

TEST REPORT

ACCORDING TO: FCC CFR 47 PART 15 SUBPART C, section 15.245

FOR:

CROW Electronic Engineering Ltd.

PIR & MW Detector

Models: LC-104-PIMW (Form A)

LC-124-PIMW (Form C)

This report is in conformity with ISO/IEC 17025. The A2LA logo endorsement applies only to the test methods and the standards 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: CROW Electronic Engineering Ltd.
Address: P.O.Box 293, Ben Gurion Airport, Airport City, 70100, Israel
Telephone: +972 3972 6000
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E-mail: shukis@crow.co.il
Contact name: Mr. Shuki Segal

2 Equipment under test attributes

Product name: Detector
Product type: Transceiver
Model(s): LC-124-PIMW (Form C)
Serial number: 88030094
Receipt date: 11/24/2006

3 Manufacturer information

Manufacturer name: CROW Electronic Engineering Ltd.
Address: P.O.Box 293, Ben Gurion Airport, Airport City, 70100, Israel
Telephone: +972 3972 6000
Fax: +972 3972 6001
E-Mail: shukis@crow.co.il
Contact name: Mr. Shuki Segal




4 Test details

Project ID: 17546
Location: Hermon Laboratories Ltd. P.O.Box 23, Binyamina 30550, Israel
Test started: 11/24/2006
Test completed: 11/29/2006
Test specification(s): FCC Part 15, subpart C, §15.245
Test suite: FCC 15.245_10.5GHz (11/19/2006, modified)

5 Tests summary

Test	Status
Transmitter characteristics	
Section 15.245(b), Field strength of emissions	Pass
Section 15.245(b)(3), Band edge emissions	Pass
Section 15.207(a), Conducted emission	Not required
Section 15.203, Antenna requirement	Pass

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

	Name and Title	Date	Signature
Tested by:	Mr. A. Lane, test engineer	November 29, 2006	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	December 3, 2006	
Approved by:	Mr. M. Nikishin, EMC and radio group leader	December 3, 2006	

6 EUT description

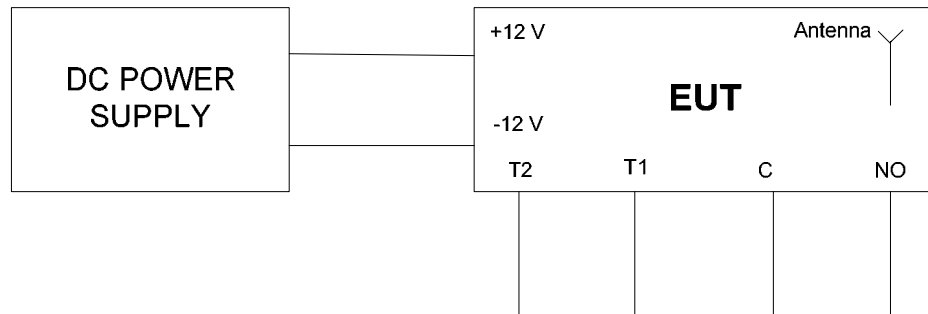
6.1 General information

The EUT is a PIR & MW 10.525 GHz detector (transceiver) operating at 10.525 MHz and used as field disturbance sensor.

6.2 Ports and lines

Port type	Port description	Connected		Connector type	Qty.	Cable type	Cable length	Indoor / outdoor
		From	To					
Power In	+ 12VDC	EUT	Power supply	Terminal Block	1	unshielded	2 m	Indoor
Power In	- 12VDC	EUT	Power supply			unshielded	2 m	Indoor
Signal Out	T1 - Tamper switch out	EUT	Open circuit	Terminal Block	1	unshielded	2 m	indoor
Signal Out	T2 - Tamper switch out	EUT	Open circuit			unshielded	2 m	indoor
Signal Out	C - Alarm relay out	EUT	Open circuit			unshielded	2 m	Indoor
Signal Out	NO - Trouble relay out	EUT	Open circuit			unshielded	2 m	Indoor

6.3 Test configuration



6.4 Transmitter characteristics

Type of equipment				
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)			
Intended use		Condition of use		
	fixed	Always at a distance more than 2 m from all people		
X	mobile	Always at a distance more than 20 cm from all people		
	portable	May operate at a distance closer than 20 cm to human body		
Assigned frequency range		10500 - 10550 MHz		
Operating frequency range		10525 MHz		
Maximum rated output power		At transmitter 50 Ω RF output connector	dBm	
		Effective radiated power (for equipment with no RF connector)	12.3 dBm	
Is transmitter output power variable?	X	No		
		Yes	continuous variable	
			stepped variable with stepsize	dB
			minimum RF power	dBm
		maximum RF power	dBm	
Antenna connection				
unique coupling	standard connector	X	integral	
			with temporary RF connector	
			X without temporary RF connector	
Transmitter duty cycle supplied for test		100%		
Transmitter power source				
DC	Nominal rated voltage	12 VDC		

Test specification: Section 15.245(b), Field strength of emissions			
Test procedure: ANSI C63.4, Section 13.1.4			
Test mode: Compliance	Verdict: PASS		
Date & Time: 11/26/2006 3:58:16 PM			
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

7 Transmitter tests according to 47CFR part 15 subpart C requirements

7.1 Field strength of emissions

7.1.1 General

This test was performed to measure field strength of fundamental and spurious emissions from the EUT. Specification test limits are given in Table 7.1.1 and Table 7.1.2.

Table 7.1.1 Radiated fundamental emission limits

Fundamental frequency, MHz	Field strength at 3 m, dB(μV/m)	
	Peak	Average
10500 – 10550	148.0	128.0

Table 7.1.2 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m, dB(μV/m)*				
	Within restricted bands			Harmonics outside restricted bands	
	Peak	Quasi Peak	Average	Peak	Average
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**	108.0	88.0
0.090 – 0.110	NA	108.5 – 106.8**	NA		
0.110 – 0.490	126.8 – 113.8	NA	106.8 – 93.8**		
0.490 – 1.705	NA	73.8 – 63.0**	NA		
1.705 – 30.0*		69.5			
30 – 88		40.0			
88 – 216		43.5			
216 – 960		46.0			
960 - 1000		54.0			
1000 – 17700		74.0			
Above 17700	108.0 (sensors within building) 97.5 (all other sensors)	NA	88.0 (sensors within building) 77.5 (all other sensors)		

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

$$\text{Lim}_{S_2} = \text{Lim}_{S_1} + 40 \log(S_1/S_2),$$

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

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

Note: The above field strength limits applied from the lowest radio frequency generated in the device, without going below 9 kHz up to the tenth harmonic of the highest fundamental frequency but not exceeding 40 GHz for intentional radiators operated below 10 GHz and up to the fifth harmonic of the highest fundamental frequency but not exceeding 100 GHz for intentional radiators operated above 10 GHz.

Test specification:		Section 15.245(b), Field strength of emissions	
Test procedure:		ANSI C63.4, Section 13.1.4	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

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

7.1.2.1 The EUT was set up as shown in Figure 7.1.1, energized and the performance check was conducted.

7.1.2.2 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.

