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Electrical

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TEST REPORT

ACCORDING TO: FCC part 15 subpart C, §15.247 and subpart B

FOR:

Airspan Networks (Israel) Ltd.

Indoor Unit (external antenna)

Model:IDR 2.4

Table of contents

1 Applicant information

Client name:	Airspan Networks (Israel) Ltd.
Address:	1, Harava street, "Unitronics" building, POB 199, Airport City, 70100, Israel
Telephone:	+972 3977 7444
Fax:	+972 3977 7400
E-mail:	zlevi@airspan.com
Contact name:	Mr. Zion Levi

2 Equipment under test attributes

Product name:	Indoor Unit (external antenna)
Product type:	IDR
Model(s):	IDR 2.4
Serial number:	063A37FFFF
Receipt date	9/9/2004

3 Manufacturer information

Manufacturer name:	Airspan Networks (Israel) Ltd.
Address:	1, Harava street, "Unitronics" building, POB 199, Airport City, 70100, Israel
Telephone:	+972 3977 7444
Fax:	+972 3977 7400
E-Mail:	zlevi@airspan.com
Contact name:	Mr. Zion Levi

4 Test details

Project ID:	16078
Location:	Hermon Laboratories Ltd. P.O.Box 23, Binyamina 30500, Israel
Test started:	9/9/2004
Test completed:	9/19/2004
Test specification(s):	FCC part 15 subpart C, §15.247(c); §15.207, subpart B, §15.107, §15.109
Test suite:	FCC_15.247_FHSS_with_RF_connector (5/4/2004 10:54:02 AM, modified)

5 Tests summary

Test	Status
Transmitter characteristics	
Section 15.247(a)(1), Minimum frequency channel separation	Pass
Section 15.247(a)(1), Minimum bandwidth	Not required
Section 15.247(a)(1), Minimum number of hopping channels	Not required
Section 15.247(b), Peak output power	Pass
Section 15.247(d), Peak power density	Pass
Section 15.247(f), Average time of occupancy	Pass
Section 15.247(c), Radiated spurious emissions	Pass
Section 15.207(a), Conducted emission	Pass
Unintentional emissions	
Section 15.107, Conducted emission at AC power port	Pass
Section 15.109, Radiated emission	Pass
Section 15.111, Conducted emission at receiver antenna port	Not required

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. M. Lerman, test engineer	September 19, 2004	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	November 17, 2004	
	Mr. M. Nikishin, EMC group leader	November 17, 2004	
Approved by:	Mr. A. Usoskin, C.E.O.	November 18, 2004	

6 EUT description

6.1 General information

An indoor radio adapter, IDR 2400 MHz, is a part of a WipLL broadband access system. The system provides a radio link between an end-user (a subscriber) and a network itself to give high-speed data access. The EUT is a hybrid system transceiver (8FSK digital modulation with frequency hopping, data rate 3 Mbps and 4 Mbps), operating in 2400 MHz to 2483.5 MHz range and powered by mains. The IDR is installed inside the subscriber's premises, typically mounted on a wall, desktop, or pole. The IDR is connected to a third-party 17 dBi gain panel or 12 dBi omnidirectional external antenna, which is typically mounted outside to provide line-of-site with the base station.

6.2 EUT modules

Description	Manufacturer	Model number	Serial number
Transceiver	AirSpan	IDR hybrid	063A37FFFF
Power supply	YCL	ADE-1721	90227036920
Antenna	TELTECH	TA2308	40946.1
Antenna	TELTECH	TA2350-2	40947.1

6.3 Ports and lines

Port type	Port description	Connected		Connector type	Qty.	Cable type	Cable length	Indoor / outdoor
		From	To					
IDR								
Signal	Ethernet	EUT	LAPTOP	RJ45	1	UTP	1m*	Indoor
Signal	Management	EUT	Not connected	RJ11	NA	NA	NA	NA
Signal	RF	EUT	ANTENNA	TNC	1	COAX	1m*	Outdoor
Power	DC power	EUT	PS	6-pin jack	1	Power	1.5m	Indoor
Power	AC mains	PS	AC mains	IEC 320	1	Power	1.5m	Indoor
LAPTOP								
Signal	Keyboard	LAPTOP	Keyboard	PS/2	1	Shielded	1.5m	Indoor
Signal	RS-232	LAPTOP	Mouse	D-Type 9	1	Shielded	1.5m	Indoor
Signal	LPT	LAPTOP	Printer	D-Type 25	1	Shielded	15m	Indoor
Power	DC power	LAPTOP	PS	3-pin jack	1	Power	1.5m	Indoor
Power	AC mains	PS	AC mains	IEC 320	1	Power	1.5m	Indoor

*- Can be longer than 30m

6.4 Support and test equipment

Description	Manufacturer	Model number	Serial number
Laptop	DELL	Latitude	TW-0791UH-12800-OCS-2939
P.S.	DELL	ADP-70EB	TUA-09364U-17971-09P-JQLA
Mouse	Logitech	M-M30	811209
Keyboard	BTC	9198	300152177
Printer	EPSON	LX-810	44B1127035

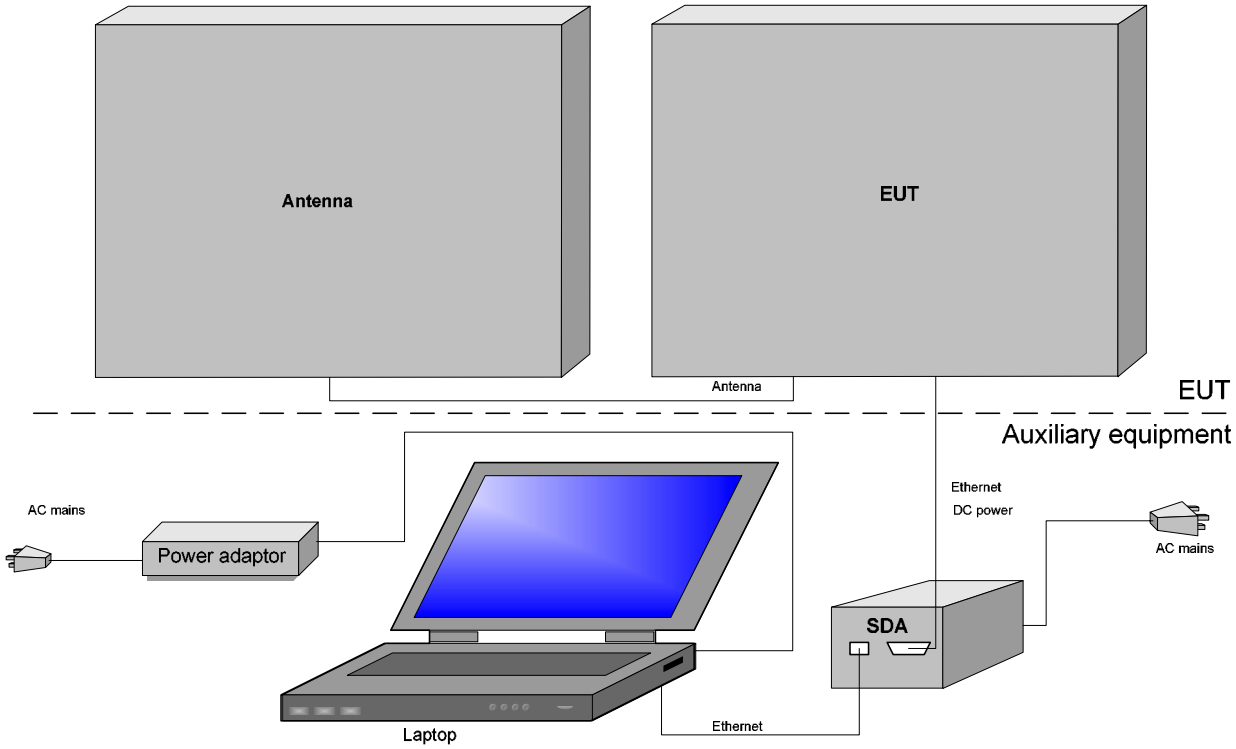
6.5 Operating frequencies

Source	Frequency, MHz			
Digital portion	(clock)	48	25	20
Receiver	6 (BASEBAND)	350 (LO1)	2133.5(LO2)	2483.5
Transmitter	6 (BASEBAND)	350 (LO1)	2133.5(LO2)	2483.5
CPU	500			
SDRAM	133			
PCI	33			

6.6 Changes made in the EUT

No changes were implemented.

6.7 Test configuration



Test specification:	Section 15.247(b)1, Peak output power		
Test procedure:	Public notice DA 00-705, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

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

7.1 Peak output power test

7.1.1 General

This test was performed to measure the peak output power at RF antenna connector. Specification test limits are given in Table 7.3.1. The test results are provided in Table 7.3.2 and associated plots.

Table 7.1.1 Peak output power limits

Assigned frequency range, MHz	Maximum peak output power	
	W	dBm
2400 – 2483.5	1	30

NOTE: If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power limit shall be reduced below the stated values by the amount in dB that the directional gain of antenna exceeds 6 dBi.
The panel antenna gain is 17 dBi, the peak output power limit is 30 - (17 - 6) = 19 dBm;
The omnidirectional antenna gain is 12 dBi, the peak output power limit is 30 - (12 - 6) = 24 dBm

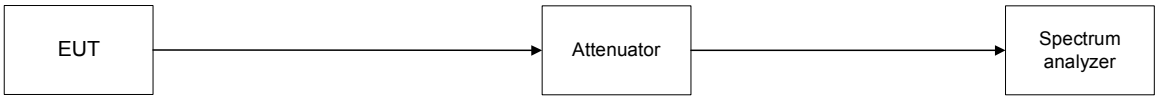
7.1.2 Test procedure

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

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

7.1.2.3 The peak output power was measured with spectrum analyzer as provided in Table 7.3.2 and associated plots.

Figure 7.1.1 Peak output power test setup



Test specification:	**Section 15.247(b)1, Peak output power**		
Test procedure:	Public notice DA 00-705, Section 15.247(b)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 39 %	**Power Supply:** 120 VAC
Remarks:			

Table 7.1.2 Peak output power test results

OPERATING FREQUENCY RANGE: 2403 – 2481 MHz
DETECTOR USED: Peak
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
HOPPING FUNCTION: Disabled

Carrier frequency, MHz	Power meter reading, dBm	External attenuation, dB	RF power, dBm	Cable loss, dB	RF output power, dBm	Limit, dBm	Margin, dB	Verdict
2403	-30.0	50.5	20.50	4.4	16.1	19	2.90	Pass
2450	-27.33	50.5	23.17	4.4	18.77	19	0.23	Pass
2481	-27.17	50.5	23.33	4.4	18.93	19	0.07	Pass

The device equipped by 100 feet length cable, BELDEN 9905, with 4.4 dB cable loss.

Reference numbers of test equipment used

HL 0661	HL 1562	HL 2014	HL 2227	HL 2400			

Full description is given in Appendix A.

Test specification:	Section 15.247(a)1, Carrier frequency separation		
Test procedure:	Public notice DA 00-705, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

7.2 Carrier frequency separation

7.2.1 General

This test was performed to measure frequency separation between the peaks of adjacent channels. Specification test limits are given in Table 7.2.1.

Table 7.2.1 Carrier frequency separation limits

Assigned frequency range, MHz	Carrier frequency separation
2400.0 – 2483.5	25 kHz or 20 dB bandwidth of the hopping channel, whichever is greater

7.2.2 Test procedure

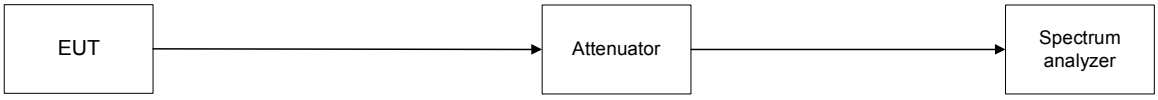
7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized with frequency hopping function enabled and its proper operation was checked.

7.2.2.2 The spectrum analyzer span was set to capture the carrier frequency and both of adjacent channels, the lower and the higher. The resolution bandwidth was set wider than 1 % of the frequency span.

7.2.2.3 The spectrum analyzer was set in max hold mode and allowed trace to stabilize.

7.2.2.4 The frequency separation between the peaks of adjacent channels was measured as provided in Table 7.2.2 and associated plots.

Figure 7.2.1 Carrier frequency separation test setup



Test specification:	**Section 15.247(a)1, Carrier frequency separation**		
Test procedure:	Public notice DA 00-705, Section 15.247(b)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 39 %	**Power Supply:** 120 VAC
Remarks:			

Table 7.2.2 Carrier frequency separation test results

OPERATING FREQUENCY RANGE:	2403 – 2481 MHz
MODULATION:	8FSK
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	100 kHz
VIDEO BANDWIDTH:	100 kHz
FREQUENCY HOPPING:	Enabled
20 dB BANDWIDTH:	980 kHz

Carrier frequency separation, kHz	Limit, kHz	Margin*	Verdict
1000	980	20	Pass

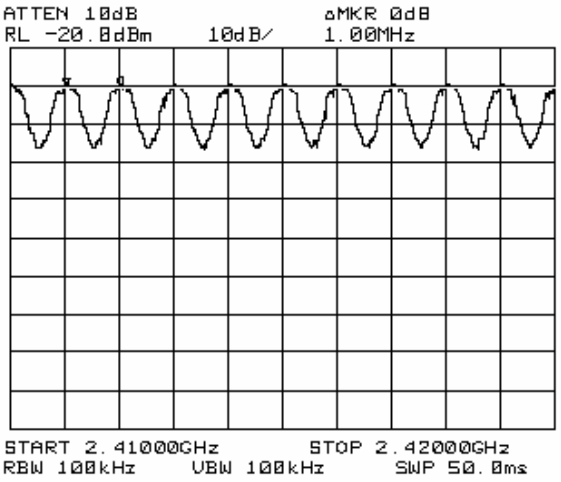
* - Margin = Carrier frequency separation – specification limit.

Reference numbers of test equipment used

HL 0057	HL 1424						

Full description is given in Appendix A.

Plot 7.2.1 Carrier frequency separation



Test specification:	Section 15.247(d), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	7/5/2004 4:03:01 PM		
Temperature: 25,4 ºC	Air Pressure: 1006 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

7.3 Peak spectral power density

7.3.1 General

This test was performed to measure the peak spectral power density at the transmitter RF antenna connector. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Peak spectral power density limits

Assigned frequency range, MHz	Measurement bandwidth, kHz	Peak spectral power density, dBm
2400.0 – 2483.5	3.0	8.0

7.3.2 Test procedure

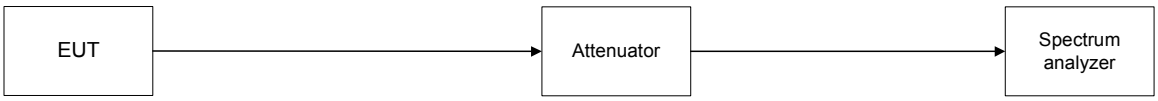
7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.

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

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

7.3.2.4 The peak of emission was zoomed with span set just wide enough to capture the emission peak area and sweep time was set equal to span width divided by resolution bandwidth. Spectrum analyzer was set in peak hold mode, sufficient number of sweeps was allowed for trace stabilization and peak spectral power density was measured as provided in Table 7.3.2 and associated plots.

Figure 7.3.1 Peak spectral power density test setup



Test specification:	**Section 15.247(d), Peak power density**		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	7/5/2004 4:03:01 PM		
Temperature: 25,4 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 39 %	**Power Supply:** 120 VAC
Remarks:			

Table 7.3.2 Peak spectral power density test results

OPERATING FREQUENCY RANGE: 2403 – 2481 MHz
MODULATION: FSK
MODULATING SIGNAL: PRBS
BIT RATE: 1.0, 2.0, 3.0 and 1.33, 4.0 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
TRANSMITTER OUTPUT POWER: For 3.0 Mbps:
23.3 dBm at low carrier frequency
23.3 dBm at mid carrier frequency
23.3 dBm at high carrier frequency
For 1.33 Mbps:
23.2 dBm at low carrier frequency
23.2 dBm at mid carrier frequency
23.2 dBm at high carrier frequency
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 3 kHz
VIDEO BANDWIDTH: 10 kHz

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	Peak power density, dB(mW/3 kHz)	Limit, dBm	Margin*, dB	Verdict
3.0 Mbps data rate (the worst case from 1.0, 2.0 and 3.0 Mbps which correspond to 1.0 Msymbol per second)							
2402.0	5.0	Included	Included	5.0	8.0	-3.0	Pass
2441.0	5.3	Included	Included	5.3	8.0	-2.7	Pass
2480.0	5.0	Included	Included	5.0	8.0	-3.0	Pass
1.33 Mbps data rate(the worst case from 1.33, and 4.0 Mbps which correspond to 1.33 Msymbol per second)							
2403.0	2.0	Included	Included	2.0	8.0	-6.0	Pass
2441.0	1.3	Included	Included	1.3	8.0	-6.7	Pass
2477.0	1.3	Included	Included	1.3	8.0	-6.7	Pass

* - Margin = Peak power density – specification limit.

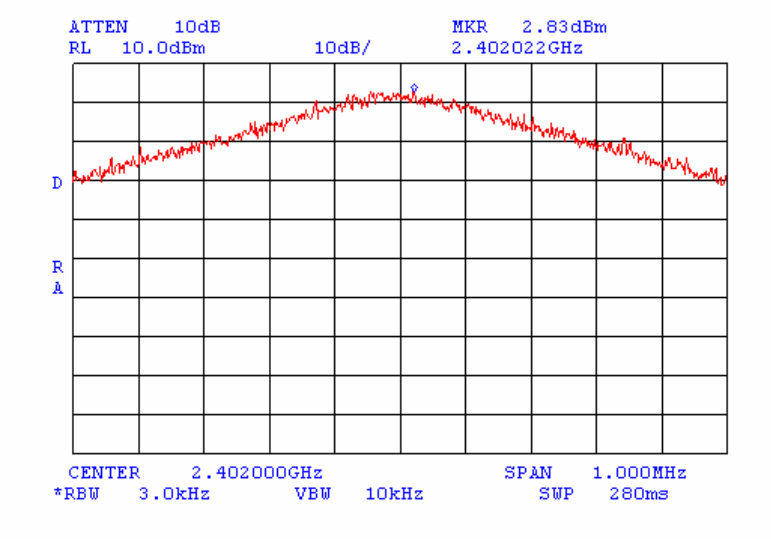
Reference numbers of test equipment used

HL 1424	HL 1651	HL 2254	HL 2524				

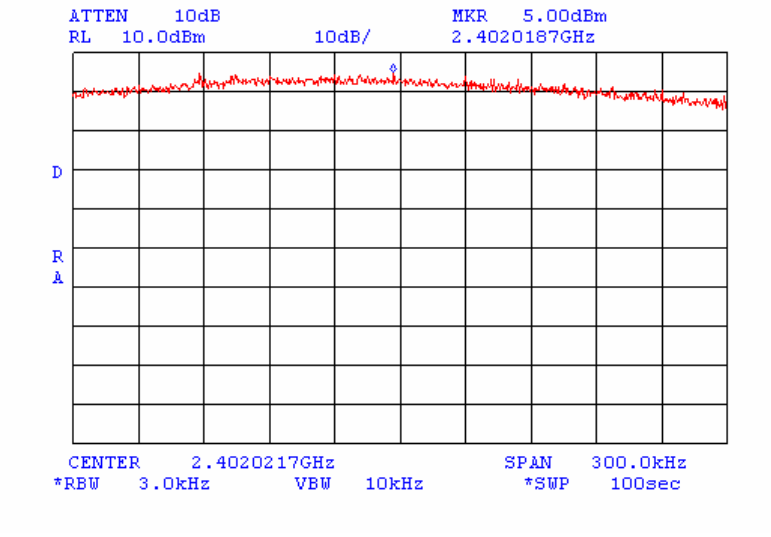
Full description is given in Appendix A.

Test specification:	Section 15.247(d), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	7/5/2004 4:03:01 PM		
Temperature: 25,4 ºC	Air Pressure: 1006 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

Plot 7.3.1 Peak spectral power density at low frequency within 6 dB band. 3.0 Mbps data rate.

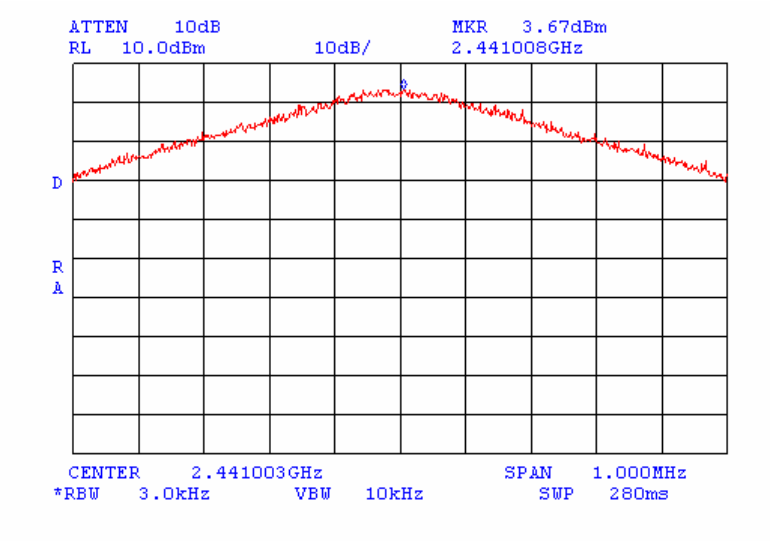


Plot 7.3.2 Peak spectral power density at low frequency zoomed at the peak. 3.0 Mbps data rate.

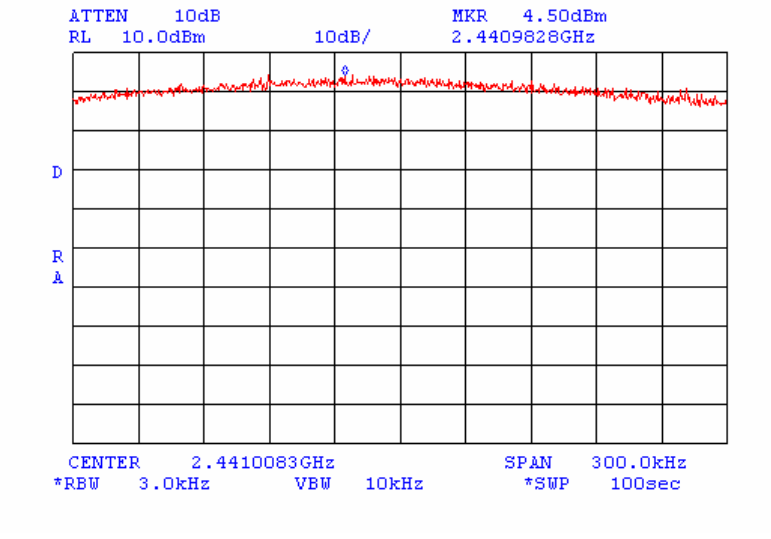


Test specification:	Section 15.247(d), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	7/5/2004 4:03:01 PM		
Temperature: 25,4 ºC	Air Pressure: 1006 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

Plot 7.3.3 Peak spectral power density at mid frequency within 6 dB band. 1.0 Mbps data rate.

