HERMON LABORATORIES

839.01
Electrical

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EMISSIONS AND ERP TEST REPORT

ACCORDING TO: FCC part 24

FOR:

Motorola Israel Ltd.

r765 iDEN, MOTOtalk Transceiver with Bluetooth

Model:H06XCN6JS9AN

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1 Applicant information

Client name:	Motorola Israel Ltd.
Address:	3 Kremenetski street, P.O.B. 25016, 67899 Tel Aviv, Israel
Telephone:	+972 3565 9796
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E-mail:	shuki.levy@motorola.com
Contact name:	Mr. Shuki Levy

2 Equipment under test attributes

Product name:	r765 iDEN, MOTOtalk Transceiver with Bluetooth
Product type:	Transceiver
Model(s):	H06XCN6JS9AN
Receipt date	2/12/2009

3 Manufacturer information

Manufacturer name:	Motorola Israel Ltd.
Address:	3 Kremenetski street, P.O.B. 25016, 67899 Tel Aviv, Israel
Telephone:	+972 3565 9796
Fax:	+972 3565 9968
E-Mail:	shuki.levy@motorola.com
Contact name:	Mr. Shuki Levy

4 Test details

Project ID:	19051
Location:	Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel
Test started:	2/12/2009
Test completed:	2/20/2009
Test specification(s):	FCC part 24

5 Tests summary

Test	Status
FCC part 24	
Transmitter characteristics	
Section 24.132, Radiated spurious emissions	Pass
Section 24.132, Radiated spurious emissions, simultaneous BT&PCS transmission	Pass

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:MOTRAD_FCC.19051_part24.

	Name and Title	Date	Signature
Tested by:	Mr. L. Markel, test engineer	February 20, 2009	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	February 25, 2009	
Approved by:	Mr. M. Nikishin, EMC and radio group leader	February 25, 2009	

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6 EUT description

6.1 General information

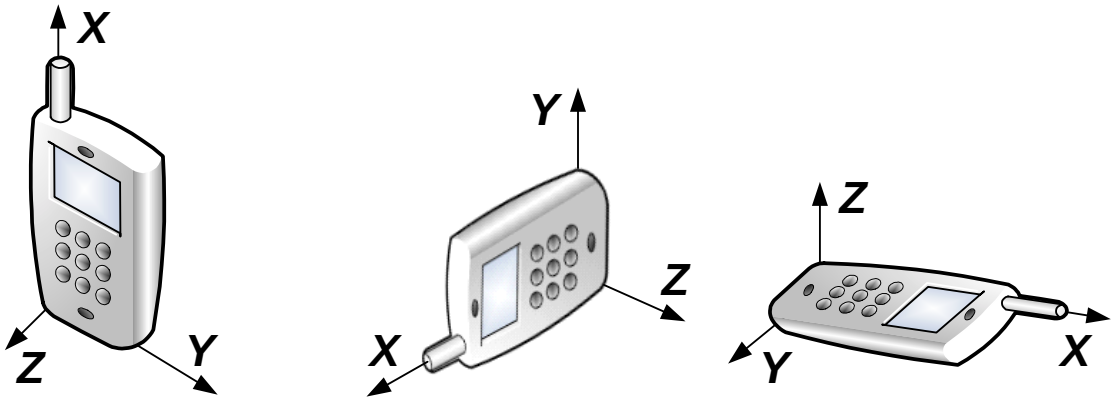
The EUT is a battery-powered hand-held radio transceiver for iDEN digital cellular networks. It also includes MOTOtalk digital walkie-talkie option and Bluetooth (R).

The devicess are rugged and durable monolith handsets targeted towards industrial, petrochemical and utility companies. Industries that use these handsets are manufacturing, construction, transportation and distribution. The handsets shall be certified for military specification requirements including humidity, shock and vibration and blowing rain.

The EUT is powered by 8 V rechargeable battery.

6.2 EUT positions

The EUT was tested in 3 orthogonal positions and maximum power was found at Z-axis orientation.



Test specification:	Section 24.132, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	Air Pressure: 1016 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks: Simultaneous mode: BT&PCS			

7 Transmitter tests according to 47CFR part 24

7.1 Radiated spurious emission measurements

7.1.1 General

This test was performed to measure radiated spurious emissions from the EUT. Specification test limits are given in Table 7.1.1.

Table 7.1.1 Radiated spurious emission test limits

Frequency, MHz	Attenuation below carrier dBc	ERP of spurious, dBm	Equivalent field strength limit @ 3m, dB(µV/m)***
0.009 – 10th harmonic*	50+10logP**	-20	77.4

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

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

7.1.2.1 The EUT was set up as shown in Figure 7.1.1, energized and the performance check was conducted.
7.1.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360^0 and the measuring antenna was rotated around its vertical axis.
7.1.2.3 The worst test results (the lowest margins) were recorded in Table 7.1.2 and shown in the associated plots.

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

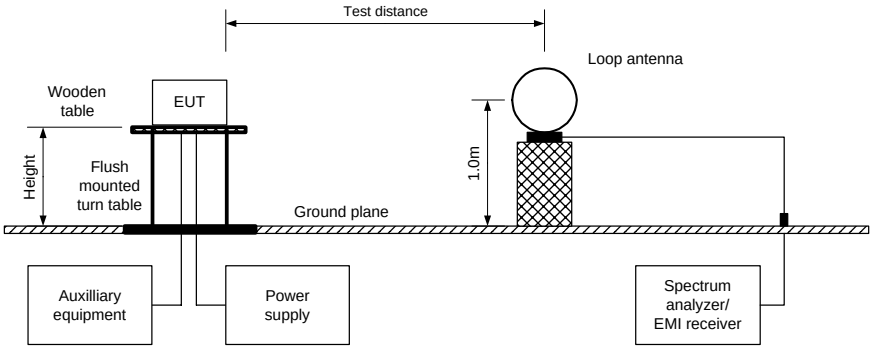
7.1.3.1 The EUT was set up as shown in Figure 7.1.2, energized and the performance check was conducted.
7.1.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer. To find maximum radiation the turntable was rotated 360^0 and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal, polarizations.
7.1.3.3 The worst test results (the lowest margins) were recorded in Table 7.1.2 and shown in the associated plots.

7.1.4 Test procedure for substitution ERP measurements of spurious

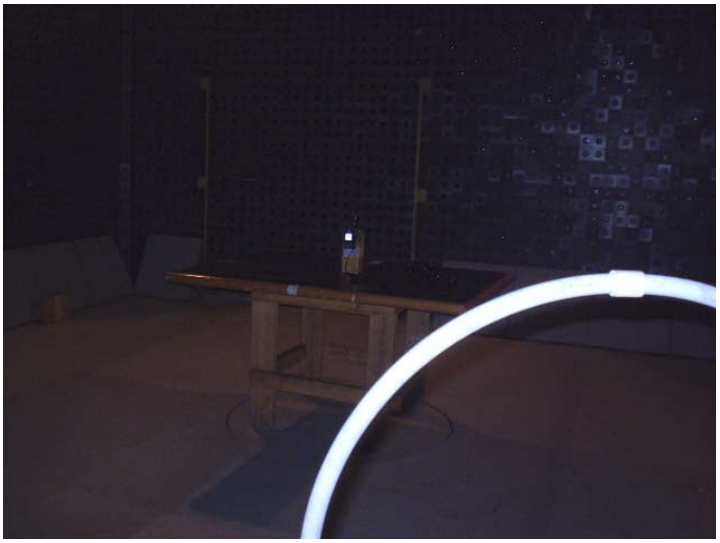
7.1.4.1 The test equipment was set up as shown in Figure 7.1.3 and energized.
7.1.4.2 RF signal generator was set to the frequency of investigated spurious emission and the RF output level was preliminary adjusted to produce the same field strength as it was measured from the EUT.
7.1.4.3 The test antenna height was swept from 1 to 4 m to find maximum emission from substitution antenna and RF signal generator output was fine adjusted to produce the same field strength as it was measured from the EUT.
7.1.4.4 The above procedure was performed in both, horizontal and vertical, polarizations of the test and substitution antennas.
7.1.4.5 The ERP of spurious emissions was calculated as a sum of signal generator output power in dBm and antenna gain in dBd reduced by cable loss in dB.
7.1.4.6 The above procedure was repeated at the rest of investigated frequencies.
7.1.4.7 The worst test results (the lowest margins) were recorded in Table 7.1.3 and shown in the associated plots.

Test specification:	Section 24.132, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	Air Pressure: 1016 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks: Simultaneous mode: BT&PCS			

Figure 7.1.1 Setup for spurious emission field strength measurements in 9 kHz to 30 MHz band

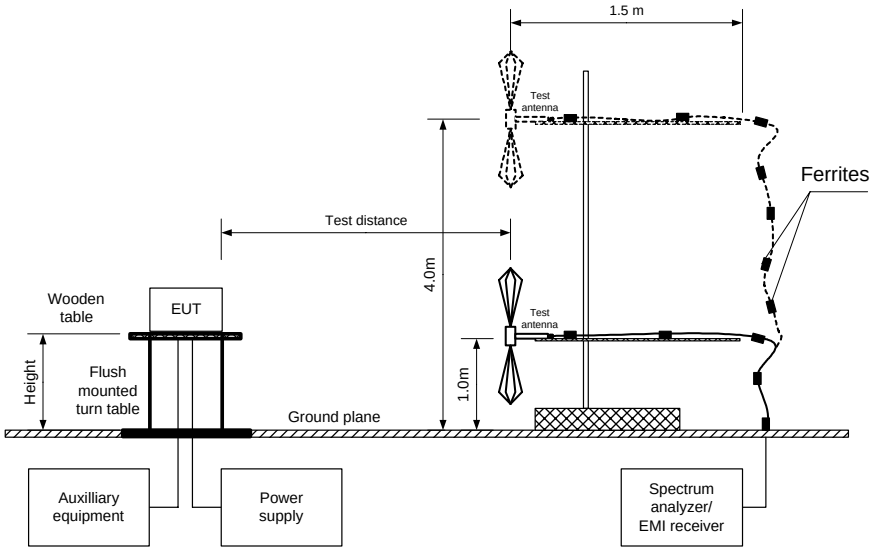


Photograph 7.1.1 Setup for spurious emission field strength measurements in 9 kHz to 30 MHz band

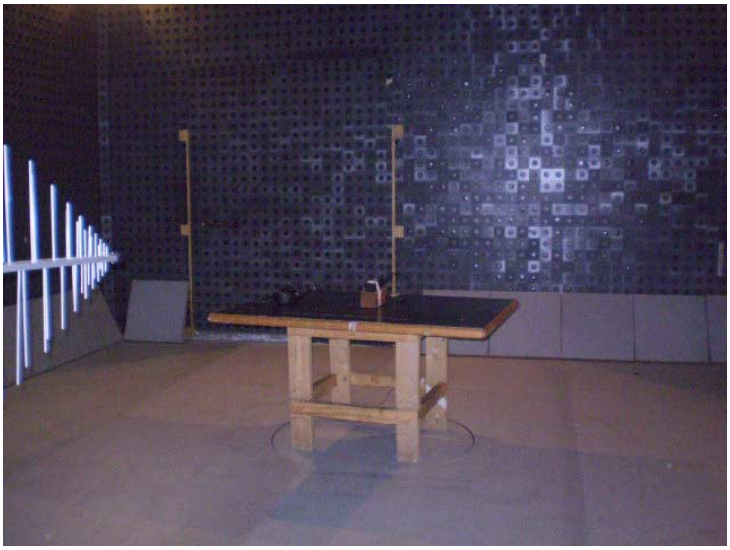


Test specification:	Section 24.132, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	Air Pressure: 1016 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks: Simultaneous mode: BT&PCS			

