

TEST REPORT

ACCORDING TO: FCC Part 15 subpart B

FOR:

Motorola Israel Ltd.

1X CDMA dual band 800&1900 MHz module

Model:C24

Model number:F6490

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1 Applicant information

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Contact name: Mr. Udi Hadar

2 Equipment under test attributes

Product name: 1X CDMA dual band 800 & 1900 MHz module
Product type: Transceiver
Model(s): C24
Model number: F6490
Receipt date 9/8/2008

3 Manufacturer information

Manufacturer name: Motorola Israel Ltd.
Address: 3 Kremenetski street, P.O.B. 25016, 67899 Tel Aviv, Israel
Telephone: +972 3565 8888
Fax: +972 3565 9968
E-Mail: buh002@motorola.com
Contact name: Mr. Udi Hadar

4 Test details

Project ID: 19062
Location: Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel
Test started: 9/8/2008
Test completed: 10/15/2008
Test specification(s): FCC Part 15 subpart B Class B

5 Tests summary

Test	Status
47 CFR part 15, subpart B	
Section 15.107 Class B, AC power lines conducted emissions	Pass
Section 15.109 Class B, Radiated emissions	Pass
Section 15.111, Spurious emissions at RF antenna connector	Pass

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

	Name and Title	Date	Signature
Tested by:	Mr. S. Samokha, test engineer	October 15, 2008	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	October 15, 2008	
Approved by:	Mr. M. Nikishin, EMC and radio group leader	October 16, 2008	

6 EUT description

6.1 General information

The EUT, C24, is a dual band (800/1900 MHz) 1X CDMA transceiver, high-speed, which enables seamless connectivity for today's fastest-growing M2M applications. It also has an integrated sGPS receiver. The C24, a single engine capable of multiple software configurations, is designed for flexibility to meet the specific needs of its customers around the globe.

The EUT is powered by 120 VAC/3.8 VDC wall-outlet adapter.

Test specification:		Section 15.107 Class B, AC power lines conducted emissions	
Test procedure:		ANSI C63.4, Section 11.5	
Test mode:		Compliance	Verdict: PASS
Date & Time:		9/26/2008 5:00:33 PM	
Temperature: 24.8 °C	Air Pressure: 1016 hPa	Relative Humidity: 42 %	Power Supply: 120 VAC
Remarks:			

7 Emissions tests according to FCC 47CFR part 15 subpart B requirements

7.1 Conducted emissions

7.1.1 General

This test was performed to measure the common mode conducted emissions at the EUT power port. The specification test limits are given in Table 7.1.1.

Table 7.1.1 Limits for conducted emissions

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

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

7.1.2 Test procedure

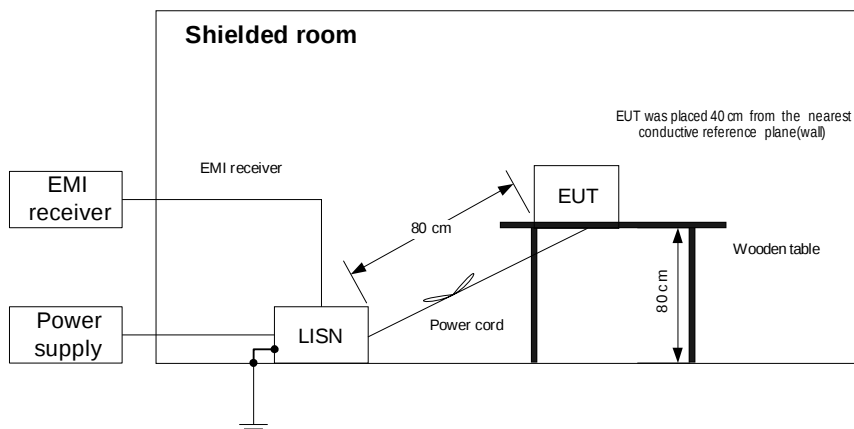
7.1.2.1 The EUT was set up as shown in Figure 7.1.1, energized and the EUT performance was checked.

7.1.2.2 The measurements were performed at the EUT power terminals with the LISN connected to the EMI receiver in the frequency range referred to in Table 7.1.2. The unused coaxial connector of the LISN was terminated with 50 Ohm.

7.1.2.3 The position of the EUT cables was varied to find the highest emission.

7.1.2.4 The worst test results with respect to the limits were recorded in Table 7.1.2 and shown in the associated plots.

