0	-42.83	Included	Included	30.32	60.00	-29.68	Pass	27.17
<b>64 QAM 37.7 Mbps</b>								
704.0	-42.49	Included	Included	30.66	60.00	-29.34	Pass	27.51
722.0	-42.38	Included	Included	30.77	60.00	-29.23	Pass	27.62
740.0	-42.73	Included	Included	30.42	60.00	-29.58	Pass	27.27

\* - RF output power, dBm/MHz (ERP) = Spectrum analyzer reading, dBm/Hz + Integration factor\*\* + Antenna gain (dBd)  
 \*\* - Integration factor = 10 log (1MHz/1 Hz) = 10 log (1000000) = 60 dB

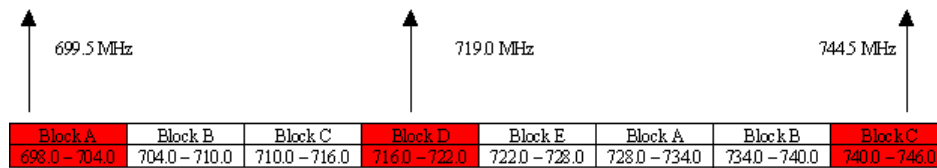
Reference numbers of test equipment used

HL 2909	HL 2911	HL 3439	HL 3441				
---------	---------	---------	---------	--	--	--	--

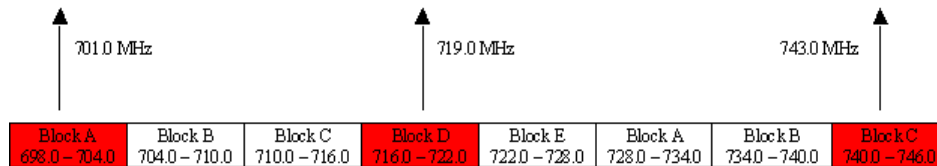
Full description is given in Appendix A.

<b>Test specification:</b>		<b>Section 27.50(c)(3), Peak output power at RF antenna connector</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 &amp; Time:</b>	1/28/2009 5:34:08 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

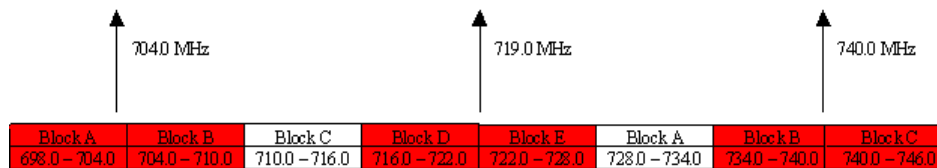
Figure 7.1.2 Frequency channels arrangement



2.5 MHz arrangement



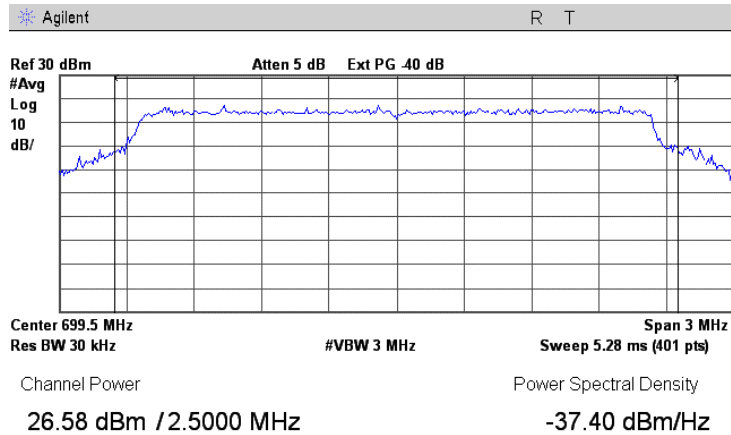
5 MHz arrangement



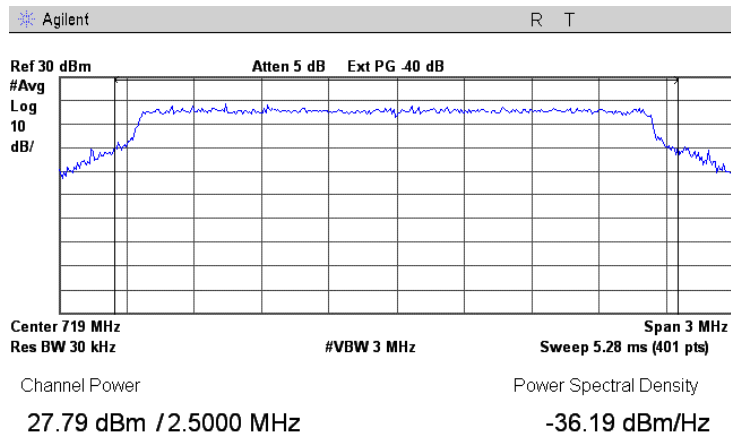
10 MHz arrangement

<b>Test specification:</b>	<b>Section 27.50(c)(3), Peak output power at RF antenna connector</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: PASS</b>	
<b>Date &amp; Time:</b>	1/28/2009 5:34:08 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.1.1 Peak output power test results at low frequency, BPSK modulation, 2.5 MHz CBW

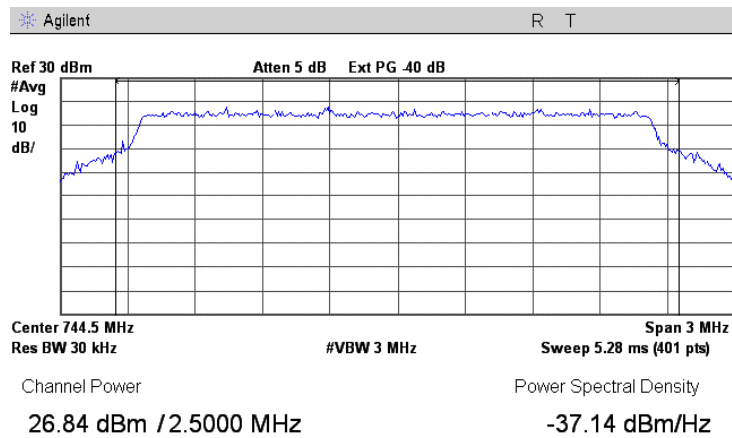


Plot 7.1.2 Peak output power test results at mid frequency, BPSK modulation, 2.5 MHz CBW

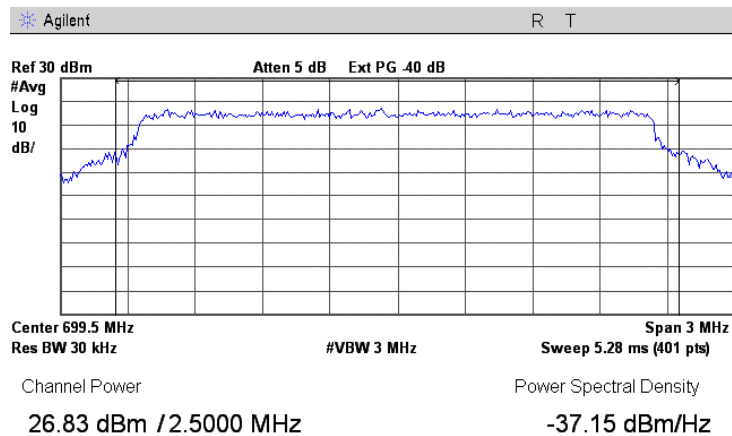


<b>Test specification:</b>	<b>Section 27.50(c)(3), Peak output power at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/28/2009 5:34:08 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.1.3 Peak output power test results at high frequency, BPSK modulation, 2.5 MHz CBW

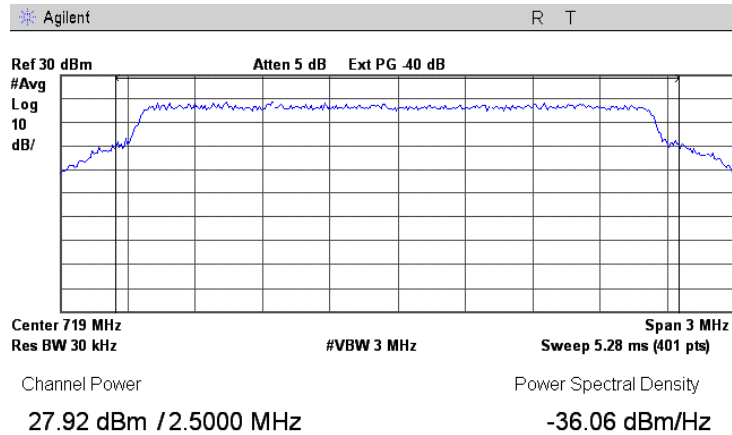


Plot 7.1.4 Peak output power test results at low frequency, 64QAM modulation, 2.5 MHz CBW

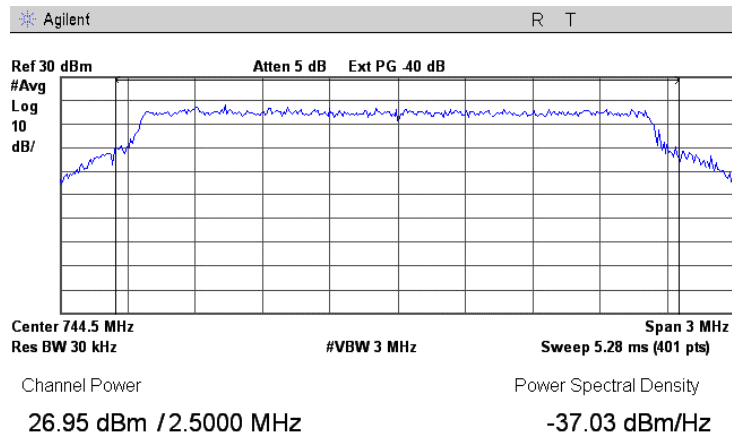


<b>Test specification:</b>	<b>Section 27.50(c)(3), Peak output power at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/28/2009 5:34:08 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.1.5 Peak output power test results at mid frequency, 64QAM modulation, 2.5 MHz CBW

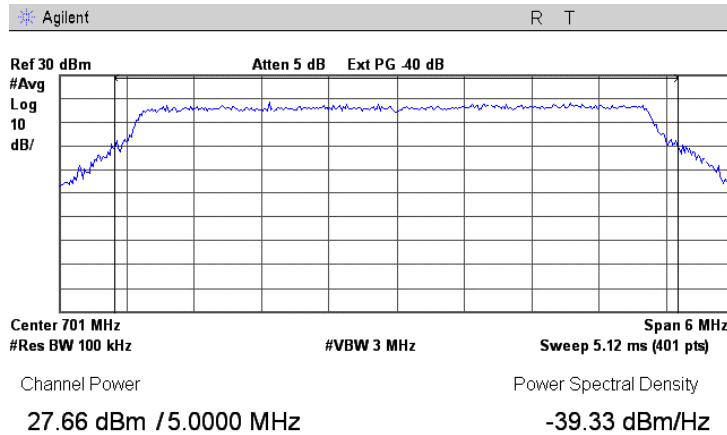


Plot 7.1.6 Peak output power test results at high frequency, 64QAM modulation, 2.5 MHz CBW

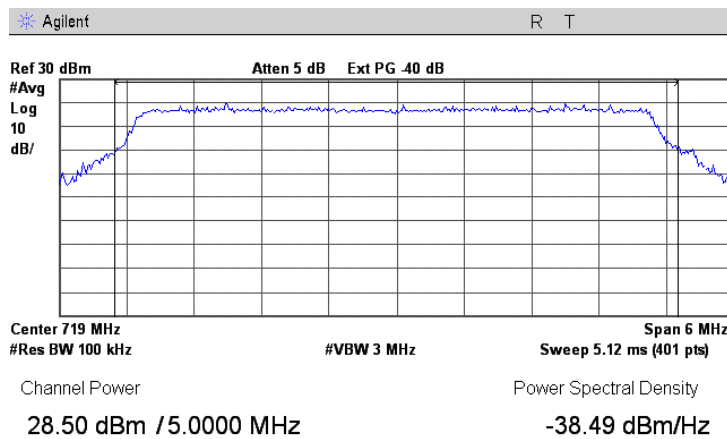


<b>Test specification:</b>	<b>Section 27.50(c)(3), Peak output power at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/28/2009 5:34:08 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.1.7 Peak output power test results at low frequency, BPSK modulation, 5 MHz CBW

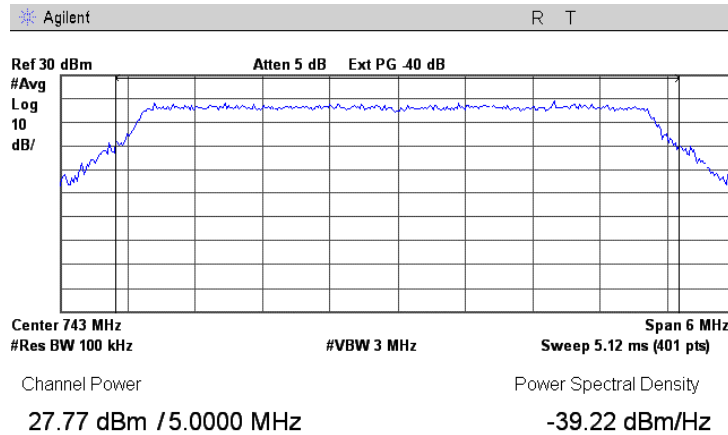


Plot 7.1.8 Peak output power test results at mid frequency, BPSK modulation, 5 MHz CBW

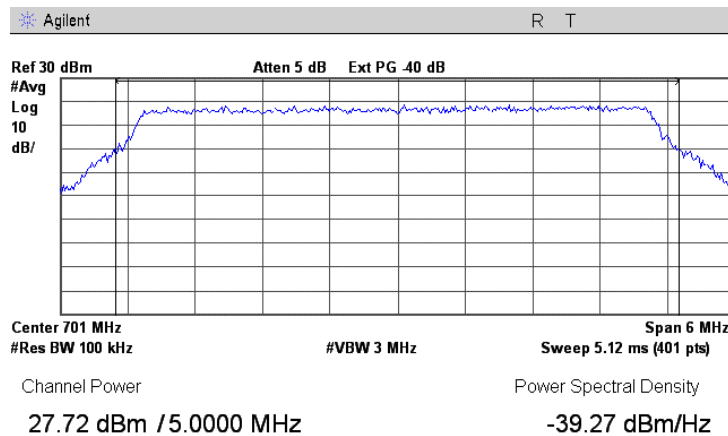


<b>Test specification:</b>	<b>Section 27.50(c)(3), Peak output power at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/28/2009 5:34:08 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.1.9 Peak output power test results at high frequency, BPSK modulation, 5 MHz CBW



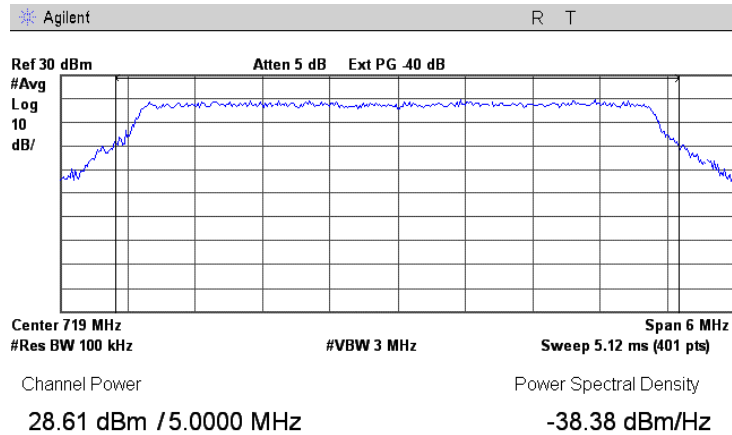
Plot 7.1.10 Peak output power test results at low frequency, 64QAM modulation, 5 MHz CBW



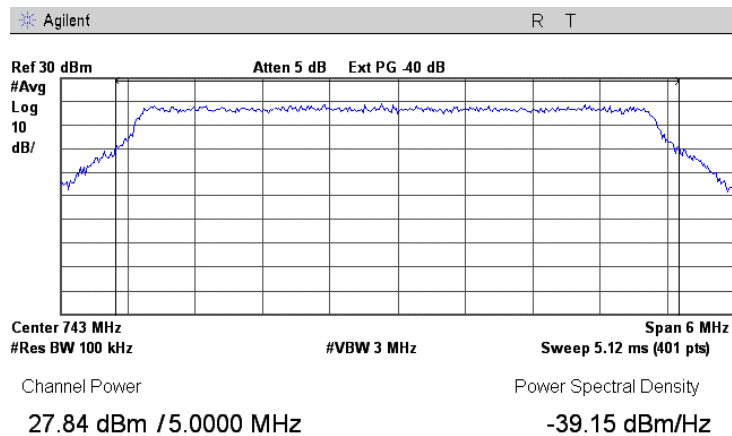


<b>Test specification:</b>	<b>Section 27.50(c)(3), Peak output power at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/28/2009 5:34:08 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.1.11 Peak output power test results at mid frequency, 64QAM modulation, 5 MHz CBW

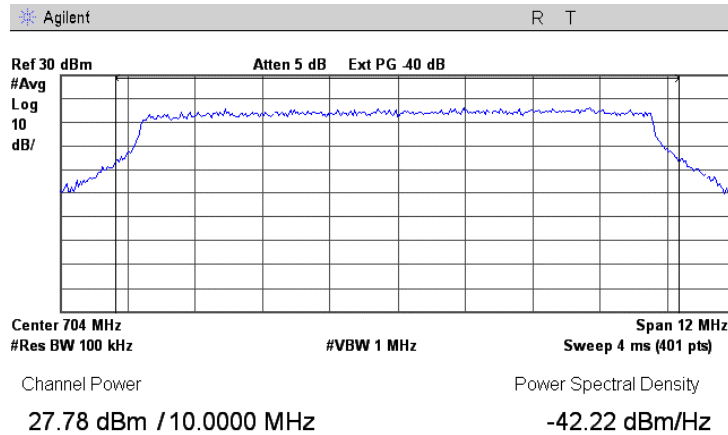


Plot 7.1.12 Peak output power test results at high frequency, 64QAM modulation, 5 MHz CBW

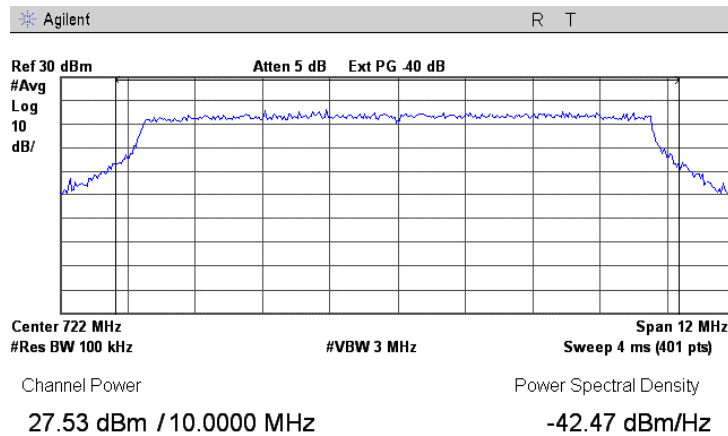


<b>Test specification:</b>	<b>Section 27.50(c)(3), Peak output power at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/28/2009 5:34:08 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.1.13 Peak output power test results at low frequency, BPSK modulation, 10 MHz CBW

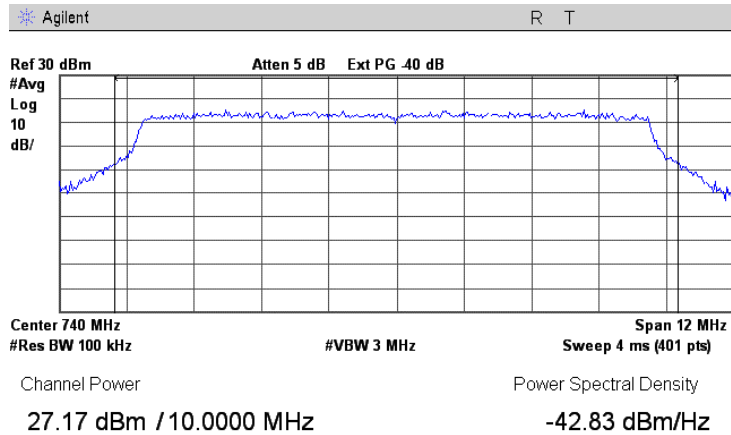


Plot 7.1.14 Peak output power test results at mid frequency, BPSK modulation, 10 MHz CBW

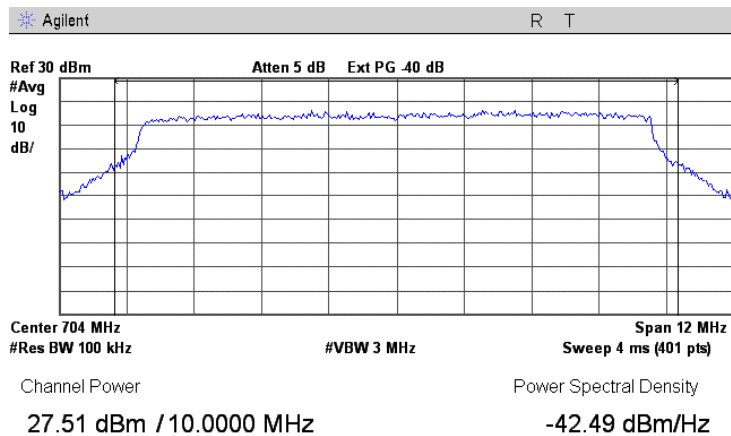


<b>Test specification:</b>	<b>Section 27.50(c)(3), Peak output power at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/28/2009 5:34:08 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1012 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.1.15 Peak output power test results at high frequency, BPSK modulation, 10 MHz CBW

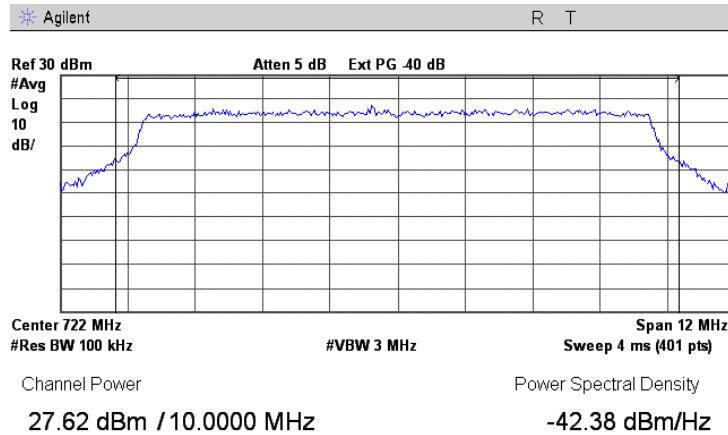


Plot 7.1.16 Peak output power test results at low frequency, 64QAM modulation, 10 MHz CBW

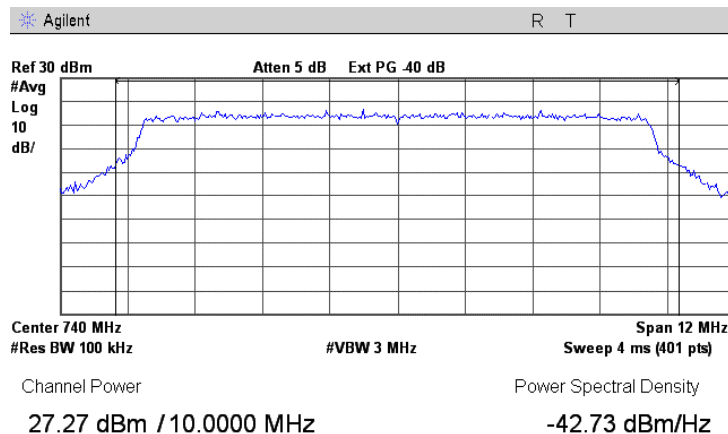


<b>Test specification:</b>	<b>Section 27.50(c)(3), Peak output power at RF antenna connector</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/28/2009 5:34:08 PM		
<b>Temperature: 23°C</b>	<b>Air Pressure: 1012 hPa</b>	<b>Relative Humidity: 42%</b>	<b>Power Supply: 120 V AC</b>
<b>Remarks:</b>			

Plot 7.1.17 Peak output power test results at mid frequency, 64QAM modulation, 10 MHz CBW



Plot 7.1.18 Peak output power test results at high frequency, 64QAM modulation, 10 MHz CBW



<b>Test specification:</b>		<b>Section 2.1049, Occupied bandwidth</b>	
<b>Test procedure:</b>		47 CFR, Section 2.1049	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

## 7.2 Occupied bandwidth test

### 7.2.1 General

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

Table 7.2.1 Occupied bandwidth limits

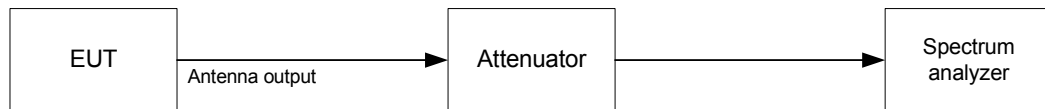
Assigned frequency, MHz	Modulation envelope reference points*, dBc	Maximum allowed bandwidth, kHz
698.0 – 746.0	26	NA

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

### 7.2.2 Test procedure

- 7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and its proper operation was checked.
- 7.2.2.2 The EUT was set to transmit the unmodulated carrier and the reference peak power level was measured.
- 7.2.2.3 The EUT was set to transmit the normally modulated carrier.
- 7.2.2.4 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and provided in Table 7.2.2 and the associated plots.

Figure 7.2.1 Occupied bandwidth test setup



<b>Test specification:</b> Section 2.1049, Occupied bandwidth	
<b>Test procedure:</b> 47 CFR, Section 2.1049	
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b> 1/21/2009 5:43:02 PM	
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa
<b>Relative Humidity:</b> 45%	
<b>Power Supply:</b> 120 V AC	
<b>Remarks:</b>	

Table 7.2.2 Occupied bandwidth test results

DETECTOR USED: Peak hold  
 RESOLUTION BANDWIDTH: 30 kHz  
 VIDEO BANDWIDTH: 300 kHz  
 MODULATION ENVELOPE REFERENCE POINTS: 26 dBc  
 MODULATING SIGNAL: PRBS  
 CBW: 2.5 MHz

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
<b>BPSK 1.0475 Mbps</b>				
699.5	2445.0	NA	NA	Pass
719.0	2490.0	NA	NA	Pass
744.5	2505.0	NA	NA	Pass
<b>64QAM 9.425 Mbps</b>				
699.5	2467.5	NA	NA	Pass
719.0	2497.5	NA	NA	Pass
744.5	2430.0	NA	NA	Pass

DETECTOR USED: Peak hold  
 RESOLUTION BANDWIDTH: 30 kHz  
 VIDEO BANDWIDTH: 300 kHz  
 MODULATION ENVELOPE REFERENCE POINTS: 26 dBc  
 MODULATING SIGNAL: PRBS  
 CBW: 5 MHz

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
<b>BPSK 2.095 Mbps</b>				
701.0	4650.0	NA	NA	Pass
719.0	4635.0	NA	NA	Pass
743.0	4665.0	NA	NA	Pass
<b>64QAM 18.85 Mbps</b>				
701.0	4665.0	NA	NA	Pass
719.0	4650.0	NA	NA	Pass
743.0	4650.0	NA	NA	Pass

DETECTOR USED: Peak hold  
 RESOLUTION BANDWIDTH: 100 kHz  
 VIDEO BANDWIDTH: 1000 kHz  
 MODULATION ENVELOPE REFERENCE POINTS: 26 dBc  
 MODULATING SIGNAL: PRBS  
 CBW: 10 MHz

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
<b>BPSK 4.19 Mbps</b>				
704.0	9652.5	NA	NA	Pass
722.0	9570.0	NA	NA	Pass
740.0	9652.5	NA	NA	Pass
<b>64QAM 37.7 Mbps</b>				
704.0	9735.0	NA	NA	Pass
722.0	9652.5	NA	NA	Pass
740.0	9790.0	NA	NA	Pass

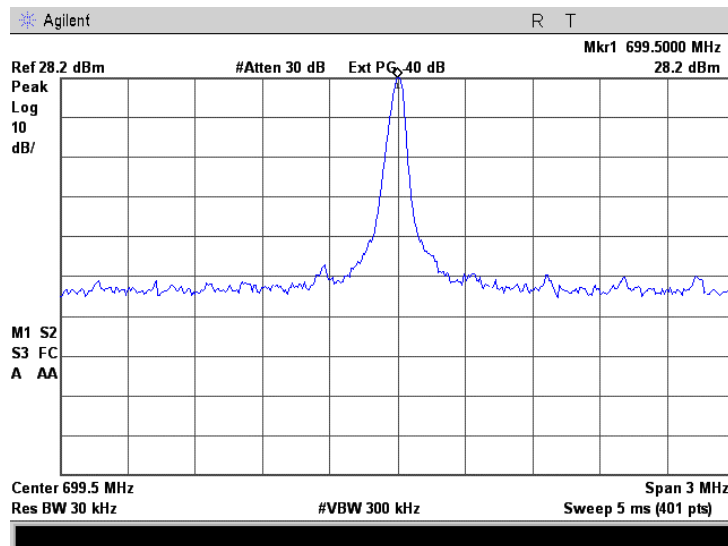
Reference numbers of test equipment used

HL 2780	HL 2911	HL 3179	HL 3181				
---------	---------	---------	---------	--	--	--	--

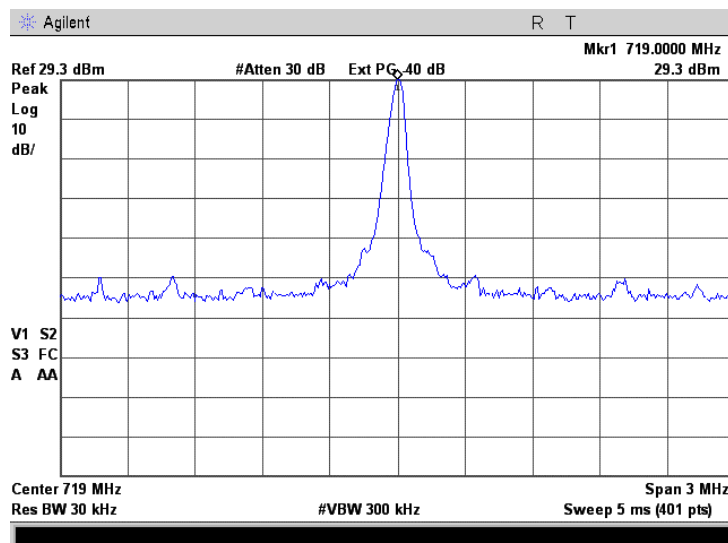
Full description is given in Appendix A.