Figure 7.1.2 Setup for spurious emission field strength measurements above 30 MHz

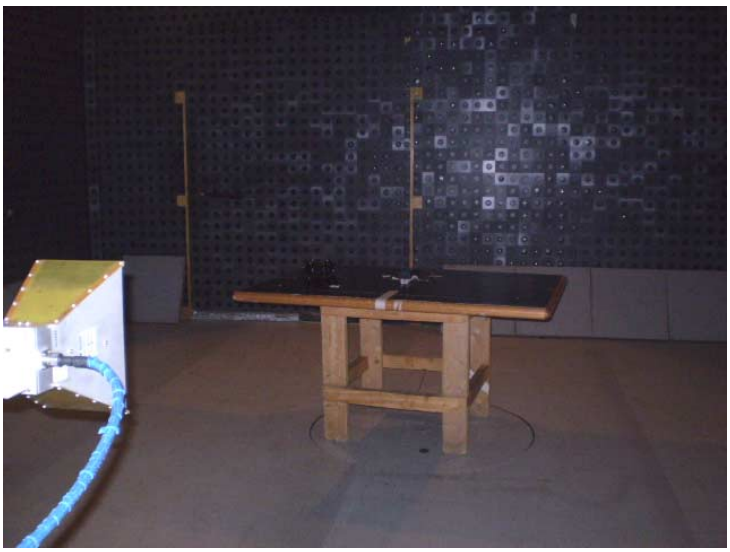


Photograph 7.1.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	Section 24.132, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	Air Pressure: 1016 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks: Simultaneous mode: BT&PCS			

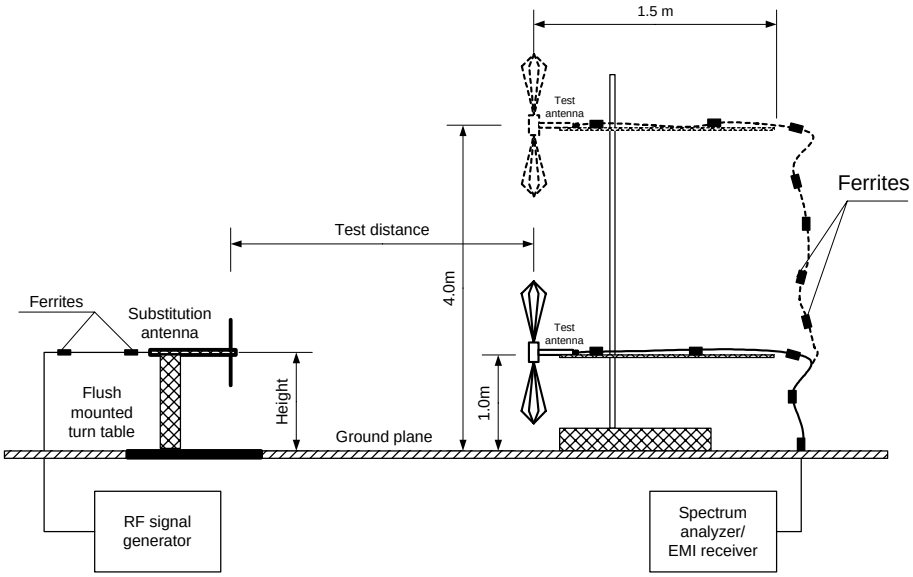
Photograph 7.1.3 Setup for spurious emission field strength measurements above 1000 MHz



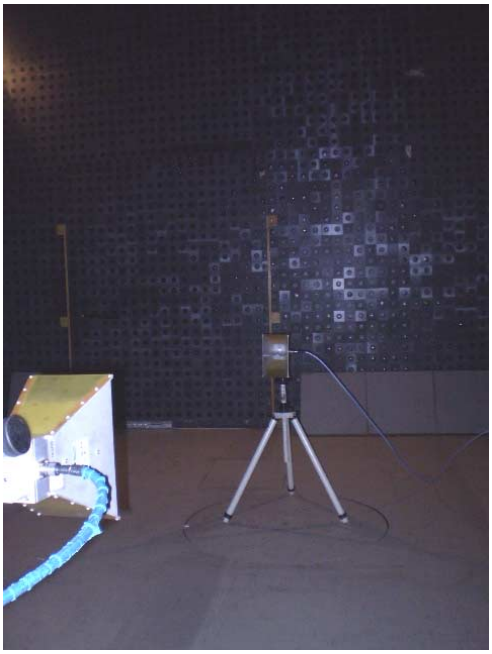
Photograph 7.1.4 Setup for spurious emission field strength measurements above 1000 MHz

Test specification:	Section 24.132, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	Air Pressure: 1016 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks: Simultaneous mode: BT&PCS			

Figure 7.1.3 Setup for substitution ERP measurements of spurious



Photograph 7.1.5 Setup for substitution ERP measurements of spurious



Test specification:	Section 24.132, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	Air Pressure: 1016 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks: Simultaneous mode: BT&PCS			

Photograph 7.1.6 Setup for substitution ERP measurements of spurious

Test specification:	**Section 24.132, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	**Air Pressure:** 1016 hPa	**Relative Humidity:** 50 %	**Power Supply:** Battery
Remarks: Simultaneous mode: BT&PCS			

Table 7.1.2 Spurious emission field strength test results

ASSIGNED FREQUENCY RANGE:	PCS:901 - 902 MHz/2400 – 2483.5 MHz (Bluetooth)
TEST DISTANCE:	3 m
TEST SITE:	Semi anechoic chamber / OATS
EUT HEIGHT:	0.8 m
INVESTIGATED FREQUENCY RANGE:	0.009 – 25000 MHz
DETECTOR USED:	Peak
VIDEO BANDWIDTH:	> Resolution bandwidth
TEST ANTENNA TYPE:	Active loop (9 kHz – 30 MHz) Biconilog (30 MHz – 1000 MHz) Double ridged guide (above 1000 MHz)
MODULATION:	4QAM for PCS / GFSK for Bluetooth
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum

Frequency, MHz	Field strength, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*	RBW, kHz	Antenna polarization	Antenna height, m	Turn-table position**, degrees
Low carrier frequency 901.01875 MHz							
1802.038	64.83	77.4	-12.57	1000	V (Y)	1.3	170
4505.051	54.17	77.4	-23.23	1000	H (Y)	1.5	190
High carrier frequency 901.98125 MHz							
1804.003	65.24	77.4	-12.61	1000	H (Y)	1.2	190
4509.857	54.33	77.4	-23.07	1000	H (Y)	1.3	170

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

Test specification:	**Section 24.132, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	**Air Pressure:** 1016 hPa	**Relative Humidity:** 50 %	**Power Supply:** Battery
Remarks: Simultaneous mode: BT&PCS			

Table 7.1.3 Substitution ERP of spurious test results

ASSIGNED FREQUENCY RANGE: PCS:901 - 902 MHz/2400 – 2483.5 MHz (Bluetooth)
TEST SITE: Semi anechoic chamber / OATS
TEST DISTANCE: 3 m
SUBSTITUTION ANTENNA HEIGHT: 0.8 m
DETECTOR USED: Peak
VIDEO BANDWIDTH: > Resolution bandwidth
SUBSTITUTION ANTENNA TYPE: Tunable dipole (30 MHz – 1000 MHz)
Double ridged guide (above 1000 MHz)

Frequency, MHz	Field strength, dB(µV/m)	RBW, kHz	Antenna polarizatio	RF generato output, dBm	Ant gain dBd	Cable loss dB	ERP, dBm	Limit, dBm	Margin, dB*	Verdict
Low carrier frequency 901.01875 MHz										
1802.038	64.83	1000	Vertical	-37.00	5.1	0.8	-32.72	-20.00	-12.72	Pass
4505.051	54.17	1000	Horizontal	-44.16	4.2	1.45	-41.38	-20.00	-21.38	Pass
High carrier frequency 901.98125 MHz										
1803.955	65.24	1000	Horizontal	-36.78	5.11	2.44	-34.11	-20.00	-11.99	Pass
4509.907	54.33	1000	Horizontal	-44.00	4.2	1.45	-41.22	-20.00	-21.22	Pass

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

Reference numbers of test equipment used

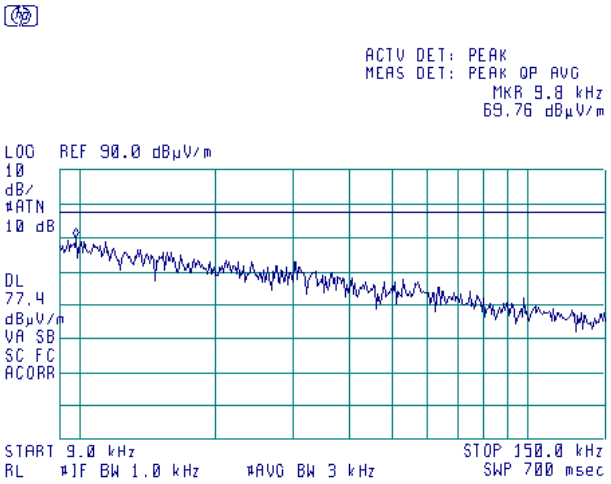
HL 0446	HL 0521	HL 0567	HL 0604	HL 0661	HL 1947	HL 1984	HL 2909
HL 2910	HL 2432	HL 3123	HL 3207	HL 3342	HL 3345		

Full description is given in Appendix A.

Test specification:	**Section 24.132, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	**Air Pressure:** 1016 hPa	**Relative Humidity:** 50 %	**Power Supply:** Battery
Remarks: Simultaneous mode: BT&PCS			

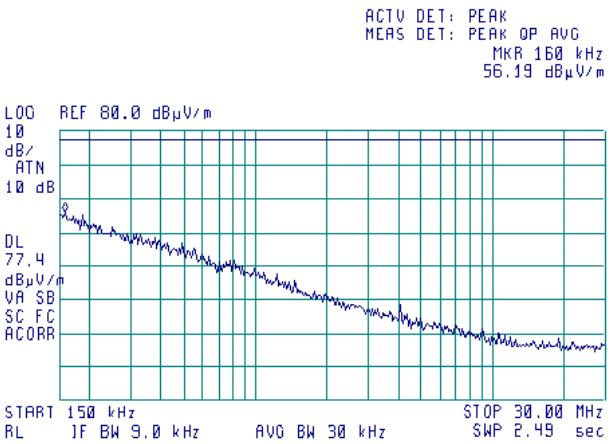
Plot 7.1.1 Radiated emission measurements in 9 - 150 kHz range

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



Plot 7.1.2 Radiated emission measurements in 0.15 - 30 MHz range

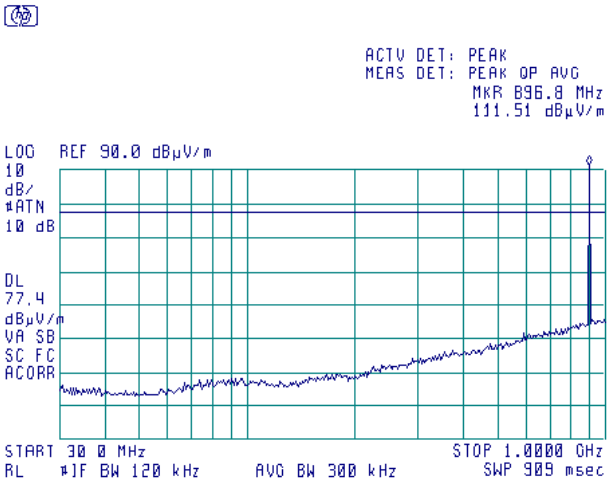
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	**Section 24.132, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	**Air Pressure:** 1016 hPa	**Relative Humidity:** 50 %	**Power Supply:** Battery
Remarks: Simultaneous mode: BT&PCS			

