

TEST REPORT

ACCORDING TO: FCC CFR 47 PART 15 Subpart C, sections 15.231, 15.209 and RSS-210, Issue 6, Annex 1; ICES-003 Issue 4:2004

FOR:

Visonic Ltd.

Wireless Alarm Control System

Model: PowerMax Pro

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1 Applicant information

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Contact name: Mr. Arick Elshtein

2 Equipment under test attributes

Product name: Wireless Alarm Control System
Product type: Transceiver
Model(s): PowerMax Pro
Serial number: 0606001587
Receipt date 8/10/2006

3 Manufacturer information

Manufacturer name: Visonic Ltd.
Address: 24 Habarzel street, Tel Aviv 61920, Israel
Telephone: +972 3645 6789
Fax: +972 3645 6788
E-Mail: aelshtein@visonic.com
Contact name: Mr. Arick Elshtein

4 Test details

Project ID: 17292
Location: Hermon Laboratories Ltd. P.O.Box 23, Binyamina 30500, Israel
Test started: 8/10/2006
Test completed: 9/6/2006
Test specification(s): FCC Part 15, subpart C, §15.231, §15.209; subpart B;
RSS-210 Issue 6:2005, Annex 1; ICES-003 issue 4:2004

5 Tests summary

Test	Status
Transmitter characteristics	
FCC Part 15, Section 231(a) / RSS-210, Section A1.1.1, Periodic operation requirements	Pass
FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions	Pass
FCC Part 15, Section 231(c) / RSS-210, Section A1.1.3, Occupied bandwidth	Pass
FCC Part 15, Section 207 / RSS-Gen, Section 7.2.2, Conducted emission	Pass
FCC Part 15, Section 203 / RSS-Gen, Section 7.1.4, Antenna requirements	Pass
FCC Part 15, Section 209 / RSS-210, Section A1.1.2, Field strength of emissions	Pass
Unintentional emissions	
FCC Part 15, Section 107 / ICES-003, Conducted emission at AC power port	Pass
FCC Part 15, Section 109 / RSS-Gen, Section 7.2.3.2/ICES-003, Radiated emission	Pass
FCC Part 15, Section 111 / RSS-Gen, Section 6(b), Section 7.2.3.1, Conducted emission at receiver antenna port	Not required

Testing was completed against the relevant requirements of the test standard. The results obtained indicate that the product under test complies in full with the requirements tested.

The test results relate only to the items tested. Pass / fail decision was based on nominal values.

This test report replaces the previously issued test report identified by Doc ID:VISRAD_FCC.17292.

	Name and Title	Date	Signature
Tested by:	Mr. P. Kagan, test engineer Mr. S. Samokha, test engineer	September 4, 2006	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	September 17, 2006	
Approved by:	Mr. M. Nikishin, EMC and radio group leader	October 4, 2006	

6 EUT description

6.1 General information

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

The PowermaxPRO has several states of alertness, such as "armed away", "armed home" and "disarmed", the reactions to each state differs and is explained in the manuals. Those various states are achieved in three ways, via the on board/ integrated keypad, via the RFID proximity sensor (125 kHz) and via the RF transmitter type MCT 234. The local reporting of the PowermaxPro is via its LCD display as well as various tones and internal sounder and prerecorded vocal alerts. The remote reporting of an intrusion is via an analogue telephone line or alternatively via GSM or CDMA modem through the cellular network to a central monitoring station.

The transmitter utilizes integral antennas. The EUT is powered from AC mains and is equipped with a rechargeable backup battery pack. The EUT has three power supply options:

- 1) EUT with TEL-AD internal power supply,
- 2) EUT with SUDTECH internal power supply.
- 3) EUT with external power supply.

6.2 Ports and lines

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

* May be up to 12 m.

** May be longer than 30 m.

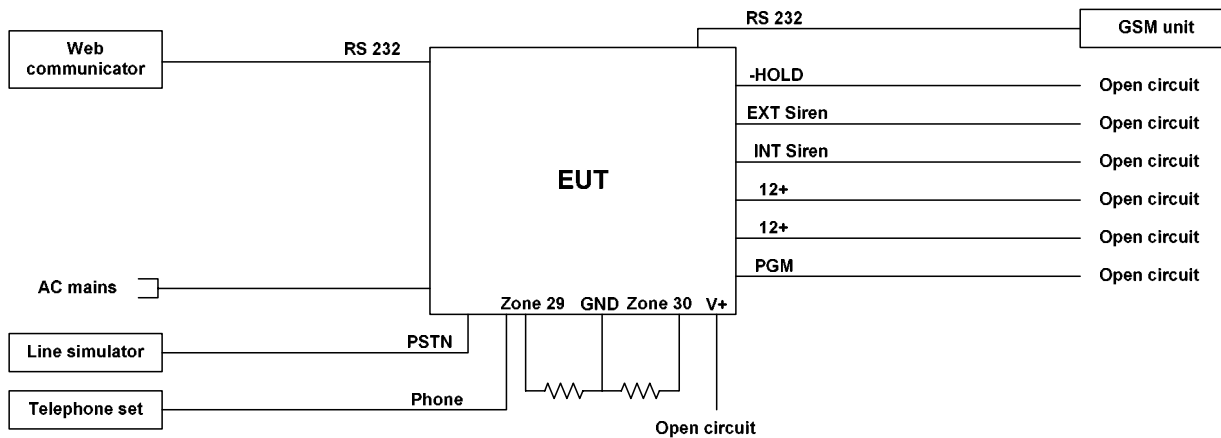
6.3 Auxiliary equipment

Description	Manufacturer	Model number	Serial number
Line simulator	Hermon Labs	LS-01	1856
Web communicator	Visonic	NA	NA
GSM unit	Visonic	NA	NA
Telephone set	Typical		

6.4 Operating frequencies

Source	Frequency, MHz					
Clock	4.19	16.0	NA	NA	NA	NA
Tx	315	NA	NA	NA	NA	NA
Rx	315	NA	NA	NA	NA	NA
Tx/Rx	0.128	NA	NA	NA	NA	NA

6.5 Test configuration



6.6 Changes made in the EUT

No changes were implemented.

6.7 Transmitter characteristics

6.7.1 Transmitter operating at 315 MHz

Type of equipment						
X	Stand-alone (Equipment with or without its own control provisions)					
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)					
	Plug-in card (Equipment intended for a variety of host systems)					
Intended use		Condition of use				
	fixed	Always at a distance more than 2 m from all people				
X	mobile	Always at a distance more than 20 cm from all people				
	portable	May operate at a distance closer than 20 cm to human body				
Operating frequency		315 MHz				
Maximum rated output power		At transmitter 50 Ω RF output connector			dBm	
		Effective radiated power (for equipment with no RF connector)			-18.1 dBm	
Is transmitter output power variable?		X	No			
		Yes	continuous variable			
			stepped variable with stepsize			
			minimum RF power			
			maximum RF power			
Antenna connection						
unique coupling	standard connector	X	integral	with temporary RF connector		
				X	without temporary RF connector	
Antenna characteristics						
Type	Manufacturer	Model number		Gain		
Wire	Visonic Ltd.	NA		NA		
Type of modulation		ASK				
Modulating test signal (baseband)		ID code				
Maximum transmitter duty cycle		0.035 %				
Transmitter power source						
X	Battery	Nominal rated voltage	9.6 VDC	Battery type	Ni-MH	
X	AC mains	Nominal rated voltage	120 VAC	Frequency	60 Hz	
Common power source for transmitter and receiver			X	yes	no	

6.7.2 Transmitter operating at 128 kHz

Type of equipment					
X	Stand-alone (Equipment with or without its own control provisions)				
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)				
	Plug-in card (Equipment intended for a variety of host systems)				
Intended use		Condition of use			
	fixed	Always at a distance more than 2 m from all people			
X	mobile	Always at a distance more than 20 cm from all people			
	portable	May operate at a distance closer than 20 cm to human body			
Operating frequency		128 kHz			
Is transmitter output power variable?		X	No		
		Yes	continuous variable		
			stepped variable with stepsize		
			minimum RF power		
			maximum RF power		
		dB			
		dBm			
		-9.67 dBm			
Antenna connection					
unique coupling		standard connector		X	integral
				X	with temporary RF connector
					without temporary RF connector
Antenna characteristics					
Type	Manufacturer		Model number		Gain
Printed	Visonic Ltd.		NA		NA
Type of modulation		ASK			
Modulating test signal (baseband)		ID code			
Maximum transmitter duty cycle		100%			
Transmitter power source					
X	Battery	Nominal rated voltage	9.6 VDC	Battery type	Ni-MH
X	AC mains	Nominal rated voltage	120 VAC	Frequency	60 Hz
Common power source for transmitter and receiver				X	yes
					no

Test specification:	FCC Part 15, Section 231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	9/4/2006 8:54:39 AM		
Temperature: 25°C	Air Pressure: 1010 hPa	Relative Humidity: 48 %	Power Supply: 120 V AC
Remarks:			

7 Transmitter tests

7.1 Periodic operation requirements

7.1.1 General

The EUT was verified for compliance with periodic operation requirements listed below:

- Continuous transmissions such as voice, video and the radio control of toys are not permitted;
- A transmitter activated automatically shall cease transmission within 5 seconds after activation;
- Periodic transmissions, excluding polling or supervision transmissions, at regular predetermined intervals are not permitted;

Total duration of polling or supervision transmissions, including data, to determine system integrity in security or safety applications shall not exceed 2 seconds per hour;

The rationale for compliance with the above requirements was either test results or supplier declaration. The summary of results is provided in Table 7.1.1.

7.1.2 Test procedure for transmitter shut down test

7.1.2.1 The EUT was set up as shown in Figure 7.1.1.

7.1.2.2 The spectrum analyzer center frequency was adjusted to the EUT carrier, span set to zero and video triggered for transmission.

7.1.2.3 The transmitter was activated either manually or automatically. Once manually operated transmitter was activated, the switch was immediately released.

7.1.2.4 The transmission time was captured and shown in Plot 7.1.1, Plot 7.1.2.

7.1.3 Test procedure for measurements of polling / supervision transmission duration

7.1.3.1 The EUT was set up as shown in Figure 7.1.1.

7.1.3.2 The spectrum analyzer center frequency was adjusted to the EUT carrier, span set to zero and video triggered for transmission.

7.1.3.3 The transmission time was captured and shown in Plot 7.1.10.

Figure 7.1.1 Setup for transmitter shut down test

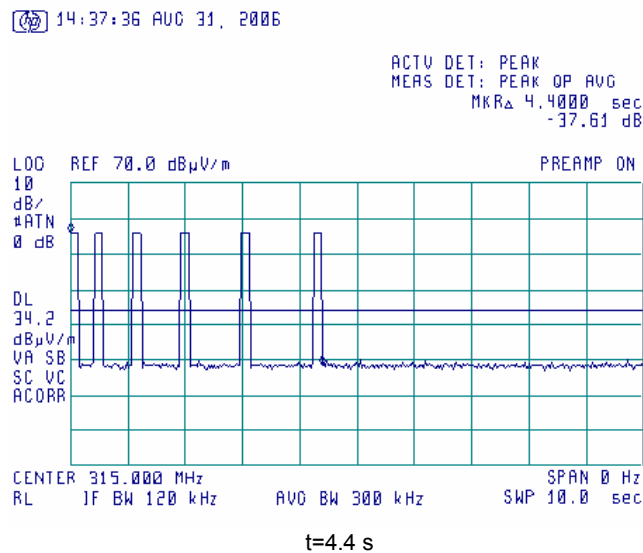


Test specification:	FCC Part 15, Section 231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/4/2006 8:54:39 AM		
Temperature: 25°C	Air Pressure: 1010 hPa	Relative Humidity: 48 %	Power Supply: 120 V AC
Remarks:			

Table 7.1.1 Periodic operation requirements

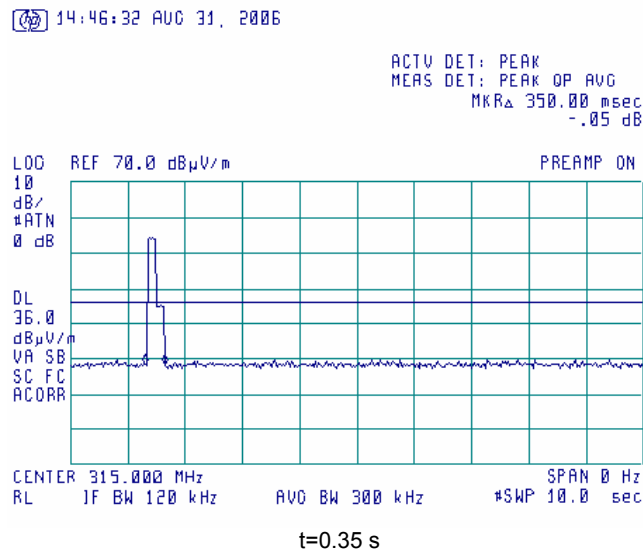
Requirement	Rationale	Verdict
Continuous transmissions are not permitted	Supplier declaration	Comply
Transmitter activated automatically shall cease transmission within 5 seconds	Plot 7.1.1	Comply
Periodic transmissions at regular predetermined intervals are not permitted	Supplier declaration	Comply
Total duration of polling or supervision transmissions shall not exceed 2 seconds per hour	Plot 7.1.10	Comply

Plot 7.1.1 Transmitter shut down test result. Alarm button. Without siren.

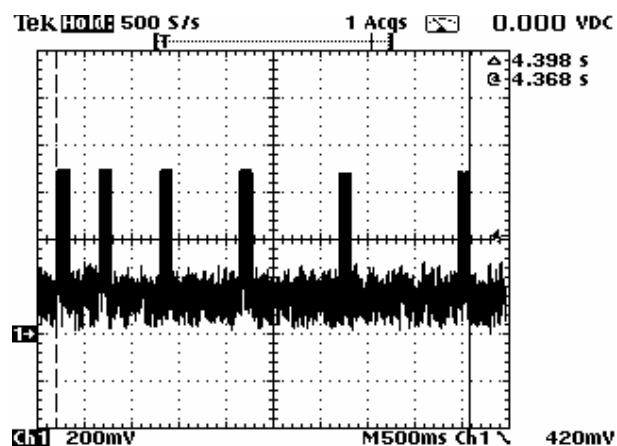


Test specification:	FCC Part 15, Section 231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/4/2006 8:54:39 AM		
Temperature: 25°C	Air Pressure: 1010 hPa	Relative Humidity: 48 %	Power Supply: 120 V AC
Remarks:			

Plot 7.1.2 Transmitter shut down test result. Alarm button. With siren

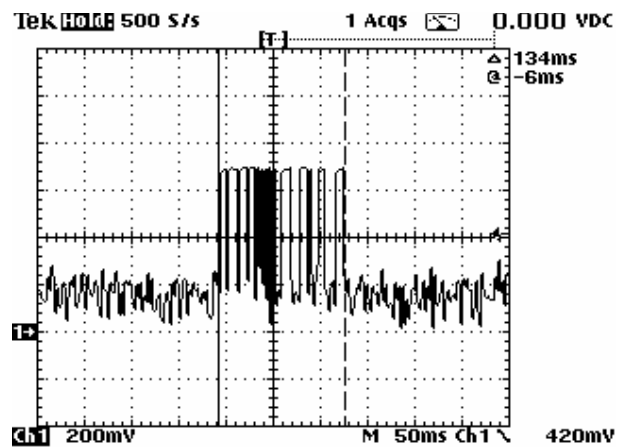


Plot 7.1.3 Transmitter shut down test result. Alarm button. Without siren

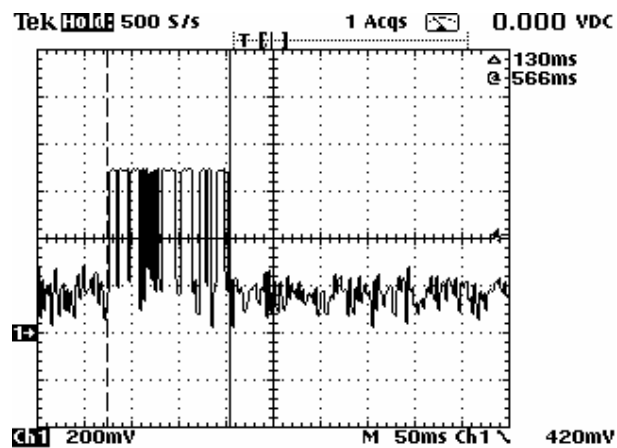


Test specification:	FCC Part 15, Section 231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/4/2006 8:54:39 AM		
Temperature: 25°C	Air Pressure: 1010 hPa	Relative Humidity: 48 %	Power Supply: 120 V AC
Remarks:			

Plot 7.1.4 Transmitter shut down test result. Alarm button. Without siren -Burst 1

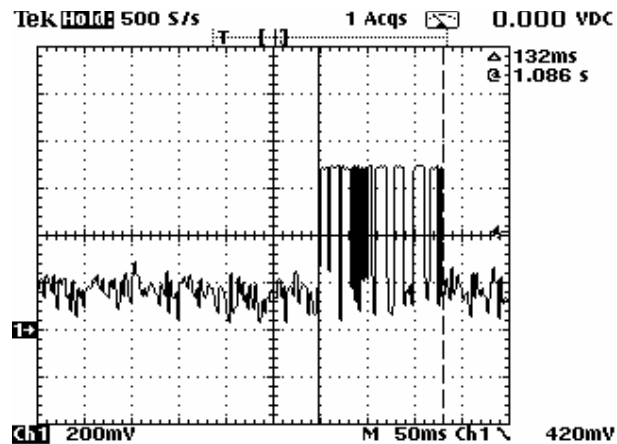


Plot 7.1.5 Transmitter shut down test result. Alarm button. Without siren -Burst 2

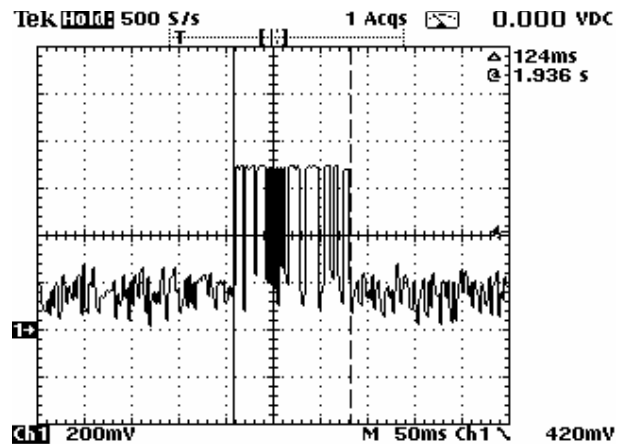


Test specification:	FCC Part 15, Section 231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/4/2006 8:54:39 AM		
Temperature: 25°C	Air Pressure: 1010 hPa	Relative Humidity: 48 %	Power Supply: 120 V AC
Remarks:			

Plot 7.1.6 Transmitter shut down test result. Alarm button. Without siren -Burst 3

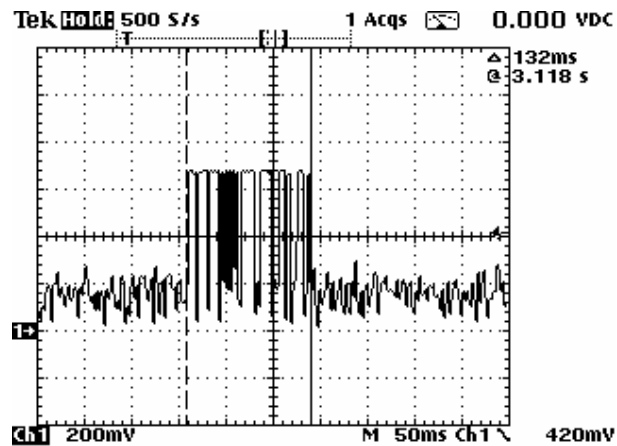


Plot 7.1.7 Transmitter shut down test result. Alarm button. Without siren -Burst 4

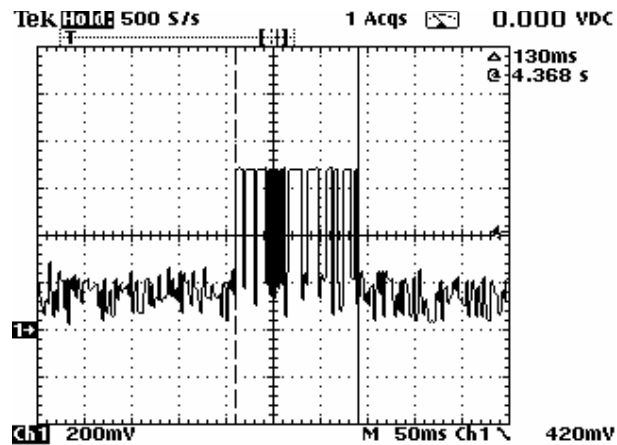


Test specification:	FCC Part 15, Section 231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/4/2006 8:54:39 AM		
Temperature: 25°C	Air Pressure: 1010 hPa	Relative Humidity: 48 %	Power Supply: 120 V AC
Remarks:			

Plot 7.1.8 Transmitter shut down test result. Alarm button. Without siren -Burst 5



Plot 7.1.9 Transmitter shut down test result. Alarm button. Without siren -Burst 6



Test specification:	FCC Part 15, Section 231(a) / RSS-210, Section A1.1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	9/4/2006 8:54:39 AM		
Temperature: 25°C	Air Pressure: 1010 hPa	Relative Humidity: 48 %	Power Supply: 120 V AC
Remarks:			

Plot 7.1.10 Polling / supervision transmission duration

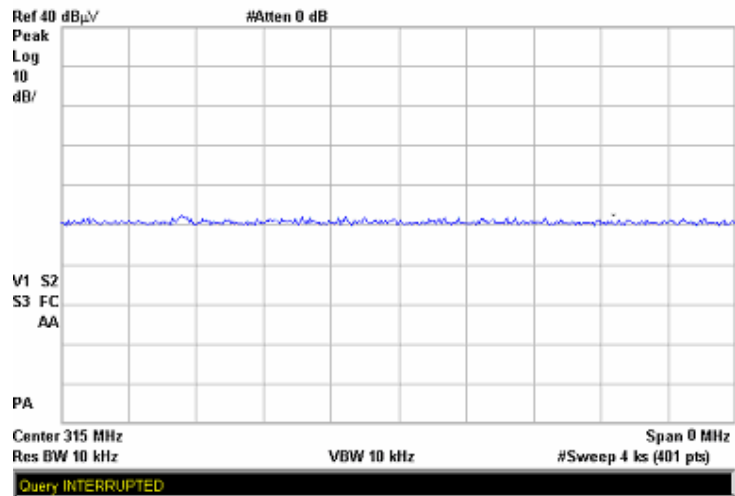


Table 7.1.2 Total duration of polling / supervision transmissions

Duration, ms	Repetition period, ms	Maximum number of transmissions within 1 hour	Total duration within 1 hour, ms
No polling / supervision transmissions were found			

Reference numbers of test equipment used

HL 0521	HL 1562	HL 2728					
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Full description is given in Appendix A.

Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

7.2 Field strength of emissions, transmitter operating at 315 MHz

7.2.1 General

This test was performed to measure field strength of fundamental and spurious emissions from the EUT. Specification test limits are given in Table 7.2.1 and Table 7.2.2.