<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.2.1 Unmodulated carrier reference level at low carrier frequency, 2.5 MHz CBW



Plot 7.2.2 Unmodulated carrier reference level at mid carrier frequency, 2.5 MHz CBW

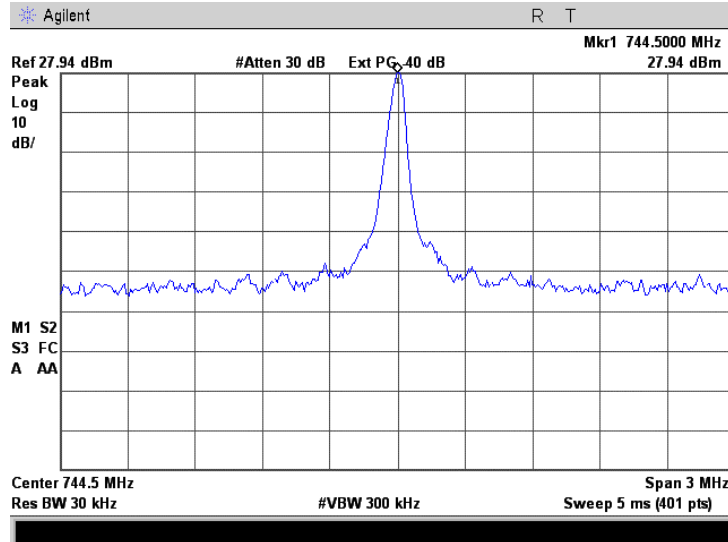




HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

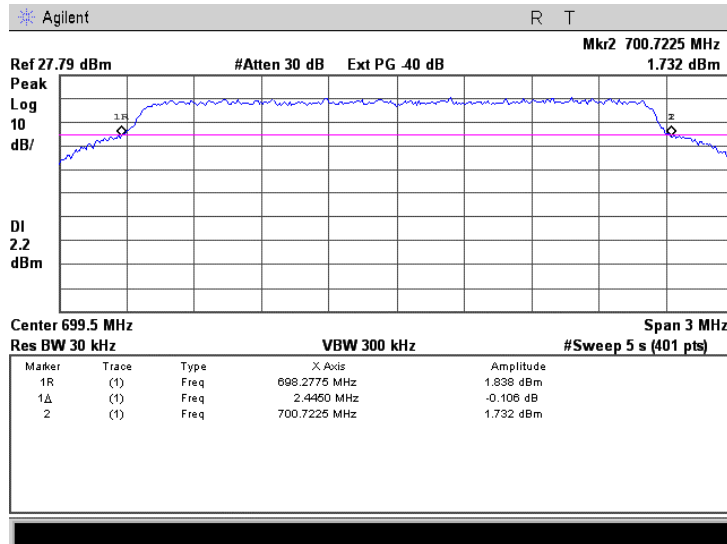
Plot 7.2.3 Unmodulated carrier reference level at high carrier frequency, 2.5 MHz CBW



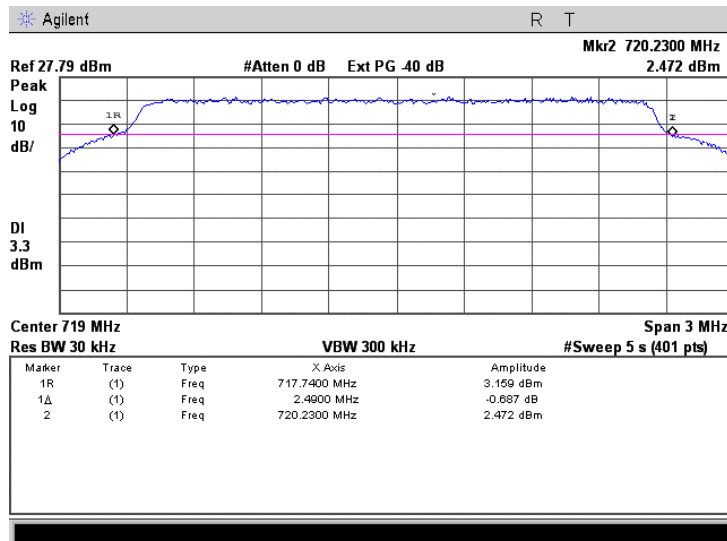


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.2.4 Occupied bandwidth test result at low frequency, BPSK modulation, 2.5 MHz CBW

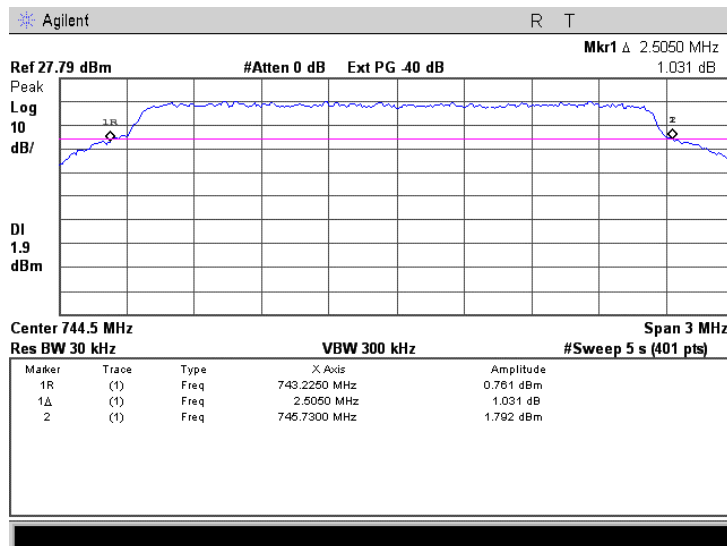


Plot 7.2.5 Occupied bandwidth test result at mid frequency, BPSK modulation, 2.5 MHz CBW

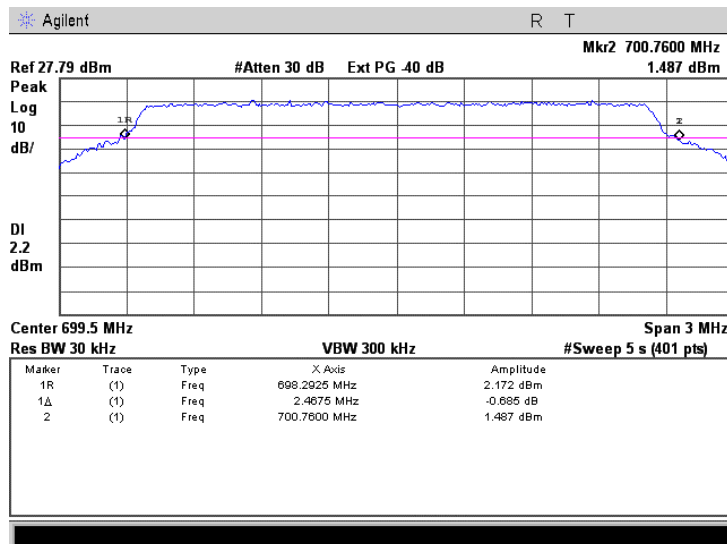


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.2.6 Occupied bandwidth test result at high frequency, BPSK modulation, 2.5 MHz CBW

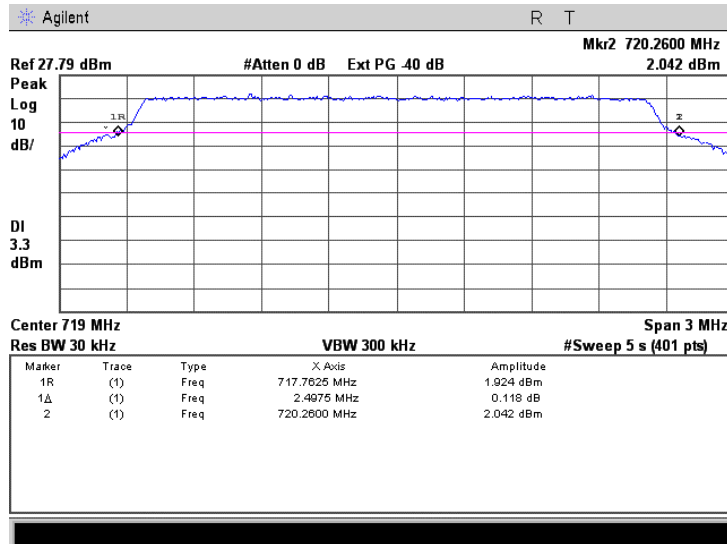


Plot 7.2.7 Occupied bandwidth test result at low frequency, 64QAM modulation, 2.5 MHz CBW

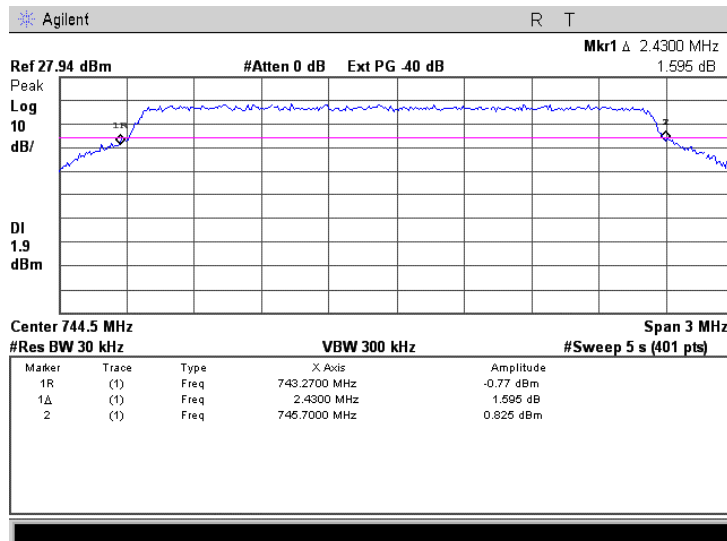


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.2.8 Occupied bandwidth test result at mid frequency, 64QAM modulation, 2.5 MHz CBW

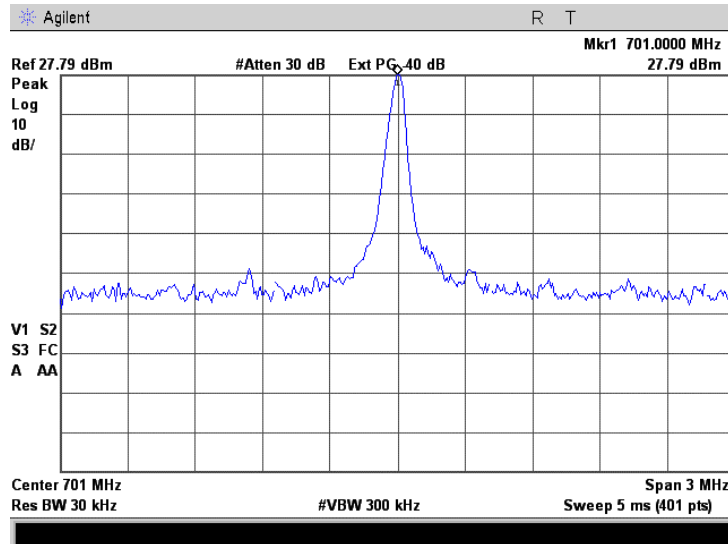


Plot 7.2.9 Occupied bandwidth test result at high frequency, 64QAM modulation, 2.5 MHz CBW

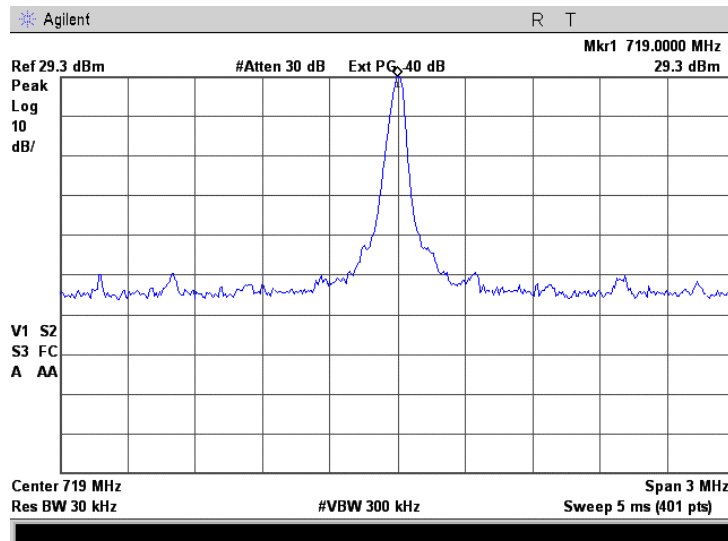


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature: 23°C</b>	<b>Air Pressure: 1008hPa</b>	<b>Relative Humidity: 45%</b>	<b>Power Supply: 120 V AC</b>
<b>Remarks:</b>			

Plot 7.2.10 Unmodulated carrier reference level at low carrier frequency, 5 MHz CBW



Plot 7.2.11 Unmodulated carrier reference level at mid carrier frequency, 5 MHz CBW

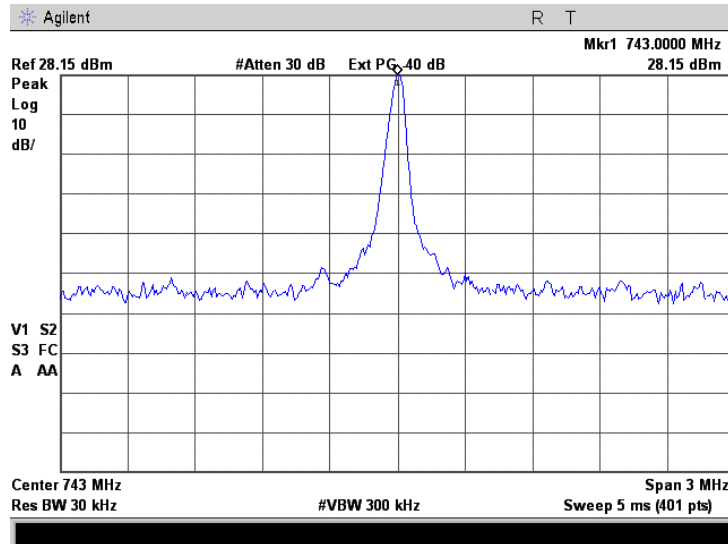




HERMON LABORATORIES

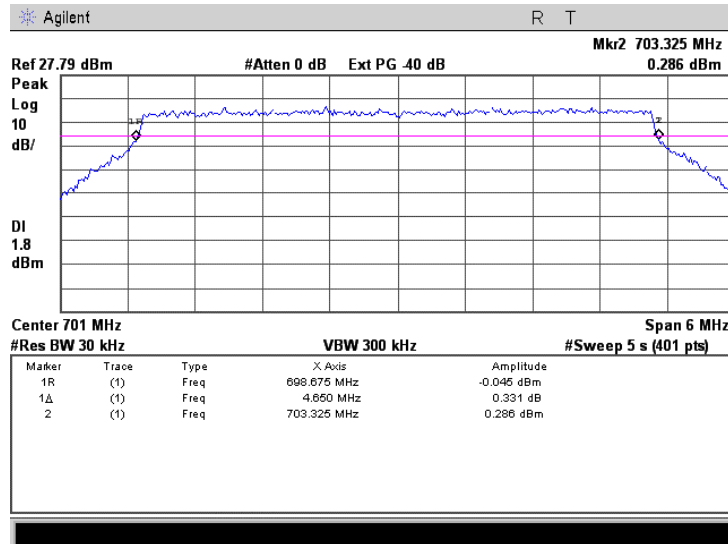
<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.2.12 Unmodulated carrier reference level at high carrier frequency, 5 MHz CBW

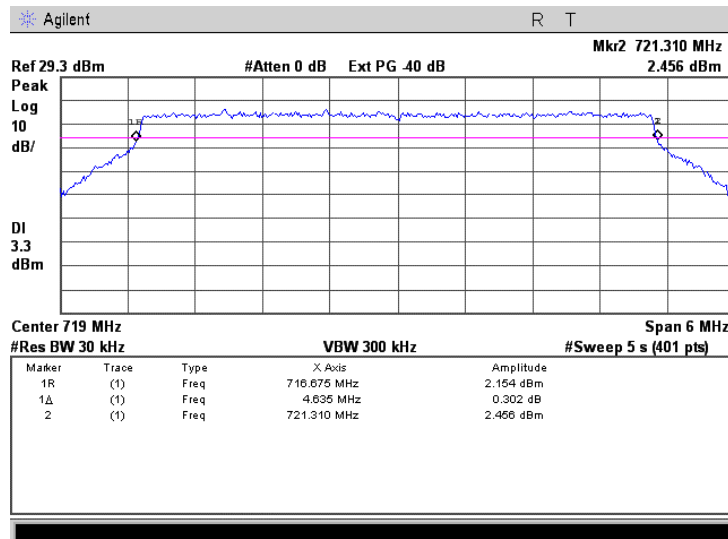


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature: 23°C</b>	<b>Air Pressure: 1008hPa</b>	<b>Relative Humidity: 45%</b>	<b>Power Supply: 120 V AC</b>
<b>Remarks:</b>			

Plot 7.2.13 Occupied bandwidth test result at low frequency, BPSK modulation, 5 MHz CBW

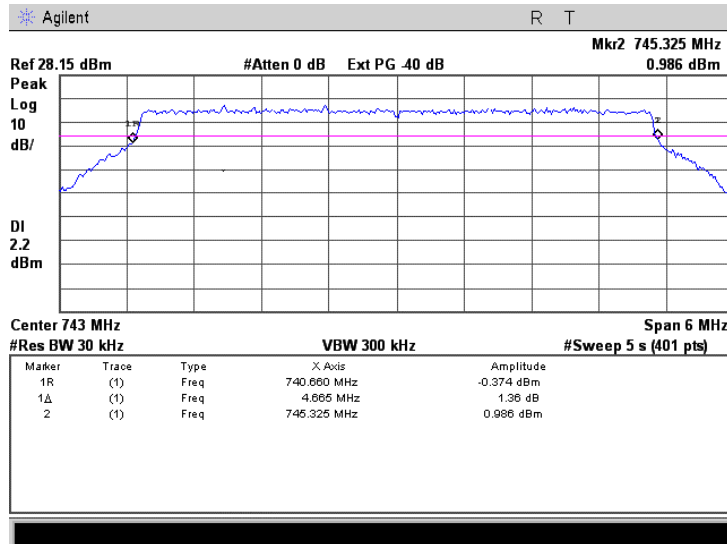


Plot 7.2.14 Occupied bandwidth test result at mid frequency, BPSK modulation, 5 MHz CBW

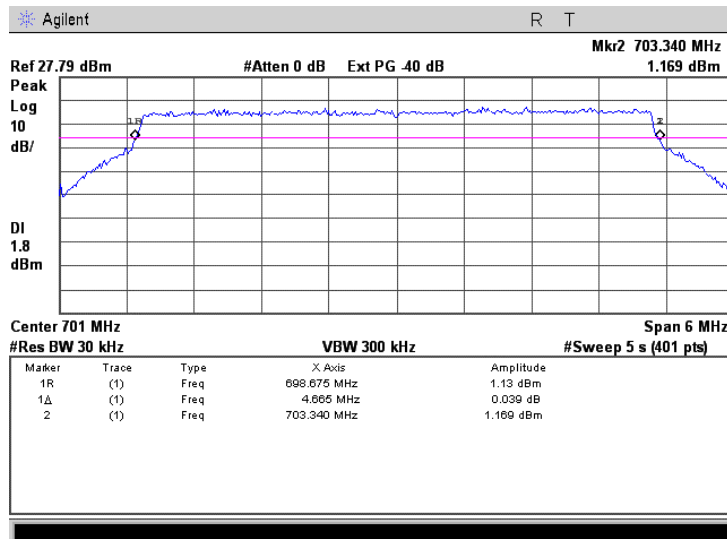


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.2.15 Occupied bandwidth test result at high frequency, BPSK modulation, 5 MHz CBW

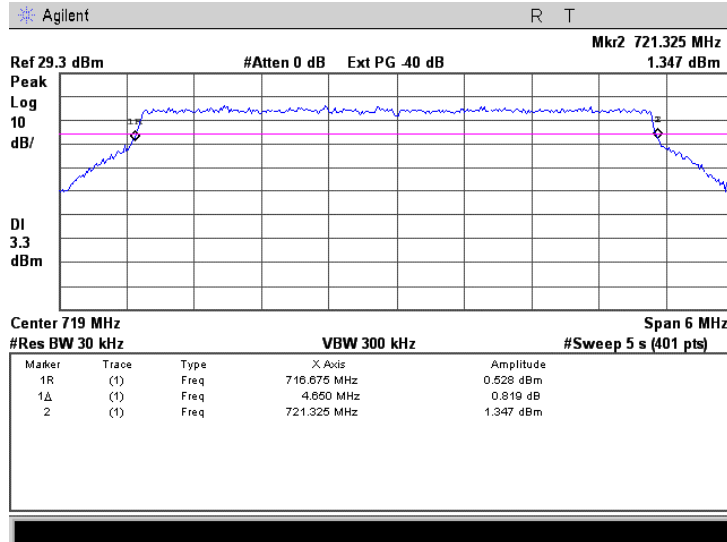


Plot 7.2.16 Occupied bandwidth test result at low frequency, 64QAM modulation, 5 MHz CBW

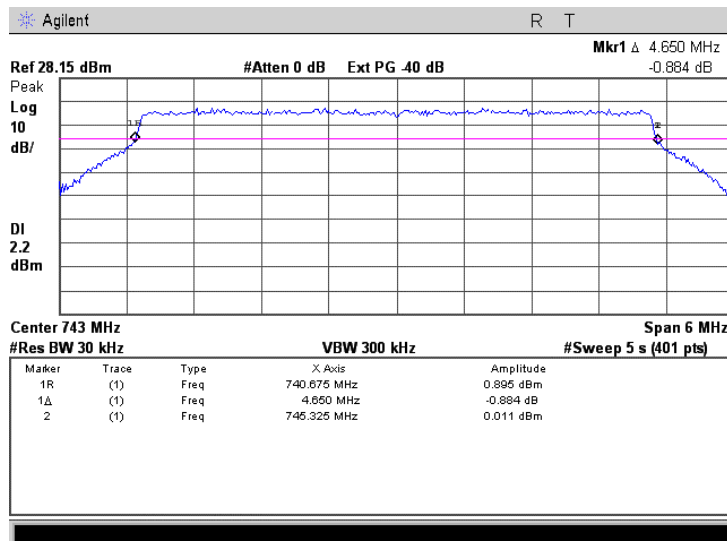


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.2.17 Occupied bandwidth test result at mid frequency, 64QAM modulation, 5 MHz CBW



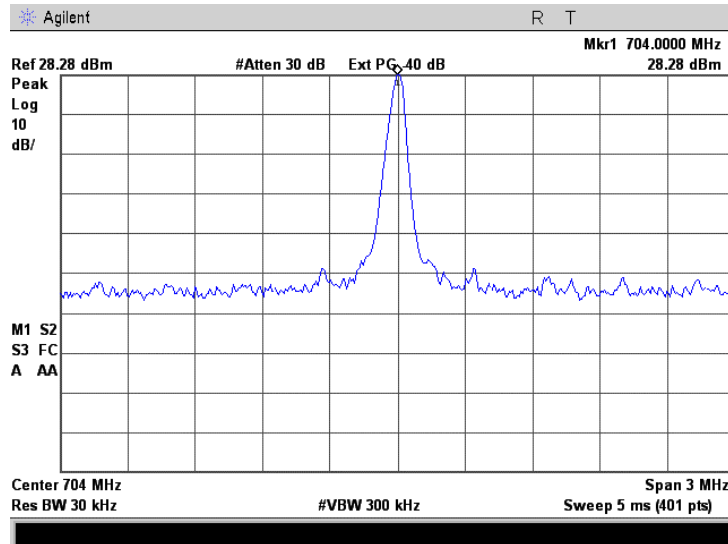
Plot 7.2.18 Occupied bandwidth test result at high frequency, 64QAM modulation, 5 MHz CBW



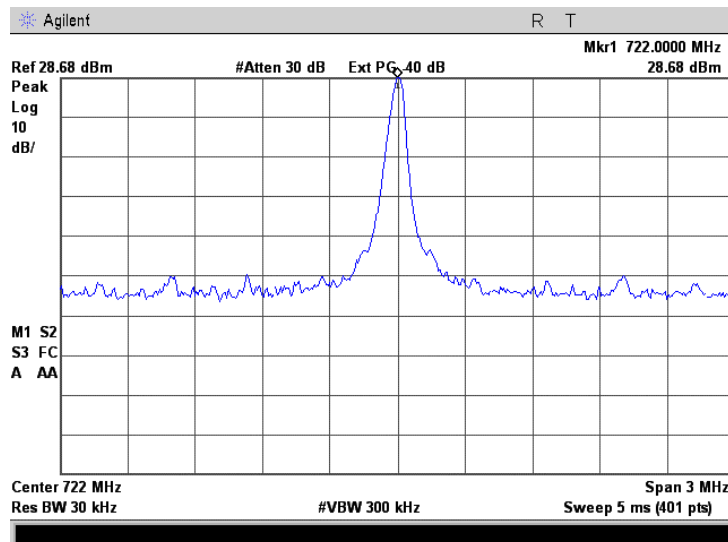


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.2.19 Unmodulated carrier reference level at low carrier frequency, 10 MHz CBW

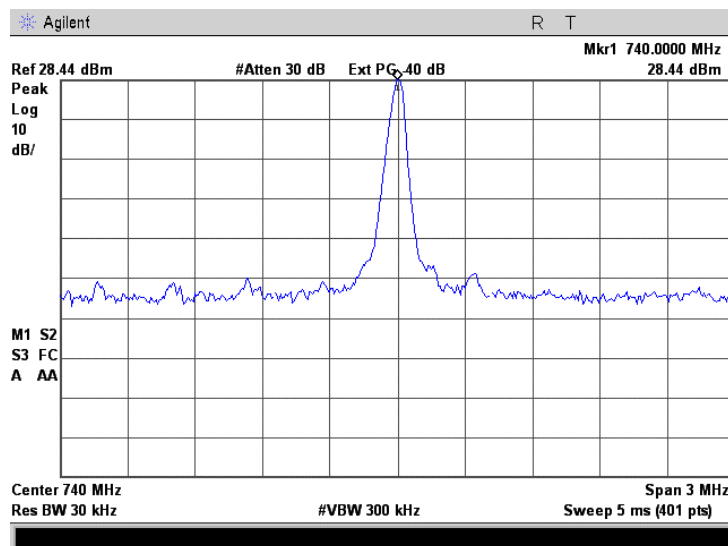


Plot 7.2.20 Unmodulated carrier reference level at mid carrier frequency, 10 MHz CBW