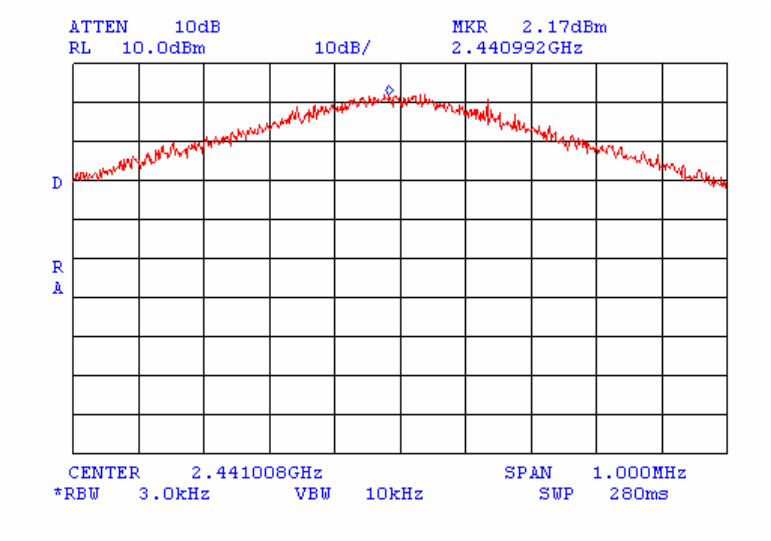


Plot 7.3.4 Peak spectral power density at mid frequency zoomed at the peak. 1.0 Mbps data rate.

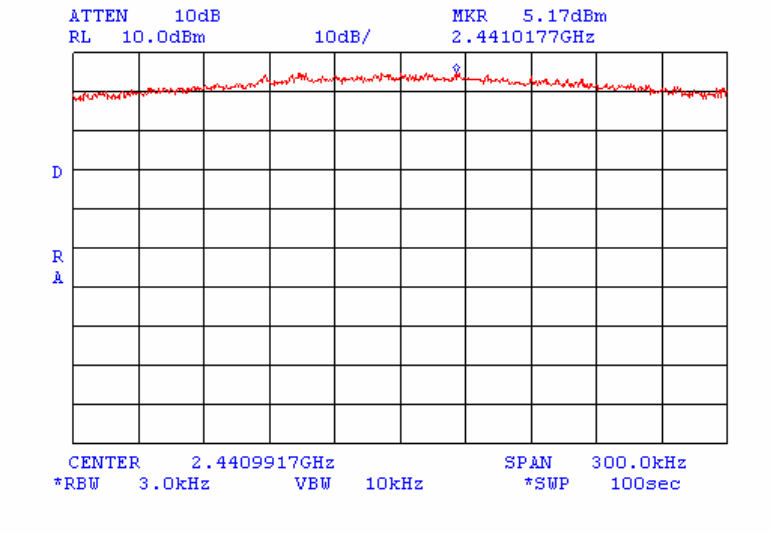


Test specification:	Section 15.247(d), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	7/5/2004 4:03:01 PM		
Temperature: 25,4 ºC	Air Pressure: 1006 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

Plot 7.3.5 Peak spectral power density at mid frequency within 6 dB band. 2.0 Mbps data rate.

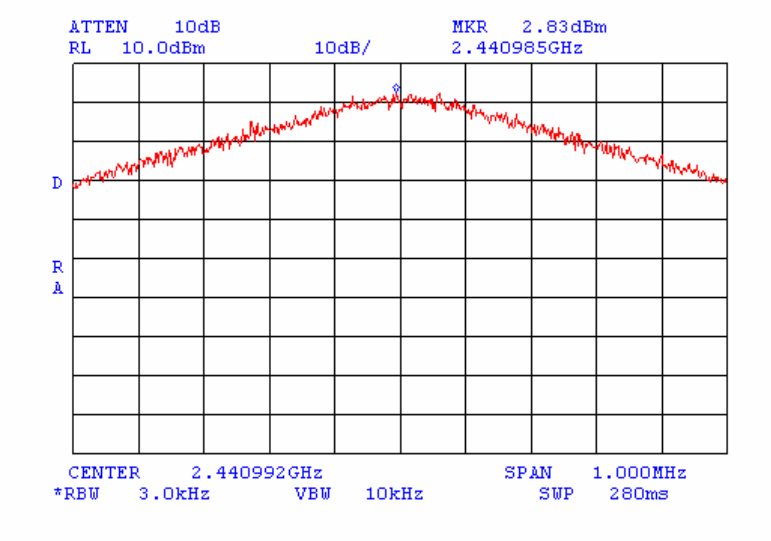


Plot 7.3.6 Peak spectral power density at mid frequency zoomed at the peak. 2.0 Mbps data rate.

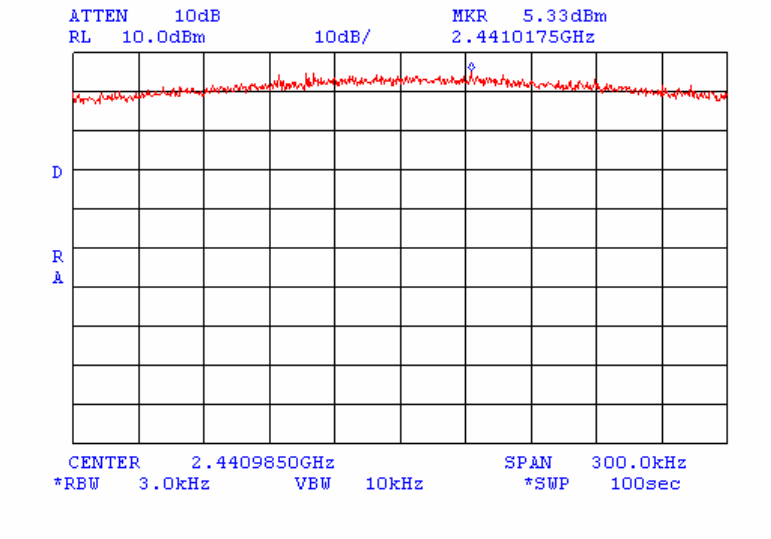


Test specification:	Section 15.247(d), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	7/5/2004 4:03:01 PM		
Temperature: 25,4 ºC	Air Pressure: 1006 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

Plot 7.3.7 Peak spectral power density at mid frequency within 6 dB band. 3.0 Mbps data rate.

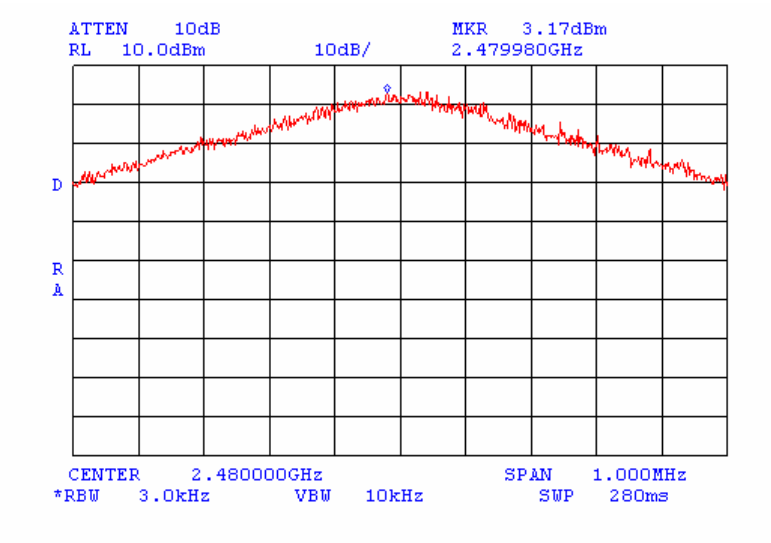


Plot 7.3.8 Peak spectral power density at mid frequency zoomed at the peak. 3.0 Mbps data rate.

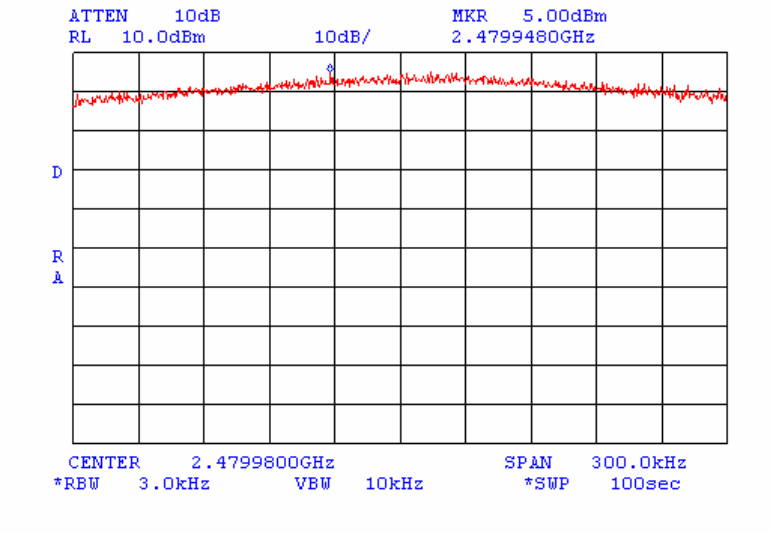


Test specification:	Section 15.247(d), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	7/5/2004 4:03:01 PM		
Temperature: 25,4 ºC	Air Pressure: 1006 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

Plot 7.3.9 Peak spectral power density at high frequency within 6 dB band. 3.0 Mbps data rate.

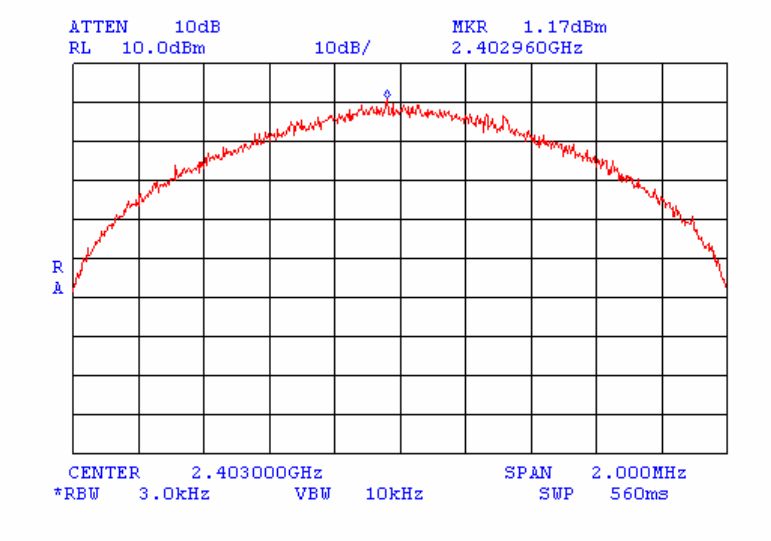


Plot 7.3.10 Peak spectral power density at high frequency zoomed at the peak. 3.0 Mbps data rate.

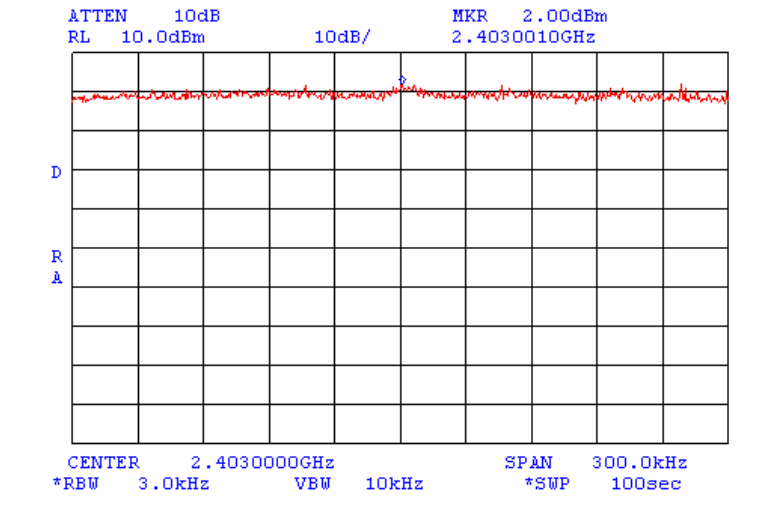


Test specification:	Section 15.247(d), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	7/5/2004 4:03:01 PM		
Temperature: 25,4 ºC	Air Pressure: 1006 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

Plot 7.3.11 Peak spectral power density at low frequency within 6 dB band. 1.33 Mbps data rate.

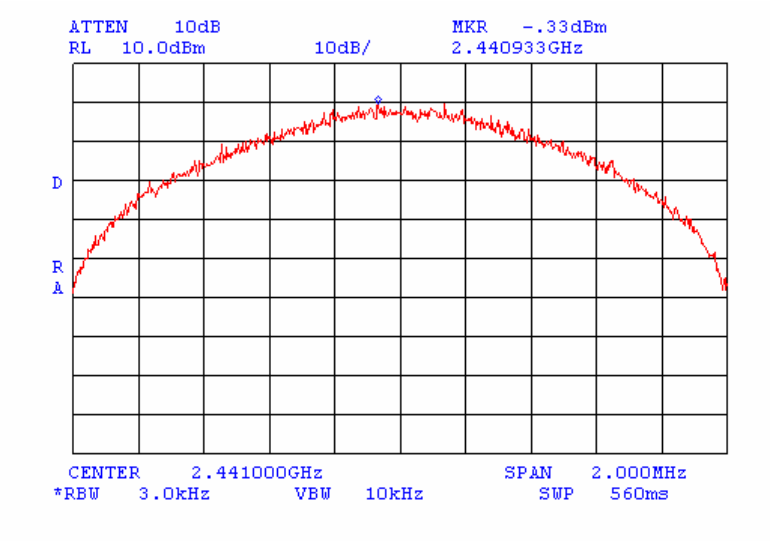


Plot 7.3.12 Peak spectral power density at low frequency zoomed at the peak. 1.33 Mbps data rate.

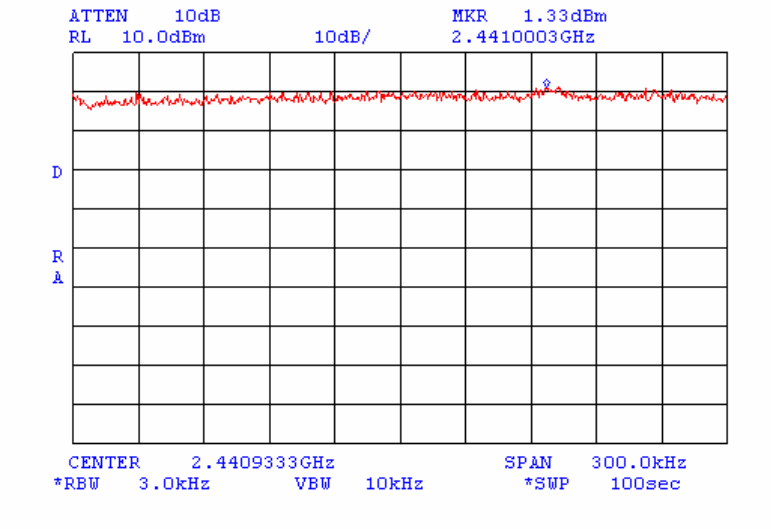


Test specification:	Section 15.247(d), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	7/5/2004 4:03:01 PM		
Temperature: 25,4 ºC	Air Pressure: 1006 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

Plot 7.3.13 Peak spectral power density at mid frequency within 6 dB band. 1.33 Mbps data rate.

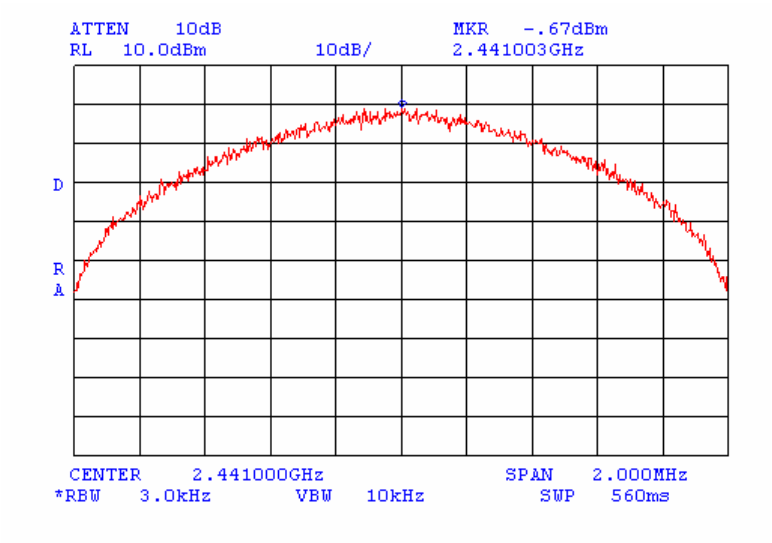


Plot 7.3.14 Peak spectral power density at mid frequency zoomed at the peak. 1.33 Mbps data rate.

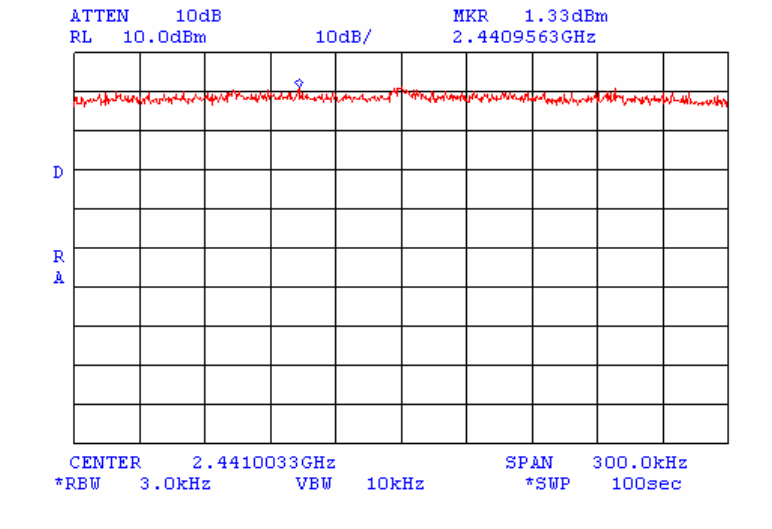


Test specification:	Section 15.247(d), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	7/5/2004 4:03:01 PM		
Temperature: 25,4 ºC	Air Pressure: 1006 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

Plot 7.3.15 Peak spectral power density at mid frequency within 6 dB band. 4.0 Mbps data rate.

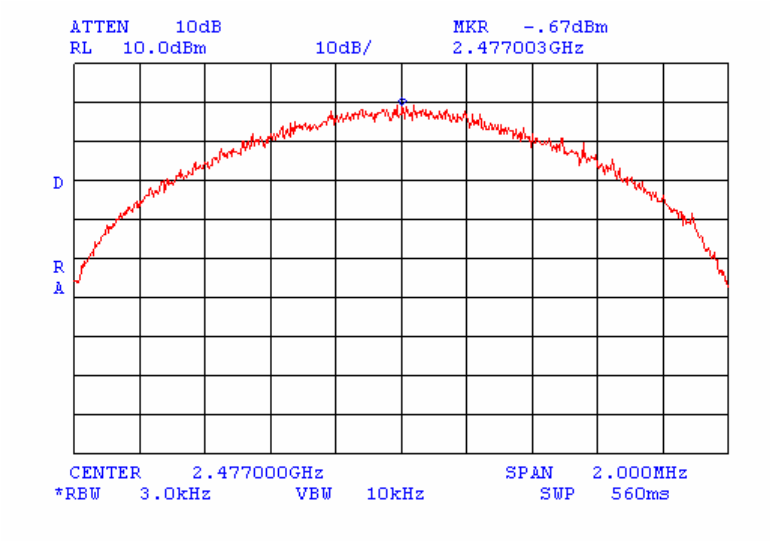


Plot 7.3.16 Peak spectral power density at mid frequency zoomed at the peak. 4.0 Mbps data rate.

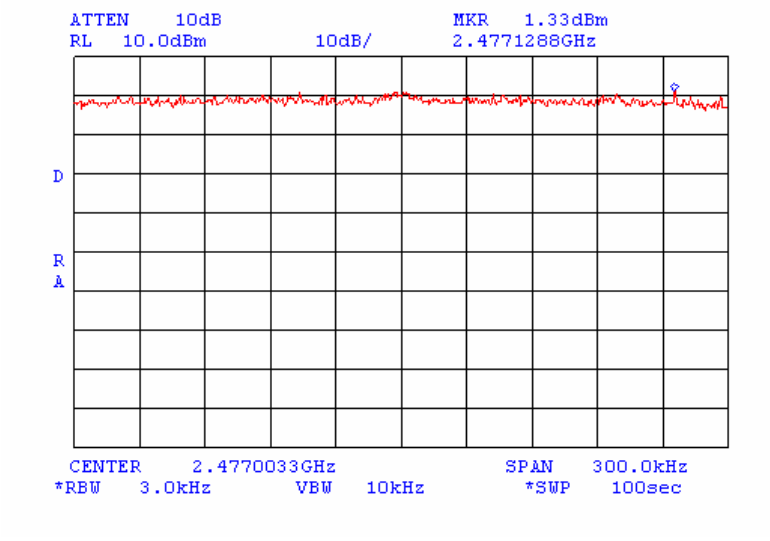


Test specification:	Section 15.247(d), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	7/5/2004 4:03:01 PM		
Temperature: 25,4 ºC	Air Pressure: 1006 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

Plot 7.3.17 Peak spectral power density at high frequency within 6 dB band. 1.33 Mbps data rate.



Plot 7.3.18 Peak spectral power density at high frequency zoomed at the peak. 1.33 Mbps data rate.



Test specification:	Section 15.247(a)(1)(iii), Average time of occupancy		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 4:03:01 PM		
Temperature: 25 ºC	Air Pressure: 1006 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

7.4 Average time of occupancy

7.4.1 General

This test was performed to calculate the average time of occupancy (dwell time) on any frequency channel of the EUT. Specification test limits are given in Table 7.4.1.

Table 7.4.1 Average time of occupancy limits

Assigned frequency range, MHz	Maximum average time of occupancy, s	Investigated period, s	Number of hopping frequencies
2400.0 – 2483.5	0.4	0.4 × N	N (≥ 15)

7.4.2 Test procedure

7.4.2.1 The EUT was set up as shown in Figure 7.4.1 , energized with frequency hopping function enabled and its proper operation was checked.

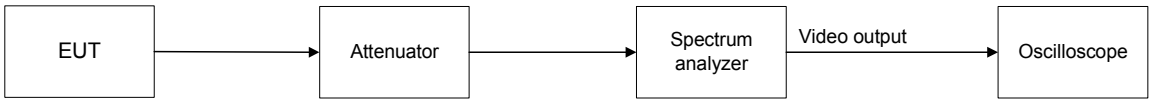
7.4.2.2 The spectrum analyzer span was set to zero centered on a hopping channel.

7.4.2.3 The single transmission duration and period were measured with oscilloscope.

7.4.2.4 The average time of occupancy was calculated as the single transmission time multiplied by the investigated period and divided by the single transmission period.