Table 7.2.1 Radiated fundamental emission limits to FCC part 15, section 15.231(b)

Fundamental frequency, MHz	Field strength at 3 m, dB(μV/m)	
	Peak	Average
315	95.62	75.62

Table 7.2.2 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m, dB(μV/m)				
	Within restricted bands			Outside restricted bands	
	Peak	Quasi Peak	Average	Peak	Average
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**	75.62	55.62
0.090 – 0.110	NA	108.5 – 106.8**	NA		
0.110 – 0.490	126.8 – 113.8	NA	106.8 – 93.8**		
0.490 – 1.705	NA	73.8 – 63.0**	NA		
1.705 – 30.0*		69.5			
30 – 88		40.0			
88 – 216		43.5			
216 – 960		46.0			
960 - 1000		54.0			
Above 1000	74.0	NA	54.0		

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

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

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

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

Note 1: The fundamental emission limit in dB(μV/m) was calculated as follows:

$$\text{Lim}_{AVR} = 20 \times \log(56.81818 \times F - 6136.3636) \text{ - within } 130 - 174 \text{ MHz band;}$$

$$\text{Lim}_{AVR} = 20 \times \log(41.6667 \times F - 7083.3333) \text{ - within } 260 - 470 \text{ MHz band,}$$

where F is the carrier frequency in MHz.

The limit for spurious emissions was 20 dB lower than fundamental emission limit.

The above limits provided in terms of average values, peak limit was 20 dB above the average limit.

Note 2: The above field strength limits applied from the lowest radio frequency generated in the device, without going below 9 kHz up to the tenth harmonic of the highest fundamental frequency.

Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

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

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

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

7.2.2.3 The worst test results (the lowest margins) were recorded in Table 7.2.3, Table 7.2.5 and shown in the associated plots.

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

7.2.3.1 The EUT was set up as shown in Figure 7.2.2, energized and the performance check was conducted.

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

7.2.3.3 The worst test results (the lowest margins) were recorded in Table 7.2.3, Table 7.2.5 and shown in the associated plots.

Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Figure 7.2.1 Setup for spurious emission field strength measurements below 30 MHz

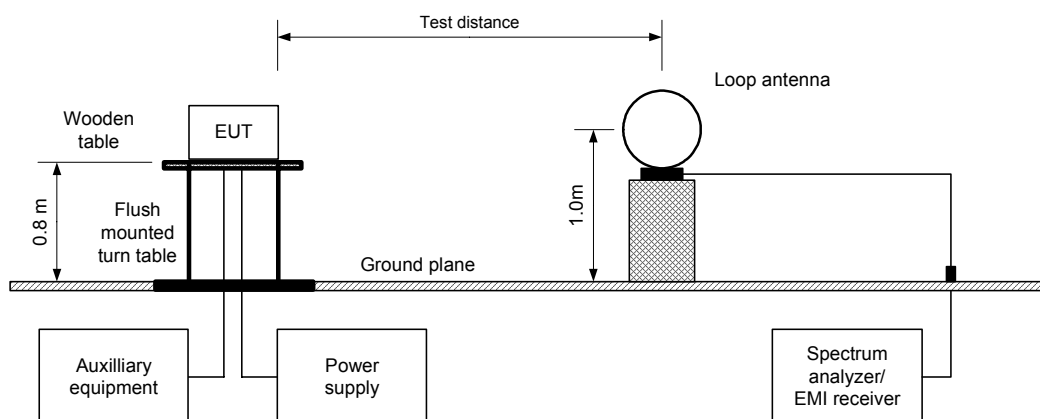
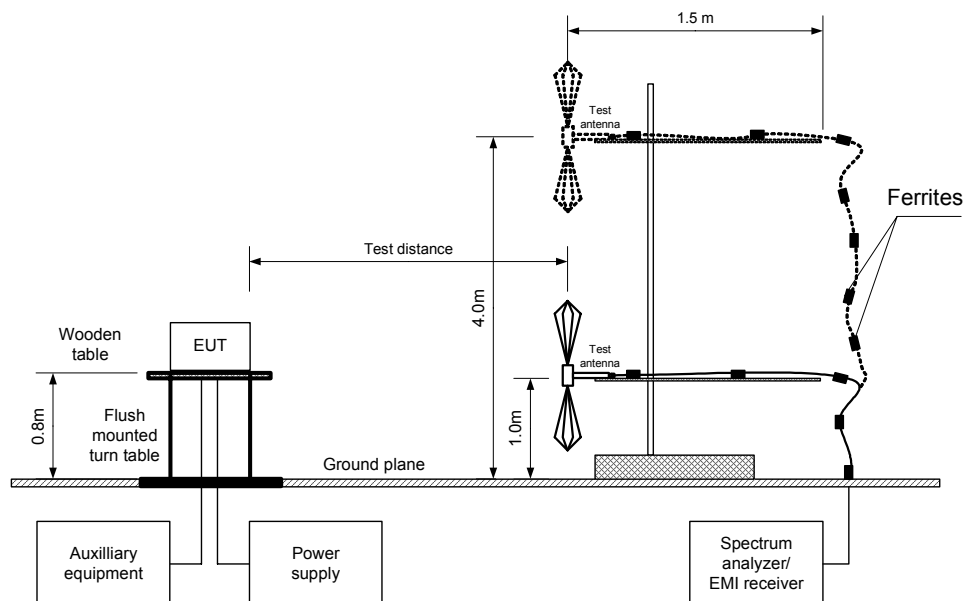


Figure 7.2.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Table 7.2.3 Field strength of fundamental emission, spurious emissions outside restricted bands and within restricted bands at frequencies above 1 GHz

TEST DISTANCE: 3 m
EUT POSITION: Typical (Vertical)
MODULATION: ASK
MODULATING SIGNAL: ID code
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
INVESTIGATED FREQUENCY RANGE: 1000 – 3500 MHz
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 0.2 kHz (9 kHz – 150 kHz)
9.0 kHz (150 kHz – 30 MHz)
120 kHz (30 MHz – 1000 MHz)
1.0 MHz (above 1000 MHz)
VIDEO BANDWIDTH: ≥ Resolution bandwidth
TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
Biconilog (30 MHz – 1000 MHz)
Double ridged guide (above 1000 MHz)

F, MHz	Antenna		Azimuth, degrees*	Peak field strength			Avr factor, dB	Average field strength			Verdict
	Pol.	Height, m		Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**		Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
Fundamental emission											
314.991	H	1.0	179	77.1	95.62	-18.52	-3.15	73.95	75.62	-1.67	Pass
Spurious emissions											
944.640	V	1.0	181	28.03	75.62	-47.59	-3.15	24.88	55.62	-30.74	Pass

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

**- Margin (dB) = measured result - specification limit.

Table 7.2.4 Average factor calculation

Transmission pulse		Transmission burst		Transmission train duration, ms	Average factor, dB
Duration, ms	Period, ms	Duration, ms	% of train		
Burst 1				130.3	-3.15
2.0120	2.4180	35.68	27.4		
Burst 2					
0.4290	0.8346	15.72	12.0		
Burst 3					
0.7206	1.0420	76.77	58.9		

*- Average factor was calculated as follows
for pulse train longer than 100 ms:

$$\text{Average factor} = 20 \times \log_{10} \left(\frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{Burst duration}}{100 \text{ ms}} \times \text{Number of bursts within 100 ms} \right)$$

for pulse train longer than 100 ms:

$$\text{Average factor} = 20 \times \log_{10} \left(\frac{2.012}{2.418} \times 0.274 + \frac{0.429}{0.8346} \times 0.12 + \frac{0.7206}{1.042} \times 0.589 \right) = 20 \times \log_{10} (0.696) = -3.15$$



Table 7.2.5 Field strength of emissions below 1 GHz within restricted bands

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

*- Margin = Measured emission - specification limit.

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

Reference numbers of test equipment used

Full description is given in Appendix A.

Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions			
Test procedure:	ANSI C63.4, Section 13.1.4			
Test mode:	Compliance	Verdict:		PASS
Date & Time:	8/21/2006 2:14:19 PM			
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC	
Remarks:				

Table 7.2.6 Restricted bands according to FCC 15, Section 205

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.37625 - 8.38675	73 - 74.6	399.9 - 410	2690 - 2900	10.6 - 12.7
0.495 - 0.505	8.41425 - 8.41475	74.8 - 75.2	608 - 614	3260 - 3267	13.25 - 13.4
2.1735 - 2.1905	12.290 - 12.293	108 - 121.94	960 - 1240	3332 - 3339	14.47 - 14.5
4.125 - 4.128	12.51975 - 12.52025	123 - 138	1300 - 1427	3345.8 - 3358	15.35 - 16.2
4.17725 - 4.17775	12.57675 - 12.57725	149.9 - 150.05	1435 - 1626.5	3600 - 4400	17.7 - 21.4
4.20725 - 4.20775	13.36 - 13.41	156.52475 - 156.52525	1645.5 - 1646.5	4500 - 5150	22.01 - 23.12
6.215 - 6.218	16.420 - 16.423	156.7 - 156.9	1660 - 1710	5350 - 5460	23.6 - 24
6.26775 - 6.26825	16.69475 - 16.69525	162.0125 - 167.17	1718.8 - 1722.2	7250 - 7750	31.2 - 31.8
6.31175 - 6.31225	16.80425 - 16.80475	167.72 - 173.2	2200 - 2300	8025 - 8500	36.43 - 36.5
8.291 - 8.294	25.5 - 25.67	240 - 285	2310 - 2390	9000 - 9200	Above 38.6
8.362 - 8.366	37.5 - 38.25	322 - 335.4	2483.5 - 2500	9300 - 9500	

Table 7.2.7 Restricted bands according to RSS-210, Section 2.7

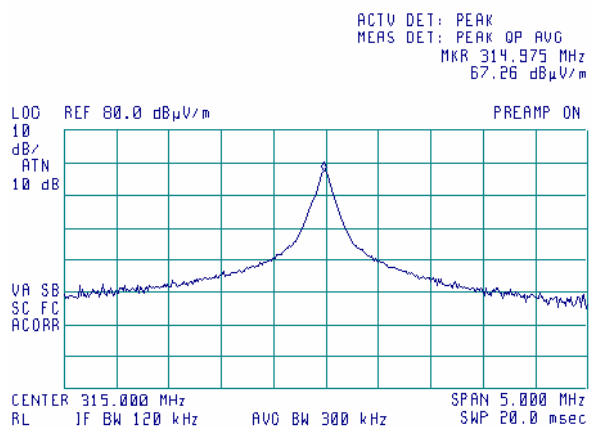
MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.291 - 8.294	16.80425 - 16.80475	399.9 - 410	3260 - 3267	10.6 - 12.7
2.1735 - 2.190	8.362 - 8.366	25.5 - 25.67	608 - 614	3332 - 3339	13.25 - 13.4
3.020 - 3.026	8.37625 - 8.38675	37.5 - 38.25	960 - 1427	3345.8 - 3358	14.47 - 14.5
4.125 - 4.128	8.41425 - 8.41475	73 - 74.6	1435 - 1626.5	3500 - 4400	15.35 - 16.2
4.17725 - 4.17775	12.290 - 12.293	74.8 - 75.2	1645.5 - 1646.5	4500 - 5150	17.7 - 21.4
4.20725 - 4.20775	12.51975 - 12.52025	108 - 138	1660 - 1710	5350 - 5460	22.01 - 23.12
5.677 - 5.683	12.57675 - 12.57725	156.52475 - 156.52525	1718.8 - 1722.2	7250 - 7750	23.6 - 24.0
6.215 - 6.218	13.36 - 13.41	156.7 - 156.9	2200 - 2300	8025 - 8500	31.2 - 31.8
6.26775 - 6.26825	16.42 - 16.423	240 - 285	2310 - 2390	9000 - 9200	36.43 - 36.5
6.31175 - 6.31225	16.69475 - 16.69525	322 - 335.4	2655 - 2900	9300 - 9500	Above 38.6

Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.1 Radiated emission measurements at the fundamental frequency

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

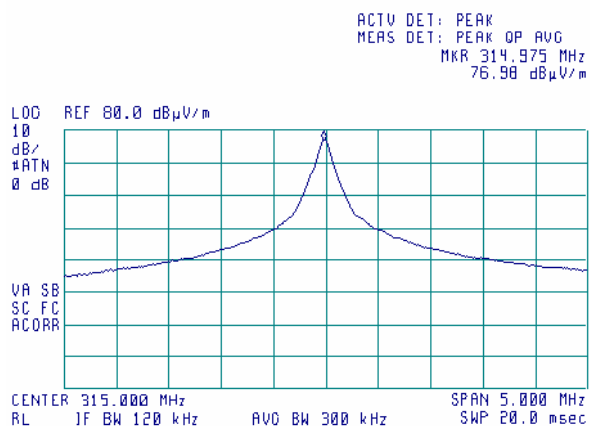
09:38:51 AUG 13, 2006



Plot 7.2.2 Radiated emission measurements at the fundamental frequency

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

10:20:58 AUG 13, 2006

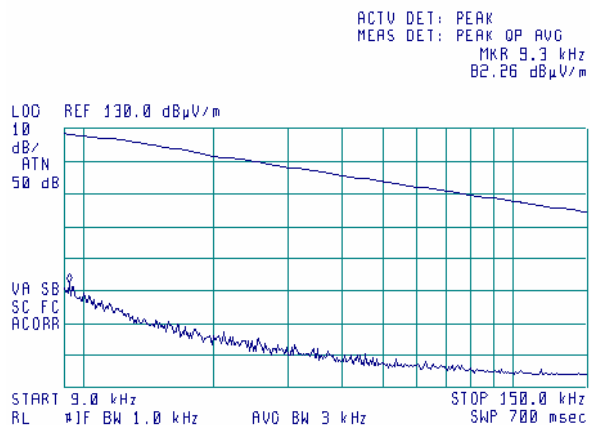


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.3 Radiated emission measurements from 9 to 150 kHz

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

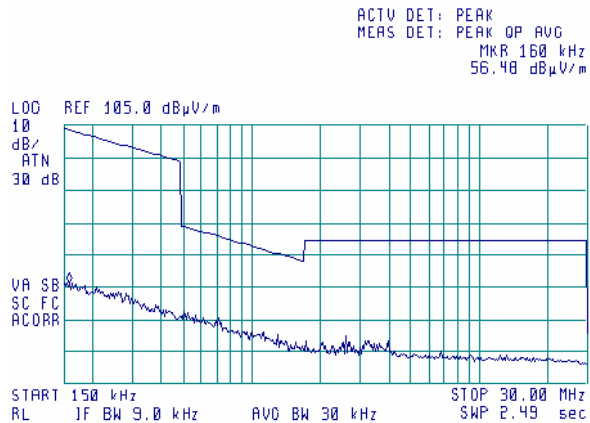
13:04:08 AUG 13, 2006



Plot 7.2.4 Radiated emission measurements from 0.15 to 30 MHz

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

13:01:37 AUG 13, 2006

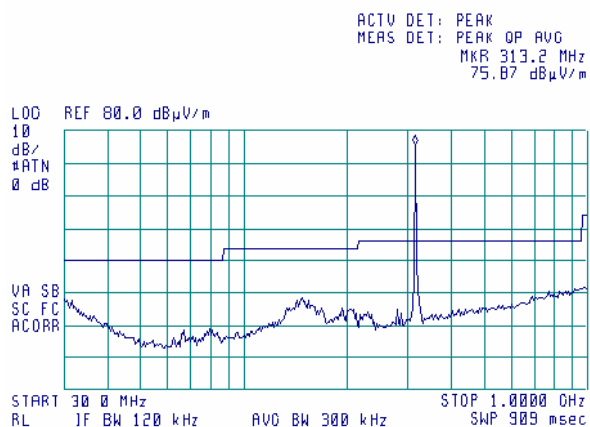


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.5 Radiated emission measurements from 30 to 1000 MHz

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

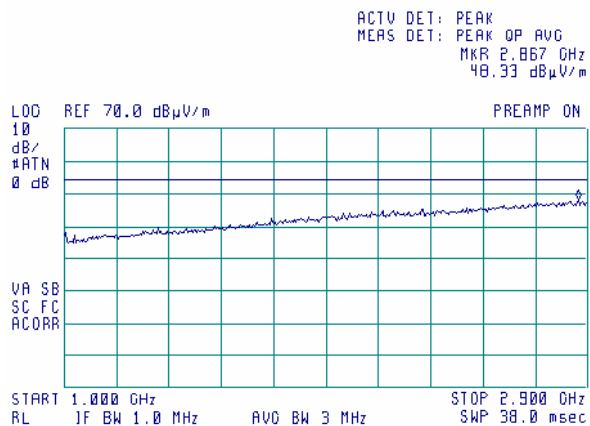
10:17:59 AUG 13, 2006



Plot 7.2.6 Radiated emission measurements from 1000 to 2900 MHz

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

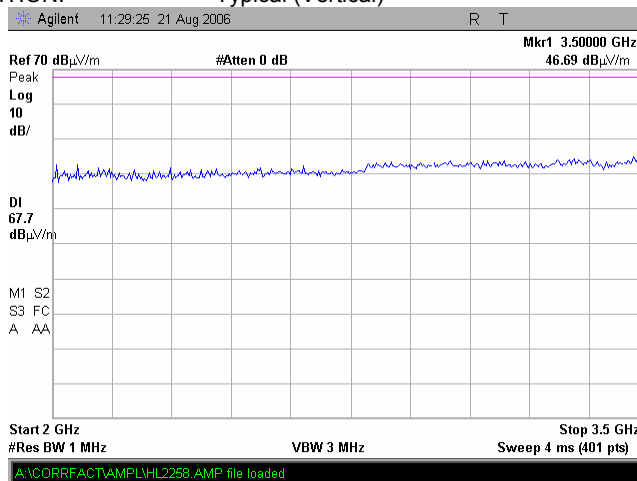
10:30:03 AUG 13, 2006



Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.7 Radiated emission measurements from 2900 to 3500 MHz

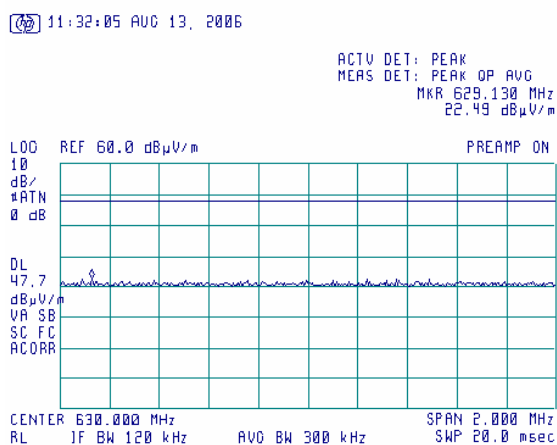
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
EUT POSITION: Typical (Vertical)



Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

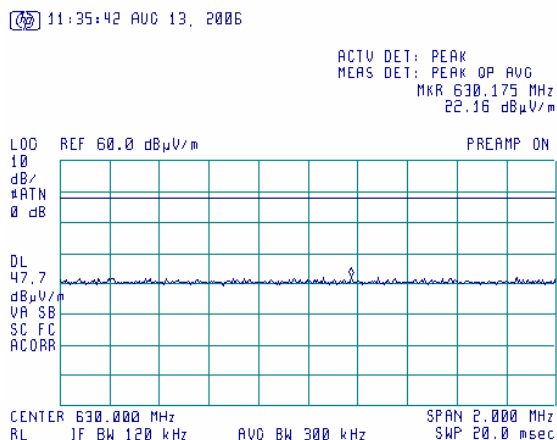
Plot 7.2.8 Radiated emission measurements at the second harmonic frequency

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



Plot 7.2.9 Radiated emission measurements at the second harmonic frequency

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

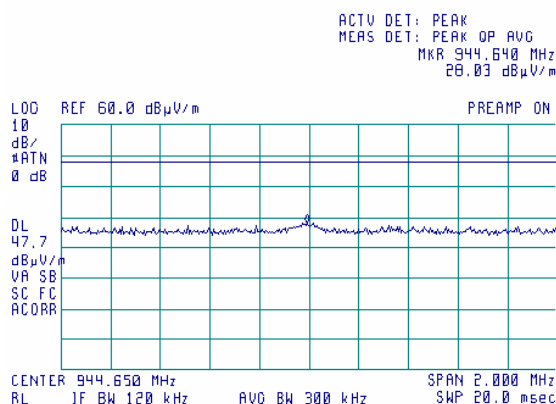


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.10 Radiated emission measurements at the third harmonic frequency

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

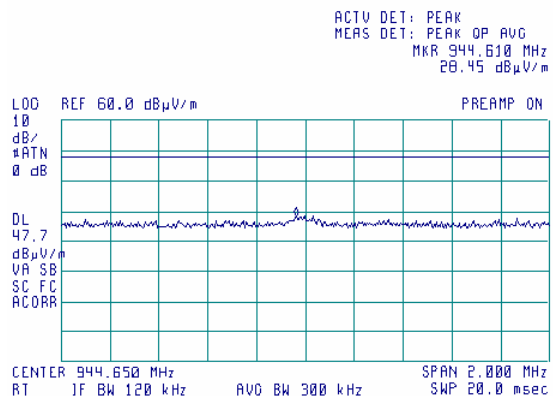
11:42:25 AUG 13, 2006



Plot 7.2.11 Radiated emission measurements at the third harmonic frequency

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

11:38:57 AUG 13, 2006

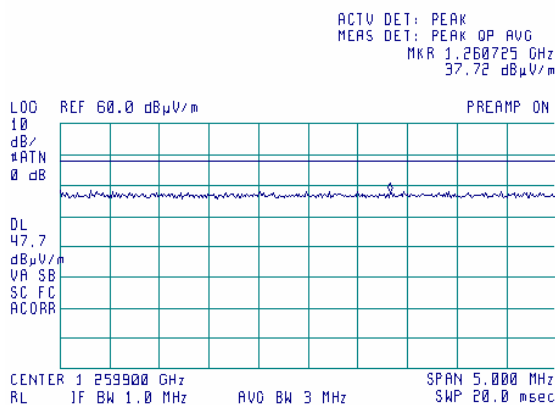


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.12 Radiated emission measurements at the forth harmonic frequency

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

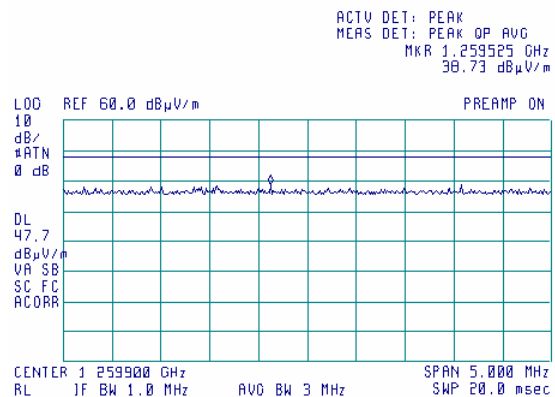
12:23:09 AUG 13, 2006



Plot 7.2.13 Radiated emission measurements at the forth harmonic frequency

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

12:18:33 AUG 13, 2006

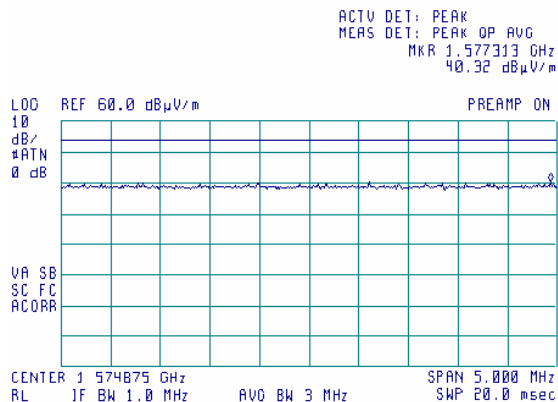


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.14 Radiated emission measurements at the fifth harmonic frequency

