

TEST REPORT

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

FOR:

Rkonet Electronics Ltd.

Ceiling detector

Trade name:LuNAR

Model:RK200DT0000A

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: Rokonet Electronics Ltd.
Address: 14 Hachoma street, Rishon Le Zion, 75655, Israel
Telephone: +972 3963 7731
Fax: +972 3961 6584
E-mail: david@riscogroup.com
Contact name: Mr. David Kartoun

2 Equipment under test attributes

Product name: Ceiling detector
Product type: LuNAR
Model(s): RK200DT0000A
Serial number: 20405070488
Receipt date: 9/2/2004

3 Manufacturer information

Manufacturer name: Rokonet Electronics Ltd.
Address: 14 Hachoma street, Rishon Le Zion, 75655, Israel
Telephone: +972 3963 7731
Fax: +972 3961 6584
E-Mail: david@riscogroup.com
Contact name: Mr. David Kartoun





4 Test details

Project ID: 16071
Location: Hermon Laboratories Ltd. P.O.Box 23, Binyamina 30500, Israel
Test started: 9/2/2004
Test completed: 9/19/04
Test specification(s): FCC Part 15, subpart C, §15.245
Test suite: FCC_15.245_10.5GHz (9/2/2004 8:22:41 PM, 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	Pass
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. Michael Lerman, test engineer	September 19, 2004	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	September 27, 2004	
	Mr. M. Nikishin, EMC group leader	September 27, 2004	
Approved by:	Mr. A. Usoskin, C.E.O.	September 28, 2004	

6 EUT description

6.1 General information

The EUT is a LuNAR ceiling mounted dual technology movement detector. The EUT incorporates the PIR (Passive Infra-Red) detector and Doppler microwave detector operated at 10.525 GHz.

6.2 Ports and lines

Port type	Port description	Connected		Connector type	Qty.	Cable type	Cable length	Indoor / outdoor
		From	To					
Radiated emissions measurement								
Power	9 – 16 VDC	EUT	PS	Terminal block	2	Unshielded	3m*	Indoor
Signal	RS 485	EUT	OC		2		1.5m*	Indoor
Signal	RC	EUT	OC		1		1.5m*	Indoor
Signal	LED	EUT	OC		1		1.5m*	Indoor
Signal	Tamper	EUT	OC		2		1.5m*	Indoor
Signal	MEM	EUT	OC		1		1.5m*	Indoor
Signal	ALARM	EUT	OC		2		1.5m*	Indoor
Conducted emissions measurement								
Power	9 – 16 VDC	EUT	PS	Terminal block	2	Unshielded	3m*	Indoor
Signal	RS 485	EUT	Central unit		2		1.5m*	Indoor
Signal	RC	EUT			1		1.5m*	Indoor
Signal	LED	EUT			1		1.5m*	Indoor
Signal	Tamper	EUT			2		1.5m*	Indoor
Signal	MEM	EUT			1		1.5m*	Indoor
Signal	ALARM	EUT			2		1.5m*	Indoor

* The cable may be up to 300m

6.3 Support and test equipment

Description	Manufacturer	Model number	Serial number
Central Unit	Lasroc Ltd	RK200DT0000A	NA

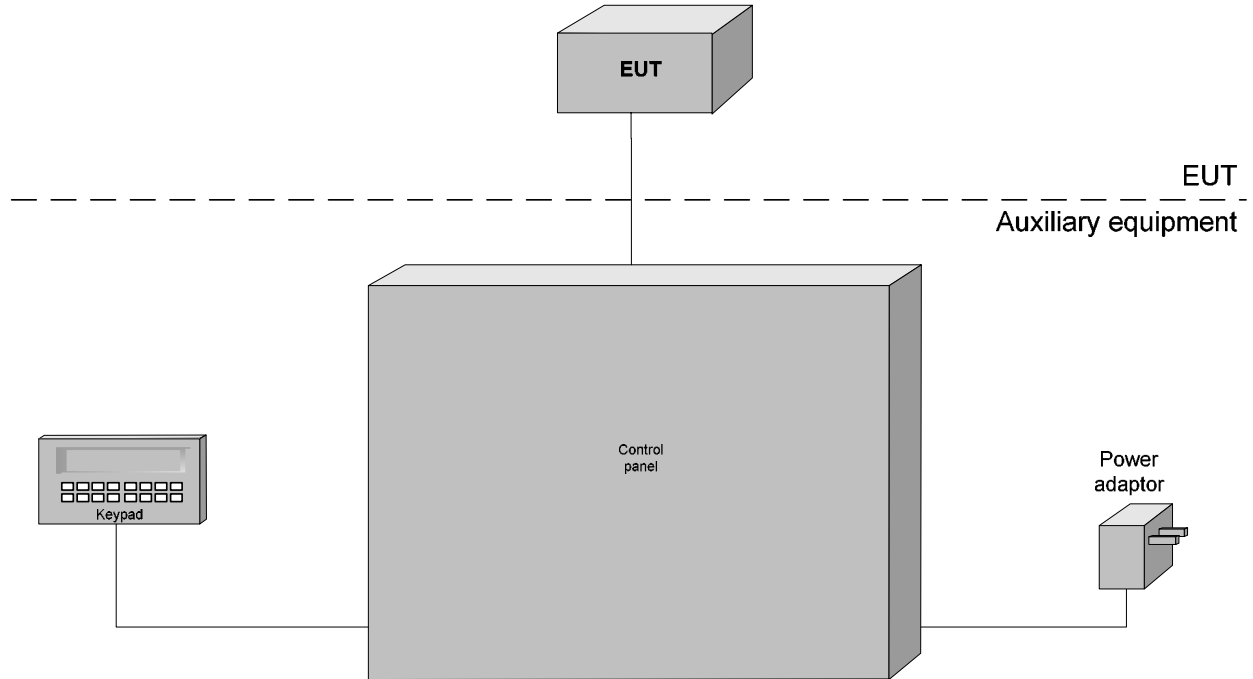
6.4 Operating frequencies

Source	Frequency, MHz					
Digital portion	4					
Transmitter	10525					

6.5 Changes made in the EUT

No changes were implemented.

