HERMON LABORATORIES

839.01
Electrical

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TEST REPORT

ACCORDING TO: FCC CFR 47 PART 90 subpart Z and part 15 subpart B

FOR:

Airspan Networks (Israel) Ltd.

Base station

Model: MicroMAX 3.7 GHz TDD

Report ID: AIRRAD_FCC.18418_rev2.doc
Date of Issue: April 2008

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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:	Base station
Product type:	Transceiver
Model(s):	MicroMAX 3.7 GHz TDD
Receipt date	12/26/2007

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:	18418
Location:	Hermon Laboratories Ltd. P.O.Box 23, Binyamina 30500, Israel
Test started:	12/26/2007
Test completed:	4/02/2008
Test specification(s):	47CFR part 90 subpart Z; part 15 subpart B class A

5 Tests summary

Test	Status
Transmitter characteristics	
Section 90.205, 90.1321 Maximum output power and peak power spectral density	Pass
Section 90.209, Occupied bandwidth	Pass
Section 90.210 (b), Emission mask	Pass
Section 90.1323, Conducted spurious emissions	Pass
Section 90.1323, Radiated spurious emissions	Pass
Section 90.213, Frequency stability	Pass
Section 2.1091, 90.1335, RF radiation exposure evaluation	Pass, exhibit provided in Application for certification
Unintentional emissions	
Section 15.107, Conducted emission at AC power port	Pass
Section 15.109, Radiated emission	Pass

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.

This test report replaces the previously issued test report identified by Doc ID:AIRRAD_FCC.18418_rev1.

	Name and Title	Date	Signature
Tested by:	Mr. S. Samokha, test engineer	April 2, 2008	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	April 3, 2008	
Approved by:	Mr. M. Nikishin, EMC and Radio group leader	April 3, 2008	

6 EUT description

6.1 General information

The EUT, base station radio, MicroMAX 3.7GHz TDD Int., is part of a WiMAX broadband fixed cellular wireless access system. The system provides a radio link between an end-user (a subscriber) and a network to give high-speed data access. The MicroMAX's transceiver/receiver (Up to 64 QAM modulation, data rate up to 18 Mbps) uses OFDM and operating in TDD duplexing mode, equipped with a 14 dBi internal antenna.

6.2 Ports and lines

Port type	Port description	Connected		Connector type	Qty.	Cable type	Cable length
		From	To				
Signal	48 V DC& Ethernet	EUT	SDA	D-type 15 pin	1	unshielded	10 m
Signal	RS232	EUT	Laptop	D-type 9 pin	1	unshielded	0.2 m
RF	Antenna	EUT	50 Ohm termination	N-type	1	NA	NA

6.3 Support and test equipment

Description	Manufacturer	Model number	Serial number
Laptop	Dell	PPx	4898T
Adapter to laptop	Dell	AA20031	93640
SDA-4S/VL type 2	Airspan	09200026B1	753D6A008G

6.4 Operating frequencies

Source	Frequency, MHz
Transmitter	3650 – 3675

6.5 Changes made in the EUT

No changes were implemented.

6.6 Transmitter characteristics

Type of equipment	
V	Stand-alone (Equipment with or without its own control provisions)
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)
	Plug-in card (Equipment intended for a variety of host systems)

Intended use		Condition of use
V	fixed	Always at a distance more than 2 m from all people
	mobile	Always at a distance more than 20 cm from all people
	portable	May operate at a distance closer than 20 cm to human body

Assigned frequency range	3650 – 3675 MHz
Operating frequency range	3652.5 – 3672.5 MHz
RF channel spacing	5 MHz
Maximum rated output power	At transmitter 50 Ω RF output connector: 21.8 dBm

Is transmitter output power variable?				
	No			
V	Yes		continuous variable	
		V	stepped variable with stepsize	1 dB
			minimum RF power	-30 dBm
			maximum RF power	21.8 dBm

Antenna connection			
unique coupling	standard connector	**V** Integral	**V** with temporary RF connector
			without temporary RF connector

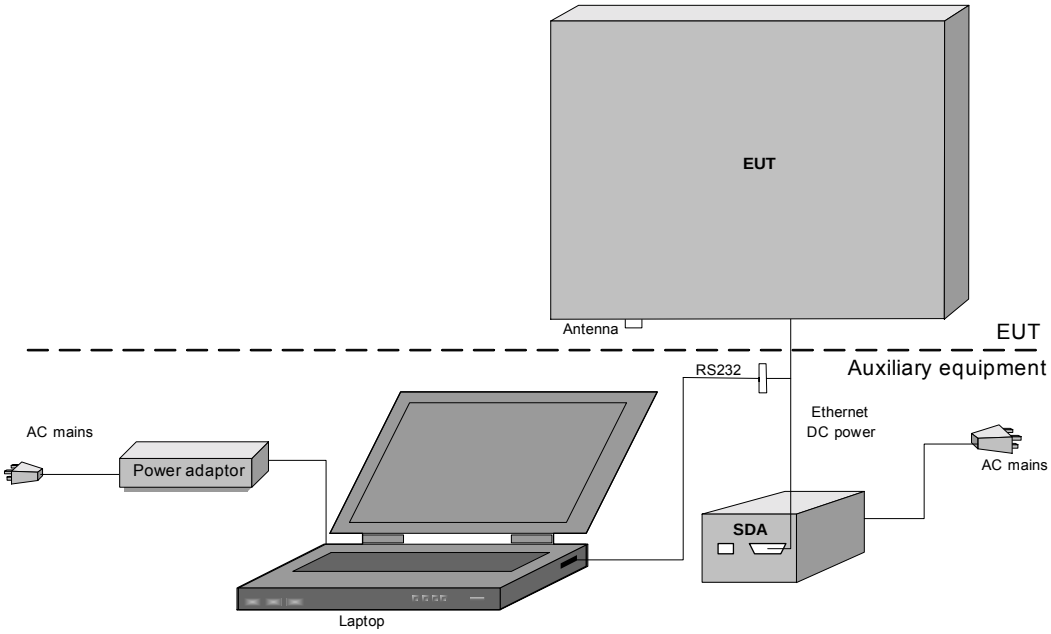
Antenna/s technical characteristics			
Type	Manufacturer	Model number	Gain
Internal	MARS	MA-WC36-AS14	14 dBi

Transmitter 99% power bandwidth	5 MHz
Transmitter aggregate data rate/s	5 MHz BW: BPSK – 2.095 MBps, QPSK - 4.19 MBps, 16QAM – 12.565 MBps, 64QAM – 18.85 MBps
Type of modulation	BPSK, QPSK, 16QAM, 64QAM
Type of multiplexing	OFDM
Modulating test signal (baseband)	PRBS
Maximum transmitter duty cycle in normal use	90%

Transmitter power source					
		Nominal rated voltage		Battery type	
	DC	**Nominal rated voltage**			
V	AC mains	**Nominal rated voltage**	120 V	Frequency	60 Hz

Common power source for transmitter and receiver	**V**	yes	no

6.7 Test configuration



Test specification:	Section 90.1321, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date:	4/02/2008		
Temperature: 23ºC	Air Pressure: 1012 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

7 Transmitter tests according to 47CFR part 90 requirements

7.1 Peak output power and power spectral density tests

7.1.1 General

This test was performed to measure the peak output power and power spectral density at RF antenna connector. Specification test limits are given in Table 7.1.1.

Table 7.1.1 Peak output power and spectral density limits

Assigned frequency range, MHz	Channel bandwidth, MHz	Maximum peak output power		Power spectral density, dBm/MHz
		W	dBm	
3650.0 – 3675.0	5	5	37.0	30

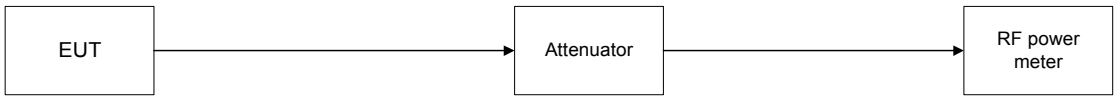
7.1.2 Test procedure

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

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

7.1.2.3 The peak output power was measured with power meter as provided in Table 7.1.2 and associated plots. The power spectral density was measured with power meter as provided in Table 7.1.3 and associated plots.

Figure 7.1.1 Peak output power test setup



Test specification:	Section 90.1321, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Table 7.1.2 Peak output power test results

OPERATING FREQUENCY RANGE: 3652.5 – 3672.5 MHz
DETECTOR USED: Power meter
MODULATION: BPSK, QPSK, 16QAM, 64QAM
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Carrier frequency, MHz	Power meter reading, dBm	External attenuation, dB	Cable loss dB	RF output power, dBm	Limit, dBm	Margin, dB	Verdict
64QAM, Bit Rate: 18.85 Mbps							
3652.5	21.24	included	included	35.24	37.0	-1.76	Pass
3665.0	21.50	included	included	35.50	37.0	-1.50	Pass
3672.5	21.08	included	included	35.08	37.0	-1.92	Pass
16QAM, Bit Rate :12.565 Mbps							
3652.5	21.12	included	included	35.12	37.0	-1.88	Pass
3665.0	21.30	included	included	35.30	37.0	-1.70	Pass
3672.5	21.41	included	included	35.41	37.0	-1.59	Pass
QPSK, Bit Rate: 4.19 Mbps							
3652.5	20.97	included	included	34.97	37.0	-2.03	Pass
3665.0	21.46	included	included	35.46	37.0	-1.54	Pass
3672.5	21.76	included	included	35.76	37.0	-1.24	Pass
BPSK, Bit Rate: 2.095 Mbps							
3652.5	21.13	included	included	35.13	37.0	-1.87	Pass
3665.0	21.15	included	included	35.15	37.0	-1.85	Pass
3672.5	21.79	included	included	35.79	37.0	-1.21	Pass

***** RF Output Power = Power Meter Reading + Antenna Gain (14 dBi)

Test specification:	**Section 90.1321, Maximum output power**		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	**Verdict:**	PASS
Date:	12/27/2007		
Temperature: 23ºC	**Air Pressure:** 1013 hPa	**Relative Humidity:** 42%	**Power Supply:** 120 V AC
Remarks:			

Table 7.1.3 Power spectral density test results for 5 MHz channel bandwidth

ASSIGNED FREQUENCY RANGE: 3652.5 – 3672.5 MHz
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 1000 kHz
VIDEO BANDWIDTH: 3000 kHz
MODULATION: BPSK, 4QAM, 16QAM, 64QAM
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Carrier frequency, MHz	Spectrum analyzer reading, dBm/Hz	Attenuation, dB	Cable loss, dB	Power density*, dBm/MHz	Limit, dBm/MHz	Margin, dB	Verdict
64QAM,Bit Rate: 18.85 Mbps							
3652.5	15.50	included	included	29.50	30	-0.50	Pass
3665.0	15.67	included	included	29.67	30	-0.33	Pass
3672.5	15.00	included	included	29.00	30	-1.00	Pass
16QAM, Bit Rate: 12.565 Mbps							
3652.5	15.50	included	included	29.50	30	-0.50	Pass
3665.0	15.67	included	included	29.67	30	-0.33	Pass
3672.5	15.00	included	included	29.00	30	-1.00	Pass
QPSK,Bit Rate: 4.19 Mbps							
3652.5	15.67	included	included	29.67	30	-0.33	Pass
3665.0	15.17	included	included	29.17	30	-0.83	Pass
3672.5	14.83	included	included	28.83	30	-1.17	Pass
BPSK, Bit Rate: 2.095 Mbps							
3652.5	15.50	included	included	29.50	30	-0.50	Pass
3665.0	15.00	included	included	29.00	30	-1.00	Pass
3672.5	14.50	included	included	28.50	30	-1.50	Pass

* - Power density = Spectrum analyzer reading + Antenna Gain (14 dBi)
Note: Additional alternative measurement settings used for peak power spectral density at low and high carrier frequencies at minimum and maximum data rates

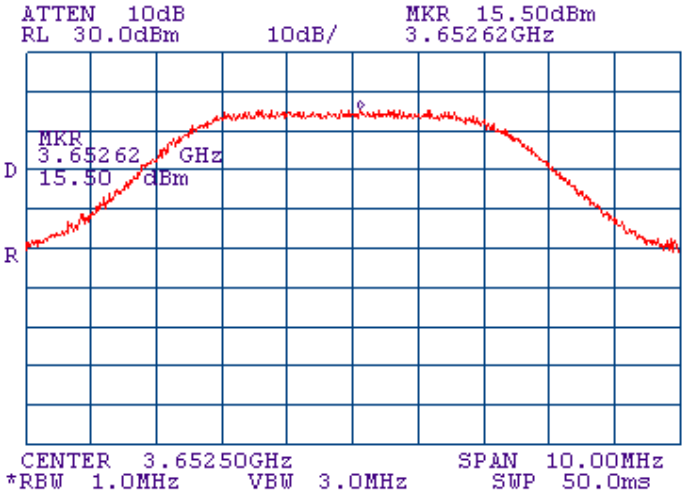
Reference numbers of test equipment used

HL 3208	HL 3301	HL 3437	HL 3440				

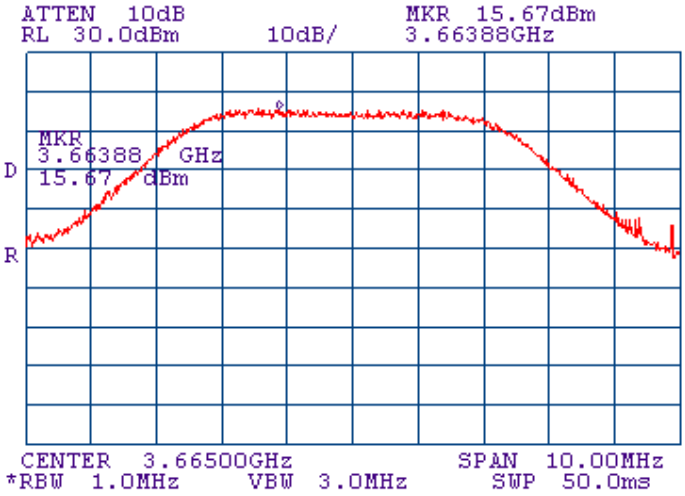
Full description is given in Appendix A.

Test specification:	Section 90.1321, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.1.1 Peak power density test results at low frequency, 64QAM, Bit Rate: 18.85 Mbps

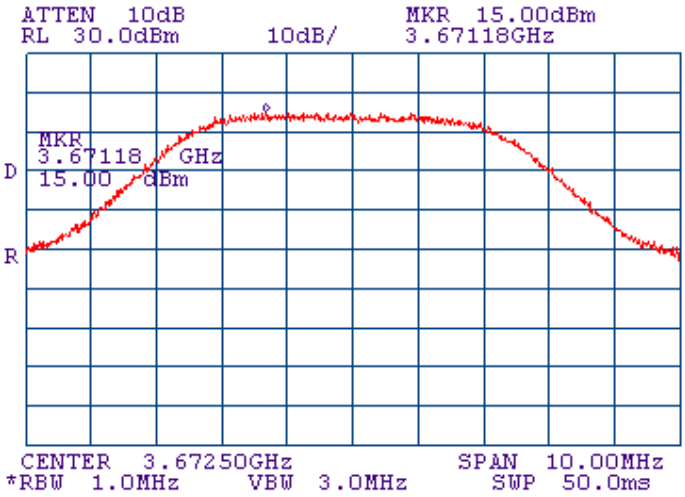


Plot 7.1.2 Peak power density test results at mid frequency, 64QAM, Bit Rate: 18.85 Mbps

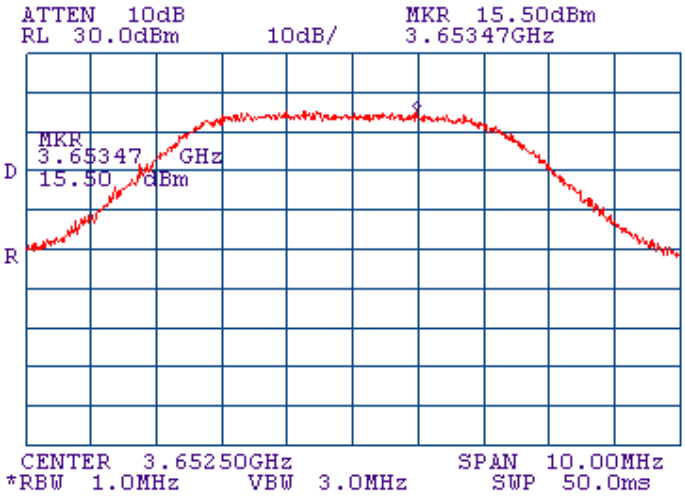


Test specification:	Section 90.1321, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.1.3 Peak power density test results at high frequency, 64QAM Bit Rate: 18.85 Mbps

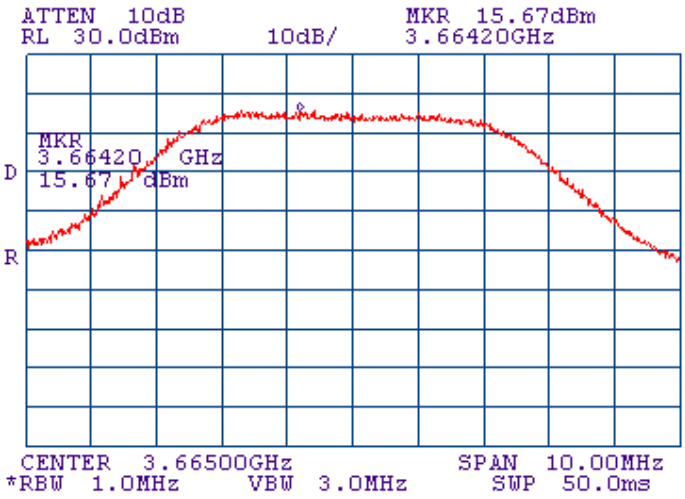


Plot 7.1.4 Peak power density test results at low frequency, 16QAM Bit Rate: 2.565 Mbps

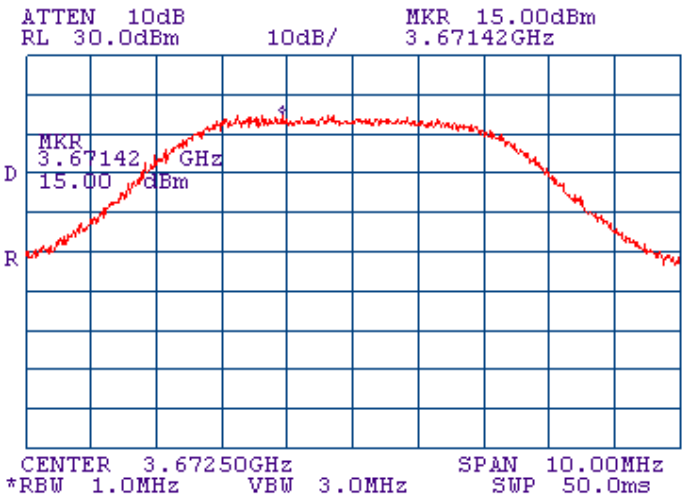


Test specification:	Section 90.1321, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.1.5 Peak power density test results at mid frequency, 16QAM Bit Rate: 12.565 Mbps

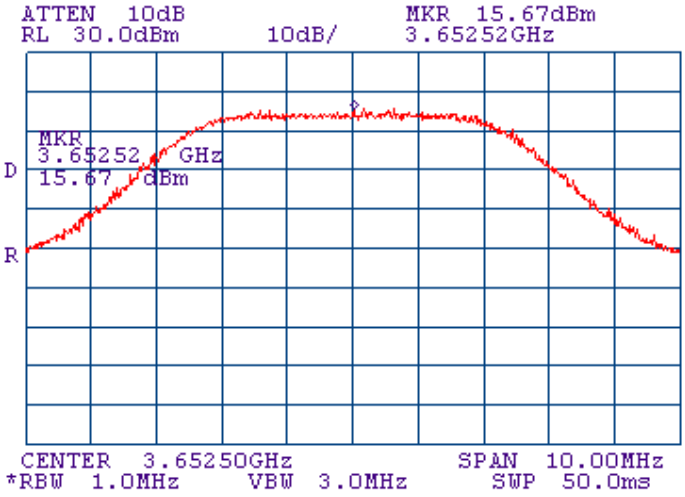


Plot 7.1.6 Peak power density test results at high frequency, 16QAM Bit Rate: 12.565 Mbps

