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TEST REPORT

**ACCORDING TO: FCC 47CFR part 15 subpart C § 15.247 (DTS), subpart B;
RSS-210 issue 8 Annex 8, RSS-Gen issue 3 section 6**

FOR:

**Telematics Wireless Ltd.
Water meter
Model: 2WM-LG
FCC ID:NTAWMLG**

This report is in conformity with ISO/ IEC 17025. The "A2LA Accredited" symbol endorsement applies only to the tests and calibrations that are listed in the scope of Hermon Laboratories accreditation. The test results relate only to the items tested. This test report shall not be reproduced in any form except in full with the written approval of Hermon Laboratories Ltd.



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2 Applicant information

Client name: Telematics Wireless Ltd.
Address: 26 Hamelaha street, POB 1911, Holon, 58117, Israel
Telephone: +972 3557 5767
Fax: +972 3557 5753
E-mail: slavas@t1mw.com
Contact name: Mr. Slava Snitkovsky

3 Equipment under test attributes

Product name: Water meter
Product type: Transceiver
Model(s): 2WM-LG
Serial number: 385796
Hardware version: A
Software release: 01.11
Receipt date 8/15/2011

4 Manufacturer information

Manufacturer name: Telematics Wireless Ltd.
Address: 26 Hamelaha street, POB 1911, Holon, 58117, Israel
Telephone: +972 3557 5767
Fax: +972 3557 5753
E-Mail: slavas@t1mw.com
Contact name: Mr. Slava Snitkovsky

5 Test details

Project ID: 22412
Location: Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel
Test started: 8/15/2011
Test completed: 9/19/2011
Test specification(s): FCC 47CFR part 15:2010, subpart C §15.247 (DTS); RSS-210 issue 8 Annex 8
FCC 47CFR part 15:2010 subpart B §15.109; RSS-Gen issue 3 section 6.1



6 Tests summary

Test	Status
Transmitter characteristics	
FCC Section 15.247(a)2 / RSS-210 section A8.2(a), 6 dB bandwidth	Pass
FCC Section 15.247(b)3/ RSS-210 section A8.4(4), Peak output power	Pass
FCC section 15.247(i) / RSS-Gen section 5.6, RF exposure	Pass, the exhibit to the application of certification is provided
FCC Section 15.247(d) / RSS-210 section A8.5, Radiated spurious emissions	Pass
FCC Section 15.247(d), RSS-210 section A8.5, Emissions at band edges	Pass
FCC Section 15.247(e) / RSS-210 section A8.2(b), Peak power density	Pass
FCC section 15.203 / RSS-Gen section 7.1.2, Antenna requirement	Pass
FCC section 15.207(a) / RSS-Gen section 7.2.4, Conducted emission	Not required
Unintentional emissions	
FCC section 15.107, Conducted emission at AC power port	Not required
FCC section 15.109, RSS-Gen section 6.1, Radiated emission	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:	Mrs. E. Pitt, test engineer	September 19, 2011	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	October 5, 2011	
Approved by:	Mr. M. Nikishin, EMC and radio group leader	October 27, 2011	

7 EUT description

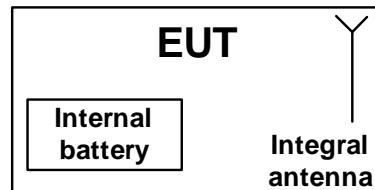
7.1 General information

The EUT, 2WM-LG, is a 2-Way RF unit which is connected to an existing Meter/Register via wires. The RF capabilities enable the transmission of the meter reading and some extra information to a remote collecting unit. In addition specific parameters can be programmed via the RF link. The EUT is powered from two 3.6 VDC lithium internal batteries. The tests were performed with the EUT using new batteries.

7.2 Ports and lines

Port type	Port description	Connected		Connector type	Qty.	Cable type	Cable length
		From	To				
Signal	8 signal ports	EUT	Open circuit	Terminal block	1	unshielded	1 m

7.3 Test configuration



7.4 Changes made in the EUT

No changes were implemented.



7.5 Transmitter characteristics

Type of equipment									
	Stand-alone (Equipment with or without its own control provisions)								
X	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								
Assigned frequency range	902-928 MHz								
Operating frequency range	905.43 - 924.75 MHz								
Maximum rated output power	At transmitter 50 Ω RF output connector			NA					
	Peak output power			19.24 dBm					
Is transmitter output power variable?	X	No							
		continuous variable							
	Yes	stepped variable with stepsize			dB				
		minimum RF power			dBm				
		maximum RF power			dBm				
Antenna connection									
unique coupling	standard connector	X	integral	with temporary RF connector					
		X		without temporary RF connector					
Antenna/s technical characteristics									
Type	Manufacturer	Model number		Gain					
Integral	Telematics Wireless Ltd.	Printed inverted F antenna		0.5 dBi					
Transmitter aggregate data rate/s	60 kbps								
Type of modulation	BPSK								
Modulating test signal (baseband)	PRBS								
Maximum transmitter duty cycle in normal use	1%								
Transmitter duty cycle supplied for test	1%								
Transmitter power source									
X	Battery	Nominal rated voltage	3.6VDC	Battery type	Lithium				
	DC	Nominal rated voltage	VDC						
	AC mains	Nominal rated voltage	VAC	Frequency	Hz				
Common power source for transmitter and receiver		X	yes		no				
Spread spectrum parameters for transmitters tested per FCC 15.247 only									
DSSS	Chip rate	900 kbps							
	Spectrum width	0.9 MHz							

Test specification:	Section 15.247(a)2, RSS-210 section A8.2(a), 6 dB bandwidth		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	9/13/2011		
Temperature: 22 °C	Air Pressure: 1010 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks:			

8 Transmitter tests according to 47CFR part 15 subpart C and RSS-210 Annex 8 requirements

8.1 Minimum 6 dB bandwidth

8.1.1 General

This test was performed to measure 6 dB bandwidth of the EUT carrier frequency. Specification test limits are given in Table 8.1.1.

Table 8.1.1 The 6 dB bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points*, dBc	Minimum bandwidth, kHz
902.0 – 928.0		
2400.0 – 2483.5	6.0	500.0
5725.0 – 5850.0		

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

Table 8.1.2 The 99% bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points	Limit, kHz
902.0 – 928.0		
2400.0 – 2483.5	99%	NA
5725.0 – 5850.0		

8.1.2 Test procedure

8.1.2.1 The EUT was set up as shown in Figure 8.1.1, energized and its proper operation was checked.

8.1.2.2 The EUT was set to transmit modulated carrier.

8.1.2.3 The transmitter minimum 6 dB bandwidth was measured with spectrum analyzer as frequency delta between reference points on modulation envelope and provided in Table 8.1.3 and associated plot.

Figure 8.1.1 The 6 dB bandwidth test setup



Test specification:	Section 15.247(a)2, RSS-210 section A8.2(a), 6 dB bandwidth		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	9/13/2011		
Temperature: 22 °C	Air Pressure: 1010 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks:			

Table 8.1.3 The 6 dB bandwidth test results

ASSIGNED FREQUENCY BAND: 902 – 928 MHz
 DETECTOR USED: Peak
 SWEEP MODE: Max hold
 SWEEP TIME: Auto
 RESOLUTION BANDWIDTH: 100 kHz
 VIDEO BANDWIDTH: 300 kHz
 MODULATION ENVELOPE REFERENCE POINTS: 6.0 dBc
 MODULATION: BPSK

Carrier frequency, MHz	6 dB bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
Low frequency 905.43	870	500	370	Pass
Mid frequency 915	875	500	375	Pass
High frequency 924.75	855	500	355	Pass

Table 8.1.4 The 99% occupied bandwidth test results

ASSIGNED FREQUENCY BAND: 902-928 MHz
 DETECTOR USED: Peak
 SWEEP MODE: Max hold
 SWEEP TIME: Auto
 RESOLUTION BANDWIDTH: 10 kHz
 VIDEO BANDWIDTH: 30 kHz
 MODULATION ENVELOPE REFERENCE POINTS: 99% OBW

Carrier frequency, MHz	99% bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
Low frequency 905.43	1210	500	710	Pass
Mid frequency 915	1217	500	717	Pass
High frequency 924.75	1220	500	720	Pass

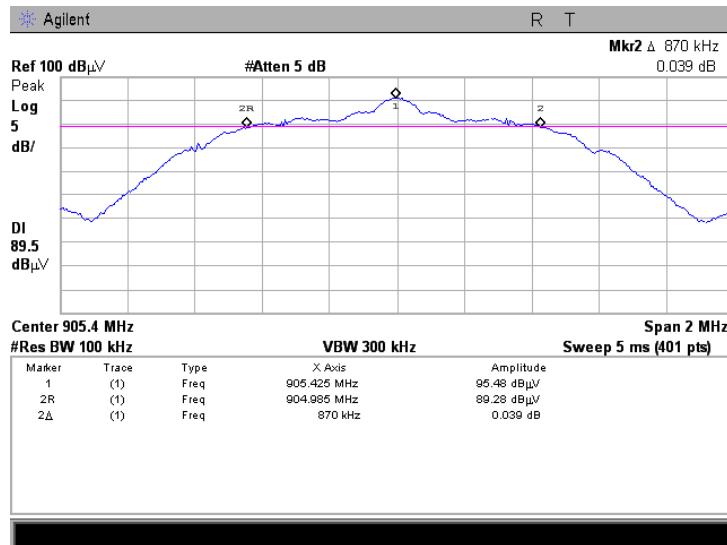
Reference numbers of test equipment used

HL 2909	HL 3903						
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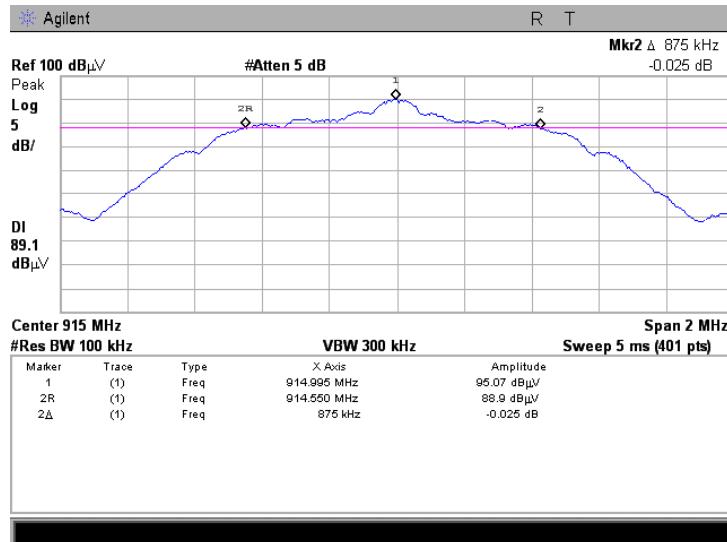
Full description is given in Appendix A.

Test specification:	Section 15.247(a)2, RSS-210 section A8.2(a), 6 dB bandwidth		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	Verdict:	
Date(s):	9/13/2011	PASS	
Temperature: 22 °C	Air Pressure: 1010 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks:			

Plot 8.1.1 The 6 dB bandwidth test result at low frequency

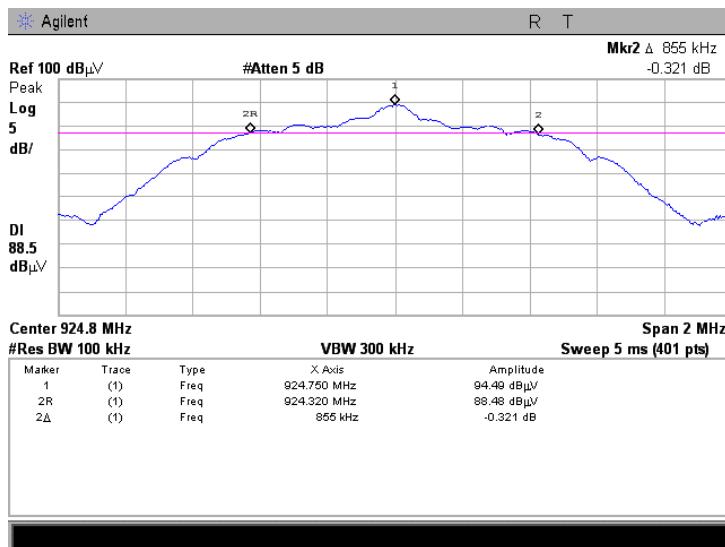


Plot 8.1.2 The 6 dB bandwidth test result at mid frequency



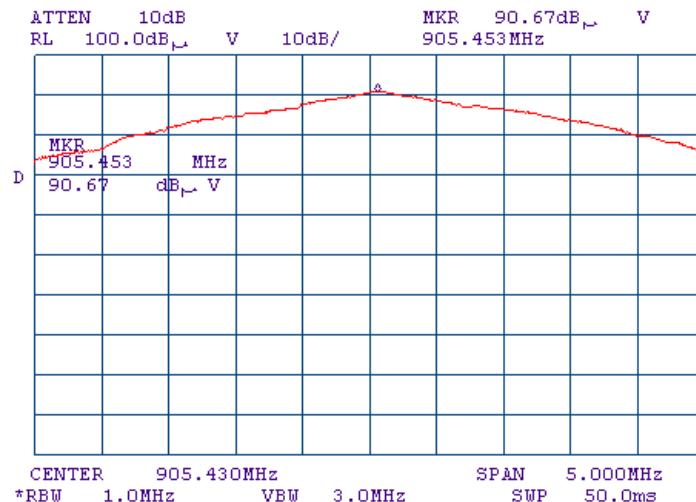
Test specification:	Section 15.247(a)2, RSS-210 section A8.2(a), 6 dB bandwidth		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	Verdict:	
Date(s):	9/13/2011	PASS	
Temperature: 22 °C	Air Pressure: 1010 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks:			