6.6 Test configuration



6.7 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			
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				
Assigned frequency range		10500 - 10550 MHz				
Operating frequency		10525 MHz				
Antenna connection						
	unique coupling		standard connector	X	integral	
					with temporary RF connector	
				X	without temporary RF connector	
Type of modulation			PM			
Maximum transmitter duty cycle in normal use		9.21 %	Tx ON time	47.1 μ sec	Period	510 μ sec
Transmitter duty cycle supplied for test		9.21 %	Tx ON time	47.1 μ sec	Period	510 μ sec
Transmitter power source						
X	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:	9/14/2004 9:14:35 AM		
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
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			Outside restricted bands	
	Peak	Quasi Peak	Average	Peak	Average
0.009 – 0.490*	NA	128.5 – 93.8**	NA	108.0	88.0
0.490 – 1.705*		73.8 – 63.0**			
1.705 – 30.0*		69.5**			
30 – 88		40.0			
88 – 216		43.5			
216 – 960		46.0			
960 - 1000	54.0	54.0			
1000 – 17700	74.0	NA	54.0		
Above 17700	108.0	NA	88.0		

*- 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: 9/14/2004 9:14:35 AM			
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
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.

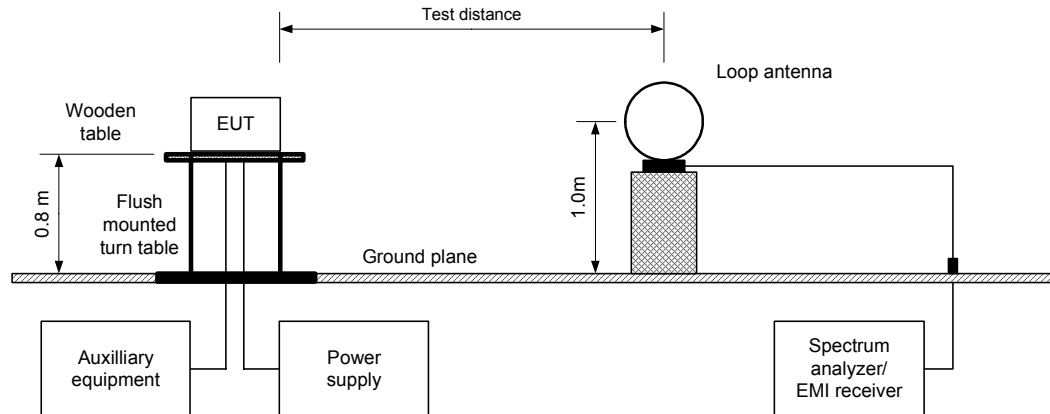
7.1.3 Test procedure for spurious emission field strength measurements above 30 MHz

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.

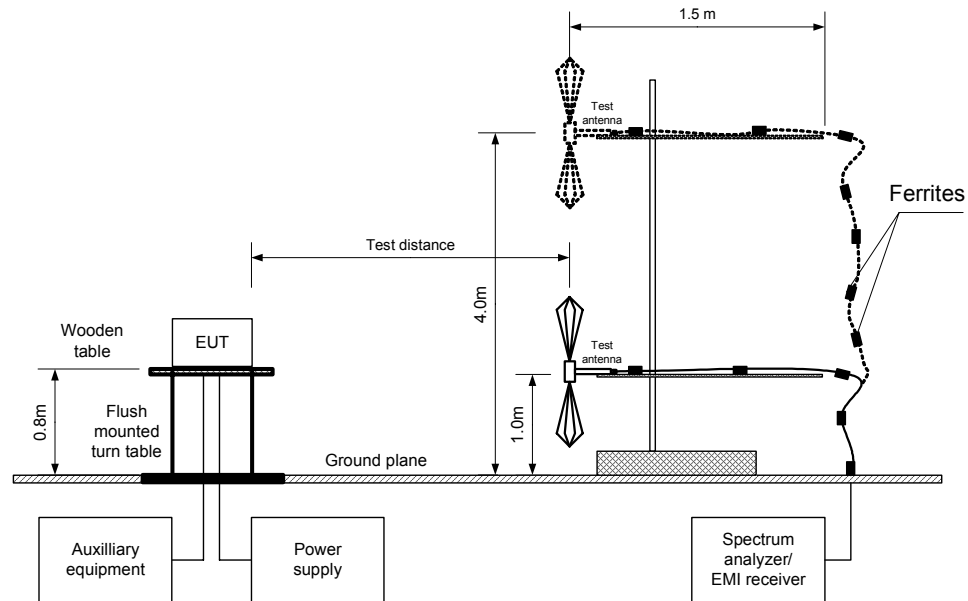
7.1.3.3 The worst test results (the lowest margins) were recorded in Table 7.1.3, Table 7.1.5 and shown in the associated plots.

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: 9/14/2004 9:14:35 AM			
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

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:		9/14/2004 9:14:35 AM			
Temperature: 23.8 °C		Air Pressure: 1009 hPa		Relative Humidity: 43 %	Power Supply: 12 VDC
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 (Horizontal)
 MODULATION: PM
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 TRANSMITTER OUTPUT POWER: W
 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)
 Biconical (30 MHz – 200 MHz)
 Log periodic (200 MHz – 1000 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											
10519.3	H	1.2	37	102.17	148	-45.83	-20.7	81.47	128	-46.53	Pass
10519.3	V	1	230	104.33	148	-43.67	-20.7	83.63	128	-44.37	Pass
Spurious emissions											
21037.83	H	1	235	86.90	97.5	-10.60	-20.7	66.20	77.5	-11.30	Pass
31557.47	H	1.1	300	79.56	97.5	-17.94	-20.7	58.86	77.5	-18.14	

*- 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, μs	Period, μs	
47.5	510.0	-20.7

*- Average factor was calculated as follows
 for pulse train shorter than 100 ms: $Average\ factor = 20 \times \log_{10} \left(\frac{Pulse\ duration}{Pulse\ period} \times \frac{Burst\ duration}{Train\ duration} \times Number\ of\ bursts\ within\ pulse\ train \right)$
 for pulse train longer than 100 ms: $Average\ factor = 20 \times \log_{10} \left(\frac{Pulse\ duration}{Pulse\ period} \times \frac{Burst\ duration}{100\ ms} \times Number\ of\ bursts\ within\ 100\ ms \right)$

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: 9/14/2004 9:14:35 AM			
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

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

TEST DISTANCE: 3 m
EUT POSITION: Typical (Horizontal)
MODULATION: PM
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)
≥ Resolution bandwidth
VIDEO BANDWIDTH: Active loop (9 kHz – 30 MHz)
Biconical (30 MHz – 200 MHz)
Log periodic (200 MHz – 1000 MHz)
Biconilog (30 MHz – 1000 MHz)
TEST ANTENNA TYPE:

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*				
0.009 – 1000	No emissions were found						Pass	

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	2655 - 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