7.4.2.5 The test was repeated at each data rate and modulation type as provided in Table 7.4.2 and associated plots.

Figure 7.4.1 Average time of occupancy test setup



Test specification:	**Section 15.247(a)(1)(iii), Average time of occupancy**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	9/19/2004 4:03:01 PM		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 39 %	**Power Supply:** 120 VAC
Remarks:			

Table 7.4.2 Average time of occupancy test results

OPERATING FREQUENCY RANGE:	2403 – 2481 MHz
MODULATION:	FSK
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	1 MHz
VIDEO BANDWIDTH:	3 MHz
NUMBER OF HOPPING FREQUENCIES:	79
INVESTIGATED PERIOD:	31.6 s
FREQUENCY HOPPING:	Enabled

Single transmission duration, ms	Single transmission period, s	Average time of occupancy*, s	Limit, s	Margin, s**	Verdict
25.3	3.950	0.202	0.4	0.198	Pass

* - Average time of occupancy = (Single transmission duration × Investigated period) / Single transmission period.
** - Margin = Average time of occupancy – specification limit.

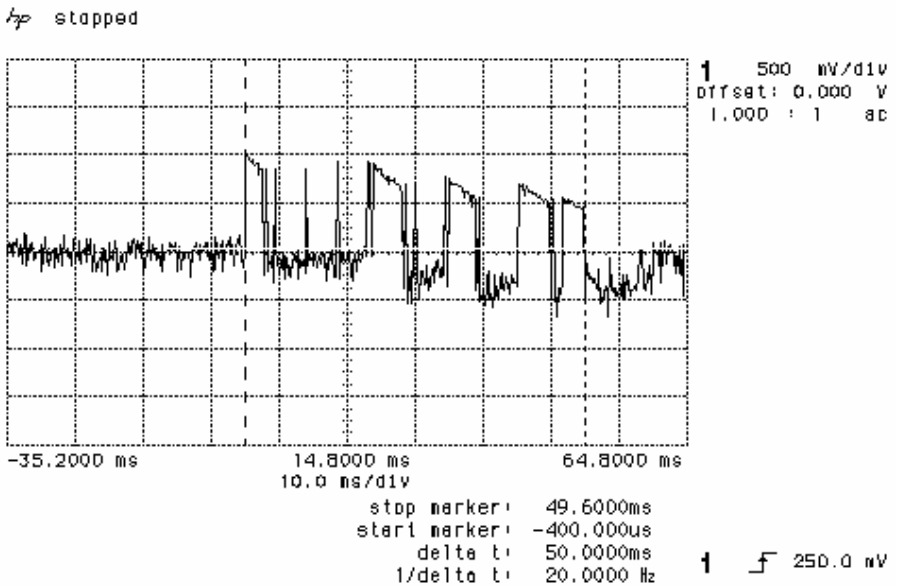
Reference numbers of test equipment used

HL 0057	HL 0483	HL 1424					

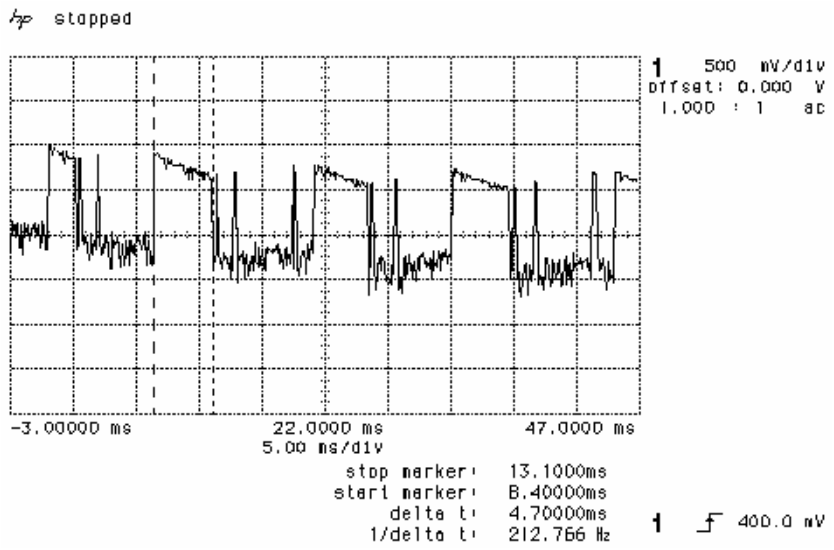
Full description is given in Appendix A.

Test specification:	Section 15.247(a)(1)(iii), Average time of occupancy		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 4:03:01 PM		
Temperature: 25 ºC	Air Pressure: 1006 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

Plot 7.4.1 Single transmission duration measurement

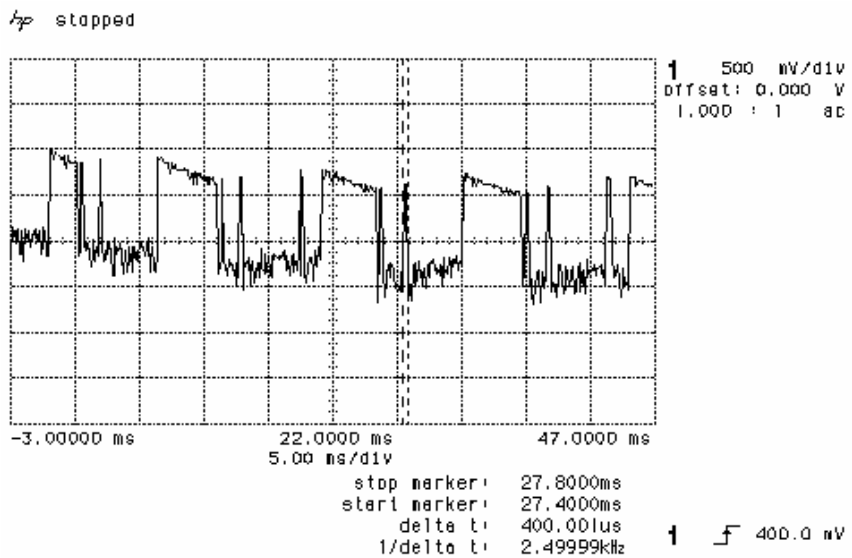


Plot 7.4.2 Single transmission duration measurement



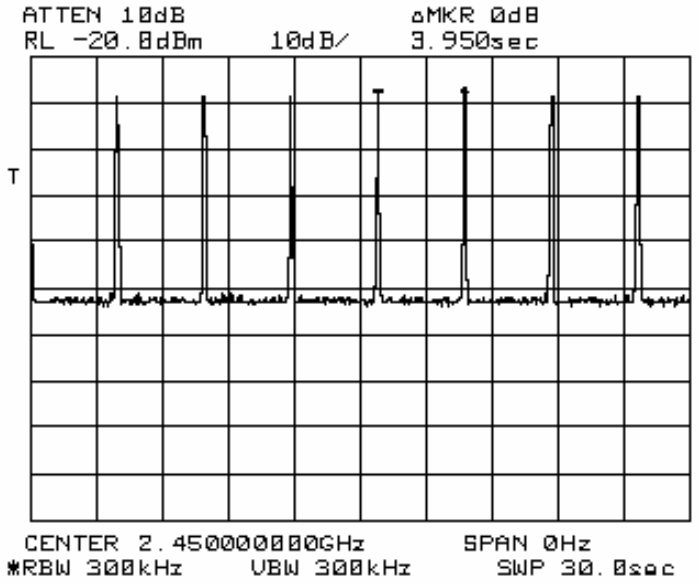
Test specification:	Section 15.247(a)(1)(iii), Average time of occupancy		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 4:03:01 PM		
Temperature: 25 ºC	Air Pressure: 1006 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

Plot 7.4.3 Single transmission duration measurement



Ton=2.5 + 4.7x4+0.4x10=25.3 ms

Plot 7.4.4 Single transmission period



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

7.5 Field strength of spurious emissions

7.5.1 General

This test was performed to measure field strength of spurious emissions from the EUT utilizing panel or omnidirectional antennas. Specification test limits are given in Table 7.5.1.

Table 7.5.1 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m within restricted bands, dB(μV/m)***			Attenuation of field strength of spurious versus carrier outside restricted bands, dBc***
	Peak	Quasi Peak	Average	
0.009 – 0.490*	NA	128.5 – 93.8**	NA	20.0
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		
Above 1000	74.0	NA	54.0	

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

$$Lim_{S2} = Lim_{S1} + 40 \log (S_1/S_2),$$

where S_1 and S_2 – standard defined and test distance respectively in meters.
**- The limit decreases linearly with the logarithm of frequency.
*** - The field strength limits applied from the lowest radio frequency generated in the device, without going below 9 kHz up to the tenth harmonic of the highest fundamental frequency.

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

7.5.2.1 The EUT was set up as shown in Figure 7.5.1, energized and the performance check was conducted.

7.5.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^0 and the measuring antenna was rotated around its vertical axis.

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

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

7.5.3.1 The EUT was set up as shown in Figure 7.5.2, energized and the performance check was conducted.

7.5.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal.

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

Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

Figure 7.5.1 Setup for spurious emission field strength measurements below 30 MHz

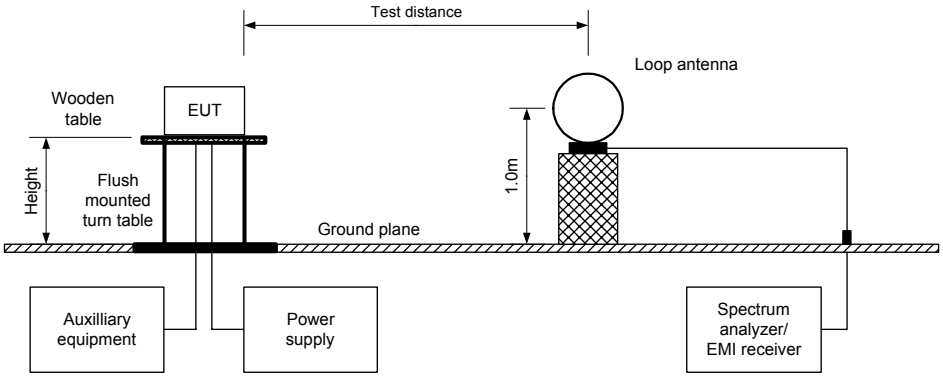
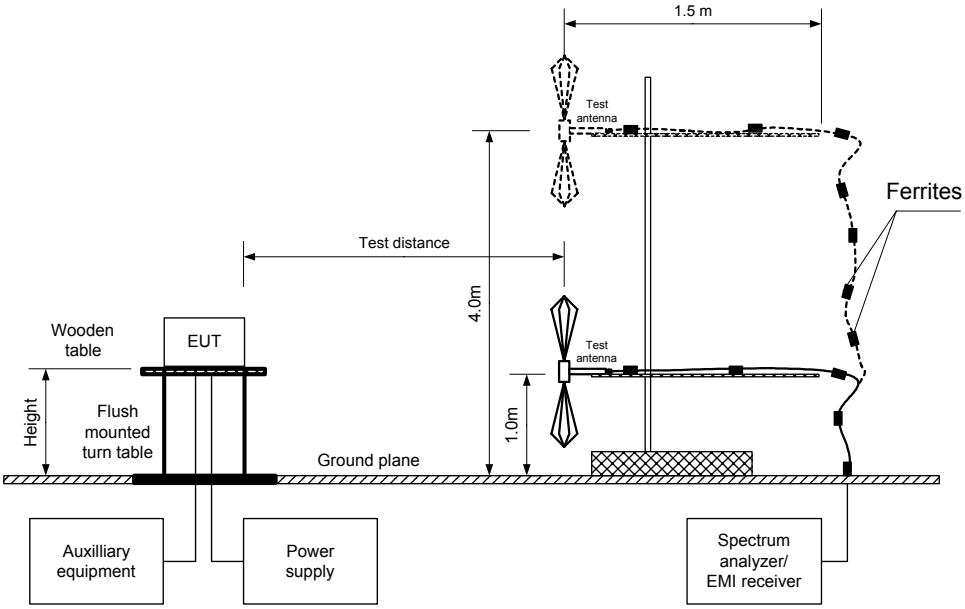


Figure 7.5.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

Table 7.5.2 Field strength of spurious emissions above 1 GHz within restricted bands

EUT with PANEL ANTENNA

ASSIGNED FREQUENCY:	2400 – 2483.5 MHz
INVESTIGATED FREQUENCY RANGE:	1000 - 25000 MHz
TEST DISTANCE:	3 m
MODULATION:	8FSK
MODULATING SIGNAL:	PRBS
BIT RATE:	3 Mbps
DUTY CYCLE:	100 %
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	1000 kHz
TEST ANTENNA TYPE:	Double ridged guide
FREQUENCY HOPPING:	Disabled

Frequency, MHz	Antenna		Azimuth, degrees*	Peak field strength(VBW=3 MHz)			Average field strength(VBW=10 Hz)				Verdict
	Polarization	Height, m		Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Calculated, dB(µV/m)	Limit, dB(µV/m)	Margin, dB***	
Low carrier frequency											
1055.043	H	1.4	60	42.53	74.00	-31.47	37.18	37.18	54.00	-16.82	Pass
1152.050	H	1.1	356	46.31	74.00	-27.69	43.01	43.01	54.00	-11.45	
1200.050	H	1.1	0	46.78	74.00	-27.22	43.53	43.53	54.00	-11.07	
1248.045	H	1.0	330	43.75	74.00	-30.25	39.54	39.54	54.00	-15.50	
1392.012	H	1.3	57	40.91	74.00	-33.09	33.60	33.60	54.00	-23.40	
1439.997	H	1.3	343	40.37	74.00	-33.63	33.22	33.22	54.00	-24.04	
1487.998	H	1.3	360	41.96	74.00	-32.04	35.91	35.91	54.00	-20.47	
1702.050	H	1.7	205	45.51	74.00	-28.49	40.14	40.14	54.00	-15.20	
Mid carrier frequency											
1152.030	H	1.2	289	48.28	74.00	-25.72	45.68	45.68	54.00	-8.51	Pass
1200.000	H	1.1	272	46.66	74.00	-27.34	43.40	43.40	54.00	-11.19	
1344.040	H	1.1	70	42.17	74.00	-31.83	36.37	36.37	54.00	-19.78	
1392.060	H	1.0	40	43.51	74.00	-30.49	38.67	38.67	54.00	-16.61	
1440.050	H	1.0	335	44.06	74.00	-29.94	39.33	39.33	54.00	-16.29	
1488.000	H	1.0	33	44.11	74.00	-29.89	39.50	39.50	54.00	-15.84	
1706.600	V	1.0	175	46.35	74.00	-27.65	34.67	34.67	54.00	-25.10	
High carrier frequency											
1152.025	H	1.2	330	46.09	74.00	-27.91	43.00	43.00	54.00	-11.45	Pass
1200.040	H	1.2	335	47.02	74.00	-26.98	43.65	43.65	54.00	-10.97	
1704.000	V	1.0	232	45.36	74.00	-28.64	37.01	37.01	54.00	-23.88	

*- EUT front panel refers to 0 degrees position of turntable.
**- Margin = Measured field strength - specification limit.
***- Margin = Calculated field strength - specification limit,
where Calculated field strength = Measured field strength + average factor.

Average factor is 0 due to duty cycle, which is 100%

Test specification:	**Section 15.247(c), Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 39 %	**Power Supply:** 120 VAC
Remarks: Panel Antenna			

Table 7.5.3 Field strength of spurious emissions below 1 GHz within restricted bands

EUT with PANEL ANTENNA

ASSIGNED FREQUENCY:	2400 – 2483.5 MHz
INVESTIGATED FREQUENCY RANGE:	0.009 – 1000 MHz
TEST DISTANCE:	3 m
MODULATION:	8FSK
MODULATING SIGNAL:	PRBS
BIT RATE:	3 Mbps
DUTY CYCLE:	100 %
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
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) Biconical (30 MHz – 200 MHz) Log periodic (200 MHz – 1000 MHz) Biconilog (30 MHz – 1000 MHz)
FREQUENCY HOPPING:	Disabled

Frequency, MHz	Peak emission, dB(µV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
Low carrier frequency								
167.5225	39.17	37.19	43.50	-6.31	H	2.3	0	Pass
333.4975	38.74	35.82	46.00	-10.18	H	1.0	228	
400.1970	41.21	38.08	46.00	-7.92	H	1.0	265	
Mid carrier frequency								
167.5165	40.79	38.57	43.50	-4.93	V	1.0	304	Pass
400.2004	38.20	34.31	46.00	-11.69	H	1.0	243	
High carrier frequency								
167.5237	43.91	41.90	43.50	-1.60	H	2.0	173	Pass
240.0300	37.41	35.65	46.00	-10.35	H	1.0	73	

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

Reference numbers of test equipment used

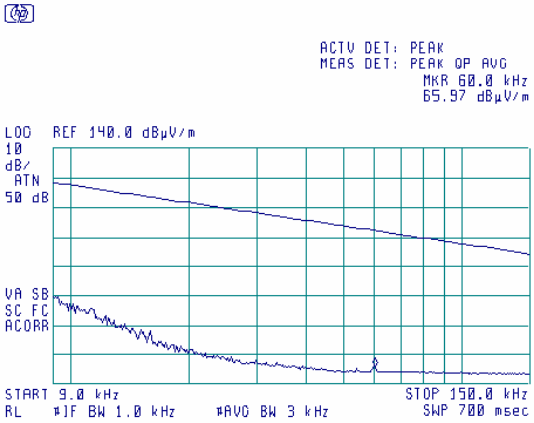
HL 0025	HL 0446	HL 0465	HL 0521	HL 0589	HL 0592	HL 0593	HL 0594
HL 0604	HL 0768	HL 0769	HL 0770	HL 1424	HL 1942	HL 1947	HL 1984
HL 2009	HL 2117	HL 2260	HL 2261	HL 2387	HL 2499		

Full description is given in Appendix A.

Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

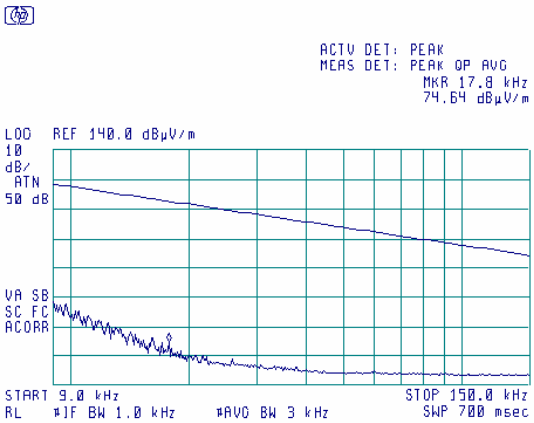
Plot 7.5.1 Radiated emission measurements from 9 to 150 kHz at the low carrier frequency

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



Plot 7.5.2 Radiated emission measurements from 9 to 150 kHz at the mid carrier frequency

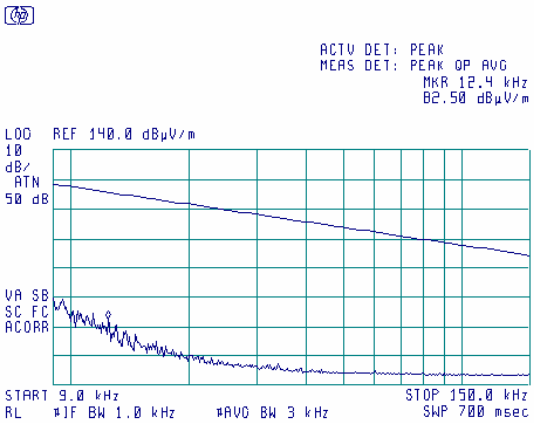
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

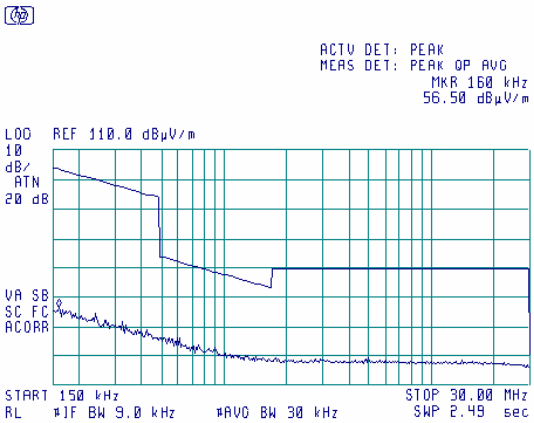
Plot 7.5.3 Radiated emission measurements from 9 to 150 kHz at the high carrier frequency

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



Plot 7.5.4 Radiated emission measurements from 0.15 to 30 MHz at the low carrier frequency

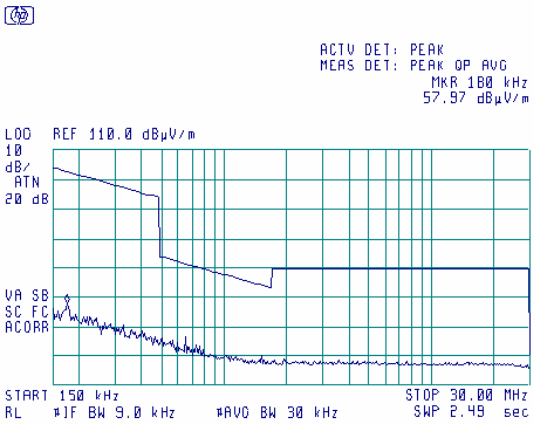
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

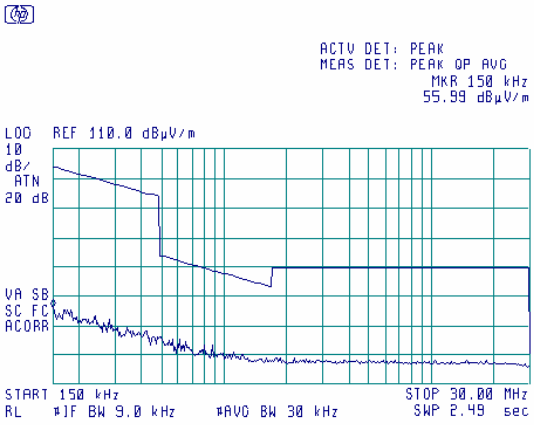
Plot 7.5.5 Radiated emission measurements from 0.15 to 30 MHz at the mid carrier frequency

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



Plot 7.5.6 Radiated emission measurements from 0.15 to 30 MHz at the high carrier frequency

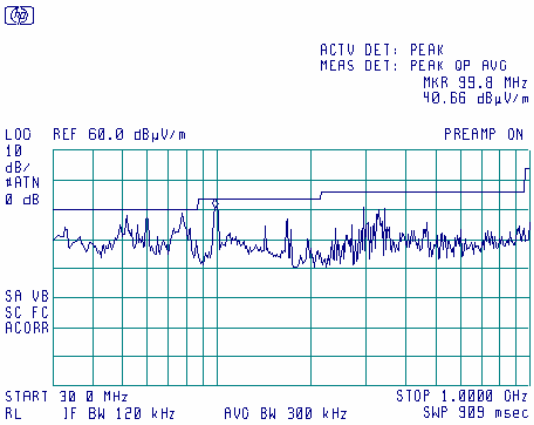
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