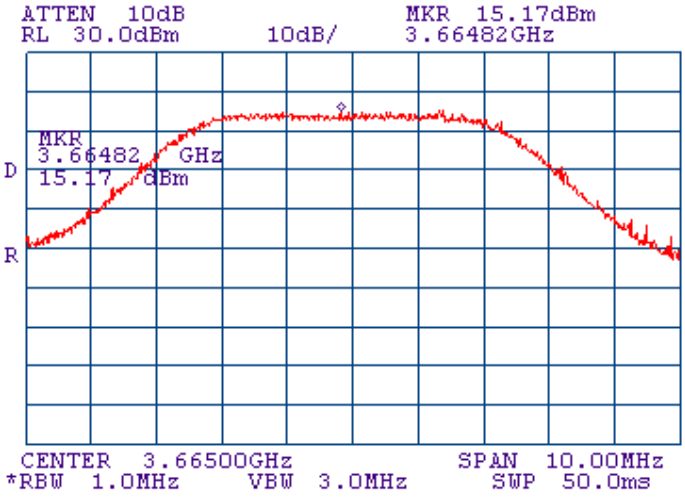


Test specification:	Section 90.1321, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.1.7 Peak power density test results at low frequency, QPSK Bit Rate: 4.19 Mbps

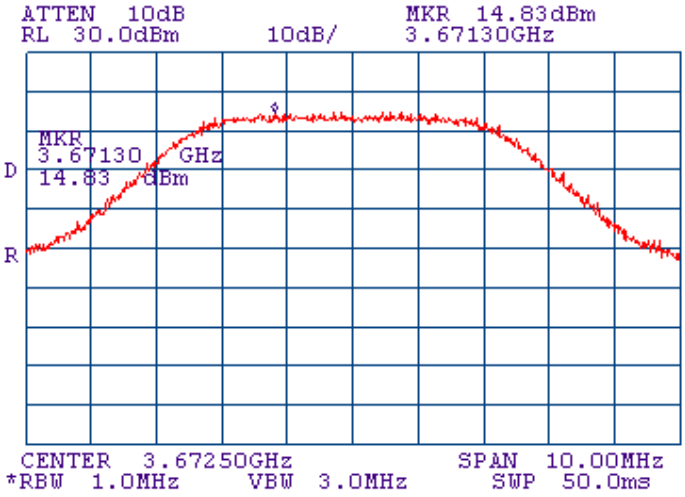


Plot 7.1.8 Peak power density test results at mid frequency, QPSK Bit Rate: 4.19 Mbps

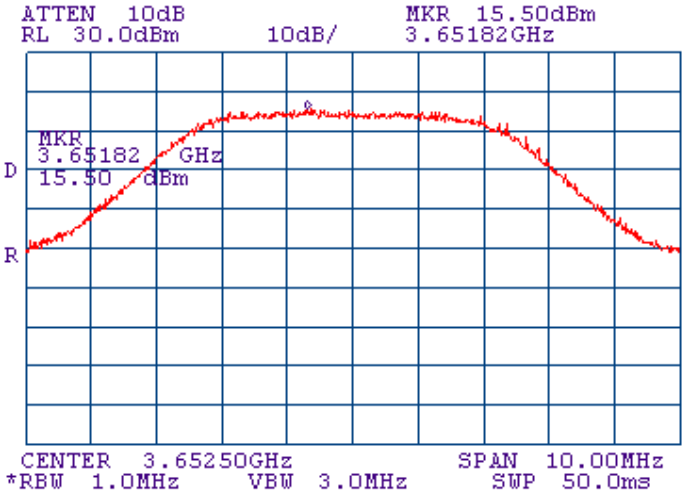


Test specification:	Section 90.1321, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.1.9 Peak power density test results at high frequency, QPSK Bit Rate: 4.19 Mbps

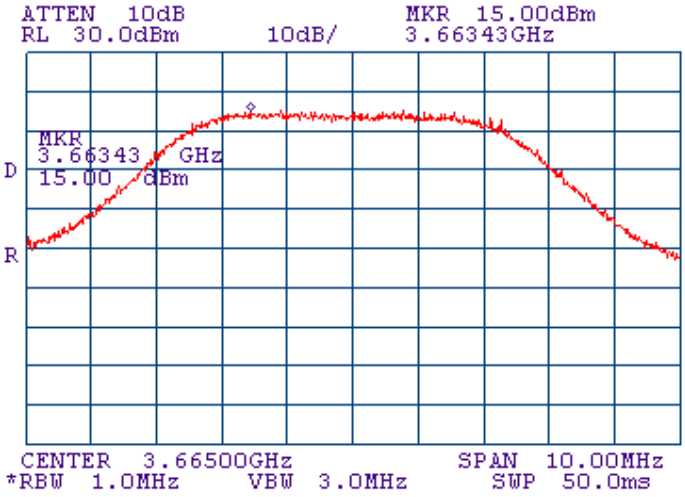


Plot 7.1.10 Peak power density test results at low frequency, BPSK, Bit Rate: 2.095 Mbps

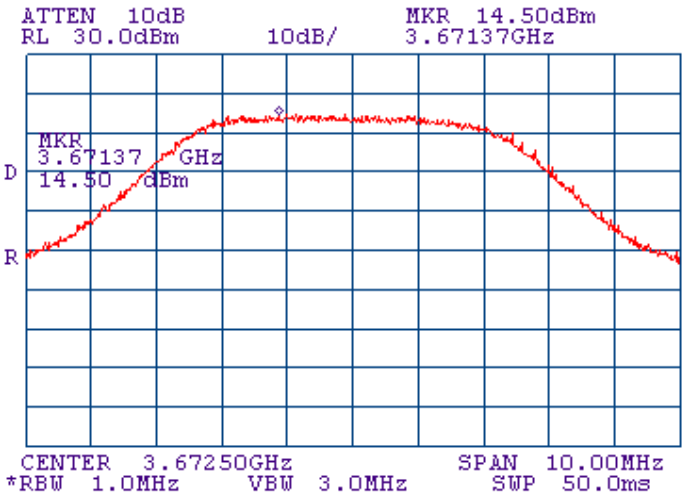


Test specification:	Section 90.1321, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-C, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.1.11 Peak power density test results at mid frequency, BPSK Bit Rate: 2.095 Mbps



Plot 7.1.12 Peak power density test results at high frequency, BPSK Bit Rate: 2.095 Mbps



Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

7.2 Occupied bandwidth test

7.2.1 General

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

Table 7.2.1 Occupied bandwidth limits

Operating frequency range, MHz	Modulation envelope reference points*, dBc	Channel bandwidth, MHz	Maximum allowed bandwidth, MHz
3650.0-3675.0	26	5	5

* - Modulation envelope reference points are provided in terms of attenuation below the maximum peak output power of carrier.

7.2.2 Test procedure

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

7.2.2.2 Maximum peak output power of carrier was taken as the reference level.

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

Figure 7.2.1 Occupied bandwidth test setup

Test specification:	**Section 90.209, Occupied bandwidth**		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	**Verdict:**	PASS
Date:	12/27/2007		
Temperature: 23ºC	**Air Pressure:** 1013 hPa	**Relative Humidity:** 42%	**Power Supply:** 120 V AC
Remarks:			

Table 7.2.2 Occupied bandwidth test results

RESOLUTION BANDWIDTH: 100 kHz*
VIDEO BANDWIDTH: 300 kHz
MODULATION ENVELOPE REFERENCE POINTS: 26 dBc
MODULATING SIGNAL: PRBS

Carrier frequency, MHz	Occupied bandwidth, MHz	Limit, MHz	Margin, MHz	Verdict
64QAM,Bit Rate 18.85 Mbps				
3652.5	4.7075	5	-0.2925	Pass
3665.0	4.7775	5	-0.2225	Pass
3672.5	4.7425	5	-0.2575	Pass
BPSK ,Bit Rate 2.095 Mbps				
3652.5	4.7075	5	-0.2925	Pass
3665.0	4.6900	5	-0.3100	Pass
3672.5	4.7250	5	-0.2750	Pass

* - RBW ≥ 1% of OBW; 1 % of 5 MHz is 50 kHz, hence, RBW=100 kHz was chosen for the measurements.

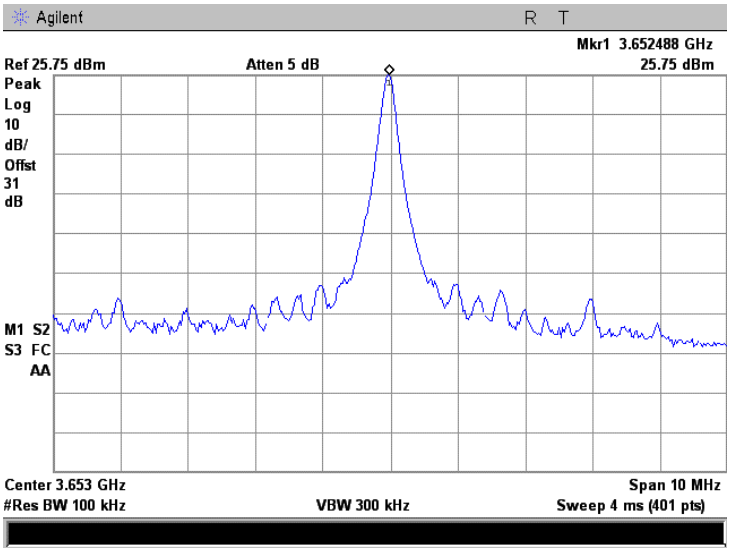
Reference numbers of test equipment used

HL 2909	HL 2912	HL 3173	HL 3179				

Full description is given in Appendix A.

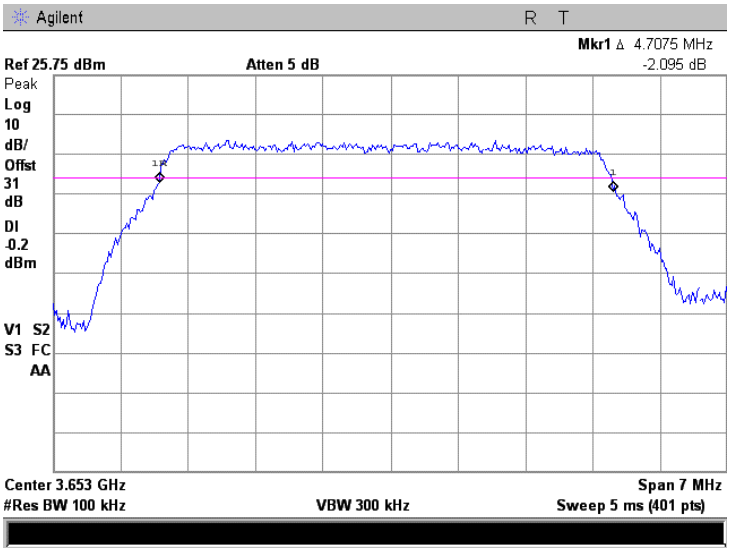
Test specification:	**Section 90.209, Occupied bandwidth**		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	**Verdict:**	PASS
Date:	12/27/2007		
Temperature: 23ºC	**Air Pressure:** 1013 hPa	**Relative Humidity:** 42%	**Power Supply:** 120 V AC
Remarks:			

Plot 7.2.1 Unmodulated signal for reference level

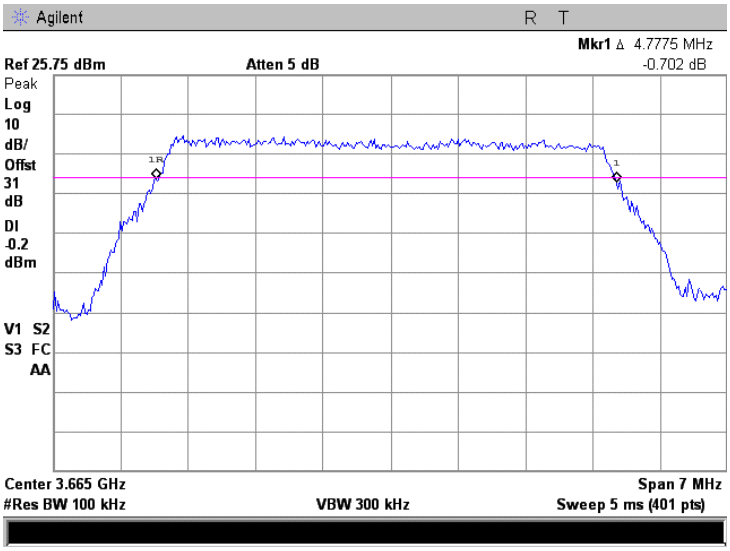


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.2.2 Occupied bandwidth test result at low frequency, 64QAM, rate 18.85 Mbps

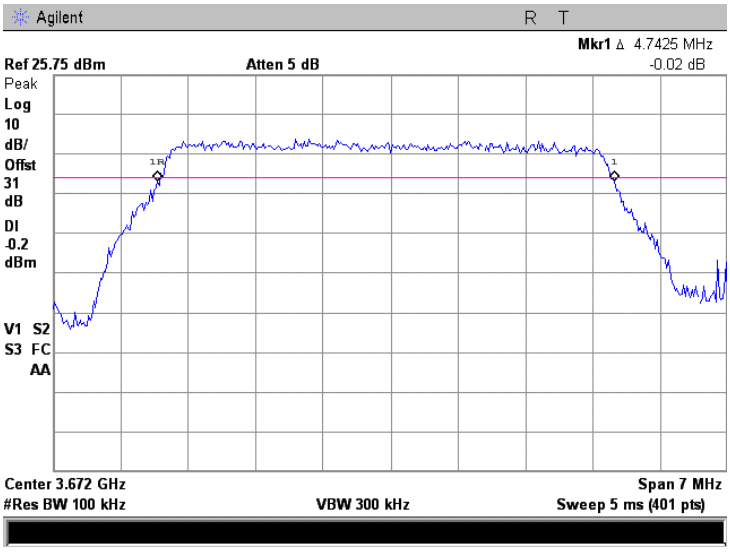


Plot 7.2.3 Occupied bandwidth test result at mid frequency, 64QAM, rate 18.85 Mbps

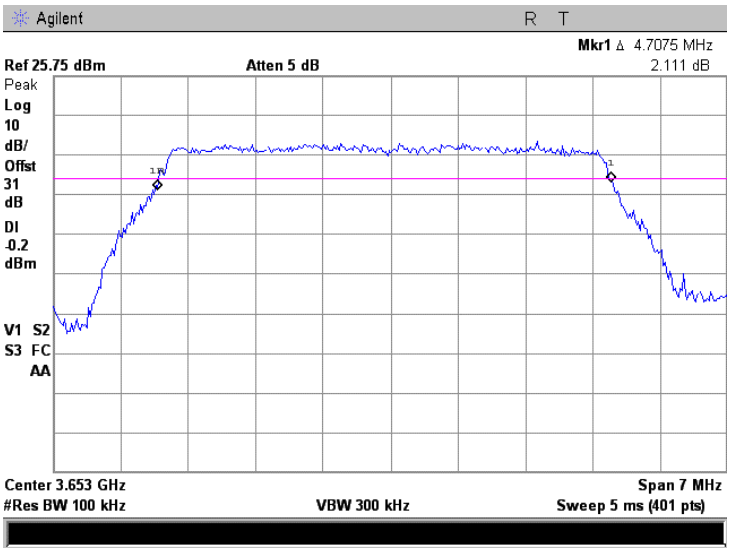


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.2.4 Occupied bandwidth test result at high frequency, 64QAM, rate 18.85 Mbps

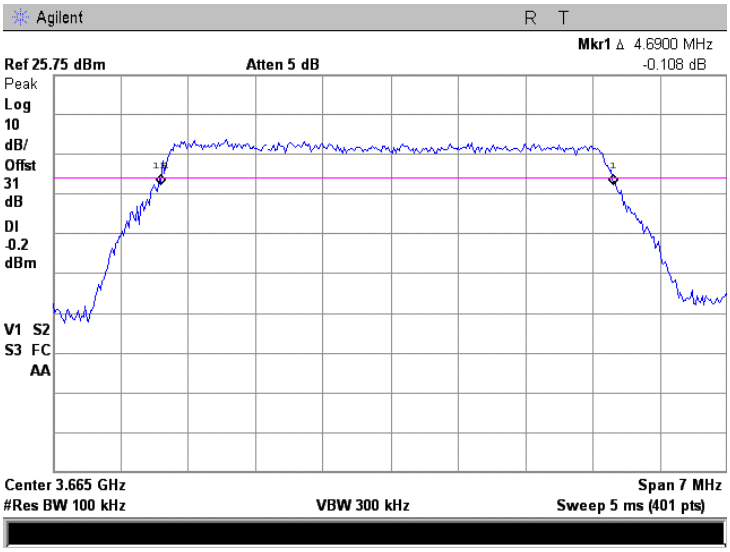


Plot 7.2.5 Occupied bandwidth test result at low frequency, BPSK, rate 2.095 Mbps

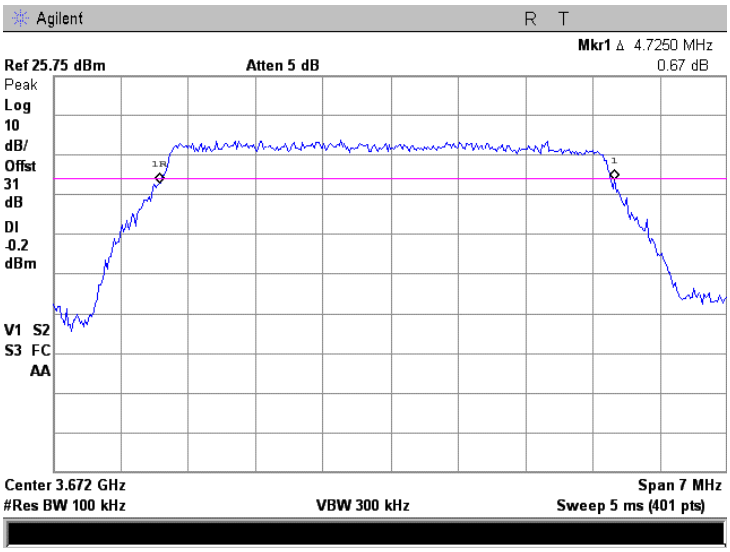


Test specification:	Section 90.209, Occupied bandwidth		
Test procedure:	47 CFR, Section 2.1049		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.2.6 Occupied bandwidth test result at mid frequency, BPSK, rate 2.095 Mbps



Plot 7.2.7 Occupied bandwidth test result at high frequency, BPSK, rate 2.095 Mbps



Test specification:	Section 90.210 (b), Emission mask		
Test procedure:	47 CFR, Sections 2.1051, 2.1047 and 90.210(b); TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

7.3 Emission mask test

7.3.1 General

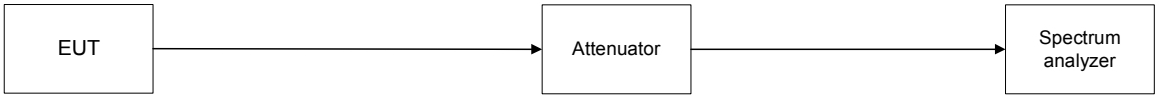
This test was performed to measure emission mask at RF antenna connector. Specification test limits are given in Table 7.3.1.

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 emission mask was measured with spectrum analyzer as provided in the associated plots. The test results are provided in Table 7.3.2.

