

## TEST REPORT

**ACCORDING TO: FCC 47CFR part 15 subpart C § 15.247 and  
RSS-210 issue 7, Annex 8**

**FOR:**

**Yoggie Security Systems Ltd.**

**Wireless network application card**

**Model: Constant Connect and Protect**

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## 1 Applicant information

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**Telephone:** +972 9894 4900  
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**E-mail:** ami@yoggie.com  
**Contact name:** Mr. Ami Oz

## 2 Equipment under test attributes

**Product name:** Wireless network application card  
**Product type:** Transceiver operating in 2412 – 2462 MHz range (802.11b/g protocol) /  
2402 – 2480 MHz range (Core v2.1 + EDR protocol)  
**Model(s):** Constant Connect and Protect  
**Serial number:** 00000001  
**OEM Part number:** 210-SA-00001  
**Lenovo Part number:** 3321-20U  
**Receipt date:** 5/14/2009

## 3 Manufacturer information

**Manufacturer name:** Yoggie Security Systems Ltd.  
**Address:** Block 310, P.O.Box 156, Beth Halevy 42870, Israel  
**Telephone:** +972 9894 4900  
**Fax:** +972 9894 4800  
**E-Mail:** ami@yoggie.com  
**Contact name:** Mr. Ami Oz

## 4 Test details

**Project ID:** 19597  
**Location:** Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel  
**Test started:** 5/14/2009  
**Test completed:** 6/17/2009  
**Test specification(s):** FCC 47CFR part 15, subpart C §15.247 and RSS-210 issue 7, Annex 8




## 5 Tests summary

Test	Status
<b>Transmitter characteristics</b>	
FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth	Pass
FCC section 15.247(b)(3), RSS-210 section A8.4(4), Peak output power	Pass
FCC section 15.247(b)(5), RSS-Gen section 5.5, RF exposure	Pass, an exhibit attached to application for certification
FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions	Pass
FCC section 15.247(e), RSS-210 A8.2(b), Peak power density	Pass
FCC section 15.207(a), RSS-Gen section 7.2.2, Conducted emission	Pass
FCC section 15.203, RSS-Gen, section 7.1.4, Antenna requirement	Pass

Testing was completed against all relevant requirements of the test standard. 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.

This test report replaces the previously issued test report identified by Doc ID:YOGRAD\_FCC.19597.

	Name and Title	Date	Signature
<b>Tested by:</b>	Mr. L. Markel, test engineer	June 17, 2009	
<b>Reviewed by:</b>	Mrs. M. Cherniavsky, certification engineer	June 21, 2009	
<b>Approved by:</b>	Mr. M. Nikishin, EMC and radio group manager	June 22, 2009	

## 6 EUT description

## 6.1 General information

The EUT is a wireless card inserted into a laptop. It supports Wi-Fi and Bluetooth protocols and can transmit in one mode only at a time. No simultaneous transmission is allowed.

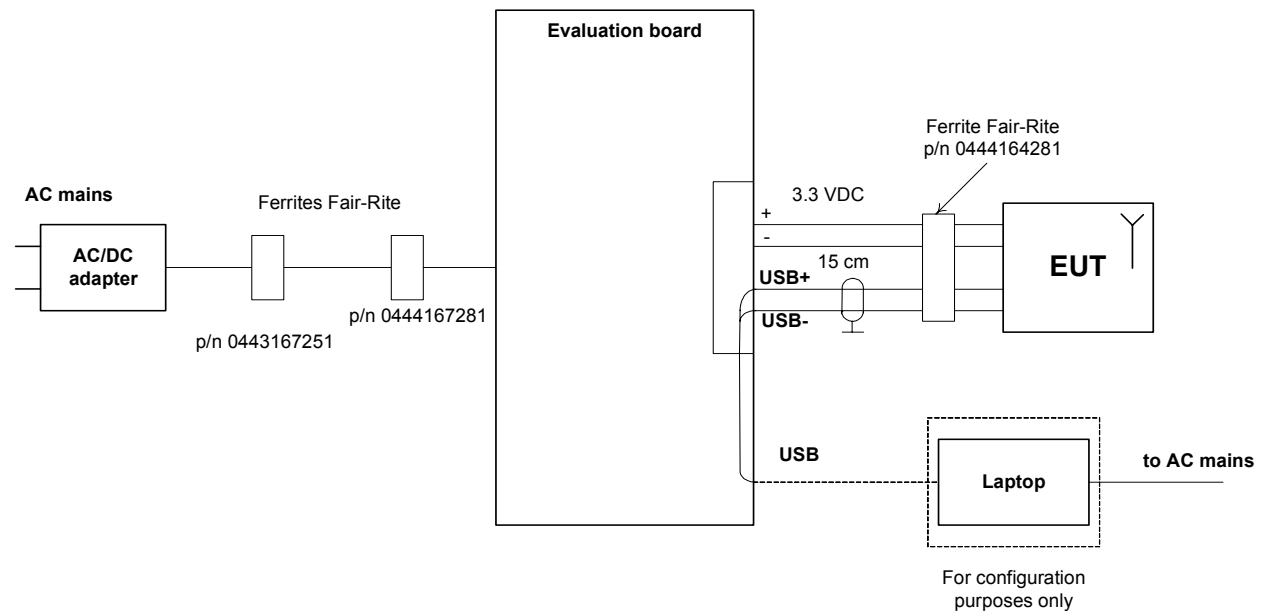
## 6.2 Ports and lines

Port type	Port description	Connected from	Connected to	Qty.	Cable type	Cable Length, m
Signal	USB	Evaluation board	Laptop	1	Shielded	1.5
Signal	Express card	EUT	Evaluation board	1	Shielded	0.15
Power	DC Power	Evaluation board	EUT	1	Unshielded	0.15
Power	DC Power	AC/DC adaptor	Evaluation board	1	Unshielded	1.5
Power	AC mains	AC/DC adapter	AC mains	1	2-pole wall-outlet	NA

### 6.3 Support and test equipment

Description	Manufacturer	Model number	Serial number
Evaluation board	Yoggie Security Systems	2.1	P/N 000-SA-00004
Laptop	Lenovo	T400	L3-D754808/10

## 6.4 Test configuration



## 6.5 EUT configuration during the field strength measurement tests

Figure 6.5.1 The EUT in X-axis orthogonal position

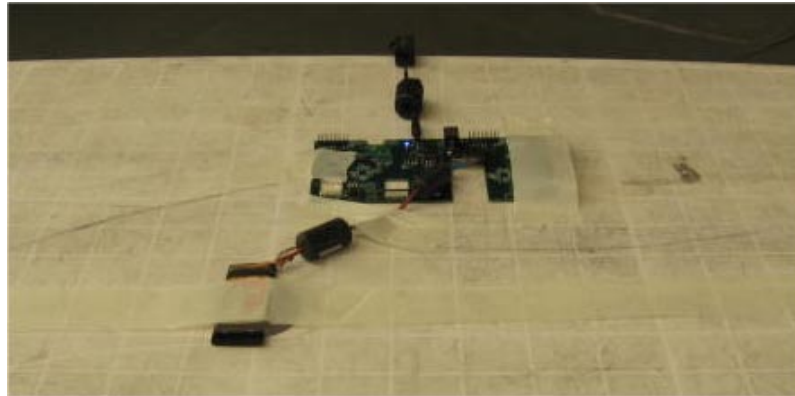


Figure 6.5.2 The EUT in Y-axis orthogonal position

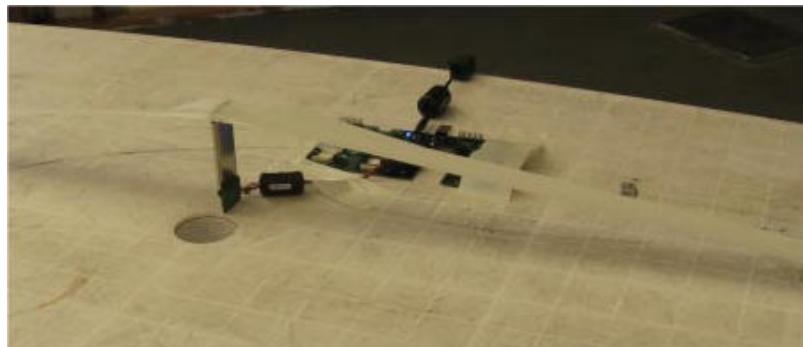
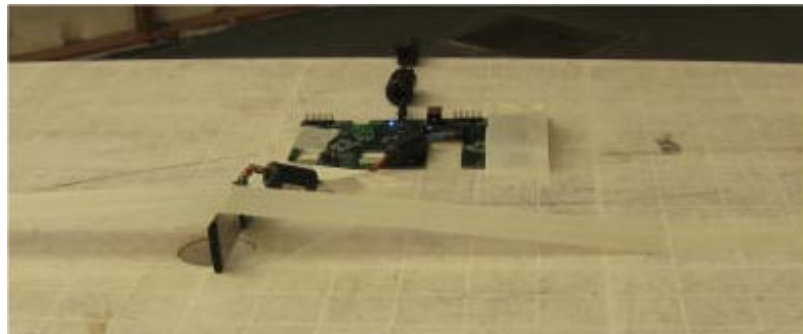


Figure 6.5.3 The EUT in Z-axis orthogonal position



## 6.6 Transmitter characteristics (Wi-Fi)

<b>Type of equipment</b>			
Stand-alone (Equipment with or without its own control provisions)			
Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)			
X	Plug-in card (Equipment intended for a variety of host systems)		
<b>Intended use</b>		<b>Condition of use</b>	
fixed		Always at a distance more than 2 m from all people	
X	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>		2400 – 2483.5 MHz	
<b>Operating frequency range</b>		2412 -2462 MHz	
<b>RF channel spacing</b>		10 MHz, 20 MHz	
<b>Maximum peak output power</b>		At transmitter 50 $\Omega$ RF output connector	dBm
		Effective radiated power (for equipment with no RF connector)	18.1 dBm
<b>Is transmitter output power variable?</b>		X	No
		Yes	continuous variable
			stepped variable with stepsize
<b>Antenna connection</b>			
unique coupling	standard connector	X	integral
			with temporary RF connector
		X	without temporary RF connector
<b>Antenna/s technical characteristics</b>			
Type	Manufacturer	Model number	Gain
Ceramic Chip Antenna	Pulse Engineering	P/N W3008E	3 dBi
<b>Transmitter 99% power bandwidth</b>	<b>Standard</b>	<b>Type of modulation</b>	<b>Transmitter aggregate data rate/s, MBps</b>
10 MHz	802.11b	DBPSK	1
	802.11b	DQPSK	2
	802.11b	CCK	5.5
	802.11b	CCK	11
20 MHz	802.11g	BPSK	6
	802.11g	BPSK	9
	802.11g	QPSK	12
	802.11g	QPSK	18
	802.11g	16QAM	24
	802.11g	16QAM	36
	802.11g	64QAM	48
	802.11g	64QAM	54
<b>Modulation type</b>		OFDM for 802.11g and DSSS for 802.11b	
<b>Maximum transmitter duty cycle in normal use</b>		50%	
<b>Maximum transmitter duty cycle for test purposes</b>		94 %	
<b>Transmitter power source</b>			
V	DC (PoE)	<b>Nominal rated voltage</b>	Battery type
		<b>Nominal rated voltage</b>	3.3 VDC
	AC mains	<b>Nominal rated voltage</b>	Frequency
			NA
<b>Common power source for transmitter and receiver</b>		V	yes no



<b>Test specification:</b>		<b>FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth</b>	
<b>Test procedure:</b>		FR Vol.62, page 26243, Section 15.247(a)2	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:32:35 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

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

### 7.1 Minimum 6 dB bandwidth

#### 7.1.1 General

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

Table 7.1.1 The 6 dB bandwidth limits

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

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

#### 7.1.2 Test procedure

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

7.1.2.2 The EUT was set to transmit modulated carrier.

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

Figure 7.1.1 The 6 dB bandwidth test setup







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Test specification:	FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth			
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2			
Test mode:	Compliance	Verdict:		PASS
Date & Time:	6/17/2009 4:32:35 PM			
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC	
Remarks:				

Table 7.1.2 The 6 dB bandwidth test results

ASSIGNED FREQUENCY BAND: 2400.00 – 2483.50 MHz  
 DETECTOR USED: Peak  
 SWEEP MODE: Single  
 SWEEP TIME: Auto  
 RESOLUTION BANDWIDTH: 100 kHz  
 VIDEO BANDWIDTH: 300 kHz  
 MODULATION ENVELOPE REFERENCE POINTS: 6.0 dBc  
 MODULATING SIGNAL: PRBS

MODULATION: BPSK  
 BIT RATE: 1 Mbps

Carrier frequency, MHz	6 dB bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2412.0	7470.0	500.0	-6970.00	Pass
2437.0	7530.0	500.0	-7030.00	Pass
2462.0	8070.0	500.0	-7570.00	Pass

MODULATION: 64QAM  
 BIT RATE: 11 Mbps

Carrier frequency, MHz	6 dB bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2412.0	8070.0	500.0	-7570.00	Pass
2437.0	7570.0	500.0	-7070.00	Pass
2462.0	7600.0	500.0	-7100.00	Pass

MODULATION: BPSK  
 BIT RATE: 6 Mbps

Carrier frequency, MHz	6 dB bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2412.0	15750.00	500.00	-15250.00	Pass
2437.0	15700.00	500.00	-15200.00	Pass
2462.0	16050.00	500.00	-15550.00	Pass

MODULATION: 64QAM  
 BIT RATE: 54 Mbps

Carrier frequency, MHz	6 dB bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
2412.0	15800.0	500.0	-15300.00	Pass
2437.0	16100.0	500.0	-15600.00	Pass
2462.0	16350.0	500.0	-15850.00	Pass

**Reference numbers of test equipment used**

HL 1116	HL 1424	HL 2867						
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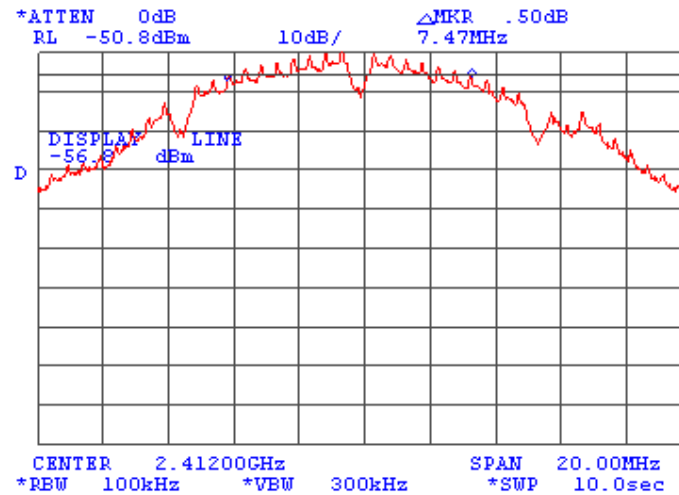
Full description is given in Appendix A.



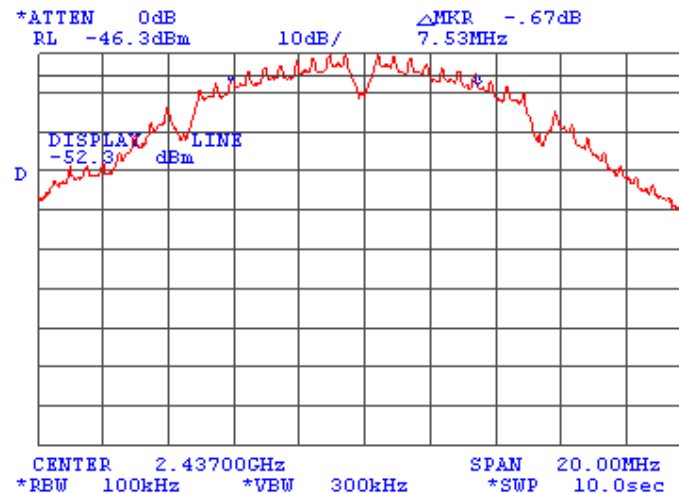
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Test specification:	FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:35 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.1.1 The 6 dB bandwidth test result at low frequency with BPSK modulation @ 1 Mbps



Plot 7.1.2 The 6 dB bandwidth test result at mid frequency with BPSK modulation @ 1 Mbps

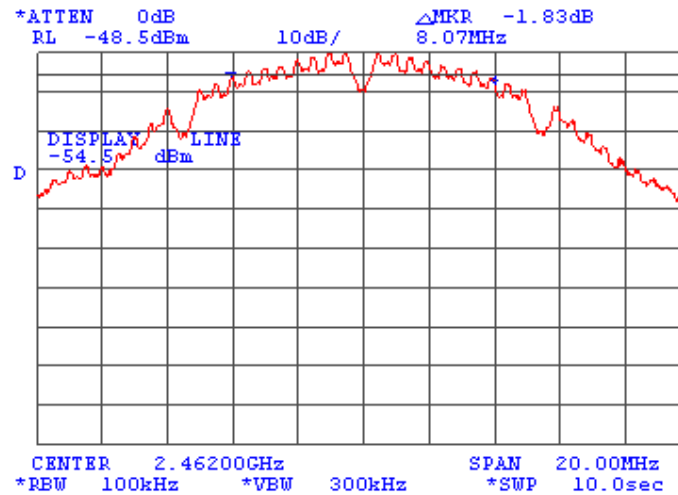




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Test specification:		FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth	
Test procedure:		FR Vol.62, page 26243, Section 15.247(a)2	
Test mode:		Compliance	Verdict: PASS
Date & Time:		6/17/2009 4:32:35 PM	
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.1.3 The 6 dB bandwidth test result at high frequency with BPSK modulation @ 1 Mbps

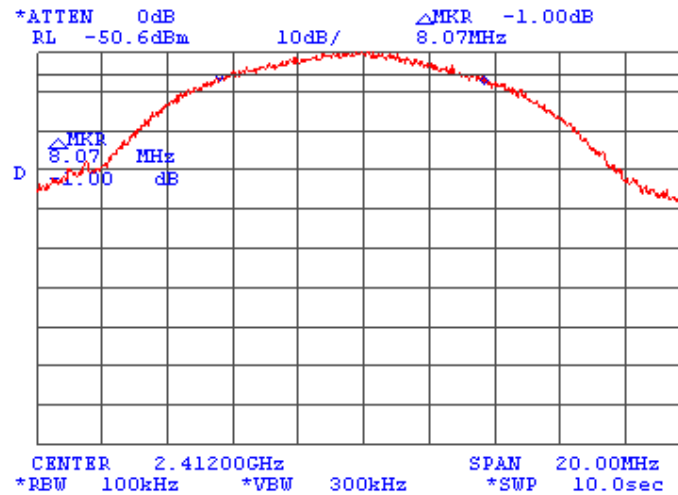




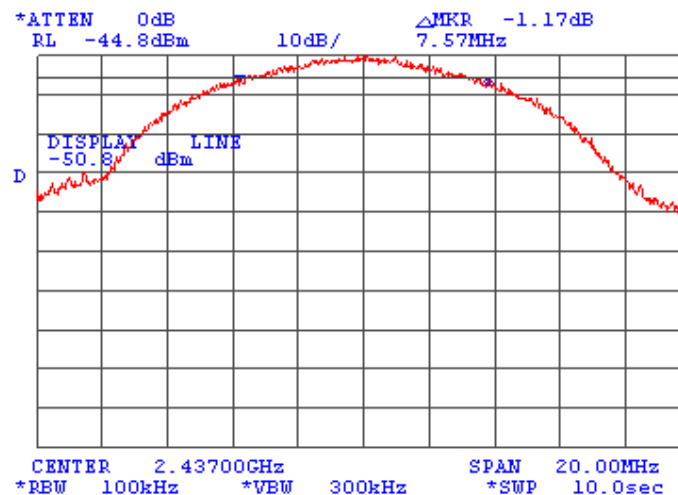
HERMON LABORATORIES

Test specification:	FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:35 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.1.4 The 6 dB bandwidth test result at low frequency with 64QAM modulation @ 11 Mbps



Plot 7.1.5 The 6 dB bandwidth test result at mid frequency with 64QAM modulation @ 11 Mbps

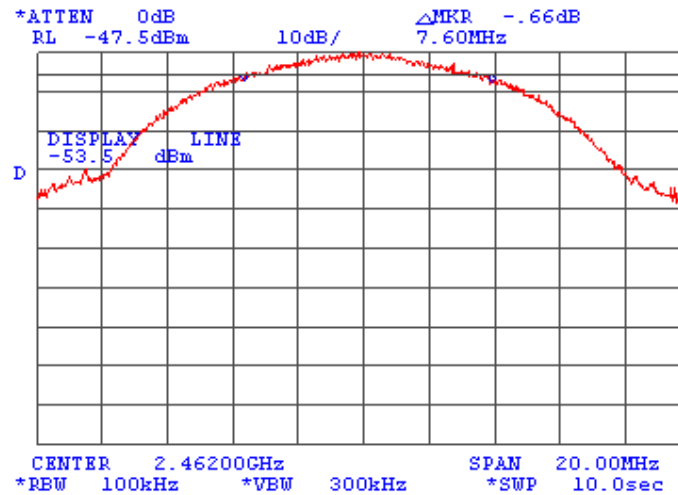




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Test specification:	FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:35 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.1.6 The 6 dB bandwidth test result at high frequency with 64QAM modulation @ 11 Mbps

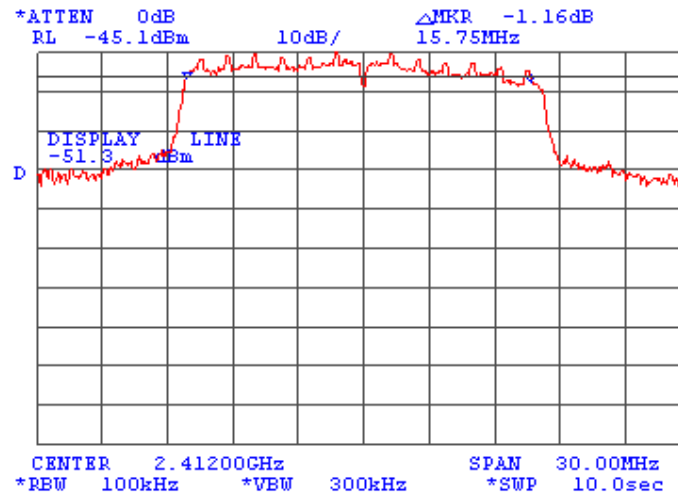




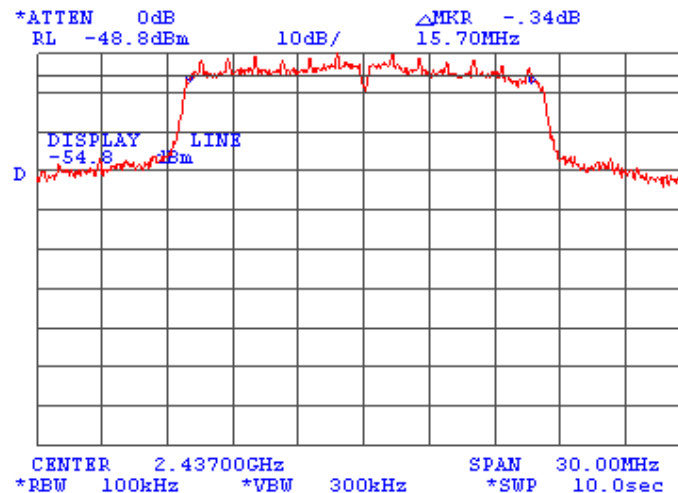
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Test specification:	FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:35 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.1.7 The 6 dB bandwidth test result at low frequency with BPSK modulation @ 6 Mbps



Plot 7.1.8 The 6 dB bandwidth test result at mid frequency with BPSK modulation @ 6 Mbps

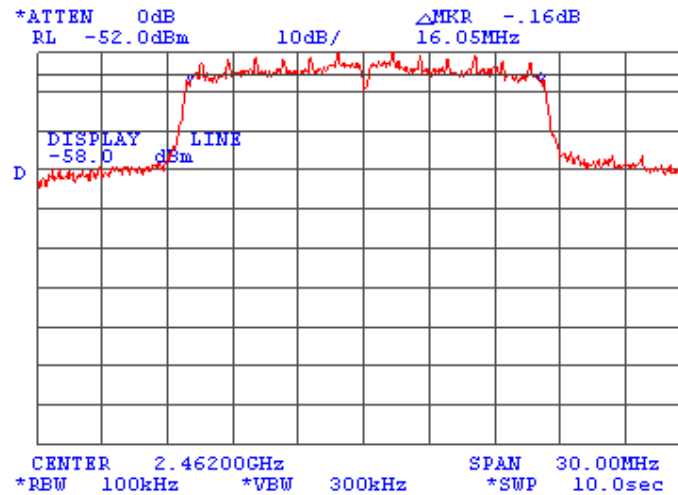




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Test specification:		FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth	
Test procedure:		FR Vol.62, page 26243, Section 15.247(a)2	
Test mode:		Compliance	Verdict: PASS
Date & Time:		6/17/2009 4:32:35 PM	
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.1.9 The 6 dB bandwidth test result at high frequency with BPSK modulation @ 6 Mbps

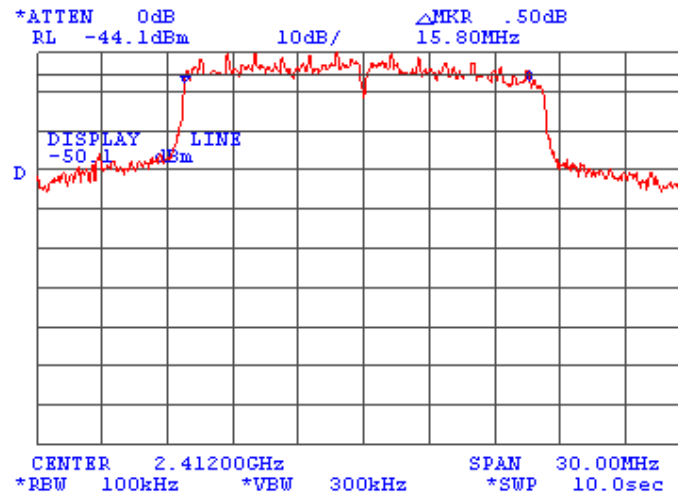




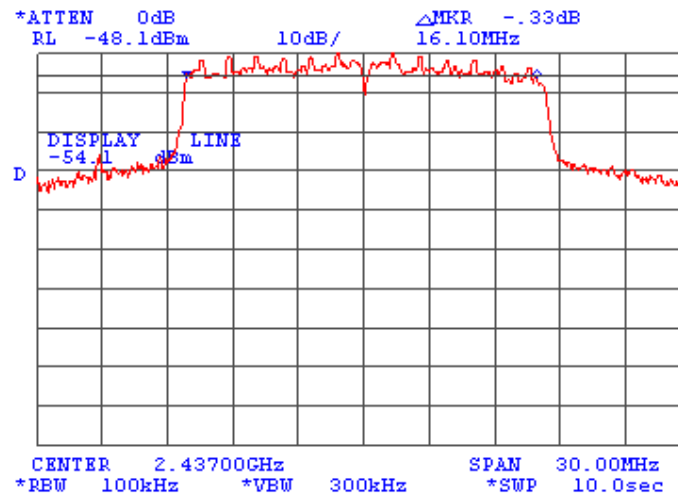
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Test specification:	FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:35 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.1.10 The 6 dB bandwidth test result at low frequency with 64QAM modulation @ 54 Mbps



Plot 7.1.11 The 6 dB bandwidth test result at mid frequency with 64QAM modulation @ 54 Mbps



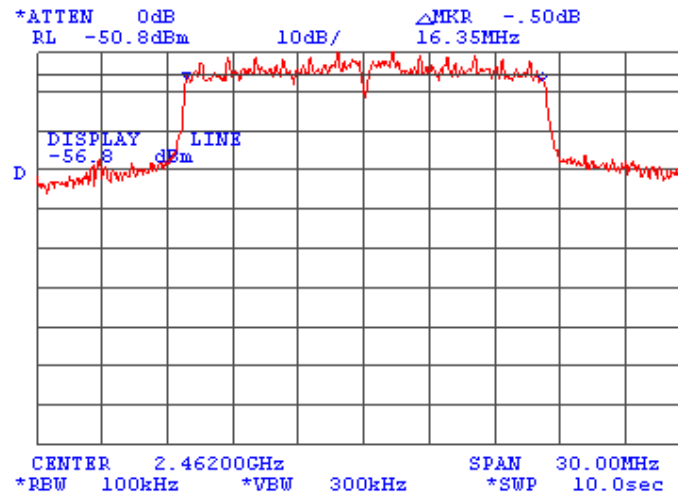




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Test specification:		FCC section 15.247(a)(2), RSS-210 section A8.2(a), 6 dB bandwidth	
Test procedure:		FR Vol.62, page 26243, Section 15.247(a)2	
Test mode:		Compliance	Verdict: PASS
Date & Time:		6/17/2009 4:32:35 PM	
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.1.12 The 6 dB bandwidth test result at high frequency with 64QAM modulation @ 54 Mbps





<b>Test specification:</b>		<b>FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power</b>	
<b>Test procedure:</b>		FR Vol.62, page 26243, Section 15.247(b)	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:14:29 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

## 7.2 Peak output power

### 7.2.1 General

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

Table 7.2.1 Peak output power limits

Assigned frequency range, MHz	Maximum antenna gain, dBi	Peak output power*		Equivalent field strength limit @ 3m, dB(μV/m)**
		W	dBm	
902.0 – 928.0	6.0	1.0	30.0	131.2
2400.0 – 2483.5				
5725.0 – 5850.0				

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

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

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

### 7.2.2 Test procedure

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

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

**7.2.2.3** The resolution bandwidth of spectrum analyzer was set wider than 6 dB bandwidth of the EUT and the field strength of the EUT carrier frequency was measured with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360° and the measuring antenna height was swept in both vertical and horizontal polarizations.

**7.2.2.4** The maximum field strength of the EUT carrier frequency was measured as provided in and associated plots.

**7.2.2.5** The maximum peak output power was calculated from the field strength of carrier as follows:

$$P = (E \times d)^2 / (30 \times G),$$

where P is the peak output power in W, E is the field strength in V/m, d is the test distance and G is the transmitter numeric antenna gain over an isotropic radiator.