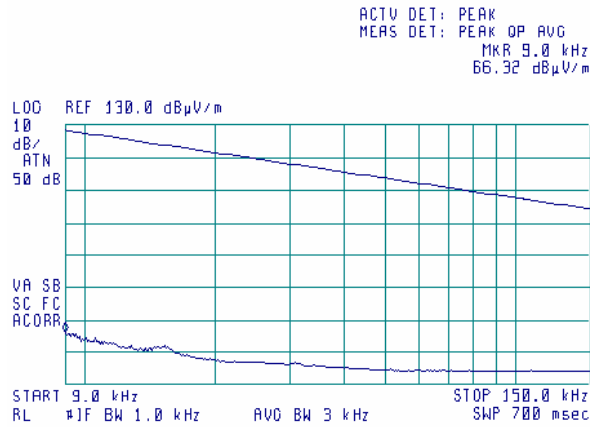
HL 0025	HL 0465	HL 0521	HL 0589	HL 0604	HL 0644	HL 0768	HL 0769
HL 0770	HL 1424	HL 1942	HL 1984	HL 2009	HL 2117	HL 2259	HL 2260
HL 2261	HL 2387	HL 2399	HL 2499				

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:	9/14/2004 9:14:35 AM		
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

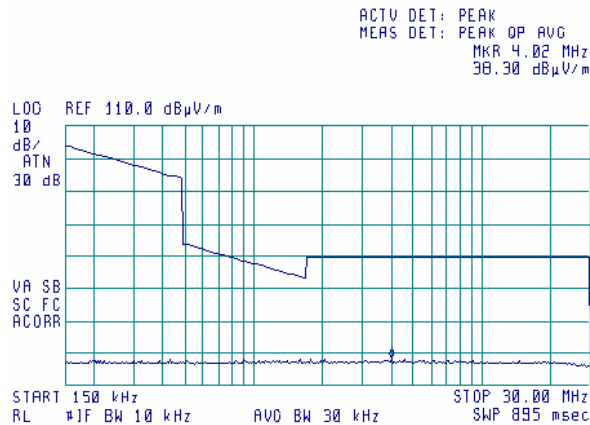
Plot 7.1.1 Radiated emission measurements from 9 to 150 kHz

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



Plot 7.1.2 Radiated emission measurements from 0.15 to 30 MHz

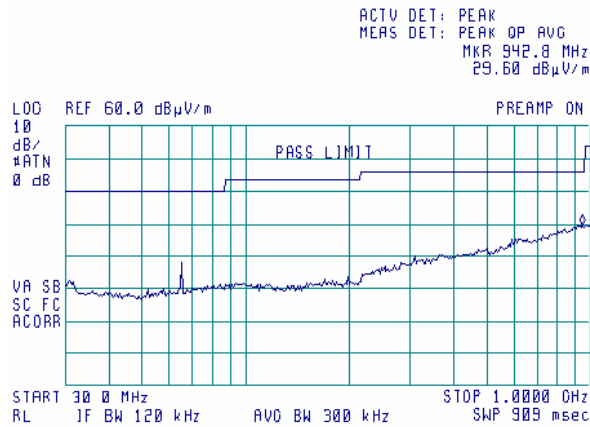
TEST SITE: Semi anechoic chamber
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical
 EUT POZITION: Typical (Horizontal)



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:	9/14/2004 9:14:35 AM		
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

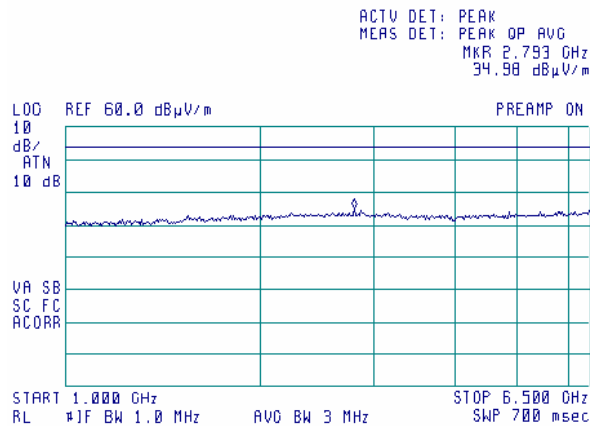
Plot 7.1.3 Radiated emission measurements from 30 to 1000 MHz

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



Plot 7.1.4 Radiated emission measurements from 1.0 to 6.5 GHz

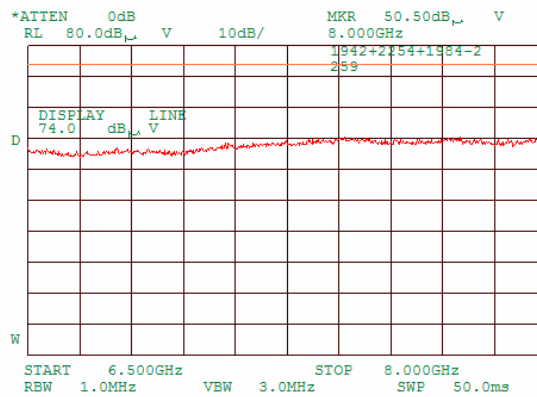
TEST SITE: Semi anechoic chamber
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POZITION: Typical (Horizontal)



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:	9/14/2004 9:14:35 AM		
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

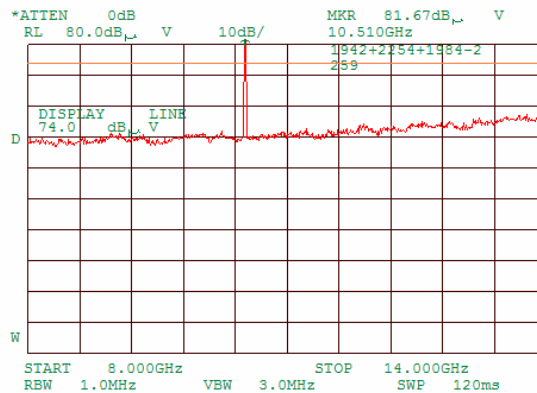
Plot 7.1.5 Radiated emission measurements from 6.5 to 8.0 GHz

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



Plot 7.1.6 Radiated emission measurements from 8.0 to 14.0 GHz

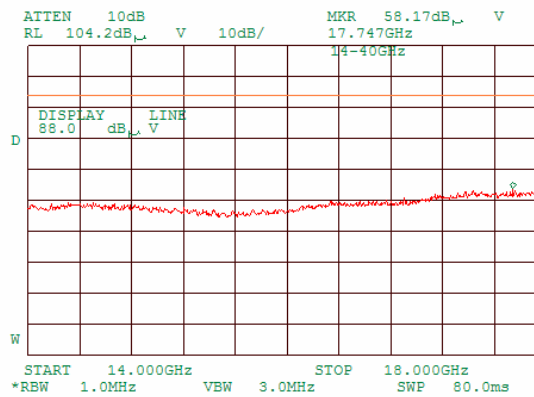
TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Horizontal)