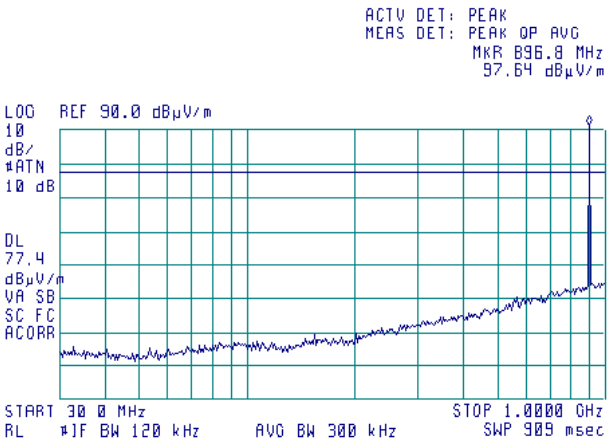
Plot 7.1.3 Radiated emission measurements in 30 - 1000 MHz range

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



Plot 7.1.4 Radiated emission measurements in 30 - 1000 MHz range

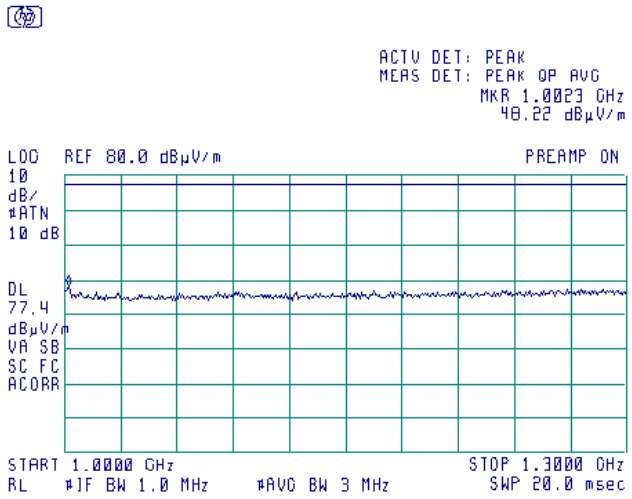
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	**Section 24.132, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	**Air Pressure:** 1016 hPa	**Relative Humidity:** 50 %	**Power Supply:** Battery
Remarks: Simultaneous mode: BT&PCS			

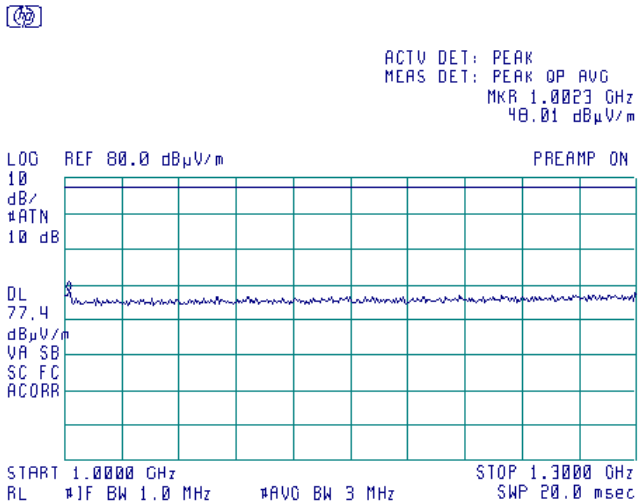
Plot 7.1.5 Radiated emission measurements in 1000 – 1300 MHz range

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



Plot 7.1.6 Radiated emission measurements in 1000 – 1300 MHz range

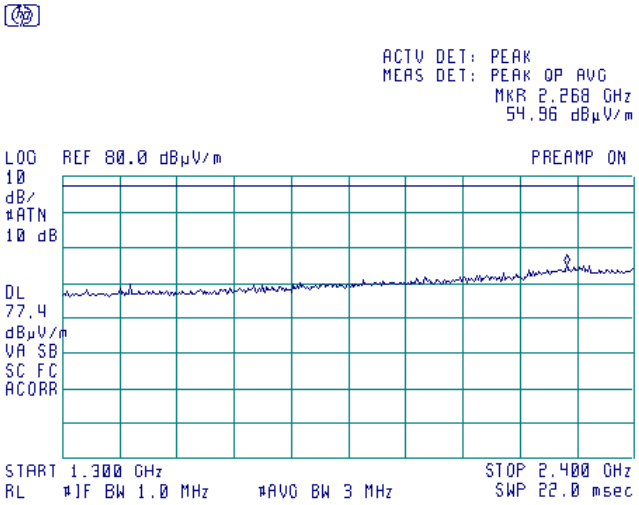
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	**Section 24.132, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	**Air Pressure:** 1016 hPa	**Relative Humidity:** 50 %	**Power Supply:** Battery
Remarks: Simultaneous mode: BT&PCS			

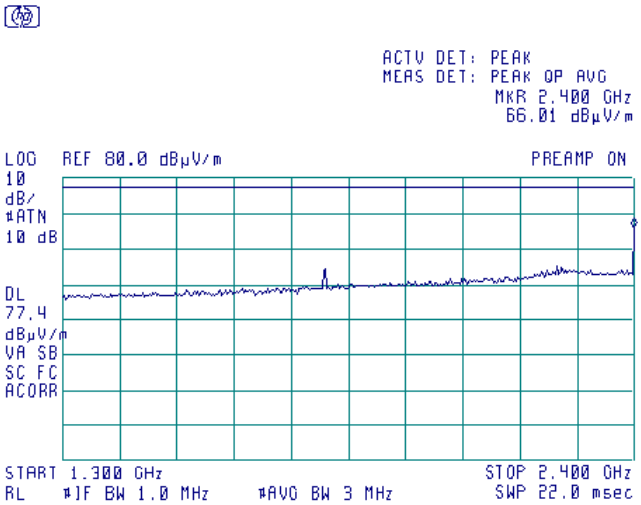
Plot 7.1.7 Radiated emission measurements in 1300 – 2400 MHz range

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



Plot 7.1.8 Radiated emission measurements in 1300 – 2400 MHz range

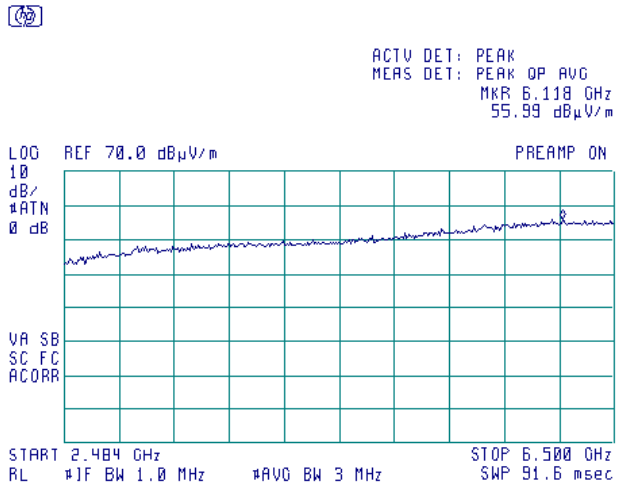
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	**Section 24.132, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	**Air Pressure:** 1016 hPa	**Relative Humidity:** 50 %	**Power Supply:** Battery
Remarks: Simultaneous mode: BT&PCS			

Plot 7.1.9 Radiated emission measurements in 2483.5 – 6500 MHz range

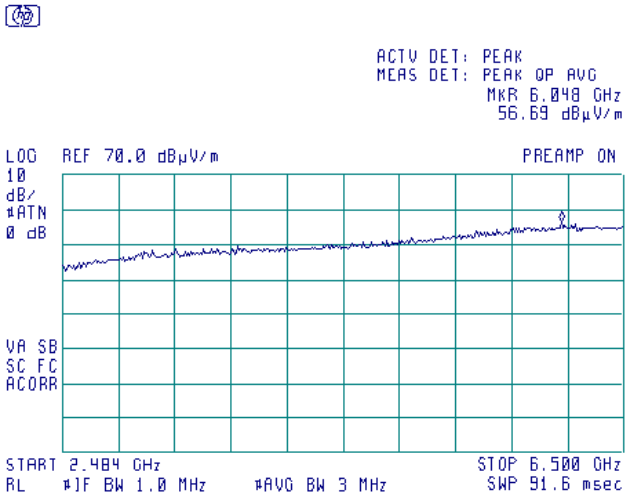
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Limit is 77.4 dbuV/m, start frequency Is 2483.5 MHz

Plot 7.1.10 Radiated emission measurements in 2483.5 – 6500 MHz range

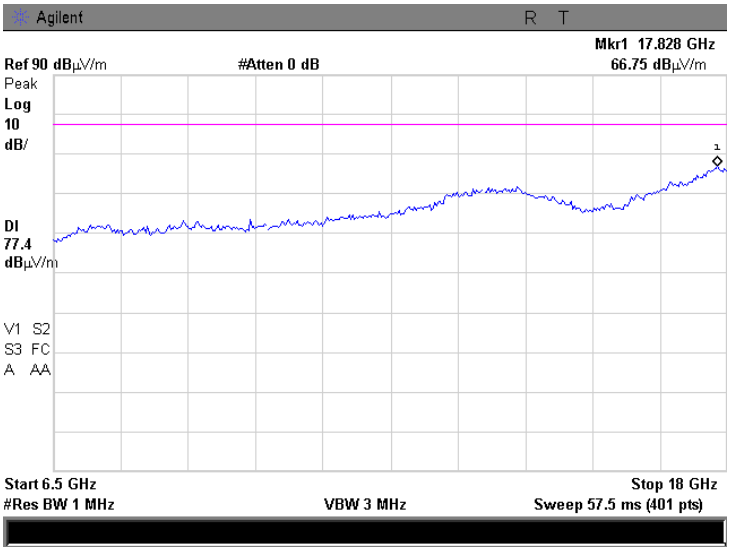
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	**Section 24.132, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	**Air Pressure:** 1016 hPa	**Relative Humidity:** 50 %	**Power Supply:** Battery
Remarks: Simultaneous mode: BT&PCS			

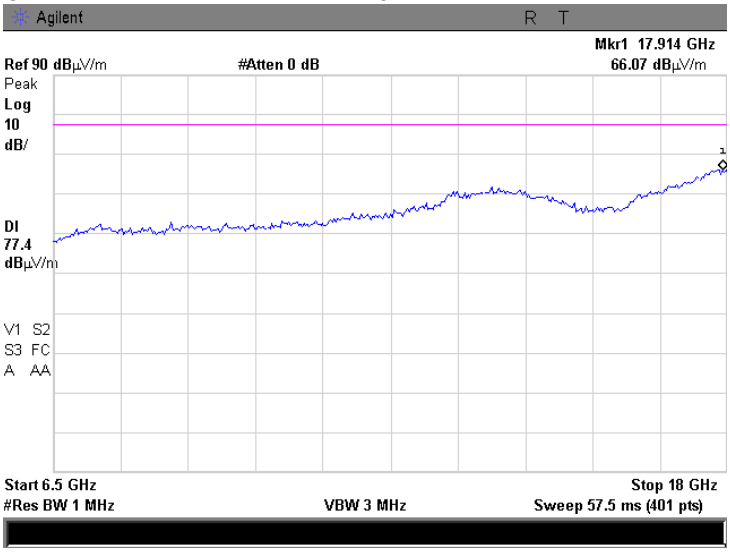
Plot 7.1.11 Radiated emission measurements in 6500 – 18000 MHz range