The above equation was converted in logarithmic units for 3 m test distance:

$$\text{Peak output power in dBm} = \text{Field strength in dB}(\mu\text{V/m}) - \text{Transmitter antenna gain in dBi} - 95.2 \text{ dB}$$

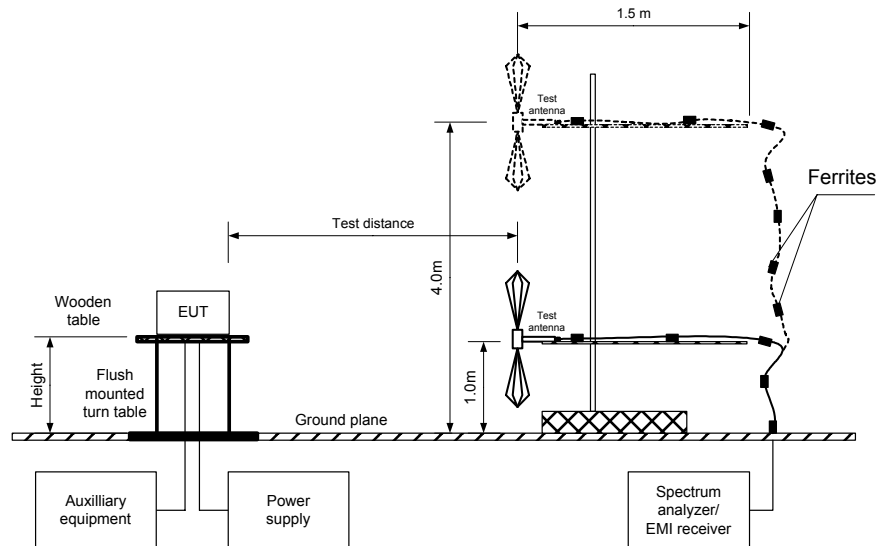
**7.2.2.6** The worst test results (the lowest margins) were recorded in Table 7.2.2.



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<b>Test specification:</b>		<b>FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power</b>	
<b>Test procedure:</b>		FR Vol.62, page 26243, Section 15.247(b)	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:14:29 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Figure 7.2.1 Setup for carrier field strength measurements





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<b>Test specification:</b>		<b>FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power</b>	
<b>Test procedure:</b>		FR Vol.62, page 26243, Section 15.247(b)	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:14:29 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Table 7.2.2 Peak output power test results

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz  
 TEST DISTANCE: 3 m  
 TEST SITE: OATS  
 EUT HEIGHT: 0.8 m  
 DETECTOR USED: Peak  
 TEST ANTENNA TYPE: Double ridged guide (above 1000 MHz)  
 MODULATING SIGNAL: PRBS  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 1 MHz  
 VIDEO BANDWIDTH: 3 MHz

MODULATION: BPSK  
 BIT RATE: 1 Mbps  
 EUT 26 dB BANDWIDTH: 15.20 MHz low channel  
 15.20 MHz mid channel  
 14.70 MHz high channel

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin dB***	Verdict
2412.00	100.33	V (z-axis)	1.0	000	3	13.92	30.00	-16.08	Pass
2437.00	97.33	H (x-axis)	1.0	350	3	10.92	30.00	-19.08	Pass
2462.00	96.00	H (x-axis)	1.1	000	3	9.44	30.00	-20.56	Pass

MODULATION: 64QAM  
 BIT RATE: 11 Mbps  
 EUT 26 dB BANDWIDTH: 15.05 MHz low channel  
 14.93 MHz mid channel  
 14.80 MHz high channel

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin dB***	Verdict
2412.00	103.67	H (x-axis)	1.1	010	3	17.22	30.00	-12.78	Pass
2437.00	102.17	H (x-axis)	1.1	350	3	15.68	30.00	-14.32	Pass
2462.00	100.17	H (x-axis)	1.1	000	3	13.64	30.00	-16.36	Pass

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

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

Peak output power in dBm = Field strength in dB(μV/m) - Transmitter antenna gain in dBi – 95.2 dB + 10log(26dBc BW, MHz / 1 MHz RBW)

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



HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power</b>	
<b>Test procedure:</b>		FR Vol.62, page 26243, Section 15.247(b)	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:14:29 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Table 7.2.2 Peak output power test results (continued)

MODULATION: BPSK  
 BIT RATE: 6 Mbps  
 EUT 26 dB BANDWIDTH: 17.60 MHz low channel  
 17.65 MHz mid channel  
 17.65 MHz high channel

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin dB***	Verdict
2412.00	102.00	H (x-axis)	1.1	000	3	16.23	30.00	-13.77	Pass
2437.00	99.67	H (x-axis)	1.1	350	3	13.91	30.00	-16.09	Pass
2462.00	97.50	H (x-axis)	1.1	000	3	11.74	30.00	-18.26	Pass

MODULATION: 64QAM  
 BIT RATE: 54 Mbps  
 EUT 26 dB BANDWIDTH: 17.95 MHz low channel  
 18.00 MHz mid channel  
 17.70 MHz high channel

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin dB***	Verdict
2412.00	103.83	H (x-axis)	1.1	000	3	18.14	30.00	-11.86	Pass
2437.00	101.33	H (x-axis)	1.1	000	3	15.65	30.00	-14.35	Pass
2462.00	99.67	H (x-axis)	1.1	010	3	13.92	30.00	-16.08	Pass

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

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

Peak output power in dBm = Field strength in dB(μV/m) - Transmitter antenna gain in dBi – 95.2 dB + 10log(26dBc BW, MHz / 1 MHz RBW)

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

## Reference numbers of test equipment used

HL 1424	HL 1984	HL 3122					
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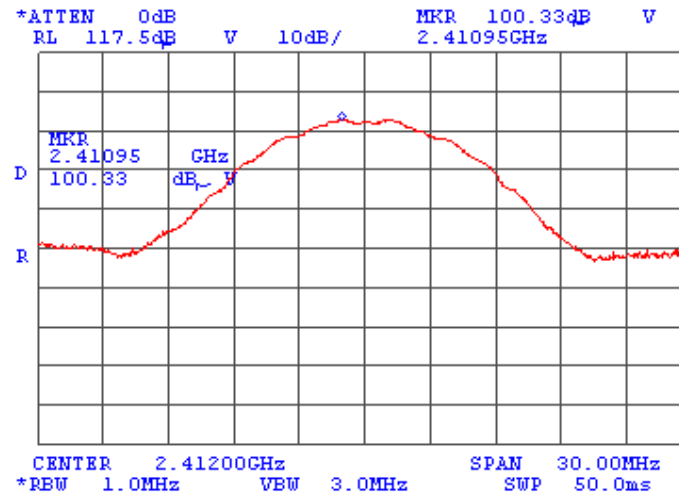
Full description is given in Appendix A.



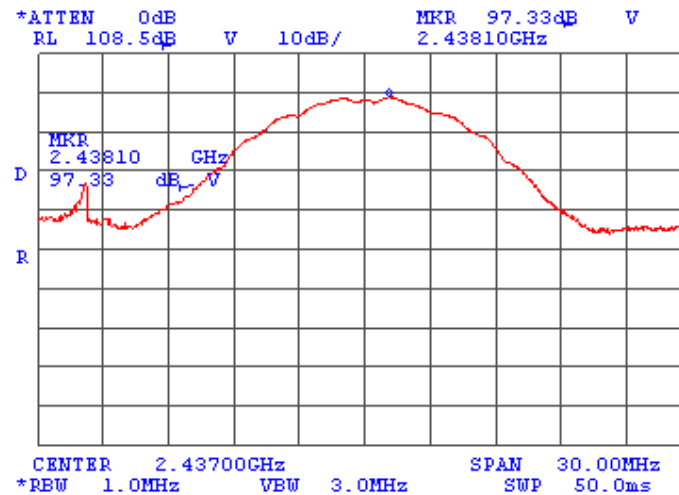
HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.1 Field strength of carrier at low frequency with BPSK modulation @ 1 Mbps



Plot 7.2.2 Field strength of carrier at mid frequency with BPSK modulation @ 1 Mbps

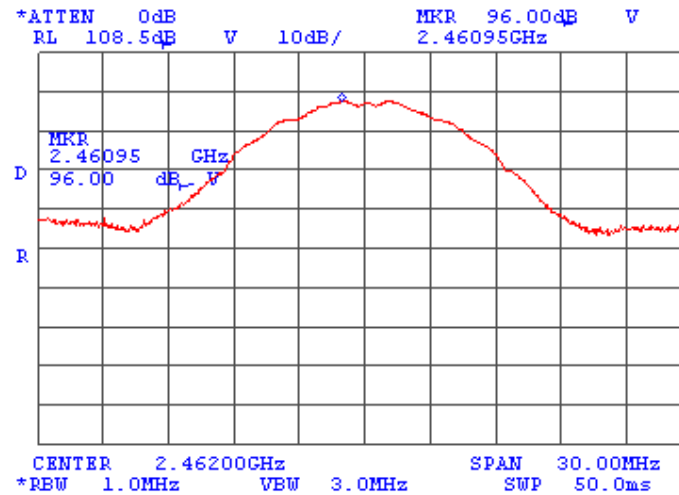




HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.3 Field strength of carrier at high frequency with BPSK modulation @ 1 Mbps

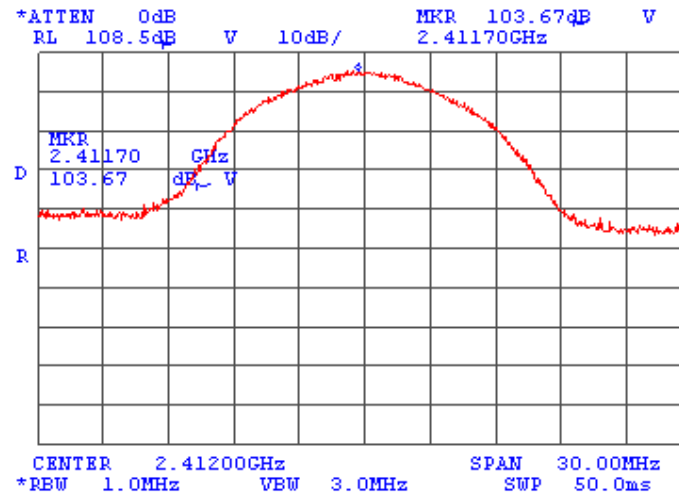




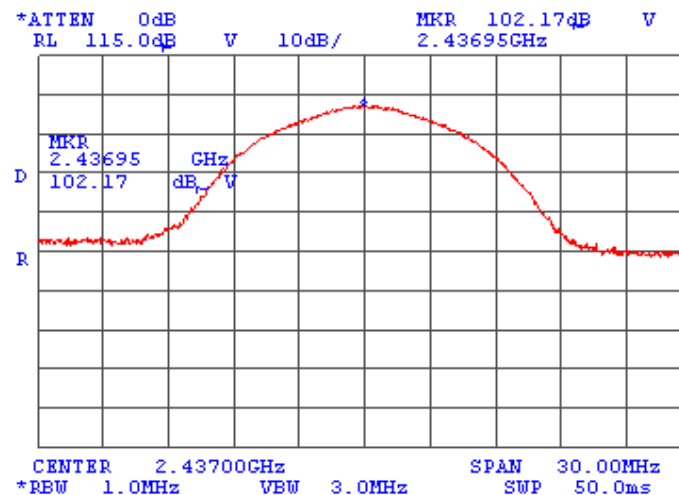
HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.4 Field strength of carrier at low frequency with 64QAM modulation @ 11 Mbps



Plot 7.2.5 Field strength of carrier at mid frequency with 64QAM modulation @ 11 Mbps



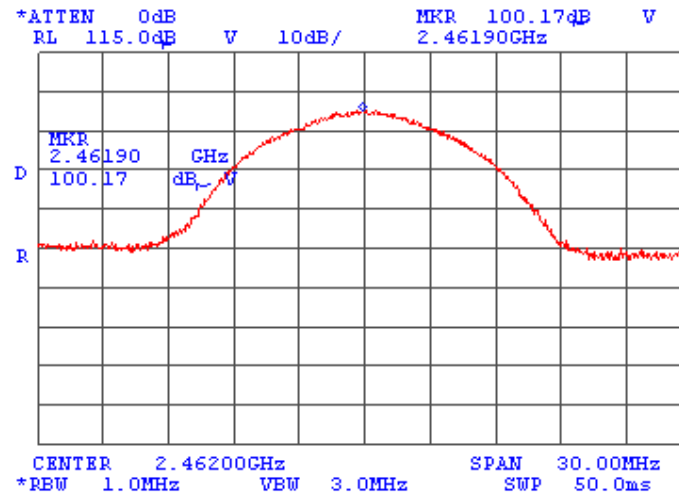




HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.6 Field strength of carrier at high frequency with 64QAM modulation @ 11 Mbps

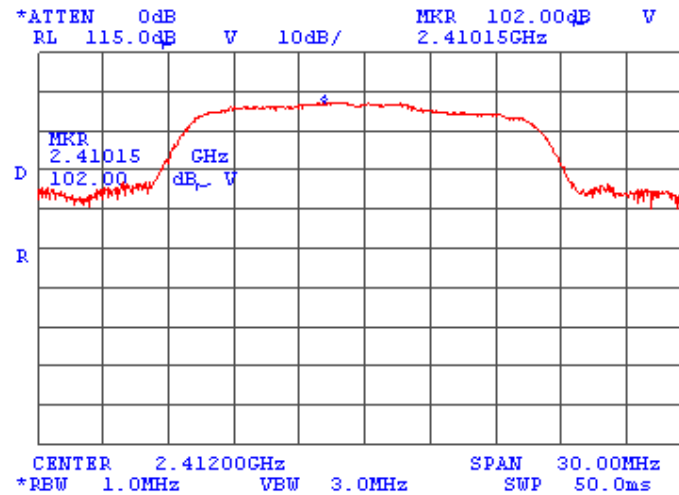




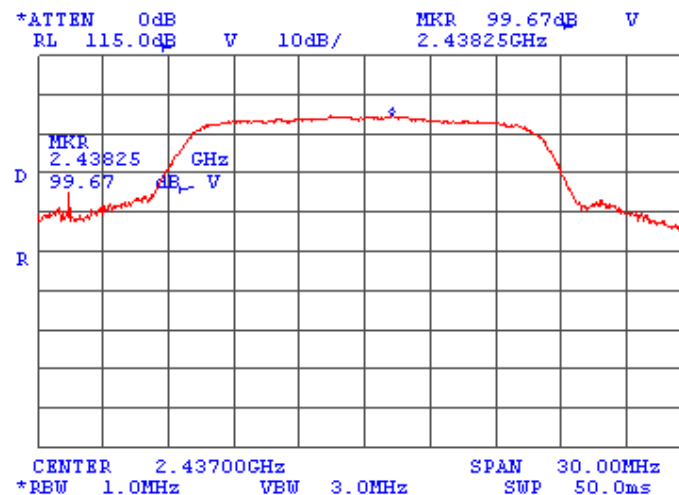
HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.7 Field strength of carrier at low frequency with BPSK modulation @ 6 Mbps



Plot 7.2.8 Field strength of carrier at mid frequency with BPSK modulation @ 6 Mbps

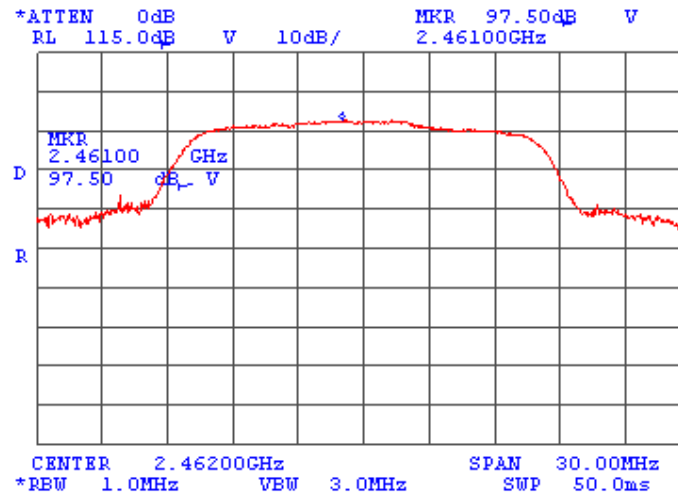




HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.9 Field strength of carrier at high frequency with BPSK modulation @ 6 Mbps

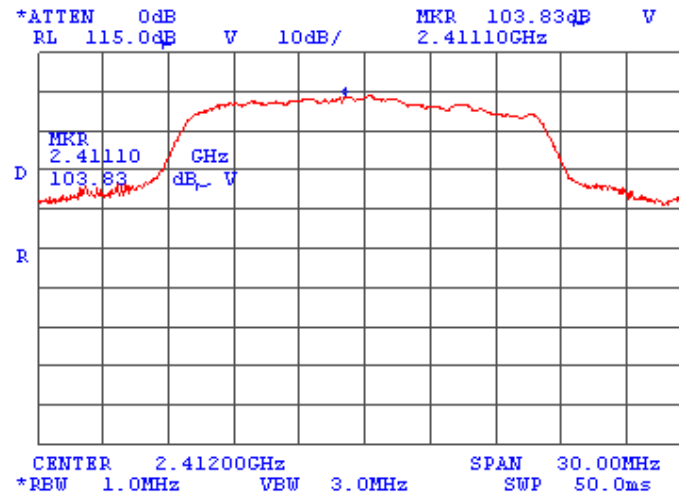




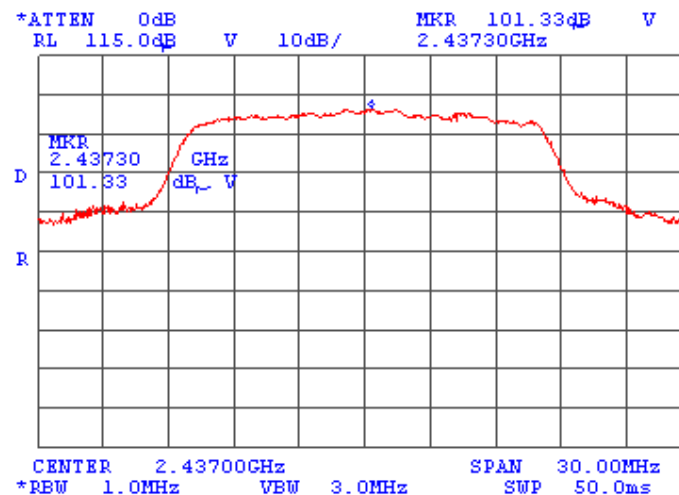
HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.10 Field strength of carrier at low frequency with 64QAM modulation @ 54 Mbps



Plot 7.2.11 Field strength of carrier at mid frequency with 64QAM modulation @ 54 Mbps

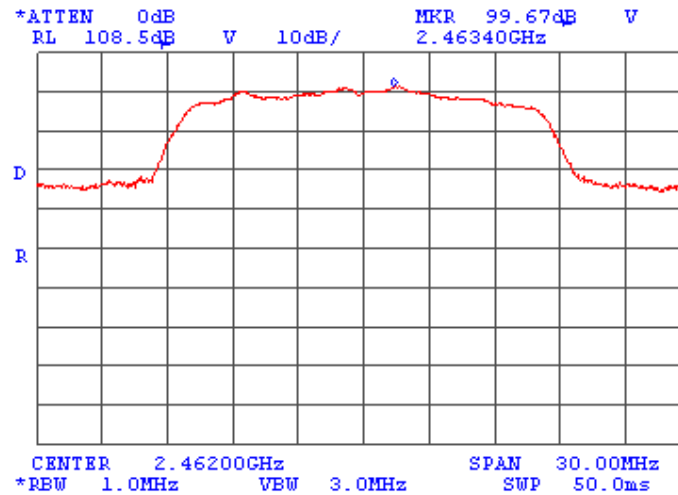




HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.12 Field strength of carrier at high frequency with 64QAM modulation @ 54 Mbps

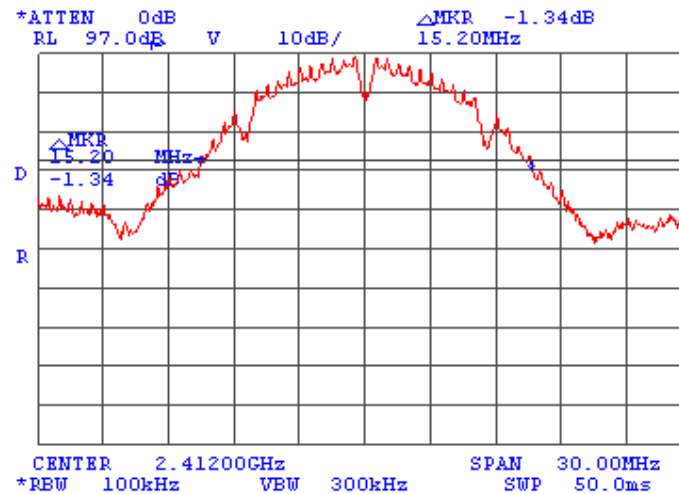




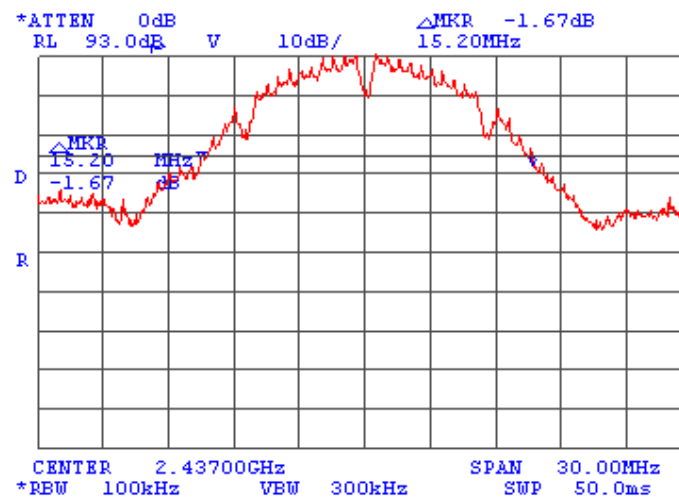
HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.13 The 26 dB bandwidth test result at low frequency with BPSK modulation @ 1 Mbps



Plot 7.2.14 The 26 dB bandwidth test result at mid frequency with BPSK modulation @ 1 Mbps

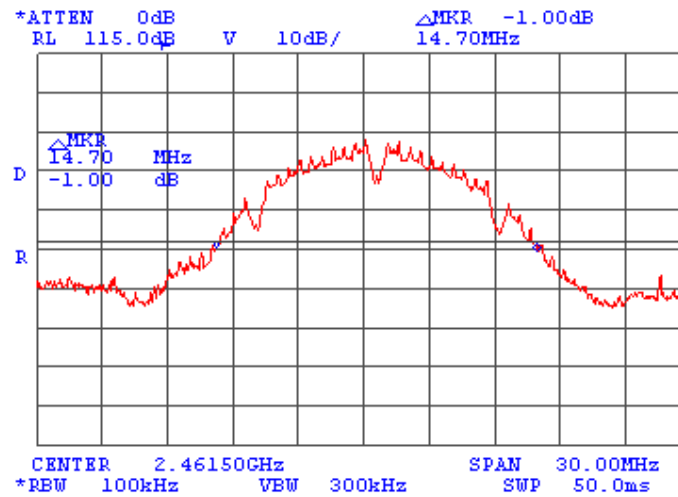




HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.15 The 26 dB bandwidth test result at high frequency with BPSK modulation @ 1 Mbps

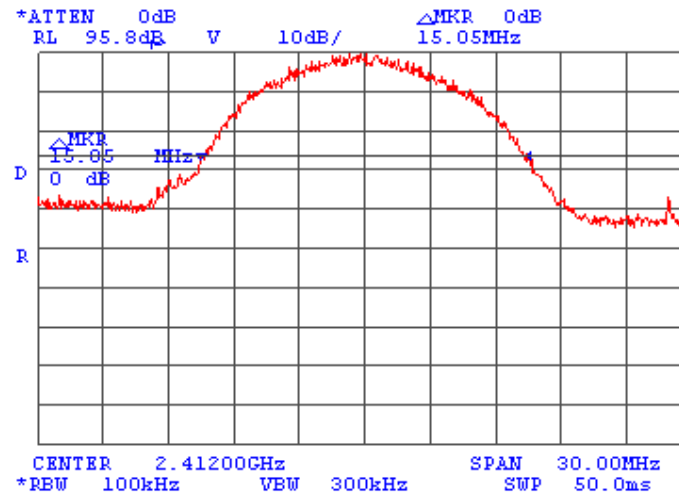




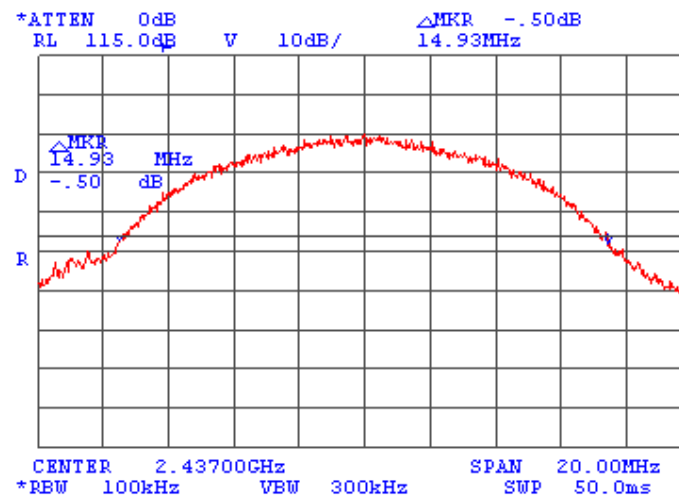
HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.16 The 26 dB bandwidth test result at low frequency with 64QAM modulation @ 11 Mbps



Plot 7.2.17 The 26 dB bandwidth test result at mid frequency with 64QAM modulation @ 11 Mbps



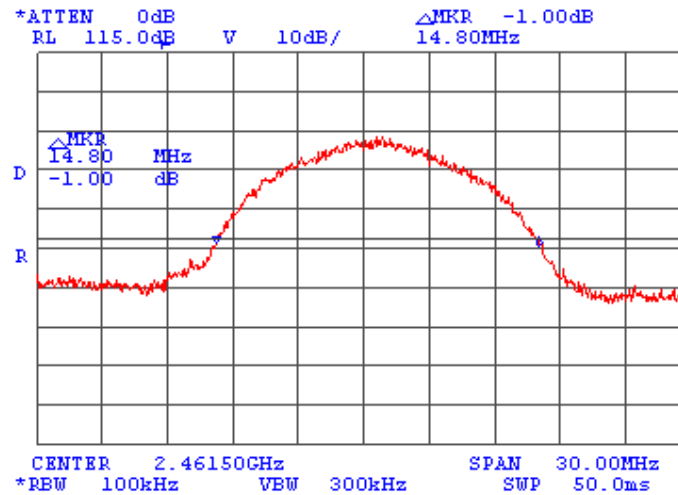




HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.18 The 26 dB bandwidth test result at high frequency with 64QAM modulation @ 11 Mbps

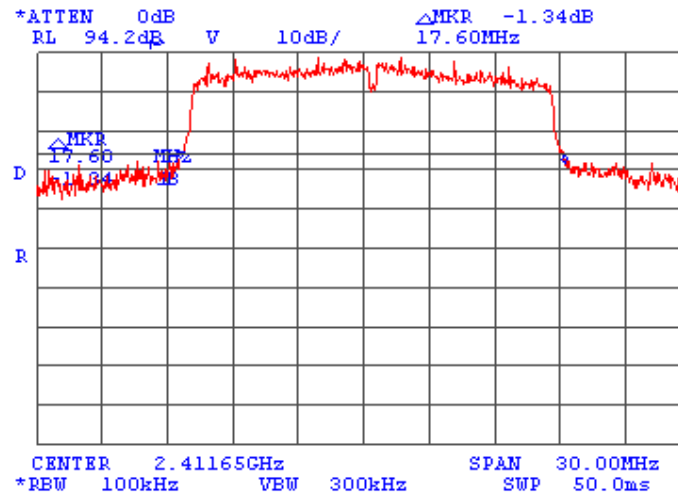




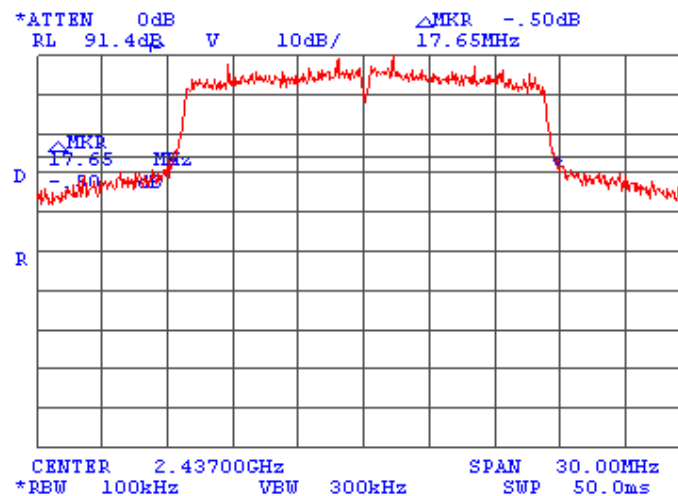
HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.19 The 26 dB bandwidth test result at low frequency with BPSK modulation @ 6 Mbps



Plot 7.2.20 The 26 dB bandwidth test result at mid frequency with BPSK modulation @ 6 Mbps

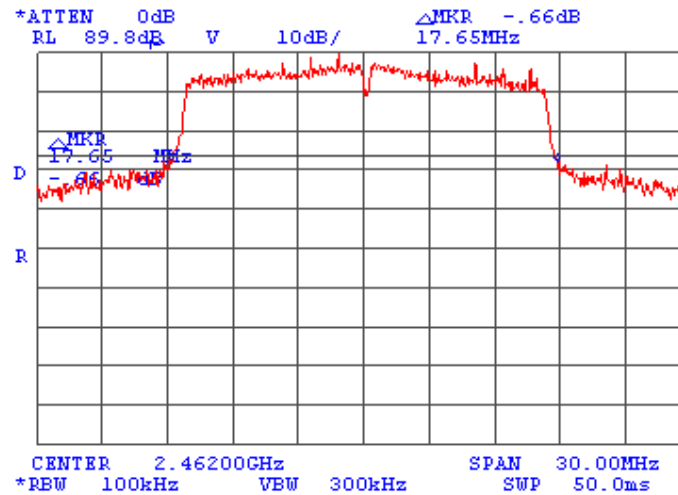




HERMON LABORATORIES

Test specification:	FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:14:29 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.21 The 26 dB bandwidth test result at high frequency with BPSK modulation @ 6 Mbps



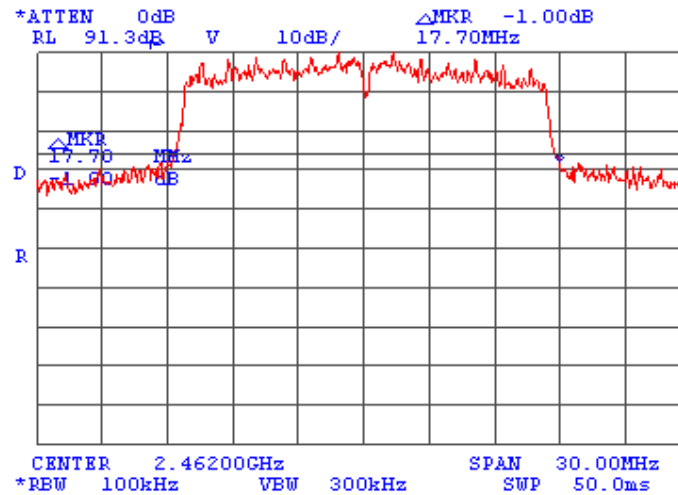




HERMON LABORATORIES

Test specification:		FCC section 15.247(b)3, RSS-210 section A8.4(4) ,Peak output power	
Test procedure:		FR Vol.62, page 26243, Section 15.247(b)	
Test mode:		Compliance	Verdict: PASS
Date & Time:		6/17/2009 4:14:29 PM	
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.2.24 The 26 dB bandwidth test result at high frequency with 64QAM modulation @ 54 Mbps





<b>Test specification:</b>	<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

### 7.3 Field strength of spurious emissions

#### 7.3.1 General

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

**Table 7.3.1 Radiated spurious emissions limits**

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

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

$$\text{Lim}_{S2} = \text{Lim}_{S1} + 40 \log(S1/S2),$$

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

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

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

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

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

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

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

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

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

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

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

<b>Test specification:</b> FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions	
<b>Test procedure:</b> FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b> 6/17/2009 4:06:32 PM	
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa
	<b>Relative Humidity:</b> 42%
	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>	

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

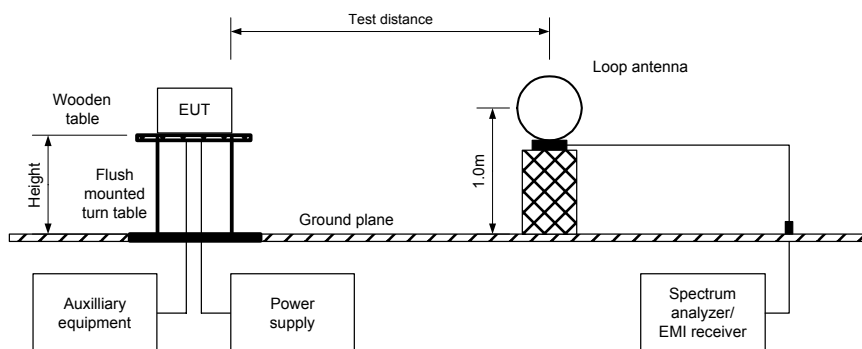
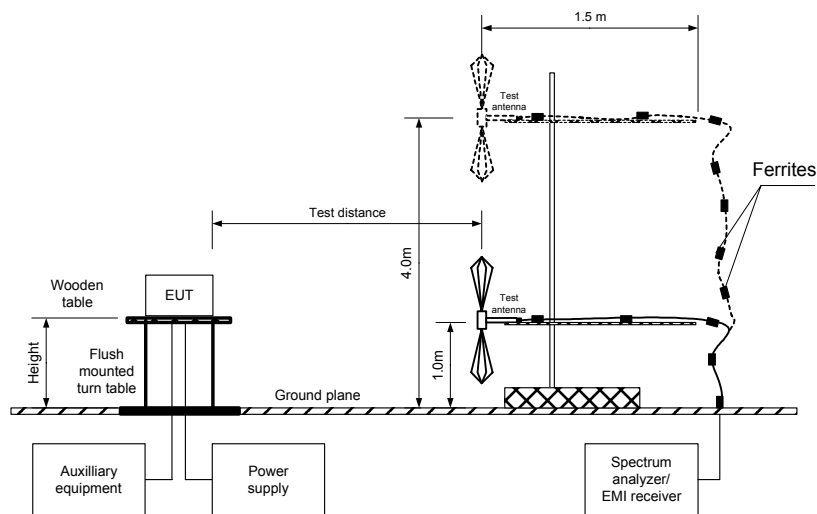


Figure 7.3.2 Setup for spurious emission field strength measurements above 30 MHz





HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

**Table 7.3.2 Field strength of emissions outside restricted bands**

ASSIGNED FREQUENCY: 2400.0 - 2483.5 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009 –25000 MHz  
 TEST DISTANCE: 3 m  
 MODULATION: BPSK (see Note)  
 MODULATING SIGNAL: PRBS  
 BIT RATE: 1 Mbps  
 DUTY CYCLE: 94 %  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 TRANSMITTER OUTPUT POWER: 13.92 dBm at low carrier frequency  
 10.92 dBm at mid carrier frequency  
 9.44 dBm at high carrier frequency  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 100 kHz  
 VIDEO BANDWIDTH: 300 kHz  
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)  
 Biconilog (30 MHz – 1000 MHz)  
 Double ridged guide (above 1000 MHz)

Frequency MHz	Field strength of spurious, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	Field strength of carrier, dB(μV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB**	Verdict
<b>Low carrier frequency</b>									
7236.50	51.63	H	1.2	010	93.3.	41.67	20.0	-21.67	Pass

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

\*\*- Margin = Attenuation below carrier – specification limit.