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:	9/14/2004 9:14:35 AM		
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

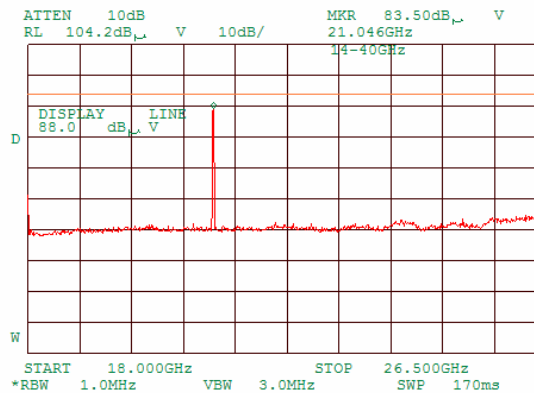
Plot 7.1.7 Radiated emission measurements from 14.0 to 18.0 GHz

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



Plot 7.1.8 Radiated emission measurements from 18.0 to 26.5 GHz

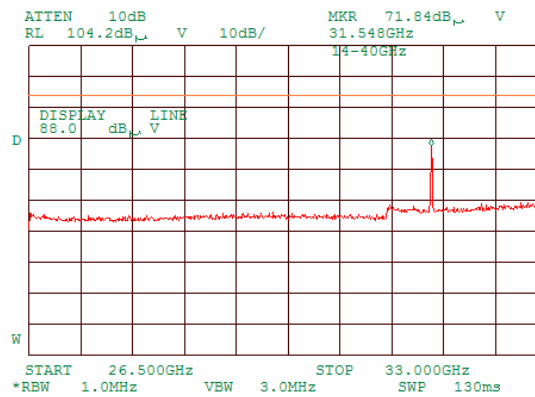
TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Horizontal)



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:	9/14/2004 9:14:35 AM		
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

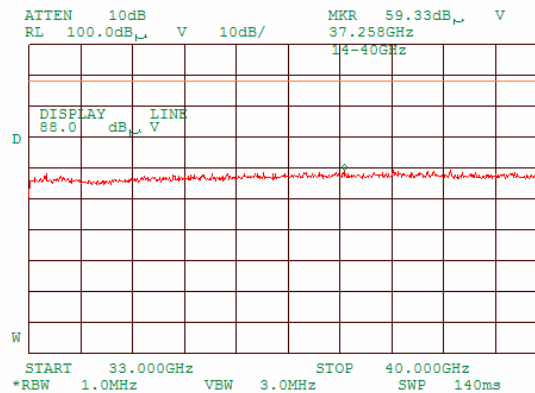
Plot 7.1.9 Radiated emission measurements from 26.5 to 33.0 GHz

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



Plot 7.1.10 Radiated emission measurements from 33.0 to 40.0 GHz

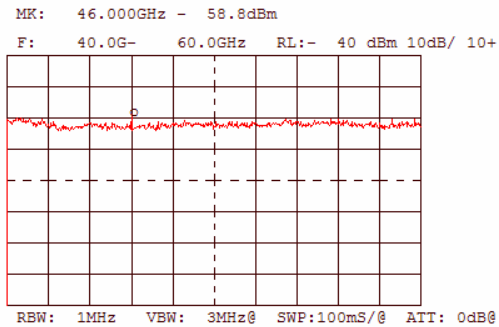
TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Horizontal)



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:	9/14/2004 9:14:35 AM		
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

Plot 7.1.11 Radiated emission measurements from 40.0 to 60.0 GHz

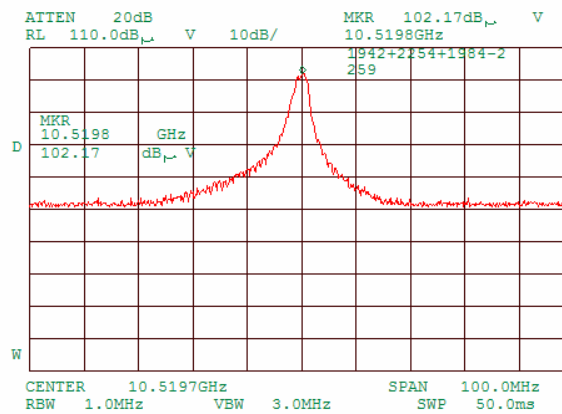
TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Vertical and Horizontal
 EUT POSITION: Typical (Horizontal)



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: 9/14/2004 9:14:35 AM			
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

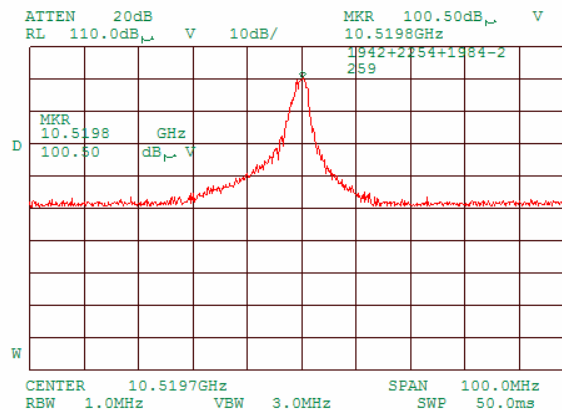
Plot 7.1.12 Radiated emission measurements at the fundamental frequency

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



Plot 7.1.13 Radiated emission measurements at the fundamental frequency

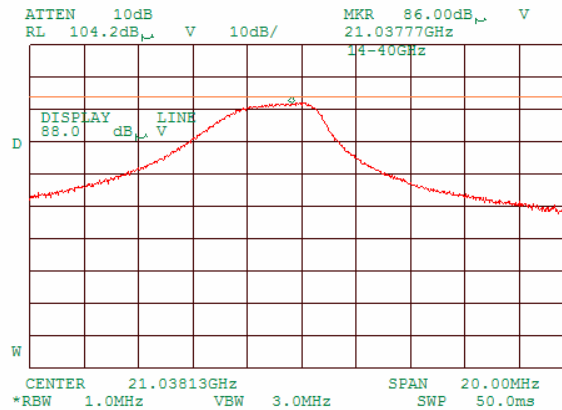
TEST SITE: OATS
 TEST DISTANCE: 3 m
 ANTENNA POLARIZATION: Horizontal
 EUT POSITION: Typical (Horizontal)



