

# TEST REPORT

ACCORDING TO: FCC parts 22, 24

FOR:

**Visonic Ltd.**

**Wireless Alarm Control System**

**Model: PowerMax Pro with GSM module**

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

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## 1 Applicant information

**Client name:** Visonic Ltd.  
**Address:** 24 Habarzel street, Tel Aviv 67920, Israel  
**Telephone:** +972 3645 6789  
**Fax:** +972 3645 6788  
**E-mail:** aelshtein@visonic.com  
**Contact name:** Mr. Arick Elshtein

## 2 Equipment under test attributes

**Product name:** Wireless Alarm Control System  
**Product type:** Transceiver  
**Model(s):** PowerMax Pro with GSM module  
**Serial number:** 13070340M  
**Receipt date:** 5/14/2007

## 3 Manufacturer information

**Client name:** Visonic Ltd.  
**Address:** 24 Habarzel street, Tel Aviv 67920, Israel  
**Telephone:** +972 3645 6789  
**Fax:** +972 3645 6788  
**E-mail:** aelshtein@visonic.com  
**Contact name:** Mr. Arick Elshtein

## 4 Test details





**Project ID:** 17925  
**Location:** Hermon Laboratories Ltd. P.O.Box 23, Binyamina 30500, Israel  
**Test started:** 5/14/2007  
**Test completed:** 10/23/2007  
**Test specification(s):** FCC 47 CFR parts 22, 24:2006;  
RSS-102

## 5 Tests summary

Test	Status
<b>Transmitter characteristics</b>	
Sections 22.913, 24.232, RF output power	Pass
Sections 24.238(b), 2.1049, Occupied bandwidth	Pass
Sections 22.917, 24.238, Spurious emissions at antenna terminal	Pass
Sections 22.917, 24.238, Emissions at band edges	Pass
Sections 22.917, 24.238, Radiated spurious emissions	Pass
Sections 22.355, 24.235, Frequency stability	Pass
Section 2.1091, RSS-102, RF radiation exposure evaluation	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:VISRAD\_FCC.17925.

	Name and Title	Date	Signature
<b>Tested by:</b>	Mr. A. Lane, test engineer	July 30, 2007; October 23, 2007	
	Mr. S. Samokha, test engineer		
<b>Reviewed by:</b>	Mrs. M. Cherniavsky, certification engineer	October 23, 2007	
<b>Approved by:</b>	Mr. M. Nikishin, EMC and radio group leader	October 24, 2007	



## 6 EUT description

### 6.1 General information

The EUT, PowermaxPro, is the controlling center of a wireless intrusion/burglar alarm system. The PowermaxPRO gets (is triggered by) alarms from various intrusion sensors via an RF link (315 MHz) and reports these intrusions locally and to remote control centers.

The PowermaxPRO has several states of alertness, such as "armed away", "armed home" and "disarmed", the reactions to each state differs and is explained in the manuals. Those various states are achieved in three ways, via the on board/ integrated keypad, via the RFID proximity sensor (125 kHz) and via the RF transmitter type MCT 234. The local reporting of the PowermaxPro is via its LCD display as well as various tones and internal sounder and prerecorded vocal alerts. The remote reporting of an intrusion is via an analogue telephone line or alternatively via GSM modem through the cellular network to a central monitoring station. The GSM module, model name GE863-Quad, manufactured by Telit Communications S.p.A., operates in 824 – 849 MHz and 1850 – 1910 MHz frequency bands.

### 6.2 Ports and lines

Port type	Port description	Connected		Connector type	Qty.	Cable type	Cable length	Indoor / outdoor
		From	To					
Power	DC power	EUT	AC/DC adaptor	Terminal block	1	Unshielded	2 m	Indoor
Power	AC mains	AC/DC adaptor	mains	2-pole	1	Unshielded	1.5 m	Indoor
Signal	RS 232	EUT	Open circuit	RJ 45	1	Unshielded	2 m*	Indoor
Telecom	Line	EUT	Line simulator	RJ 11	1	Unshielded	3 m**	Outdoor
Signal	Set	EUT	Telephone set	RJ 11	1	Unshielded	3 m	Indoor
Signal	Zone 29, 30	EUT	Termination	Terminal block	2	Unshielded	3 m**	Indoor
Signal	V+	EUT	Open circuit	Terminal block	1	Unshielded	3 m**	Indoor
Signal	12+	EUT	Open circuit	Terminal block	1	Unshielded	3 m**	Indoor
Signal	-HOLD	EUT	Open circuit	Terminal block	1	Unshielded	3 m**	Indoor
Signal	EXT Siren	EUT	Open circuit	Terminal block	1	Unshielded	3 m**	Indoor
Signal	INT Siren	EUT	Open circuit	Terminal block	1	Unshielded	3 m**	Indoor
Signal	PGM	EUT	Open circuit	Terminal block	1	Unshielded	3 m**	Indoor

\* May be up to 12 m.

\*\* May be longer than 30 m.

### 6.3 Auxiliary equipment

Description	Manufacturer	Model number	Serial number
Line simulator	Hermon Labs	LS-01	1856
AC/DC adaptor	Leader Elec.Inc.	MV24-1125160-A1	NA
Mobile service tester	Will-Tek	4202S	0813718
Telephone set	Typical		

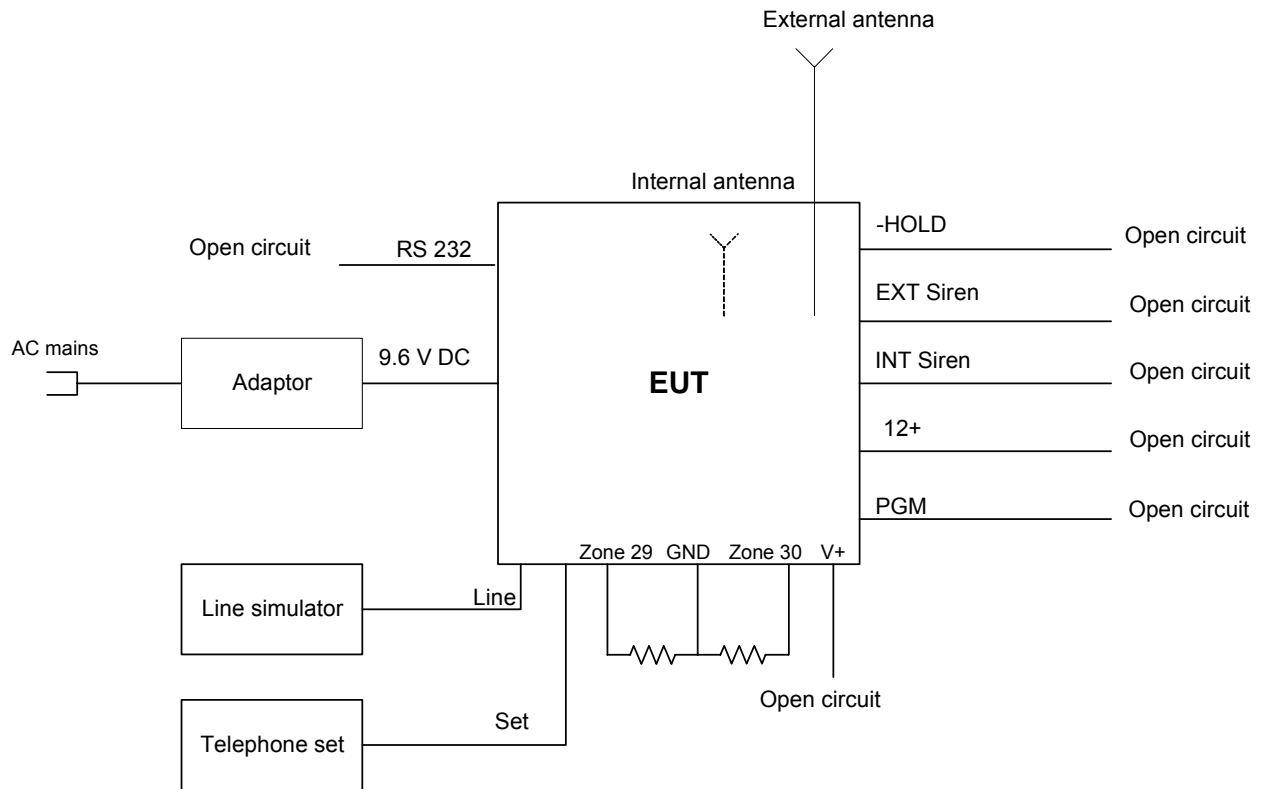
### 6.4 Operating frequencies

Source	Frequency, MHz		
Clock	4.19	16.0	NA
Cell 850	824.2	836.4	848.8
PCS 1900	1850.2	1880	1909.8

### 6.5 Changes made in the EUT

No changes were implemented.

## 6.6 Test configuration





### 6.7 Transmitter characteristics

<b>Type of equipment</b>						
X	Stand-alone (Equipment with or without its own control provisions)					
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)					
	Plug-in card (Equipment intended for a variety of host systems)					
<b>Intended use</b>		<b>Condition of use</b>				
X	fixed	Always at a distance more than 2 m from all people				
	mobile	Always at a distance more than 20 cm from all people				
	portable	May operate at a distance closer than 20 cm to human body				
<b>Assigned frequency range</b>		824 – 849 MHz/1850 – 1910 MHz				
<b>Operating frequency range</b>		824.2 – 848.8 MHz/1850.2 – 1909.8 MHz				
<b>RF channel spacing</b>		200 kHz				
<b>Maximum rated output power</b>		800 – 27.8 dBm 1900 –28.7 dBm				
<b>Is transmitter output power variable?</b>		X	No			
			continuous variable			
			Yes	X	stepped variable with stepsize	
					minimum RF power	
				maximum RF power		
<b>Antenna connection</b>						
	unique coupling		standard connector	X	integral	
					with temporary RF connector	
					without temporary RF connector	
<b>Transmitter 99% power bandwidth</b>		200 kHz				
<b>Transmitter aggregate data rate/s</b>		270 kbps				
<b>Transmitter aggregate symbol (baud) rate/s</b>		NA				
<b>Type of modulation</b>		GSM				
<b>Transmitter power source</b>						
X	AC	<b>Nominal rated voltage</b>	120 V	Frequency	60 Hz	
X	Battery (backup)	<b>Nominal rated voltage</b>	9.6 V			
<b>Common power source for transmitter and receiver</b>				X	yes	
					no	



<b>Test specification:</b>	<b>Section 22.913, Peak output power</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.913		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 27°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 40 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

## 7 Transmitter tests according to 47CFR part 22 requirements

### 7.1 Peak output power (radiated)

#### 7.1.1 General

This test was performed to measure the maximum peak output power radiated by transmitter. Specification test limits are given in Table 7.1.1.

Table 7.1.1 Peak output power limits

Assigned frequency range, MHz	Peak output power		Equivalent field strength limit @ 3m, dB( $\mu$ V/m)*
	W	dBm	
824 - 849	7.0	38.45	133.68

\*- 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.

#### 7.1.2 Test procedure for field strength measurements

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

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

7.1.2.3 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.

7.1.2.4 The maximum field strength of the EUT carrier frequency was measured as provided in Table 7.1.2, Table 7.1.4 and associated plots.

#### 7.1.3 Test procedure for substitution power measurements

7.1.3.1 The test equipment was set up as shown in Figure 7.1.2 and energized.

7.1.3.2 RF signal generator was set to the EUT carrier frequency and the RF output level was preliminary adjusted to produce the same field strength as it was measured from the EUT.

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

7.1.3.4 The maximum peak output power was calculated as a sum of signal generator output power in dBm and substitution antenna gain in dBi reduced by cable loss in dB.

7.1.3.5 The above procedure was performed in both horizontal and vertical polarizations of the substitution antenna.

7.1.3.6 The worst test results (the lowest margins) were recorded in Table 7.1.3, Table 7.1.5 and shown in the associated plots.



<b>Test specification:</b>	<b>Section 22.913, Peak output power</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.913		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 27°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 40 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Figure 7.1.1 Setup for carrier field strength measurements

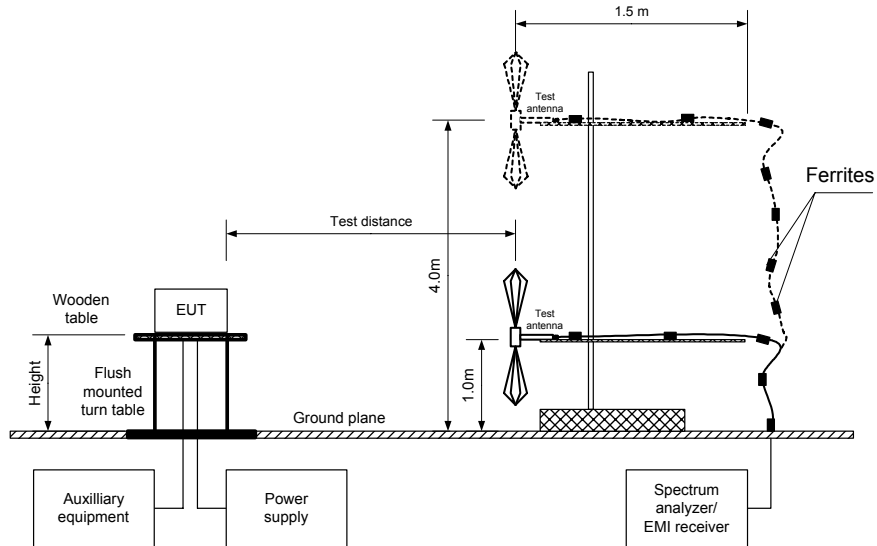
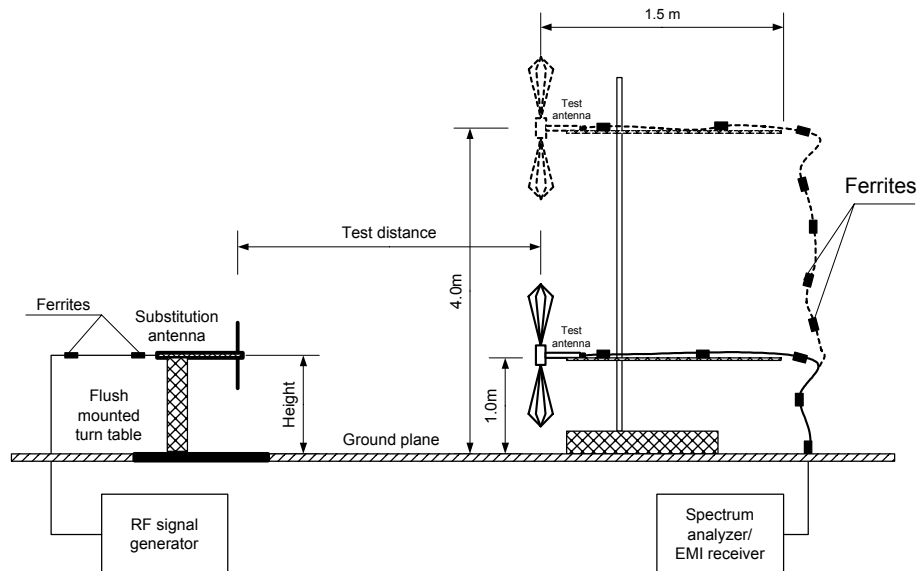


Figure 7.1.2 Setup for substitution peak output power measurements





<b>Test specification:</b>	<b>Section 22.913, Peak output power</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.913		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with external antenna			

**Table 7.1.2 Field strength measurement of peak output power (EUT with external antenna)**

ASSIGNED FREQUENCY: 824 - 849 MHz  
TEST DISTANCE: 3 m  
TEST SITE: Semi anechoic chamber  
EUT HEIGHT: 0.8 m  
DETECTOR USED: Peak  
TEST ANTENNA TYPE: Biconilog (30 MHz – 1000 MHz)  
Double ridged guide (above 1000 MHz)  
MODULATION: GSM  
BIT RATE: 270 kbps  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
RESOLUTION BANDWIDTH: 1 MHz  
VIDEO BANDWIDTH: 3 MHz

Frequency, MHz	Field strength, dB( $\mu$ V/m)	Limit, dB( $\mu$ V/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees
824.157	126.97	133.68	-6.71	V	1.10	50
832.528	125.40	133.68	-8.28	H	1.15	180
848.798	125.62	133.68	-8.06	V	1.10	107

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

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

**Table 7.1.3 Substitution measurement of peak output power**

ASSIGNED FREQUENCY RANGE: 824 - 849 MHz  
TEST DISTANCE: 3 m  
SUBSTITUTION ANTENNA HEIGHT: 0.8 m  
DETECTOR USED: Peak  
RESOLUTION BANDWIDTH: 1 MHz  
VIDEO BANDWIDTH: 3 MHz  
SUBSTITUTION ANTENNA TYPE: Tunable dipole (30 MHz – 1000 MHz)  
Double ridged guide (above 1000 MHz)

Frequency MHz	Field strength dB( $\mu$ V/m)	Antenna polarization	RF generator output, dBm	Antenna gain dBd	Cable loss, dB	Peak output power, ERP dBm	Limit, dBm	Margin, dB*	Verdict
824.157	126.97	V	27.1	-2.11	2.1	22.86	38.5	-13.44	Pass
832.528	125.40	H	26.2	-2.06	2.1	22.04	38.5	-14.26	Pass
848.798	125.62	V	25.7	-1.96	2.1	21.59	38.5	-14.71	Pass

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

**Reference numbers of test equipment used**

HL 0661	HL 1430	HL 1533	HL 1565	HL 1566	HL 2697	HL 2871	
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Full description is given in Appendix A.



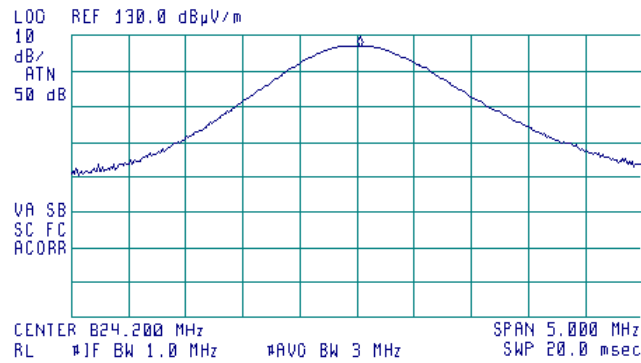
<b>Test specification:</b>	<b>Section 22.913, Peak output power</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.913		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with external antenna			

**Plot 7.1.1 Field strength of carrier at low frequency**

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

11:20:16 OCT 23, 2007

ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 824.225 MHz  
 126.97 dBμV/m

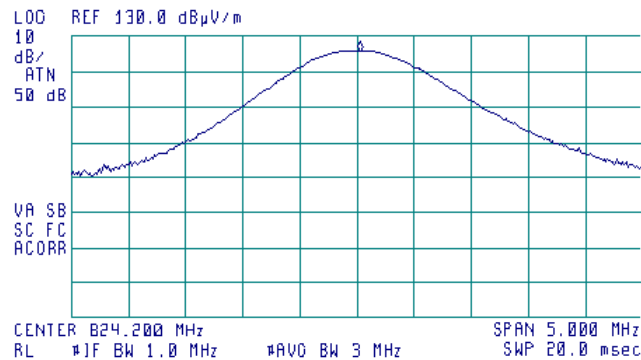


**Plot 7.1.2 Field strength of carrier at low frequency**

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

11:31:22 OCT 23, 2007

ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 824.225 MHz  
 125.93 dBμV/m





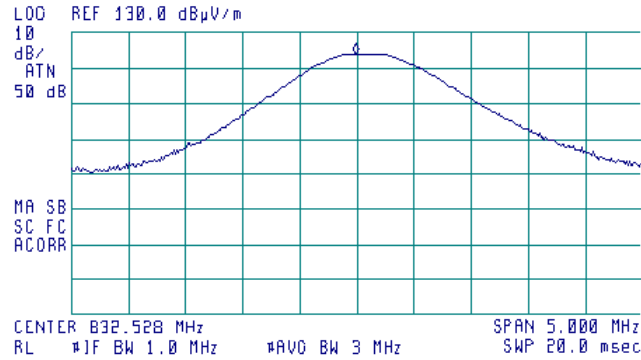
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<b>Test procedure:</b>	FCC part 22, Section 22.913		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with external antenna			

**Plot 7.1.3 Field strength of carrier at mid frequency**

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

12:23:30 OCT 23, 2007

ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 832.516 MHz  
 124.12 dBμV/m

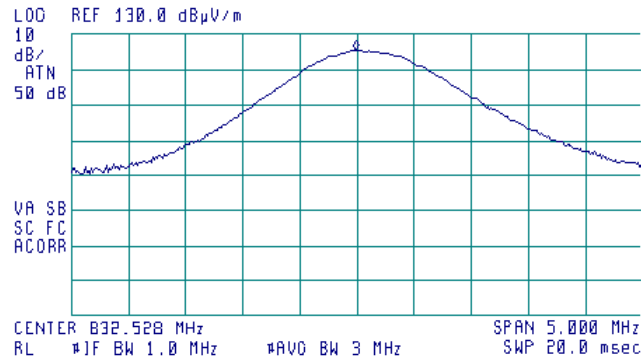


**Plot 7.1.4 Field strength of carrier at mid frequency**

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

12:18:04 OCT 23, 2007

ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 832.516 MHz  
 125.40 dBμV/m



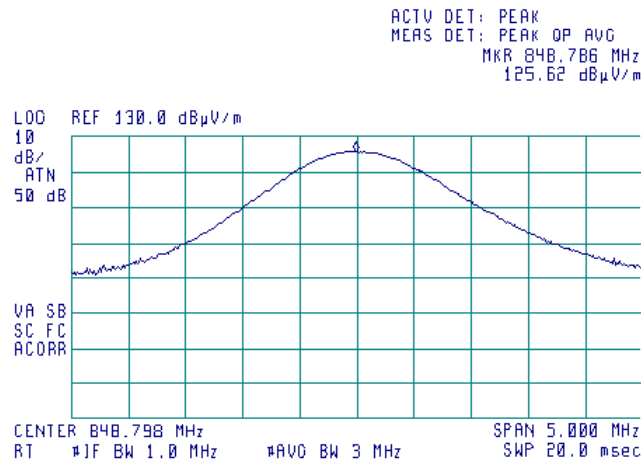


<b>Test specification:</b>	<b>Section 22.913, Peak output power</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.913		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with external antenna			

**Plot 7.1.5 Field strength of carrier at high frequency**

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

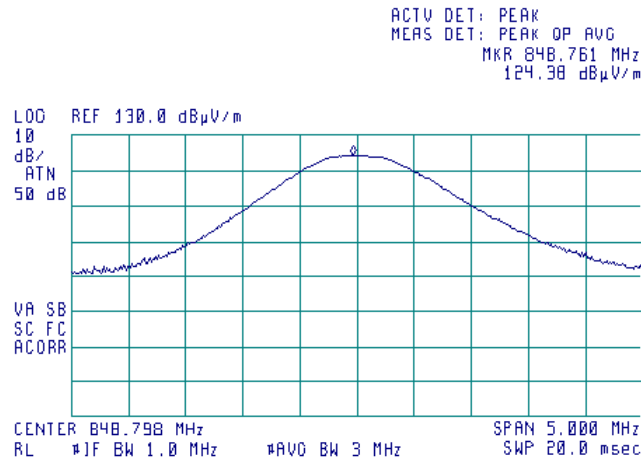
12:31:35 OCT 23, 2007



**Plot 7.1.6 Field strength of carrier at high frequency**

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

12:35:09 OCT 23, 2007





<b>Test specification:</b> Section 22.913, Peak output power			
<b>Test procedure:</b> FCC part 22, Section 22.913			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/27/2007			
<b>Temperature:</b> 27°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 40 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with internal antenna			

Table 7.1.4 Field strength measurement of peak output power (EUT with internal antenna)

ASSIGNED FREQUENCY: 824 - 849 MHz  
TEST DISTANCE: 3 m  
TEST SITE: Semi anechoic chamber  
EUT HEIGHT: 0.8 m  
DETECTOR USED: Peak  
TEST ANTENNA TYPE: Biconilog (30 MHz – 1000 MHz)  
Double ridged guide (above 1000 MHz)  
MODULATION: GSM  
BIT RATE: 270 kbps  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
RESOLUTION BANDWIDTH: 1 MHz  
VIDEO BANDWIDTH: 3 MHz

Frequency, MHz	Field strength, dB( $\mu$ V/m)	Limit, dB( $\mu$ V/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees
824.2	128.40	133.68	-5.28	H	2.20	27
832.6	128.57	133.68	-5.11	H	2.20	23
848.8	127.96	133.68	-5.72	H	2.25	31

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

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

Table 7.1.5 Substitution measurement of peak output power

ASSIGNED FREQUENCY RANGE: 824 - 849 MHz  
TEST DISTANCE: 3 m  
SUBSTITUTION ANTENNA HEIGHT: 0.8 m  
DETECTOR USED: Peak  
RESOLUTION BANDWIDTH: 1 MHz  
VIDEO BANDWIDTH: 3 MHz  
SUBSTITUTION ANTENNA TYPE: Tunable dipole (30 MHz – 1000 MHz)  
Double ridged guide (above 1000 MHz)

Frequency MHz	Field strength dB( $\mu$ V/m)	Antenna polarization	RF generator output, dBm	Antenna gain dBd	Cable loss, dB	Peak output power, ERP dBm	Limit, dBm	Margin, dB*	Verdict
824.2	128.40	H	28.6	-2.11	2.1	24.34	38.5	-11.96	Pass
832.6	128.57	H	29.4	-2.06	2.1	25.21	38.5	-11.09	Pass
848.8	127.96	H	28.4	-1.96	2.1	24.32	38.5	-11.98	Pass

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

## Reference numbers of test equipment used

HL 0521	HL 0557	HL 0567	HL 0604	HL 0661	HL 2400		
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Full description is given in Appendix A.



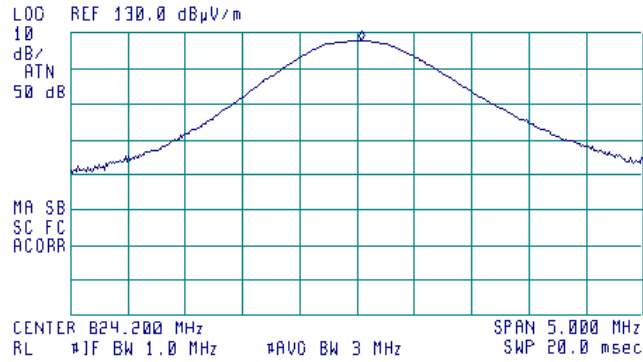
<b>Test specification:</b>	<b>Section 22.913, Peak output power</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.913		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/27/2007		
<b>Temperature:</b> 27°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 40 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with internal antenna			

**Plot 7.1.7 Field strength of carrier at low frequency**

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

14:12:22 OCT 23, 2007

ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 824.238 MHz  
 127.87 dBμV/m

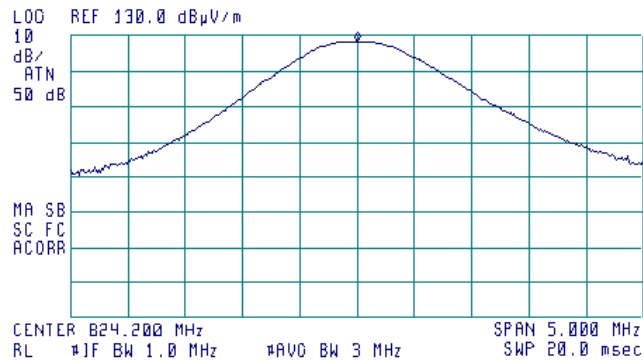


**Plot 7.1.8 Field strength of carrier at low frequency**

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

14:08:04 OCT 23, 2007

ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 824.200 MHz  
 128.40 dBμV/m





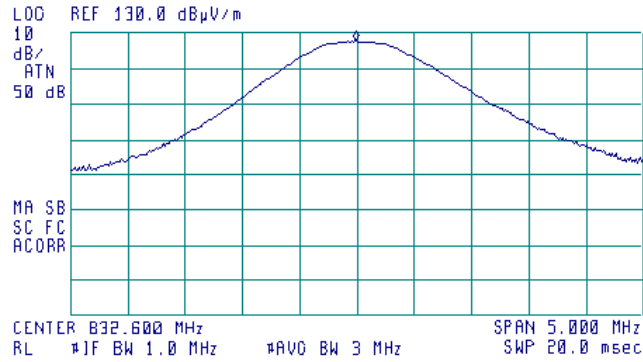
<b>Test specification:</b>	<b>Section 22.913, Peak output power</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.913		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/27/2007		
<b>Temperature:</b> 27°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 40 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with internal antenna			

**Plot 7.1.9 Field strength of carrier at mid frequency**

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

13:34:57 OCT 23, 2007

ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 832.588 MHz  
 127.78 dBμV/m

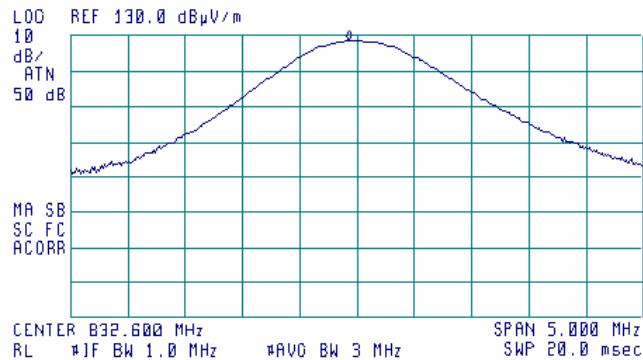


**Plot 7.1.10 Field strength of carrier at mid frequency**

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

14:02:36 OCT 23, 2007

ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 832.525 MHz  
 128.57 dBμV/m





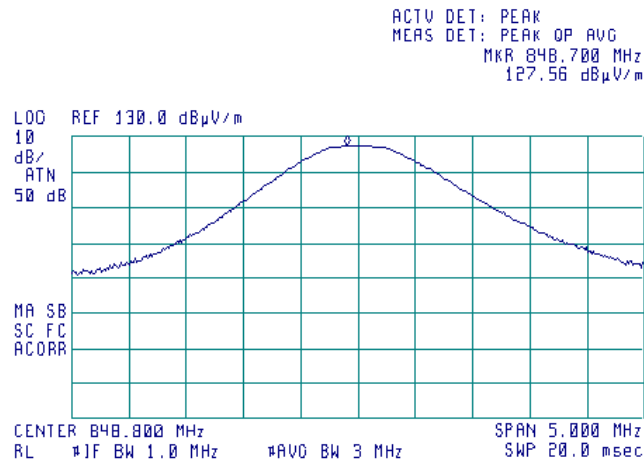


<b>Test specification:</b>	<b>Section 22.913, Peak output power</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.913		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/27/2007		
<b>Temperature:</b> 27°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 40 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with internal antenna			

**Plot 7.1.11 Field strength of carrier at high frequency**

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

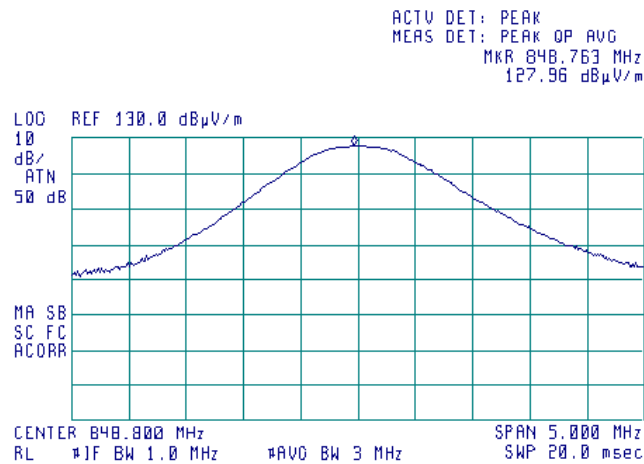
14:17:12 OCT 23, 2007



**Plot 7.1.12 Field strength of carrier at high frequency**

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

14:27:12 OCT 23, 2007





<b>Test specification:</b> Section 2.1049, Occupied bandwidth	
<b>Test procedure:</b> FCC part 2, Section 2.1049	
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS
<b>Date:</b> 7/19/2007	
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa
<b>Relative Humidity:</b> 41%	
<b>Power Supply:</b> 9.6 VDC	
<b>Remarks:</b>	

## 7.2 Occupied bandwidth test

### 7.2.1 General

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

Table 7.2.1 Occupied bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points*, dBc
824 - 849	26

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

### 7.2.2 Test procedure

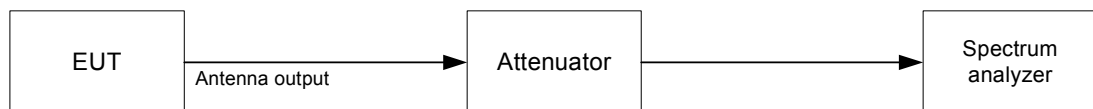
7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and its proper operation was checked.

7.2.2.2 The EUT was set to transmit the unmodulated carrier and the reference peak power level was measured.

7.2.2.3 The EUT was set to transmit the normally modulated carrier.

7.2.2.4 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and the results provided in Table 7.2.2 and the associated plots.

Figure 7.2.1 Occupied bandwidth test setup





<b>Test specification:</b> Section 2.1049, Occupied bandwidth	
<b>Test procedure:</b>	FCC part 2, Section 2.1049
<b>Test mode:</b>	Compliance
<b>Date:</b>	7/19/2007
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa
<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>	
<b>Verdict: PASS</b>	

Table 7.2.2 Occupied bandwidth test results

DETECTOR USED: Peak hold  
 RESOLUTION BANDWIDTH: 3 kHz  
 VIDEO BANDWIDTH: 10 kHz  
 MODULATION ENVELOPE REFERENCE POINTS: 26 dBc  
 MODULATION: GSM  
 BIT RATE: 270 kbps

Carrier frequency, MHz	Occupied bandwidth, kHz
824.2	280.0
836.6	270.0
848.8	275.0

Reference numbers of test equipment used

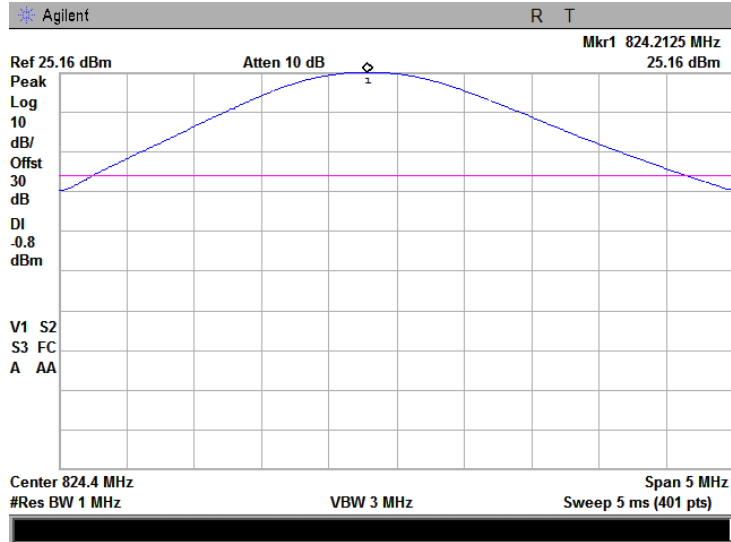
HL 2015	HL 2254	HL 2912	HL 2780	HL 2869		
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Full description is given in Appendix A.