Plot 8.1.3 The 6 dB bandwidth test result at high frequency

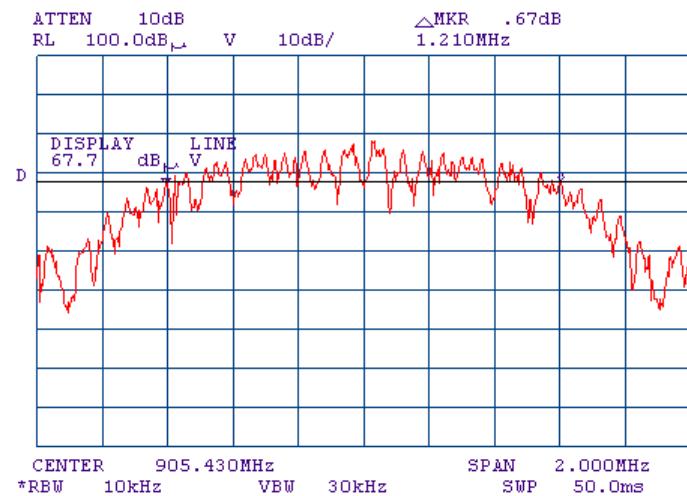


Test specification:	Section 15.247(a)2, RSS-210 section A8.2(a), 6 dB bandwidth		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	Verdict:	
Date(s):	9/13/2011	PASS	
Temperature: 22 °C	Air Pressure: 1010 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks:			

Plot 8.1.4 The 99% occupied bandwidth test result at low frequency, reference level

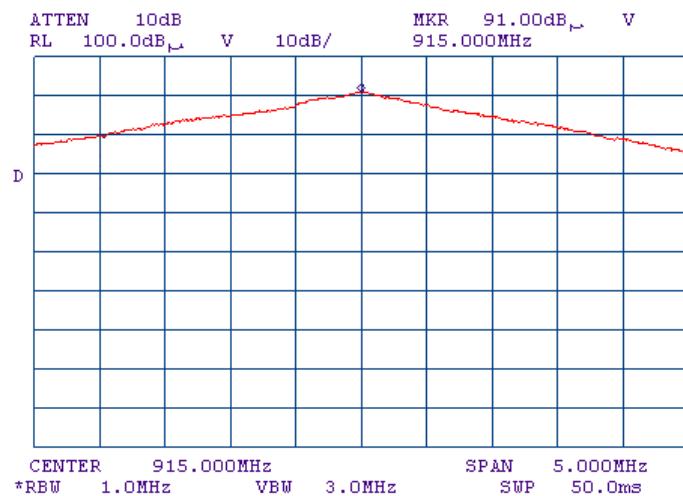


Plot 8.1.5 The 99% occupied bandwidth test result at low frequency

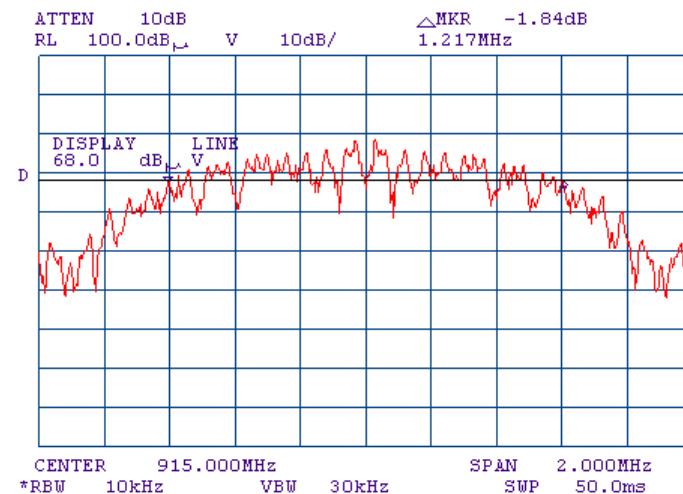


Test specification:	Section 15.247(a)2, RSS-210 section A8.2(a), 6 dB bandwidth		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	Verdict:	
Date(s):	9/13/2011	PASS	
Temperature: 22 °C	Air Pressure: 1010 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks:			

Plot 8.1.6 The 99% occupied bandwidth test result at mid frequency, Reference level

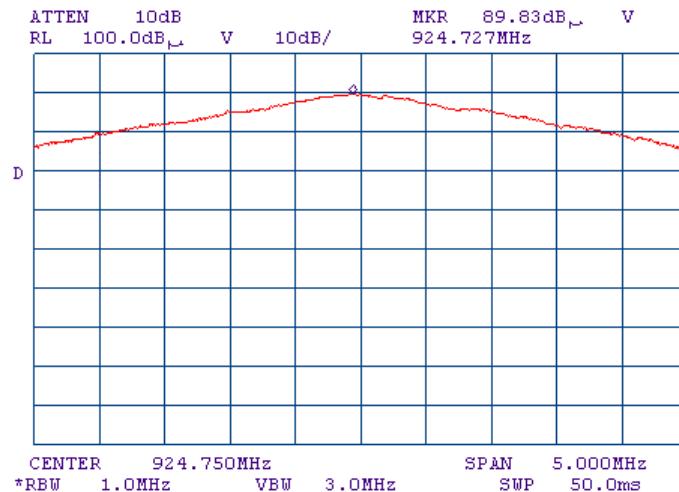


Plot 8.1.7 The 99% occupied bandwidth test result at mid frequency

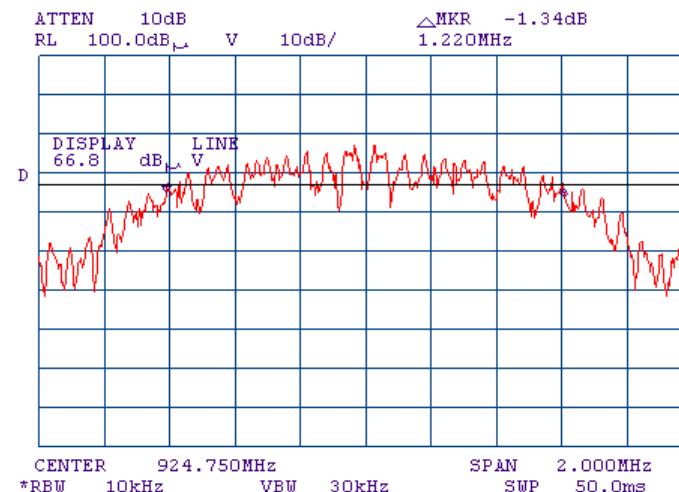


Test specification:	Section 15.247(a)2, RSS-210 section A8.2(a), 6 dB bandwidth		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	Verdict:	
Date(s):	9/13/2011	PASS	
Temperature: 22 °C	Air Pressure: 1010 hPa	Relative Humidity: 50 %	Power Supply: Battery
Remarks:			

Plot 8.1.8 The 99% occupied bandwidth test result at high frequency, Reference level



Plot 8.1.9 The 99% occupied bandwidth test result at high frequency



Test specification:	Section 15.247(b)3, RSS-210 section A8.4(4), Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 9/13/2011		PASS
Temperature: 23 °C	Air Pressure: 1008 hPa	Relative Humidity: 56 %	Power Supply: Battery
Remarks:			

8.2 Peak output power

8.2.1 General

This test was performed to measure the maximum peak output power radiated by transmitter. Specification test limits are given in Table 8.2.1.

Table 8.2.1 Peak output power limits

Assigned frequency range, MHz	Maximum antenna gain, dBi	Peak output power*		Equivalent field strength limit @ 3m, dB(µV/m)**
		W	dBm	
902.0 – 928.0	6.0	1.0	30.0	131.2
2400.0 – 2483.5				
5725.0 – 5850.0				

*- The limit is provided in terms of conducted RF power at the antenna connector. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power limit shall be reduced below the stated value as follows:

- by 1 dB for every 3 dB that the directional gain of antenna exceeds 6 dBi for fixed point-to-point transmitters operate in 2400-2483.5 MHz band;
- without any corresponding reduction for fixed point-to-point transmitters operate in 5725-5850 MHz band;
- by the amount in dB that the directional gain of antenna exceeds 6 dBi for the rest of transmitters.

**- Equivalent field strength limit was calculated from the peak output power as follows: $E = \sqrt{30 \times P \times G} / r$, where P is peak output power in Watts, r is antenna to EUT distance in meters and G is transmitter antenna gain in dBi.

8.2.2 Test procedure

- 8.2.2.1 The EUT was set up as shown in Figure 8.2.1, energized and its proper operation was checked.
- 8.2.2.2 The EUT was adjusted to produce maximum available to end user RF output power.
- 8.2.2.3 The resolution bandwidth of spectrum analyzer was set wider than 6 dB bandwidth of the EUT and 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° and the measuring antenna height was swept in both vertical and horizontal polarizations.
- 8.2.2.4 The maximum field strength of the EUT carrier frequency was measured as provided in Table 8.2.2 and associated plots.
- 8.2.2.5 The maximum peak output power was calculated from the field strength of carrier as follows:

$$P = (E \times d)^2 / (30 \times G),$$

where P is the peak output power in W, E is the field strength in V/m, d is the test distance and G is the transmitter numeric antenna gain over an isotropic radiator.

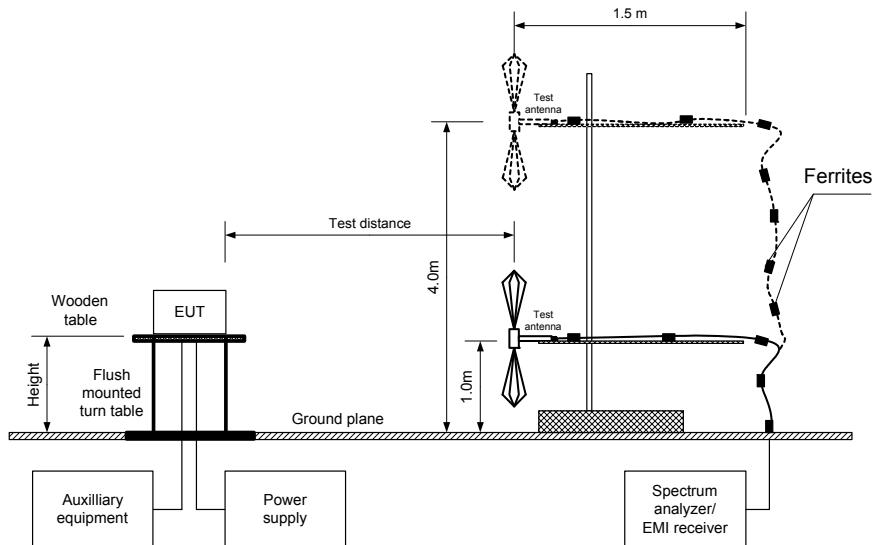
The above equation was converted in logarithmic units for 3 m test distance:

$$\text{Peak output power in dBm} = \text{Field strength in dB}(\mu\text{V/m}) - \text{Transmitter antenna gain in dBi} - 95.2 \text{ dB}$$

- 8.2.2.6 The worst test results (the lowest margins) were recorded in Table 8.2.2.

Test specification:	Section 15.247(b)3, RSS-210 section A8.4(4), Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 9/13/2011		PASS
Temperature: 23 °C	Air Pressure: 1008 hPa	Relative Humidity: 56 %	Power Supply: Battery
Remarks:			

Figure 8.2.1 Setup for carrier field strength measurements





Test specification:	Section 15.247(b)3, RSS-210 section A8.4(4), Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 9/13/2011	PASS	
Temperature: 23 °C	Air Pressure: 1008 hPa	Relative Humidity: 56 %	Power Supply: Battery
Remarks:			

Table 8.2.2 Peak output power test results

ASSIGNED FREQUENCY: 902 - 928 MHz
 TEST DISTANCE: 3 m
 TEST SITE: Semi anechoic chamber
 EUT HEIGHT: 0.8 m
 DETECTOR USED: Peak
 TEST ANTENNA TYPE: Biconilog (30 MHz – 1000 MHz)
 MODULATION: BPSK
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 DETECTOR USED: Peak
 EUT 6 dB BANDWIDTH: 0.88 MHz
 RESOLUTION BANDWIDTH: 1 MHz
 VIDEO BANDWIDTH: 3 MHz

Frequency, MHz	Field strength, dB(µV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin dB***	Verdict
905.43	114.02	Vertical	1	8	0.5	18.32	30.0	-11.68	Pass
915.00	114.94	Vertical	1	357	0.5	19.24	30.0	-10.76	Pass
924.75	114.53	Vertical	1	8	0.5	18.83	30.0	-11.17	Pass

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

**- Peak output power was calculated from the field strength of carrier as follows: $P = (E \times d)^2 / (30 \times G)$, where P is the peak output power in W, E is the field strength in V/m, d is the test distance in meters and G is the transmitter numeric antenna gain over an isotropic radiator. The above equation was converted in logarithmic units for 3 m test distance: $\text{Peak output power in dBm} = \text{Field strength in dB}(\mu\text{V/m}) - \text{Transmitter antenna gain in dBi} - 95.2 \text{ dB}$

***- Margin = Peak output power – specification limit.

Note: Maximum peak output power was obtained at Unom input power voltage.

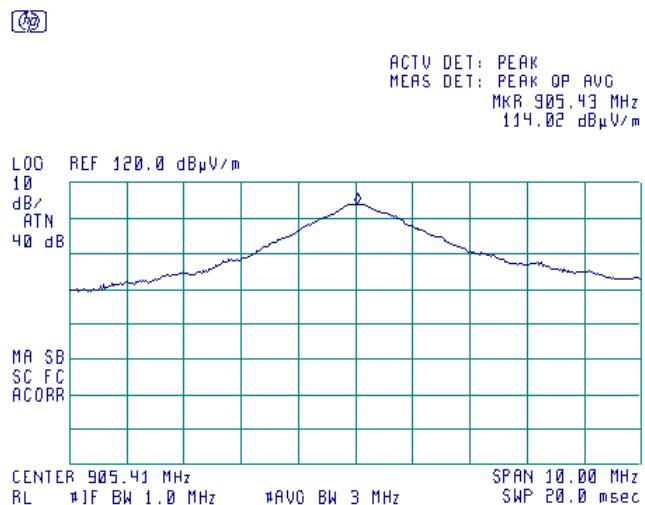
Reference numbers of test equipment used

HL 0521	HL 0604	HL 2871	HL 3623			
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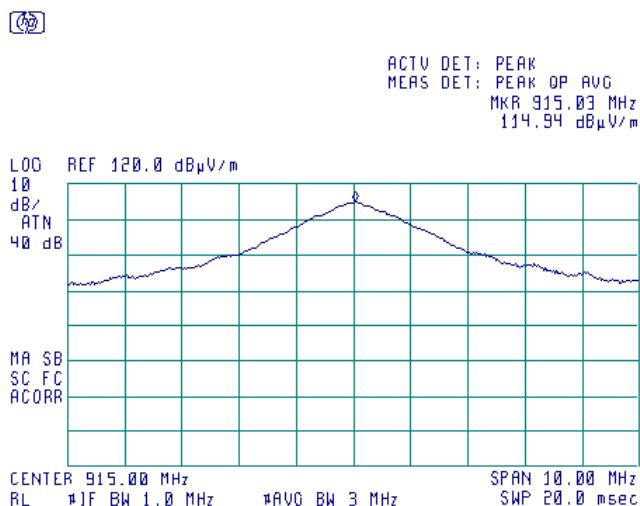
Full description is given in Appendix A.