Figure 7.1.1 Setup for conducted emission measurements, table-top EUT



Test specification:	Section 15.107 Class B, AC power lines conducted emissions			
Test procedure:	ANSI C63.4, Section 11.5			
Test mode:	Compliance	Verdict:		PASS
Date & Time:	9/26/2008 5:00:33 PM			
Temperature: 24.8 °C	Air Pressure: 1016 hPa	Relative Humidity: 42 %	Power Supply: 120 VAC	
Remarks:				

Table 7.1.2 Conducted emission test results

LINE: AC mains
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*		
0.358046	51.88	48.01	58.83	-10.82	42.42	48.83	-6.41	L1	Pass
0.537928	49.92	45.90	56.00	-10.10	39.69	46.00	-6.31		
0.715956	46.51	41.68	56.00	-14.32	30.83	46.00	-15.17		
1.253298	50.36	33.62	56.00	-22.38	34.85	46.00	-11.15		
1.670928	47.96	40.30	56.00	-15.70	26.02	46.00	-19.98		
6.971049	46.46	39.98	60.00	-20.02	25.66	50.00	-24.34		
0.357249	50.80	49.96	58.85	-8.89	43.47	48.85	-5.38	L2	Pass
0.536535	49.46	48.01	56.00	-7.99	42.79	46.00	-3.21		
1.075109	48.78	47.02	56.00	-8.98	38.96	46.00	-7.04		
1.253467	50.33	47.97	56.00	-8.03	41.00	46.00	-5.00		
1.977252	50.65	43.25	56.00	-12.75	30.56	46.00	-15.44		
3.539223	48.49	41.46	56.00	-14.54	21.97	46.00	-24.03		

*- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

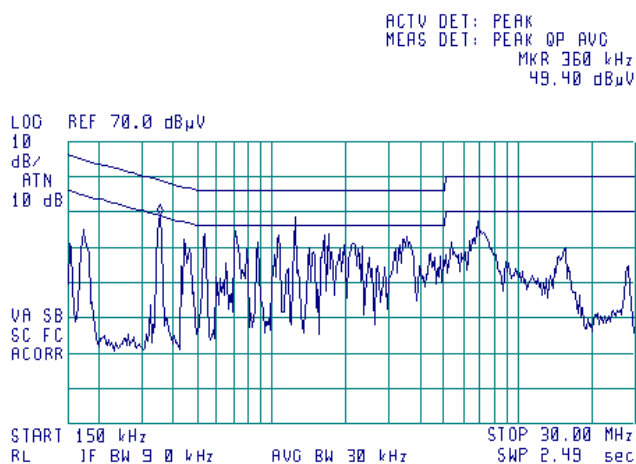
HL 0447	HL 0787	HL 1430	HL 1502	HL 1510			
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Full description is given in Appendix A.

Test specification:		Section 15.107 Class B, AC power lines conducted emissions	
Test procedure:		ANSI C63.4, Section 11.5	
Test mode:		Compliance	Verdict: PASS
Date & Time:		9/26/2008 5:00:33 PM	
Temperature: 24.8 °C	Air Pressure: 1016 hPa	Relative Humidity: 42 %	Power Supply: 120 VAC
Remarks:			

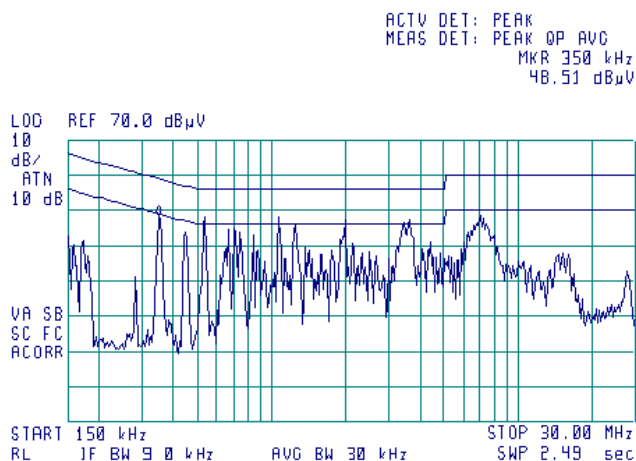
Plot 7.1.1 Conducted emission measurements

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



Plot 7.1.2 Conducted emission measurements

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



Test specification:		Section 15.109 Class B, Radiated emissions	
Test procedure:		ANSI C63.4, Section 11.6	
Test mode:		Verdict: PASS	
Date & Time:			
9/26/2008 2:49:49 PM			
Temperature: 24.8 °C	Air Pressure: 1016 hPa	Relative Humidity: 42 %	Power Supply: 120 VAC
Remarks:			

7.2 Radiated emission measurements

7.2.1 General

This test was performed to measure radiated emissions from the EUT enclosure. The specification test limits are given in Table 7.2.1.

Table 7.2.1 Radiated emission test limits

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

* - The limit for a 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 – the standard defined and the test distance respectively in meters.