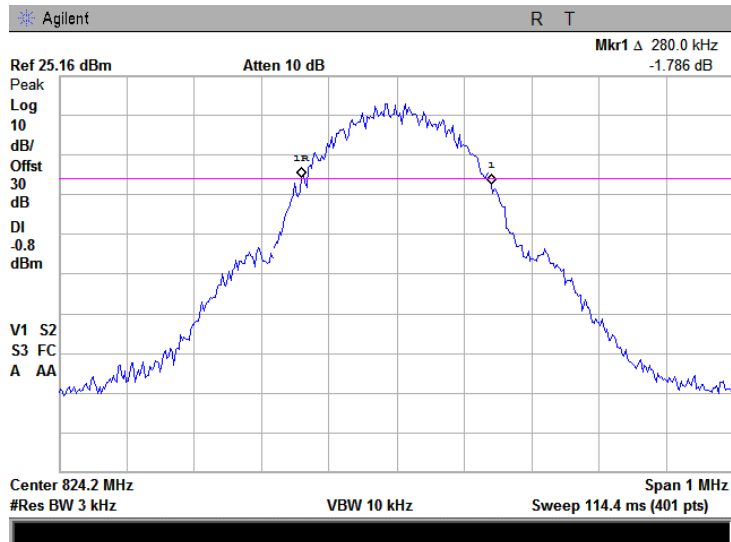


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	FCC part 2, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.2.1 Occupied bandwidth test result at low frequency, reference level



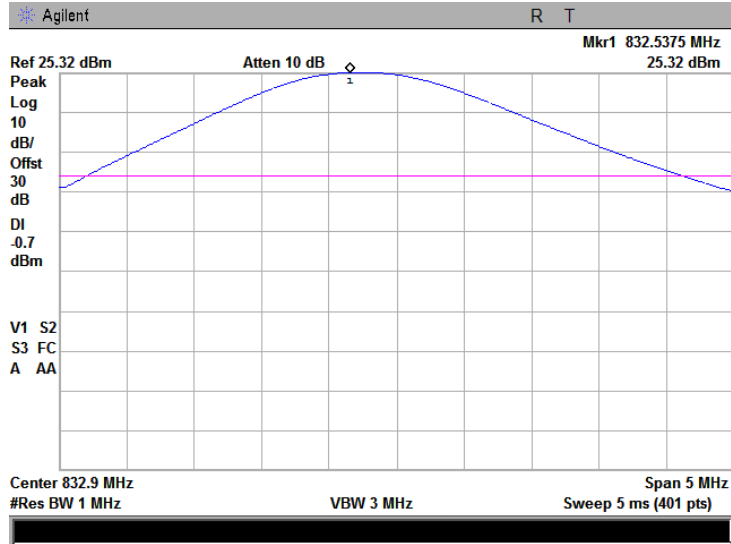
Plot 7.2.2 Occupied bandwidth test result at low frequency



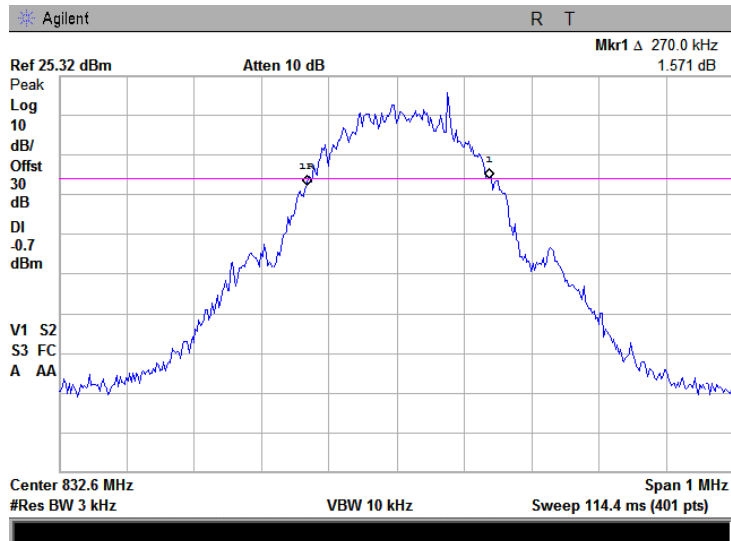


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	FCC part 2, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.2.3 Occupied bandwidth test result at mid frequency, reference level



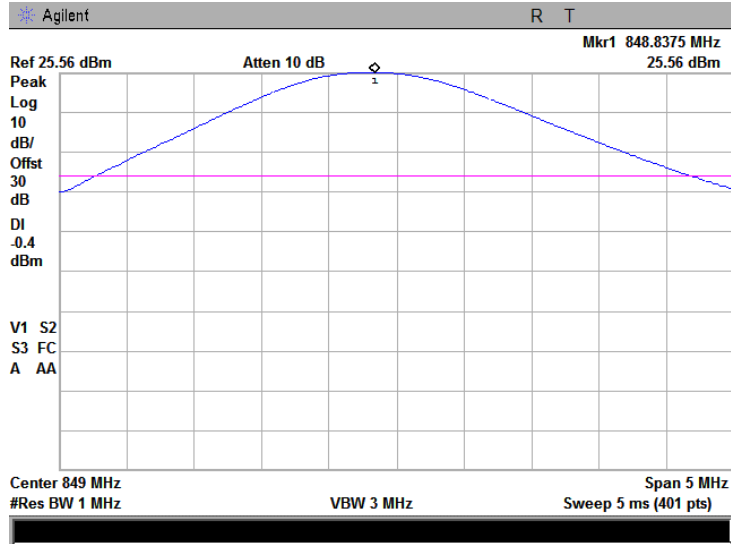
Plot 7.2.4 Occupied bandwidth test result at mid frequency



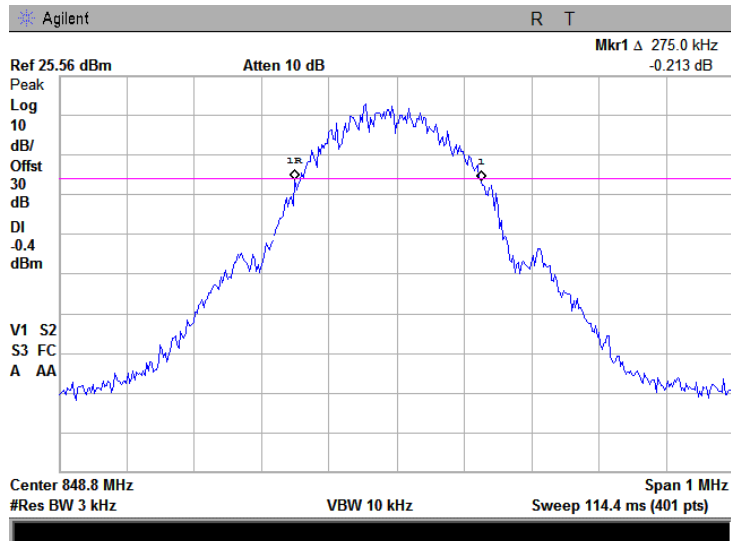


<b>Test specification:</b>	<b>Section 2.1049, Occupied bandwidth</b>		
<b>Test procedure:</b>	FCC part 2, Section 2.1049		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date:</b>	7/19/2007		
<b>Temperature: 26°C</b>	<b>Air Pressure: 1006 hPa</b>	<b>Relative Humidity: 41%</b>	<b>Power Supply: 9.6 VDC</b>
<b>Remarks:</b>			

Plot 7.2.5 Occupied bandwidth test result at high frequency, reference level



Plot 7.2.6 Occupied bandwidth test result at high frequency



<b>Test specification:</b>		<b>Section 22.917, Spurious emission at antenna terminal</b>	
<b>Test procedure:</b>		FCC part 22, Section 22.917	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

### 7.3 Spurious emissions at RF antenna connector test

#### 7.3.1 General

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

Table 7.3.1 Spurious emission limits

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

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

#### 7.3.2 Test procedure

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

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

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

Figure 7.3.1 Spurious emission test setup





<b>Test specification:</b>		<b>Section 22.917, Spurious emission at antenna terminal</b>			
<b>Test procedure:</b>		FCC part 22, Section 22.917			
<b>Test mode:</b>	Compliance	<b>Verdict:</b>		<b>PASS</b>	
<b>Date:</b>	7/19/2007				
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC		
<b>Remarks:</b>					

Table 7.3.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE: 824-849 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009-10000 MHz  
 DETECTOR USED: Peak  
 VIDEO BANDWIDTH:  $\geq$  Resolution bandwidth  
 MODULATION: GMSK  
 MODULATING SIGNAL: PRBS  
 BIT RATE: 270 kbps  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Attenuation below carrier, dBc	Limit, dBm	Margin, dB*	Verdict
<b>Low carrier frequency</b>									
823.9975	-15.18	Included	Included	3.0	-15.18	51.45	-13.0	-2.18	Pass
1648.5500	-34.36	Included	Included	1000.0	-34.36	51.45	-13.0	-21.36	Pass
2472.5250	-36.85	Included	Included	1000.0	-36.85	51.45	-13.0	-23.85	Pass
<b>Mid carrier frequency</b>									
1665.2000	-34.58	Included	Included	1000.0	-34.58	51.45	-13.0	-21.58	Pass
2497.5750	-36.59	Included	Included	1000.0	-36.59	51.45	-13.0	-23.59	Pass
<b>High carrier frequency</b>									
849.0175	-16.34	Included	Included	3.0	-16.34	51.45	-13.0	-3.34	Pass
1697.6500	-33.54	Included	Included	1000.0	-33.54	51.45	-13.0	-20.54	Pass
2546.4250	-36.41	Included	Included	1000.0	-36.41	51.45	-13.0	-23.41	Pass

\*- Margin = Spurious emission – specification limit.

## Reference numbers of test equipment used

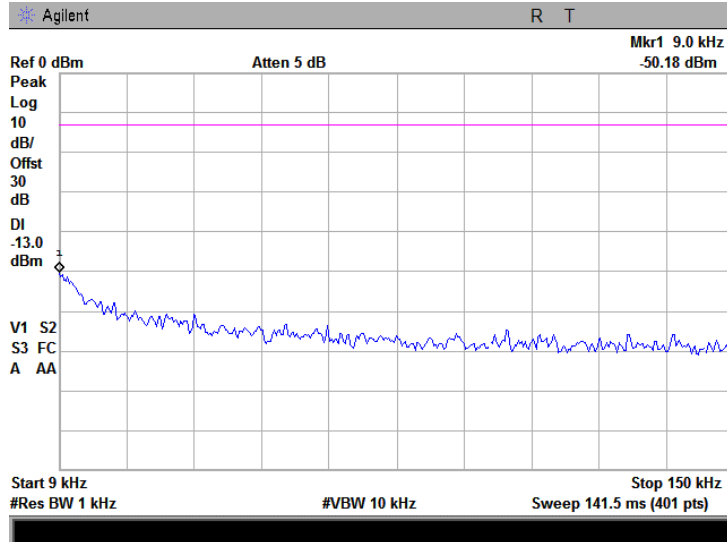
HL 2015	HL 2254	HL 2912	HL 2780	HL 2869		
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Full description is given in Appendix A.

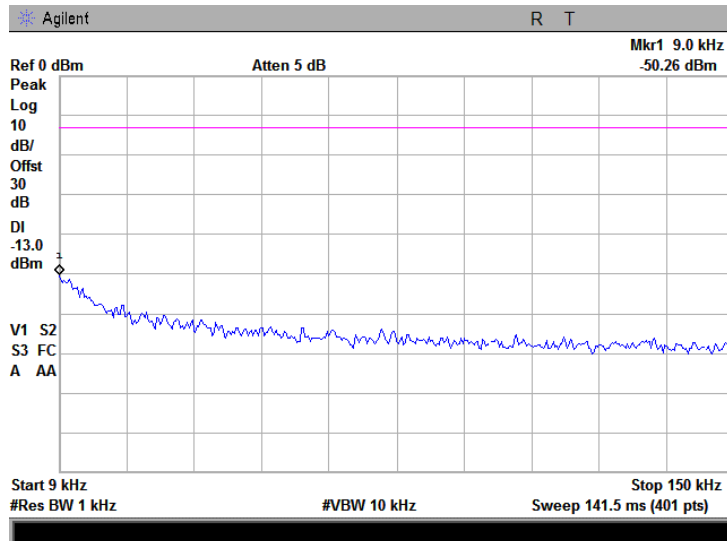


<b>Test specification:</b> Section 22.917, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

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



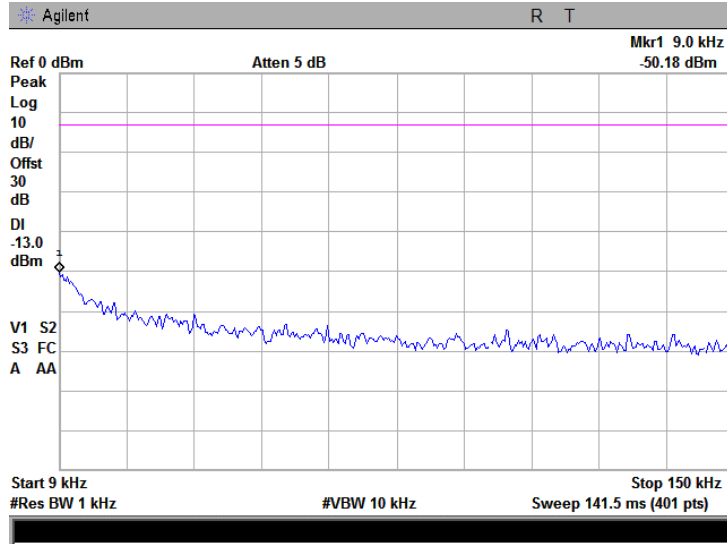
Plot 7.3.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency



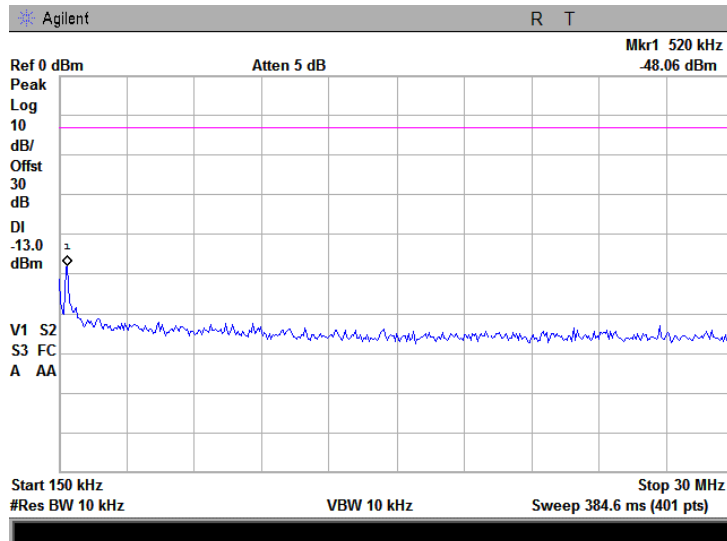


<b>Test specification:</b> Section 22.917, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.3.3 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency

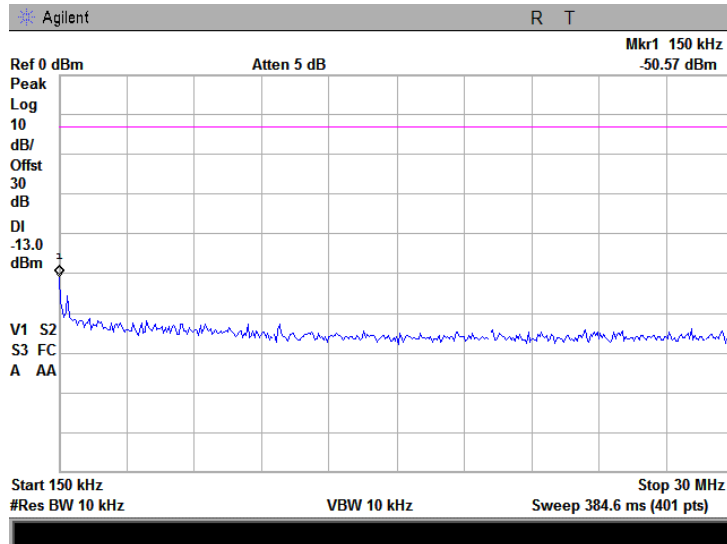


Plot 7.3.4 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

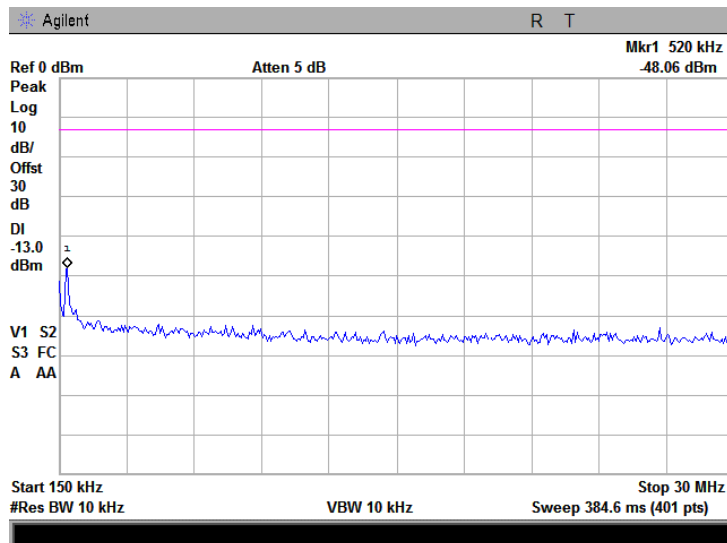


<b>Test specification:</b>	<b>Section 22.917, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.3.5 Spurious emission measurements in 0.15 - 30.0 MHz range at mid carrier frequency

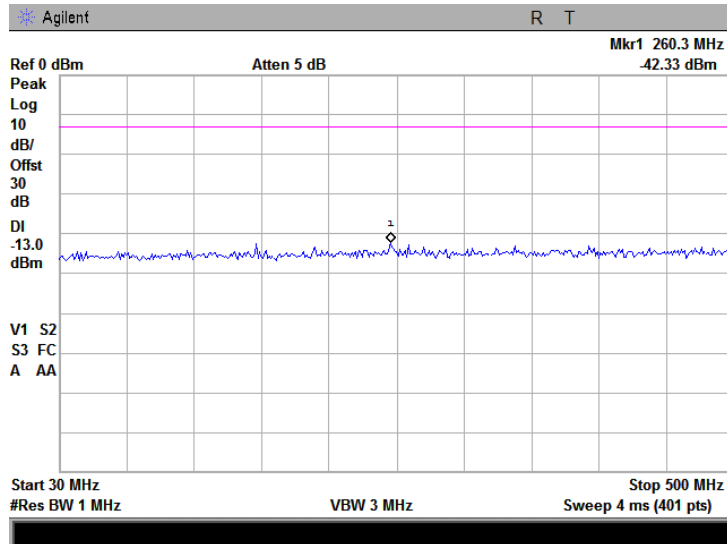


Plot 7.3.6 Spurious emission measurements in 0.15 – 30.0 MHz range at high carrier frequency

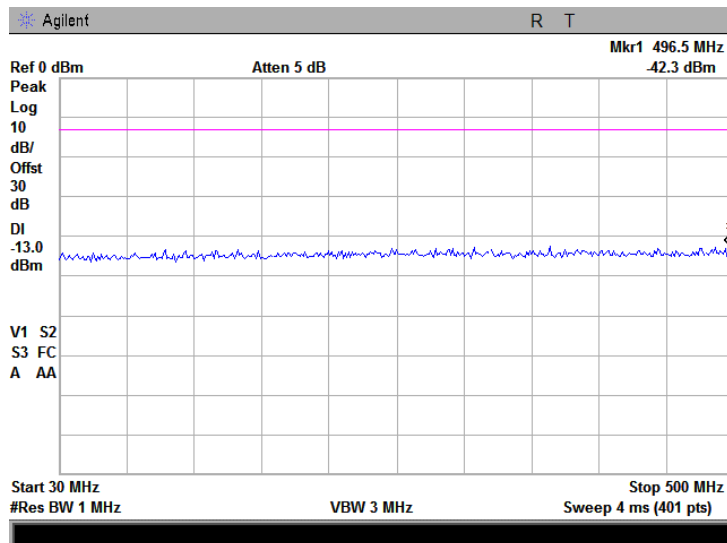


<b>Test specification:</b> Section 22.917, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.3.7 Spurious emission measurements in 30.0 - 500 MHz range at low carrier frequency

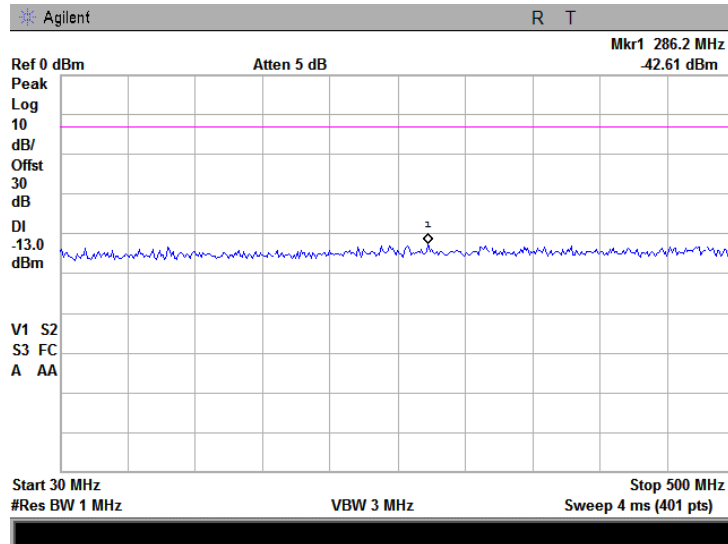


Plot 7.3.8 Spurious emission measurements in 30.0 - 500 MHz range at mid carrier frequency

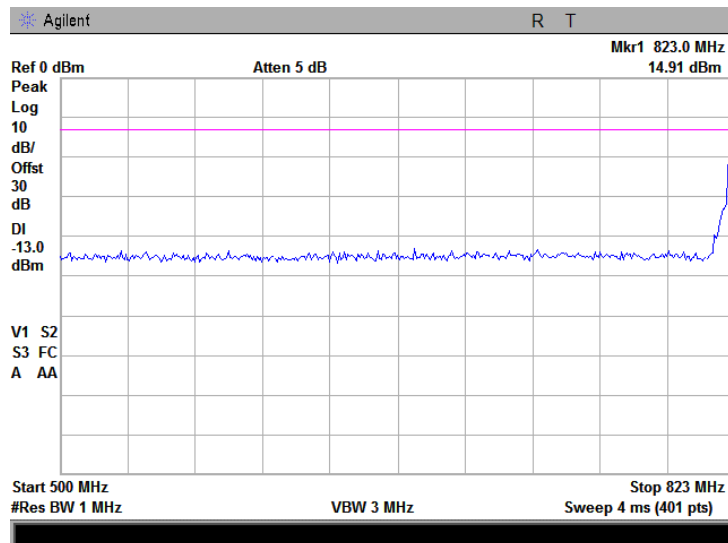


<b>Test specification:</b> Section 22.917, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.3.9 Spurious emission measurements in 30.0 - 500 MHz range at high carrier frequency

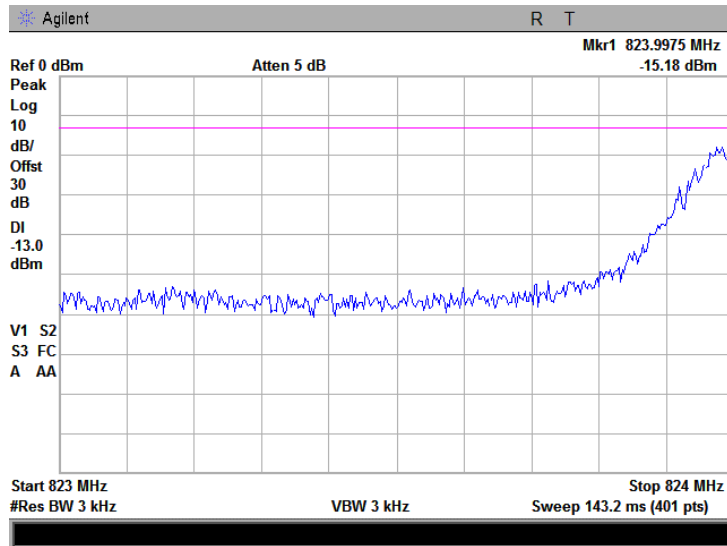


Plot 7.3.10 Spurious emission measurements in 500.0 – 823.0 MHz range at low carrier frequency

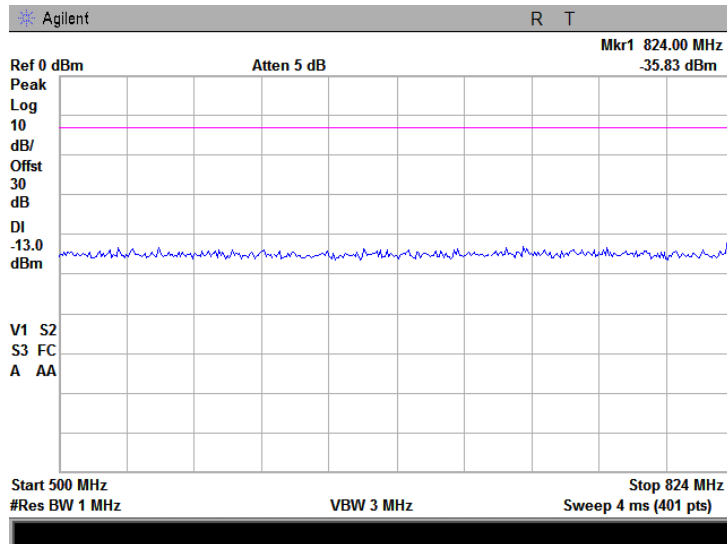


<b>Test specification:</b> Section 22.917, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.3.11 Spurious emission measurements in 823.0 – 824.0 MHz range at low carrier frequency

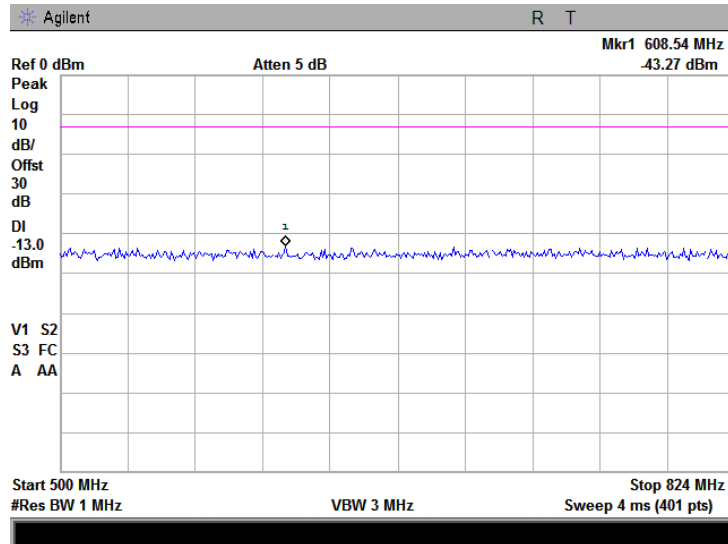


Plot 7.3.12 Spurious emission measurements in 500.0 - 824 MHz range at mid carrier frequency

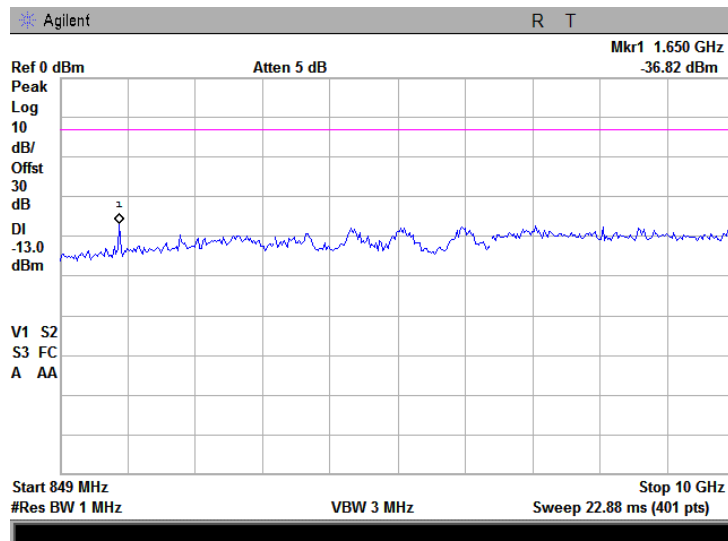


<b>Test specification:</b> Section 22.917, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.3.13 Spurious emission measurements in 500.0 - 824 MHz range at high carrier frequency

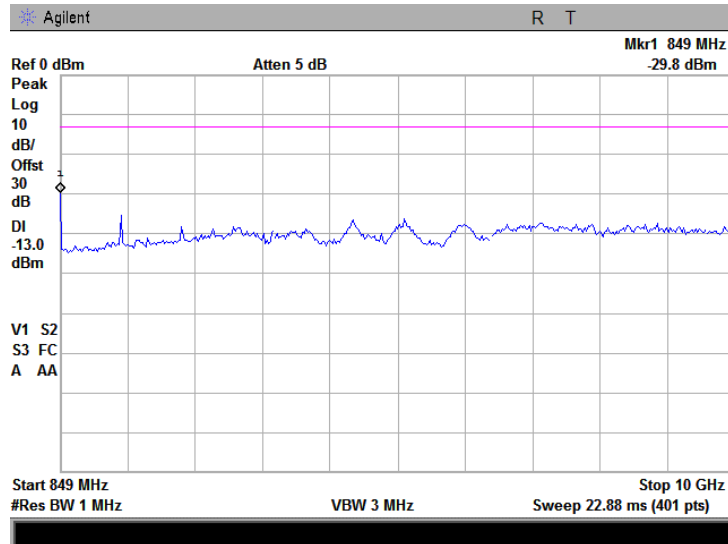


Plot 7.3.14 Spurious emission measurements in 849 -10000 MHz range at low carrier frequency

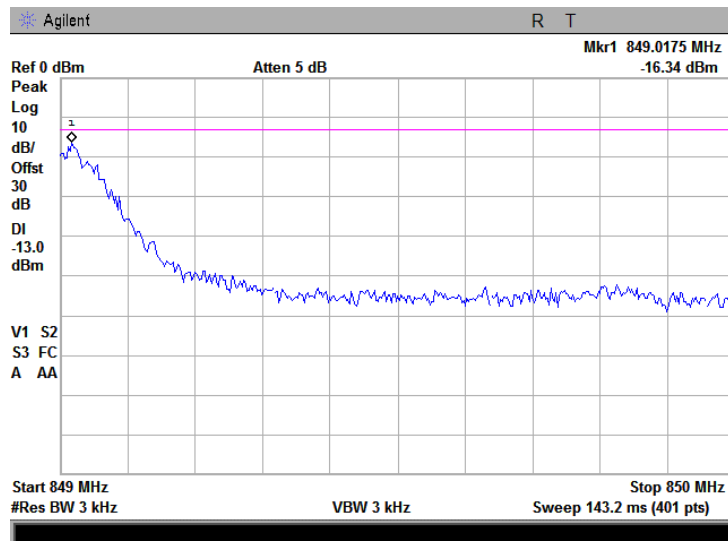


<b>Test specification:</b> Section 22.917, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.3.15 Spurious emission measurements in 849 - 10000MHz range at mid carrier frequency



Plot 7.3.16 Spurious emission measurements in 849 - 850MHz range at high carrier frequency

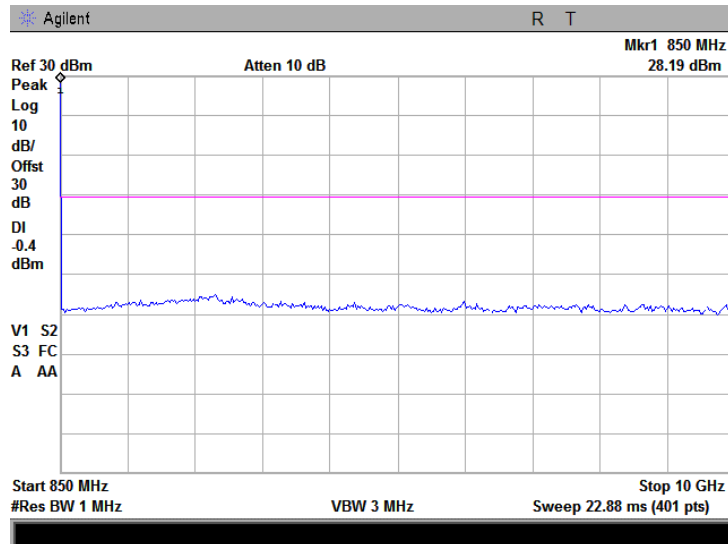






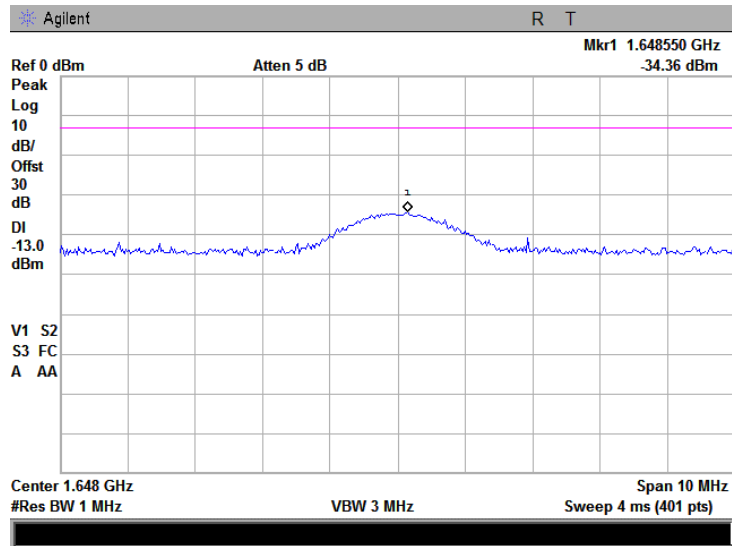
<b>Test specification:</b>	<b>Section 22.917, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.3.17 Spurious emission measurements in 850 - 10000MHz range at high carrier frequency

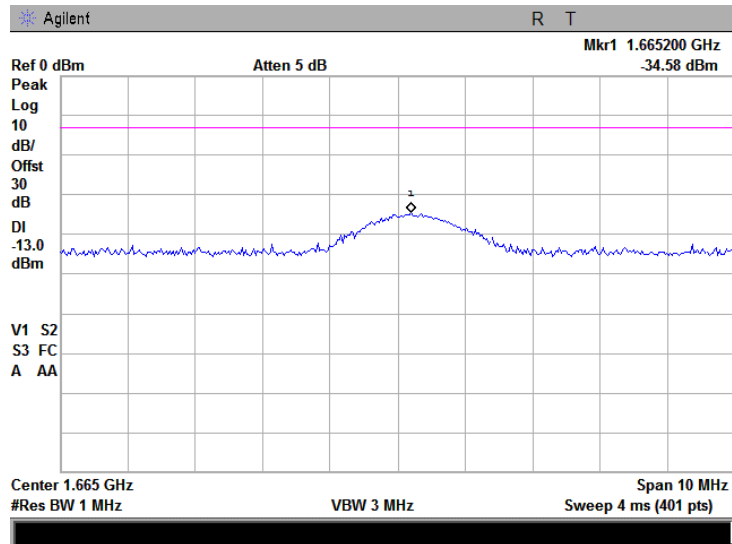


<b>Test specification:</b>		<b>Section 22.917, Spurious emission at antenna terminal</b>	
<b>Test procedure:</b>		FCC part 22, Section 22.917	
<b>Test mode:</b>		Compliance	
<b>Date:</b>		7/19/2007	
<b>Temperature:</b> 26°C		<b>Air Pressure:</b> 1006 hPa	
<b>Remarks:</b>		<b>Verdict:</b> PASS	
		<b>Relative Humidity:</b> 41%	
		<b>Power Supply:</b> 9.6 VDC	

Plot 7.3.18 Conducted spurious emission measurements at the 2<sup>nd</sup> harmonic of low carrier frequency

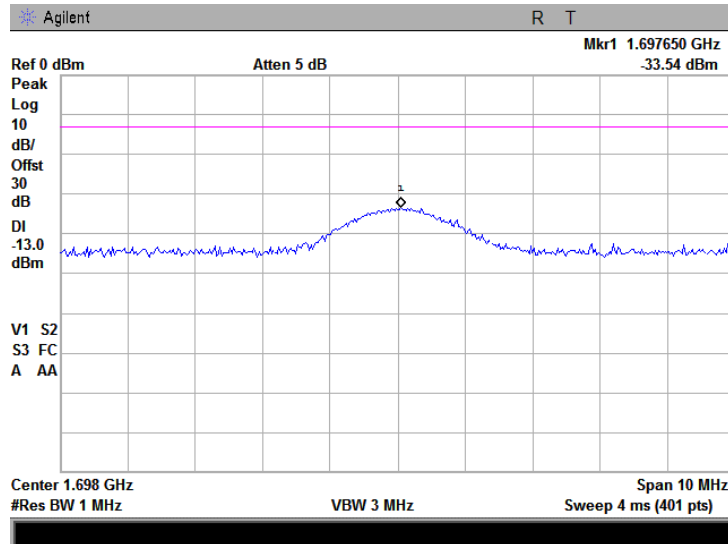


Plot 7.3.19 Conducted spurious emission measurements at the 2<sup>nd</sup> harmonic of mid carrier frequency

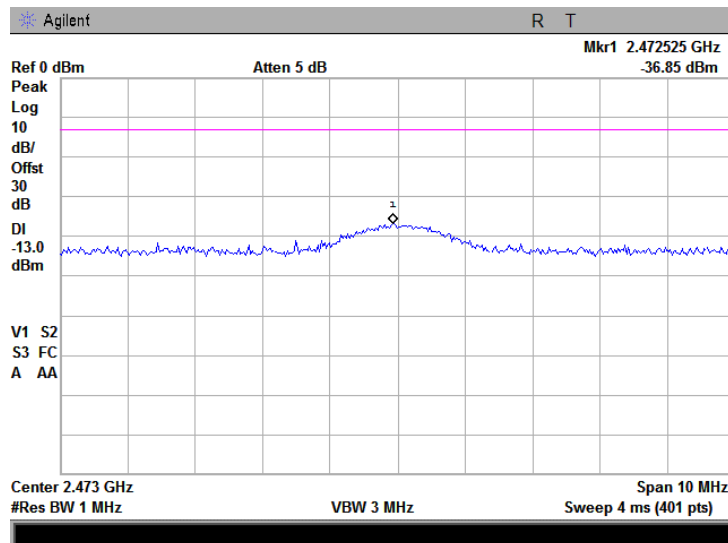


<b>Test specification:</b> Section 22.917, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.3.20 Conducted spurious emission measurements at the 2<sup>nd</sup> harmonic of high carrier frequency

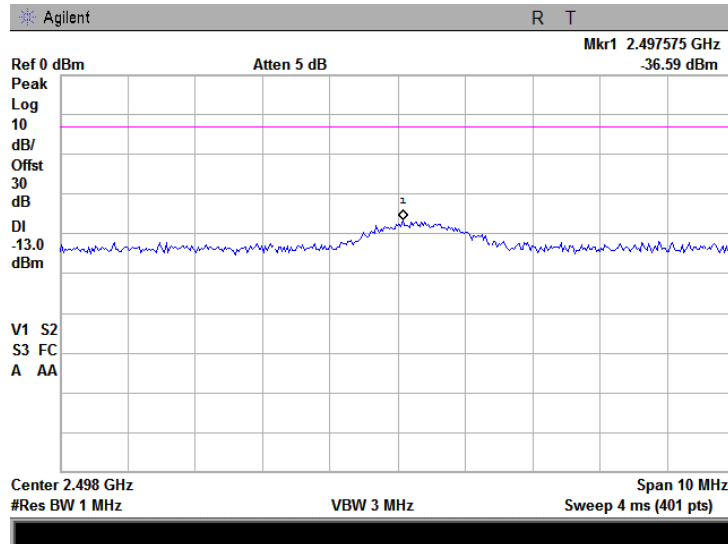


Plot 7.3.21 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of low carrier frequency

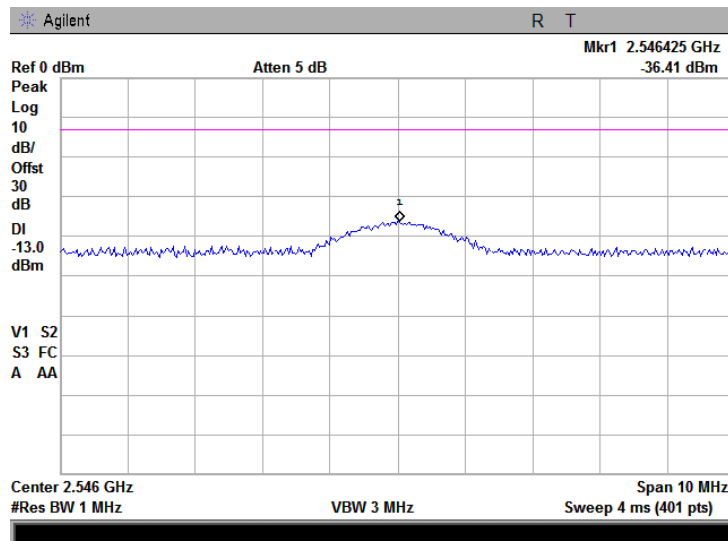


<b>Test specification:</b> Section 22.917, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.3.22 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of mid carrier frequency

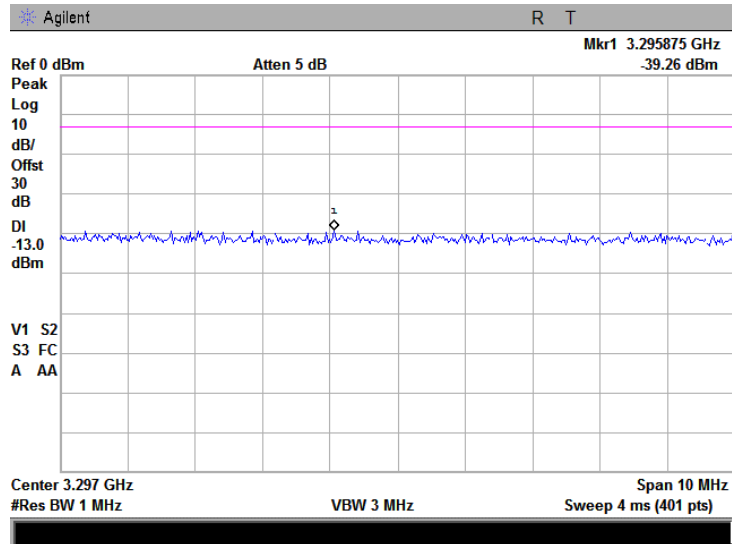


Plot 7.3.23 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of high carrier frequency