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



Plot 7.1.12 Radiated emission measurements in 6500 – 18000 MHz range

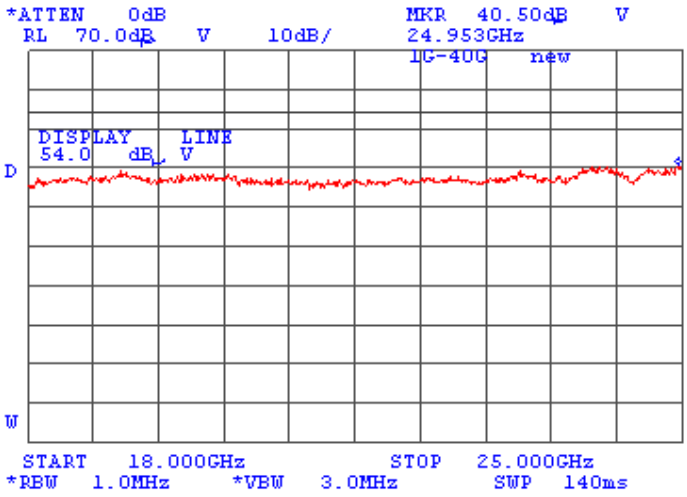
TEST SITE: Semi anechoic chamber
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Test specification:	**Section 24.132, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	**Air Pressure:** 1016 hPa	**Relative Humidity:** 50 %	**Power Supply:** Battery
Remarks: Simultaneous mode: BT&PCS			

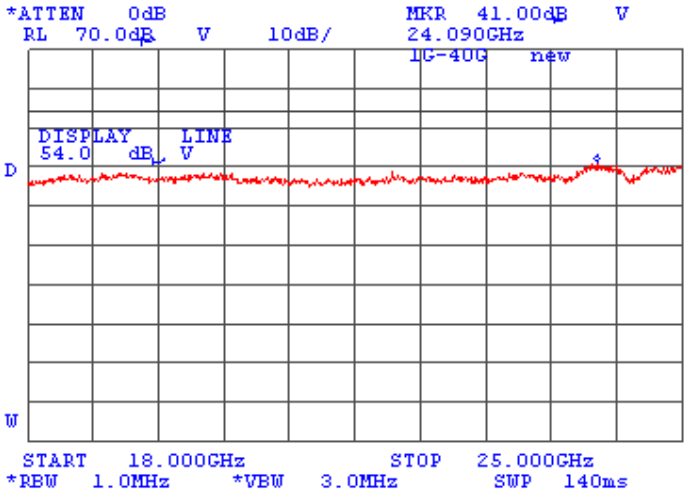
Plot 7.1.13 Radiated emission measurements in 18000 – 25000 MHz range

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



Plot 7.1.14 Radiated emission measurements in 18000 – 25000 MHz range

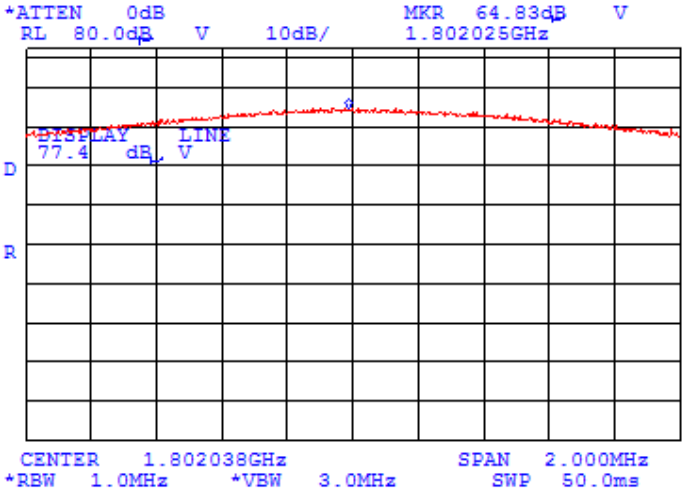
TEST SITE:	OATS
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Test specification:	**Section 24.132, Radiated spurious emissions**		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	**Air Pressure:** 1016 hPa	**Relative Humidity:** 50 %	**Power Supply:** Battery
Remarks: Simultaneous mode: BT&PCS			

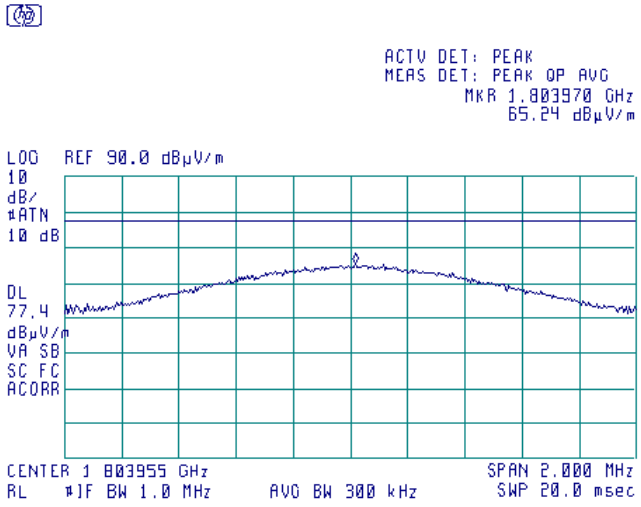
Plot 7.1.15 Radiated emission measurements at the 2nd harmonic

TEST SITE:	OATS
CARRIER FREQUENCY:	Low (901.01875 MHz)
ANTENNA POLARIZATION:	Vertical, EUT in Y-axis oriented
TEST DISTANCE:	3 m



Plot 7.1.16 Radiated emission measurements at the 2nd harmonic

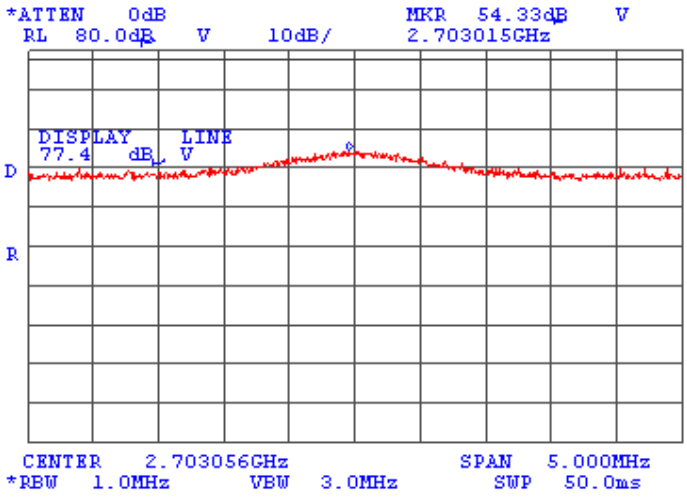
TEST SITE:	Semi anechoic chamber
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Horizontal, EUT in Y-axis oriented
TEST DISTANCE:	3 m



Test specification:	Section 24.132, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	Air Pressure: 1016 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks: Simultaneous mode: BT&PCS			

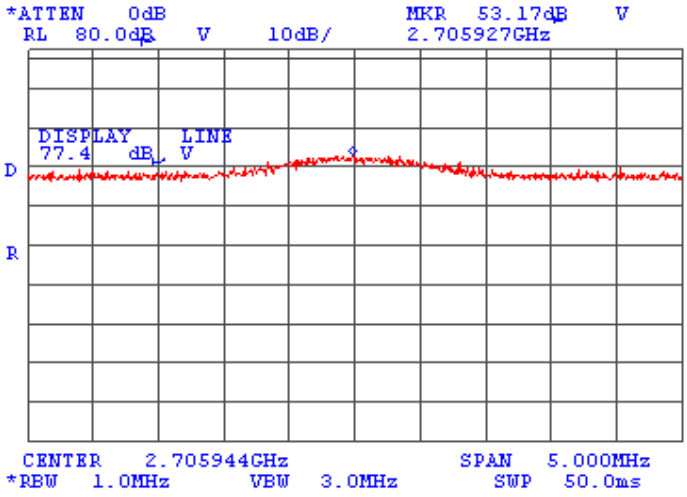
Plot 7.1.17 Radiated emission measurements at the 3rd harmonic

TEST SITE:	OATS
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Horizontal (Y axis)
TEST DISTANCE:	3 m



Plot 7.1.18 Radiated emission measurements at the 3rd harmonic

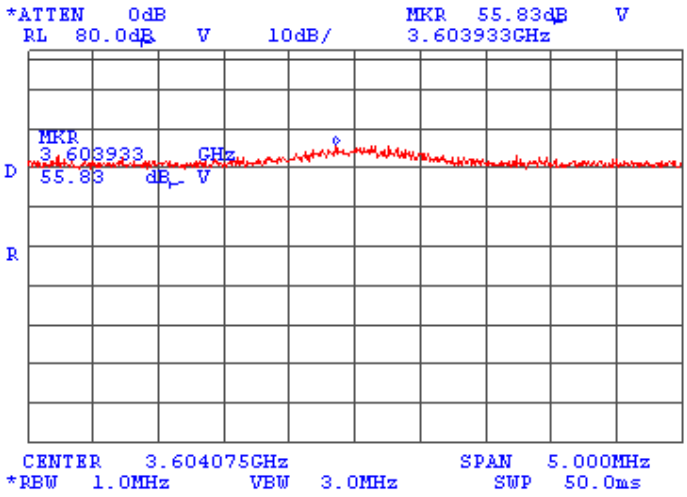
TEST SITE:	OATS
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Horizontal (Y axis)
TEST DISTANCE:	3 m



Test specification:	Section 24.132, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	Air Pressure: 1016 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks: Simultaneous mode: BT&PCS			

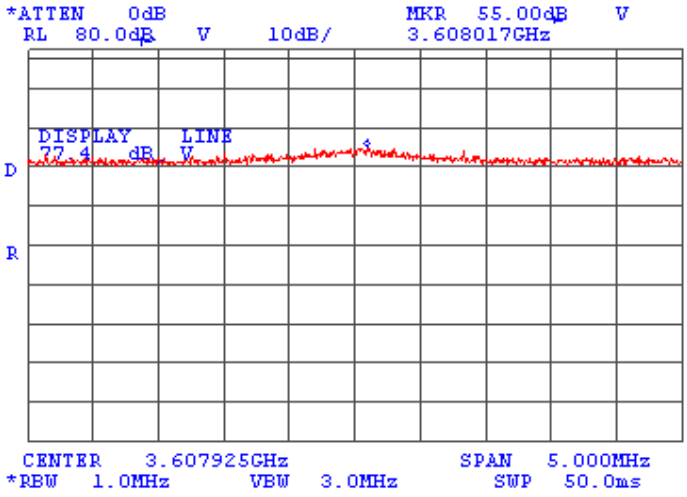
Plot 7.1.19 Radiated emission measurements at the 4th harmonic