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:	9/14/2004 9:14:35 AM		
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

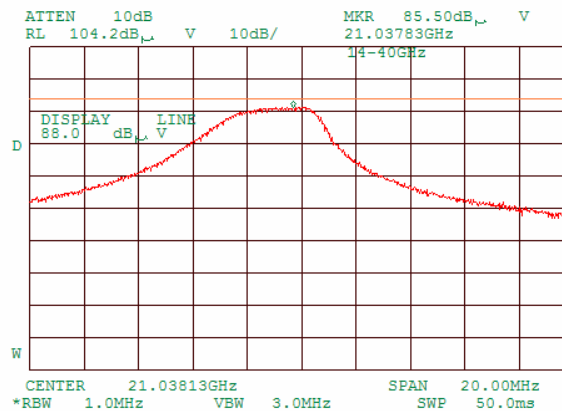
Plot 7.1.14 Radiated emission measurements at the second harmonic frequency

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



Plot 7.1.15 Radiated emission measurements at the second harmonic frequency

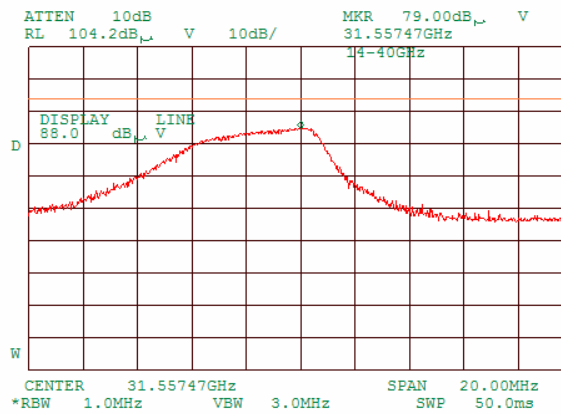
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
EUT POSITION: Typical (Vertical)



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: 9/14/2004 9:14:35 AM			
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

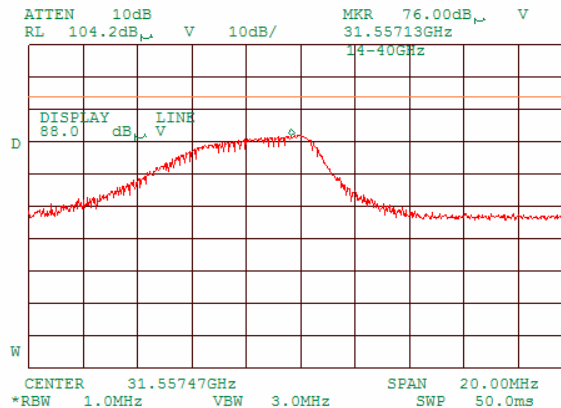
Plot 7.1.16 Radiated emission measurements at the third harmonic frequency

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



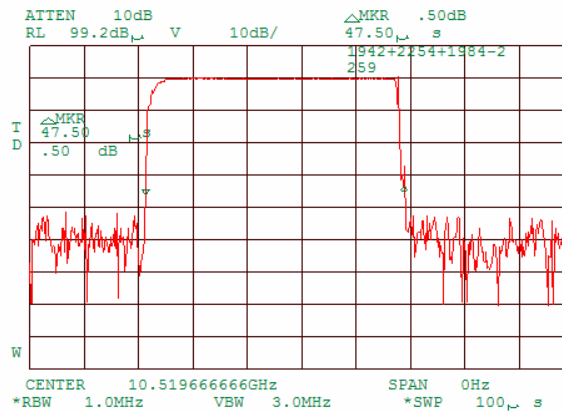
Plot 7.1.17 Radiated emission measurements at the third harmonic frequency

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

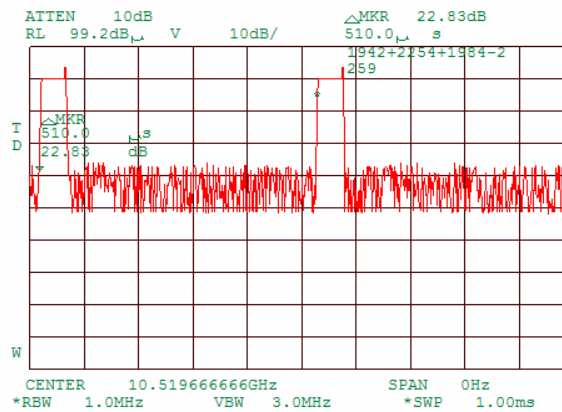


Test specification:	Section 15.245(b), Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/14/2004 9:14:35 AM		
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

Plot 7.1.18 Transmission pulse duration



Plot 7.1.19 Transmission pulse period



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:	9/14/2004 9:30:04 AM		
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
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	108.0	88.0	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.

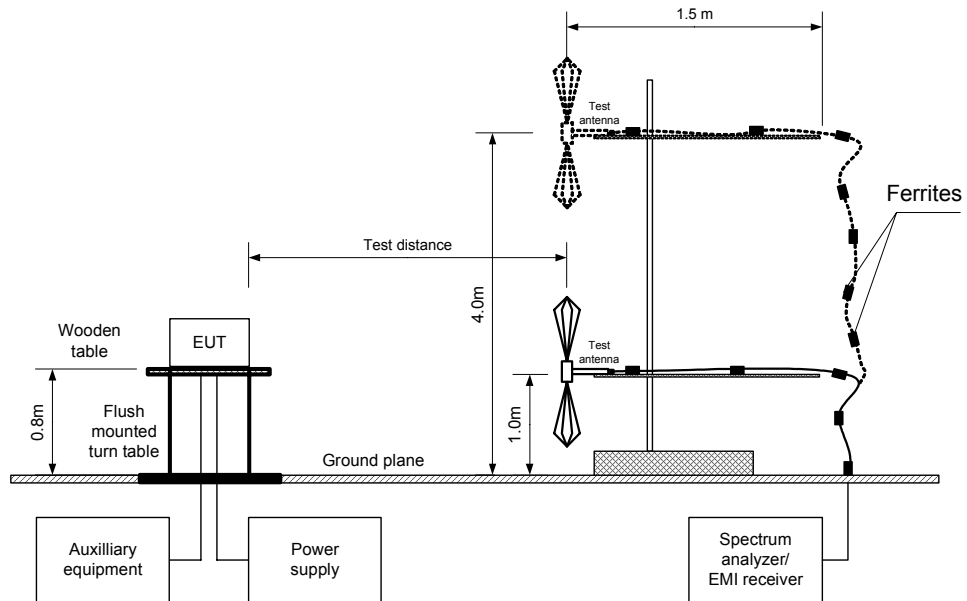
7.2.2.2 The spectrum analyzer frequency span was set to capture all major modulation sidebands of emission and sweep time was set sufficiently slow to ensure peak measurements. Spectrum analyzer was set in peak hold mode and time sufficient for trace stabilization was allowed.