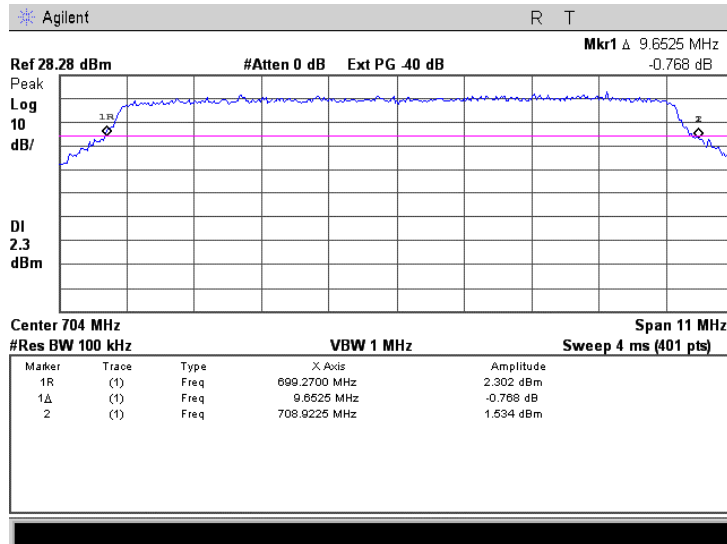
<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.2.21 Unmodulated carrier reference level at high carrier frequency, 10 MHz CBW

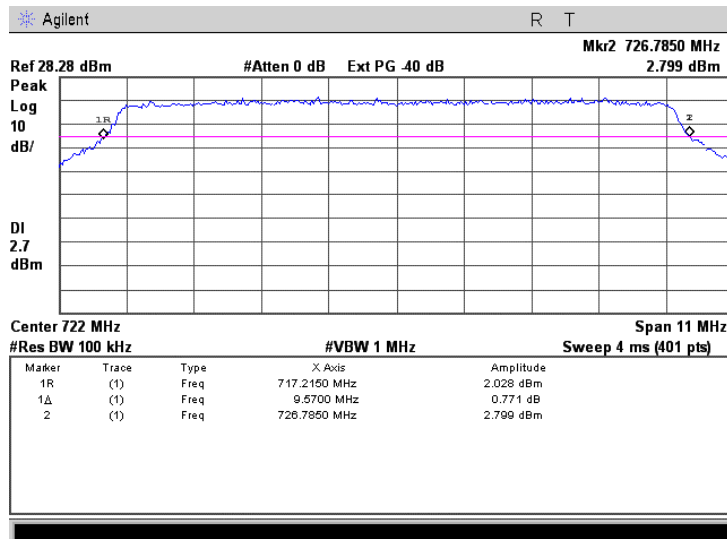


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature: 23°C</b>	<b>Air Pressure: 1008hPa</b>	<b>Relative Humidity: 45%</b>	<b>Power Supply: 120 V AC</b>
<b>Remarks:</b>			

Plot 7.2.22 Occupied bandwidth test result at low frequency, BPSK modulation, 10 MHz CBW

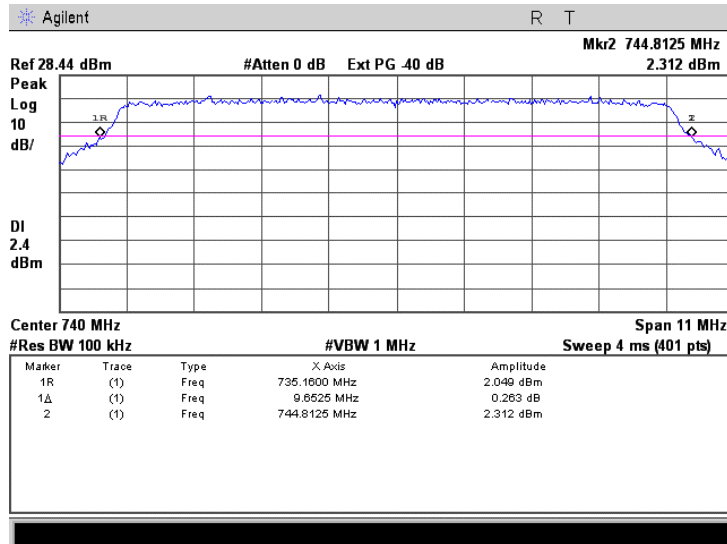


Plot 7.2.23 Occupied bandwidth test result at mid frequency, BPSK modulation, 10 MHz CBW

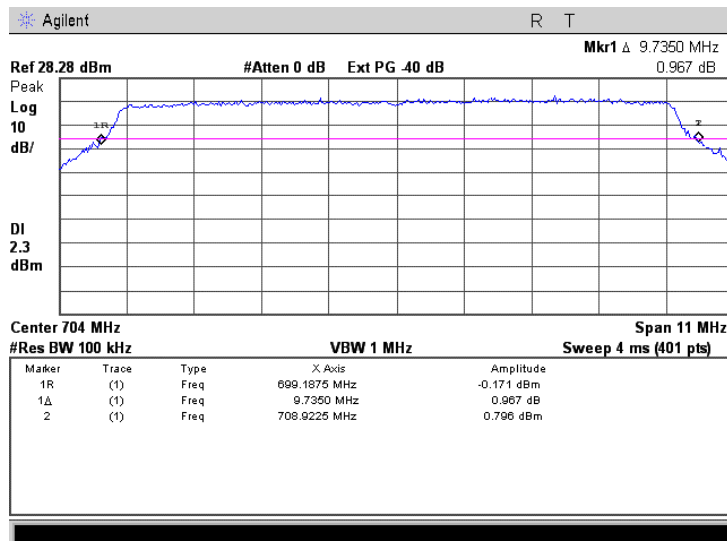


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.2.24 Occupied bandwidth test result at high frequency, BPSK modulation, 10 MHz CBW

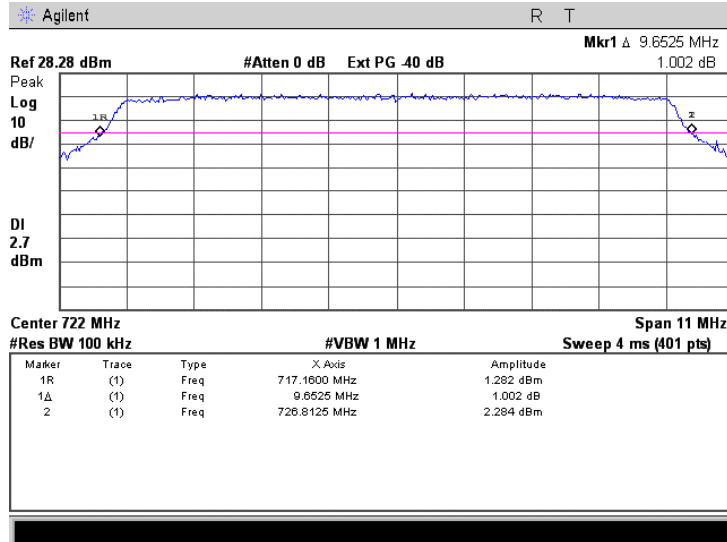


Plot 7.2.25 Occupied bandwidth test result at low frequency, 64QAM modulation, 10 MHz CBW

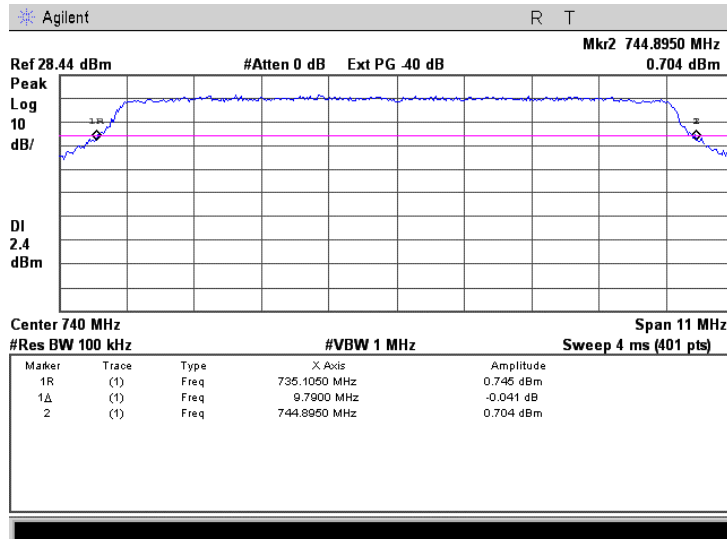


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	47 CFR, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 5:43:02 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.2.26 Occupied bandwidth test result at mid frequency, 64QAM modulation, 10 MHz CBW



Plot 7.2.27 Occupied bandwidth test result at high frequency, 64QAM modulation, 10 MHz CBW



<b>Test specification:</b> Section 27.53(g), Band edge emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 1/21/2009 6:05:16 PM			
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

### 7.3 Emission mask (band edge emissions) test

#### 7.3.1 General

This test was performed to measure emission mask at RF antenna connector. Specification test limits are given in Table 7.3.1. The test results are provided in the associated plots.

Table 7.3.1 Emission mask limits

<b>Attenuation below carrier, dBc</b>	<b>ERP of spurious, dBm</b>
43+10logP(W)	-13.0

OBW (MHz)	Investigated Band Edge	Attenuation below carrier, dBc
<b>698.0 - 704.0 MHz Channel (Block A low)</b>		
2.5	697.9 – 698.0 MHz	43+10logP(W) (RBW = 30 kHz)
	704.0 – 704.1 MHz	
5	697.9 – 698.0 MHz	
	704.0 – 704.1 MHz	
<b>698.0 - 710.0 MHz Channel (Block A + Block B low)</b>		
10	697.9 – 698.0 MHz	43+10logP(W) (RBW = 30 kHz)
	710.0 – 710.1 MHz	
<b>716.0 - 722.0 MHz Channel (Block D + Block E)</b>		
2.5	715.9 – 716.0 MHz	43+10logP(W) (RBW = 30 kHz)
	722.0 – 722.1 MHz	
5	715.9 – 716.0 MHz	
	722.0 – 722.1 MHz	
<b>716.0 - 728.0 MHz Channel (Block D + Block E)</b>		
10	715.9 – 716.0 MHz	43+10logP(W) (RBW = 30 kHz)
	728.0 – 728.1 MHz	
<b>740.0 - 746.0 MHz Channel (Block C high)</b>		
2.5	739.9 – 740.0 MHz	43+10logP(W) (RBW = 30 kHz)
	746.0 – 746.1 MHz	
5	739.9 – 740.0 MHz	
	746.0 – 746.1 MHz	
<b>734.0 - 746.0 MHz Channel (Block B + Block C high)</b>		
10	733.9 – 734.0 MHz	43+10logP(W) (RBW = 30 kHz)
	746.0 – 746.1 MHz	

#### 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 emission mask was measured with spectrum analyzer as provided in the associated plots.

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

Figure 7.3.1 Emission mask test setup





HERMON LABORATORIES

<b>Test specification:</b>		<b>Section 27.53(g), Band edge emissions</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:05:16 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

**Table 7.3.2 Spurious emission at band edges test results**

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 7500 MHz  
 DETECTOR USED: Peak  
 VIDEO BANDWIDTH: ≥ Resolution bandwidth  
 MODULATING SIGNAL: PRBS  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
<b>2.5 Mz BW BPSK 1.0475 Mbps</b>								
<b>Low carrier frequency 699.5 MHz</b>								
697.9975	-26.06	Included	Included	30	-26.06	-13.0	-13.06	Pass
<b>High carrier frequency 744.5 MHz</b>								
746.0010	-26.36	Included	Included	30	-26.36	-13.0	-16.36	Pass
<b>2.5 Mz BW 64QAM 9.425 Mbps</b>								
<b>Low carrier frequency 699.5 MHz</b>								
698.0000	-25.78	Included	Included	30	-25.78	-13.0	-12.78	Pass
<b>High carrier frequency 744.5 MHz</b>								
746.0013	-26.83	Included	Included	30	-26.83	-13.0	-13.83	Pass
<b>5 Mz BW BPSK 4.19 Mbps</b>								
<b>Low carrier frequency 699.5 MHz</b>								
697.9573	-32.38	Included	Included	30	-32.38	-13.0	-19.38	Pass
<b>Mid carrier frequency 719.0 MHz</b>								
715.9690	-31.71	Included	Included	30	-31.71	-13.0	-18.71	Pass
<b>5 Mz BW 64QAM 18.85 Mbps</b>								
<b>Low carrier frequency 699.5 MHz</b>								
697.9900	-32.76	Included	Included	30	-32.76	-13.0	-19.76	Pass
<b>Mid carrier frequency 719.0 MHz</b>								
715.8275	-31.59	Included	Included	30	-31.59	-13.0	-18.59	Pass
722.0025	-32.63	Included	Included	30	-32.63	-13.0	-19.63	Pass
<b>10 Mz BW BPSK 8.38 Mbps</b>								
All emissions were found at least 20 dB below the specified limit								

\*- Margin = Spurious emission – specification limit.

**Reference numbers of test equipment used**

HL 2780	HL 2911	HL 3179	HL 3180				
---------	---------	---------	---------	--	--	--	--

Full description is given in Appendix A.

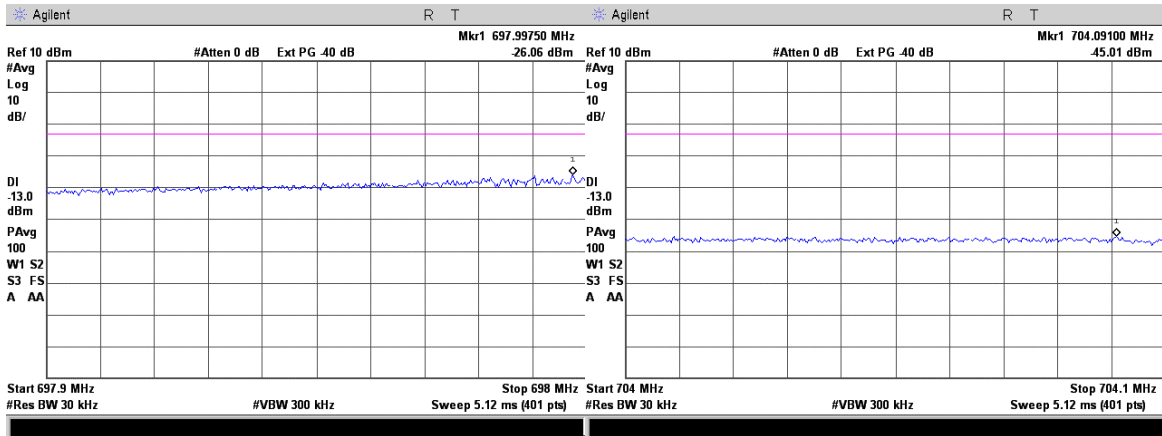


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 27.53(g), Band edge emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:05:16 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

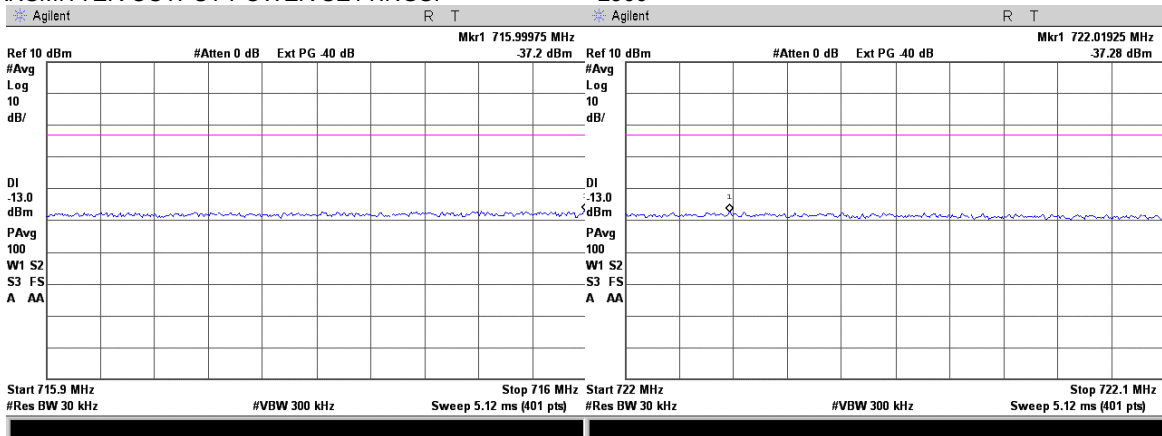
Plot 7.3.1 Emission mask test results at low carrier frequency, 2.5 MHz CBW

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: BPSK  
MODULATING SIGNAL: PRBS  
BIT RATE: 1.0475 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



Plot 7.3.2 Emission mask test results at mid carrier frequency, 2.5 MHz CBW

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: BPSK  
MODULATING SIGNAL: PRBS  
BIT RATE: 1.0475 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500





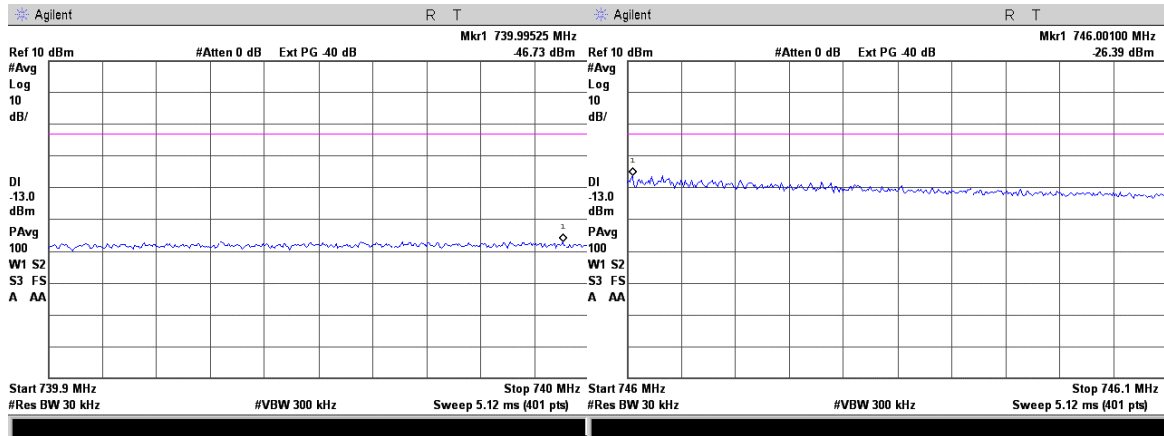


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 27.53(g), Band edge emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:05:16 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

**Plot 7.3.3 Emission mask test results at high carrier frequency, 2.5 MHz CBW**

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: BPSK  
MODULATING SIGNAL: PRBS  
BIT RATE: 1.0475 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



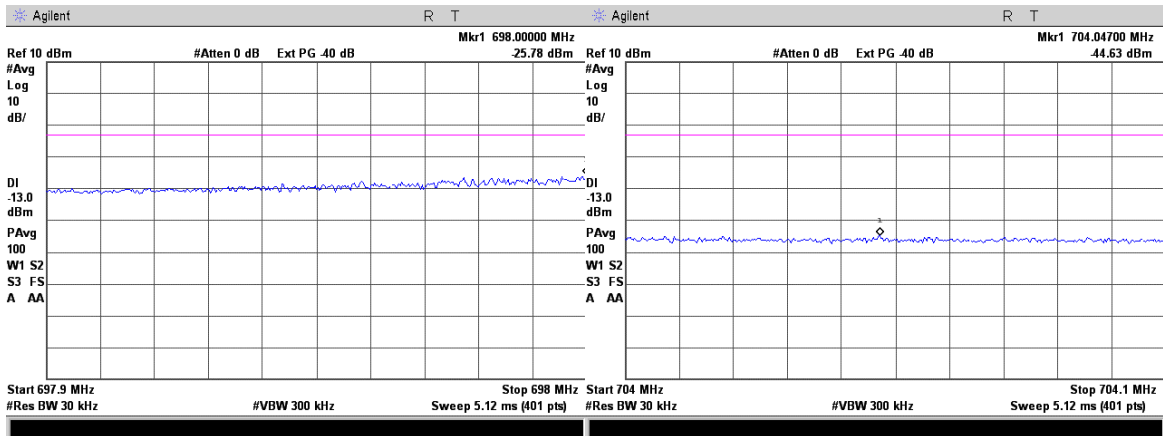


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 27.53(g), Band edge emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:05:16 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

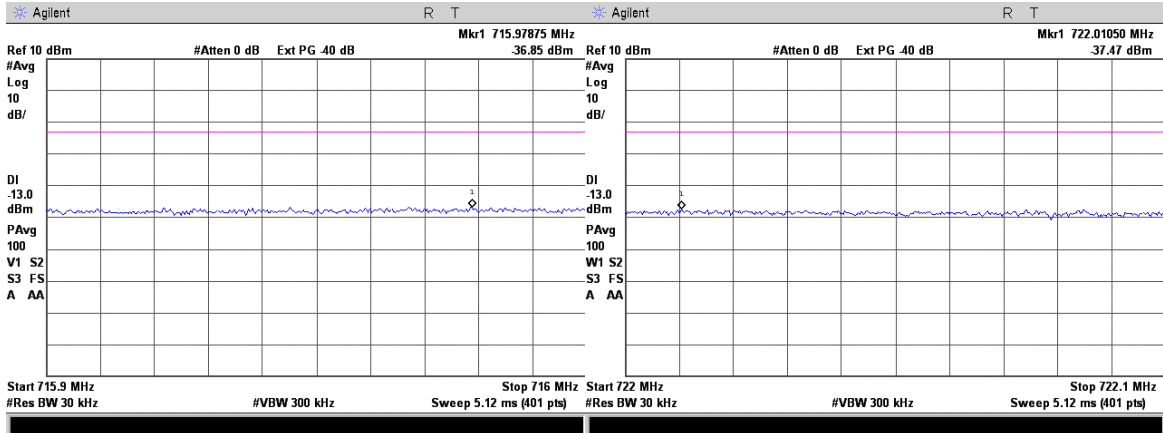
Plot 7.3.4 Emission mask test results at low carrier frequency, 2.5 MHz CBW

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: 64QAM  
MODULATING SIGNAL: PRBS  
BIT RATE: 9.425 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



Plot 7.3.5 Emission mask test results at mid carrier frequency, 2.5 MHz CBW

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: 64QAM  
MODULATING SIGNAL: PRBS  
BIT RATE: 9.425 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



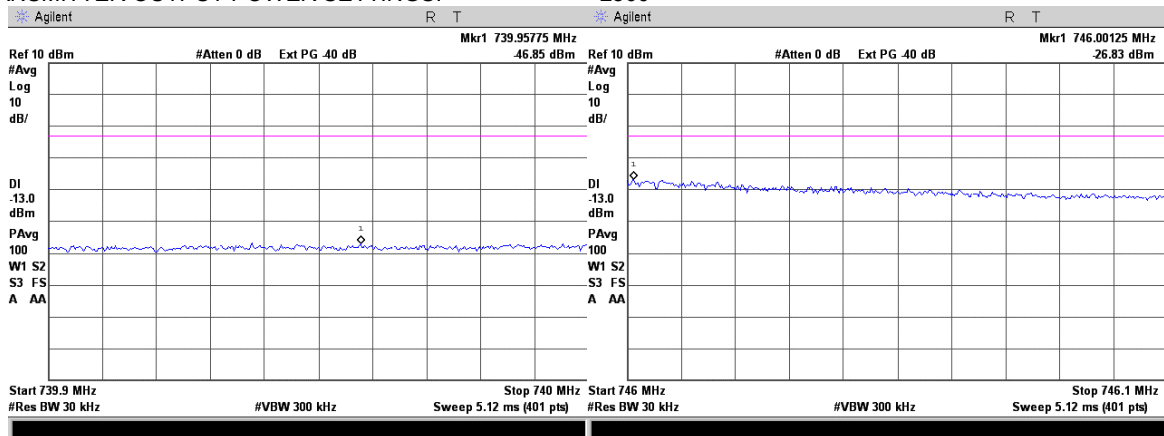


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 27.53(g), Band edge emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:05:16 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

**Plot 7.3.6 Emission mask test results at high carrier frequency, 2.5 MHz CBW**

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: 64QAM  
MODULATING SIGNAL: PRBS  
BIT RATE: 9.425 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



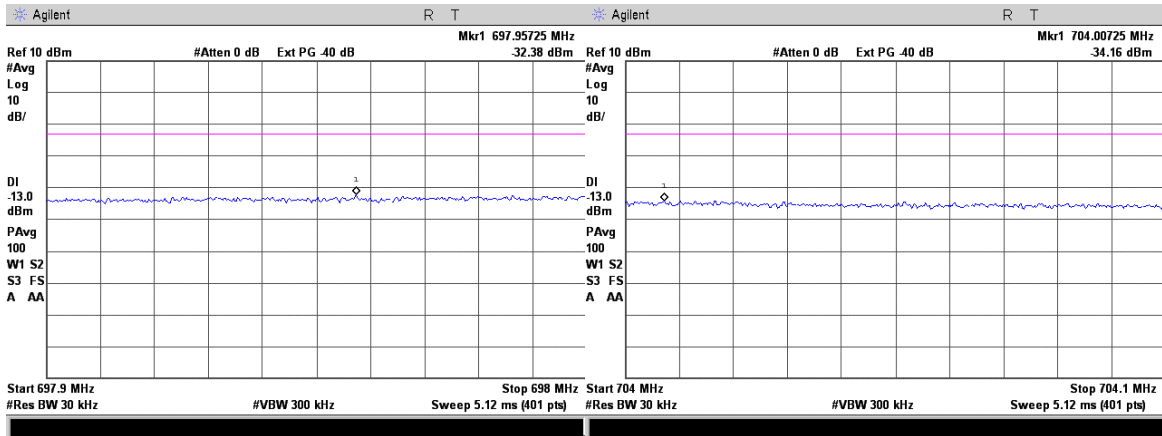


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 27.53(g), Band edge emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:05:16 PM		
<b>Temperature: 23°C</b>	<b>Air Pressure: 1008hPa</b>	<b>Relative Humidity: 45%</b>	<b>Power Supply: 120 V AC</b>
<b>Remarks:</b>			

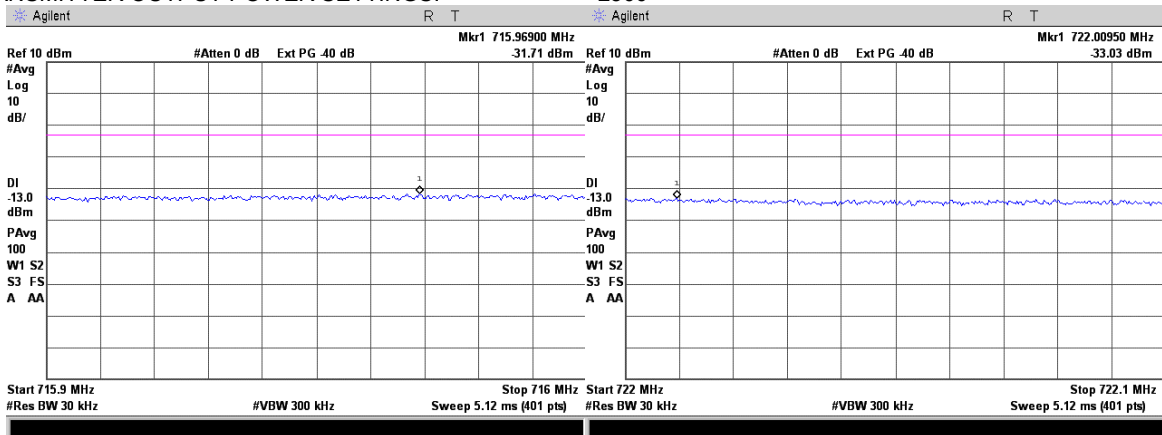
Plot 7.3.7 Emission mask test results at low carrier frequency, 5 MHz CBW

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: BPSK  
MODULATING SIGNAL: PRBS  
BIT RATE: 2.094 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



Plot 7.3.8 Emission mask test results at mid carrier frequency, 5 MHz CBW

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: BPSK  
MODULATING SIGNAL: PRBS  
BIT RATE: 2.094 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



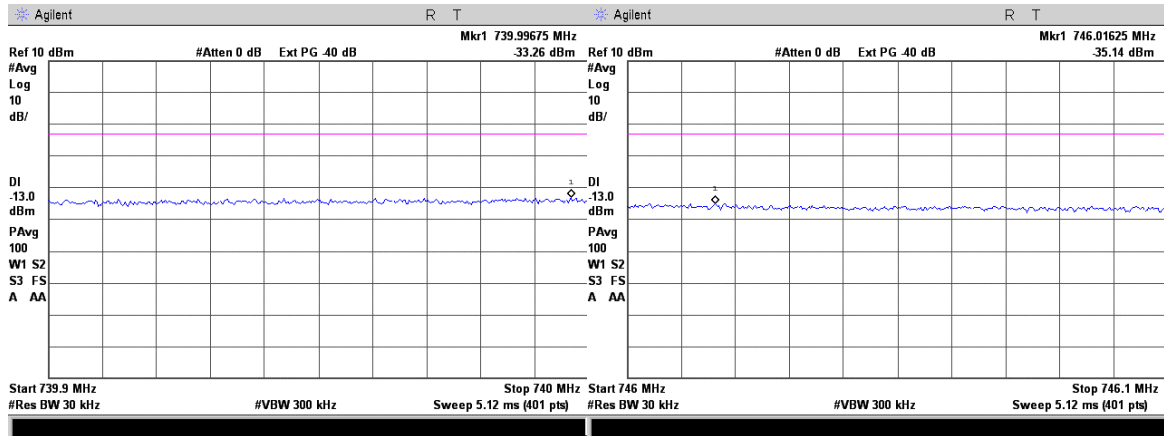


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 27.53(g), Band edge emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:05:16 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