TEST SITE: OATS
CARRIER FREQUENCY: Low
ANTENNA POLARIZATION: H (Y axis)
TEST DISTANCE: 3 m



Plot 7.1.20 Radiated emission measurements at the 4th harmonic

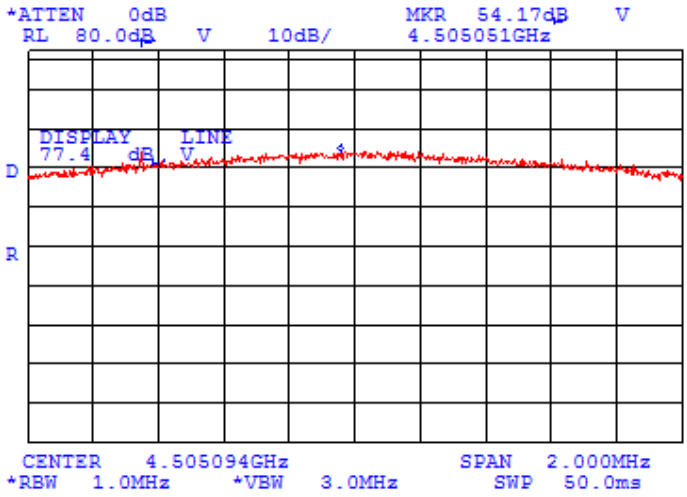
TEST SITE: OATS
CARRIER FREQUENCY: High
ANTENNA POLARIZATION: V (Y axis)
TEST DISTANCE: 3 m



Test specification:	Section 24.132, Radiated spurious emissions		
Test procedure:	47 CFR, Sections 2.1053; TIA/EIA-603-C, Section 2.2.12		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/20/2009 1:17 PM		
Temperature: 21ºC	Air Pressure: 1016 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks: Simultaneous mode: BT&PCS			

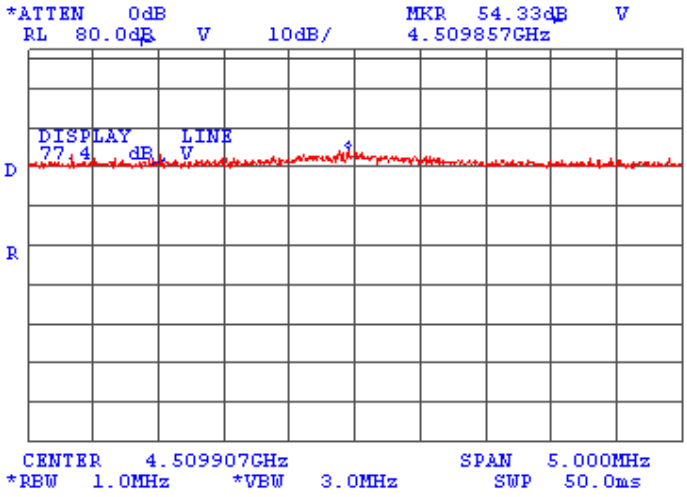
Plot 7.1.21 Radiated emission measurements at the 5th harmonic

TEST SITE:	OATS
CARRIER FREQUENCY:	Low
ANTENNA POLARIZATION:	Horizontal (Y-axis)
TEST DISTANCE:	3 m



Plot 7.1.22 Radiated emission measurements at the 5th harmonic

TEST SITE:	OATS
CARRIER FREQUENCY:	High
ANTENNA POLARIZATION:	Horizontal (Y-axis)
TEST DISTANCE:	3 m



Test specification:	Section 24.132, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/23/2008 1:11:53 PM		
Temperature: 26ºC	Air Pressure: 1014 hPa	Relative Humidity: 47 %	Power Supply: Battery
Remarks: PCS 901-902 MHz			

7.2 Effective radiated power of carrier

7.2.1 General

This test was performed to measure effective radiated power emanated by transmitter at carrier frequency. Specification test limits are given in Table 7.2.1.

Table 7.2.1 Effective radiated power limit

Assigned frequency band, MHz	ERP		Equivalent field strength limit @ 3m, dB(μV/m)*
	mW	dBm	
901-902	7000	38.45	135.8

* - Equivalent field strength limit was calculated from maximum allowed ERP as follows: E=sqrt(30×P×1.64)/r, where P is ERP in Watts, 1.64 is numeric gain of ideal dipole and r is antenna to EUT distance in meters

7.2.2 Test procedure for field strength measurements

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

7.2.2.2 The field strength of the EUT carrier frequency was measured with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna height was swept throughout the range, specified in Table 7.3.2, in both vertical and horizontal polarizations.

7.2.2.3 The worst test results (the lowest margins) were recorded in Table 7.3.2 and shown in the associated plots.

7.2.3 Test procedure for substitution ERP measurements

7.2.3.1 The test equipment was set up as shown in Figure 7.3.2 and energized.

7.2.3.2 RF signal generator was set to the EUT carrier frequency and the RF output level was preliminary adjusted to produce the same field strength as it was measured from the EUT.

7.2.3.3 The test antenna height was swept throughout the specified in Table 7.3.2 range to find maximum emission from substitution antenna and RF signal generator output was fine adjusted to produce the same field strength as it was measured from the EUT.

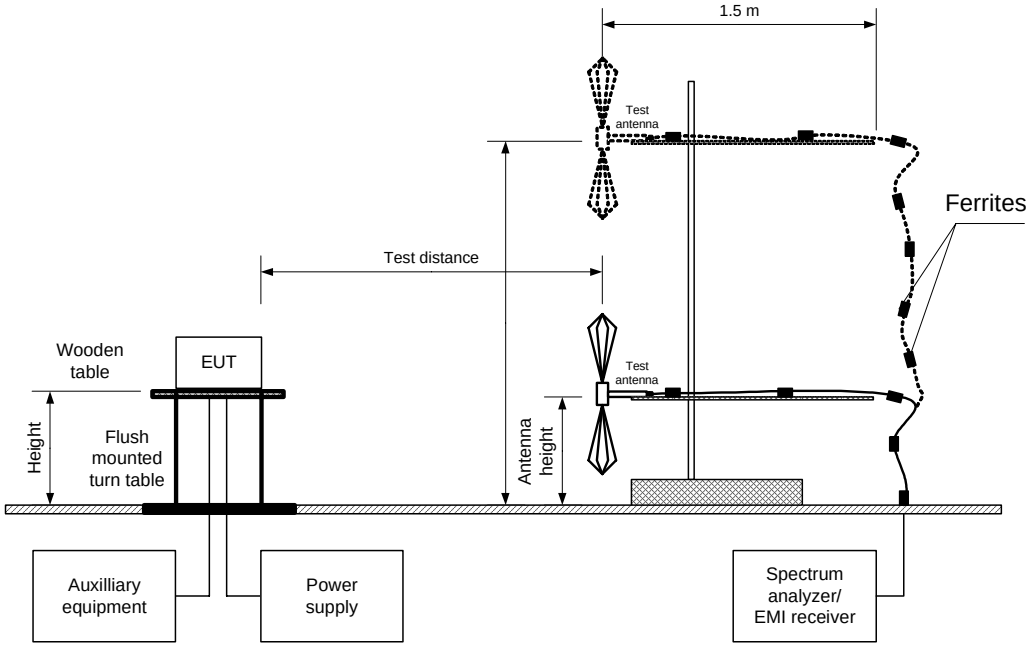
7.2.3.4 The ERP was calculated as a sum of signal generator output power in dBm and antenna gain in dBd reduced by cable loss in dB.

7.2.3.5 The above procedure was performed in both horizontal and vertical polarizations of the test antenna.

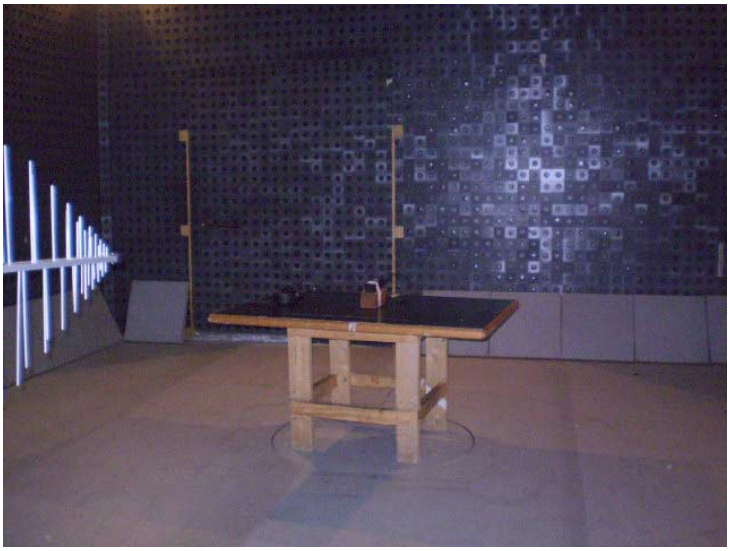
7.2.3.6 The worst test results (the lowest margins) were recorded in Table 7.2.3 and shown in the associated plots.

Test specification:	**Section 24.132, Maximum output power**		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	9/23/2008 1:11:53 PM		
Temperature: 26ºC	**Air Pressure:** 1014 hPa	**Relative Humidity:** 47 %	**Power Supply:** Battery
Remarks: PCS 901-902 MHz			

Figure 7.2.1 Setup for carrier field strength measurements

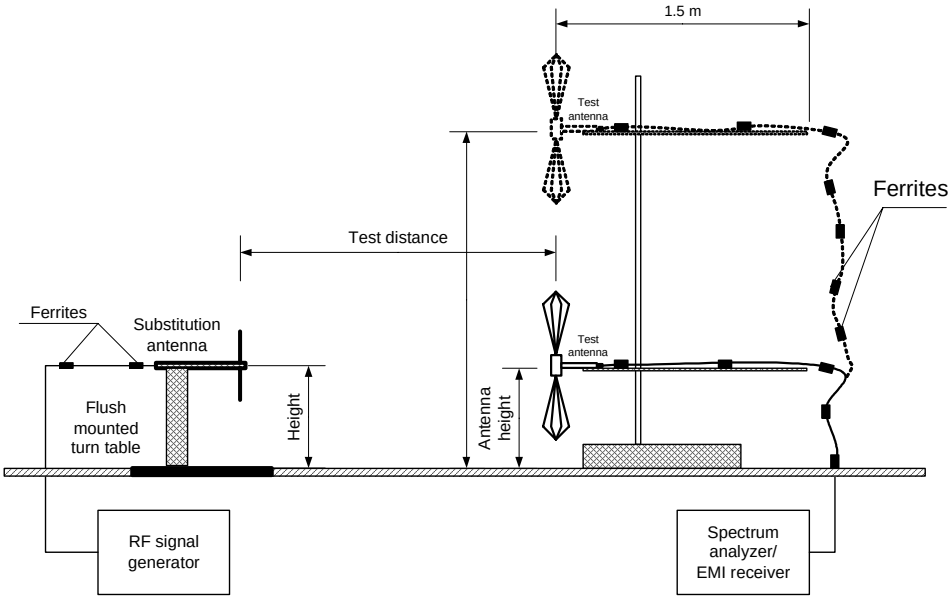


Photograph 7.2.1 Setup for carrier field strength measurements

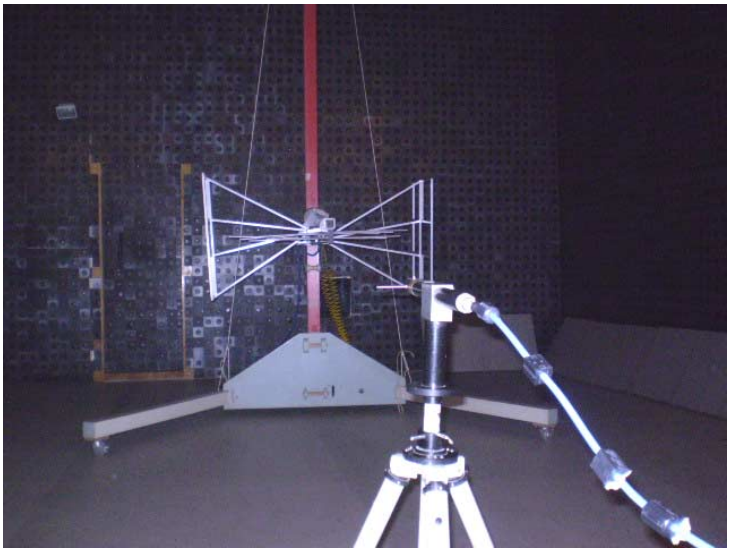


Test specification:	Section 24.132, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/23/2008 1:11:53 PM		
Temperature: 26ºC	Air Pressure: 1014 hPa	Relative Humidity: 47 %	Power Supply: Battery
Remarks: PCS 901-902 MHz			