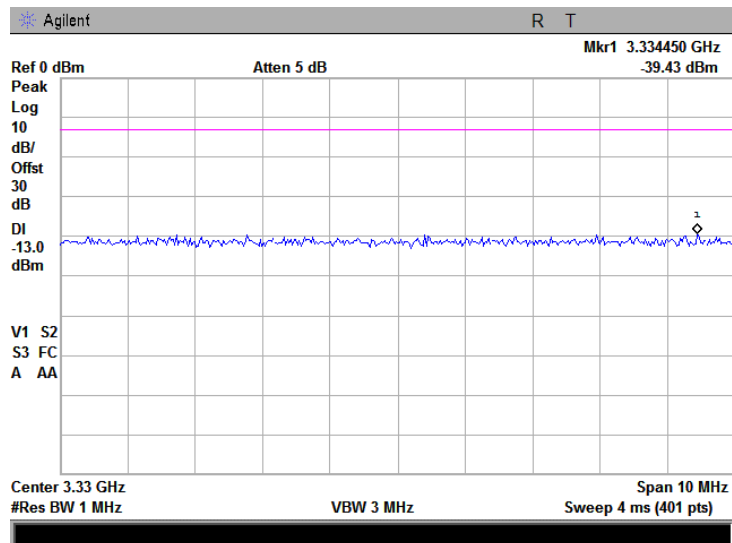


<b>Test specification:</b>	<b>Section 22.917, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.3.24 Conducted spurious emission measurements at the 4<sup>th</sup> harmonic of low carrier frequency

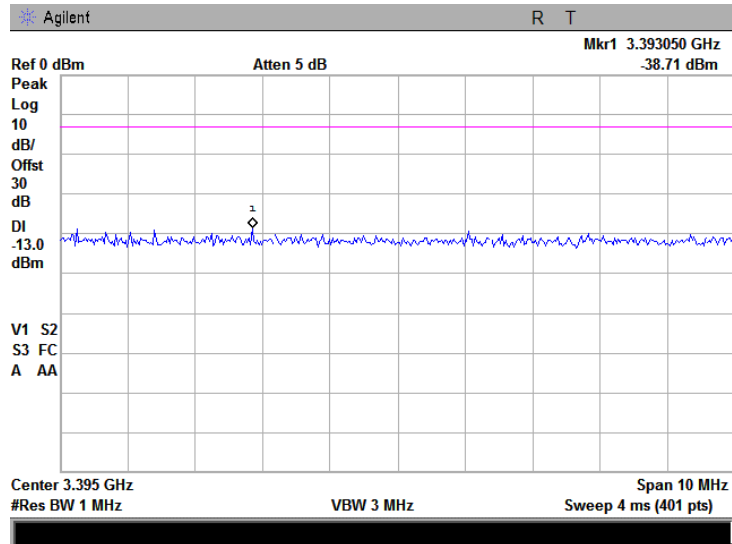


Plot 7.3.25 Conducted spurious emission measurements at the 4<sup>th</sup> harmonic of mid carrier frequency

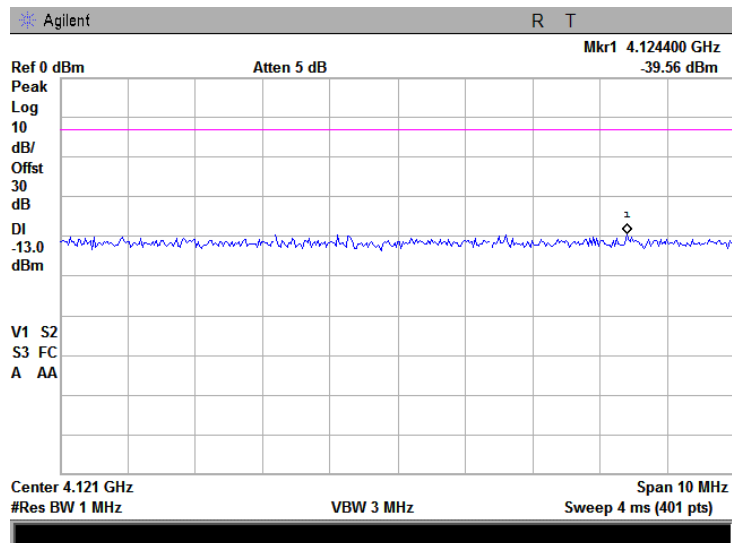


<b>Test specification:</b> Section 22.917, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.3.26 Conducted spurious emission measurements at the 4<sup>th</sup> harmonic of high carrier frequency

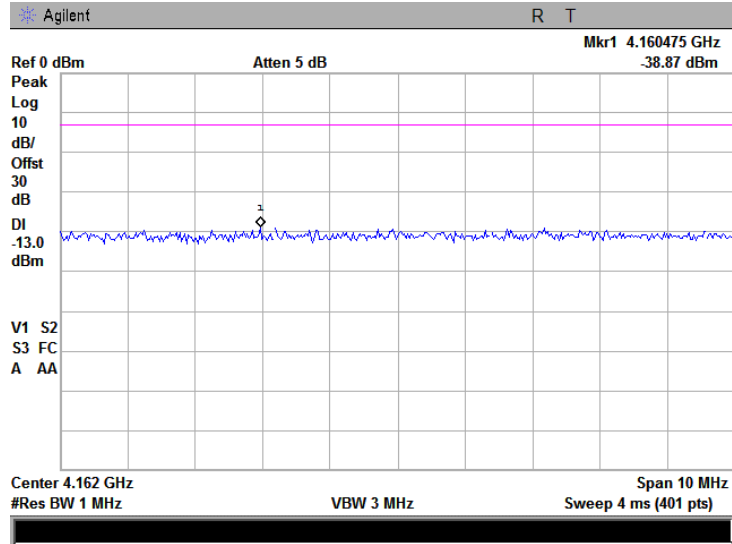


Plot 7.3.27 Conducted spurious emission measurements at the 5<sup>th</sup> harmonic of low carrier frequency

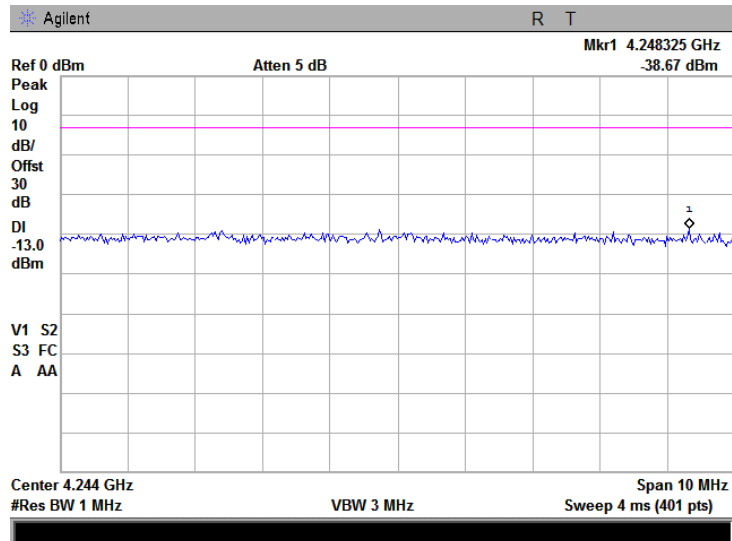


<b>Test specification:</b> Section 22.917, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.3.28 Conducted spurious emission measurements at the 5<sup>th</sup> harmonic of mid carrier frequency



Plot 7.3.29 Conducted spurious emission measurements at the 5<sup>th</sup> harmonic of high carrier frequency





<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

## 7.4 Field strength of spurious emissions

### 7.4.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limit is given in Table 7.4.1.

**Table 7.4.1 Radiated spurious emissions limits**

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

\* - P is transmitter output power in Watts.

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

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

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

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

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

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

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

7.4.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ 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.

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



<b>Test specification:</b> Section 22.917, Radiated spurious emissions			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Figure 7.4.1 Setup for spurious emission field strength measurements below 30 MHz

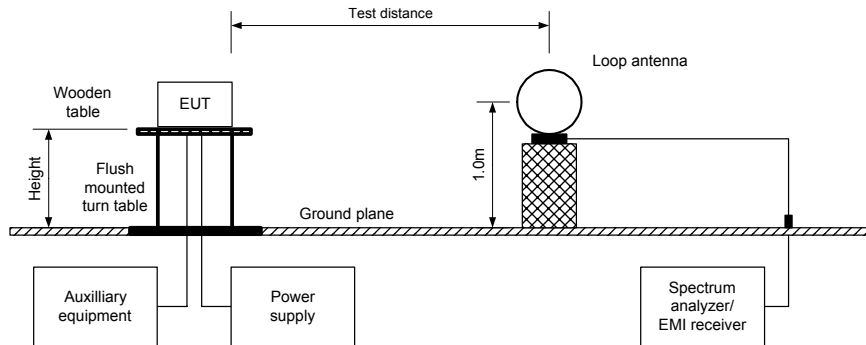
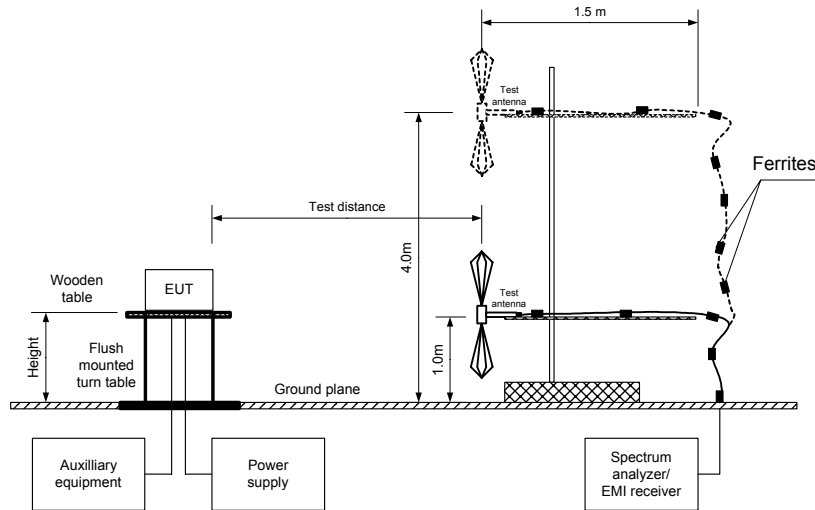


Figure 7.4.2 Setup for spurious emission field strength measurements above 30 MHz





<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

**Table 7.4.2 Spurious emission field strength test results**

ASSIGNED FREQUENCY RANGE: 824-849 MHz  
TEST DISTANCE: 3 m  
TEST SITE: OATS  
EUT HEIGHT: 0.8 m  
INVESTIGATED FREQUENCY RANGE: 0.009 – 10000 MHz  
DETECTOR USED: Peak  
VIDEO BANDWIDTH: > Resolution bandwidth  
TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)  
Biconilog (30 MHz – 1000 MHz)  
Double ridged guide (above 1000 MHz)  
MODULATION: GSM  
BIT RATE: 270 kbps  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	Field strength, dB( $\mu$ V/m)	Limit, dB( $\mu$ V/m)	Margin, dB*	RBW, kHz	Antenna polarization	Antenna height, m	Turn-table position**, degrees
<b>Low carrier frequency</b>							
All spurious were found at least 20 dB below specified limit							
<b>Mid carrier frequency</b>							
All spurious were found at least 20 dB below specified limit							
<b>High carrier frequency</b>							
All spurious were found at least 20 dB below specified limit							

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

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

**Reference numbers of test equipment used**

HL 0446	HL 0521	HL 0589	HL 0604	HL 1984	HL 1947	HL 2009	HL 2259
HL 2909							

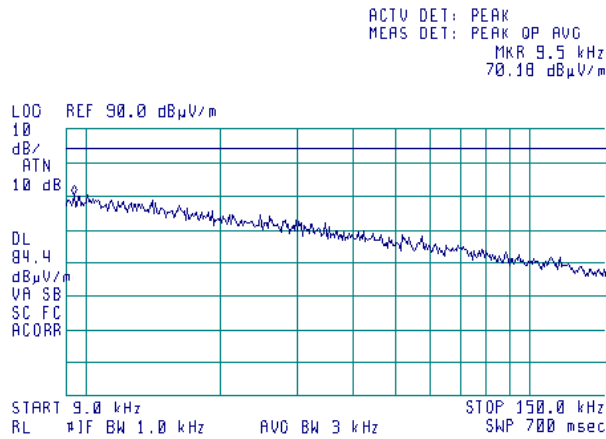
Full description is given in Appendix A.



<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

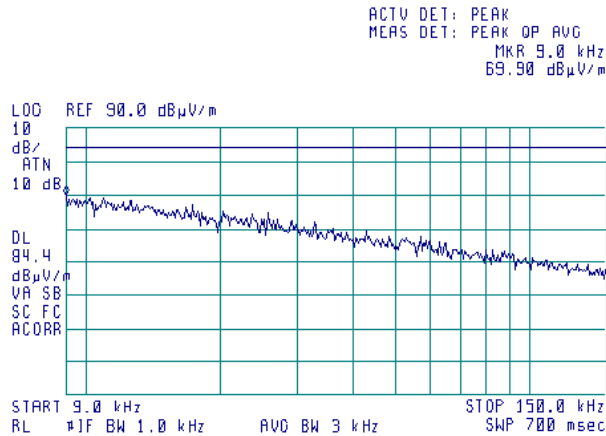
Plot 7.4.1 Radiated emission measurements in 9 to 150 kHz range

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



Plot 7.4.2 Radiated emission measurements in 9 to 150 kHz range

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

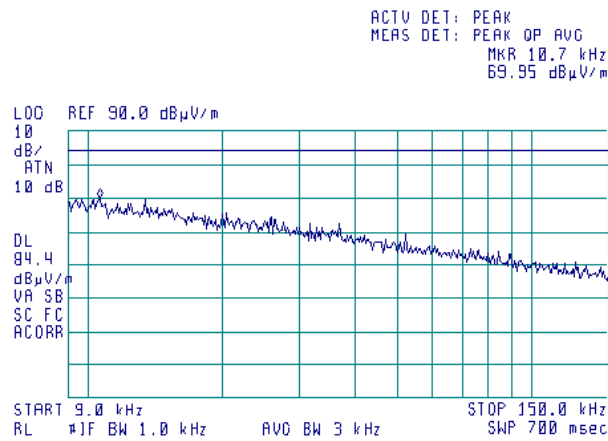




<b>Test specification:</b> Section 22.917, Radiated spurious emissions			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

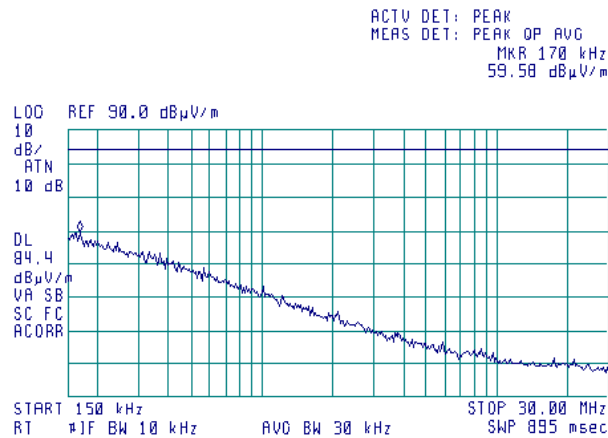
Plot 7.4.3 Radiated emission measurements in 9 to 150 kHz range

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



Plot 7.4.4 Radiated emission measurements in 0.15 - 30 MHz range

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

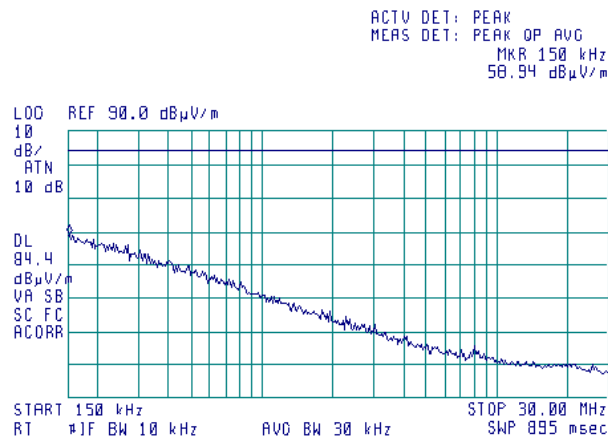




<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

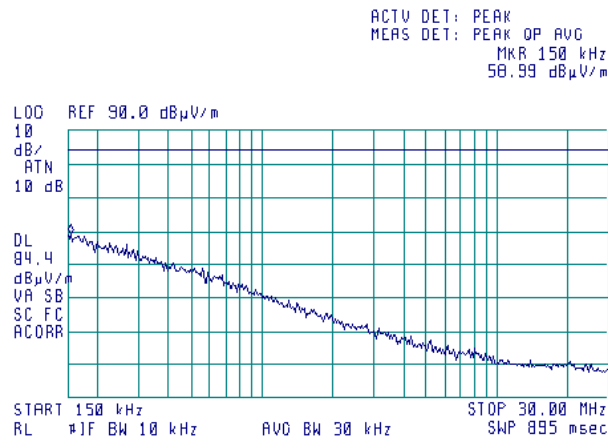
**Plot 7.4.5 Radiated emission measurements in 0.15 - 30 MHz range**

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



**Plot 7.4.6 Radiated emission measurements in 0.15 - 30 MHz range**

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



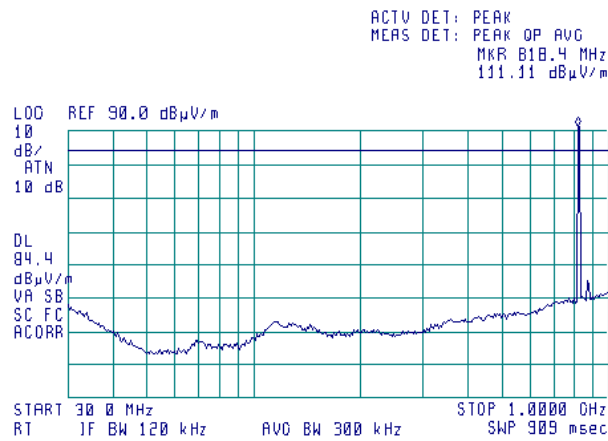


<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

**Plot 7.4.7 Radiated emission measurements in 30 - 1000 MHz range**

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

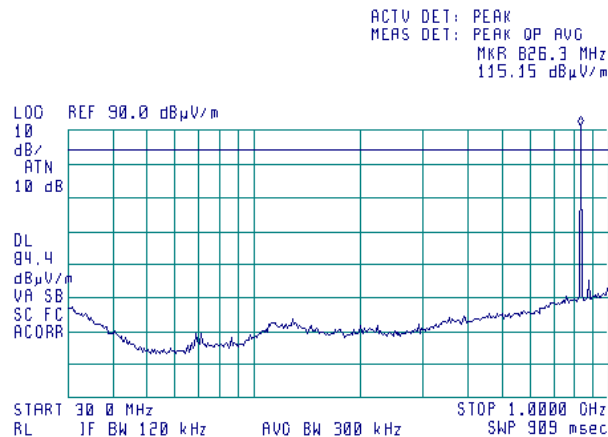
11:22:34 JUL 15, 2007



**Plot 7.4.8 Radiated emission measurements in 30 - 1000 MHz range**

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

11:40:02 JUL 15, 2007



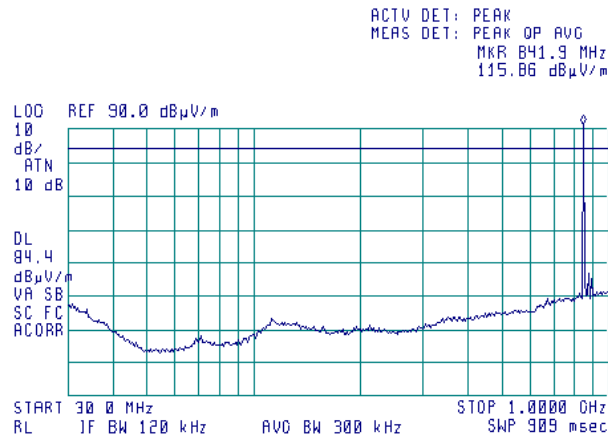


<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

**Plot 7.4.9 Radiated emission measurements in 30 - 1000 MHz range**

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

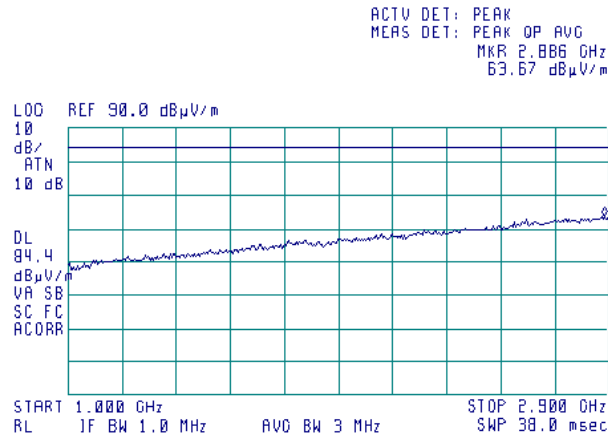
11:51:42 JUL 15, 2007



**Plot 7.4.10 Radiated emission measurements in 1000 – 2900 MHz range**

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

12:09:49 JUL 15, 2007



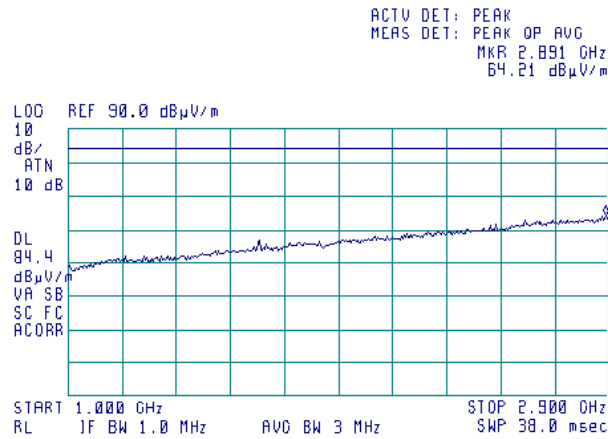


<b>Test specification:</b> Section 22.917, Radiated spurious emissions			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 7.4.11 Radiated emission measurements in 1 – 2.9 GHz range

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

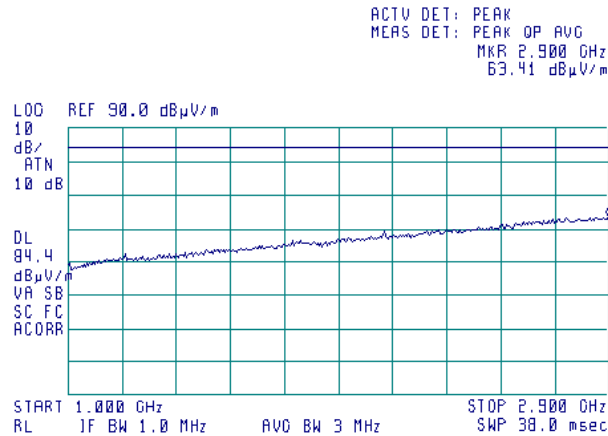
12:17:29 JUL 15, 2007



Plot 7.4.12 Radiated emission measurements in 1 – 2.9 GHz range

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

12:00:20 JUL 15, 2007



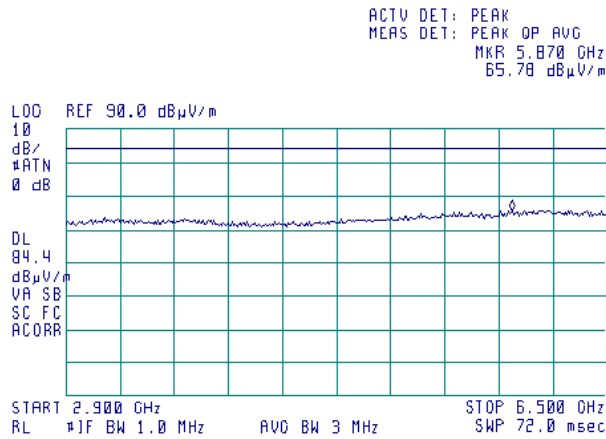




<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

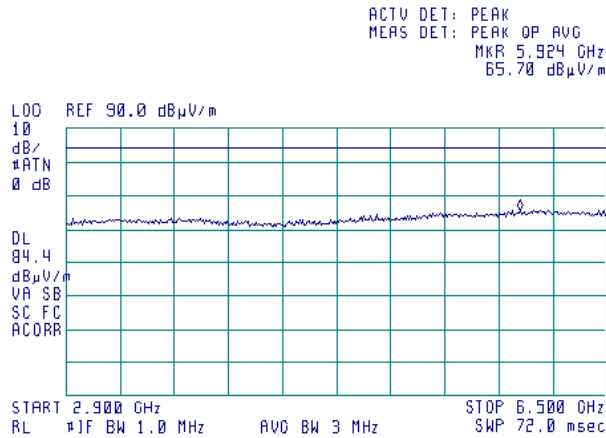
**Plot 7.4.13 Radiated emission measurements in 2.9 – 6.5 GHz range**

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



**Plot 7.4.14 Radiated emission measurements in 2.9 – 6.5 GHz range**

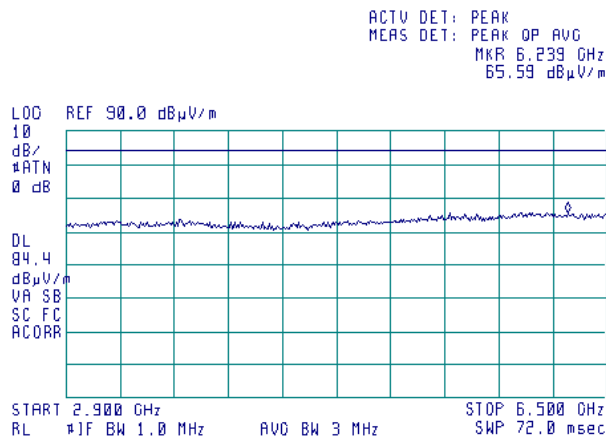
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b> Section 22.917, Radiated spurious emissions			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

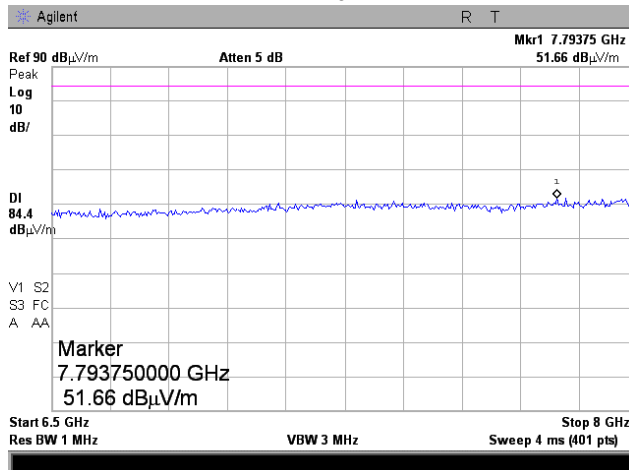
Plot 7.4.15 Radiated emission measurements in 2.9 – 6.5 GHz range

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



Plot 7.4.16 Radiated emission measurements in 6.5 - 8 GHz range

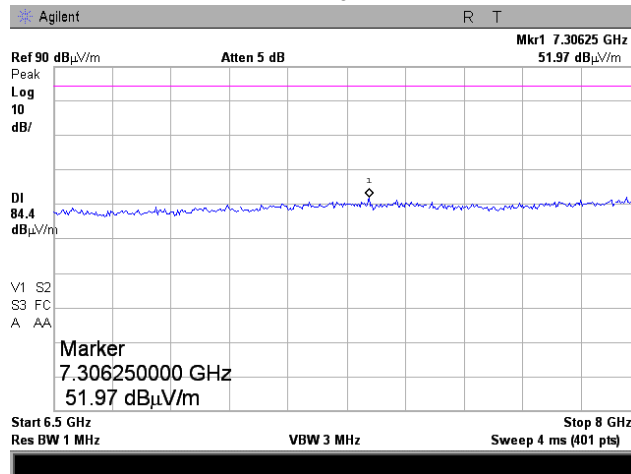
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

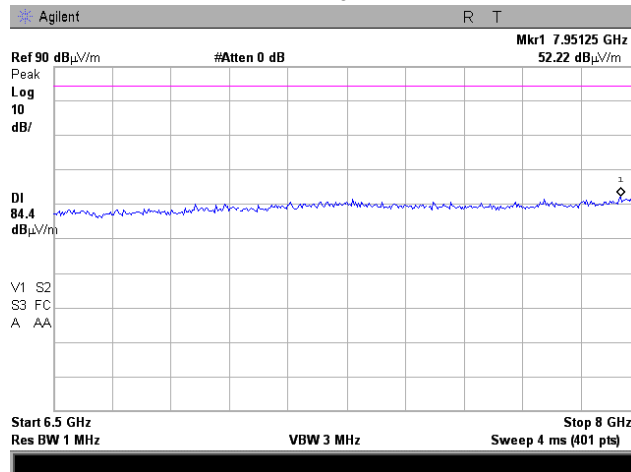
**Plot 7.4.17 Radiated emission measurements in 6.5 - 8 GHz range**

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



**Plot 7.4.18 Radiated emission measurements in 6.5 - 8 GHz range**

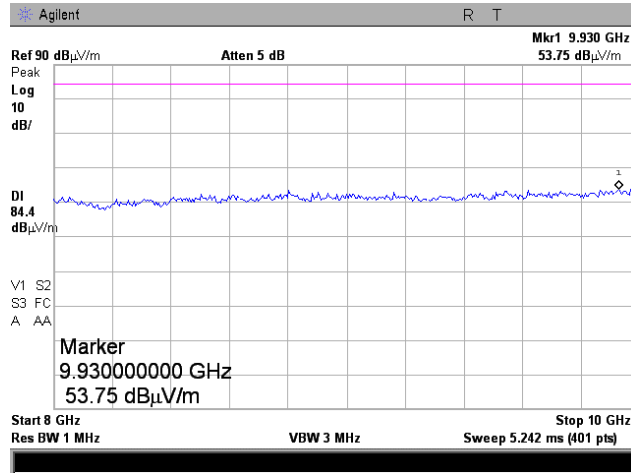
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b> Section 22.917, Radiated spurious emissions			
<b>Test procedure:</b> FCC part 22, Section 22.917			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

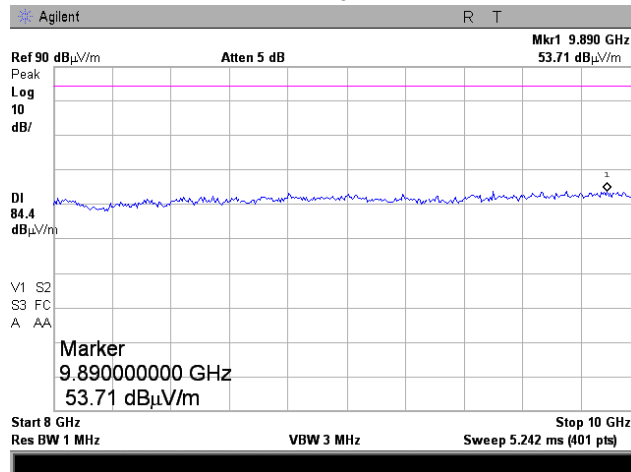
**Plot 7.4.19 Radiated emission measurements in 8 - 10 GHz range**

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



**Plot 7.4.20 Radiated emission measurements in 8 - 10 GHz range**

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

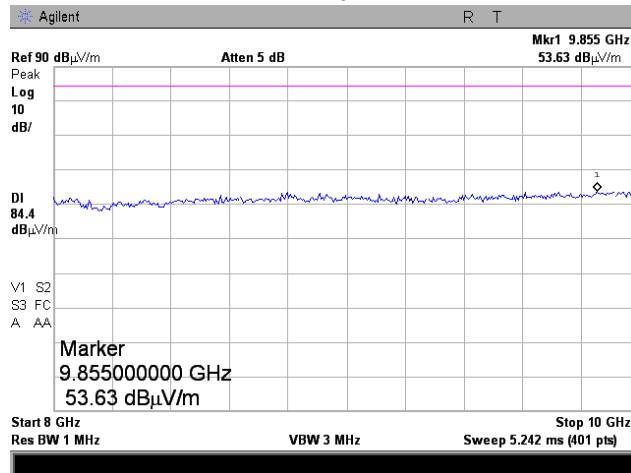




<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

**Plot 7.4.21 Radiated emission measurements in 8 - 10 GHz range**

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

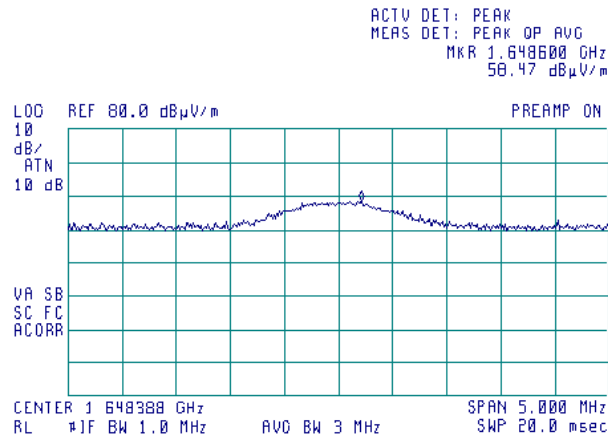




<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

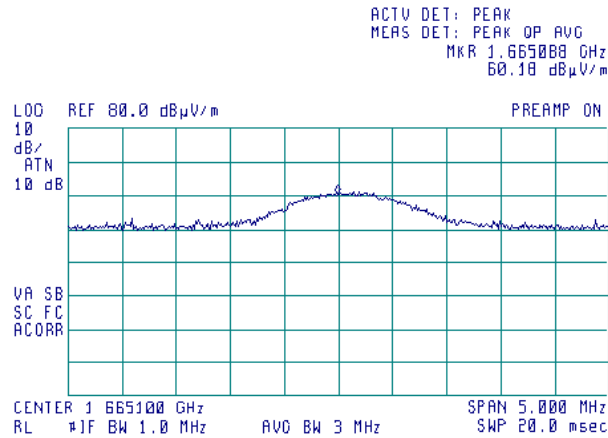
Plot 7.4.22 Radiated emission measurements at the 2<sup>nd</sup> harmonic

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



Plot 7.4.23 Radiated emission measurements at the 2<sup>nd</sup> harmonic

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

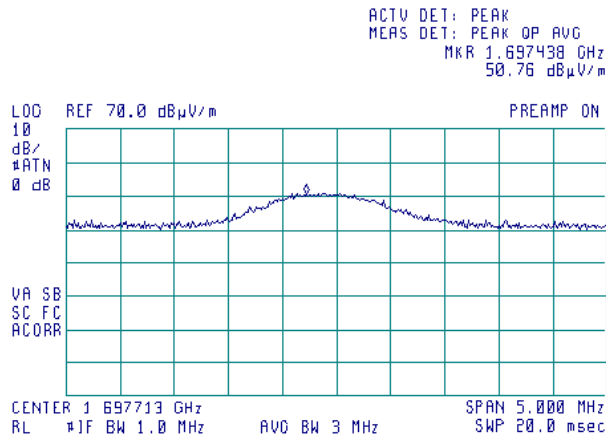




<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

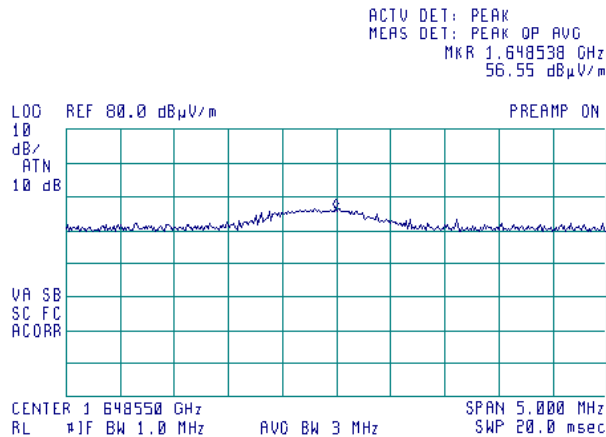
Plot 7.4.24 Radiated emission measurements at the 2<sup>nd</sup> harmonic

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



Plot 7.4.25 Radiated emission measurements at the 2<sup>nd</sup> harmonic

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

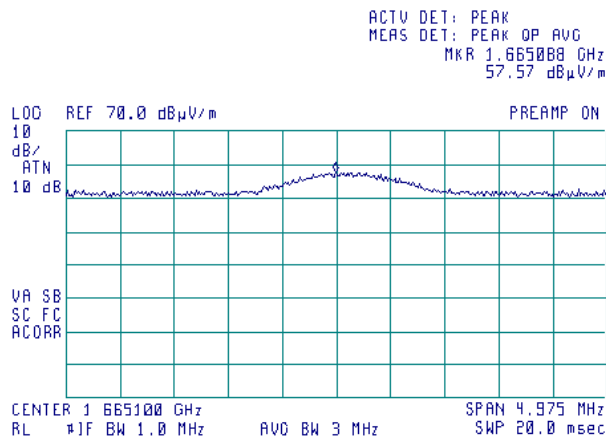




<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

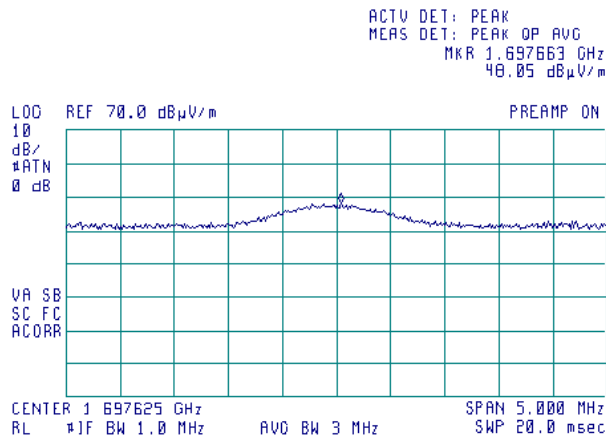
Plot 7.4.26 Radiated emission measurements at the 2<sup>nd</sup> harmonic

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



Plot 7.4.27 Radiated emission measurements at the 2<sup>nd</sup> harmonic

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



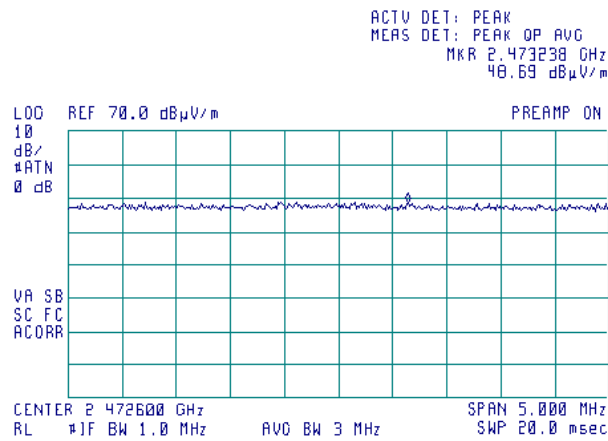




<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

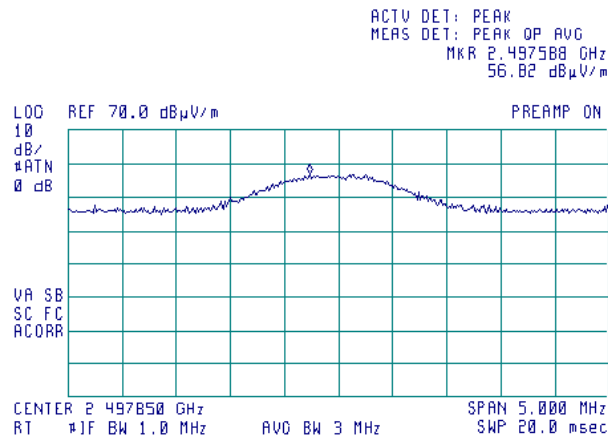
Plot 7.4.28 Radiated emission measurements at the 3<sup>rd</sup> harmonic