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

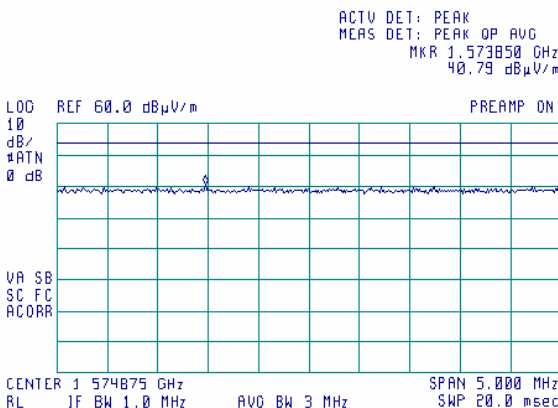
12:11:18 AUG 13, 2006



Plot 7.2.15 Radiated emission measurements at the fifth harmonic frequency

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

12:15:27 AUG 13, 2006

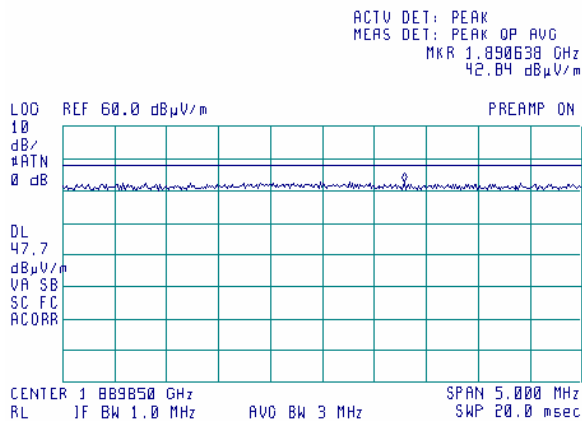


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.16 Radiated emission measurements at the sixth harmonic frequency

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

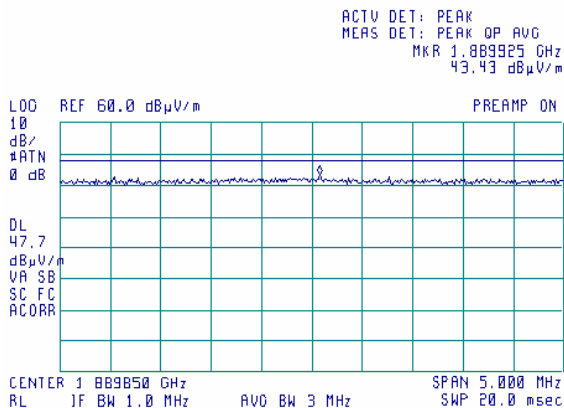
12:00:39 AUG 13, 2006



Plot 7.2.17 Radiated emission measurements at the sixth harmonic frequency

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

12:07:12 AUG 13, 2006

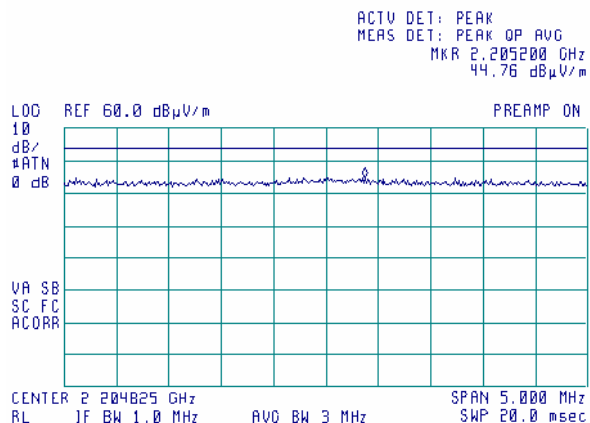


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.18 Radiated emission measurements at the seventh harmonic frequency

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

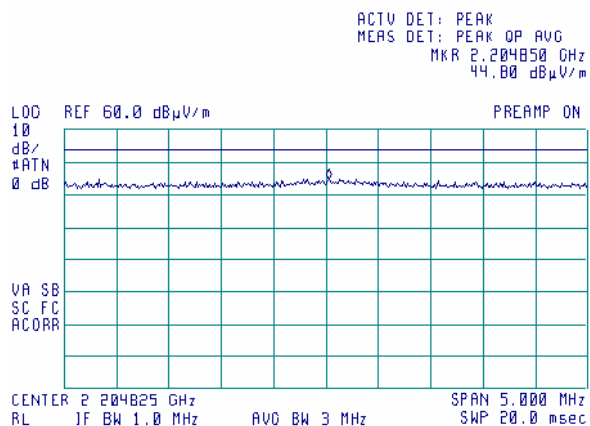
12:27:20 AUG 13, 2006



Plot 7.2.19 Radiated emission measurements at the seventh harmonic frequency

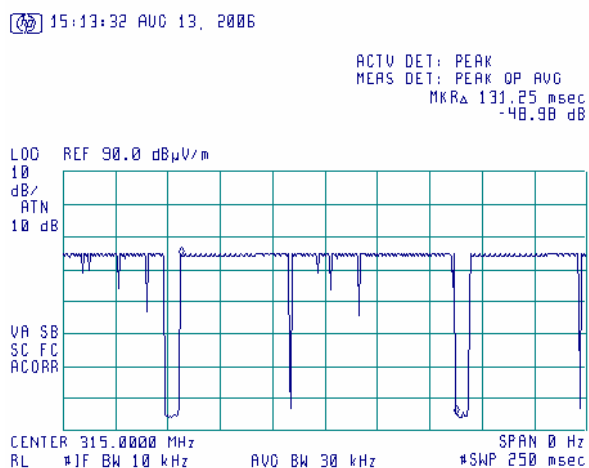
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
EUT POSITION: Typical (Vertical)

12:30:19 AUG 13, 2006

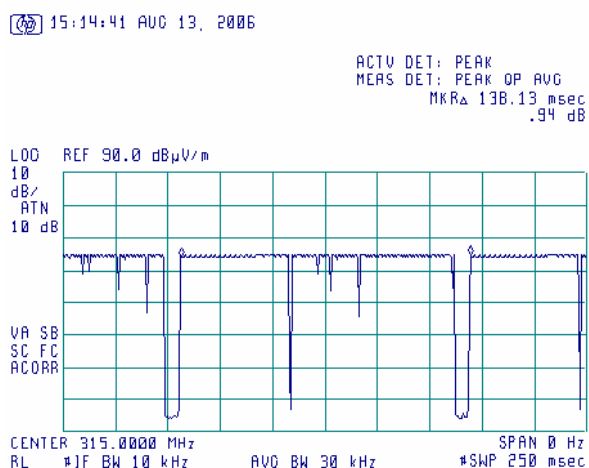


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.20 Transmission duration

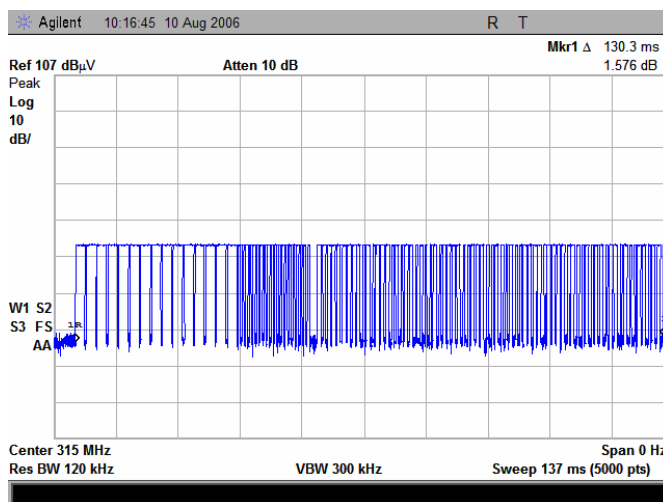


Plot 7.2.21 Transmission period

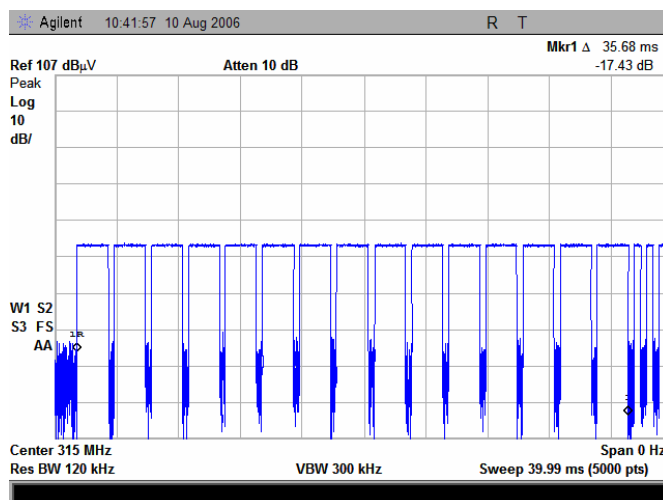


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.22 Burst train duration

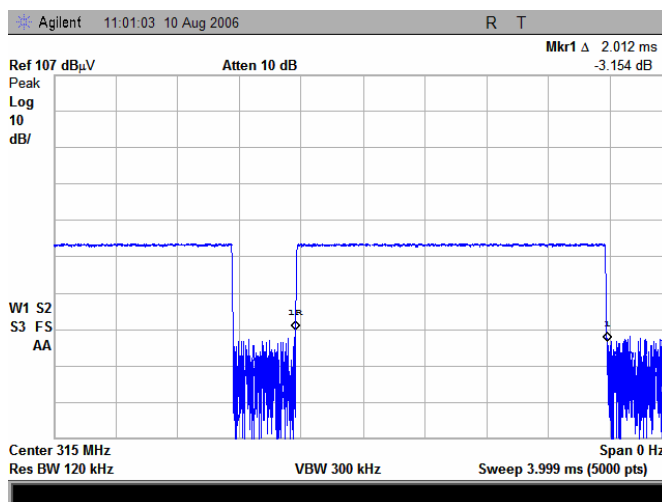


Plot 7.2.23 First burst duration

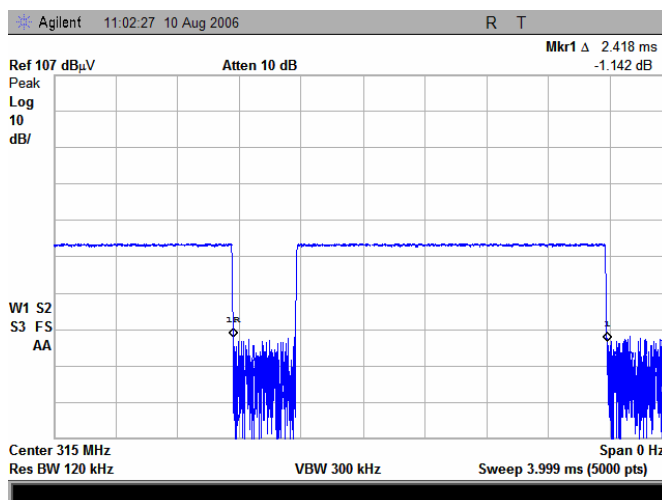


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.24 First pulse duration

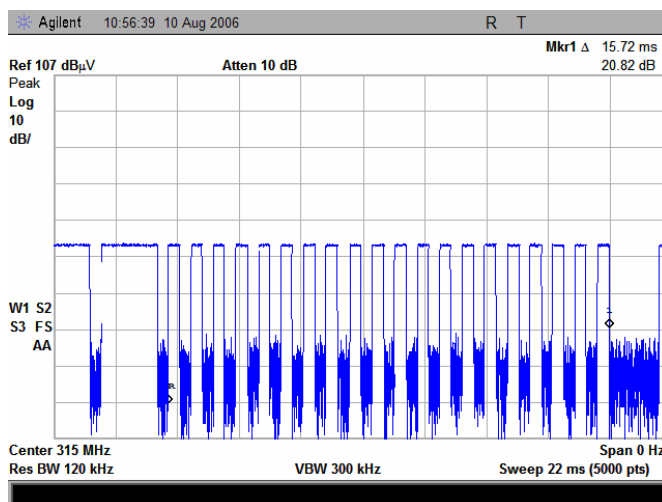


Plot 7.2.25 First pulse period

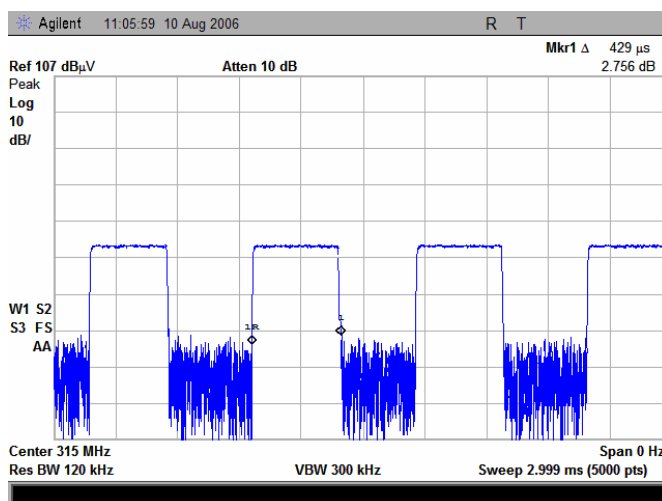


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.26 Second burst duration

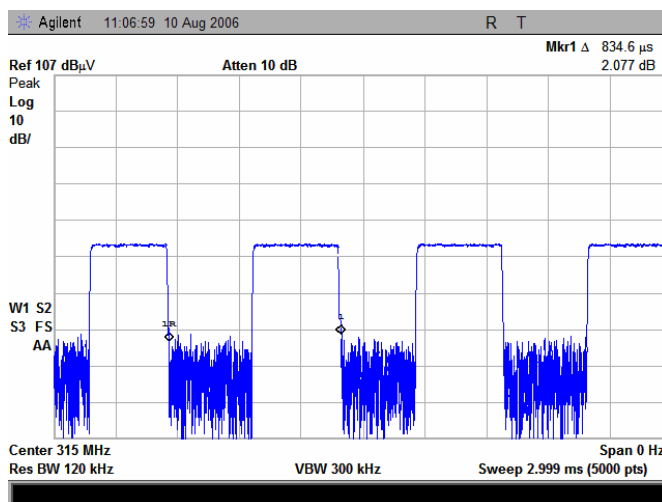


Plot 7.2.27 Second pulse duration

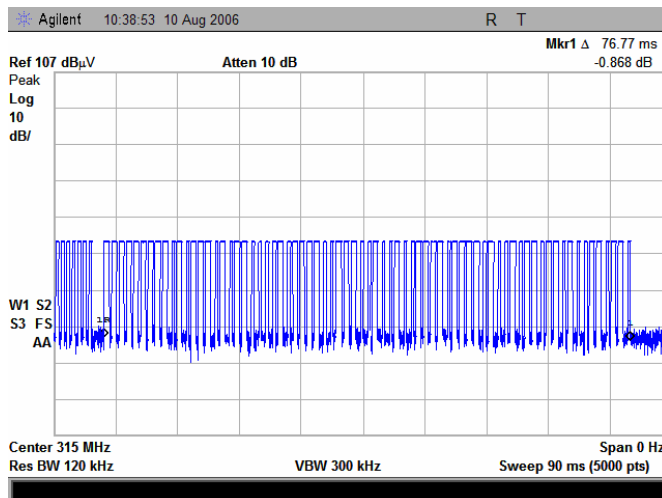


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.28 Second pulse period

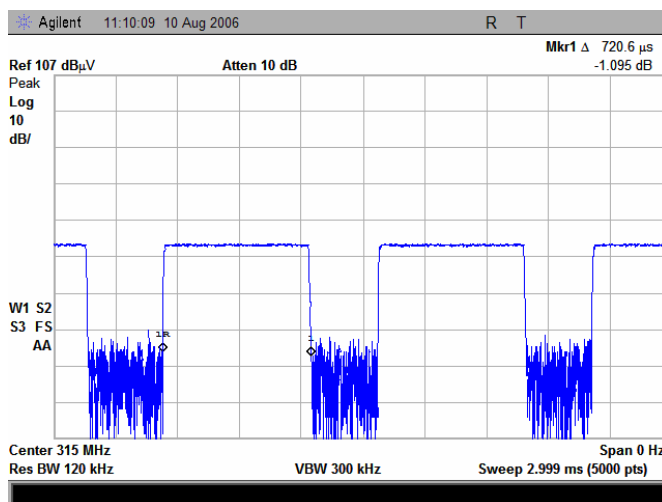


Plot 7.2.29 Third burst duration

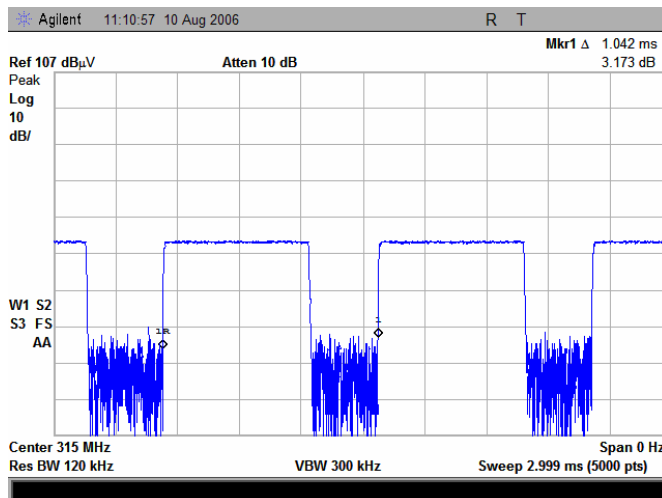


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:14:19 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

Plot 7.2.30 Third pulse duration



Plot 7.2.31 Third pulse period



Test specification:	FCC Part 15, Section 209 / RSS-210, Tables 2, 3, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/30/2006 4:47:50 PM		
Temperature: 26 °C	Air Pressure: 1009 hPa	Relative Humidity: 36 %	Power Supply: 120 V AC
Remarks:			

7.3 Field strength of emissions, transmitter operating at 128 kHz

7.3.1 General

This test was performed to measure field strength of fundamental and spurious emissions from the EUT. Specification test limits are given in Table 7.3.1 and Table 7.3.2.

Table 7.3.1 Radiated fundamental emission limits according to FCC part 15, section 15.209

Fundamental frequency, kHz	Field strength at 3 m, dB(μV/m)
	Average
128	105.5

Table 7.3.2 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m, dB(μV/m)		
	Within restricted bands		
	Peak	Quasi Peak	Average
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**
0.090 – 0.110	NA	108.5 – 106.8**	NA
0.110 – 0.490	126.8 – 113.8	NA	106.8 – 93.8**
0.490 – 1.705	NA	73.8 – 63.0**	NA
1.705 – 30.0*		69.5	
30 – 88		40.0	
88 – 216		43.5	
216 – 960		46.0	
960 – 1000		54.0	
Above 1000	74.0	NA	54.0

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

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

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

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

Test specification:		FCC Part 15, Section 209 / RSS-210, Tables 2, 3, Field strength of emissions	
Test procedure:		ANSI C63.4, Section 13.1.4	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/30/2006 4:47:50 PM		
Temperature: 26 °C	Air Pressure: 1009 hPa	Relative Humidity: 36 %	Power Supply: 120 V AC
Remarks:			

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

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

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

7.3.2.3 The worst test results (the lowest margins) were found in vertical antenna polarization, recorded in Table 7.3.3 and shown in the associated plots.

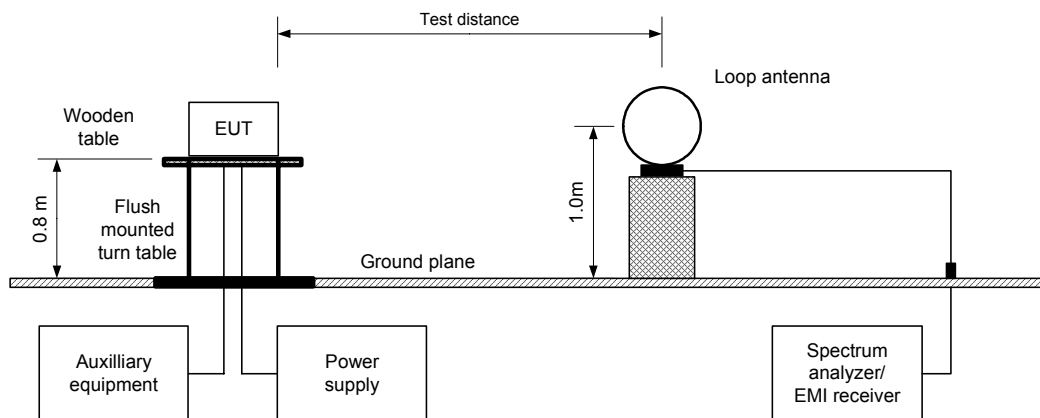
7.3.3 Test procedure for spurious emission field strength measurements above 30 MHz

7.3.3.1 The EUT was set up as shown in Figure 7.3.2, energized and the performance check was conducted.

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

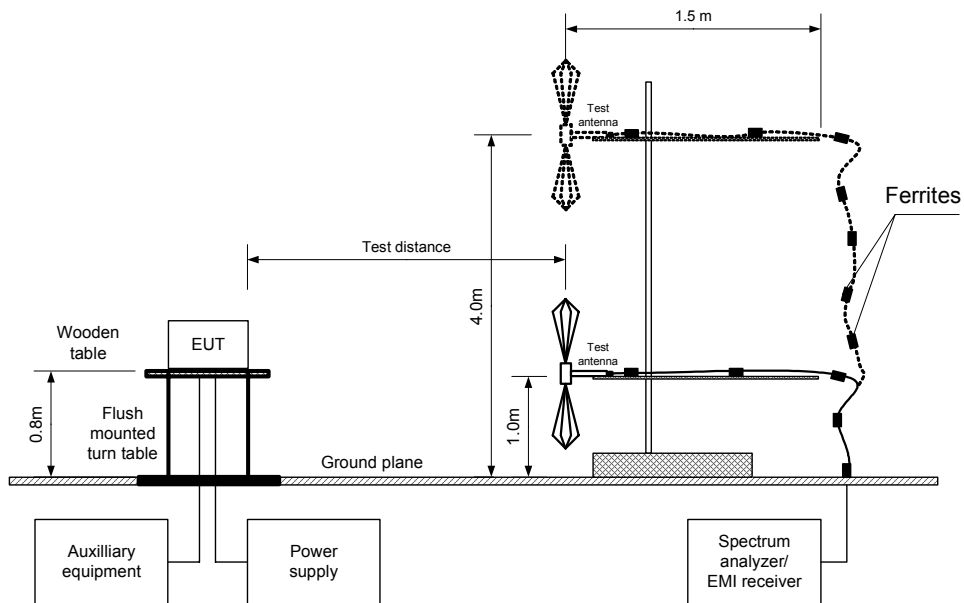
7.3.3.3 The worst test results (the lowest margins) were recorded in Table 7.3.4 and shown in the associated plots.