Figure 7.2.2 Setup for substitution ERP measurements



Photograph 7.2.2 Setup for substitution ERP measurements



Test specification:	**Section 24.132, Maximum output power**		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	9/23/2008 1:11:53 PM		
Temperature: 26ºC	**Air Pressure:** 1014 hPa	**Relative Humidity:** 47 %	**Power Supply:** Battery
Remarks: PCS 901-902 MHz			

Table 7.2.2 Transmitter carrier field strength

ASSIGNED FREQUENCY RANGE: 901 - 902 MHz
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
EUT HEIGHT: 0.8 m
TEST ANTENNA HEIGHTS RANGE: 1.0 – 4.0 m
DETECTOR USED: Peak
VIDEO BANDWIDTH: > Resolution bandwidth
TEST ANTENNA TYPE: Biconical
MODULATION: 4QAM
TRANSMITTER OUTPUT POWER SETTINGS: Maximum with Whip(110mm) antenna

Frequency, MHz	Field strength, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	RBW, kHz	Antenna polarization	Antenna height, m	Turn-table position**, degrees
901.01875	135.09	135.8	-0.71	120	H	1.6	220
901.98125	134.63	135.8	-1.17		H	1.7	270

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

Table 7.2.3 Transmitter carrier ERP

TEST DISTANCE: 3 m
SUBSTITUTION ANTENNA HEIGHT: 0.8 m
TEST ANTENNA HEIGHTS RANGE: 1.0 – 4.0 m
DETECTOR USED: Peak
VIDEO BANDWIDTH: 300 kHz
SUBSTITUTION ANTENNA TYPE: Tunable dipole

Frequency, MHz	Field strength, dB(μV/m)	RBW, kHz	Antenna polarization	RF generator output, dBm	Ant gain, dBd	Cable loss, dB	ERP, dBm	Limit, dBm	Margin, dB*	Verdict
901.01875	135.09	120	H	34.09	-1.42	1.26	31.41	38.45	-7.04	Pass
901.98125	134.63		H	33.66	-1.41	1.26	30.99	38.45	-7.46	Pass

*****- Margin = ERP – specification limit.

NOTE1:EUT was tested at 3 orthogonal positions at lowest frequency and maximum was found at Z-axis orientation.
NOTE2: External 20 dB attenuator was installed at Spectrum analyzer input due to the dynamic range limitations.

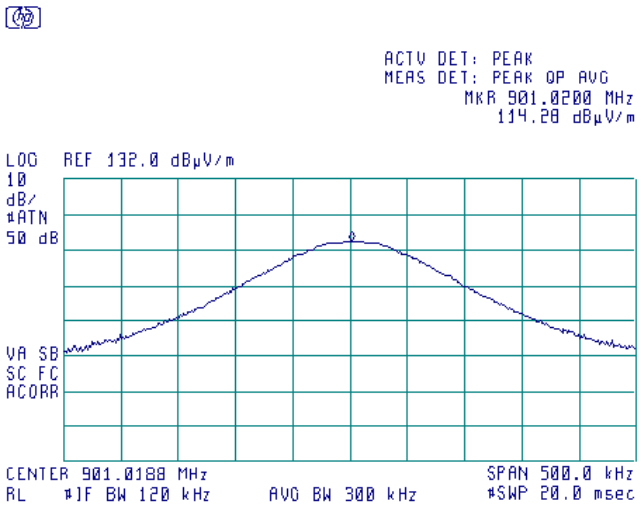
Reference numbers of test equipment used

HL 0604	HL 1521	HL 1565	HL 1948	HL 2667	HL 3122	HL 3123	HL 3385

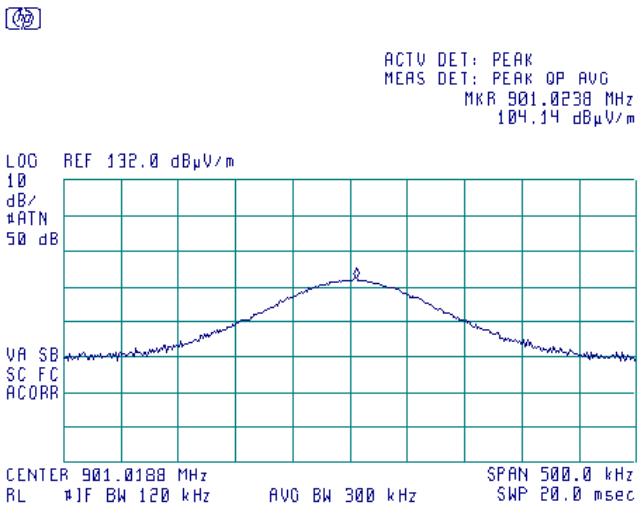
Full description is given in Appendix A.

Test specification:	Section 24.132, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/23/2008 1:11:53 PM		
Temperature: 26ºC	Air Pressure: 1014 hPa	Relative Humidity: 47 %	Power Supply: Battery
Remarks: PCS 901-902 MHz			

Plot 7.2.1 Transmitter carrier field strength at low frequency in vertical antenna polarization, EUT X-axis orientation, Whip (110mm) antenna

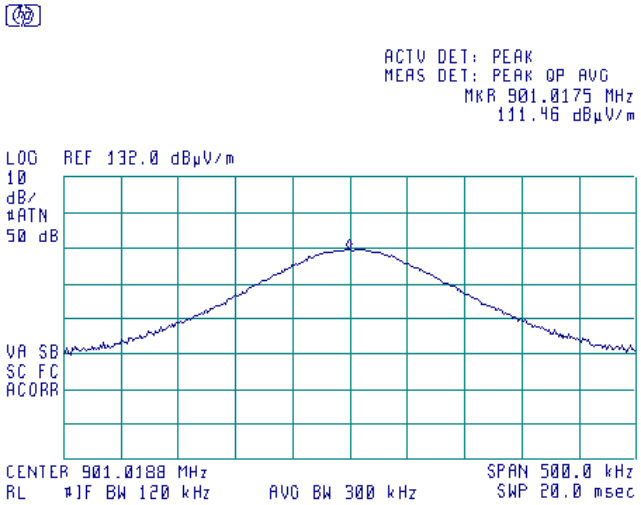


Plot 7.2.2 Transmitter carrier field strength at low frequency in horizontal antenna polarization, EUT X-axis orientation, Whip (110mm) antenna

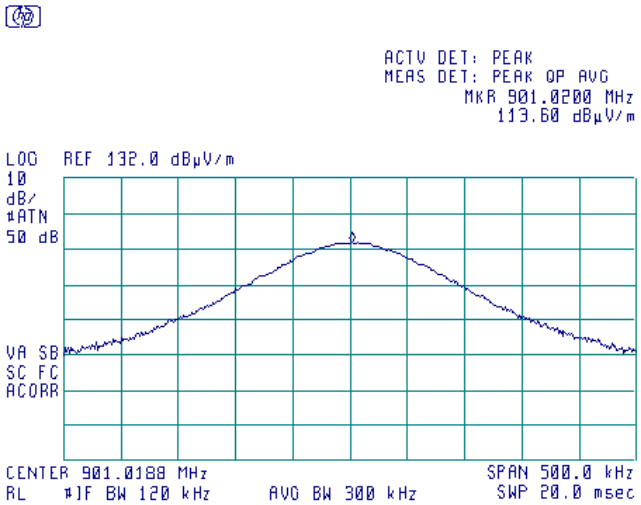


Test specification:	Section 24.132, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/23/2008 1:11:53 PM		
Temperature: 26ºC	Air Pressure: 1014 hPa	Relative Humidity: 47 %	Power Supply: Battery
Remarks: PCS 901-902 MHz			

Plot 7.2.3 Transmitter carrier field strength at low frequency in vertical antenna polarization, EUT Y-axis orientation, Whip (110mm) antenna

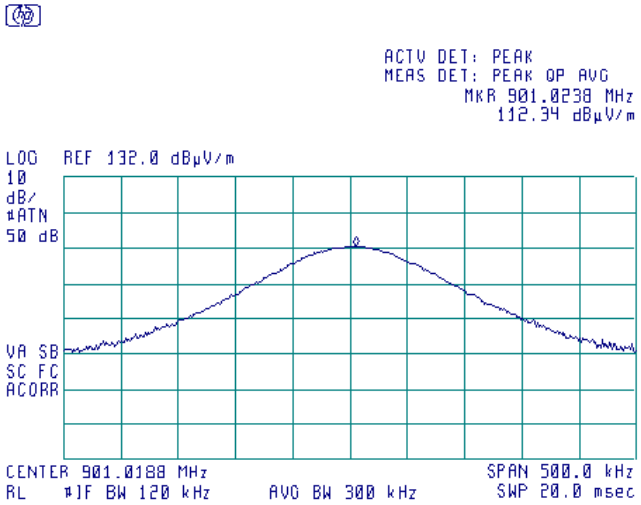


Plot 7.2.4 Transmitter carrier field strength at low frequency in horizontal antenna polarization, EUT Y-axis orientation, Whip (110mm) antenna

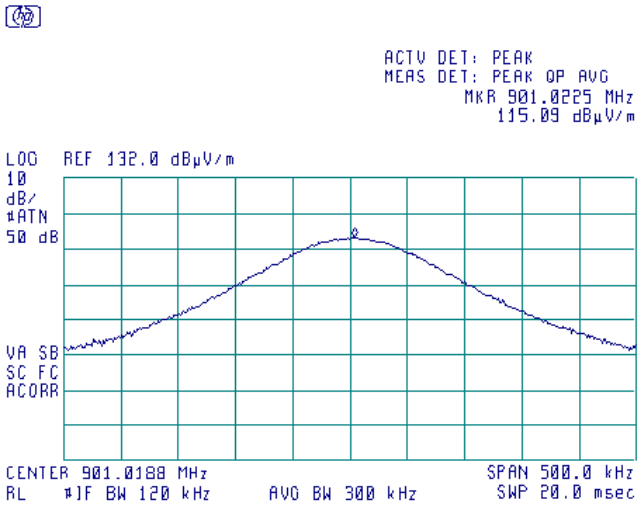


Test specification:	Section 24.132, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/23/2008 1:11:53 PM		
Temperature: 26ºC	Air Pressure: 1014 hPa	Relative Humidity: 47 %	Power Supply: Battery
Remarks: PCS 901-902 MHz			

Plot 7.2.5 Transmitter carrier field strength at low frequency in vertical antenna polarization, EUT Z-axis orientation, Whip (110mm) antenna