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



Plot 7.4.29 Radiated emission measurements at the 3<sup>rd</sup> harmonic

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

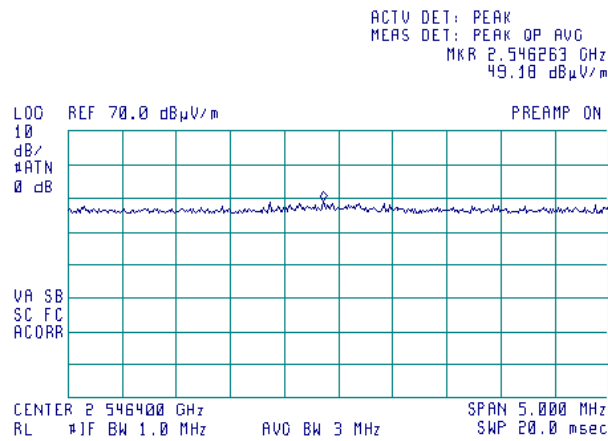




<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

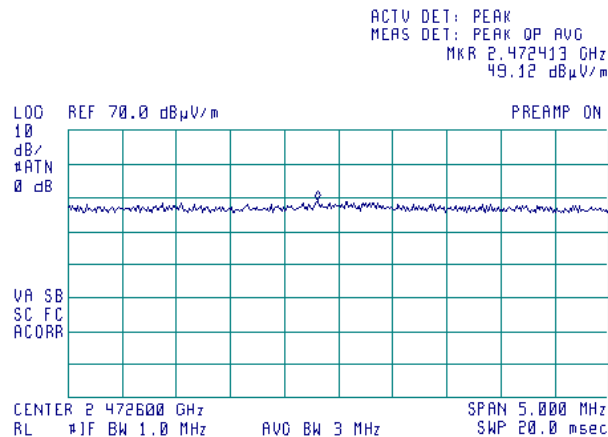
**Plot 7.4.30 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

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



**Plot 7.4.31 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

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

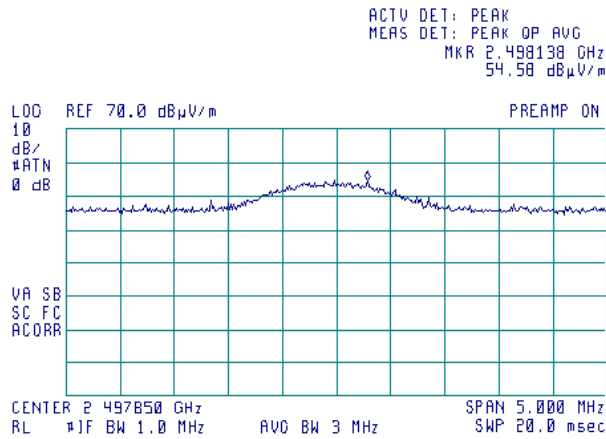




<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

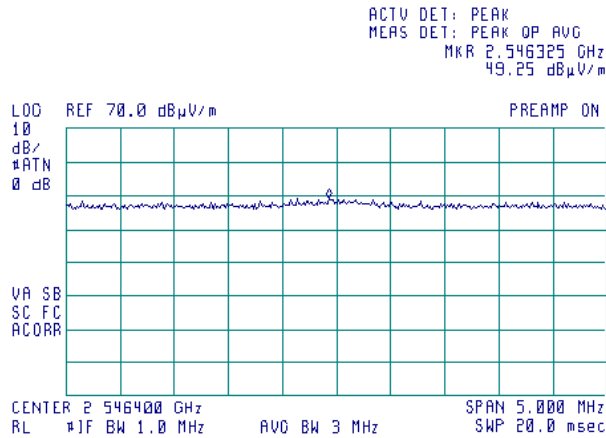
**Plot 7.4.32 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

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



**Plot 7.4.33 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

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

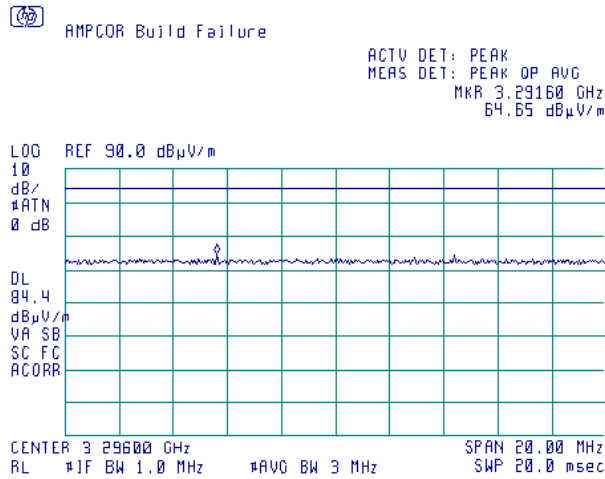




<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

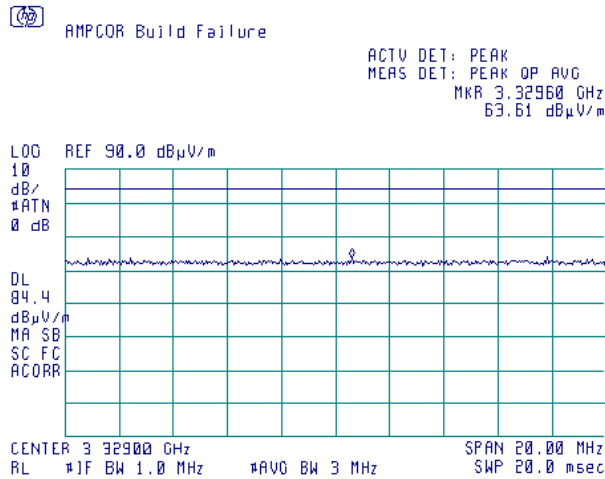
**Plot 7.4.34 Radiated emission measurements at the 4<sup>th</sup> harmonic**

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



**Plot 7.4.35 Radiated emission measurements at the 4<sup>th</sup> harmonic**

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

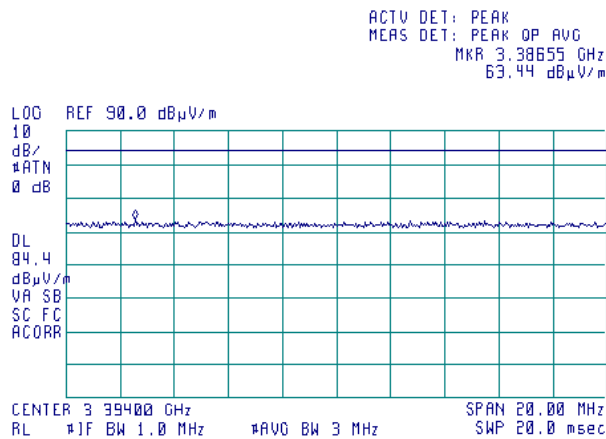




<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

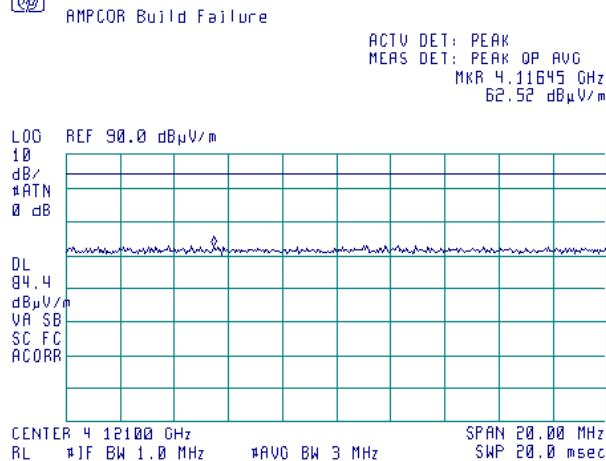
**Plot 7.4.36 Radiated emission measurements at the 4<sup>th</sup> harmonic**

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



**Plot 7.4.37 Radiated emission measurements at the 5<sup>th</sup> harmonic**

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

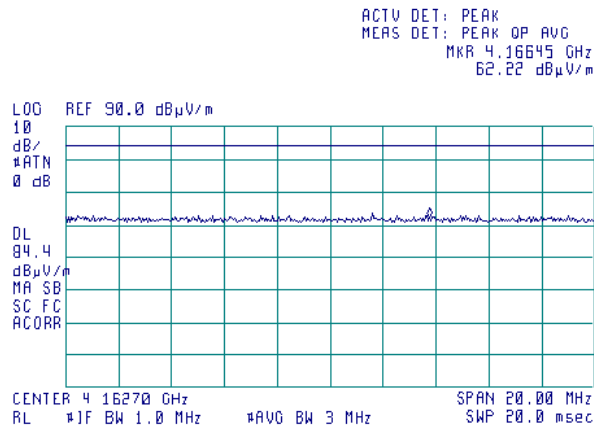




<b>Test specification:</b>	<b>Section 22.917, Radiated spurious emissions</b>		
<b>Test procedure:</b>	FCC part 22, Section 22.917		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

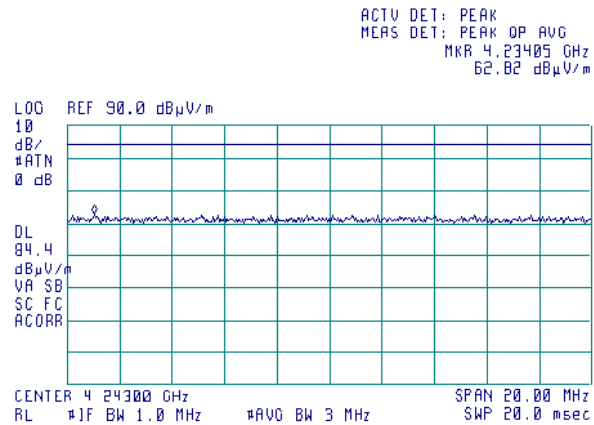
Plot 7.4.38 Radiated emission measurements at the 5<sup>th</sup> harmonic

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



Plot 7.4.39 Radiated emission measurements at the 5<sup>th</sup> harmonic

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



<b>Test specification:</b> Section 22.355, Frequency stability test	
<b>Test procedure:</b> FCC part 22, Section 22.355, part 2 section 2.1055	
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS
<b>Date:</b> 7/26/2007	
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa
<b>Relative Humidity:</b> 41%	
<b>Power Supply:</b> 120 VAC	
<b>Remarks:</b>	

## 7.5 Frequency stability test

### 7.5.1 General

This test was performed to measure frequency stability of transmitter RF carrier. Specification test limits are given in Table 7.5.1. The test results are provided in Table 7.5.2.

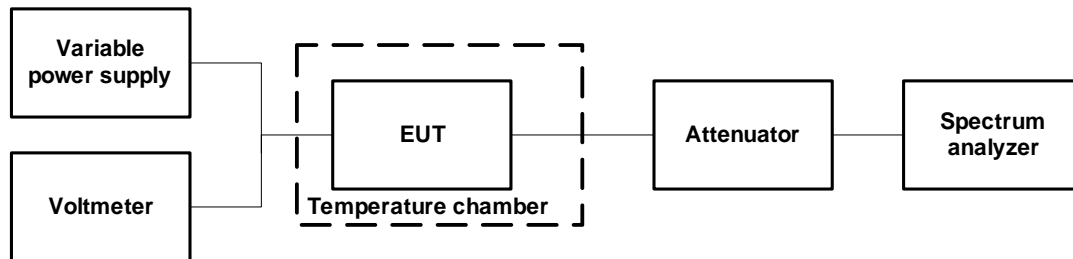
Table 7.5.1 Frequency stability limits

Assigned frequency, MHz	Limit, ppm	Limits, Hz
824.2	2.5	2061
836.4		2092
848.8		2122

### 7.5.2 Test procedure

- 7.5.2.1 The EUT was set up as shown in Figure 7.5.1, energized and its proper operation was checked.
- 7.5.2.2 The EUT power was turned off. Temperature within test chamber was set to +30°C and a period of time sufficient to stabilize all of the oscillator circuit components was allowed.
- 7.5.2.3 The EUT was powered on and carrier frequency was measured at start up moment and then every minute until frequency had been stabilized or 10 minutes elapsed whichever reached the last. The EUT was powered off.
- 7.5.2.4 The above procedure was repeated at 0°C and at the lowest test temperature.
- 7.5.2.5 The EUT was powered on and carrier frequency was measured at start up moment and at the end of stabilization period at the rest of test temperatures and voltages. The EUT was powered off.
- 7.5.2.6 Frequency displacement was calculated and compared with the limit as provided in Table 7.5.2

Figure 7.5.1 Frequency stability test setup





<b>Test specification:</b> Section 22.355, Frequency stability test	
<b>Test procedure:</b> FCC part 22, Section 22.355, part 2 section 2.1055	
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS
<b>Date:</b> 7/26/2007	
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa
<b>Relative Humidity:</b> 41%	
<b>Power Supply:</b> 120 VAC	
<b>Remarks:</b>	

Table 7.5.2 Frequency stability test results

OPERATING FREQUENCY RANGE: 824.2 – 848.8 MHz  
 NOMINAL POWER VOLTAGE: 120 V  
 TEMPERATURE STABILIZATION PERIOD: 20 min  
 POWER DURING TEMPERATURE TRANSITION: Off  
 SPECTRUM ANALYZER MODE: Counter  
 RESOLUTION BANDWIDTH: 10 kHz  
 VIDEO BANDWIDTH: 100 Hz  
 MODULATION: modulated

T, °C	Voltage V	Frequency, MHz							Max frequency drift, Hz		Limit, Hz	Margin, Hz	Verdict
		Start up	1 <sup>st</sup> min	2 <sup>nd</sup> min	3 <sup>rd</sup> min	4 <sup>th</sup> min	5 <sup>th</sup> min	0 <sup>th</sup> min	Positive	Negative			
<b>Low frequency</b>													
-30	nominal	824.200140	824.200400	824.200300	824.200500	824.200490	824.200730	824.200500	280	-310	2061	-1750	Pass
-20	nominal	824.200500	NA	NA	NA	NA	NA	824.200660	210	0		-1851	Pass
-10	nominal	824.200310	NA	NA	NA	NA	NA	824.200510	60	-140		-1920	Pass
0	nominal	824.200490	824.200470	824.200610	824.200410	824.200310	824.200320	824.200390	160	-140		-1901	Pass
10	nominal	824.200380	NA	NA	NA	NA	NA	824.200600	150	-70		-1911	Pass
20	-15%	824.200620	NA	NA	NA	NA	NA	824.200360	170	-90		-1891	Pass
20	nominal	824.200490	NA	NA	NA	NA	NA	824.200450	40	0		-2021	Pass
20	+15%	824.200400	NA	NA	NA	NA	NA	824.200380	0	-70		-1990	Pass
30	nominal	824.200380	824.200400	824.200480	824.200280	824.200410	824.200400	824.200490	40	-170		-1890	Pass
40	nominal	824.200260	NA	NA	NA	NA	NA	824.200220	0	-230		-1830	Pass
50	nominal	824.200350	NA	NA	NA	NA	NA	824.200390	0	-100	-1960	Pass	
<b>Mid frequency</b>													
-30	nominal	832.600500	832.600730	832.600460	832.600410	832.600290	832.600540	832.600340	240	-200	2092	-1852	Pass
-20	nominal	832.600380	NA	NA	NA	NA	NA	832.600490	0	-110		-1981	Pass
-10	nominal	832.600370	NA	NA	NA	NA	NA	832.600250	0	-240		-1851	Pass
0	nominal	832.600500	832.600530	832.600250	832.600530	832.600640	832.600470	832.600550	150	-240		-1851	Pass
10	nominal	832.600640	NA	NA	NA	NA	NA	832.600150	150	-340.0		-1751.5	Pass
20	-15%	832.600430	NA	NA	NA	NA	NA	832.600520	30	-60		-2031	Pass
20	nominal	832.600450	NA	NA	NA	NA	NA	832.600490	0	-40		-2051	Pass
20	+15%	832.600360	NA	NA	NA	NA	NA	832.600270	0	-220		-1871	Pass
30	nominal	832.600310	832.600560	832.600640	832.600590	832.600660	832.600390	832.600410	170	-180		-1911	Pass
40	nominal	832.600350	NA	NA	NA	NA	NA	832.600370	0	-140		-1952	Pass
50	nominal	832.600690	NA	NA	NA	NA	NA	832.600340	200	-150	-1892	Pass	
<b>High frequency</b>													
-30	nominal	848.800330	848.800440	848.800510	848.800670	848.800320	848.800390	848.800460	290	-60	2122	-1832	Pass
-20	nominal	848.800240	NA	NA	NA	NA	NA	848.800280	0	-140		-1982	Pass
-10	nominal	848.800280	NA	NA	NA	NA	NA	848.800570	190	-100		-1932	Pass
0	nominal	848.800460	848.800410	848.800320	848.800530	848.800420	848.800350	848.800650	270	-60		-1852	Pass
10	nominal	848.800650	NA	NA	NA	NA	NA	848.800530	270	0		-1852	Pass
20	-15%	848.800410	NA	NA	NA	NA	NA	848.800460	80	0		-2042	Pass
20	nominal	848.800390	NA	NA	NA	NA	NA	848.800380	10	0		-2112	Pass
20	+15%	848.800570	NA	NA	NA	NA	NA	848.800440	190	0		-1932	Pass
30	nominal	848.800370	848.800520	848.800500	848.800450	848.800300	848.800430	848.800160	140	-220		-1902	Pass
40	nominal	848.800450	NA	NA	NA	NA	NA	848.800420	70	0		-2052	Pass
50	nominal	848.800390	NA	NA	NA	NA	NA	848.800380	10	0	-2112	Pass	

\* - Reference frequency  
 \*\* - Battery operating end point specified by the manufacturer.

Reference numbers of test equipment used

HL0495	HL2882	HL2909				
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Full description is given in Appendix A.





<b>Test specification:</b>		<b>Section 24.232, Peak output power</b>	
<b>Test procedure:</b>		FCC part 24, Section 24.232	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

## 8 Transmitter tests according to 47CFR part 24 requirements

### 8.1 Peak output power

#### 8.1.1 General

This test was performed to measure the maximum peak output power radiated by transmitter. Specification test limits are given in Table 8.1.1.

Table 8.1.1 Peak output power limits

Assigned frequency range, MHz	Peak output power		Equivalent field strength limit @ 3m, dB( $\mu$ V/m)*
	W	dBm	
1850 - 1910	2.0	33.0	128.23

\*- 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.

#### 8.1.2 Test procedure for field strength measurements

- 8.1.2.1 The EUT was set up as shown in Figure 8.1.1, energized and its proper operation was checked.
- 8.1.2.2 The EUT was adjusted to produce maximum available to end user RF output power.
- 8.1.2.3 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.
- 8.1.2.4 The maximum field strength of the EUT carrier frequency was measured as provided in Table 8.1.2, Table 8.1.4 and associated plots.

#### 8.1.3 Test procedure for substitution power measurements

- 8.1.3.1 The test equipment was set up as shown in Figure 8.1.2 and energized.
- 8.1.3.2 RF signal generator was set to the EUT carrier frequency and the RF output level was preliminary adjusted to produce the same field strength as it was measured from the EUT.
- 8.1.3.3 The test antenna height was swept to find maximum emission from substitution antenna and RF signal generator output was fine adjusted to produce the same field strength as it was measured from the EUT.
- 8.1.3.4 The maximum peak output power was calculated as a sum of signal generator output power in dBm and substitution antenna gain in dBi reduced by cable loss in dB.
- 8.1.3.5 The above procedure was performed in both horizontal and vertical polarizations of the substitution antenna.
- 8.1.3.6 The worst test results (the lowest margins) were recorded in Table 8.1.3, Table 8.1.5 and shown in the associated plots.

<b>Test specification:</b>	<b>Section 24.232, Peak output power</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.232		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Figure 8.1.1 Setup for carrier field strength measurements

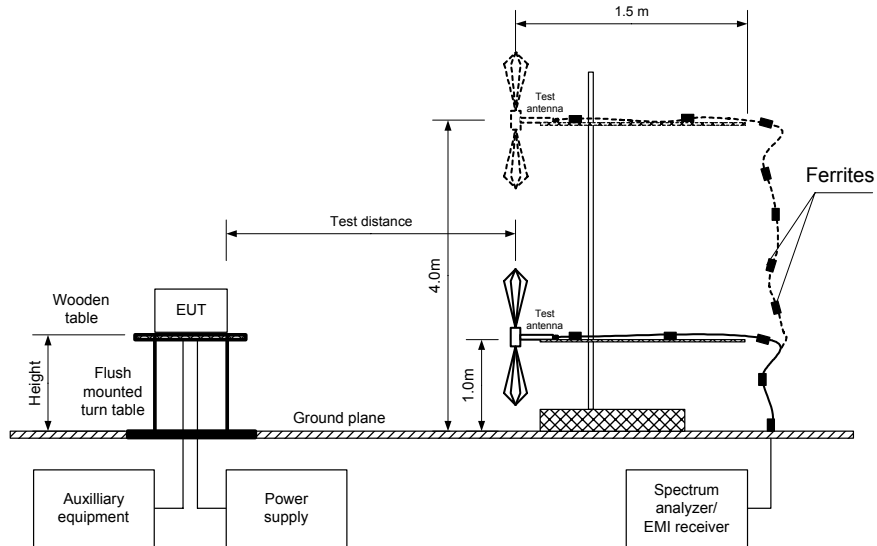
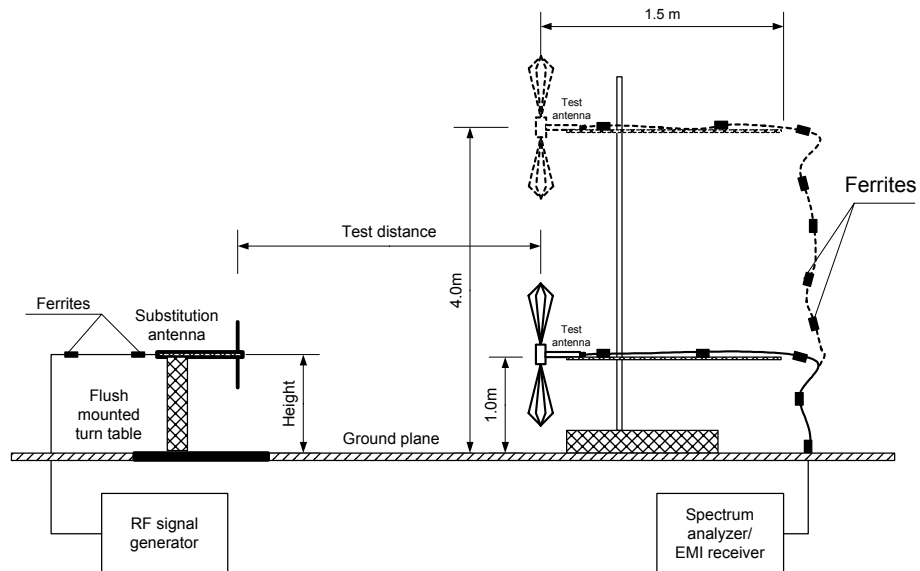


Figure 8.1.2 Setup for substitution peak output power measurements





<b>Test specification:</b>	<b>Section 24.232, Peak output power</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.232		
<b>Test mode:</b>	Compliance	<b>Verdict: PASS</b>	
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with external antenna			

Table 8.1.2 Field strength measurement of peak output power (EUT with external antenna)

ASSIGNED FREQUENCY: 1850 – 1910 MHz  
TEST DISTANCE: 3 m  
TEST SITE: Semi anechoic chamber  
EUT HEIGHT: 0.8 m  
DETECTOR USED: Peak  
TEST ANTENNA TYPE: Biconilog (30 MHz – 1000 MHz)  
Double ridged guide (above 1000 MHz)  
MODULATION: GSM  
BIT RATE: 270 kbps  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
RESOLUTION BANDWIDTH: 1 MHz  
VIDEO BANDWIDTH: 3 MHz

Frequency, MHz	Field strength, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees
1850.2	121.99	128.23	-6.24	V	1.40	120
1879.8	123.44	128.23	-4.79	V	1.30	155
1909.8	123.69	128.23	-4.54	V	1.35	308

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

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

Table 8.1.3 Substitution measurement of peak output power

ASSIGNED FREQUENCY RANGE: 1850 – 1910 MHz  
TEST DISTANCE: 3 m  
SUBSTITUTION ANTENNA HEIGHT: 0.8 m  
DETECTOR USED: Peak  
RESOLUTION BANDWIDTH: 1 MHz  
VIDEO BANDWIDTH: 3 MHz  
SUBSTITUTION ANTENNA TYPE: Tunable dipole (30 MHz – 1000 MHz)  
Double ridged guide (above 1000 MHz)

Frequency MHz	Field strength dB(μV/m)	Antenna polarization	RF generator output, dBm	Antenna gain dBi	Cable loss, dB	Peak output power, EIRP dBm	Limit, dBm	Margin, dB*	Verdict
1850.2	121.99	V	20.59	8.60	1.40	27.79	33.00	-5.21	Pass
1879.8	123.44	V	20.88	8.61	1.44	28.05	33.00	-4.95	Pass
1909.8	123.69	V	20.63	8.62	1.45	27.80	33.00	-5.20	Pass

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

## Reference numbers of test equipment used

HL 0589	HL 0661	HL 1430	HL 1947	HL 1984	HL 2432	HL 3207	
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Full description is given in Appendix A.



<b>Test specification:</b>	<b>Section 24.232, Peak output power</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.232		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with external antenna			

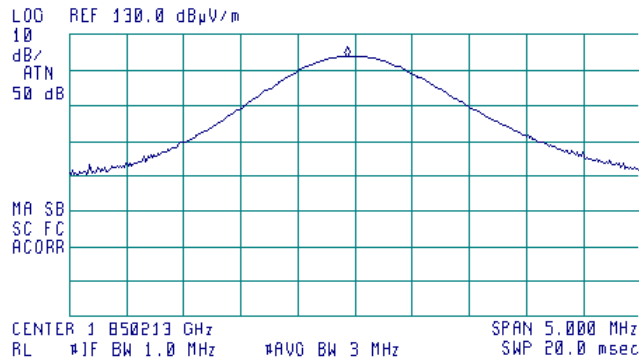
**Plot 8.1.1 Field strength of carrier at low frequency**

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



AMPCOR Build Failure

ACTV DET: PEAK  
 MEAS DET: PEAK QP AVG  
 MKR 1.850138 GHz  
 123.69 dBμV/m



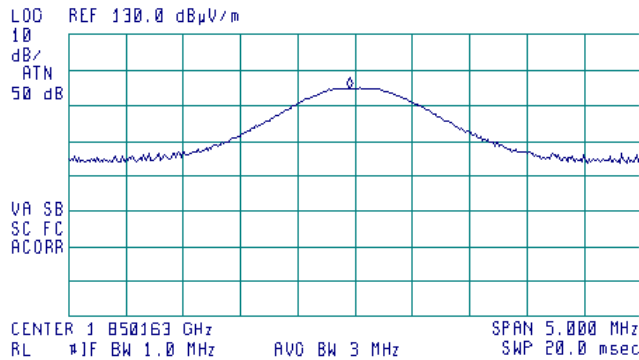
**Plot 8.1.2 Field strength of carrier at low frequency**

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



15:46:26 JUL 15, 2007

ACTV DET: PEAK  
 MEAS DET: PEAK QP AVG  
 MKR 1.850113 GHz  
 115.01 dBμV/m





<b>Test specification:</b>	<b>Section 24.232, Peak output power</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.232		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with external antenna			

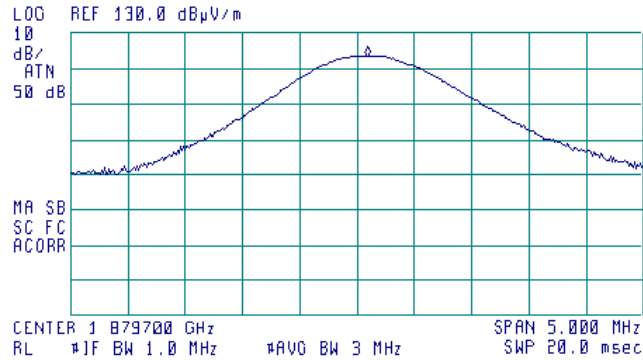
**Plot 8.1.3 Field strength of carrier at mid frequency**

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



AMPCOR Build Failure

ACTV DET: PEAK  
 MEAS DET: PEAK QP AVG  
 MKR 1.879788 GHz  
 123.44 dBμV/m



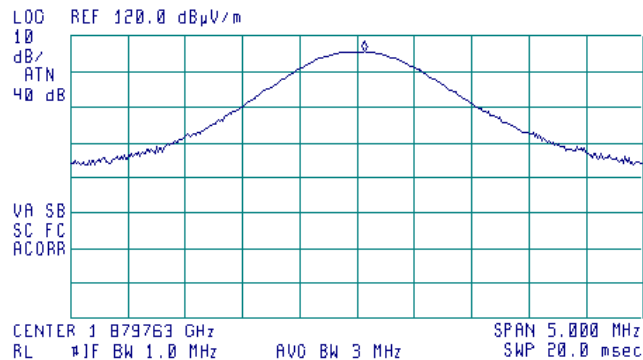
**Plot 8.1.4 Field strength of carrier at mid frequency**

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



16:21:04 JUL 15, 2007

ACTV DET: PEAK  
 MEAS DET: PEAK QP AVG  
 MKR 1.879825 GHz  
 115.68 dBμV/m

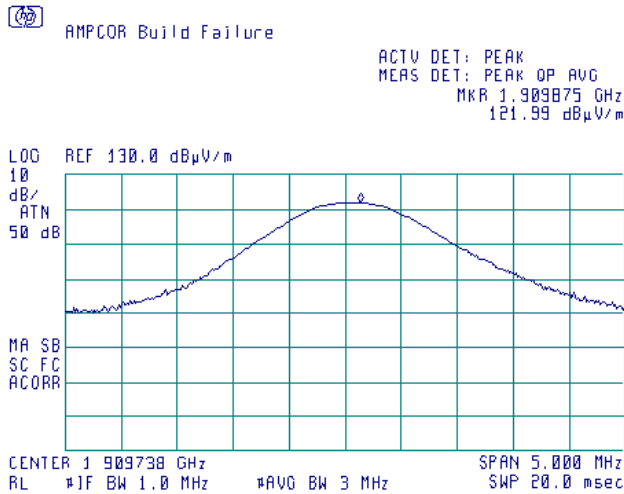




<b>Test specification:</b>	<b>Section 24.232, Peak output power</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.232		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 36%	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with external antenna			

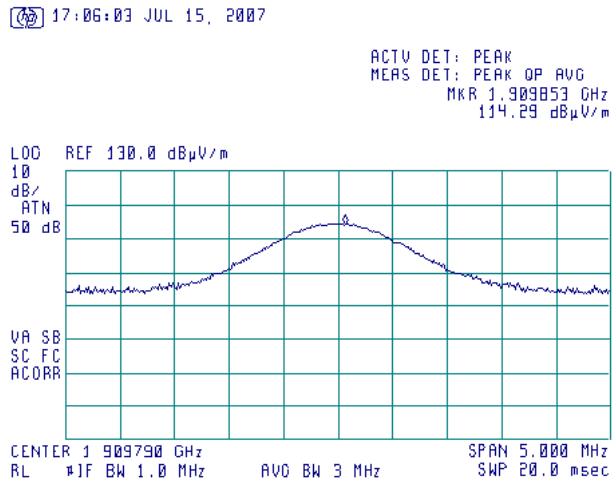
**Plot 8.1.5 Field strength of carrier at high frequency**

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



**Plot 8.1.6 Field strength of carrier at high frequency**

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





<b>Test specification:</b>	<b>Section 24.232, Peak output power</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.232		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/27/2007		
<b>Temperature:</b> 27°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 40 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with internal antenna			

**Table 8.1.4 Field strength measurement of peak output power (EUT with internal antenna)**

ASSIGNED FREQUENCY: 1850 – 1910 MHz  
TEST DISTANCE: 3 m  
TEST SITE: Semi anechoic chamber  
EUT HEIGHT: 0.8 m  
DETECTOR USED: Peak  
TEST ANTENNA TYPE: Biconilog (30 MHz – 1000 MHz)  
Double ridged guide (above 1000 MHz)  
MODULATION: GSM  
BIT RATE: 270 kbps  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
RESOLUTION BANDWIDTH: 1 MHz  
VIDEO BANDWIDTH: 3 MHz

Frequency, MHz	Field strength, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees
1850.2	122.74	128.23	-5.49	V	1.40	120
1879.8	123.03	128.23	-5.20	V	1.40	150
1909.8	122.78	128.23	-5.45	V	1.50	130

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

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

**Table 8.1.5 Substitution measurement of peak output power**

ASSIGNED FREQUENCY RANGE: 1850 – 1910 MHz  
TEST DISTANCE: 3 m  
SUBSTITUTION ANTENNA HEIGHT: 0.8 m  
DETECTOR USED: Peak  
RESOLUTION BANDWIDTH: 1 MHz  
VIDEO BANDWIDTH: 3 MHz  
SUBSTITUTION ANTENNA TYPE: Tunable dipole (30 MHz – 1000 MHz)  
Double ridged guide (above 1000 MHz)

Frequency MHz	Field strength dB(μV/m)	Antenna polarization	RF generator output, dBm	Antenna gain dBi	Cable loss, dB	Peak output power, EIRP dBm	Limit, dBm	Margin, dB*	Verdict
1850.2	122.74	V	19.84	8.60	1.40	27.04	33.00	-5.96	Pass
1879.8	123.03	V	21.29	8.61	1.44	28.46	33.00	-4.54	Pass
1909.8	122.78	V	21.54	8.62	1.45	28.71	33.00	-4.29	Pass

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

**Reference numbers of test equipment used**

HL 0589	HL 0661	HL 1430	HL 1947	HL 1984	HL 2432	HL 3207	
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Full description is given in Appendix A.



<b>Test specification:</b> Section 24.232, Peak output power			
<b>Test procedure:</b> FCC part 24, Section 24.232			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/27/2007			
<b>Temperature:</b> 27°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 40 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with internal antenna			

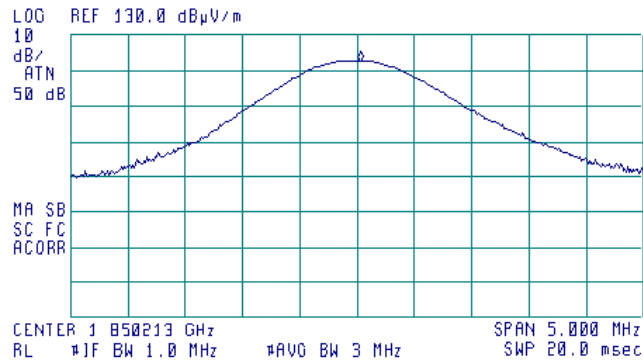
**Plot 8.1.7 Field strength of carrier at low frequency**

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



AMPCOR Build Failure

ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 1.850238 GHz  
 122.74 dBμV/m



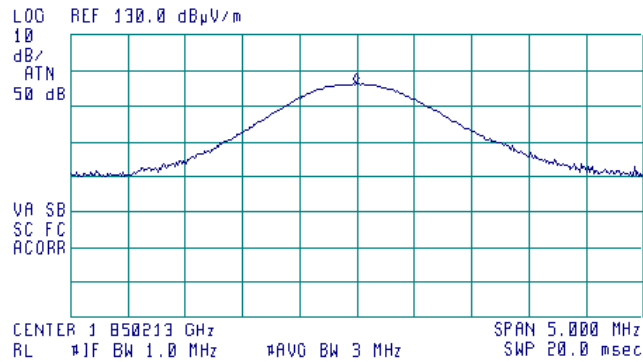
**Plot 8.1.8 Field strength of carrier at low frequency**

TEST SITE: Semi anechoic chamber  
 ANTENNA POLARIZATION: Horizontal 1.15m 109deg  
 TEST DISTANCE: 3 m



AMPCOR Build Failure

ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 1.850200 GHz  
 116.17 dBμV/m







<b>Test specification:</b>	<b>Section 24.232, Peak output power</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.232		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/27/2007		
<b>Temperature:</b> 27°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 40 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with internal antenna			

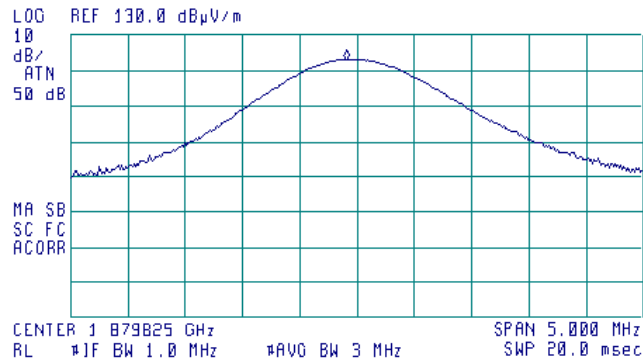
**Plot 8.1.9 Field strength of carrier at mid frequency**

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



AMPCOR Build Failure

ACTV DET: PEAK  
 MEAS DET: PEAK QP AVG  
 MKR 1.879725 GHz  
 123.03 dBμV/m



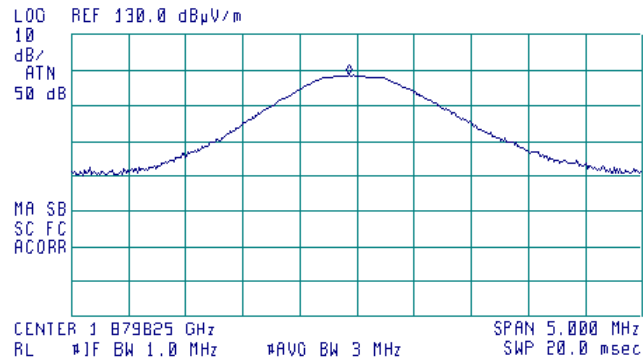
**Plot 8.1.10 Field strength of carrier at mid frequency**

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



AMPCOR Build Failure

ACTV DET: PEAK  
 MEAS DET: PEAK QP AVG  
 MKR 1.879750 GHz  
 110.57 dBμV/m





<b>Test specification:</b> Section 24.232, Peak output power			
<b>Test procedure:</b> FCC part 24, Section 24.232			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/27/2007			
<b>Temperature:</b> 27°C	<b>Air Pressure:</b> 1010 hPa	<b>Relative Humidity:</b> 40 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b> EUT with internal antenna			

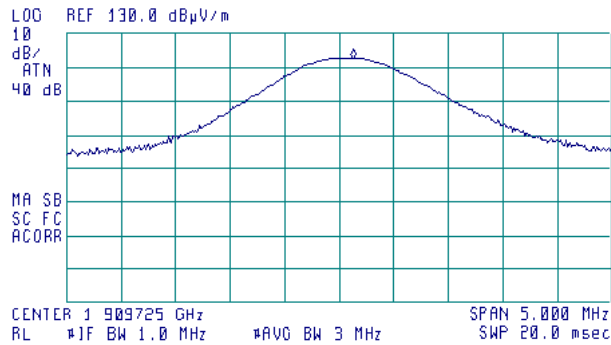
**Plot 8.1.11 Field strength of carrier at high frequency**

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



AMPCOR Build Failure

ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 1.909850 GHz  
 122.78 dBμV/m



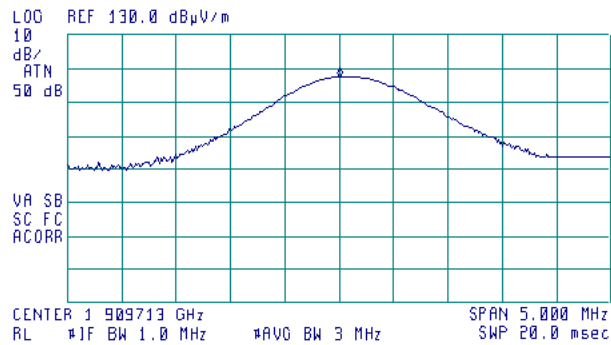
**Plot 8.1.12 Field strength of carrier at high frequency**

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



AMPCOR Build Failure

ACTV DET: PEAK  
 MEAS DET: PEAK OP AVG  
 MKR 1.909713 GHz  
 117.49 dBμV/m



<b>Test specification:</b>		<b>Section 24.238(b), Occupied bandwidth</b>	
<b>Test procedure:</b>		FCC part 24, Section 24.238	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

## 8.2 Occupied bandwidth test

### 8.2.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 8.2.1

**Table 8.2.1 Occupied bandwidth limits**

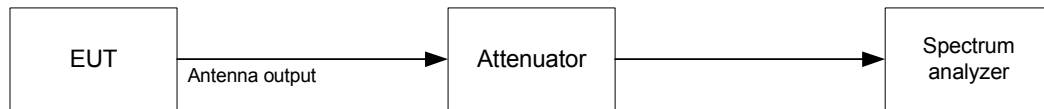
Assigned frequency, MHz	Modulation envelope reference points*, dBc
1850 – 1910	26

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

### 8.2.2 Test procedure

- 8.2.2.1 The EUT was set up as shown in Figure 8.2.1, energized and its proper operation was checked.
- 8.2.2.2 The EUT was set to transmit the unmodulated carrier and the reference peak power level was measured.
- 8.2.2.3 The EUT was set to transmit the normally modulated carrier.
- 8.2.2.4 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and the results provided in Table 8.2.2 and the associated plots.