Figure 7.3.1 Setup for spurious emission field strength measurements below 30 MHz



Test specification:		FCC Part 15, Section 209 / RSS-210, Tables 2, 3, Field strength of emissions	
Test procedure:		ANSI C63.4, Section 13.1.4	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/30/2006 4:47:50 PM		
Temperature: 26 °C	Air Pressure: 1009 hPa	Relative Humidity: 36 %	Power Supply: 120 V AC
Remarks:			

Figure 7.3.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	FCC Part 15, Section 209 / RSS-210, Tables 2, 3, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	8/30/2006 4:47:50 PM		
Temperature: 26 °C	Air Pressure: 1009 hPa	Relative Humidity: 36 %	Power Supply: 120 V AC
Remarks:			

Table 7.3.3 Field strength of fundamental emission

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

Frequency, kHz	Peak emission, dB(μV/m)	Average		Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Limit, dB(μV/m)	Margin, dB*				
128.330	85.56	105.5	-19.94	V	1	0	Pass

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

**- Margin (dB) = measured result - specification limit.

Test specification:	FCC Part 15, Section 209 / RSS-210, Tables 2, 3, Field strength of emissions				
Test procedure:	ANSI C63.4, Section 13.1.4				
Test mode:	Compliance	Verdict:		PASS	
Date & Time:	8/30/2006 4:47:50 PM				
Temperature: 26 °C	Air Pressure: 1009 hPa	Relative Humidity: 36 %	Power Supply: 120 V AC		
Remarks:					

Table 7.3.4 Field strength of emissions below 1 GHz

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

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*				
148.670345	34.85	28.38	43.50	-15.12	V	1.2	188	Pass
162.117645	38.31	32.60	43.50	-10.90	H	1.0	200	
169.400445	40.22	34.33	43.50	-9.17	V	1.0	179	
175.634245	33.96	27.03	43.50	-16.47	V	1.3	180	

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

** - Margin (dB) = measured result - specification limit.

Reference numbers of test equipment used

HL 0446	HL 0521	HL 0589	HL 0604	HL 2009			
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Full description is given in Appendix A.

Test specification:	FCC Part 15, Section 209 / RSS-210, Tables 2, 3, Field strength of emissions			
Test procedure:	ANSI C63.4, Section 13.1.4			
Test mode:	Compliance	Verdict:		PASS
Date & Time:	8/30/2006 4:47:50 PM			
Temperature: 26 °C	Air Pressure: 1009 hPa	Relative Humidity: 36 %	Power Supply: 120 V AC	
Remarks:				

Table 7.3.5 Restricted bands according to FCC 15, Section 205

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.37625 - 8.38675	73 - 74.6	399.9 - 410	2690 - 2900	10.6 - 12.7
0.495 - 0.505	8.41425 - 8.41475	74.8 - 75.2	608 - 614	3260 - 3267	13.25 - 13.4
2.1735 - 2.1905	12.290 - 12.293	108 - 121.94	960 - 1240	3332 - 3339	14.47 - 14.5
4.125 - 4.128	12.51975 - 12.52025	123 - 138	1300 - 1427	3345.8 - 3358	15.35 - 16.2
4.17725 - 4.17775	12.57675 - 12.57725	149.9 - 150.05	1435 - 1626.5	3600 - 4400	17.7 - 21.4
4.20725 - 4.20775	13.36 - 13.41	156.52475 - 156.52525	1645.5 - 1646.5	4500 - 5150	22.01 - 23.12
6.215 - 6.218	16.420 - 16.423	156.7 - 156.9	1660 - 1710	5350 - 5460	23.6 - 24
6.26775 - 6.26825	16.69475 - 16.69525	162.0125 - 167.17	1718.8 - 1722.2	7250 - 7750	31.2 - 31.8
6.31175 - 6.31225	16.80425 - 16.80475	167.72 - 173.2	2200 - 2300	8025 - 8500	36.43 - 36.5
8.291 - 8.294	25.5 - 25.67	240 - 285	2310 - 2390	9000 - 9200	Above 38.6
8.362 - 8.366	37.5 - 38.25	322 - 335.4	2483.5 - 2500	9300 - 9500	

Table 7.3.6 Restricted bands according to RSS-210, Section 2.7

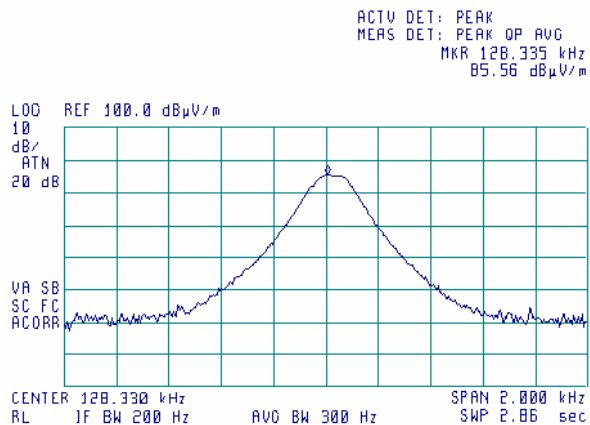
MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.291 - 8.294	16.80425 - 16.80475	399.9 - 410	3260 - 3267	10.6 - 12.7
2.1735 - 2.190	8.362 - 8.366	25.5 - 25.67	608 - 614	3332 - 3339	13.25 - 13.4
3.020 - 3.026	8.37625 - 8.38675	37.5 - 38.25	960 - 1427	3345.8 - 3358	14.47 - 14.5
4.125 - 4.128	8.41425 - 8.41475	73 - 74.6	1435 - 1626.5	3500 - 4400	15.35 - 16.2
4.17725 - 4.17775	12.290 - 12.293	74.8 - 75.2	1645.5 - 1646.5	4500 - 5150	17.7 - 21.4
4.20725 - 4.20775	12.51975 - 12.52025	108 - 138	1660 - 1710	5350 - 5460	22.01 - 23.12
5.677 - 5.683	12.57675 - 12.57725	156.52475 - 156.52525	1718.8 - 1722.2	7250 - 7750	23.6 - 24.0
6.215 - 6.218	13.36 - 13.41	156.7 - 156.9	2200 - 2300	8025 - 8500	31.2 - 31.8
6.26775 - 6.26825	16.42 - 16.423	240 - 285	2310 - 2390	9000 - 9200	36.43 - 36.5
6.31175 - 6.31225	16.69475 - 16.69525	322 - 335.4	2655 - 2900	9300 - 9500	Above 38.6

Test specification:		FCC Part 15, Section 209 / RSS-210, Tables 2, 3, Field strength of emissions	
Test procedure:		ANSI C63.4, Section 13.1.4	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/30/2006 4:47:50 PM		
Temperature: 26 °C	Air Pressure: 1009 hPa	Relative Humidity: 36 %	Power Supply: 120 V AC
Remarks:			

Plot 7.3.1 Radiated emission measurements at the fundamental frequency

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

14:56:31 AUG 30, 2006

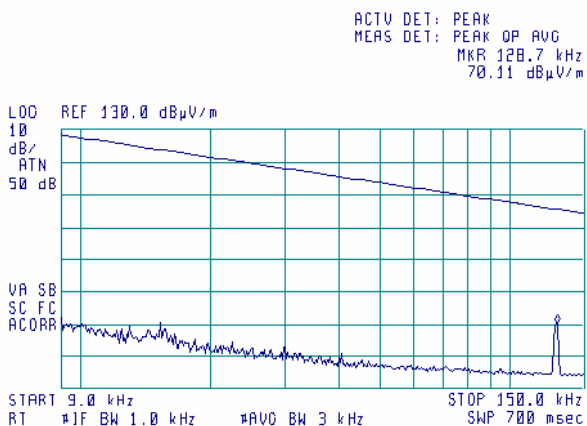


Test specification:	FCC Part 15, Section 209 / RSS-210, Tables 2, 3, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/30/2006 4:47:50 PM		
Temperature: 26 °C	Air Pressure: 1009 hPa	Relative Humidity: 36 %	Power Supply: 120 V AC
Remarks:			

Plot 7.3.2 Radiated emission measurements from 9 to 150 kHz

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

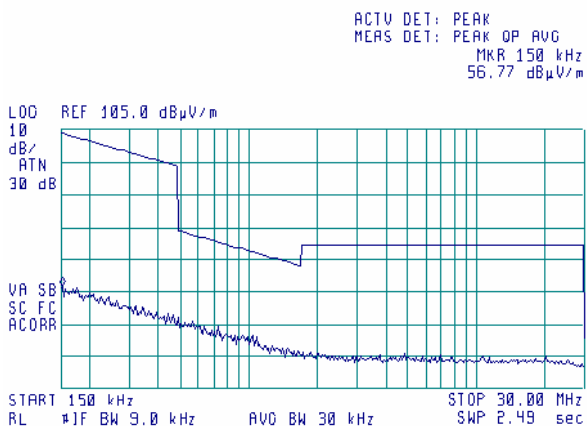
09:56:45 AUG 22, 2006



Plot 7.3.3 Radiated emission measurements from 0.15 to 30 MHz

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

10:00:41 AUG 22, 2006

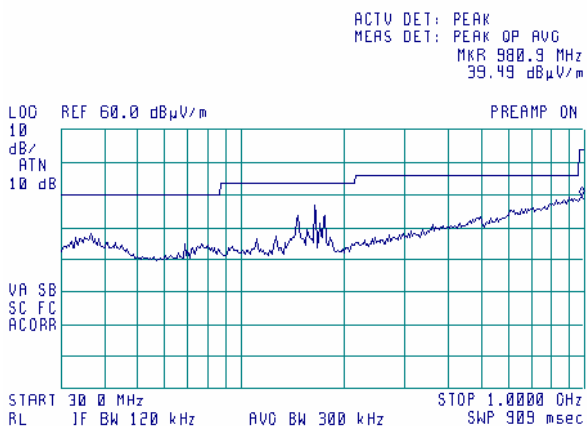


Test specification:	FCC Part 15, Section 209 / RSS-210, Tables 2, 3, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/30/2006 4:47:50 PM		
Temperature: 26 °C	Air Pressure: 1009 hPa	Relative Humidity: 36 %	Power Supply: 120 V AC
Remarks:			

Plot 7.3.4 Radiated emission measurements from 30 to 1000 MHz

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

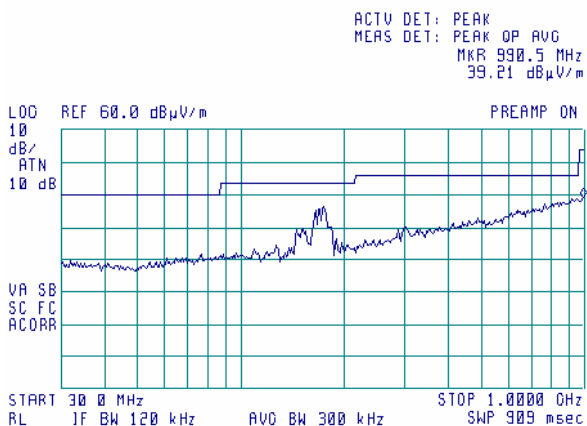
08:37:00 AUG 22, 2006



Plot 7.3.5 Radiated emission measurements from 30 to 1000 MHz

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

08:47:50 AUG 22, 2006

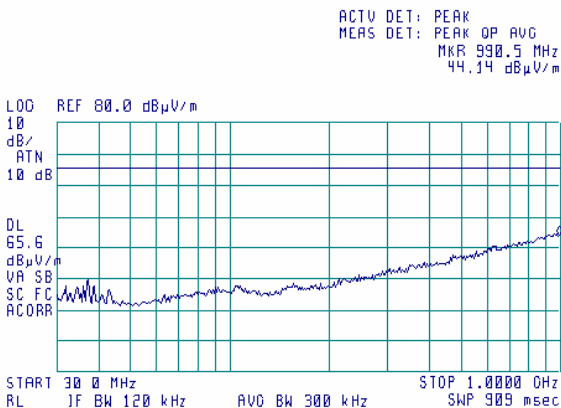


Test specification:	FCC Part 15, Section 209 / RSS-210, Tables 2, 3, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/30/2006 4:47:50 PM		
Temperature: 26 °C	Air Pressure: 1009 hPa	Relative Humidity: 36 %	Power Supply: 120 V AC
Remarks:			

Plot 7.3.6 Radiated emission measurements from 30 to 1000 MHz (Outside Restricted Band Limit)

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

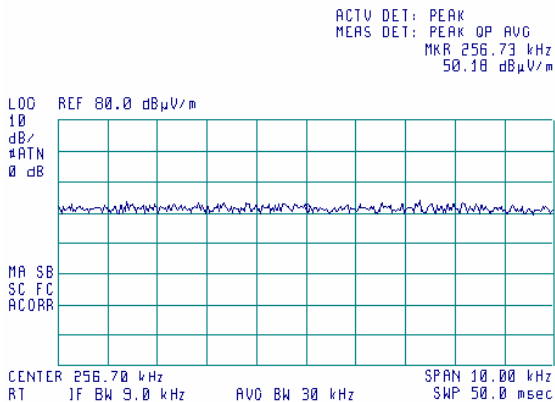
15:25:15 AUG 30, 2006



Plot 7.3.7 Radiated emission measurements at the second harmonic frequency

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

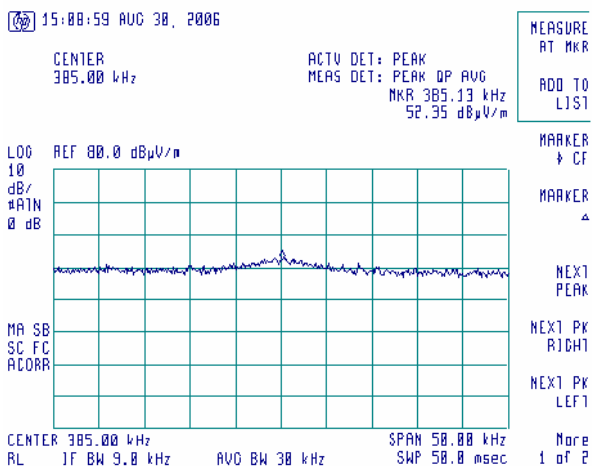
15:04:46 AUG 30, 2006



Test specification:	FCC Part 15, Section 209 / RSS-210, Tables 2, 3, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/30/2006 4:47:50 PM		
Temperature: 26 °C	Air Pressure: 1009 hPa	Relative Humidity: 36 %	Power Supply: 120 V AC
Remarks:			

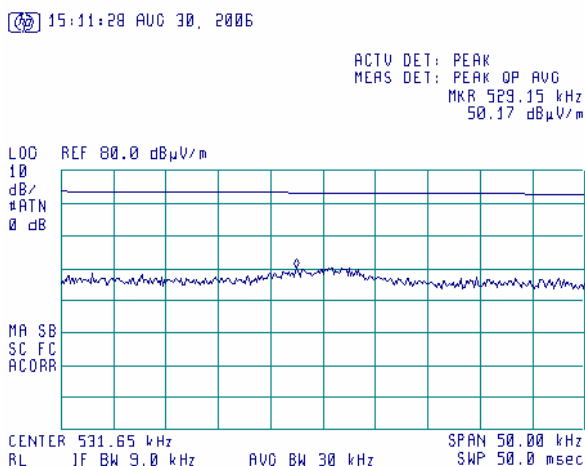
Plot 7.3.8 Radiated emission measurements at the third harmonic frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
EUT POSITION: Typical (Vertical)



Plot 7.3.9 Radiated emission measurements at the fourth harmonic frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
EUT POSITION: Typical (Vertical)

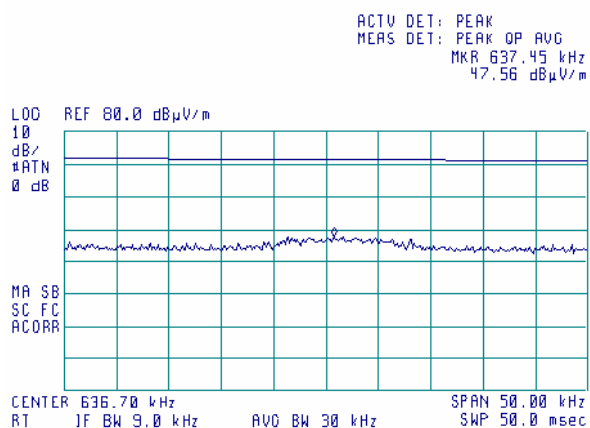


Test specification:	FCC Part 15, Section 209 / RSS-210, Tables 2, 3, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/30/2006 4:47:50 PM		
Temperature: 26 °C	Air Pressure: 1009 hPa	Relative Humidity: 36 %	Power Supply: 120 V AC
Remarks:			

Plot 7.3.10 Radiated emission measurements at the fifth harmonic frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
EUT POSITION: Typical (Vertical)

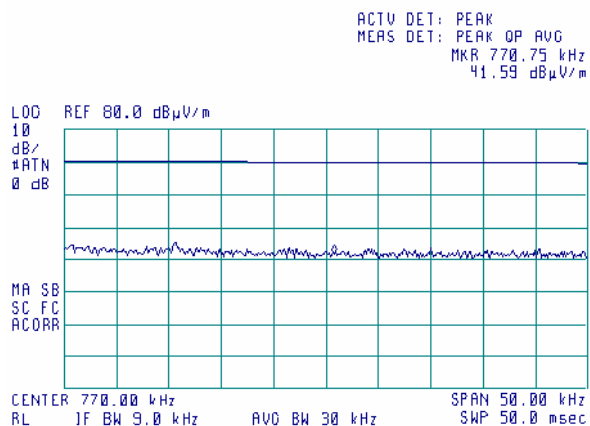
15:14:50 AUG 30, 2006



Plot 7.3.11 Radiated emission measurements at the sixth harmonic frequency

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

15:17:16 AUG 30, 2006



Test specification:	FCC Part 15, Section 231 / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	10/3/2006 2:47:50 PM		
Temperature: 23 °C	Air Pressure: 1009 hPa	Relative Humidity: 43%	Power Supply: 120 V AC
Remarks:			

7.4 Field strength of emissions – simultaneous transmission

7.4.1 General

This test was performed to measure field strength of spurious emissions from the EUT with two simultaneously operating transmitters. Specification test limits are given in Table 7.4.1.

Table 7.4.1 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m, dB(μV/m)				
	Within restricted bands			Outside restricted bands	
	Peak	Quasi Peak	Average	Peak	Average
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**	75.62	55.62
0.090 – 0.110	NA	108.5 – 106.8**	NA		
0.110 – 0.490	126.8 – 113.8	NA	106.8 – 93.8**		
0.490 – 1.705	NA	73.8 – 63.0**	NA		
1.705 – 30.0*		69.5			
30 – 88		40.0			
88 – 216		43.5			
216 – 960		46.0			
960 - 1000		54.0			
Above 1000	74.0	NA	54.0		

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

$$\text{Lim}_{S2} = \text{Lim}_{S1} + 40 \log(S1/S2),$$

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

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

Note 1: The fundamental emission limit in dB(mV/m) was calculated as follows:

$$\text{Lim}_{AVR} = 20 \times \log(56.81818 \times F - 6136.3636) \text{ - within } 130 - 174 \text{ MHz band;}$$

$$\text{Lim}_{AVR} = 20 \times \log(41.6667 \times F - 7083.3333) \text{ - within } 260 - 470 \text{ MHz band,}$$

where F is the carrier frequency in MHz.

The limit for spurious emissions was 20 dB lower than fundamental emission limit.

The above limits provided in terms of average values, peak limit was 20 dB above the average limit.

Note 2: The above field strength limits applied from the lowest radio frequency generated in the device, without going below 9 kHz up to the tenth harmonic of the highest fundamental frequency.

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

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

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

7.4.2.3 The worst test results (the lowest margins) were recorded in Tables 7.4.3, 7.4.4 and shown in the associated plots.

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

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

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

7.4.3.3 The worst test results (the lowest margins) were recorded in Tables 7.4.3, 7.4.4 and shown in the associated plots.

Test specification:		FCC Part 15, Section 231 / RSS-210, Section A1.1.2, Field strength of emissions	
Test procedure:		ANSI C63.4, Section 13.1.4	
Test mode:		Compliance	Verdict: PASS
Date & Time:		10/3/2006 2:47:50 PM	
Temperature: 23 °C	Air Pressure: 1009 hPa	Relative Humidity: 43%	Power Supply: 120 V AC
Remarks:			

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

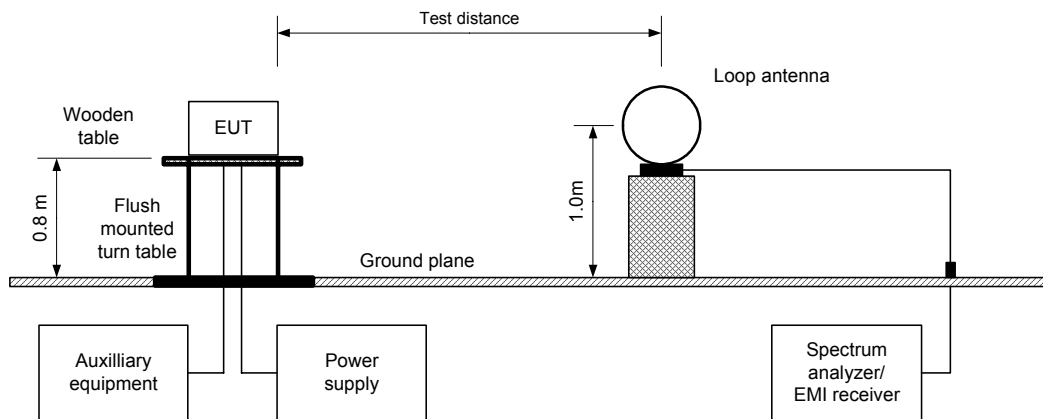
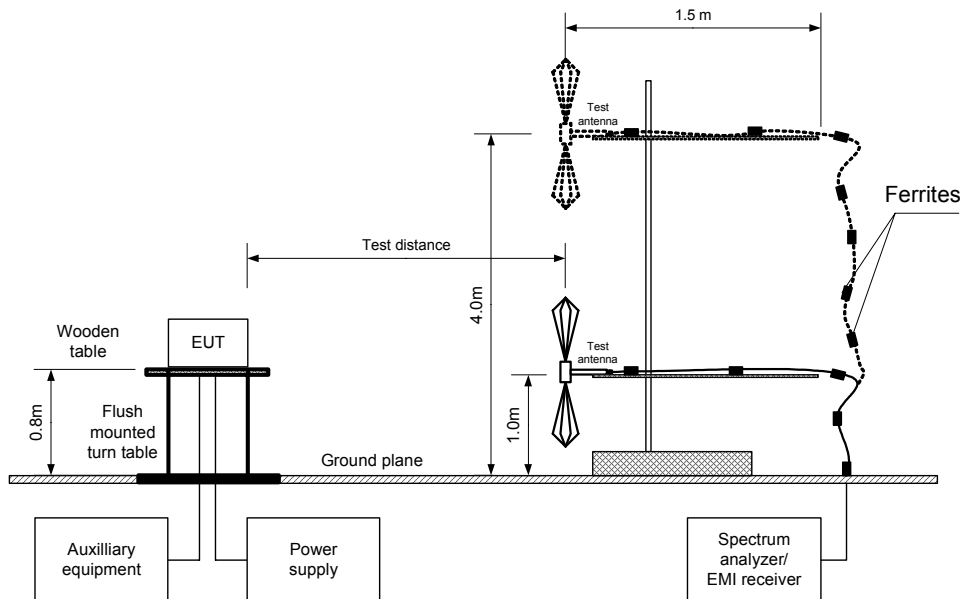


Figure 7.4.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	FCC Part 15, Section 231 / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	10/3/2006 2:47:50 PM		
Temperature: 23 °C	Air Pressure: 1009 hPa	Relative Humidity: 43%	Power Supply: 120 V AC
Remarks:			

Table 7.4.2 Field strength of spurious emissions outside restricted bands and within restricted bands at frequencies above 1 GHz

TEST DISTANCE: 3 m
EUT POSITION: Typical (Vertical)
MODULATION: ASK
MODULATING SIGNAL: ID code
BIT RATE: 0.8 kbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
TRANSMITTER OUTPUT POWER: -10 dBm
INVESTIGATED FREQUENCY RANGE: 0.009 -3500 MHz
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 0.2 kHz (9 kHz – 150 kHz)
9.0 kHz (150 kHz – 30 MHz)
120 kHz (30 MHz – 1000 MHz)
1.0 MHz (above 1000 MHz)
VIDEO BANDWIDTH: ≥ Resolution bandwidth
TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
Biconilog (30 MHz – 1000 MHz)
Double ridged guide (above 1000 MHz)

F, MHz	Antenna		Azimuth, degrees*	Peak field strength			Avr factor, dB	Average field strength			Verdict
	Pol.	Height, m		Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**		Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
Spurious emissions											
944.675	V	1.1	177	29.63	75.62	-45.99	0	26.48	55.62	-29.14	Pass

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

**-. Margin = dB below (negative if above) specification limit.

Reference numbers of test equipment used

HL 0446	HL 0465	HL 0521	HL 0589	HL 0592	HL 0593	HL 0594	HL 0604
HL 1947	HL 1984	HL 2009	HL 2556				

Full description is given in Appendix A.