Figure 7.3.1 Emission mask test setup



Test specification:	**Section 90.210, Emission mask**		
Test procedure:	47 CFR, Sections 2.1051, 2.1047 and 90.210(b); TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	**Verdict:**	PASS
Date:	12/27/2007		
Temperature: 23ºC	**Air Pressure:** 1013 hPa	**Relative Humidity:** 42%	**Power Supply:** 120 V AC
Remarks:			

Table 7.3.1 Emission mask limits

Frequency displacement from carrier	Attenuation below carrier, dBc
Emission mask B (Channel bandwidth 5 MHz)	
0 – 2.5 MHz	0
2.5 – 5.0 MHz	25
5.0 – 12.5 MHz	35
More than** 12.5 MHz	43 + 10 log(P)

* - F – frequency in MHz removed from center
** - emission mask includes carrier modulation envelope within ± 250 % of the authorized bandwidth; the frequency range removed beyond ± 250 % of the authorized bandwidth from carrier was investigated as spurious emission

Table 7.3.2 Emission mask test results

Carrier frequency, MHz	Limit	Verdict
3652.5	Emission mask B	Pass
3665.0		
3672.5		

The zero dB reference is measured relative to the highest average power of the fundamental emission measured across the designated channel bandwidth

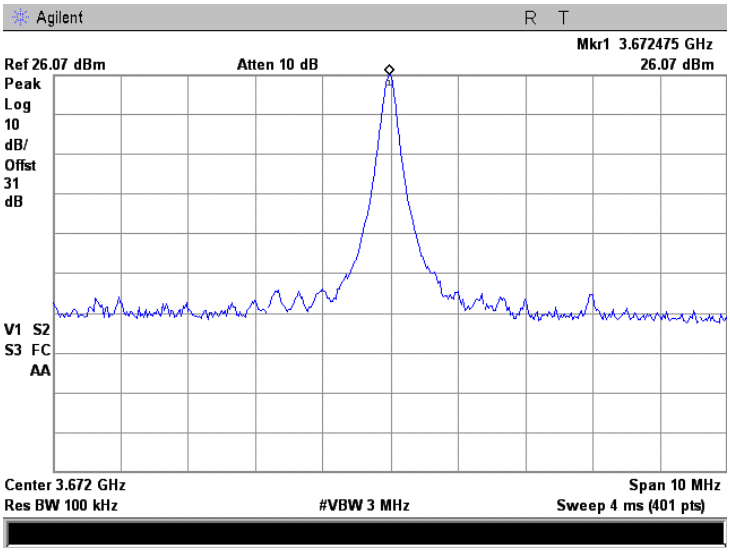
Reference numbers of test equipment used

HL 2909	HL 2912	HL 3173	HL 3179				

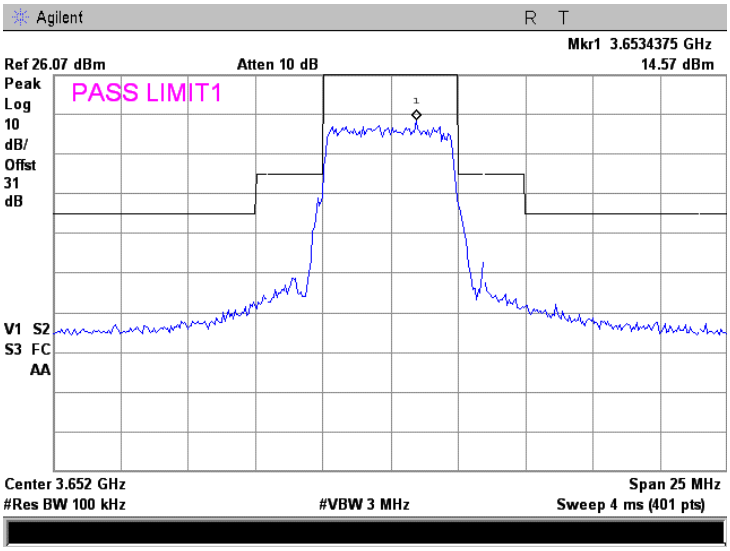
Full description is given in Appendix A.

Test specification:	Section 90.210, Emission mask		
Test procedure:	47 CFR, Sections 2.1051, 2.1047 and 90.210(b); TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.3.1 Emission mask

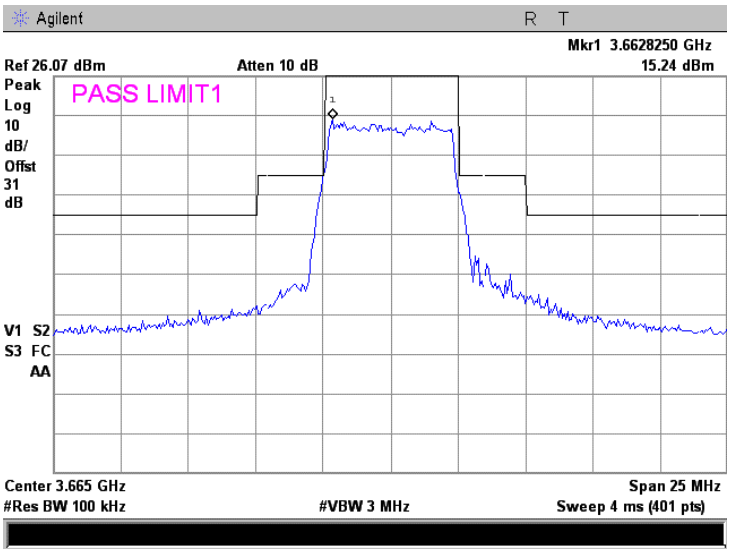


Plot 7.3.2 Emission mask test results at low carrier frequency, 64QAM rate 18.85 Mbps

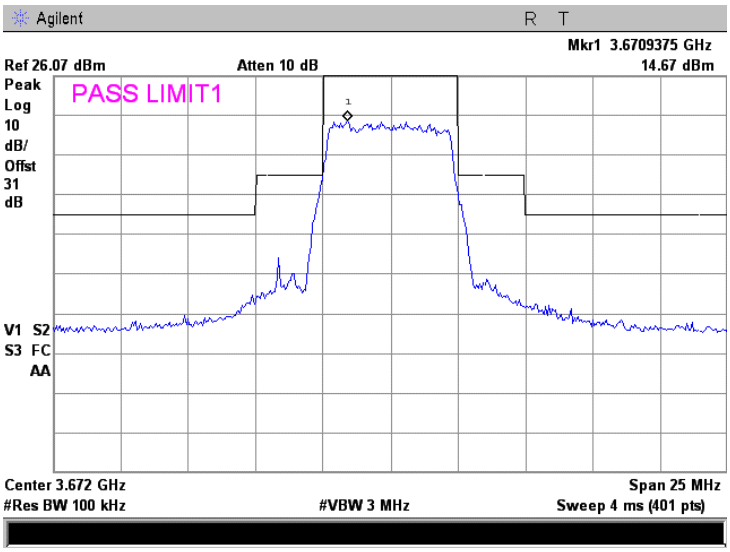


Test specification:	Section 90.210, Emission mask		
Test procedure:	47 CFR, Sections 2.1051, 2.1047 and 90.210(b); TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.3.3 Emission mask test results at mid carrier frequency, 64QAM rate 18.85 Mbps

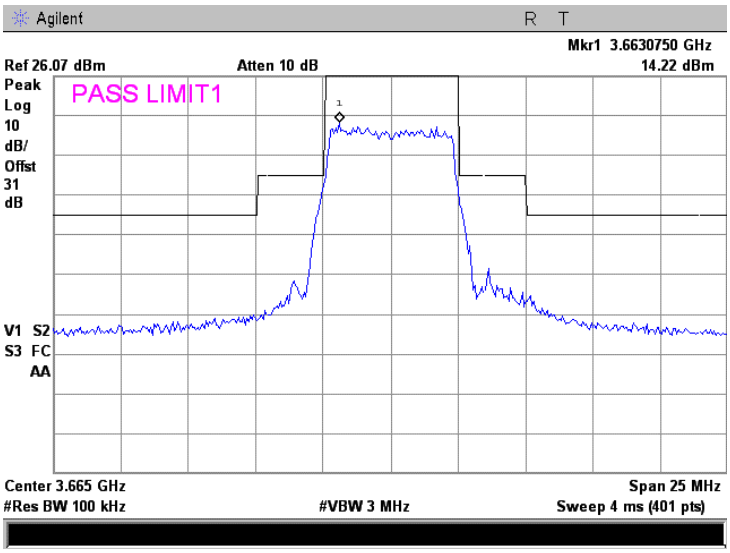


Plot 7.3.4 Emission mask test results at high carrier frequency, 64QAM rate 18.85 Mbps

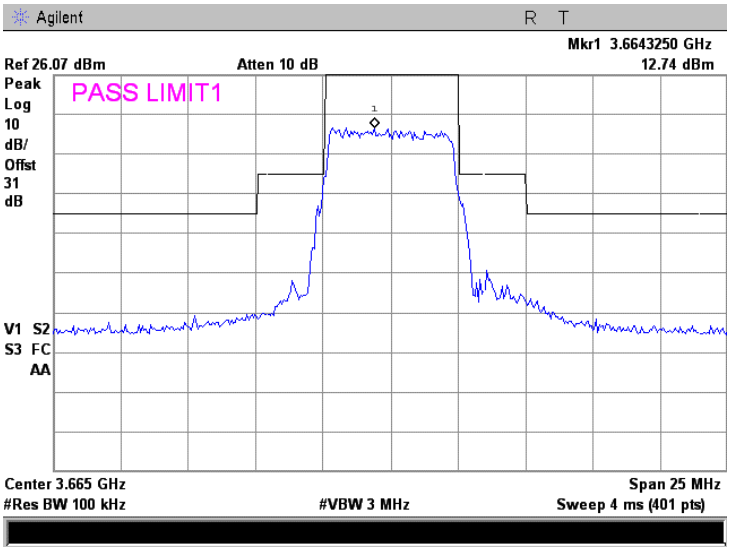


Test specification:	Section 90.210, Emission mask		
Test procedure:	47 CFR, Sections 2.1051, 2.1047 and 90.210(b); TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.3.5 Emission mask test results at mid carrier frequency,16QAM rate 12.565 Mbps

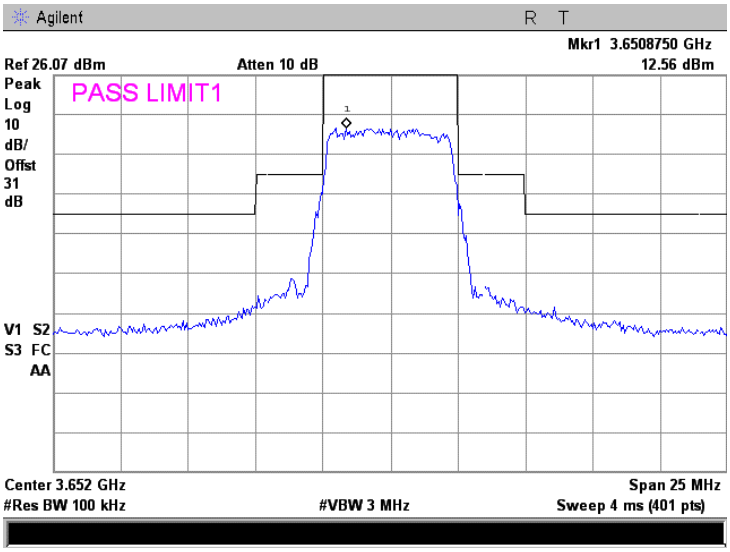


Plot 7.3.6 Emission mask test results at mid carrier frequency, QPSK rate 4.19 Mbps

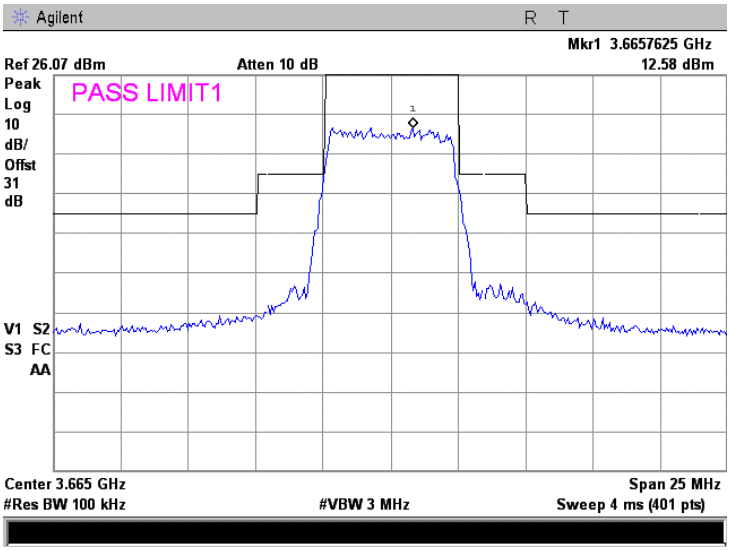


Test specification:	Section 90.210, Emission mask		
Test procedure:	47 CFR, Sections 2.1051, 2.1047 and 90.210(b); TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.3.7 Emission mask test results at low carrier frequency, BPSK rate 2.095 Mbps

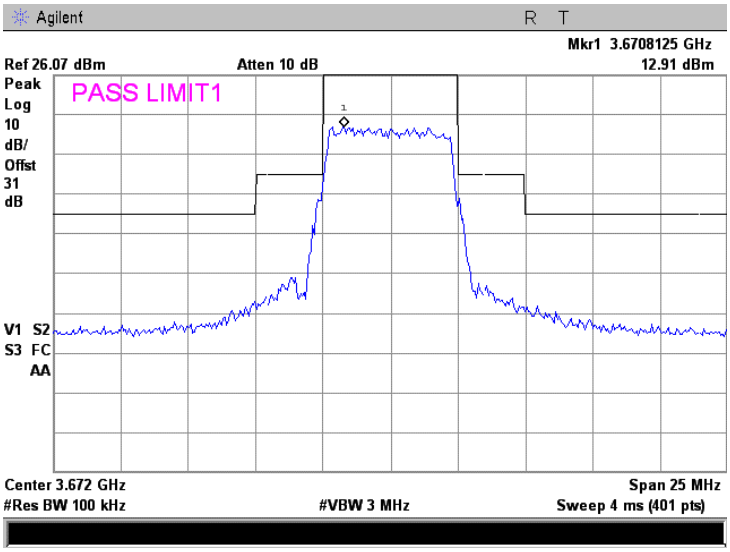


Plot 7.3.8 Emission mask test results at mid carrier frequency, BPSK rate 2.095 Mbps



Test specification:	Section 90.210, Emission mask		
Test procedure:	47 CFR, Sections 2.1051, 2.1047 and 90.210(b); TIA/EIA-603-C, Section 2.2.13		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.3.9 Emission mask test results at high carrier frequency, BPSK rate 2.095 Mbps



Test specification:	Section 90.1323, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.1323		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

7.4 Spurious emissions at RF antenna connector test

7.4.1 General

This test was performed to measure spurious emissions at RF antenna connector. Specification test limits are given in Table 7.4.1.

Table 7.4.1 Spurious emission limits

Frequency, MHz	ERP of spurious, dBm	
0.009 – 10th harmonic*	Low carrier frequency	-13
	Mid carrier frequency	-13
	High carrier frequency	-13

* - spurious emission limits do not apply to the in band emission within ± 150 % of the authorized bandwidth from the carrier; investigated in course of emission mask testing

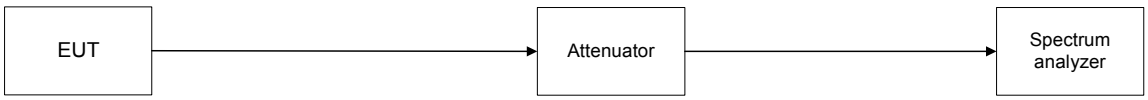
7.4.2 Test procedure

7.4.2.1 The EUT was set up as shown in Figure 7.4.1, energized and its proper operation was checked.

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

7.4.2.3 The spurious emission was measured with spectrum analyzer as provided in Table 7.4.2 and associated plots.

Figure 7.4.1 Spurious emission test setup



Test specification:	**Section 90.1323, Conducted spurious emissions**		
Test procedure:	47 CFR, Sections 2.1051 and 90.1323		
Test mode:	Compliance	**Verdict:**	PASS
Date:	12/27/2007		
Temperature: 23ºC	**Air Pressure:** 1013 hPa	**Relative Humidity:** 42%	**Power Supply:** 120 V AC
Remarks:			

Table 7.4.2 Spurious emission test results

OPERATING FREQUENCY RANGE: 3652.5 – 3672.5 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 40000 MHz
DETECTOR USED: Peak
VIDEO BANDWIDTH: 30 kHz
MODULATION: BPSK
BIT RATE: 2.095 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	SA reading, dBm	Attenuator, dB	Cable loss, dB	RBW, kHz	Spurious emission, dBm	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
Low carrier frequency 3652.5 MHz									
No spurious were found									Pass
Mid carrier frequency 3665.0 MHz									
No spurious were found									Pass
High carrier frequency 3672.5 MHz									
No spurious were found									Pass

*****- Margin = Spurious emission – specification limit.

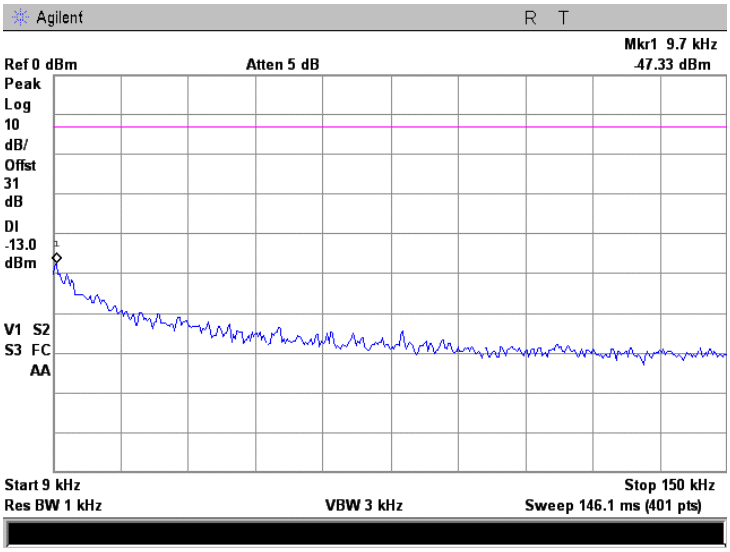
Reference numbers of test equipment used

HL 2909	HL 2912	HL 2260	HL 2261	HL 3173	HL 3179	HL 3208	HL 3321

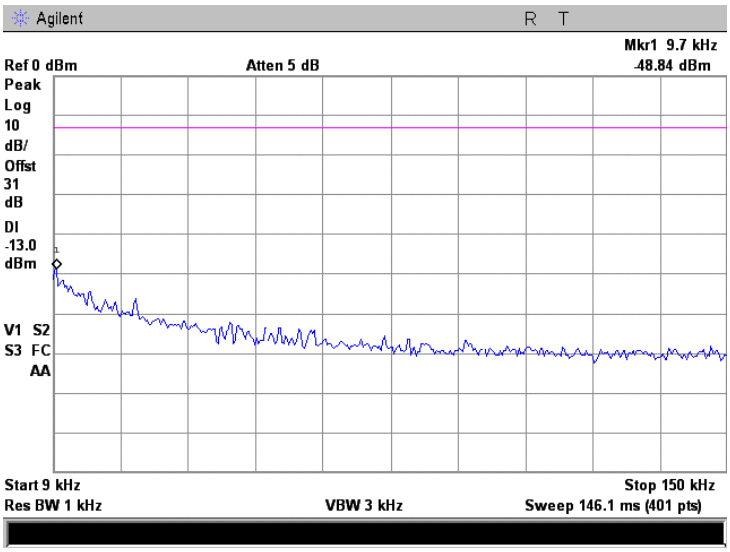
Full description is given in Appendix A.