Test specification:	Section 15.247(b)3, RSS-210 section A8.4(4), Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 9/13/2011	PASS	
Temperature: 23 °C	Air Pressure: 1008 hPa	Relative Humidity: 56 %	Power Supply: Battery
Remarks:			

Plot 8.2.1 Field strength of carrier at low frequency

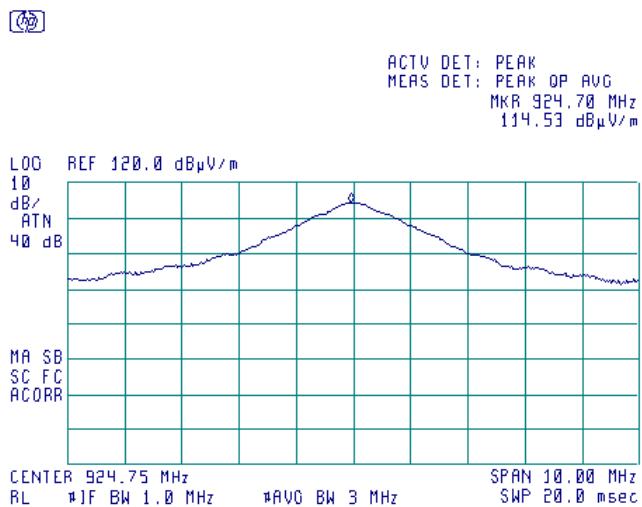


Plot 8.2.2 Field strength of carrier at mid frequency



Test specification:	Section 15.247(b)3, RSS-210 section A8.4(4), Peak output power		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	8/15/2011 - 9/13/2011		
Temperature: 23 °C	Air Pressure: 1008 hPa	Relative Humidity: 56 %	Power Supply: Battery
Remarks:			

Plot 8.2.3 Field strength of carrier at high frequency



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance		Verdict: PASS
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

8.3 Field strength of spurious emissions

8.3.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limits are given in Table 8.3.1.

Table 8.3.1 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m within restricted bands, dB(µV/m)*			Attenuation of field strength of spurious versus carrier outside restricted bands, dBc***	
	Peak	Quasi Peak	Average		
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**	20.0	
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			
1000 – 10 th harmonic	74.0	NA	54.0		

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

$$\text{Lim}_{S2} = \text{Lim}_{S1} + 40 \log \left(\frac{S_1}{S_2} \right)$$

where S₁ and S₂ – standard defined and test distance respectively in meters.

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

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

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

- 8.3.2.1 The EUT was set up as shown in Figure 8.3.1, energized and the performance check was conducted.
- 8.3.2.2 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.
- 8.3.2.3 The worst test results (the lowest margins) were recorded and shown in the associated plots.

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

- 8.3.3.1 The EUT was set up as shown in Figure 8.3.2, energized and the performance check was conducted.
- 8.3.3.2 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.
- 8.3.3.3 The worst test results (the lowest margins) were recorded and shown in the associated plots.

Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance		Verdict: PASS
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Figure 8.3.1 Setup for spurious emission field strength measurements below 30 MHz

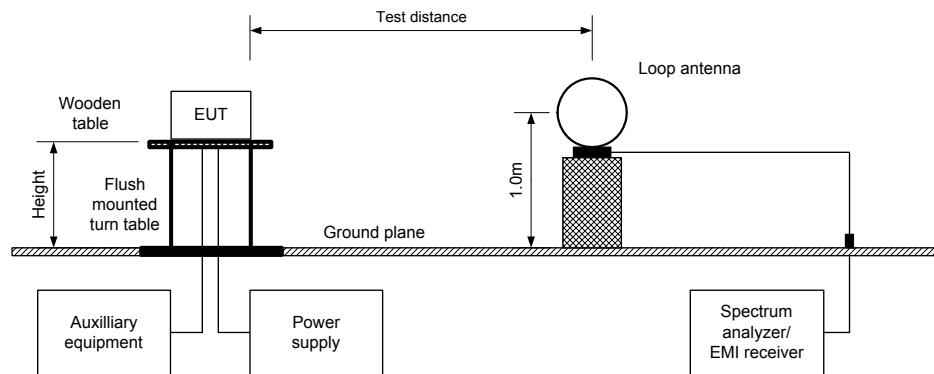
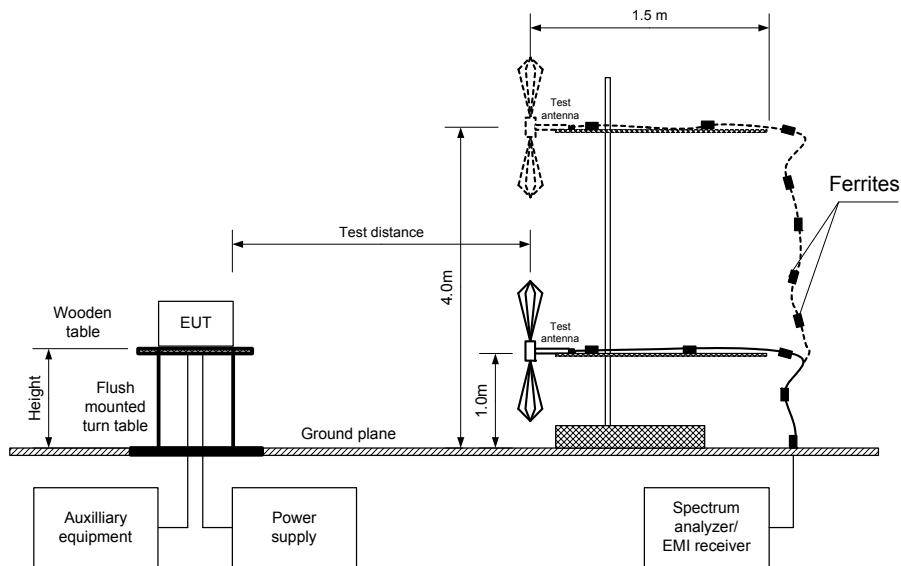


Figure 8.3.2 Setup for spurious emission field strength measurements above 30 MHz





Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance		Verdict: PASS
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Table 8.3.2 Field strength of emissions outside restricted bands

ASSIGNED FREQUENCY: 902 - 928 MHz
 INVESTIGATED FREQUENCY RANGE: 0.009 - 9300 MHz
 TEST DISTANCE: 3 m
 MODULATION: BPSK
 MODULATING SIGNAL: PRBS
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 100 kHz
 VIDEO BANDWIDTH: 300 kHz
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
 Biconilog (30 MHz – 1000 MHz)
 Double ridged guide (above 1000 MHz)

Frequency, MHz	Field strength of spurious, dB(µV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	Field strength of carrier, dB(µV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB**	Verdict
Low carrier frequency									
1810.855	55.05	Hor	1.4	10	107.91	52.86	20.0	32.86	Pass
6338.000	47.55	Hor	1.3	10		60.36		40.36	
7343.415	49.47	Hor	1.2	0		58.44		38.44	
Mid carrier frequency									
1829.965	52.94	Hor	1.4	10	108.66	55.72	20.0	35.72	Pass
5489.975	48.28	Hor	1.4	10		60.38		40.38	
6405.087	44.11	Hor	1.3	10		64.55		44.55	
High carrier frequency									
1849.495	54.59	Hor	1.4	10	108.70	54.11	20.0	34.11	Pass
5548.460	45.34	Hor	1.4	10		63.36		43.36	
6472.787	44.28	Hor	1.3	10		64.42		44.42	

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

**- Margin = Attenuation below carrier – specification limit.

Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance		Verdict:
Date(s):	8/15/2011 - 8/31/2011		PASS
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Table 8.3.3 Field strength of spurious emissions above 1 GHz within restricted bands

ASSIGNED FREQUENCY: 902 – 928 MHz
 INVESTIGATED FREQUENCY RANGE: 1000 - 9300 MHz
 TEST DISTANCE: 3 m
 MODULATION: BPSK
 MODULATING SIGNAL: PRBS
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 1000 kHz
 TEST ANTENNA TYPE: Double ridged guide

Frequency, MHz	Antenna		Azimuth, degrees*	Peak field strength(VBW=3 MHz)			Average field strength(VBW=10 Hz)			Verdict
	Polarization	Height, m		Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Calculated, dB(µV/m)	Limit, dB(µV/m)	
Low carrier frequency										
2716.075	Hor	1.9	0	64.82	74.0	-9.18	61.64	32.89	54.0	-21.11
3621.725	Hor	1.8	0	58.50	74.0	-15.50	57.18	28.43	54.0	-25.57
4526.975	Hor	1.5	0	61.10	74.0	-12.90	45.47	16.72	54.0	-37.28
5432.617	Vert	1.7	280	53.89	74.0	-20.11	51.48	22.73	54.0	-31.27
8148.995	Hor	1.2	10	56.39	74.0	-17.61	50.17	21.42	54.0	-32.58
Mid carrier frequency										
2744.825	Hor	1.9	0	63.11	74.0	-10.89	59.66	30.91	54.0	-23.09
3660.025	Hor	1.8	0	56.19	74.0	-17.81	53.40	24.65	54.0	-29.35
4574.875	Hor	1.5	0	62.01	74.0	-11.99	43.19	14.44	54.0	-39.56
7319.950	Hor	1.3	10	55.47	74.0	-18.53	49.31	20.56	54.0	-33.44
8235.175	Vert	1.0	10	56.91	74.0	-17.09	39.71	10.96	54.0	-43.04
High carrier frequency										
2774.475	Hor	1.9	0	63.19	74.0	-10.81	59.58	30.83	54.0	-23.17
3698.962	Hor	1.8	0	54.55	74.0	-19.45	50.32	21.57	54.0	-32.43
4623.712	Hor	1.5	0	62.32	74.0	-11.68	42.85	14.10	54.0	-39.90
7398.025	Hor	1.3	10	56.95	74.0	-17.05	43.85	15.10	54.0	-38.90
8322.475	Vert	1.0	10	57.13	74.0	-16.87	41.11	12.36	54.0	-41.64

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

**- Margin = Measured field strength - specification limit.

***- Margin = Calculated field strength - specification limit,

where Calculated field strength = Measured field strength + average factor.

Table 8.3.4 Average factor calculation

Transmission pulse		Transmission burst		Transmission train duration, ms	Average factor, dB
Duration, ms	Period, ms	Duration, ms	Period, ms		
3.65	421.5	NA	NA	NA	-28.75

*- Average factor was calculated as follows

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

for pulse train shorter 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:

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

Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance		Verdict: PASS
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Table 8.3.5 Field strength of spurious emissions below 1 GHz within restricted bands

ASSIGNED FREQUENCY: 902 – 928 MHz
 INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz
 TEST DISTANCE: 3 m
 MODULATION: BPSK
 MODULATING SIGNAL: PRBS
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 RESOLUTION BANDWIDTH: 1.0 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		Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
Low carrier frequency								
961.502	60.20	51.0	54.0	-3.0	Vert	1.0	179	Pass
Mid carrier frequency								
960.452	60.30	51.6	54.0	-2.4	Vert	1.0	179	Pass
High carrier frequency								
960.582	61.10	52.2	54.0	-2.8	Vert	1.0	179	Pass

*- Margin = Measured emission - specification limit.

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

Table 8.3.6 Restricted bands

MHz	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	12.29 - 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	16.42 - 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		

Reference numbers of test equipment used

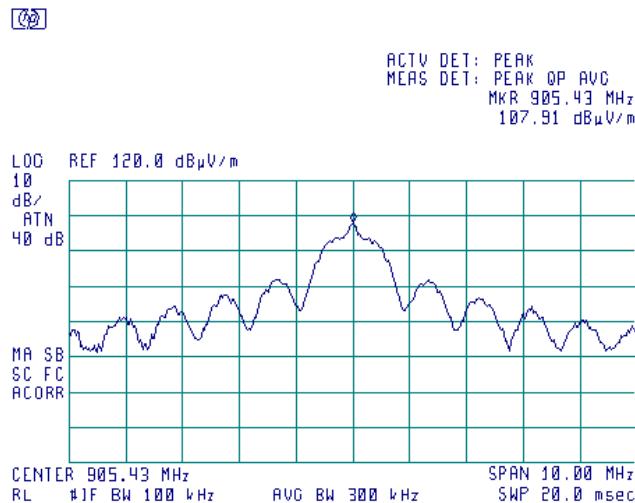
HL 0415	HL 0446	HL 0521	HL 0583	HL 0604	HL 0812	HL 1431	HL 2871
HL 3623							

Full description is given in Appendix A.

Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance		Verdict: PASS
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

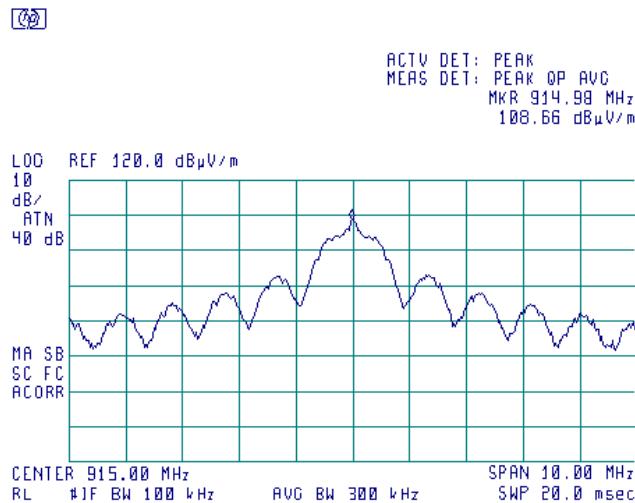
Plot 8.3.1 Radiated emission measurements at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and horizontal
MODULATION: BPSK



Plot 8.3.2 Radiated emission measurements at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and horizontal
MODULATION: BPSK



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance		Verdict: PASS
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.3 Radiated emission measurements at the high carrier frequency

TEST SITE: Semi anechoic chamber

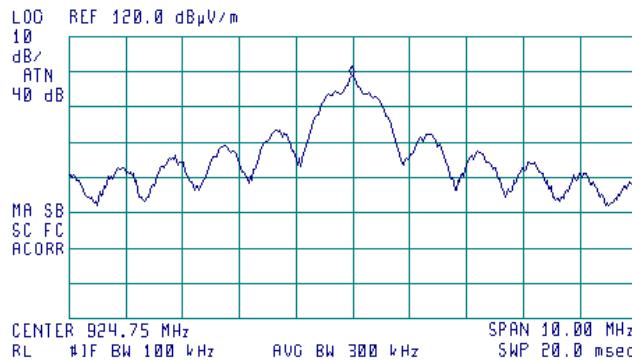
TEST DISTANCE: 3 m

ANTENNA POLARIZATION: Vertical and horizontal

MODULATION: BPSK



ACTV DET: PEAK
 MERS DET: PEAK QP AVG
 MKR 924.73 MHz
 108.70 dB μ V/m



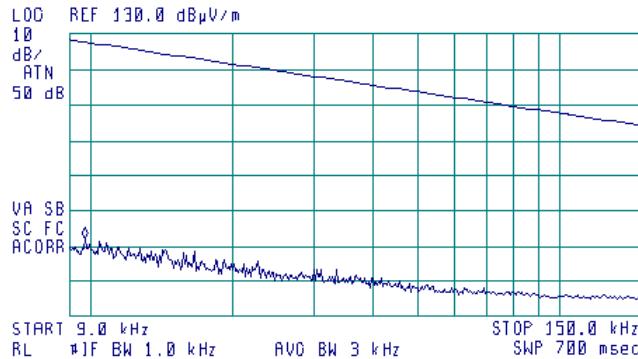
Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict: PASS	
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.4 Radiated emission measurements from 9 to 150 kHz at the low carrier frequency

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
MODULATION: BPSK



ACTV DET: PEAK
MERS DET: PEAK OP AVG
MKR 9.8 kHz
72.19 dB μ V/m

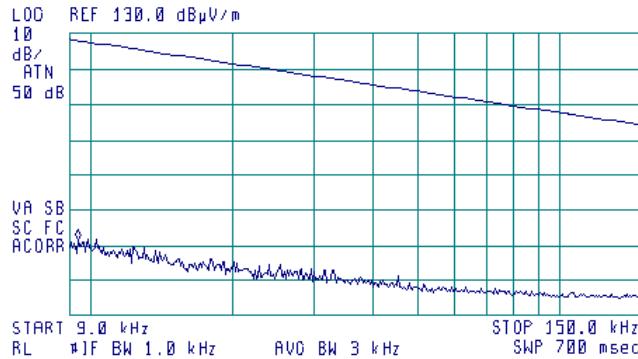


Plot 8.3.5 Radiated emission measurements from 9 to 150 kHz at the mid carrier frequency

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
MODULATION: BPSK



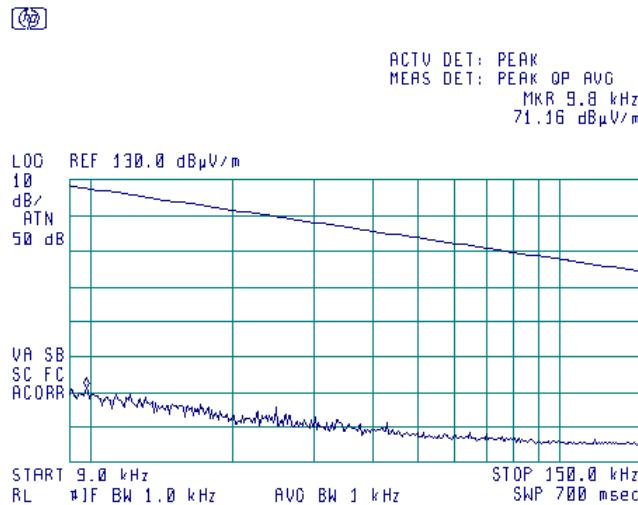
ACTV DET: PEAK
MERS DET: PEAK OP AVG
MKR 9.5 kHz
71.51 dB μ V/m



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

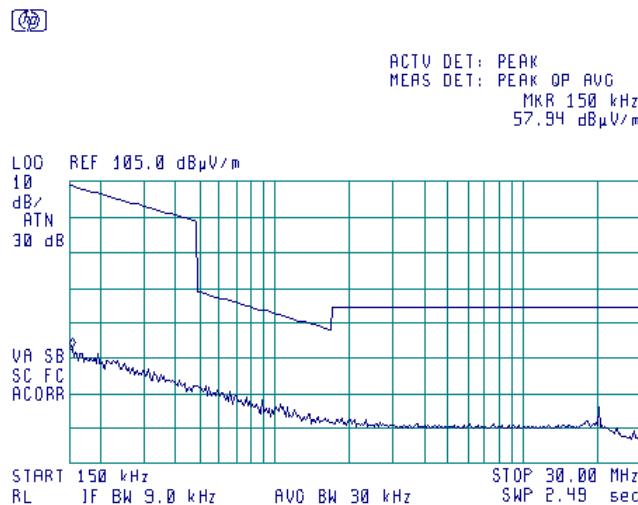
Plot 8.3.6 Radiated emission measurements from 9 to 150 kHz at the high carrier frequency

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
MODULATION: BPSK



Plot 8.3.7 Radiated emission measurements from 0.15 to 30 MHz at the low carrier frequency

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
MODULATION: BPSK



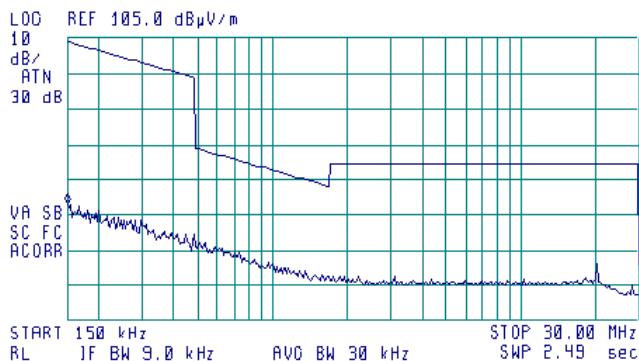
Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.8 Radiated emission measurements from 0.15 to 30 MHz at the mid carrier frequency

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
MODULATION: BPSK



ACTV DET: PEAK
MERS DET: PEAK OP AVG
MKR 150 kHz
58.05 dB μ V/m

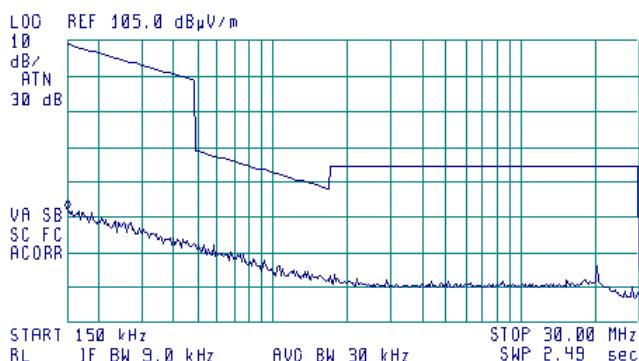


Plot 8.3.9 Radiated emission measurements from 0.15 to 30 MHz at the high carrier frequency

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
MODULATION: BPSK



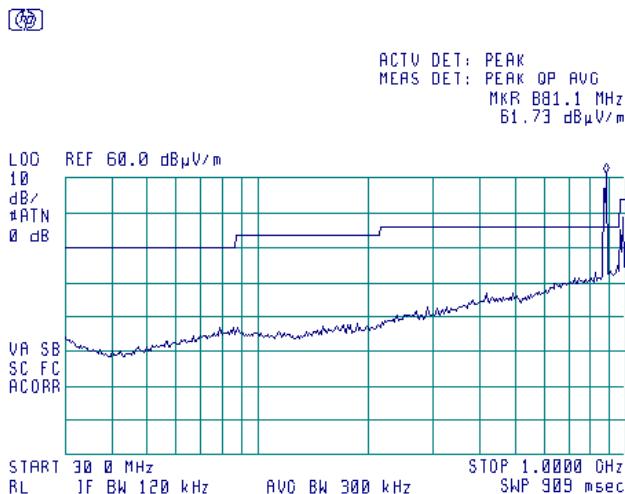
ACTV DET: PEAK
MERS DET: PEAK OP AVG
MKR 150 kHz
56.95 dB μ V/m



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.10 Radiated emission measurements from 30 to 1000 MHz at the low carrier frequency

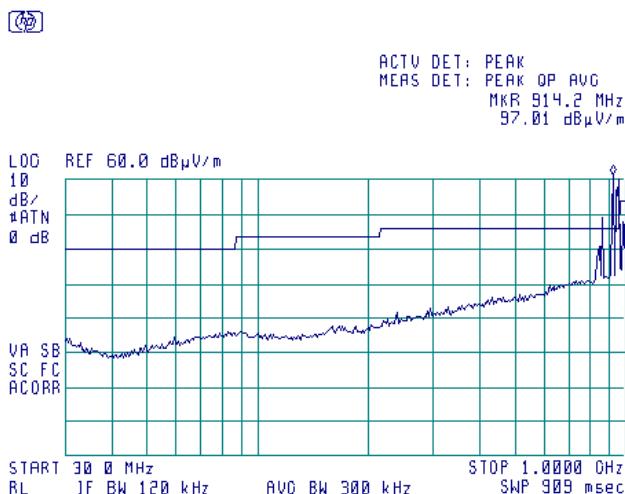
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
MODULATION: BPSK



Note: Due to large span used, the frequency is shifted. Actual frequency of fundamental is 905.43 MHz

Plot 8.3.11 Radiated emission measurements from 30 to 1000 MHz at the mid carrier frequency

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

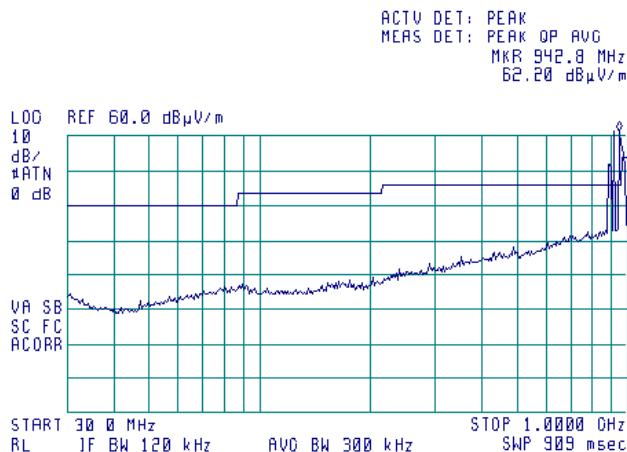


Note: Due to large span used, the frequency is shifted. Actual frequency of fundamental is 915 MHz

Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.12 Radiated emission measurements from 30 to 1000 MHz at the high carrier frequency

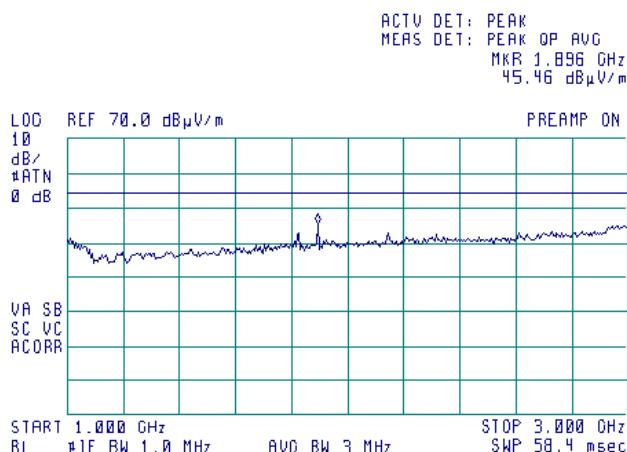
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
MODULATION: BPSK



Note: Due to large span used, the frequency is shifted. Actual frequency of fundamental is 924.75 MHz

Plot 8.3.13 Radiated emission measurements from 1000 to 3000 MHz at the low carrier frequency

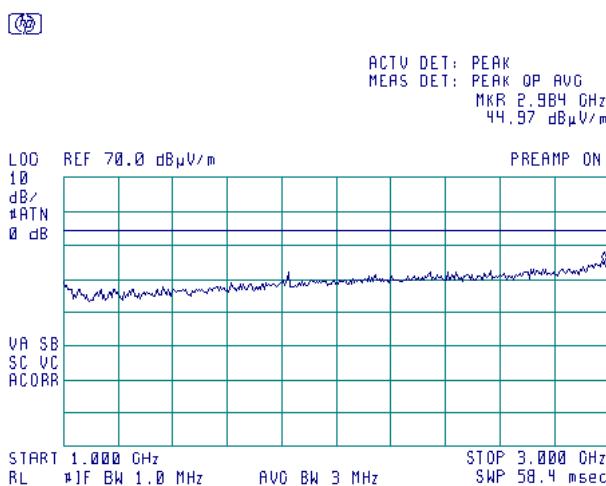
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
MODULATION: BPSK
DETECTOR: Peak



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance		Verdict: PASS
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

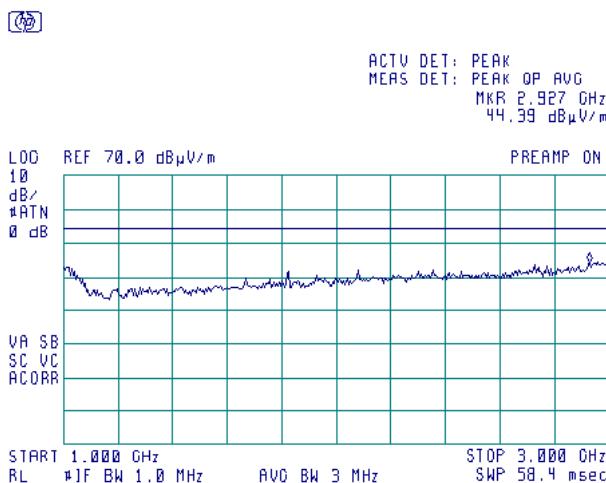
Plot 8.3.14 Radiated emission measurements from 1000 to 3000 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
MODULATION: BPSK
DETECTOR: Peak