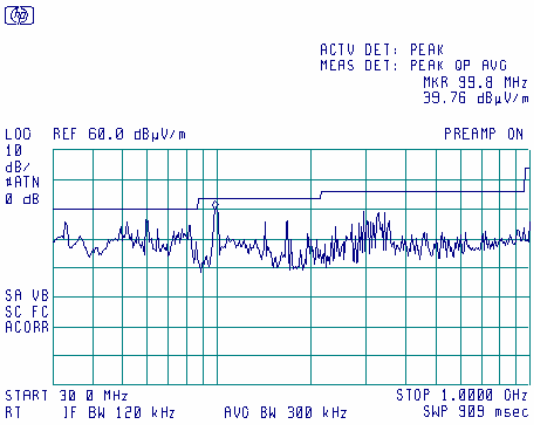
Plot 7.5.7 Radiated emission measurements from 30 to 1000 MHz at the low carrier frequency

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



Plot 7.5.8 Radiated emission measurements from 30 to 1000 MHz at the mid carrier frequency

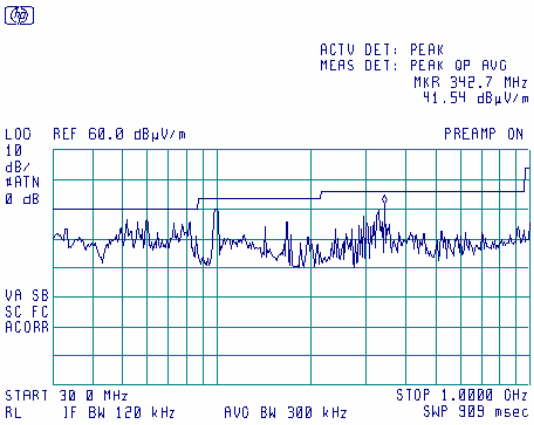
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

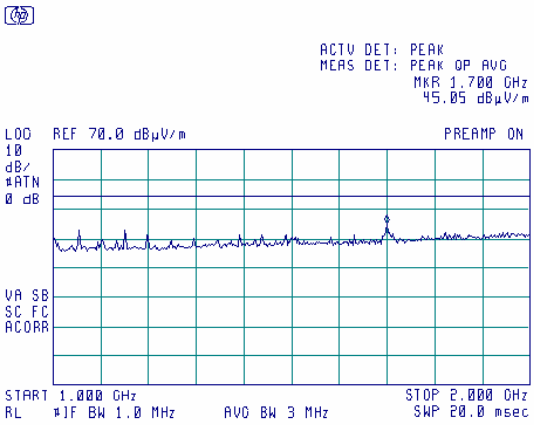
Plot 7.5.9 Radiated emission measurements from 30 to 1000 MHz at the high carrier frequency

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



Plot 7.5.10 Radiated emission measurements from 1000 to 2000 MHz at the low carrier frequency

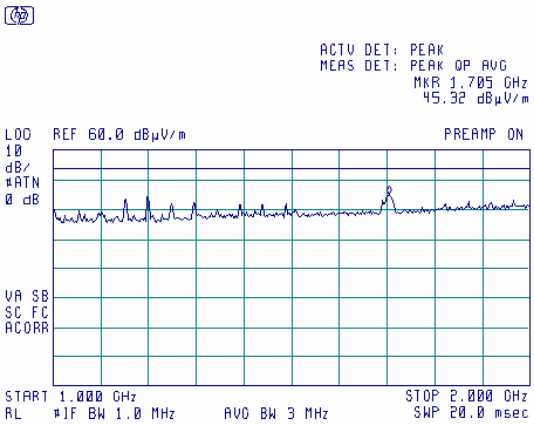
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

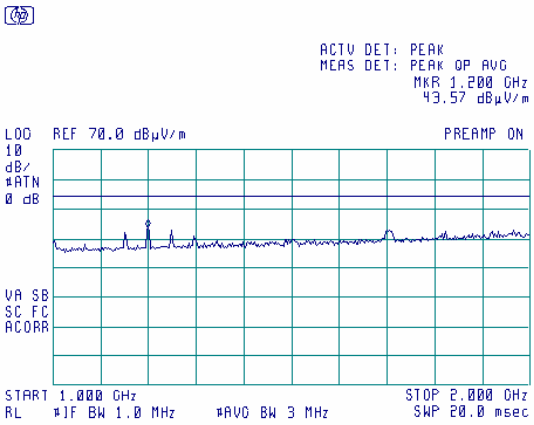
Plot 7.5.11 Radiated emission measurements from 1000 to 2000 MHz at the mid carrier frequency

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



Plot 7.5.12 Radiated emission measurements from 1000 to 2000 MHz at the high carrier frequency

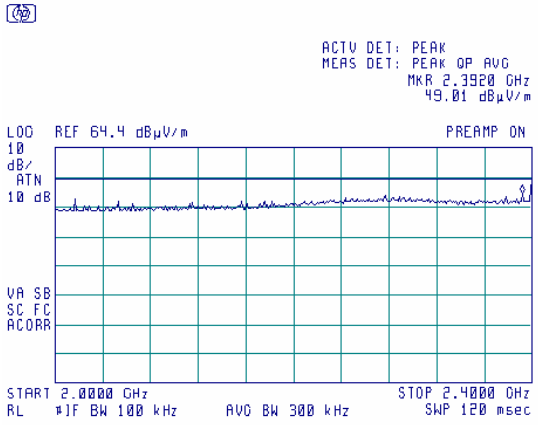
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

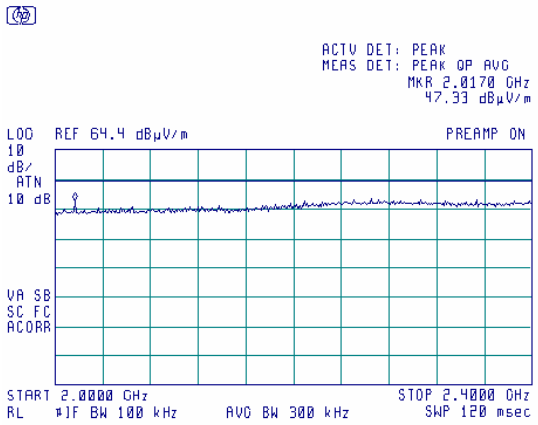
Plot 7.5.13 Radiated emission measurements from 2000 to 2400 MHz at the low carrier frequency

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



Plot 7.5.14 Radiated emission measurements from 2000 to 2400 MHz at the mid carrier frequency

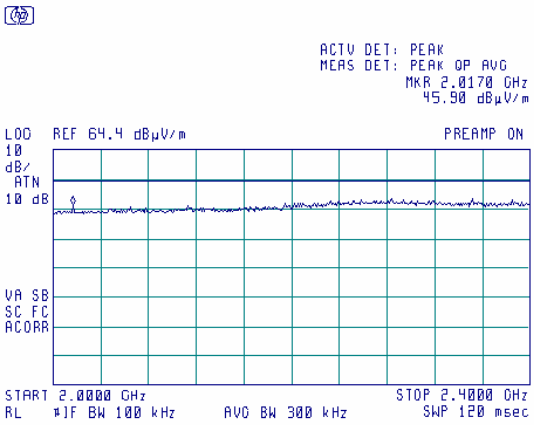
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

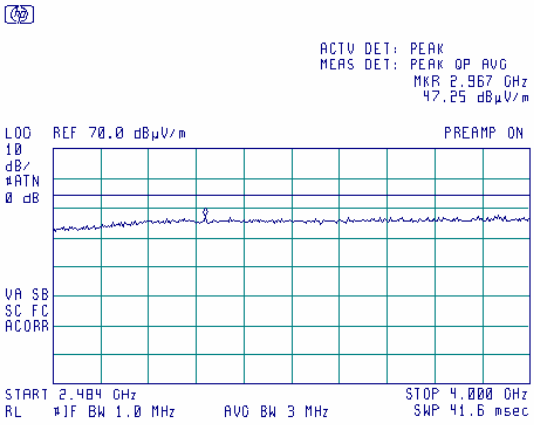
Plot 7.5.15 Radiated emission measurements from 2000 to 2400 MHz at the high carrier frequency

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



Plot 7.5.16 Radiated emission measurements from 2483.5 to 4000 MHz at the low carrier frequency

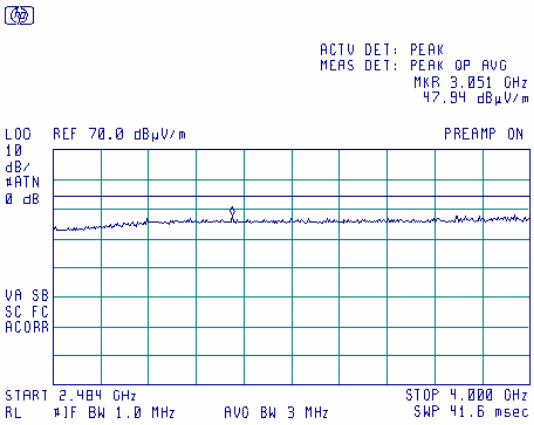
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

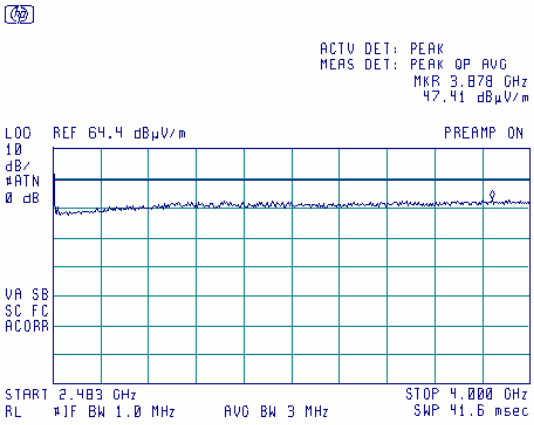
Plot 7.5.17 Radiated emission measurements from 2483.5 to 4000 MHz at the mid carrier frequency

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



Plot 7.5.18 Radiated emission measurements from 2483.5 to 4000 MHz at the high carrier frequency

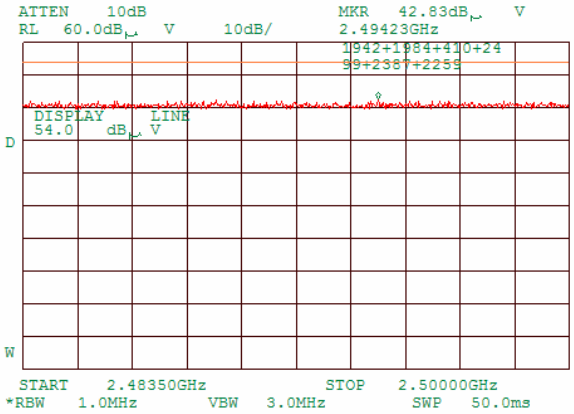
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

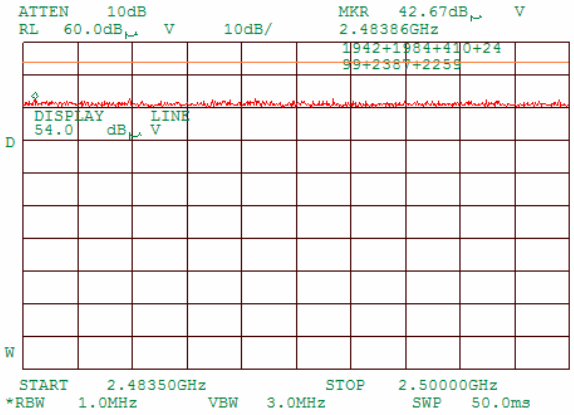
Plot 7.5.19 Radiated emission measurements from 2483.5 to 2500 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DATA RATE: 3 Mbps, 1.0 Msymbol per sec



Plot 7.5.20 Radiated emission measurements from 2483.5 to 2500 MHz at the mid carrier frequency

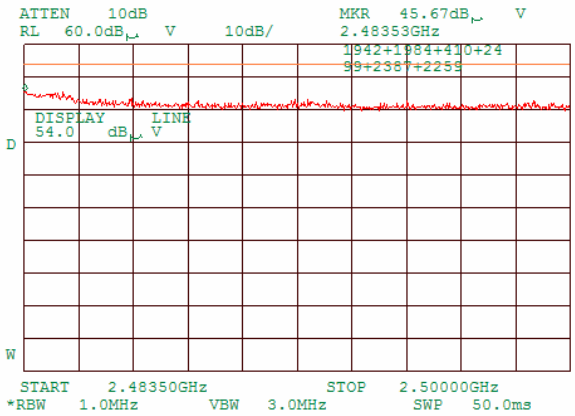
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DATA RATE: 3 Mbps, 1.0 Msymbol per sec



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

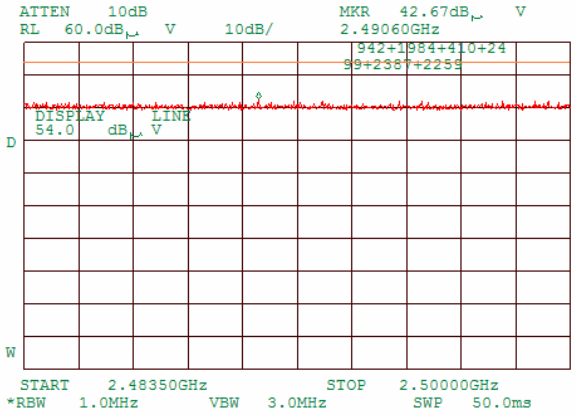
Plot 7.5.21 Radiated emission measurements from 2483.5 to 2500 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DATA RATE: 3 Mbps, 1.0 Msymbol per sec



Plot 7.5.22 Radiated emission measurements from 2483.5 to 2500 MHz at the low carrier frequency

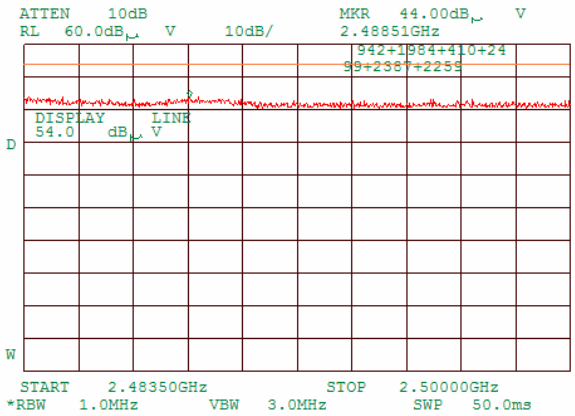
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DATA RATE: 4 Mbps, 1.33 Msymbol per sec



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

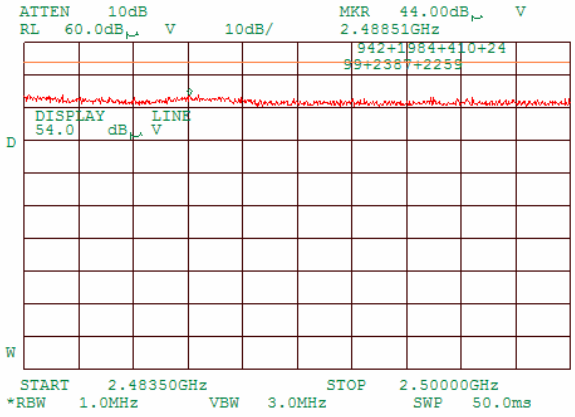
Plot 7.5.23 Radiated emission measurements from 2483.5 to 2500 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DATA RATE: 4 Mbps, 1.33 Msymbol per sec



Plot 7.5.24 Radiated emission measurements from 2483.5 to 2500 MHz at the high carrier frequency

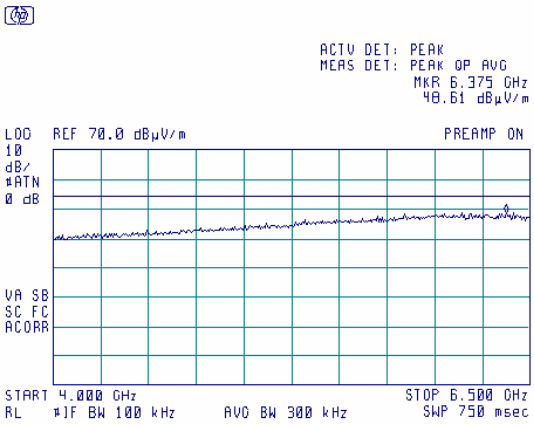
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DATA RATE: 4 Mbps, 1.33 Msymbol per sec



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

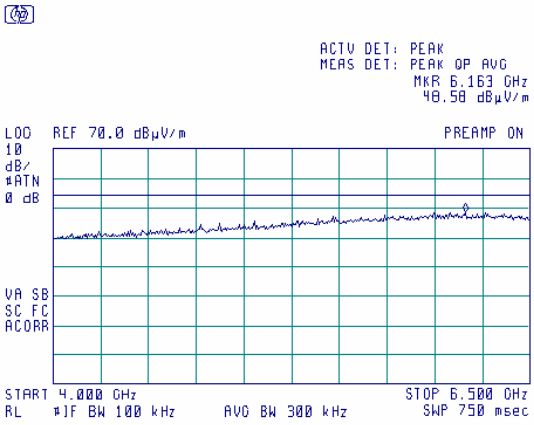
Plot 7.5.25 Radiated emission measurements from 4000 to 6500 MHz at the low carrier frequency

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



Plot 7.5.26 Radiated emission measurements from 4000 to 6500 MHz at the mid carrier frequency

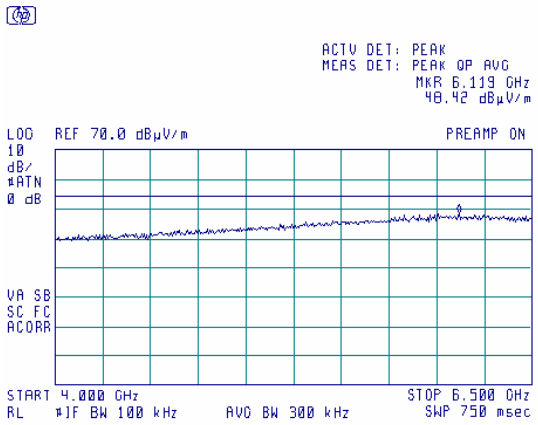
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

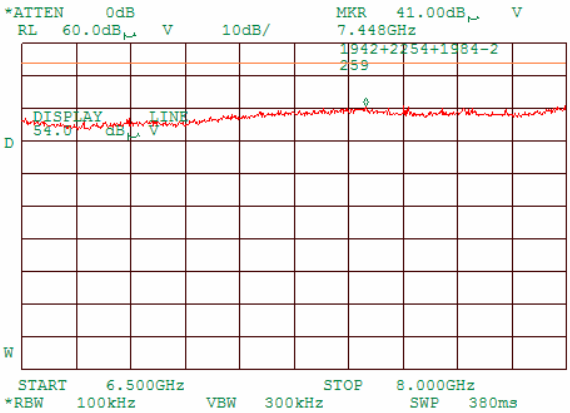
Plot 7.5.27 Radiated emission measurements from 4000 to 6500 MHz at the high carrier frequency

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



Plot 7.5.28 Radiated emission measurements from 6500 to 8000 MHz at the low carrier frequency

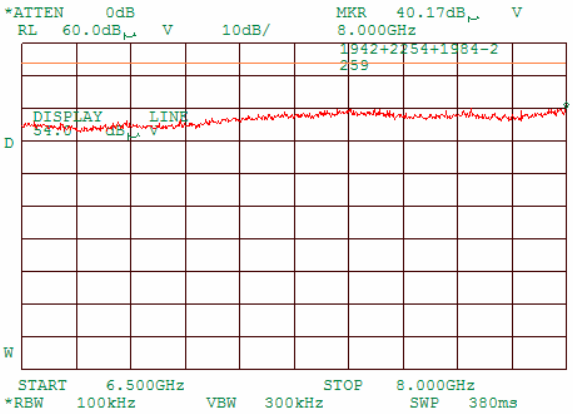
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

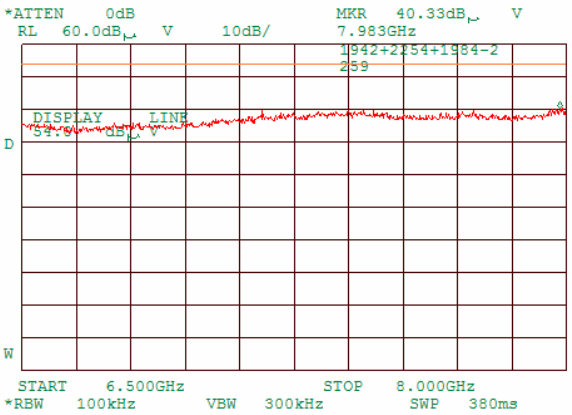
Plot 7.5.29 Radiated emission measurements from 6500 to 8000 MHz at the mid carrier frequency

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



Plot 7.5.30 Radiated emission measurements from 6500 to 8000 MHz at the high carrier frequency

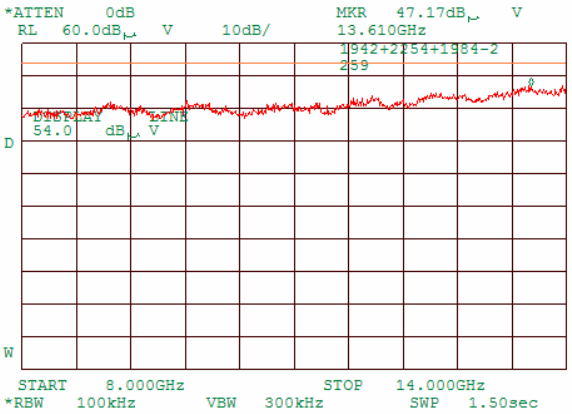
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

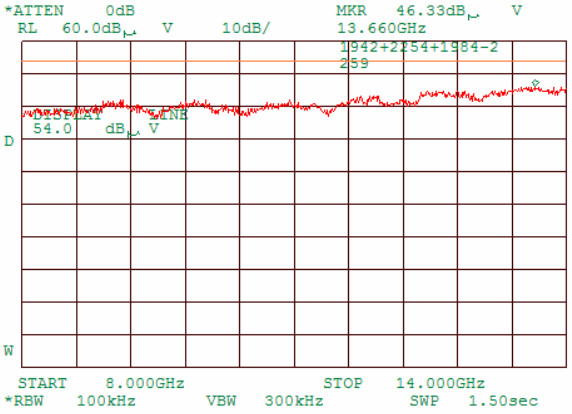
Plot 7.5.31 Radiated emission measurements from 8000 to 14000 MHz at the low carrier frequency

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



Plot 7.5.32 Radiated emission measurements from 8000 to 14000 MHz at the mid carrier frequency

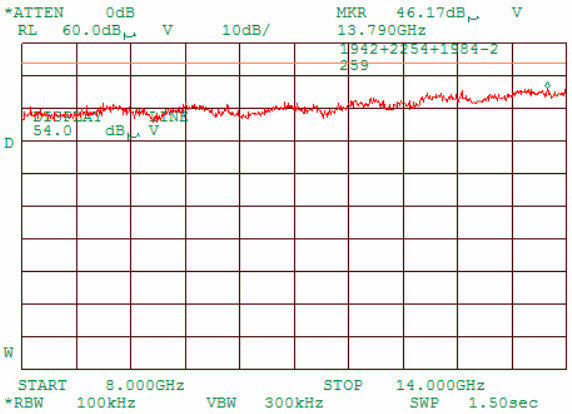
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