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

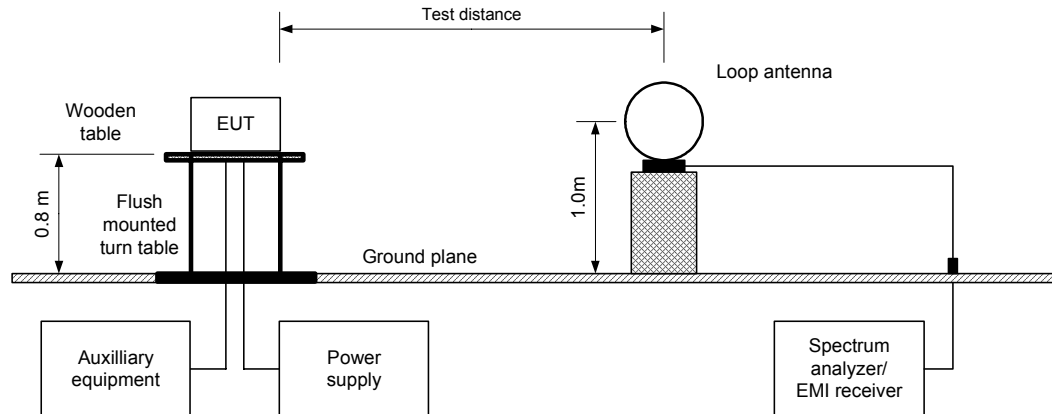
7.1.3 Test procedure for spurious emission field strength measurements above 30 MHz

7.1.3.1 The EUT was set up as shown in Figure 7.1.2, energized and the performance check was conducted.

7.1.3.2 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.

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

Figure 7.1.1 Setup for spurious emission field strength measurements below 30 MHz

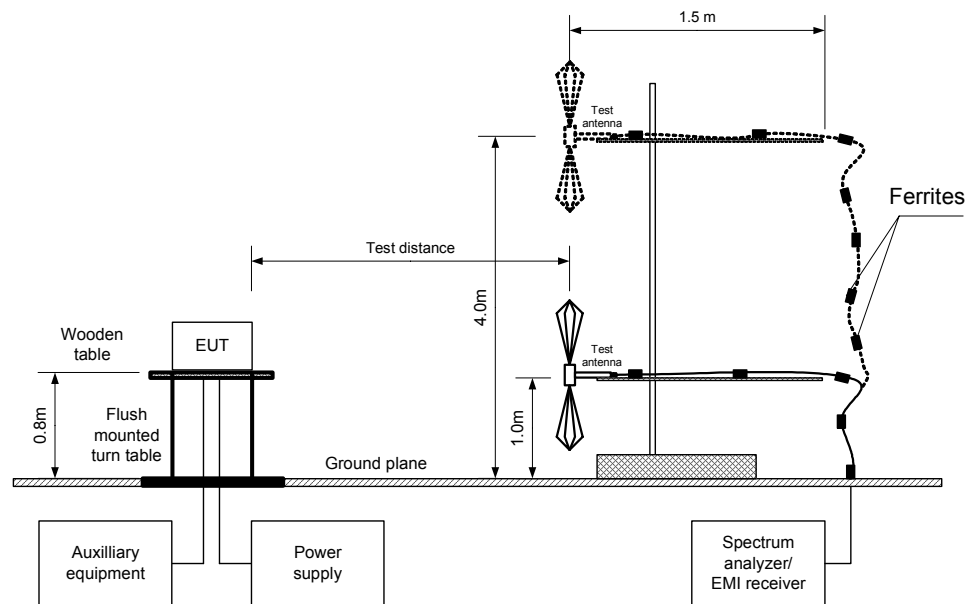


Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Photograph 7.1.1 Setup for spurious emission field strength measurements below 30 MHz



Figure 7.1.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Photograph 7.1.2 Setup for spurious emission field strength measurements from 30 to 1000 MHz



Photograph 7.1.3 Setup for spurious emission field strength measurements from 1 to 18 GHz



Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Photograph 7.1.4 Setup for spurious emission field strength measurements from 18 to 26.5 GHz



Photograph 7.1.5 Setup for spurious emission field strength measurements from 26.5 to 40 GHz



Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Photograph 7.1.6 Setup for spurious emission field strength measurements above 40 GHz



Test specification:		Section 15.245(b), Field strength of emissions	
Test procedure:		ANSI C63.4, Section 13.1.4	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Table 7.1.3 Field strength of fundamental emission, spurious emissions outside restricted bands and within restricted bands at frequencies above 1 GHz

TEST DISTANCE: 3 m
 EUT POSITION: Typical (Vertical)
 MODULATION: OOK
 MODULATING SIGNAL: ID code
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 INVESTIGATED FREQUENCY RANGE: 0.009 -60000 MHz
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 0.2 kHz (9 kHz – 150 kHz)
 9.0 kHz (150 kHz – 30 MHz)
 120 kHz (30 MHz – 1000 MHz)
 1.0 MHz (above 1000 MHz)
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
 Biconilog (30 MHz – 1000 MHz)
 Double ridged guide (above 1000 MHz)

F, MHz	Antenna		Azimuth, degrees*	Peak field strength			Avr factor, dB	Average field strength			Verdict
	Pol.	Height, m		Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**		Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
Fundamental emission											
10524.4	H	1.2	20	107.50	148	-40.5	-12.5	95.0	128	-33.0	Pass
Spurious emissions											
21049.1	H	1.2	60	63.17	108	-44.83	-12.5	50.67	88	-37.33	Pass
31573.5	H	1.2	60	68.50	108	-39.5	-12.5	56.0	88	-32.0	

*- EUT front panel refers to 0 degrees position of turntable.
 **- Margin = dB below (negative if above) specification limit.

Table 7.1.4 Average factor calculation

Transmission pulse		Average factor, dB
Duration, ms	Period, ms	
20.4	86	-12.5

*- Average factor was calculated as follows:

$$\text{Average factor} = 20 \times \log_{10} \left(\frac{20.4}{86} \right) = -12.5$$

Test specification: Section 15.245(b), Field strength of emissions			
Test procedure: ANSI C63.4, Section 13.1.4			
Test mode: Compliance	Verdict: PASS		
Date & Time: 11/26/2006 3:58:16 PM			
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Table 7.1.5 Field strength of emissions below 1 GHz within restricted bands

TEST DISTANCE: 3 m
 EUT POSITION: Typical (Vertical)
 MODULATION: OOK
 MODULATING SIGNAL: ID code
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 0.2 kHz (9 kHz – 150 kHz)
 9.0 kHz (150 kHz – 30 MHz)
 120 kHz (30 MHz – 1000 MHz)
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
 Biconilog (30 MHz – 1000 MHz)

Frequency, MHz	Peak emission, dB(μV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*				
No spurious were found								Pass

*- Margin = Measured emission - specification limit.

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

Table 7.1.6 Restricted bands

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

Reference numbers of test equipment used

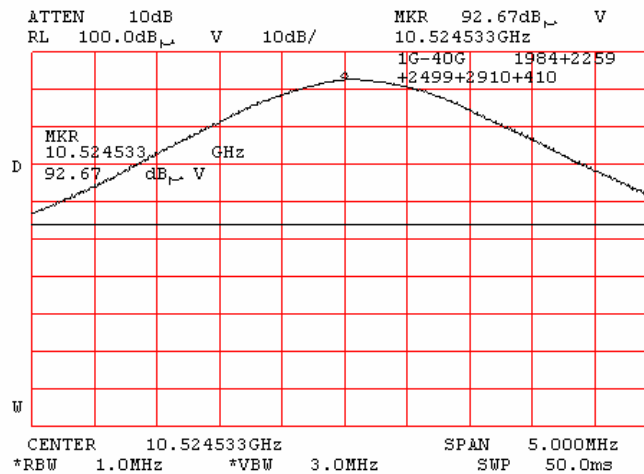
HL 0446	HL 0521	HL 0768	HL 0769	HL 0770	HL 1424	HL 1826	HL 1849
HL 1850	HL 1947	HL 1984	HL 2009	HL 2254	HL 2399	HL 2697	

Full description is given in Appendix A.

Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

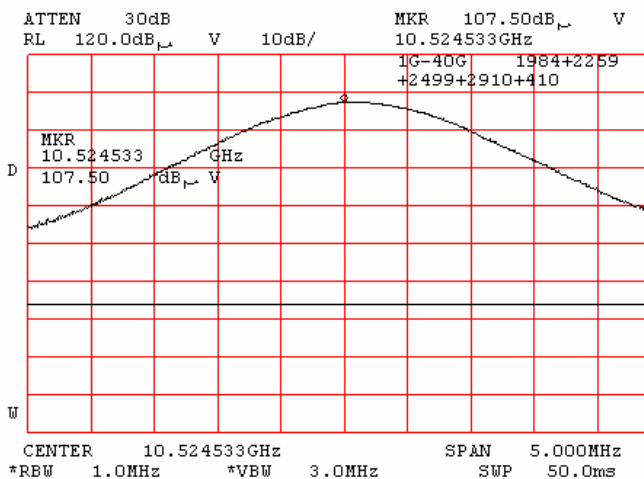
Plot 7.1.1 Radiated emission measurements at the fundamental frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical
 EUT POSITION: Typical (Vertical)



Plot 7.1.2 Radiated emission measurements at the fundamental frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: horizontal
 EUT POSITION: Typical (Vertical)



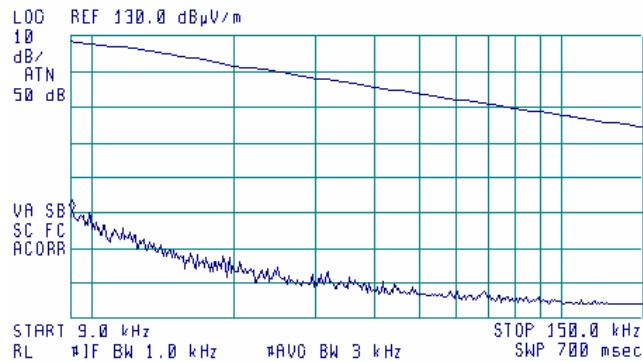
Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Plot 7.1.3 Radiated emission measurements from 9 to 150 kHz

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
EUT POSITION: Typical (Vertical)

15:34:16 24 NOV 2006

ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 9.1 kHz
80.52 dBμV/m

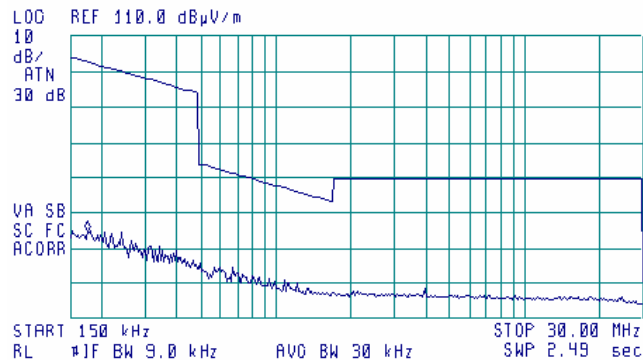


Plot 7.1.4 Radiated emission measurements from 0.15 to 30 MHz

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
EUT POSITION: Typical (Vertical)

15:37:57 24 NOV 2006

ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 180 kHz
54.72 dBμV/m

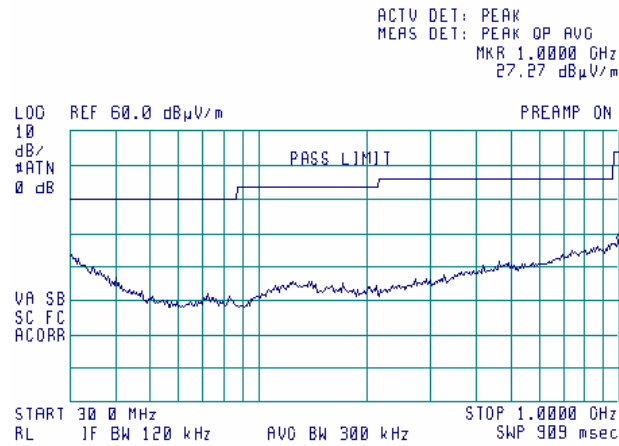


Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Plot 7.1.5 Radiated emission measurements from 30 to 1000 MHz

TEST SITE: Anechoic chamber
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Vertical)

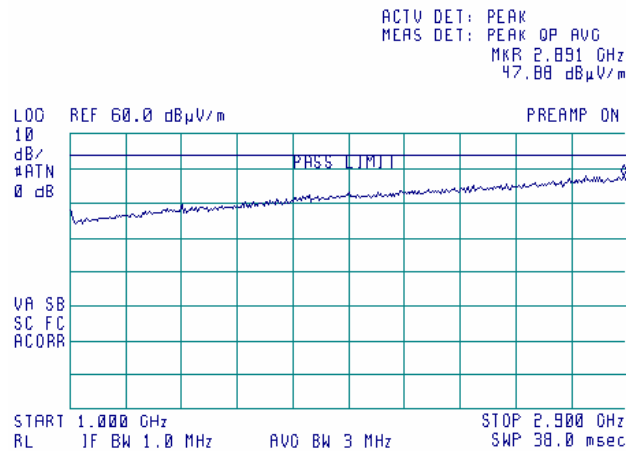
15:17:46 24 NOV 2006



Plot 7.1.6 Radiated emission measurements from 1.0 to 2.9 MHz

TEST SITE: Anechoic chamber
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Vertical)

15:14:40 24 NOV 2006



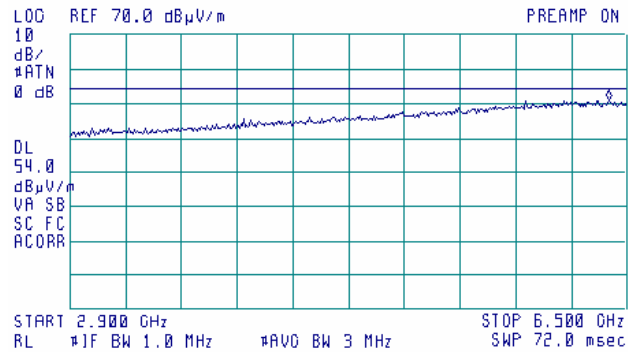
Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Plot 7.1.7 Radiated emission measurements from 2.9 to 6.5 GHz

TEST SITE: Semi anechoic chamber
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Vertical)