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: 9/14/2004 9:30:04 AM			
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

Figure 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:	9/14/2004 9:30:04 AM		
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

Table 7.2.2 Band edge emission test results

OPERATING FREQUENCY RANGE: 10500 – 10550 MHz
DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 300 kHz
MODULATION: PM
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
ATTENUATION BELOW CARRIER: 50 dBc

Modulation envelope		Band edge limit, MHz	Margin, kHz***	Verdict
Edge	Frequency, MHz*			
Low	10505.63	10500	5630	Pass
High	10526.63	10550	-23370	Pass

* - Measured frequency beyond which the emission dropped 50 dB below the carrier emission or below the field strength limit whichever was a less stringent

** - Margin = Band edge limit – Band edge frequency

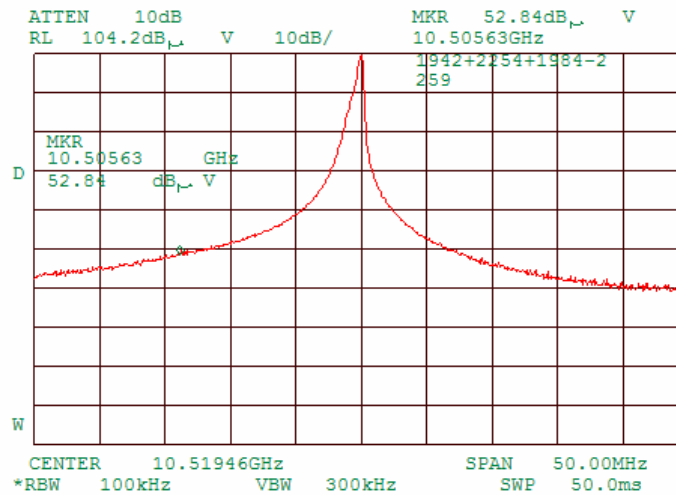
Reference numbers of test equipment used

HL 1424	HL 1942	HL 1984	HL 2254	HL 2259	HL 2399		
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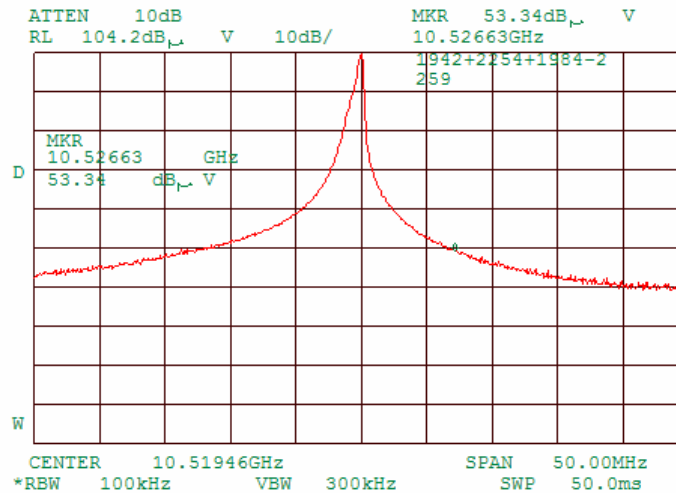
Full description is given in Appendix A.

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:	9/14/2004 9:30:04 AM		
Temperature: 23.8 °C	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 12 VDC
Remarks:			

Plot 7.2.1 Band edge emission test result left side



Plot 7.2.2 Band edge emission test result right side



Test specification:		Section 15.207(a), Conducted emission	
Test procedure:		ANSI C63.4, Section 13.1.3	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 5:02:55 PM		
Temperature: 24.5 °C	Air Pressure: 1010 hPa	Relative Humidity: 40 %	Power Supply: 120 VAC
Remarks:			

7.3 Conducted emissions

7.3.1 General

This test was performed to measure common mode conducted emissions at the power port. Specification test limits are given in Table 7.3.1. The worst test results (the lowest margins) were recorded in Table 7.3.2 and shown in the associated plots.

Table 7.3.1 Limits for conducted emissions

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

* The limit decreases linearly with the logarithm of frequency.

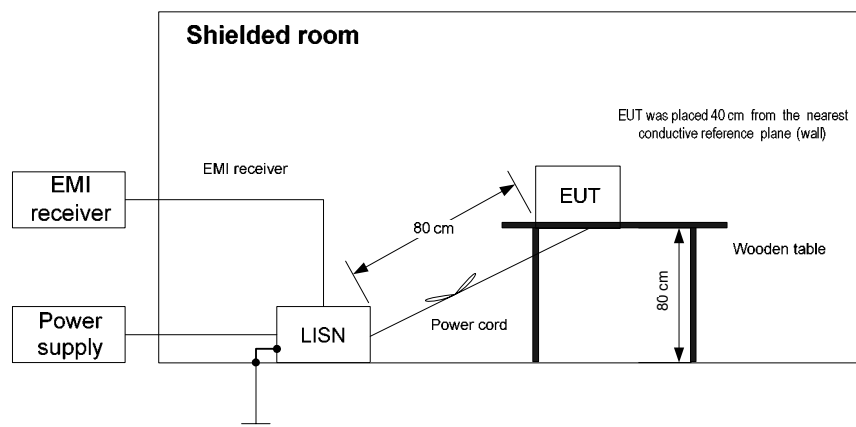
7.3.2 Test procedure

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

7.3.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer in the frequency range referred to in Table 7.3.2. Unused coaxial connector of the LISN was terminated with 50 Ohm. Quasi-peak and average detectors were used throughout the testing.