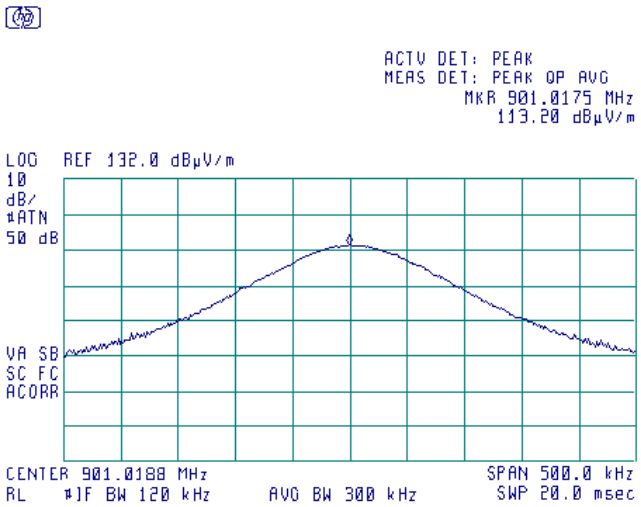


Plot 7.2.6 Transmitter carrier field strength at low frequency in horizontal antenna polarization, EUT Z-axis orientation, Whip (110mm) antenna

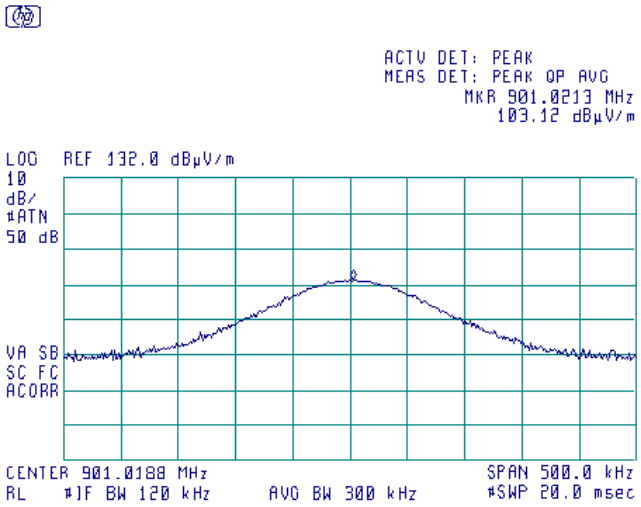


Test specification:	Section 24.132, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/23/2008 1:11:53 PM		
Temperature: 26ºC	Air Pressure: 1014 hPa	Relative Humidity: 47 %	Power Supply: Battery
Remarks: PCS 901-902 MHz			

Plot 7.2.7 Transmitter carrier field strength at low frequency in vertical antenna polarization, EUT X-axis orientation, Stubby (35mm) antenna

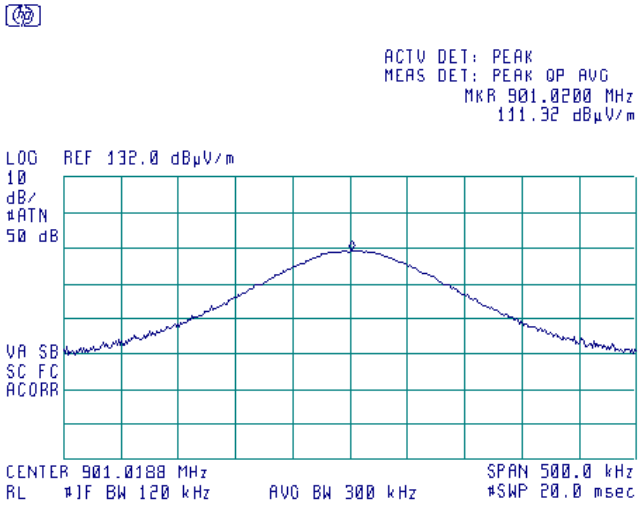


Plot 7.2.8 Transmitter carrier field strength at low frequency in horizontal antenna polarization, EUT X-axis orientation, Stubby (35mm) antenna

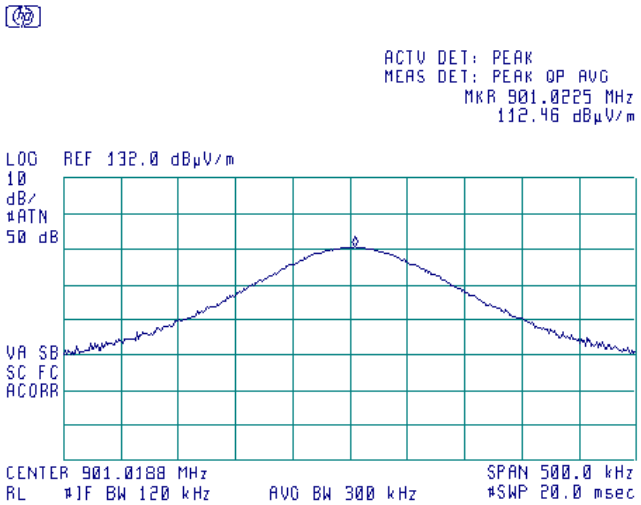


Test specification:	Section 24.132, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/23/2008 1:11:53 PM		
Temperature: 26ºC	Air Pressure: 1014 hPa	Relative Humidity: 47 %	Power Supply: Battery
Remarks: PCS 901-902 MHz			

Plot 7.2.9 Transmitter carrier field strength at low frequency in vertical antenna polarization, EUT Y-axis orientation, Stubby (35mm) antenna

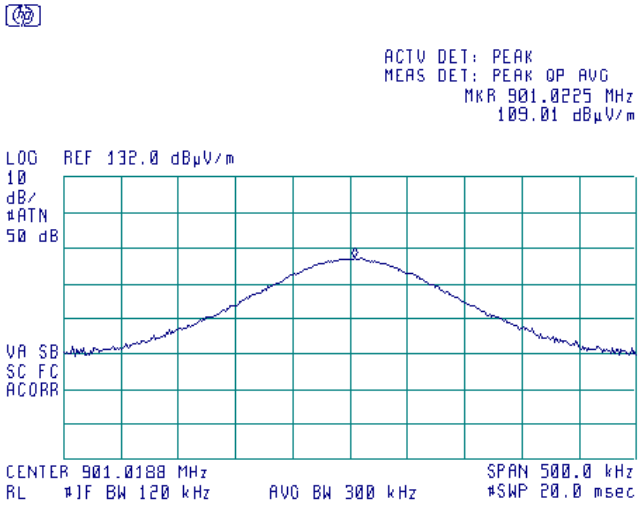


Plot 7.2.10 Transmitter carrier field strength at low frequency in horizontal antenna polarization, EUT Y-axis orientation, Stubby (35mm) antenna

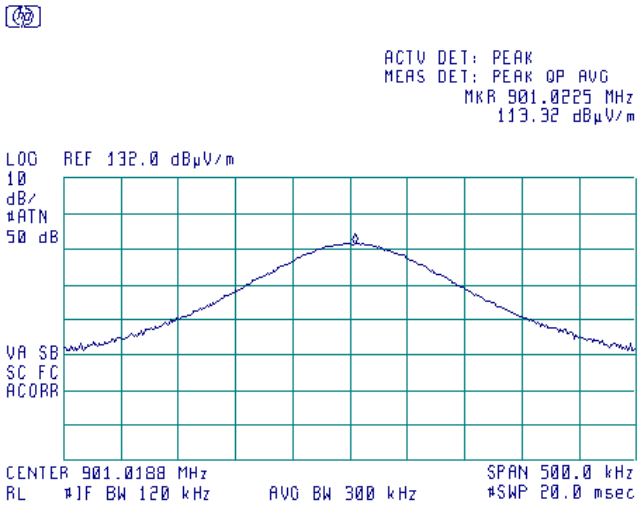


Test specification:	Section 24.132, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/23/2008 1:11:53 PM		
Temperature: 26ºC	Air Pressure: 1014 hPa	Relative Humidity: 47 %	Power Supply: Battery
Remarks: PCS 901-902 MHz			

Plot 7.2.11 Transmitter carrier field strength at low frequency in vertical antenna polarization, EUT Z-axis orientation, Stubby (35mm) antenna

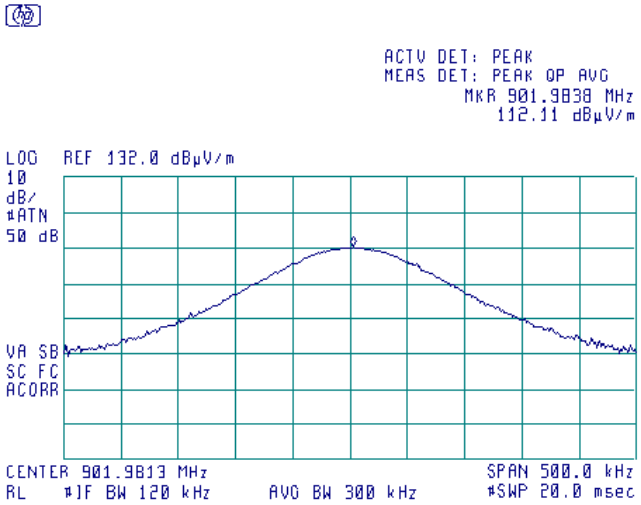


Plot 7.2.12 Transmitter carrier field strength at low frequency in horizontal antenna polarization, EUT Z-axis orientation, Stubby (35mm) antenna

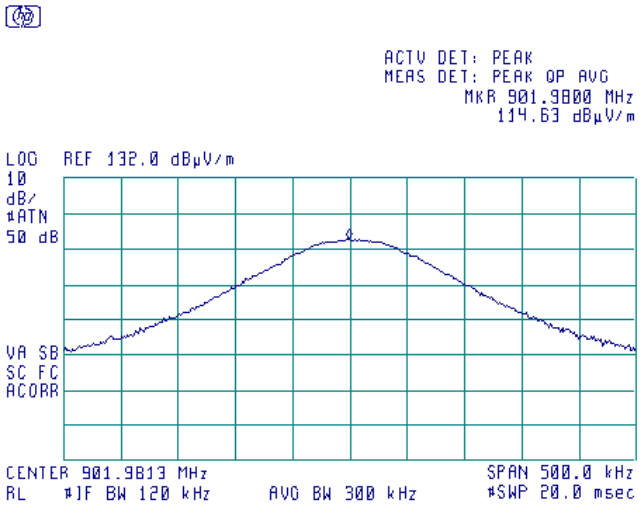


Test specification:	Section 24.132, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/23/2008 1:11:53 PM		
Temperature: 26ºC	Air Pressure: 1014 hPa	Relative Humidity: 47 %	Power Supply: Battery
Remarks: PCS 901-902 MHz			

Plot 7.2.13 Transmitter carrier field strength at high frequency in vertical antenna polarization, EUT Z-axis orientation, Whip (110mm) antenna

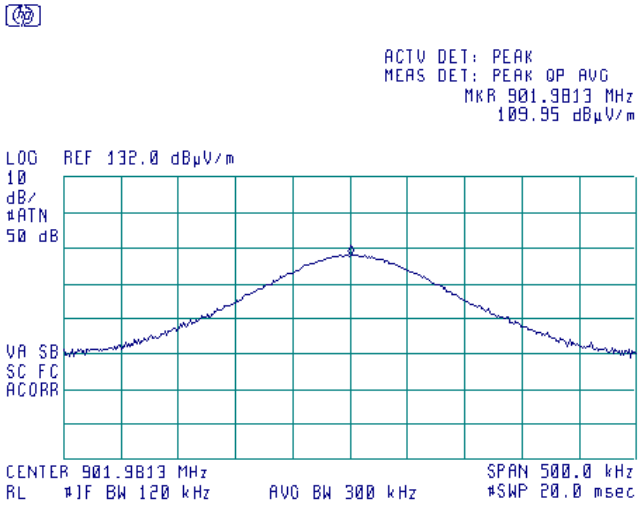


Plot 7.2.14 Transmitter carrier field strength at high frequency in horizontal antenna polarization, EUT Z-axis orientation, Whip (110mm) antenna