Test specification:	Section 90.1323, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.1323		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.4.1 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency

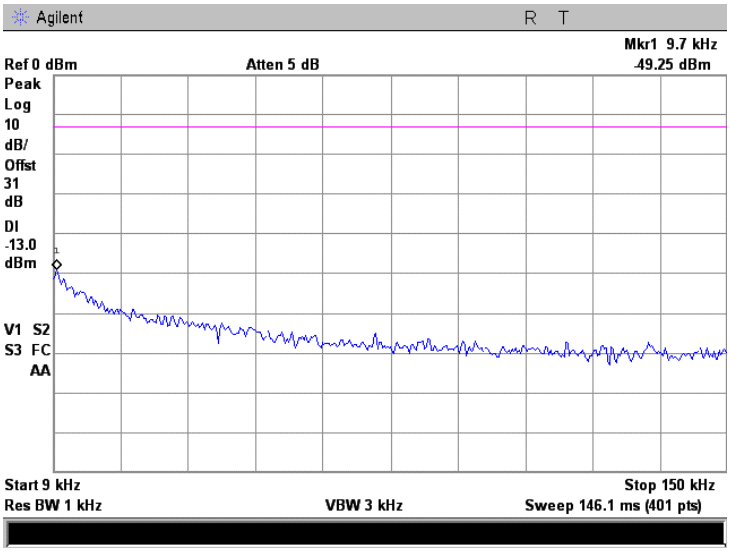


Plot 7.4.2 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency

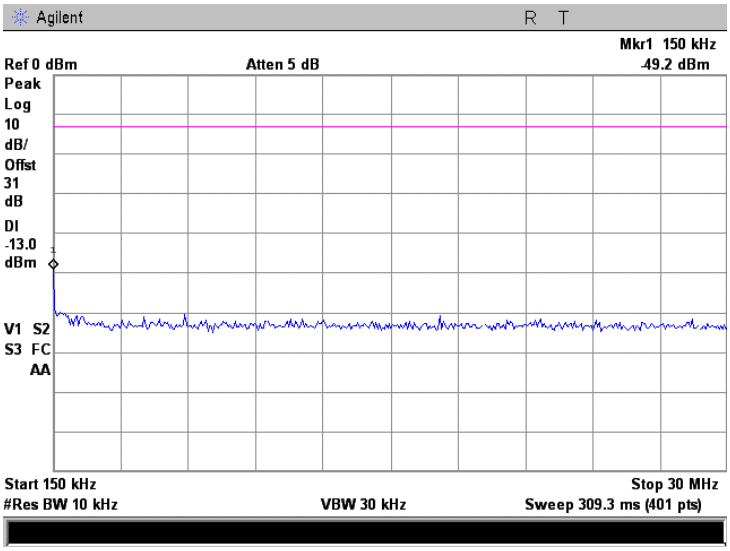


Test specification:	Section 90.1323, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.1323		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.4.3 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency

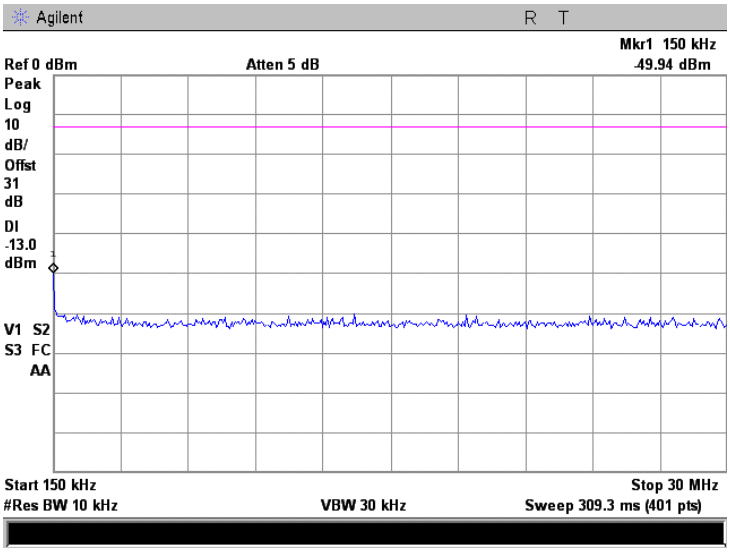


Plot 7.4.4 Spurious emission measurements in 0.15 - 30.0 MHz range at low carrier frequency

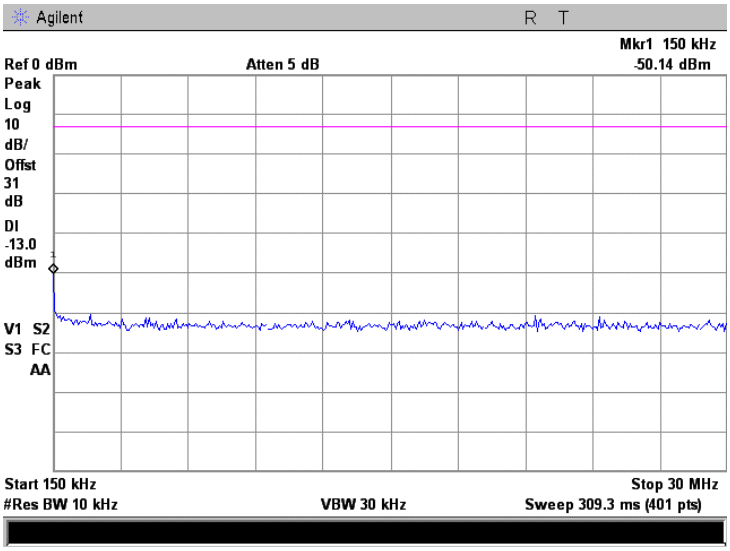


Test specification:	Section 90.1323, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.1323		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.4.5 Spurious emission measurements in 0.15 - 30.0 MHz range at mid carrier frequency

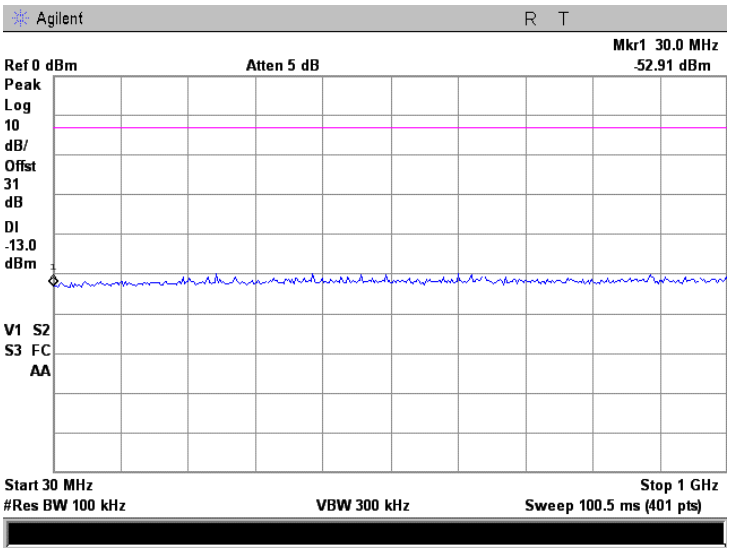


Plot 7.4.6 Spurious emission measurements in 0.15 – 30.0 MHz range at high carrier frequency

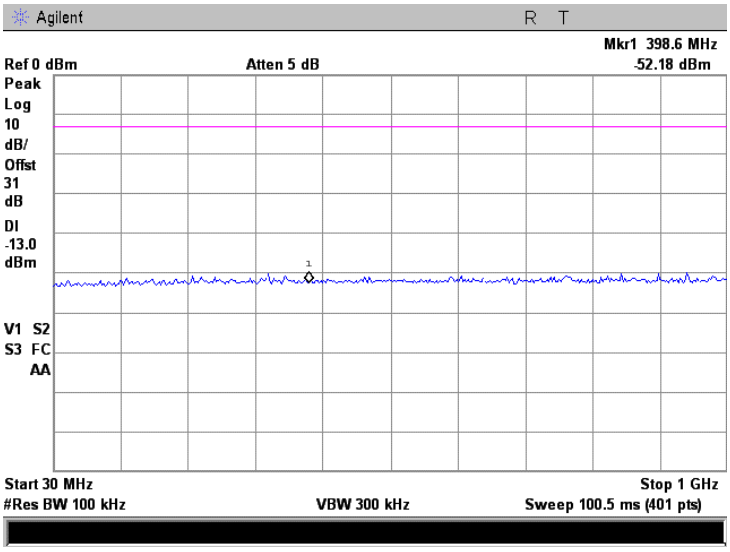


Test specification:	Section 90.1323, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.1323		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.4.7 Spurious emission measurements in 30.0 - 1000 MHz range at low carrier frequency

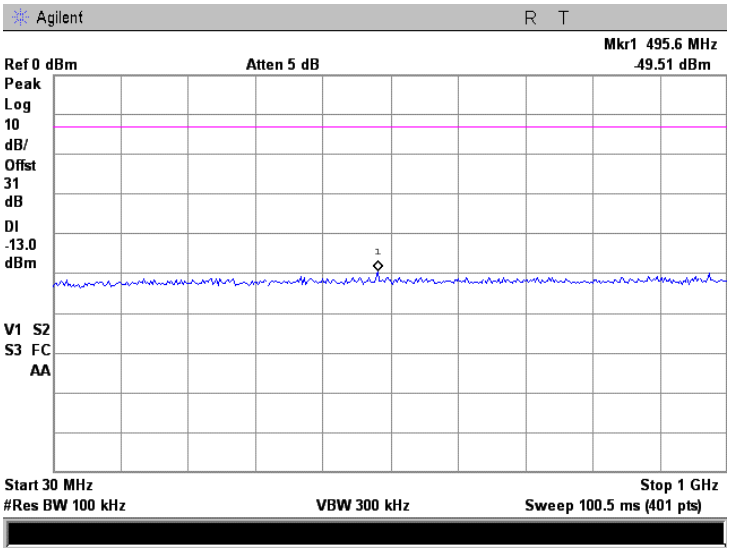


Plot 7.4.8 Spurious emission measurements in 30.0 - 1000 MHz range at mid carrier frequency

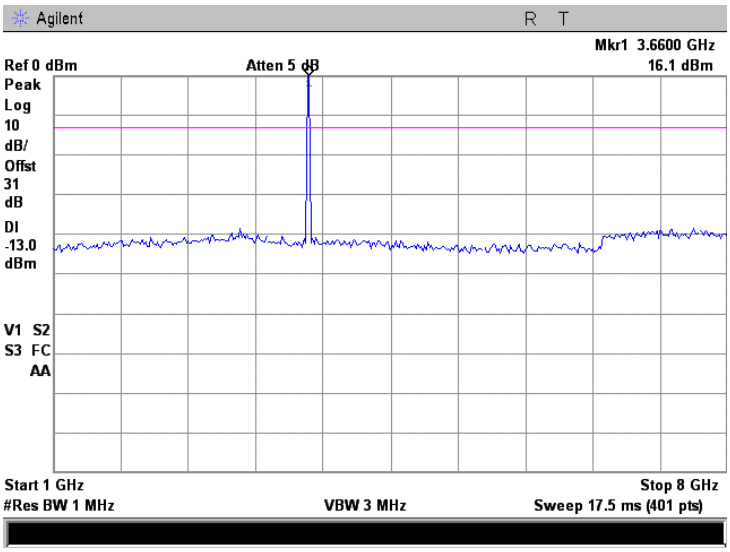


Test specification:	Section 90.1323, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.1323		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.4.9 Spurious emission measurements in 30.0 - 1000 MHz range at high carrier frequency

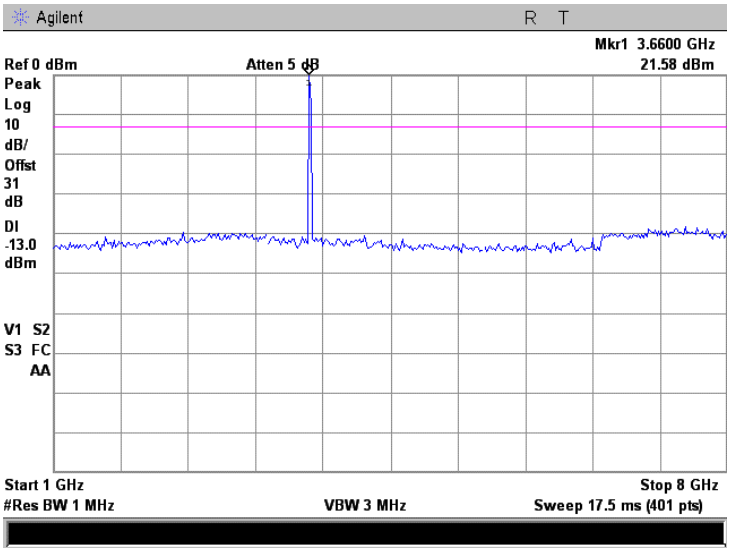


Plot 7.4.10 Spurious emission measurements in 1000 - 8000 MHz range at low carrier frequency

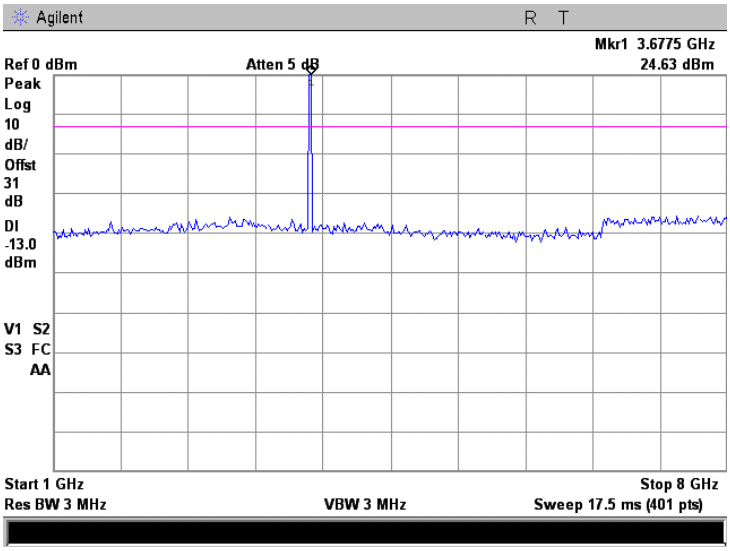


Test specification:	Section 90.1323, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.1323		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.4.11 Spurious emission measurements in 1000 - 8000 MHz range at mid carrier frequency

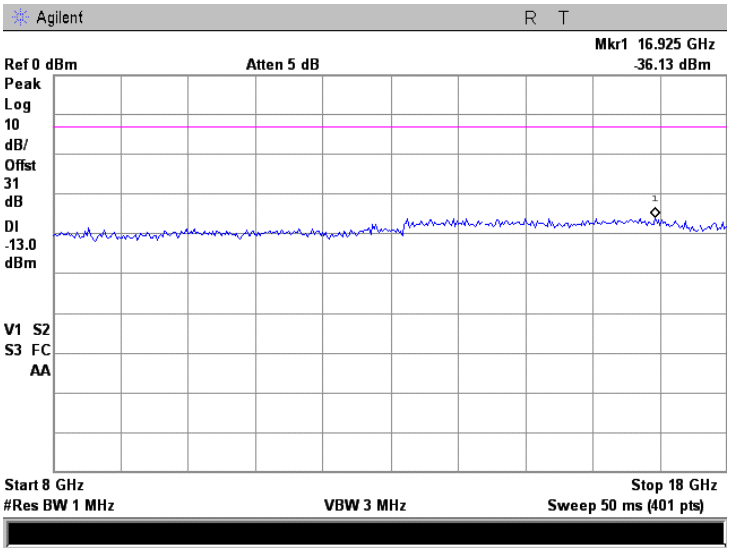


Plot 7.4.12 Spurious emission measurements in 1000 - 8000 MHz range at high carrier frequency

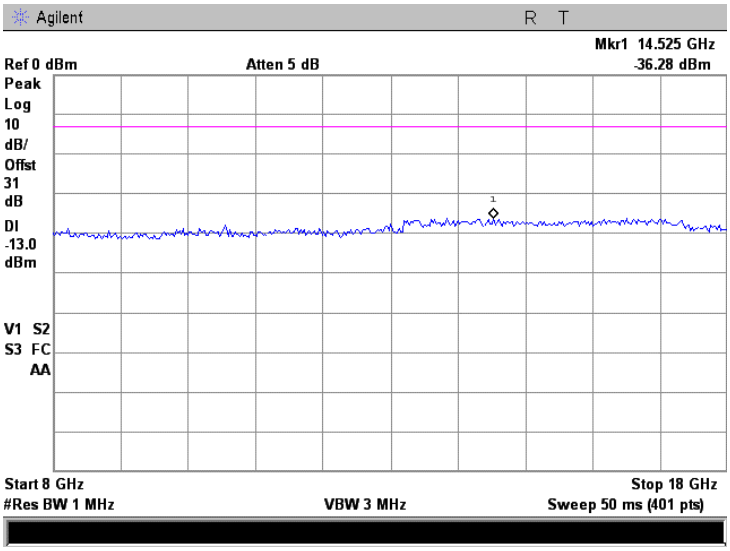


Test specification:	Section 90.1323, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.1323		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.4.13 Spurious emission measurements in 8000 - 18000 MHz range at low carrier frequency

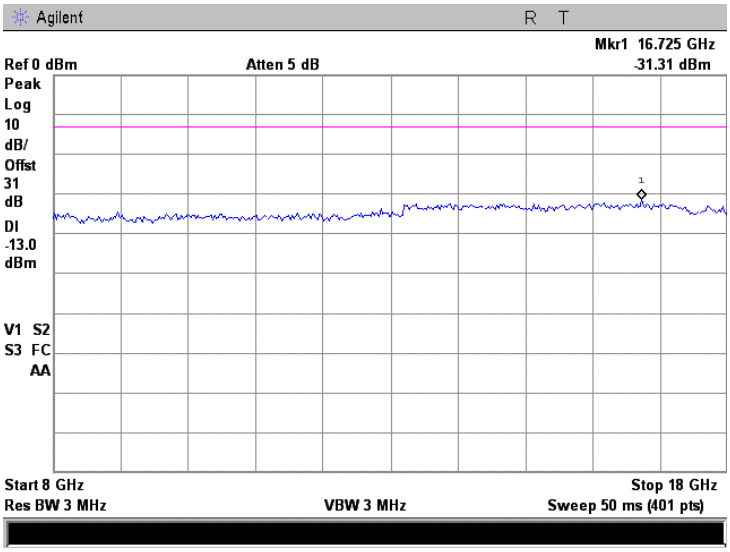


Plot 7.4.14 Spurious emission measurements in 8000 - 18000 MHz range at mid carrier frequency

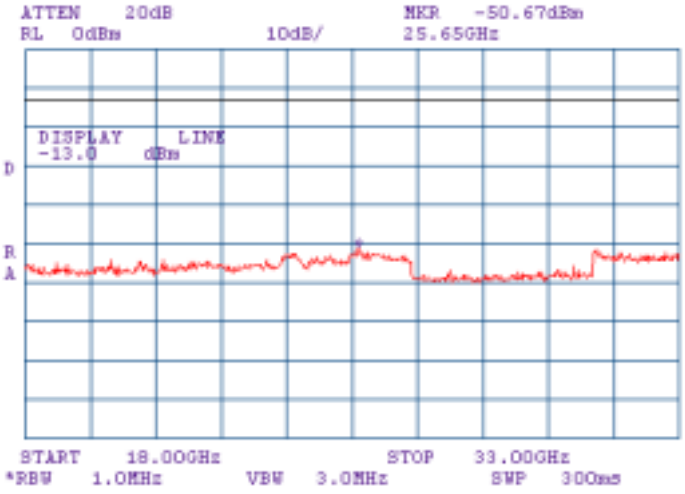


Test specification:	Section 90.1323, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.1323		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.4.15 Spurious emission measurements in 8000 - 18000 MHz range at high carrier frequency

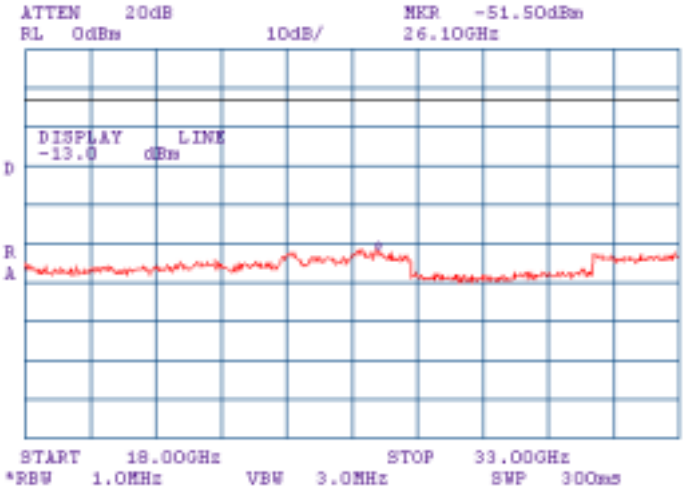


Plot 7.4.16 Spurious emission measurements in 18000 - 33000 MHz range at low carrier frequency

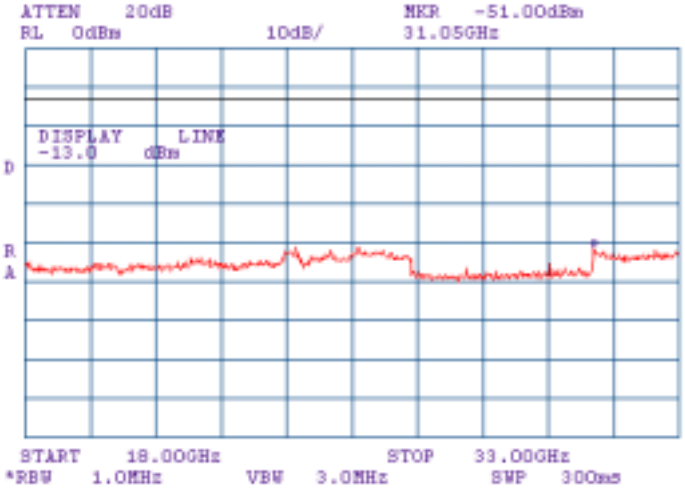


Test specification:	Section 90.1323, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.1323		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.4.17 Spurious emission measurements in 18000 - 33000 MHz range at mid carrier frequency

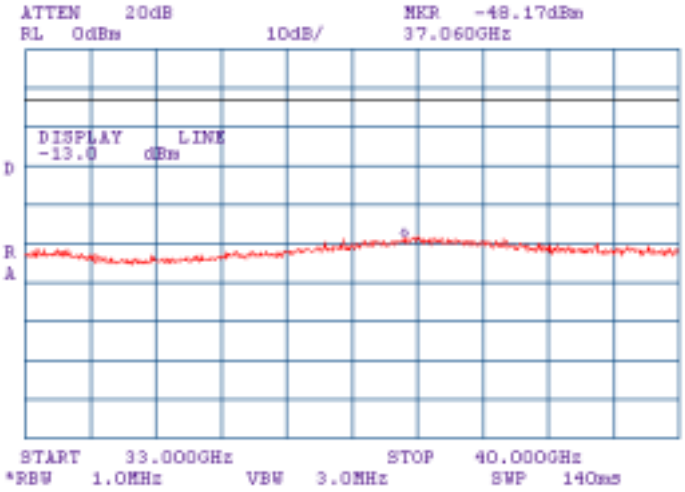


Plot 7.4.18 Spurious emission measurements in 18000 - 33000 MHz range at high carrier frequency