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

Figure 7.3.1 Setup for conducted emission measurements, table-top equipment



Test specification: Section 15.207(a), Conducted emission			
Test procedure: ANSI C63.4, Section 13.1.3			
Test mode: Compliance	Verdict: PASS		
Date & Time: 9/19/2004 5:02:55 PM			
Temperature: 24.5 °C	Air Pressure: 1010 hPa	Relative Humidity: 40 %	Power Supply: 120 VAC
Remarks:			

Table 7.3.2 Conducted emission test results

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

Frequency, MHz	Peak emission, dB(μV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*	Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*		
16.030639	40.66	38.06	60.00	-21.94	37.42	50.00	-12.58	L1	Pass
24.045432	44.35	43.27	60.00	-16.73	43.14	50.00	-6.86		
26.669493	28.81	27.61	60.00	-32.39	27.08	50.00	-22.92		
16.029655	39.43	37.23	60.00	-22.77	36.56	50.00	-13.44	L2	Pass
24.045651	44.34	43.18	60.00	-16.82	43.02	50.00	-6.98		
26.669994	28.98	27.51	60.00	-32.49	26.90	50.00	-23.10		

*- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

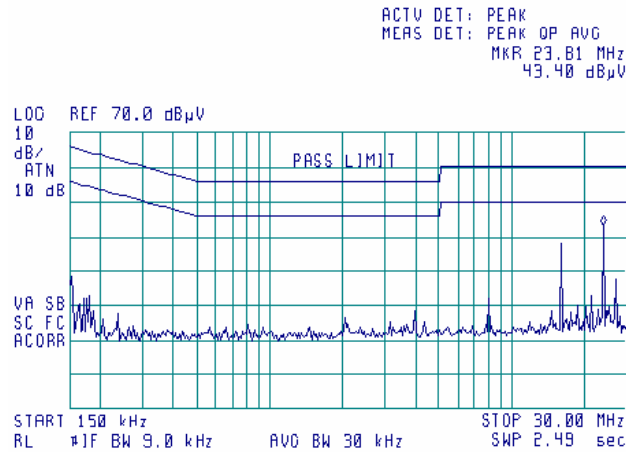
HL 0163	HL 0672	HL 0787	HL 1194	HL 1430	HL 1502	HL 1510	
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Full description is given in Appendix A.

Test specification:	Section 15.207(a), Conducted emission		
Test procedure:	ANSI C63.4, Section 13.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 5:02:55 PM		
Temperature: 24.5 °C	Air Pressure: 1010 hPa	Relative Humidity: 40 %	Power Supply: 120 VAC
Remarks:			

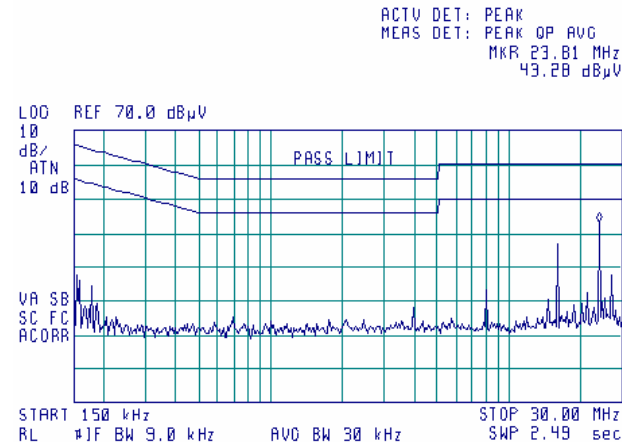
Plot 7.3.1 Conducted emission measurements

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



Plot 7.3.2 Conducted emission measurements

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



Test specification:	Section 15.203, Antenna requirement		
Test procedure:	Visual inspection / supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/15/2004 11:45:49 AM		
Temperature: 24 °C	Air Pressure: 1010 hPa	Relative Humidity: 37 %	Power Supply: 12 VDC
Remarks:			

7.4 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 was permanently attached antenna proposed for use with the EUT.

The rationale for compliance with the above requirements was visual inspection results. The summary of results is provided in Table 7.4.1.

Table 7.4.1 Antenna requirements

Requirement	Rationale	Verdict
The transmitter antenna is permanently attached (integral)	Visual inspection	Comply

Photograph 7.4.1 Antenna assembly



8 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0025	Analyzer, Spectrum, 10 kHz - 23 GHz / 140 GHz	Anritsu	MS-710C	5837	25-Oct-03	25-Oct-04
0163	LISN FCC/VDE/MIL-STD	Electro-Metrics	ANS 25/2	1314	01-Oct-03	01-Oct-04
0446	Antenna, Loop active, 10kHz-30MHz	EMCO	6502	2857	28-Jun-04	28-Jun-05
0465	Anechoic Chamber 9(L) x 6,5(W) x 5,5(H) m	HL	AC - 1	023	28-Jun-04	28-Jun-05
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-2.9 GHz	Hewlett Packard	8546A	3617A 00319, 3448A002 53	26-Sep-04	26-Sep-05
0589	Cable Coaxial, GORE A2P01POL118, 2.3 m	HL	GORE-3	176	02-Dec-03	02-Dec-04
0592	Position Controller	HL	L2-SR3000 (HL CRL-3)	100	18-May-04	18-May-05
0593	Antenna Mast, 1-4 m Pneumatic	Madgesh	AM-F1	101	03-Feb-04	03-Feb-05
0594	Turn Table FOR ANECHOIC CHAMBER flush mount d=1.2 m Pneumatic	HL	TT-WDC1	102	27-Jan-04	27-Jan-05
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE 26 - 2000 MHz	EMCO	3141	9611-1011	27-Jan-04	27-Jan-05
0644	Probe current, 20 Hz - 100 MHz	Solar Electronics	6741-1	874916	27-Jan-04	27-Jan-05
0672	Shielded Room 4,6(L) x 4,2(W) x 2,4(H) m	HL	SR - 3	027	11-Nov-03	11-Nov-04
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
0787	Transient Limiter	Hewlett Packard	11947A	3107A018 77	21-Jul-04	21-Jul-05
1004	Cable Coaxial , ANDREW PSWJ4 , 6m	HL	ANDREW -6	163	21-Jul-04	21-Jul-05
1194	Variac, 220 V/ 2.5 A	Matsunaga		2962	05-Jan-04	05-Jan-05
1424	Spectrum Analyzer, 30 Hz- 40 GHz	Agilent Technologies (HP)	8564EC	3946A002 19	30-Aug-04	30-Aug-05
1430	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1431, HL1432	Agilent Technologies (HP)	8542E	3807A002 62,3705A0 0217	01-Sep-04	01-Sep-05
1502	Cable RF, 6 m	Belden	M17/167 MIL-C-17	1502	05-Jan-04	05-Jan-05
1510	Cable RF, 8 m	Belden	M17/167 MIL-C-17	1510	05-Jan-04	05-Jan-05
1942	Cable 18GHz, 4 m, blue	Rhophase Microwave Limited	SPS-1803A-4000-NPS	T4658	05-Jan-04	05-Jan-05
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W, N-type	EMC Test Systems	3115	9911-5964	22-Mar-04	22-Mar-05
2009	Cable RF, 8 m	Alpha Wire	RG-214	C-56	05-Jan-04	05-Jan-05
2117	Waveguide mixer 40 to 60 GHz	Tektronix	WM 490U	BO12794	05-Jan-04	05-Jan-05