**NOTE:** The spurious emissions sweeps were performed with EUT configured to 54 Mbps 64QAM modulation assuming maximum output power, however the spurious emissions measurements were performed with EUT configured to 1 Mbps BPSK modulation since it was found the worst case.





Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions			
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4			
Test mode:	Compliance	Verdict:		PASS
Date & Time:	6/17/2009 4:06:32 PM			
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC	
Remarks:				

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

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz  
 INVESTIGATED FREQUENCY RANGE: 1000 – 25000 MHz  
 TEST DISTANCE: 3 m  
 MODULATION: BPSK (see Note)  
 MODULATING SIGNAL: PRBS  
 BIT RATE: 1 Mbps  
 DUTY CYCLE: 94 %  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 TRANSMITTER OUTPUT POWER: 13.92 dBm at low carrier frequency  
 10.92 dBm at mid carrier frequency  
 9.44 dBm at high carrier frequency  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 1000 kHz  
 TEST ANTENNA TYPE: Double ridged guide

frequency MHz	Antenna		'Azimuth degrees'	'Peak field strength(VBW=3 MHz			Average field strength(VBW=300 Hz)				Verdict
	'Polarization'	'height m'		'Measured dB(μV/m)	'Limit, dB(μV/m)	'Margin, dB**'	'Measured dB(μV/m)	'Calculated dB(μV/m)	'Limit, dB(μV/m)	'Margin dB***'	
Low carrier frequency											
4824.00	V	1.0	160	49.70	74.0	-24.30	48.85	48.32	54.0	-5.68	Pass
12062.00	H	1.1	010	46.52	74.0	-27.48	36.14	35.61	54.0	-18.39	
Mid carrier frequency											
4874.00	V	1.0	160	50.36	74.0	-23.64	49.52	48.99	54.0	-5.01	Pass
7311.00	H	1.1	000	54.84	74.0	-19.16	51.02	50.49	54.0	-3.51	
12185.00	H	1.1	020	47.79	74.0	-26.61	37.30	36.77	54.0	-17.23	
High carrier frequency											
4924.000	V	1.1	180	50.04	74.0	-23.96	47.91	47.38	54.0	-6.62	Pass
7386.000	H	1.0	000	54.06	74.0	-19.94	49.84	49.31	54.0	-4.69	
12310.00	H	1.0	000	48.33	74.0	-25.67	37.57	37.04	54.0	-16.69	

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

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

\*\*\*- Margin = Calculated field strength - specification limit, where Calculated field strength = Measured field strength + average factor.

**NOTE:** The spurious emissions sweeps were performed with EUT configured to 54 Mbps 64QAM modulation assuming maximum output power, however the spurious emissions measurements were performed with EUT configured to 1 Mbps BPSK modulation since it was found the worst case.

**Table 7.3.4 Average factor calculation**

Transmission pulse		Transmission burst		Transmission train duration, ms	Average factor, dB
Duration, ms	Period, ms	Duration, ms	Period, ms		
BPSK 1 Mbps					
8.8	9.35	NA	NA	≥100 ms	-0.53

\*- Average factor was calculated as follows

for pulse train shorter than 100 ms:

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

for pulse train longer than 100 ms:

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

$$\text{Average factor} = 20 \times \log_{10} \left( \frac{8.8}{9.35} \right) = -0.53 \text{ dB}$$



HERMON LABORATORIES

<b>Test specification:</b>	<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

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

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz  
 TEST DISTANCE: 3 m  
 MODULATION: BPSK (see Note)  
 MODULATING SIGNAL: PRBS  
 BIT RATE: 1 Mbps  
 DUTY CYCLE: 94 %  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 TRANSMITTER OUTPUT POWER: 13.92 dBm at low carrier frequency  
 10.92 dBm at mid carrier frequency  
 9.44 dBm at high carrier frequency  
 RESOLUTION BANDWIDTH: 1 kHz (9 kHz – 150 kHz)  
 9.0 kHz (150 kHz – 30 MHz)  
 120 kHz (30 MHz – 1000 MHz)  
 VIDEO BANDWIDTH: > Resolution bandwidth  
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)  
 Biconilog (30 MHz – 1000 MHz)

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				
Low carrier frequency								
400.000	32.10	29.40	46.0	-16.60	H	1.0	090	Pass
Mid carrier frequency								
400.000	31.70	29.60	46.0	-16.40	H	1.0	090	Pass
High carrier frequency								
400.00	30.7	27.70	46.0	-18.30	H	1.0	090	Pass

\*- Margin = Measured emission - specification limit.

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

**NOTE:** The spurious emissions sweeps were performed with EUT configured to 54 Mbps 64QAM modulation assuming maximum output power, however the spurious emissions measurements were performed with EUT configured to 1 Mbps BPSK modulation since it was found the worst case.

**Table 7.3.6 Restricted bands**

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

**Reference numbers of test equipment used**

HL 0446	HL 0521	HL 0604	HL 0768	HL 1984	HL 2254	HL 2780	HL 2882
HL 3121	HL 3532	HL 3534	HL 3535	HL 3616			

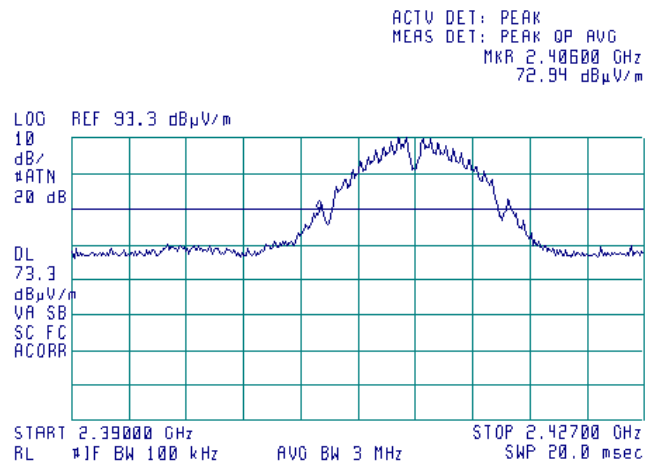
Full description is given in Appendix A.



HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.3.1 Radiated emission measurements at the low carrier frequency with BPSK modulation at 1 Mbps



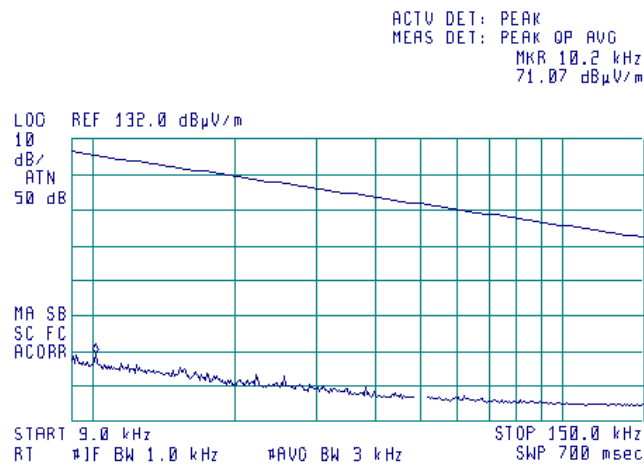


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

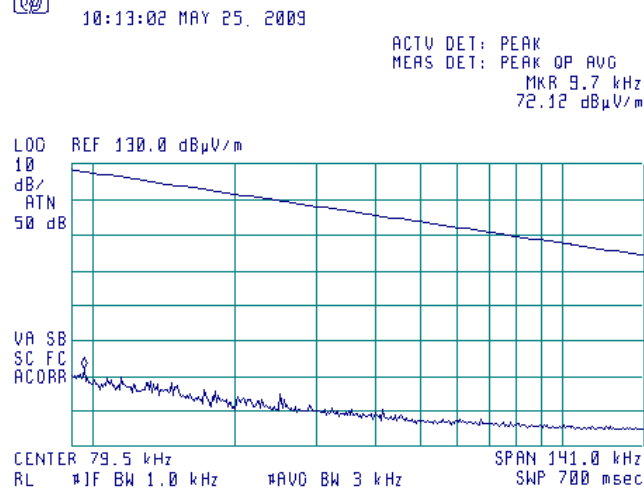
Plot 7.3.2 Radiated emission measurements from 9 to 150 kHz at the low carrier frequency

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



Plot 7.3.3 Radiated emission measurements from 9 to 150 kHz at the mid carrier frequency

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



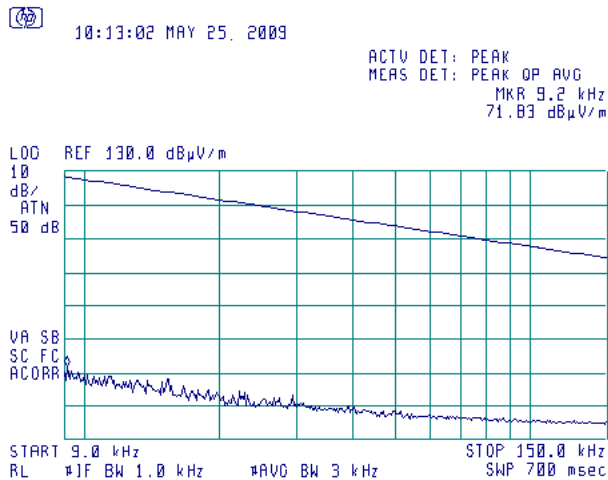


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

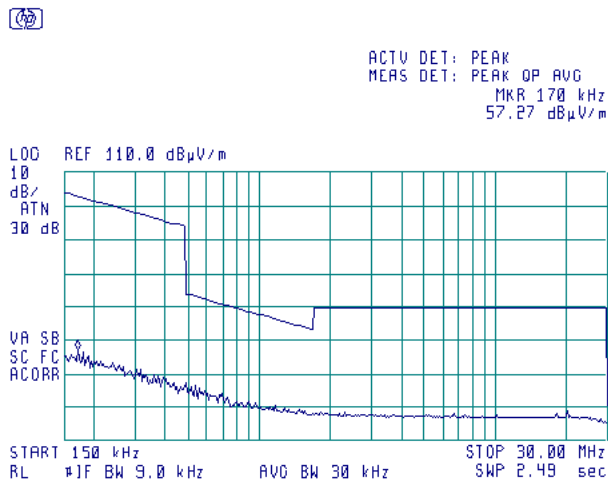
Plot 7.3.4 Radiated emission measurements from 9 to 150 kHz at the high carrier frequency

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



Plot 7.3.5 Radiated emission measurements from 150 kHz to 30 MHz at the low carrier frequency

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



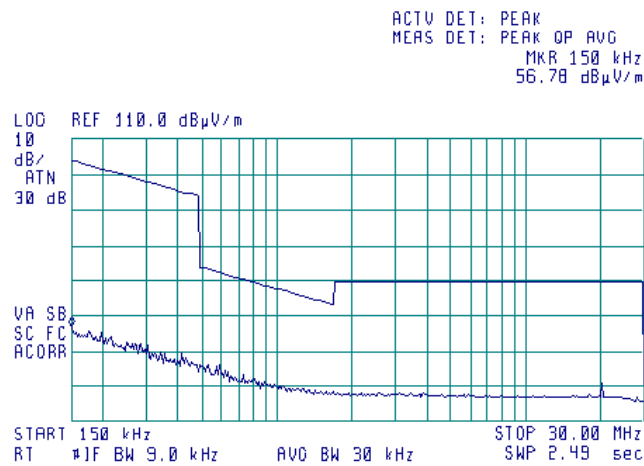


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.3.6 Radiated emission measurements from 0.15 to 30 MHz at the mid carrier frequency

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

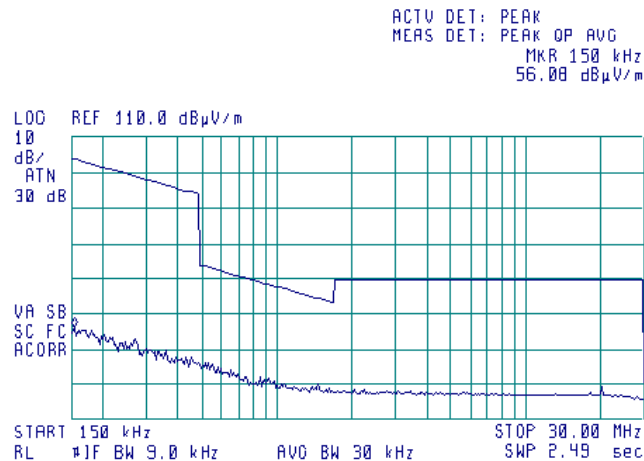


Plot 7.3.7 Radiated emission measurements from 0.15 to 30 MHz at the high carrier frequency

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



10:12:00 MAY 25, 2009



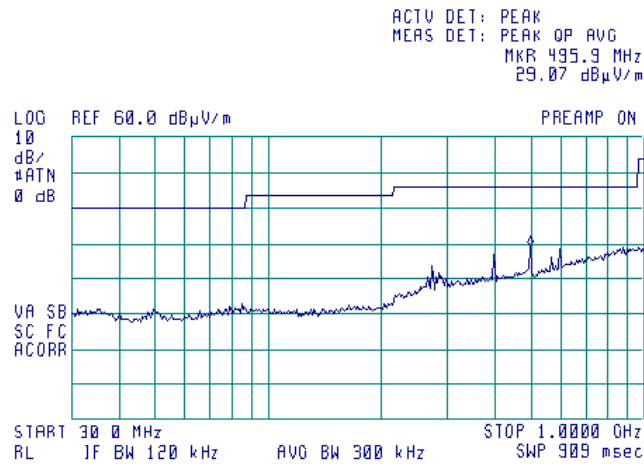


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

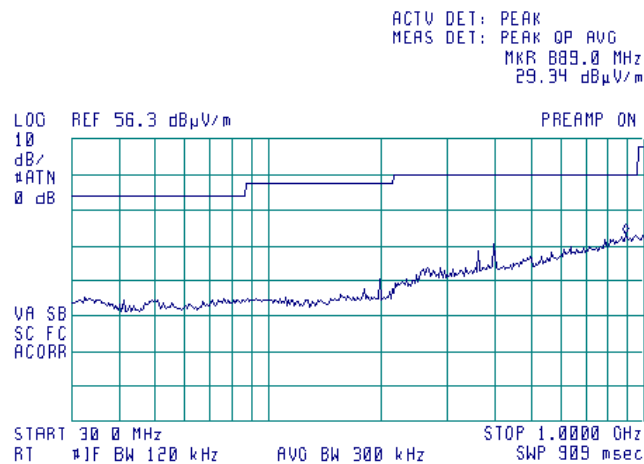
Plot 7.3.8 Radiated emission measurements from 30 to 1000 MHz at the low carrier frequency

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



Plot 7.3.9 Radiated emission measurements from 30 to 1000 MHz at the mid carrier frequency

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



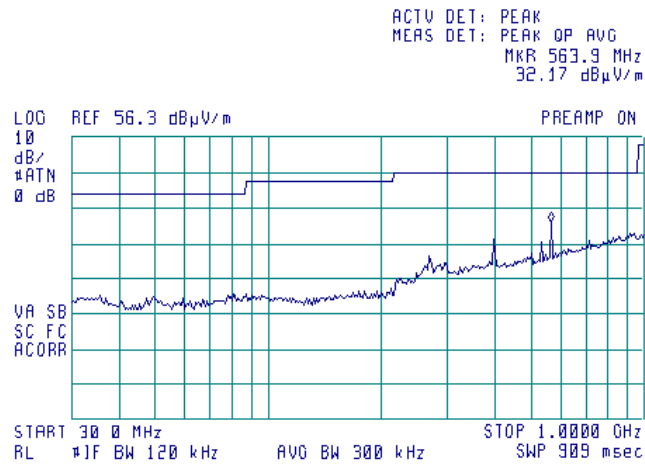


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

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

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





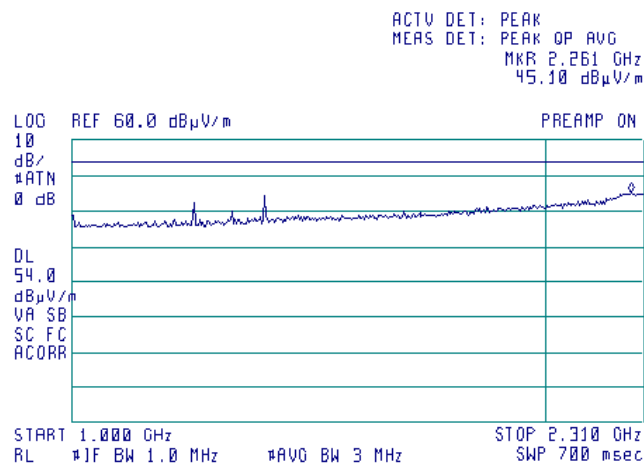


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b> PASS	
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

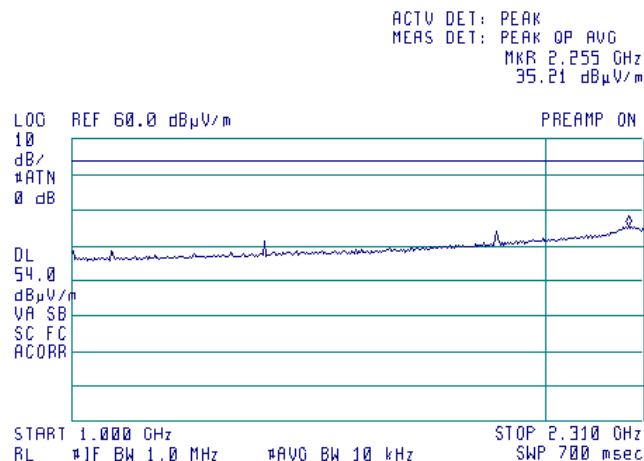
Plot 7.3.11 Radiated emission measurements from 1000 to 2310 MHz at the low carrier frequency

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



Plot 7.3.12 Radiated emission measurements from 1000 to 2310 MHz at the low carrier frequency

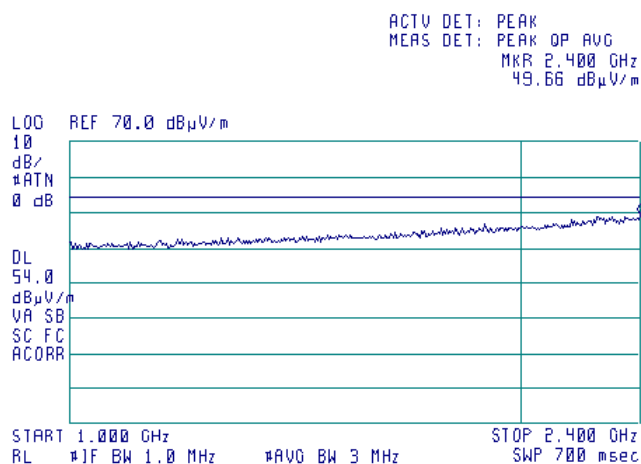
TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR: VBW = 10 kHz



<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

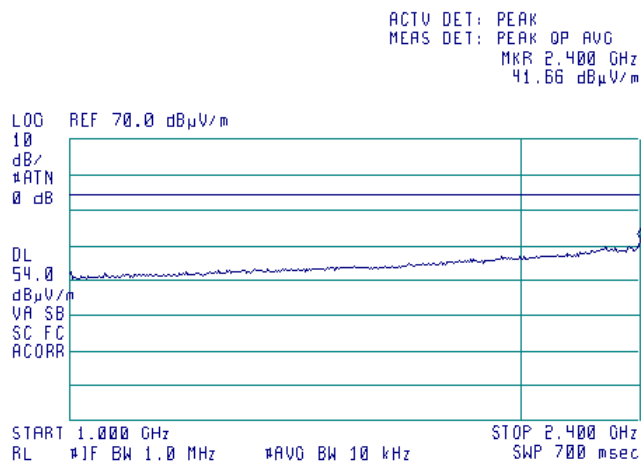
**Plot 7.3.13 Radiated emission measurements from 1000 to 2400 MHz at the mid carrier frequency**

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



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

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR: VBW = 10 kHz





HERMON LABORATORIES

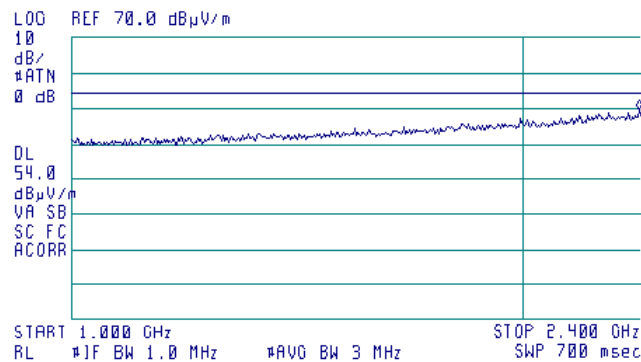
<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b> PASS	
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

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

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



ACTV DET: PEAK  
MEAS DET: PEAK OP AVG  
MKR 2.388 GHz  
49.49 dBμV/m

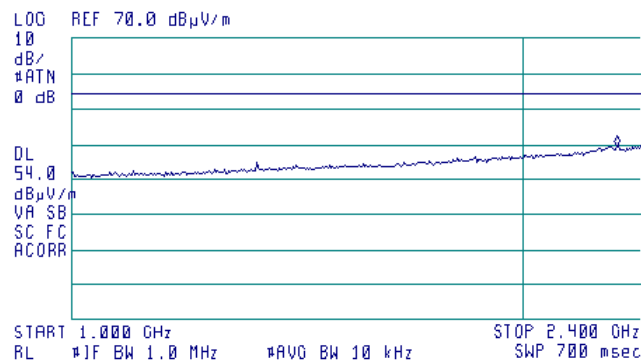


Plot 7.3.16 Radiated emission measurements from 1000 to 2400 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR: VBW = 10 kHz



ACTV DET: PEAK  
MEAS DET: PEAK OP AVG  
MKR 2.384 GHz  
39.28 dBμV/m



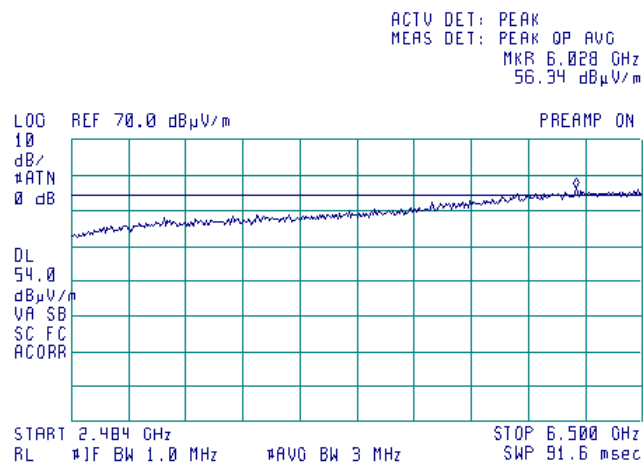


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

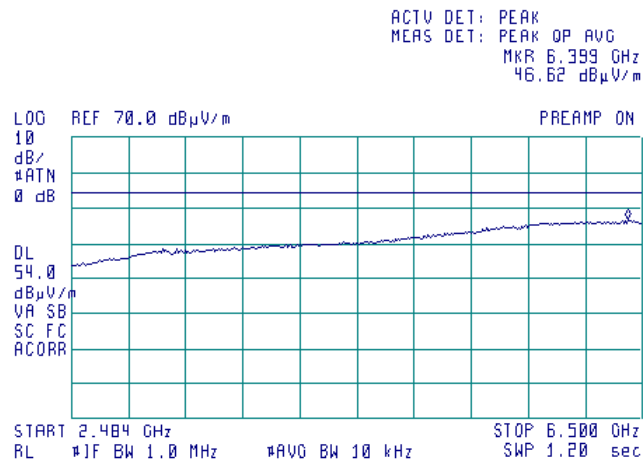
Plot 7.3.17 Radiated emission measurements from 2483.5 to 6500 MHz at the low carrier frequency

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



Plot 7.3.18 Radiated emission measurements from 2483.5 to 6500 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR: VBW = 10 kHz



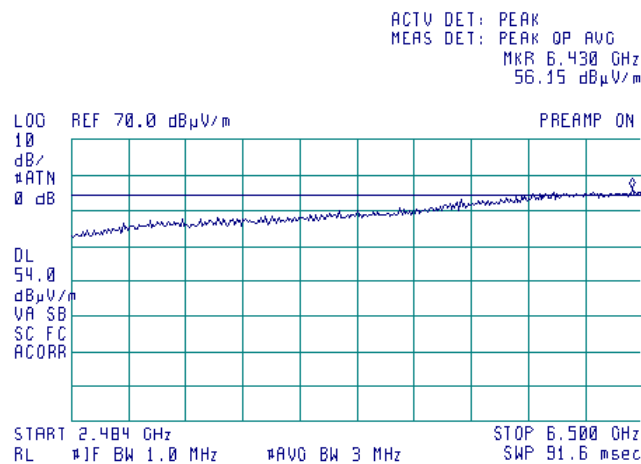


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

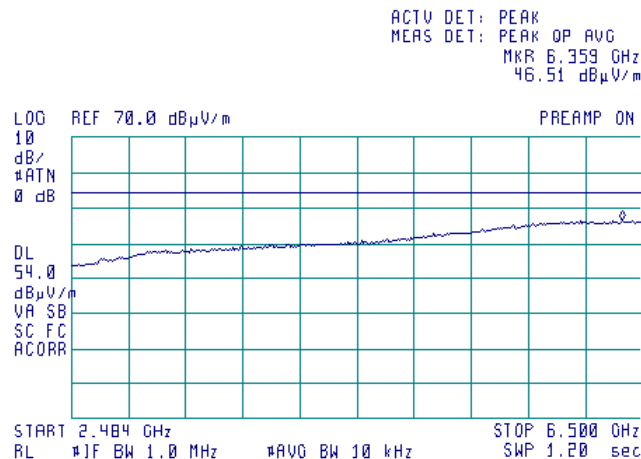
Plot 7.3.19 Radiated emission measurements from 2483.5 to 6500 MHz at the mid carrier frequency

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



Plot 7.3.20 Radiated emission measurements from 2483.5 to 6500 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR: VBW = 10 kHz



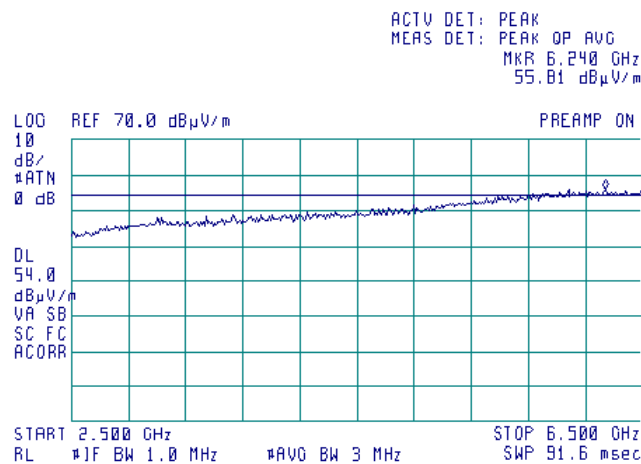


HERMON LABORATORIES

Test specification:		FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions	
Test procedure:		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