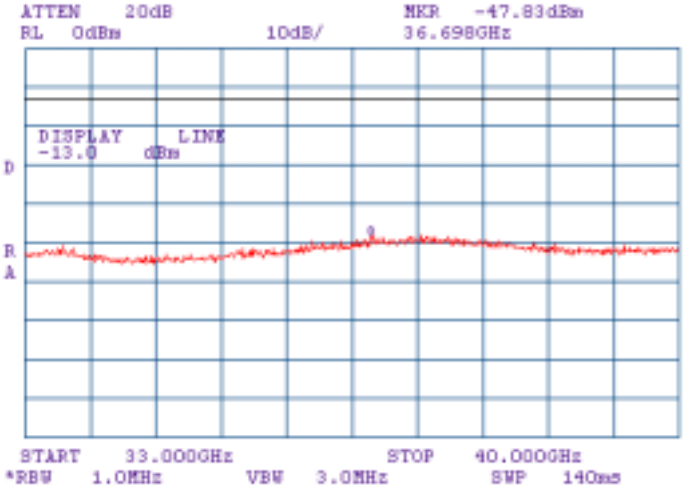


Test specification:	Section 90.1323, Conducted spurious emissions		
Test procedure:	47 CFR, Sections 2.1051 and 90.1323		
Test mode:	Compliance	Verdict:	PASS
Date:	12/27/2007		
Temperature: 23ºC	Air Pressure: 1013 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

Plot 7.4.19 Spurious emission measurements in 26500 - 40000 MHz range at low carrier frequency

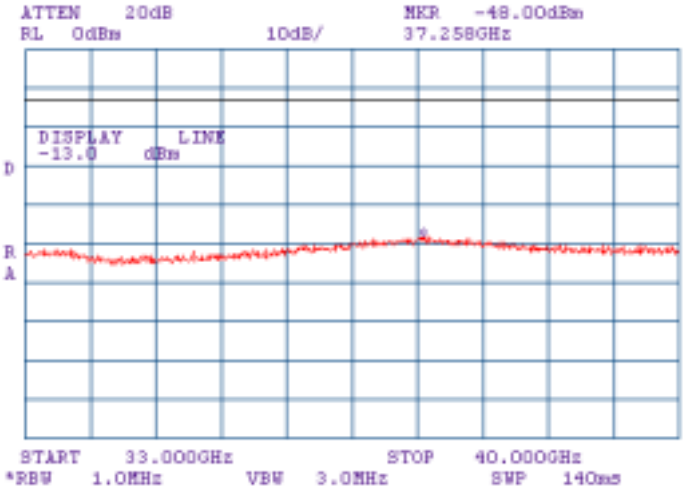


Plot 7.4.20 Spurious emission measurements in 26500 - 40000 MHz range at mid carrier frequency



Test specification:	**Section 90.1323, Conducted spurious emissions**		
Test procedure:	47 CFR, Sections 2.1051 and 90.1323		
Test mode:	Compliance	**Verdict:**	PASS
Date:	12/27/2007		
Temperature: 23ºC	**Air Pressure:** 1013 hPa	**Relative Humidity:** 42%	**Power Supply:** 120 V AC
Remarks:			

Plot 7.4.21 Spurious emission measurements in 26500 - 40000 MHz range at high carrier frequency



Test specification:	Section 90.1323, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	Verdict:	PASS
Date:	1/2/2008		
Temperature: 21ºC	Air Pressure: 1003 hPa	Relative Humidity: 54%	Power Supply: 120 V AC
Remarks:			

7.5 Radiated spurious emission measurements

7.5.1 General

This test was performed to measure radiated spurious emissions from the EUT. Specification test limits are given in Table 7.5.1.

Table 7.5.1 Radiated spurious emission test limits

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

* - Excluding the in band emission within ± 250 % of the authorized bandwidth from the carrier
** - P is transmitter output power in Watts
*** - Equivalent field strength limit was calculated from maximum allowed ERP of spurious as follows: E=sqrt(30×P×1.64)/r, where P is ERP in Watts, 1.64 is numeric gain of ideal dipole and r is antenna to EUT distance in meters

7.5.2 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. 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 in Table 7.5.2 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. To find maximum radiation the turntable was rotated 360^0 and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal, polarizations.

7.5.3.3 The worst test results (the lowest margins) were recorded in Table 7.5.2 and shown in the associated plots.

Test specification:	Section 90.1323, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	Verdict:	PASS
Date:	1/2/2008		
Temperature: 21ºC	Air Pressure: 1003 hPa	Relative Humidity: 54%	Power Supply: 120 V AC
Remarks:			

Figure 7.5.1 Setup for spurious emission field strength measurements in 9 kHz to 30 MHz band

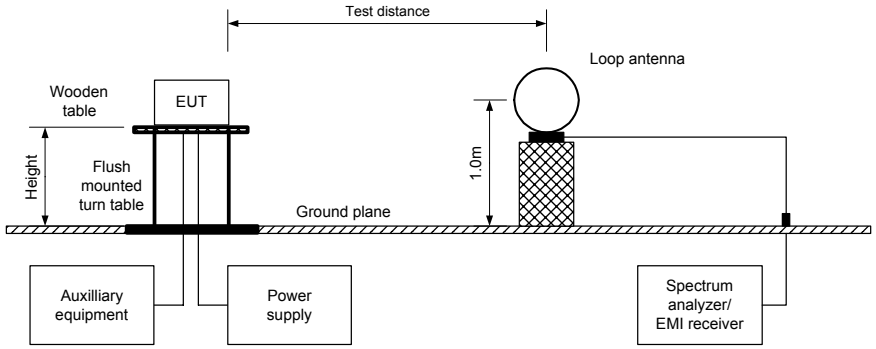
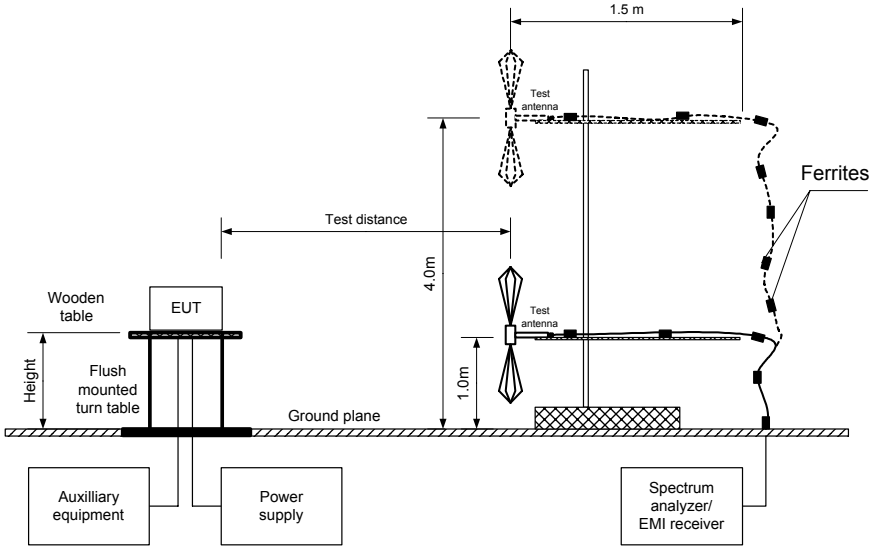


Figure 7.5.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	**Section 90.1323, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	**Verdict:**	PASS
Date:	1/2/2008		
Temperature: 21ºC	**Air Pressure:** 1003 hPa	**Relative Humidity:** 54%	**Power Supply:** 120 V AC
Remarks:			

Table 7.5.2 Spurious emission field strength test results

OPERATING FREQUENCY RANGE:	3652.5 – 3672.5 MHz
TEST DISTANCE:	3 m
TEST SITE:	Semi anechoic chamber / OATS
EUT HEIGHT:	0.8 m
INVESTIGATED FREQUENCY RANGE:	0.009 – 40000 MHz
DETECTOR USED:	Peak
VIDEO BANDWIDTH:	> Resolution bandwidth
TEST ANTENNA TYPE:	Active loop (9 kHz – 30 MHz) Biconilog (30 MHz – 1000 MHz) Double ridged guide (above 1000 MHz)
MODULATION:	BPSK
BIT RATE:	2.095 Mbps
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum

Frequency, MHz	Field strength, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	RBW, kHz	Antenna polarization	Antenna height, m	Turn-table position**, degrees
Low carrier frequency 3652.5 MHz							
No spurious emissions were found							
Mid carrier frequency 3665.0 MHz							
No spurious emissions were found							
High carrier frequency 3672.5 MHz							
No spurious emissions were found							

*****- Margin = Field strength of spurious – calculated field strength limit.
******- EUT front panel refers to 0 degrees position of turntable.

Reference numbers of test equipment used

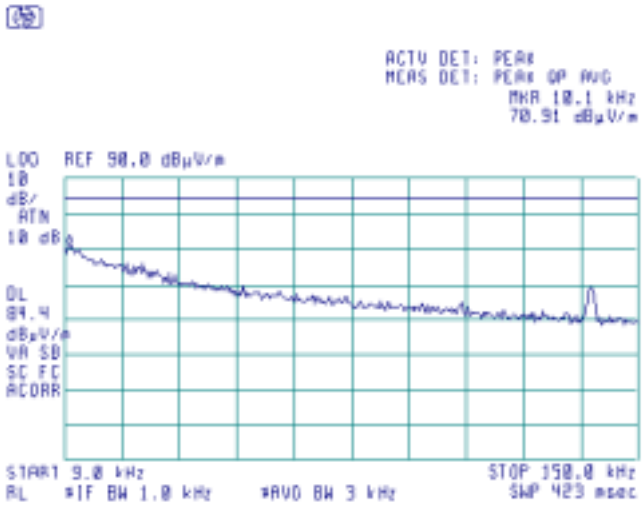
HL 0446	HL 0521	HL 0589	HL 0604	HL 0768	HL 0769	HL 1947	HL 2254
HL 2260	HL 2261	HL 2432	HL 3208				

Full description is given in Appendix A.

Test specification:	Section 90.1323, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	Verdict:	PASS
Date:	1/2/2008		
Temperature: 21ºC	Air Pressure: 1003 hPa	Relative Humidity: 54%	Power Supply: 120 V AC
Remarks:			

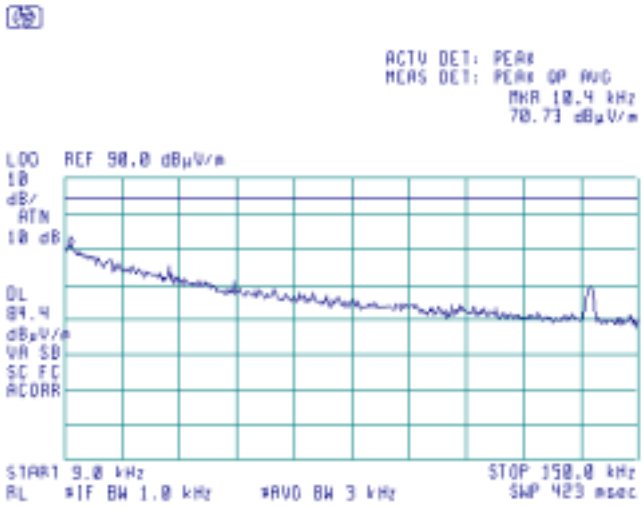
Plot 7.5.1 Radiated emission measurements in 9 - 150 kHz range

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



Plot 7.5.2 Radiated emission measurements in 9 - 150 kHz range

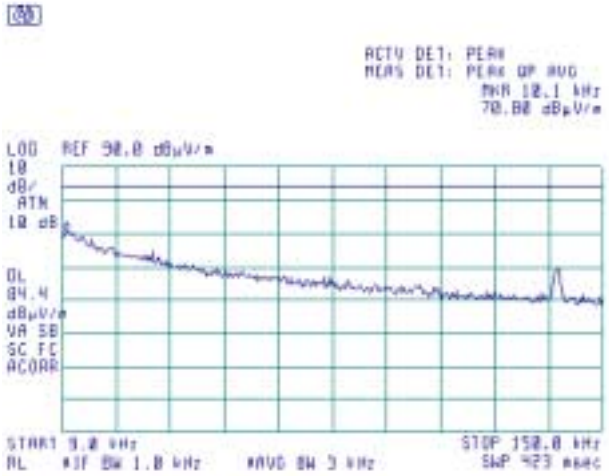
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	Section 90.1323, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	Verdict:	PASS
Date:	1/2/2008		
Temperature: 21ºC	Air Pressure: 1003 hPa	Relative Humidity: 54%	Power Supply: 120 V AC
Remarks:			

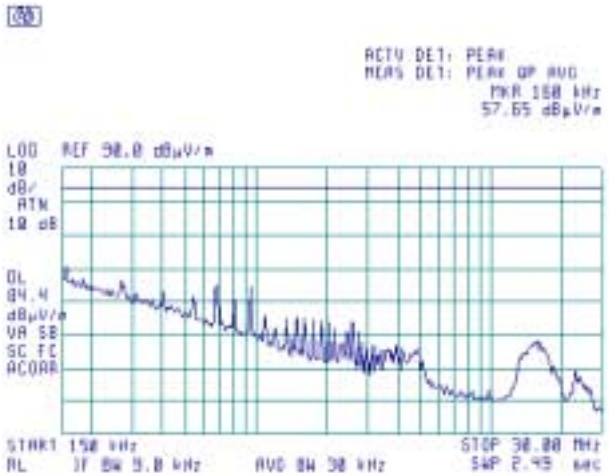
Plot 7.5.3 Radiated emission measurements in 9 - 150 kHz range

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



Plot 7.5.4 Radiated emission measurements in 0.15 - 30 MHz range

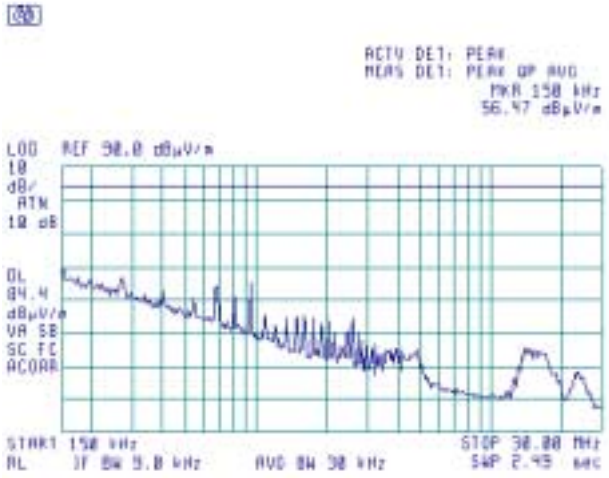
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	**Section 90.1323, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	**Verdict:**	PASS
Date:	1/2/2008		
Temperature: 21ºC	**Air Pressure:** 1003 hPa	**Relative Humidity:** 54%	**Power Supply:** 120 V AC
Remarks:			

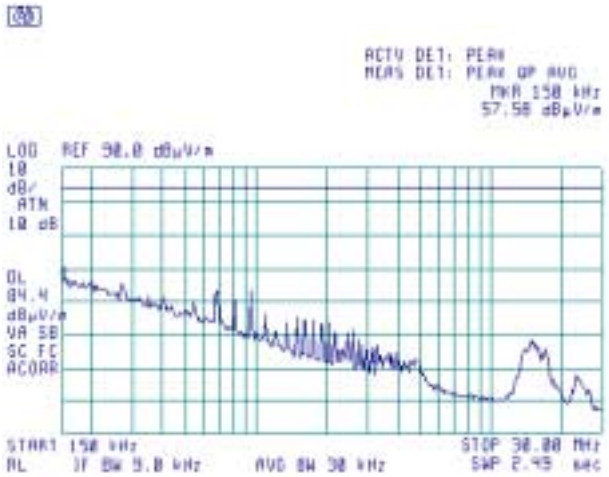
Plot 7.5.5 Radiated emission measurements in 0.15 - 30 MHz range

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



Plot 7.5.6 Radiated emission measurements in 0.15 - 30 MHz range

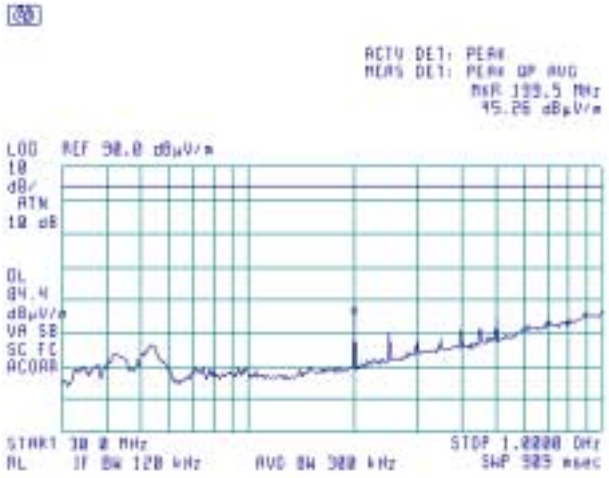
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	**Section 90.1323, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	**Verdict:**	PASS
Date:	1/2/2008		
Temperature: 21ºC	**Air Pressure:** 1003 hPa	**Relative Humidity:** 54%	**Power Supply:** 120 V AC
Remarks:			

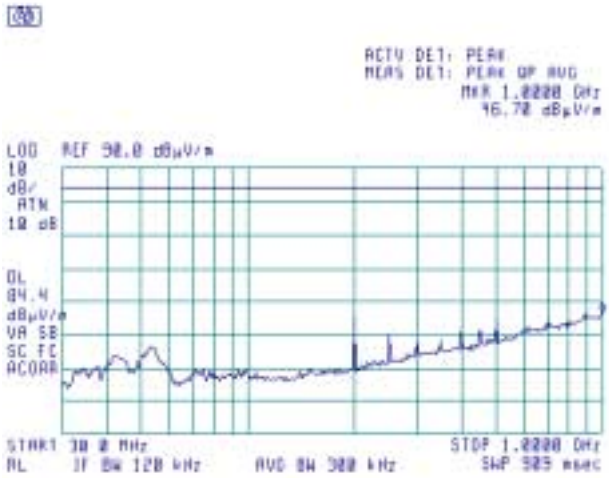
Plot 7.5.7 Radiated emission measurements in 30 - 1000 MHz range

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



Plot 7.5.8 Radiated emission measurements in 30 - 1000 MHz range

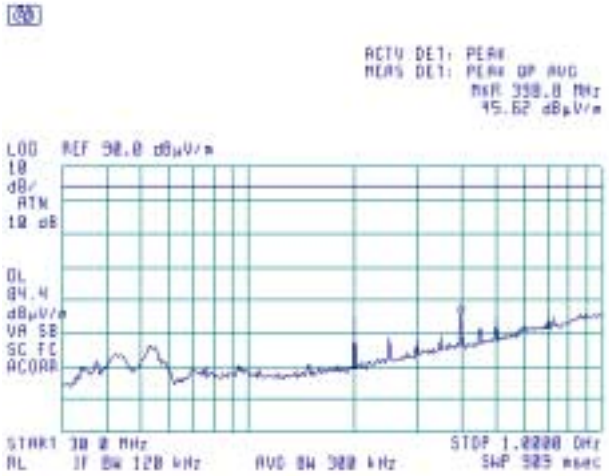
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	**Section 90.1323, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	**Verdict:**	PASS
Date:	1/2/2008		
Temperature: 21ºC	**Air Pressure:** 1003 hPa	**Relative Humidity:** 54%	**Power Supply:** 120 V AC
Remarks:			

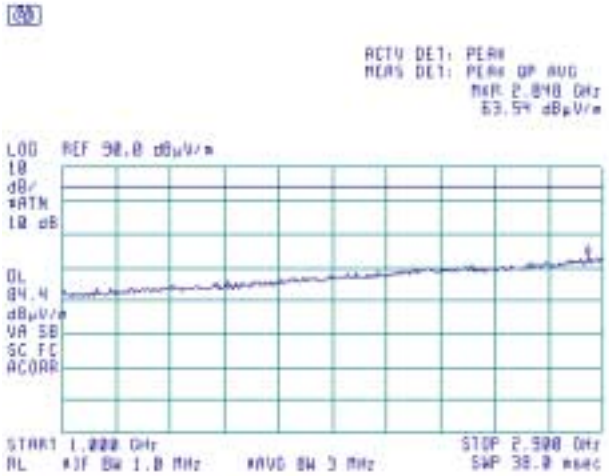
Plot 7.5.9 Radiated emission measurements in 30 - 1000 MHz range