**Figure 8.2.1 Occupied bandwidth test setup**





<b>Test specification:</b> Section 24.238(b), Occupied bandwidth	
<b>Test procedure:</b> FCC part 24, Section 24.238	
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS
<b>Date:</b> 7/19/2007	
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa
<b>Relative Humidity:</b> 41 %	
<b>Power Supply:</b> 9.6 VDC	
<b>Remarks:</b>	

Table 8.2.2 Occupied bandwidth test results

DETECTOR USED: Peak hold  
RESOLUTION BANDWIDTH: 3 kHz  
VIDEO BANDWIDTH: 10 kHz  
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc  
MODULATION: GSM  
BIT RATE: 270 kbps

Carrier frequency, MHz	Occupied bandwidth, kHz
1850.2	275.0
1880.0	277.5
1909.8	275.0

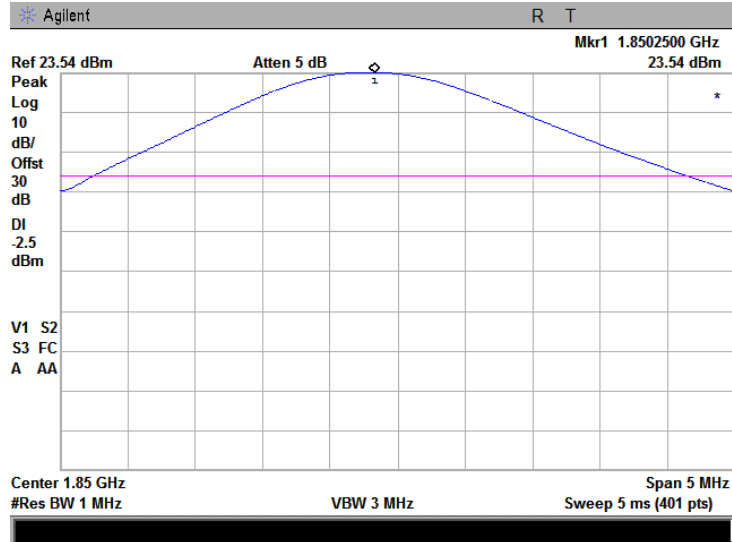
Reference numbers of test equipment used

HL 2015	HL 2254	HL 2780	HL 2869	HL 2912		
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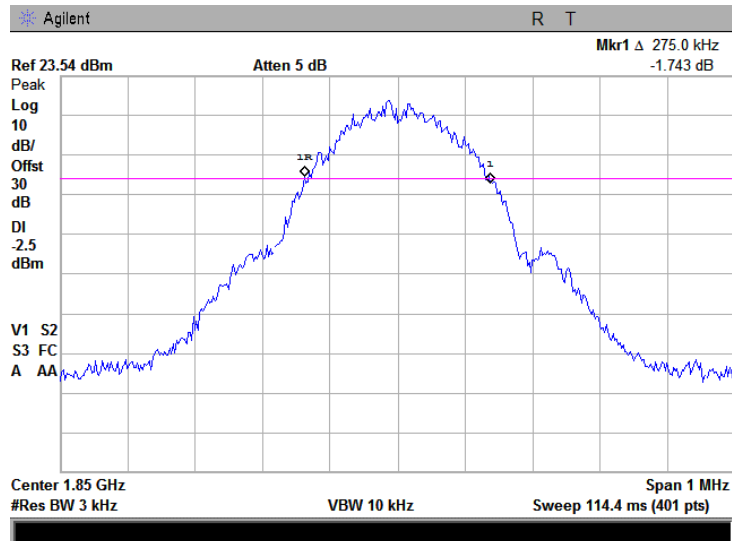
Full description is given in Appendix A.

<b>Test specification:</b>	<b>Section 24.238(b), Occupied bandwidth</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.2.1 Occupied bandwidth test result at low frequency, reference level

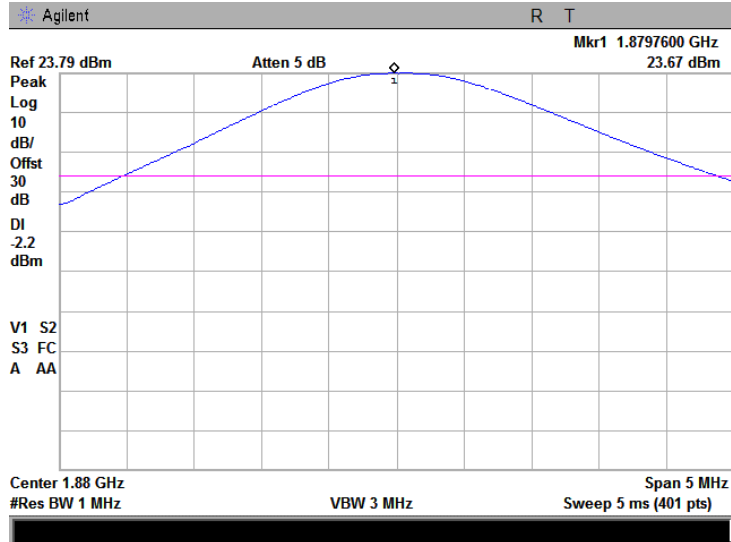


Plot 8.2.2 Occupied bandwidth test result at low frequency

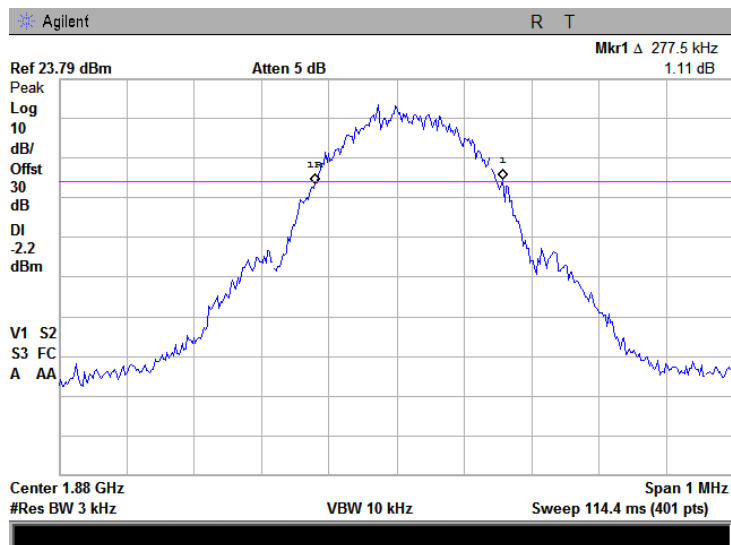


<b>Test specification:</b>	<b>Section 24.238(b), Occupied bandwidth</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.2.3 Occupied bandwidth test result at mid frequency, reference level

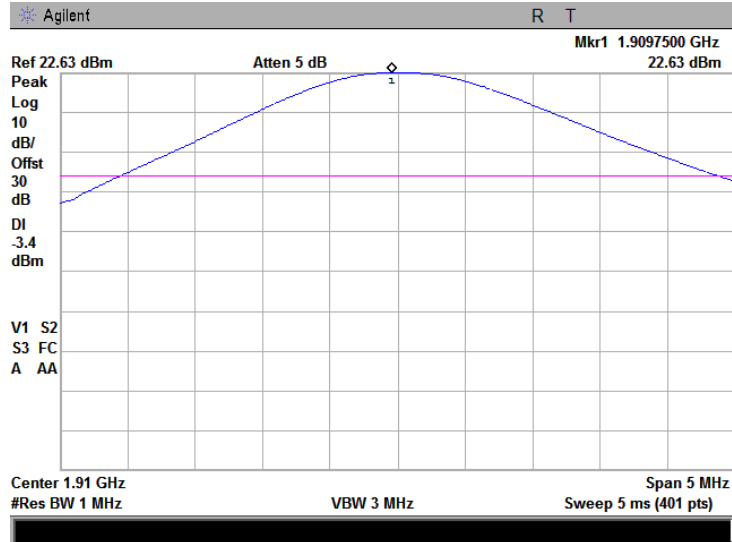


Plot 8.2.4 Occupied bandwidth test result at mid frequency



<b>Test specification:</b>	<b>Section 24.238(b), Occupied bandwidth</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.2.5 Occupied bandwidth test result at high frequency, reference level



Plot 8.2.6 Occupied bandwidth test result at high frequency



<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

### 8.3 Spurious emissions at RF antenna connector test

#### 8.3.1 General

This test was performed to measure spurious emissions at RF antenna connector. Specification test limits are given in Table 8.3.1.

Table 8.3.1 Spurious emission limits

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

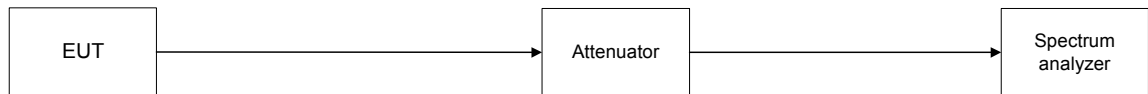
#### 8.3.2 Test procedure

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

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

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

Figure 8.3.1 Spurious emission test setup







<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

**Table 8.3.2 Spurious emission test results**

ASSIGNED FREQUENCY RANGE: 1850-1910 MHz  
 INVESTIGATED FREQUENCY RANGE: 0.009-20000 MHz  
 DETECTOR USED: Peak  
 VIDEO BANDWIDTH: ≥ Resolution bandwidth  
 MODULATION: GSM  
 BIT RATE: 270 kbps  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Attenuation below carrier, dBc	Limit, dBm	Margin, dB*	Verdict
<b>Low carrier frequency</b>									
1849.9975	-16.94	Included	Included	3.0	-16.94	46.0	-13.0	-3.94	Pass
<b>Mid carrier frequency</b>									
No spurious were found									Pass
<b>High carrier frequency</b>									
1910.0200	-19.15	Included	Included	3.0	-19.15	46.0	-130	-6.15	Pass

\*- Margin = Spurious emission – specification limit.

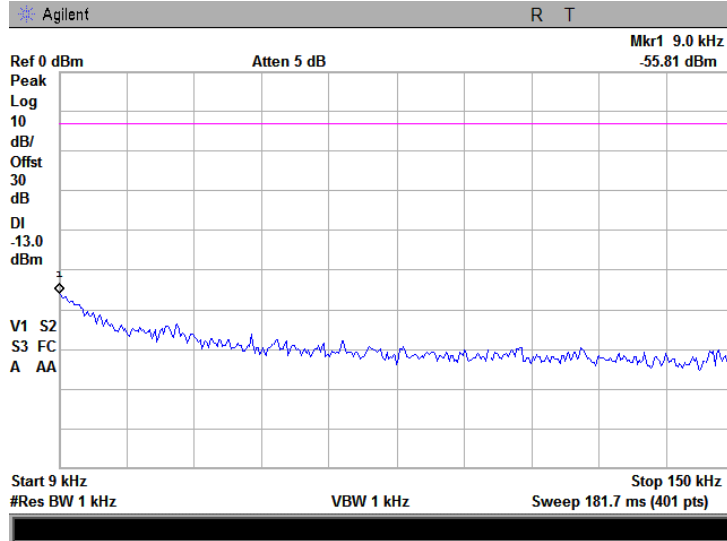
**Reference numbers of test equipment used**

HL 2910	HL 2912	HL 3001	HL 3178	HL 3182		
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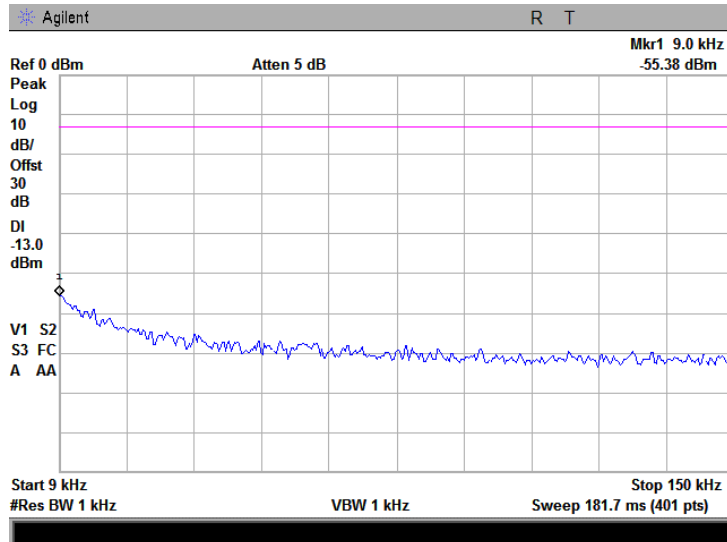
Full description is given in Appendix A.

<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.1 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency

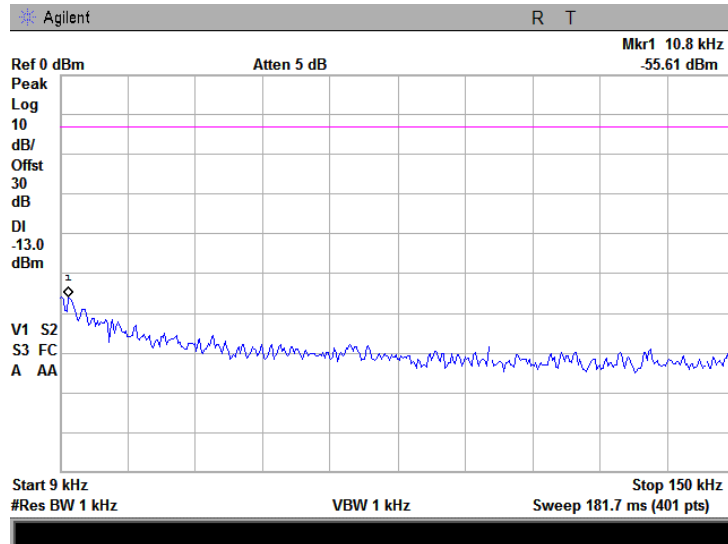


Plot 8.3.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency

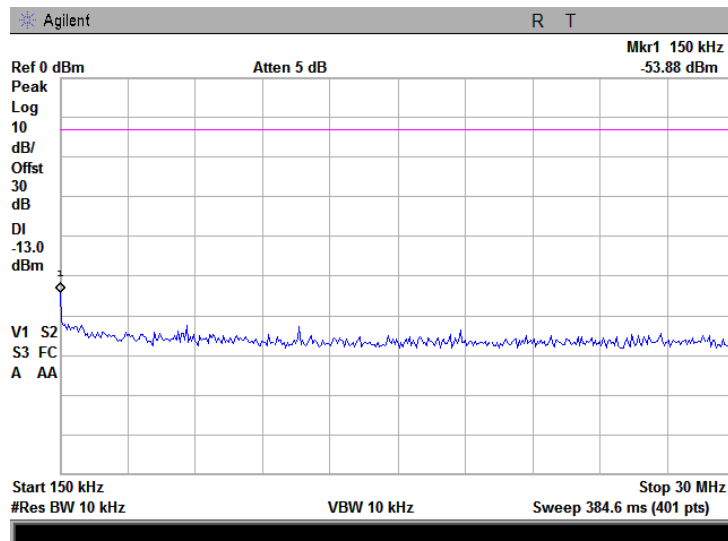


<b>Test specification:</b> Section 24.238, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 24, Section 24.238			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.3 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency

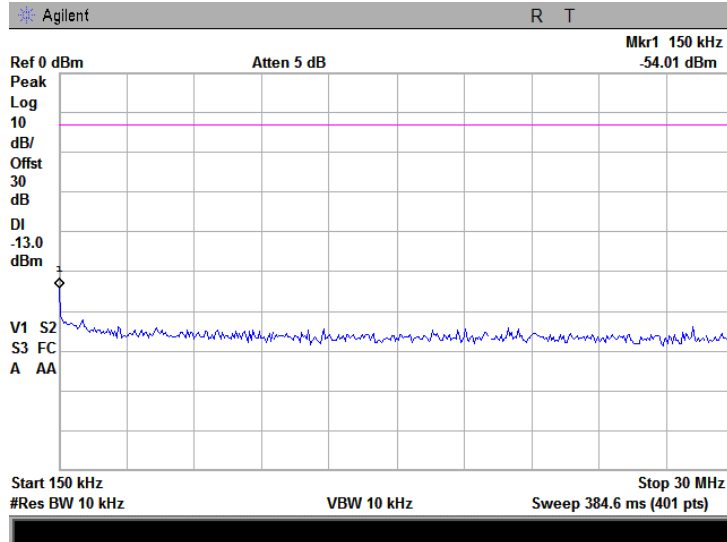


Plot 8.3.4 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

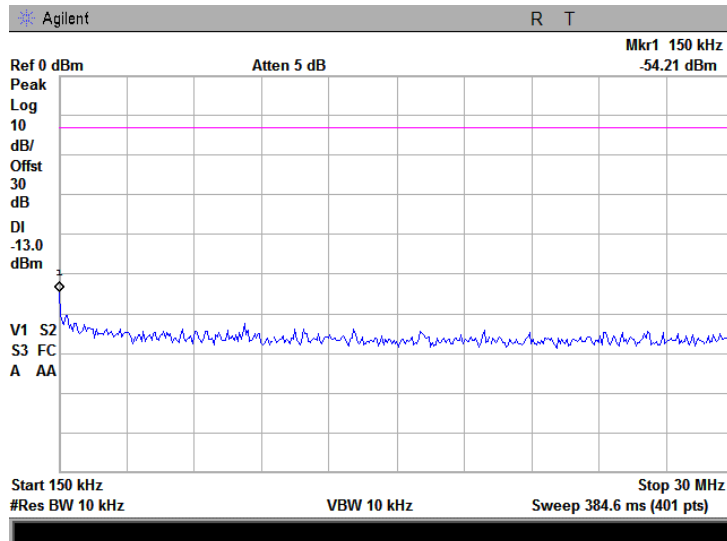


<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.5 Spurious emission measurements in 0.15 - 30.0 MHz range at mid carrier frequency

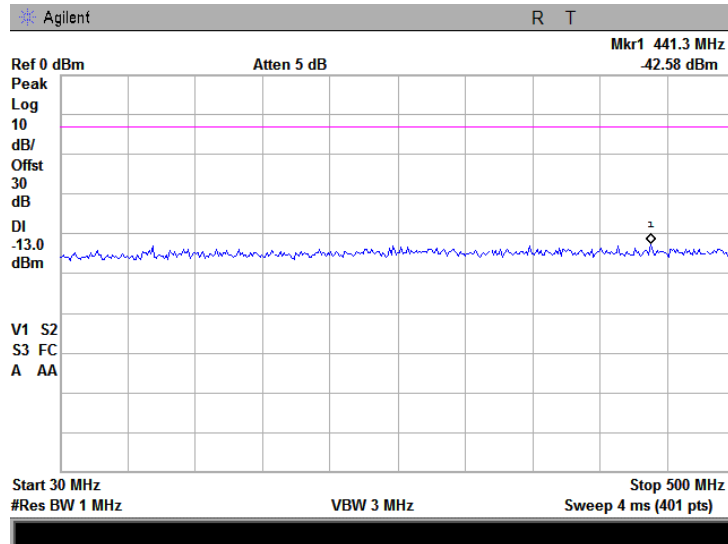


Plot 8.3.6 Spurious emission measurements in 0.15 – 30.0 MHz range at high carrier frequency

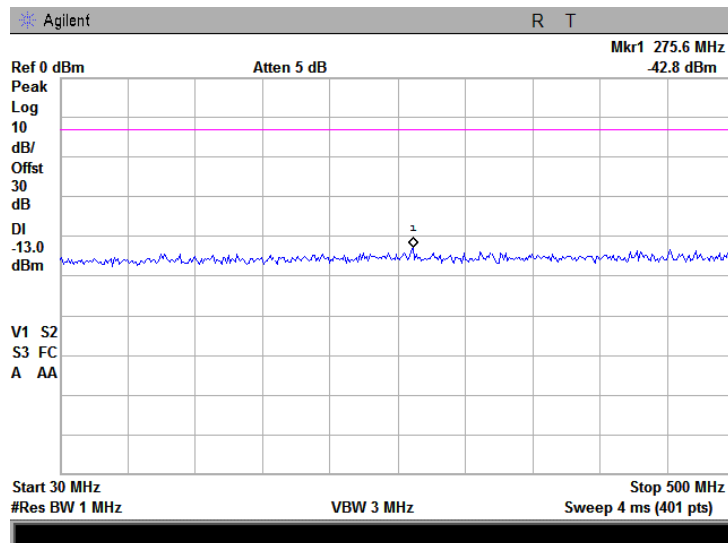


<b>Test specification:</b> Section 24.238, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 24, Section 24.238			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.7 Spurious emission measurements in 30.0 - 500 MHz range at low carrier frequency

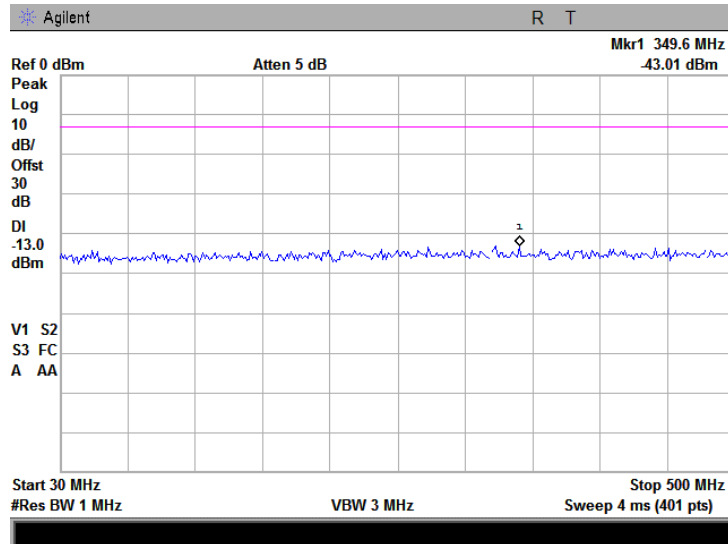


Plot 8.3.8 Spurious emission measurements in 30.0 - 500 MHz range at mid carrier frequency

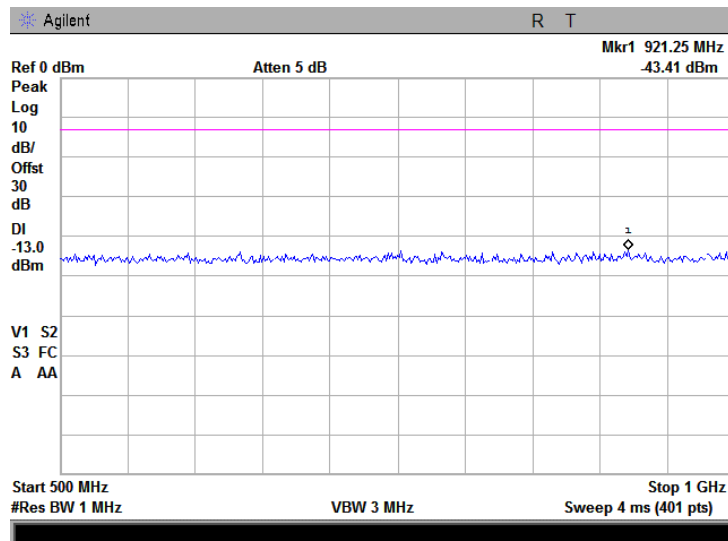


<b>Test specification:</b> Section 24.238, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 24, Section 24.238			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.9 Spurious emission measurements in 30.0 - 500 MHz range at high carrier frequency

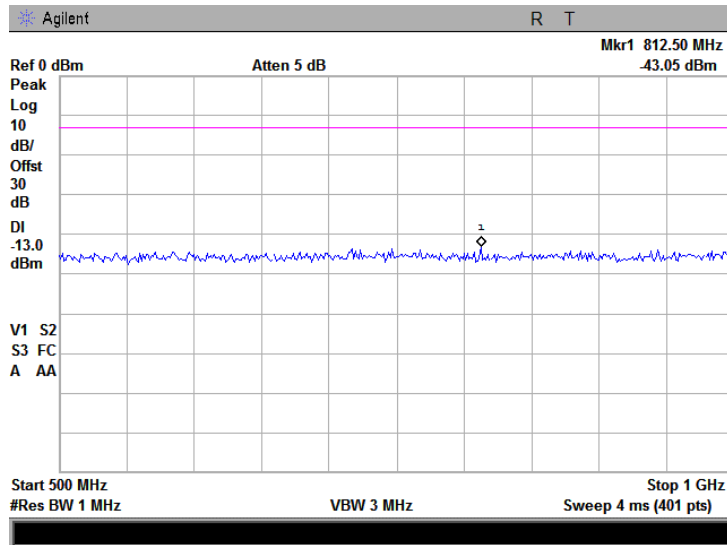


Plot 8.3.10 Spurious emission measurements in 500.0 - 1000 MHz range at low carrier frequency

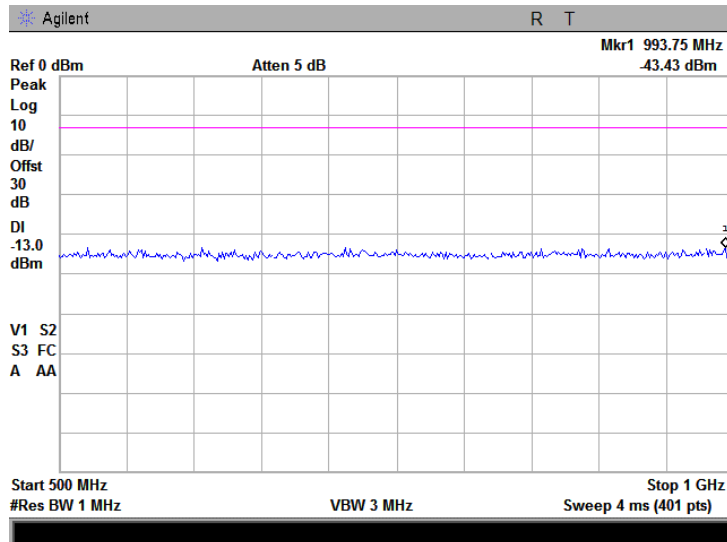


<b>Test specification:</b> Section 24.238, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 24, Section 24.238			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.11 Spurious emission measurements in 500.0 - 1000 MHz range at mid carrier frequency

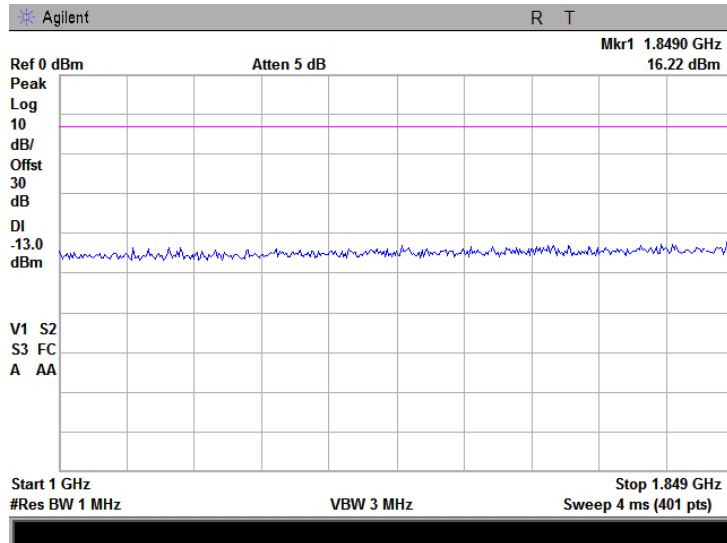


Plot 8.3.12 Spurious emission measurements in 500.0 - 1000 MHz range at high carrier frequency

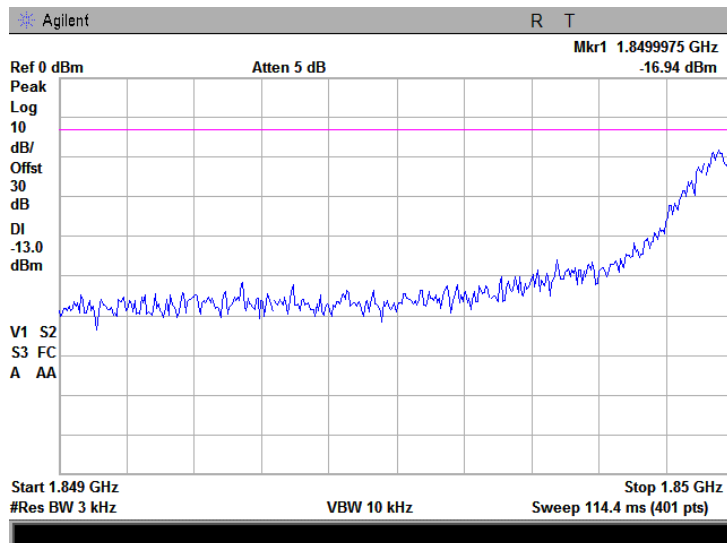


<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.13 Spurious emission measurements in 1000 -1849 MHz range at low carrier frequency



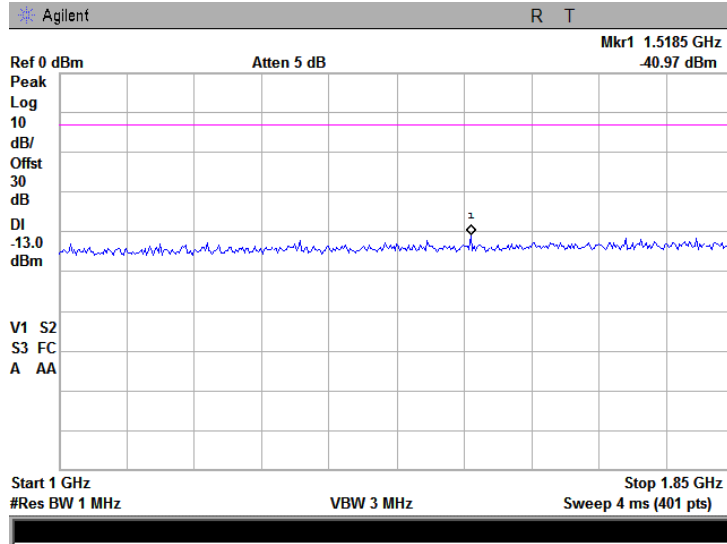
Plot 8.3.14 Spurious emission measurements in 1849 -1850 MHz range at low carrier frequency



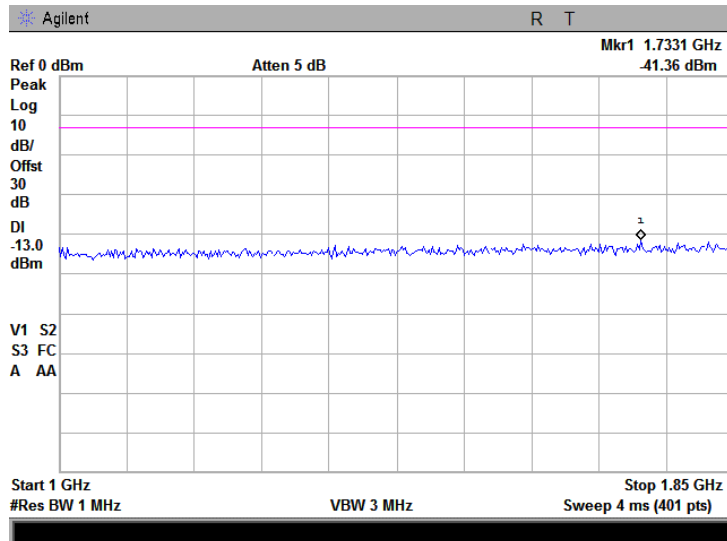


<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.15 Spurious emission measurements in 1000 – 1850 MHz range at mid carrier frequency



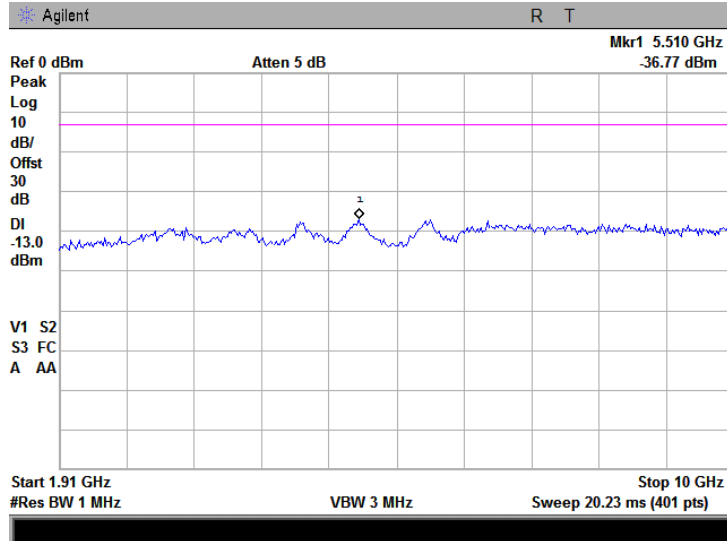
Plot 8.3.16 Spurious emission measurements in 1000 – 1850 MHz range at high carrier frequency





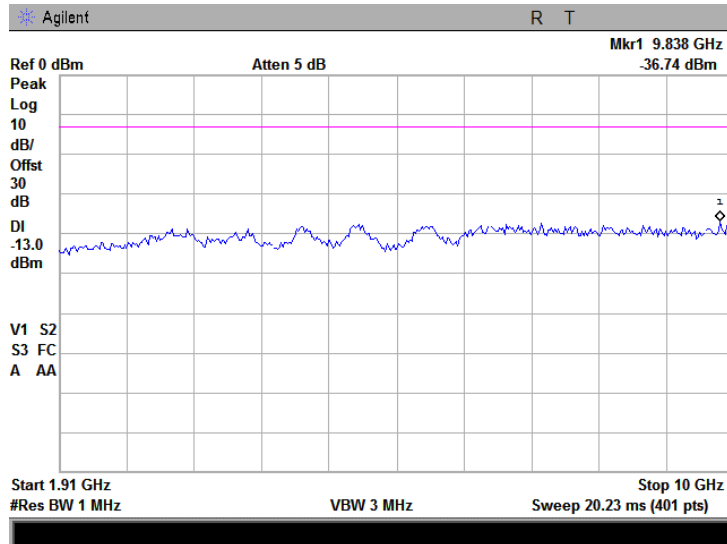
<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.17 Spurious emission measurements in 1910 -10000 MHz range at low carrier frequency

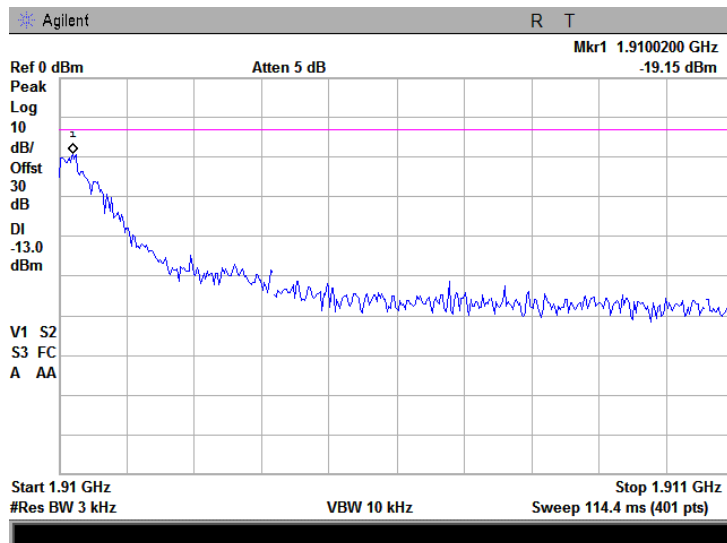


<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.18 Spurious emission measurements in 1910 – 10000 MHz range at mid carrier frequency

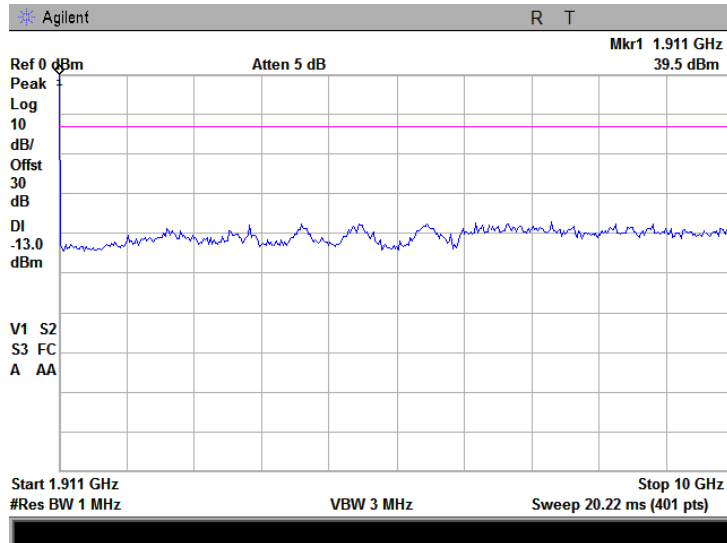


Plot 8.3.19 Spurious emission measurements in 1910 - 1911M Hz range at high carrier frequency