09:31:07 NOV 27, 2006

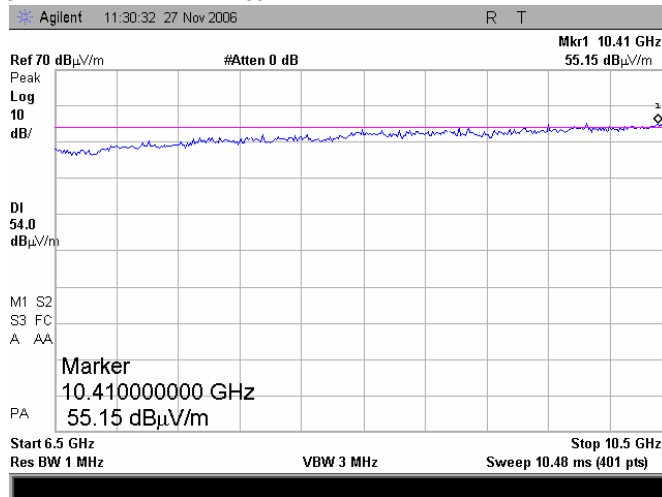
ACTV DET: PEAK
 MEAS DET: PEAK OP AVG
 MKR 6.383 GHz
 50.82 dB μ V/m



Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

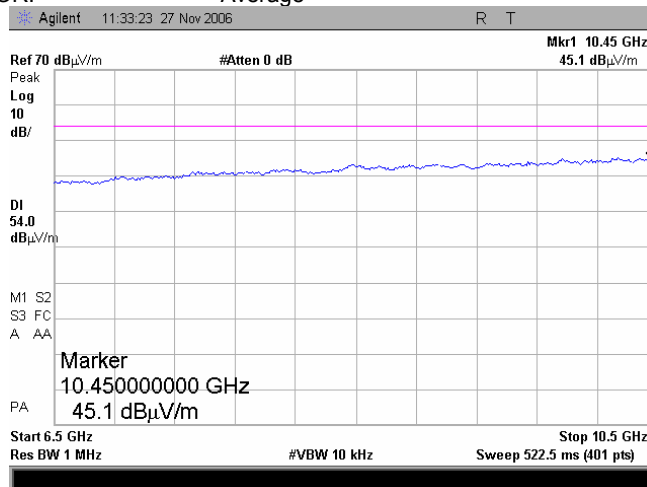
Plot 7.1.8 Radiated emission measurements from 6.5 to 10.5 GHz

TEST SITE: Semi anechoic chamber
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Vertical)
 DETECTOR: Peak



Plot 7.1.9 Radiated emission measurements from 6.5 to 10.5 GHz

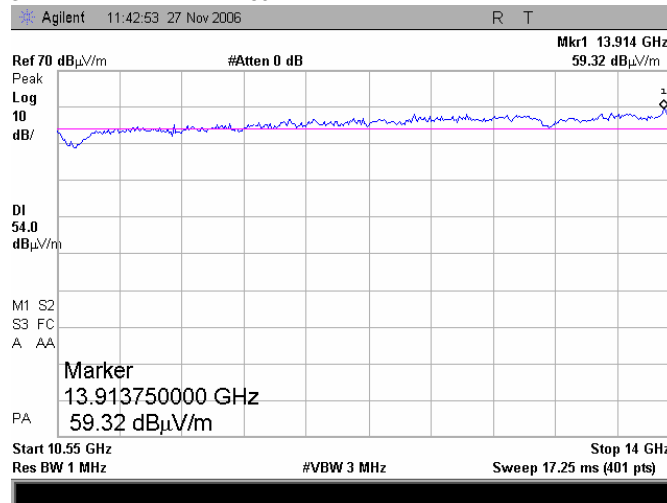
TEST SITE: Semi anechoic chamber
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Vertical)
 DETECTOR: Average



Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

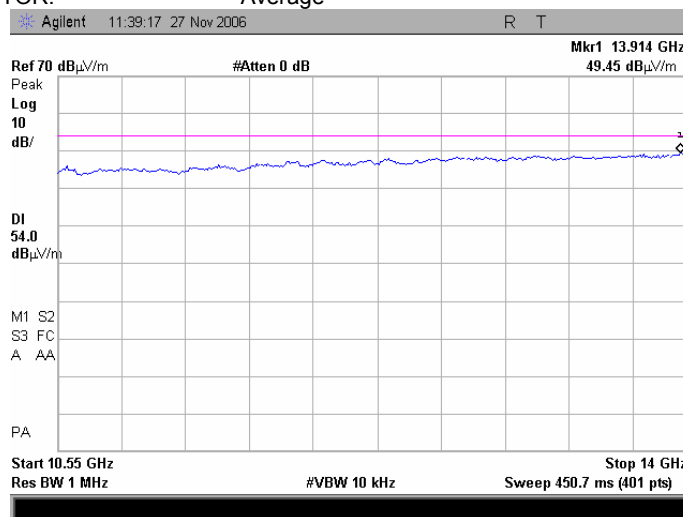
Plot 7.1.10 Radiated emission measurements from 10.55 to 14.0 GHz

TEST SITE: Semi anechoic chamber
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Vertical)
 DETECTOR: Peak



Plot 7.1.11 Radiated emission measurements from 10.55 to 14.0 GHz

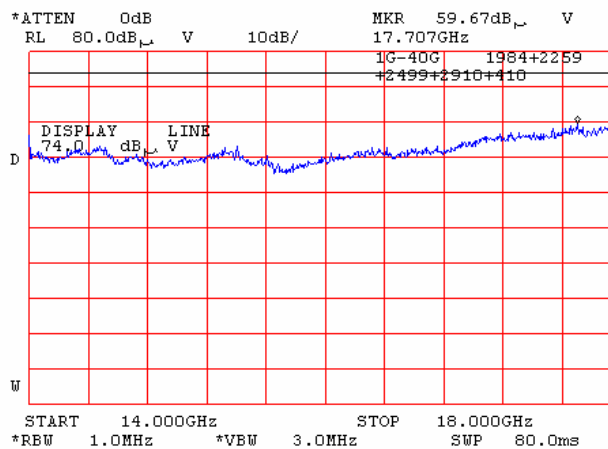
TEST SITE: Semi anechoic chamber
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Vertical)
 DETECTOR: Average



Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

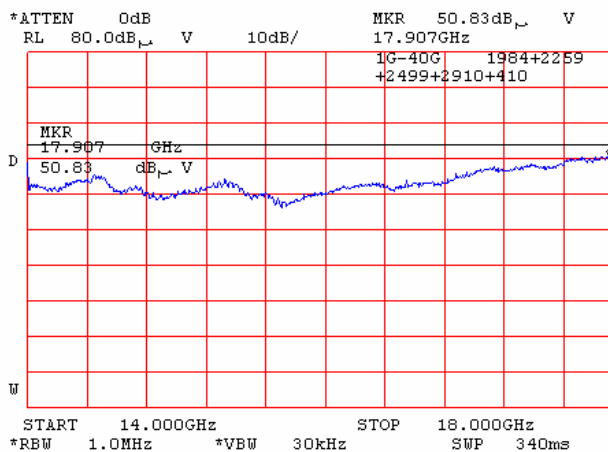
Plot 7.1.12 Radiated emission measurements from 14.0 to 18.0 GHz

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical & horizontal
 EUT POSITION: Typical (Vertical)
 DETECTOR: Peak