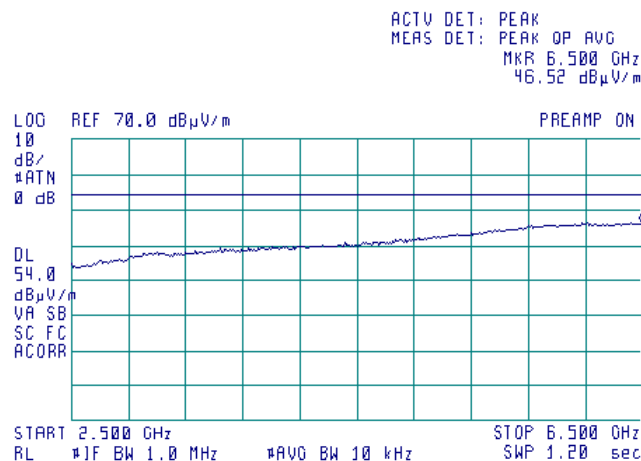
Plot 7.3.21 Radiated emission measurements from 2500 to 6500 MHz at the high carrier frequency

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



Plot 7.3.22 Radiated emission measurements from 2500 to 6500 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR: VBW = 10 kHz



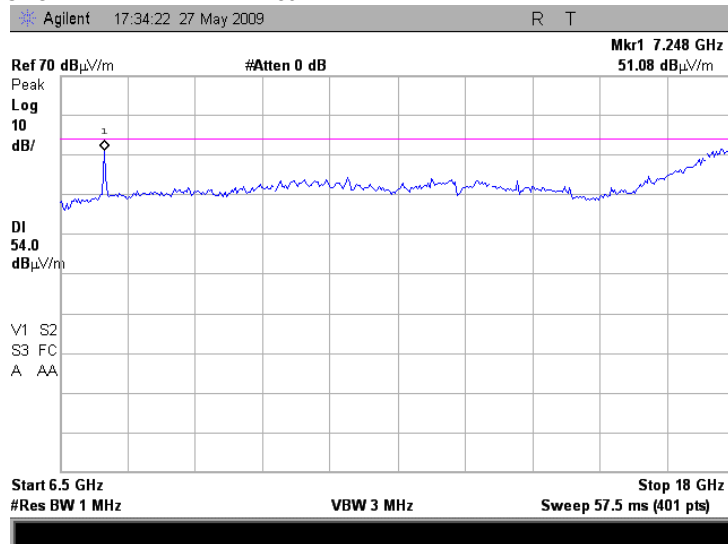


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

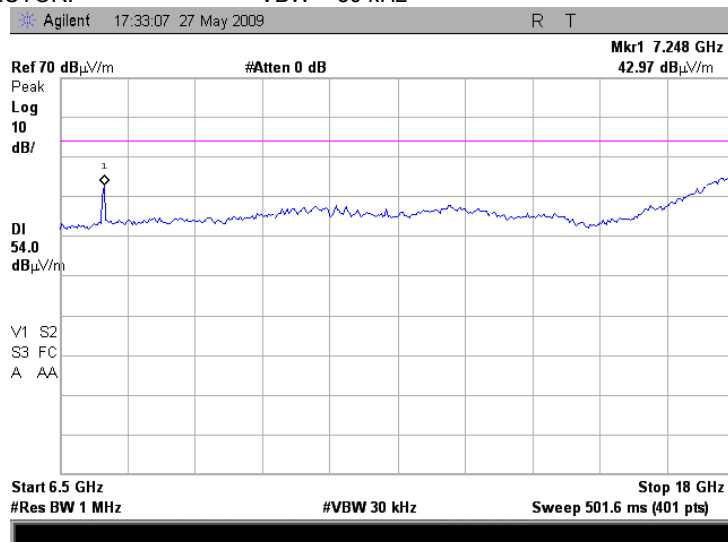
Plot 7.3.23 Radiated emission measurements from 6500 to 18000 MHz at the low carrier frequency

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



Plot 7.3.24 Radiated emission measurements from 6500 to 18000 MHz at the low carrier frequency

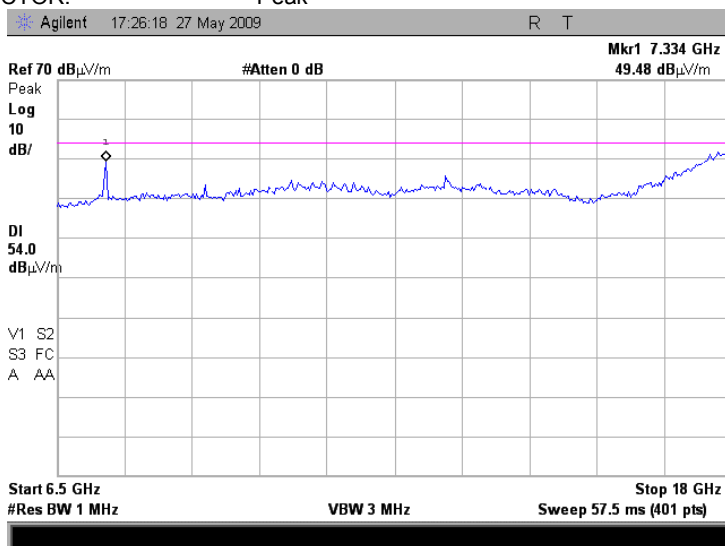
TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR: VBW = 30 kHz



<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

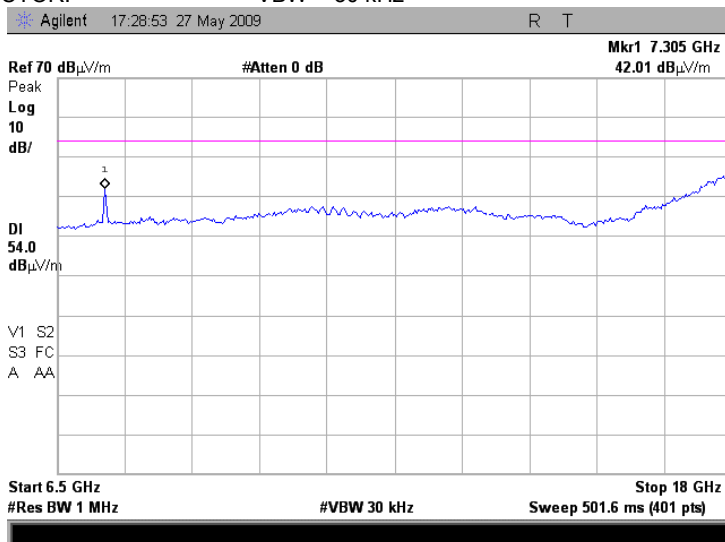
**Plot 7.3.25 Radiated emission measurements from 6500 to 18000 MHz at the mid carrier frequency**

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



**Plot 7.3.26 Radiated emission measurements from 6500 to 18000 MHz at the mid carrier frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR: VBW = 30 kHz





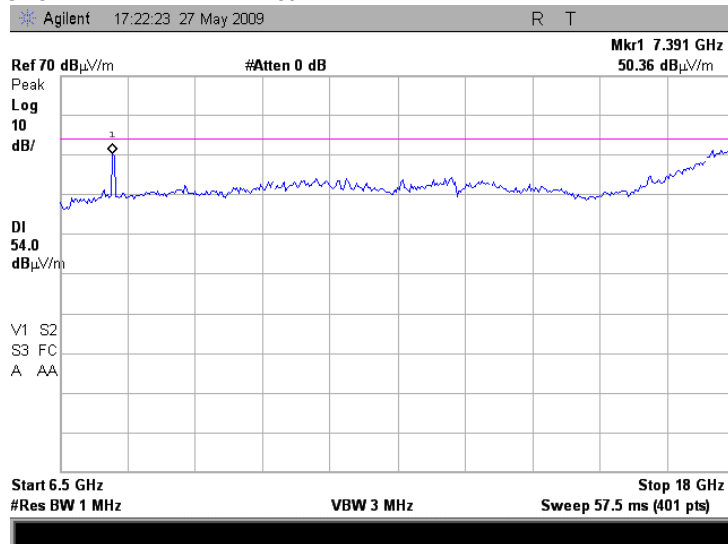


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

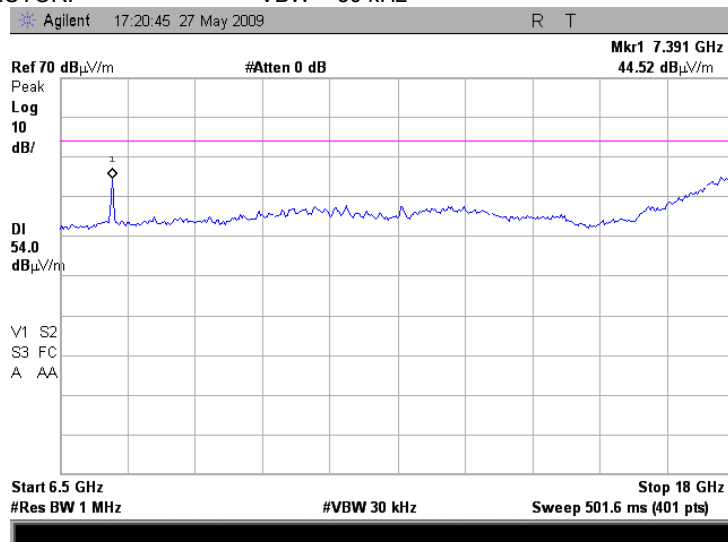
Plot 7.3.27 Radiated emission measurements from 6500 to 18000 MHz at the high carrier frequency

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



Plot 7.3.28 Radiated emission measurements from 6500 to 18000 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical and Horizontal  
DETECTOR: VBW = 30 kHz



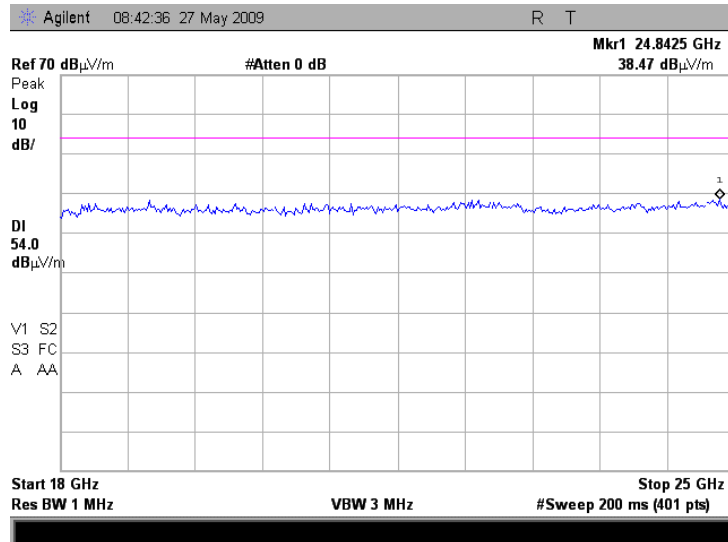


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>		Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b>		6/17/2009 4:06:32 PM	
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

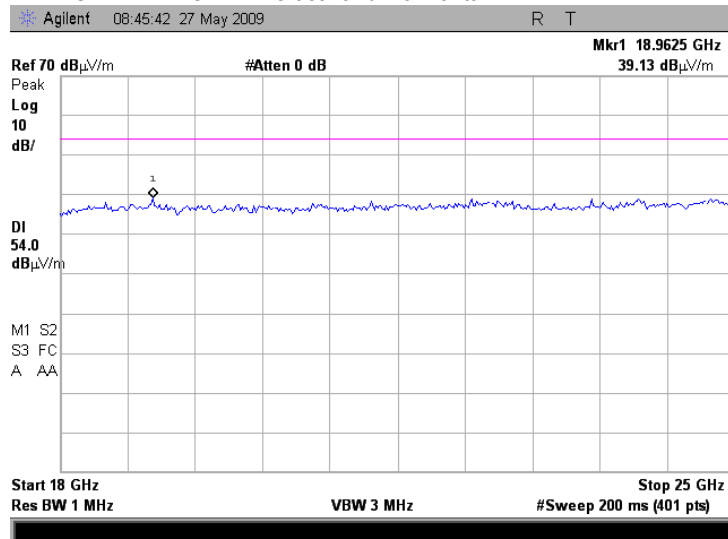
Plot 7.3.29 Radiated emission measurements from 18000 to 25000 MHz at the low carrier frequency

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



Plot 7.3.30 Radiated emission measurements from 18000 to 25000 MHz at the mid carrier frequency

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



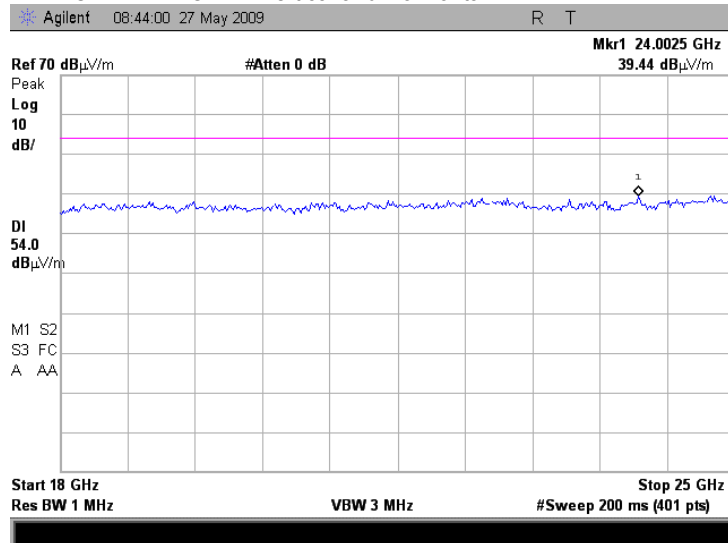


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>		Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b>		6/17/2009 4:06:32 PM	
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

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

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



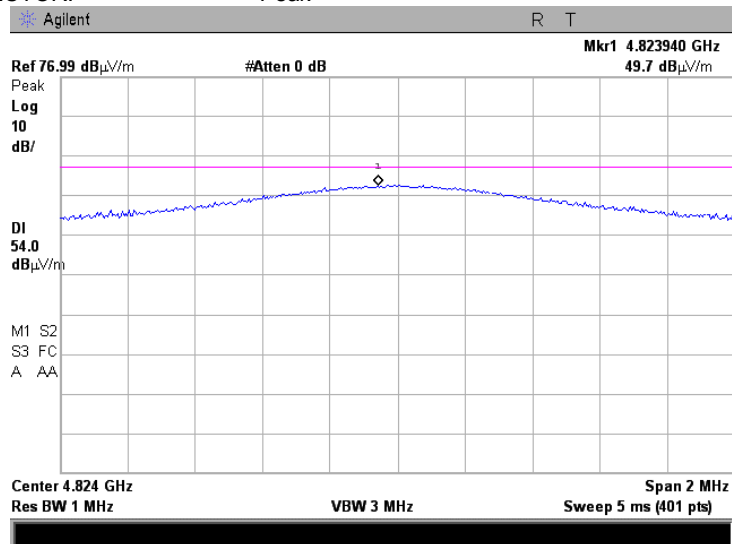


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>		Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b>		6/17/2009 4:06:32 PM	
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

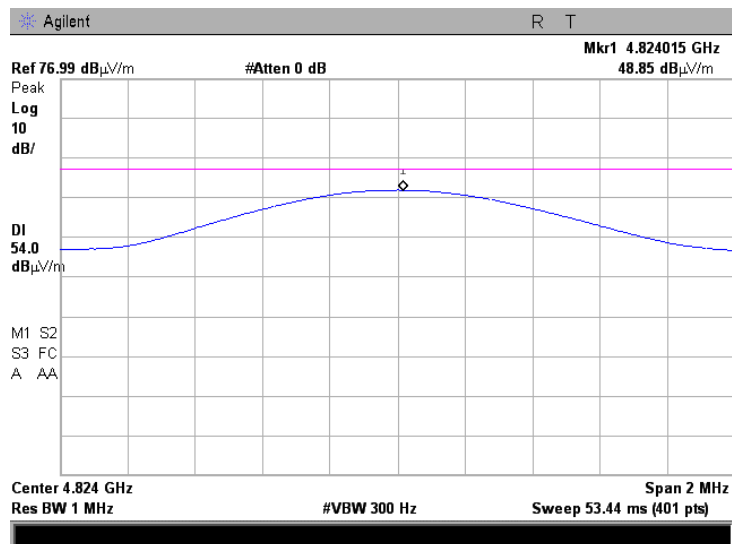
Plot 7.3.32 Radiated emission measurements at the second harmonic of low carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: Peak



Plot 7.3.33 Radiated emission measurements at the second harmonic of low carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: VBW = 300 Hz



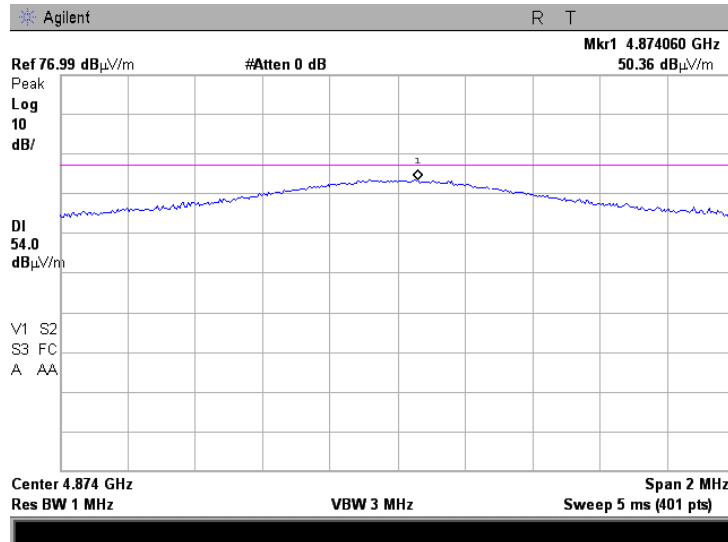


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

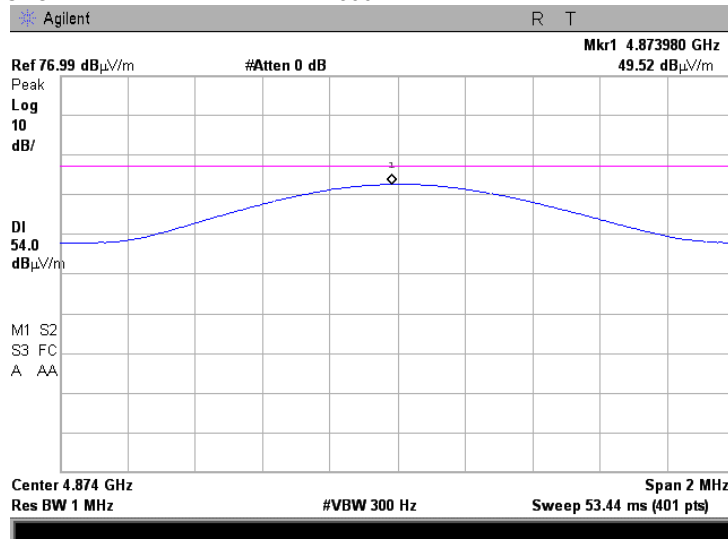
Plot 7.3.34 Radiated emission measurements at the second harmonic of mid carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: Peak



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

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: VBW = 300 Hz



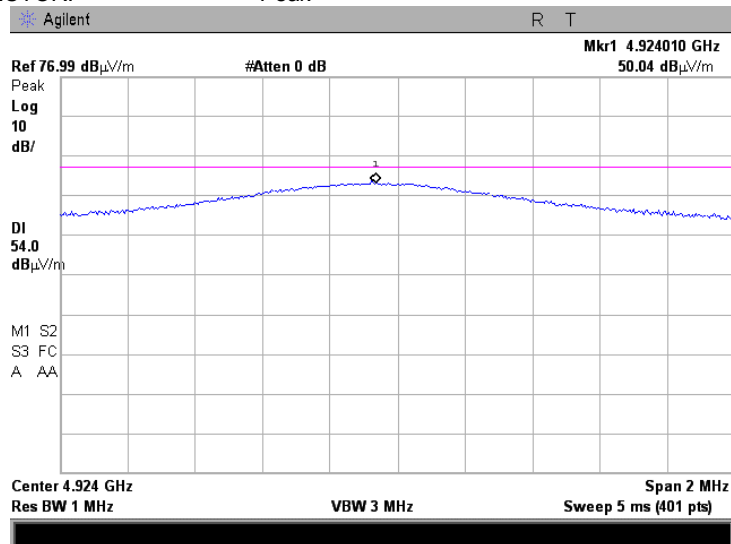


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

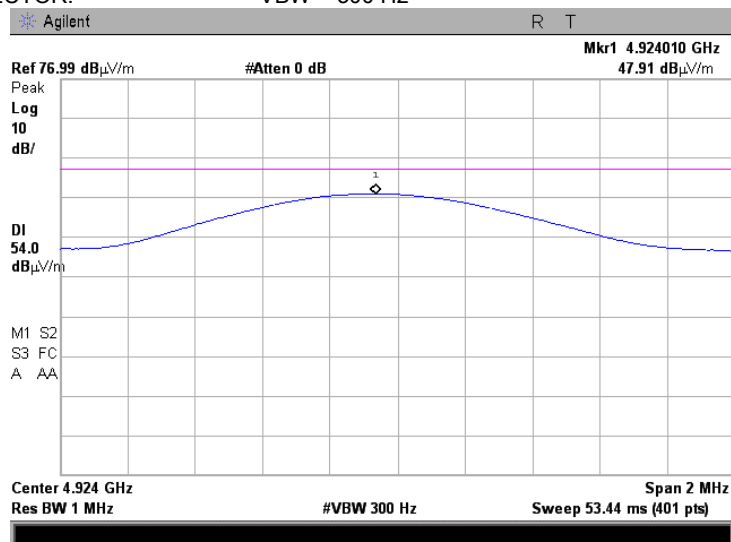
Plot 7.3.36 Radiated emission measurements at the second harmonic of high carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: Peak



Plot 7.3.37 Radiated emission measurements at the second harmonic of high carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: VBW = 300 Hz



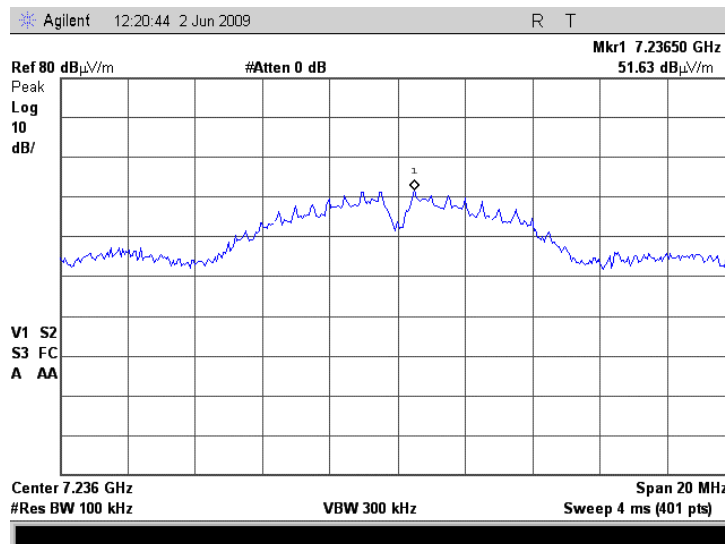


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

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

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: Peak



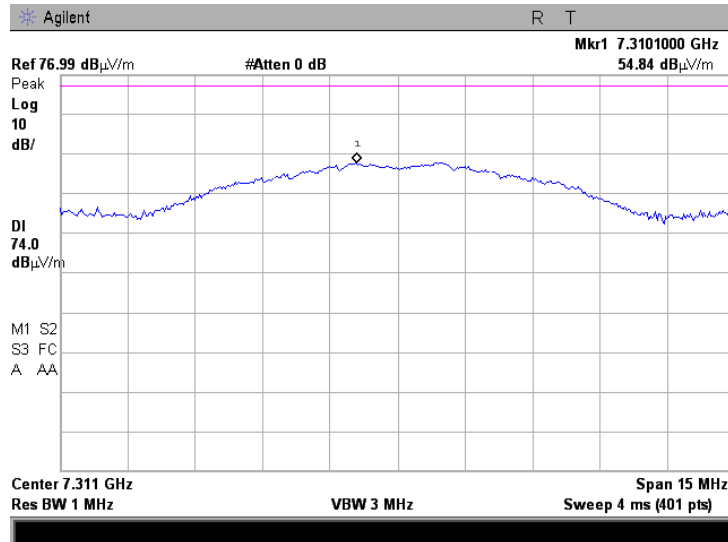


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>		Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b>		6/17/2009 4:06:32 PM	
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

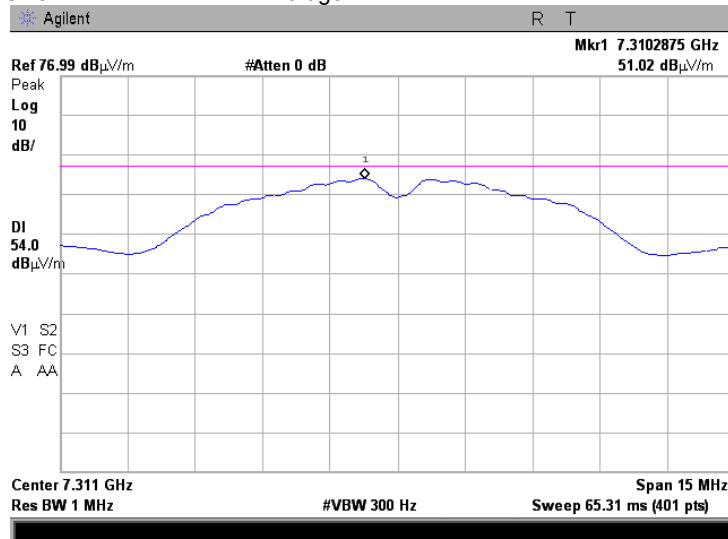
Plot 7.3.39 Radiated emission measurements at the third harmonic of mid carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: Peak



Plot 7.3.40 Radiated emission measurements at the third harmonic of mid carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: Average

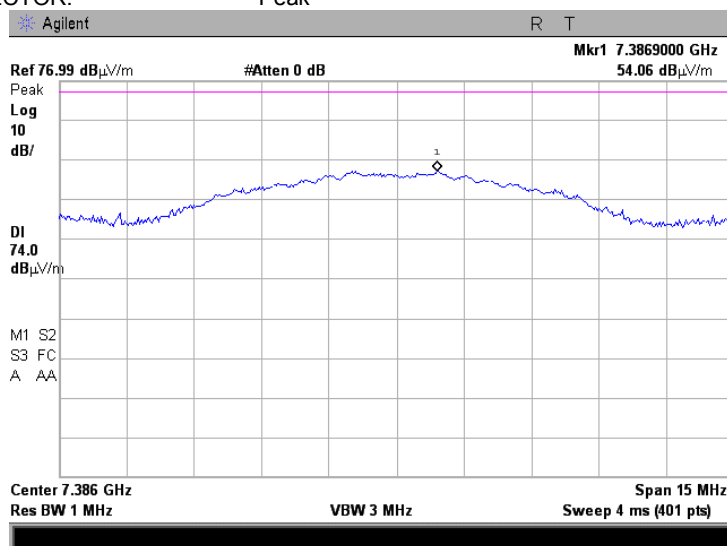




<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

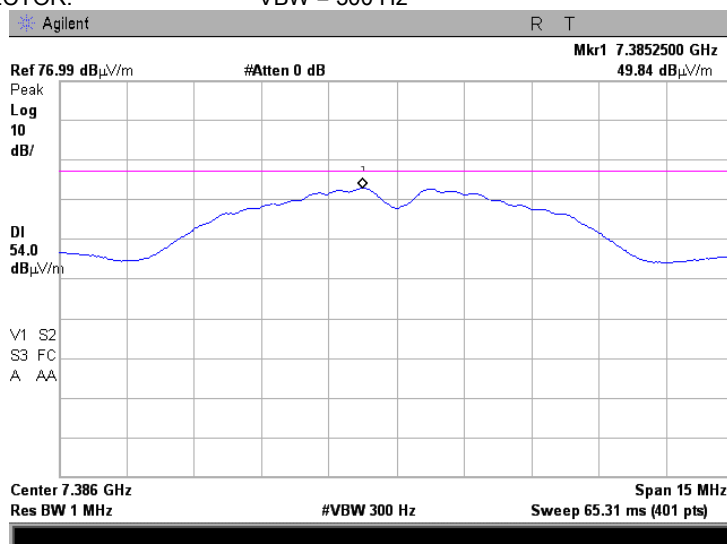
Plot 7.3.41 Radiated emission measurements at the third harmonic of high carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: Peak



Plot 7.3.42 Radiated emission measurements at the third harmonic of high carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: VBW = 300 Hz



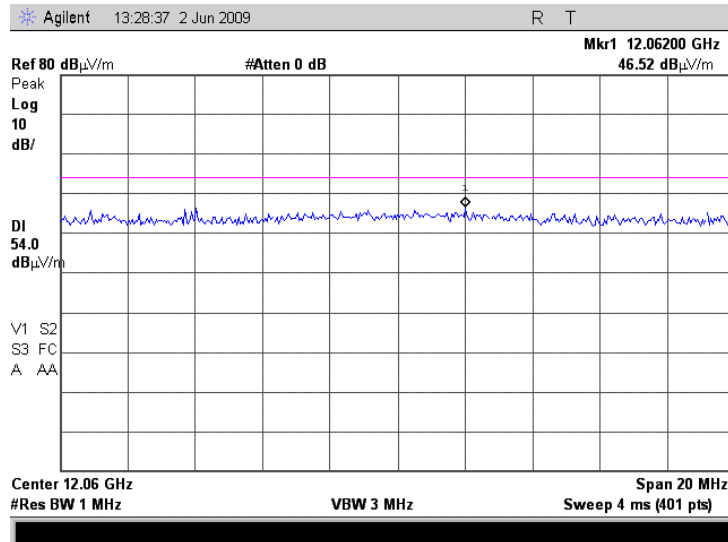


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

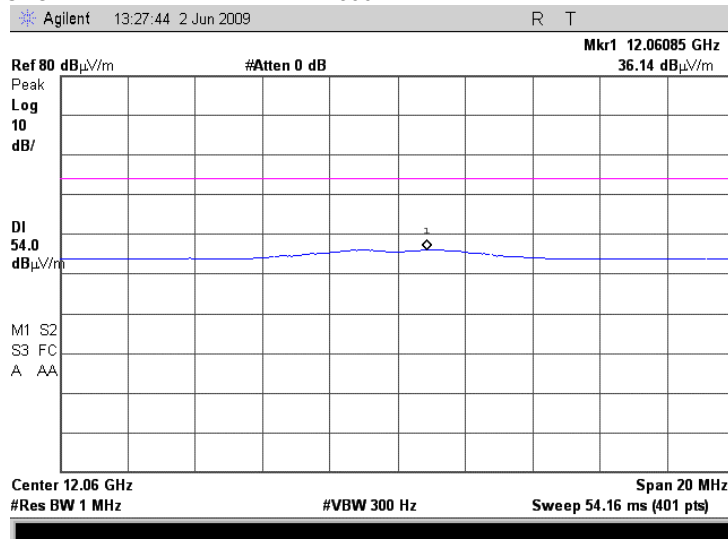
Plot 7.3.43 Radiated emission measurements at the fifth harmonic of low carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: Peak