Plot 8.3.15 Radiated emission measurements from 1000 to 3000 MHz at the high carrier frequency

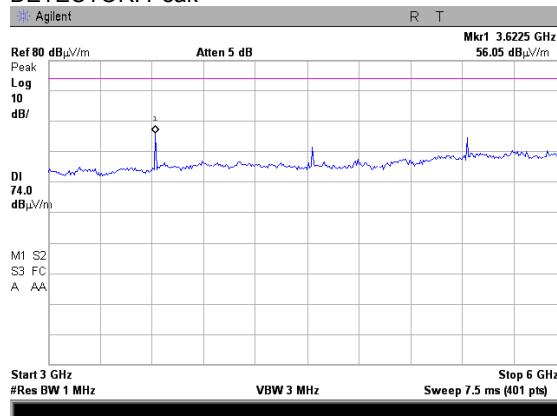
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
MODULATION: BPSK
DETECTOR: Peak



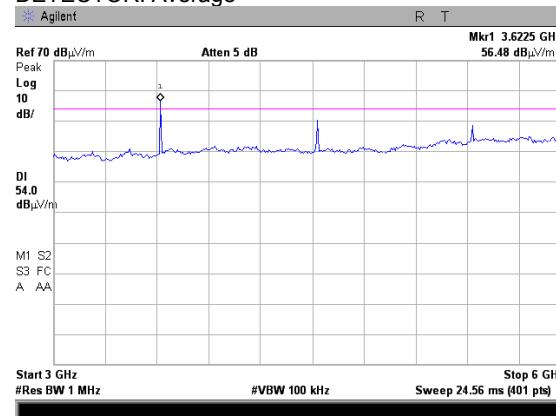
Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.16 Radiated emission measurements from 3000 to 6000 MHz at the low carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

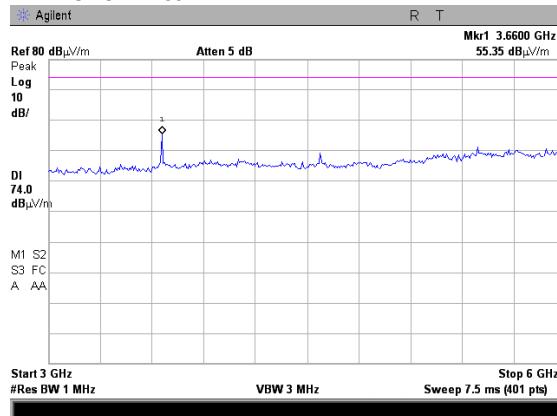


Semi anechoic chamber
3 m
Vertical and Horizontal
BPSK
DETECTOR: Average

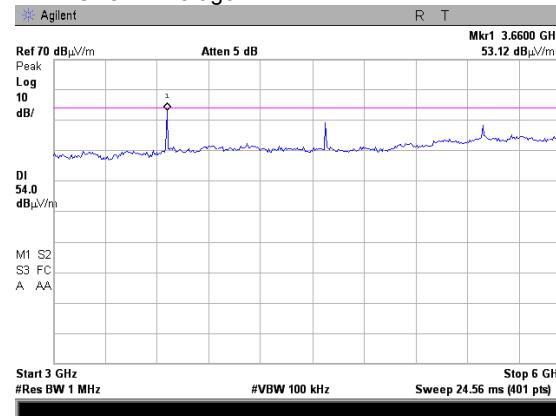


Plot 8.3.17 Radiated emission measurements from 3000 to 6000 MHz at the mid carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak



Semi anechoic chamber
3 m
Vertical and Horizontal
BPSK
DETECTOR: Average



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.18 Radiated emission measurements from 3000 to 6000 MHz at the high carrier frequency

TEST SITE:

Semi anechoic chamber

TEST DISTANCE:

3 m

ANTENNA POLARIZATION:

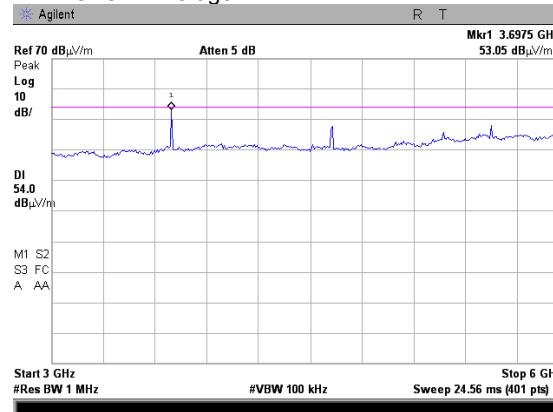
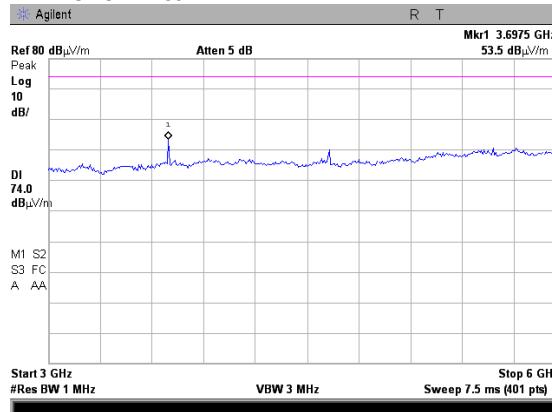
Vertical and Horizontal

MODULATION:

BPSK

DETECTOR: Peak

DETECTOR: Average



Plot 8.3.19 Radiated emission measurements from 6000 to 9300 MHz at the low carrier frequency

TEST SITE:

Semi anechoic chamber

TEST DISTANCE:

3 m

ANTENNA POLARIZATION:

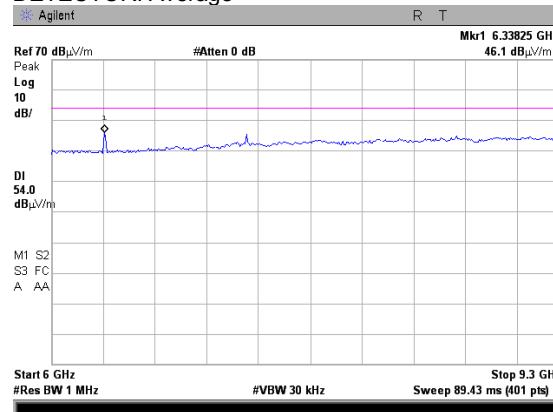
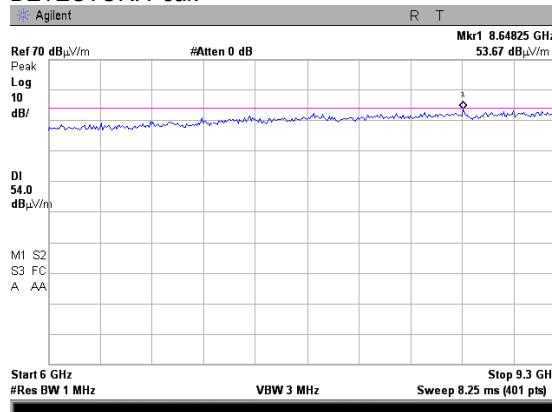
Vertical and Horizontal

MODULATION:

BPSK

DETECTOR: Peak

DETECTOR: Average



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict: PASS	
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.20 Radiated emission measurements from 6000 to 9300 MHz at the mid carrier frequency

TEST SITE:

Semi anechoic chamber

TEST DISTANCE:

3 m

ANTENNA POLARIZATION:

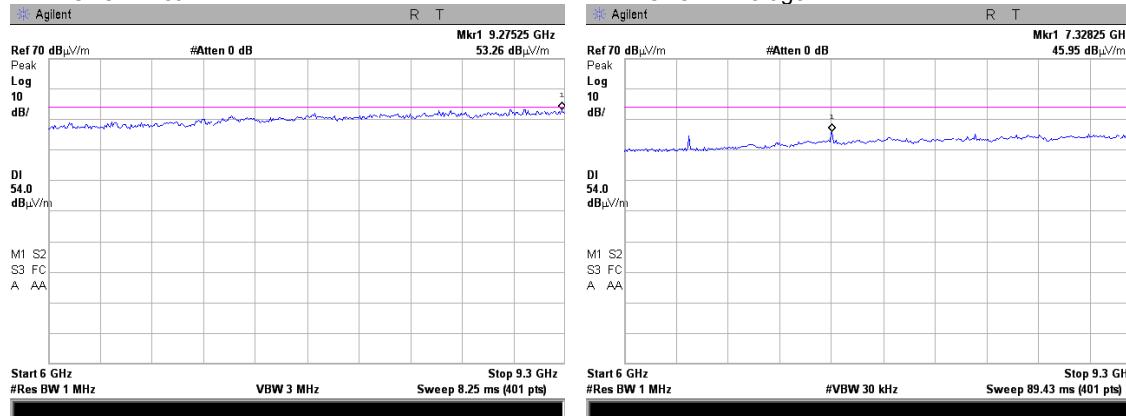
Vertical and Horizontal

MODULATION:

BPSK

DETECTOR: Peak

DETECTOR: Average



Plot 8.3.21 Radiated emission measurements from 6000 to 9300 MHz at the high carrier frequency

TEST SITE:

Semi anechoic chamber

TEST DISTANCE:

3 m

ANTENNA POLARIZATION:

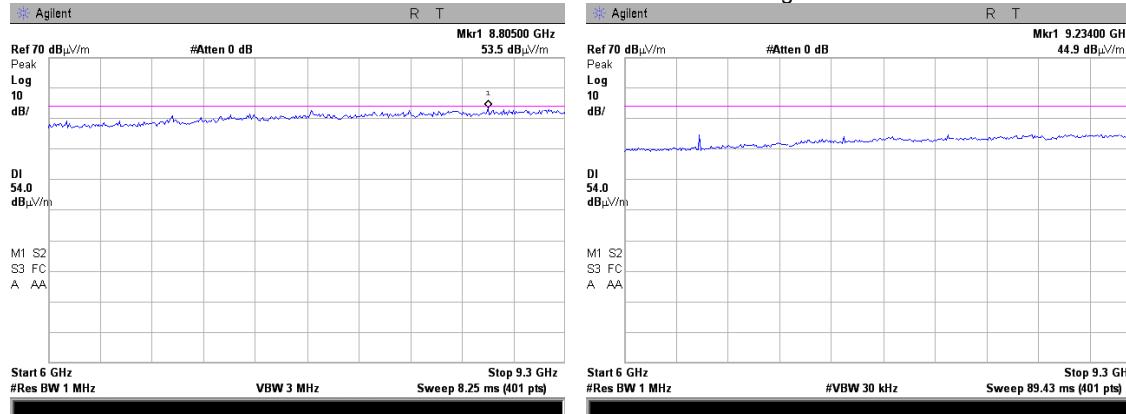
Vertical and Horizontal

MODULATION:

BPSK

DETECTOR: Peak

DETECTOR: Average





Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict: PASS	
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.22 Radiated emission measurements at the second harmonic of low carrier frequency

TEST SITE:

Semi anechoic chamber

TEST DISTANCE:

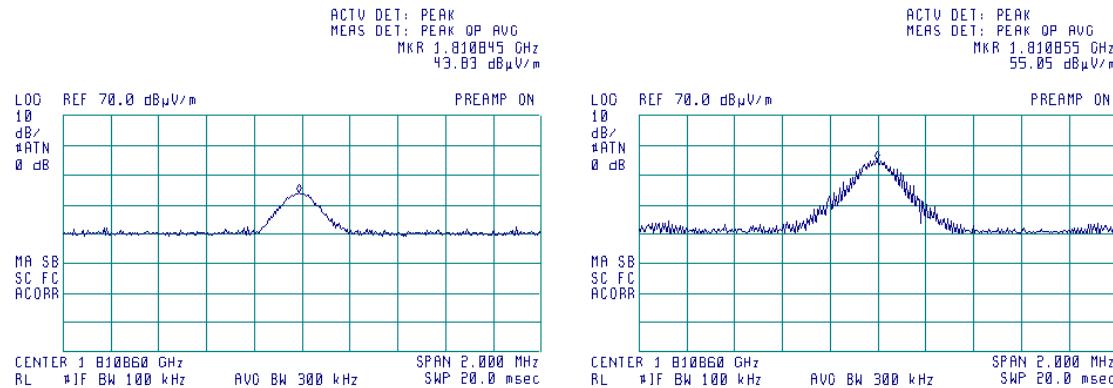
3 m

MODULATION:

BPSK

ANTENNA POLARIZATION: Vertical

ANTENNA POLARIZATION: Horizontal



Plot 8.3.23 Radiated emission measurements at the second harmonic of mid carrier frequency

TEST SITE:

Semi anechoic chamber

TEST DISTANCE:

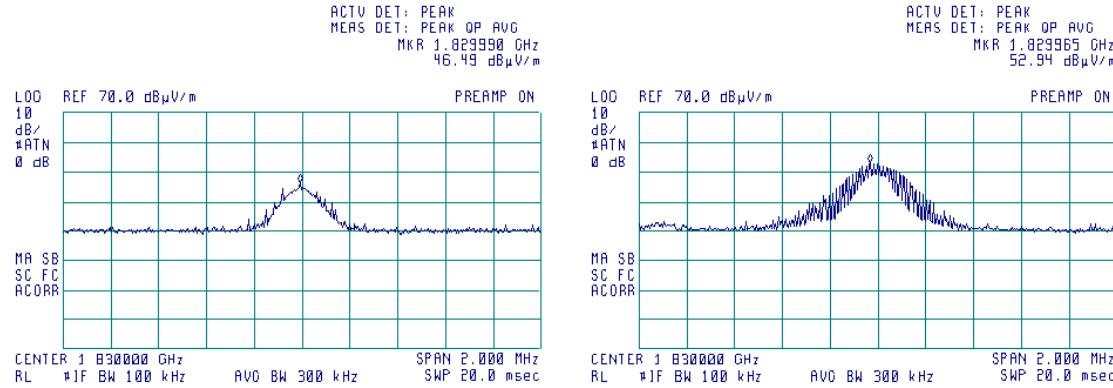
3 m

MODULATION:

BPSK

ANTENNA POLARIZATION: Vertical

ANTENNA POLARIZATION: Horizontal



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.24 Radiated emission measurements at the second harmonic of high carrier frequency

TEST SITE:

Semi anechoic chamber

TEST DISTANCE:

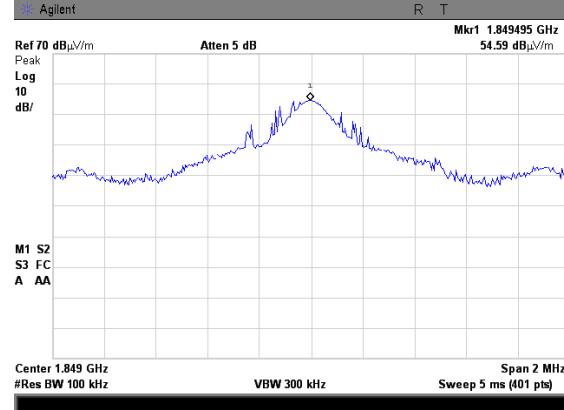
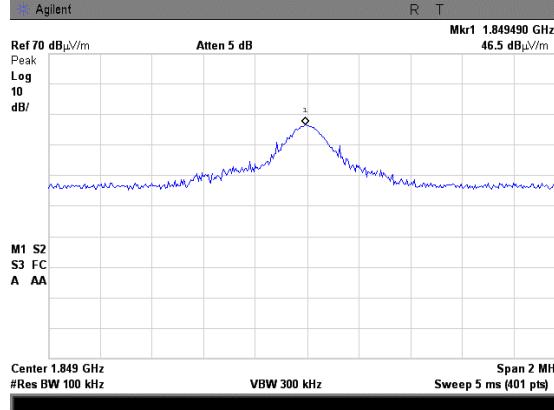
3 m

MODULATION:

BPSK

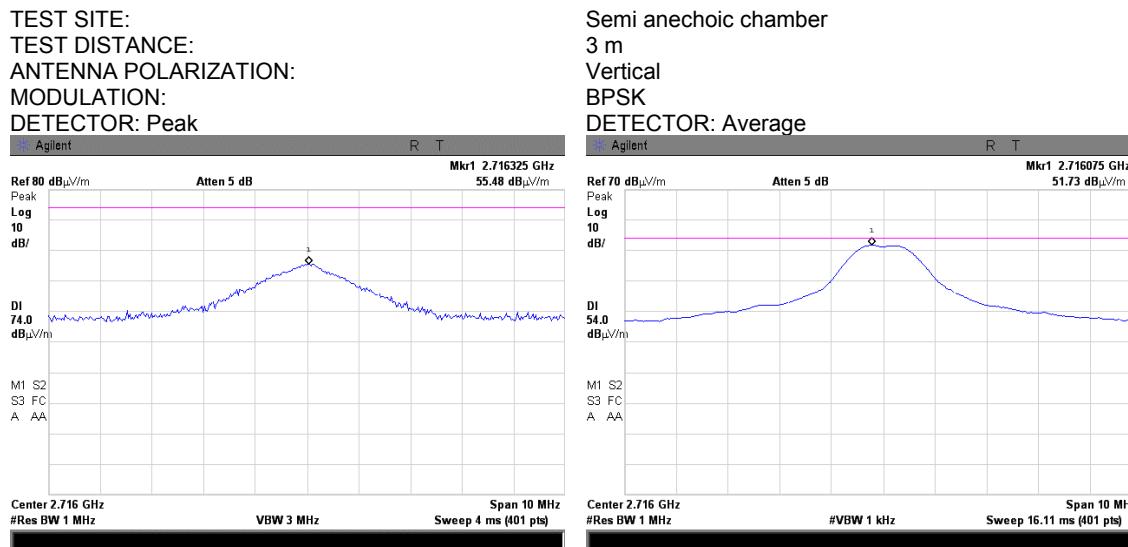
ANTENNA POLARIZATION: Vertical

ANTENNA POLARIZATION: Horizontal

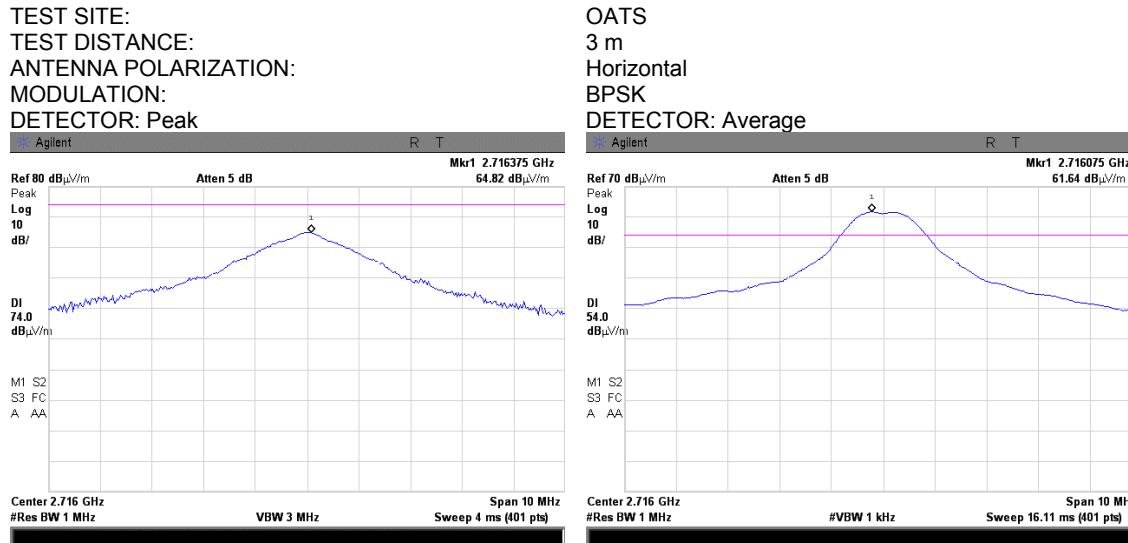


Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.25 Radiated emission measurements at the third harmonic of low carrier frequency



Plot 8.3.26 Radiated emission measurements at the third harmonic of low carrier frequency

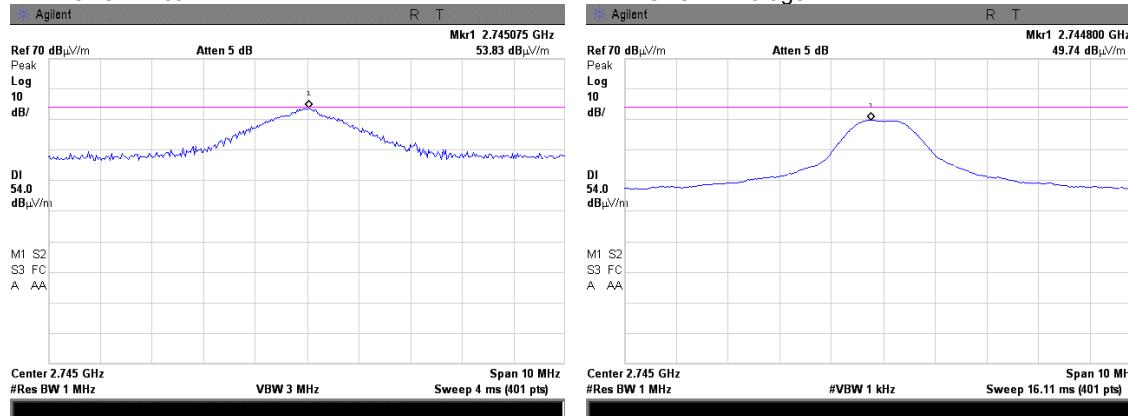


Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.27 Radiated emission measurements at the third harmonic of mid carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

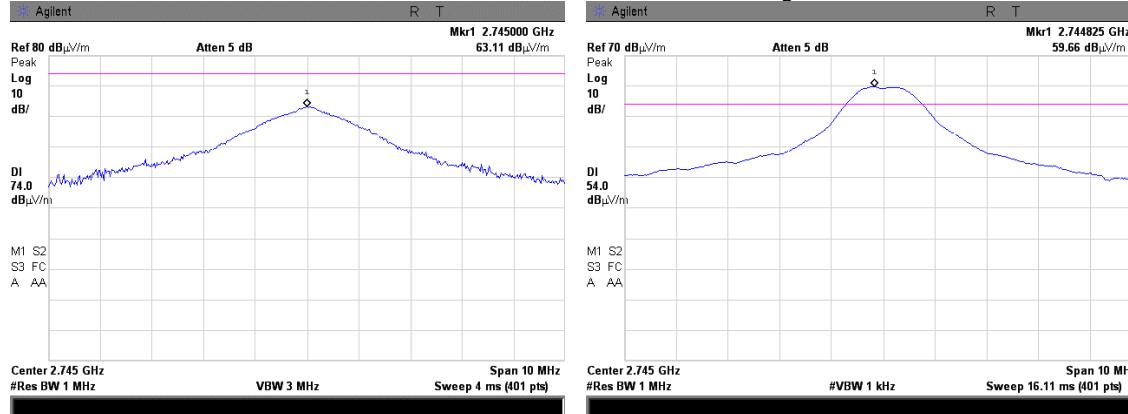
OATS
3 m
Vertical
BPSK
DETECTOR: Average



Plot 8.3.28 Radiated emission measurements at the third harmonic of mid carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

OATS
3 m
Horizontal
BPSK
DETECTOR: Average



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.29 Radiated emission measurements at the third harmonic of high carrier frequency

TEST SITE:

Semi anechoic chamber

TEST DISTANCE:

3 m

ANTENNA POLARIZATION:

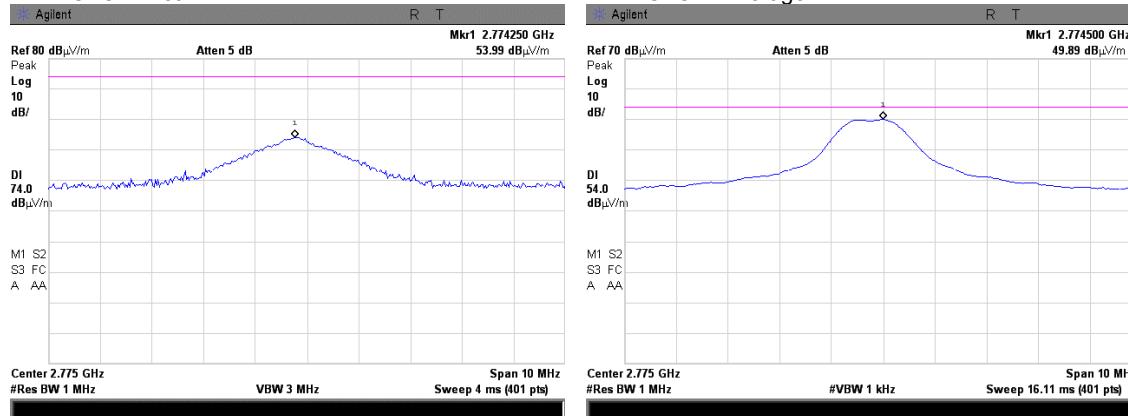
Vertical

MODULATION:

BPSK

DETECTOR: Peak

DETECTOR: Average



Plot 8.3.30 Radiated emission measurements at the third harmonic of high carrier frequency

TEST SITE:

OATS

TEST DISTANCE:

3 m

ANTENNA POLARIZATION:

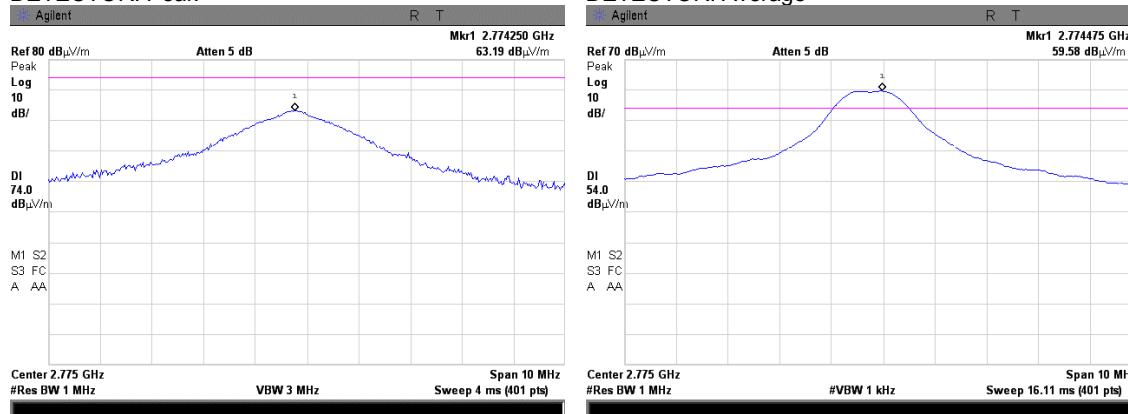
Horizontal

MODULATION:

BPSK

DETECTOR: Peak

DETECTOR: Average

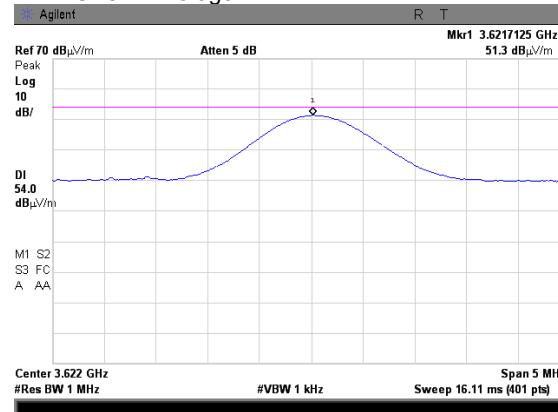
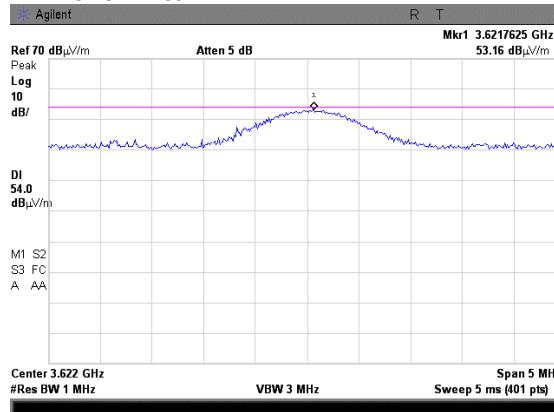


Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.31 Radiated emission measurements at the fourth harmonic of low carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

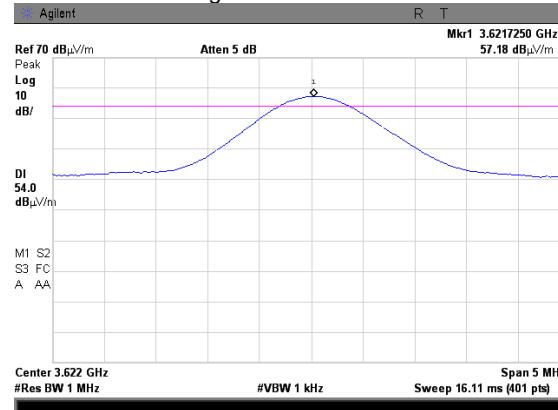
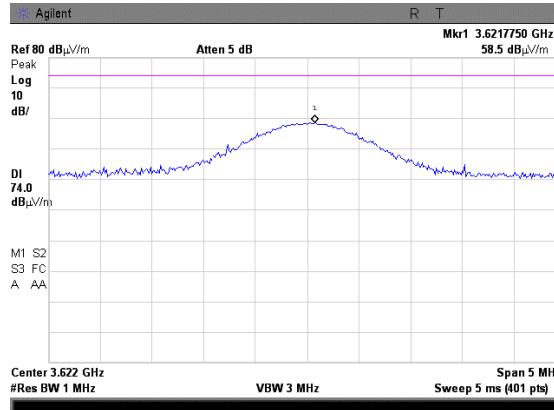
OATS
3 m
Vertical
BPSK
DETECTOR: Average



Plot 8.3.32 Radiated emission measurements at the fourth harmonic of low carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

OATS
3 m
Horizontal
BPSK
DETECTOR: Average

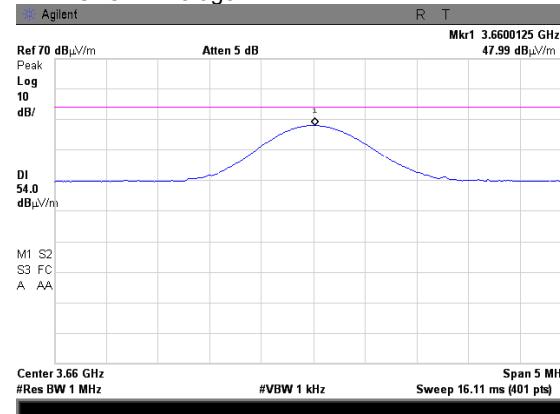
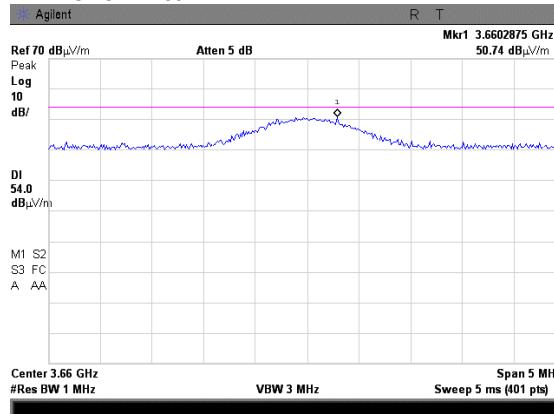


Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.33 Radiated emission measurements at the fourth harmonic of mid carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

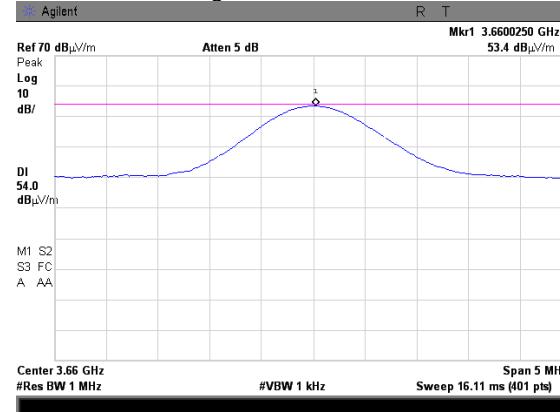
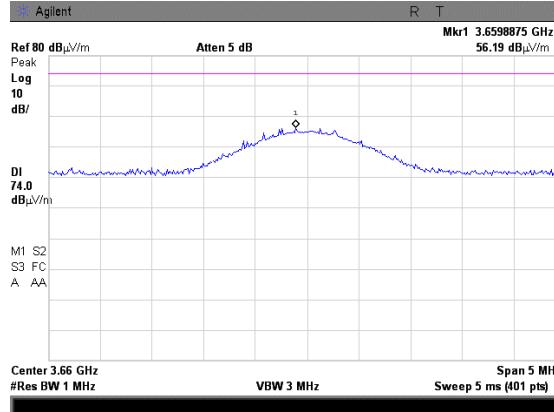
OATS
3 m
Vertical
BPSK
DETECTOR: Average



Plot 8.3.34 Radiated emission measurements at the fourth harmonic of mid carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

OATS
3 m
Horizontal
BPSK
DETECTOR: Average

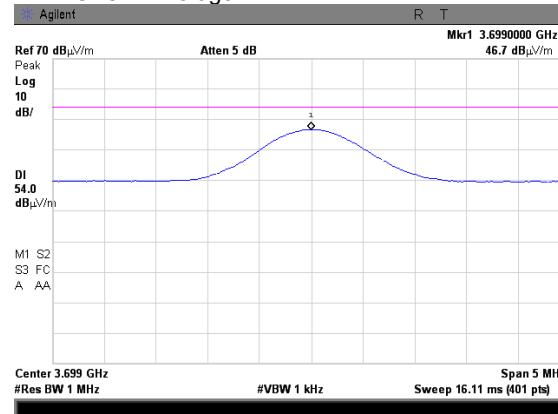
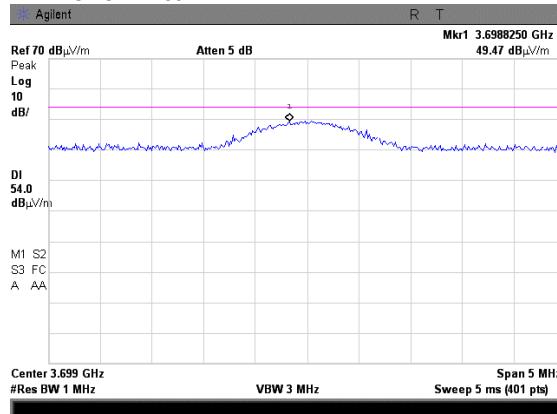


Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.35 Radiated emission measurements at the fourth harmonic of high carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

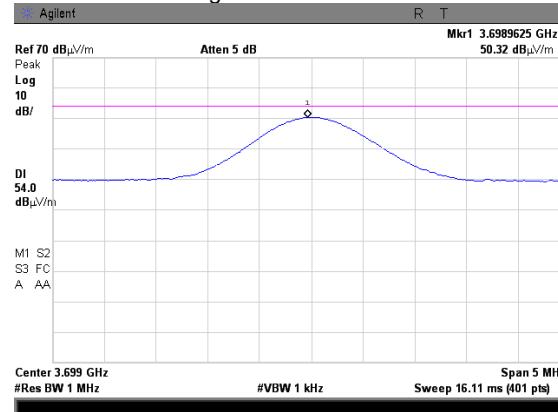
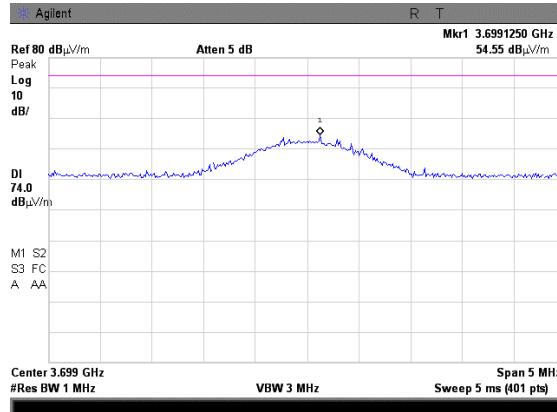
OATS
3 m
Vertical
BPSK
DETECTOR: Average



Plot 8.3.36 Radiated emission measurements at the fourth harmonic of high carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

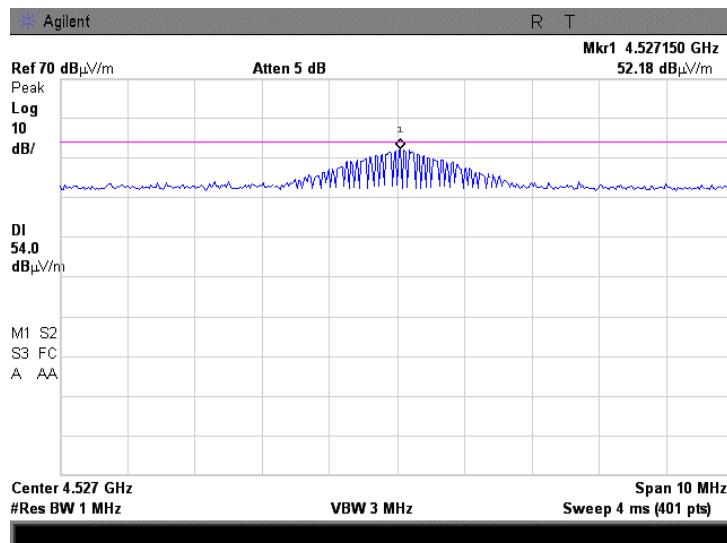
OATS
3 m
Horizontal
BPSK
DETECTOR: Average



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

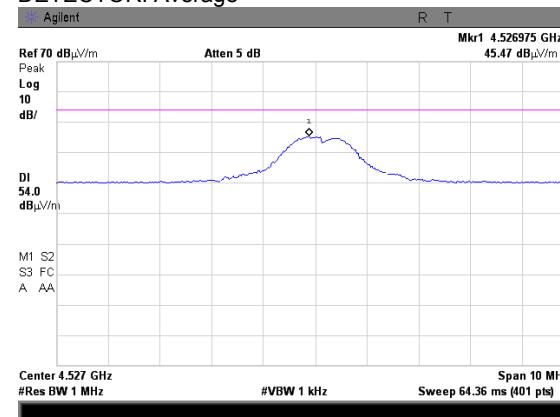
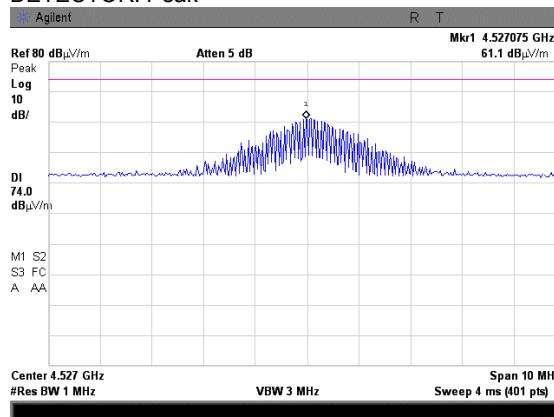
Plot 8.3.37 Radiated emission measurements at the fifth harmonic of low carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
MODULATION: BPSK



Plot 8.3.38 Radiated emission measurements at the fifth harmonic of low carrier frequency

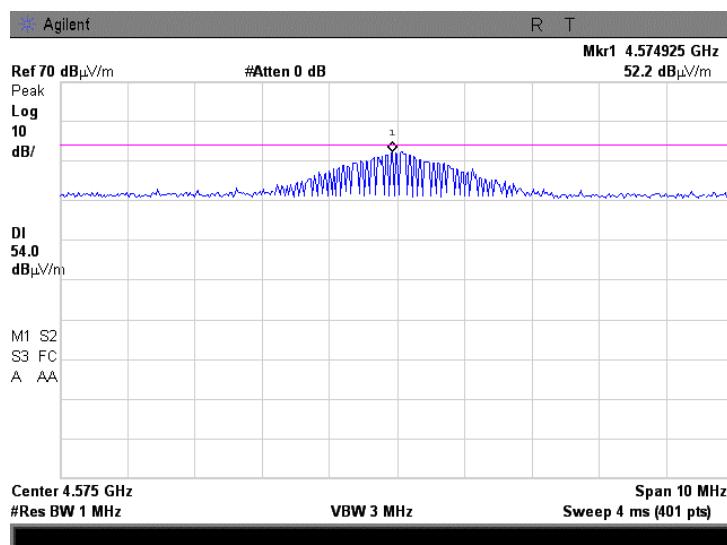
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
MODULATION: BPSK
DETECTOR: Peak



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

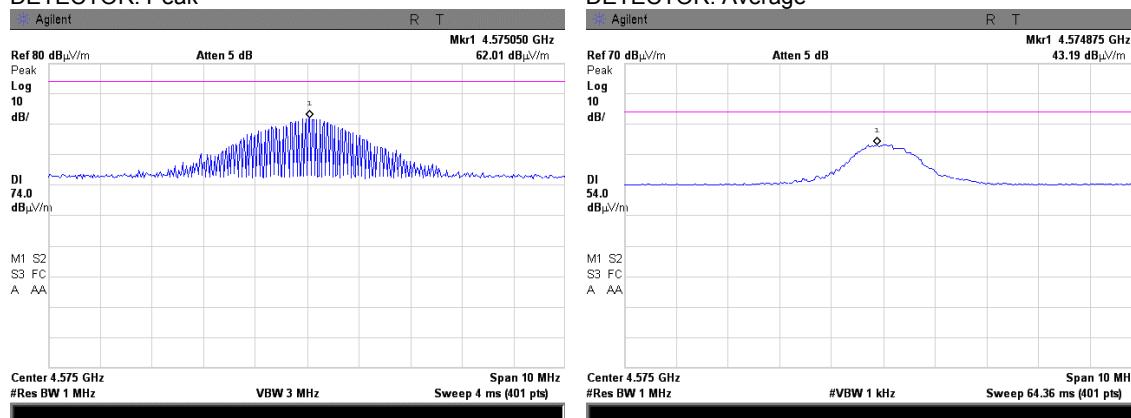
Plot 8.3.39 Radiated emission measurements at the fifth harmonic of mid carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
MODULATION: BPSK
DETECTOR: Peak