7.2.2 Test procedure for measurements in semi-anechoic chamber

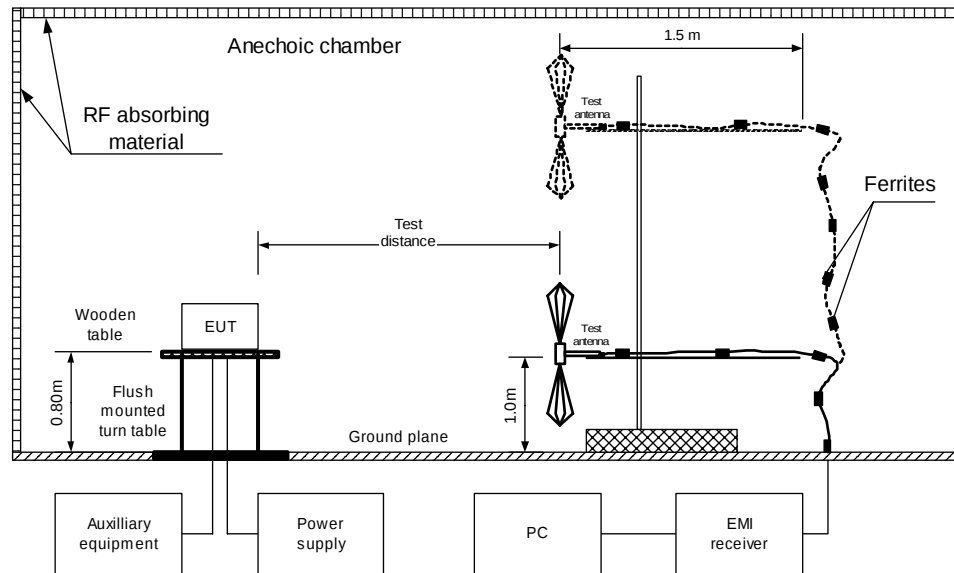
7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and the EUT performance was checked.

7.2.2.2 The measurements were performed in the anechoic chamber at 3 m test distance. The specified frequency range was investigated with the antenna connected to the EMI receiver. To find the highest emission the turntable was rotated 360° and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal polarizations. The EUT cables position was varied to maximize emission.

7.2.2.3 The worst test results with respect to the limits were recorded in Table 7.2.2 and shown in the associated plots.

Test specification:		Section 15.109 Class B, Radiated emissions	
Test procedure:		ANSI C63.4, Section 11.6	
Test mode:		Compliance	Verdict: PASS
Date & Time:		9/26/2008 2:49:49 PM	
Temperature: 24.8 °C	Air Pressure: 1016 hPa	Relative Humidity: 42 %	Power Supply: 120 VAC
Remarks:			

Figure 7.2.1 Setup for radiated emission measurements in anechoic chamber, table-top EUT



Test specification:		Section 15.109 Class B, Radiated emissions			
Test procedure:		ANSI C63.4, Section 11.6			
Test mode:		Compliance		Verdict: PASS	
Date & Time:		9/26/2008 2:49:49 PM			
Temperature: 24.8 °C	Air Pressure: 1016 hPa	Relative Humidity: 42 %		Power Supply: 120 VAC	
Remarks:					

Table 7.2.2 Radiated emission test results

EUT SET UP: TABLE-TOP
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*				
34.86120	38.0	34.0	40.0	-6.00	Vert	1.0	30	Pass
138.29480	37.0	33.2	43.5	-10.30	Hor	1.8	0	
199.80920	33.9	29.2	43.5	-14.30	Vert	1.0	210	
207.43955	42.1	37.7	43.5	-5.80	Hor	1.4	325	
276.57325	41.8	36.7	46.0	-9.30	Hor	1.3	271	
532.94960	39.8	35.4	46.0	-10.60	Vert	1.5	285	
566.26690	42.2	37.2	46.0	-8.80	Vert	1.0	220	
599.60370	42.7	37.8	46.0	-8.20	Vert	1.1	210	
632.89000	41.1	37.3	46.0	-8.70	Vert	1.0	190	

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

RESOLUTION BANDWIDTH: 100 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*				
No spurious emissions were found								
Pass								

*- Margin = Measured emission - specification limit.

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

Reference numbers of test equipment used

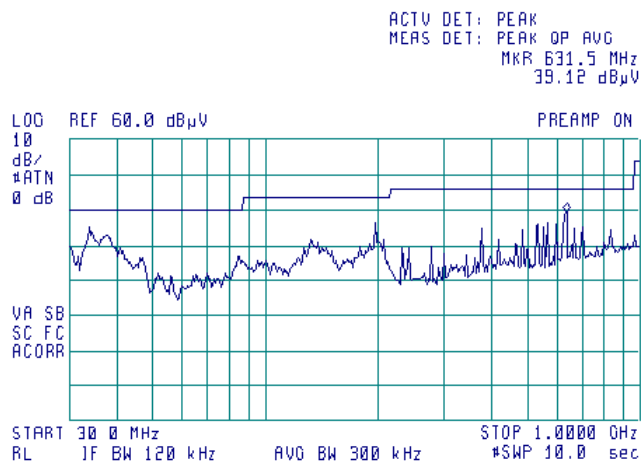
HL 0521	HL 0604	HL 1947	HL 2432	HL 2634	HL 2780	HL 3123	
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Full description is given in Appendix A.