Plot 7.3.44 Radiated emission measurements at the fifth harmonic of low carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: VBW = 300 Hz



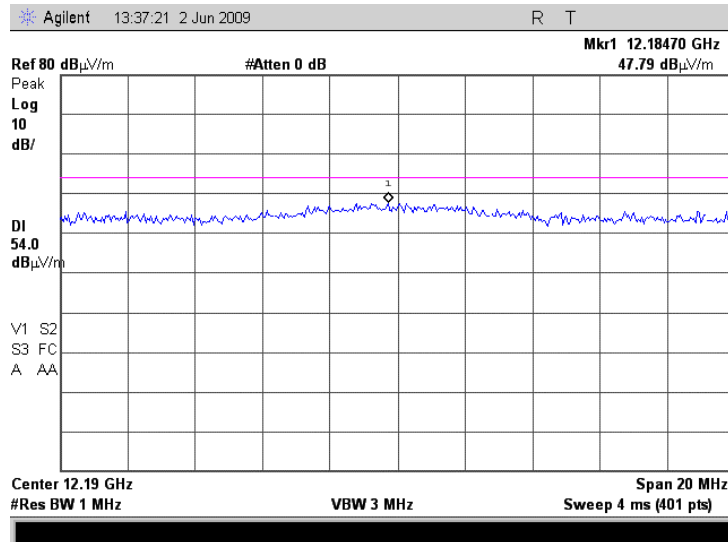


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

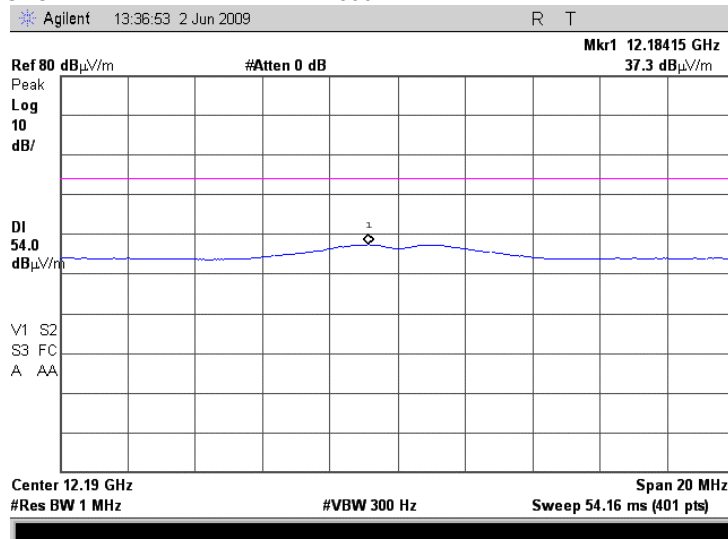
Plot 7.3.45 Radiated emission measurements at the fifth harmonic of mid carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: Peak



Plot 7.3.46 Radiated emission measurements at the fifth harmonic of mid carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: VBW = 300 Hz



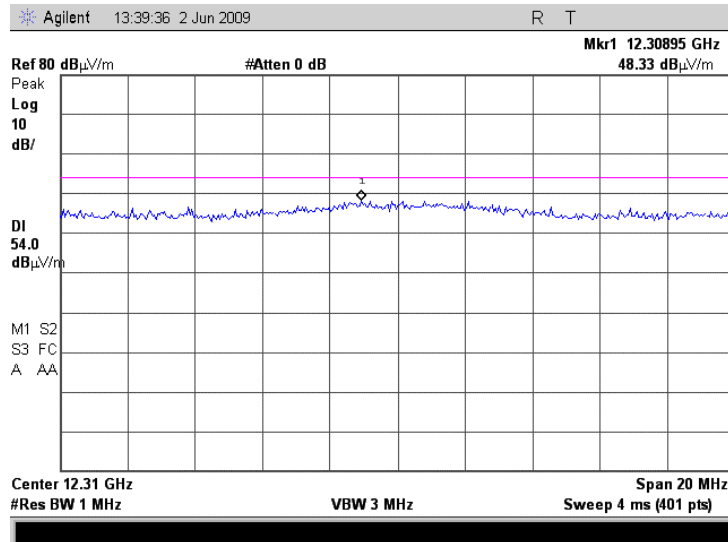


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

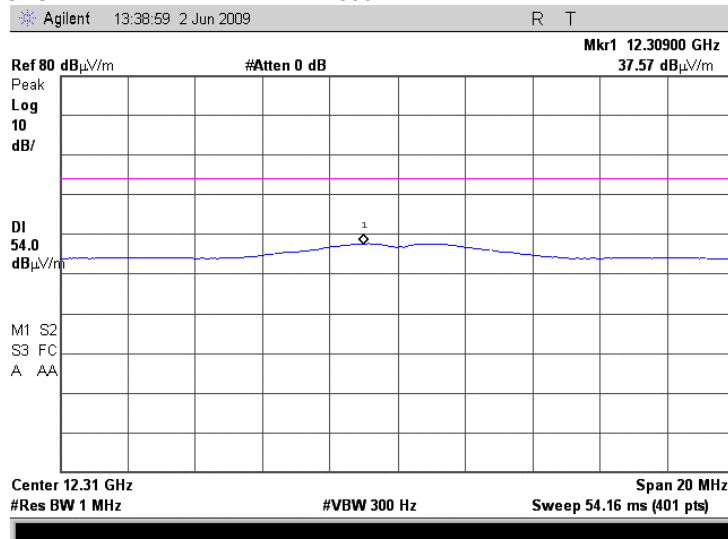
Plot 7.3.47 Radiated emission measurements at the fifth harmonic of high carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: Peak



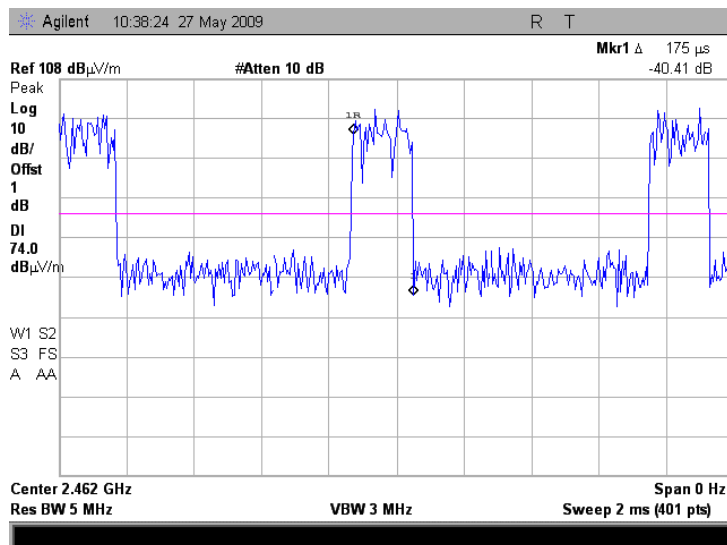
Plot 7.3.48 Radiated emission measurements at the fifth harmonic of high carrier frequency

TEST SITE: OATS  
TEST DISTANCE: 3 m  
DETECTOR: VBW = 300 Hz

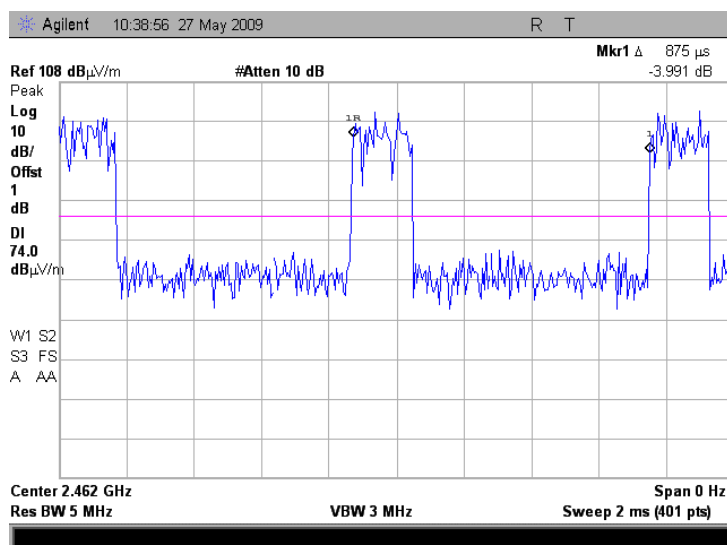


<b>Test specification:</b>	<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Plot 7.3.49 Transmission pulse duration, 64QAM modulation @54 Mbps

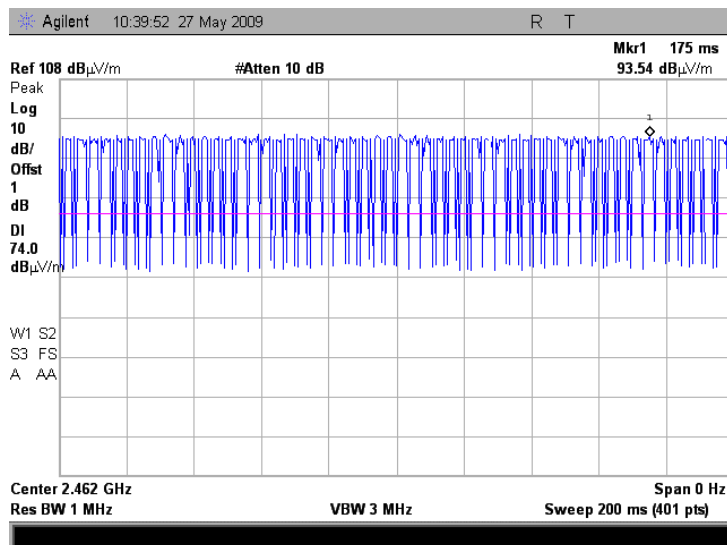


Plot 7.3.50 Transmission pulse period, 64QAM modulation @54 Mbps



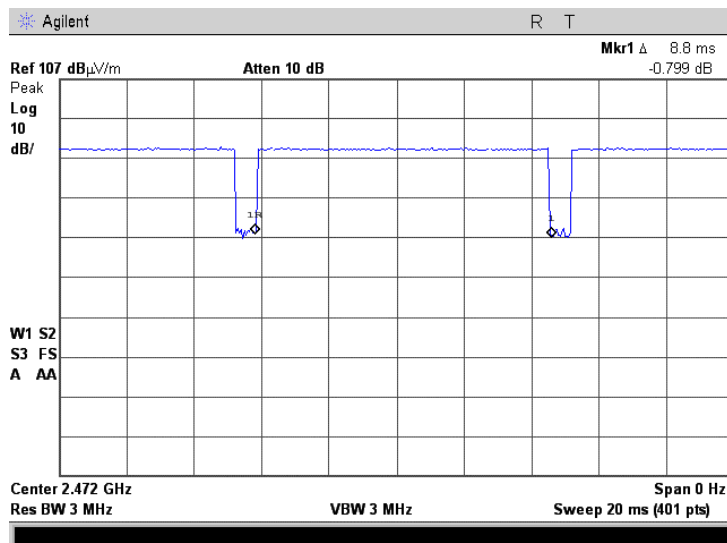
<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>	
<b>Test procedure:</b>		FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b> PASS	
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Plot 7.3.51 Transmission train duration, 64QAM modulation @54 Mbps

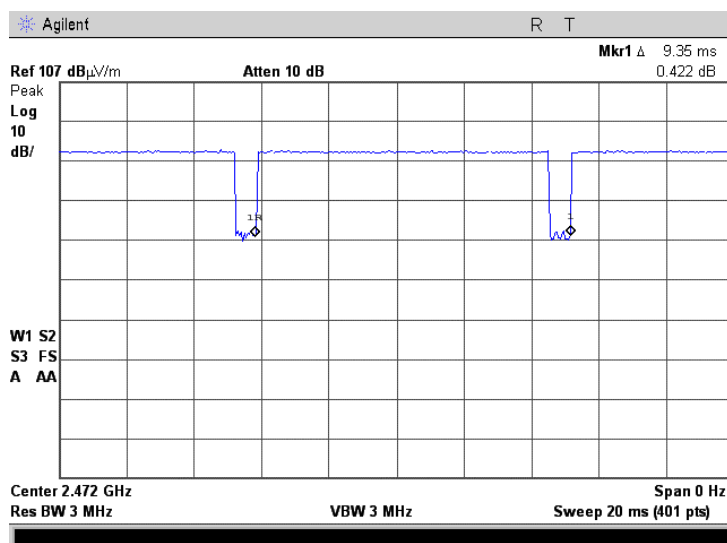


<b>Test specification:</b>	<b>FCC section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Plot 7.3.52 Transmission pulse duration, BPSK modulation @1 Mbps



Plot 7.3.53 Transmission pulse period, BPSK modulation @1 Mbps





<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges</b>	
<b>Test procedure:</b>		Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

## 7.4 Band edge radiated emissions

### 7.4.1 General

This test was performed to measure emissions, radiated from the EUT at the assigned frequency band edges. Specification test limits are given in Table 7.4.1.

**Table 7.4.1 Band edge emission limits**

Assigned frequency, MHz	Attenuation below carrier*, dBc	Field strength at 3 m within restricted bands, dB(μV/m)	
		Peak	Average
902.0 – 928.0	20.0	74.0	54.0
2400.0 – 2483.5			
5725.0 – 5850.0			

\* - Band edge emission limit is provided in terms of attenuation below the peak of modulated carrier measured with the same resolution bandwidth.

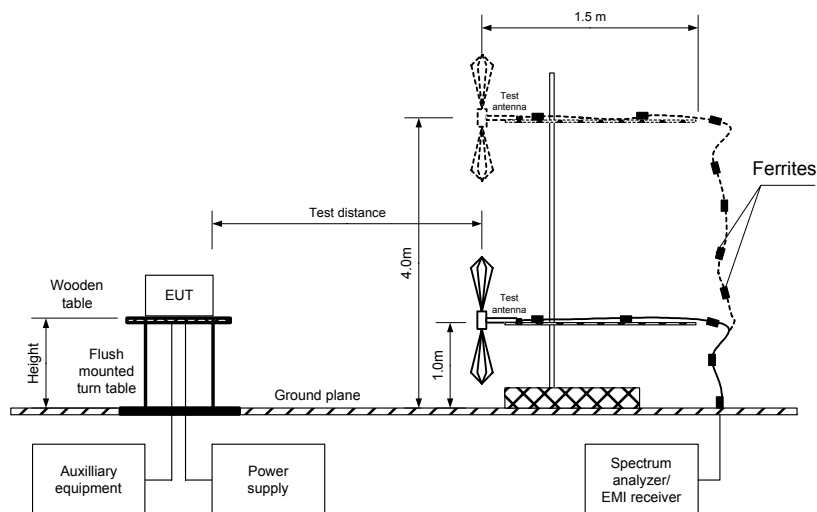
### 7.4.2 Test procedure

- 7.4.2.1** The EUT was set up as shown in Figure 7.4.1, energized normally modulated and its proper operation was checked.
- 7.4.2.2** The EUT was adjusted to produce maximum available to end user RF output power at the lowest carrier frequency.
- 7.4.2.3** The spectrum analyzer span was set to capture the carrier frequency and associated modulation products. The resolution bandwidth was set wider than 1 % of the frequency span.
- 7.4.2.4** The spectrum analyzer was set in max hold mode and allowed trace to stabilize. The highest emission level within the authorized band was measured.
- 7.4.2.5** The maximum band edge emission and modulation product outside of the band were measured as provided in Table 7.4.2 and associated plots and referenced to the highest emission level measured within the authorized band.
- 7.4.2.6** The above procedure was repeated with the EUT adjusted to produce maximum RF output power at the highest carrier frequency.



<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges</b>	
<b>Test procedure:</b>		Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>		Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b>		6/17/2009 4:06:32 PM	
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

**Figure 7.4.1 Band edge emission test setup**





HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges</b>	
<b>Test procedure:</b>		Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

**Table 7.4.2 Band edge emission test results**

ASSIGNED FREQUENCY RANGE: 2400.00 – 2483.5 MHz  
 DETECTOR USED: Peak  
 MODULATION: BPSK/64QAM  
 MODULATING SIGNAL: PRBS  
 BIT RATE: 1/11/6/54Mbps  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 RESOLUTION BANDWIDTH:  $\geq 1\%$  of the span  
 VIDEO BANDWIDTH:  $\geq$  RBW

Frequency, MHz	Band edge emission, dB $\mu$ V/m	Emission at carrier, dB $\mu$ V/m	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
<b>QPSK 1 Mbps</b>						
The highest band edge emission meets 20 dBc limit at 2406.00 MHz				20.0	NA	Pass
<b>64QAM 11 Mbps</b>						
The highest band edge emission meets 20 dBc limit at 2405.54 MHz				20.0	NA	Pass
<b>QPSK 6 Mbps</b>						
The highest band edge emission meets 20 dBc limit at 2403.41 MHz				20.0	NA	Pass
2398.180	91.0	65.45	25.55	20.0	-5.55	Pass
<b>64QAM 54 Mbps</b>						
The highest band edge emission meets 20 dBc limit at 2403.60 MHz				20.0	NA	Pass

\*- Margin = Attenuation below carrier – specification limit.



HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges			
Test procedure:	Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4			
Test mode:	Compliance	Verdict:		PASS
Date & Time:	6/17/2009 4:06:32 PM			
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC	
Remarks:				

**Table 7.4.3 Field strength of spurious emissions above 1 GHz within restricted bands**

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz  
 INVESTIGATED FREQUENCY RANGE: 2310.0 – 2390.0 and 2483.5 – 2500.0 MHz  
 TEST DISTANCE: 3 m  
 MODULATION: BPSK/64QAM  
 MODULATING SIGNAL: PRBS  
 BIT RATE: 1/11/6/54Mbps  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 1000 kHz  
 TEST ANTENNA TYPE: Double ridged guide

Frequency MHz	Antenna		Azimuth degrees	Peak field strength(VBW=3 MHz)			Average field strength(VBW=1/Txon kHz)				Verdict
	Polarization	Height m		Measured dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured dB(μV/m)	Calculated dB(μV/m)	Limit, dB(μV/m)	Margin dB***	
Low carrier frequency											
BPSK 1 Mbps											Pass
2386.400	V	1.2	010	48.12	74.0	-25.88	37.63	37.09	54.0	-16.91	
64 QAM 11 Mbps											
2390.000	V	1.2	010	49.33	74.0	-24.67	38.55	34.02	54.0	-19.98	
BPSK 6 Mbps											
2390.000	V	1.2	010	67.30	74.0	-6.70	48.15	44.93	54.0	-9.07	
64QAM 54 Mbps											
2390.000	V	1.2	010	71.16	74.0	-2.84	57.50	43.50	54.0	-10.50	
High carrier frequency											
BPSK 1 Mbps											Pass
2485.600	V	1.2	010	46.88	74.0	-27.12	34.64	34.11	54.0	-19.89	
64 QAM 11 Mbps											
2484.040	V	1.2	010	47.55	74.0	-26.45	36.22	31.69	54.0	-22.31	
BPSK 6 Mbps											
2484.080	V	1.2	010	65.53	74.0	-8.47	48.07	44.85	54.0	-9.15	
64QAM 54 Mbps											
2483.500	V	1.2	010	63.54	74.0	-10.46	51.13	37.13	54.0	-16.87	

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

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

\*\*\*- Margin = Calculated field strength - specification limit, where Calculated field strength = Measured field strength + average factor.



HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges</b>			
<b>Test procedure:</b>		Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4			
<b>Test mode:</b>		Compliance		<b>Verdict:</b> PASS	
<b>Date &amp; Time:</b>		6/17/2009 4:06:32 PM			
<b>Temperature: 23°C</b>		<b>Air Pressure:</b> 1009 hPa		<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>					

Table 7.4.4 Average factor calculation

Transmission pulse		Transmission burst		Transmission train duration, ms	Average factor, dB
Duration, ms	Period, ms	Duration, ms	Period, ms		
BPSK 1 Mbps					
8.8	9.36	NA	NA	≥100 ms	-0.54
64QAM 11 Mbps					
0.98	1.65	NA	NA	≥100 ms	-4.53
BPSK 6 Mbps					
1.47	2.13	NA	NA	≥100 ms	-3.22
64QAM 54 Mbps					
0.175	0.875	NA	NA	≥100 ms	-14.0

\*- Average factor was calculated as follows

pulse train longer than 100 ms:

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

**Reference numbers of test equipment used**

HL 0521	HL 1984	HL 3122	HL 3616				
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Full description is given in Appendix A.

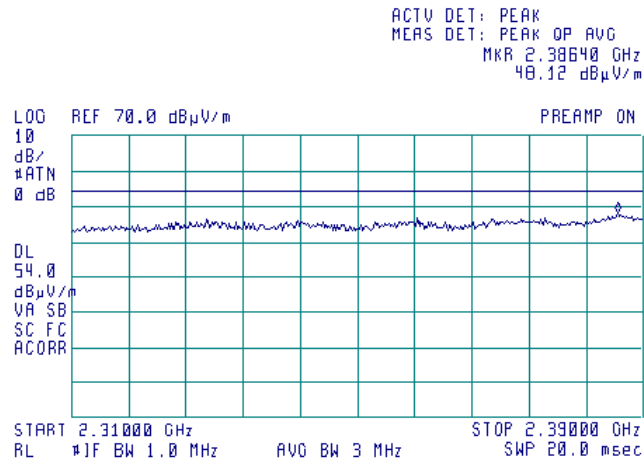


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges</b>	
<b>Test procedure:</b>		Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b> PASS	
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

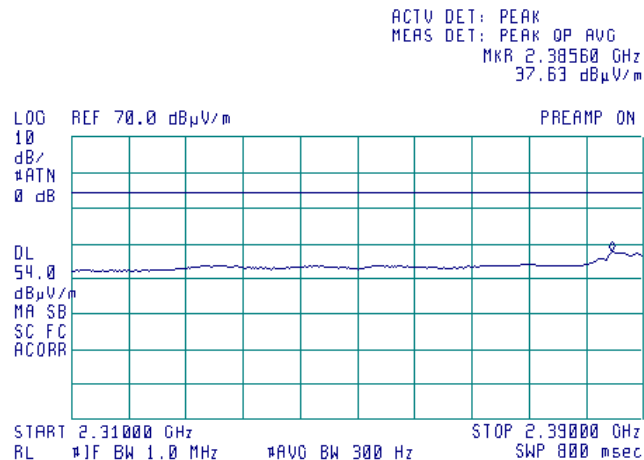
Plot 7.4.1 The highest emission level within the band edge in 2310.0 - 2390.0 MHz range,  
BPSK modulation @ 1 Mbps

DETECTOR: Peak



Plot 7.4.2 The highest emission level within the band edge in 2310.0 - 2390.0 MHz range,  
BPSK modulation @ 1 Mbps

DETECTOR: VBW = 1/Txon = 300 Hz



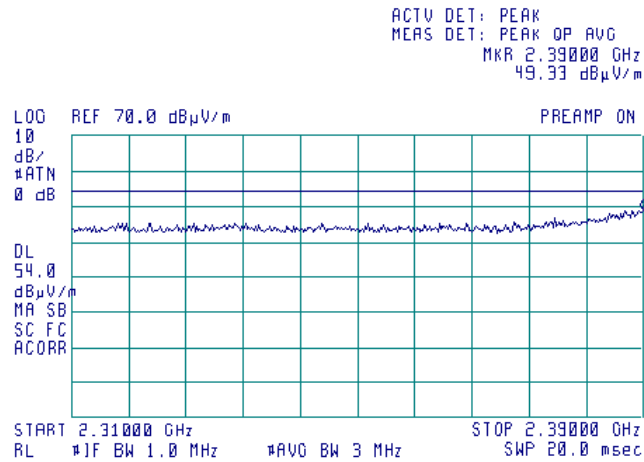


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges</b>	
<b>Test procedure:</b>		Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

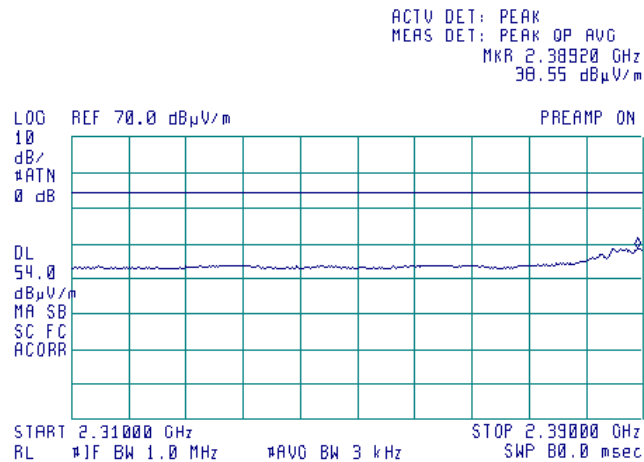
Plot 7.4.3 The highest emission level within the band edge in 2310.0 - 2390.0 MHz range,  
64QAM modulation @ 11 Mbps

DETECTOR: Peak



Plot 7.4.4 The highest emission level within the band edge in 2310.0 - 2390.0 MHz range,  
64QAM modulation @ 11 Mbps

DETECTOR: VBW = 1/Txon = 3000 Hz



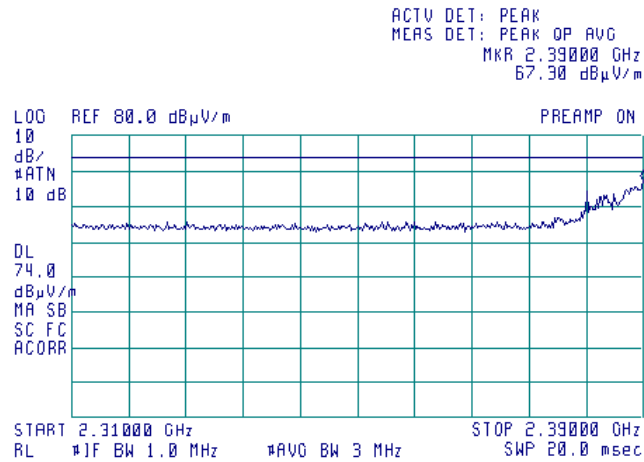


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

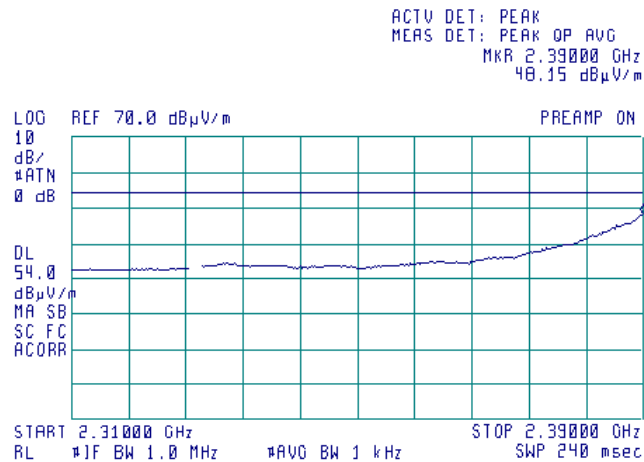
Plot 7.4.5 The highest emission level within the band edge in 2310.0 - 2390.0 MHz range,  
BPSK modulation @ 6 Mbps

DETECTOR: Peak



Plot 7.4.6 The highest emission level within the band edge in 2310.0 - 2390.0 MHz range,  
BPSK modulation @ 6 Mbps

DETECTOR: VBW = 1/Txon = 1000 Hz



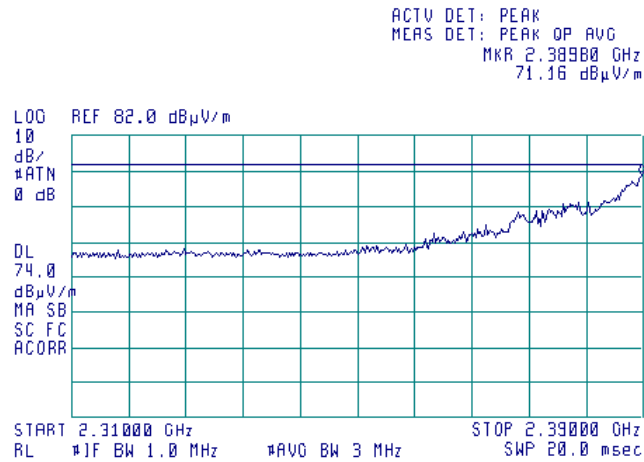


HERMON LABORATORIES

Test specification:		FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges	
Test procedure:		Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4	
Test mode:		Compliance	Verdict: PASS
Date & Time:		6/17/2009 4:06:32 PM	
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

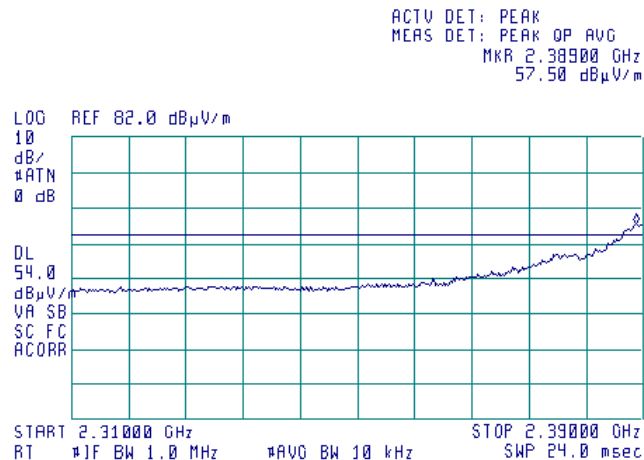
Plot 7.4.7 The highest emission level within the band edge in 2310.0 - 2390.0 MHz range,  
64QAM modulation @ 54 Mbps

DETECTOR: Peak



Plot 7.4.8 The highest emission level within the band edge in 2310.0 - 2390.0 MHz range,  
64QAM modulation @ 54 Mbps

DETECTOR: VBW = 1/Txon = 10000 Hz



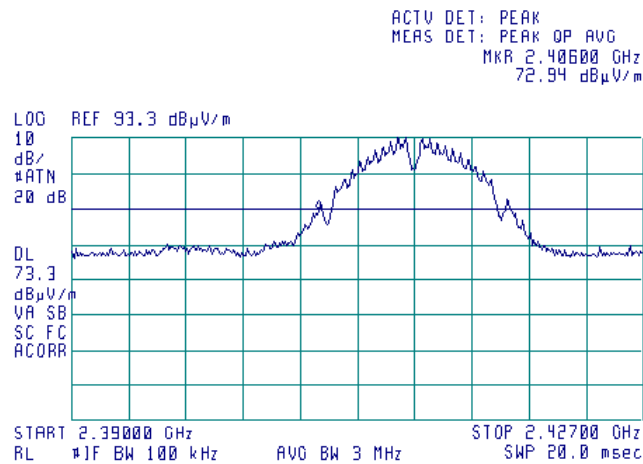




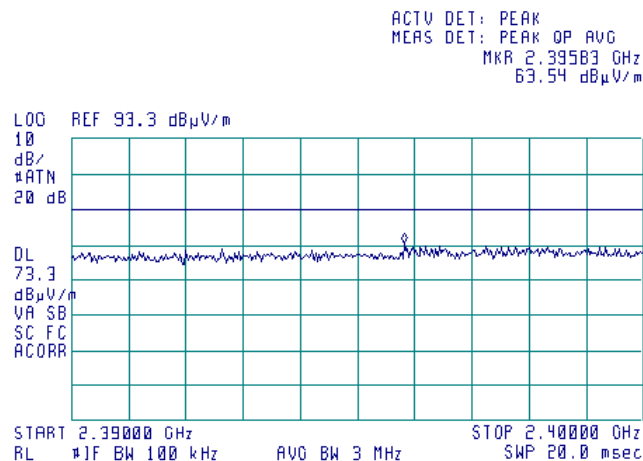
HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.4.9 The highest emission level within the assigned band at low carrier frequency in  
2390.0 - 2427.0 MHz range, BPSK modulation @ 1 Mbps