Test specification:	FCC Part 15, Section 231 / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	10/3/2006 2:47:50 PM		
Temperature: 23 °C	Air Pressure: 1009 hPa	Relative Humidity: 43%	Power Supply: 120 V AC
Remarks:			

Table 7.4.3 Field strength of emissions below 1 GHz within restricted bands

TEST DISTANCE: 3 m
EUT POSITION: Typical (Vertical)
MODULATION: ASK
MODULATING SIGNAL: ID code
BIT RATE: 0.8 kbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
TRANSMITTER OUTPUT POWER: -10 dBm
INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 0.2 kHz (9 kHz – 150 kHz)
9.0 kHz (150 kHz – 30 MHz)
120 kHz (30 MHz – 1000 MHz)
VIDEO BANDWIDTH: ≥ Resolution bandwidth
TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
Biconilog (30 MHz – 1000 MHz)

Frequency, MHz	Peak emission, dB(μV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*				
0.009-3500	No emissions were found							Pass

*- Margin = Measured emission - specification limit.

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

Reference numbers of test equipment used

HL 0446	HL 0465	HL 0521	HL 0589	HL 0592	HL 0593	HL 0594	HL 0604
HL 1947	HL 1984	HL 2009	HL 2556				

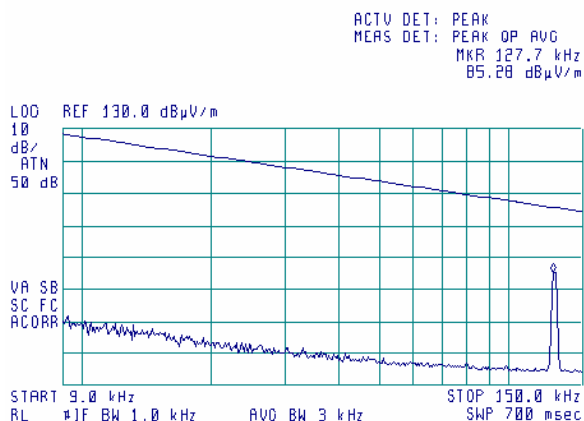
Full description is given in Appendix A.

Test specification:	FCC Part 15, Section 231 / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	10/3/2006 2:47:50 PM		
Temperature: 23 °C	Air Pressure: 1009 hPa	Relative Humidity: 43%	Power Supply: 120 V AC
Remarks:			

Plot 7.4.1 Radiated emission measurements from 9 to 150 kHz

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

12:09:17 OCT 03, 2006

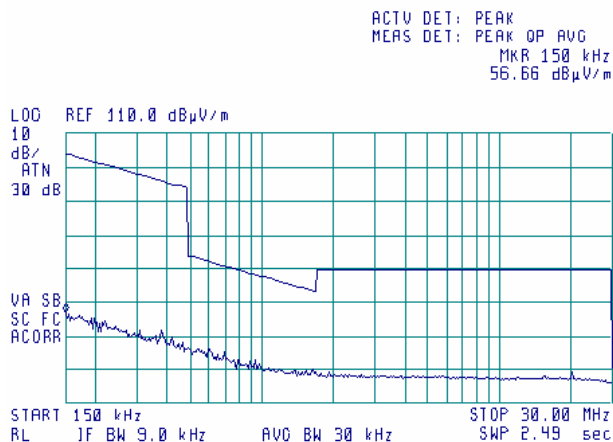


Note: 128 kHz – carrier frequency of RFID proximity sensor

Plot 7.4.2 Radiated emission measurements from 0.15 to 30 MHz

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

12:22:52 OCT 03, 2006

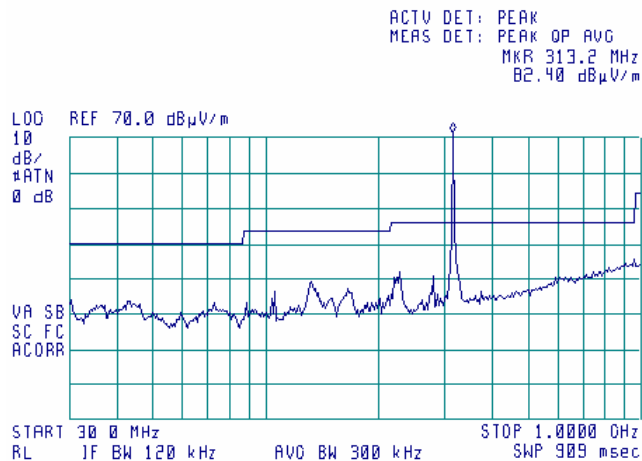


Test specification:	FCC Part 15, Section 231 / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	10/3/2006 2:47:50 PM		
Temperature: 23 °C	Air Pressure: 1009 hPa	Relative Humidity: 43%	Power Supply: 120 V AC
Remarks:			

Plot 7.4.3 Radiated emission measurements from 30 to 1000 MHz

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

11:28:30 OCT 03, 2006



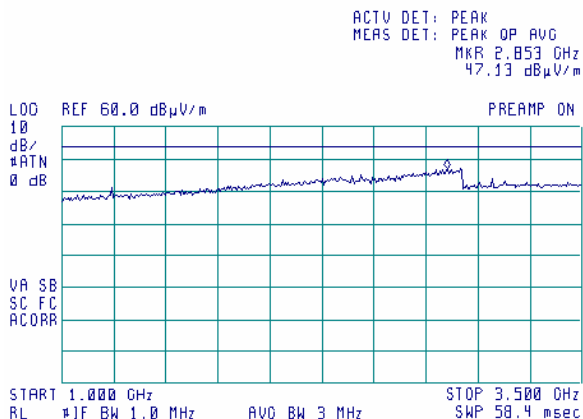
Note: 315 MHz – carrier frequency of RF transmitter

Test specification:	FCC Part 15, Section 231 / RSS-210, Section A1.1.2, Field strength of emissions		
Test procedure:	ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	10/3/2006 2:47:50 PM		
Temperature: 23 °C	Air Pressure: 1009 hPa	Relative Humidity: 43%	Power Supply: 120 V AC
Remarks:			

Plot 7.4.4 Radiated emission measurements from 1000 to 3500 MHz

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

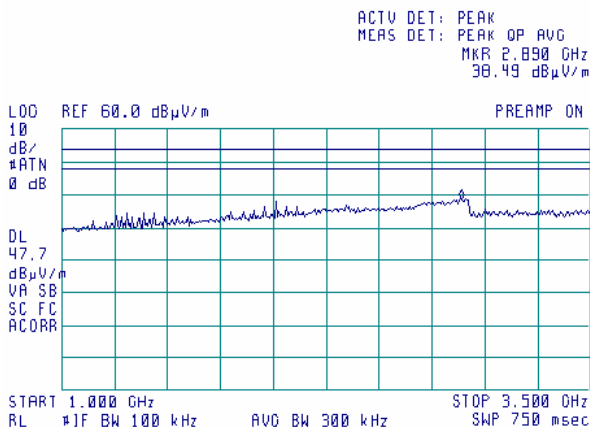
12:41:17 OCT 03, 2006



Plot 7.4.5 Radiated emission measurements from 1000 to 3500 MHz

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

12:44:21 OCT 03, 2006



Test specification:		FCC Part 15, Section 231(c) / RSS-210, Section A1.1.3, Occupied bandwidth	
Test procedure:		ANSI C63.4, Section 13.1.7	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	8/21/2006 2:19:28 PM		
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %	Power Supply: 120 V AC
Remarks:			

7.5 Occupied bandwidth test

7.5.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.5.1. The test results are provided in Table 7.5.2 and associated plots.

Table 7.5.1 Occupied bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points*, dBc	Maximum allowed bandwidth, % of the carrier frequency
70 - 900	20.0	0.25

*- Modulation envelope reference points provided in terms of attenuation below modulated carrier.

7.5.2 Test procedure

7.5.2.1 The EUT was set up as shown in Figure 7.5.1, energized and its proper operation was checked.

7.5.2.2 The EUT was set to transmit modulated carrier.

7.5.2.3 The transmitter occupied bandwidth was measured with spectrum analyzer as frequency delta between reference points on modulation envelope and provided in Table 7.5.2 and associated plot.

Figure 7.5.1 Occupied bandwidth test setup



Test specification:	FCC Part 15, Section 231(c) / RSS-210, Section A1.1.3, Occupied bandwidth				
Test procedure:	ANSI C63.4, Section 13.1.7				
Test mode:	Compliance	Verdict:			PASS
Date & Time:	8/21/2006 2:19:28 PM				
Temperature: 26°C	Air Pressure: 1014 hPa	Relative Humidity: 52 %		Power Supply: 120 V AC	
Remarks:					

Table 7.5.2 Occupied bandwidth test results

DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 1 kHz
VIDEO BANDWIDTH: 3 MHz
MODULATION ENVELOPE REFERENCE POINTS: 20 dBc
MODULATION: ASK
MODULATING SIGNAL: ID code

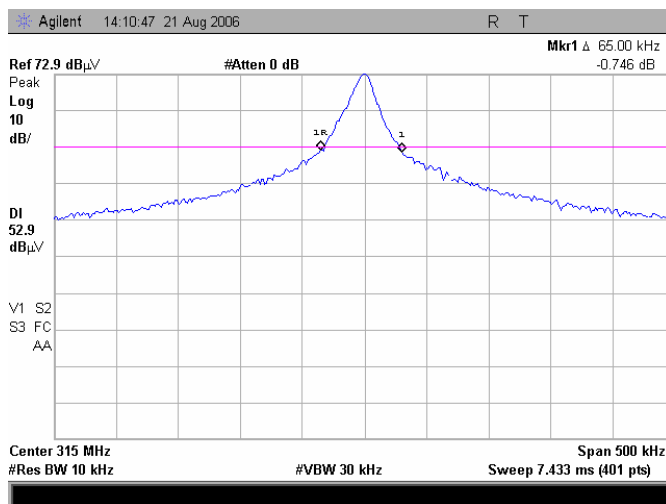
Carrier frequency, MHz	Occupied bandwidth, kHz	Limit		Margin, kHz	Verdict
		% of the carrier frequency	kHz		
315	65	0.25	785.5	-720.5	Pass

Reference numbers of test equipment used

HL 0337	HL 2780							
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Full description is given in Appendix A.

Plot 7.5.1 Occupied bandwidth test result



Test specification:		FCC Part 15, Section 207 / RSS-Gen, Section 7.2.2, Conducted emission	
Test procedure:		ANSI C63.4, Section 13.1.3 / RSS-212, Section 5.0	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:34:00 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

7.6 Conducted emissions

7.6.1 General

This test was performed to measure common mode conducted emissions at the power port. Specification test limits are given in Table 7.6.1.

**Table 7.6.1 Limits for conducted emissions
according to FCC Part 15, Section 207 and RSS-Gen, Section 7.2.2**

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

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

7.6.2 Test procedure

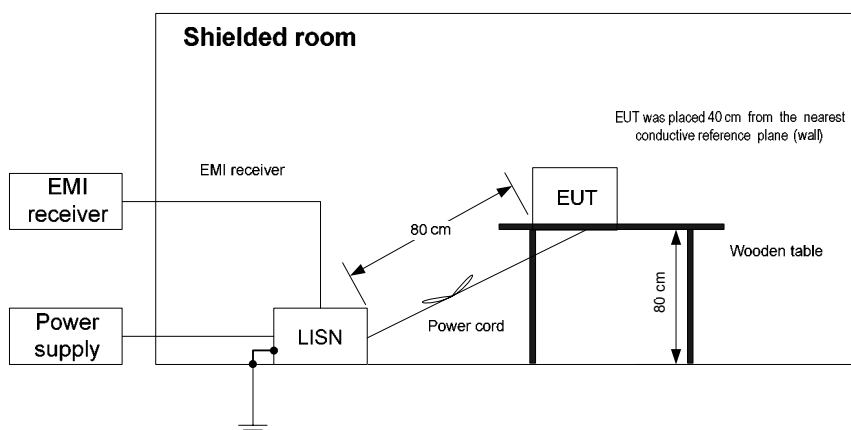
7.6.2.1 The EUT was set up as shown in Figure 7.6.1, energized and the performance check was conducted.

7.6.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer while unused coaxial connector of the LISN was terminated with 50 Ohm.

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

7.6.2.4 The worst test results (the lowest margins) were recorded in Table 7.6.2, Table 7.6.3, Table 7.6.4 and shown in the associated plots.

Figure 7.6.1 Setup for conducted emission measurements, table-top EUT



Test specification:		FCC Part 15, Section 207 / RSS-Gen, Section 7.2.2, Conducted emission	
Test procedure:		ANSI C63.4, Section 13.1.3 / RSS-212, Section 5.0	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:34:00 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

Table 7.6.2 Conducted emission test results

LINE: AC mains
 POWER SUPPLY: EXTERNAL (No.3)
 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

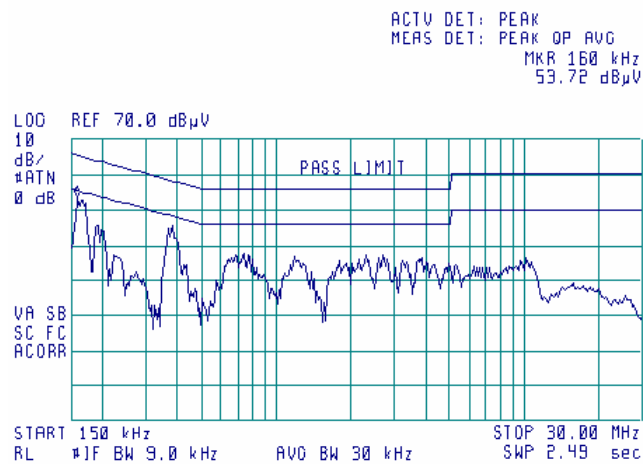
Frequency, MHz	Peak emission, dB(μV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*	Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*		
0.163883	53.73	52.00	65.32	-13.32	41.37	55.32	-13.95	L1	Pass
0.193672	46.78	44.77	63.90	-19.13	34.11	53.90	-19.79		
0.391405	46.23	43.98	58.04	-14.06	32.22	48.04	-15.82		
0.754099	38.23	36.05	56.00	-19.95	28.17	46.00	-17.83		
1.234850	36.85	34.48	56.00	-21.52	24.69	46.00	-21.31		
2.780578	38.10	34.73	56.00	-21.27	27.27	46.00	-18.73		
0.164914	54.92	52.47	65.27	-12.80	41.60	55.27	-13.67	L2	Pass
0.193288	47.52	44.94	63.91	-18.97	31.47	53.91	-22.44		
0.231465	40.04	37.19	62.44	-25.25	30.62	52.44	-21.82		
0.387515	46.28	43.69	58.13	-14.44	29.98	48.13	-18.15		
0.753111	37.53	35.81	56.00	-20.19	27.70	46.00	-18.30		
1.264332	38.94	36.37	56.00	-19.63	27.80	46.00	-18.20		

*- Margin = Measured emission - specification limit.

Test specification:		FCC Part 15, Section 207 / RSS-Gen, Section 7.2.2, Conducted emission	
Test procedure:		ANSI C63.4, Section 13.1.3 / RSS-212, Section 5.0	
Test mode:		Compliance	Verdict: PASS
Date & Time:		9/7/2006 11:34:00 AM	
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

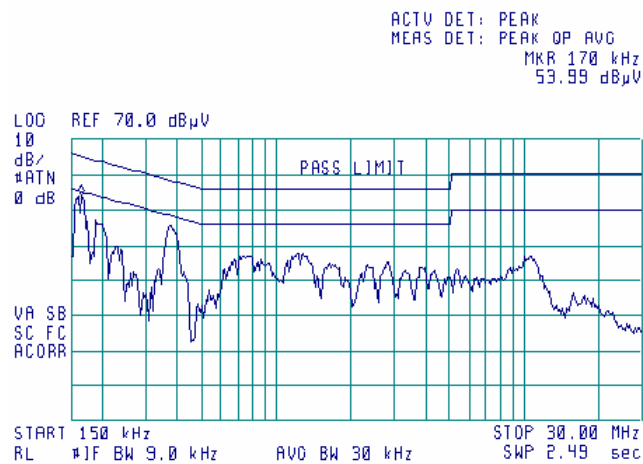
Plot 7.6.1 Conducted emission measurements

LINE: L1
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 7.6.2 Conducted emission measurements

LINE: L2
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:		FCC Part 15, Section 207 / RSS-Gen, Section 7.2.2, Conducted emission			
Test procedure:		ANSI C63.4, Section 13.1.3 / RSS-212, Section 5.0			
Test mode:		Compliance		Verdict: PASS	
Date & Time:		9/7/2006 11:34:00 AM			
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %		Power Supply: 120 V AC	
Remarks:					

Table 7.6.3 Conducted emission test results

LINE: AC mains
POWER SUPPLY: Sub Tech (No.2)
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

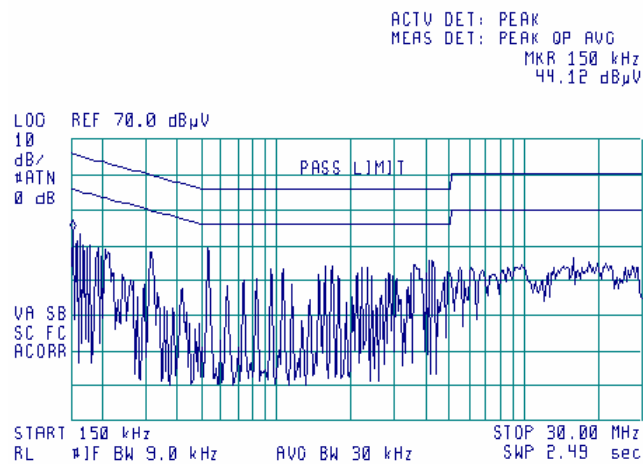
Frequency, MHz	Peak emission, dB(μV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*	Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*		
0.156293	42.83	35.74	65.69	-29.95	6.38	55.69	-49.31	L1	Pass
0.318918	39.07	37.11	59.76	-22.65	34.22	49.76	-15.54		
0.534685	39.40	38.22	56.00	-17.78	37.42	46.00	-8.58		
1.598064	34.82	32.99	56.00	-23.01	29.45	46.00	-16.55		
4.148207	35.08	32.45	56.00	-23.55	21.55	46.00	-24.45		
15.807866	36.69	32.37	60.00	-27.63	18.34	50.00	-31.66		
0.159366	44.30	36.60	65.54	-28.94	5.90	55.54	-49.64	L2	Pass
0.319155	40.23	38.85	59.76	-20.91	35.51	49.76	-14.25		
0.534583	39.81	38.91	56.00	-17.09	36.51	46.00	-9.49		
0.961704	34.63	33.14	56.00	-22.86	31.12	46.00	-14.88		
2.241889	33.72	31.82	56.00	-24.18	26.42	46.00	-19.58		
4.272052	35.51	33.36	56.00	-22.64	24.04	46.00	-21.96		

*- Margin = Measured emission - specification limit.

Test specification:		FCC Part 15, Section 207 / RSS-Gen, Section 7.2.2, Conducted emission	
Test procedure:		ANSI C63.4, Section 13.1.3 / RSS-212, Section 5.0	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:34:00 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

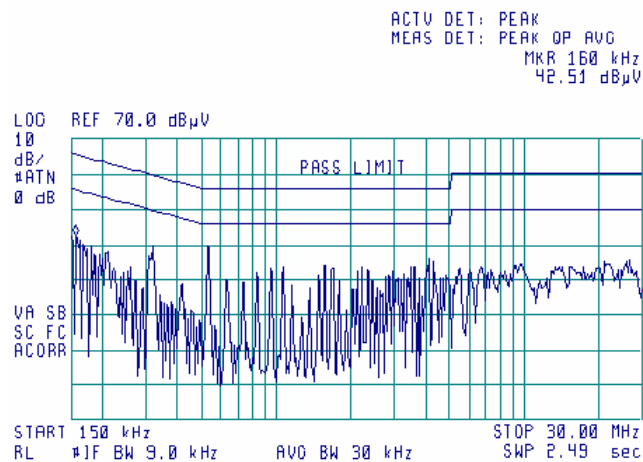
Plot 7.6.3 Conducted emission measurements

LINE: L1
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 7.6.4 Conducted emission measurements

LINE: L2
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:		FCC Part 15, Section 207 / RSS-Gen, Section 7.2.2, Conducted emission			
Test procedure:		ANSI C63.4, Section 13.1.3 / RSS-212, Section 5.0			
Test mode:		Compliance		Verdict: PASS	
Date & Time:		9/7/2006 11:34:00 AM			
Temperature: 25°C		Air Pressure: 1013 hPa		Relative Humidity: 45 %	
Remarks:		Power Supply: 120 V AC			

Table 7.6.4 Conducted emission test results

LINE: AC mains
POWER SUPPLY: Tel Ad (No.1)
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*		
0.172055	41.79	39.19	64.92	-25.73	24.84	54.92	-30.08	L1	Pass
0.229835	33.78	31.29	62.51	-31.22	20.13	52.51	-32.38		
0.385591	27.56	20.53	58.18	-37.65	17.65	48.18	-30.53		
1.671510	26.94	25.65	56.00	-30.35	25.35	46.00	-20.65		
27.774690	33.85	29.33	60.00	-30.67	26.55	50.00	-23.45		
0.169652	42.52	38.83	65.04	-26.21	26.89	55.04	-28.15	L2	Pass
0.223316	34.17	31.35	62.76	-31.41	20.67	52.76	-32.09		
0.382834	29.61	22.37	58.24	-35.87	14.72	48.24	-33.52		
1.672170	28.27	27.50	56.00	-28.50	26.95	46.00	-19.05		
15.042301	30.78	26.32	60.00	-33.68	22.69	50.00	-27.31		
27.258831	33.82	30.54	60.00	-29.46	26.86	50.00	-23.14		

*- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

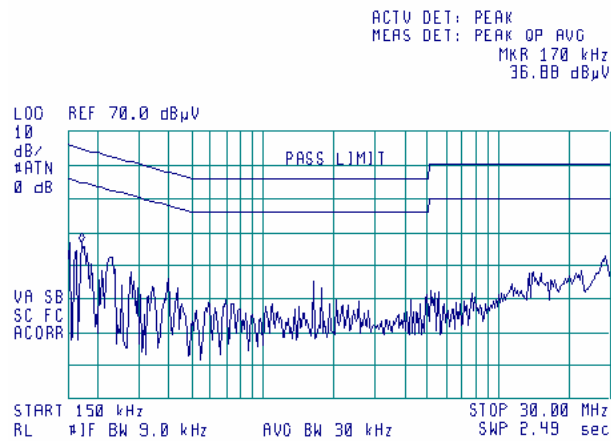
HL 0163	HL 0466	HL 0787	HL 1503	HL 1215	HL 1430		
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Full description is given in Appendix A.