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



Plot 7.5.10 Radiated emission measurements in 1000 – 2900 MHz range

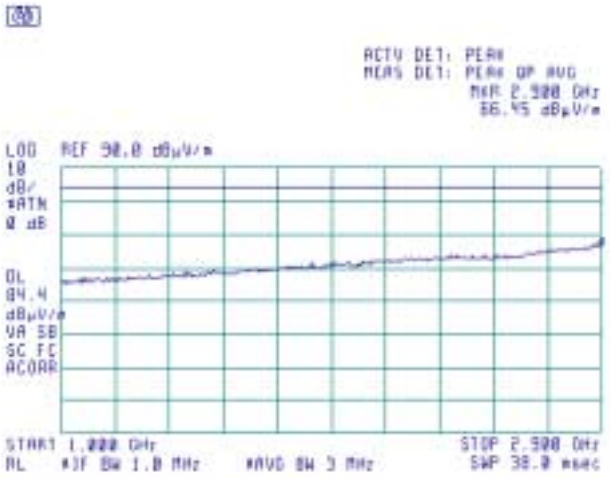
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	**Section 90.1323, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	**Verdict:**	PASS
Date:	1/2/2008		
Temperature: 21ºC	**Air Pressure:** 1003 hPa	**Relative Humidity:** 54%	**Power Supply:** 120 V AC
Remarks:			

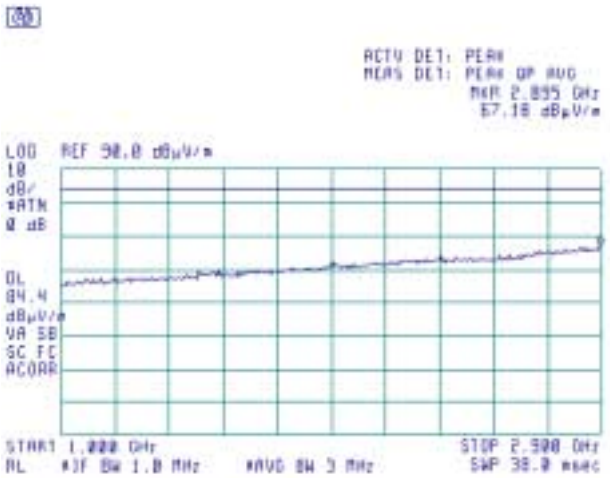
Plot 7.5.11 Radiated emission measurements in 1000 – 2900 MHz range

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



Plot 7.5.12 Radiated emission measurements in 1000 – 2900 MHz range

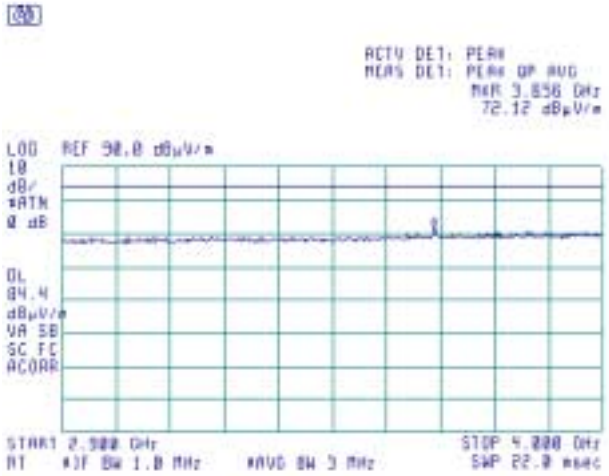
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 90.1323, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	Verdict:	PASS
Date:	1/2/2008		
Temperature: 21ºC	Air Pressure: 1003 hPa	Relative Humidity: 54%	Power Supply: 120 V AC
Remarks:			

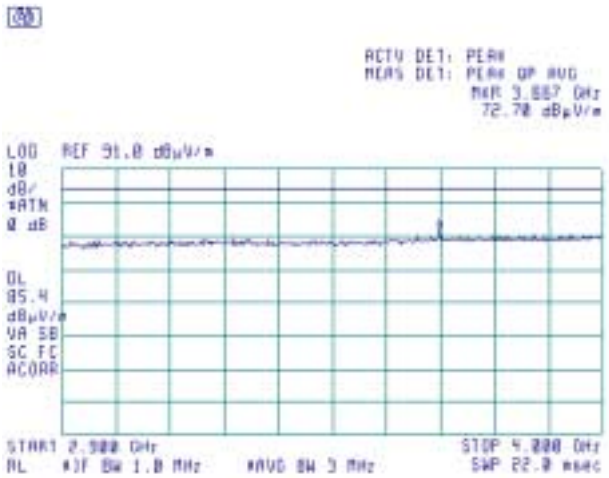
Plot 7.5.13 Radiated emission measurements in 2900 – 4000 MHz range

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



Plot 7.5.14 Radiated emission measurements in 2900 – 4000 MHz range

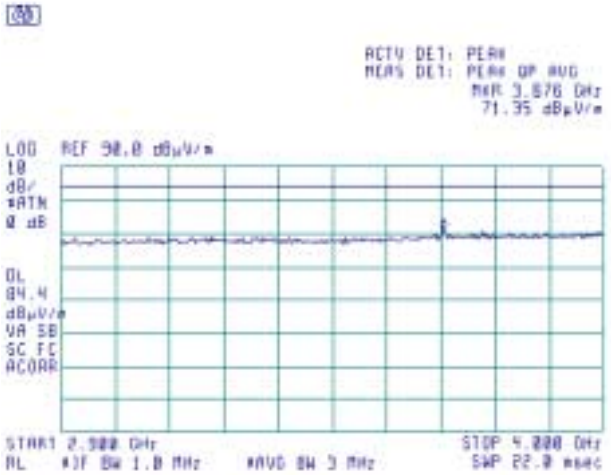
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Mid
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	**Section 90.1323, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	**Verdict:**	PASS
Date:	1/2/2008		
Temperature: 21ºC	**Air Pressure:** 1003 hPa	**Relative Humidity:** 54%	**Power Supply:** 120 V AC
Remarks:			

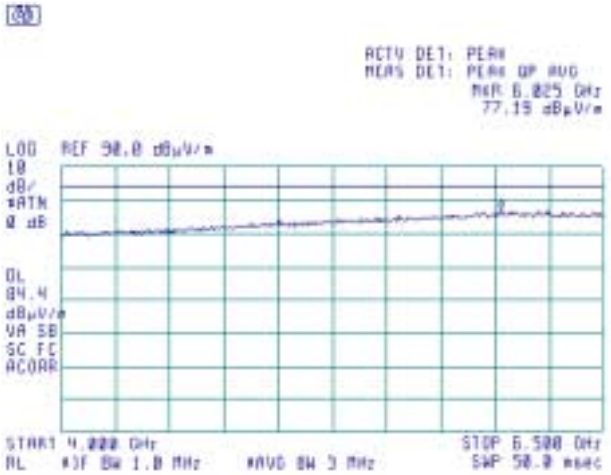
Plot 7.5.15 Radiated emission measurements in 2900 – 4000 MHz range

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



Plot 7.5.16 Radiated emission measurements in 4000 – 6500 MHz range

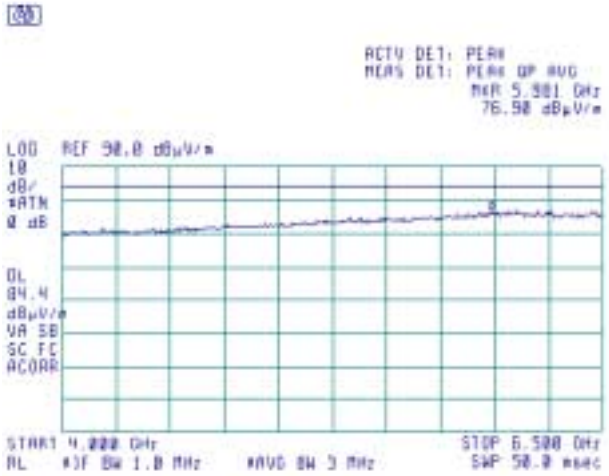
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	Section 90.1323, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	Verdict:	PASS
Date:	1/2/2008		
Temperature: 21ºC	Air Pressure: 1003 hPa	Relative Humidity: 54%	Power Supply: 120 V AC
Remarks:			

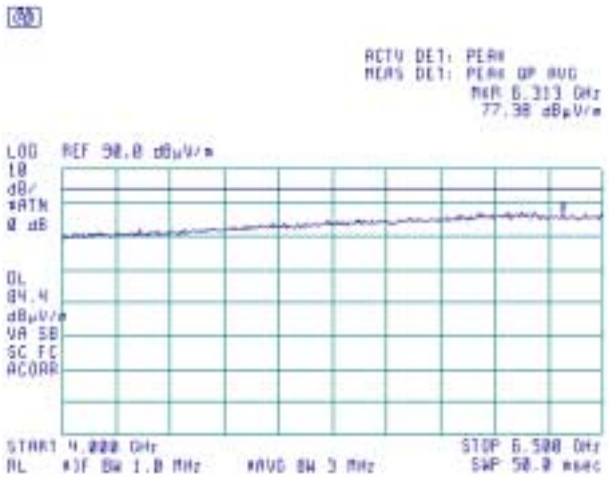
Plot 7.5.17 Radiated emission measurements in 4000 – 6500 MHz range

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



Plot 7.5.18 Radiated emission measurements in 4000 – 6500 MHz range

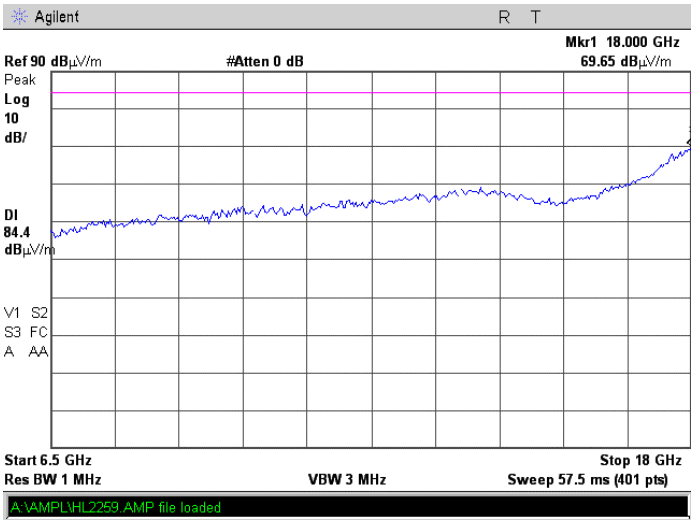
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 90.1323, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	Verdict:	PASS
Date:	1/2/2008		
Temperature: 21°C	Air Pressure: 1003 hPa	Relative Humidity: 54%	Power Supply: 120 V AC
Remarks:			

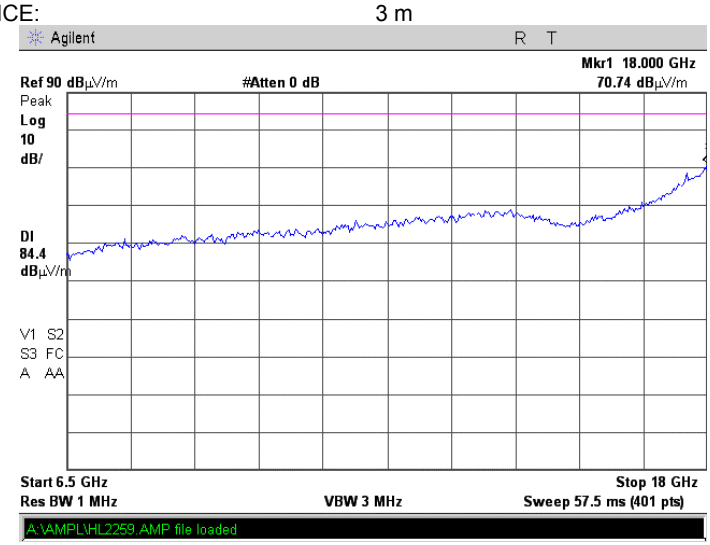
Plot 7.5.19 Radiated emission measurements in 6500 – 18000 MHz range

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



Plot 7.5.20 Radiated emission measurements in 6500 – 18000 MHz range

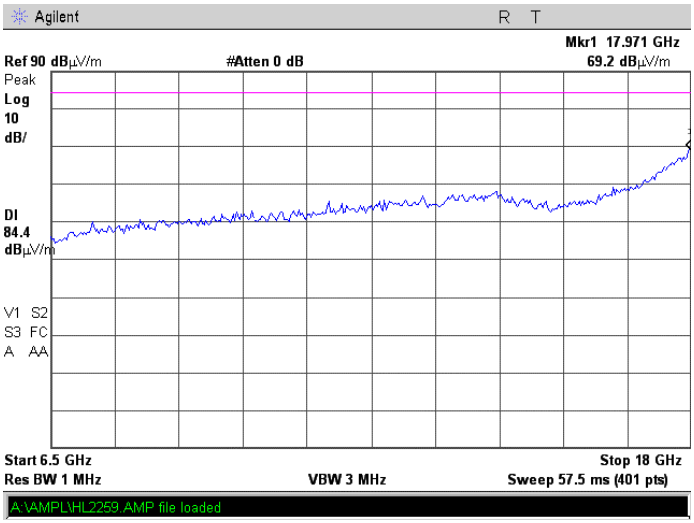
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	**Section 90.1323, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	**Verdict:**	PASS
Date:	1/2/2008		
Temperature: 21ºC	**Air Pressure:** 1003 hPa	**Relative Humidity:** 54%	**Power Supply:** 120 V AC
Remarks:			

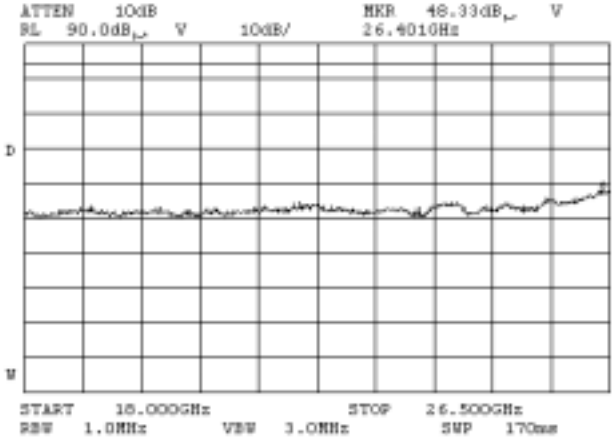
Plot 7.5.21 Radiated emission measurements in 6500 – 18000 MHz range

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



Plot 7.5.22 Radiated emission measurements in 18000 – 26500 MHz range

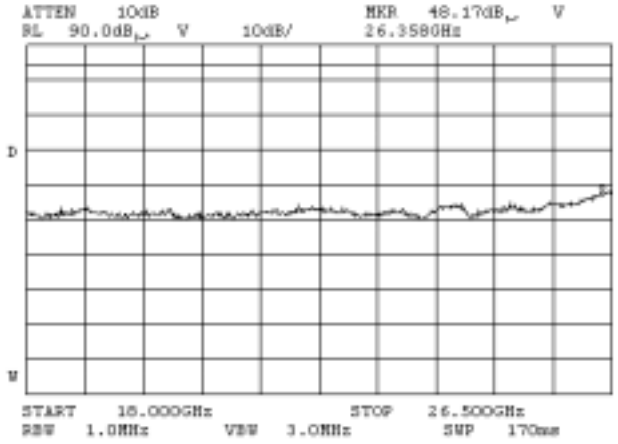
TEST SITE: OATS
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	Section 90.1323, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	Verdict:	PASS
Date:	1/2/2008		
Temperature: 21ºC	Air Pressure: 1003 hPa	Relative Humidity: 54%	Power Supply: 120 V AC
Remarks:			

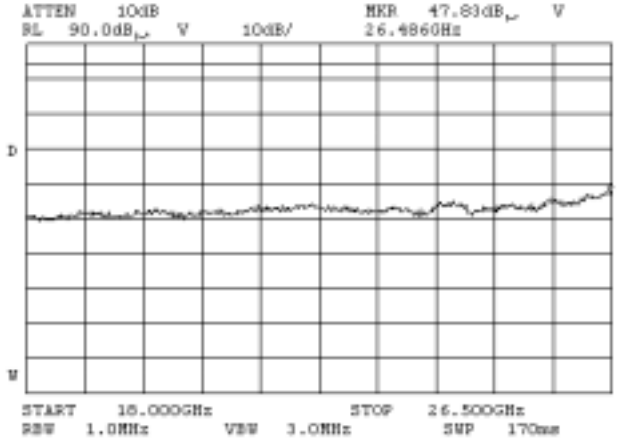
Plot 7.5.23 Radiated emission measurements in 18000 – 26500 MHz range

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



Plot 7.5.24 Radiated emission measurements in 18000 – 26500 MHz range

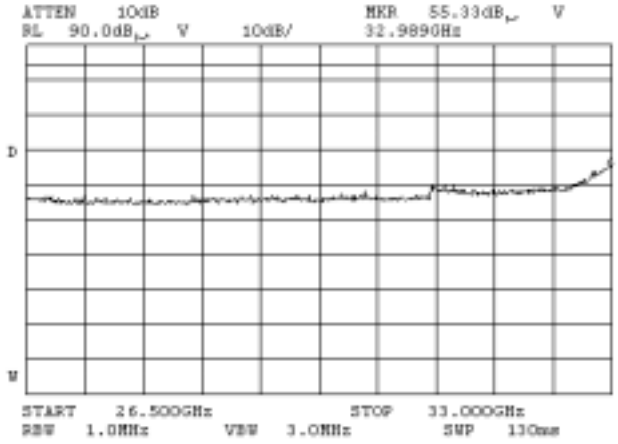
TEST SITE:	OATS
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	Section 90.1323, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	Verdict:	PASS
Date:	1/2/2008		
Temperature: 21ºC	Air Pressure: 1003 hPa	Relative Humidity: 54%	Power Supply: 120 V AC
Remarks:			

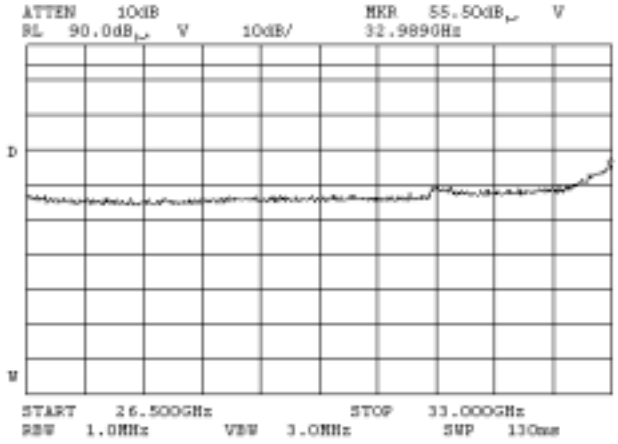
Plot 7.5.25 Radiated emission measurements in 26500-33000 MHz range

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



Plot 7.5.26 Radiated emission measurements in 26500-33000 MHz range

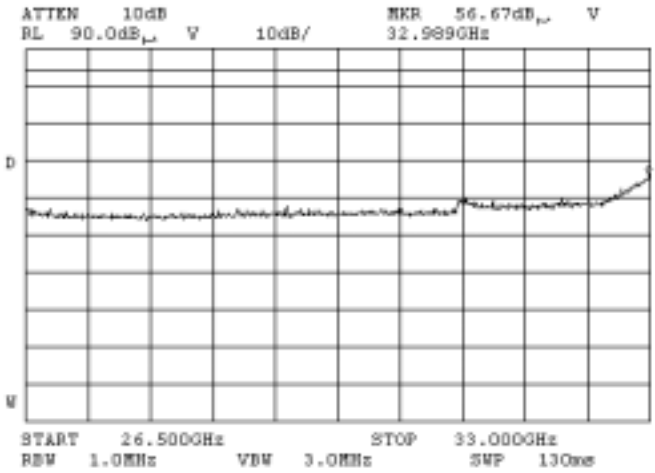
TEST SITE: OATS
CARRIER FREQUENCY: Mid
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	**Section 90.1323, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	**Verdict:**	PASS
Date:	1/2/2008		
Temperature: 21ºC	**Air Pressure:** 1003 hPa	**Relative Humidity:** 54%	**Power Supply:** 120 V AC
Remarks:			