Plot 7.1.13 Radiated emission measurements from 14.0 to 18.0 GHz

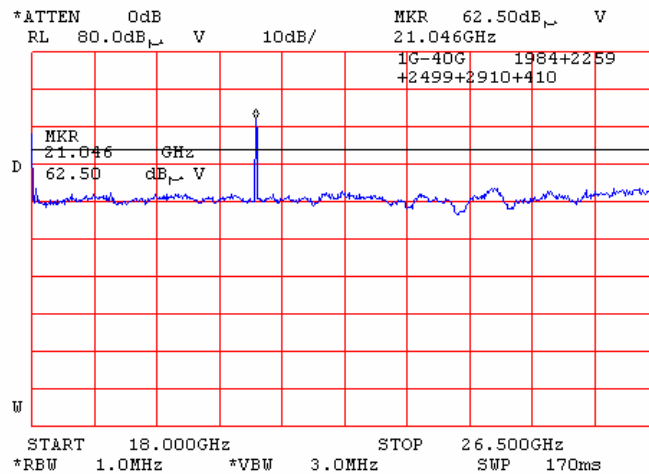
TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical & horizontal
 EUT POSITION: Typical (Vertical)
 DETECTOR: Average



Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

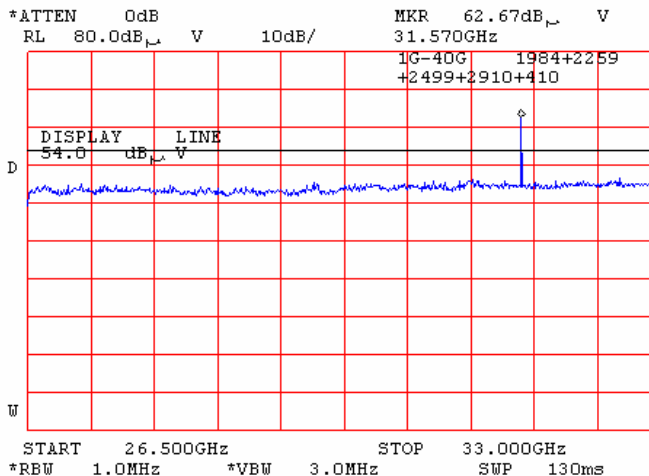
Plot 7.1.14 Radiated emission measurements from 18.0 to 26.5 GHz

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical & horizontal
 EUT POSITION: Typical (Vertical)



Plot 7.1.15 Radiated emission measurements from 26.5 to 33.0 GHz

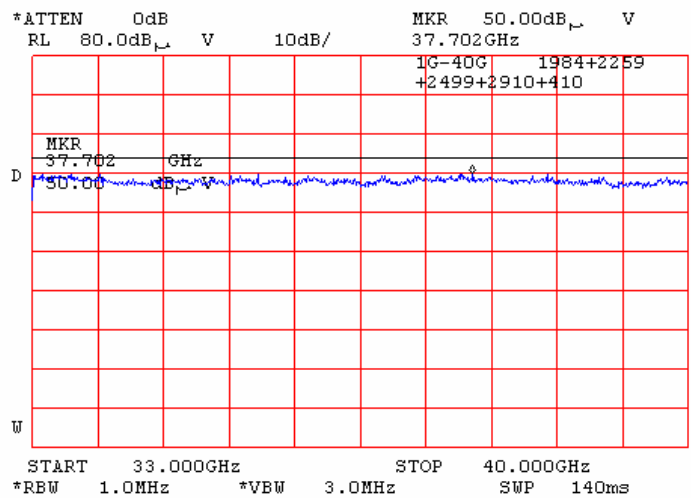
TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical & horizontal
 EUT POSITION: Typical (Vertical)



Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Plot 7.1.16 Radiated emission measurements from 33.0 to 40.0 GHz

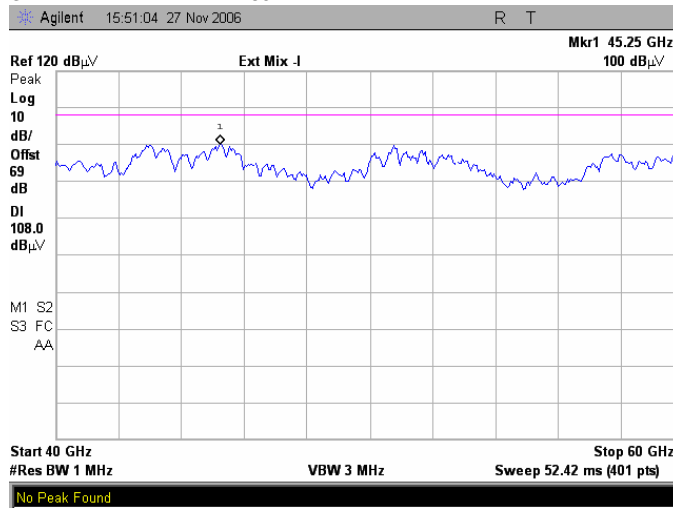
TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical & horizontal
 EUT POSITION: Typical (Vertical)



Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

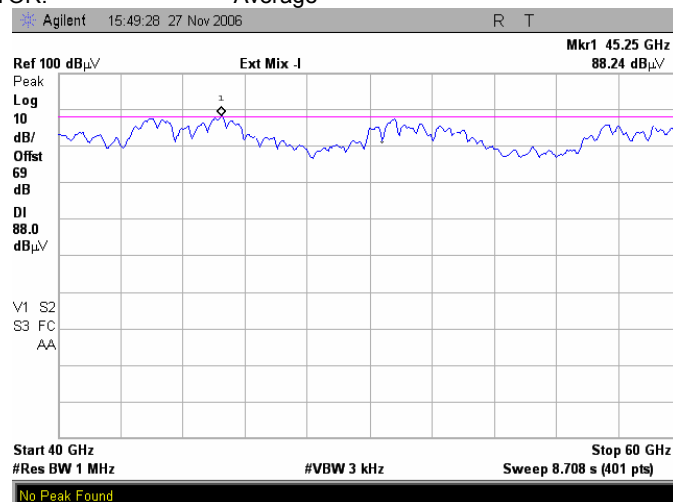
Plot 7.1.17 Radiated emission measurements above 40.0 GHz

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical & horizontal
 EUT POSITION: Typical (Vertical)
 DETECTOR: Peak



Plot 7.1.18 Radiated emission measurements above 40.0 GHz

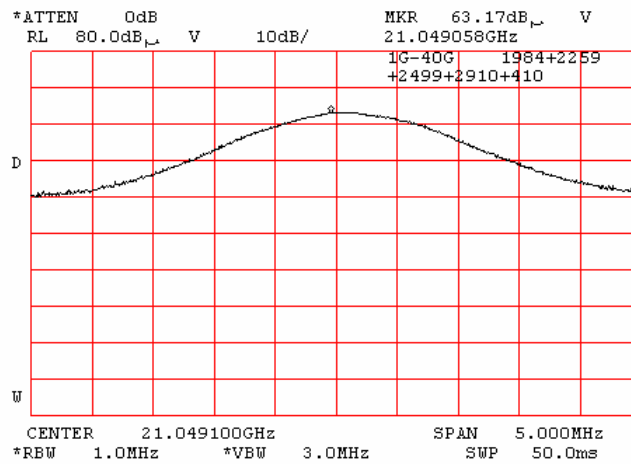
TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical & horizontal
 EUT POSITION: Typical (Vertical)
 DETECTOR: Average



Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

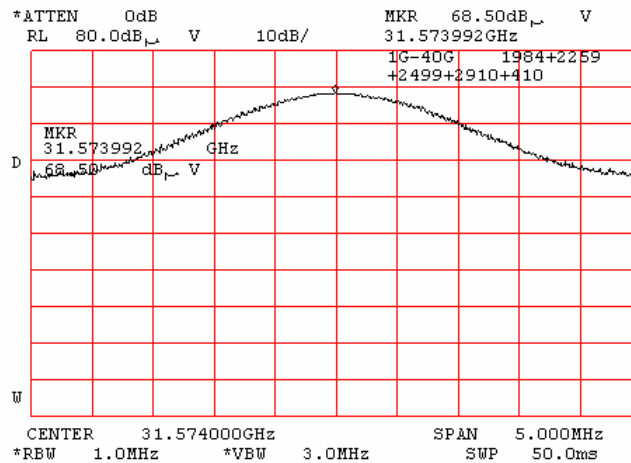
Plot 7.1.19 Radiated emission measurements at the second harmonic frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical & horizontal
 EUT POSITION: Typical (Vertical)



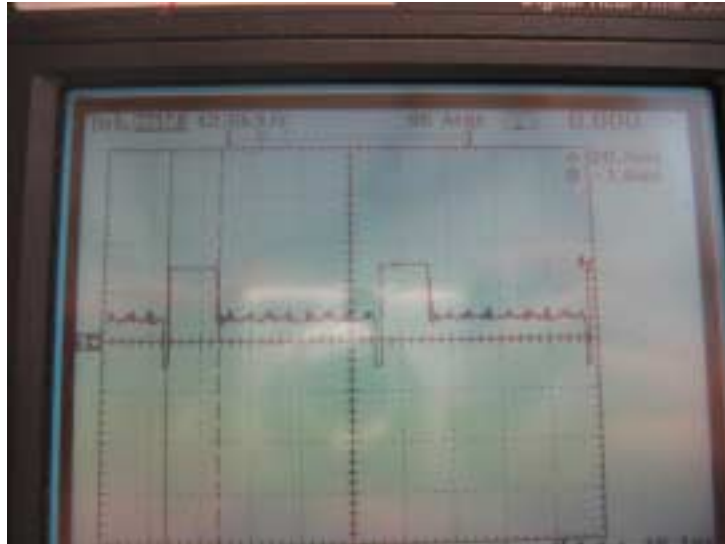
Plot 7.1.20 Radiated emission measurements at the third harmonic frequency

TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical & horizontal
 EUT POSITION: Typical (Vertical)



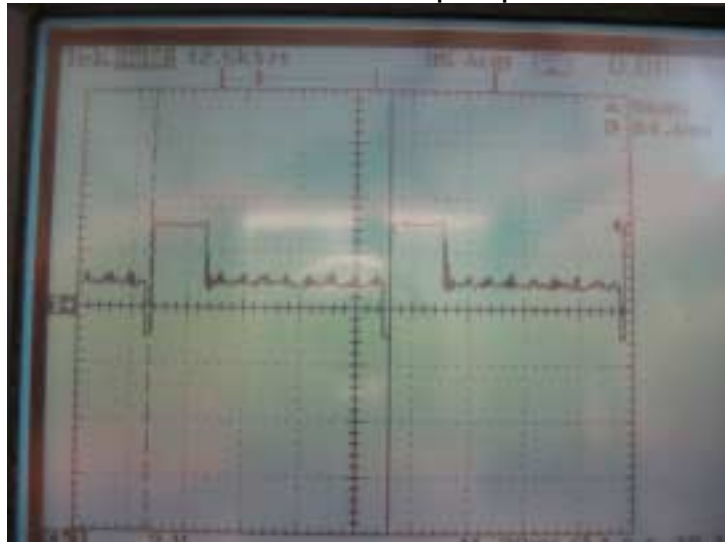
Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 3:58:16 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Plot 7.1.21 Transmission pulse duration



Tx pulse duration = 20.4 ms

Plot 7.1.22 Transmission pulse period



Tx repetition period = 86 ms

Test specification:		Section 15.245(b)(3), Band edge emissions	
Test procedure:		ANSI C63.4, Section 13.1.4	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 4:34:41 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

7.2 Band edge emission

7.2.1 General

This test was performed to verify the EUT band edge emission including all associated side bands and was attenuated at least 50 dB below the unmodulated carrier level or below the general spurious emission limit. Specification test limits are given in Table 7.2.1.

Table 7.2.1 Band edge emission limits

Frequency band, MHz	Field strength limit at 3 m, dB μ V/m		Attenuation below carrier, dBc
	Peak	Average	
10500 - 10550	74.0	54.0	50

7.2.2 Test procedure

7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and the performance check was conducted.

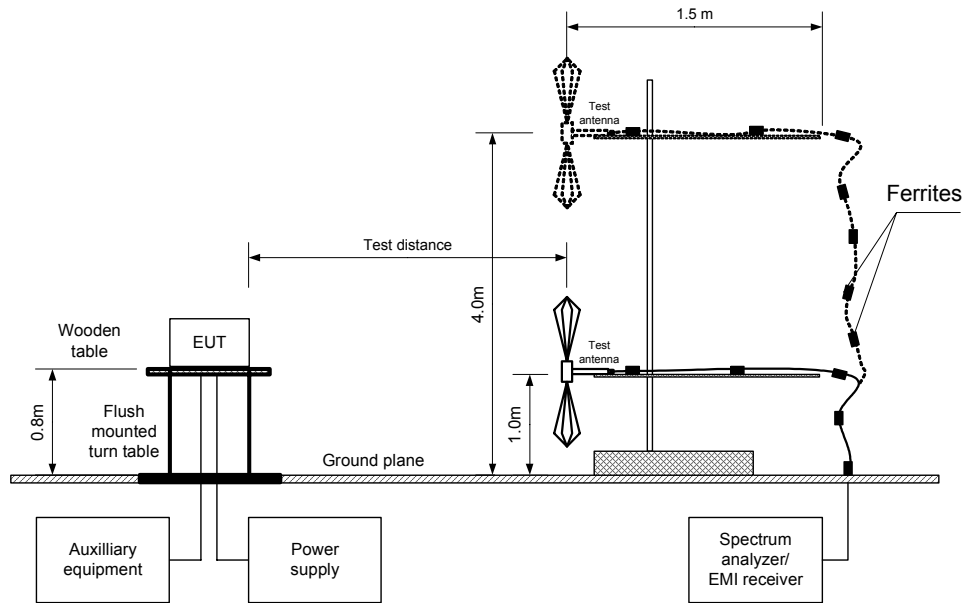
7.2.2.2 The spectrum analyzer frequency span was set to capture all major modulation sidebands of emission and sweep time was set sufficiently slow to ensure peak measurements. Spectrum analyzer was set in peak hold mode and time sufficient for trace stabilization was allowed.

7.2.2.3 The frequency of modulation envelope points beyond which power level drops below the band edge emission limit was measured.

7.2.2.4 The test results were recorded in Table 7.2.2 and shown in the associated plots.

Test specification: Section 15.245(b)(3), Band edge emissions			
Test procedure: ANSI C63.4, Section 13.1.4			
Test mode: Compliance		Verdict: PASS	
Date & Time: 11/26/2006 4:34:41 PM			
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Figure 7.2.1 Band edge emission measurement set up



Photograph 7.2.1 Band edge emission measurement set up



Test specification:		Section 15.245(b)(3), Band edge emissions	
Test procedure:		ANSI C63.4, Section 13.1.4	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 4:34:41 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Table 7.2.2 Band edge emission test results

OPERATING FREQUENCY RANGE: 10500 – 10550 MHz
DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 1000 kHz
VIDEO BANDWIDTH: 3000 kHz
MODULATION: OOK
MODULATING SIGNAL: ID code
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

F, MHz	Antenna		Azimuth, degrees*	Peak field strength			Avr factor, dB	Average field strength			Verdict
	Pol.	Height, m		Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**		Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
10500	H	1.2	20	51.00	74	-23.0	-12.5	38.5	54	-15.5	Pass
10550	H	1.2	20	51.50	74	-22.5	-12.5	39.0	54	-16.0	Pass

*- EUT front panel refers to 0 degrees position of turntable.
**- Margin = dB below (negative if above) specification limit.