Test specification:		FCC Part 15, Section 207 / RSS-Gen, Section 7.2.2, Conducted emission	
Test procedure:		ANSI C63.4, Section 13.1.3 / RSS-212, Section 5.0	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:34:00 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

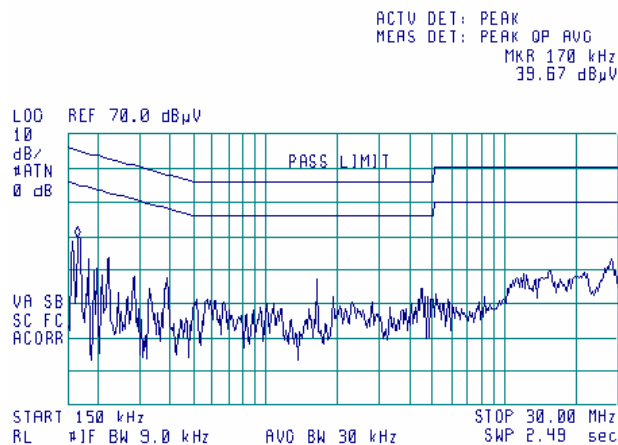
Plot 7.6.5 Conducted emission measurements

LINE: L1
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 7.6.6 Conducted emission measurements

LINE: L2
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:	FCC Part 15, Section 203 / RSS-Gen, Section 7.1.4, Antenna requirements		
Test procedure:	Visual inspection / supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:32:31 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

7.7 Antenna requirements

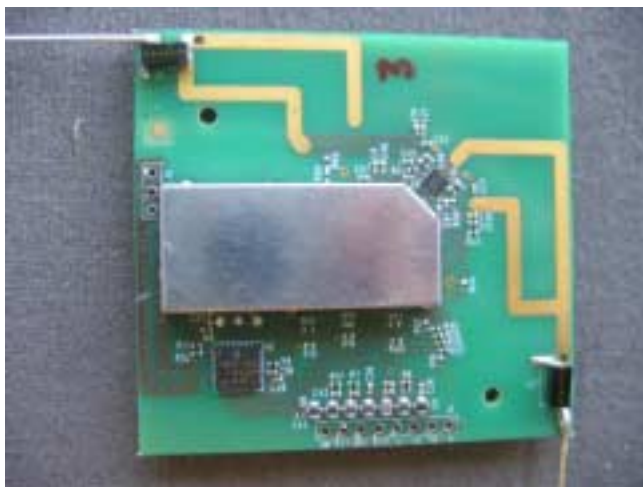
The EUT was verified for compliance with antenna requirements. A transmitter shall be designed to ensure that no antenna other than that furnished by the responsible party will be used with the device. It may be either permanently attached or employs a unique antenna connector for every antenna proposed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

The rationale for compliance with the above requirements was either visual inspection results or supplier declaration. The summary of results is provided in Table 7.7.1.

Table 7.7.1 Antenna requirements

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

Photograph 7.7.1 Antenna assembly



Test specification:		FCC Part 15, Section 107 / ICES-003, Conducted emission at AC power port	
Test procedure:		ANSI C63.4, Sections 11.5 and 12.1.3 / RSS-212, Section 5.0 / CISPR 22	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:34:48 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

8 Unintentional emissions

8.1 Conducted emissions

8.1.1 General

This test was performed to measure common mode conducted emissions at the mains power port. Specification test limits are given in Table 8.1.1.

Table 8.1.1 Limits for conducted emissions according to FCC Part 15, Section 107 and ICES-003, Section 5

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.

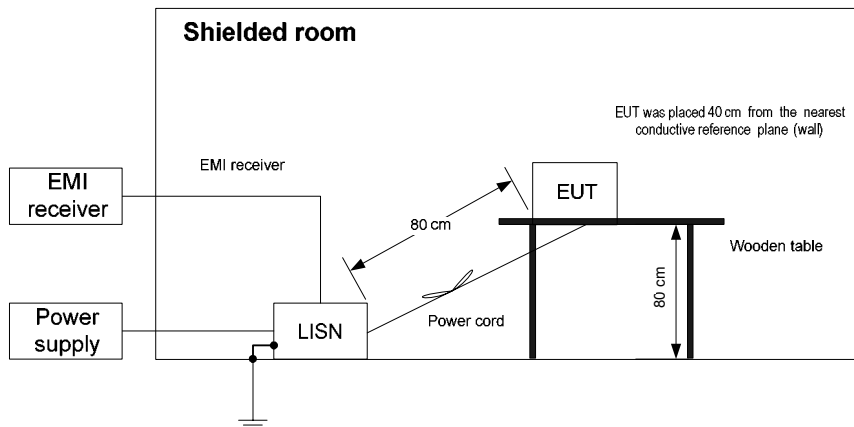
8.1.2 Test procedure

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

8.1.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer while unused coaxial connector of the LISN was terminated with 50 Ohm.

8.1.2.3 The position of the device cables was varied to determine maximum emission level. The worst test results (the lowest margins) were recorded in Table 8.1.2 , Table 8.1.3 and Table 8.1.4 and shown in the associated plots.

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



Test specification:	FCC Part 15, Section 107 / ICES-003, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3 / RSS-212, Section 5.0 / CISPR 22		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	9/7/2006 11:34:48 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

Table 8.1.2 Conducted emission test results

LINE: AC mains
POWER SUPPLY: EXTERNAL (No.3)
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

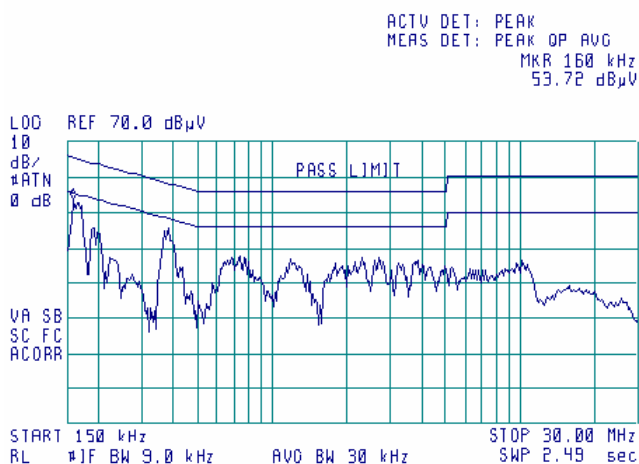
Frequency, MHz	Peak emission, dB(μV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*	Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*		
0.163883	53.73	52.00	65.32	-13.32	41.37	55.32	-13.95	L1	Pass
0.193672	46.78	44.77	63.90	-19.13	34.11	53.90	-19.79		
0.391405	46.23	43.98	58.04	-14.06	32.22	48.04	-15.82		
0.754099	38.23	36.05	56.00	-19.95	28.17	46.00	-17.83		
1.234850	36.85	34.48	56.00	-21.52	24.69	46.00	-21.31		
2.780578	38.10	34.73	56.00	-21.27	27.27	46.00	-18.73		
0.164914	54.92	52.47	65.27	-12.80	41.60	55.27	-13.67	L2	Pass
0.193288	47.52	44.94	63.91	-18.97	31.47	53.91	-22.44		
0.231465	40.04	37.19	62.44	-25.25	30.62	52.44	-21.82		
0.387515	46.28	43.69	58.13	-14.44	29.98	48.13	-18.15		
0.753111	37.53	35.81	56.00	-20.19	27.70	46.00	-18.30		
1.264332	38.94	36.37	56.00	-19.63	27.80	46.00	-18.20		

*- Margin = Measured emission - specification limit.

Test specification:	FCC Part 15, Section 107 / ICES-003, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3 / RSS-212, Section 5.0 / CISPR 22		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:34:48 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

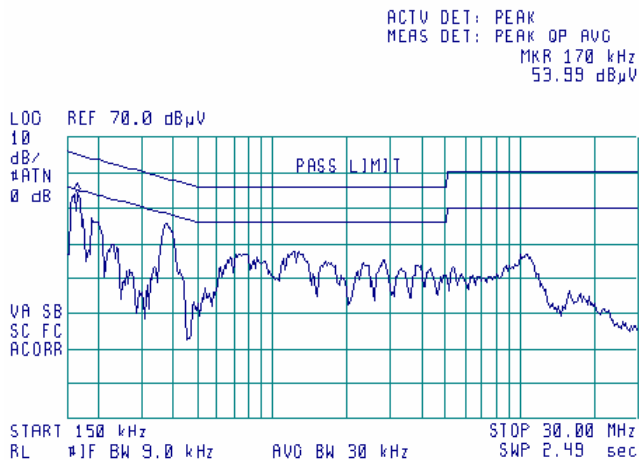
Plot 8.1.1 Conducted emission measurements

LINE: L1
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 8.1.2 Conducted emission measurements

LINE: L2
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:	FCC Part 15, Section 107 / ICES-003, Conducted emission at AC power port			
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3 / RSS-212, Section 5.0 / CISPR 22			
Test mode:	Compliance	Verdict:		PASS
Date & Time:	9/7/2006 11:34:48 AM			
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC	
Remarks:				

Table 8.1.3 Conducted emission test results

LINE: AC mains
POWER SUPPLY: Sub Tech (No.2)
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

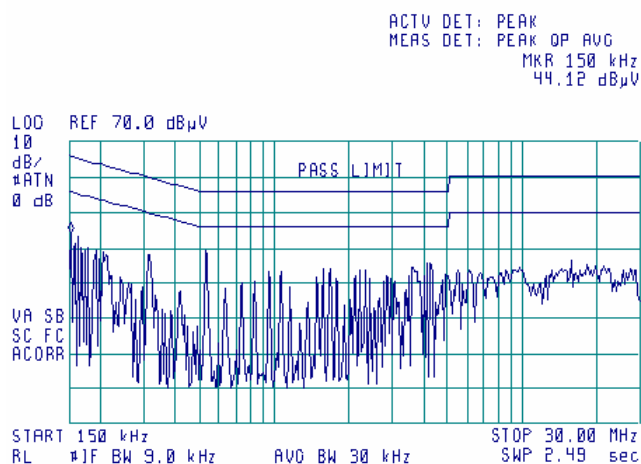
Frequency, MHz	Peak emission, dB(μV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*	Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*		
0.156293	42.83	35.74	65.69	-29.95	6.38	55.69	-49.31	L1	Pass
0.318918	39.07	37.11	59.76	-22.65	34.22	49.76	-15.54		
0.534685	39.40	38.22	56.00	-17.78	37.42	46.00	-8.58		
1.598064	34.82	32.99	56.00	-23.01	29.45	46.00	-16.55		
4.148207	35.08	32.45	56.00	-23.55	21.55	46.00	-24.45		
15.807866	36.69	32.37	60.00	-27.63	18.34	50.00	-31.66		
0.159366	44.30	36.60	65.54	-28.94	5.90	55.54	-49.64	L2	Pass
0.319155	40.23	38.85	59.76	-20.91	35.51	49.76	-14.25		
0.534583	39.81	38.91	56.00	-17.09	36.51	46.00	-9.49		
0.961704	34.63	33.14	56.00	-22.86	31.12	46.00	-14.88		
2.241889	33.72	31.82	56.00	-24.18	26.42	46.00	-19.58		
4.272052	35.51	33.36	56.00	-22.64	24.04	46.00	-21.96		

*- Margin = Measured emission - specification limit.

Test specification:	FCC Part 15, Section 107 / ICES-003, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3 / RSS-212, Section 5.0 / CISPR 22		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:34:48 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

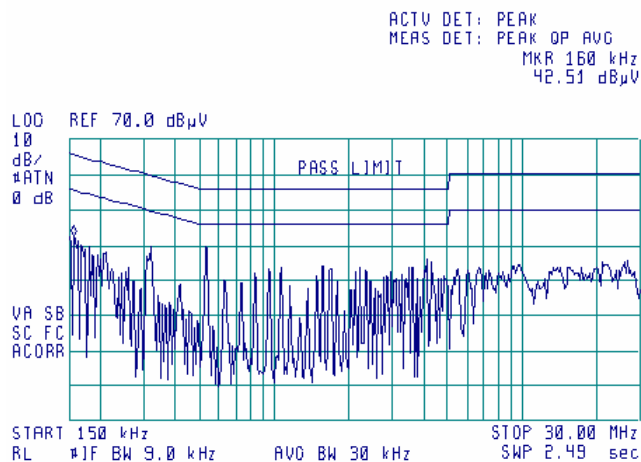
Plot 8.1.3 Conducted emission measurements

LINE: L1
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 8.1.4 Conducted emission measurements

LINE: L2
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:	FCC Part 15, Section 107 / ICES-003, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3 / RSS-212, Section 5.0 / CISPR 22		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:34:48 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

Table 8.1.4 Conducted emission test results

LINE: AC mains
POWER SUPPLY: Tel Ad (No.1)
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*		
0.172055	41.79	39.19	64.92	-25.73	24.84	54.92	-30.08	L1	Pass
0.229835	33.78	31.29	62.51	-31.22	20.13	52.51	-32.38		
0.385591	27.56	20.53	58.18	-37.65	17.65	48.18	-30.53		
1.671510	26.94	25.65	56.00	-30.35	25.35	46.00	-20.65		
27.774690	33.85	29.33	60.00	-30.67	26.55	50.00	-23.45		
0.169652	42.52	38.83	65.04	-26.21	26.89	55.04	-28.15	L2	Pass
0.223316	34.17	31.35	62.76	-31.41	20.67	52.76	-32.09		
0.382834	29.61	22.37	58.24	-35.87	14.72	48.24	-33.52		
1.672170	28.27	27.50	56.00	-28.50	26.95	46.00	-19.05		
15.042301	30.78	26.32	60.00	-33.68	22.69	50.00	-27.31		
27.258831	33.82	30.54	60.00	-29.46	26.86	50.00	-23.14		

*- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

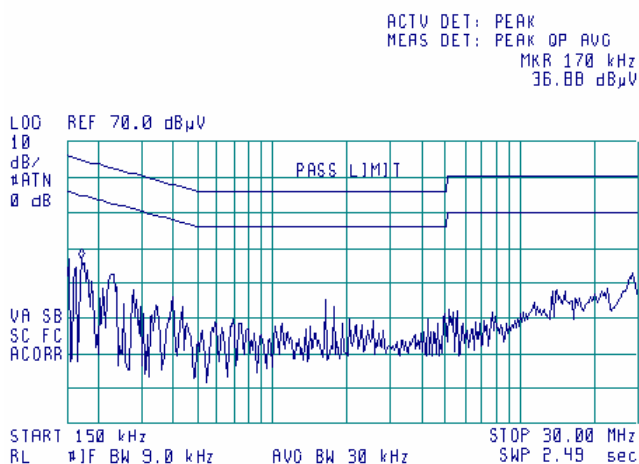
HL 0163	HL 0466	HL 0787	HL 1503	HL 1215	HL 1430		
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Full description is given in Appendix A.

Test specification:	FCC Part 15, Section 107 / ICES-003, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3 / RSS-212, Section 5.0 / CISPR 22		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:34:48 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

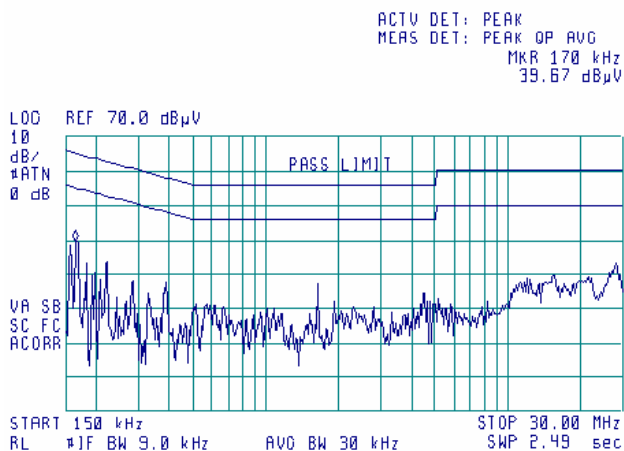
Plot 8.1.5 Conducted emission measurements

LINE: L1
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 8.1.6 Conducted emission measurements

LINE: L2
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:	FCC Part 15, Section 109 / RSS-Gen, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	9/7/2006 11:39:05 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: sud tech (no.2) power supply			

8.2 Radiated emission measurements

8.2.1 General

This test was performed to measure radiated emissions from the EUT enclosure. Specification test limits according to FCC Part 15, Section 109 are given in Table 8.2.1, according to ICES-003, Section 5 in Table 8.2.2 and according to RSS-Gen, Section 7.2.3 in Table 8.2.3.

Table 8.2.1 Radiated emission limits according to FCC Part 15, Section 109

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*
960 - 5 th harmonic**	43.5*	54.0	49.5	60.0*

Table 8.2.2 Radiated emission limits according to ICES-003, Section 5

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 - 230	30	40.5*	40	50.5*
230 - 1000	37	47.5*	47	57.5*

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

Table 8.2.3 Radiated emission limits according to RSS-210, Section 7.2.3

Frequency, MHz	Field strength limit at 3 m test distance, dB(μV/m)
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
960 - 3 rd harmonic**	54.0

** - harmonic of the highest frequency the EUT generates, uses, operates or tunes to.

8.2.2 Test procedure

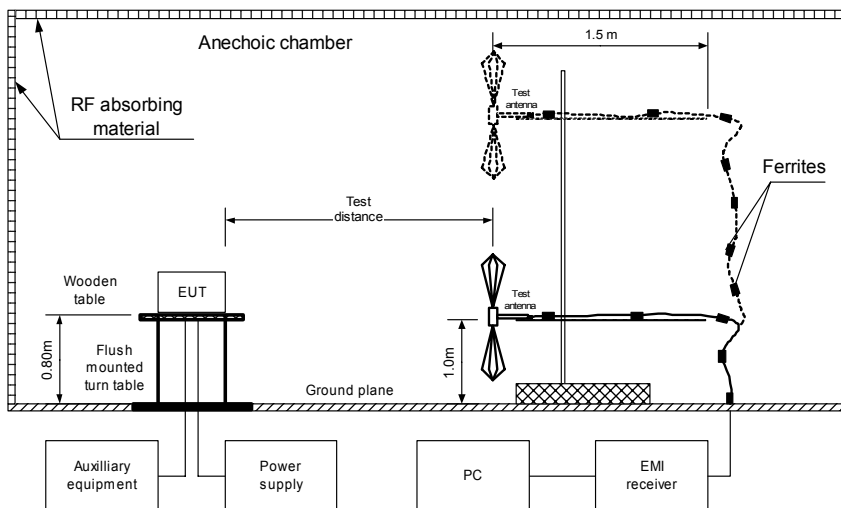
8.2.2.1 The EUT was set up as shown in Figure 8.2.1, energized and the performance check was conducted.

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°, 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 provided in the associated tables and plots.

Test specification:	FCC Part 15, Section 109 / RSS-Gen, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:39:05 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: sud tech (no.2) power supply			

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



Test specification:	FCC Part 15, Section 109 / RSS-Gen, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	9/7/2006 11:39:05 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: sud tech (no.2) power supply			

Table 8.2.4 Radiated emission test results

EUT SET UP: TABLE-TOP
POWER SUPPLY: Sub Tech (No.2)
TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / QUASI-PEAK
FREQUENCY RANGE: 30 MHz – 1000 MHz
RESOLUTION BANDWIDTH: 120 kHz

Frequency, MHz	Peak emission, dB(μV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*				
148.670345	34.85	28.38	43.50	-15.12	V	1.2	188	Pass
162.117645	38.31	32.60	43.50	-10.90	H	1.0	200	
169.400445	40.22	34.33	43.50	-9.17	V	1.0	179	
175.634245	33.96	27.03	43.50	-16.47	V	1.3	180	

TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / AVERAGE
FREQUENCY RANGE: 1000 MHz – 10000 MHz
RESOLUTION BANDWIDTH: 1000 kHz

Frequency, MHz	Peak emission, dB(μV/m)	Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*				
5030.0000	51.23	46.12	54.00	-7.88	V	1.2	144	Pass

*- Margin = Measured emission - specification limit.

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

Reference numbers of test equipment used

HL 0465	HL 0521	HL 0589	HL 0592	HL 0593	HL 0594	HL 0604	HL 2009
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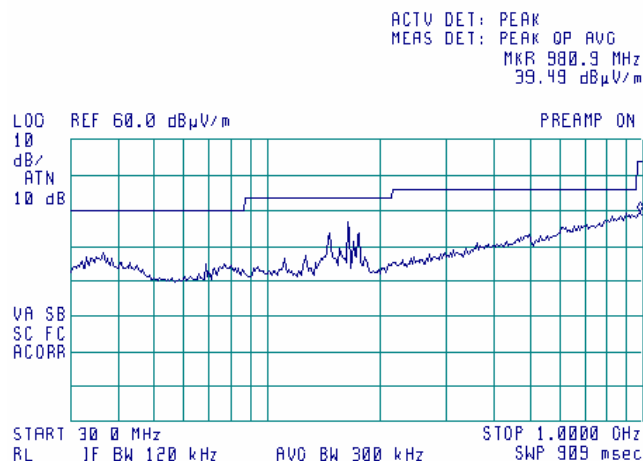
Full description is given in Appendix A.