**Plot 7.3.9 Emission mask test results at high carrier frequency, 5 MHz CBW**

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: BPSK  
MODULATING SIGNAL: PRBS  
BIT RATE: 2.094 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



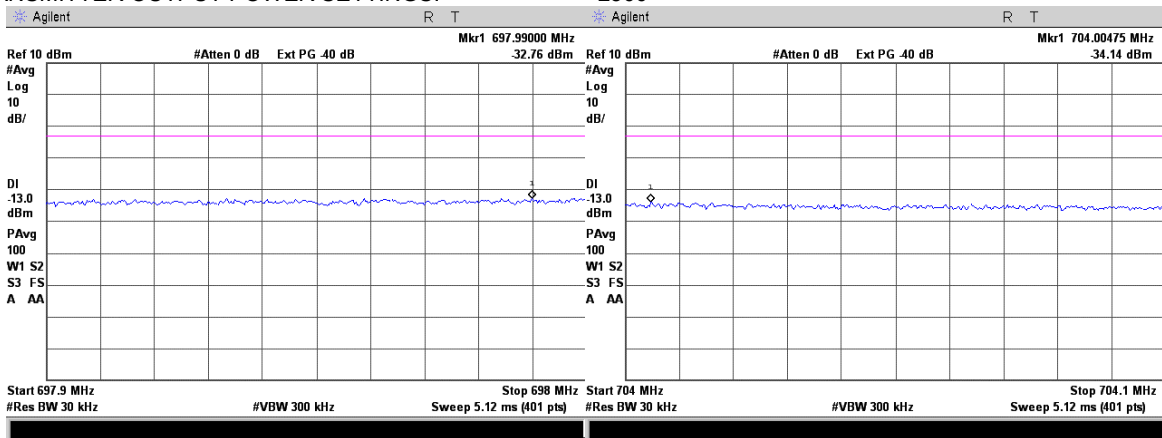


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 27.53(g), Band edge emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:05:16 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

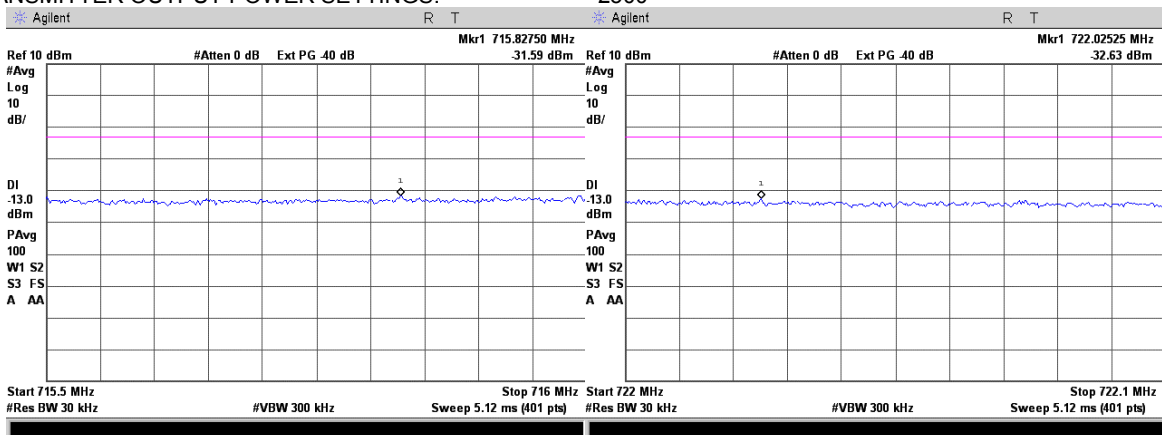
Plot 7.3.10 Emission mask test results at low carrier frequency, 5 MHz CBW

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: 64QAM  
MODULATING SIGNAL: PRBS  
BIT RATE: 18.85 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



Plot 7.3.11 Emission mask test results at mid carrier frequency, 5 MHz CBW

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: 64QAM  
MODULATING SIGNAL: PRBS  
BIT RATE: 18.85 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



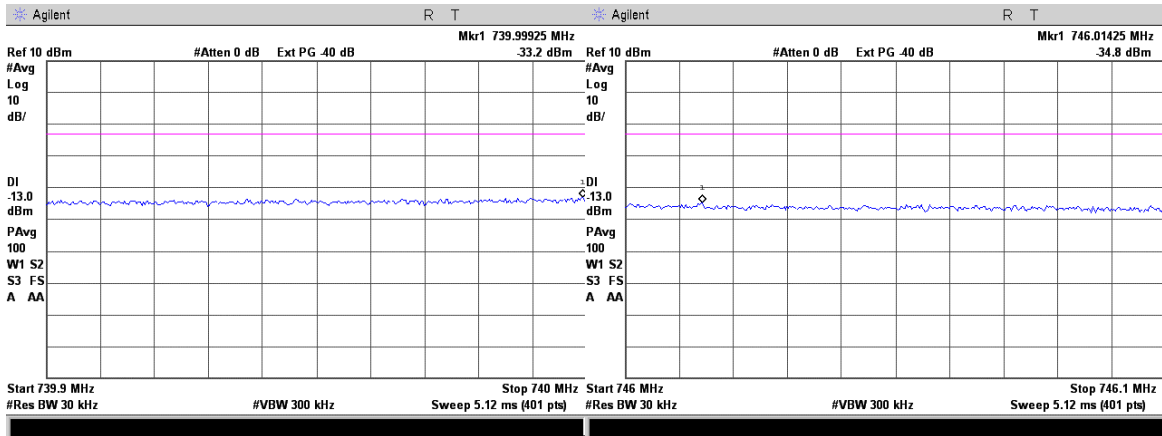


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 27.53(g), Band edge emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:05:16 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

**Plot 7.3.12 Emission mask test results at high carrier frequency, 5 MHz CBW**

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: 64QAM  
MODULATING SIGNAL: PRBS  
BIT RATE: 18.85 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



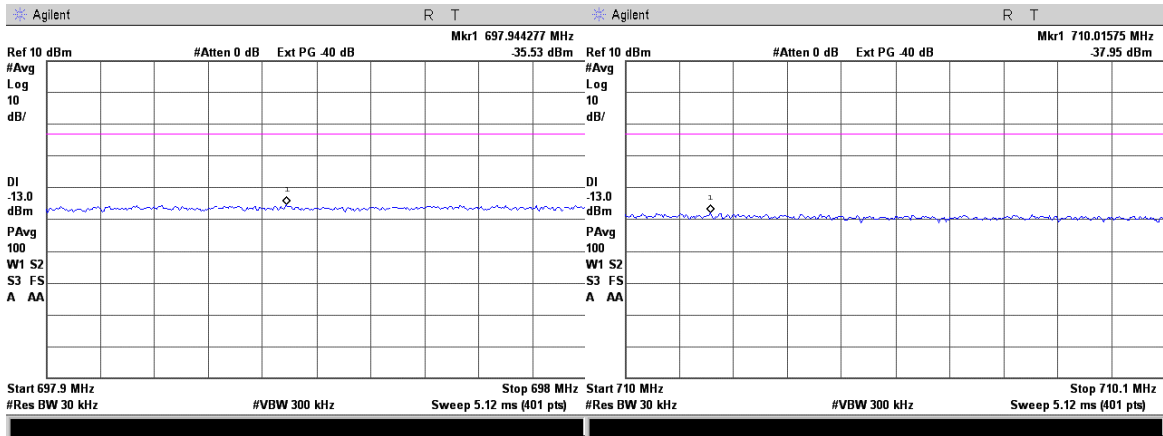


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 27.53(g), Band edge emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:05:16 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

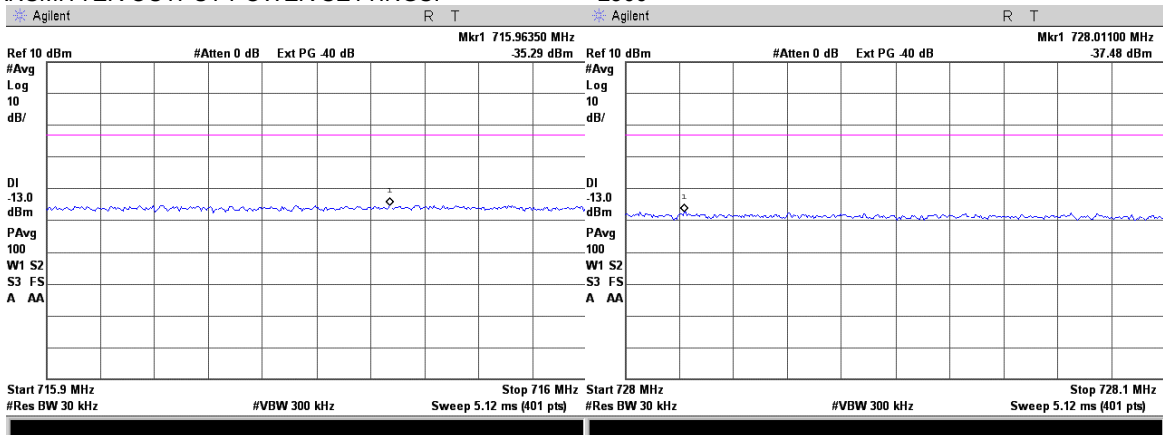
Plot 7.3.13 Emission mask test results at low carrier frequency, 10 MHz CBW

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: BPSK  
MODULATING SIGNAL: PRBS  
BIT RATE: 4.188 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



Plot 7.3.14 Emission mask test results at mid carrier frequency, 10 MHz CBW

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: BPSK  
MODULATING SIGNAL: PRBS  
BIT RATE: 4.188 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500





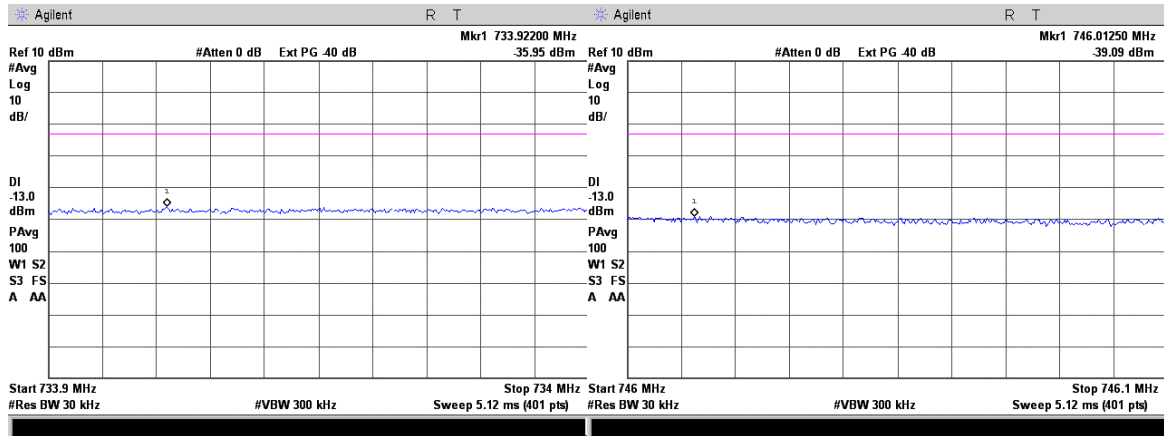


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 27.53(g), Band edge emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:05:16 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

**Plot 7.3.15 Emission mask test results at high carrier frequency, 10 MHz CBW**

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: BPSK  
MODULATING SIGNAL: PRBS  
BIT RATE: 4.188 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



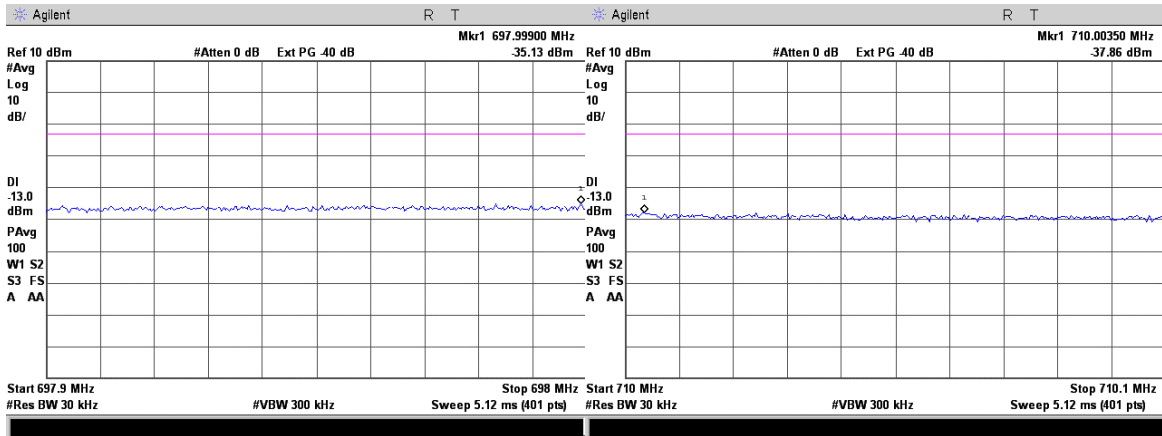


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 27.53(g), Band edge emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:05:16 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

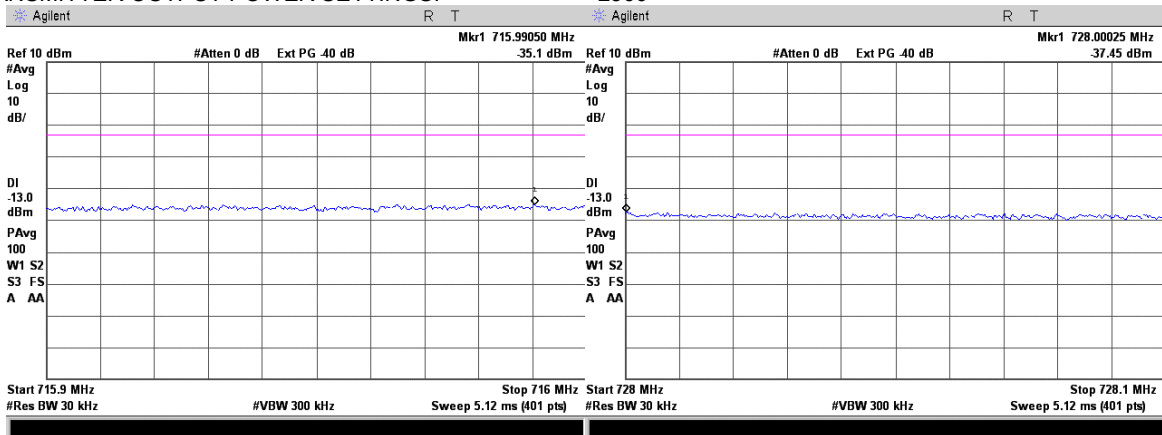
Plot 7.3.16 Emission mask test results at low carrier frequency, 10 MHz CBW

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: 64QAM  
MODULATING SIGNAL: PRBS  
BIT RATE: 37.7 MBps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



Plot 7.3.17 Emission mask test results at mid carrier frequency, 10 MHz CBW

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: 64QAM  
MODULATING SIGNAL: PRBS  
BIT RATE: 37.7 MBps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



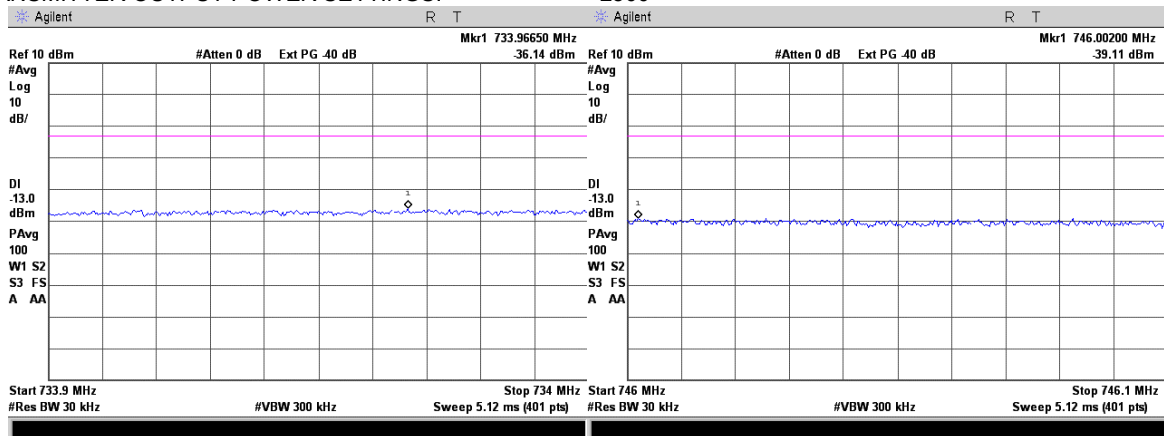


HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 27.53(g), Band edge emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1047 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:05:16 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

**Plot 7.3.18 Emission mask test results at high carrier frequency, 10 MHz CBW**

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
DETECTOR USED: Peak  
MODULATION: 64QAM  
MODULATING SIGNAL: PRBS  
BIT RATE: 37.7 MBps  
TRANSMITTER OUTPUT POWER SETTINGS: 2500



<b>Test specification:</b>		<b>Section 27.53(g), Radiated spurious emissions</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

## 7.4 Radiated spurious emission measurements

### 7.4.1 General

This test was performed to measure radiated spurious emissions from the EUT. Specification test limits are given in Table 7.4.1.

Table 7.4.1 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

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

7.4.2.1 The EUT was set up as shown in Figure 7.4.1, energized and the performance check was conducted.

7.4.2.2 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.

7.4.2.3 The worst test results (the lowest margins) were recorded in Table 7.4.2 and shown in the associated plots.

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

7.4.3.1 The EUT was set up as shown in Figure 7.4.2, energized and the performance check was conducted.

7.4.3.2 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.

7.4.3.3 The worst test results (the lowest margins) were recorded in Table 7.4.2 and shown in the associated plots.

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

7.4.4.1 The test equipment was set up as shown in Figure 7.4.3 and energized.

7.4.4.2 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.

7.4.4.3 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.

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

7.4.4.5 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.

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

7.4.4.7 The worst test results (the lowest margins) were recorded in Table 7.4.3 and shown in the associated plots.

<b>Test specification:</b>		<b>Section 27.53(g), Radiated spurious emissions</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Figure 7.4.1 Setup for spurious emission field strength measurements in 9 kHz to 30 MHz band

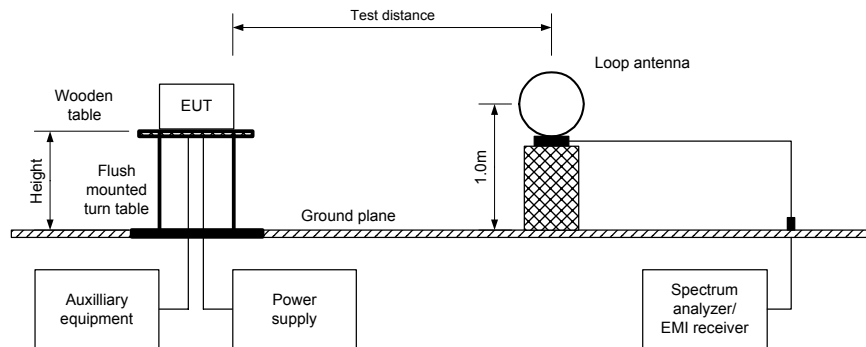
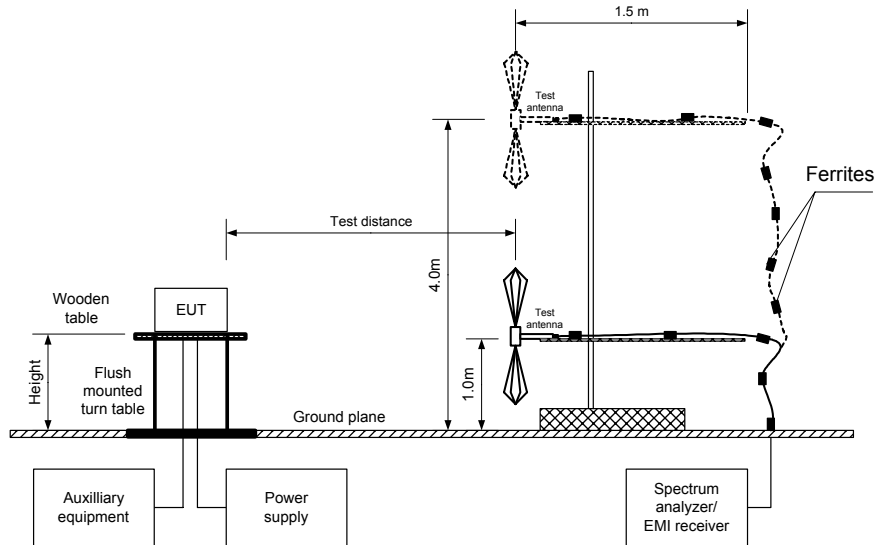
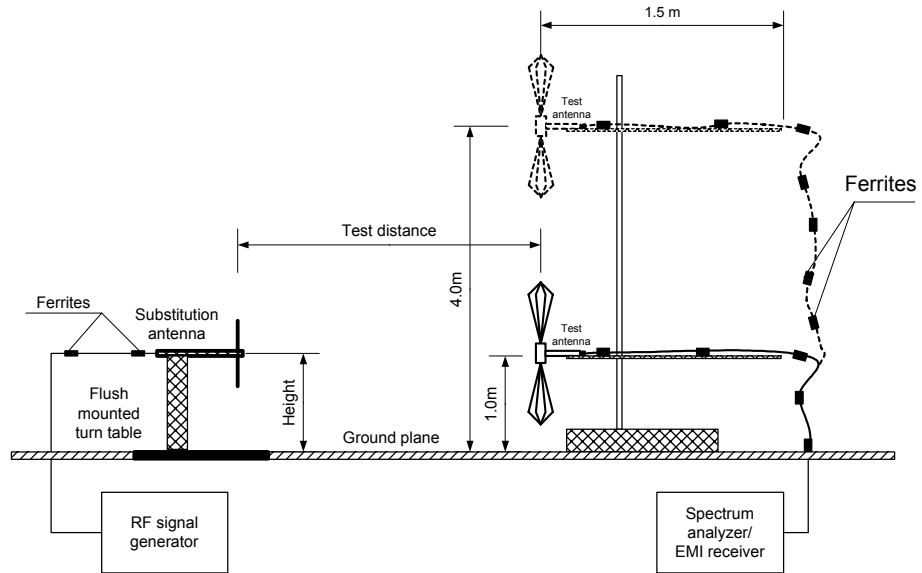


Figure 7.4.2 Setup for spurious emission field strength measurements above 30 MHz



<b>Test specification:</b>	<b>Section 27.53(g), Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Figure 7.4.3 Setup for substitution ERP measurements of spurious





<b>Test specification:</b>		<b>Section 27.53(g), Radiated spurious emissions</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Table 7.4.2 Spurious emission field strength test results

ASSIGNED FREQUENCY RANGE: 698.0 – 746.0 MHz  
TEST DISTANCE: 3 m  
TEST SITE: Semi anechoic chamber  
EUT HEIGHT: 0.8 m  
INVESTIGATED FREQUENCY RANGE: 0.009 – 8000 MHz  
DETECTOR USED: Power average (100 sweeps)  
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: OFDM  
BIT RATE: 9.425 Mbps  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
DUTY CYCLE: 100%

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 699.5 MHz</b>							
2098.500	72.81	84.40	-11.59	1000	H	1.3	340
2798.000	68.63	84.40	-15.77	1000	H	1.4	010
3498.700	57.09	84.40	-27.31	1000	H	1.4	030
4197.750	51.57	84.40	-32.83	1000	H	1.4	020
<b>Mid carrier frequency 719.0 MHz</b>							
2157.350	77.32	84.4	-7.08	1000	H	1.4	290
2875.800	69.21	84.4	-15.19	1000	H	1.3	030
3595.850	60.38	84.4	-24.02	1000	H	1.3	030
<b>High carrier frequency 744.5 MHz</b>							
2233.350	72.86	84.4	-11.54	1000	H	1.3	330
2977.700	62.47	84.4	-21.93	1000	H	1.4	020
3722.700	50.74	84.4	-33.66	1000	H	1.3	030

\*- 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 27.53(g), Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

**Table 7.4.3 Substitution ERP of spurious test results**

ASSIGNED FREQUENCY RANGE: 698.0 –746.0 MHz  
TRANSMITTER CARRIER ERP: 22.85 dBm/MHz at low frequency  
23.94 dBm/MHz at mid frequency  
22.97 dBm/MHz at high frequency  
Antenna Gain: 15.3 dBi  
TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
SUBSTITUTION ANTENNA HEIGHT: 0.8 m  
DETECTOR USED: Power average (100 sweeps)  
VIDEO BANDWIDTH: > Resolution bandwidth  
SUBSTITUTION ANTENNA TYPE: Tunable dipole (30 MHz – 1000 MHz)  
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</b>										
2098.500	72.81	1000	H	-32.08	6.67	4.07	-29.48	-13	-16.48	Pass
2798.000	68.63	1000	H	-35.19	7.05	4.9	-33.04	-13	-20.04	Pass
3498.700	57.09	1000	H	-46.37	6.97	5.73	-45.13	-13	-32.13	Pass
4197.750	51.57	1000	H	-50.24	8.25	6.6	-48.59	-13	-35.59	Pass
<b>Mid carrier frequency</b>										
2157.350	77.32	1000	H	-27.41	6.91	4.07	-24.57	-13	-11.57	Pass
2875.800	69.21	1000	H	-34.61	7.22	5.05	-32.44	-13	-19.44	Pass
3595.850	60.38	1000	H	-43.08	7.03	5.86	-41.91	-13	-28.91	Pass
<b>High carrier frequency</b>										
2233.350	72.86	1000	H	-31.87	6.95	4.2	-29.12	-13	-16.12	Pass
2977.700	62.47	1000	H	-31.87	6.87	5.17	-30.17	-13	-17.17	Pass
3722.700	50.74	1000	H	-52.84	7.15	6.02	-51.71	-13	-38.71	Pass

\*- Margin = Spurious emission – specification limit.

**Reference numbers of test equipment used**

HL 0446	HL 0521	HL 0554	HL 0661	HL 1984	HL 2432	HL 3121	HL 3123
HL 3207	HL 3616						

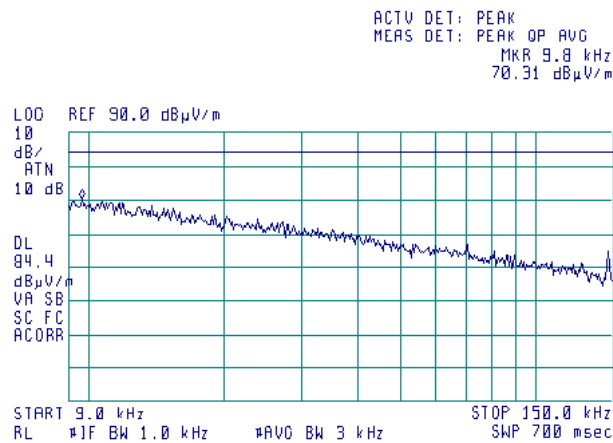
Full description is given in Appendix A.