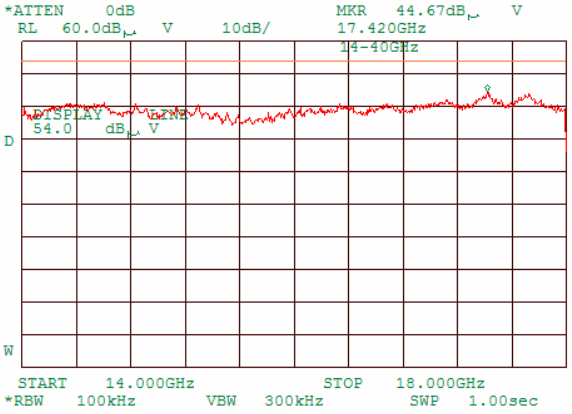
Plot 7.5.33 Radiated emission measurements from 8000 to 14000 MHz at the high carrier frequency

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



Plot 7.5.34 Radiated emission measurements from 14000 to 18000 MHz at the low carrier frequency

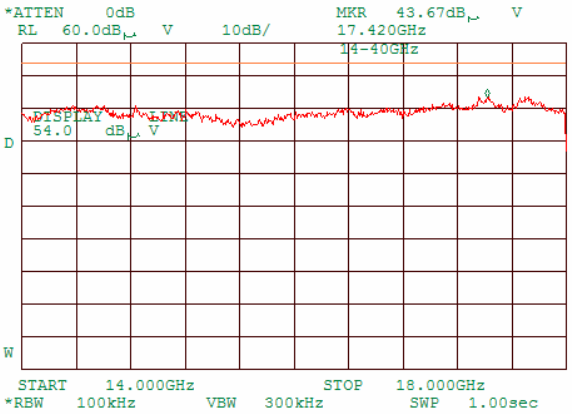
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

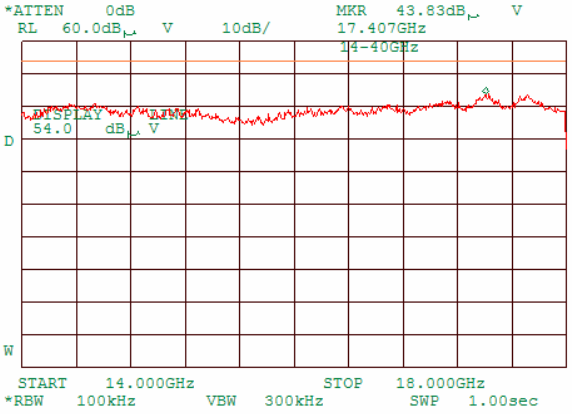
Plot 7.5.35 Radiated emission measurements from 14000 to 18000 MHz at the mid carrier frequency

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



Plot 7.5.36 Radiated emission measurements from 14000 to 18000 MHz at the high carrier frequency

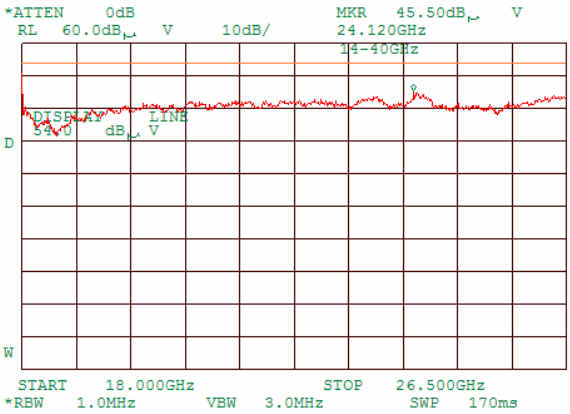
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Panel Antenna			

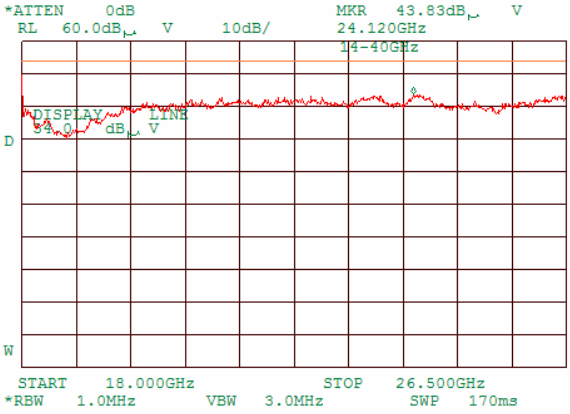
Plot 7.5.37 Radiated emission measurements from 18000 to 26500 MHz at the low carrier frequency

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



Plot 7.5.38 Radiated emission measurements from 18000 to 26500 MHz at the mid carrier frequency

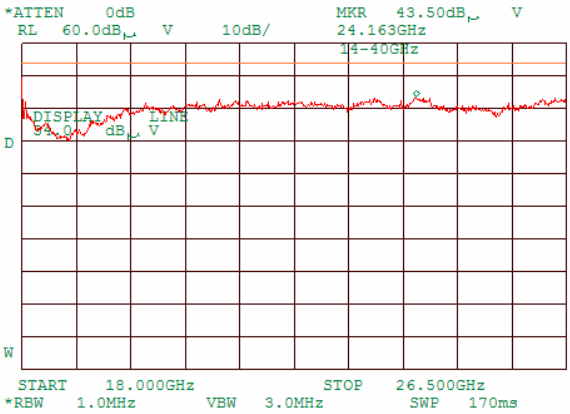
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	9/19/2004 8:16:33 AM		
Temperature: 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 39 %	**Power Supply:** 120 VAC
Remarks: Panel Antenna			

Plot 7.5.39 Radiated emission measurements from 18000 to 26500 MHz at the high carrier frequency

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



Test specification:	**Section 15.247(c), Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 39 %	**Power Supply:** 120 VAC
Remarks: Omni Antenna			

Table 7.5.4 Field strength of spurious emissions above 1 GHz within restricted bands

EUT with OMNIDIRECTIONAL ANTENNA

ASSIGNED FREQUENCY:	2400 – 2483.5 MHz
INVESTIGATED FREQUENCY RANGE:	1000 - 25000 MHz
TEST DISTANCE:	3 m
MODULATION:	8FSK
BIT RATE:	3 Mbps
DUTY CYCLE:	100 %
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	1000 kHz
TEST ANTENNA TYPE:	Double ridged guide
FREQUENCY HOPPING:	Disabled

Frequency, MHz	Antenna		Azimuth, degrees*	Peak field strength(VBW=3 MHz)			Average field strength(VBW=10 Hz)				Verdict
	Polarization	Height, m		Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Calculated, dB(µV/m)	Limit, dB(µV/m)	Margin, dB***	
Low carrier frequency											
1151.994	H	1.1	23	43.34	74	-30.66	38.84	38.84	54	-15.16	Pass
1200.000	H	1	291	44.36	74	-29.64	39.69	39.69	54	-14.31	
1706.500	V	1.3	360	43.82	74	-30.18	30.28	30.28	54	-23.72	
Mid carrier frequency											
1151.994	H	1.1	43	44.82	74	-29.18	41.59	41.59	54	-12.41	Pass
1200.000	H	1.2	70	45.94	74	-28.06	42.58	42.58	54	-11.42	
1440.100	H	1	0	41.32	74	-32.68	32.78	32.78	54	-21.22	
1706.295	V	1	280	45.89	74	-28.11	31.45	31.45	54	-22.55	
High carrier frequency											
1151.994	H	1.1	80	42.4	74	-31.6	41.56	41.56	54	-12.44	Pass
1200.100	H	1.1	108	47.16	74	-26.84	42.87	42.87	54	-11.13	
1439.999	H	1	360	41.99	74	-32.01	32.02	32.02	54	-21.98	
1708.000	V	1.4	296	44.77	74	-29.23	29.56	29.56	54	-24.44	

*****- EUT front panel refers to 0 degrees position of turntable.
******- Margin = Measured field strength - specification limit.
***- Margin = Calculated field strength - specification limit,
where Calculated field strength = Measured field strength + average factor.

Average factor is 0 due to duty cycle, which is 100%

Test specification:	**Section 15.247(c), Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 39 %	**Power Supply:** 120 VAC
Remarks: Omni Antenna			

Table 7.5.5 Field strength of spurious emissions below 1 GHz within restricted bands

EUT with OMNIDIRECTIONAL ANTENNA

ASSIGNED FREQUENCY:	2400 – 2483.5 MHz
INVESTIGATED FREQUENCY RANGE:	0.009 – 1000 MHz
TEST DISTANCE:	3 m
MODULATION:	8FSK
MODULATING SIGNAL:	PRBS
BIT RATE:	3 Mbps
DUTY CYCLE:	100 %
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
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) Biconical (30 MHz – 200 MHz) Log periodic (200 MHz – 1000 MHz) Biconilog (30 MHz – 1000 MHz)
FREQUENCY HOPPING:	Disabled

Frequency, MHz	Peak emission, dB(µV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
Low carrier frequency								
167.5225	39.17	37.19	43.50	-6.31	H	2.3	0	Pass
333.4975	38.74	35.82	46.00	-10.18	H	1.0	228	
400.1970	41.21	38.08	46.00	-7.92	H	1.0	265	
Mid carrier frequency								
167.5165	40.79	38.57	43.50	-4.93	V	1.0	304	Pass
400.2004	38.20	34.31	46.00	-11.69	H	1.0	243	
High carrier frequency								
167.5237	43.91	41.90	43.50	-1.60	H	2.0	173	Pass
240.0300	37.41	35.65	46.00	-10.35	H	1.0	73	

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

Reference numbers of test equipment used

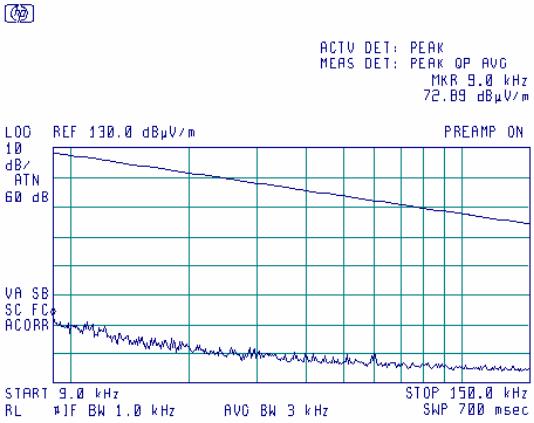
HL 0025	HL 0446	HL 0465	HL 0521	HL 0589	HL 0592	HL 0593	HL 0594
HL 0604	HL 0768	HL 0769	HL 0770	HL 1424	HL 1942	HL 1947	HL 1984
HL 2009	HL 2117	HL 2260	HL 2261	HL 2387	HL 2499		

Full description is given in Appendix A.

Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

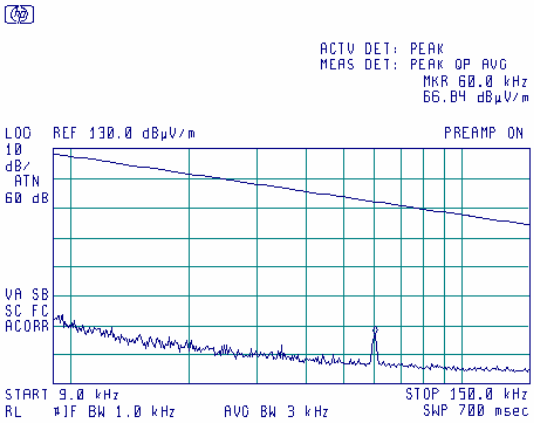
Plot 7.5.40 Radiated emission measurements from 9 to 150 kHz at the low carrier frequency

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



Plot 7.5.41 Radiated emission measurements from 9 to 150 kHz at the mid carrier frequency

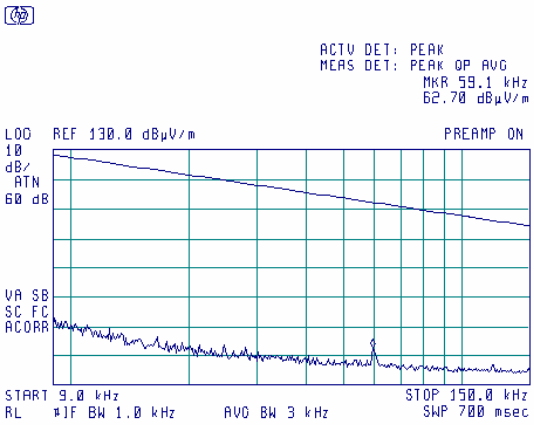
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

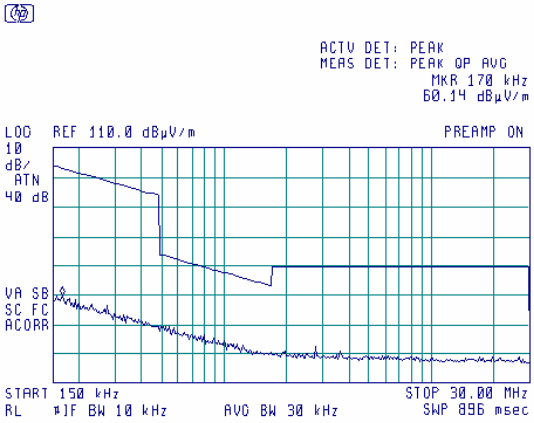
Plot 7.5.42 Radiated emission measurements from 9 to 150 kHz at the high carrier frequency

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



Plot 7.5.43 Radiated emission measurements from 0.15 to 30 MHz at the low carrier frequency

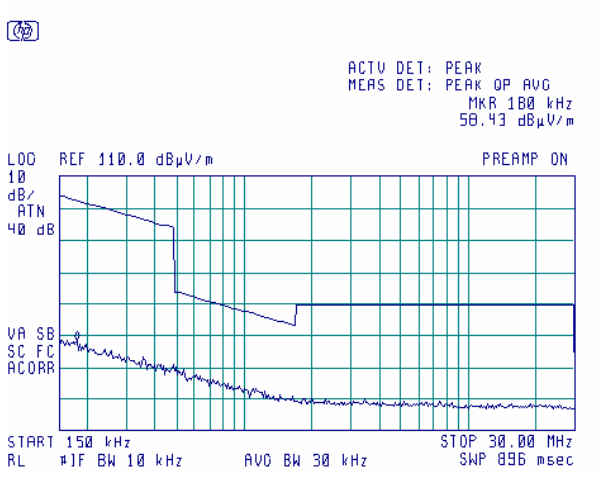
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

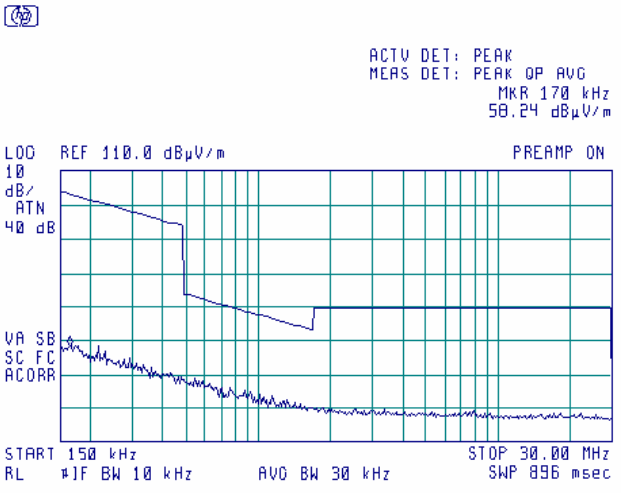
Plot 7.5.44 Radiated emission measurements from 0.15 to 30 MHz at the mid carrier frequency

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



Plot 7.5.45 Radiated emission measurements from 0.15 to 30 MHz at the high carrier frequency

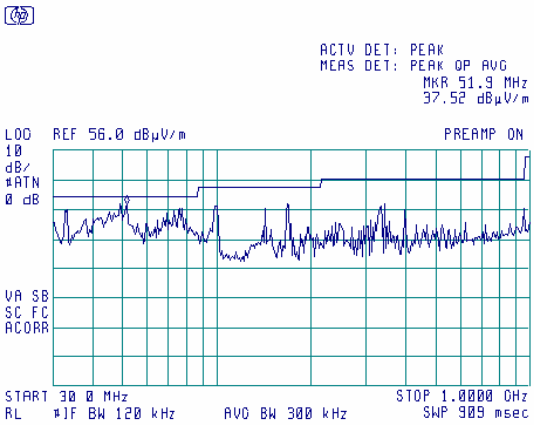
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

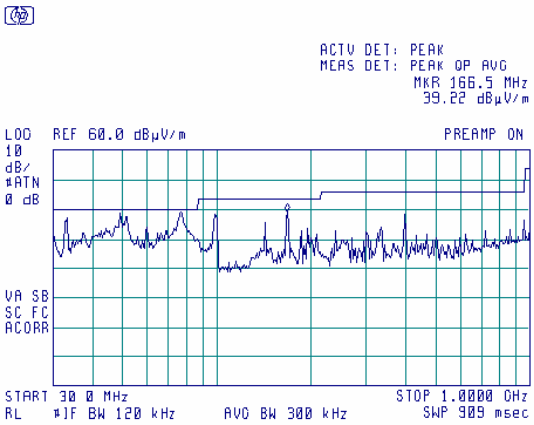
Plot 7.5.46 Radiated emission measurements from 30 to 1000 MHz at the low carrier frequency

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



Plot 7.5.47 Radiated emission measurements from 30 to 1000 MHz at the mid carrier frequency

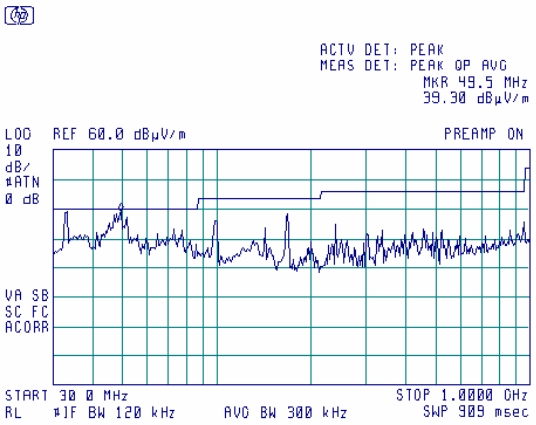
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

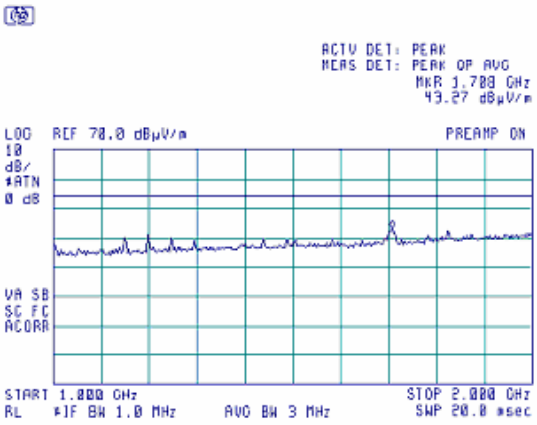
Plot 7.5.48 Radiated emission measurements from 30 to 1000 MHz at the high carrier frequency

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



Plot 7.5.49 Radiated emission measurements from 1000 to 2000 MHz at the low carrier frequency

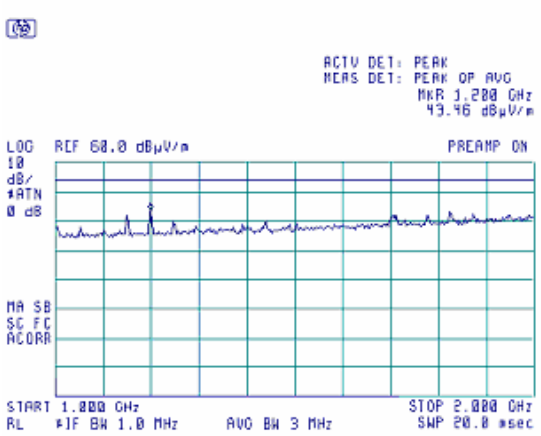
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

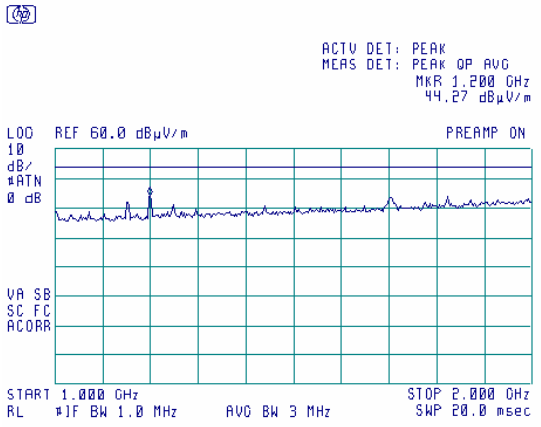
Plot 7.5.50 Radiated emission measurements from 1000 to 2000 MHz at the mid carrier frequency

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



Plot 7.5.51 Radiated emission measurements from 1000 to 2000 MHz at the high carrier frequency

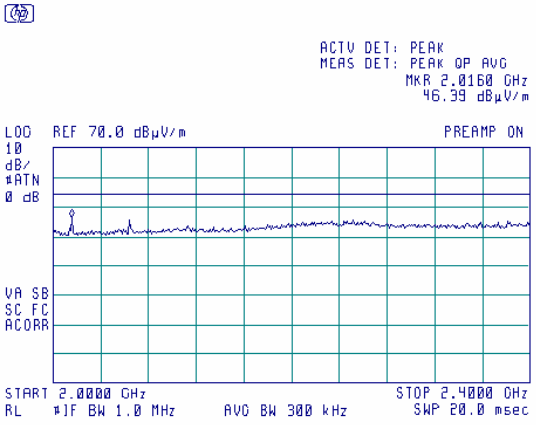
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

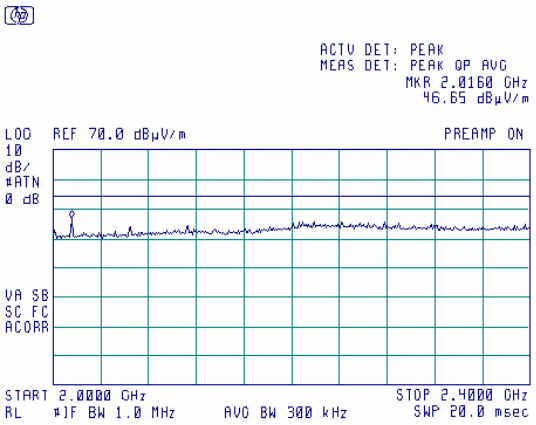
Plot 7.5.52 Radiated emission measurements from 2000 to 2400 MHz at the low carrier frequency

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



Plot 7.5.53 Radiated emission measurements from 2000 to 2400 MHz at the mid carrier frequency