Test specification:	FCC Part 15, Section 109 / RSS-Gen, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:39:05 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: sud tech (no.2) power supply			

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

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m

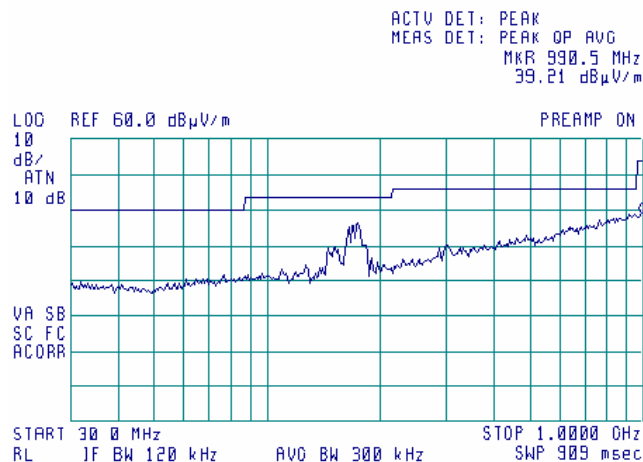
08:37:00 AUG 22, 2006



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

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m

08:47:50 AUG 22, 2006

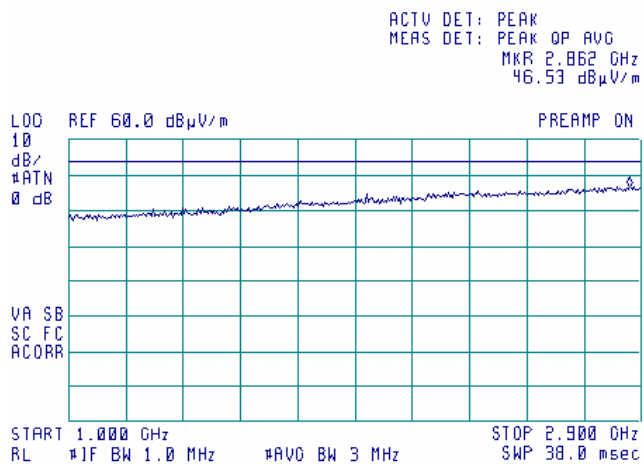


Test specification:	FCC Part 15, Section 109 / RSS-Gen, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	9/7/2006 11:39:05 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: sud tech (no.2) power supply			

Plot 8.2.3 Radiated emission measurements in 1000 - 2900 MHz range, vertical antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m

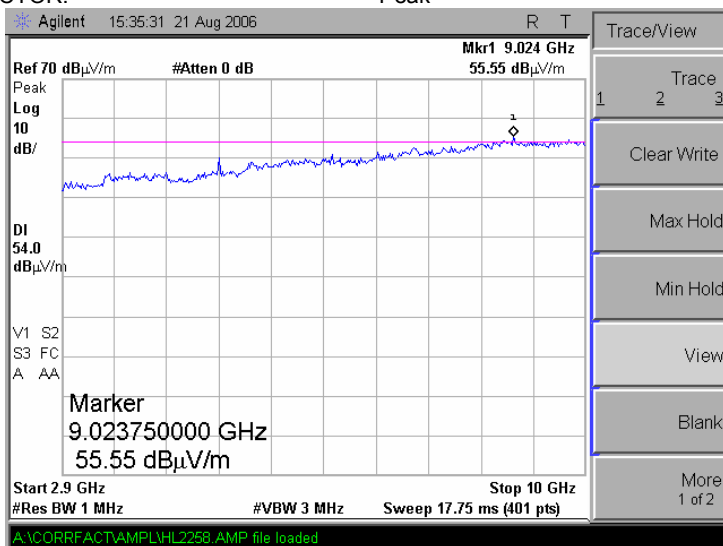
13:42:34 AUG 22, 2006



Test specification:	FCC Part 15, Section 109 / RSS-Gen, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	9/7/2006 11:39:05 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: sud tech (no.2) power supply			

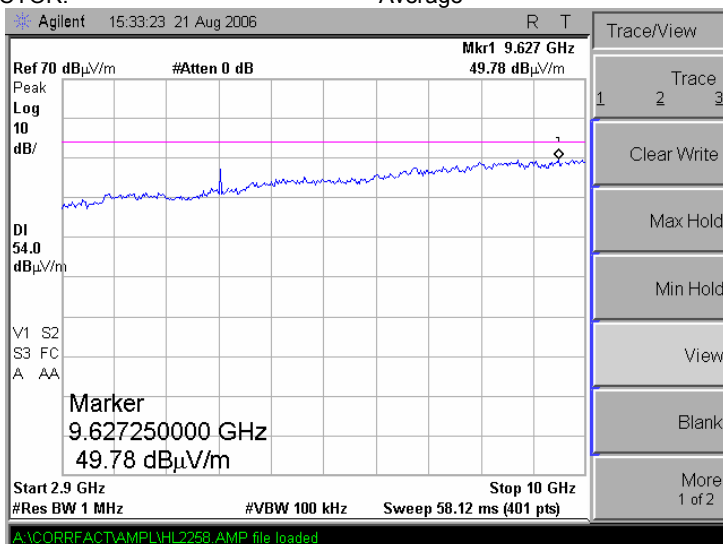
Plot 8.2.4 Radiated emission measurements in 2900 - 10000 MHz range, vertical antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Peak



Plot 8.2.5 Radiated emission measurements in 2900 - 10000 MHz range, vertical antenna polarization

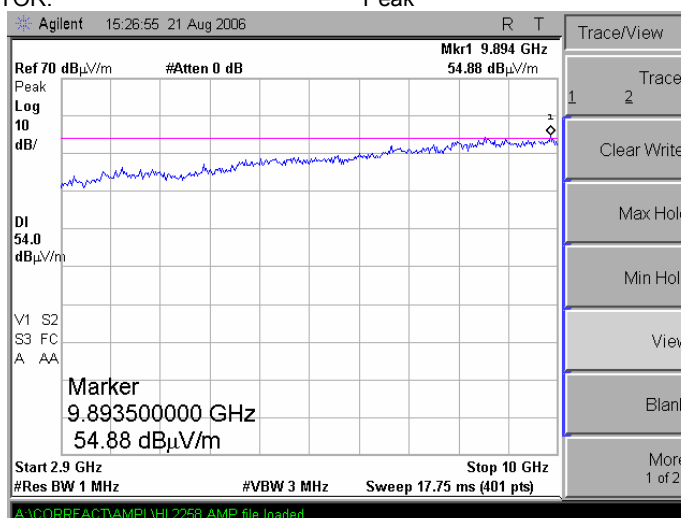
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Average



Test specification:	FCC Part 15, Section 109 / RSS-Gen, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	9/7/2006 11:39:05 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: sud tech (no.2) power supply			

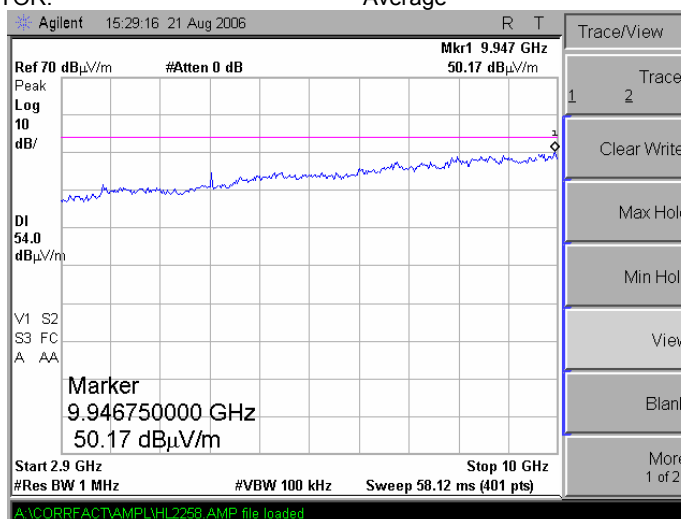
Plot 8.2.6 Radiated emission measurements in 2900 - 10000 MHz range, horizontal antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Peak



Plot 8.2.7 Radiated emission measurements in 2900 - 10000 MHz range, horizontal antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Average



Test specification:	FCC Part 15, Section 109 / RSS-210, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	9/7/2006 11:42:20 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: tel AD (no.1) power supply			

Table 8.2.5 Radiated emission test results

EUT SET UP: TABLE-TOP
POWER SUPPLY: Tel Ad (No.1)
TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / QUASI-PEAK
FREQUENCY RANGE: 30 MHz – 1000 MHz
RESOLUTION BANDWIDTH: 120 kHz

Frequency, MHz	Peak emission, dB(μV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*				
37.522500	32.72	26.95	40.00	-13.05	V	1.0	128	Pass
147.473683	34.53	29.35	43.50	-14.15	V	1.0	110	
164.797445	34.42	30.43	43.50	-13.07	V	1.6	201	
172.437500	40.28	36.58	43.50	-6.92	H	2.0	201	
175.672445	34.63	30.60	43.50	-12.90	V	1.2	173	

TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / AVERAGE
FREQUENCY RANGE: 1000 MHz - 10000
RESOLUTION BANDWIDTH: 1000 kHz

Frequency, MHz	Peak emission, dB(μV/m)	Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*				
5030.0000	50.12	44.87	54.00	-9.13	V	1.0	147	Pass

*- Margin = Measured emission - specification limit.

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

Reference numbers of test equipment used

HL 0465	HL 0521	HL 0589	HL 0592	HL 0593	HL 0594	HL 0604	HL 2009
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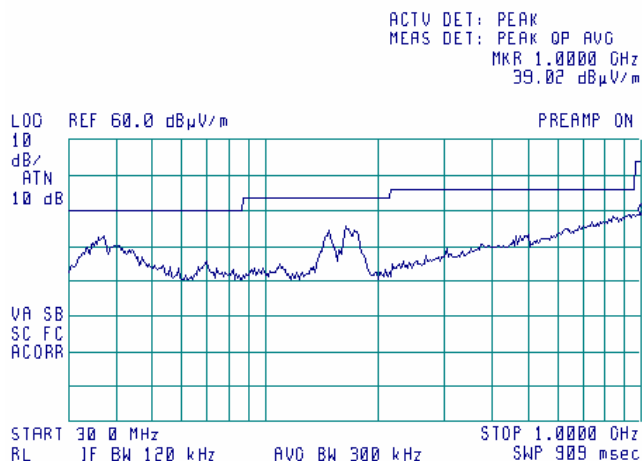
Full description is given in Appendix A.

Test specification:	FCC Part 15, Section 109 / RSS-210, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:42:20 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: tel AD (no.1) power supply			

Plot 8.2.8 Radiated emission measurements in 30 - 1000 MHz range, vertical antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m

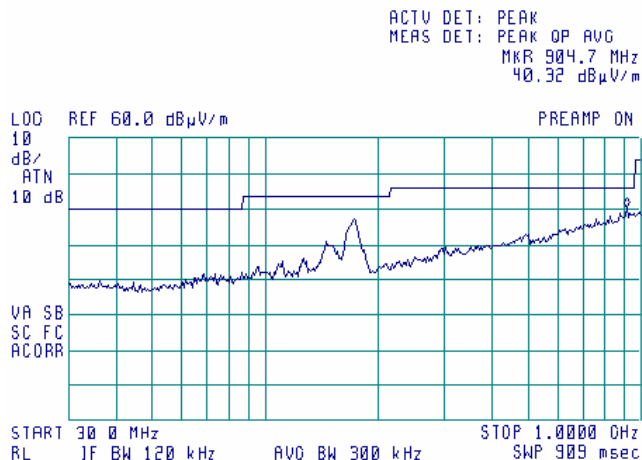
09:18:27 AUG 22, 2006



Plot 8.2.9 Radiated emission measurements in 30 - 1000 MHz range, horizontal antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m

09:24:40 AUG 22, 2006

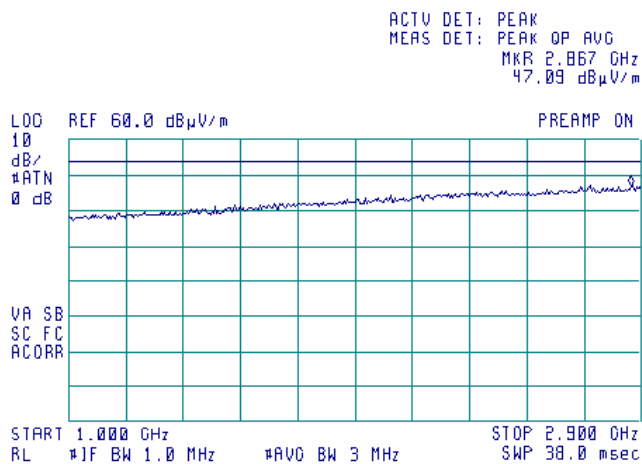


Test specification:	FCC Part 15, Section 109 / RSS-210, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	9/7/2006 11:42:20 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: tel AD (no.1) power supply			

Plot 8.2.10 Radiated emission measurements in 1000 - 2900 MHz range, vertical and horizontal antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m

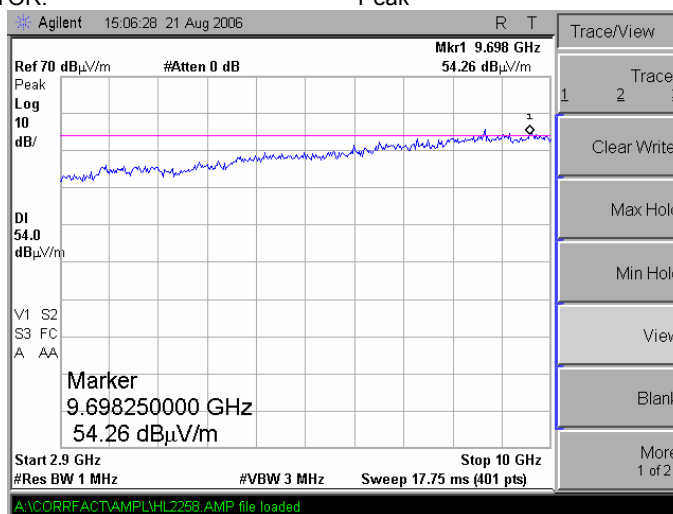
13:33:00 AUG 22, 2006



Test specification:	FCC Part 15, Section 109 / RSS-210, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:42:20 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: tel AD (no.1) power supply			

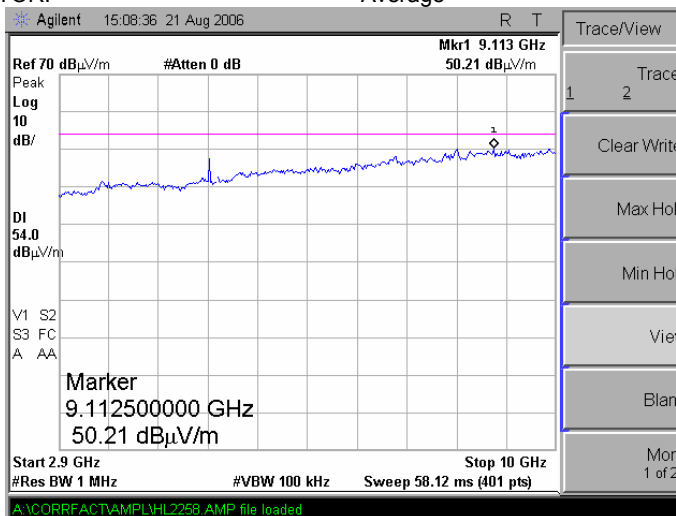
Plot 8.2.11 Radiated emission measurements in 2900 - 10000 MHz range, vertical antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Peak



Plot 8.2.12 Radiated emission measurements in 2900 - 10000 MHz range, vertical antenna polarization

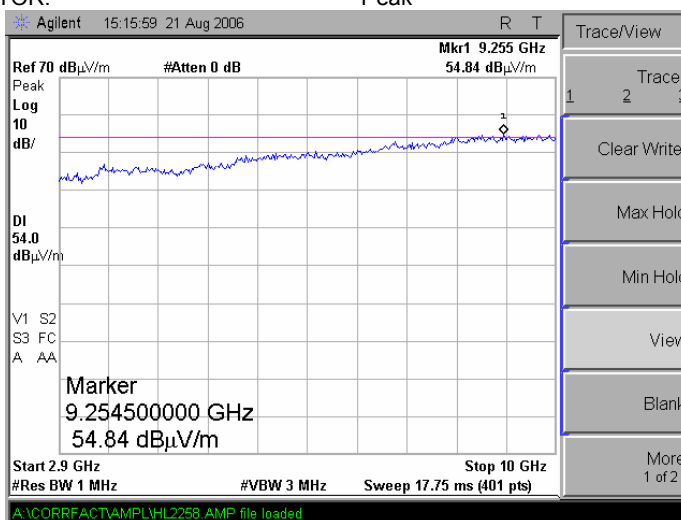
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Average



Test specification:	FCC Part 15, Section 109 / RSS-210, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:42:20 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: tel AD (no.1) power supply			

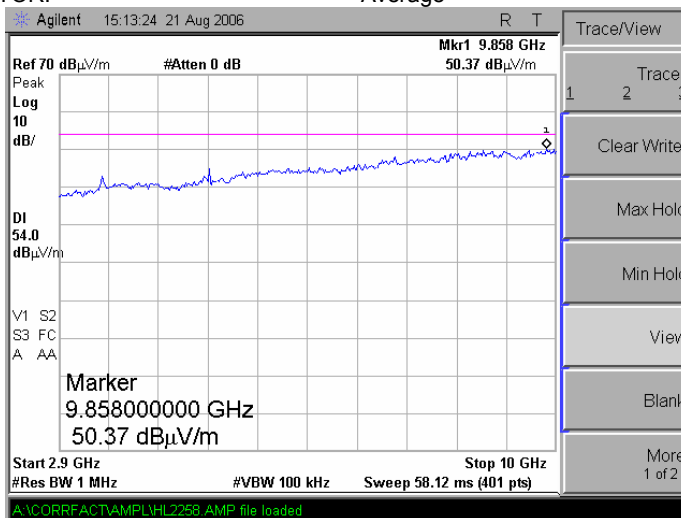
Plot 8.2.13 Radiated emission measurements in 2900 - 10000 MHz range, horizontal antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Peak



Plot 8.2.14 Radiated emission measurements in 2900 - 10000 MHz range, horizontal antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Average



Test specification:	FCC Part 15, Section 109 / RSS-210, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	9/7/2006 11:44:12 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: External (No.3) Power supply			

Table 8.2.6 Radiated emission test results

EUT SET UP: TABLE-TOP
POWER SUPPLY: External (No.3)
TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / QUASI-PEAK
FREQUENCY RANGE: 30 MHz – 1000 MHz
RESOLUTION BANDWIDTH: 120 kHz

Frequency, MHz	Peak emission, dB(μV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*				
70.97000	31.50	24.80	40.00	-15.20	V	1.4	42	Pass

TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / AVERAGE
FREQUENCY RANGE: 1000 MHz – 10000 MHz
RESOLUTION BANDWIDTH: 1000 kHz

Frequency, MHz	Peak emission, dB(μV/m)	Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*				
5030.000	51.01	47.10	54.00	-6.90	H	1.3	320	Pass

*- Margin = Measured emission - specification limit.

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

Reference numbers of test equipment used

HL 0465	HL 0521	HL 0589	HL 0592	HL 0593	HL 0594	HL 0604	HL 2009
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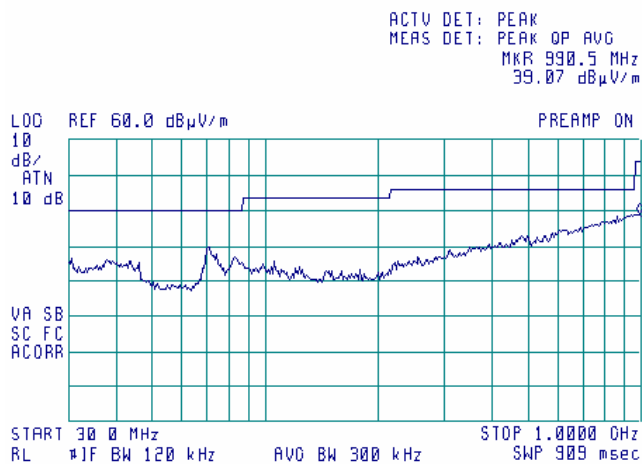
Full description is given in Appendix A.

Test specification:	FCC Part 15, Section 109 / RSS-210, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:44:12 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: External (No.3) Power supply			

Plot 8.2.15 Radiated emission measurements in 30 - 1000 MHz range, vertical antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m

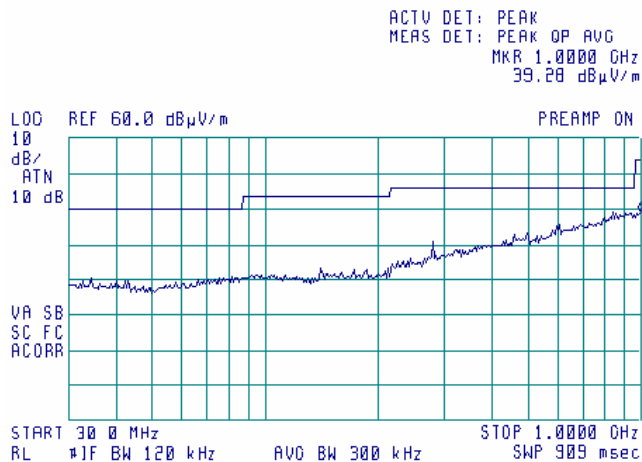
11:01:33 AUG 22, 2006



Plot 8.2.16 Radiated emission measurements in 30 - 1000 MHz range, horizontal antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m

11:05:25 AUG 22, 2006

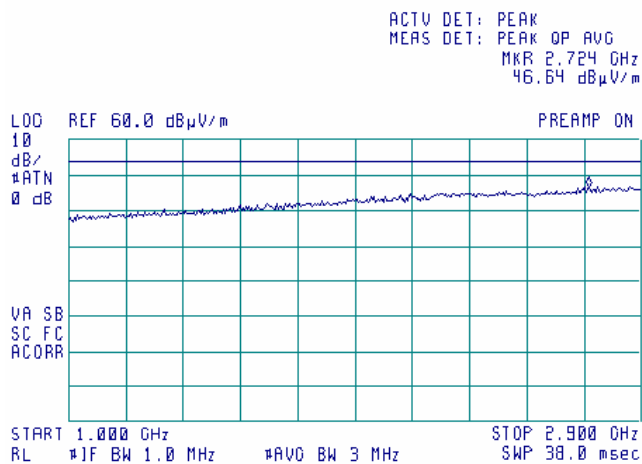


Test specification:	FCC Part 15, Section 109 / RSS-210, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	9/7/2006 11:44:12 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: External (No.3) Power supply			

Plot 8.2.17 Radiated emission measurements in 1000 - 2900 MHz range, vertical and horizontal antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m

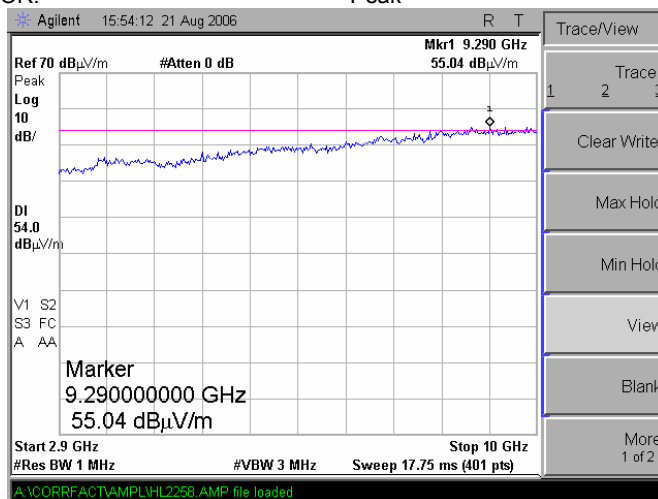
12:52:36 AUG 22, 2006



Test specification:	FCC Part 15, Section 109 / RSS-210, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/7/2006 11:44:12 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: External (No.3) Power supply			