Test specification:		Section 15.109 Class B, Radiated emissions	
Test procedure:		ANSI C63.4, Section 11.6	
Test mode:		Compliance	Verdict: PASS
Date & Time:		9/26/2008 2:49:49 PM	
Temperature: 24.8 °C	Air Pressure: 1016 hPa	Relative Humidity: 42 %	Power Supply: 120 VAC
Remarks:			

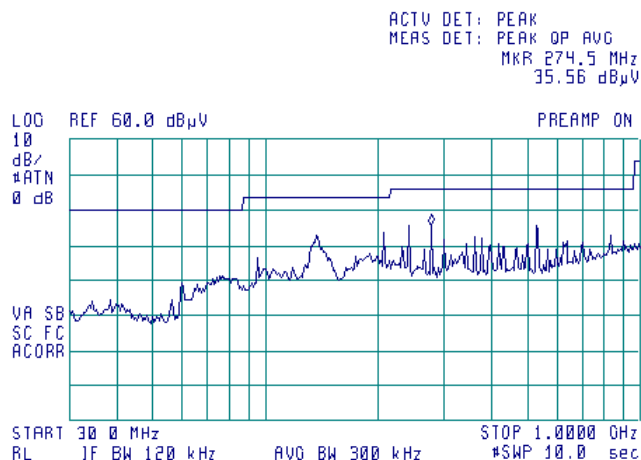
Plot 7.2.1 Radiated emission measurements in 30 - 1000 MHz range, vertical antenna polarization

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m



Plot 7.2.2 Radiated emission measurements in 30 - 1000 MHz range, horizontal antenna polarization

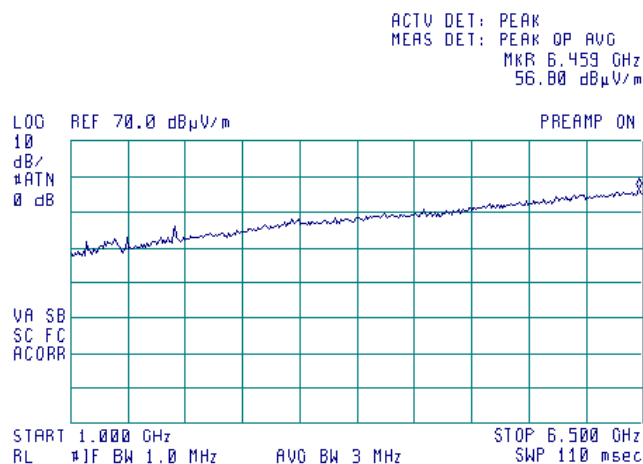
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m



Test specification:		Section 15.109 Class B, Radiated emissions	
Test procedure:		ANSI C63.4, Section 11.6	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/26/2008 2:49:49 PM		
Temperature: 24.8 °C	Air Pressure: 1016 hPa	Relative Humidity: 42 %	Power Supply: 120 VAC
Remarks:			

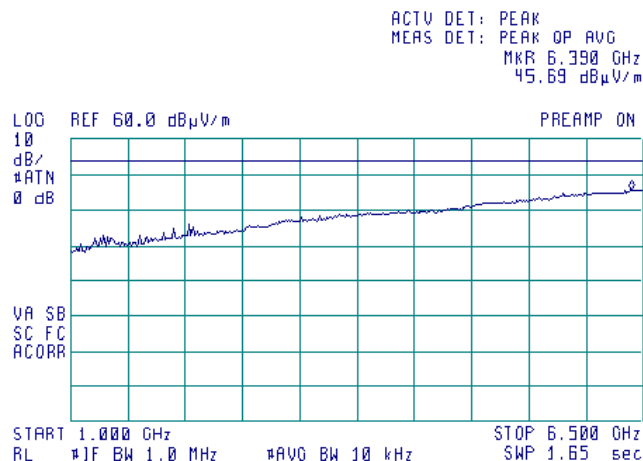
Plot 7.2.3 Radiated emission measurements 1000 –6500 MHz, vertical & horizontal antenna polarization

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



Plot 7.2.4 Radiated emission measurements 1000 –6500 MHz, vertical & horizontal antenna polarization

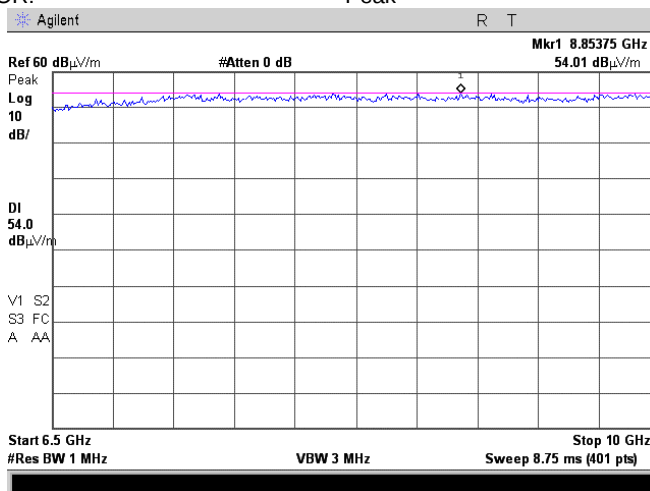
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Average