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
2254	Cable 40GHz, 0.8 m, blue	Rhophase Microwave Limited	KPS-1503A-800-KPS	W4907	05-Jan-04	05-Jan-05
2259	Amplifier Low Noise 2-20 GHz	Sophia Wireless	LNA0220-C	0223	05-Jan-04	05-Jan-05
2260	Amplifier Low Noise 14-33 GHz	Sophia Wireless	LNA28-B	0233	05-Jan-04	05-Jan-05
2261	Amplifier Low Noise 33-40 GHz	Sophia Wireless	LNA38-B	0234	05-Jan-04	05-Jan-05
2387	Filter Bandpass, 8-14 GHz	HL	FBP8-14	2387	05-Jun-04	05-Jun-05
2399	Cable 40GHz, 1.5 m, blue	Rhophase Microwave Limited	KPS-1503A-1500-KPS	X2945	24-Jun-04	24-Jun-05
2499	Quadruplexer 1-12 GHz (1-2 GHz; 2-4GHz;4-8 GHz; 8-12GHz)	Elettronica S.p.A. - Roma	UE 84	D/00239	10-Feb-04	10-Feb-05

9 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB 150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 10 m measuring distance Horizontal polarization Vertical polarization	Biconilog antenna: ± 5.0 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.1 dB Double ridged horn antenna: ± 5.3 dB 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 Vertical polarization	Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB 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. Person for contact: Mr. Alex Usoskin, QA manager.

10 APPENDIX C 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).

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.

11 APPENDIX D Specification references

47CFR part 15: 2004	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: 2001	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.

12 APPENDIX E Abbreviations and acronyms

A	ampere
AC	alternating current
A/m	ampere per meter
AM	amplitude modulation
AVRG	average (detector)
BB	broad band
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(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
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
μ s	microsecond
NA	not applicable
NB	narrow band
NT	not tested
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
VA	volt-ampere
WB	wideband

13 APPENDIX F Test equipment correction factors

Correction factor
Line impedance stabilization network
Model ANS-25/2
Electro-Metrics

Frequency, MHz	Correction factor, dB	Frequency, MHz	Correction factor, dB
0.01	4.7	3	0.1
0.02	2.1	4	0.1
0.03	1.1	6	0.1
0.04	0.7	10	0.1
0.05	0.5	12	0.1
0.1	0.2	16	0.1
0.2	0.1	18	0.1
0.4	0.1	20	0.1
0.6	0.1	25	0.1
0.8	0.1	28	0.1
1	0.1	30	0.1
2	0.1		

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

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
Biconilog antenna EMCO, model 3141, serial number 1011

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(μ V) to convert it into field intensity in dB(μ V/m).

**Antenna factor
Double-ridged wave guide horn antenna
EMC Test Systems (EMCO), model 3115**

Frequency, MHz	Antenna factor (s/n 9911-5964), dB(1/m)	Antenna factor (s/n 00027177), dB(1/m)
1000.0	24.5	24.7
1500.0	24.8	25.7
2000.0	27.6	27.8
2500.0	28.7	28.9
3000.0	30.8	30.7
3500.0	32.9	31.8
4000.0	32.7	33.0
4500.0	32.0	32.8
5000.0	33.6	34.2
5500.0	35.3	34.9
6000.0	35.7	35.2
6500.0	35.8	35.4
7000.0	36.2	36.3
7500.0	37.2	37.3
8000.0	37.2	37.5
8500.0	38.1	38.0
9000.0	38.6	38.3
9500.0	38.3	38.3
10000.0	38.4	38.7
10500.0	38.3	38.7
11000.0	38.8	38.9
11500.0	39.9	39.5
12000.0	39.6	39.5
12500.0	39.5	39.4
13000.0	40.5	40.5
13500.0	41.1	40.8
14000.0	41.5	41.5
14500.0	40.8	41.3
15000.0	39.5	40.2
15500.0	38.1	38.7
16000.0	38.1	38.5
16500.0	40.1	39.8
17000.0	42.6	41.9
17500.0	45.4	45.8
18000.0	48.7	49.1

Antenna factor 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).

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		±0.17
24	5100	4.62		
25	5400	4.78		
26	5700	5.16		
27	6000	5.67		
28	6500	5.99		

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 18 GHz, 4 m, blue, model: SPS-1803A-4000-NPS, S/N T4658, HL 1942

Frequency, GHz	Cable loss, dB
0.03	0.21
0.05	0.26
0.10	0.36
0.20	0.50
0.30	0.61
0.40	0.70
0.50	0.78
0.60	0.85
0.70	0.93
0.80	0.99
0.90	1.04
1.00	1.10
1.10	1.16
1.20	1.22
1.30	1.26
1.40	1.31
1.50	1.35
1.60	1.41
1.70	1.45
1.80	1.49
1.90	1.53
2.00	1.57
2.10	1.61
2.20	1.65
2.30	1.69
2.40	1.72
2.50	1.76
2.60	1.79
2.70	1.83
2.80	1.87
2.90	1.90
3.10	1.97
3.30	2.04
3.50	2.11
3.70	2.18
3.90	2.24
4.10	2.31
4.30	2.38
4.50	2.43
4.70	2.53
4.90	2.53
5.10	2.63
5.30	2.65
5.50	2.72
5.70	2.76
5.90	2.79

Frequency, GHz	Cable loss, dB
6.10	2.88
6.30	2.90
6.50	2.97
6.70	3.02
6.90	3.04
7.10	3.07
7.30	3.12
7.50	3.13
7.70	3.19
7.90	3.24
8.10	3.30
8.30	3.36
8.50	3.45
8.70	3.41
8.90	3.45
9.10	3.42
9.30	3.55
9.50	3.48
9.70	3.58
9.90	3.61
10.10	3.66
10.30	3.68
10.50	3.70
10.70	3.70
10.90	3.75
11.10	3.78
11.30	3.86
11.50	3.98
11.70	4.10
11.90	4.12
12.10	4.09
12.40	4.13
13.00	4.23
13.50	4.35
14.00	4.40
14.50	4.44
15.00	4.57
15.50	4.66
16.00	4.64
16.50	4.66
17.00	4.75
17.50	4.85
18.00	4.93

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, Rhophase 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