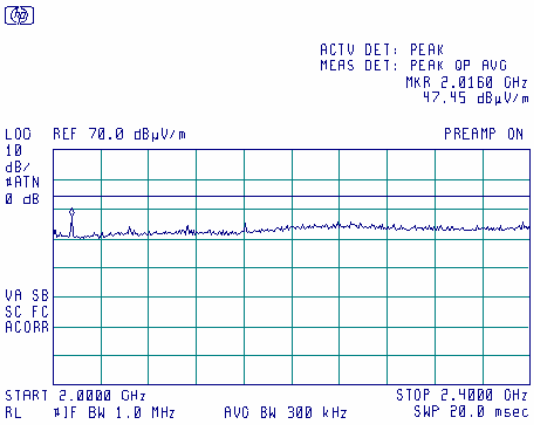
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

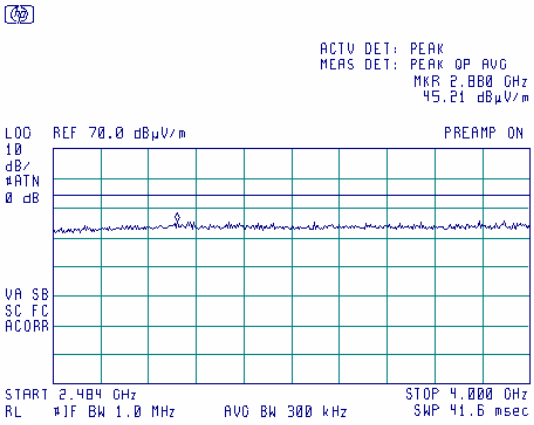
Plot 7.5.54 Radiated emission measurements from 2000 to 2400 MHz at the high carrier frequency

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



Plot 7.5.55 Radiated emission measurements from 2483.5 to 4000 MHz at the low carrier frequency

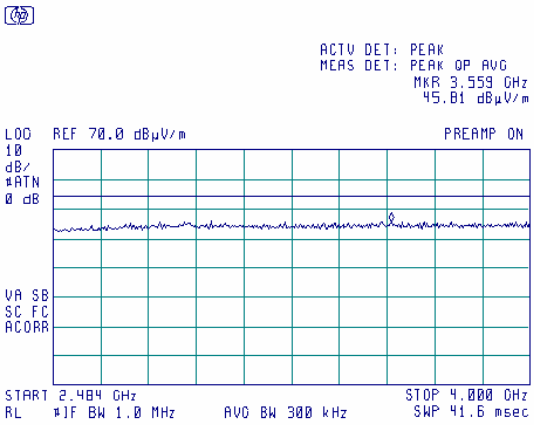
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

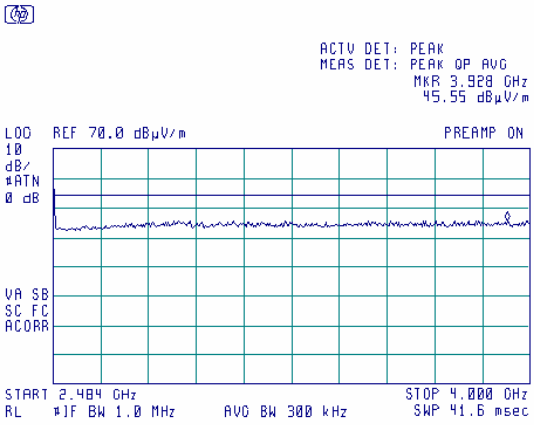
Plot 7.5.56 Radiated emission measurements from 2483.5 to 4000 MHz at the mid carrier frequency

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



Plot 7.5.57 Radiated emission measurements from 2483.5 to 4000 MHz at the high carrier frequency

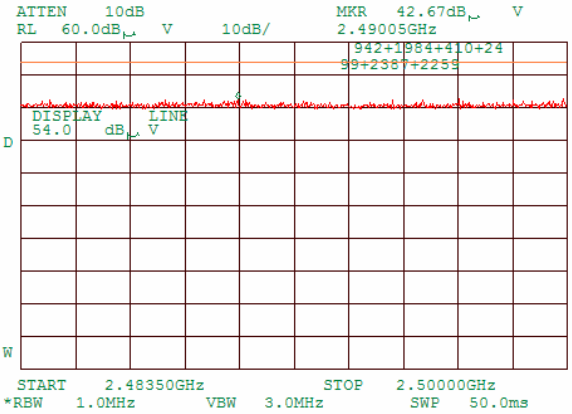
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

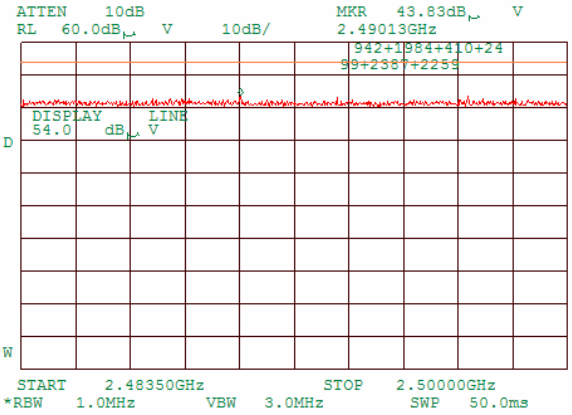
Plot 7.5.58 Radiated emission measurements from 2483.5 to 2500 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DATA RATE: 3 Mbps, 1.0 Msymbol per sec



Plot 7.5.59 Radiated emission measurements from 2483.5 to 2500 MHz at the mid carrier frequency

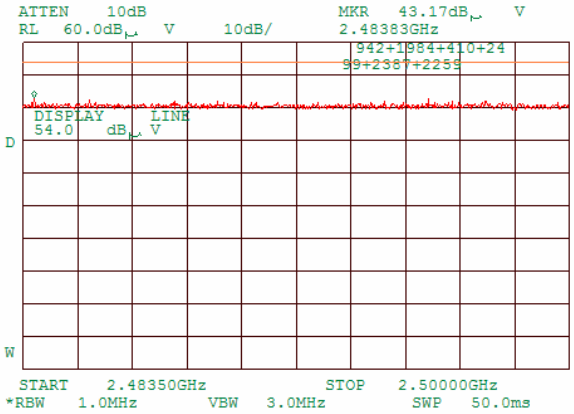
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DATA RATE: 3 Mbps, 1.0 Msymbol per sec



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

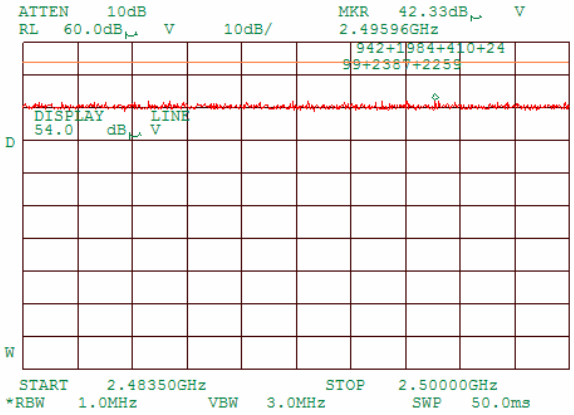
Plot 7.5.60 Radiated emission measurements from 2483.5 to 2500 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DATA RATE: 3 Mbps, 1.0 Msymbol per sec



Plot 7.5.61 Radiated emission measurements from 2483.5 to 2500 MHz at the low carrier frequency

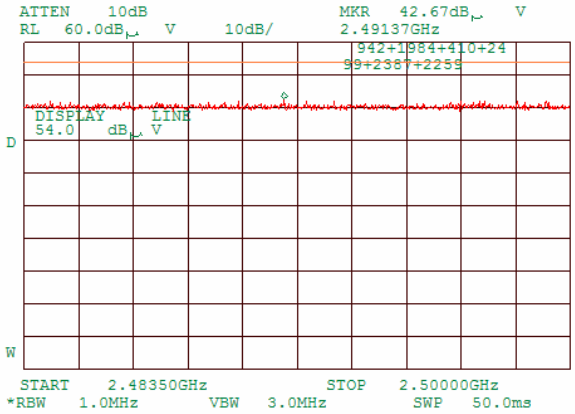
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DATA RATE: 4 Mbps, 1.33 Msymbol per sec



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

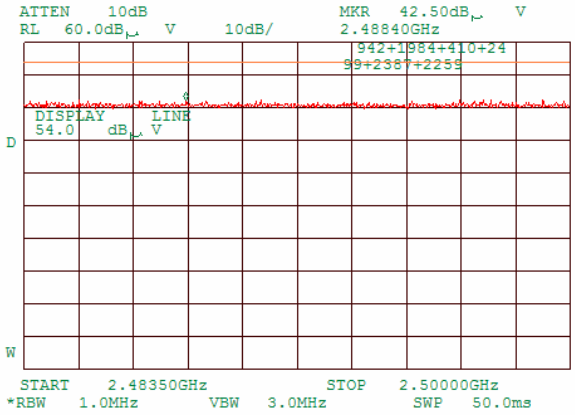
Plot 7.5.62 Radiated emission measurements from 2483.5 to 2500 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DATA RATE: 4 Mbps, 1.33 Msymbol per sec



Plot 7.5.63 Radiated emission measurements from 2483.5 to 2500 MHz at the high carrier frequency

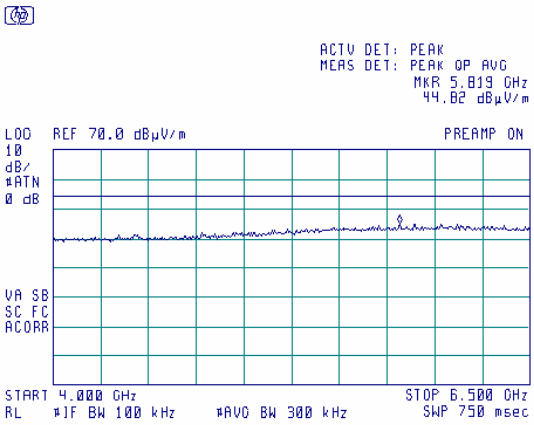
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
DATA RATE: 4 Mbps, 1.33 Msymbol per sec



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

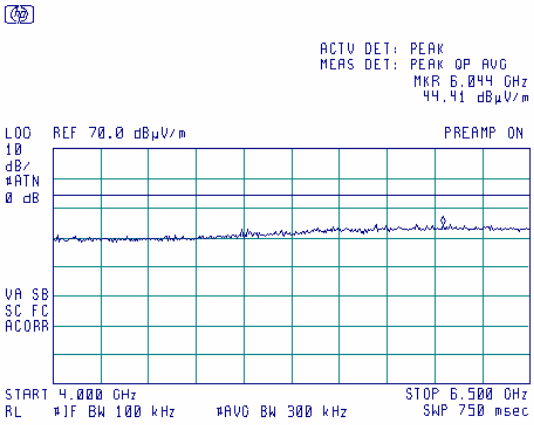
Plot 7.5.64 Radiated emission measurements from 4000 to 6500 MHz at the low carrier frequency

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



Plot 7.5.65 Radiated emission measurements from 4000 to 6500 MHz at the mid carrier frequency

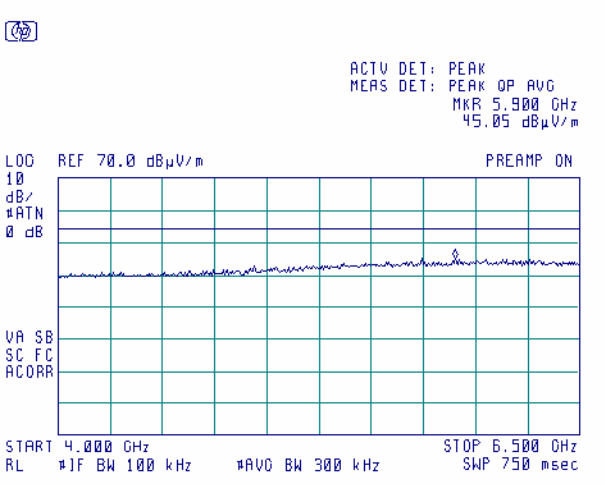
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

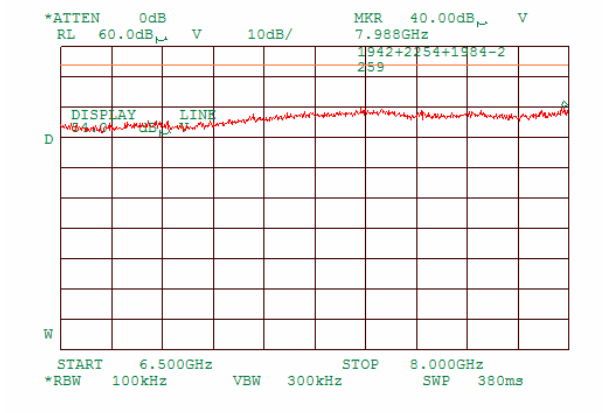
Plot 7.5.66 Radiated emission measurements from 4000 to 6500 MHz at the high carrier frequency

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



Plot 7.5.67 Radiated emission measurements from 6500 to 8000 MHz at the low carrier frequency

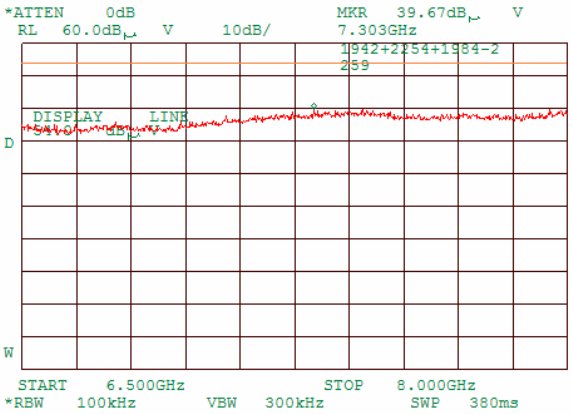
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

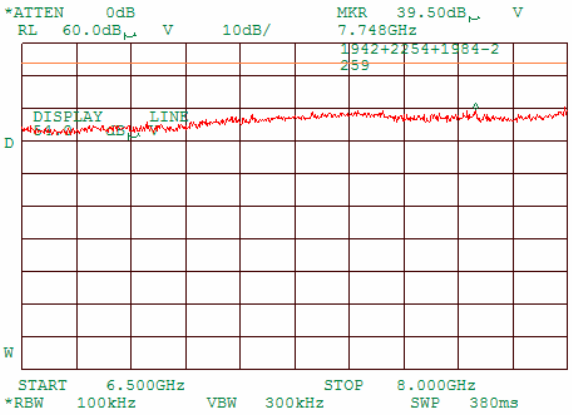
Plot 7.5.68 Radiated emission measurements from 6500 to 8000 MHz at the mid carrier frequency

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



Plot 7.5.69 Radiated emission measurements from 6500 to 8000 MHz at the high carrier frequency

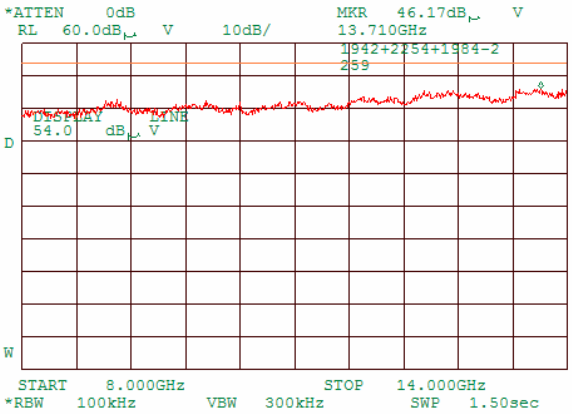
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

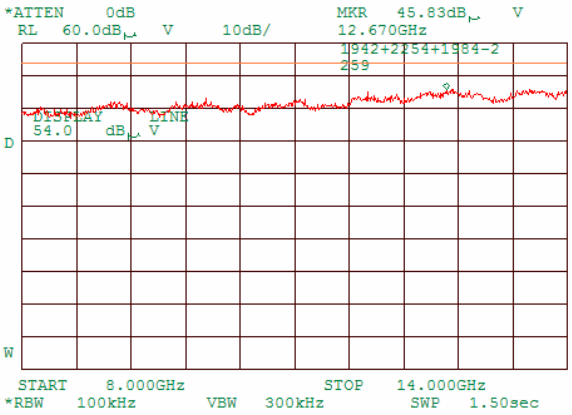
Plot 7.5.70 Radiated emission measurements from 8000 to 14000 MHz at the low carrier frequency

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



Plot 7.5.71 Radiated emission measurements from 8000 to 14000 MHz at the mid carrier frequency

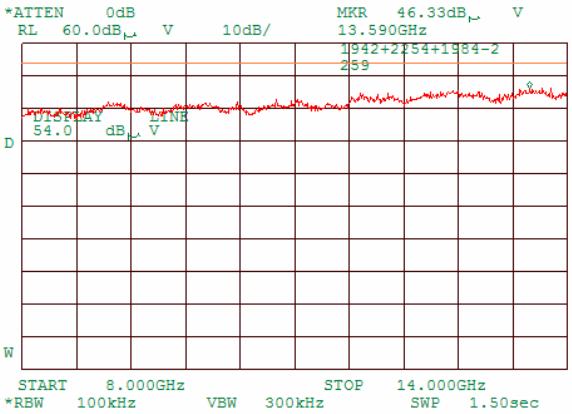
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

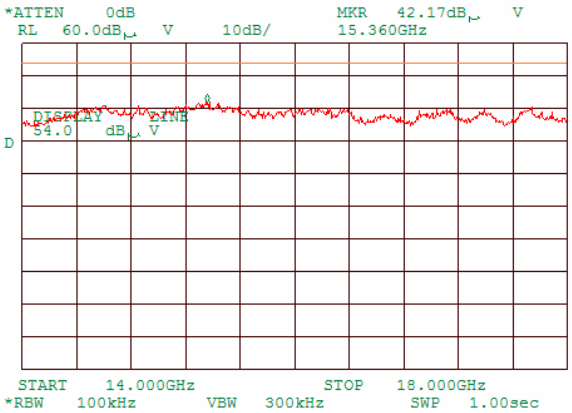
Plot 7.5.72 Radiated emission measurements from 8000 to 14000 MHz at the high carrier frequency

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



Plot 7.5.73 Radiated emission measurements from 14000 to 18000 MHz at the low carrier frequency

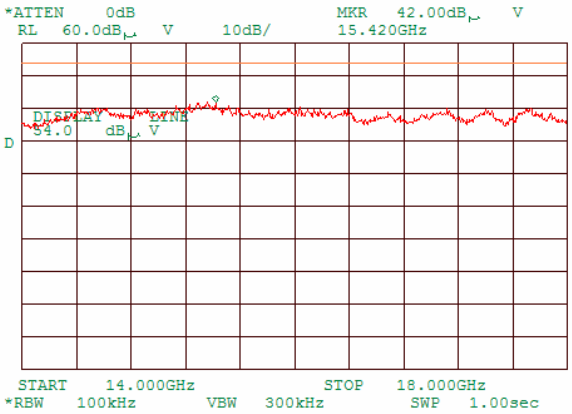
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

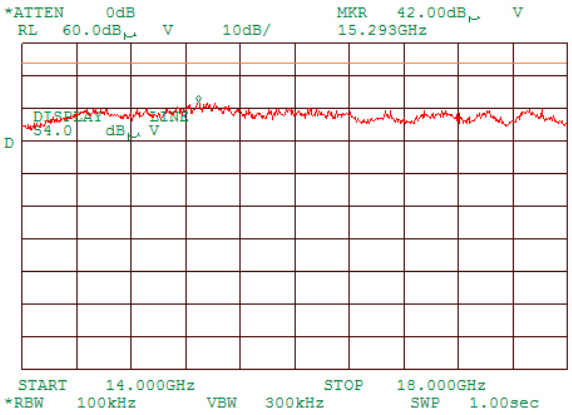
Plot 7.5.74 Radiated emission measurements from 14000 to 18000 MHz at the mid carrier frequency

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



Plot 7.5.75 Radiated emission measurements from 14000 to 18000 MHz at the high carrier frequency

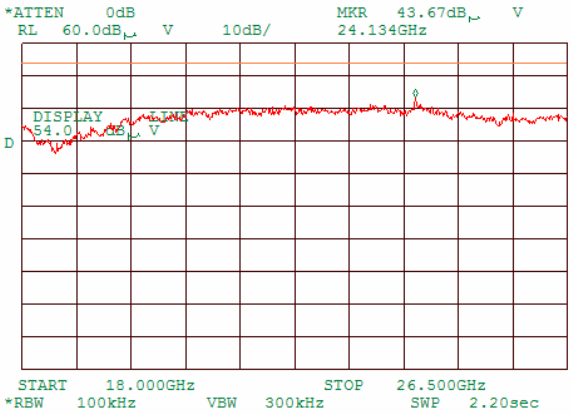
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks: Omni Antenna			

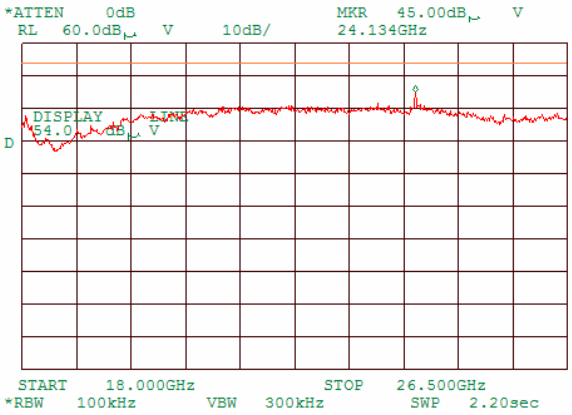
Plot 7.5.76 Radiated emission measurements from 18000 to 26500 MHz at the low carrier frequency

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



Plot 7.5.77 Radiated emission measurements from 18000 to 26500 MHz at the mid carrier frequency

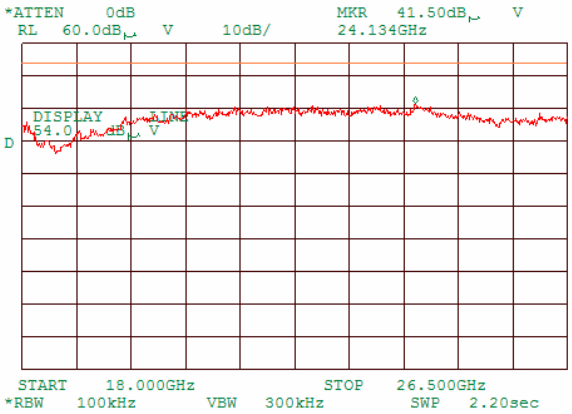
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	9/19/2004 8:18:41 AM		
Temperature: 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 39 %	**Power Supply:** 120 VAC
Remarks: Omni Antenna			

Plot 7.5.78 Radiated emission measurements from 18000 to 26500 MHz at the high carrier frequency

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



Test specification:	Section 15.207(a), Conducted emission		
Test procedure:	ANSI C63.4, Section 13.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/13/2004 11:31:54 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

7.6 Conducted emissions

7.6.1 General

This test was performed to measure common mode conducted emissions at the power port. Specification test limits are given in Table 7.6.1. The worst test results (the lowest margins) were recorded in Table 7.6.2 and shown in the associated plots.

Table 7.6.1 Limits for conducted emissions

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

* The limit decreases linearly with the logarithm of frequency.