Plot 7.4.10 The highest emission level within the assigned band at low carrier frequency in  
2390.0 - 2400.0 MHz range, BPSK modulation @ 1 Mbps

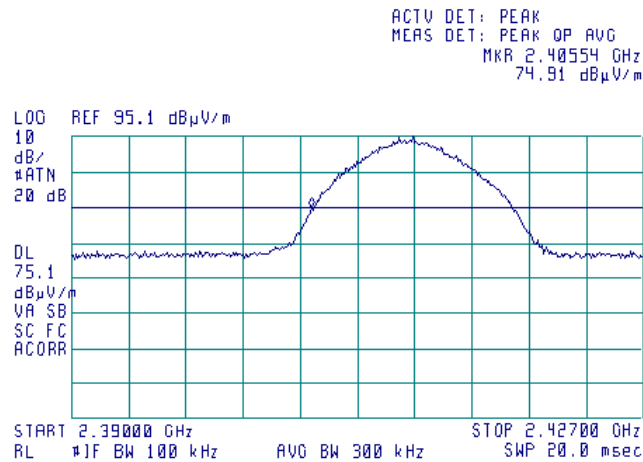




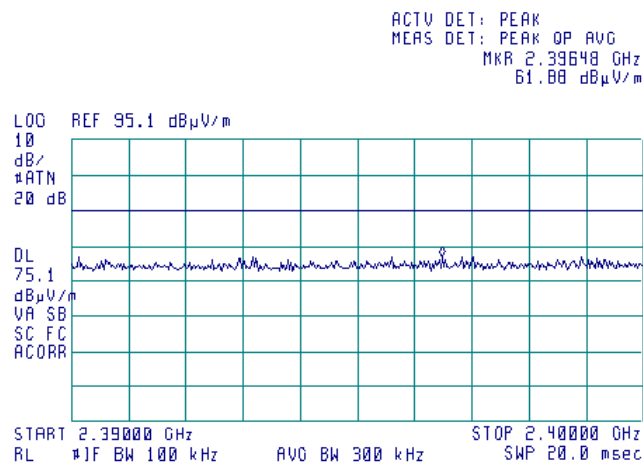
HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.4.11 The highest emission level within the assigned band at low carrier frequency in 2390.0 - 2427.0 MHz range, 64QAM modulation @ 11 Mbps



Plot 7.4.12 The highest emission level within the assigned band at low carrier frequency in 2390.0 - 2400.0 MHz range, 64QAM modulation @ 11 Mbps

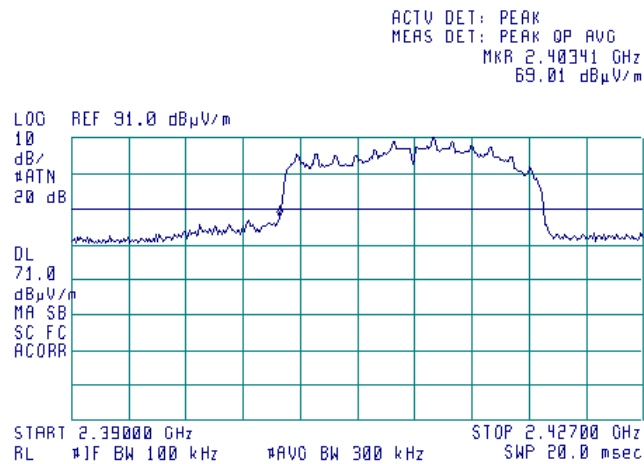




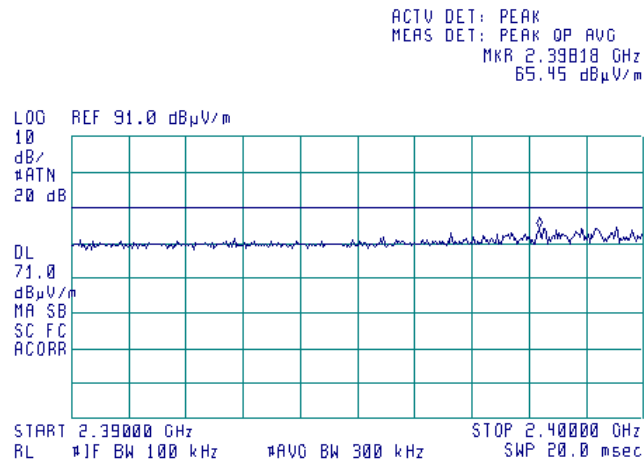
HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.4.13 The highest emission level within the assigned band at low carrier frequency  
in 2390.0 - 2427.0 MHz range, BPSK modulation @ 6 Mbps



Plot 7.4.14 The highest emission level within the assigned band at low carrier frequency  
in 2390.0 - 2400.0 MHz range, BPSK modulation @ 6 Mbps

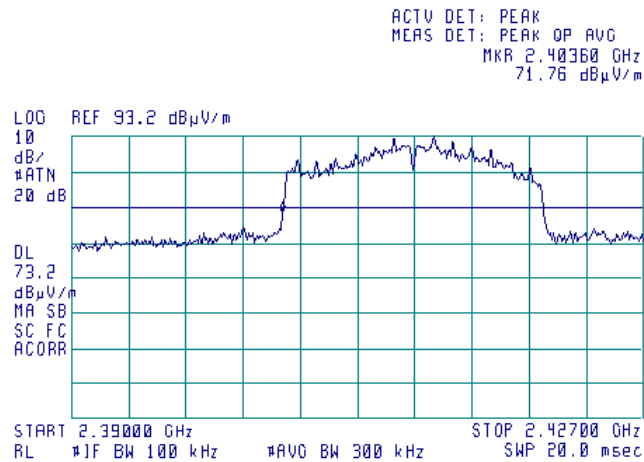




HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges</b>	
<b>Test procedure:</b>		Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>		Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b>		6/17/2009 4:06:32 PM	
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Plot 7.4.15 The highest emission level within the assigned band at low carrier frequency  
in 2390.0 - 2427.0 MHz range, 64QAM modulation @ 54 Mbps



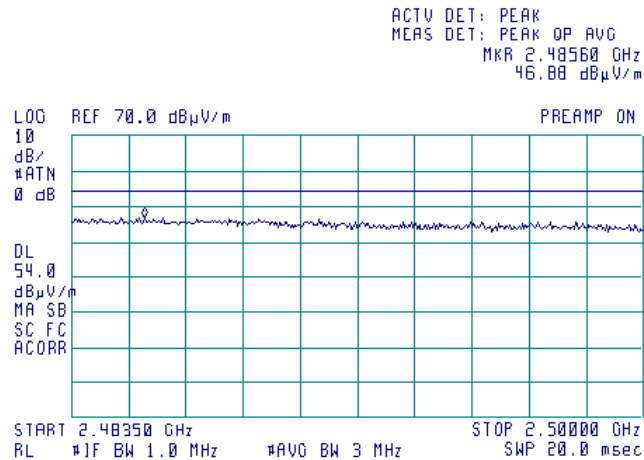


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges</b>	
<b>Test procedure:</b>		Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

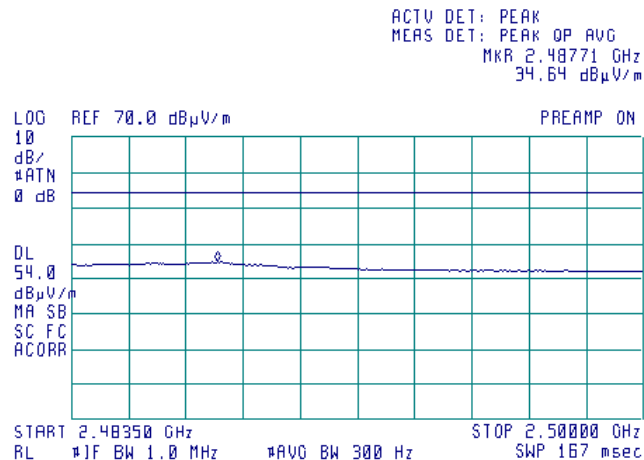
**Plot 7.4.16 The highest emission level within the band edge in 2483.5 – 2500.0 MHz range,  
BPSK modulation @ 1 Mbps**

DETECTOR: Peak



**Plot 7.4.17 The highest emission level within the band edge in 2483.5 – 2500.0 MHz range,  
BPSK modulation @ 1 Mbps**

DETECTOR: VBW = 1/Txon = 300 Hz



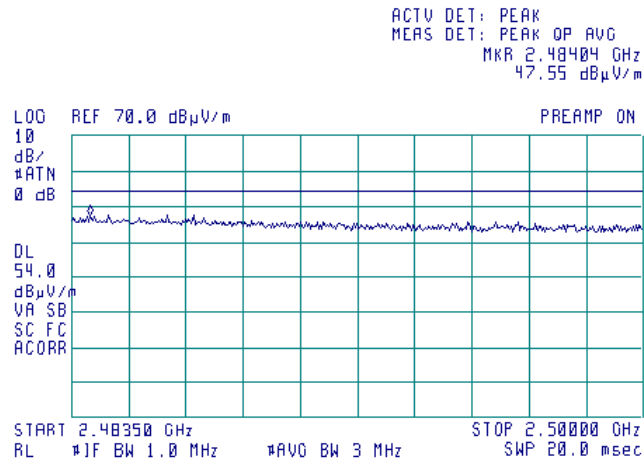


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

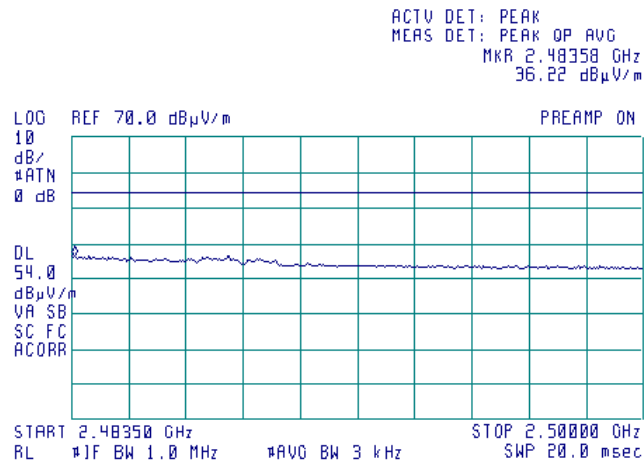
Plot 7.4.18 The highest emission level within the band edge in 2483.5 – 2500.0 MHz range,  
64QAM modulation @ 11 Mbps

DETECTOR: Peak



Plot 7.4.19 The highest emission level within the band edge in 2483.5 – 2500.0 MHz range,  
64QAM modulation @ 11 Mbps

DETECTOR: VBW = 1/Txon = 3000 Hz



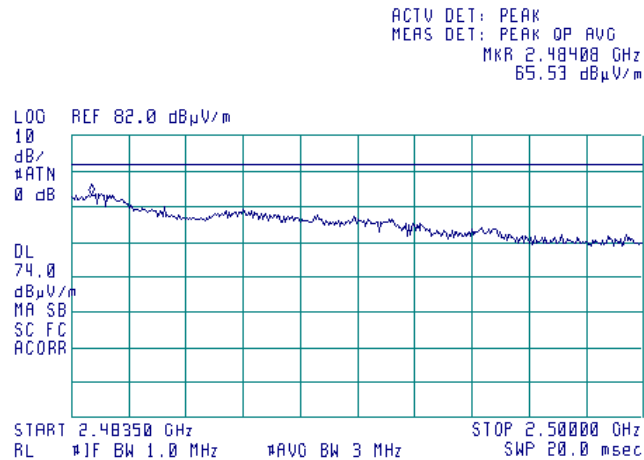


HERMON LABORATORIES

Test specification:	FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:06:32 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

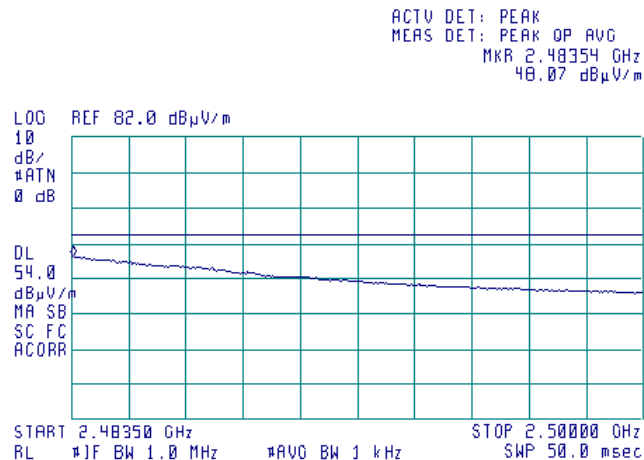
Plot 7.4.20 The highest emission level within the band edge in 2483.5 – 2500.0 MHz range,  
BPSK modulation @ 6 Mbps

DETECTOR: Peak



Plot 7.4.21 The highest emission level within the band edge in 2483.5 – 2500.0 MHz range,  
BPSK modulation @ 6 Mbps

DETECTOR: VBW = 1/Txon = 1000 Hz



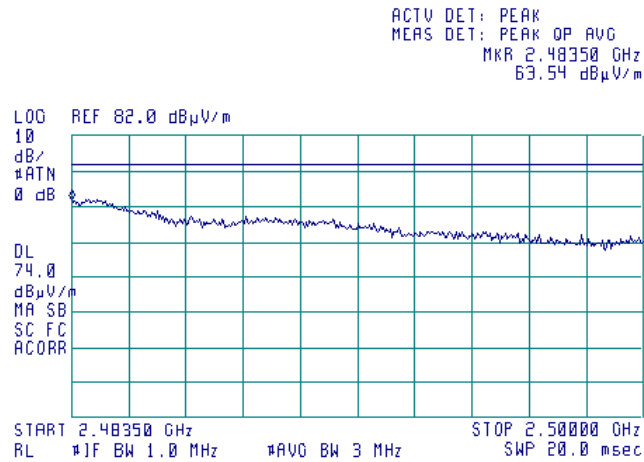


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges</b>	
<b>Test procedure:</b>		Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

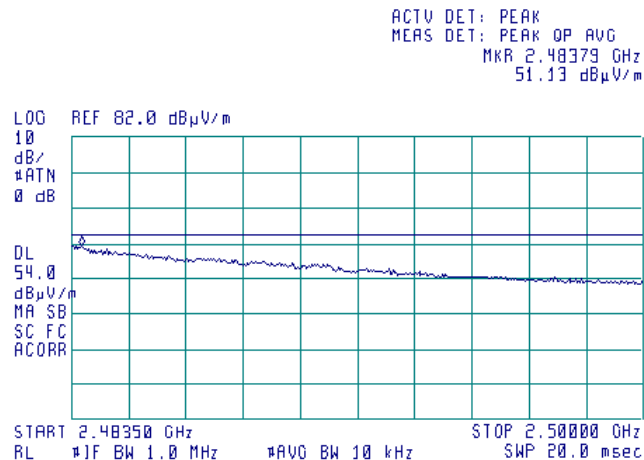
**Plot 7.4.22 The highest emission level within the band edge in 2483.5 – 2500.0 MHz range, 64QAM modulation @ 54 Mbps**

DETECTOR: Peak



**Plot 7.4.23 The highest emission level within the band edge in 2483.5 – 2500.0 MHz range, 64QAM modulation @ 54 Mbps**

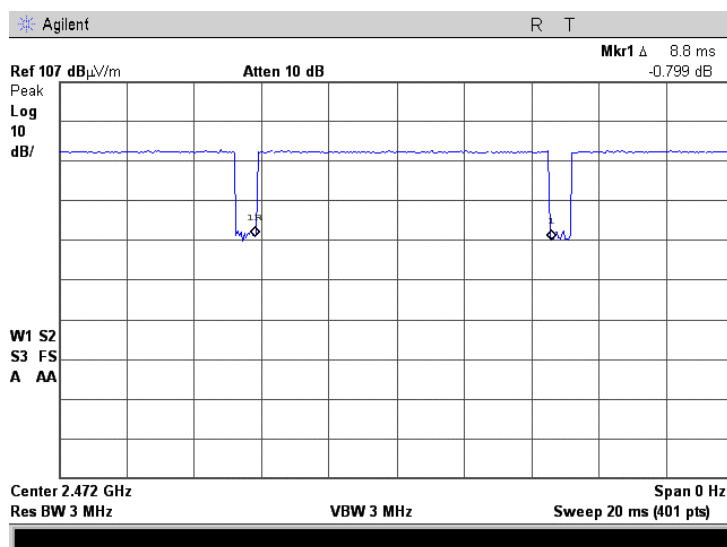
DETECTOR: VBW = 1/Txon = 10000 Hz



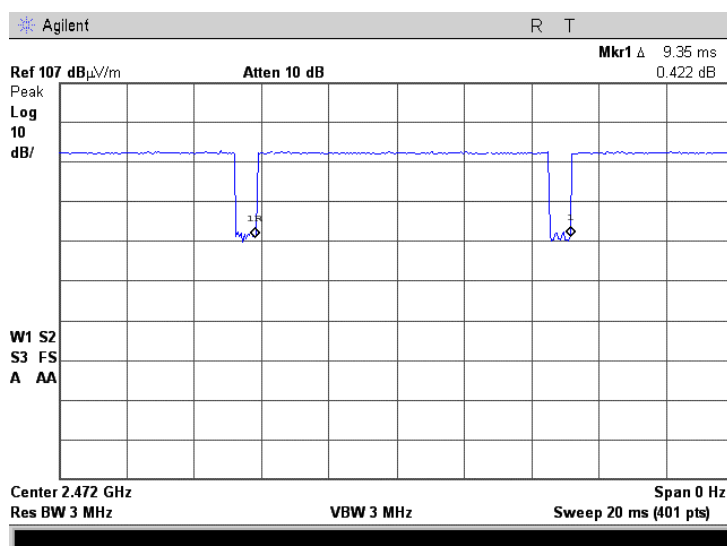


<b>Test specification:</b>		<b>FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges</b>	
<b>Test procedure:</b>		Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4	
<b>Test mode:</b>		Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b>		6/17/2009 4:06:32 PM	
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Plot 7.4.24 Transmitter duty cycle, BPSK modulation @ 1 Mbps, Tx on

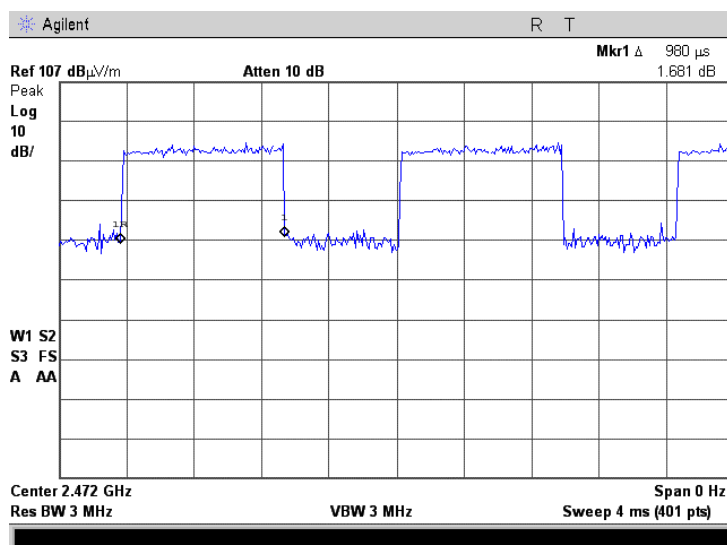


Plot 7.4.25 Transmitter duty cycle, BPSK modulation @ 1 Mbps, Tx period

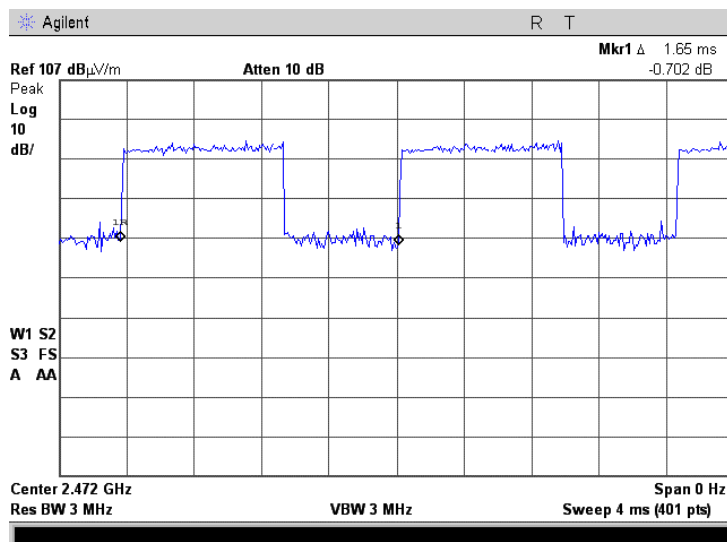


<b>Test specification:</b>	<b>FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges</b>		
<b>Test procedure:</b>	Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Plot 7.4.26 Transmitter duty cycle, 64QAM modulation @ 11 Mbps, Tx on

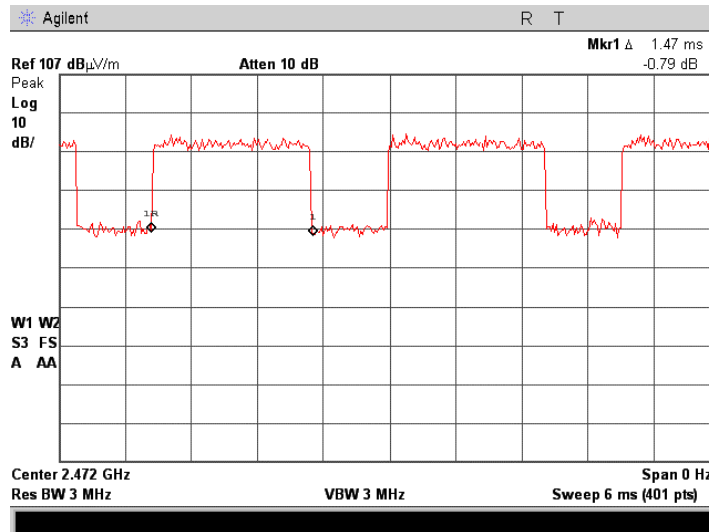


Plot 7.4.27 Transmitter duty cycle, 64QAM modulation @ 11 Mbps, Tx period

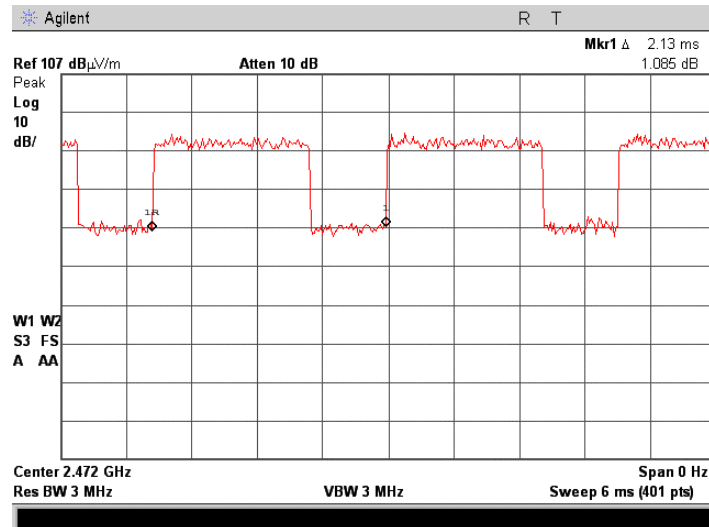


<b>Test specification:</b>	<b>FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges</b>		
<b>Test procedure:</b>	Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Plot 7.4.28 Transmitter duty cycle, BPSK modulation @ 6 Mbps, Txon

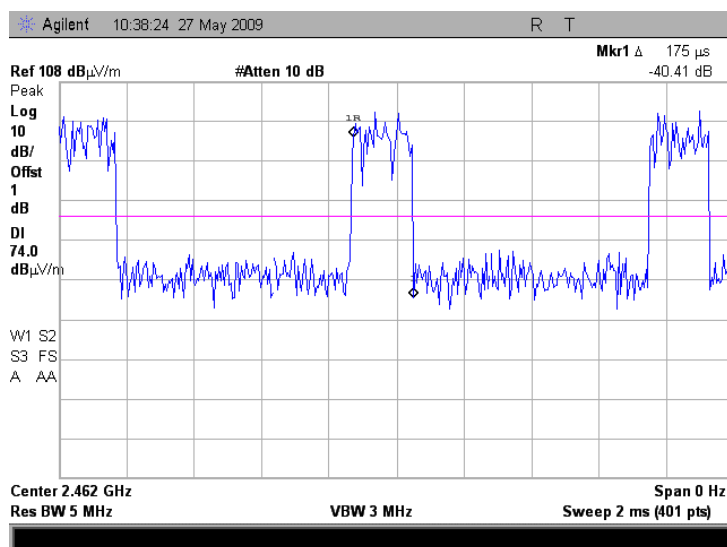


Plot 7.4.29 Transmitter duty cycle, BPSK modulation @ 6 Mbps, Txoff

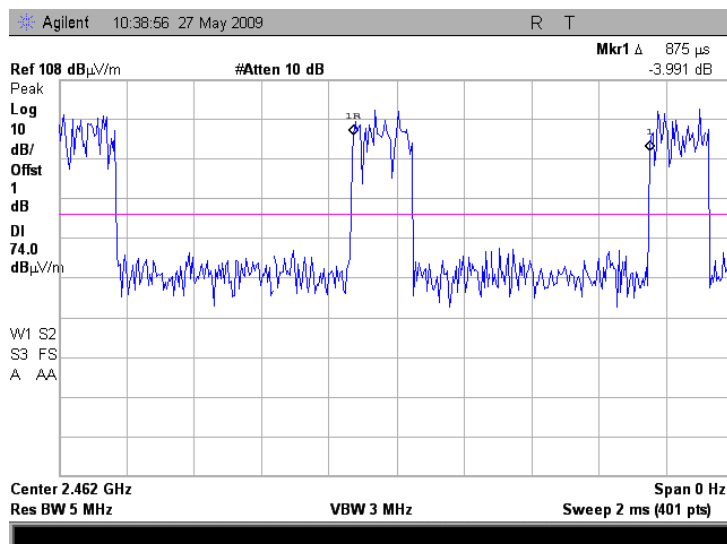


<b>Test specification:</b>	<b>FCC section 15.247(d), RSS-210 section A8.5, Emissions at band edges</b>		
<b>Test procedure:</b>	Public notice DA 00-705, Section 15.247(d) / ANSI C63.4, Section 13.1.4		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:06:32 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Plot 7.4.30 Transmitter duty cycle, 64QAM modulation @ 54 Mbps, Tx on



Plot 7.4.31 Transmitter duty cycle, 64QAM modulation @ 54 Mbps, Tx off





<b>Test specification:</b>		<b>FCC section 15.247(e), RSS-210 A8.2(b), Peak power density</b>	
<b>Test procedure:</b>		New Guidance for DTS, Section 15.247(d)	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:32:14 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

## 7.5 Peak spectral power density

### 7.5.1 General

This test was performed to measure the peak spectral power density radiated by the transmitter RF antenna. Specification test limits according to FCC part 15 section 15.247(d) and RSS-210 section A8.2(b) are given in Table 7.5.1.

**Table 7.5.1 Peak spectral power density limits**

Assigned frequency range, MHz	Measurement bandwidth, kHz	Peak spectral power density, dBm	Equivalent field strength limit @ 3m, dB(μV/m)*
902.0 – 928.0	3.0	8.0	103.2
2400.0 – 2483.5			
5725.0 – 5850.0			

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

### 7.5.2 Test procedure for field strength measurements

**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 to end user RF output power.

**7.5.2.3** The field strength of the EUT carrier frequency was measured with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360° and the measuring antenna height was swept in both vertical and horizontal polarizations.

**7.5.2.4** The frequency span of spectrum analyzer was set to capture the entire 6 dB band of the transmitter, in peak hold mode with resolution bandwidth set to 3.0 kHz, video bandwidth wider than resolution bandwidth, auto sweep time and sufficient number of sweeps was allowed for trace stabilization. The spectrum lines spacing was verified to be wider than 3 kHz. Otherwise the resolution bandwidth was reduced until individual spectrum lines were resolved and the power of individual spectrum lines was integrated over 3 kHz band.

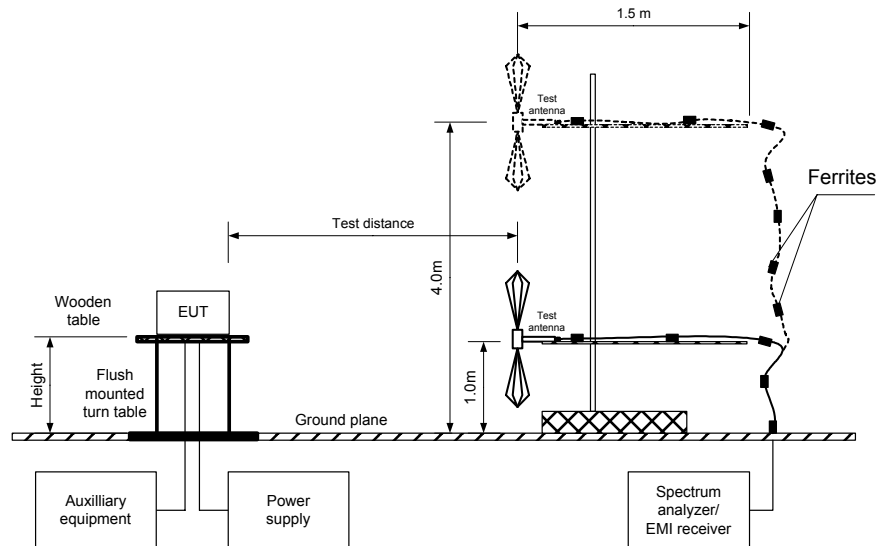
**7.5.2.5** The peak of emission was zoomed with span set just wide enough to capture the emission peak area. Spectrum analyzer was set in max hold mode with a peak detector, sufficient number of sweeps was allowed for trace stabilization and peak spectral power density was measured as provided in Table 7.5.2 and associated plots.



HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(e), RSS-210 A8.2(b), Peak power density</b>	
<b>Test procedure:</b>		New Guidance for DTS, Section 15.247(d)	
<b>Test mode:</b>		<b>Verdict:</b> <b>PASS</b>	
Compliance			
<b>Date &amp; Time:</b>		6/17/2009 4:32:14 PM	
<b>Temperature:</b> 23°C		<b>Air Pressure:</b> 1009 hPa	
		<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Figure 7.5.1 Setup for carrier field strength measurements





HERMON LABORATORIES

<b>Test specification:</b> FCC section 15.247(e), RSS-210 A8.2(b), Peak power density			
<b>Test procedure:</b> New Guidance for DTS, Section 15.247(d)			
<b>Test mode:</b>	Compliance	<b>Verdict:</b> PASS	
<b>Date &amp; Time:</b>	6/17/2009 4:32:14 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Table 7.5.2 Field strength measurement of peak spectral power density

ASSIGNED FREQUENCY: 2400.00 – 2483.50 MHz  
 TEST DISTANCE: 3 m  
 TEST SITE: OATS  
 EUT HEIGHT: 0.8 m  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 3 kHz  
 VIDEO BANDWIDTH: 10 kHz  
 TEST ANTENNA TYPE: Double ridged guide (above 1000 MHz)  
 MODULATING SIGNAL: PRBS  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 MODULATION: BPSK  
 BIT RATE: 1 Mbps  
 TRANSMITTER OUTPUT POWER: 13.92 dBm at low carrier frequency  
 10.92 dBm at mid carrier frequency  
 9.44 dBm at high carrier frequency

Frequency, MHz	Field strength, dB(μV/m)	EUT antenna gain, dBi	Limit, dB(μV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees
2412.00	82.17	3	103.23	-24.06	H (x-axis)	1.1	000
2437.00	80.17	3	103.23	-26.06	H (x-axis)	1.1	010
2462.00	78.83	3	103.23	-27.40	H (x-axis)	1.1	000

MODULATION: 64 QAM  
 BIT RATE: 11 Mbps  
 TRANSMITTER OUTPUT POWER: 17.22 dBm at low carrier frequency  
 15.68 dBm at mid carrier frequency  
 13.64 dBm at high carrier frequency

Frequency, MHz	Field strength, dB(μV/m)	EUT antenna gain, dBi	Limit, dB(μV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees
2412.00	82.33	3	103.23	-23.90	H (x-axis)	1.1	010
2437.00	80.00	3	103.23	-26.23	H (x-axis)	1.1	000
2462.00	78.50	3	103.23	-27.73	H (x-axis)	1.1	000

MODULATION: BPSK  
 BIT RATE: 6 Mbps  
 TRANSMITTER OUTPUT POWER: 16.23 dBm at low carrier frequency  
 13.91 dBm at mid carrier frequency  
 11.74 dBm at high carrier frequency

Frequency, MHz	Field strength, dB(μV/m)	EUT antenna gain, dBi	Limit, dB(μV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees
2412.00	80.00	3	103.23	-26.23	H (x-axis)	1.1	000
2437.00	77.00	3	103.23	-29.23	H (x-axis)	1.1	000
2462.00	75.67	3	103.23	-30.56	H (x-axis)	1.1	010

MODULATION: 64 QAM  
 BIT RATE: 54 Mbps  
 TRANSMITTER OUTPUT POWER: 18.14 dBm at low carrier frequency  
 15.65 dBm at mid carrier frequency  
 13.92 dBm at high carrier frequency

Frequency, MHz	Field strength, dB(μV/m)	EUT antenna gain, dBi	Limit, dB(μV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees
2412.00	80.50	3	103.23	-25.73	H (x-axis)	1.1	350
2437.00	78.17	3	103.23	-28.06	H (x-axis)	1.1	000
2462.00	75.67	3	103.23	-30.56	H (x-axis)	1.1	000

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

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



HERMON LABORATORIES

<b>Test specification:</b>	<b>FCC section 15.247(e), RSS-210 A8.2(b), Peak power density</b>		
<b>Test procedure:</b>	New Guidance for DTS, Section 15.247(d)		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:32:14 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Table 7.5.3 Calculations of peak spectral power density

ASSIGNED FREQUENCY RANGE: 2400.0 – 2483.5 MHz  
 TEST DISTANCE: 3 m  
 SUBSTITUTION ANTENNA HEIGHT: 0.8 m  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 3 kHz  
 VIDEO BANDWIDTH: 10 kHz  
 SUBSTITUTION ANTENNA TYPE: Double ridged guide (above 1000 MHz)

**MODULATION:****BPSK****BIT RATE:****1 Mbps**

Frequency, MHz	Field strength, dB(μV/m)	EUT ant. gain, dBi	Peak power density*, dB(mW/3 kHz)	Limit, dBm	Margin, dB**	Verdict
2412.00	82.17	3	-16.06	8.00	-24.06	Pass
2437.00	80.17		-18.06	8.00	-26.06	Pass
2462.00	78.83		-19.40	8.00	-27.40	Pass

**MODULATION:****64 QAM****BIT RATE:****11 Mbps**

Frequency, MHz	Field strength, dB(μV/m)	EUT ant. gain, dBi	Peak power density*, dB(mW/3 kHz)	Limit, dBm	Margin, dB**	Verdict
2412.00	82.33	3	-15.90	8.00	-23.90	Pass
2437.00	80.00		-18.23	8.00	-26.23	Pass
2462.00	78.50		-19.73	8.00	-27.73	Pass

**MODULATION:****BPSK****BIT RATE:****6 Mbps**

Frequency, MHz	Field strength, dB(μV/m)	EUT ant. gain, dBi	Peak power density*, dB(mW/3 kHz)	Limit, dBm	Margin, dB**	Verdict
2412.00	80.00	3	-18.23	8.00	-26.23	Pass
2437.00	77.00		-21.23	8.00	-29.23	Pass
2462.00	75.67		-22.56	8.00	-30.56	Pass

**MODULATION:****64 QAM****BIT RATE:****54 Mbps**

Frequency, MHz	Field strength, dB(μV/m)	EUT ant. gain, dBi	Peak power density*, dB(mW/3 kHz)	Limit, dBm	Margin, dB**	Verdict
2412.00	80.50	3	-17.73	8.00	-25.73	Pass
2437.00	78.17		-20.06	8.00	-28.06	Pass
2462.00	75.67		-22.56	8.00	-30.56	Pass

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

Peak power density = Field Strength, (dBμV/m) – 95.23 dB - Transmitter antenna gain in dBi

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

**Reference numbers of test equipment used**

HL 1424	HL 1984	HL 2432	HL 2667	HL 3122	HL 3634		
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Full description is given in Appendix A.

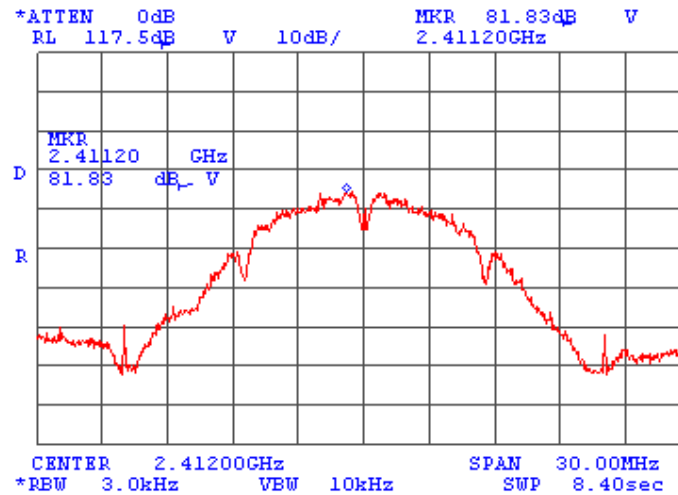




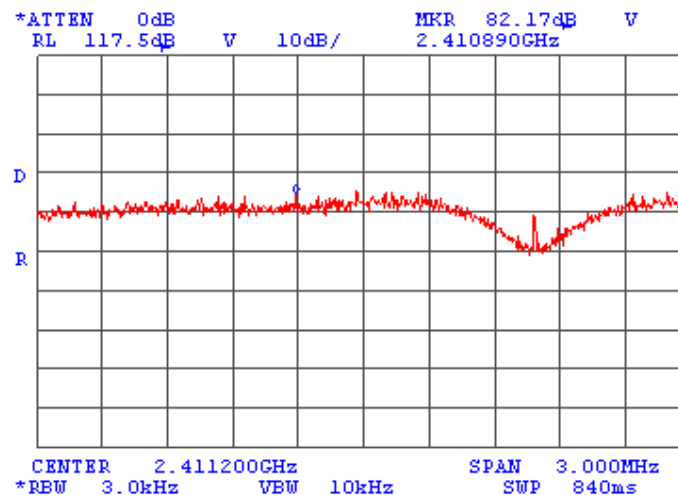
HERMON LABORATORIES

Test specification:	FCC section 15.247(e), RSS-210 A8.2(b), Peak power density		
Test procedure:	New Guidance for DTS, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:14 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.5.1 Peak spectral power density at low frequency within 6 dB band, BPSK modulation @ 1 Mbps



Plot 7.5.2 Peak spectral power density at low frequency zoomed at the peak, BPSK modulation @ 1 Mbps

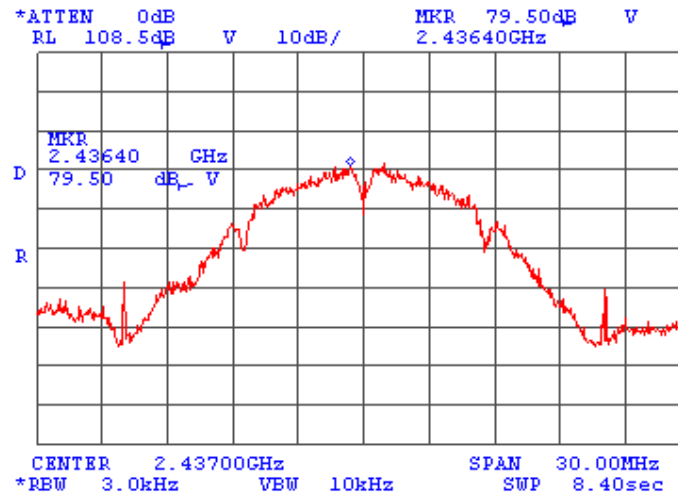




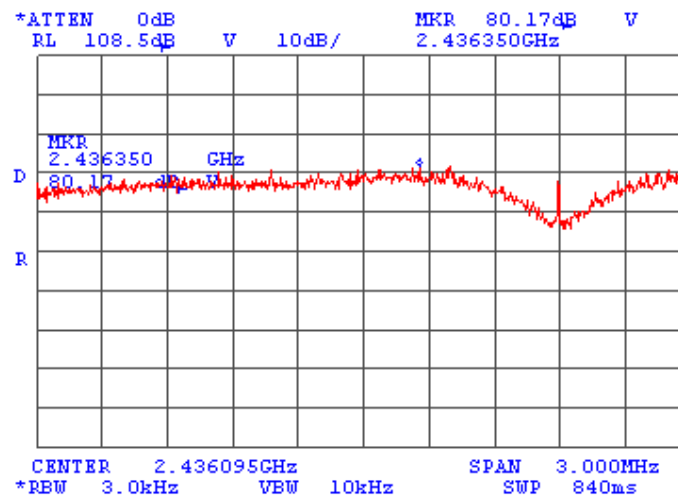
HERMON LABORATORIES

Test specification:	FCC section 15.247(e), RSS-210 A8.2(b), Peak power density		
Test procedure:	New Guidance for DTS, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:14 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.5.3 Peak spectral power density at mid frequency within 6 dB band, BPSK modulation @ 1 Mbps



Plot 7.5.4 Peak spectral power density at mid frequency zoomed at the peak, BPSK modulation @ 1 Mbps

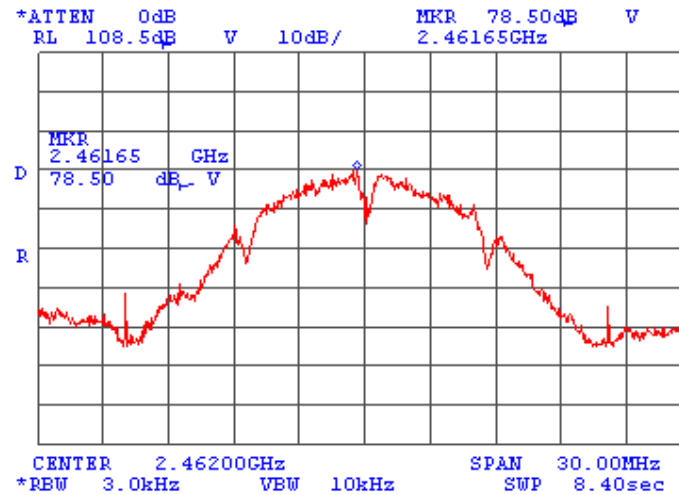




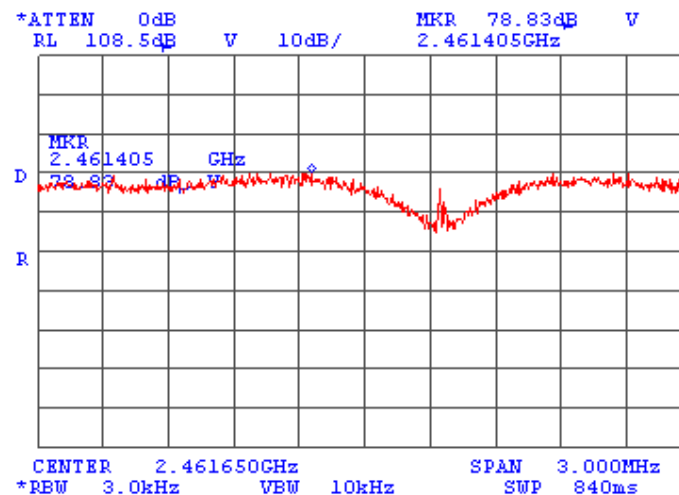
HERMON LABORATORIES

Test specification:	FCC section 15.247(e), RSS-210 A8.2(b), Peak power density		
Test procedure:	New Guidance for DTS, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:14 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.5.5 Peak spectral power density at high frequency within 6 dB band, BPSK modulation @ 1 Mbps



Plot 7.5.6 Peak spectral power density at high frequency zoomed at the peak, BPSK modulation @ 1 Mbps

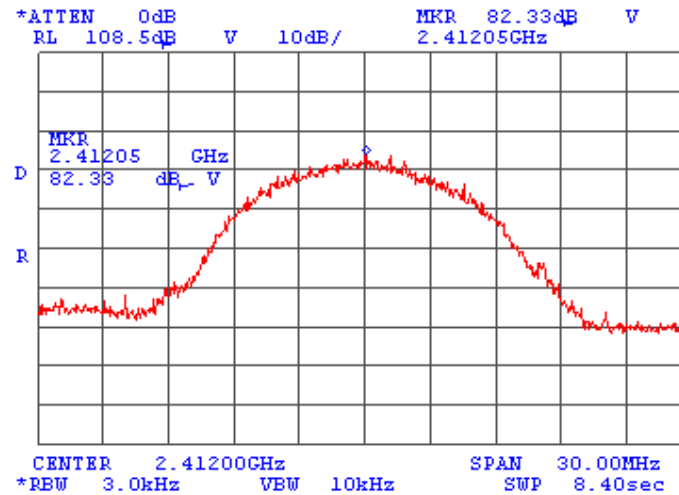




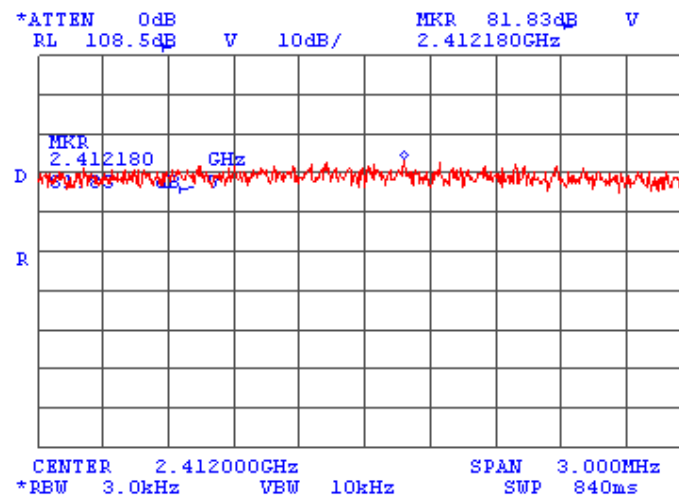
HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(e), RSS-210 A8.2(b), Peak power density</b>	
<b>Test procedure:</b>		New Guidance for DTS, Section 15.247(d)	
<b>Test mode:</b>		Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b>		6/17/2009 4:32:14 PM	
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Plot 7.5.7 Peak spectral power density at low frequency within 6 dB band, 64QAM modulation @ 11 Mbps



Plot 7.5.8 Peak spectral power density at low frequency zoomed at the peak, 64QAM modulation @ 11 Mbps

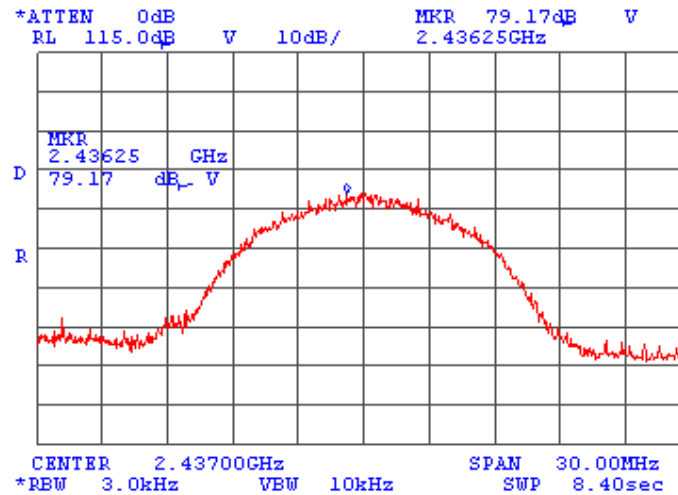




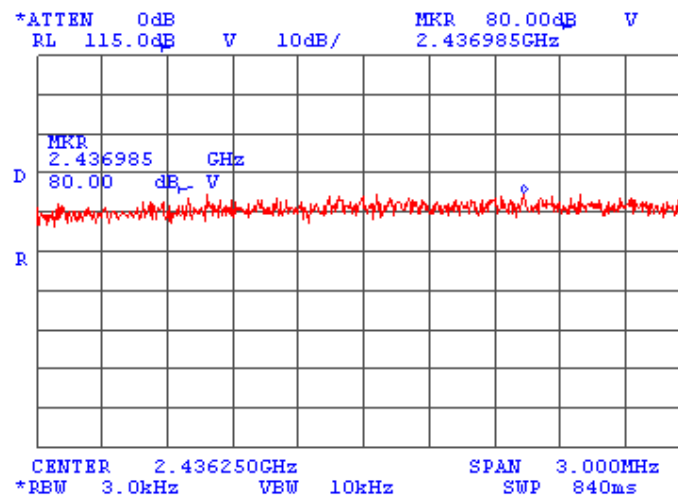
HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(e), RSS-210 A8.2(b), Peak power density</b>	
<b>Test procedure:</b>		New Guidance for DTS, Section 15.247(d)	
<b>Test mode:</b>		Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b>		6/17/2009 4:32:14 PM	
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Plot 7.5.9 Peak spectral power density at mid frequency within 6 dB band, 64QAM modulation @ 11 Mbps



Plot 7.5.10 Peak spectral power density at mid frequency zoomed at the peak, 64QAM modulation @ 11 Mbps

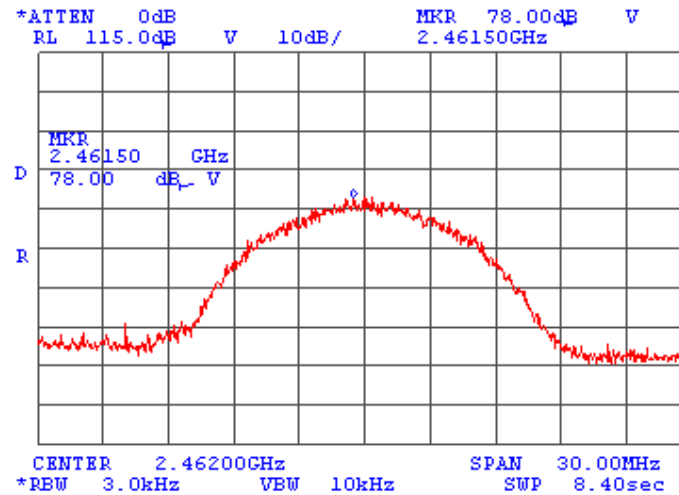




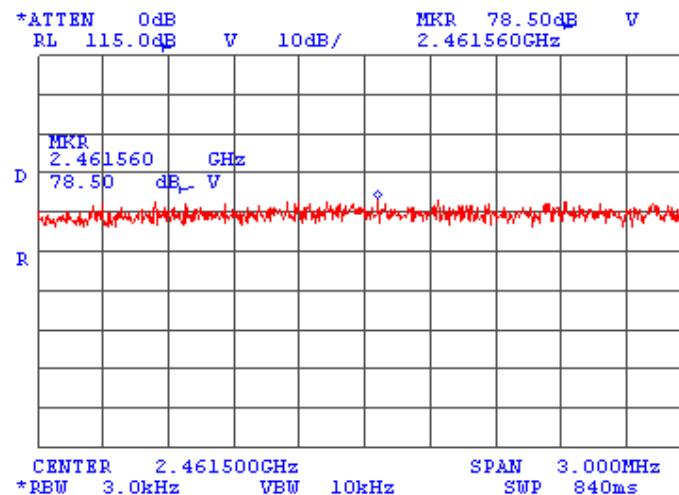
HERMON LABORATORIES

Test specification:	FCC section 15.247(e), RSS-210 A8.2(b), Peak power density		
Test procedure:	New Guidance for DTS, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:14 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.5.11 Peak spectral power density at high frequency within 6 dB band, 64QAM modulation @ 11 Mbps



Plot 7.5.12 Peak spectral power density at high frequency zoomed at the peak, 64QAM modulation @ 11 Mbps

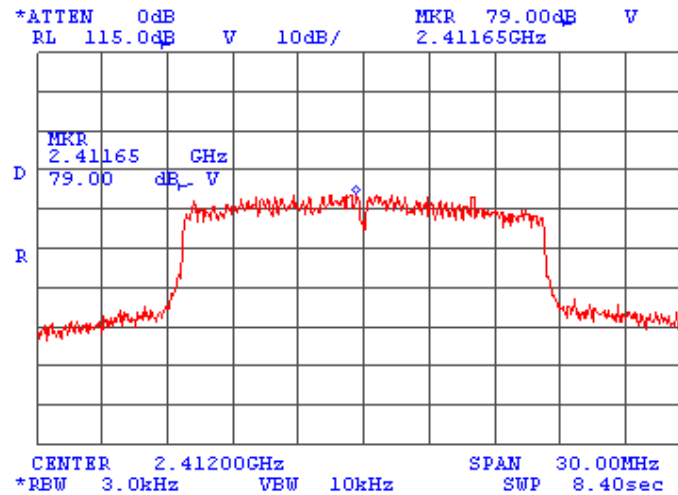




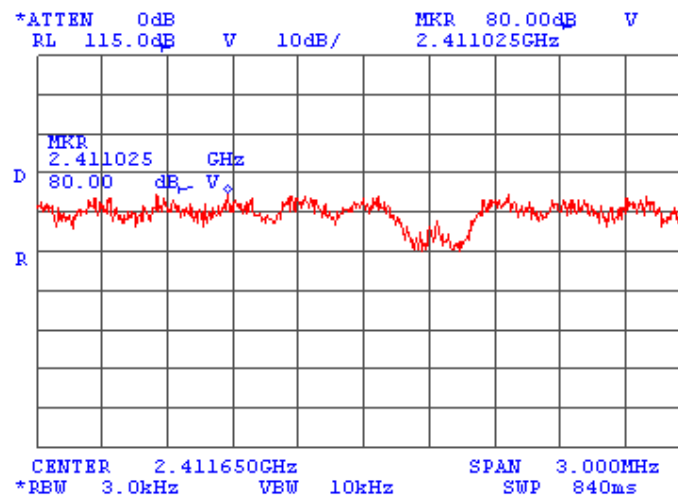
HERMON LABORATORIES

Test specification:	FCC section 15.247(e), RSS-210 A8.2(b), Peak power density		
Test procedure:	New Guidance for DTS, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:14 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.5.13 Peak spectral power density at low frequency within 6 dB band, BPSK modulation @ 6 Mbps



Plot 7.5.14 Peak spectral power density at low frequency zoomed at the peak, BPSK modulation @ 6 Mbps

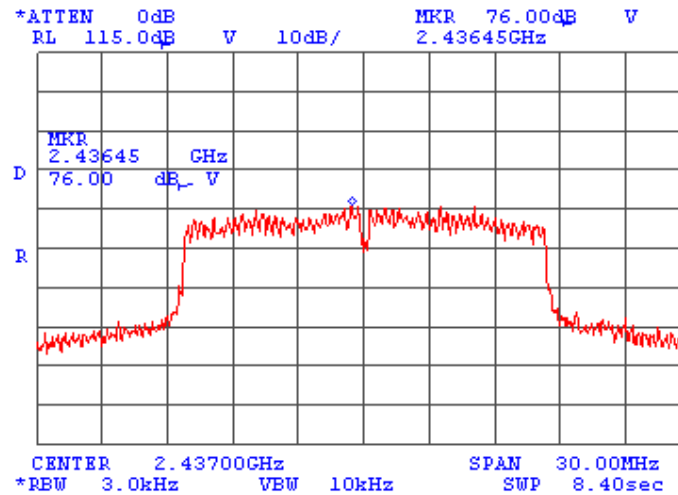




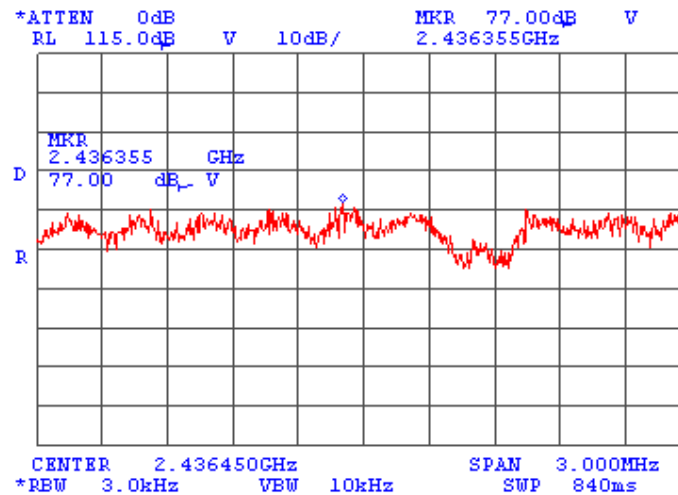
HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.247(e), RSS-210 A8.2(b), Peak power density</b>	
<b>Test procedure:</b>		New Guidance for DTS, Section 15.247(d)	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:32:14 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

Plot 7.5.15 Peak spectral power density at mid frequency within 6 dB band, BPSK modulation @ 6 Mbps



Plot 7.5.16 Peak spectral power density at mid frequency zoomed at the peak, BPSK modulation @ 6 Mbps



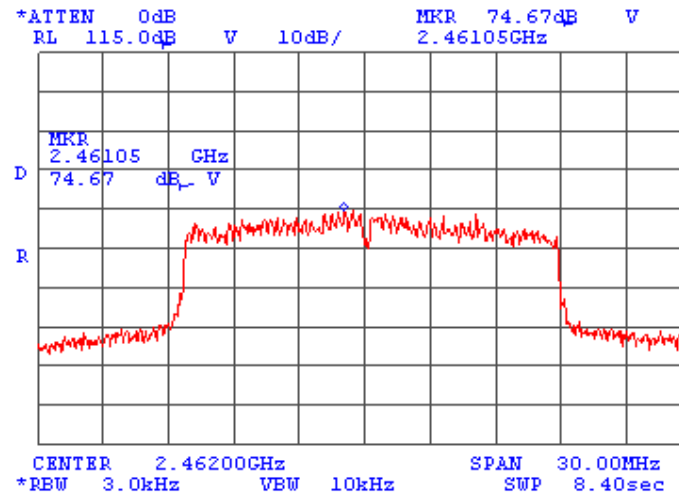




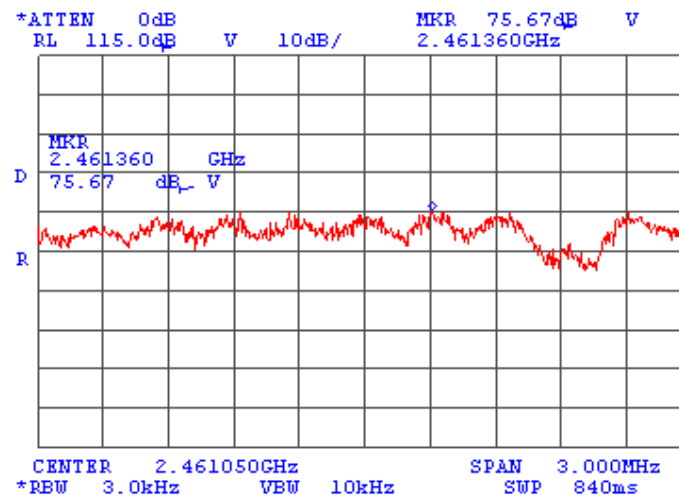
HERMON LABORATORIES

Test specification:	FCC section 15.247(e), RSS-210 A8.2(b), Peak power density		
Test procedure:	New Guidance for DTS, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:14 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.5.17 Peak spectral power density at high frequency within 6 dB band, BPSK modulation @ 6 Mbps



Plot 7.5.18 Peak spectral power density at high frequency zoomed at the peak, BPSK modulation @ 6 Mbps

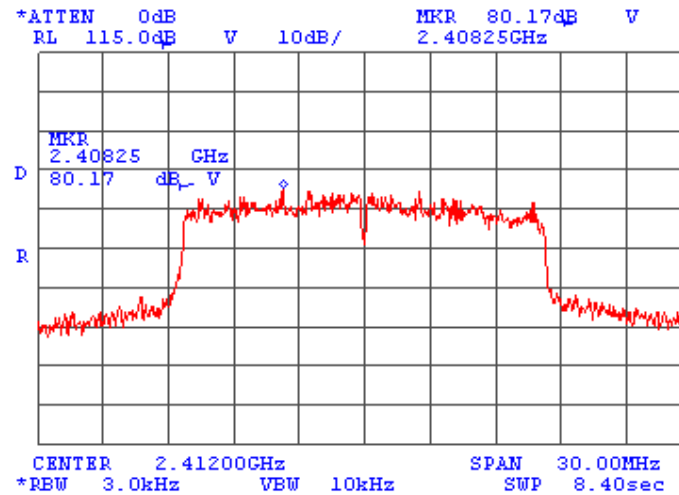




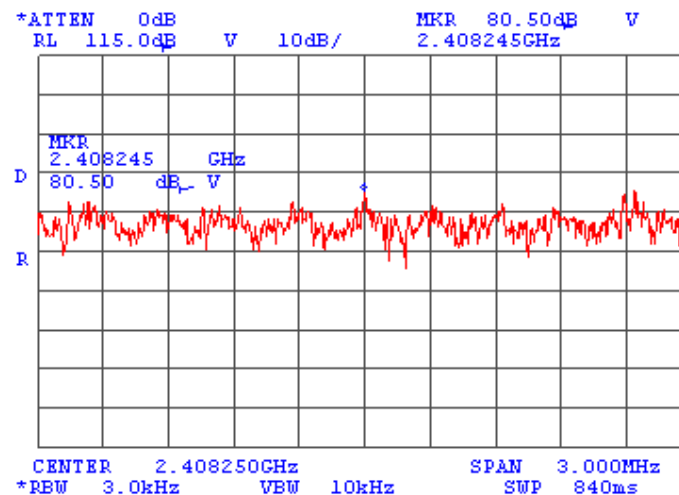
HERMON LABORATORIES

Test specification:	FCC section 15.247(e), RSS-210 A8.2(b), Peak power density		
Test procedure:	New Guidance for DTS, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:14 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.5.19 Peak spectral power density at low frequency within 6 dB band, 64QAM modulation @ 54 Mbps