<b>Test specification:</b>		<b>Section 27.53(g), Radiated spurious emissions</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

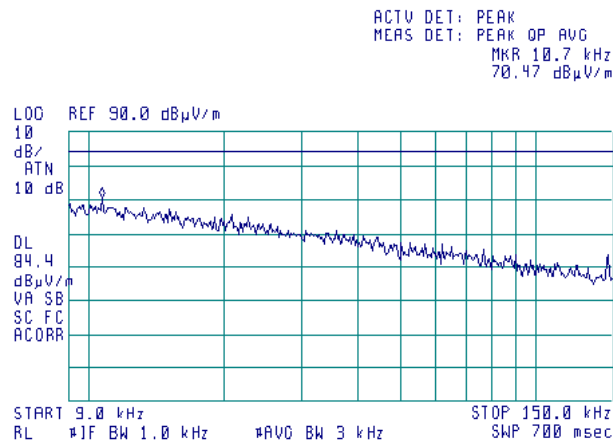
**Plot 7.4.1 Radiated emission measurements in 9 - 150 kHz range**

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



**Plot 7.4.2 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



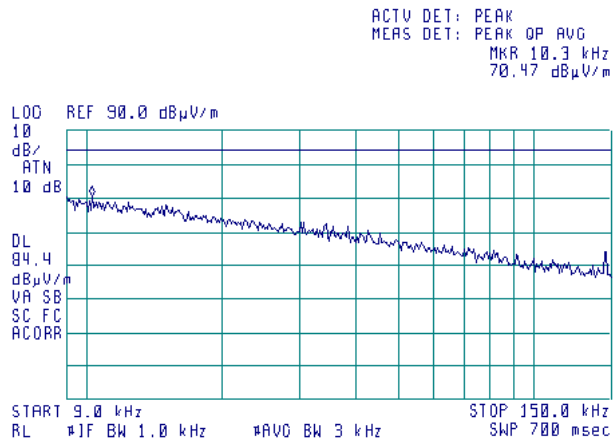


HERMON LABORATORIES

<b>Test specification:</b> Section 27.53(g), Radiated spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 1/21/2009 6:07:00 PM			
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

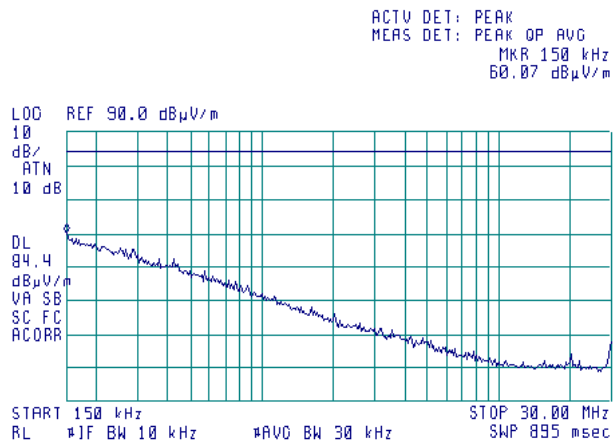
Plot 7.4.3 Radiated emission measurements in 9 - 150 kHz range

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



Plot 7.4.4 Radiated emission measurements in 0.15 - 30 MHz range

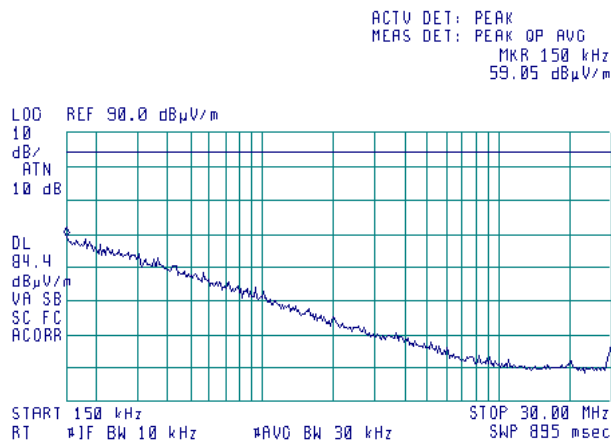
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b> Section 27.53(g), Radiated spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 1/21/2009 6:07:00 PM			
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

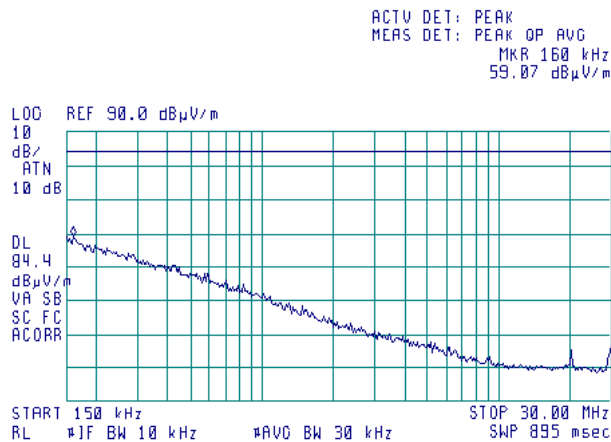
**Plot 7.4.5 Radiated emission measurements in 0.15 - 30 MHz range**

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



**Plot 7.4.6 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



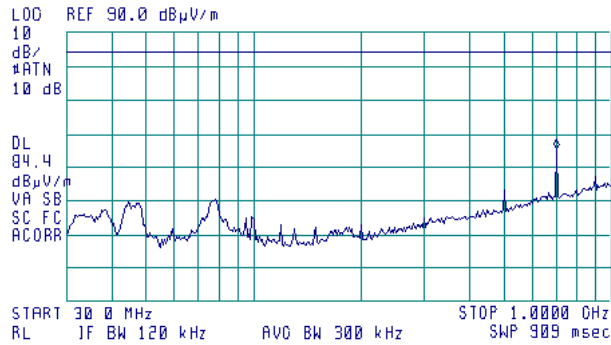
<b>Test specification:</b>	<b>Section 27.53(g), Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

**Plot 7.4.7 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



ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 695.5 MHz  
 55.44 dBμV/m



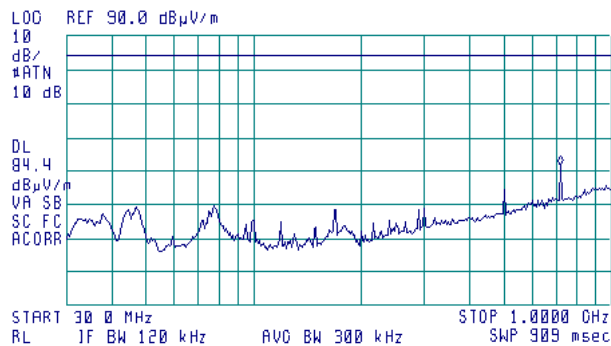
699.5 MHz - low channel carrier

**Plot 7.4.8 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



ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 714.7 MHz  
 51.53 dBμV/m

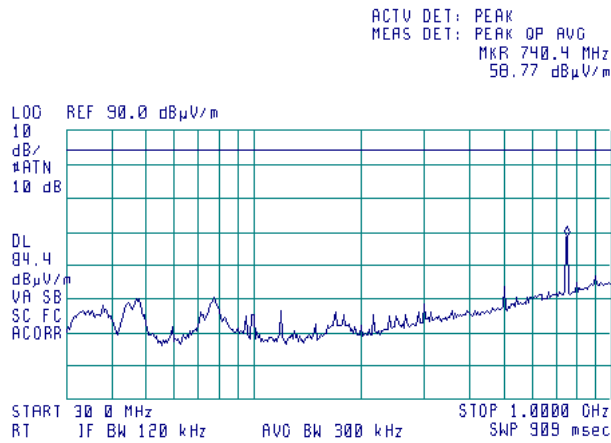


719.0 MHz - mid channel carrier

<b>Test specification:</b> Section 27.53(g), Radiated spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 1/21/2009 6:07:00 PM			
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.4.9 Radiated emission measurements in 30 - 1000 MHz range

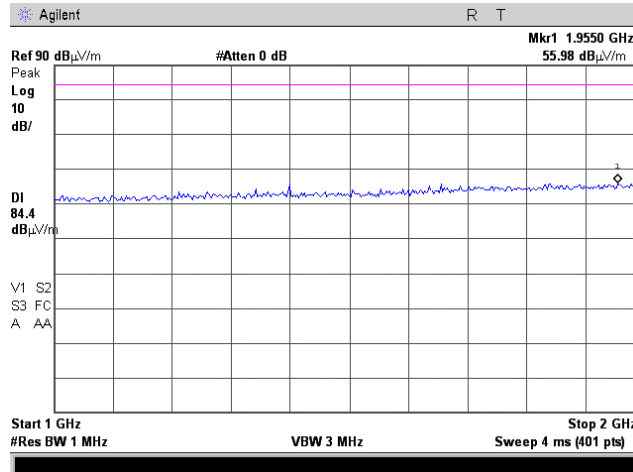
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



744.5 MHz - high channel carrier

Plot 7.4.10 Radiated emission measurements in 1000 – 2000 MHz range

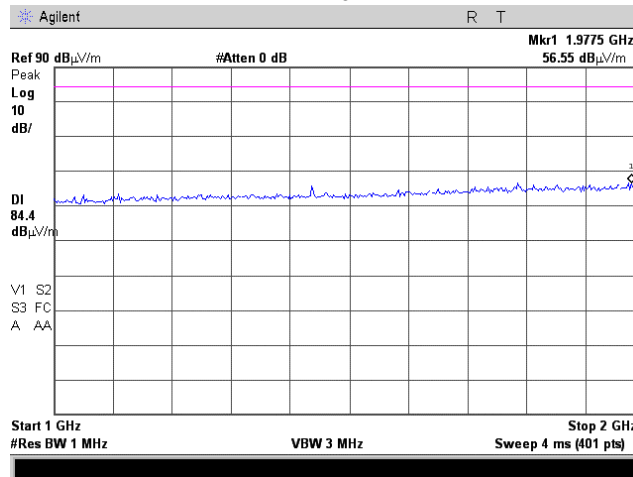
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b>		<b>Section 27.53(g), Radiated spurious emissions</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

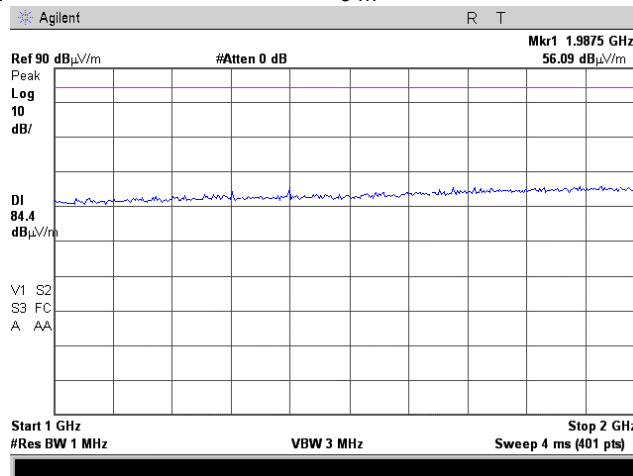
Plot 7.4.11 Radiated emission measurements in 1000 – 2000 MHz range

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



Plot 7.4.12 Radiated emission measurements in 1000 – 2000 MHz range

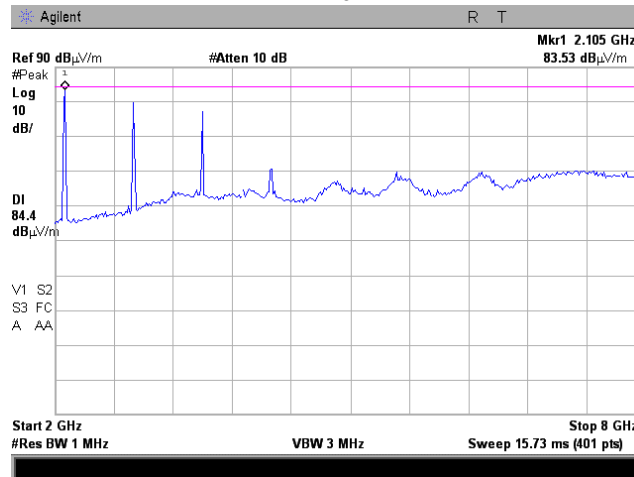
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b> Section 27.53(g), Radiated spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 1/21/2009 6:07:00 PM			
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

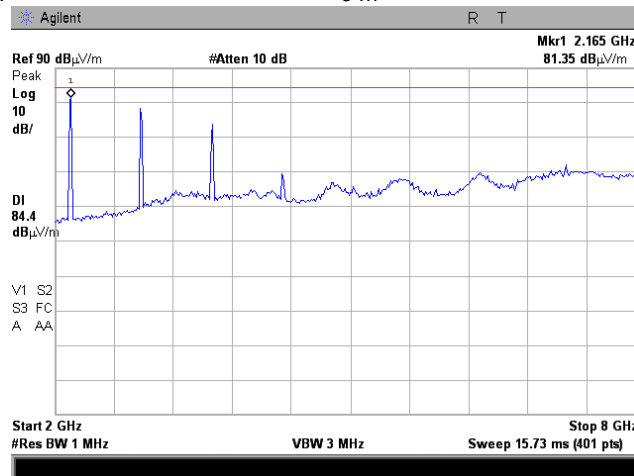
Plot 7.4.13 Radiated emission measurements in 2000 – 8000 MHz range

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



Plot 7.4.14 Radiated emission measurements in 2000 – 8000 MHz range

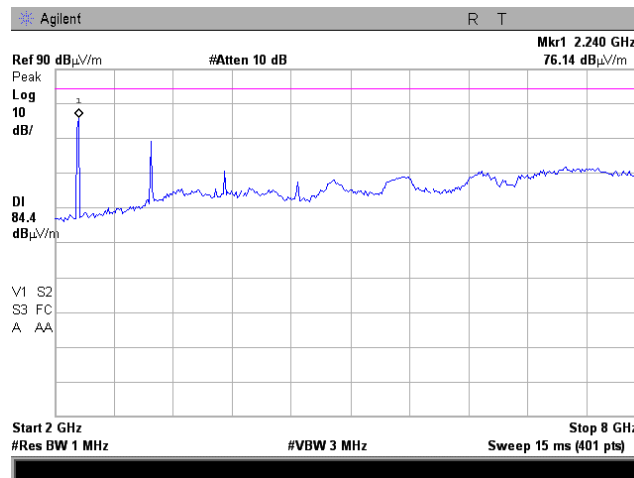
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 27.53(g), Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

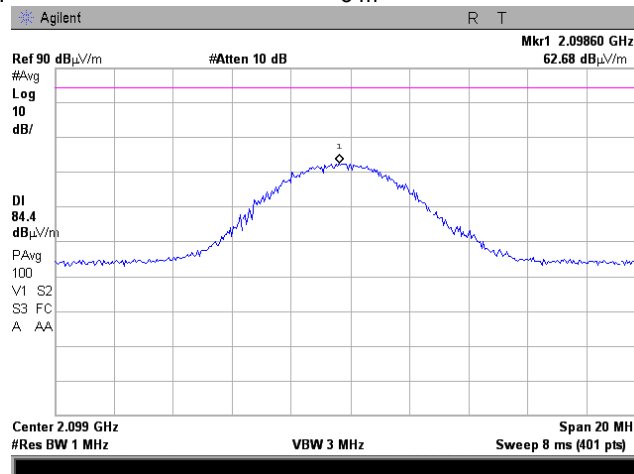
**Plot 7.4.15 Radiated emission measurements in 2000 – 8000 MHz range**

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



**Plot 7.4.16 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

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

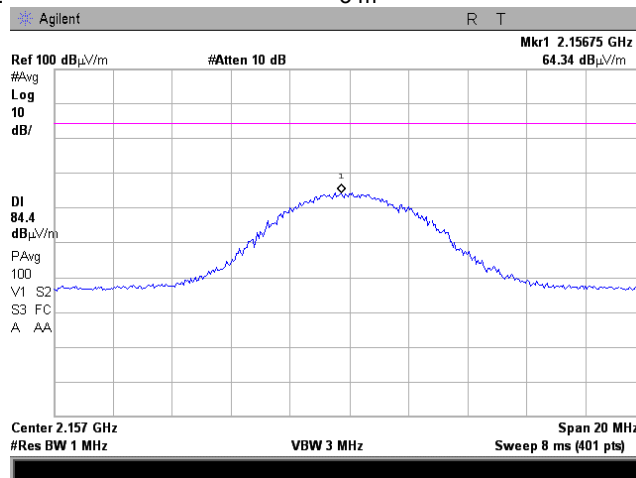




<b>Test specification:</b>	<b>Section 27.53(g), Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

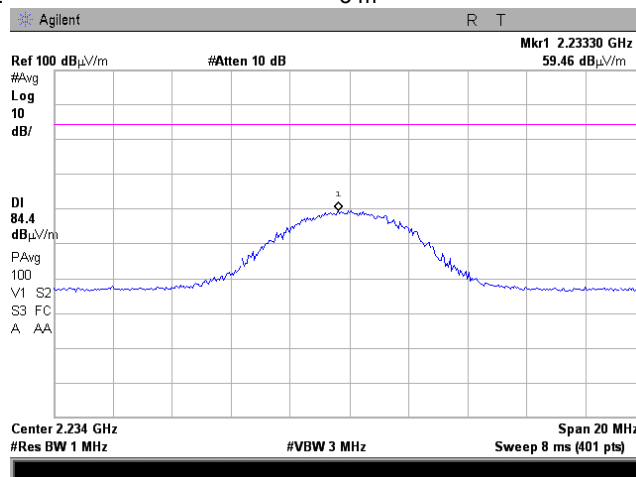
**Plot 7.4.17 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

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



**Plot 7.4.18 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

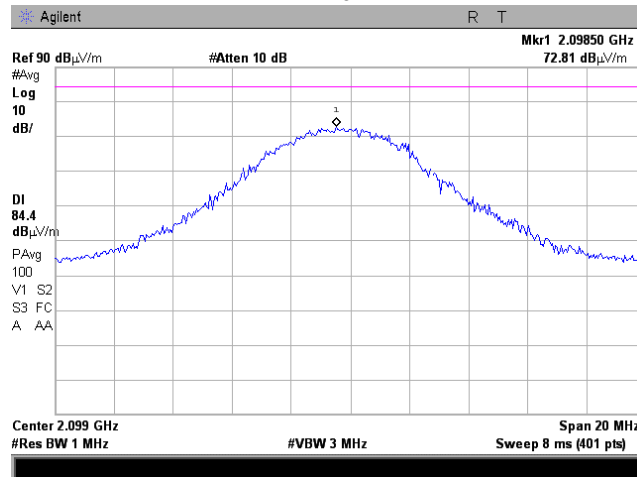
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 27.53(g), Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

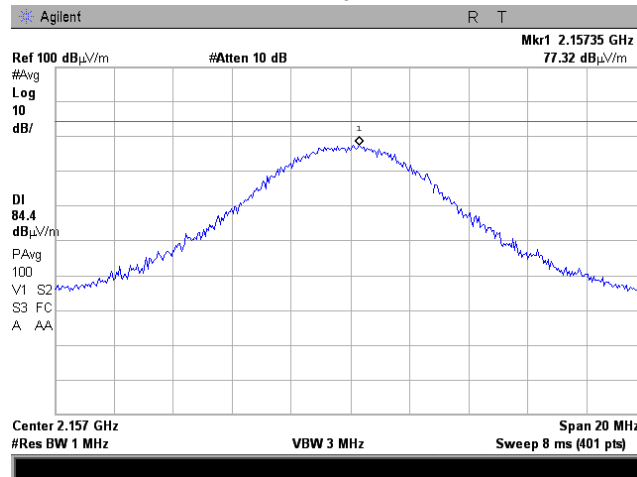
**Plot 7.4.19 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

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



**Plot 7.4.20 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

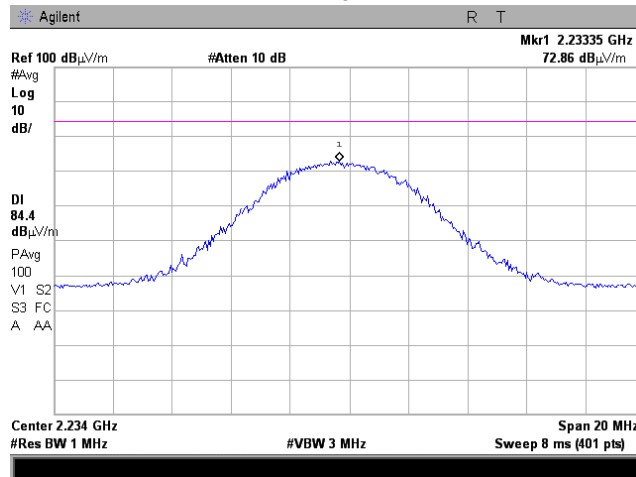
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 27.53(g), Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

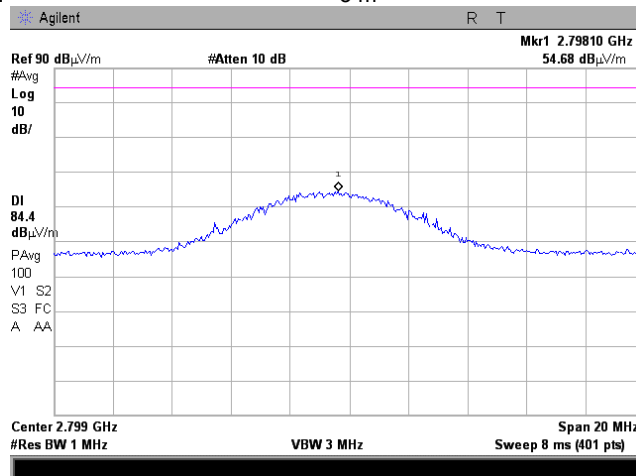
**Plot 7.4.21 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

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



**Plot 7.4.22 Radiated emission measurements at the 4<sup>th</sup> harmonic**

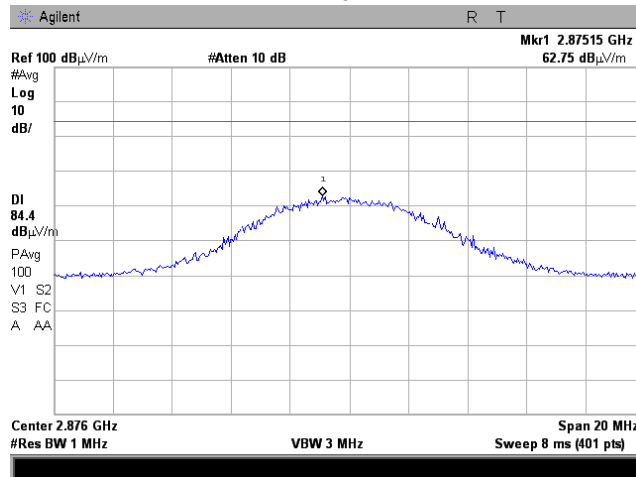
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



<b>Test specification:</b> Section 27.53(g), Radiated spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 1/21/2009 6:07:00 PM			
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

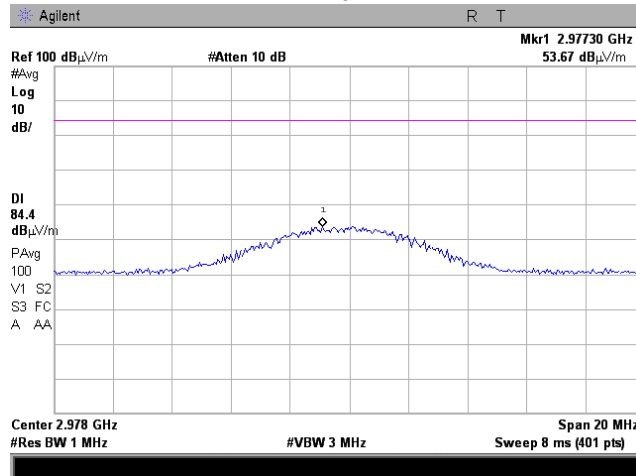
Plot 7.4.23 Radiated emission measurements at the 4<sup>th</sup> harmonic

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



Plot 7.4.24 Radiated emission measurements at the 4<sup>th</sup> harmonic

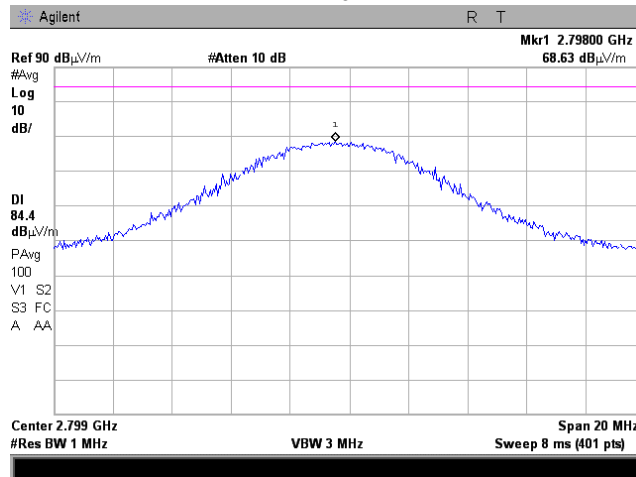
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical  
 TEST DISTANCE: 3 m



<b>Test specification:</b> Section 27.53(g), Radiated spurious emissions			
<b>Test procedure:</b> 47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 1/21/2009 6:07:00 PM			
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

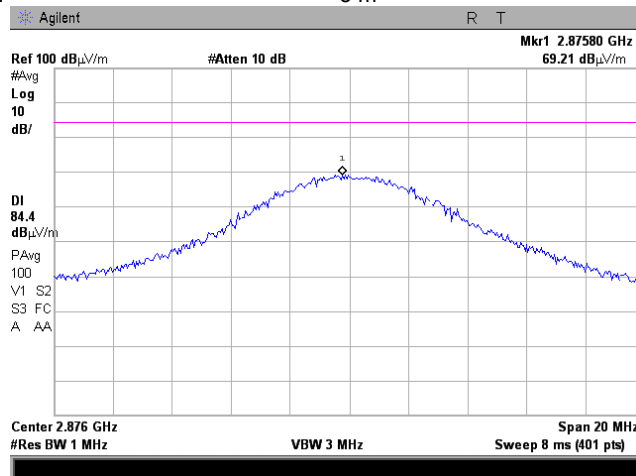
Plot 7.4.25 Radiated emission measurements at the 4<sup>th</sup> harmonic

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



Plot 7.4.26 Radiated emission measurements at the 4<sup>th</sup> harmonic

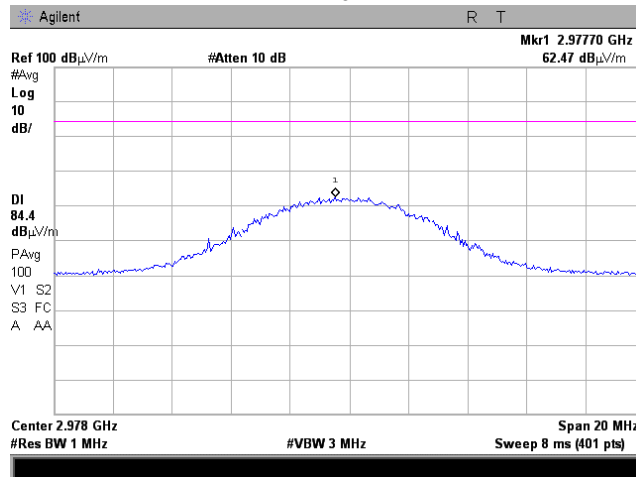
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b>		<b>Section 27.53(g), Radiated spurious emissions</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

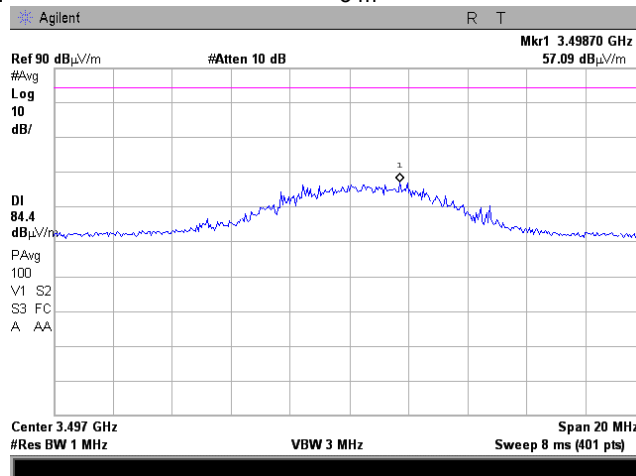
**Plot 7.4.27 Radiated emission measurements at the 4<sup>th</sup> harmonic**

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



**Plot 7.4.28 Radiated emission measurements at the 5<sup>th</sup> harmonic**

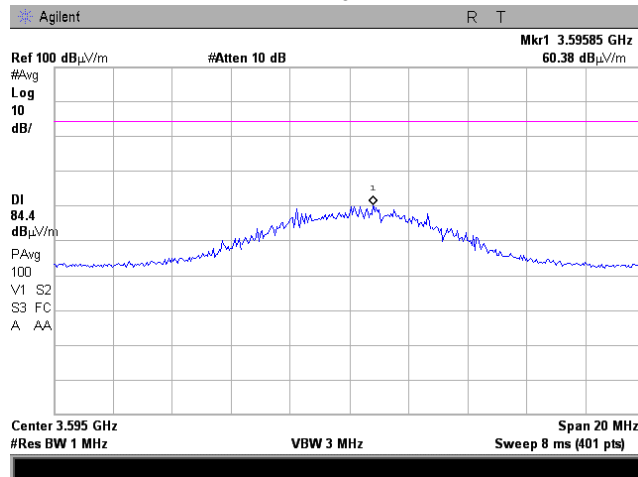
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 27.53(g), Radiated spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1053 and 27.53(f); TIA/EIA-603-C, Section 2.2.12		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:07:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

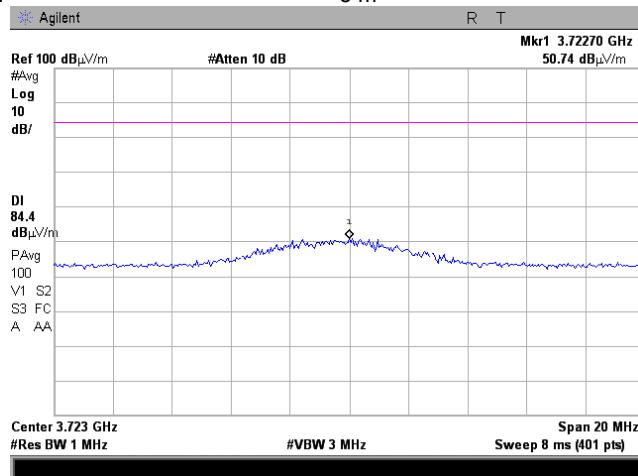
**Plot 7.4.29 Radiated emission measurements at the 5<sup>th</sup> harmonic**

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



**Plot 7.4.30 Radiated emission measurements at the 5<sup>th</sup> harmonic**

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



<b>Test specification:</b>		<b>Section 27.53(g), Conducted spurious emissions</b>	
<b>Test procedure:</b>		47 CFR, Sections 2.1051 and 27.53(f); TIA/EIA-603-C, Section 2.2.13	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date &amp; Time:</b>	1/21/2009 6:03:22 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<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*	$43 + 10 \log P^*$	-13.0

\* - P is transmitter output power in Watts

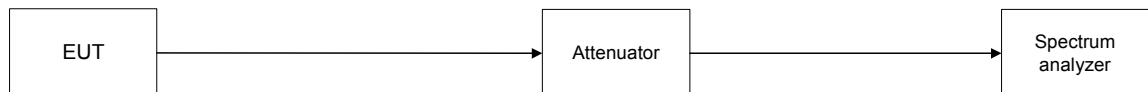
### 7.5.2 Test procedure

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







<b>Test specification:</b>	<b>Section 27.53(g), Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:03:22 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Table 7.5.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE:	698.0 – 746.0 MHz
INVESTIGATED FREQUENCY RANGE:	0.009 – 7500 MHz
DETECTOR USED:	Peak
VIDEO BANDWIDTH:	≥ Resolution bandwidth
MODULATION:	64QAM
MODULATING SIGNAL:	PRBS
BIT RATE:	9.425 MBps
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
TRANSMITTER OUTPUT POWER:	26.83 dBm at low frequency
(TOTAL POWER PER CHANNEL)	27.92 dBm at mid frequency 26.95 dBm at high frequency

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Limit, dBm	Margin, dB*	Verdict
<b>Low carrier frequency 499.5 MHz</b>								
697.604	-25.53	Included	Included	100	-25.53	-13.0	-12.23	Pass
<b>Mid carrier frequency 719.0 MHz</b>								
715.885	-21.14	Included	Included	100	-21.14	-13.0	-8.10	Pass
722.219	-23.20	Included	Included	100	-23.20	-13.0	-10.20	Pass
<b>High carrier frequency 744.5 MHz</b>								
746.100	-25.53	Included	Included	100	-25.53	-13.0	-12.53	Pass

\*- Margin = Spurious emission – specification limit.