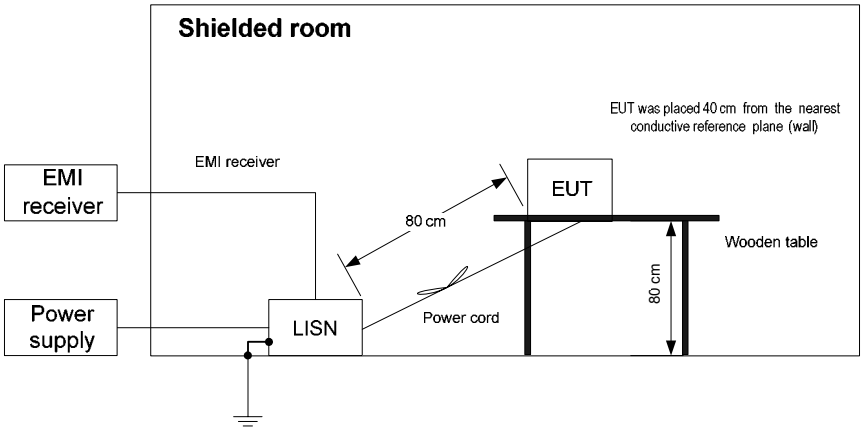
7.6.2 Test procedure

7.6.2.1 The EUT was set up as shown in Figure 7.6.1 and associated photographs, energized and the performance check was conducted.

7.6.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer in the frequency range referred to in Table 7.6.2. Unused coaxial connector of the LISN was terminated with 50 Ohm. Quasi-peak and average detectors were used throughout the testing.

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

Figure 7.6.1 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:	9/13/2004 11:31:54 AM		
Temperature: 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 39 %	**Power Supply:** 120 VAC
Remarks:			

Table 7.6.2 Conducted emission test results

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

Frequency, MHz	Peak emission, dB(µV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*		
0.158956	54.04	53.29	65.56	-12.27	42.34	55.56	-13.22	L1	Pass
0.265327	41.51	40.54	61.32	-20.78	33.33	51.32	-17.99		
0.372090	36.28	35.06	58.50	-23.44	30.56	48.50	-17.94		
4.393944	37.39	35.97	56.00	-20.03	32.95	46.00	-13.05		
6.478387	36.40	33.90	60.00	-26.10	28.97	50.00	-21.03		
10.988815	33.10	33.42	60.00	-26.58	30.51	50.00	-19.49		
0.159742	53.70	53.08	65.52	-12.44	41.32	55.52	-14.20	L2	Pass
0.212421	45.02	44.23	63.18	-18.95	33.50	53.18	-19.68		
0.903152	34.64	32.59	56.00	-23.41	28.18	46.00	-17.82		
4.516801	38.73	31.27	56.00	-24.73	27.65	46.00	-18.35		
6.860432	35.16	31.49	60.00	-28.51	25.35	50.00	-24.65		
11.282927	33.55	31.31	60.00	-28.69	28.05	50.00	-21.95		

LINE: Laptop AC mains

Frequency, MHz	Peak emission, dB(µV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*		
0.169360	51.06	48.96	65.06	-16.10	45.88	55.06	-9.18	L1	Pass
0.225823	47.56	47.69	62.66	-14.97	41.40	52.66	-11.26		
0.507617	37.67	39.13	56.00	-16.87	35.45	46.00	-10.55		
1.185472	34.24	34.54	56.00	-21.46	33.03	46.00	-12.97		
1.976136	35.01	35.59	56.00	-20.41	33.80	46.00	-12.20		
4.347159	40.69	38.41	56.00	-17.59	34.24	46.00	-11.76		
0.167835	52.70	53.52	65.13	-11.61	44.36	55.13	-10.77	L2	Pass
0.224362	49.47	47.42	62.72	-15.30	44.95	52.72	-7.77		
0.284712	42.87	40.90	60.74	-19.84	37.75	50.74	-12.99		
0.507526	38.85	37.64	56.00	-18.36	38.84	46.00	-7.16		
1.920654	36.35	31.42	56.00	-24.58	32.45	46.00	-13.55		
4.291621	38.15	36.25	56.00	-19.75	31.54	46.00	-14.46		

*- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

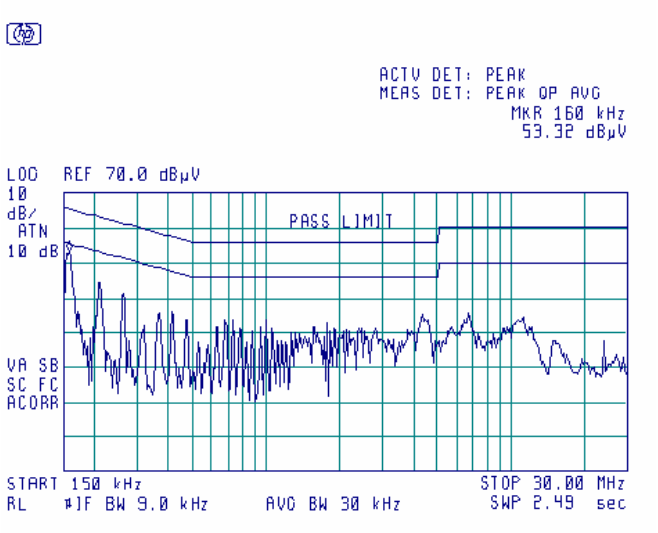
HL 0163	HL 0787	HL 1430	HL 1502	HL 1510			

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:	9/13/2004 11:31:54 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

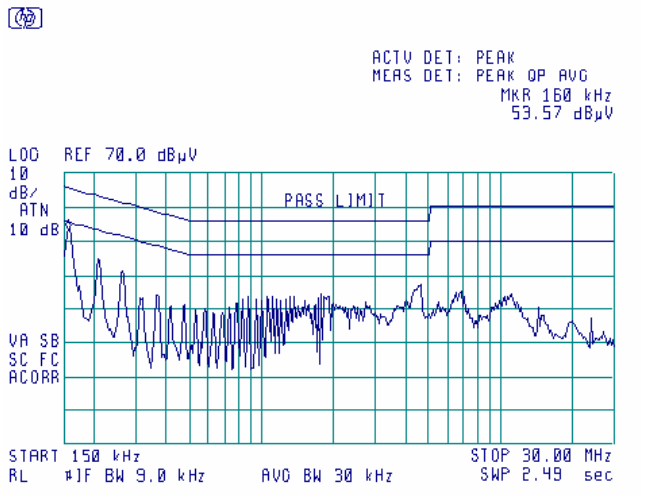
Plot 7.6.1 Conducted emission measurements at EUT AC mains

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



Plot 7.6.2 Conducted emission measurements at EUT AC mains

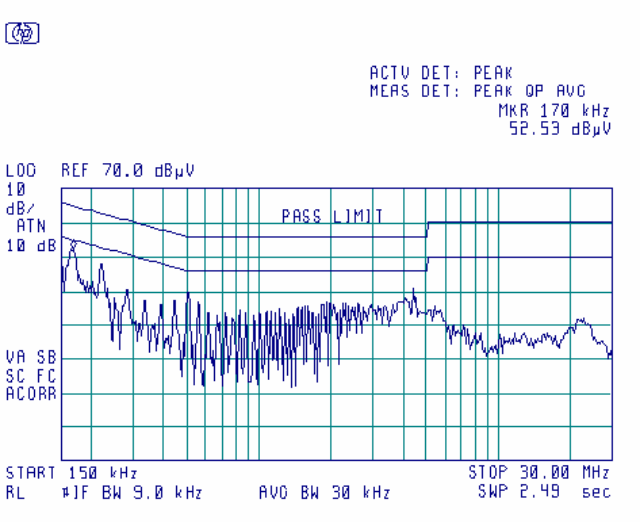
LINE: L2
EUT OPERATING MODE: Transmit
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:	Section 15.207(a), Conducted emission		
Test procedure:	ANSI C63.4, Section 13.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/13/2004 11:31:54 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

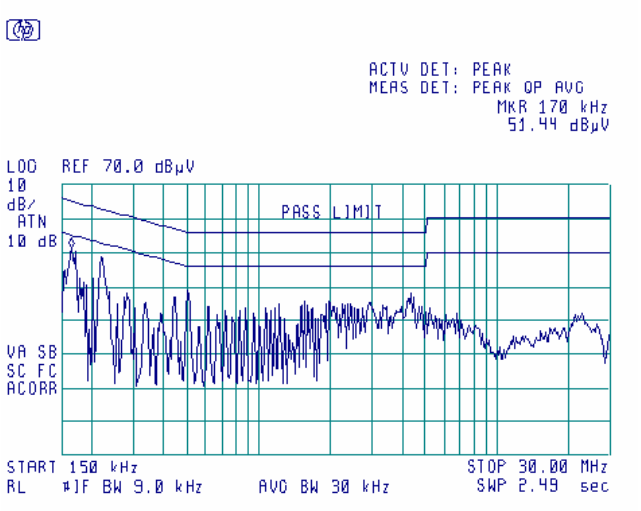
Plot 7.6.3 Conducted emission measurements at Laptop AC mains

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



Plot 7.6.4 Conducted emission measurements at Laptop AC mains

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



Test specification:	Section 15.107, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/13/2004 11:33:22 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

8 Unintentional emissions tests according to 47CFR part 15 subpart B requirements

8.1 Conducted emissions

8.1.1 General

This test was performed to measure common mode conducted emissions at the power port. Specification test limits are given in Table 8.1.1. The worst test results (the lowest margins) were recorded in Table 8.1.2 and shown in the associated plots.

Table 8.1.1 Limits for conducted emissions

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

* The limit decreases linearly with the logarithm of frequency.

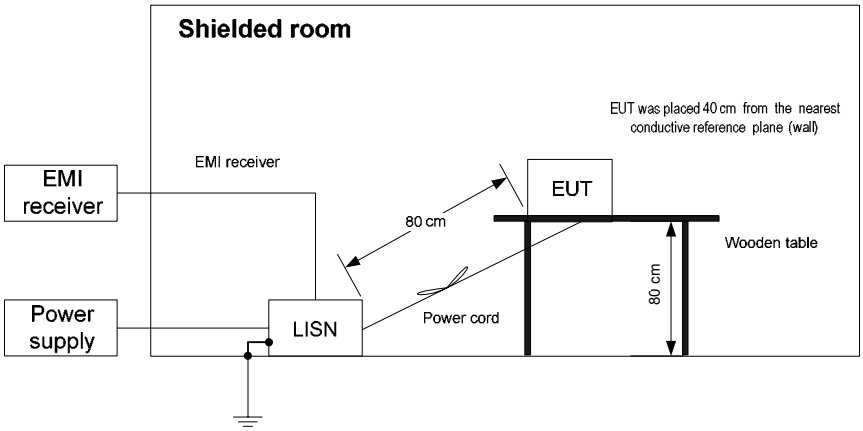
8.1.2 Test procedure

8.1.2.1 The EUT was set up as shown in Figure 8.1.1and associated photographs, energized and the performance check was conducted.

8.1.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer in the frequency range referred to in Table 8.1.2. Unused coaxial connector of the LISN was terminated with 50 Ohm. Quasi-peak and average detectors were used throughout the testing.

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

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



Test specification:	**Section 15.107, Conducted emission at AC power port**		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	9/13/2004 11:33:22 AM		
Temperature: 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 39 %	**Power Supply:** 120 VAC
Remarks:			

Table 8.1.2 Conducted emission test results

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

Frequency, MHz	Peak emission, dB(µV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*		
0.158956	54.04	53.29	65.56	-12.27	42.34	55.56	-13.22	L1	Pass
0.265327	41.51	40.54	61.32	-20.78	33.33	51.32	-17.99		
0.372090	36.28	35.06	58.50	-23.44	30.56	48.50	-17.94		
4.393944	37.39	35.97	56.00	-20.03	32.95	46.00	-13.05		
6.478387	36.40	33.90	60.00	-26.10	28.97	50.00	-21.03		
10.988815	33.10	33.42	60.00	-26.58	30.51	50.00	-19.49		
0.159742	53.70	53.08	65.52	-12.44	41.32	55.52	-14.20	L2	Pass
0.212421	45.02	44.23	63.18	-18.95	33.50	53.18	-19.68		
0.903152	34.64	32.59	56.00	-23.41	28.18	46.00	-17.82		
4.516801	38.73	31.27	56.00	-24.73	27.65	46.00	-18.35		
6.860432	35.16	31.49	60.00	-28.51	25.35	50.00	-24.65		
11.282927	33.55	31.31	60.00	-28.69	28.05	50.00	-21.95		

LINE: Laptop AC mains

Frequency, MHz	Peak emission, dB(µV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*		
0.169360	51.06	48.96	65.06	-16.10	45.88	55.06	-9.18	L1	Pass
0.225823	47.56	47.69	62.66	-14.97	41.40	52.66	-11.26		
0.507617	37.67	39.13	56.00	-16.87	35.45	46.00	-10.55		
1.185472	34.24	34.54	56.00	-21.46	33.03	46.00	-12.97		
1.976136	35.01	35.59	56.00	-20.41	33.80	46.00	-12.20		
4.347159	40.69	38.41	56.00	-17.59	34.24	46.00	-11.76		
0.167835	52.70	53.52	65.13	-11.61	44.36	55.13	-10.77	L2	Pass
0.224362	49.47	47.42	62.72	-15.30	44.95	52.72	-7.77		
0.284712	42.87	40.90	60.74	-19.84	37.75	50.74	-12.99		
0.507526	38.85	37.64	56.00	-18.36	38.84	46.00	-7.16		
1.920654	36.35	31.42	56.00	-24.58	32.45	46.00	-13.55		
4.291621	38.15	36.25	56.00	-19.75	31.54	46.00	-14.46		

*****- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

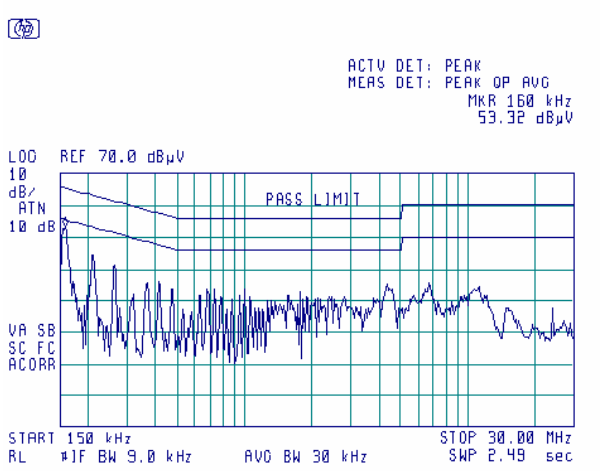
HL 0163	HL 0787	HL 1430	HL 1502	HL 1510			

Full description is given in Appendix A.

Test specification:	Section 15.107, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/13/2004 11:33:22 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

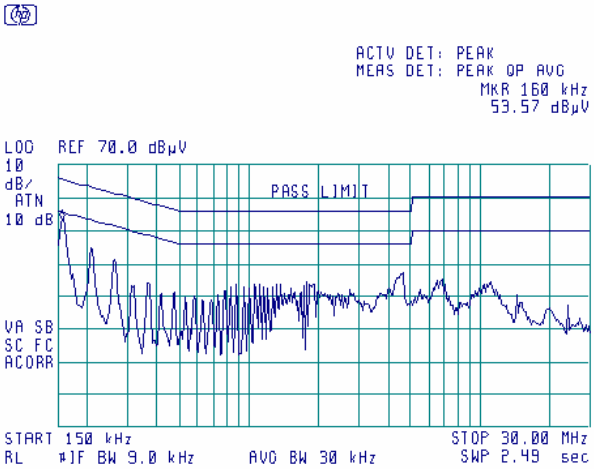
Plot 8.1.1 Conducted emission measurements at EUT AC mains

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



Plot 8.1.2 Conducted emission measurements at EUT AC mains

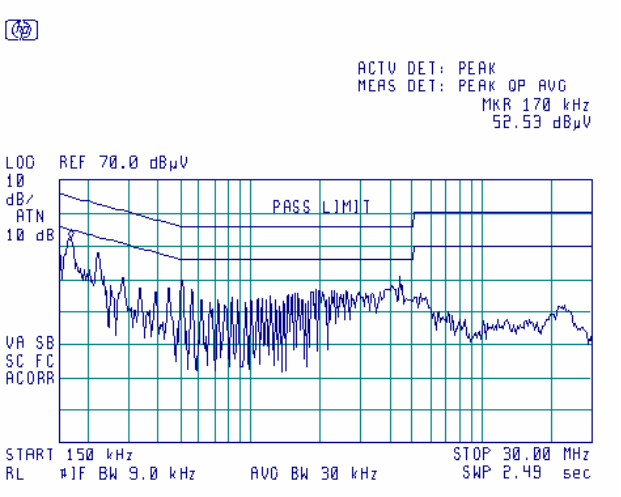
LINE: L2
EUT OPERATING MODE: Transmit
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:	Section 15.107, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/13/2004 11:33:22 AM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

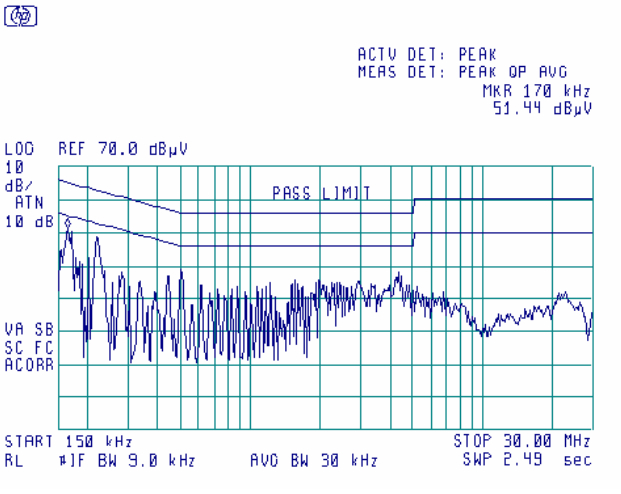
Plot 8.1.3 Conducted emission measurements at Laptop AC mains

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



Plot 8.1.4 Conducted emission measurements at Laptop AC mains

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



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/14/2004 6:03:57 PM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

8.2 Radiated emission measurements

8.2.1 General

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

Table 8.2.1 Radiated emission test limits

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

* The limit for test distance other than specified was calculated using the inverse linear distance extrapolation factor as follows: $Lim_{S2} = Lim_{S1} + 20 \log (S_1/S_2)$,
where S_1 and S_2 – standard defined and test distance respectively in meters.

8.2.2 Test procedure for measurements in semi-anechoic chamber

8.2.2.1 The EUT was set up as shown in Figure 8.2.1 and associated photograph/s, energized and the performance check was conducted.

8.2.2.2 The specified frequency range was investigated with biconilog antenna connected to EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal and the EUT cables position was varied.

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

8.2.3 Test procedure for measurements at OATS

8.2.3.1 The EUT was set up as shown in Figure 8.2.1 and associated photograph/s, energized and the performance check was conducted.

8.2.3.2 Preliminary measurements were performed in the anechoic chamber at 3 m test distance. The specified frequency range was investigated with biconical and log periodic antennas connected to EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna height was changed, its polarization was switched from vertical to horizontal and the EUT cables position was varied.

8.2.3.3 The EUT was set up as shown in Figure 8.2.2, energized and the performance check was conducted.

8.2.3.4 Final measurements were performed at the open area test site at 10 m test distance. The EUT wires and cables were arranged to produce maximum emission as it was found during preliminary measurements. The frequencies yield the worst test results (the lowest margins) during preliminary testing were investigated with biconilog antenna connected to EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna height was changed from 1 to 4 m and its polarization was changed from vertical to horizontal. At frequencies where high ambient noise was encountered, the final measurements were taken in the anechoic chamber at 3 m distance.

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

Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/14/2004 6:03:57 PM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

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

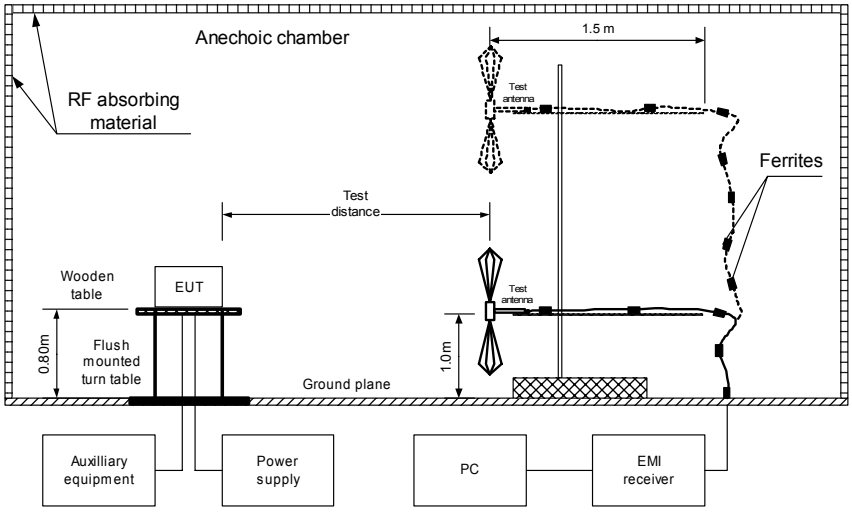
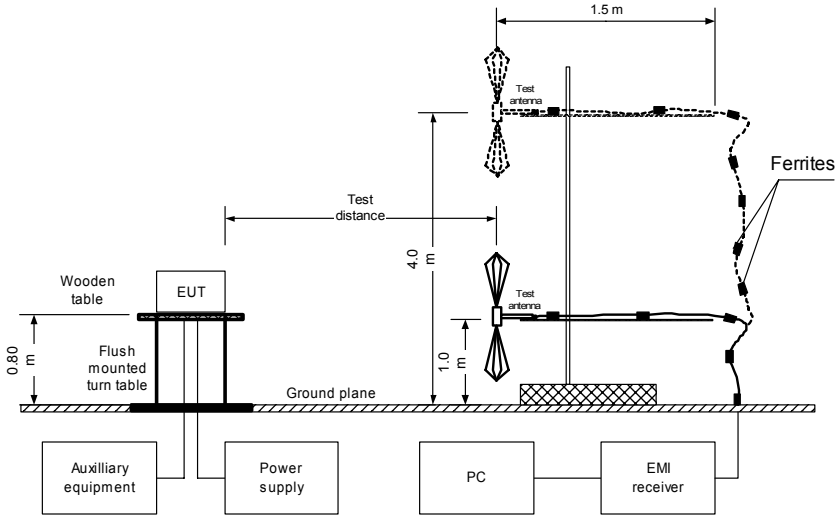


Figure 8.2.2 Setup for radiated emission measurements at OATS, table-top equipment



Test specification:	**Section 15.109, Radiated emission**		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	9/14/2004 6:03:57 PM		
Temperature: 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 39 %	**Power Supply:** 120 VAC
Remarks:			