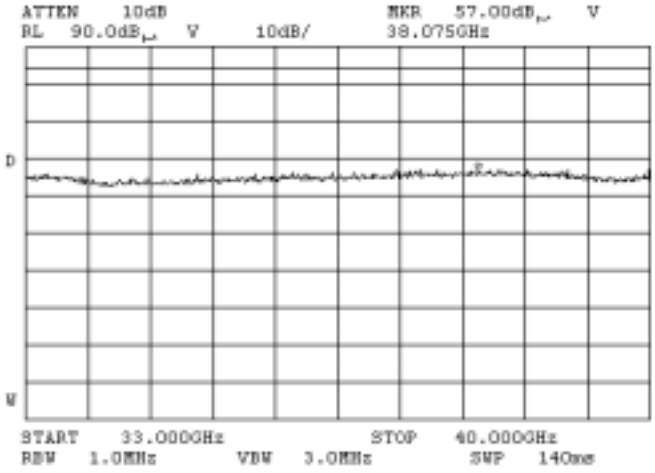
Plot 7.5.27 Radiated emission measurements in 26500-33000 MHz range

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



Plot 7.5.28 Radiated emission measurements in 33000-40000 MHz range

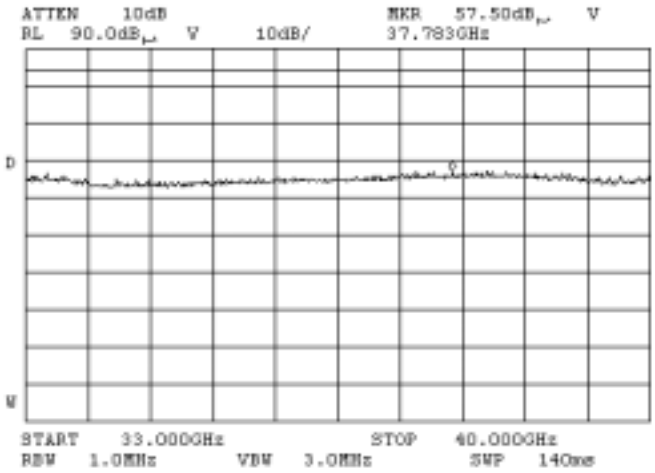
TEST SITE: OATS
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	**Section 90.1323, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053 and 90. 1323		
Test mode:	Compliance	**Verdict:**	PASS
Date:	1/2/2008		
Temperature: 21ºC	**Air Pressure:** 1003 hPa	**Relative Humidity:** 54%	**Power Supply:** 120 V AC
Remarks:			

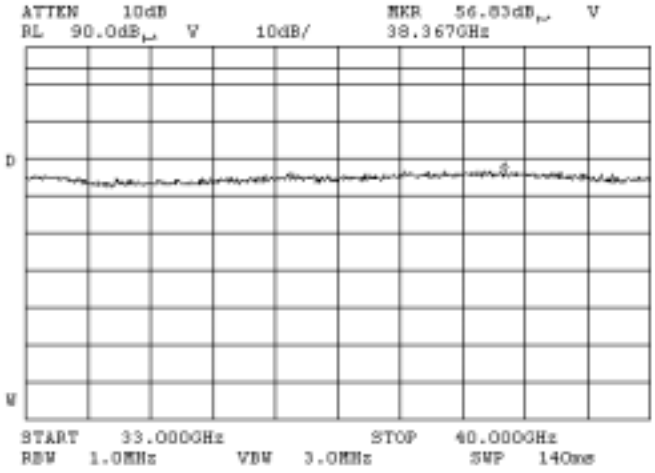
Plot 7.5.29 Radiated emission measurements in 33000-40000 MHz range

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



Plot 7.5.30 Radiated emission measurements in 33000-40000 MHz range

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



Test specification:	Section 90.213, Frequency stability		
Test procedure:	47 CFR, Section 2.1055; TIA/EIA-603-C Section 2.2.2		
Test mode:	Compliance	Verdict:	PASS
Date:	12/30/2007		
Temperature: 24ºC	Air Pressure: 1018 hPa	Relative Humidity: 36%	Power Supply: 120 VAC
Remarks:			

7.6 Frequency stability test

7.6.1 General

This test was performed to measure frequency stability of transmitter RF carrier. Specification test limits are given in Table 7.6.1.

Table 7.6.1 Frequency stability limits

Operating frequency, MHz	Maximum allowed frequency displacement	
	ppm	Hz
3652.500	20	73050
3665.000		73300
3672.500		73450

7.6.2 Test procedure

7.6.2.1 The EUT was set up as shown in Figure 7.6.1, energized and its proper operation was checked.

7.6.2.2 The EUT power was turned off. Temperature within test chamber was set to +30˚C and a period of time sufficient to stabilize all of the oscillator circuit components was allowed.

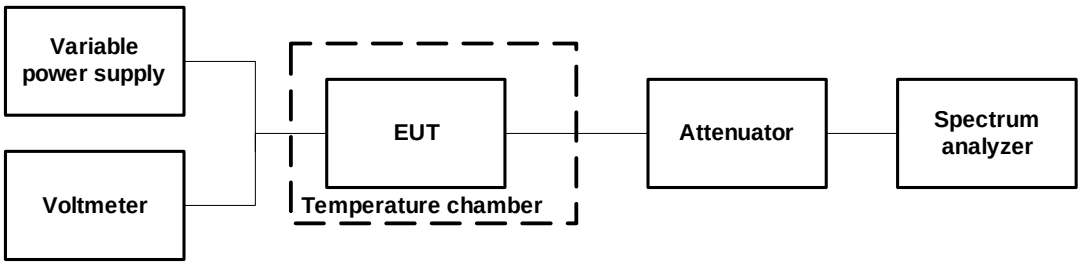
7.6.2.3 The EUT was powered on and carrier frequency was measured at start up moment and then every minute until frequency had been stabilized or 10 minutes elapsed whichever reached the last. The EUT was powered off.

7.6.2.4 The above procedure was repeated at 0˚C and at the lowest test temperature.

7.6.2.5 The EUT was powered on and carrier frequency was measured at start up moment and at the end of stabilization period at the rest of test temperatures and voltages. The EUT was powered off.

7.6.2.6 Frequency displacement was calculated and compared with the limit as provided in Table 7.6.2.

Figure 7.6.1 Frequency stability test setup



Test specification:	**Section 90.213, Frequency stability**		
Test procedure:	47 CFR, Section 2.1055; TIA/EIA-603-C Section 2.2.2		
Test mode:	Compliance	**Verdict:**	PASS
Date:	12/30/2007		
Temperature: 24ºC	**Air Pressure:** 1018 hPa	**Relative Humidity:** 36%	**Power Supply:** 120 VAC
Remarks:			

Table 7.6.2 Frequency stability test results

OPERATING FREQUENCY RANGE: 3655 – 3695 MHz
NOMINAL POWER VOLTAGE: 120 VAC
TEMPERATURE STABILIZATION PERIOD: 20 min
POWER DURING TEMPERATURE TRANSITION: Off
SPECTRUM ANALYZER MODE: peak
RESOLUTION BANDWIDTH: 1000 Hz
VIDEO BANDWIDTH: 3000 Hz
MODULATION: Unmodulated

·, ºC	Voltage V	Frequency, MHz							Max frequency drift, Hz		Limit, Hz	Margin, Hz	Verdic
		Start up	1st min	2nd min	3rd min	4th min	5th min	10th min	ositiv	legativ			
Low frequency 3652.5 MHz													
-30	nominal	3652.476210	3652.476056	3652.476028	3652.47599	3652.47600	3652.47604	3652.476154	330	0		-72720	Pass
-20	nominal	3652.475307	NA	NA	NA	NA	NA	3652.475095	0	-785		-72265	Pass
-10	nominal	3652.472952	NA	NA	NA	NA	NA	3652.473675	0	-2928		-70122	Pass
0	nominal	3652.471798	3652.471957	3652.472150	3652.47222	3652.47234	3652.47243	3652.472872	0	-4082		-68968	Pass
10	nominal	3652.473307	NA	NA	NA	NA	NA	3652.473956	0	-2573		-70477	Pass
20	15%	3652.474927	NA	NA	NA	NA	NA	3652.475561	0	-953	73050	-72097	Pass
20	nominal	3652.475446	NA	NA	NA	NA	NA	3652.475880*	0	-434		-72616	Pass
20	-15%	3652.475129	NA	NA	NA	NA	NA	3652.475607	0	-751		-72299	Pass
30	nominal	3652.474086	3652.474216	3652.474295	3652.47435	3652.47439	3652.47443	3652.474560	0	-1794		-71256	Pass
40	nominal	3652.474748	NA	NA	NA	NA	NA	3652.475382	0	-1132		-71918	Pass
50	nominal	3652.475785	NA	NA	NA	NA	NA	3652.476578	698	-95		-72352	Pass
Mid frequency 3665.0 MHz													
-30	nominal	3664.975936	3664.976011	3664.975921	3664.97599	3664.97603	3664.97609	3664.976014	850	0		-72450	Pass
-20	nominal	3664.975040	NA	NA	NA	NA	NA	3664.975205	0	-208		-73092	Pass
-10	nominal	3664.973786	NA	NA	NA	NA	NA	3664.973891	0	-1462		-71838	Pass
0	nominal	3664.973275	3664.973348	3664.973336	3664.97329	3664.97338	3664.97334	3664.973421	0	-1973		-71327	Pass
10	nominal	3664.973467	NA	NA	NA	NA	NA	3664.973950	0	-1781		-71519	Pass
20	15%	3664.975246	NA	NA	NA	NA	NA	3664.975712	464	-2	73300	-72836	Pass
20	nominal	3664.974625	NA	NA	NA	NA	NA	3664.975248*	0	-623		-72677	Pass
20	-15%	3664.975103	NA	NA	NA	NA	NA	3664.975481	233	-145		-73067	Pass
30	nominal	3664.975507	3664.974514	3664.974529	3664.97454	3664.97457	3664.97456	3664.974658	259	-734		-72566	Pass
40	nominal	3664.975121	NA	NA	NA	NA	NA	3664.975708	460	-127		-72840	Pass
50	nominal	3664.976371	NA	NA	NA	NA	NA	3664.976869	1621	0		-71679	Pass
High frequency 3672.5 MHz													
-30	nominal	3672.476021	3672.476206	3672.476127	3672.47622	3672.47620	3672.47622	3672.476078	971	0		-72479	Pass
-20	nominal	3672.475337	NA	NA	NA	NA	NA	3672.475380	124	0		-73326	Pass
-10	nominal	3672.473950	NA	NA	NA	NA	NA	3672.474186	0	-1306		-72144	Pass
0	nominal	3672.473187	3672.473217	3672.473261	3672.47329	3672.47332	3672.47333	3672.473363	0	-2069		-71381	Pass
10	nominal	3672.473196	NA	NA	NA	NA	NA	3672.473901	0	-2060		-71390	Pass
20	15%	3672.471117	NA	NA	NA	NA	NA	3672.472795	0	-4139	73450	-69311	Pass
20	nominal	3672.474629	NA	NA	NA	NA	NA	3672.475256*	0	-627		-72823	Pass
20	-15%	3672.474750	NA	NA	NA	NA	NA	3672.475203	0	-506		-72944	Pass
30	nominal	3672.474367	3672.474459	3672.474496	3672.47451	3672.47456	3672.47454	3672.474694	0	-889		-72561	Pass
40	nominal	3672.475515	NA	NA	NA	NA	NA	3672.475952	696	0		-72754	Pass
50	nominal	3672.476642	NA	NA	NA	NA	NA	3672.476954	1698	0		-71752	Pass

* - Reference frequency

Reference numbers of test equipment used

HL 0337	HL 2909	HL 3000						

Full description is given in Appendix A.

Test specification:	Section 15.107, Class A, Conducted emission		
Test procedure:	ANSI C63.4, Section 13.1.3; Sections 11.5 and 12.1.3		
Test mode:	Compliance	Verdict:	PASS
Date:	12/31/2007		
Temperature: 22 ºC	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 V AC
Remarks:			

8 Unintentional radiation 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.

Table 8.1.1 Limits for conducted emissions

Frequency, MHz	Class B limit, dB(µV)		Class A limit, dB(µV)	
	QP	AVRG	QP	AVRG
0.15 - 0.5	66 - 56*	56 - 46*	79	66
0.5 - 5.0	56	46	73	60
5.0 - 30	60	50	73	60

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

8.1.2 Test procedure

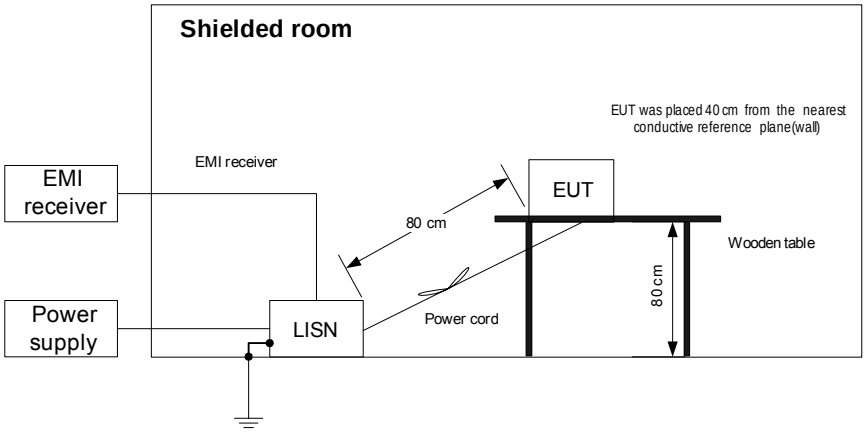
8.1.2.1 The EUT was set up as shown in Figure 8.1.1, energized and the performance check was conducted.

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, Table 8.1.3, Table 8.1.4. 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.

8.1.2.4 The worst test results (the lowest margins) were recorded in Table 8.1.2 and shown in the associated plots.

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



Test specification:	**Section 15.107, Class A, Conducted emission**		
Test procedure:	ANSI C63.4, Section 13.1.3; Sections 11.5 and 12.1.3		
Test mode:	Compliance	**Verdict:**	PASS
Date:	12/31/2007		
Temperature: 22 ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 48 %	**Power Supply:** 120 V AC
Remarks:			

Table 8.1.2 Conducted emission test results on the EUT power lines

LINE: AC mains
LIMIT: Class A
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*		
0.157313	48.06	46.75	79.00	-32.25	43.68	66.00	-22.32	L1	Pass
0.209025	48.37	47.74	79.00	-31.26	45.86	66.00	-20.14		
0.262700	48.02	47.12	79.00	-31.88	42.03	66.00	-23.97		
0.314300	46.69	45.49	79.00	-33.51	40.71	66.00	-25.29		
0.681038	48.91	48.17	73.00	-24.83	44.71	60.00	-15.29		
0.817675	45.13	44.81	73.00	-28.19	44.30	60.00	-15.70		
0.209150	48.21	47.60	79.00	-31.40	46.92	66.00	-19.08	L2	Pass
0.261475	48.19	47.78	79.00	-31.22	44.39	66.00	-21.61		
0.314475	49.38	48.33	79.00	-30.67	43.13	66.00	-22.87		
0.523425	45.86	44.78	73.00	-28.22	41.71	60.00	-18.29		
0.679738	50.77	49.97	73.00	-23.03	45.92	60.00	-14.08		
1.769450	46.78	43.64	73.00	-29.36	43.06	60.00	-16.94		

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

Reference numbers of test equipment used

HL 0447	HL 0521	HL 0787	HL 1503	HL 1510	HL 2888		

Full description is given in Appendix A.

Test specification:	**Section 15.107, Class A, Conducted emission**		
Test procedure:	ANSI C63.4, Section 13.1.3; Sections 11.5 and 12.1.3		
Test mode:	Compliance	**Verdict:**	PASS
Date:	12/31/2007		
Temperature: 22 ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 48 %	**Power Supply:** 120 V AC
Remarks:			

Table 8.1.3 Conducted emission test results on the laptop power lines

LINE: AC mains
LIMIT: Class A
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*		
0.15 - 30	All emissions were found at least 20 dB below the specified limit							L1	Pass
0.15 - 30	All emissions were found at least 20 dB below the specified limit							L2	Pass

Reference numbers of test equipment used

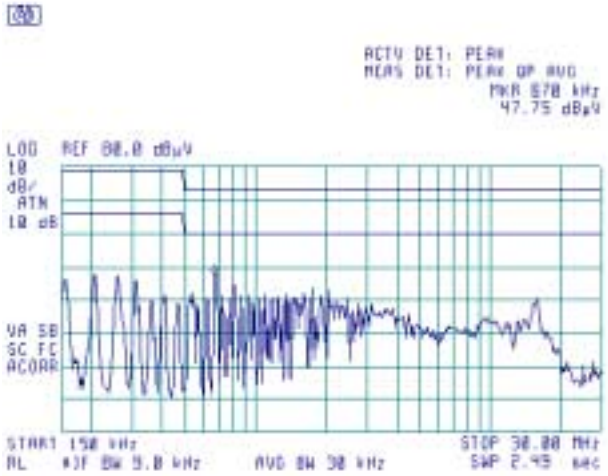
HL 0447	HL 0521	HL 0787	HL 1503	HL 1510	HL 2888		

Full description is given in Appendix A.

Test specification:	**Section 15.107, Class A, Conducted emission**		
Test procedure:	ANSI C63.4, Section 13.1.3; Sections 11.5 and 12.1.3		
Test mode:	Compliance	**Verdict:**	PASS
Date:	12/31/2007		
Temperature: 22 ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 48 %	**Power Supply:** 120 V AC
Remarks:			

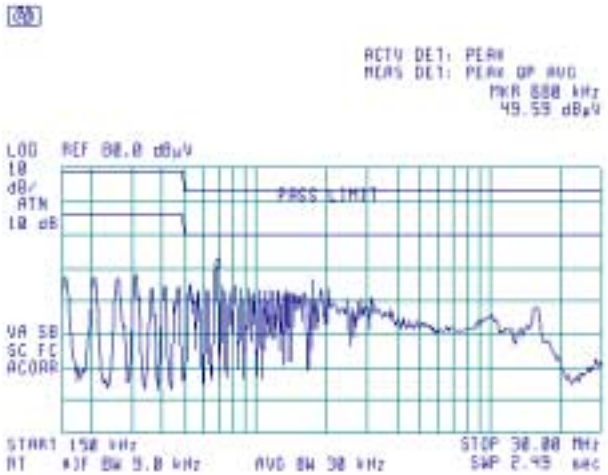
Plot 8.1.1 Conducted emission measurements on the EUT power lines

LINE: L1
LIMIT: Class B - QUASI-PEAK, AVERAGE
EUT OPERATING MODE: Receive / Stand-by
DETECTOR: PEAK



Plot 8.1.2 Conducted emission measurements on the EUT power lines

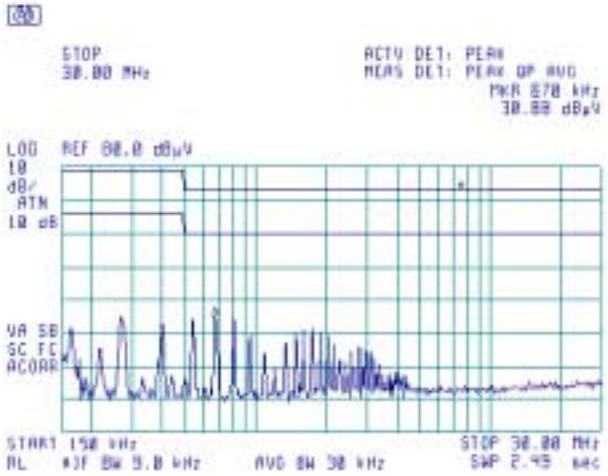
LINE: L2
LIMIT: Class A - QUASI-PEAK, AVERAGE
EUT OPERATING MODE: Receive / Stand-by
DETECTOR: PEAK



Test specification:	**Section 15.107, Class A, Conducted emission**		
Test procedure:	ANSI C63.4, Section 13.1.3; Sections 11.5 and 12.1.3		
Test mode:	Compliance	**Verdict:**	PASS
Date:	12/31/2007		
Temperature: 22 ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 48 %	**Power Supply:** 120 V AC
Remarks:			

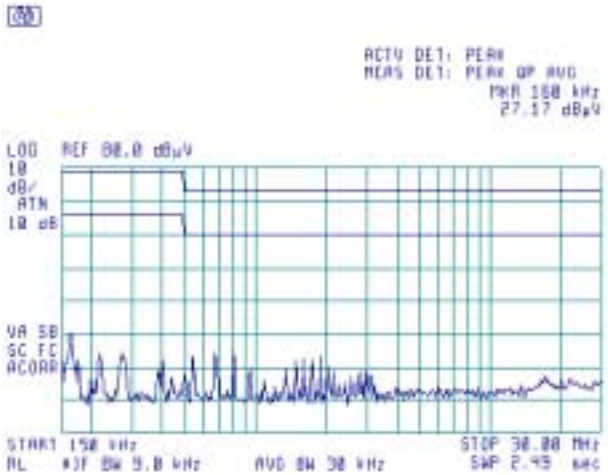
Plot 8.1.3 Conducted emission measurements on the laptop power lines

LINE: L1
LIMIT: Class A - QUASI-PEAK, AVERAGE
EUT OPERATING MODE: Receive / Stand-by
DETECTOR: PEAK



Plot 8.1.4 Conducted emission measurements on the laptop power lines

LINE: L2
LIMIT: Class A - QUASI-PEAK, AVERAGE
EUT OPERATING MODE: Receive / Stand-by
DETECTOR: PEAK



Test specification:	Section 15.109, Class A, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date:	12/31/2007		
Temperature: 22 ºC	Air Pressure: 1011 hPa	Relative Humidity: 48 %	Power Supply: 120 V AC
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.