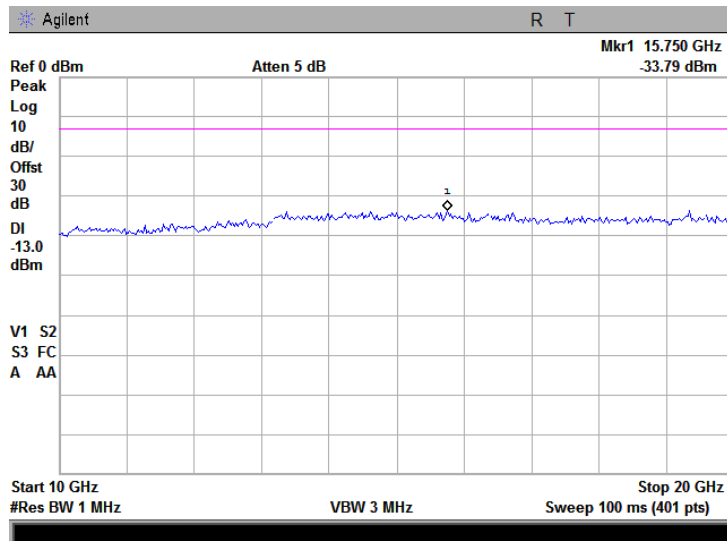


<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.20 Spurious emission measurements in 1911 – 10000 MHz range at high carrier frequency

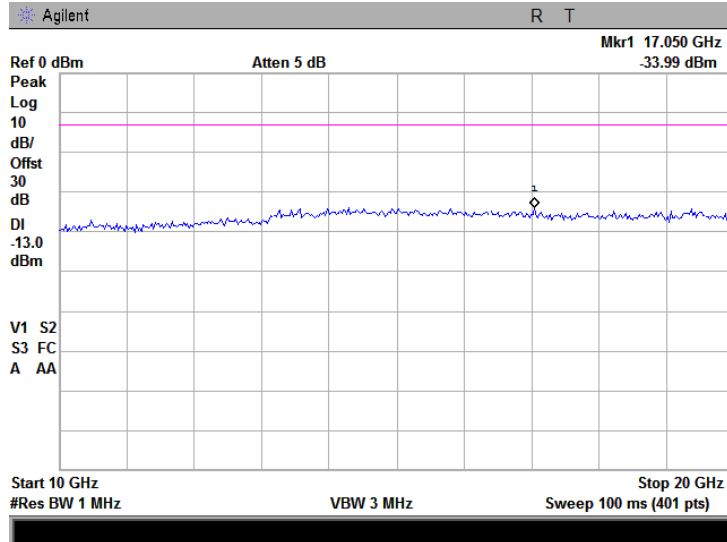


Plot 8.3.21 Spurious emission measurements in 10000 -20000 MHz range at low carrier frequency

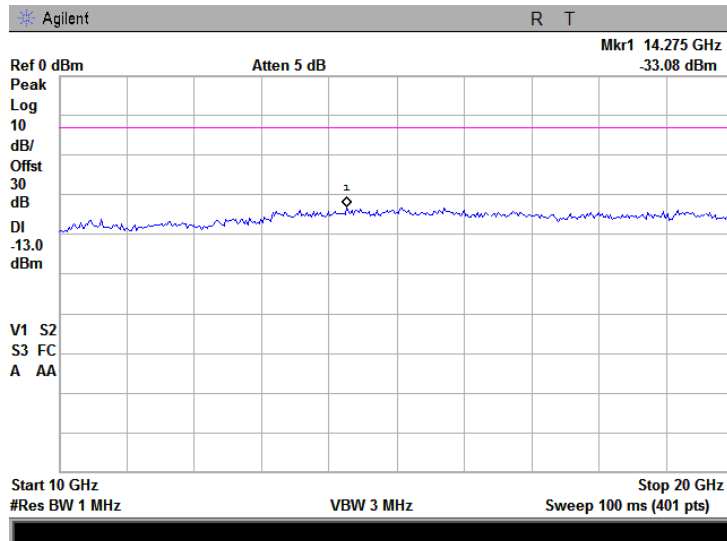


<b>Test specification:</b> Section 24.238, Spurious emission at antenna terminal			
<b>Test procedure:</b> FCC part 24, Section 24.238			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/19/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.22 Spurious emission measurements in 10000 – 20000 MHz range at mid carrier frequency

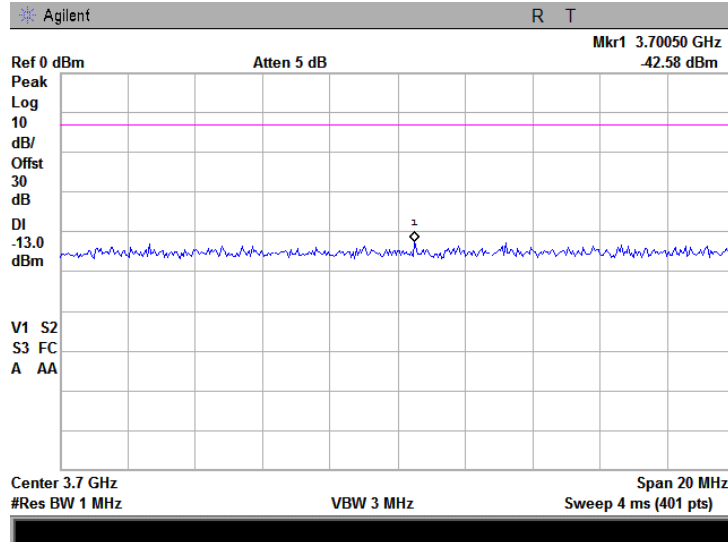


Plot 8.3.23 Spurious emission measurements in 10000 – 20000 MHz range at high carrier frequency

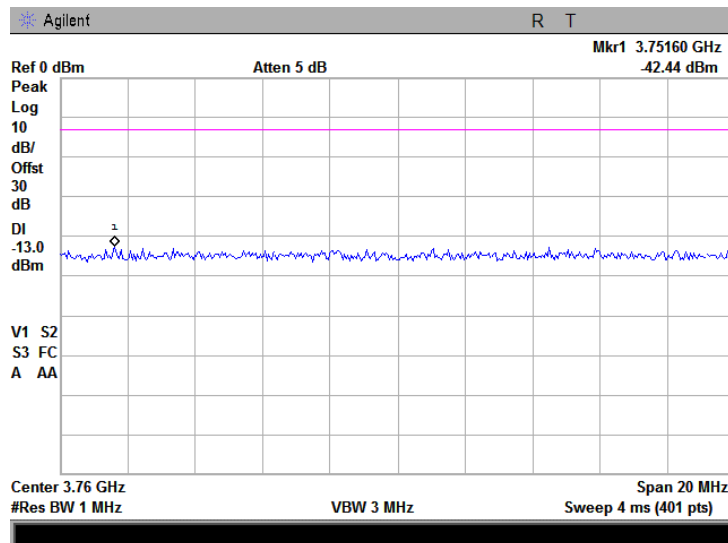


<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.24 Conducted spurious emission measurements at the 2<sup>nd</sup> harmonic of low carrier frequency

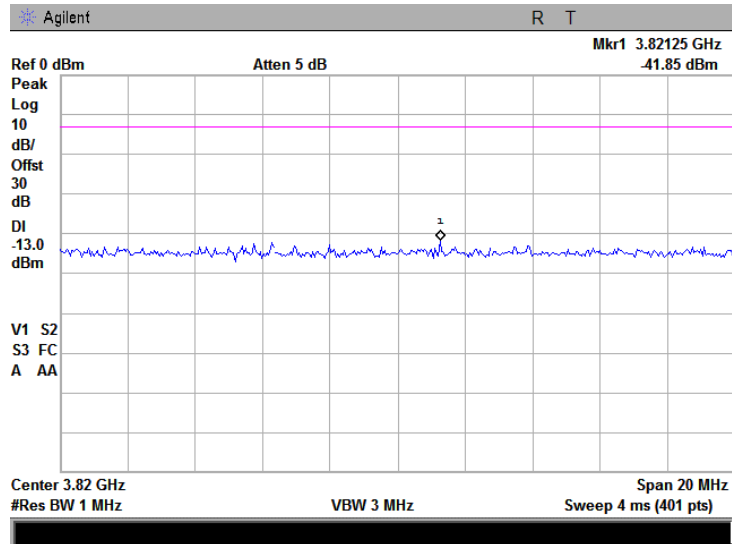


Plot 8.3.25 Conducted spurious emission measurements at the 2<sup>nd</sup> harmonic of mid carrier frequency

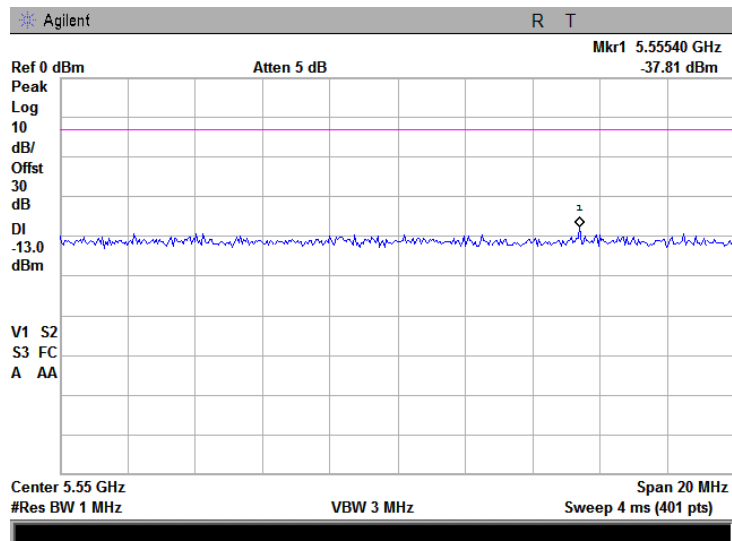


<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.26 Conducted spurious emission measurements at the 2<sup>nd</sup> harmonic of high carrier frequency

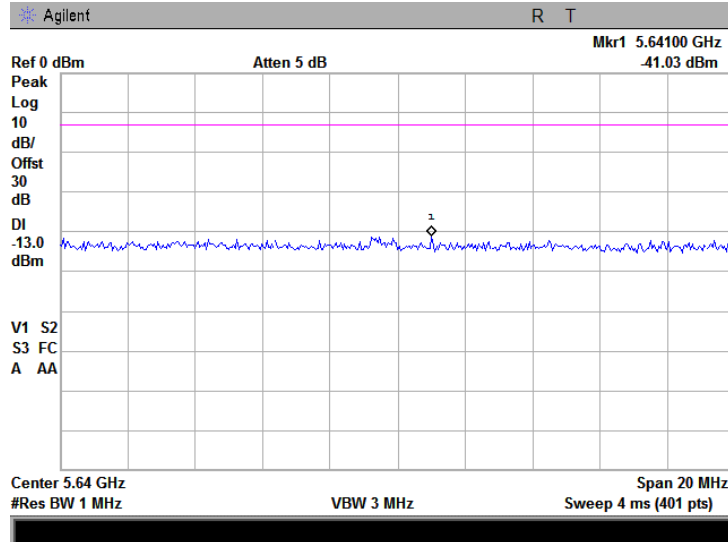


Plot 8.3.27 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of low carrier frequency

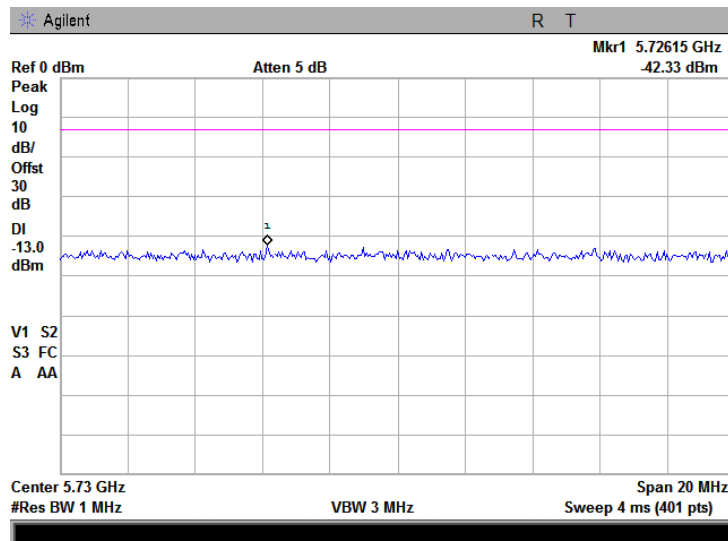


<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.28 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of mid carrier frequency



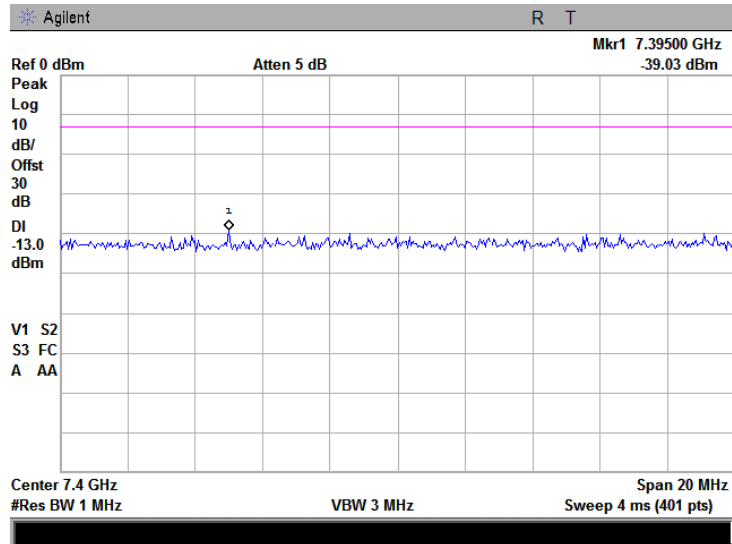
Plot 8.3.29 Conducted spurious emission measurements at the 3<sup>rd</sup> harmonic of high carrier frequency



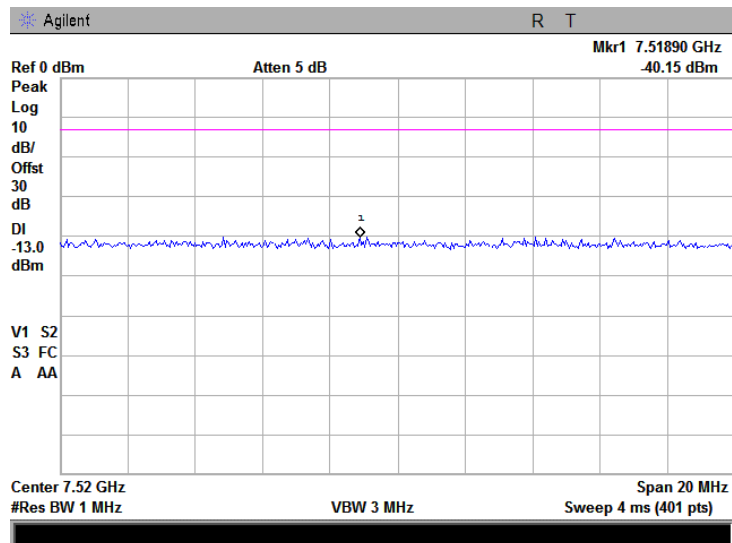


<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.30 Conducted spurious emission measurements at the 4<sup>th</sup> harmonic of low carrier frequency

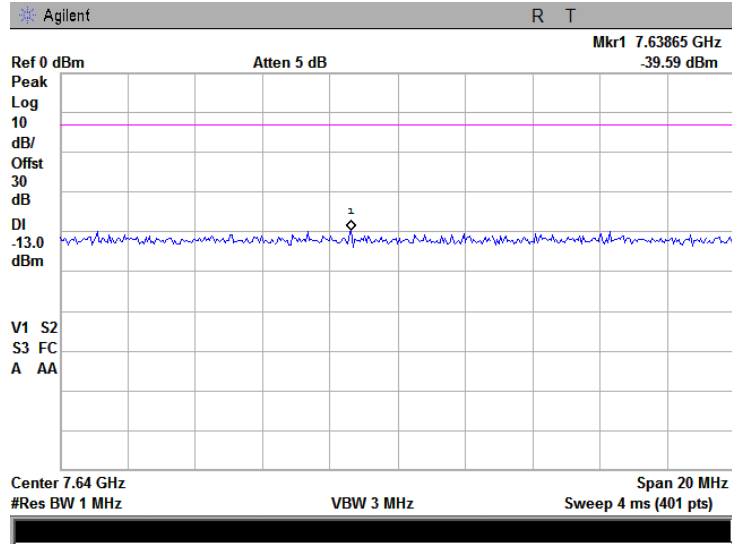


Plot 8.3.31 Conducted spurious emission measurements at the 4<sup>th</sup> harmonic of mid carrier frequency

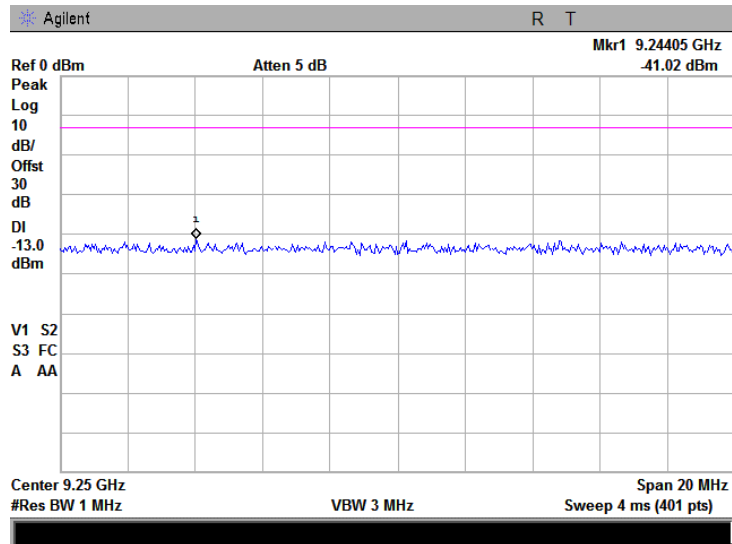


<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.32 Conducted spurious emission measurements at the 4<sup>th</sup> harmonic of high carrier frequency



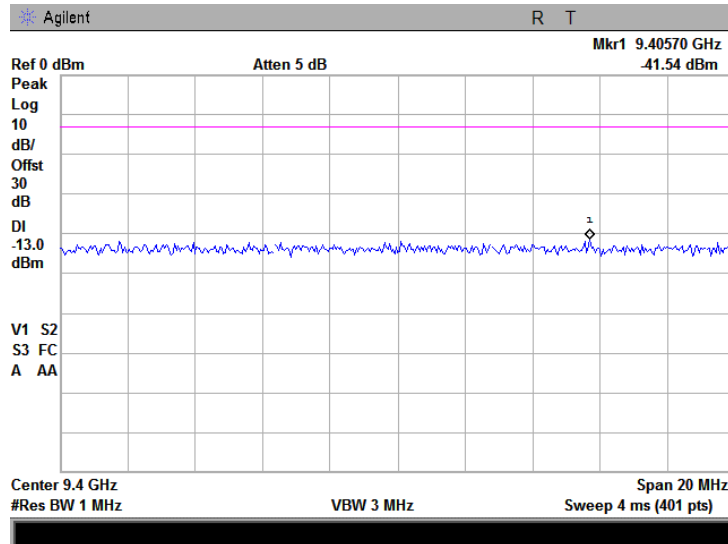
Plot 8.3.33 Conducted spurious emission measurements at the 5<sup>th</sup> harmonic of low carrier frequency



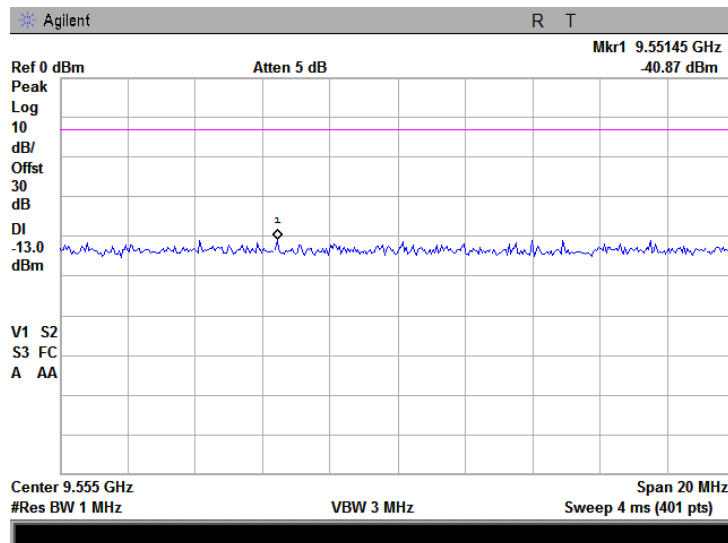


<b>Test specification:</b>	<b>Section 24.238, Spurious emission at antenna terminal</b>		
<b>Test procedure:</b>	FCC part 24, Section 24.238		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	PASS
<b>Date:</b>	7/19/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Plot 8.3.34 Conducted spurious emission measurements at the 5<sup>th</sup> harmonic of mid carrier frequency



Plot 8.3.35 Conducted spurious emission measurements at the 5<sup>th</sup> harmonic of high carrier frequency





<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

## 8.4 Field strength of spurious emissions

### 8.4.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limit is given in Table 8.4.1.

**Table 8.4.1 Radiated spurious emissions limits**

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

\* - P is transmitter output power in Watts.

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

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

8.4.2.1 The EUT was set up as shown in Figure 8.4.1, energized and the performance check was conducted.

8.4.2.2 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.

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

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

8.4.3.1 The EUT was set up as shown in Figure 8.4.2, energized and the performance check was conducted.

8.4.3.2 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.

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

<b>Test specification:</b> Section 24.238, Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

Figure 8.4.1 Setup for spurious emission field strength measurements below 30 MHz

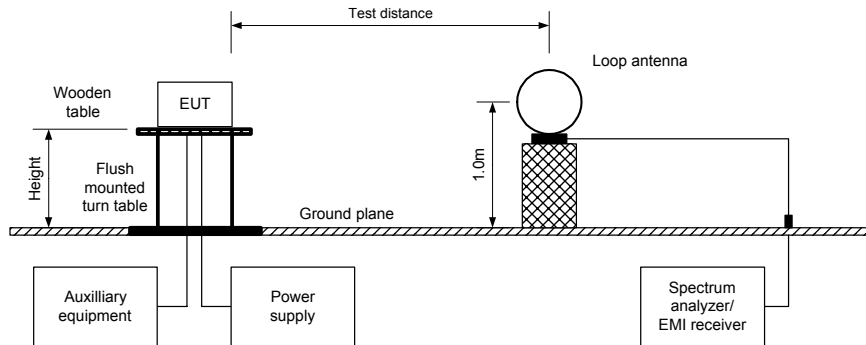
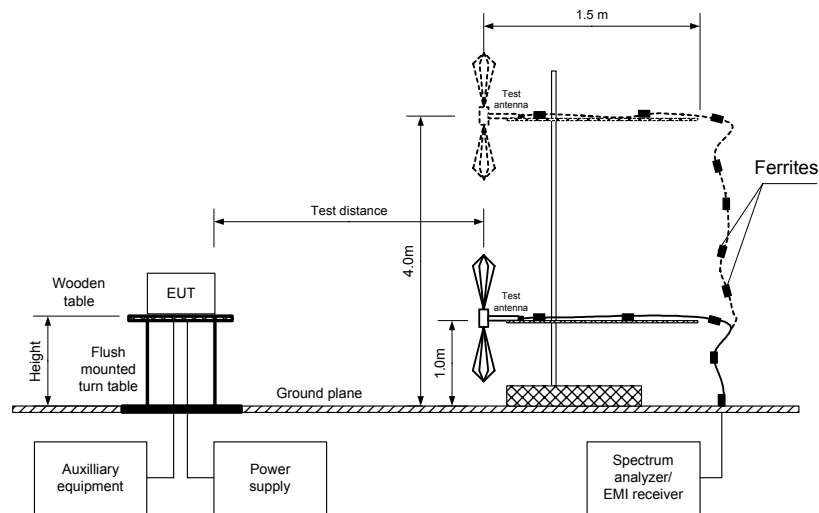


Figure 8.4.2 Setup for spurious emission field strength measurements above 30 MHz





<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

**Table 8.4.2 Spurious emission field strength test results**

ASSIGNED FREQUENCY RANGE: 1850-1910 MHz  
TEST DISTANCE: 3 m  
TEST SITE: Semi anechoic chamber / OATS  
EUT HEIGHT: 0.8 m  
INVESTIGATED FREQUENCY RANGE: 0.009 – 20000 MHz  
DETECTOR USED: Peak  
VIDEO BANDWIDTH: > Resolution bandwidth  
TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)  
Biconilog (30 MHz – 1000 MHz)  
Double ridged guide (above 1000 MHz)  
MODULATION: GSM  
BIT RATE: 270 kbps  
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	Field strength, dB( $\mu$ V/m)	Limit, dB( $\mu$ V/m)	Margin, dB*	RBW, kHz	Antenna polarization	Antenna height, m	Turn-table position**, degrees
<b>Low carrier frequency MHz</b>							
All spurious were found at least 20dB below specified limit							
<b>Mid carrier frequency MHz</b>							
All spurious were found at least 20dB below specified limit							
<b>High carrier frequency MHz</b>							
All spurious were found at least 20dB below specified limit							

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

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

**Reference numbers of test equipment used**

HL 0446	HL 0521	HL 0589	HL 0604	HL 1984	HL 1947	HL 2009	HL 2259
HL 2909							

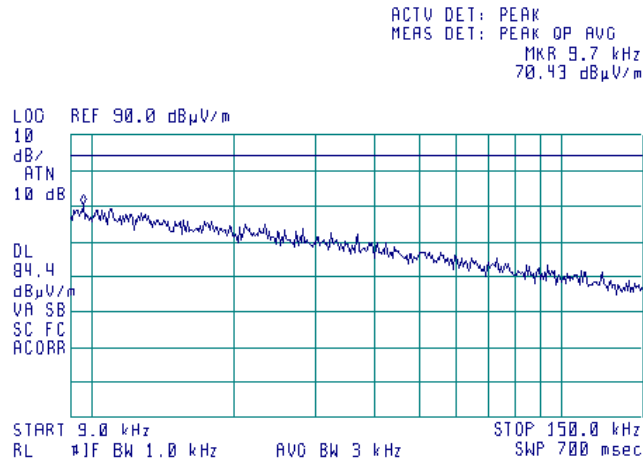
Full description is given in Appendix A.



<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

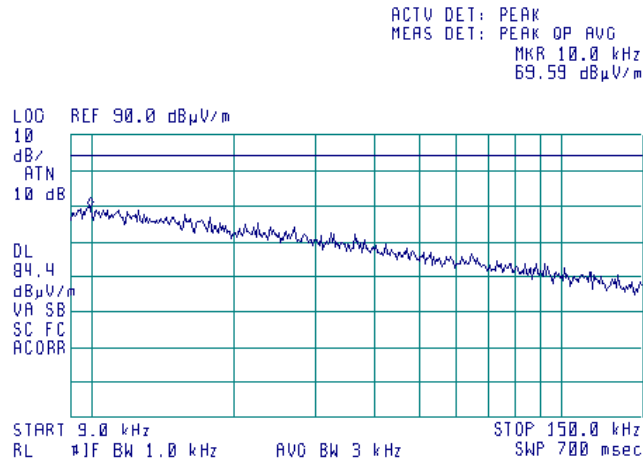
**Plot 8.4.1 Radiated emission measurements in 9 - 150 kHz range**

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



**Plot 8.4.2 Radiated emission measurements in 9 - 150 kHz range**

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

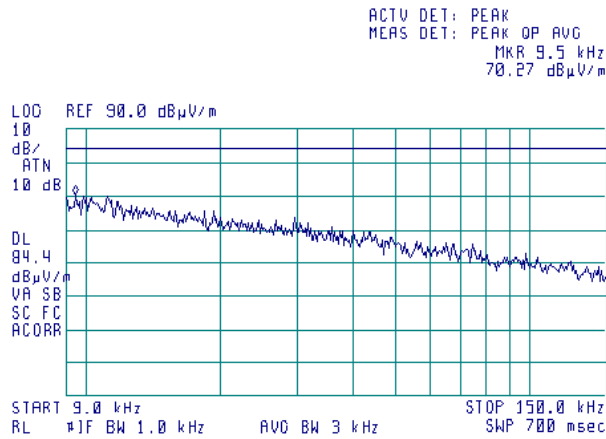




<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

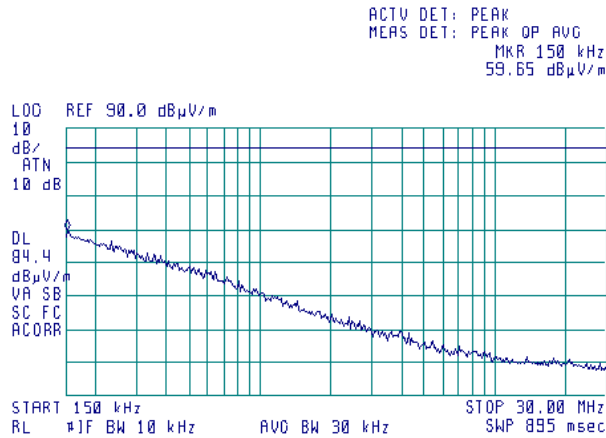
**Plot 8.4.3 Radiated emission measurements in 9 - 150 kHz range**

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



**Plot 8.4.4 Radiated emission measurements in 0.15 - 30 MHz range**

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



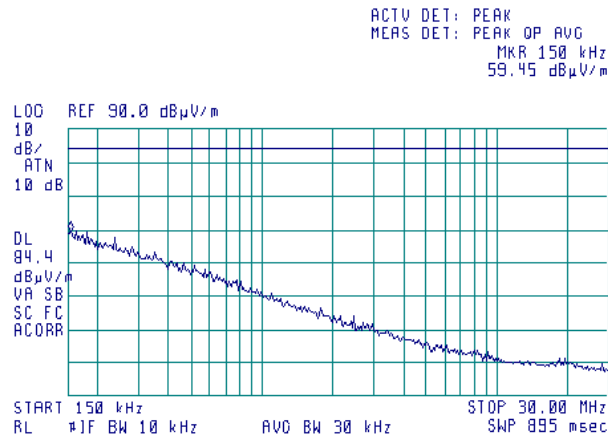




<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

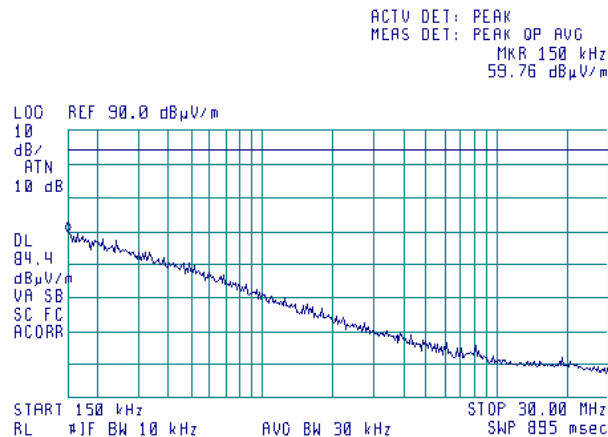
**Plot 8.4.5 Radiated emission measurements in 0.15 - 30 MHz range**

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



**Plot 8.4.6 Radiated emission measurements in 0.15 - 30 MHz range**

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

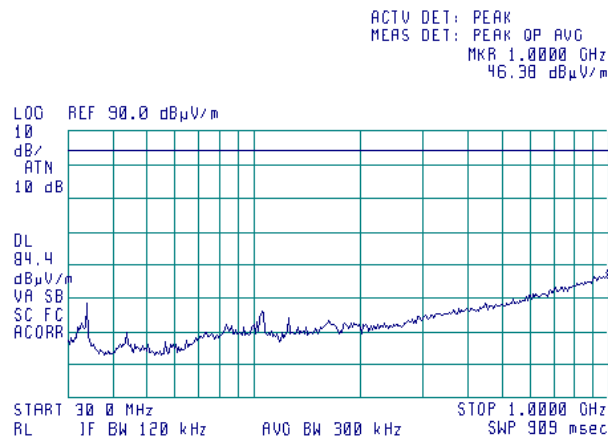




<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

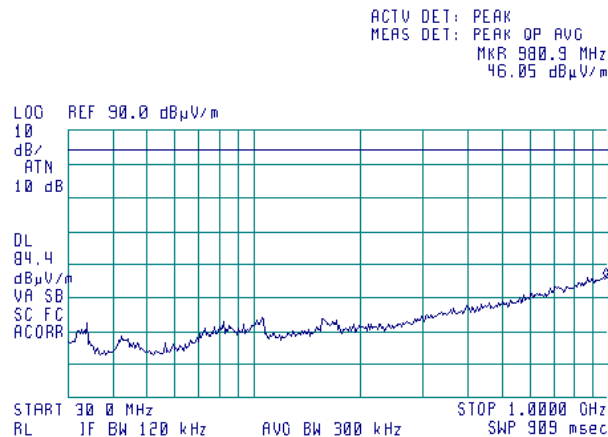
**Plot 8.4.7 Radiated emission measurements in 30 - 1000 MHz range**

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



**Plot 8.4.8 Radiated emission measurements in 30 - 1000 MHz range**

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

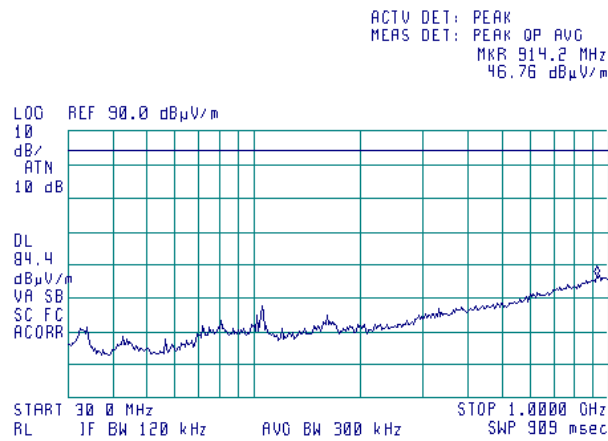




<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

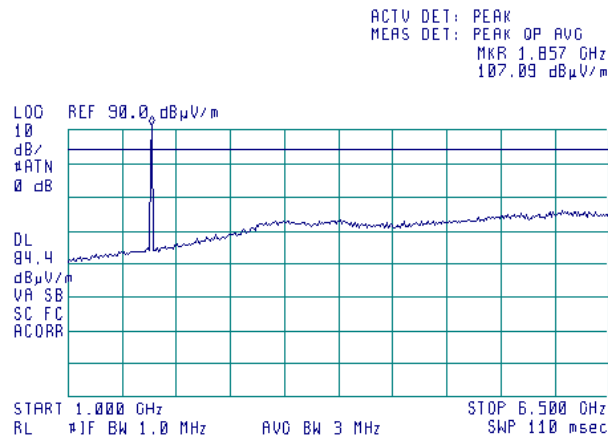
**Plot 8.4.9 Radiated emission measurements in 30 - 1000 MHz range**

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



**Plot 8.4.10 Radiated emission measurements in 1000 – 6500 MHz range**

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

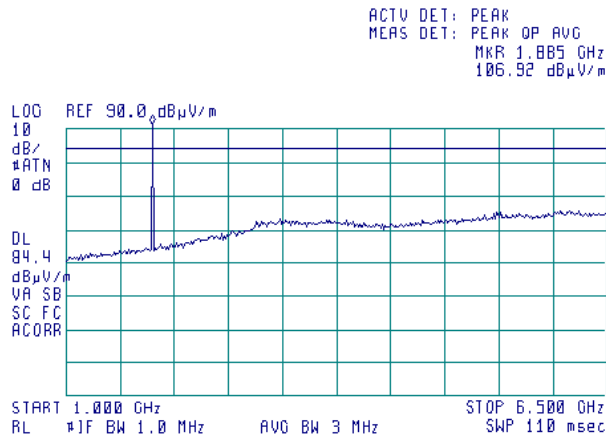




<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

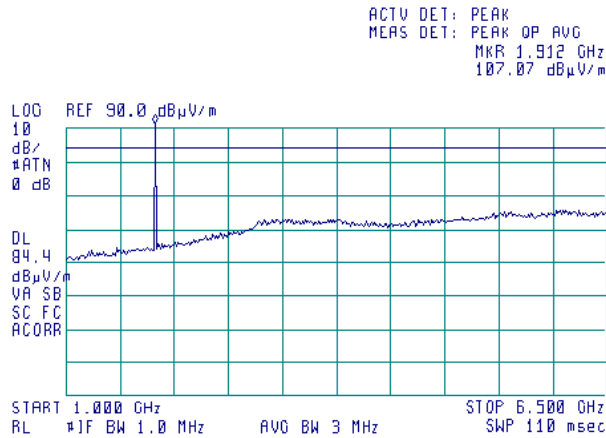
Plot 8.4.11 Radiated emission measurements in 1000 – 6500 MHz range

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



Plot 8.4.12 Radiated emission measurements in 1000 – 6500 MHz range

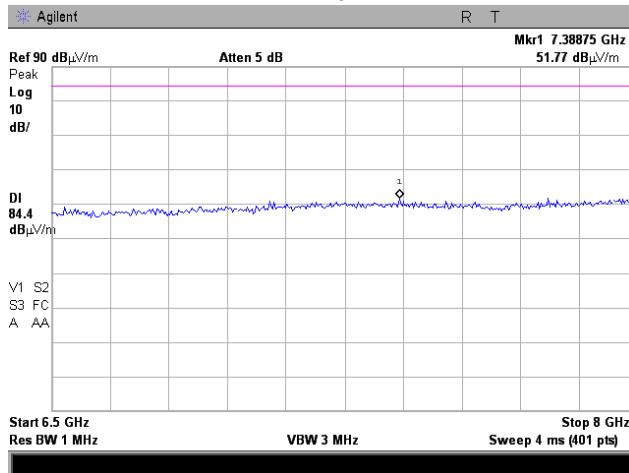
TEST SITE: Semi anechoic chamber  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

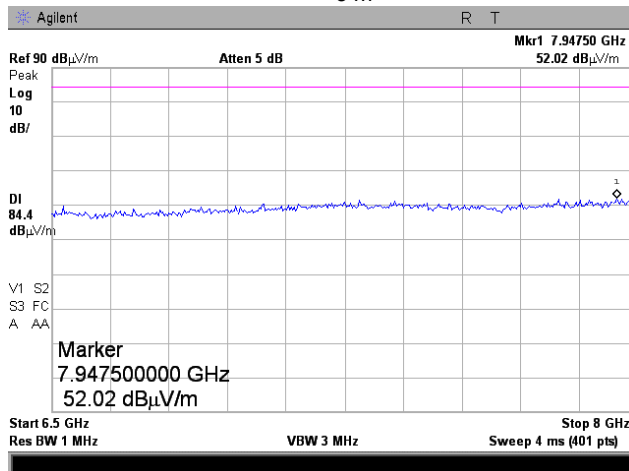
**Plot 8.4.13 Radiated emission measurements in 6.5- 8 GHz range**