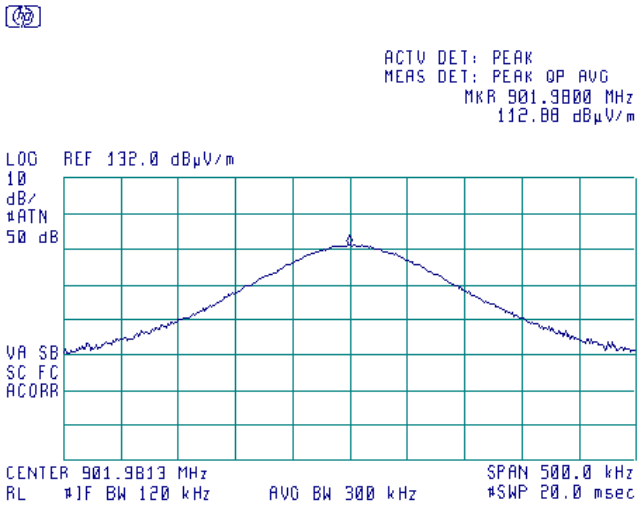


Test specification:	Section 24.132, Maximum output power		
Test procedure:	47 CFR, Section 2.1046; TIA/EIA-603-A, Section 2.2.1		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	9/23/2008 1:11:53 PM		
Temperature: 26ºC	Air Pressure: 1014 hPa	Relative Humidity: 47 %	Power Supply: Battery
Remarks: PCS 901-902 MHz			

Plot 7.2.15 Transmitter carrier field strength at high frequency in vertical antenna polarization, EUT Z-axis orientation, Stubby (35mm) antenna



Plot 7.2.16 Transmitter carrier field strength at high frequency in horizontal antenna polarization, EUT Z-axis orientation, Stubby (35mm) antenna



8 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	29-Jun-08	29-Jun-09
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
0554	Amplifier, 2-18 GHz RF	Miteq	AFD4	104300	28-Feb-08	28-Feb-09
0567	Antenna, Dipole, Tunable, 500 - 1000 MHz	Electro-Metrics	TDS-25/30-2	298	29-Jan-09	29-Jan-10
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	10-Jan-09	10-Jan-10
0661	Generator Swept Signal, 10 MHz to 40 GHz, + 10 dBm	HP	83640B	3614A002 66	17-Sep-08	17-Sep-09
1521	Cable RF, 1.0 m, BNC/BNC	Telequis	MIL-C-17F-RG 058 CU	1521	03-Sep-08	03-Sep-09
1565	Antenna, Dipole, Tunable 500 - 1000 MHz	Electro-Metrics	TDS-30-2	334	29-Jan-09	29-Jan-10
1947	Cable 18GHz, 6.5 m, blue	Rhophase Microwave Limited	NPS-1803A-6500-NPS	T4974	05-Oct-08	05-Oct-09
1948	Attenuator 10 dB, DC-18 GHz	Weinschel	NA	1948	01-Jan-09	01-Jan-10
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W	EMC Test Systems	3115	9911-5964	03-Mar-08	03-Mar-09
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	03-Mar-08	03-Mar-09
2667	Signal generator, 9 kHz - 3.3 GHz	Rohde & Schwarz	SML03	101909	25-Sep-08	25-Sep-10
2780	EMC analyzer, 100 Hz to 26.5 GHz	Agilent Technologies	E7405A	MY451024 6	11-Jun-07	11-Jun-09
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY414447 62	07-May-07	07-May-09
2910	Cable 18 GHz, 3 m, SMA-SMA	Gore	NA	989370	05-Oct-08	05-Oct-09
3122	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	3122	13-Dec-08	13-Dec-09
3123	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	3123	13-Dec-08	13-Dec-09
3207	Cable 40GHz, 1.2 m	Gore	GOR245	05118337	10-Jun-08	10-Jun-09
3342	High Pass Filter, 50 Ohm, 2000 to 5200 MHz.	Mini-Circuits	VHF-1910+	NA	24-Oct-08	24-Oct-09
3345	High Pass Filter, 50 Ohm, 4250 to 10000 MHz.	Mini-Circuits	VHF-3800+	NA	24-Oct-08	24-Oct-09
3385	Microwave Cable Assembly, 18.0 GHz, 1.0 m, N type/N type	Suhner Sucoflex	104EA	3385	12-Feb-09	12-Feb-10

9 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Conducted carrier power at RF antenna connector	Below 12.4 GHz: ± 1.7 dB 12.4 GHz to 40 GHz: ± 2.3 dB
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB 2.9 GHz to 6.46 GHz: ± 3.5 dB 6.46 GHz to 13.2 GHz: ± 4.3 dB 13.2 GHz to 22.0 GHz: ± 5.0 dB 22.0 GHz to 26.8 GHz: ± 5.5 dB 26.8 GHz to 40.0 GHz: ± 4.8 dB
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB 150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 3 m measuring distance Horizontal polarization Vertical polarization	 Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 6.0 dB Biconical antenna: ± 5.7 dB Log periodic antenna: ± 6.0 dB Double ridged horn antenna: ± 6.0 dB

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

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11 APPENDIX D Specification references

FCC 47CFR part 15: 2008	Radio Frequency Devices.
Public notice DA 00- 705: 2000	Filing and measurement guidelines for frequency hopping spread spectrum systems.
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4: 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.
FCC 47CFR part 90: 2007	Private Land Mobile Radio Services
FCC 47CFR part 24: 2007	Personal Communications services
FCC 47CFR part 2: 2007	Frequency allocations and radio treaty matters; general rules and regulations
ANSI/TIA/EIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

12 APPENDIX E Test equipment correction factors

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

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

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

Antenna factor
Dipole antenna
Model TDS-30-2, S/N 334, HL 1565

Frequency, MHz	Antenna factor, dB(1/m)
500	23.7
550	24.1
600	24.0
700	24.5
800	27.0
900	27.6
1000	28.1

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

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

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

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

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

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

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

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

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

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

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

Cable loss
Cable coaxial, Gore, 18 GHz, 3m, SMA-SMA, S/N 989370
HL 2910

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.07	5750	2.97	12000	5.05
30	0.19	6000	2.91	12250	4.44
100	0.36	6250	3.23	12500	4.82
250	0.53	6500	3.42	12750	5.22
500	0.77	6750	3.17	13000	5.02
750	0.94	7000	3.56	13250	5.00
1000	1.10	7250	3.77	13500	5.09
1250	1.19	7500	3.48	13750	4.70
1500	1.35	7750	3.81	14000	5.03
1750	1.51	8000	3.82	14250	5.17
2000	1.57	8250	3.62	14500	4.92
2250	1.69	8500	3.95	14750	4.91
2500	1.76	8750	4.00	15000	5.03
2750	1.83	9000	3.80	15250	4.93
3000	2.02	9250	4.09	15500	5.28
3250	2.17	9500	4.12	15750	5.60
3500	2.13	9750	4.11	16000	5.16
3750	2.23	10000	4.36	16250	5.45
4000	2.40	10250	4.75	16500	5.78
4250	2.31	10500	4.61	16750	5.47
4500	2.52	10750	4.26	17000	5.21
4750	2.77	11000	4.62	17250	5.53
5000	2.82	11250	4.55	17500	5.53
5250	2.77	11500	4.59	17750	5.71
5500	3.04	11750	5.20	18000	5.77

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		

Cable loss
Cable coaxial, GORE-TEX, GOR245, 40 GHz, 1.2 m, SMA-SMA, S/N 05118337
HL 3207

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	0.17	5000	1.54	10200	2.26	15500	2.77	31500	4.07
30	0.14	5100	1.54	10300	2.26	15600	2.78	32000	4.03
50	0.16	5200	1.56	10400	2.24	15700	2.81	32500	3.93
100	0.22	5300	1.59	10500	2.23	15800	2.81	33000	4.00
200	0.30	5400	1.60	10600	2.25	15900	2.84	33500	4.09
300	0.38	5500	1.61	10700	2.31	16000	2.91	34000	4.08
400	0.44	5600	1.63	10800	2.34	16100	2.92	34500	4.13
500	0.48	5700	1.66	10900	2.38	16200	2.88	35000	4.15
600	0.54	5800	1.68	11000	2.38	16300	2.90	35500	4.18
700	0.58	5900	1.68	11100	2.38	16400	2.93	36000	4.22
800	0.62	6000	1.71	11200	2.37	16500	2.92	36500	4.25
900	0.65	6100	1.71	11300	2.38	16600	2.97	37000	4.26
1000	0.69	6200	1.73	11400	2.40	16700	3.02	37500	4.40
1100	0.73	6300	1.75	11500	2.41	16800	3.02	38000	4.40
1200	0.76	6400	1.76	11600	2.44	16900	3.01	38500	4.52
1300	0.78	6500	1.78	11700	2.44	17000	3.04	39000	4.54
1400	0.81	6600	1.77	11800	2.44	17100	3.08	39500	4.36
1500	0.85	6700	1.79	11900	2.45	17200	3.05	40000	4.48
1600	0.87	6800	1.80	12000	2.46	17300	3.06		
1700	0.90	6900	1.83	12100	2.45	17400	3.06		
1800	0.93	7000	1.84	12200	2.45	17500	3.07		
1900	0.96	7100	1.86	12300	2.48	17600	3.08		
2000	0.95	7200	1.88	12400	2.49	17700	3.09		
2100	0.98	7300	1.86	12500	2.51	17800	3.12		
2200	1.00	7400	1.87	12600	2.53	17900	3.09		
2300	1.02	7500	1.90	12700	2.51	18000	3.08		
2400	1.04	7600	1.91	12800	2.52	18500	3.11		
2500	1.06	7700	1.95	12900	2.54	19000	3.14		
2600	1.08	7800	1.98	13000	2.56	19500	3.20		
2700	1.11	7900	1.99	13100	2.56	20000	3.24		
2800	1.14	8000	1.98	13200	2.59	20500	3.31		
2900	1.15	8100	1.98	13300	2.59	21000	3.38		
3000	1.17	8200	2.00	13400	2.60	21500	3.44		
3100	1.19	8300	2.01	13500	2.65	22000	3.45		
3200	1.20	8400	2.05	13600	2.71	22500	3.45		
3300	1.24	8500	2.07	13700	2.71	23000	3.47		
3400	1.26	8600	2.08	13800	2.69	23500	3.47		
3500	1.27	8700	2.09	13900	2.67	24000	3.54		
3600	1.28	8800	2.09	14000	2.68	24500	3.62		
3700	1.32	8900	2.10	14100	2.68	25000	3.73		
3800	1.32	9000	2.12	14200	2.74	25500	3.77		
3900	1.35	9100	2.12	14300	2.77	26000	3.71		
4000	1.36	9200	2.15	14400	2.80	26500	3.73		
4100	1.39	9300	2.13	14600	2.74	27000	3.73		
4200	1.40	9400	2.16	14700	2.73	27500	3.78		
4300	1.41	9500	2.17	14800	2.75	28000	3.81		
4400	1.43	9600	2.17	14900	2.75	28500	3.81		
4500	1.47	9700	2.18	15000	2.77	29000	3.80		
4600	1.46	9800	2.16	15100	2.76	29500	3.81		
4700	1.49	9900	2.17	15200	2.76	30000	3.89		
4800	1.50	10000	2.20	15300	2.77	30500	4.03		
4900	1.52	10100	2.22	15400	2.79	31000	4.01		

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