NOTE: the test was performed with EUT configured to 2.5 MHz CBW with 64QAM modulation as settings that produce maximum power spectral density.

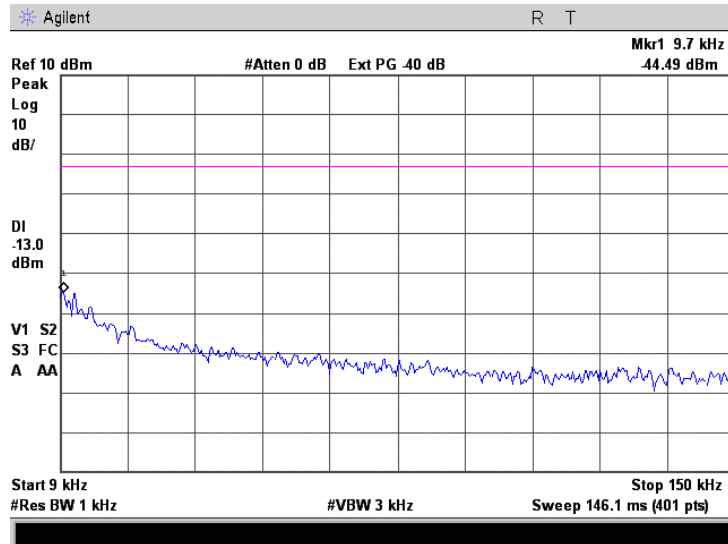
## Reference numbers of test equipment used

HL 2780	HL 2911	HL 3179	HL 3180				
---------	---------	---------	---------	--	--	--	--

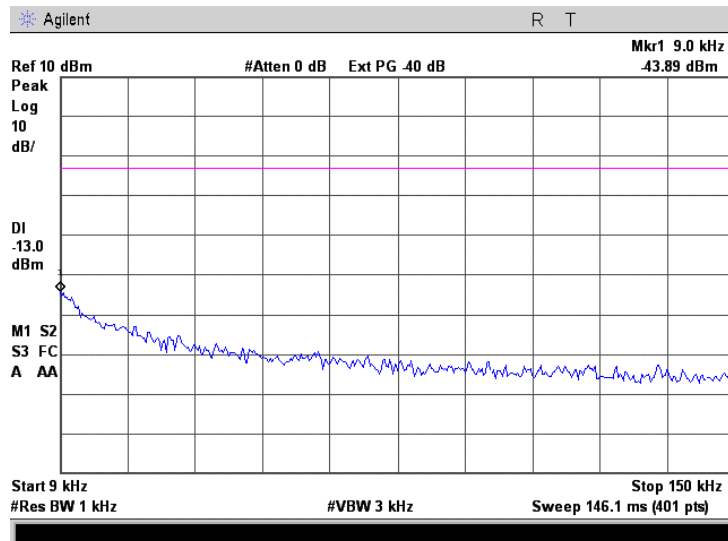
Full description is given in Appendix A.

<b>Test specification:</b>	<b>Section 27.53(g), Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:03:22 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

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

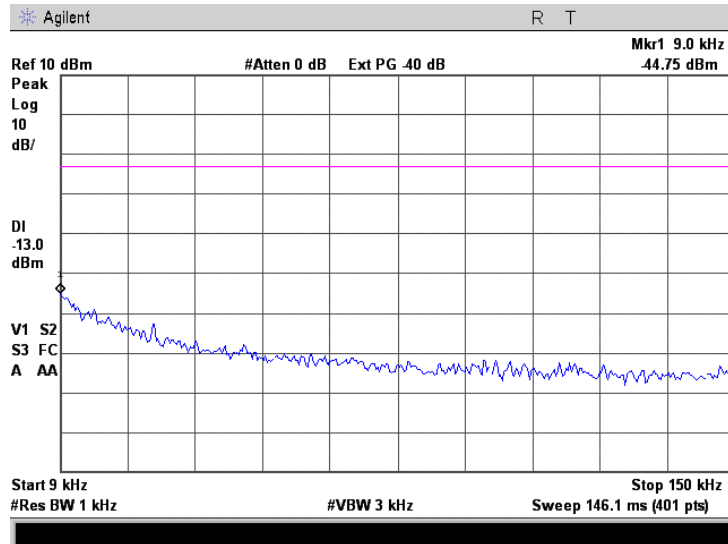


Plot 7.5.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency

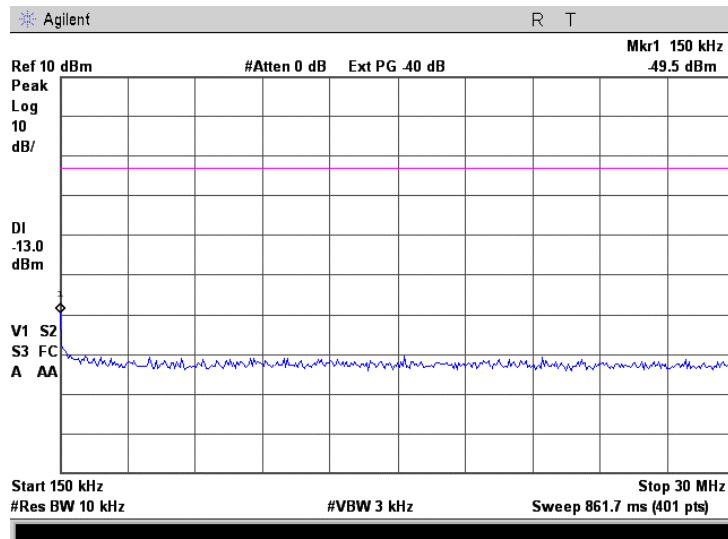


<b>Test specification:</b>	<b>Section 27.53(g), Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:03:22 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

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

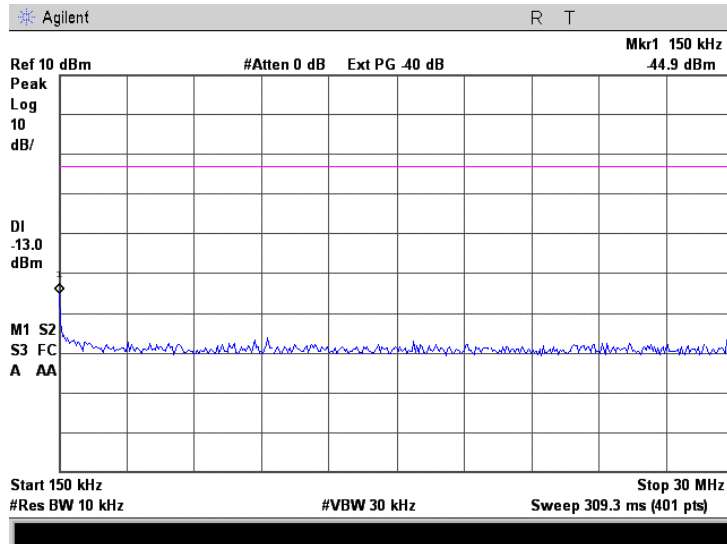


Plot 7.5.4 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

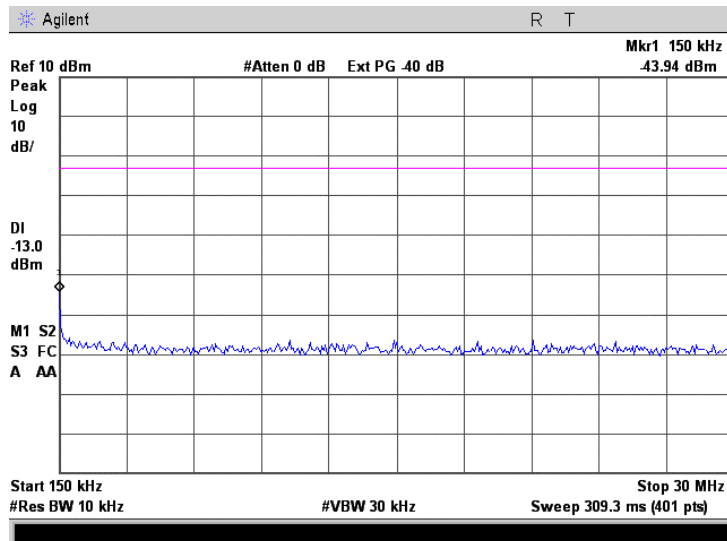


<b>Test specification:</b>	<b>Section 27.53(g), Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:03:22 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.5.5 Spurious emission measurements in 0.15 - 30.0 MHz range at mid carrier frequency

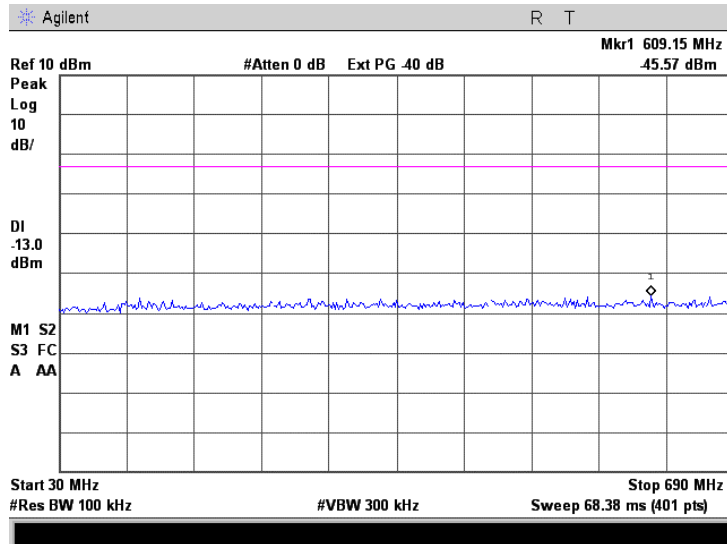


Plot 7.5.6 Spurious emission measurements in 0.15 - 30.0 MHz range at high carrier frequency

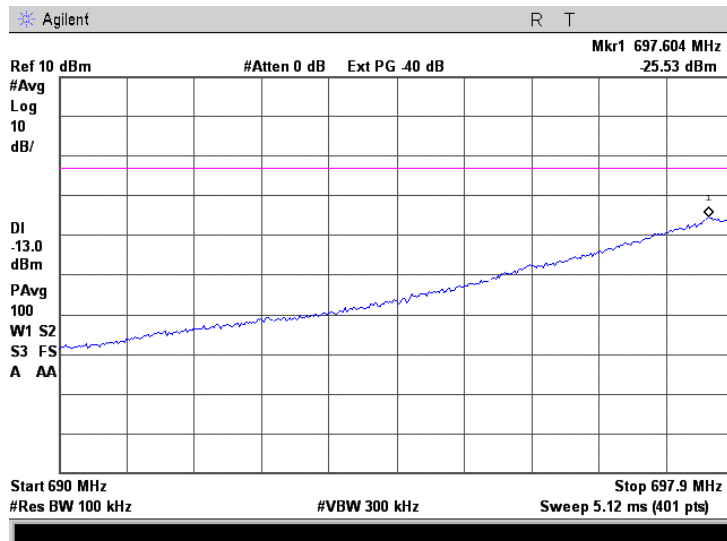


<b>Test specification:</b>	<b>Section 27.53(g), Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:03:22 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.5.7 Spurious emission measurements in 30.0 – 690.0 MHz range at low carrier frequency



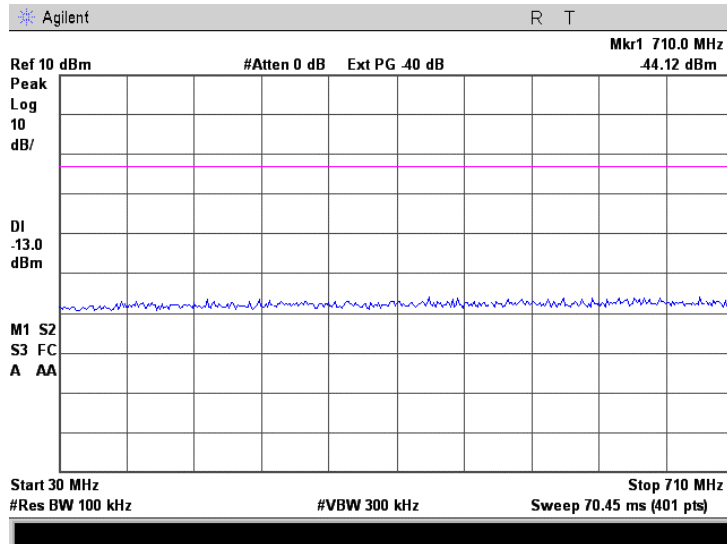
Plot 7.5.8 Spurious emission measurements in 690.0 – 697.9 MHz range at low carrier frequency



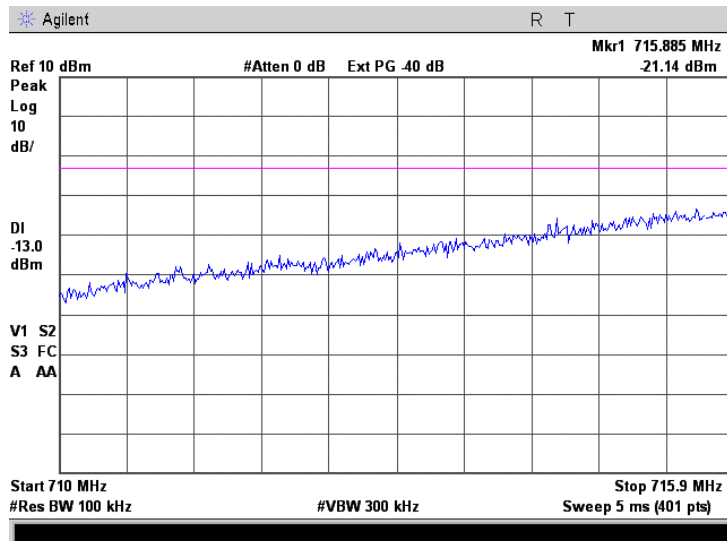
Power average at band edges

<b>Test specification:</b>	<b>Section 27.53(g), Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:03:22 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.5.9 Spurious emission measurements in 30 – 710.0 MHz range at mid carrier frequency

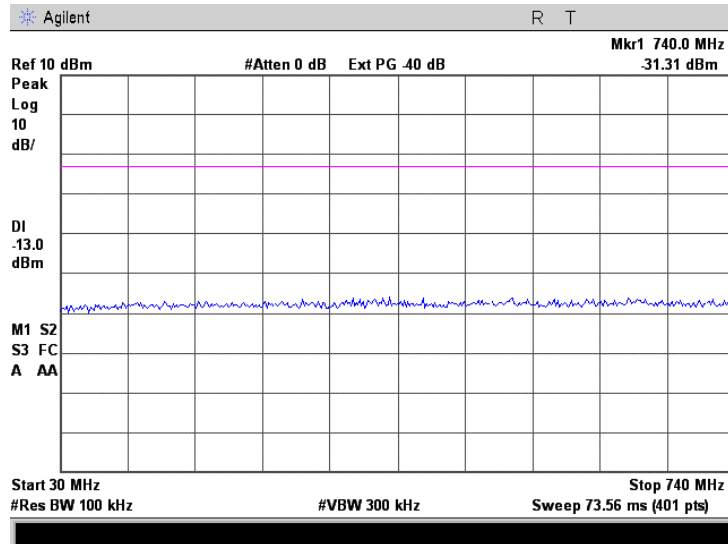


Plot 7.5.10 Spurious emission measurements in 710.0 – 715.9 MHz range at mid carrier frequency

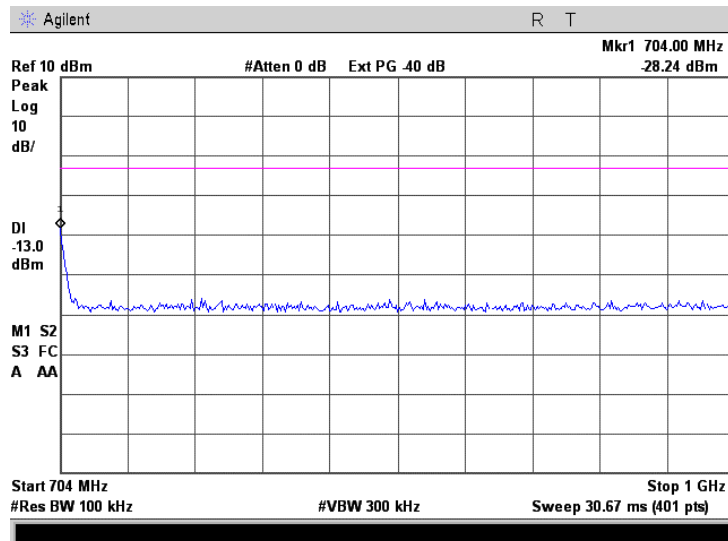


<b>Test specification:</b>	<b>Section 27.53(g), Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:03:22 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.5.11 Spurious emission measurements in 30.0 - 740 MHz range at high carrier frequency

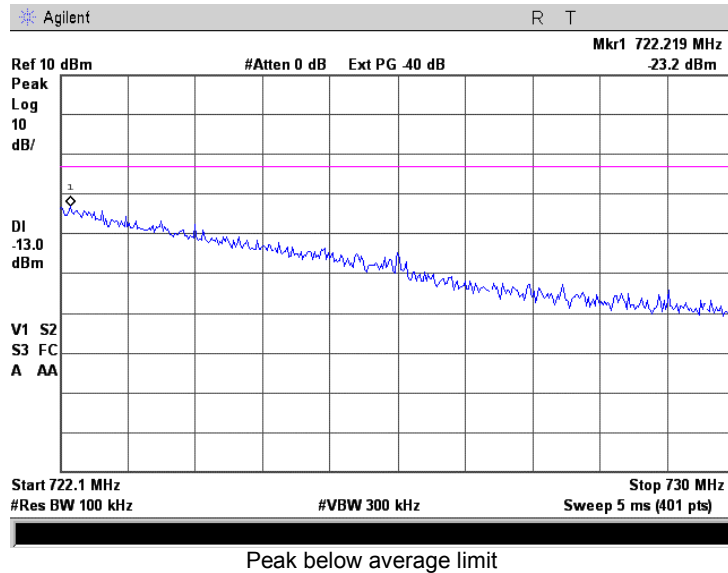


Plot 7.5.12 Spurious emission measurements in 704 - 1000 MHz range at low carrier frequency

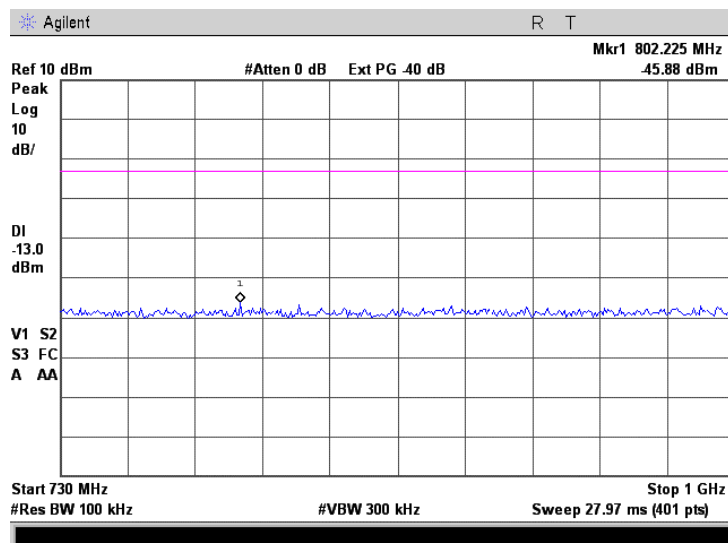


<b>Test specification:</b>	<b>Section 27.53(g), Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:03:22 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.5.13 Spurious emission measurements in 722.1 – 730.0 MHz at mid carrier frequency



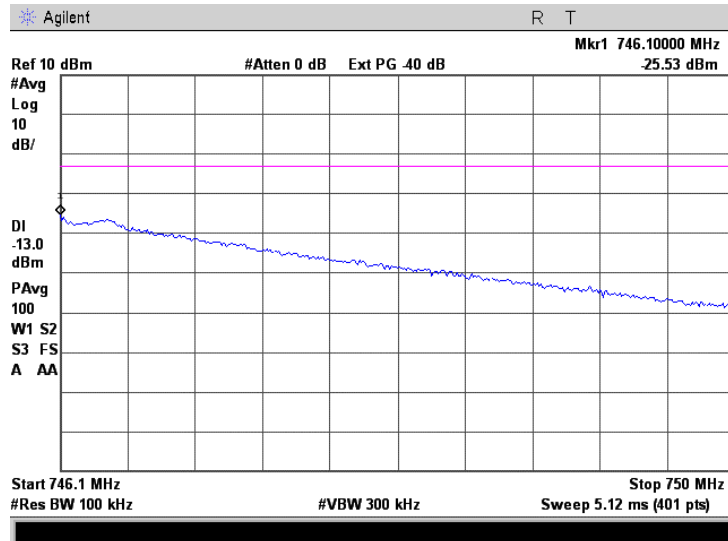
Plot 7.5.14 Spurious emission measurements in 730 - 1000 MHz at mid carrier frequency



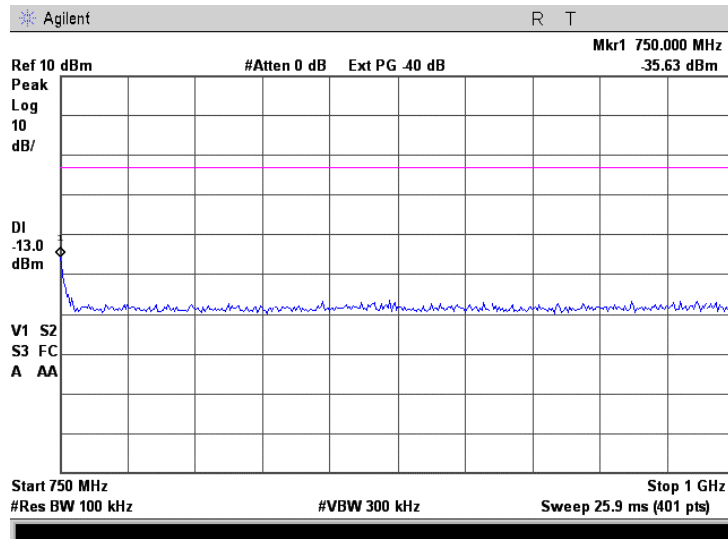


<b>Test specification:</b>	<b>Section 27.53(g), Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:03:22 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.5.15 Spurious emission measurements in 746.1 - 750 MHz at high carrier frequency

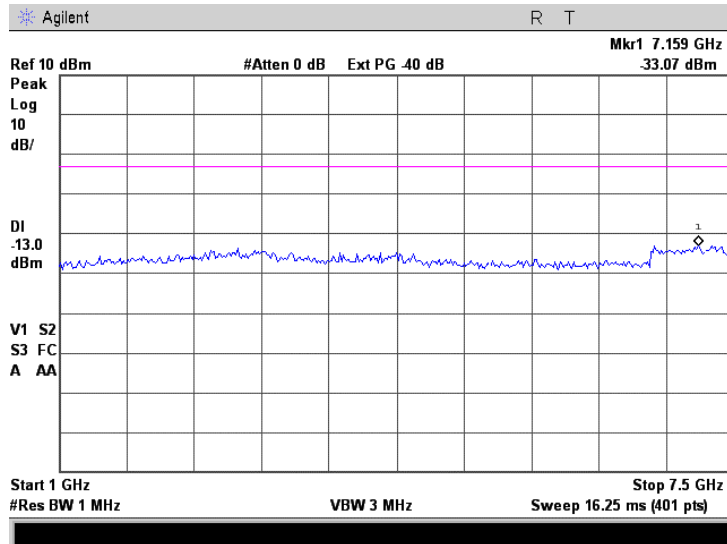


Plot 7.5.16 Spurious emission measurements in 750.0 - 1000 MHz at high carrier frequency

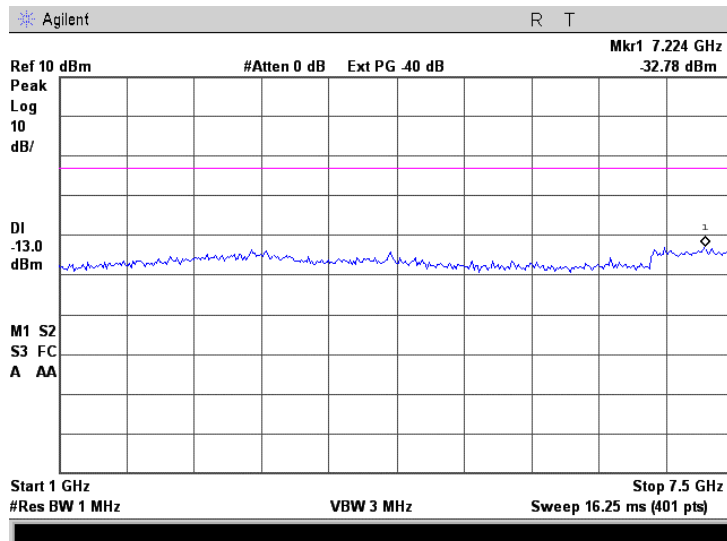


<b>Test specification:</b>	<b>Section 27.53(g), Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 6:03:22 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.5.17 Spurious emission measurements in 1000 - 7500 MHz range at low carrier frequency

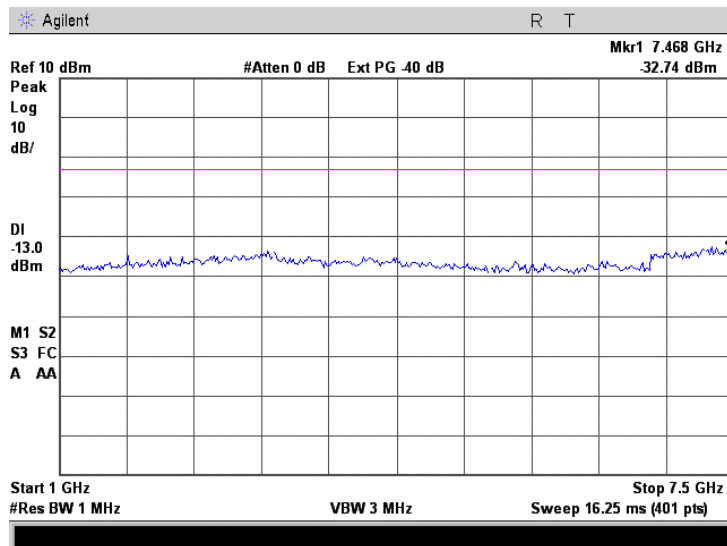


Plot 7.5.18 Spurious emission measurements in 1000 - 7500 MHz at mid carrier frequency



<b>Test specification:</b>	<b>Section 27.53(g), Conducted spurious emissions</b>		
<b>Test procedure:</b>	47 CFR, Sections 2.1051 and 27.53(f); TIA/EIA-603-C, Section 2.2.13		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 6:03:22 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Plot 7.5.19 Spurious emission measurements in 1000.0 – 7500.0 MHz at high carrier frequency



<b>Test specification:</b>		<b>Section 27.54, 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>	PASS
<b>Date &amp; Time:</b>	1/21/2009 5:48:03 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

## 7.6 Frequency stability test

### 7.6.1 General

This test was performed to measure frequency stability of transmitter RF carrier. Specification test limits are given in Table 7.6.1.