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



**Plot 8.4.14 Radiated emission measurements in 6.5- 8 GHz range**

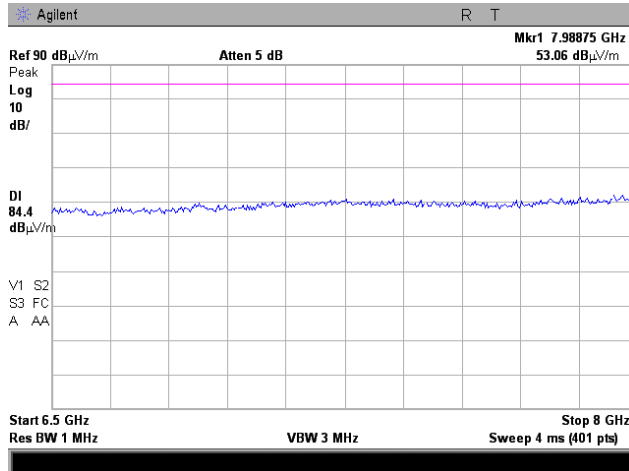
TEST SITE: OATS  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b> Section 24.238, Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

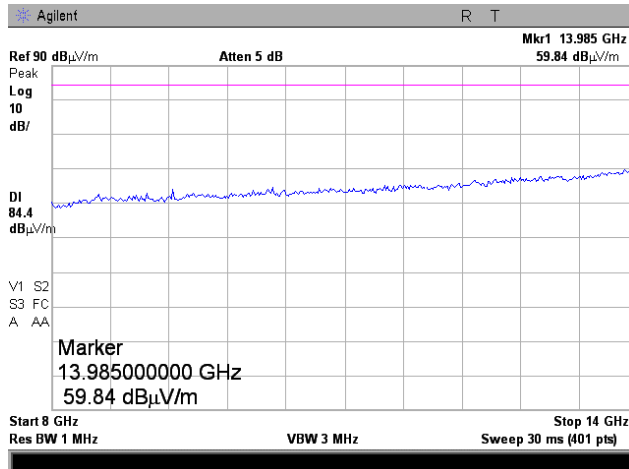
**Plot 8.4.15 Radiated emission measurements in 6.5- 8 GHz range**

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



**Plot 8.4.16 Radiated emission measurements in 8 - 14 GHz range**

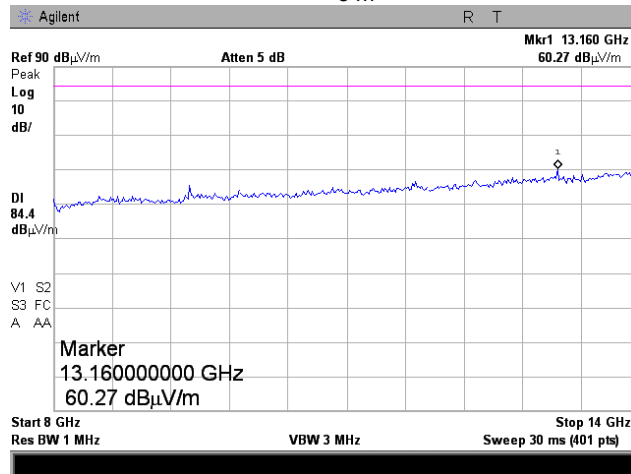
TEST SITE: OATS  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

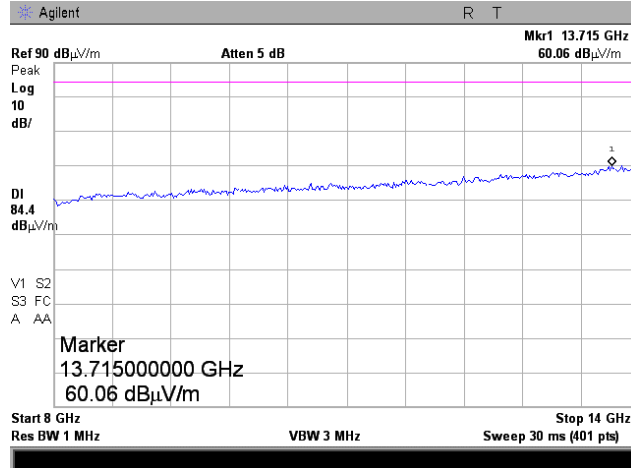
**Plot 8.4.17 Radiated emission measurements in 8 - 14 GHz range**

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



**Plot 8.4.18 Radiated emission measurements in 8 - 14 GHz range**

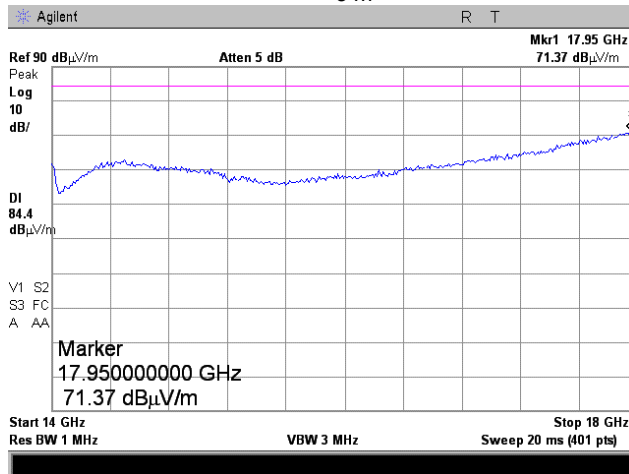
TEST SITE: OATS  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

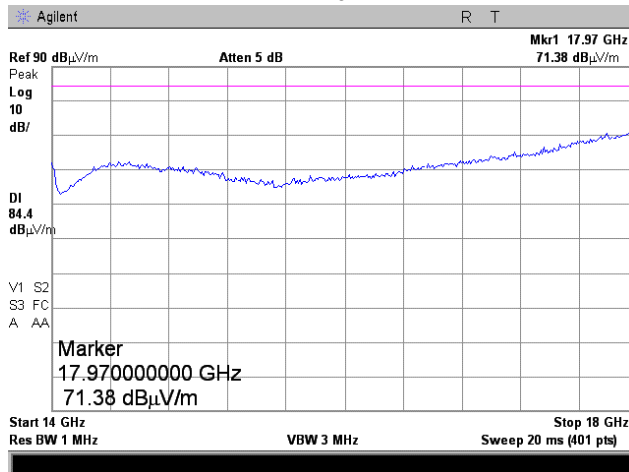
**Plot 8.4.19 Radiated emission measurements in 14 – 18 GHz range**

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



**Plot 8.4.20 Radiated emission measurements in 14 – 18 GHz range**

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



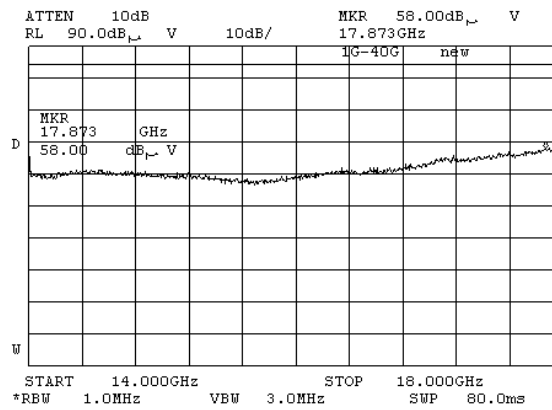




<b>Test specification:</b> Section 24.238, Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

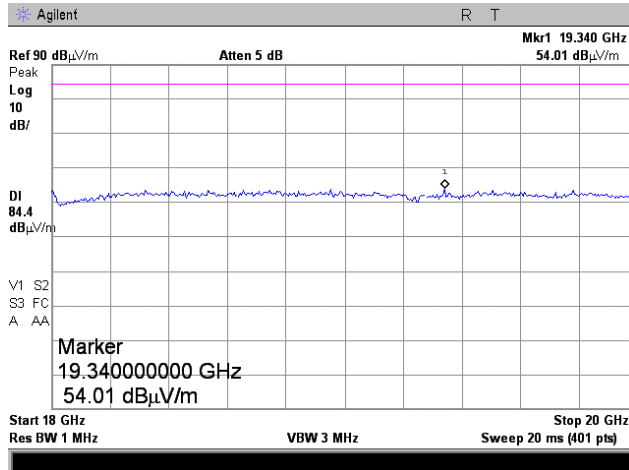
**Plot 8.4.21 Radiated emission measurements in 14 – 18 GHz range**

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



**Plot 8.4.22 Radiated emission measurements in 18 – 20 GHz range**

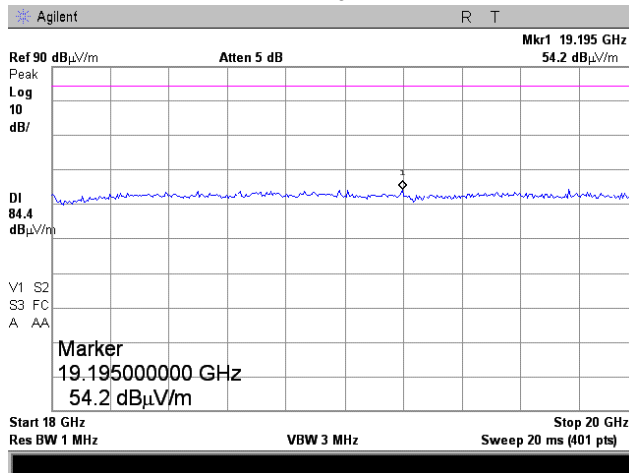
TEST SITE: OATS  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Vertical and Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b> Section 24.238, Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

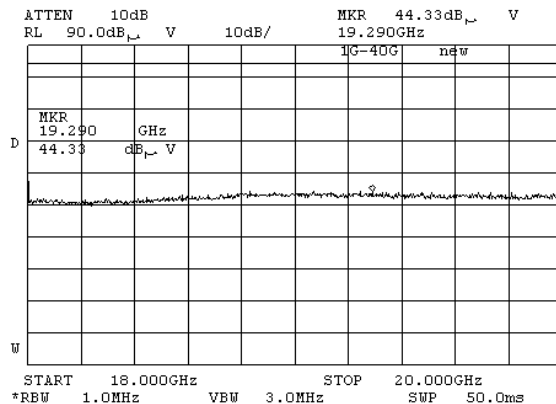
Plot 8.4.23 Radiated emission measurements in 18 – 20 GHz range

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



Plot 8.4.24 Radiated emission measurements in 18 – 20 GHz range

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

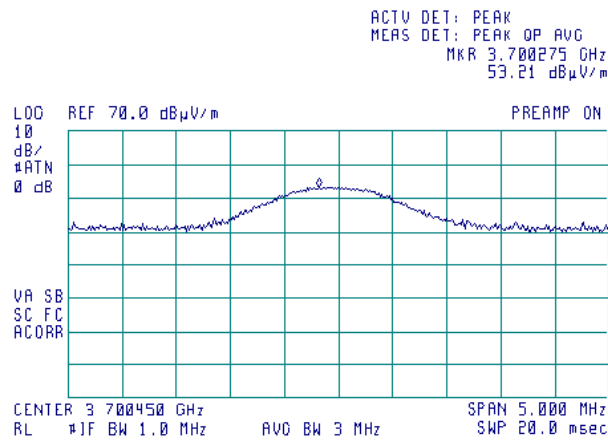




<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

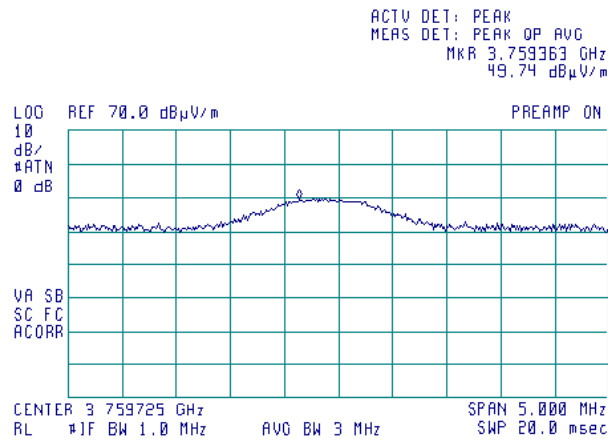
Plot 8.4.25 Radiated emission measurements at the 2<sup>nd</sup> harmonic

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



Plot 8.4.26 Radiated emission measurements at the 2<sup>nd</sup> harmonic

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

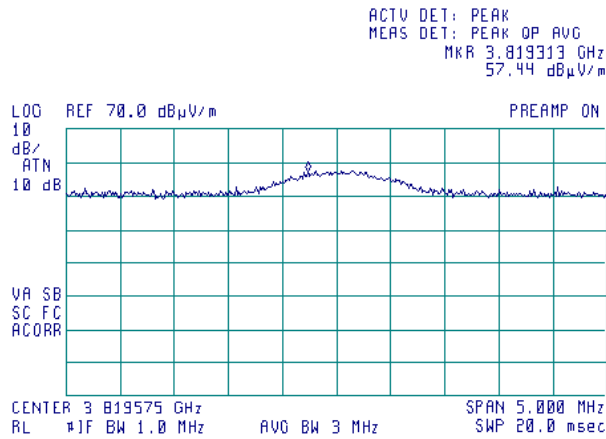




<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

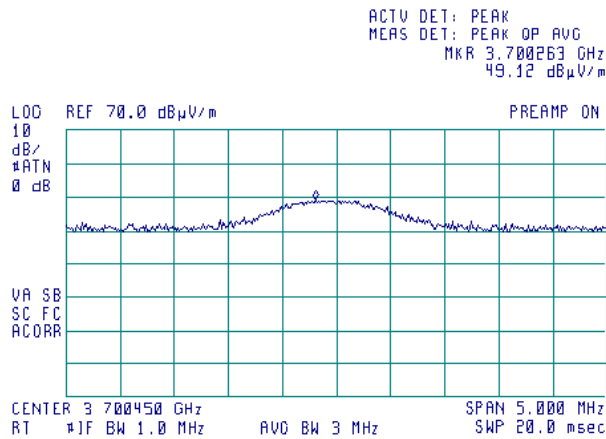
Plot 8.4.27 Radiated emission measurements at the 2<sup>nd</sup> harmonic

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



Plot 8.4.28 Radiated emission measurements at the 2<sup>nd</sup> harmonic

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

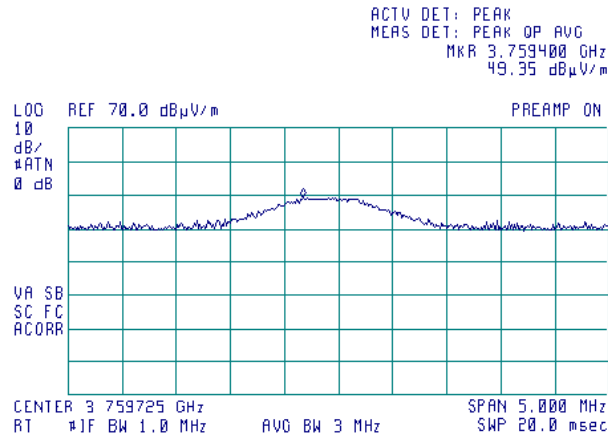




<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

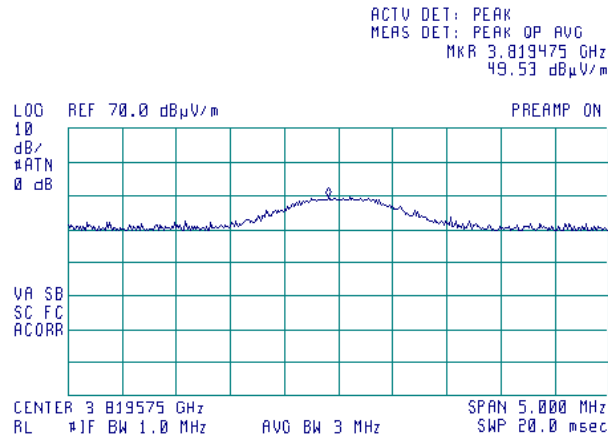
**Plot 8.4.29 Radiated emission measurements at the 2<sup>nd</sup> harmonic**

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



**Plot 8.4.30 Radiated emission measurements at the 2<sup>nd</sup> harmonic**

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

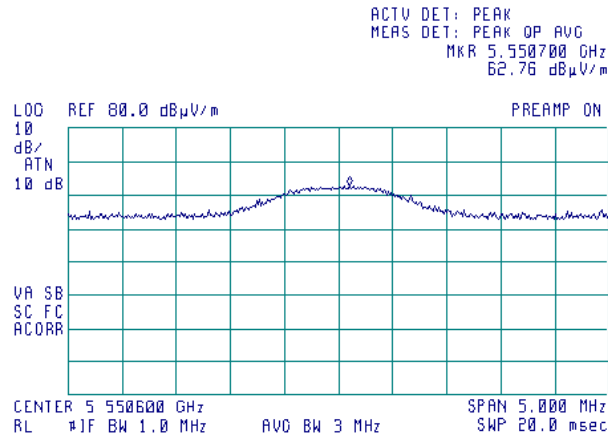




<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

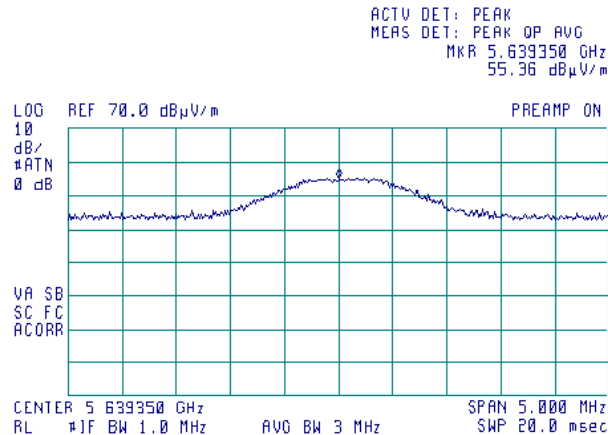
**Plot 8.4.31 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

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



**Plot 8.4.32 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

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

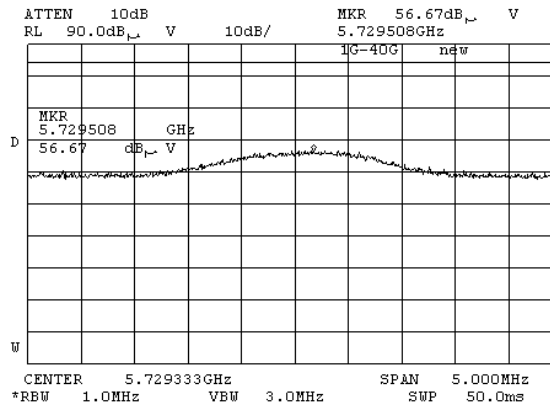




<b>Test specification:</b> Section 24.238, Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

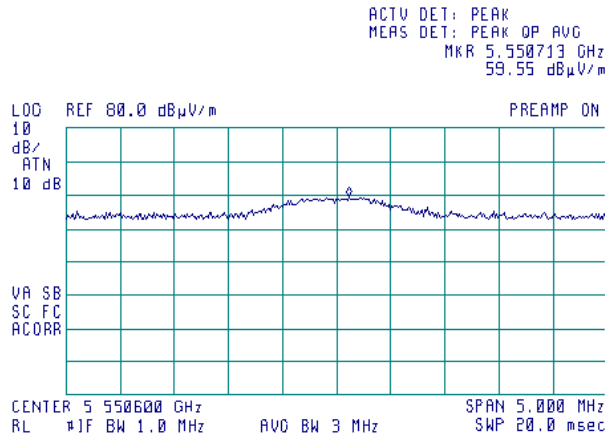
Plot 8.4.33 Radiated emission measurements at the 3<sup>rd</sup> harmonic

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



Plot 8.4.34 Radiated emission measurements at the 3<sup>rd</sup> harmonic

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

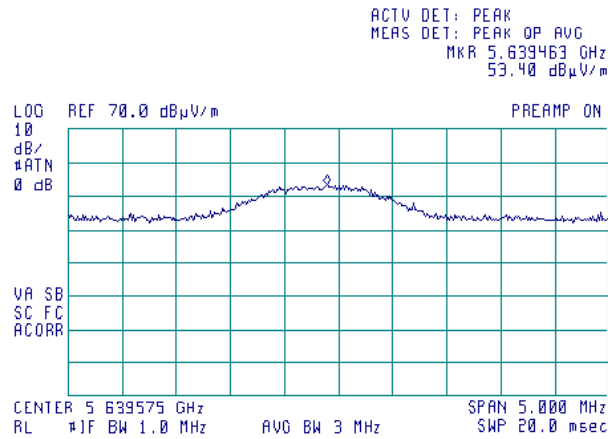




<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

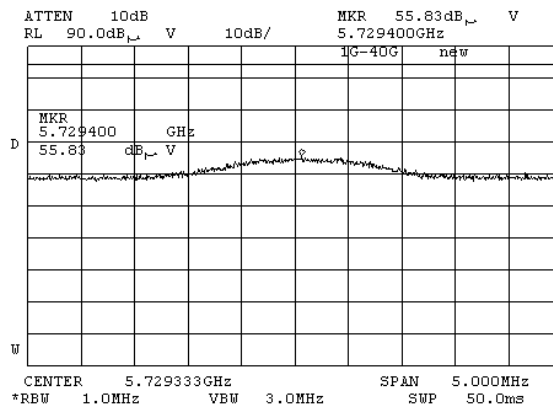
**Plot 8.4.35 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

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



**Plot 8.4.36 Radiated emission measurements at the 3<sup>rd</sup> harmonic**

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



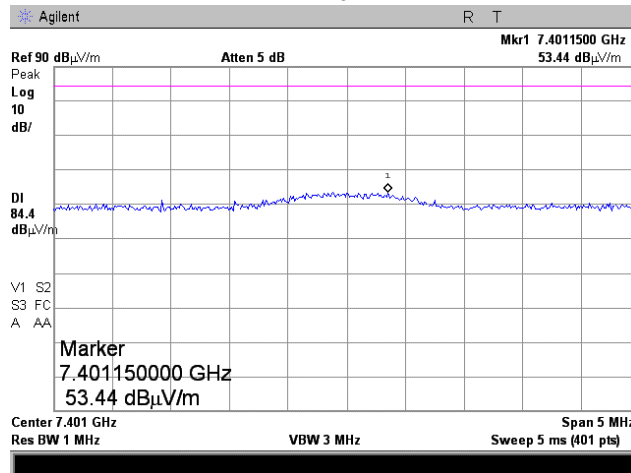




<b>Test specification:</b> Section 24.238, Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

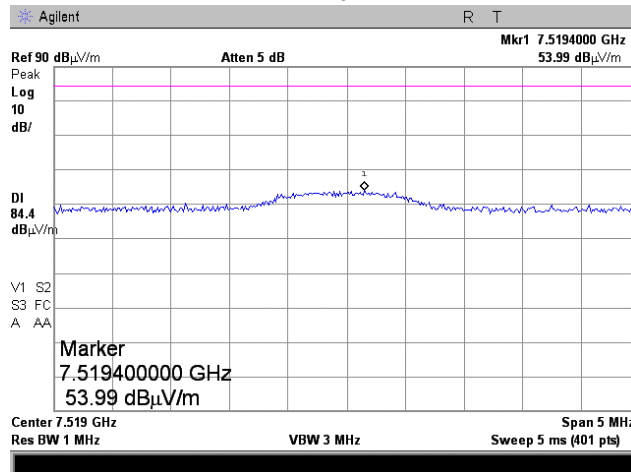
Plot 8.4.37 Radiated emission measurements at the 4<sup>th</sup> harmonic

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



Plot 8.4.38 Radiated emission measurements at the 4<sup>th</sup> harmonic

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

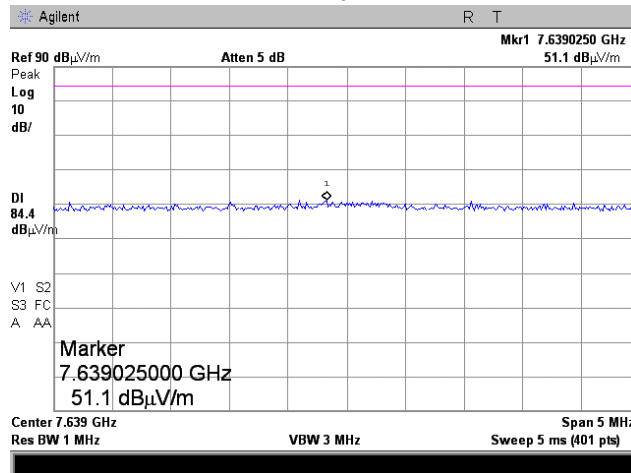




<b>Test specification:</b> Section 24.238, Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

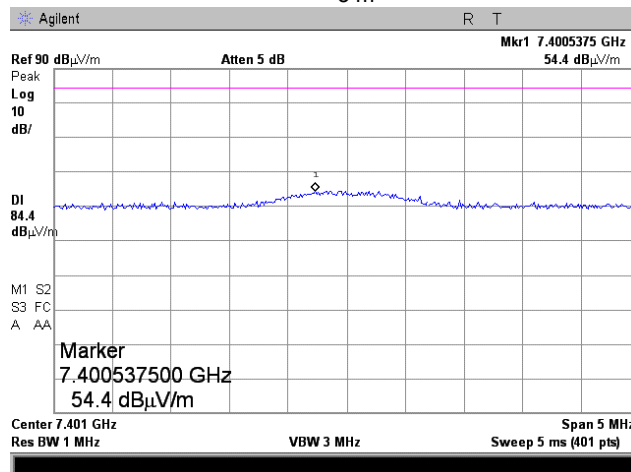
Plot 8.4.39 Radiated emission measurements at the 4<sup>th</sup> harmonic

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



Plot 8.4.40 Radiated emission measurements at the 4<sup>th</sup> harmonic

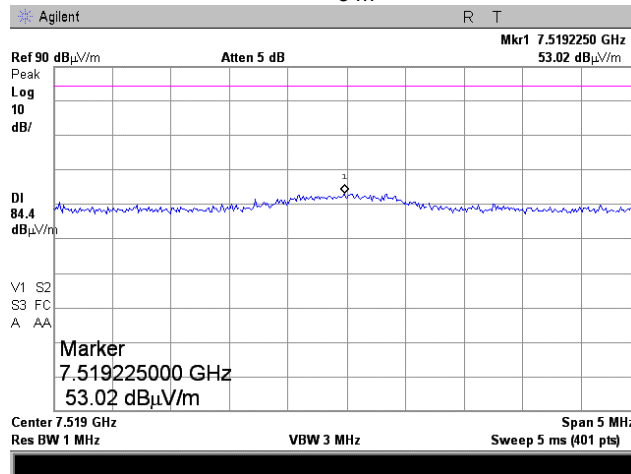
TEST SITE: OATS  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

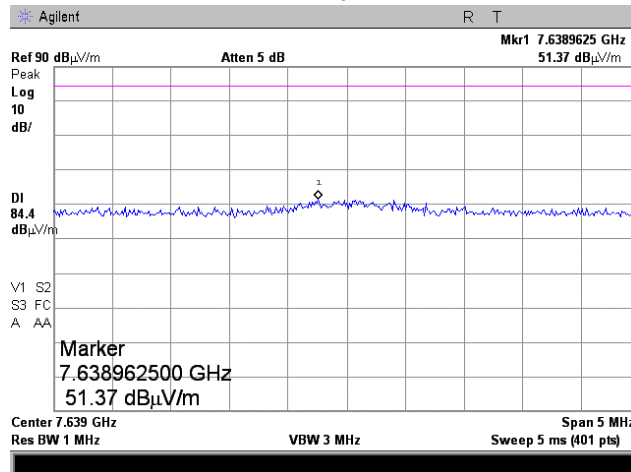
**Plot 8.4.41 Radiated emission measurements at the 4<sup>th</sup> harmonic**

TEST SITE: OATS  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Horizontal  
 TEST DISTANCE: 3 m



**Plot 8.4.42 Radiated emission measurements at the 4<sup>th</sup> harmonic**

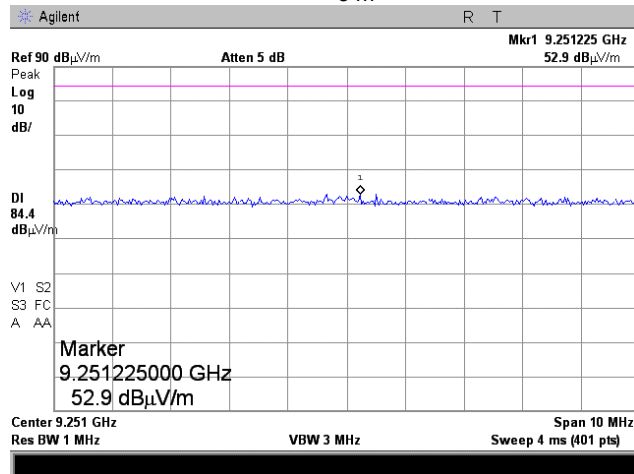
TEST SITE: OATS  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b> Section 24.238, Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

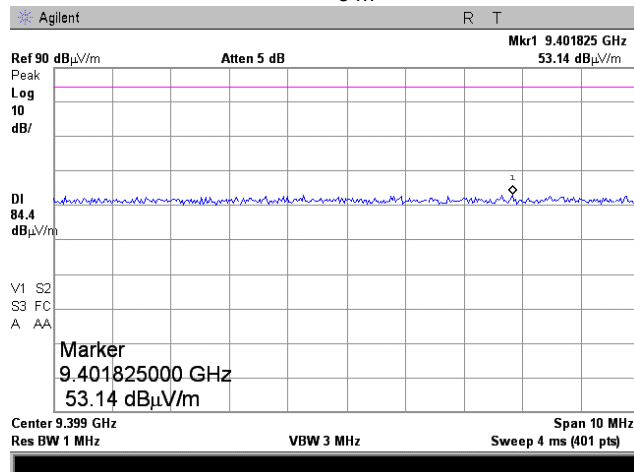
Plot 8.4.43 Radiated emission measurements at the 5<sup>th</sup> harmonic

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



Plot 8.4.44 Radiated emission measurements at the 5<sup>th</sup> harmonic

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

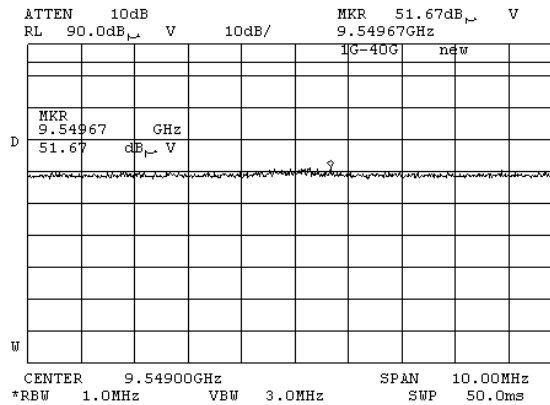




<b>Test specification:</b> Section 24.238, Radiated spurious emissions			
<b>Test procedure:</b> Public notice DA 00-705			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/15/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

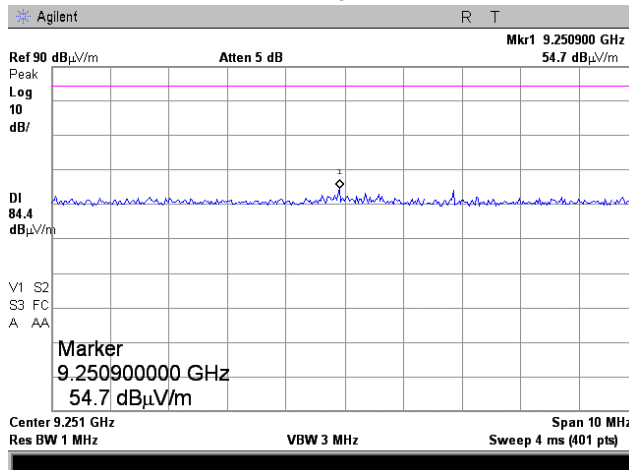
Plot 8.4.45 Radiated emission measurements at the 5<sup>th</sup> harmonic

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



Plot 8.4.46 Radiated emission measurements at the 5<sup>th</sup> harmonic

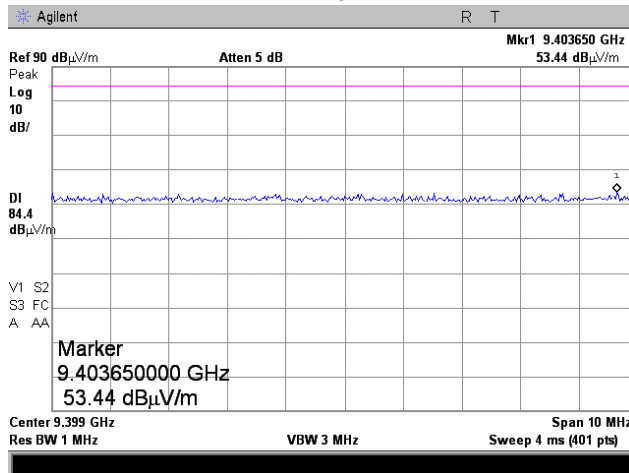
TEST SITE: OATS  
 CARRIER FREQUENCY: Low  
 ANTENNA POLARIZATION: Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b>	<b>Section 24.238, Radiated spurious emissions</b>		
<b>Test procedure:</b>	Public notice DA 00-705		
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/15/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1007 hPa	<b>Relative Humidity:</b> 36 %	<b>Power Supply:</b> 9.6 VDC
<b>Remarks:</b>			

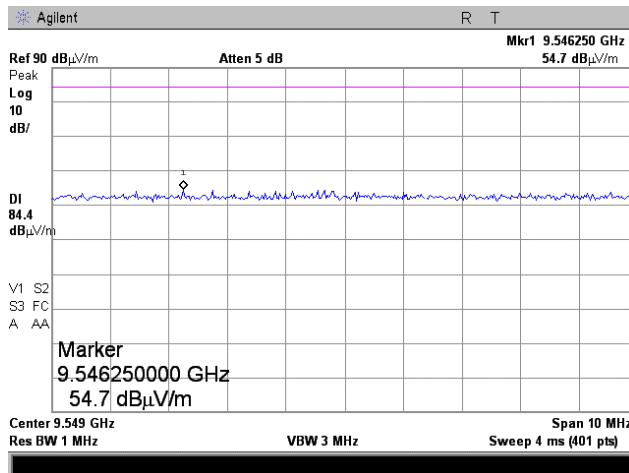
**Plot 8.4.47 Radiated emission measurements at the 5<sup>th</sup> harmonic**

TEST SITE: OATS  
 CARRIER FREQUENCY: Mid  
 ANTENNA POLARIZATION: Horizontal  
 TEST DISTANCE: 3 m



**Plot 8.4.48 Radiated emission measurements at the 5<sup>th</sup> harmonic**

TEST SITE: OATS  
 CARRIER FREQUENCY: High  
 ANTENNA POLARIZATION: Horizontal  
 TEST DISTANCE: 3 m



<b>Test specification:</b> Section 15.107 Conducted emission			
<b>Test procedure:</b> ANSI C63.4, Section 13.1.3; Sections 11.5 and 12.1.3			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/30/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 120 VAC
<b>Remarks:</b>			

## 8.5 Frequency stability test

### 8.5.1 General

This test was performed to measure frequency stability of transmitter RF carrier. Specification test limits are given in Table 8.5.1.

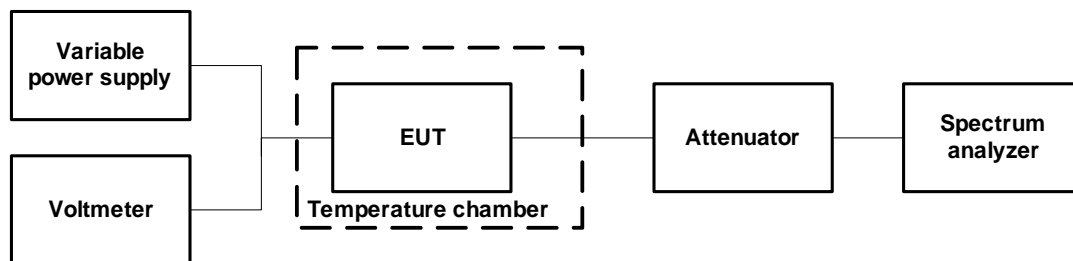
Table 8.5.1 Frequency stability limits

Assigned frequency, MHz	Limits
1850.2	26 dBc points including frequency tolerance shall remain within the authorized frequency block
1880.0	
1909.8	

### 8.5.2 Test procedure

- 8.5.2.1 The EUT was set up as shown in Figure 8.5.1, energized and its proper operation was checked.
- 8.5.2.2 The EUT power was turned off. Temperature within test chamber was set to +30°C and a period of time sufficient to stabilize all of the oscillator circuit components was allowed.
- 8.5.2.3 The EUT was powered on and carrier frequency was measured at start up moment and then every minute until frequency had been stabilized or 10 minutes elapsed whichever reached the last. The EUT was powered off.
- 8.5.2.4 The above procedure was repeated at 0°C and at the lowest test temperature.
- 8.5.2.5 The EUT was powered on and carrier frequency was measured at start up moment and at the end of stabilization period at the rest of test temperatures and voltages. The EUT was powered off.
- 8.5.2.6 Frequency displacement was calculated and compared with the limit as provided in Table 8.5.2

Figure 8.5.1 Frequency stability test setup





<b>Test specification:</b>		<b>Section 15.107 Conducted emission</b>			
<b>Test procedure:</b>		ANSI C63.4, Section 13.1.3; Sections 11.5 and 12.1.3			
<b>Test mode:</b>	Compliance	<b>Verdict:</b>		<b>PASS</b>	
<b>Date:</b>	7/30/2007				
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 120 VAC		
<b>Remarks:</b>					

Table 8.5.2 Frequency stability test results

OPERATING FREQUENCY RANGE: 1850.2 – 1909.8 MHz  
 NOMINAL POWER VOLTAGE: 120 VAC  
 TEMPERATURE STABILIZATION PERIOD: 20 min  
 POWER DURING TEMPERATURE TRANSITION: Off  
 SPECTRUM ANALYZER MODE: Counter  
 RESOLUTION BANDWIDTH: 10 kHz  
 VIDEO BANDWIDTH: 100 Hz  
 MODULATION: GSM

T, °C	Voltage, V	Frequency, MHz							Max frequency drift, H	
		Start up	1 <sup>st</sup> min	2 <sup>nd</sup> min	3 <sup>rd</sup> min	4 <sup>th</sup> min	5 <sup>th</sup> min	10 <sup>th</sup> min	Positive	Negative
<b>Low carrier frequency</b>										
-30	nominal	1850.2004	1850.20044	1850.20024	1850.20039	1850.2004	1850.20038	1850.20031	0	-340
-20	nominal	1850.20065	NA	NA	NA	NA	NA	1850.20056	70	-20
-10	nominal	1850.20046	NA	NA	NA	NA	NA	1850.20064	60	-120
0	nominal	1850.20050	1850.20042	1850.20043	1850.20031	1850.20026	1850.20052	1850.20043	0	-320
10	nominal	1850.20060	NA	NA	NA	NA	NA	1850.20036	20	-220
20	+15%	1850.20045	NA	NA	NA	NA	NA	1850.20035	0	-230
20	nominal	1850.20043	NA	NA	NA	NA	NA	1850.20058	0	-150
20	-15%l	1850.20040	NA	NA	NA	NA	NA	1850.20037	0	-210
30	nominal	1850.20063	1850.20052	1850.20046	1850.20018	1850.20046	1850.20008	1850.20045	50	-500
40	nominal	1850.20048	NA	NA	NA	NA	NA	1850.20043	0	-150
50	nominal	1850.20028	NA	NA	NA	NA	NA	1850.20048	0	-300
<b>Mid carrier frequency</b>										
-30	nominal	1879.999980	1879.999850	1879.999980	1880.000030	1879.999940	1880.000000	1879.999940	220	0
-20	nominal	1879.999540	NA	NA	NA	NA	NA	1879.999740	0	-270
-10	nominal	1879.999880	NA	NA	NA	NA	NA	1879.999970	160	0
0	nominal	1880.000270	1880.000250	1880.000190	1880.000180	1880.000150	1879.999810	1880.000016	460	0
10	nominal	1880.000020	NA	NA	NA	NA	NA	1879.999790	210	-20.0
20	+15%	1879.999860	NA	NA	NA	NA	NA	1879.999760	50	-50
20	nominal	1879.999820	NA	NA	NA	NA	NA	1879.999810	10	0
20	-15%l	1879.999970	NA	NA	NA	NA	NA	1879.999770	160	-40
30	nominal	1879.999990	1879.999770	1879.999620	1879.999930	1880.000030	1880.000060	1879.999840	250	-190
40	nominal	1879.999660	NA	NA	NA	NA	NA	1879.999750	0	-150
50	nominal	1879.999890	NA	NA	NA	NA	NA	1879.999780	80	-30
<b>High carrier frequency</b>										
-30	nominal	1909.800670	1909.800430	1909.800550	1909.800300	1909.800600	1909.800310	1909.800380	290	-80
-20	nominal	1909.800520	NA	NA	NA	NA	NA	1909.800510	140	0
-10	nominal	1909.800580	NA	NA	NA	NA	NA	1909.800680	300	0
0	nominal	1909.800540	1909.800530	1909.800530	1909.800460	1909.800420	1909.800390	1909.800460	160	0
10	nominal	1909.800380	NA	NA	NA	NA	NA	1909.800290	0	-90
20	+15%	1909.800570	NA	NA	NA	NA	NA	1909.800450	190	0
20	nominal	1909.800370	NA	NA	NA	NA	NA	1909.800380	0	-10
20	-15%l	1909.800430	NA	NA	NA	NA	NA	1909.800340	50	-40
30	nominal	1909.800470	1909.800420	1909.800330	1909.800420	1909.800620	1909.800280	1909.800470	240	-100
40	nominal	1909.800250	NA	NA	NA	NA	NA	1909.800610	230	-130
50	nominal	1909.800590	NA	NA	NA	NA	NA	1909.800240	210	-140

\* - Reference frequency  
 \*\* - Battery operating end point specified by the manufacturer.