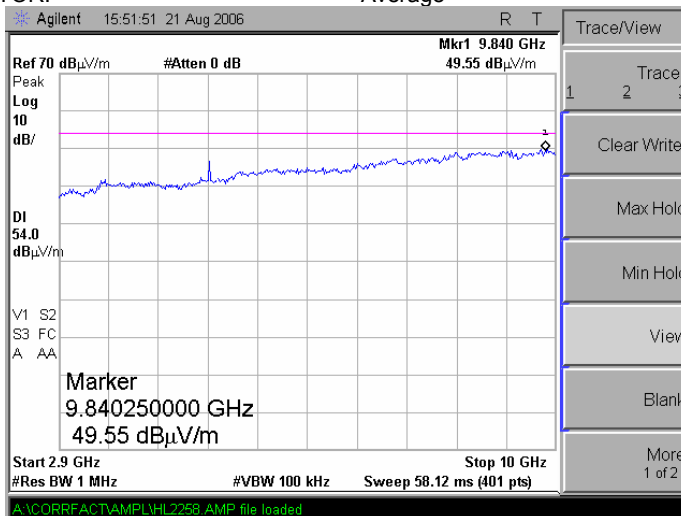
Plot 8.2.18 Radiated emission measurements in 2900 - 10000 MHz range, vertical antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Peak



Plot 8.2.19 Radiated emission measurements in 2900 - 10000 MHz range, vertical antenna polarization

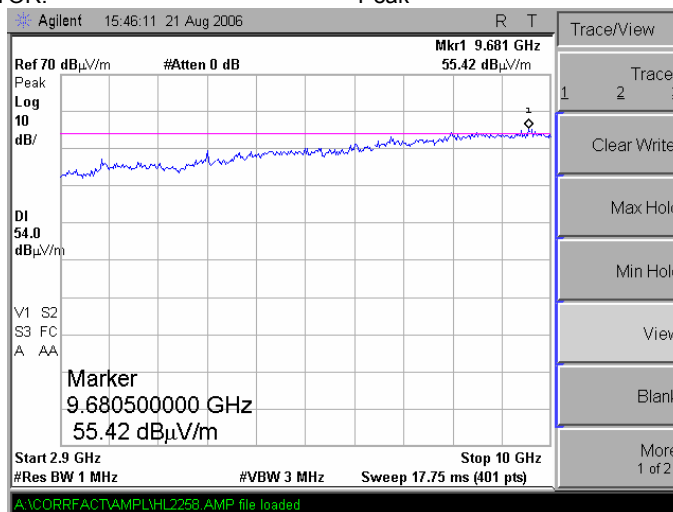
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Average



Test specification:	FCC Part 15, Section 109 / RSS-210, Section 7.2.3 / ICES-003, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4 / RSS-212, Section 3.0 / CISPR 22		
Test mode:	Compliance	Verdict: PASS	
Date & Time:	9/7/2006 11:44:12 AM		
Temperature: 25°C	Air Pressure: 1013 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks: External (No.3) Power supply			

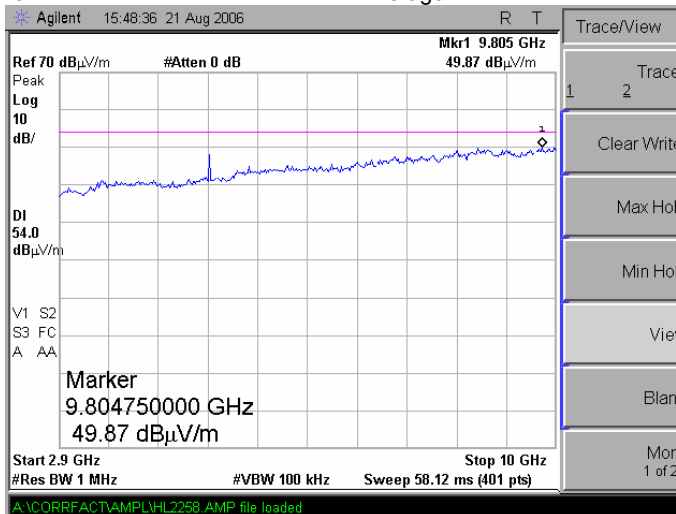
Plot 8.2.20 Radiated emission measurements in 2900 - 10000 MHz range, horizontal antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Peak



Plot 8.2.21 Radiated emission measurements in 2900 - 10000 MHz range, horizontal antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Average



9 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0163	LISN FCC/VDE/50 Ohm/50 uH + 5 Ohm, MIL-STD-461E, CISPR 16-1	Electro-Metrics	ANS 25/2	1314	01-Oct-05	01-Oct-06
0337	Probe Set, Hand held, 5 probes	Electro-Metrics	EHFP-30	238	08-Jun-06	08-Jun-07
0446	Antenna, Loop active, 10kHz-30MHz	EMCO	6502	2857	28-Jun-06	28-Jun-07
0465	Anechoic Chamber 9(L) x 6.5(W) x 5.5(H) m	HL	AC - 1	023	11-Nov-05	11-Nov-06
0466	Shielded Room 3(L) x 3(W) x 2,4(H) m	HL	SR - 1	024	11-Nov-05	11-Nov-06
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard	8546A	3617A 00319, 3448A002 53	26-Sep-05	26-Sep-06
0589	Cable Coaxial, GORE A2P01POL118, 2.3 m	HL	GORE-3	176	02-Dec-05	02-Dec-06
0592	Position Controller	HL	L2-SR3000 (HL CRL-3)	100	18-May-06	18-May-07
0593	Antenna Mast, 1-4 m Pneumatic	Madgesh	AM-F1	101	02-Feb-06	02-Feb-07
0594	Turn Table FOR ANECHOIC CHAMBER flush mount d=1.2 m Pneumatic	HL	TT-WDC1	102	26-Jan-06	26-Jan-07
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE 26 - 2000 MHz	EMCO	3141	9611-1011	10-Jan-06	10-Jan-07
0787	Transient Limiter	Hewlett Packard	11947A	3107A018 77	21-Nov-05	21-Nov-06
1215	Gertsch ratio transformer, 350V	Singer, Alfred, Eaton	RT-60	1077	01-Jan-06	01-Jan-07
1425	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1426, HL1427	Agilent Technologies	8542E	3710A002 22, 3705A002 04	01-Sep-06	01-Sep-07
1430	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1431, HL1432	Agilent Technologies	8542E	3807A002 62,3705A0 0217	01-Sep-06	01-Sep-07
1503	Cable RF, 6 m	Belden	M17/167 MIL-C-17	1503	11-Sep-06	11-Sep-07
1553	Cable RF, 3.5 m	Alpha Wire	RG-214	1553	02-Dec-05	02-Dec-06
1562	Oscilloscope 100 MHz, DMM	Tektronix	THS720A	B039444	20-Sep-05	20-Sep-06
1566	Cable RF, 2 m	Huber-Suhner	Sucoflex 104PE	13094/4PE	02-Dec-05	02-Dec-06
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W, N-type	EMC Test Systems	3115	9911-5964	03-Mar-06	03-Mar-07
2009	Cable RF, 8 m	Alpha Wire	RG-214	C-56	02-Dec-05	02-Dec-06
2258	Amplifier Low Noise 2-20 GHz	Sophia Wireless	LNA0220-C	0222	05-Nov-05	05-Nov-06
2697	Antenna, 30 MHz - 3.0 GHz,	Sunol Sciences. Corp. Pleasanton, California USA	JB3	A022805	10-Jan-06	10-Jan-07
2728	Australian termination (AS/ASIF S002:2001)	HL	AUS		26-Mar-05	26-Mar-06
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY451024 6	11-Jun-06	11-Jun-07

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
2883	Cable, 18 GHz N-type, M-F	Bird	TC-MNFN-3.0	211539 003	01-Mar-06	01-Mar-07

10 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB 150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 10 m measuring distance Horizontal polarization Vertical polarization	Biconilog antenna: ± 5.0 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.1 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 5.5 dB Biconical antenna: ± 5.5 dB Log periodic antenna: ± 5.6 dB Double ridged horn antenna: ± 5.8 dB
Radiated emissions at 3 m measuring distance Horizontal polarization Vertical polarization	Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 6.0 dB Biconical antenna: ± 5.7 dB Log periodic antenna: ± 6.0 dB Double ridged horn antenna: ± 6.0 dB
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB 2.9 GHz to 6.46 GHz: ± 3.5 dB 6.46 GHz to 13.2 GHz: ± 4.3 dB 13.2 GHz to 22.0 GHz: ± 5.0 dB 22.0 GHz to 26.8 GHz: ± 5.5 dB 26.8 GHz to 40.0 GHz: ± 4.8 dB
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %
Occupied bandwidth	± 8.0 %

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

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

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).

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

Person for contact: Mr. Alex Usoskin, CEO.

12 APPENDIX D Specification references

47CFR part 15: 2005	Radio Frequency Devices.
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
RSS-210 Issue 6: 2005	Low Power Licence- Exempt Radiocommunication Devices (All frequency bands), Category I Equipment
RSS-Gen Issue 1:2005	General Requirements and Information for the Certification of Radiocommunication Equipment
RSS-212 Issue 1:1999	Test Facilities and Test Methods for Radio Equipment
ICES-003 Issue 4: 2004	Digital Apparatus
CAN/CSA-CEI/IEC CISPR 22: 02	Information Technology Equipment- Radio Disturbance Characteristics- Limits and Methods of measurement

13 APPENDIX E Abbreviations and acronyms

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

14 APPENDIX F Test equipment correction factors

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

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

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

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

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

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

Antenna factor
Biconilog antenna EMCO Model 3141
Ser.No.1011, HL 0604

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

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

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

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

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

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

Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain	Frequency, MHz	ACF, dB	Gain, dBi	Num gain
30	22.2	-22.5	0.01	620	19.7	6.3	4.27	1215	24.9	7.0	5.05	1810	28.3	7.1	5.08	2405	30.9	6.9	4.93
40	14.7	-12.5	0.06	630	19.6	6.6	4.57	1225	25.1	6.9	4.91	1820	28.6	6.8	4.74	2415	31.0	6.9	4.85
45	11.3	-8.1	0.16	635	19.7	6.5	4.48	1230	25.2	6.8	4.82	1825	28.7	6.8	4.75	2420	31.0	6.8	4.82
45	11.3	-8.1	0.16	640	19.9	6.4	4.40	1235	25.1	7.0	4.96	1830	28.7	6.8	4.76	2425	31.1	6.8	4.81
50	8.9	-4.7	0.34	645	19.9	6.5	4.45	1240	25.0	7.1	5.09	1835	28.7	6.7	4.72	2430	31.0	6.9	4.87
55	7.9	-2.8	0.52	650	19.9	6.5	4.51	1245	25.0	7.1	5.12	1840	28.8	6.7	4.69	2435	31.0	6.9	4.88
60	7.8	-2.1	0.62	655	19.9	6.6	4.60	1250	25.0	7.1	5.15	1845	28.6	6.9	4.90	2440	31.2	6.8	4.74
70	9.0	-1.9	0.94	665	19.9	6.7	4.70	1260	24.9	7.3	5.36	1855	28.5	7.0	5.07	2450	31.0	7.0	4.96
75	8.8	-1.1	0.78	670	20.0	6.7	4.71	1265	25.0	7.3	5.31	1860	28.6	7.0	5.01	2455	31.0	7.0	5.01
80	8.4	-0.2	0.97	675	20.1	6.7	4.71	1270	25.1	7.2	5.26	1865	28.5	7.1	5.17	2460	30.9	7.2	5.19
85	8.0	0.8	1.20	680	20.1	6.7	4.71	1275	25.3	7.0	5.05	1870	28.4	7.3	5.33	2465	31.1	6.9	4.95
90	8.2	1.1	1.29	685	20.1	6.8	4.79	1280	25.5	6.8	4.84	1875	28.4	7.2	5.28	2470	31.3	6.8	4.76
95	9.2	0.5	1.13	690	20.1	6.9	4.88	1285	25.4	7.0	4.97	1880	28.5	7.2	5.22	2475	31.4	6.7	4.69
100	10.6	-0.4	0.92	695	20.2	6.8	4.82	1290	25.3	7.1	5.10	1885	28.5	7.2	5.22	2480	31.3	6.8	4.79
110	12.6	-1.6	0.70	705	20.4	6.8	4.75	1300	25.2	7.3	5.33	1895	28.6	7.2	5.24	2490	31.1	7.0	4.99
115	13.3	-1.9	0.65	710	20.5	6.8	4.75	1305	25.3	7.2	5.21	1900	28.6	7.2	5.27	2495	31.2	7.0	4.99
120	13.9	-2.1	0.62	715	20.5	6.8	4.80	1310	25.5	7.1	5.09	1905	28.5	7.3	5.36	2500	30.9	7.2	5.27
125	14.2	-2.0	0.63	720	20.5	6.9	4.85	1315	25.4	7.2	5.23	1910	28.5	7.4	5.45	2505	31.1	7.1	5.15
130	14.7	-1.7	0.68	725	20.6	6.8	4.81	1320	25.3	7.3	5.36	1915	28.5	7.3	5.38	2510	31.0	7.2	5.22
135	13.8	-1.0	0.79	730	20.7	6.8	4.77	1325	25.5	7.2	5.21	1920	28.6	7.3	5.31	2515	31.0	7.2	5.26
140	13.4	-0.3	0.94	735	20.9	6.7	4.65	1330	25.6	7.0	5.06	1925	28.6	7.3	5.35	2520	31.2	7.0	5.05
150	12.9	0.8	1.21	745	21.0	6.6	4.59	1340	25.7	7.1	5.09	1935	28.5	7.4	5.54	2530	31.0	7.3	5.37
155	12.7	1.6	1.34	750	21.0	6.7	4.64	1345	25.7	7.1	5.13	1940	28.4	7.6	5.70	2535	31.2	7.0	5.06
160	12.7	1.6	1.44	755	21.0	6.8	4.74	1350	25.7	7.1	5.17	1945	28.5	7.5	5.67	2540	31.2	7.1	5.09
165	12.5	2.0	1.59	760	21.0	6.8	4.83	1355	25.8	7.0	5.06	1950	28.6	7.4	5.48	2545	31.0	7.3	5.43
170	12.2	2.6	1.83	765	21.1	6.8	4.73	1360	25.9	6.9	4.95	1955	28.6	7.5	5.57	2550	31.0	7.3	5.39
175	11.8	3.3	2.13	770	21.3	6.7	4.64	1365	26.0	6.9	4.95	1960	28.6	7.5	5.65	2555	31.1	7.2	5.30
180	11.6	3.7	2.36	775	21.3	6.7	4.68	1370	26.0	7.0	4.96	1965	28.7	7.4	5.47	2560	31.0	7.4	5.47
185	11.5	4.0	2.54	780	21.3	6.7	4.72	1375	26.1	7.2	5.24	1970	28.9	7.2	5.29	2565	30.8	7.6	5.70
190	11.6	4.2	2.61	785	21.3	6.8	4.77	1380	26.0	7.0	5.06	1975	28.9	7.2	5.22	2570	31.1	7.3	5.37
195	12.1	3.9	2.47	790	21.3	6.8	4.82	1385	26.0	7.0	4.99	1980	29.0	7.1	5.16	2575	31.5	7.0	4.96
200	13.1	3.2	2.07	795	21.4	6.8	4.79	1390	26.1	6.9	4.92	1985	29.1	7.1	5.11	2580	31.6	6.9	4.87
205	12.0	4.4	2.76	800	21.5	6.8	4.77	1395	26.2	6.9	4.84	1990	29.1	7.0	5.06	2585	31.6	6.8	4.79
210	11.0	5.6	3.68	805	21.6	6.7	4.71	1400	26.2	7.0	4.98	1995	29.4	7.1	5.09	2590	31.6	6.9	4.88
215	11.3	5.6	3.59	810	21.7	6.7	4.65	1405	26.1	7.0	5.02	2000	29.1	7.1	5.11	2595	31.5	7.0	4.97
220	11.6	5.5	3.62	815	21.7	6.7	4.72	1410	26.1	7.1	5.09	2005	29.1	7.1	5.16	2600	31.6	6.9	4.88
225	11.7	5.5	3.65	820	21.7	6.8	4.80	1415	26.2	7.0	5.02	2010	29.1	7.1	5.15	2605	31.3	7.2	5.30
230	11.9	5.5	3.57	825	21.7	6.8	4.82	1420	26.3	7.0	4.96	2015	29.2	7.1	5.13	2610	31.4	7.1	5.15
240	12.3	5.5	3.54	835	21.8	6.8	4.82	1430	26.1	7.2	5.25	2025	29.3	7.1	5.08	2620	31.6	7.0	4.97
245	12.3	5.7	3.71	840	21.8	6.8	4.80	1435	26.1	7.2	5.24	2030	29.3	7.0	5.05	2625	31.4	7.1	5.17
250	12.3	5.9	3.88	845	21.9	6.8	4.83	1440	26.2	7.2	5.27	2035	29.3	7.1	5.07	2630	31.6	7.0	5.00
260	12.7	5.8	3.83	855	22.0	6.8	4.80	1450	26.5	7.0	4.98	2045	29.2	7.2	5.23	2640	31.7	7.0	4.98
265	13.2	5.5	3.54	860	22.1	6.8	4.74	1455	26.4	7.1	5.07	2050	29.2	7.2	5.27	2645	31.7	6.9	4.93
270	13.7	5.2	3.27	865	22.0	6.9	4.92	1460	26.4	7.1	5.17	2055	29.3	7.2	5.21	2650	31.8	6.9	4.85
275	13.7	5.3	3.39	870	21.9	7.1	5.11	1465	26.4	7.2	5.19	2060	29.5	7.0	5.02	2655	31.8	6.9	4.85
280	13.7	5.4	3.50	875	22.0	7.1	5.08	1470	26.4	7.2	5.22	2065	29.4	7.1	5.08	2660	31.7	7.0	5.02
285	13.7	5.6	3.61	880	22.1	7.0	5.05	1475	26.4	7.1	5.17	2070	29.4	7.1	5.10	2665	32.0	6.7	4.71
290	13.7	5.7	3.72	885	22.1	7.0	5.06	1480	26.5	7.1	5.12	2075	29.5	7.0	5.01	2670	32.0	6.7	4.67
295	13.8	5.8	3.77	890	22.1	7.0	5.06	1485	26.5	7.1	5.14	2080	29.8	6.8	4.76	2675	31.9	6.8	4.81
300	13.9	5.8	3.81	895	22.2	7.1	5.09	1490	26.5	7.1	5.17	2085	29.7	6.9	4.89	2680	31.7	7.0	5.04
305	14.0	5.9	3.85	900	22.2	7.1	5.12	1495	26.5	7.2	5.24	2090	29.7	6.9	4.86	2685	31.9	6.8	4.83
310	14.1	5.9	3.88	905	22.3	7.1	5.09	1500	26.5	7.2	5.31	2095	29.8	6.8	4.78	2690	32.1	6.7	4.72
315	14.3	5.9	3.99	910	22.3	7.0	5.05	1505	26.5	7.2	5.27	2100	29.9	6.8	4.75	2695	32.1	6.7	4.71
320	14.4	5.9	3.90	915	22.4	7.0	4.99	1510	26.6	7.2	5.23	2105	29.8	6.8	4.81	2700	32.0	6.8	4.81
325	14.5	5.9	3.92	920	22.6	6.9	4.92	1515	26.6	7.2	5.30	2110	29.9	6.8	4.78	2705	32.0	6.8	4.80
330	14.6	5.9	3.93	925	22.7	6.9	4.85	1520	26.5	7.3	5.38	2115	29.9	6.8	4.76	2710	32.1	6.8	4.79
335	14.7	6.0	4.02	930	22.8	6.8	4.77	1525	26.6	7.3	5.37	2120	29.9	6.8	4.84	2715	32.1	6.7	4.71
340	14.7	6.2	4.12	935	22.8	6.8	4.83	1530	26.6	7.3	5.36	2125	29.9	6.9	4.89	2720	32.4	6.5	4.47
350	15.0	6.0	3.99	945	22.8	6.9	4.87	1540	26.5	7.4	5.53	2135	29.8	6.9	4.94	2730	31.9	7.0	5.05
355	15.3	5.9	3.88	955	22.9	6.9	4.85	1545	26.5	7.5	5.58	2140	29.8	7.1	5.08	2735	31.6	7.4	5.44
360	15.6	5.8	3.78	955	23.0	6.8	4.81	1550	26.5	7.5	5.63	2145	29.9	6.9	4.92	2740	31.6	7.1	5.46
365	15.5	5.9	3.89	960	23.1	6.8	4.77	1555	26.7	7.3	5.39	2150	29.9	7.0	4.98	2745	31.9	7.0	5.06
370	15.5	6.0	4.01	965	23.1	6.7	4.73	1560	26.9	7.1	5.16	2155	29.8	7.1	5.10	2750	32.0	6.9	4.94
375	15.6	6.1	4.03	970	23.2	6.7	4.69	1565	26.9	7.2	5.23	2160	29.8	7.1	5.09	2755	32.0	7.0	4.98
380	15.7	6.1	4.05	975	23.3	6.6	4.62	1570	26.9	7.2	5.30	2165	29.9	7.0	5.05	2760	32.0	7.0	5.06
385	15.7	6.2	4.15	980	23.5	6.6	4.54	1575	27.0	7.2	5.23	2170	29.9	7.1	5.07	2765	32.2	6.8	4.80
390	15.7	6.3	4.25	985	23.5	6.6	4.52	1580	27.0	7.1	5.17	2175	29.8	7.2	5.20	2770	32.3	6.8	4.73
395	15.9	6.3	4.22	990	23.6	6.5	4.50	1585	27.0	7.2	5.20	2180	29.8	7.2	5.27	2775	32		

Cable loss
RF cable 3.5 m, Alpha Wire, model RG-214, S/N 149, HL 1553

No.	Frequency, MHz	Cable loss, dB	Measurement uncertainty, dB
1	1	0.01	±0.05
2	10	0.07	
3	30	0.12	
4	50	0.22	
5	100	0.26	
6	200	0.40	
7	300	0.52	
8	400	0.60	
9	500	0.70	
10	600	0.77	
11	700	0.84	
12	800	1.00	
13	900	1.00	
14	1000	1.05	
15	2000	1.70	

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

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

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

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

Cable loss
Cable coaxial, Bird, 18 GHz, N-type, M-F, model TC-MNFN-3.0, S/N 211539 003
HL 2883

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
10	0.06	5750	1.70	12000	2.46
30	0.12	6000	1.75	12250	2.48
100	0.21	6250	1.80	12500	2.52
250	0.34	6500	1.81	12750	2.50
500	0.47	6750	1.86	13000	2.54
750	0.59	7000	1.86	13250	2.48
1000	0.67	7250	1.92	13500	2.63
1250	0.76	7500	1.96	13750	2.65
1500	0.84	7750	1.98	14000	2.72
1750	0.92	8000	2.02	14250	2.67
2000	0.98	8250	2.03	14500	2.70
2250	1.05	8500	2.05	14750	2.72
2500	1.12	8750	2.11	15000	2.79
2750	1.17	9000	2.17	15250	2.80
3000	1.22	9250	2.17	15500	2.83
3250	1.27	9500	2.20	15750	2.75
3500	1.33	9750	2.19	16000	2.82
3750	1.38	10000	2.22	16250	2.85
4000	1.42	10250	2.25	16500	2.90
4250	1.46	10500	2.30	16750	2.89
4500	1.51	10750	2.28	17000	2.88
4750	1.54	11000	2.32	17250	2.85
5000	1.59	11250	2.34	17500	2.96
5250	1.62	11500	2.39	17750	3.04
5500	1.65	11750	2.42	18000	3.04