Test specification:		Section 15.109 Class B, Radiated emissions	
Test procedure:		ANSI C63.4, Section 11.6	
Test mode:		Compliance	Verdict: PASS
Date & Time:		9/26/2008 2:49:49 PM	
Temperature: 24.8 °C	Air Pressure: 1016 hPa	Relative Humidity: 42 %	Power Supply: 120 VAC
Remarks:			

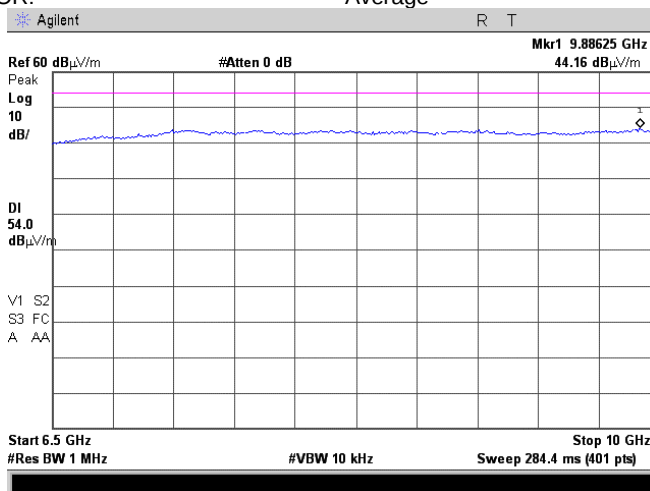
Plot 7.2.5 Radiated emission measurements 6500 -10000MHz, vertical & horizontal antenna polarization

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



Plot 7.2.6 Radiated emission measurements 6500 -10000MHz, vertical & horizontal antenna polarization

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



Test specification:		Section 15.111, Spurious emissions at RF antenna connector	
Test procedure:		ANSI C63.4, Section 12.1.5	
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/26/2008 1:05:54 PM		
Temperature: 25.5 °C	Air Pressure: 1016 hPa	Relative Humidity: 50 %	Power Supply: 120 VAC
Remarks: For frequency range 824 MHz			

7.3 Spurious emissions at RF antenna connector

7.3.1 General

This test was performed to measure spurious emissions at RF antenna connector of receiver operated within 30 to 960 MHz band or a citizens band (CB) receiver which was tested for compliance with radiated emission limits with the antenna port connected to resistive termination. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Spurious emission limits

Frequency, MHz	EUT type	Power of spurious	
		nW	dBm
25 MHz – 5 th harmonic*	Citizens band (CB) receiver	2.0	-57.0
30 MHz – 2 nd harmonic**	Superheterodyne receiver		
30 MHz – 5 th harmonic*	Other receiver operates within 30 – 960 MHz		

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

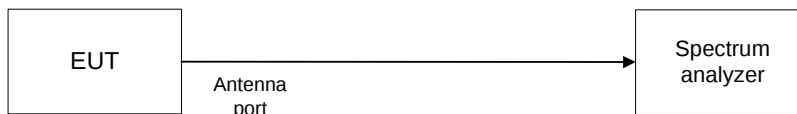
** - harmonic of the highest local oscillator frequency.

7.3.2 Test procedure

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

7.3.2.2 The spurious emission was measured with spectrum analyzer as provided in **Error! Reference source not found.** and associated plots.

Figure 7.3.1 Spurious emission test setup



Test specification:		Section 15.111, Spurious emissions at RF antenna connector	
Test procedure:		ANSI C63.4, Section 12.1.5	
Test mode:		Compliance	Verdict: PASS
Date & Time:		9/26/2008 1:05:54 PM	
Temperature: 25.5 °C	Air Pressure: 1016 hPa	Relative Humidity: 50 %	Power Supply: 120 VAC
Remarks: For frequency range 824 MHz			

Table 7.3.2 Spurious emission test results

INVESTIGATED FREQUENCY RANGE: 824 – 849 MHz
 RECEIVER TYPE: Other than CB or superheterodyne
 EUT OPERATING MODE: Receive
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 120 kHz
 VIDEO BANDWIDTH: 300 kHz

Frequency, MHz	Spurious emission, dBm	Limit, dBm	Margin, dB	Verdict
881.200	-60.34	-57.0	-3.34	Pass

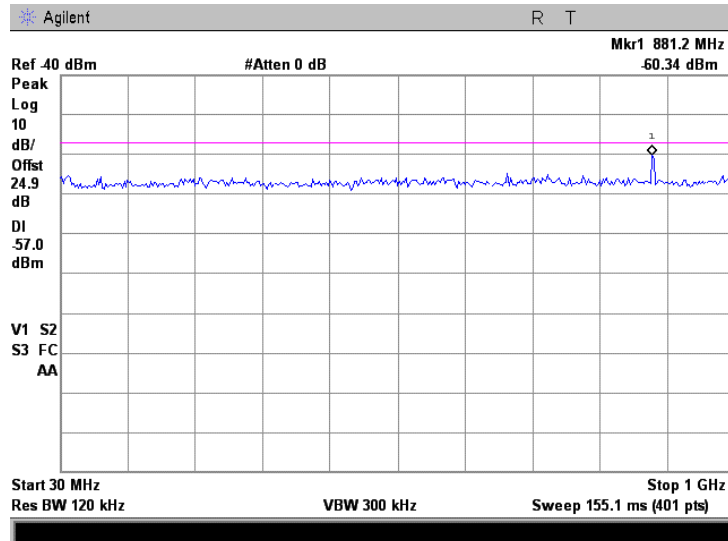
Reference numbers of test equipment used