Plot 7.5.20 Peak spectral power density at low frequency zoomed at the peak, 64QAM modulation @ 54 Mbps

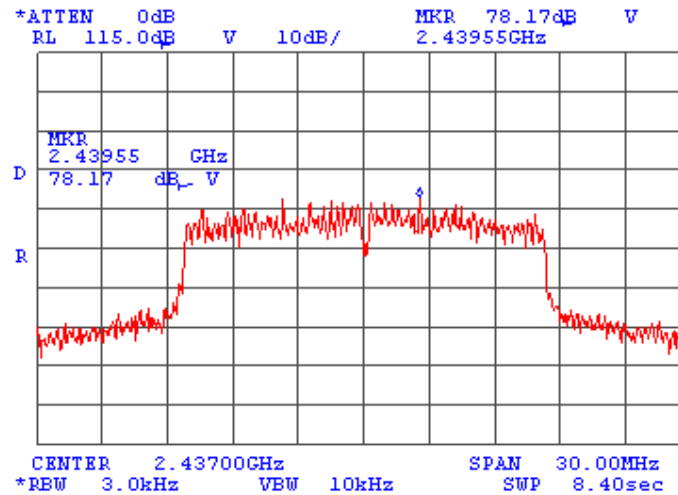




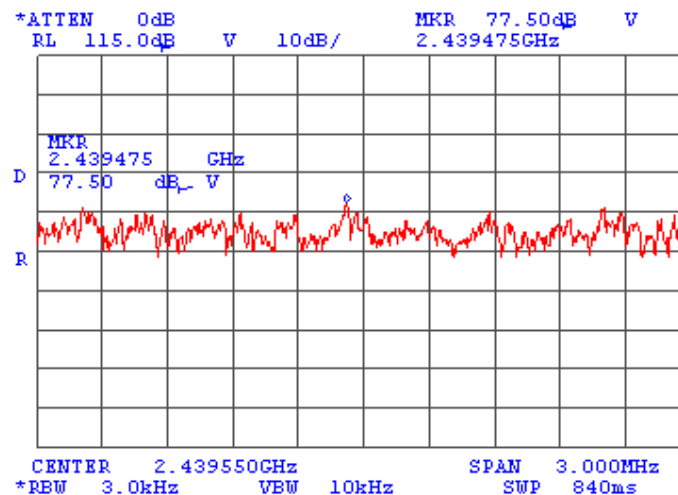
HERMON LABORATORIES

Test specification:	FCC section 15.247(e), RSS-210 A8.2(b), Peak power density		
Test procedure:	New Guidance for DTS, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:14 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.5.21 Peak spectral power density at mid frequency within 6 dB band, 64QAM modulation @ 54 Mbps



Plot 7.5.22 Peak spectral power density at mid frequency zoomed at the peak, 64QAM modulation @ 54 Mbps

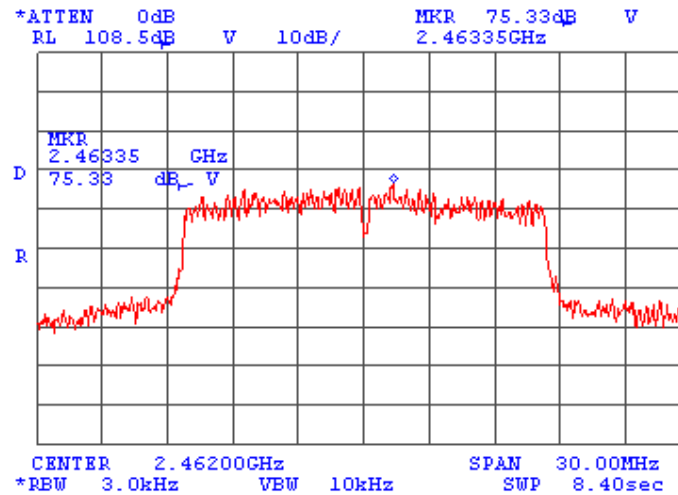




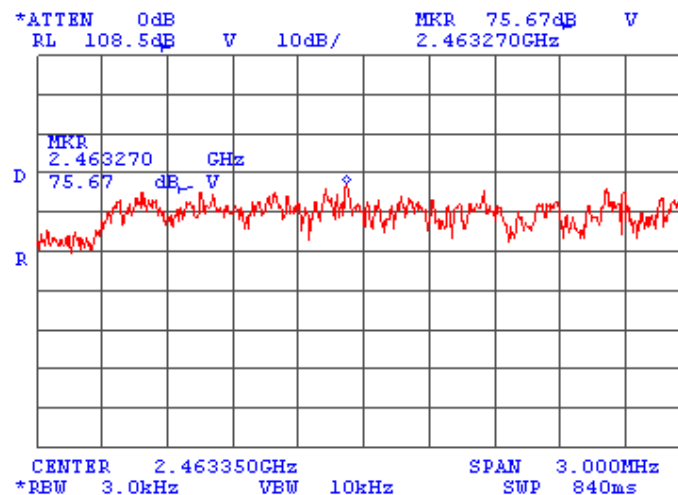
HERMON LABORATORIES

Test specification:	FCC section 15.247(e), RSS-210 A8.2(b), Peak power density		
Test procedure:	New Guidance for DTS, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	6/17/2009 4:32:14 PM		
Temperature: 23°C	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 3.3 VDC
Remarks:			

Plot 7.5.23 Peak spectral power density at high frequency within 6 dB band, 64QAM modulation @ 54 Mbps



Plot 7.5.24 Peak spectral power density at high frequency zoomed at the peak, 64QAM modulation @ 54 Mbps





<b>Test specification:</b>	<b>Section 15.203/ RSS-Gen, section 7.1.4, Antenna requirement</b>		
<b>Test procedure:</b>	Visual inspection		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date &amp; Time:</b>	6/17/2009 4:32:14 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

## 7.6 Antenna requirements

The EUT was verified for compliance with antenna requirements. A transmitter shall be designed to ensure that no antenna other than that furnished by the responsible party will be used with the device. It may be either permanently attached or employs a unique antenna connector for every antenna proposed for use with the EUT. This requirement does not apply to professionally installed transmitters.

The rationale for compliance with the above requirements was either visual inspection results or supplier declaration. The summary of results is provided in Table 7.6.1.

**Table 7.6.1 Antenna requirements**

Requirement	Rationale	Verdict
The transmitter antenna is permanently attached	Visual inspection	Comply
The transmitter employs a unique antenna connector	NA	
The transmitter requires professional installation	NA	

<b>Test specification:</b>		<b>FCC section 15.207(a) / RSS-Gen, Section 7.2.2, Conducted emission</b>	
<b>Test procedure:</b>		ANSI C63.4, Section 13.1.3	
<b>Test mode:</b>		Compliance	<b>Verdict:</b> PASS
<b>Date &amp; Time:</b>		6/17/2009 4:32:14 PM	
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

## 7.7 Conducted emissions

### 7.7.1 General

This test was performed to measure common mode conducted emissions at the power port. Specification test limits are given in Table 7.7.1.

Table 7.7.1 Limits for conducted emissions

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

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

### 7.7.2 Test procedure

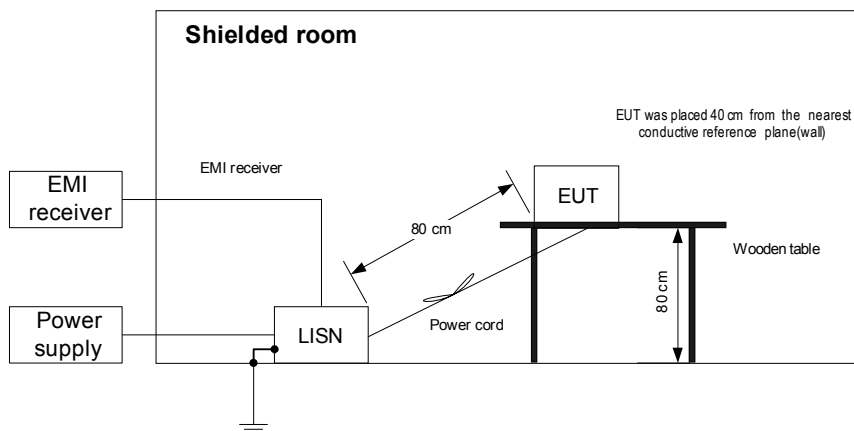
7.7.2.1 The EUT was set up as shown in Figure 7.7.1, energized and the performance check was conducted.

7.7.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer in the frequency range referred to in Table 7.7.2. Unused coaxial connector of the LISN was terminated with 50 Ohm. Quasi-peak and average detectors were used throughout the testing.

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

7.7.2.4 The worst test results (the lowest margins) were recorded in Table 7.7.2 and shown in the associated plots.

Figure 7.7.1 Setup for conducted emission measurements, table-top equipment





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<b>Test specification:</b>		<b>FCC section 15.207(a) / RSS-Gen, Section 7.2.2, Conducted emission</b>			
<b>Test procedure:</b>		ANSI C63.4, Section 13.1.3			
<b>Test mode:</b>		Compliance		<b>Verdict:</b> <b>PASS</b>	
<b>Date &amp; Time:</b>		6/17/2009 4:32:14 PM			
<b>Temperature:</b> 23°C		<b>Air Pressure:</b> 1009 hPa		<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>					

Table 7.7.2 Conducted emission test results

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

Frequency, MHz	Peak emission, dB(μV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*	Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*		
0.192450	51.75	46.93	63.94	-17.01	28.86	53.94	-25.08	L1	Pass
0.200300	50.48	47.54	63.64	-16.10	33.01	53.64	-20.63		
0.209225	49.59	45.01	63.30	-18.29	23.79	53.30	-29.51		
0.189000	50.60	45.62	64.10	-18.48	22.76	54.10	-31.34	L2	Pass
0.195600	49.75	47.16	63.82	-16.66	29.28	53.82	-24.54		
0.208825	48.46	43.84	63.31	-19.47	23.79	53.31	-29.52		

\* - Margin = Measured emission - specification limit.

## Reference numbers of test equipment used

HL 0447	HL 0580	HL 1503	HL 2924	HL 3170	HL 3612		
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Full description is given in Appendix A.

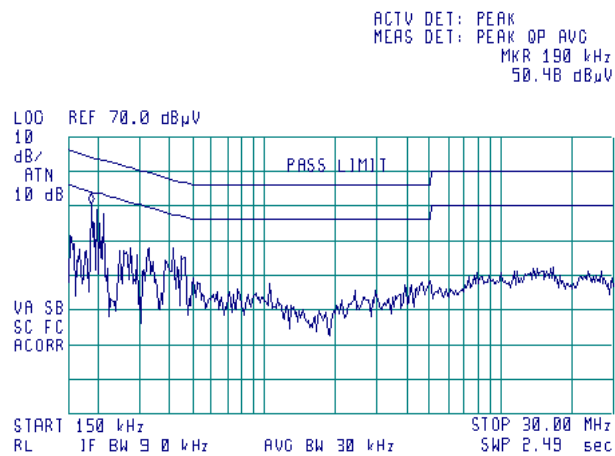


HERMON LABORATORIES

<b>Test specification:</b>		<b>FCC section 15.207(a) / RSS-Gen, Section 7.2.2, Conducted emission</b>	
<b>Test procedure:</b>		ANSI C63.4, Section 13.1.3	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date &amp; Time:</b>	6/17/2009 4:32:14 PM		
<b>Temperature:</b> 23°C	<b>Air Pressure:</b> 1009 hPa	<b>Relative Humidity:</b> 42%	<b>Power Supply:</b> 3.3 VDC
<b>Remarks:</b>			

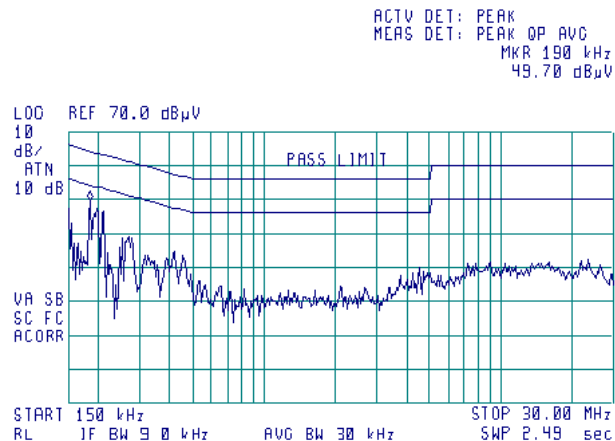
Plot 7.7.1 Conducted emission measurements

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



Plot 7.7.2 Conducted emission measurements

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





## 8 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
0447	LISN, 16/2, 300V RMS, 50 Ohm/50 uH + 5 Ohm, STD CISPR 16-1	Hermon Laboratories	LISN 16 - 1	066	04-Nov-08	04-Nov-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
0580	DC block adaptor 10 kHz - 2.2 GHz	Anritsu	MA8601 A	580	23-Nov-08	23-Nov-09
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	11-Jan-09	11-Jan-10
0768	Antenna Standard Gain Horn, 18-26.5 GHz, WR-42, 25 dB gain	Quinstar Technology	QWH-4200-BA	110	23-Dec-08	23-Dec-11
1116	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz	Hermon Laboratories	A1-18	186	23-Jan-09	23-Jan-10
1424	Spectrum Analyzer, 30 Hz- 40 GHz	Agilent Technologies	8564EC	3946A002 19	28-Aug-08	28-Aug-09
1503	Cable RF, 6 m, BNC/BNC	Belden	M17/167 MIL-C-17	1503	01-Jan-09	01-Jan-10
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W	EMC Test Systems	3115	9911-5964	23-Jan-09	23-Jan-10
2254	Cable 40 GHz, 0.8 m, blue	Rhophase Microwave Limited	KPS-1503A-800-KPS	W4907	11-Jun-09	11-Jun-10
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	23-Jan-09	23-Jan-10
2667	Signal generator, 9 kHz - 3.3 GHz	Rohde & Schwarz	SML03	101909	25-Sep-08	25-Sep-10
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY451024 6	12-Jun-08	12-Jun-10
2867	Cable, 18 GHz, 0.9 m, SMA - SMA, Right Angle	Gore	NA	91P72076	04-Feb-09	04-Feb-10
2882	Cable, 18 GHz N-type, M-F, 3 m	Bird	TC-MNFN-3.0	211539 001	04-Feb-09	04-Feb-10
2924	Line Impedance Stabilization Network (LISN), 50Ohm/50 uH+50Ohm, 25 A, 2 lines, STD: MIL-461E, CISPR 16-1	Electro-Metrics	FCC VDE 25-2	1178	16-Jun-09	16-Jun-10
3121	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	3121	07-Dec-08	07-Dec-09
3122	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	3122	07-Dec-08	07-Dec-09
3170	Attenuator, N-type, 10 dB, DC to 6 GHz, 1 W	Mini-Circuits	UNAT-10+	NA	01-Jan-09	01-Jan-10
3532	Amplifier, low noise, 2 to 8 GHz	Quinstar Technology	QLJ-02084040 -J0	111590020 01	23-Nov-08	23-Nov-09
3534	Amplifier, low noise, 6 to 18 GHz	Quinstar Technology	QLJ-06184040 -J0	111590010 02	07-Dec-08	07-Dec-09
3535	Amplifier, low noise, 18 to 40 GHz	Quinstar Technology	QLJ-18404537 -J0	111590030 01	07-Dec-08	07-Dec-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



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Date of Issue: 6/18/2009

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
3634	Cable RF, 5.5 m, N type-N type, DC-6.5 GHz	Alpha Wire	RG 214/U	NA	17-Dec-08	17-Dec-09

## 9 APPENDIX B Measurement uncertainties

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

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

## 10 APPENDIX C Test laboratory description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, safety, environmental and telecommunication testing facility.

Hermon Laboratories is listed by the Federal Communications Commission (USA) for all parts of Code of Federal Regulations 47 (CFR 47), Registration Numbers 90624 for OATS and 90623 for the anechoic chamber; by Industry Canada for electromagnetic emissions (file numbers IC 2186A-1 for OATS 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), has a status of a Telefication - Listed Testing Laboratory, Certificate No. L138/00; 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).

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Person for contact: Mr. Alex Usoskin, CEO.

## 11 APPENDIX D Specification references

FCC 47CFR part 15: 2008	Radio Frequency Devices.
FR Vol.62	Federal Register, Volume 62, May 13, 1997
FCC New Guidance:2004	FCC New Guidance on Measurements for DTS
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
RSS-210 Issue 7: 2007	Low Power Licence- Exempt Radiocommunication Devices
RSS-Gen Issue 2: 2007	General Requirements and Information for the Certification of Radiocommunication Equipment

## 12 APPENDIX E Test equipment correction factors

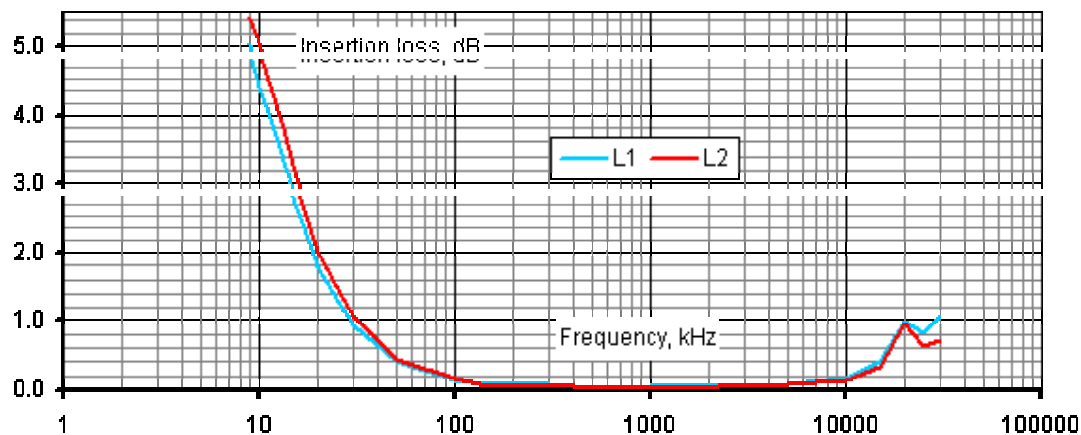
Correction factor  
Line impedance stabilization network  
Model LISN 16 - 1  
Hermon Laboratories, HL 0447

Frequency, kHz	Correction factor, dB
10	4.9
15	2.86
20	1.83
25	1.25
30	0.91
35	0.69
40	0.53
50	0.35
60	0.25
70	0.18
80	0.14
90	0.11
100	0.09
125	0.06
150	0.04

The correction factor in dB is to be added to meter readings of an interference analyzer or a spectrum analyzer.

**Correction factor**  
**Line impedance stabilization network**  
**Model FCC VDE 25-2, Electro-Metrics, HL 2924**

Frequency, kHz	Insertion loss, dB		Measurement uncertainty, dB
	L1	L2	
9	5.03	5.43	0.6
10	4.47	5.07	
20	1.77	2.00	
30	0.93	1.07	
50	0.41	0.45	
100	0.14	0.16	
150	0.09	0.06	
200	0.07	0.07	
300	0.07	0.05	
400	0.05	0.05	
500	0.02	0.03	
1000	0.05	0.02	
5000	0.07	0.08	
10000	0.17	0.15	
15000	0.42	0.32	
20000	0.99	0.97	
25000	0.83	0.63	
30000	1.07	0.71	



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

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

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

**Antenna factor**  
**Standard gain horn antenna**  
**Quinstar Technology**  
**Model QWH**  
**Ser.No.110, HL 0768**

Frequency min, GHz	Frequency max, GHz	Antenna factor, dB(1/m)
18.000	26.500	32.01
26.500	40.000	35.48
40.000	60.000	39.03
60.000	90.000	42.55
90.000	140.000	46.23
140.000	220.000	50.11

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

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

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

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



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

Frequency, 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).

**Cable loss**  
**Cable coaxial, 6 m, model: M17/167 MIL-C-17, HL 1503**

Frequency, MHz	Cable loss, dB
0.15	0.043
1	0.077
3	0.139
5	0.169
10	0.248
30	0.430
50	0.561
75	0.697
100	0.822
300	1.446
500	1.901
800	2.663
1000	2.829
1500	3.569
2000	4.179

**Cable loss**  
**Cable 40 GHz, 0.8 m, blue, model: KPS-1503A-800-KPS, S/N W4907, HL 2254**

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
0.03	0.04	5.10	0.80	15.00	1.49
0.05	0.07	5.30	0.83	15.50	1.49
0.10	0.09	5.50	0.83	16.00	1.46
0.20	0.15	5.70	0.84	16.50	1.47
0.30	0.19	5.90	0.87	17.00	1.50
0.40	0.25	6.10	0.86	17.50	1.57
0.50	0.29	6.30	0.89	18.00	1.63
0.60	0.33	6.50	0.90	18.50	1.57
0.70	0.37	6.70	0.89	19.00	1.63
0.80	0.41	6.90	0.93	19.50	1.65
0.90	0.44	7.10	0.92	20.00	1.64
1.00	0.45	7.30	0.95	20.50	1.75
1.10	0.48	7.50	0.96	21.00	1.72
1.20	0.51	7.70	0.97	21.50	1.78
1.30	0.53	7.90	1.01	22.00	1.76
1.40	0.54	8.10	1.00	22.50	1.72
1.50	0.57	8.30	1.05	23.00	1.83
1.60	0.59	8.50	1.04	23.50	1.80
1.70	0.04	8.70	1.07	24.00	1.90
1.80	0.07	8.90	1.11	24.50	1.81
1.90	0.09	9.10	1.09	25.00	1.98
2.00	0.15	9.30	1.14	25.50	1.91
2.10	0.19	9.50	1.12	26.00	2.02
2.20	0.25	9.70	1.15	26.50	1.92
2.30	0.29	9.90	1.16	27.00	1.97
2.40	0.33	10.10	1.16	28.00	2.02
2.50	0.37	10.30	1.19	29.00	1.95
2.60	0.41	10.50	1.14	30.00	1.94
2.70	0.44	10.70	1.19	31.00	2.11
2.80	0.45	10.90	1.17	32.00	2.17
2.90	0.48	11.10	1.13	33.00	2.27
3.10	0.61	11.30	1.20	34.00	2.27
3.30	0.64	11.50	1.13	35.00	2.29
3.50	0.65	11.70	1.20	36.00	2.35
3.70	0.68	11.90	1.18	37.00	2.37
3.90	0.69	12.10	1.14	38.00	2.40
4.10	0.71	12.40	1.19	39.00	2.57
4.30	0.73	13.00	1.34	40.00	2.36
4.50	0.75	13.50	1.33		
4.70	0.77	14.00	1.48		
4.90	0.79	14.50	1.45		

**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, Bird, 18 GHz, N-type, M-F, model TC-MNFN-3.0, S/N 211539 001**  
**HL 2882**

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.08	5750	1.78	12000	2.57
30	0.12	6000	1.84	12250	2.62
100	0.22	6250	1.87	12500	2.66
250	0.35	6500	1.92	12750	2.68
500	0.49	6750	1.96	13000	2.67
750	0.60	7000	2.01	13250	2.75
1000	0.68	7250	2.08	13500	2.77
1250	0.78	7500	2.12	13750	2.90
1500	0.85	7750	2.19	14000	3.00
1750	0.92	8000	2.22	14250	3.12
2000	0.98	8250	2.28	14500	2.98
2250	1.06	8500	2.29	14750	3.03
2500	1.11	8750	2.27	15000	2.99
2750	1.19	9000	2.28	15250	2.99
3000	1.25	9250	2.26	15500	2.98
3250	1.30	9500	2.29	15750	2.98
3500	1.34	9750	2.33	16000	2.99
3750	1.40	10000	2.34	16250	3.05
4000	1.45	10250	2.41	16500	3.11
4250	1.51	10500	2.46	16750	3.18
4500	1.54	10750	2.48	17000	3.23
4750	1.59	11000	2.48	17250	3.21
5000	1.63	11250	2.52	17500	3.22
5250	1.68	11500	2.53	17750	3.22
5500	1.72	11750	2.56	18000	3.25

**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 3122**

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	2.08	7400	3.07	11200	3.92	15100	4.61
30	0.17	3700	2.12	7500	3.09	11300	3.95	15200	4.58
50	0.23	3800	2.15	7600	3.14	11400	3.93	15300	4.62
100	0.32	3900	2.18	7700	3.15	11500	3.93	15400	4.62
200	0.47	4000	2.21	7800	3.19	11600	3.94	15500	4.65
300	0.58	4100	2.24	7900	3.22	11700	3.97	15600	4.66
400	0.66	4200	2.27	8000	3.20	11800	3.98	15700	4.66
500	0.74	4300	2.31	8100	3.21	11900	4.08	15800	4.72
600	0.81	4400	2.31	8200	3.24	12000	4.03	15900	4.78
700	0.88	4500	2.36	8300	3.27	12100	4.06	16000	4.89
800	0.95	4600	2.37	8400	3.32	12200	4.05	16100	4.95
900	1.00	4700	2.40	8500	3.35	12300	4.16	16200	4.92
1000	1.06	4800	2.43	8600	3.35	12400	4.18	16300	4.95
1100	1.11	4900	2.45	8700	3.33	12500	4.20	16400	5.02
1200	1.16	5000	2.50	8800	3.37	12600	4.22	16500	5.04
1300	1.21	5100	2.51	8900	3.39	12700	4.23	16600	5.06
1400	1.26	5200	2.55	9000	3.45	12800	4.28	16700	5.17
1500	1.31	5300	2.56	9100	3.46	12900	4.26	16800	5.16
1600	1.35	5400	2.59	9200	3.47	13000	4.28	16900	5.19
1700	1.39	5500	2.62	9300	3.46	13100	4.28	17000	5.23
1800	1.44	5600	2.65	9400	3.50	13200	4.28	17100	5.30
1900	1.47	5700	2.67	9500	3.50	13300	4.29	17200	5.26
2000	1.52	5800	2.71	9600	3.53	13400	4.34	17300	5.30
2100	1.55	5900	2.72	9700	3.52	13500	4.31	17400	5.30
2200	1.60	6000	2.73	9800	3.54	13600	4.35	17500	5.36
2300	1.63	6100	2.76	9900	3.56	13700	4.36	17600	5.40
2400	1.67	6200	2.78	10000	3.57	13800	4.37	17700	5.47
2500	1.70	6300	2.81	10100	3.60	13900	4.41	17800	5.56
2600	1.74	6400	2.85	10200	3.69	14000	4.42	17900	5.45
2700	1.78	6500	2.87	10300	3.69	14100	4.45	18000	5.47
2800	1.83	6600	2.87	10400	3.67	14200	4.49		
2900	1.85	6700	2.90	10500	3.70	14300	4.55		
3000	1.89	6800	2.91	10600	3.70	14400	4.62		
3100	1.92	6900	2.96	10700	3.76	14600	4.54		
3200	1.96	7000	2.99	10800	3.88	14700	4.58		
3300	1.99	7100	3.01	10900	3.88	14800	4.57		
3400	2.03	7200	3.04	11000	3.85	14900	4.65		
3500	2.06	7300	3.08	11100	3.85	15000	4.64		



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

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

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

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

**Cable loss**  
**Cable coaxial, RG-214/U, N type-N type, 5.5 m**  
**Alpha Wire, HL 3634**

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.05	1750	2.12	3550	3.43	5350	4.66
30	0.18	1800	2.16	3600	3.50	5400	4.70
50	0.24	1850	2.17	3650	3.53	5450	4.76
100	0.36	1900	2.23	3700	3.55	5500	4.80
150	0.47	1950	2.25	3750	3.57	5550	4.86
200	0.55	2000	2.33	3800	3.63	5600	4.87
250	0.64	2050	2.34	3850	3.67	5650	4.91
300	0.70	2100	2.41	3900	3.73	5700	4.97
350	0.77	2150	2.44	3950	3.73	5750	5.02
400	0.83	2200	2.49	4000	3.78	5800	5.07
450	0.91	2250	2.52	4050	3.79	5850	5.07
500	0.95	2300	2.55	4100	3.90	5900	5.15
550	1.02	2350	2.56	4150	3.88	5950	5.20
600	1.08	2400	2.60	4200	3.88	6000	5.25
650	1.15	2450	2.68	4250	3.98	6050	5.26
700	1.19	2500	2.67	4300	4.00	6100	5.30
750	1.25	2550	2.73	4350	4.02	6150	5.37
800	1.31	2600	2.74	4400	4.03	6200	5.40
850	1.35	2650	2.77	4450	4.06	6250	5.45
900	1.39	2700	2.84	4500	4.14	6300	5.47
950	1.45	2750	2.85	4550	4.16	6350	5.50
1000	1.49	2800	2.89	4600	4.17	6400	5.57
1050	1.56	2850	2.91	4650	4.19	6450	5.62
1100	1.57	2900	2.99	4700	4.21	6500	5.61
1150	1.64	2950	3.00	4750	4.26		
1200	1.66	3000	3.03	4800	4.29		
1250	1.71	3050	3.06	4850	4.30		
1300	1.73	3100	3.14	4900	4.33		
1350	1.80	3150	3.20	4950	4.36		
1400	1.81	3200	3.20	5000	4.45		
1450	1.87	3250	3.22	5050	4.44		
1500	1.94	3300	3.24	5100	4.49		
1550	1.96	3350	3.33	5150	4.53		
1600	1.97	3400	3.35	5200	4.62		
1650	2.03	3450	3.38	5250	4.63		
1700	2.05	3500	3.39	5300	4.64		

## 13 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
LISN	line impedance stabilization network
LO	local oscillator
m	meter
MHz	megahertz
min	minute
mm	millimeter
ms	millisecond
$\mu$ s	microsecond
NA	not applicable
NB	narrow band
OATS	open area test site
$\Omega$	Ohm
PCB	printed circuit board
PM	pulse modulation
PS	power supply
ppm	part per million ( $10^{-6}$ )
QP	quasi-peak
RE	radiated emission
RF	radio frequency
rms	root mean square
Rx	receive
s	second
T	temperature
Tx	transmit
V	volt
VA	volt-ampere
WB	wideband

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