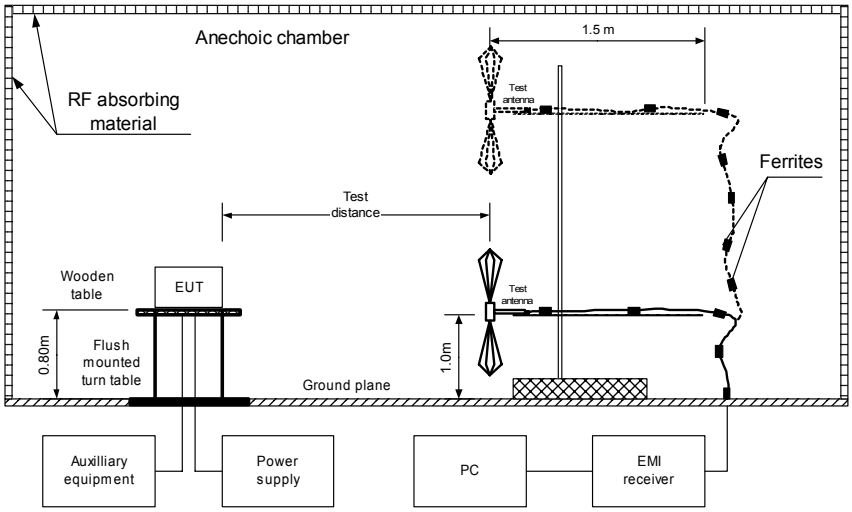
8.2.2 Test procedure for measurements in semi-anechoic chamber

8.2.2.1 The EUT was set up as shown in Figure 8.2.1, 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, Table 8.2.3 and shown in the associated plots.

Figure 8.2.1 Setup for radiated emission measurements in anechoic chamber, 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:	4/3/2006		
Temperature: 22ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 42%	**Power Supply:** 120 V AC
Remarks:			

Table 8.2.2 Radiated emission test results

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

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*				
200.008125	46.25	45.27	54.00	-8.73	V	1.0	040	Pass
300.011250	41.81	39.48	57.00	-17.52	V	1.0	280	
400.014250	47.44	45.82	57.00	-11.18	V	1.1	260	
450.007500	44.43	42.21	57.00	-14.79	V	1.4	220	
500.003600	48.13	46.32	57.00	-10.68	V	0.9	350	

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

Reference numbers of test equipment used

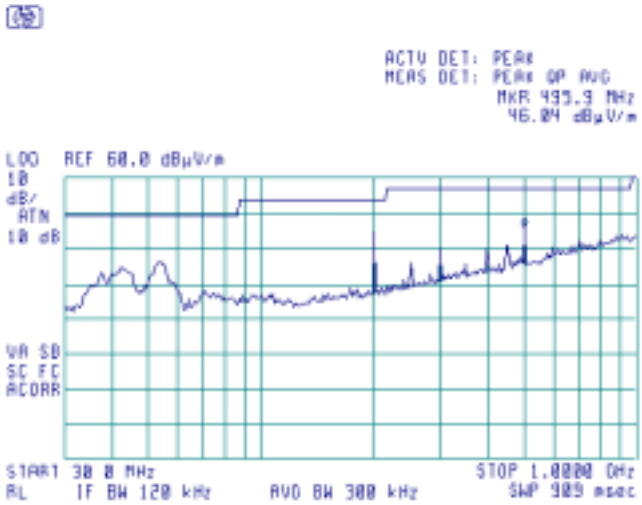
HL 0521	HL 0604	HL 0589	HL 1947				

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:	4/3/2006		
Temperature: 22ºC	Air Pressure: 1009 hPa	Relative Humidity: 42%	Power Supply: 120 V AC
Remarks:			

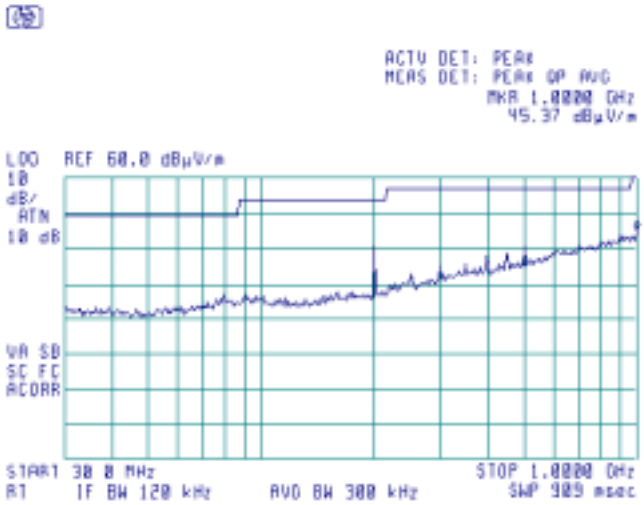
Plot 8.2.1 Radiated emission measurements in 30 – 1000 MHz range, vertical antenna polarization

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
LIMIT: Class A



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

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
LIMIT: Class A



9 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0337	Probe Set, Hand held, 5 probes	Electro-Metrics	EHFP-30	238	08-Jun-07	08-Jun-08
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	28-Jun-07	28-Jun-08
0447	LISN, 16/2, 300V RMS, 50 Ohm/50 uH + 5 Ohm, STD CISPR 16-1	HL	LISN 16 - 1	066	03-Nov-07	03-Nov-08
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard Co	8546A	3617A 00319, 3448A002 53	28-Aug-07	28-Aug-08
0589	Cable Coaxial, GORE A2P01POL118, 2.3 m	HL	GORE-3	176	02-Dec-07	02-Dec-08
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	10-Jan-08	10-Jan-09
0768	Antenna Standard Gain Horn, 18-26.5GHz, WR-42, K-band, Gain - 25 dB	Quinstar Technology	QWH-4200-BA	110	21-Jul-07	21-Jul-08
0769	Antenna Standard Gain Horn, 26.5-40 GHz, WR28, Ka band, Gain 25 dB	Quinstar Technology	QWH-2800-BA	112	21-Jul-07	21-Jul-08
0787	Transient Limiter 9 kHz-200 MHz	Hewlett Packard Co	11947A	3107A018 77	21-Nov-07	21-Nov-08
1503	Cable RF, 6 m, BNC/BNC	Belden	M17/167 MIL-C-17	1503	11-Sep-07	11-Sep-08
1510	Cable RF, 8 m, BNC/BNC	Belden	M17/167 MIL-C-17	1510	01-Jan-08	01-Jan-09
1629	Isotropic Field Monitor	Amplifier Research	FM2000	23308	07-Dec-07	07-Dec-08
1947	Cable 18GHz, 6.5 m, blue	Rhophase Microwave Limited	NPS-1803A-6500-NPS	T4974	05-Oct-07	05-Oct-08
2078	Isotropic Field Probe 80 MHz - 40 GHz	Amplifier Research	FP2080	302541	01-Jan-08	01-Jan-09
2254	Cable 40GHz, 0.8 m, blue	Rhophase Microwave Limited	KPS-1503A-800-KPS	W4907	17-Jun-07	17-Jun-08
2260	Amplifier Low Noise 14-33 GHz	Sophia Wireless	LNA28-B	0233	05-Nov-07	05-Nov-08
2261	Amplifier Low Noise 33-40 GHz	Sophia Wireless	LNA38-B	0234	05-Nov-07	05-Nov-08
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	03-Mar-07	03-Mar-08
2888	LISN Two-line V-Network 50 Ohm / 50 uH + 5 Ohm, 16A, MIL STD 461E, CISPR 16-1	Rolf Heine	NNB-2/16Z	02/10018	29-Mar-07	29-Mar-08
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY414447 62	07-May-07	07-May-08
2912	Cable 18 GHz, 1.5 m, SMA-SMA	Gore	NA	91P72067	11-Feb-07	11-Feb-08
3000	Cable RF 7.5 m BNC-BNC	Paige Electric Corp.	RG 58 A/U	3000	11-Sep-07	11-Sep-08
3173	Attenuator, N-type, 10 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW-N10W5+	0708	07-May-07	07-May-08
3179	Attenuator, N-type, 20 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW-N20W5+	0651	07-May-07	07-May-08
3208	Cable 40GHz, 1.8 m	GORE-TEX	GOR245	05118338	17-Jun-07	17-Jun-08

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
3301	Power Meter, P-series, 50 MHz to 40 GHz	Agilent Technologies	N1911A	MY45101057	27-Jul-07	27-Jul-08
3302	Power sensor, P-Series, 50 MHz to 40 GHz, -35/30 to 20 dBm	Agilent Technologies	N1922A	MY45240586	25-Jul-07	25-Jul-08
3321	Attenuator DC to 22 GHz, 50 W	Aeroflex / Weinschel	86-30-12	380	25-Dec-07	25-Dec-08
3437	Precision Fixed Attenuator, 50 Ohm, 5 W, 10 dB, DC to 18 GHz	Mini-Circuits	BW-S10W5+	3437	9-Mar-08	9-Mar-09
3440	Precision Fixed Attenuator, 50 Ohm, 5 W, 20 dB, DC to 18 GHz	Mini-Circuits	BW-S20W5+	3440	9-Mar-08	9-Mar-09

10 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Transmitter tests	
Carrier power conducted at antenna connector	± 1.7 dB
Carrier power radiated (substitution method)	± 4.5 dB
Occupied bandwidth	±8%
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
Spurious emissions radiated 30 MHz – 40 GHz (substitution method)	± 4.5 dB
Frequency error	30 – 300 MHz: ± 50.5 Hz (1.68 ppm) 300 – 1000 MHz: ± 168 Hz (0.56 ppm)
Transient frequency behaviour	187 Hz ± 13.9 %
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %
Unintentional radiator tests	
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

Hermon Laboratories is accredited by A2LA for calibration according to present requirements of ISO/IEC 17025 and NCSL Z540-1. The accreditation is granted to perform calibration of parameters that are listed in the Scope of Hermon Laboratories Accreditation.

Hermon Laboratories calibrates its reference and transfer standards by calibration laboratories accredited to ISO/IEC 17025 by a mutually recognized Accreditation Body or by a recognized national metrology institute. All reference and transfer standards used in the calibration system are traceable to national or international standards.

In-house calibration of all test and measurement equipment is performed on a regular basis according to Hermon Laboratories calibration procedures, manufacturer calibration/verification procedures or procedures defined in the relevant standards. The Hermon Laboratories test and measurement equipment is calibrated within the tolerances specified by the manufacturers and/or by the relevant standards.

11 APPENDIX C Test 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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12 APPENDIX D Specification references

47CFR part 90: 2006	Private land mobile radio services
47CFR part 1: 2006	Practice and procedure
47CFR part 2: 2006	Frequency allocations and radio treaty matters; general rules and regulations
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
ANSI/TIA/EIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

13 APPENDIX E Test equipment correction factors

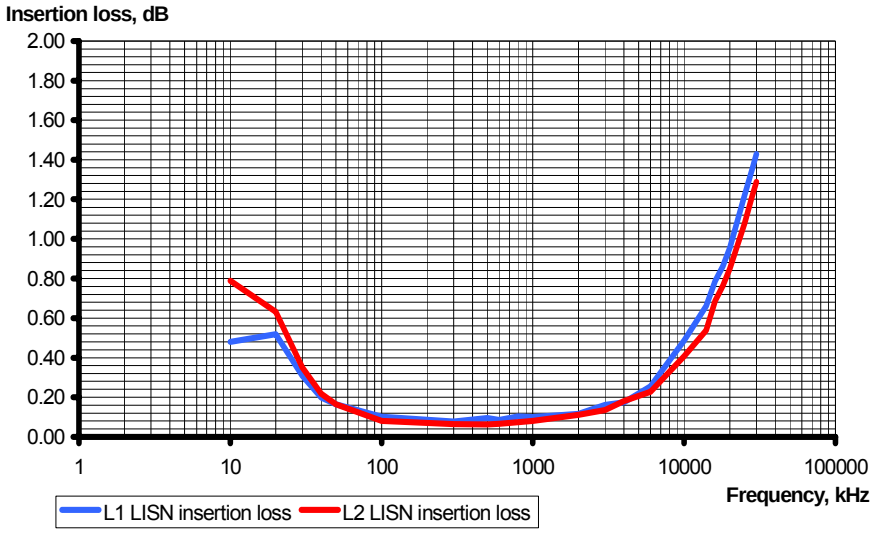
Correction factor
Line impedance stabilization network
Model LISN 16 - 1
Hermon Laboratories

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

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

Correction factor
Line impedance stabilization network
Model NNB-2/16Z, Rolf Heine, HL 2888

Frequency, kHz	Insertion loss,dB		Measurement Uncertainty, dB
	L1	N	
10	0.48	0.79	±0.6
20	0.52	0.63	
30	0.31	0.35	
40	0.20	0.22	
50	0.16	0.17	
100	0.10	0.08	
300	0.08	0.06	
500	0.10	0.06	
600	0.09	0.07	
800	0.10	0.07	
1000	0.10	0.08	
2000	0.12	0.11	
3000	0.16	0.14	
4000	0.17	0.18	
6000	0.26	0.23	
10000	0.49	0.41	
14000	0.66	0.54	
16000	0.79	0.69	
18000	0.86	0.76	
20000	0.96	0.85	
25000	1.22	1.08	
28000	1.35	1.21	
30000	1.43	1.29	



Antenna Factor
Active Loop Antenna
EMC Test Systems, model 6502, S/N 2857, HL 0446

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

Antenna factor in dB(S/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μA/m).
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

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, HL 0604

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

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

Antenna factor
Double-ridged guide horn antenna
Model 3115, serial number: 00027177, HL2432

Frequency, MHz	Antenna factor. dB(1/m)
1000.0	24.7
1500.0	25.7
2000.0	27.8
2500.0	28.9
3000.0	30.7
3500.0	31.8
4000.0	33.0
4500.0	32.8
5000.0	34.2
5500.0	34.9
6000.0	35.2
6500.0	35.4
7000.0	36.3
7500.0	37.3
8000.0	37.5
8500.0	38.0
9000.0	38.3
9500.0	38.3
10000.0	38.7
10500.0	38.7
11000.0	38.9
11500.0	39.5
12000.0	39.5
12500.0	39.4
13000.0	40.5
13500.0	40.8
14000.0	41.5
14500.0	41.3
15000.0	40.2
15500.0	38.7
16000.0	38.5
16500.0	39.8
17000.0	41.9
17500.0	45.8
18000.0	49.1

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(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 1503

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

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

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

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

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

Cable loss
Cable coaxial, GORE-TEX, GOR245, 40 GHz, 1.8 m, SMA-SMA, S/N 05118338
HL 3208

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss,dB	Frequency, MHz	Cable loss,dB
10	0.18	5000	2.25	10200	3.30	15500	4.08	31500	5.80
30	0.18	5100	2.26	10300	3.30	15600	4.15	32000	5.79
50	0.21	5200	2.30	10400	3.31	15700	4.13	32500	5.78
100	0.30	5300	2.31	10500	3.30	15800	4.13	33000	5.91
200	0.42	5400	2.35	10600	3.34	15900	4.17	33500	5.94
300	0.53	5500	2.36	10700	3.36	16000	4.18	34000	5.97
400	0.61	5600	2.40	10800	3.40	16100	4.26	34500	6.05
500	0.68	5700	2.41	10900	3.45	16200	4.23	35000	6.09
600	0.76	5800	2.45	11000	3.42	16300	4.22	35500	6.13
700	0.82	5900	2.45	11100	3.47	16400	4.27	36000	6.22
800	0.88	6000	2.48	11200	3.46	16500	4.25	36500	6.23
900	0.93	6100	2.50	11300	3.48	16600	4.28	37000	6.30
1000	0.98	6200	2.52	11400	3.52	16700	4.32	37500	6.41
1100	1.04	6300	2.55	11500	3.52	16800	4.35	38000	6.42
1200	1.08	6400	2.56	11600	3.56	16900	4.34	38500	6.39
1300	1.12	6500	2.59	11700	3.54	17000	4.36	39000	6.55
1400	1.17	6600	2.60	11800	3.58	17100	4.39	39500	6.58
1500	1.21	6700	2.62	11900	3.61	17200	4.40	40000	6.65
1600	1.25	6800	2.64	12000	3.67	17300	4.37		
1700	1.30	6900	2.66	12100	3.61	17400	4.45		
1800	1.34	7000	2.70	12200	3.65	17500	4.39		
1900	1.37	7100	2.73	12300	3.64	17600	4.44		
2000	1.39	7200	2.74	12400	3.65	17700	4.45		
2100	1.42	7300	2.74	12500	3.67	17800	4.49		
2200	1.46	7400	2.75	12600	3.69	17900	4.53		
2300	1.49	7500	2.77	12700	3.71	18000	4.49		
2400	1.52	7600	2.81	12800	3.69	18500	4.61		
2500	1.55	7700	2.83	12900	3.71	19000	4.63		
2600	1.59	7800	2.88	13000	3.74	19500	4.67		
2700	1.62	7900	2.89	13100	3.75	20000	4.69		
2800	1.67	8000	2.89	13200	3.76	20500	4.82		
2900	1.68	8100	2.89	13300	3.78	21000	4.88		
3000	1.71	8200	2.92	13400	3.78	21500	5.00		
3100	1.74	8300	2.97	13500	3.83	22000	5.08		
3200	1.77	8400	2.99	13600	3.90	22500	5.03		
3300	1.80	8500	3.04	13700	3.88	23000	5.11		
3400	1.84	8600	3.04	13800	3.91	23500	5.06		
3500	1.85	8700	3.03	13900	3.88	24000	5.12		
3600	1.89	8800	3.04	14000	3.89	24500	5.23		
3700	1.92	8900	3.08	14100	3.95	25000	5.38		
3800	1.94	9000	3.09	14200	3.97	25500	5.39		
3900	1.96	9100	3.15	14300	4.08	26000	5.45		
4000	2.00	9200	3.14	14400	3.98	26500	5.48		
4100	2.03	9300	3.14	14600	3.96	27000	5.42		
4200	2.05	9400	3.15	14700	4.00	27500	5.49		
4300	2.07	9500	3.17	14800	4.01	28000	5.57		
4400	2.09	9600	3.20	14900	4.04	28500	5.58		
4500	2.14	9700	3.19	15000	4.10	29000	5.59		
4600	2.15	9800	3.19	15100	4.08	29500	5.56		
4700	2.18	9900	3.21	15200	4.07	30000	5.69		
4800	2.20	10000	3.23	15300	4.09	30500	5.73		
4900	2.23	10100	3.26	15400	4.13	31000	5.81		

14 APPENDIX F Abbreviations and acronyms

A	ampere
AC	alternating current
A/m	ampere per meter
AM	amplitude modulation
AVRG	average (detector)
BB	broad band
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(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
EIRP	equivalent isotropically radiated power
ERP	effective radiated power
EUT	equipment under test
F	frequency
GHz	gigahertz
GND	ground
H	height
HL	Hermon laboratories
Hz	hertz
ITE	information technology equipment
k	kilo
kHz	kilohertz
LISN	line impedance stabilization network
LO	local oscillator
m	meter
MHz	megahertz
min	minute
mm	millimeter
ms	millisecond
μs	microsecond
NA	not applicable
NB	narrow band
NT	not tested
OATS	open area test site
Ω	Ohm
QP	quasi-peak
PCB	printed circuit board
PM	pulse modulation
PS	power supply
RE	radiated emission
RF	radio frequency
rms	root mean square
Rx	receive
s	second
T	temperature
Tx	transmit
V	volt
VA	volt-ampere