HL 2011	HL 2634	HL 2780	HL 2869	HL 2952			
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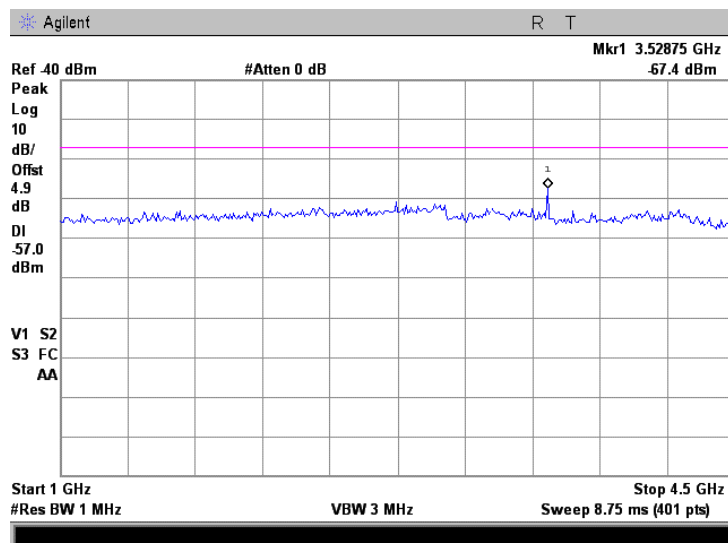
Full description is given in Appendix A.

Test specification:	Section 15.111, Spurious emissions at RF antenna connector		
Test procedure:	ANSI C63.4, Section 12.1.5		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/26/2008 1:05:54 PM		
Temperature: 25.5 °C	Air Pressure: 1016 hPa	Relative Humidity: 50 %	Power Supply: 120 VAC
Remarks: For frequency range 824 MHz			

Plot 7.3.1 Spurious emission test results in 30-1000 MHz range



Plot 7.3.2 Spurious emission test results in 1 – 4.5 GHz range



8 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0447	LISN, 16/2, 300V RMS, 50 Ohm/50 uH + 5 Ohm, STD CISPR 16-1	Hermon Laboratories	LISN 16 - 1	066	03-Nov-07	03-Nov-08
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard Co	8546A	3617A 00319, 3448A002 53	29-Aug-08	29-Aug-09
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	10-Jan-08	10-Jan-09
0787	Transient Limiter 9 kHz-200 MHz	Hewlett Packard Co	11947A	3107A018 77	21-Nov-07	21-Nov-08
1430	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1431, HL1432	Agilent Technologies	8542E	3807A002 62,3705A0 0217	31-Aug-08	31-Aug-09
1502	Cable RF, 6 m, BNC/BNC	Belden	M17/167 MIL-C-17	1502	30-Dec-07	30-Dec-08
1510	Cable RF, 8 m, BNC/BNC	Belden	M17/167 MIL-C-17	1510	30-Dec-07	30-Dec-08
1947	Cable 18GHz, 6.5 m, blue	Rhophase Microwave Limited	NPS-1803A-6500-NPS	T4974	30-Dec-07	30-Dec-08
2011	Power Divider, 0.5-18.0 GHz, 80 W	Omni Spectra	2090-6204-00	2011	05-Dec-07	05-Dec-08
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	03-Mar-08	03-Mar-09
2634	Power Supply, 0-36.0 VDC, 0-12.0 A	NEMIC-LAMBDA	UP36-12	2634	25-Aug-08	25-Aug-09
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY451024 6	11-Jun-07	11-Jun-09
2869	Cable, 18 GHz, 1.2 m, SMA - SMA, Right Angle	Gore	NA	91P72073	11-Feb-08	11-Feb-09
2952	Cable, RF, 18 GHz, 1.2 m, SMA-SMA	Gore	10020014	NA	05-Oct-08	05-Oct-09
3123	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	3123	13-Dec-07	13-Dec-08

9 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Conducted emissions at mains port with LISN and HP 8542E or HP 8546A receiver	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

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

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

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

10 APPENDIX C Test laboratory 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 2186A-1 for OATS and IC 2186A-2 for anechoic chamber), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, C-845 for conducted emissions site), assessed by TNO Certification EP&S (Netherlands) for a number of EMC, telecommunications, environmental, safety standards, and by AMTAC (UK) for safety of medical devices. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing and environmental simulation (for exact scope please refer to Certificate No. 839.01).

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website: www.hermonlabs.com

Person for contact: Mr. Alex Usoskin, CEO.