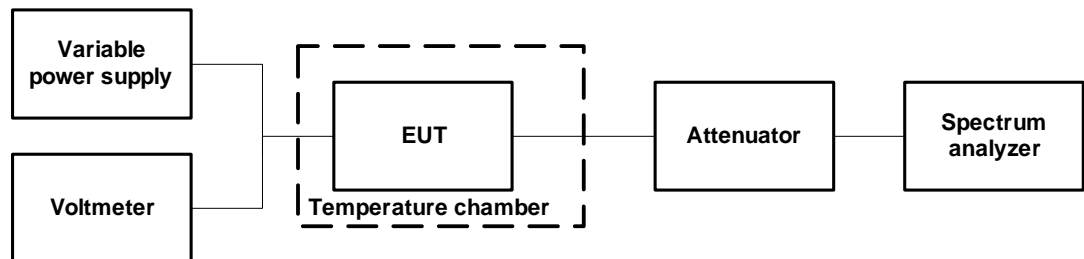
Table 7.6.1 Frequency stability limits

Assigned frequency, MHz	Maximum allowed frequency displacement Hz
698.0 – 746.0	The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation

### 7.6.2 Test procedure

- 7.6.2.1 The EUT was set up as shown in Figure 7.6.1, energized and its proper operation was checked.
- 7.6.2.2 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.
- 7.6.2.3 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.
- 7.6.2.4 The above procedure was repeated at 0°C and at the lowest test temperature.
- 7.6.2.5 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.
- 7.6.2.6 Frequency displacement was calculated and compared with the limit as provided in Table 7.6.2.

Figure 7.6.1 Frequency stability test setup





HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 27.54, 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 &amp; Time:</b>	1/21/2009 5:48:03 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Table 7.6.2 Frequency stability test results

OPERATING FREQUENCY: 698.0 – 746.0 MHz  
 NOMINAL POWER VOLTAGE: 120 VAC  
 TEMPERATURE STABILIZATION PERIOD: 20 min  
 POWER DURING TEMPERATURE TRANSITION: Off  
 SPECTRUM ANALYZER MODE: Peak Hold  
 RESOLUTION BANDWIDTH: 10 Hz  
 VIDEO BANDWIDTH: 30 Hz

T, °C	Voltage, V	Frequency, MHz							Max frequency drift Hz	
		Start up	1 <sup>st</sup> min	2 <sup>nd</sup> min	3 <sup>rd</sup> min	4 <sup>th</sup> min	5 <sup>th</sup> min	10 <sup>th</sup> min	Positive	Negative
<b>Low carrier frequency 699.50 MHz</b>										
-30	nominal	699.500383	699.500380	699.500380	699.500380	699.500381	699.500379	699.500379	453.00000	0.00
-20	nominal	699.500370	NA	NA	NA	NA	NA	699.500362	440.00000	0.00
-10	nominal	699.500275	NA	NA	NA	NA	NA	699.500268	345.00000	0.00
0	nominal	699.500097	699.500094	699.500091	699.500090	699.500089	699.500090	699.500089	167.00000	0.00
10	nominal	699.500143	NA	NA	NA	NA	NA	699.500143	213.00000	0.00
20	15%	699.499980	NA	NA	NA	NA	NA	699.499985	55.000000	0.00
20	nominal	699.499940	NA	NA	NA	NA	NA	699.499930	0.000000	-530.00
20	-15%	699.499908	NA	NA	NA	NA	NA	699.499910	0.000000	-22.00
30	nominal	699.499999	699.499998	699.499998	699.499998	699.499993	699.499995	699.499990	69.000000	0.00
40	nominal	699.500003	NA	NA	NA	NA	NA	699.500007	77.000000	0.00
50	nominal	699.500380	699.500062	699.500070	699.500073	699.500075	699.500077	699.500080	450.00000	0.00
<b>Mid carrier frequency 719.00 MHz</b>										
-30	nominal	719.000383	719.000392	719.000394	719.000392	719.000391	719.000392	719.000392	476.00	0.00
-20	nominal	719.000756	NA	NA	NA	NA	NA	719.000374	838.00	0.00
-10	nominal	719.000289	NA	NA	NA	NA	NA	719.000280	371.00	0.00
0	nominal	719.000092	719.000092	719.000094	719.000093	719.000092	719.000093	719.000093	176.00	0.00
10	nominal	719.000148	NA	NA	NA	NA	NA	719.000148	230.00	0.00
20	15%	718.999912	NA	NA	NA	NA	NA	718.999907	0.00	-11.00
20	nominal	718.999927	NA	NA	NA	NA	NA	718.999918	9.00	0.00
20	-15%	718.999965	NA	NA	NA	NA	NA	718.999907	47.00	-11.00
30	nominal	718.999992	718.999993	718.999992	718.999992	718.999990	718.999990	718.999992	75.00	0.00
40	nominal	718.999997	NA	NA	NA	NA	NA	719.000000	82.00	0.00
50	nominal	719.000085	719.000087	719.000088	719.000088	719.000090	719.000091	719.000091	173.00	0.00
<b>High carrier frequency 744.5 MHz</b>										
-30	nominal	744.500475	744.500423	744.500415	744.500415	744.500412	744.500413	744.500407	563.00	0.00
-20	nominal	744.500767	NA	NA	NA	NA	NA	744.500390	855.00	0.00
-10	nominal	744.500357	NA	NA	NA	NA	NA	744.500315	445.00	0.00
0	nominal	744.500096	744.500097	744.500096	744.500099	744.500097	744.500096	744.500097	187.00	0.00
10	nominal	744.500152	NA	NA	NA	NA	NA	744.500151	240.00	0.00
20	15%	744.499910	NA	NA	NA	NA	NA	744.499909	0.00	-3.00
20	nominal	744.499915	NA	NA	NA	NA	NA	744.499912	3.00	0.00
20	-15%	744.500039	NA	NA	NA	NA	NA	744.499903	127.00	-9.00
30	nominal	744.499994	744.499991	744.499991	744.499993	744.499990	744.499991	744.499991	82.00	0.00
40	nominal	744.499970	NA	NA	NA	NA	NA	744.499994	82.00	0.00
50	nominal	744.500093	744.500095	744.500097	744.500098	744.500098	744.500102	744.500099	190.00	0.00

\* - Reference frequency ??



HERMON LABORATORIES

<b>Test specification:</b> Section 27.54, Frequency stability	
<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> PASS
<b>Date &amp; Time:</b> 1/21/2009 5:48:03 PM	
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa
<b>Relative Humidity:</b> 45%	
<b>Power Supply:</b> 120 V AC	
<b>Remarks:</b>	

Table 7.6.3 Transmission occupied bandwidth with frequency drift test results

Lower measured* band edge, MHz	Upper measured* band edge, MHz	Lower calculated** band edge, MHz	Upper calculated** band edge, MHz	Lower specified band edge, MHz	Upper specified band edge, MHz	Lower Margin***, MHz	Upper Margin***, MHz	Verdict
<b>2.5 MHz BW</b>								
<b>BPSK</b>								
698.2775	700.7225	698.2770	700.7230	698.0000	704.0000	-0.2770	-3.2770	Pass
717.7400	720.2300	717.7400	720.2308	716.0000	722.0000	-1.7400	-1.7692	Pass
743.2250	745.7300	743.2250	745.7309	740.0000	746.0000	-3.2250	-0.2691	Pass
<b>64QAM</b>								
698.2925	700.7600	698.2920	700.7605	698.0000	704.0000	-0.2920	-3.2395	Pass
717.7625	720.2600	717.7625	720.2608	716.0000	722.0000	-1.7625	-1.7392	Pass
743.2700	745.7000	743.2700	745.7009	740.0000	746.0000	-3.2700	-0.2991	Pass
<b>5 MHz BW</b>								
<b>BPSK</b>								
698.6750	703.3250	698.6745	703.3255	698.0000	704.0000	-0.6745	-0.6745	Pass
716.6750	721.3100	716.6750	721.3108	716.0000	722.0000	-0.6750	-0.6892	Pass
740.6600	745.3250	740.6600	745.3259	740.0000	746.0000	-0.6600	-0.6741	Pass
<b>64QAM</b>								
698.6750	703.3400	698.6745	703.3405	698.0000	704.0000	-0.6745	-0.6595	Pass
716.6750	721.3250	716.6750	721.3258	716.0000	722.0000	-0.6750	-0.6742	Pass
740.6750	745.3250	740.6750	745.3259	740.0000	746.0000	-0.6750	-0.6741	Pass
<b>10 MHz BW</b>								
<b>QPSK</b>								
699.2700	708.9225	699.2695	708.9230	698.0000	710.0000	-1.2695	-1.0770	Pass
717.2150	726.7850	717.2150	726.7858	716.0000	728.0000	-1.2150	-1.2142	Pass
735.1600	744.8125	735.1600	744.8134	734.0000	746.0000	-1.1600	-1.1866	Pass
<b>64QAM</b>								
699.1875	708.9225	699.1870	708.9230	698.0000	710.0000	-1.1870	-1.0770	Pass
717.1600	726.8125	717.1600	726.8133	716.0000	728.0000	-1.1600	-1.1867	Pass
735.1050	744.8950	735.1050	744.8959	734.0000	746.0000	-1.1050	-1.1041	Pass

\* - measured under normal test conditions at 26 dBc points during the Occupied Bandwidth test

\*\* - Measured band edge with proper drift addition

\*\*\* - Margin = Calculated band edge – specified band edge

**Reference numbers of test equipment used**

HL 1194	HL 1424	HL 2867	HL 3210				
---------	---------	---------	---------	--	--	--	--

Full description is given in Appendix A.

<b>Test specification:</b>		<b>Section 15.107, Conducted emission at AC power port</b>	
<b>Test procedure:</b>		ANSI C63.4, Sections 11.5 and 12.1.3	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date &amp; Time:</b>	1/21/2009 5:48:26 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

## 8 Emissions tests according to 47CFR part 15 subpart B requirements

### 8.1 Conducted emissions

#### 8.1.1 General

This test was performed to measure common mode conducted emissions at the mains power port. Specification test limits are given in Table 8.1.1.

Table 8.1.1 Limits for conducted emissions

Frequency, MHz	Class B limit, dB(μV)		Class A limit, dB(μV)	
	QP	AVRG	QP	AVRG
0.15 - 0.5	66 - 56*	56 - 46*	79	66
0.5 - 5.0	56	46	73	60
5.0 - 30	60	50	73	60

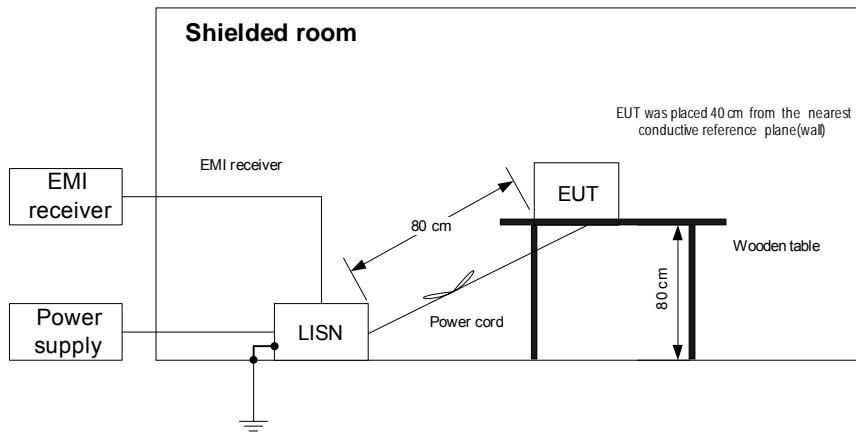
\* The limit decreases linearly with the logarithm of frequency.

#### 8.1.2 Test procedure

- 8.1.2.1 The EUT was set up as shown in Figure 8.1.1, energized and the performance check was conducted.
- 8.1.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer in the frequency range referred to in Table 8.1.2. Unused coaxial connector of the LISN was terminated with 50 Ohm. Quasi-peak and average detectors were used throughout the testing.
- 8.1.2.3 The position of the device cables was varied to determine maximum emission level.
- 8.1.2.4 The worst test results (the lowest margins) were recorded in Table 8.1.2 and shown in the associated plots.

<b>Test specification:</b> Section 15.107, Conducted emission at AC power port			
<b>Test procedure:</b> ANSI C63.4, Sections 11.5 and 12.1.3			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 1/21/2009 5:48:26 PM			
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Figure 8.1.1 Setup for conducted emission measurements, table-top equipment







HERMON LABORATORIES

<b>Test specification:</b>		<b>Section 15.107, Conducted emission at AC power port</b>	
<b>Test procedure:</b>		ANSI C63.4, Sections 11.5 and 12.1.3	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 5:48:26 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Table 8.1.2 Conducted emission test results

LINE: AC mains  
LIMIT: Class A  
EUT OPERATING MODE: Receive / Stand-by  
EUT SET UP: TABLE-TOP  
TEST SITE: SHIELDED ROOM  
DETECTORS USED: PEAK / QUASI-PEAK / AVERAGE  
FREQUENCY RANGE: 150 kHz - 30 MHz  
RESOLUTION BANDWIDTH: 9 kHz

Frequency, MHz	Peak emission, dB(μV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*	Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*		
0.156550	50.11	49.39	79.00	-29.61	49.00	66.00	-17.00	L1	Pass
0.208800	44.90	42.99	79.00	-36.01	42.86	66.00	-23.14		
0.261275	47.35	46.97	79.00	-32.03	46.94	66.00	-19.06		
0.418225	43.96	43.64	79.00	-35.36	43.60	66.00	-22.40		
0.679325	43.18	42.67	73.00	-30.33	42.43	60.00	-17.57		
0.732325	44.93	44.31	73.00	-28.69	44.17	60.00	-15.83		
0.993875	43.96	43.58	73.00	-29.42	43.49	60.00	-16.51		
0.156700	49.05	48.40	79.00	-30.60	47.98	66.00	-18.02	L2	Pass
0.208950	46.81	45.87	79.00	-33.13	45.84	66.00	-20.16		
0.261600	47.63	47.31	79.00	-31.69	47.32	66.00	-18.68		
0.418200	46.02	45.77	79.00	-33.23	45.75	66.00	-20.25		
0.679800	45.53	45.19	73.00	-27.81	45.07	60.00	-14.93		
0.732335	46.35	45.72	73.00	-27.28	45.44	60.00	-14.56		
0.993825	45.42	45.08	73.00	-27.92	45.02	60.00	-14.98		

\*- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

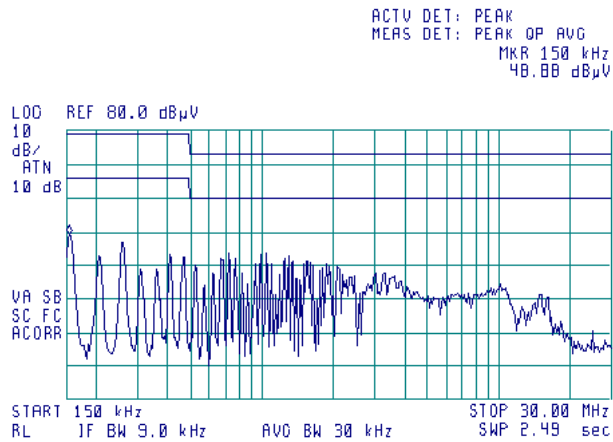
HL 0787	HL 1430	HL 1513	HL 2888	HL 3612			
---------	---------	---------	---------	---------	--	--	--

Full description is given in Appendix A.

<b>Test specification:</b> Section 15.107, Conducted emission at AC power port			
<b>Test procedure:</b> ANSI C63.4, Sections 11.5 and 12.1.3			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 1/21/2009 5:48:26 PM			
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

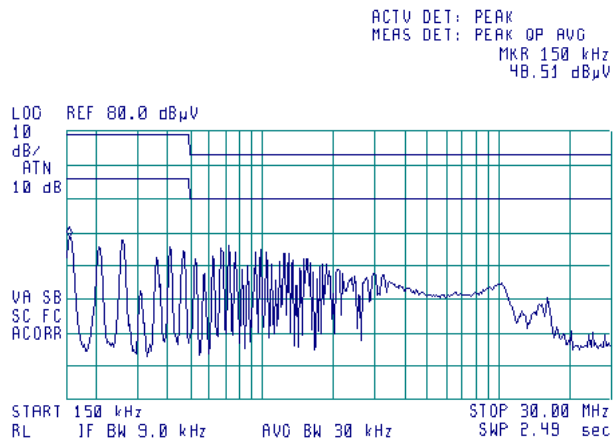
**Plot 8.1.1 Conducted emission measurements**

LINE: L1  
LIMIT: Class A  
EUT OPERATING MODE: Receive / Stand-by  
LIMIT: QUASI-PEAK, AVERAGE  
DETECTOR: PEAK



**Plot 8.1.2 Conducted emission measurements**

LINE: L2  
LIMIT: Class A  
EUT OPERATING MODE: Receive / Stand-by  
LIMIT: QUASI-PEAK, AVERAGE  
DETECTOR: PEAK



<b>Test specification:</b>		<b>Section 15.109, Radiated emission</b>	
<b>Test procedure:</b>		ANSI C63.4, Sections 11.6 and 12.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 5:49:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

## 8.2 Radiated emission measurements

### 8.2.1 General

This test was performed to measure radiated emissions from the EUT enclosure. Specification test limits are given in Table 8.2.1.

Table 8.2.1 Radiated emission test limits

Frequency, MHz	Class B limit, dB(μV/m)		Class A limit, dB(μV/m)	
	10 m distance	3 m distance	10 m distance	3 m distance
30 - 88	29.5*	40.0	39.0	49.5*
88 - 216	33.0*	43.5	43.5	54.0*
216 - 960	35.5*	46.0	46.4	56.9*
Above 960	43.5*	54.0	49.5	60.0*

\* The limit for test distance other than specified was calculated using the inverse linear distance extrapolation factor as follows:  $Lim_{S_2} = Lim_{S_1} + 20 \log(S_1/S_2)$ , where  $S_1$  and  $S_2$  – standard defined and test distance respectively in meters.

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

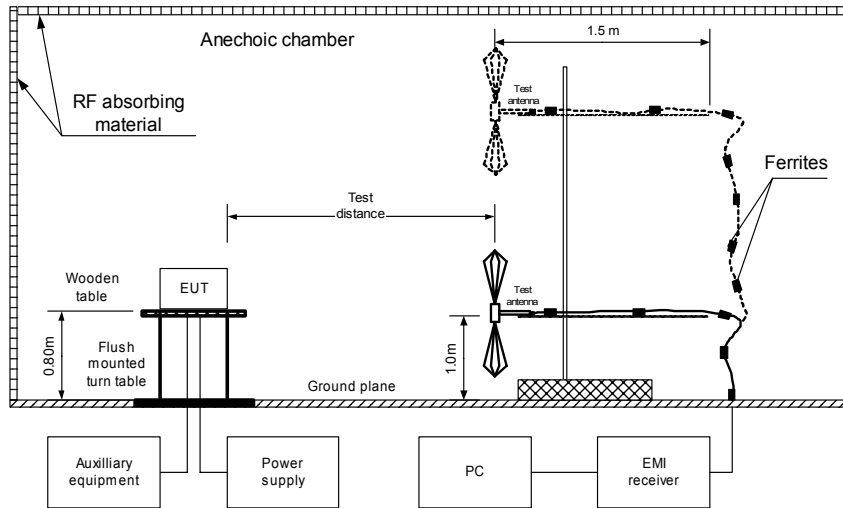
**8.2.2.1** The EUT was set up as shown in Figure 8.2.1, energized and the performance check was conducted.

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

**8.2.2.3** The worst test results (the lowest margins) were recorded in Table 8.2.2 and shown in the associated plots.

<b>Test specification:</b> Section 15.109, Radiated emission			
<b>Test procedure:</b> ANSI C63.4, Sections 11.6 and 12.1.4			
<b>Test mode:</b> Compliance		<b>Verdict:</b> PASS	
<b>Date &amp; Time:</b> 1/21/2009 5:49:00 PM			
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Figure 8.2.1 Setup for radiated emission measurements in anechoic chamber, table-top equipment





HERMON LABORATORIES

<b>Test specification:</b>		<b>Section 15.109, Radiated emission</b>	
<b>Test procedure:</b>		ANSI C63.4, Sections 11.6 and 12.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 5:49:00 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

Table 8.2.2 Radiated emission test results

EUT SET UP: TABLE-TOP  
LIMIT: Class A  
EUT OPERATING MODE: Receive / Stand-by  
TEST SITE: SEMI ANECHOIC CHAMBER  
TEST DISTANCE: 3 m  
DETECTORS USED: PEAK / QUASI-PEAK  
FREQUENCY RANGE: 30 MHz – 1000 MHz  
RESOLUTION BANDWIDTH: 120 kHz

Frequency, MHz	Peak emission, dB(µV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
299.990	39.6	38.8	56.9	-18.10	V	1.5	120	Pass
499.983	42.7	41.9	56.9	-15.00	V	1.3	090	
899.979	47.6	46.9	56.9	-10.00	V	1.4	000	

TEST SITE: SEMI ANECHOIC CHAMBER  
TEST DISTANCE: 3 m  
DETECTORS USED: PEAK / AVERAGE  
FREQUENCY RANGE: 1000 MHz – 4000 MHz  
RESOLUTION BANDWIDTH: 1000 kHz

Frequency, MHz	Peak emission, dB(µV/m)	Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
1500.050	43.6	36.4	60.0	-23.6	V	1.4	340	Pass

\*- Margin = Measured emission - specification limit.  
\*\*- EUT front panel refer to 0 degrees position of turntable.

Reference numbers of test equipment used

HL 0521	HL 0604	HL 2432	HL 3121	HL 3123			
---------	---------	---------	---------	---------	--	--	--

Full description is given in Appendix A.

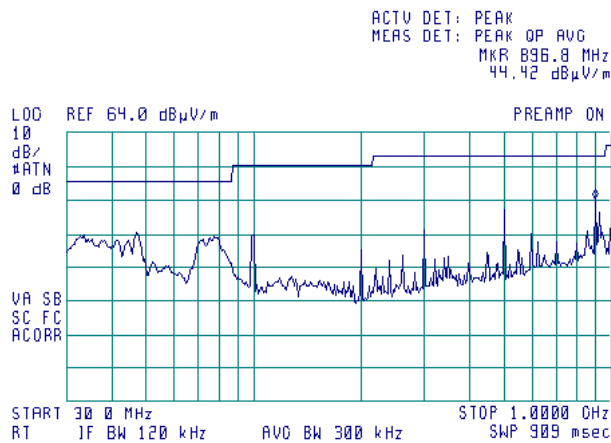


HERMON LABORATORIES

<b>Test specification:</b> Section 15.109, Radiated emission			
<b>Test procedure:</b> ANSI C63.4, Sections 11.6 and 12.1.4			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 1/21/2009 5:49:00 PM			
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

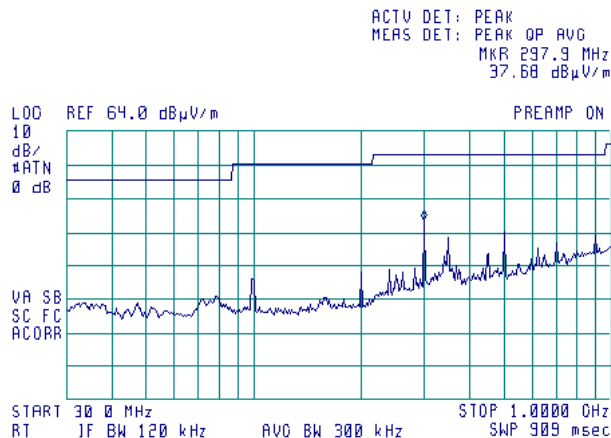
**Plot 8.2.1 Radiated emission measurements in 30 - 1000 MHz range, vertical antenna polarization**

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



**Plot 8.2.2 Radiated emission measurements in 30 - 1000 MHz range, horizontal antenna polarization**

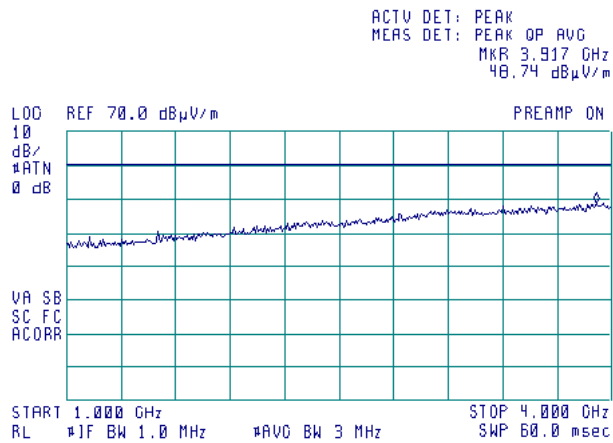
TEST SITE: Semi anechoic chamber  
LIMIT: Class A  
TEST DISTANCE: 3 m  
EUT OPERATING MODE: Receive / Stand-by



<b>Test specification:</b> Section 15.109, Radiated emission			
<b>Test procedure:</b> ANSI C63.4, Sections 11.6 and 12.1.4			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 1/21/2009 5:49:00 PM			
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

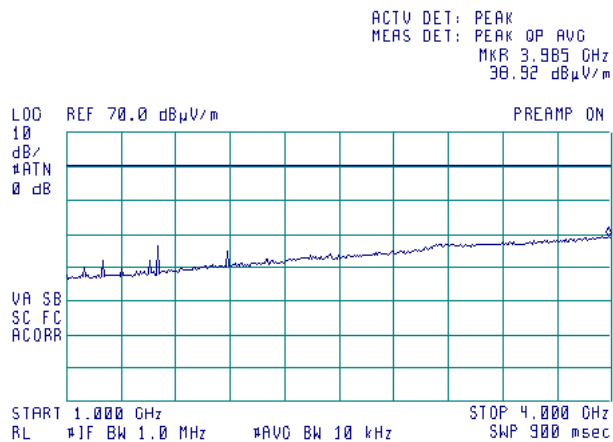
**Plot 8.2.3 Radiated emission measurements above 1000 MHz, vertical antenna polarization**

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



**Plot 8.2.4 Radiated emission measurements above 1000 MHz, vertical antenna polarization**

TEST SITE: Semi anechoic chamber  
LIMIT: Class A  
TEST DISTANCE: 3 m  
EUT OPERATING MODE: Receive / Stand-by  
VBW: 10 kHz



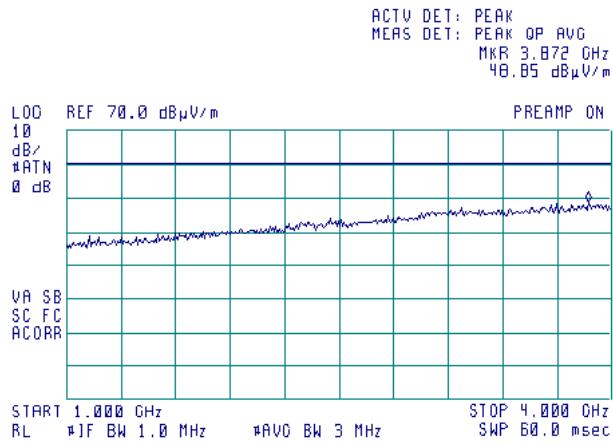


HERMON LABORATORIES

<b>Test specification:</b> Section 15.109, Radiated emission			
<b>Test procedure:</b> ANSI C63.4, Sections 11.6 and 12.1.4			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date &amp; Time:</b> 1/21/2009 5:49:00 PM			
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

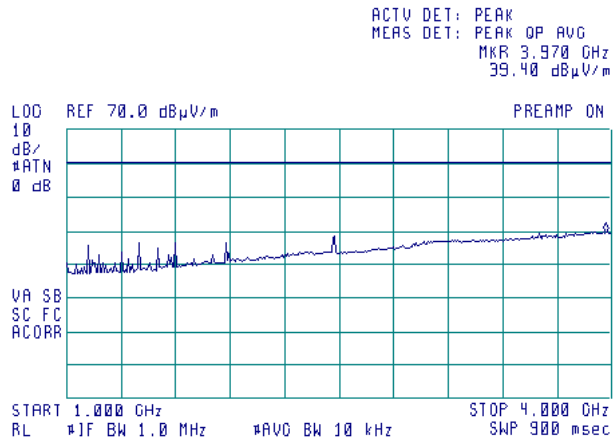
Plot 8.2.5 Radiated emission measurements above 1000 MHz, horizontal antenna polarization

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



Plot 8.2.6 Radiated emission measurements above 1000 MHz, horizontal antenna polarization

TEST SITE: Semi anechoic chamber  
LIMIT: Class A  
TEST DISTANCE: 3 m  
EUT OPERATING MODE: Receive / Stand-by  
VBW: 10 kHz





<b>Test specification:</b>	<b>Section 15.111, Conducted emission at receiver antenna port</b>		
<b>Test procedure:</b>	ANSI C63.4, Section 12.1.5		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	1/21/2009 5:49:25 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

### 8.3 Spurious emissions at receiver RF antenna connector

#### 8.3.1 General

This test was performed to measure spurious emissions at RF antenna connector of receiver operated within 30 to 960 MHz band or a citizens band (CB) receiver which was tested for compliance with radiated emission limits with the antenna port connected to resistive termination. Specification test limits are given in Table 8.3.1.