<b>Test specification:</b>		<b>Section 15.107 Conducted emission</b>	
<b>Test procedure:</b>		ANSI C63.4, Section 13.1.3; Sections 11.5 and 12.1.3	
<b>Test mode:</b>	Compliance	<b>Verdict:</b>	<b>PASS</b>
<b>Date:</b>	7/30/2007		
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 120 VAC
<b>Remarks:</b>			

Table 8.5.3 Transmitter operating range including frequency drift

Carrier frequency, MHz	Lower reference point, MHz	Upper reference point, MHz	Maximum negative drift, Hz	Maximum positive drift, Hz	Frequency tolerance, MHz	Limit, MHz	Margin, kHz	Verdict
1850.2	1850.0626	NA	500	70	1850.0621	1850	62.100	Pass
1909.8	NA	1909.9350	140	300	1909.9347	1910	65.300	Pass

Reference numbers of test equipment used

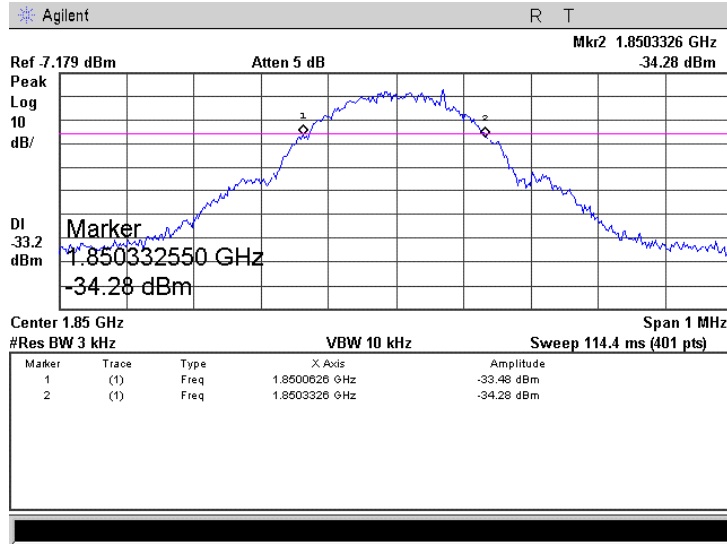
HL 0495	HL 2882	HL 2909					
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Full description is given in Appendix A.

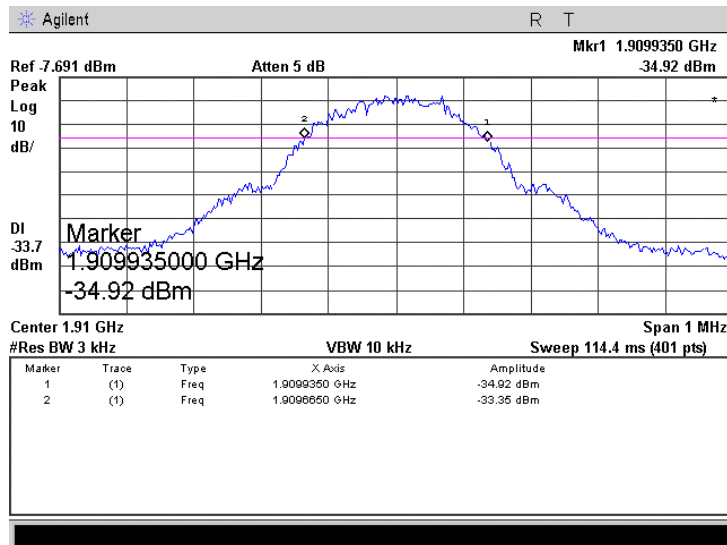


<b>Test specification:</b> Section 15.107 Conducted emission			
<b>Test procedure:</b> ANSI C63.4, Section 13.1.3; Sections 11.5 and 12.1.3			
<b>Test mode:</b> Compliance	<b>Verdict:</b> PASS		
<b>Date:</b> 7/30/2007			
<b>Temperature:</b> 26°C	<b>Air Pressure:</b> 1006 hPa	<b>Relative Humidity:</b> 41 %	<b>Power Supply:</b> 120 VAC
<b>Remarks:</b>			

Plot 8.5.1 Transmitter band edges at the low frequency



Plot 8.5.2 Transmitter band edges at the high frequency



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

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	28-Jun-07	28-Jun-08
0447	LISN, 16/2, 300V RMS, 50 Ohm/50 uH + 5 Ohm, STD CISPR 16-1	HL	LISN 16 - 1	066	03-Nov-06	03-Nov-07
0495	Autotransformer 0-255V, 10A	Variac	EMPL01	495	15-Aug-07	15-Aug-08
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard	8546A	3617A 00319, 3448A002 53	26-Sep-06	26-Sep-07
0557	Generator Signal, 9 KHz - 1.2 GHz	Marconi Instruments	2023	112225/08 0	13-Feb-07	13-Feb-08
0567	Antenna, Dipole, Tunable, 500 - 1000 MHz	Electro-Metrics	TDS-25/30-2	298	29-Jan-07	29-Jan-08
0589	Cable Coaxial, GORE A2P01POL118, 2.3 m	HL	GORE-3	176	02-Dec-06	02-Dec-07
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	10-Jan-07	10-Jan-08
0661	Generator Swept Signal, 10 MHz to 40 GHz, + 10 dBm	Hewlett Packard	83640B	3614A002 66	14-Sep-06	14-Sep-07
0787	Transient Limiter 9 kHz-200 MHz	Hewlett Packard	11947A	3107A018 77	21-Nov-06	21-Nov-07
1004	Cable Coaxial , ANDREW PSWJ4 , 6m	HL	ANDREW -6	163	02-Dec-06	02-Dec-07
1430	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1431, HL1432	Agilent Technologies	8542E	3807A002 62,3705A0 0217	01-Sep-06	01-Sep-07
1502	Cable RF, 6 m, BNC/BNC	Belden	M17/167 MIL-C-17	1502	27-Nov-06	27-Nov-07
1510	Cable RF, 8 m, BNC/BNC	Belden	M17/167 MIL-C-17	1510	01-Jan-07	01-Jan-08
1533	Cable RF, 1.0 m	Alpha Wire	RG-213/U	1533	11-Sep-06	11-Sep-07
1565	Antenna, Dipole, Tunable 500 - 1000 MHz	Electro-Metrics	TDS-30-2	334	29-Jan-07	29-Jan-08
1566	Cable RF, 2 m	Huber-Suhner	Sucoflex 104PE	13094/4PE	02-Dec-06	02-Dec-07
1947	Cable 18GHz, 6.5 m, blue	Rhophase Microwave Limited	NPS-1803A-6500-NPS	T4974	17-Oct-06	17-Oct-07
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W	EMC Test Systems	3115	9911-5964	03-Mar-07	03-Mar-08
2009	Cable RF, 8 m	Alpha Wire	RG-214	C-56	20-May-07	20-May-08
2015	Power Divider, 0.5-18.0 GHz, 80 W	Omni Spectra	2090-6204-00	2015	05-Dec-06	05-Dec-07
2254	Cable 40GHz, 0.8 m, blue	Rhophase Microwave Limited	KPS-1503A-800-KPS	W4907	17-Jun-07	17-Jun-08
2259	Amplifier Low Noise 2-20 GHz	Sophia Wireless	LNA0220-C	0223	05-Nov-06	05-Nov-07
2400	Cable 40GHz, 1.5 m, green	Rhophase Microwave Limited	KPS-1503A-1500-KPS	X2946	01-Jan-07	01-Jan-08
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	03-Mar-07	03-Mar-08



HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
2697	Antenna, 30 MHz - 3.0 GHz	Sunol Sciences. Corp. Pleasanton, California USA	JB3	A022805	10-Jan-07	10-Jan-08
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY4510246	11-Jun-07	11-Jun-08
2869	Cable, 18 GHz, 1.2 m, SMA - SMA, Right Angle	Gore	NA	91P72073	11-Feb-07	11-Feb-08
2871	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-8155-00	2871	11-Feb-07	11-Feb-08
2882	Cable, 18 GHz N-type, M-F, 3 m	Bird	TC-MNFN-3.0	211539001	11-Feb-07	11-Feb-08
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY41444762	07-May-07	07-May-08
2910	Cable 18 GHz, 3 m, SMA-SMA	Gore	NA	989370	01-Jan-07	01-Jan-08
2912	Cable 18 GHz, 1.5 m, SMA-SMA	Gore	NA	91P72067	11-Feb-07	11-Feb-08
2976	Fieldmeter with EF2 isotropic probe (100kHz-2.5GHz ) & electric field probe (0.1V/m-200V/m),supplied in a carrying case.	CHAUVIN ARNOUX	C.A 43	2976	28-Jun-07	28-Jun-08
3001	EMC Analyzer, 9 kHz to 3 GHz	Agilent Technologies	E7402A	US39440180	22-Nov-06	22-Nov-07
3178	Attenuator, N-type, 20 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW-N20W5+	0651	07-May-07	07-May-08
3182	Attenuator, N-type, 10 dB, DC to 6 GHz, 1 W	Mini-Circuits	UNAT-10+	15542	07-May-07	07-May-08
3207	Cable 40 GHz, 1.2 m	GORE-TEX	GOR245	05118337	17-Jun-07	17-Jun-08

## 10 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.

## 11 APPENDIX C Test laboratory description

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

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Person for contact: Mr. Alex Usoskin, CEO.

## 12 APPENDIX D Specification references

47CFR part 22:2006	Public Mobile Services
47CFR part 24: 2006	Personal Communications Services
47CFR part 15:2006	Radio Frequency Devices
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
ANSI/TIA/EIA-603-A:2001	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

**13 APPENDIX E Test equipment correction factors**

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

<b>Frequency, kHz</b>	<b>Correction factor, dB</b>
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.

**Antenna factor**  
**Biconilog antenna EMCO, model 3141, serial number 1011, HL 0604**

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

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



**Antenna factor**  
**Double-ridged wave guide horn antenna**  
**EMC Test Systems, model 3115, serial no: 9911-5964, HL 1984**

Frequency, MHz	Antenna gain, dBi	Antenna factor. dB(1/m)
1000.0	5.8	24.5
1500.0	9.0	24.8
2000.0	8.6	27.7
2500.0	9.5	28.7
3000.0	8.9	30.8
3500.0	8.2	32.9
4000.0	9.6	32.7
4500.0	11.2	32.1
5000.0	10.6	33.6
5500.0	9.8	35.3
6000.0	10.1	35.7
6500.0	10.7	35.8
7000.0	10.9	36.2
7500.0	10.5	37.2
8000.0	11.1	37.2
8500.0	10.8	38.1
9000.0	10.7	38.6
9500.0	11.5	38.3
10000.0	11.8	38.4
10500.0	12.3	38.3
11000.0	12.3	38.8
11500.0	11.5	39.9
12000.0	12.2	39.6
12500.0	12.6	39.5
13000.0	12.0	40.5
13500.0	11.7	41.1
14000.0	11.7	41.5
14500.0	12.7	40.8
15000.0	14.2	39.5
15500.0	16.0	38.1
16000.0	16.2	38.1
16500.0	14.5	40.1
17000.0	12.2	42.6
17500.0	9.7	45.4
18000.0	6.6	48.7

Antenna factor 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**  
**Active Loop Antenna**  
**EMC Test Systems, model 6502, serial number 2857, HL 0446**

Frequency, MHz	Magnetic Antenna Factor, dB(S/m)	Electric Antenna Factor, dB(1/m)
0.009	-32.8	18.7
0.010	-33.8	17.7
0.020	-38.3	13.2
0.050	-41.1	10.4
0.075	-41.3	10.2
0.100	-41.6	9.9
0.150	-41.7	9.8
0.250	-41.6	9.9
0.500	-41.8	9.7
0.750	-41.9	9.6
1.000	-41.4	10.1
2.000	-41.5	10.0
3.000	-41.4	10.1
4.000	-41.4	10.1
5.000	-41.5	10.0
10.000	-41.9	9.6
15.000	-41.9	9.6
20.000	-42.2	9.3
25.000	-42.8	8.7
30.000	-44.0	7.5

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

**Antenna factor**  
**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).

Antenna calibration  
Sunol Sciences Inc., model JB3, serial number A022805, HL 2697

Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain
30	22.2	-22.5	0.01	620	19.7	6.3	4.27	1215	24.9	7.0	5.05	1810	28.3	7.1	5.08	2405	30.9	6.9	4.93
35	18.5	-17.4	0.02	625	19.7	6.5	4.42	1220	24.9	7.0	4.99	1815	28.5	6.9	4.91	2410	30.9	6.9	4.89
40	14.7	-12.5	0.06	630	19.6	6.6	4.57	1225	25.1	6.9	4.91	1820	28.6	6.8	4.74	2415	31.0	6.9	4.85
45	11.3	-8.1	0.16	635	19.6	6.5	4.48	1230	25.2	6.8	4.82	1825	28.7	6.8	4.76	2420	31.0	6.8	4.82
45	11.3	-8.1	0.16	640	19.9	6.4	4.40	1235	25.1	7.0	4.96	1830	28.7	6.8	4.76	2425	31.1	6.8	4.81
50	8.9	-4.7	0.34	645	19.9	6.5	4.45	1240	25.0	7.1	5.09	1835	28.7	6.7	4.72	2430	31.0	6.9	4.87
55	7.9	-2.8	0.62	650	19.9	6.5	4.51	1245	25.0	7.1	5.12	1840	28.8	6.7	4.69	2435	31.0	6.9	4.88
60	7.8	-2.1	0.82	655	19.9	6.6	4.60	1250	25.0	7.1	5.15	1845	28.6	6.9	4.90	2440	31.2	6.8	4.74
65	2.0	8.5	2.0	660	19.9	6.7	4.69	1255	25.0	7.2	5.25	1850	28.4	7.1	5.12	2445	31.1	6.9	4.91
70	9.0	-1.9	0.64	665	19.9	6.7	4.70	1260	24.9	7.3	5.36	1855	28.5	7.0	5.07	2450	31.0	7.0	4.96
75	8.8	-1.1	0.78	670	20.0	6.7	4.71	1265	25.0	7.3	5.31	1860	28.6	7.0	5.01	2455	31.0	7.0	5.01
80	8.4	-0.2	0.97	675	20.1	6.7	4.71	1270	25.1	7.2	5.26	1865	28.5	7.1	5.17	2460	30.9	7.2	5.19
85	8.0	0.8	1.20	680	20.1	6.7	4.71	1275	25.3	7.0	5.05	1870	28.4	7.3	5.33	2465	31.1	6.9	4.95
90	9.2	1.1	1.29	685	20.1	6.8	4.79	1280	25.5	6.8	4.94	1875	28.4	7.2	5.28	2470	31.3	6.8	4.76
95	9.2	0.5	1.13	690	20.1	6.9	4.88	1285	25.4	7.0	4.97	1880	28.5	7.2	5.22	2475	31.4	6.7	4.69
100	10.6	-0.4	0.92	695	20.2	6.8	4.82	1290	25.3	7.1	5.10	1885	28.5	7.2	5.22	2480	31.3	6.8	4.79
110	12.6	-1.6	0.70	705	20.4	6.8	4.75	1300	25.2	7.3	5.33	1895	28.6	7.2	5.24	2490	31.1	7.0	4.99
120	13.9	-2.1	0.62	715	20.5	6.8	4.80	1310	25.5	7.1	5.09	1905	28.5	7.3	5.36	2500	30.9	7.2	5.27
125	14.2	-2.0	0.63	720	20.5	6.9	4.85	1315	25.6	7.2	5.23	1910	28.5	7.4	5.45	2505	31.1	7.1	5.15
130	14.2	-1.7	0.68	725	20.6	6.8	4.81	1320	25.3	7.3	5.36	1915	28.5	7.3	5.38	2510	31.0	7.2	5.22
140	13.4	-0.3	0.94	735	20.9	6.7	4.65	1330	25.6	7.0	5.06	1925	28.6	7.3	5.35	2520	31.2	7.0	5.05
150	12.9	0.8	1.21	745	21.0	6.6	4.59	1340	25.7	7.1	5.09	1935	28.5	7.4	5.54	2530	31.0	7.3	5.37
160	12.7	1.6	1.44	755	21.0	6.8	4.74	1350	25.7	7.1	5.09	1945	28.5	7.5	5.59	2540	31.2	7.1	5.08
165	2.0	2.0	1.59	760	21.0	6.8	4.73	1355	25.8	7.2	5.08	1950	28.5	7.4	5.48	2545	31.0	7.3	5.37
170	12.2	2.6	1.83	765	21.1	6.8	4.73	1360	25.9	6.9	4.95	1955	28.6	7.5	5.57	2550	31.0	7.3	5.39
175	11.8	3.3	2.13	770	21.3	6.7	4.64	1365	26.0	6.9	4.95	1960	28.6	7.5	5.65	2555	31.1	7.2	5.30
180	11.6	3.7	2.36	775	21.3	6.7	4.68	1370	26.0	7.0	4.96	1965	28.7	7.4	5.47	2560	31.0	7.4	5.47
185	11.5	4.0	2.54	780	21.3	6.7	4.72	1375	26.0	7.0	5.01	1970	28.9	7.2	5.29	2565	30.8	7.6	5.70
190	11.2	4.2	2.81	785	21.2	6.8	4.77	1380	26.1	7.0	5.03	1975	28.9	7.4	5.22	2570	31.2	7.3	5.37
200	13.1	3.2	2.07	795	21.4	6.8	4.79	1390	26.1	6.9	4.92	1985	29.1	7.1	5.11	2580	31.6	6.9	4.87
205	12.0	4.4	2.76	800	21.5	6.8	4.77	1395	26.2	6.9	4.94	1990	29.1	7.0	5.06	2585	31.6	6.8	4.79
210	11.0	5.6	3.66	805	21.6	6.7	4.71	1400	26.2	7.0	4.96	1995	29.1	7.1	5.09	2590	31.6	6.9	4.88
215	11.3	5.6	3.69	810	21.7	6.7	4.65	1405	26.1	7.0	4.92	2000	29.1	7.1	5.11	2595	31.5	7.0	4.97
220	11.6	5.5	3.52	815	21.7	6.7	4.72	1410	26.1	7.1	5.09	2005	29.5	7.1	5.16	2600	31.6	6.9	4.86
225	11.7	5.5	3.55	820	21.7	6.8	4.80	1415	26.2	7.0	5.02	2010	29.1	7.1	5.15	2605	31.3	7.2	5.30
230	11.9	5.5	3.57	825	21.7	6.8	4.82	1420	26.3	7.0	4.96	2015	29.2	7.1	5.13	2610	31.4	7.1	5.15
235	12.1	5.5	3.56	830	21.7	6.9	4.85	1425	26.2	7.1	5.10	2020	29.2	7.1	5.18	2615	31.7	6.9	4.88
240	12.3	5.5	3.54	835	21.8	6.8	4.82	1430	26.1	7.2	5.25	2025	29.3	7.1	5.08	2620	31.8	7.0	4.97
245	12.3	5.7	3.71	840	21.9	6.8	4.80	1435	26.1	7.2	5.24	2030	29.3	7.0	5.05	2625	31.4	7.1	5.17
250	12.3	5.9	3.88	845	21.9	6.8	4.83	1440	26.2	7.2	5.24	2035	29.3	7.1	5.07	2630	31.6	7.0	5.00
255	12.5	5.9	3.85	850	22.0	6.8	4.86	1445	26.3	7.1	5.11	2040	29.3	7.1	5.13	2635	31.6	6.8	4.82
260	12.7	5.8	3.83	855	22.0	6.8	4.80	1450	26.5	7.0	4.98	2045	29.2	7.2	5.23	2640	31.7	7.0	4.98
265	13.2	5.5	3.54	860	22.1	6.8	4.74	1455	26.4	7.1	5.07	2050	29.2	7.2	5.27	2645	31.7	6.9	4.93
270	13.7	5.2	3.27	865	22.0	6.9	4.92	1460	26.4	7.1	5.17	2055	29.3	7.2	5.21	2650	31.8	6.9	4.85
275	13.7	5.3	3.39	870	21.9	7.1	5.11	1465	26.4	7.2	5.19	2060	29.5	7.0	5.02	2655	31.8	6.9	4.85
280	13.7	5.4	3.50	875	22.0	7.1	5.08	1470	26.4	7.2	5.22	2065	29.4	7.1	5.08	2660	31.7	7.0	5.02
285	13.6	5.6	3.61	880	22.0	7.0	5.05	1475	26.4	7.1	5.11	2070	29.4	7.1	5.10	2665	31.6	6.7	4.71
290	13.7	5.7	3.72	885	22.1	7.0	5.06	1480	26.5	7.1	5.12	2075	29.5	7.0	5.10	2670	32.0	6.7	4.67
295	13.8	5.8	3.77	890	22.1	7.0	5.06	1485	26.5	7.1	5.14	2080	29.8	6.8	4.76	2675	31.9	6.8	4.81
300	13.9	5.8	3.81	895	22.2	7.1	5.09	1490	26.5	7.1	5.17	2085	29.7	6.9	4.89	2680	31.7	7.0	5.04
305	14.0	5.9	3.85	900	22.2	7.1	5.12	1495	26.5	7.2	5.24	2090	29.7	6.9	4.86	2685	31.9	6.8	4.83
310	14.1	5.9	3.88	905	22.3	7.1	5.09	1500	26.5	7.2	5.31	2095	29.8	6.8	4.78	2690	32.1	6.7	4.72
315	14.3	5.9	3.89	910	22.3	7.0	5.05	1505	26.5	7.2	5.27	2100	29.9	6.8	4.75	2695	32.1	6.7	4.71
320	14.4	5.9	3.90	915	22.4	7.0	4.99	1510	26.6	7.2	5.23	2105	29.8	6.8	4.81	2700	32.0	6.8	4.81
325	14.5	5.9	3.92	920	22.6	6.9	4.92	1515	26.6	7.2	5.20	2110	29.9	6.8	4.76	2705	32.0	6.8	4.80
330	14.6	5.9	3.93	925	22.7	6.9	4.85	1520	26.5	7.3	5.38	2115	29.9	6.8	4.76	2710	32.1	6.8	4.79
335	14.7	6.0	4.02	930	22.8	6.8	4.77	1525	26.6	7.3	5.37	2120	29.9	6.8	4.84	2715	32.1	6.7	4.71
340	14.7	6.2	4.12	935	22.8	6.8	4.83	1530	26.6	7.3	5.38	2125	29.9	6.9	4.89	2720	32.4	6.5	4.47
345	14.8	6.1	4.06	940	22.9	6.8	4.89	1535	26.6	7.4	5.44	2130	29.9	6.8	4.90	2725	32.2	6.7	4.63
350	15.1	6.0	3.99	945	22.8	6.9	4.87	1540	26.5	7.4	5.53	2135	29.8	6.9	4.94	2730	31.9	7.0	5.05
355	15.3	5.9	3.88	950	22.9	6.9	4.85	1545	26.5	7.5	5.58	2140	29.8	7.1	5.08	2735	31.6	7.4	5.44
360	15.6	5.8	3.78	955	23.0	6.8	4.81	1550	26.5	7.5	5.63	2145	29.9	6.9	4.92	2740	31.6	7.1	5.46
365	15.5	5.9	3.89	960	23.1	6.8	4.77	1555	26.7	7.3	5.39	2150	29.9	7.0	4.98	2745	31.9	7.0	5.06
370	15.5	6.0	4.01	965	23.1	6.7	4.73	1560	26.9	7.1	5.16	2155	29.8	7.1	5.10	2750	32.0	6.9	4.94
375	15.6	6.1	4.03	970	23.2	6.7	4.69	1565	26.9	7.2	5.23	2160	29.8	7.1	5.09	2755	32.0	7.0	4.98
380	15.7	6.1	4.05	975	23.2	6.8	4.82	1570	26.9	7.2	5.30	2165	29.9	7.0	5.00	2760	32.0	7.0	5.06
385	15.7	6.2	4.15	980	23.5	6.6	4.54	1575	27.0	7.2	5.23	2170	29.9	7.1	5.07	2765	32.2	6.8	4.80
390	15.7	6.3	4.25																

**Cable loss**  
Cable Coaxial, GORE A2P01POL118, 2.3 m, model:GORE-3, HL 0589  
+ Cable Coaxial, ANDREW PSWJ4, 6m, model: ANDREW-6, HL 1004

No.	Frequency, MHz	Cable loss, dB	Tolerance (Specification), dB	Measurement uncertainty, dB
1	30	0.33	≤ 6.5	±0.12
2	50	0.40		
3	100	0.57		
4	300	0.97		
5	500	1.25		
6	800	1.59		
7	1000	1.81		
8	1200	1.97		
9	1400	2.15		
10	1600	2.28		
11	1800	2.43		
12	2000	2.61		
13	2200	2.75		
14	2400	2.89		
15	2600	2.97		
16	2800	3.21	≤ 6.5	±0.12
17	3000	3.32		
18	3300	3.47		
19	3600	3.62		
20	3900	3.84		
21	4200	3.92		
22	4500	4.07		
23	4800	4.36		
24	5100	4.62		
25	5400	4.78		
26	5700	5.16		
27	6000	5.67		
28	6500	5.99		±0.17



**Cable loss**  
**Cable coaxial, 6 m, model: M17/167 MIL-C-17, HL 1502**

Frequency, MHz	Cable loss, dB
0.1	0.02
1	0.07
3	0.15
5	0.17
10	0.26
30	0.43
50	0.57
80	0.72
100	0.81
300	1.48
500	2.00
800	2.70
1000	3.09

**Cable loss**  
**Cable M17/167 MIL-C-17, HL 1510**

No.	Frequency, MHz	Cable loss, dB
1	0.1	0.05
2	1	0.09
3	3	0.16
4	5	0.18
5	10	0.27
6	30	0.44
7	50	0.58
8	80	0.69
9	100	0.82
10	300	1.48
11	500	2.01
12	800	2.65
13	1000	3.12



**Cable loss**  
Cable RF, 2m, model: Sucoflex 104PE, S/N 13094/4PE, HL 1566

No.	Frequency, MHz	Cable loss, dB	Tolerance, dB	Measurement uncertainty, dB
1	30	0.10	≤ 5.0	±0.12
2	50	0.13		
3	100	0.20		
4	300	0.33		
5	500	0.45		
6	800	0.60		
7	1000	0.65		
8	1500	0.91		
9	2000	1.08		
10	2500	1.19		
11	3000	1.28		
12	3500	1.49		
13	4000	1.63		
14	4500	1.63	≤ 5.0	±0.17
15	5000	1.66		
16	5500	1.88		
17	6000	1.96		
18	6500	1.93		
19	7000	2.07		
20	7500	2.37		
21	8000	2.34		
22	8500	2.64		
23	9000	2.68		
24	9500	2.64		
25	10000	2.70		
26	10500	2.84		
27	11000	2.88	≤ 5.0	±0.26
28	11500	3.19		
29	12000	3.15		
30	12500	3.20		
31	13000	3.22		
32	13500	3.47		
33	14000	3.41		
34	14500	3.59		
35	15000	3.79		
36	15500	4.24		
37	16000	4.12		
38	16500	4.46		
39	17000	4.50		
40	17500	4.49		
41	18000	4.45		

**Cable loss**  
**Cable 18 GHz, 6.5 m, blue, model: NPS-1803A-6500-NPS, S/N T4974, HL 1947**

Frequency, GHz	Cable loss, dB
0.03	0.30
0.05	0.38
0.10	0.53
0.20	0.74
0.30	0.91
0.40	1.05
0.50	1.18
0.60	1.29
0.70	1.40
0.80	1.50
0.90	1.59
1.00	1.68
1.10	1.77
1.20	1.86
1.30	1.94
1.40	2.01
1.50	2.08
1.60	2.16
1.70	2.22
1.80	2.29
1.90	2.36
2.00	2.42
2.10	2.48
2.20	2.54
2.30	2.60
2.40	2.66
2.50	2.71
2.60	2.77
2.70	2.83
2.80	2.89
2.90	2.95
3.10	3.06
3.30	3.17
3.50	3.28
3.70	3.39
3.90	3.51
4.10	3.62
4.30	3.76
4.50	3.87
4.70	4.01
4.90	4.10
5.10	4.21
5.30	4.31
5.50	4.43
5.70	4.56
5.90	4.71

Frequency, GHz	Cable loss, dB
6.10	4.87
6.30	4.95
6.50	4.94
6.70	4.88
6.90	4.87
7.10	4.83
7.30	4.85
7.50	4.86
7.70	4.91
7.90	4.96
8.10	5.03
8.30	5.08
8.50	5.13
8.70	5.21
8.90	5.22
9.10	5.34
9.30	5.35
9.50	5.52
9.70	5.51
9.90	5.66
10.10	5.70
10.30	5.78
10.50	5.79
10.70	5.82
10.90	5.86
11.10	5.94
11.30	6.06
11.50	6.21
11.70	6.44
11.90	6.61
12.10	6.76
12.40	6.68
13.00	6.66
13.50	6.81
14.00	6.90
14.50	6.90
15.00	6.97
15.50	7.17
16.00	7.28
16.50	7.27
17.00	7.38
17.50	7.68
18.00	7.92





**Cable loss**  
**RF cable 8 m, model RG-214, HL 2009**

No.	Frequency, MHz	Cable loss, dB	Tolerance (Specification), dB	Measurement uncertainty, dB
1	1	0.10	NA	±0.12
2	10	0.14		
3	30	0.25		
4	50	0.34		
5	100	0.53		
6	300	0.99		
7	500	1.31		
8	800	1.73		
9	1000	1.98		
10	1100	2.11		
11	1200	2.21		
12	1300	2.35		
13	1400	2.46		
14	1500	2.55		
15	1600	2.68		
16	1700	2.78		
17	1800	2.88		
18	1900	2.98		
19	2000	3.09		

**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, 40GHz, 1.5 m, green, Rhophase Microwave Limited, model: KPS-1503A-1500-KPS, HL 2400**

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
0.03	0.06	6.5	1.46	15.50	2.34
0.05	0.08	6.7	1.49	16.00	2.34
0.1	0.15	6.9	1.50	16.50	2.40
0.2	0.23	7.1	1.51	17.00	2.46
0.3	0.29	7.3	1.55	17.50	2.54
0.5	0.37	7.5	1.56	18.00	2.61
0.7	0.46	7.7	1.58	18.50	2.59
0.9	0.53	7.9	1.60	19.00	2.59
1.1	0.58	8.1	1.61	19.50	2.67
1.3	0.65	8.3	1.68	20.00	2.62
1.5	0.66	8.5	1.68	20.50	2.73
1.7	0.72	8.7	1.75	21.00	2.71
1.9	0.76	8.9	1.74	21.50	2.78
2.1	0.79	9.1	1.81	22.00	2.83
2.3	0.85	9.3	1.79	22.50	2.81
2.5	0.90	9.5	1.86	23.50	2.91
2.7	0.91	9.7	1.85	24.00	2.97
2.9	0.97	9.9	1.87	24.50	2.98
3.1	0.97	10.1	1.88	25.00	2.97
3.3	1.03	10.30	1.82	25.50	3.03
3.5	1.06	10.50	1.92	26.00	3.04
3.7	1.10	10.70	1.86	26.50	3.11
3.9	1.13	10.90	1.96	27.00	2.97
4.1	1.16	11.10	1.90	28.00	3.15
4.3	1.18	11.30	1.99	29.00	3.07
4.5	1.21	11.50	1.95	30.00	3.13
4.7	1.23	11.70	2.00	31.00	3.13
4.9	1.26	11.90	2.01	32.00	3.18
5.1	1.28	12.10	1.99	33.00	3.31
5.3	1.31	12.40	2.06	34.00	3.32
5.5	1.32	13.00	2.11	35.00	3.37
5.7	1.36	13.50	2.17	36.00	3.36
5.9	1.37	14.00	2.36	37.00	3.46
6.1	1.38	14.50	2.32	39.00	3.49
6.3	1.44	15.00	2.30	40.00	3.52



**Cable loss**  
**Cable coaxial, Gore, 18 GHz, 1.1 m, SMA - SMA, model Right Angle, S/N 91P72071**  
**HL 2869**

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
10	0.06	5750	0.87	12000	1.30
30	0.06	6000	0.87	12250	1.33
100	0.10	6250	0.89	12500	1.35
250	0.18	6500	0.92	12750	1.36
500	0.25	6750	0.94	13000	1.38
750	0.27	7000	0.98	13250	1.41
1000	0.34	7250	0.99	13500	1.39
1250	0.35	7500	1.02	13750	1.41
1500	0.42	7750	1.03	14000	1.42
1750	0.44	8000	1.04	14250	1.46
2000	0.49	8250	1.04	14500	1.39
2250	0.52	8500	1.08	14750	1.46
2500	0.55	8750	1.08	15000	1.40
2750	0.59	9000	1.12	15250	1.47
3000	0.61	9250	1.12	15500	1.36
3250	0.64	9500	1.15	15750	1.49
3500	0.67	9750	1.14	16000	1.51
3750	0.69	10000	1.19	16250	1.60
4000	0.70	10250	1.20	16500	1.56
4250	0.74	10500	1.23	16750	1.66
4500	0.76	10750	1.24	17000	1.71
4750	0.77	11000	1.24	17250	1.78
5000	0.79	11250	1.25	17500	1.75
5250	0.82	11500	1.28	17750	1.77
5500	0.84	11750	1.29	18000	1.86

**Cable loss**  
**Cable coaxial, Gore, 18 GHz, 3m, SMA-SMA, S/N 989370**  
**HL 2910**

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
10	0.07	5750	2.97	12000	5.05
30	0.19	6000	2.91	12250	4.44
100	0.36	6250	3.23	12500	4.82
250	0.53	6500	3.42	12750	5.22
500	0.77	6750	3.17	13000	5.02
750	0.94	7000	3.56	13250	5.00
1000	1.10	7250	3.77	13500	5.09
1250	1.19	7500	3.48	13750	4.70
1500	1.35	7750	3.81	14000	5.03
1750	1.51	8000	3.82	14250	5.17
2000	1.57	8250	3.62	14500	4.92
2250	1.69	8500	3.95	14750	4.91
2500	1.76	8750	4.00	15000	5.03
2750	1.83	9000	3.80	15250	4.93
3000	2.02	9250	4.09	15500	5.28
3250	2.17	9500	4.12	15750	5.60
3500	2.13	9750	4.11	16000	5.16
3750	2.23	10000	4.36	16250	5.45
4000	2.40	10250	4.75	16500	5.78
4250	2.31	10500	4.61	16750	5.47
4500	2.52	10750	4.26	17000	5.21
4750	2.77	11000	4.62	17250	5.53
5000	2.82	11250	4.55	17500	5.53
5250	2.77	11500	4.59	17750	5.71
5500	3.04	11750	5.20	18000	5.77



**Cable loss**  
**Cable coaxial, Gore, 18 GHz, 1.5 m, SMA-SMA, S/N 91P72067**  
**HL 2912**

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
10	0.07	5750	1.56	12000	2.23
30	0.10	6000	1.48	12250	2.14
100	0.17	6250	1.55	12500	2.19
250	0.28	6500	1.52	12750	2.14
500	0.43	6750	1.57	13000	2.24
750	0.52	7000	1.59	13250	2.19
1000	0.59	7250	1.64	13500	2.24
1250	0.66	7500	1.66	13750	2.14
1500	0.72	7750	1.78	14000	2.29
1750	0.81	8000	1.87	14250	2.41
2000	0.82	8250	1.78	14500	2.48
2250	0.94	8500	1.79	14750	2.31
2500	0.94	8750	1.88	15000	2.45
2750	0.99	9000	2.01	15250	2.55
3000	1.03	9250	1.90	15500	2.75
3250	1.15	9500	1.90	15750	2.75
3500	1.13	9750	1.90	16000	2.68
3750	1.17	10000	2.03	16250	2.73
4000	1.19	10250	2.04	16500	2.82
4250	1.31	10500	2.26	16750	2.79
4500	1.24	10750	2.09	17000	2.87
4750	1.30	11000	2.05	17250	2.80
5000	1.31	11250	2.15	17500	2.90
5250	1.41	11500	2.34	17750	2.82
5500	1.41	11750	2.34	18000	2.90

## 14 APPENDIX F Abbreviations and acronyms

A	ampere
AC	alternating current
AM	amplitude modulation
AVRG	average (detector)
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
DTS	digital transmission system
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
ITE	information technology equipment
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
OATS	open area test site
$\Omega$	Ohm
PM	pulse modulation
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