Table 7.2.3 Average factor calculation

Transmission pulse		Average factor, dB
Duration, ms	Period, ms	
20.4	86	-12.5

*- Average factor was calculated as follows:

$$\text{Average factor} = 20 \times \log_{10} \left(\frac{20.4}{86} \right) = -12.5$$

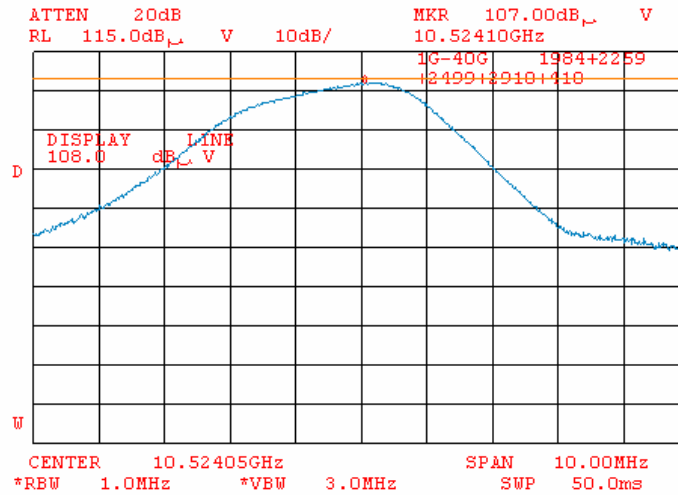
Reference numbers of test equipment used

HL 0521	HL 1984	HL 2909				
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Full description is given in Appendix A.

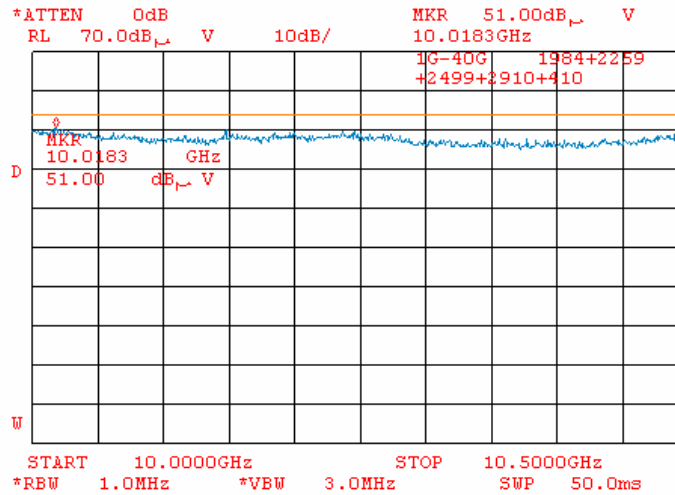
Test specification:	Section 15.245(b)(3), Band edge emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 4:34:41 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Plot 7.2.1 Band edge emission test result - Peak

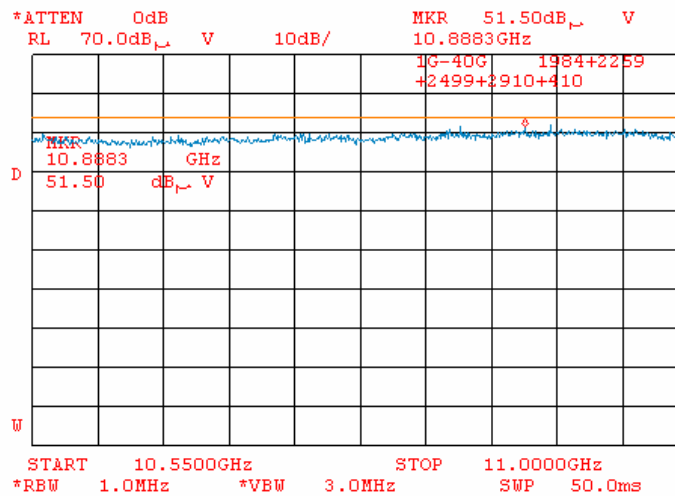


Test specification:	Section 15.245(b)(3), Band edge emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	11/26/2006 4:34:41 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Plot 7.2.2 Band edge emission measurements from 10.00 to 10.50 GHz - Peak



Plot 7.2.3 Band edge emission measurements from 10.50 to 11.00 GHz - Peak



Test specification:	Section 15.203, Antenna requirement		
Test procedure:	Visual inspection / supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	11/26/2006 4:52:05 PM		
Temperature: 22°C	Air Pressure: 1013 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

7.3 Antenna requirements

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

The rationale for compliance with the above requirements was either visual inspection results or supplier declaration. The summary of results is provided in Table 7.3.1.

Table 7.3.1 Antenna requirements

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

Photograph 7.3.1 Antenna assembly



8 Transmitter photographs

8.1 External

Photograph 8.1.1 Front view



Photograph 8.1.2 Rear view



8.2 Internal

Photograph 8.2.1 Internal view



Photograph 8.2.2 Component side of the main PCB with RF PCB



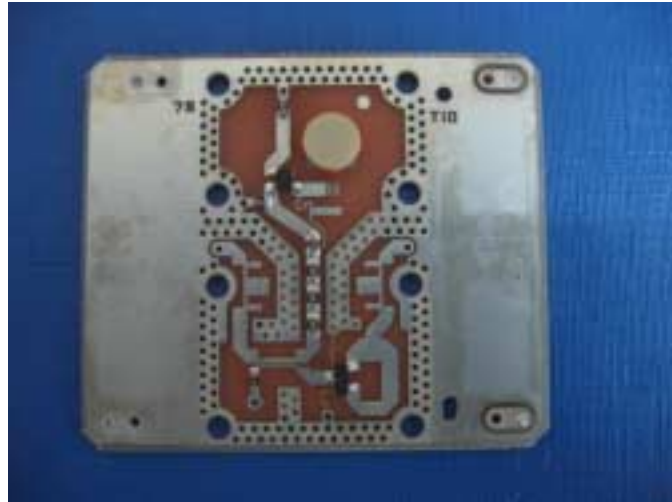
Photograph 8.2.3 Component side of the main PCB without RF PCB



Photograph 8.2.4 Print side of the main PCB



Photograph 8.2.5 Component side of the RF PCB



Photograph 8.2.6 Print side of the RF PCB



Photograph 8.2.7 Shielding compartments of the RF PCB



9 APPENDIX A Test facility 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) and approved by Israel Ministry of environmental protection, radiation hazards department (Permit number 1158).

Address: P.O. Box 23, Binyamina 30500, Israel.
Telephone: +972 4628 8001
Fax: +972 4628 8277
e-mail: mail@hermonlabs.com
website: www.hermonlabs.com

Person for contact: Mr. Alex Usoskin, CEO.