Table 8.2.2 Radiated emission test results

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

Frequency, MHz	Peak emission, dB(µV/m)	Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
LOW								
49.650000	40.12	36.72	40.00	-7.44	V	1.0	224	Pass
51.825000	40.69	37.61	40.00	-3.88	V	1.1	190	
60.462500	39.06	35.46	40.00	-5.88	V	1.0	277	
82.055000	37.06	33.21	40.00	-9.18	V	1.0	282	
100.033750	38.53	36.21	43.50	-11.77	V	1.0	306	
167.507500	42.56	40.46	43.50	-8.16	H	1.8	98	
MID								
33.518840	37.20	34.30	40.00	-5.70	V	1.0	358	Pass
60.450000	37.82	34.48	40.00	-5.52	V	1.0	297	
100.013750	42.74	40.78	43.50	-2.72	V	1.0	304	
144.032500	39.26	37.82	43.50	-5.68	H	2.5	138	
167.525000	38.66	36.32	43.50	-7.18	H	2.0	91	
195.773500	34.37	29.93	43.50	-13.57	H	1.4	120	
300.500000	34.36	28.12	46.00	-17.88	H	1.0	106	
HIGH								
33.518840	37.20	35.10	40.00	-4.90	V	1.0	38	Pass
60.450000	37.82	36.07	40.00	-3.93	V	1.1	55	
100.013750	42.74	41.69	43.50	-1.81	V	1.0	4	
144.032500	39.26	39.01	43.50	-4.49	H	2.5	238	
167.507500	42.56	41.81	43.50	-1.69	H	1.7	198	
195.773500	34.37	31.72	43.50	-11.78	H	1.3	220	
300.500000	34.36	28.61	46.00	-17.39	H	1.1	306	

Test specification:	**Section 15.109, Radiated emission**		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	9/14/2004 6:03:57 PM		
Temperature: 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 39 %	**Power Supply:** 120 VAC
Remarks:			

TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / AVERAGE
FREQUENCY RANGE: 1000 MHz – 14 GHz
RESOLUTION BANDWIDTH: 1000 kHz

Frequency, MHz	Peak emission, dB(µV/m)	Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
LOW								
1.152.010	50.98	50.01	54.00	-3.99	H	1.1	350	Pass
1200.015	50.33	47.63	54.00	-6.75	H	1.1	64	
2015.996	44.85	44.20	54.00	-9.99	H	1.0	91	
MID								
1152.030	48.28	45.68	54.00	-8.51	H	1.2	289	Pass
1200.000	46.66	43.40	54.00	-11.19	H	1.1	272	
1488.000	44.11	39.50	54.00	-15.84	H	1.0	33	
HIGH								
1152.009	50.97	50.21	54.00	-3.86	H	1.2	57	Pass
1200.007	48.53	47.41	54.00	-6.95	H	1.2	0	
2016.011	47.15	45.71	54.00	-8.72	H	1	105	

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

Reference numbers of test equipment used

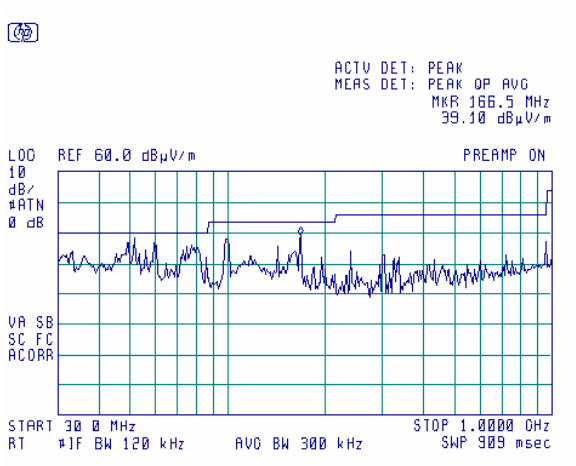
HL 0446	HL 0465	HL 0521	HL 0589	HL 0592	HL 0593	HL 0594	HL 0604
HL 1424	HL 1942	HL 1947	HL 1984	HL 1989	HL 2009	HL 2254	HL 2259
HL 2261	HL 2399						

Full description is given in Appendix A.

Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/14/2004 6:03:57 PM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

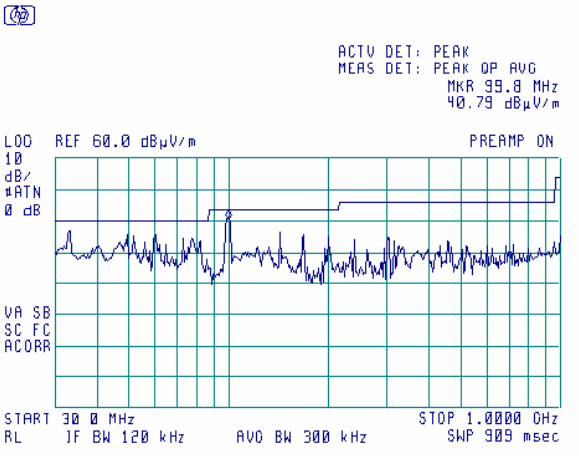
Plot 8.2.1 Radiated emission measurements in 30- 1000 MHz range, vertical and horizontal antenna polarization

TEST SITE:	Anechoic chamber
LIMIT:	Class B
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive
FREQUENCY:	LOW



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

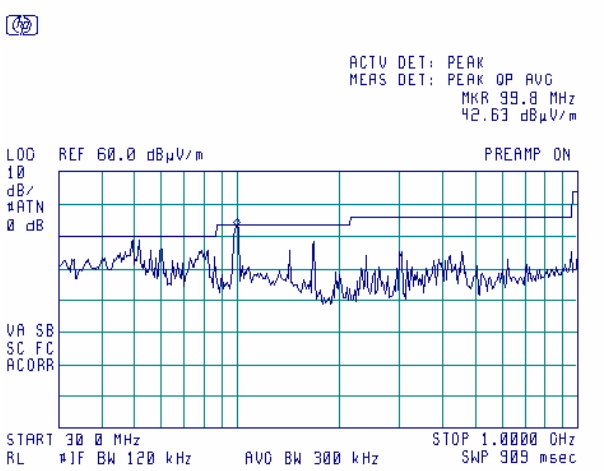
TEST SITE:	Anechoic chamber
LIMIT:	Class B
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive
FREQUENCY:	MID



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/14/2004 6:03:57 PM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

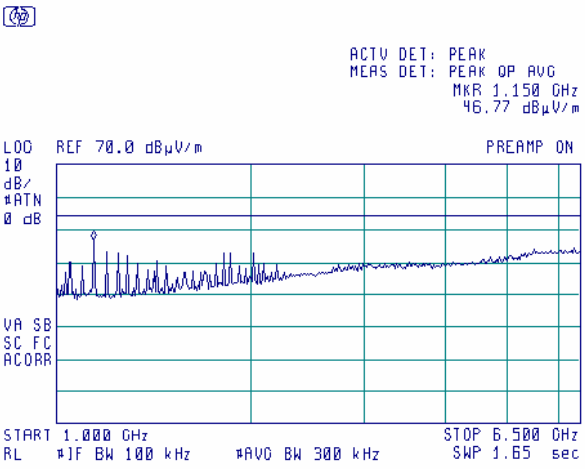
Plot 8.2.3 Radiated emission measurements in 30- 1000 MHz range, vertical and horizontal antenna polarization

TEST SITE:	Anechoic chamber
LIMIT:	Class B
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive
FREQUENCY:	HIGH



Plot 8.2.4 Radiated emission measurements 1000 – 6500 MHz, vertical and horizontal antenna polarization

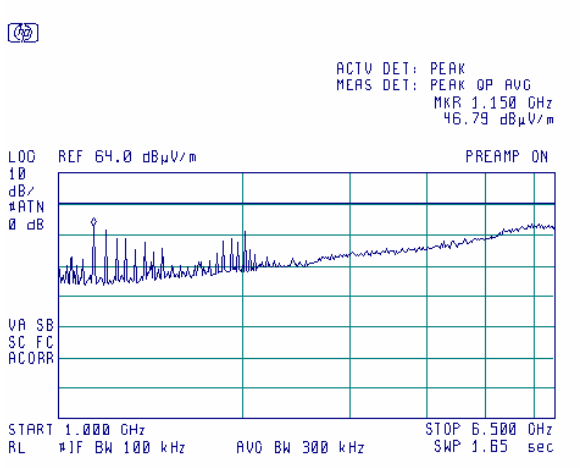
TEST SITE:	Semi anechoic chamber
LIMIT:	Class B
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive
FREQUENCY:	LOW



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/14/2004 6:03:57 PM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

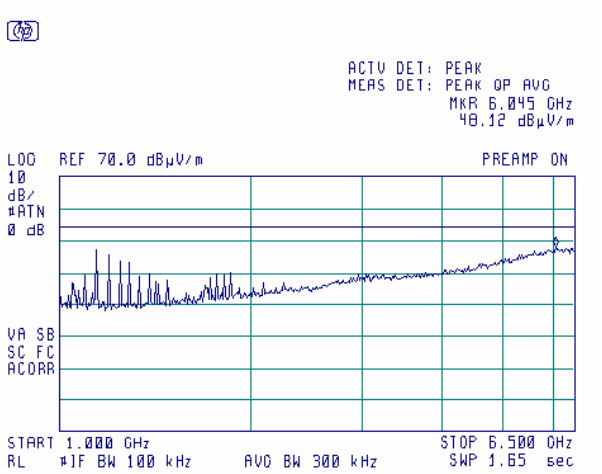
Plot 8.2.5 Radiated emission measurements 1000 – 6500 MHz, vertical and horizontal antenna polarization

TEST SITE:	Semi anechoic chamber
LIMIT:	Class B
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive
FREQUENCY:	MID



Plot 8.2.6 Radiated emission measurements 1000 – 6500 MHz, vertical and horizontal antenna polarization

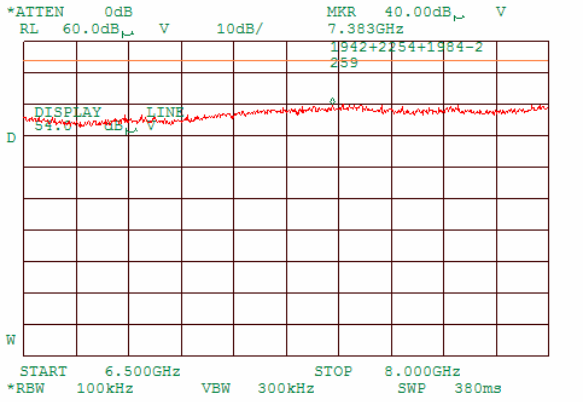
TEST SITE:	Semi anechoic chamber
LIMIT:	Class B
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive
FREQUENCY:	HIGH



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/14/2004 6:03:57 PM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

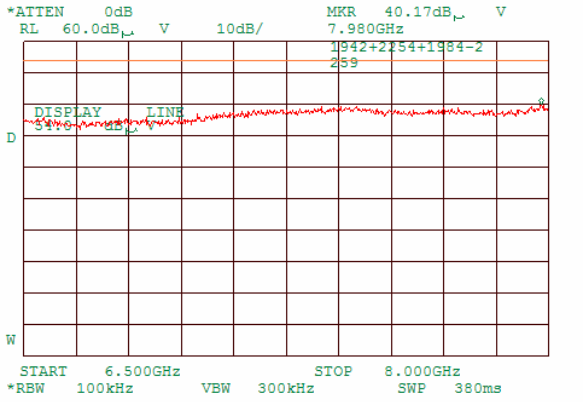
Plot 8.2.7 Radiated emission measurements 6500 – 8000 MHz, vertical and horizontal antenna polarization

TEST SITE:	Semi anechoic chamber
LIMIT:	Class B
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive
FREQUENCY:	LOW



Plot 8.2.8 Radiated emission measurements 6500 – 8000 MHz, vertical and horizontal antenna polarization

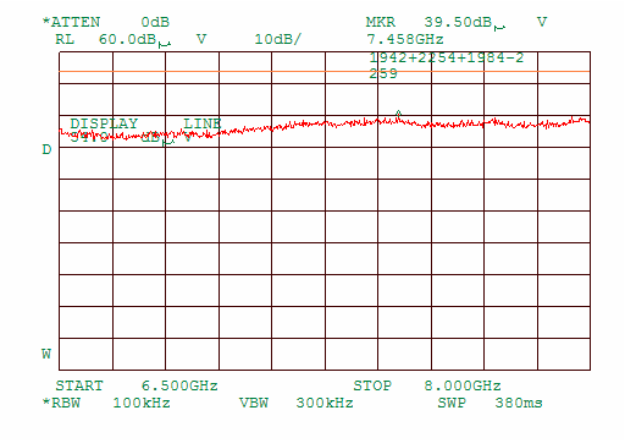
TEST SITE:	Semi anechoic chamber
LIMIT:	Class B
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive
FREQUENCY:	MID



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/14/2004 6:03:57 PM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

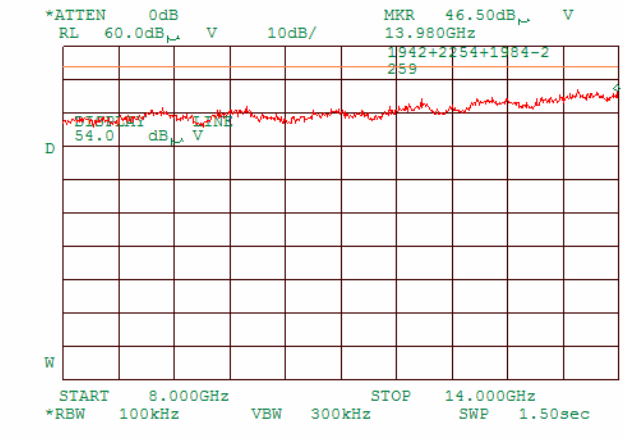
Plot 8.2.9 Radiated emission measurements 6500 – 8000 MHz, vertical and horizontal antenna polarization

TEST SITE:	Semi anechoic chamber
LIMIT:	Class B
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive
FREQUENCY:	HIGH



Plot 8.2.10 Radiated emission measurements 8000 – 14000 MHz, vertical and horizontal antenna polarization

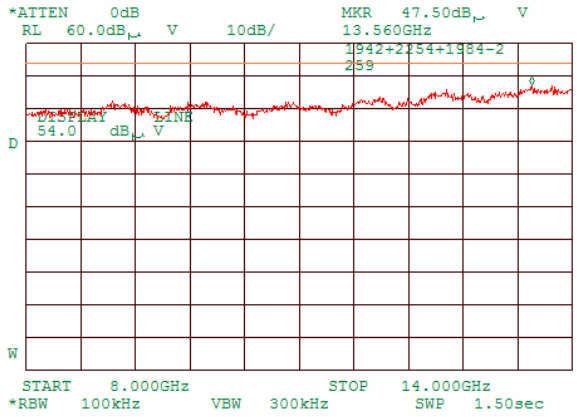
TEST SITE:	Semi anechoic chamber
LIMIT:	Class B
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive
FREQUENCY:	LOW



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/14/2004 6:03:57 PM		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 39 %	Power Supply: 120 VAC
Remarks:			

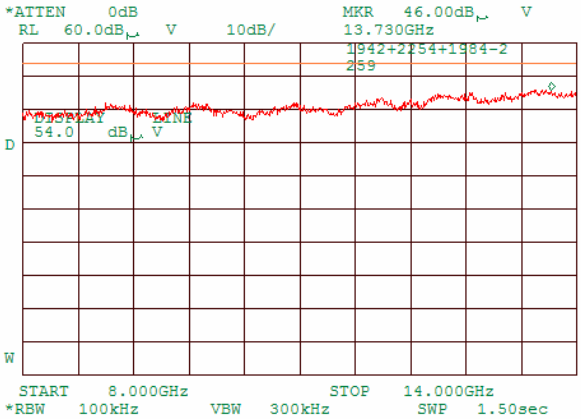
Plot 8.2.11 Radiated emission measurements 8000 – 14000 MHz, vertical and horizontal antenna polarization

TEST SITE:	Semi anechoic chamber
LIMIT:	Class B
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive
FREQUENCY:	MID



Plot 8.2.12 Radiated emission measurements 8000 – 14000 MHz, vertical and horizontal antenna polarization

TEST SITE:	Semi anechoic chamber
LIMIT:	Class B
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Receive
FREQUENCY:	HIGH



9 APPENDIX A Test equipment and ancillaries used for tests

HL No.	Description	Manufacturer information			Due Calibr. Month/Year
		Name	Model No.	Serial No.	
0025	Analyzer, Spectrum, 10 kHz - 23 GHz / 140 GHz	Anritsu	MS-710C	5837	25-Oct-05
0057	Attenuator, 50 Ohm, 2 W, 0 - 18 GHz, 50 dB	Hewlett Packard	8492A	129	03-Mar-05
0163	LISN FCC/VDE/MIL-STD	Electro-Metrics	ANS 25/2	1314	01-Oct-05
0446	Antenna, Loop active, 10kHz-30MHz	EMCO	6502	2857	28-Jun-05
0465	Anechoic Chamber 9(L) x 6,5(W) x 5,5(H) m	HL	AC - 1	023	10-Oct-05
0483	Oscilloscope, Digitizing, 100 MHz	Hewlett Packard	54501A	2833A01325	10-Oct-05
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-2.9 GHz	Hewlett Packard	8546A	3617A 00319, 3448A00253	10-Oct-05
0589	Cable Coaxial, GORE A2P01POL118, 2.3 m	HL	GORE-3	176	10-Oct-05
0592	Position Controller	HL	L2-SR3000 (HL CRL-3)	100	18-May-05
0593	Antenna Mast, 1-4 m Pneumatic	Madgesh	AM-F1	101	03-Feb-05
0594	Turn Table FOR ANECHOIC CHAMBER flush mount d=1.2 m Pneumatic	HL	TT-WDC1	102	27-Jan-05
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE 26 - 2000 MHz	EMCO	3141	9611-1011	27-Jan-05
0661	Generator Swept Signal, 10 MHz to 40 GHz, + 10 dBm	Hewlett Packard	83640B	3614A00266	14-Sep-05
0768	Antenna Standard Gain Horn,18-26.5 GHz, WR-42, K-band, Gain - 25 dB	Quinstar Technology	QWH-4200-BA	110	14-Sep-05
0769	Antenna Standard Gain Horn, 26.5-40 GHz, WR28, Ka band, Gain 25 dB	Quinstar Technology	QWH-2800-BA	112	14-Sep-05
0770	Antenna Standard Gain Horn, 40-60 GHz WR-19, U-band Gain - 25 dB	Quinstar Technology	QWH-1900-AA	118	14-Sep-05
0787	Transient Limiter	Hewlett Packard	11947A	3107A01877	21-Jul-05
1424	Spectrum Analyzer, 30 Hz- 40 GHz	Agilent Technologies (HP)	8564EC	3946A00219	30-Aug-05
1430	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1431, HL1432	Agilent Technologies (HP)	8542E	3807A00262 ,3705A0021 7	01-Sep-05
1502	Cable RF, 6 m	Belden	M17/167 MIL-C-17	1502	21-Jul-05
1510	Cable RF, 8 m	Belden	M17/167 MIL-C-17	1510	21-Jul-05
1562	Oscilloscope 100 MHz, DMM	Tektronix	THS720A	B039444	20-Sep-05
1651	Attenuators Set (2, 3, 5, 20 dB), DC-18 GHz	M/A-COM	2082	1651	21-Jul-05
1942	Cable 18GHz, 4 m, blue	Rhophase Microwave Limited	SPS-1803A-4000-NPS	T4658	17-Oct-05
1947	Cable 18GHz, 6.5 m, blue	Rhophase Microwave Limited	NPS-1803A-6500-NPS	T4974	17-Oct-05
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W, N-type	EMC Test Systems	3115	9911-5964	21-Jul-05
1989	Adapter, 18 - 26.5 GHz, WR-42/SMA	Continental Microwave & Tool Co.	WR-42/SMA	1989	30-Aug-05
2009	Cable RF, 8 m	Alpha Wire	RG-214	C-56	30-Aug-05

HL No.	Description	Manufacturer information			Due Calibr. Month/Year
		Name	Model No.	Serial No.	
2014	Attenuator, Manual Step, 0-99/1 dB, 0-4 GHz, 2 W	Weinschel	AC9004-99-11	16924	30-Aug-05
2117	Waveguide mixer 40 to 60 GHz	Tektronix	WM 490U	BO12794	30-Aug-05
2227	Crystal Detector 0.01-18 GHz	Hewlett Packard	8472A	NA	14-Oct-05
2254	Cable 40GHz, 0.8 m, blue	Rhophase Microwave Limited	KPS-1503A-800-KPS	W4907	14-Oct-05
2259	Amplifier Low Noise 2-20 GHz	Sophia Wireless	LNA0220-C	0223	14-Oct-05
2260	Amplifier Low Noise 14-33 GHz	Sophia Wireless	LNA28-B	0233	14-Oct-05
2261	Amplifier Low Noise 33-40 GHz	Sophia Wireless	LNA38-B	0234	14-Oct-05
2387	Filter Bandpass, 8-14 GHz	HL	FBP8-14	2387	14-Oct-05
2399	Cable 40GHz, 1.5 m, blue	Rhophase Microwave Limited	KPS-1503A-1500-KPS	X2945	14-Oct-05
2400	Cable 40GHz, 1.5 m, green	Rhophase Microwave Limited	KPS-1503A-1500-KPS	X2946	14-Oct-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	14-Oct-05
2524	Attenuator, 10 dB, DC-18 GHz	Midwest Microwave	263-10	2524	14-Oct-05

10 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Conducted carrier power at RF antenna connector	Below 12.4 GHz: ± 1.7 dB 12.4 GHz to 40 GHz: ± 2.3 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
Occupied bandwidth	± 8.0 %
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB 150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 3 m measuring distance Horizontal polarization 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

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, CEO.

11 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).

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Person for contact: Mr. Alex Usoskin, CEO.

12 APPENDIX D Specification references

FCC 47CFR part 15: 2004	Radio Frequency Devices.
Public notice DA 00- 705: 2000	Filing and measurement guidelines for frequency hopping spread spectrum systems.
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.

13 APPENDIX E Abbreviations and acronyms

A	ampere
AC	alternating current
A/m	ampere per meter
AM	amplitude modulation
AVRG	average (detector)
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(μV)	decibel referred to one microvolt
dB(μV/m)	decibel referred to one microvolt per meter
dB(μA)	decibel referred to one microampere
dBΩ	decibel referred to one Ohm
DC	direct current
DTS	digital transmission system
EIRP	equivalent isotropically radiated power
ERP	effective radiated power
EUT	equipment under test
F	frequency
FHSS	frequency hopping spread spectrum
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
μs	microsecond
NA	not applicable
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

14 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	0.1
0.02	2.1	4.0	0.1
0.03	1.1	5.0	0.1
0.04	0.7	6.0	0.1
0.05	0.5	10.0	0.1
0.1	0.2	12.0	0.1
0.2	0.1	16.0	0.1
0.4	0.1	18.0	0.1
0.6	0.1	20.0	0.1
0.8	0.1	25.0	0.1
1.0	0.1	28.0	0.1
2.0	0.1	30.0	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(μV) to convert it into field intensity in dB(μV/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(μV) to convert it into field intensity in dB(μV/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(μV) to convert it into field intensity in dB(μV/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(μV) to convert it into field intensity in dB(μV/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		±0.17
22	4500	4.07		
23	4800	4.36		
24	5100	4.62		
25	5400	4.78		
26	5700	5.16		
27	6000	5.67		
28	6500	5.99		

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
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, 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

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

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