11 APPENDIX D Specification references

FCC 47CFR part 15: 2007 subpart B	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.
CISPR 16-1-1: 2006	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus

12 APPENDIX E Test equipment correction factors

Correction factor
Line impedance stabilization network
Model LISN 16 - 1
Hermon Laboratories, HL 0447

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

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

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 guide horn antenna
Model 3115, serial number: 00027177, HL 2432

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

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

Cable loss
Cable coaxial, 6 m, model: M17/167 MIL-C-17, HL 1502

Frequency, MHz	Cable loss, dB
0.1	0.02
1	0.07
3	0.15
5	0.17
10	0.26
30	0.43
50	0.57
80	0.72
100	0.81
300	1.48
500	2.00
800	2.70
1000	3.09

Cable loss
Cable M17/167 MIL-C-17, HL 1510

No.	Frequency, MHz	Cable loss, dB
1	0.1	0.05
2	1	0.09
3	3	0.16
4	5	0.18
5	10	0.27
6	30	0.44
7	50	0.58
8	80	0.69
9	100	0.82
10	300	1.48
11	500	2.01
12	800	2.65
13	1000	3.12

Cable loss
Cable 18 GHz, 6.5 m, blue, model: NPS-1803A-6500-NPS, S/N T4974, HL 1947

Frequency, GHz	Cable loss, dB
0.03	0.30
0.05	0.38
0.10	0.53
0.20	0.74
0.30	0.91
0.40	1.05
0.50	1.18
0.60	1.29
0.70	1.40
0.80	1.50
0.90	1.59
1.00	1.68
1.10	1.77
1.20	1.86
1.30	1.94
1.40	2.01
1.50	2.08
1.60	2.16
1.70	2.22
1.80	2.29
1.90	2.36
2.00	2.42
2.10	2.48
2.20	2.54
2.30	2.60
2.40	2.66
2.50	2.71
2.60	2.77
2.70	2.83
2.80	2.89
2.90	2.95
3.10	3.06
3.30	3.17
3.50	3.28
3.70	3.39
3.90	3.51
4.10	3.62
4.30	3.76
4.50	3.87
4.70	4.01
4.90	4.10
5.10	4.21
5.30	4.31
5.50	4.43
5.70	4.56
5.90	4.71

Frequency, GHz	Cable loss, dB
6.10	4.87
6.30	4.95
6.50	4.94
6.70	4.88
6.90	4.87
7.10	4.83
7.30	4.85
7.50	4.86
7.70	4.91
7.90	4.96
8.10	5.03
8.30	5.08
8.50	5.13
8.70	5.21
8.90	5.22
9.10	5.34
9.30	5.35
9.50	5.52
9.70	5.51
9.90	5.66
10.10	5.70
10.30	5.78
10.50	5.79
10.70	5.82
10.90	5.86
11.10	5.94
11.30	6.06
11.50	6.21
11.70	6.44
11.90	6.61
12.10	6.76
12.40	6.68
13.00	6.66
13.50	6.81
14.00	6.90
14.50	6.90
15.00	6.97
15.50	7.17
16.00	7.28
16.50	7.27
17.00	7.38
17.50	7.68
18.00	7.92

Cable loss
Cable coaxial, Gore, 18 GHz, 1.1 m, SMA - SMA, model Right Angle, S/N 91P72071
HL 2869

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.06	5750	0.87	12000	1.30
30	0.06	6000	0.87	12250	1.33
100	0.10	6250	0.89	12500	1.35
250	0.18	6500	0.92	12750	1.36
500	0.25	6750	0.94	13000	1.38
750	0.27	7000	0.98	13250	1.41
1000	0.34	7250	0.99	13500	1.39
1250	0.35	7500	1.02	13750	1.41
1500	0.42	7750	1.03	14000	1.42
1750	0.44	8000	1.04	14250	1.46
2000	0.49	8250	1.04	14500	1.39
2250	0.52	8500	1.08	14750	1.46
2500	0.55	8750	1.08	15000	1.40
2750	0.59	9000	1.12	15250	1.47
3000	0.61	9250	1.12	15500	1.36
3250	0.64	9500	1.15	15750	1.49
3500	0.67	9750	1.14	16000	1.51
3750	0.69	10000	1.19	16250	1.60
4000	0.70	10250	1.20	16500	1.56
4250	0.74	10500	1.23	16750	1.66
4500	0.76	10750	1.24	17000	1.71
4750	0.77	11000	1.24	17250	1.78
5000	0.79	11250	1.25	17500	1.75
5250	0.82	11500	1.28	17750	1.77
5500	0.84	11750	1.29	18000	1.86