**Table 8.3.1 Spurious emission limits**

Frequency, MHz	EUT type	Power of spurious	
		nW	dBm
25 MHz – 5 <sup>th</sup> harmonic*	Citizens band (CB) receiver	2.0	-57.0
30 MHz – 2 <sup>nd</sup> harmonic**	Superheterodyne receiver		
30 MHz – 5 <sup>th</sup> harmonic*	Other receiver operates within 30 – 960 MHz		

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

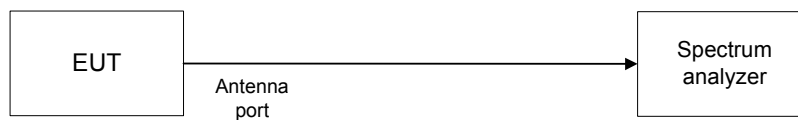
\*\* - harmonic of the local oscillator frequency.

#### 8.3.2 Test procedure

**8.3.2.1** The EUT was set up as shown in Figure 8.3.1, energized and its proper operation was checked.

**8.3.2.2** The spurious emission was measured with spectrum analyzer as provided in Table 8.3.2 and associated plots.

**Figure 8.3.1 Spurious emission test setup**



<b>Test specification:</b>	<b>Section 15.111, Conducted emission at receiver antenna port</b>		
<b>Test procedure:</b>	ANSI C63.4, Section 12.1.5		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 5:49:25 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

**Table 8.3.2 Spurious emission test results**

INVESTIGATED FREQUENCY RANGE: 30.0 – 4000.0 MHz  
 EUT OPERATING MODE: Receive  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 100 kHz (30 MHz – 1000 MHz);  
 1000 kHz (1000 MHz – 4000 MHz)  
 VIDEO BANDWIDTH: 300 kHz (30 MHz – 1000 MHz);  
 3000 kHz (1000 MHz – 4000 MHz)

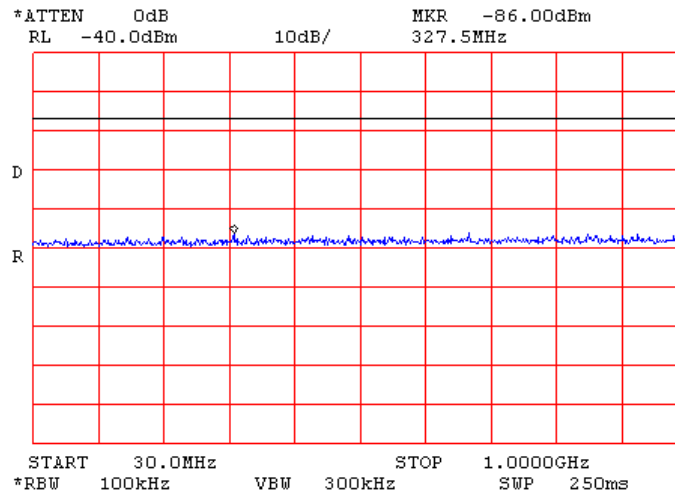
Frequency, MHz	Spurious emission, dBm	Limit, dBm	Margin, dB	Verdict
No emissions were found		-57.0	NA	Pass

**Reference numbers of test equipment used**

HL 1424	HL 2867					
---------	---------	--	--	--	--	--

Full description is given in Appendix A.

**Plot 8.3.1 Spurious emission test results 30 – 1000 MHz**

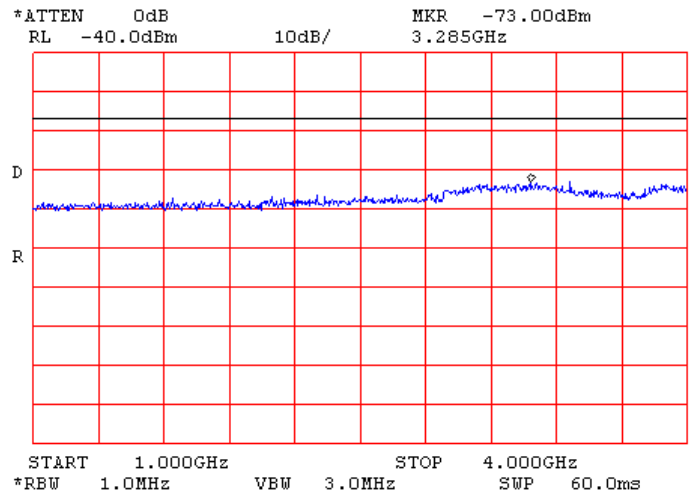




HERMON LABORATORIES

<b>Test specification:</b>	<b>Section 15.111, Conducted emission at receiver antenna port</b>		
<b>Test procedure:</b>	ANSI C63.4, Section 12.1.5		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date &amp; Time:</b>	1/21/2009 5:49:25 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1008hPa	<b>Relative Humidity:</b> 45%	<b>Power Supply:</b> 120 V AC
<b>Remarks:</b>			

**Plot 8.3.2 Spurious emission test results 1000 – 4000 MHz**



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

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	29-Jun-08	29-Jun-09
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard Co	8546A	3617A 00319, 3448A002 53	29-Aug-08	29-Aug-09
0554	Amplifier, 2-18 GHz RF	Miteq	AFD4	104300	28-Feb-08	28-Feb-09
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	11-Jan-09	11-Jan-10
0661	Generator Swept Signal, 10 MHz to 40 GHz, + 10 dBm	HP	83640B	3614A002 66	17-Sep-08	17-Sep-09
0787	Transient Limiter 9 kHz-200 MHz	Hewlett Packard Co	11947A	3107A018 77	16-Oct-08	16-Oct-09
1194	Variac, 220 V/ 2.5 A	Matsunaga		2962	06-Jan-08	06-Jan-09
1424	Spectrum Analyzer, 30 Hz- 40 GHz	Agilent Technologies	8564EC	3946A002 19	30-Dec-08	30-Dec-09
1430	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1431, HL1432	Agilent Technologies	8542E	3807A002 62,3705A0 0217	31-Aug-08	31-Aug-09
1513	Cable RF, 8 m, BNC/BNC	Belden	M17/167 MIL-C-17	1513	03-Sep-08	03-Sep-09
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W	EMC Test Systems	3115	9911-5964	23-Jan-09	23-Jan-10
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	23-Jan-09	23-Jan-10
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY451024 6	11-Jun-07	11-Jun-09
2867	Cable, 18 GHz, 0.9 m, SMA - SMA, Right Angle	Gore	NA	91P72076	11-Feb-08	11-Feb-09
2888	LISN Two-line V-Network 50 Ohm / 50 uH + 5 Ohm, 16A, MIL STD 461E, CISPR 16-1	Rolf Heine	NNB- 2/16Z	02/10018	09-Jul-08	09-Jul-09
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY414447 62	07-May-07	07-May-09
2911	Cable 18 GHz, 1.5 m, SMA-SMA	Gore	NA	89386	05-Oct-08	05-Oct-09
3121	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155- 00	3121	07-Dec-08	07-Dec-09
3123	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155- 00	3123	30-Dec-08	30-Dec-09
3179	Attenuator, N-type, 20 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW- N20W5+	0651	07-May-08	07-May-09
3180	Attenuator, N-type, 20 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW- N20W5+	0651	07-May-08	07-May-09
3181	Attenuator, N-type, 20 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW- N20W5+	0651	30-Dec-08	30-Dec-09
3207	Cable 40 GHz, 1.2 m	Gore	GOR245	05118337	10-Jun-08	10-Jun-09
3210	Temperature Chamber, (-50...+100) °C	Associated	NA	NA	11-Sep-08	11-Sep-09



HERMON LABORATORIES

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
3439	Precision Fixed Attenuator, 50 Ohm, 5 W, 20 dB, DC to 18 GHz	Mini-Circuits	BW-S20W5+	NA	09-Mar-08	09-Mar-09
3441	Precision Fixed Attenuator, 50 Ohm, 5 W, 20 dB, DC to 18 GHz	Mini-Circuits	BW-S20W5+	NA	09-Mar-08	09-Mar-09
3612	Cable RF, 17.5 m, N type-N type	Teldor	RG-214/U	NA	17-Nov-08	17-Nov-09
3616	Cable RF, 6.5 m, N type-N type, DC-6.5 GHz	Suhner Switzerland	Rg 214/U	NA	07-Dec-08	07-Dec-09

## 10 APPENDIX B Measurement uncertainties

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

Test description	Expanded uncertainty
<b>Transmitter tests</b>	
Carrier power conducted at antenna connector	± 1.7 dB
Carrier power radiated (substitution method)	± 4.5 dB
Occupied bandwidth	±8%
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB 2.9 GHz to 6.46 GHz: ± 3.5 dB 6.46 GHz to 13.2 GHz: ± 4.3 dB 13.2 GHz to 22.0 GHz: ± 5.0 dB 22.0 GHz to 26.8 GHz: ± 5.5 dB 26.8 GHz to 40.0 GHz: ± 4.8 dB
Spurious emissions radiated 30 MHz – 40 GHz (substitution method)	± 4.5 dB
Frequency error	30 – 300 MHz: ± 50.5 Hz (1.68 ppm) 300 – 1000 MHz: ± 168 Hz (0.56 ppm)
Transient frequency behaviour	187 Hz ± 13.9 %
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %
<b>Unintentional radiator tests</b>	
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB 150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 3 m measuring distance Horizontal polarization	Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB
Vertical polarization	Biconilog antenna: ± 6.0 dB Biconical antenna: ± 5.7 dB Log periodic antenna: ± 6.0 dB Double ridged horn antenna: ± 6.0 dB

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.

## 11 APPENDIX C Test laboratory description

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

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.

## 12 APPENDIX D Specification references

FCC 47CFR part 27: 2008	Miscellaneous wireless communications services
FCC 47CFR part 1: 2008	Practice and procedure
FCC 47CFR part 2: 2008	Frequency allocations and radio treaty matters; general rules and regulations
FCC 47CFR part 15: 2008	Radio Frequency Devices
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4: 2005	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

### 13 APPENDIX E Test equipment correction factors

**Antenna Factor**  
**Active Loop Antenna**  
EMC Test Systems, model 6502, S/N 2857, HL 0446

Frequency, MHz	Magnetic Antenna Factor, dB(S/m)	Electric Antenna Factor, dB(1/m)
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	9.7
0.750	-41.9	9.6
1.000	-41.4	10.1
2.000	-41.5	10.0
3.000	-41.4	10.1
4.000	-41.4	10.1
5.000	-41.5	10.0
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(S/m) is to be added to receiver meter reading in dB( $\mu$ V) to convert it into field intensity in dB( $\mu$ A/m).  
Antenna factor in dB(1/m) is to be added to receiver meter reading in dB( $\mu$ V) to convert it into field intensity in dB( $\mu$ V/m).



**Antenna factor**  
**Biconilog antenna EMCO, model 3141, serial number 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	560	19.8	1300	27.0
28	7.8	580	20.6	1320	27.8
30	7.8	600	21.3	1340	28.3
40	7.2	620	21.5	1360	28.2
60	7.1	640	21.2	1380	27.9
70	8.5	660	21.4	1400	27.9
80	9.4	680	21.9	1420	27.9
90	9.8	700	22.2	1440	27.8
100	9.7	720	22.2	1460	27.8
110	9.3	740	22.1	1480	28.0
120	8.8	760	22.3	1500	28.5
130	8.7	780	22.6	1520	28.9
140	9.2	800	22.7	1540	29.6
150	9.8	820	22.9	1560	29.8
160	10.2	840	23.1	1580	29.6
170	10.4	860	23.4	1600	29.5
180	10.4	880	23.8	1620	29.3
190	10.3	900	24.1	1640	29.2
200	10.6	920	24.1	1660	29.4
220	11.6	940	24.0	1680	29.6
240	12.4	960	24.1	1700	29.8
260	12.8	980	24.5	1720	30.3
280	13.7	1000	24.9	1740	30.8
300	14.7	1020	25.0	1760	31.1
320	15.2	1040	25.2	1780	31.0
340	15.4	1060	25.4	1800	30.9
360	16.1	1080	25.6	1820	30.7
380	16.4	1100	25.7	1840	30.6
400	16.6	1120	26.0	1860	30.6
420	16.7	1140	26.4	1880	30.6
440	17.0	1160	27.0	1900	30.6
460	17.7	1180	27.0	1920	30.7
480	18.1	1200	26.7	1940	30.9
500	18.5	1220	26.5	1960	31.2
520	19.1	1240	26.5	1980	31.6
540	19.5	1260	26.5	2000	32.0
		1280	26.6		

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

**Antenna factor  
Double-ridged wave guide horn antenna  
Model 3115, S/N 9911-5964, HL 1984**

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 intensity in dB( $\mu$ V/m).

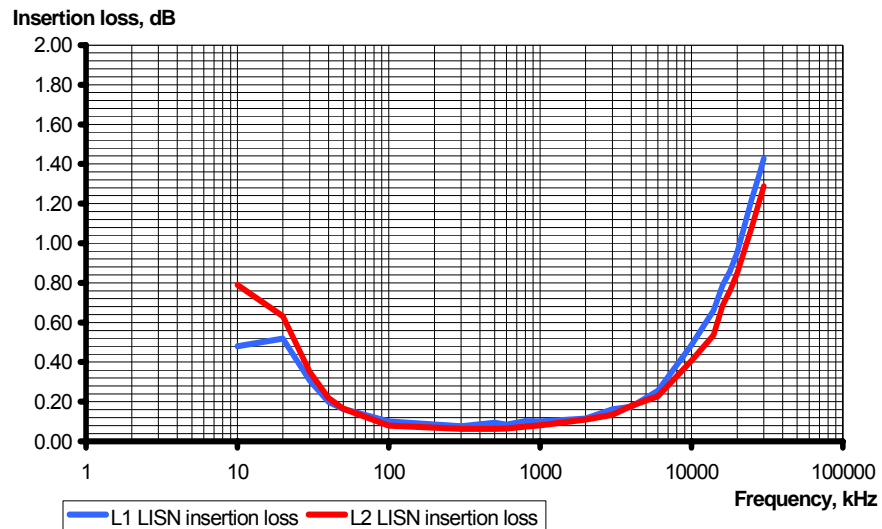
**Antenna factor  
Double-ridged guide horn antenna  
Model 3115, serial number: 00027177, HL 2432**

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

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

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

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



**Cable loss**  
Cable coaxial, Gore, 18 GHz, 0.9 m, SMA - SMA, model Right Angle, S/N 91P72076  
HL 2867

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.06	5750	0.68	12000	1.06
30	0.04	6000	0.69	12250	1.07
100	0.07	6250	0.70	12500	1.09
250	0.14	6500	0.73	12750	1.09
500	0.19	6750	0.74	13000	1.15
750	0.22	7000	0.78	13250	1.17
1000	0.26	7250	0.77	13500	1.16
1250	0.27	7500	0.79	13750	1.17
1500	0.31	7750	0.81	14000	1.14
1750	0.35	8000	0.86	14250	1.13
2000	0.38	8250	0.86	14500	1.06
2250	0.41	8500	0.87	14750	1.12
2500	0.43	8750	0.87	15000	1.16
2750	0.46	9000	0.88	15250	1.11
3000	0.48	9250	0.89	15500	1.06
3250	0.51	9500	0.90	15750	1.12
3500	0.53	9750	0.94	16000	1.20
3750	0.55	10000	1.00	16250	1.25
4000	0.56	10250	1.01	16500	1.24
4250	0.58	10500	1.02	16750	1.34
4500	0.60	10750	1.01	17000	1.35
4750	0.62	11000	1.01	17250	1.35
5000	0.64	11250	1.01	17500	1.36
5250	0.67	11500	1.01	17750	1.40
5500	0.68	11750	1.05	18000	1.51

**Cable loss**  
Cable coaxial, Gore, 18 GHz, 1.5 m, SMA-SMA, S/N 89386  
HL 2911

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.06	5750	1.32	12000	2.04
30	0.09	6000	1.34	12250	2.04
100	0.16	6250	1.41	12500	2.07
250	0.27	6500	1.43	12750	1.96
500	0.38	6750	1.46	13000	1.97
750	0.49	7000	1.49	13250	2.01
1000	0.55	7250	1.52	13500	2.04
1250	0.62	7500	1.56	13750	2.12
1500	0.68	7750	1.66	14000	2.16
1750	0.74	8000	1.69	14250	2.16
2000	0.78	8250	1.78	14500	2.28
2250	0.83	8500	1.73	14750	2.26
2500	0.88	8750	1.71	15000	2.22
2750	0.97	9000	1.72	15250	2.34
3000	1.00	9250	1.74	15500	2.41
3250	1.03	9500	1.76	15750	2.45
3500	1.05	9750	1.80	16000	2.57
3750	1.09	10000	1.89	16250	2.54
4000	1.14	10250	1.94	16500	2.55
4250	1.17	10500	1.99	16750	2.52
4500	1.21	10750	1.92	17000	2.42
4750	1.22	11000	1.96	17250	2.49
5000	1.24	11250	1.97	17500	2.62
5250	1.28	11500	2.02	17750	2.70
5500	1.30	11750	2.07	18000	2.76

**Cable loss**  
**Microwave Cable Assembly, 18 GHz, 6.4 m, SMA – SMA, Huber-Suhner, model 198-9155-00**  
**HL 3121**

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.08	3600	2.10	7400	3.08	11200	3.85	15100	4.58
30	0.18	3700	2.14	7500	3.11	11300	3.85	15200	4.60
50	0.26	3800	2.18	7600	3.14	11400	3.86	15300	4.63
100	0.34	3900	2.19	7700	3.16	11500	3.86	15400	4.65
200	0.47	4000	2.25	7800	3.18	11600	3.87	15500	4.71
300	0.59	4100	2.25	7900	3.20	11700	3.85	15600	4.70
400	0.66	4200	2.28	8000	3.22	11800	3.96	15700	4.69
500	0.75	4300	2.35	8100	3.26	11900	3.92	15800	4.71
600	0.83	4400	2.35	8200	3.27	12000	3.92	15900	4.74
700	0.90	4500	2.38	8300	3.29	12100	3.94	16000	4.69
800	0.96	4600	2.43	8400	3.30	12200	3.94	16100	4.72
900	1.02	4700	2.43	8500	3.31	12300	3.99	16200	4.71
1000	1.07	4800	2.45	8600	3.33	12400	4.02	16300	4.74
1100	1.12	4900	2.48	8700	3.35	12500	4.10	16400	4.74
1200	1.15	5000	2.55	8800	3.36	12600	4.09	16500	4.75
1300	1.22	5100	2.54	8900	3.38	12700	4.15	16600	4.78
1400	1.28	5200	2.56	9000	3.40	12800	4.15	16700	4.86
1500	1.29	5300	2.58	9100	3.41	12900	4.08	16800	4.84
1600	1.36	5400	2.61	9200	3.45	13000	4.21	16900	4.83
1700	1.40	5500	2.64	9300	3.48	13100	4.19	17000	4.86
1800	1.45	5600	2.69	9400	3.52	13200	4.29	17100	4.83
1900	1.51	5700	2.67	9500	3.54	13300	4.24	17200	4.90
2000	1.50	5800	2.71	9600	3.59	13400	4.26	17300	4.91
2100	1.56	5900	2.73	9700	3.59	13500	4.26	17400	4.94
2200	1.59	6000	2.75	9800	3.62	13600	4.29	17500	4.93
2300	1.63	6100	2.81	9900	3.70	13700	4.35	17600	4.93
2400	1.73	6200	2.80	10000	3.70	13800	4.31	17700	5.00
2500	1.73	6300	2.82	10100	3.72	13900	4.29	17800	5.01
2600	1.78	6400	2.85	10200	3.73	14000	4.32	17900	5.00
2700	1.84	6500	2.87	10300	3.75	14100	4.33	18000	5.00
2800	1.84	6600	2.90	10400	3.76	14200	4.34		
2900	1.91	6700	2.91	10500	3.77	14300	4.36		
3000	1.91	6800	2.94	10600	3.79	14400	4.38		
3100	1.97	6900	2.96	10700	3.80	14600	4.42		
3200	1.98	7000	2.98	10800	3.81	14700	4.42		
3300	2.04	7100	3.01	10900	3.81	14800	4.55		
3400	2.04	7200	3.02	11000	3.83	14900	4.55		
3500	2.10	7300	3.04	11100	3.84	15000	4.55		

**Cable loss**  
**Microwave Cable Assembly, 18 GHz, 6.4 m, SMA – SMA, Huber-Suhner, model 198-9155-00**  
**HL 3123**

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.11	3600	1.97	7400	3.12	11200	3.90	15100	4.74
30	0.17	3700	1.97	7500	3.13	11300	3.93	15200	4.70
50	0.25	3800	2.03	7600	3.16	11400	3.88	15300	4.73
100	0.32	3900	2.04	7700	3.18	11500	3.87	15400	4.78
200	0.46	4000	2.10	7800	3.20	11600	3.90	15500	4.75
300	0.58	4100	1.97	7900	3.23	11700	3.86	15600	4.76
400	0.65	4200	1.97	8000	3.25	11800	3.88	15700	4.75
500	0.74	4300	2.03	8100	3.26	11900	3.86	15800	4.78
600	0.82	4400	2.04	8200	3.28	12000	3.89	15900	4.79
700	0.89	4500	2.10	8300	3.31	12100	3.94	16000	4.73
800	0.95	4600	1.97	8400	3.31	12200	3.92	16100	4.78
900	1.01	4700	1.97	8500	3.32	12300	3.96	16200	4.84
1000	1.07	4800	2.03	8600	3.34	12400	4.01	16300	4.90
1100	1.11	4900	2.04	8700	3.35	12500	4.07	16400	4.87
1200	1.17	5000	2.10	8800	3.37	12600	4.08	16500	4.90
1300	1.22	5100	2.53	8900	3.39	12700	4.17	16600	4.98
1400	1.27	5200	2.55	9000	3.42	12800	4.26	16700	5.05
1500	1.29	5300	2.60	9100	3.43	12900	4.16	16800	5.04
1600	1.35	5400	2.61	9200	3.51	13000	4.21	16900	5.02
1700	1.40	5500	2.64	9300	3.52	13100	4.24	17000	5.09
1800	1.44	5600	2.70	9400	3.54	13200	4.27	17100	5.07
1900	1.51	5700	2.67	9500	3.63	13300	4.31	17200	5.10
2000	1.49	5800	2.71	9600	3.61	13400	4.33	17300	5.13
2100	1.55	5900	2.74	9700	3.71	13500	4.25	17400	5.23
2200	1.58	6000	2.80	9800	3.66	13600	4.27	17500	5.21
2300	1.62	6100	2.79	9900	3.77	13700	4.33	17600	5.22
2400	1.72	6200	2.81	10000	3.75	13800	4.33	17700	5.36
2500	1.76	6300	2.83	10100	3.77	13900	4.31	17800	5.35
2600	1.78	6400	2.86	10200	3.80	14000	4.30	17900	5.45
2700	1.80	6500	2.88	10300	3.79	14100	4.30	18000	5.43
2800	1.86	6600	2.90	10400	3.87	14200	4.31		
2900	1.90	6700	2.92	10500	3.83	14300	4.37		
3000	1.90	6800	2.98	10600	3.88	14400	4.35		
3100	1.97	6900	2.98	10700	3.86	14600	4.53		
3200	1.97	7000	3.00	10800	3.87	14700	4.50		
3300	2.03	7100	3.02	10900	3.90	14800	4.62		
3400	2.04	7200	3.04	11000	3.84	14900	4.65		
3500	2.10	7300	3.06	11100	3.88	15000	4.79		



**Cable loss**  
**Cable coaxial, GORE-TEX, GOR245, 40 GHz, 1.2 m, SMA-SMA, S/N 05118337, HL 3207**

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.17	5000	1.54	10200	2.26	15500	2.77	31500	4.07
30	0.14	5100	1.54	10300	2.26	15600	2.78	32000	4.03
50	0.16	5200	1.56	10400	2.24	15700	2.81	32500	3.93
100	0.22	5300	1.59	10500	2.23	15800	2.81	33000	4.00
200	0.30	5400	1.60	10600	2.25	15900	2.84	33500	4.09
300	0.38	5500	1.61	10700	2.31	16000	2.91	34000	4.08
400	0.44	5600	1.63	10800	2.34	16100	2.92	34500	4.13
500	0.48	5700	1.66	10900	2.38	16200	2.88	35000	4.15
600	0.54	5800	1.68	11000	2.38	16300	2.90	35500	4.18
700	0.58	5900	1.68	11100	2.38	16400	2.93	36000	4.22
800	0.62	6000	1.71	11200	2.37	16500	2.92	36500	4.25
900	0.65	6100	1.71	11300	2.38	16600	2.97	37000	4.26
1000	0.69	6200	1.73	11400	2.40	16700	3.02	37500	4.40
1100	0.73	6300	1.75	11500	2.41	16800	3.02	38000	4.40
1200	0.76	6400	1.76	11600	2.44	16900	3.01	38500	4.52
1300	0.78	6500	1.78	11700	2.44	17000	3.04	39000	4.54
1400	0.81	6600	1.77	11800	2.44	17100	3.08	39500	4.36
1500	0.85	6700	1.79	11900	2.45	17200	3.05	40000	4.48
1600	0.87	6800	1.80	12000	2.46	17300	3.06		
1700	0.90	6900	1.83	12100	2.45	17400	3.06		
1800	0.93	7000	1.84	12200	2.45	17500	3.07		
1900	0.96	7100	1.86	12300	2.48	17600	3.08		
2000	0.95	7200	1.88	12400	2.49	17700	3.09		
2100	0.98	7300	1.86	12500	2.51	17800	3.12		
2200	1.00	7400	1.87	12600	2.53	17900	3.09		
2300	1.02	7500	1.90	12700	2.51	18000	3.08		
2400	1.04	7600	1.91	12800	2.52	18500	3.11		
2500	1.06	7700	1.95	12900	2.54	19000	3.14		
2600	1.08	7800	1.98	13000	2.56	19500	3.20		
2700	1.11	7900	1.99	13100	2.56	20000	3.24		
2800	1.14	8000	1.98	13200	2.59	20500	3.31		
2900	1.15	8100	1.98	13300	2.59	21000	3.38		
3000	1.17	8200	2.00	13400	2.60	21500	3.44		
3100	1.19	8300	2.01	13500	2.65	22000	3.45		
3200	1.20	8400	2.05	13600	2.71	22500	3.45		
3300	1.24	8500	2.07	13700	2.71	23000	3.47		
3400	1.26	8600	2.08	13800	2.69	23500	3.47		
3500	1.27	8700	2.09	13900	2.67	24000	3.54		
3600	1.28	8800	2.09	14000	2.68	24500	3.62		
3700	1.32	8900	2.10	14100	2.68	25000	3.73		
3800	1.32	9000	2.12	14200	2.74	25500	3.77		
3900	1.35	9100	2.12	14300	2.77	26000	3.71		
4000	1.36	9200	2.15	14400	2.80	26500	3.73		
4100	1.39	9300	2.13	14600	2.74	27000	3.73		
4200	1.40	9400	2.16	14700	2.73	27500	3.78		
4300	1.41	9500	2.17	14800	2.75	28000	3.81		
4400	1.43	9600	2.17	14900	2.75	28500	3.81		
4500	1.47	9700	2.18	15000	2.77	29000	3.80		
4600	1.46	9800	2.16	15100	2.76	29500	3.81		
4700	1.49	9900	2.17	15200	2.76	30000	3.89		
4800	1.50	10000	2.20	15300	2.77	30500	4.03		
4900	1.52	10100	2.22	15400	2.79	31000	4.01		

## 14 APPENDIX F Abbreviations and acronyms

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

END OF DOCUMENT