10 APPENDIX B 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-06	28-Jun-07
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
0768	Antenna Standard Gain Horn, 18-26.5 GHz, WR-42, K-band, Gain - 25 dB	Quinstar Technology	QWH-4200-BA	110	21-Jul-04	21-Jul-07
0769	Antenna Standard Gain Horn, 26.5-40 GHz, WR28, Ka band, Gain 25 dB	Quinstar Technology	QWH-2800-BA	112	21-Jul-04	21-Jul-07
0770	Antenna Standard Gain Horn, 40-60 GHz WR-19, U-band Gain - 25 dB	Quinstar Technology	QWH-1900-AA	118	21-Jul-04	21-Jul-07
1424	Spectrum Analyzer, 30 Hz- 40 GHz	Agilent Technologies	8564EC	3946A002 19	30-Aug-06	30-Aug-07
1826	Antenna mast and Turntable position controller (Small Anechoic chamber)	Sh. I. Machines	CRL-4	1	13-May-06	13-May-07
1849	Antenna mast with polarity control (Small Anechoic chamber)	Sh. I. Machines	AM-F4	1849	18-Jan-06	18-Jan-07
1850	Turntable	Sh. I. Machines	TT-M-3	1850	11-Nov-06	11-Nov-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, N-type	EMC Test Systems	3115	9911-5964	03-Mar-06	03-Mar-07
2009	Cable RF, 8 m	Alpha Wire	RG-214	C-56	02-Dec-05	02-Dec-06
2254	Cable 40GHz, 0.8 m, blue	Rhophase Microwave Limited	KPS-1503A-800-KPS	W4907	20-Jun-06	20-Jun-07
2399	Cable 40GHz, 1.5 m, blue	Rhophase Microwave Limited	KPS-1503A-1500-KPS	X2945	01-Jan-06	01-Jan-07
2697	Antenna, 30 MHz - 3.0 GHz,	Sunol Sciences Corp. Pleasanton, California USA	JB3	A022805	10-Jan-06	10-Jan-07
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY414447 62	10-Apr-06	10-Apr-07

11 APPENDIX C Abbreviations and acronyms

AC	alternating current
AM	amplitude modulation
AVRG	average (detector)
BB	broad band
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(μ V)	decibel referred to one microvolt
dB(μ V/m)	decibel referred to one microvolt per meter
dB(μ A)	decibel referred to one microampere
dB Ω	decibel referred to one Ohm
DC	direct current
EIRP	equivalent isotropically radiated power
ERP	effective radiated power
EUT	equipment under test
F	frequency
GHz	gigahertz
GND	ground
H	height
HL	Hermon laboratories
Hz	hertz
k	kilo
kHz	kilohertz
LO	local oscillator
m	meter
Mbps	Mega but per second
MHz	megahertz
min	minute
mm	millimeter
ms	millisecond
μ s	microsecond
NA	not applicable
NB	narrow band
OATS	open area test site
Ω	Ohm
PCB	printed circuit board
PM	pulse modulation
PS	power supply
ppm	part per million (10^{-6})
QP	quasi-peak
RE	radiated emission
RF	radio frequency
rms	root mean square
Rx	receive
s	second
T	temperature
Tx	transmit
V	volt
WB	wideband

12 APPENDIX D Test equipment correction factors

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

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

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

Antenna factor
Standard gain horn antenna
Quinstar Technology
Model QWH
Ser.No.112, HL 0768, 0769, 0770

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

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

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

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

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



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

Table with 17 columns: Frequency, ACF, Gain, Num gain, Frequency, ACF, Gain, Num gain, Frequency, ACF, Gain, Num gain, Frequency, ACF, Gain, Num gain, Frequency, ACF, Gain, Num gain. It contains calibration data for various frequencies from 30 to 615 MHz.

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, Blue, Rhopase Microwave Limited, model: KPS-1503A-1500-KPS,
HL 2399

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
0.03	0.07	6.5	1.57	15.50	2.50
0.05	0.10	6.7	1.60	16.00	2.51
0.1	0.16	6.9	1.55	16.50	2.58
0.2	0.26	7.1	1.65	17.00	2.65
0.3	0.33	7.3	1.65	17.50	2.73
0.5	0.38	7.5	1.70	18.00	2.74
0.7	0.41	7.7	1.71	18.50	2.67
0.9	0.58	7.9	1.73	19.00	2.67
1.1	0.64	8.1	1.79	19.50	2.74
1.3	0.70	8.3	1.81	20.00	2.69
1.5	0.75	8.5	1.84	20.50	2.80
1.7	0.79	8.7	1.85	21.00	2.82
1.9	0.83	8.9	1.90	21.50	2.87
2.1	0.88	9.1	1.95	22.00	2.87
2.3	0.93	9.3	1.93	22.50	2.92
2.5	0.97	9.5	1.98	23.50	3.04
2.7	1.01	9.7	1.96	24.00	3.05
2.9	1.04	9.9	2.03	24.50	3.03
3.1	1.08	10.1	1.99	25.00	3.11
3.3	1.14	10.30	2.02	25.50	3.10
3.5	1.17	10.50	2.02	26.00	3.17
3.7	1.21	10.70	2.02	26.50	3.11
3.9	1.24	10.90	2.08	27.00	3.16
4.1	1.26	11.10	2.02	28.00	3.19
4.3	1.26	11.30	2.09	29.00	3.19
4.5	1.29	11.50	2.05	30.00	3.30
4.7	1.34	11.70	2.11	31.00	3.31
4.9	1.34	11.90	2.11	32.00	3.35
5.1	1.40	12.10	2.12	33.00	3.46
5.3	1.43	12.40	2.17	34.00	3.45
5.5	1.45	13.00	2.29	35.00	3.49
5.7	1.47	13.50	2.31	36.00	3.54
5.9	1.40	14.00	2.43	37.00	3.62
6.1	1.53	14.50	2.43	39.00	3.69
6.3	1.55	15.00	2.46	40.00	3.75

13 APPENDIX E Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Radiated emissions at 10 m measuring distance Horizontal polarization	Biconilog antenna: ± 5.0 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.1 dB Double ridged horn antenna: ± 5.3 dB
Vertical polarization	Biconilog antenna: ± 5.5 dB Biconical antenna: ± 5.5 dB Log periodic antenna: ± 5.6 dB Double ridged horn antenna: ± 5.8 dB
Radiated emissions at 3 m measuring distance Horizontal polarization	Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB
Vertical polarization	Biconilog antenna: ± 6.0 dB Biconical antenna: ± 5.7 dB Log periodic antenna: ± 6.0 dB Double ridged horn antenna: ± 6.0 dB
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB 2.9 GHz to 6.46 GHz: ± 3.5 dB 6.46 GHz to 13.2 GHz: ± 4.3 dB 13.2 GHz to 22.0 GHz: ± 5.0 dB 22.0 GHz to 26.8 GHz: ± 5.5 dB 26.8 GHz to 40.0 GHz: ± 4.8 dB
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %

The test equipment has been calibrated according to its recommended procedures and is within the manufacturer's published limit of error. The standards and instruments used in the calibration system conform to the present requirements of ISO/IEC 17025 (or alternately ANSI/NCSL Z540-1).

The laboratory calibrates its measurement standards by a third party (traceable to NIST, USA) on a regular basis according to equipment manufacturer requirements. The Hermon Labs EMC measurements uncertainty is given in the table above.

14 APPENDIX F Specification references

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.