Cable loss
Cable coaxial, Gore, 18 GHz, 1.2 m, SMA-SMA, S/N 10020014
HL 2952

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.03	5750	0.97	12000	1.50
30	0.05	6000	1.01	12250	1.45
100	0.11	6250	1.03	12500	1.48
250	0.19	6500	1.06	12750	1.57
500	0.26	6750	1.08	13000	1.51
750	0.32	7000	1.10	13250	1.64
1000	0.38	7250	1.13	13500	1.60
1250	0.43	7500	1.13	13750	1.63
1500	0.47	7750	1.21	14000	1.59
1750	0.53	8000	1.20	14250	1.66
2000	0.55	8250	1.24	14500	1.60
2250	0.59	8500	1.29	14750	1.65
2500	0.63	8750	1.23	15000	1.72
2750	0.66	9000	1.27	15250	1.68
3000	0.69	9250	1.27	15500	1.73
3250	0.72	9500	1.29	15750	1.70
3500	0.75	9750	1.30	16000	1.82
3750	0.78	10000	1.38	16250	1.79
4000	0.82	10250	1.44	16500	1.81
4250	0.84	10500	1.47	16750	1.91
4500	0.86	10750	1.45	17000	1.92
4750	0.90	11000	1.50	17250	1.98
5000	0.91	11250	1.46	17500	2.05
5250	0.94	11500	1.47	17750	2.04
5500	0.96	11750	1.44	18000	2.05

Cable loss
Microwave Cable Assembly, 18 GHz, 6.4 m, SMA – SMA, Huber-Suhner, model 198-9155-00
HL 3123

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10.0	0.11	3600	1.97	7400	3.12	11200	3.90	15100	4.74
30	0.17	3700	1.97	7500	3.13	11300	3.93	15200	4.70
50	0.25	3800	2.03	7600	3.16	11400	3.88	15300	4.73
100	0.32	3900	2.04	7700	3.18	11500	3.87	15400	4.78
200	0.46	4000	2.10	7800	3.20	11600	3.90	15500	4.75
300	0.58	4100	1.97	7900	3.23	11700	3.86	15600	4.76
400	0.65	4200	1.97	8000	3.25	11800	3.88	15700	4.75
500	0.74	4300	2.03	8100	3.26	11900	3.86	15800	4.78
600	0.82	4400	2.04	8200	3.28	12000	3.89	15900	4.79
700	0.89	4500	2.10	8300	3.31	12100	3.94	16000	4.73
800	0.95	4600	1.97	8400	3.31	12200	3.92	16100	4.78
900	1.01	4700	1.97	8500	3.32	12300	3.96	16200	4.84
1000	1.07	4800	2.03	8600	3.34	12400	4.01	16300	4.90
1100	1.11	4900	2.04	8700	3.35	12500	4.07	16400	4.87
1200	1.17	5000	2.10	8800	3.37	12600	4.08	16500	4.90
1300	1.22	5100	2.53	8900	3.39	12700	4.17	16600	4.98
1400	1.27	5200	2.55	9000	3.42	12800	4.26	16700	5.05
1500	1.29	5300	2.60	9100	3.43	12900	4.16	16800	5.04
1600	1.35	5400	2.61	9200	3.51	13000	4.21	16900	5.02
1700	1.40	5500	2.64	9300	3.52	13100	4.24	17000	5.09
1800	1.44	5600	2.70	9400	3.54	13200	4.27	17100	5.07
1900	1.51	5700	2.67	9500	3.63	13300	4.31	17200	5.10
2000	1.49	5800	2.71	9600	3.61	13400	4.33	17300	5.13
2100	1.55	5900	2.74	9700	3.71	13500	4.25	17400	5.23
2200	1.58	6000	2.80	9800	3.66	13600	4.27	17500	5.21
2300	1.62	6100	2.79	9900	3.77	13700	4.33	17600	5.22
2400	1.72	6200	2.81	10000	3.75	13800	4.33	17700	5.36
2500	1.76	6300	2.83	10100	3.77	13900	4.31	17800	5.35
2600	1.78	6400	2.86	10200	3.80	14000	4.30	17900	5.45
2700	1.80	6500	2.88	10300	3.79	14100	4.30	18000	5.43
2800	1.86	6600	2.90	10400	3.87	14200	4.31		
2900	1.90	6700	2.92	10500	3.83	14300	4.37		
3000	1.90	6800	2.98	10600	3.88	14400	4.35		
3100	1.97	6900	2.98	10700	3.86	14600	4.53		
3200	1.97	7000	3.00	10800	3.87	14700	4.50		
3300	2.03	7100	3.02	10900	3.90	14800	4.62		
3400	2.04	7200	3.04	11000	3.84	14900	4.65		
3500	2.10	7300	3.06	11100	3.88	15000	4.79		

13 APPENDIX F Abbreviations and acronyms

A	ampere
AC	alternating current
AM	amplitude modulation
AVRG	average (detector)
BB	broad band
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(μV)	decibel referred to one microvolt
dB(μV/m)	decibel referred to one microvolt per meter
dB(μA)	decibel referred to one microampere
DC	direct current
EIRP	equivalent isotropically radiated power
ERP	effective radiated power
EUT	equipment under test
F	frequency
GHz	gigahertz
GND	ground
H	height
HL	Hermon laboratories
Hz	hertz
k	kilo
kHz	kilohertz
LO	local oscillator
m	meter
MHz	megahertz
mm	millimeter
ms	millisecond
μs	microsecond
NA	not applicable
NB	narrow band
OATS	open area test site
Ω	Ohm
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

END OF DOCUMENT