Plot 8.3.40 Radiated emission measurements at the fifth harmonic of mid carrier frequency

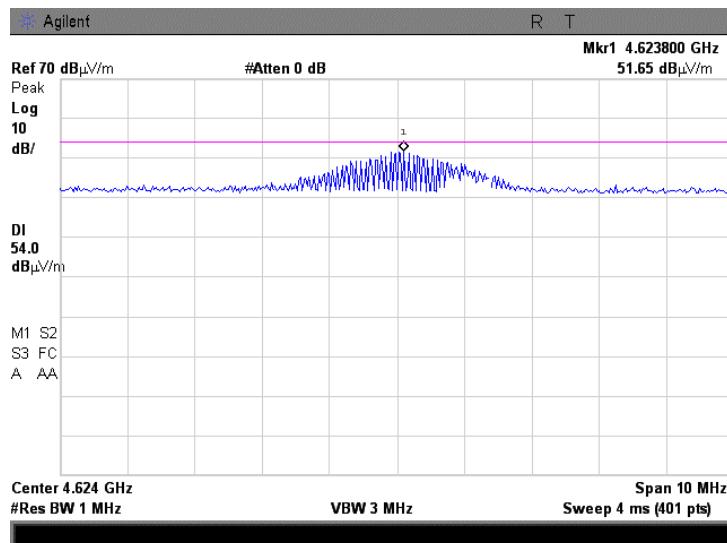
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
MODULATION: BPSK
DETECTOR: Peak



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

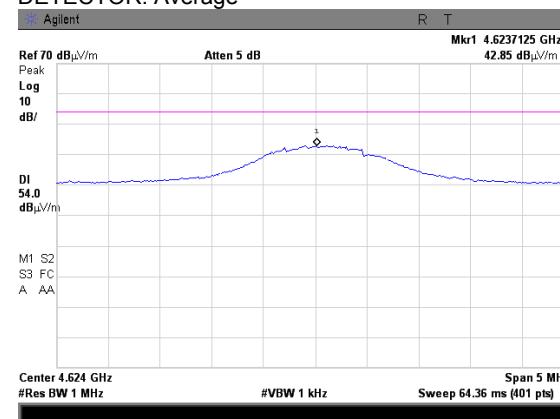
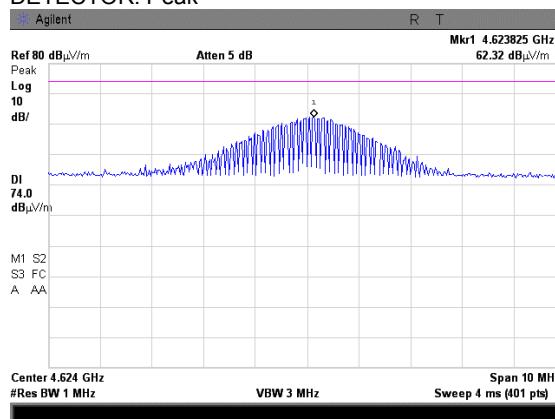
Plot 8.3.41 Radiated emission measurements at the fifth harmonic of high carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
MODULATION: BPSK



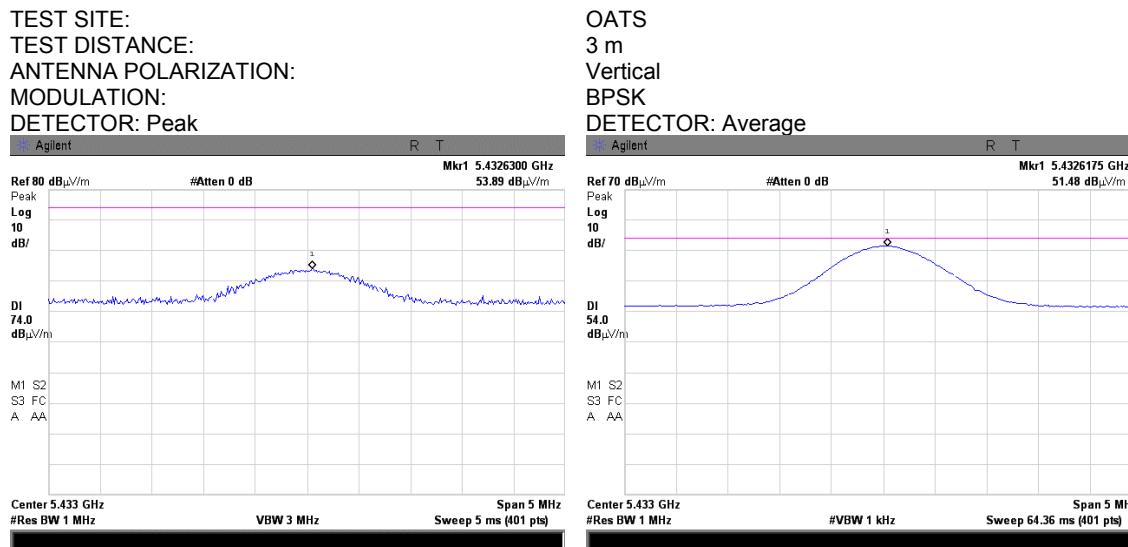
Plot 8.3.42 Radiated emission measurements at the fifth harmonic of high carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
MODULATION: BPSK
DETECTOR: Peak

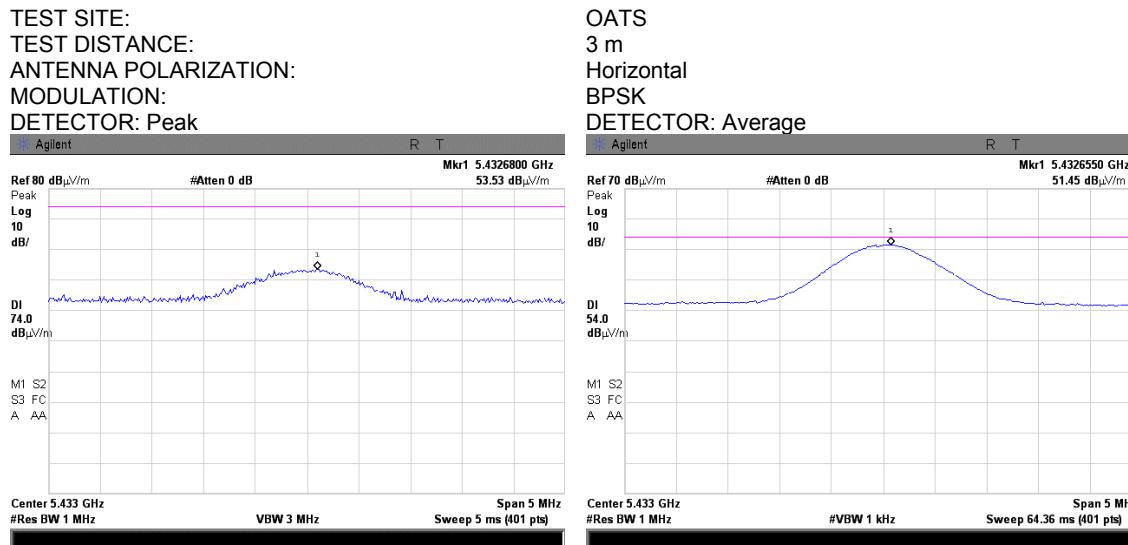


Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.43 Radiated emission measurements at the sixth harmonic of low carrier frequency

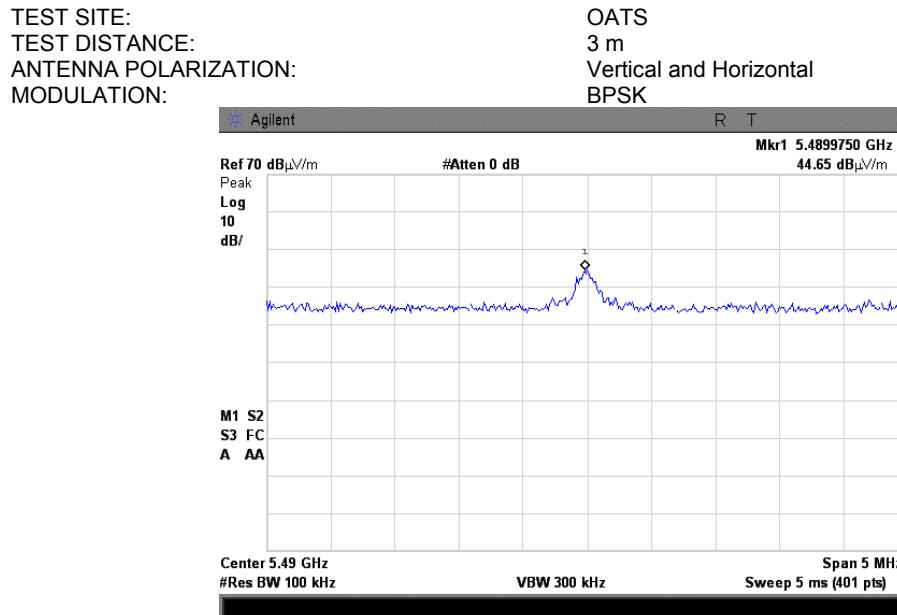


Plot 8.3.44 Radiated emission measurements at the sixth harmonic of low carrier frequency



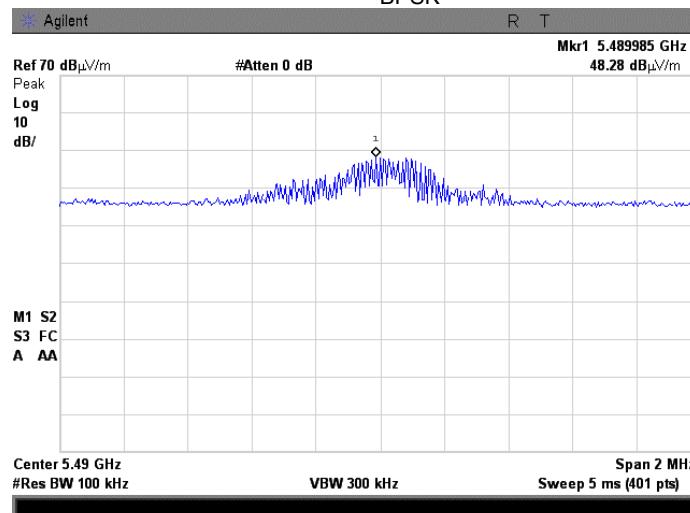
Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict: PASS	
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.45 Radiated emission measurements at the sixth harmonic of mid carrier frequency



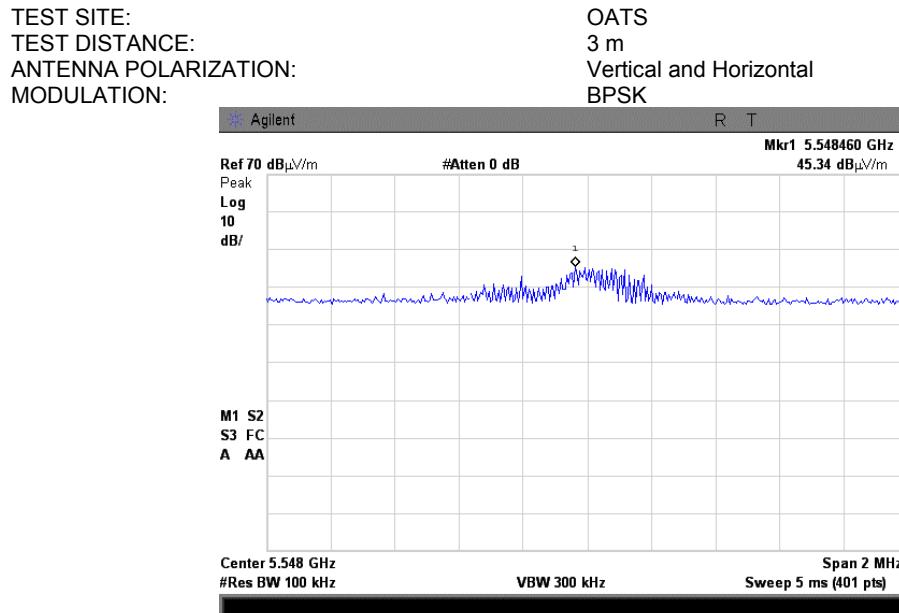
Plot 8.3.46 Radiated emission measurements at the sixth harmonic of mid carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
MODULATION: BPSK

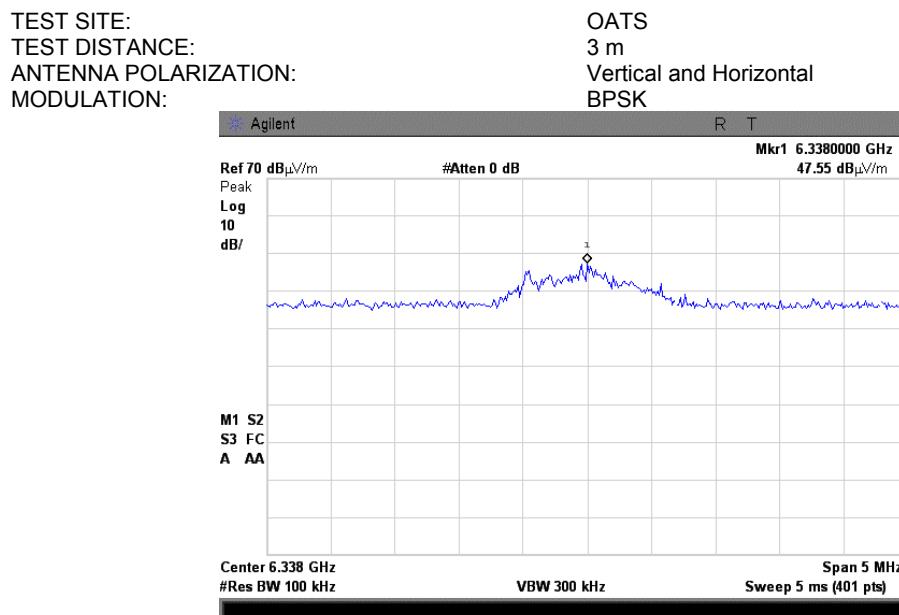


Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict: PASS	
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.47 Radiated emission measurements at the sixth harmonic of high carrier frequency

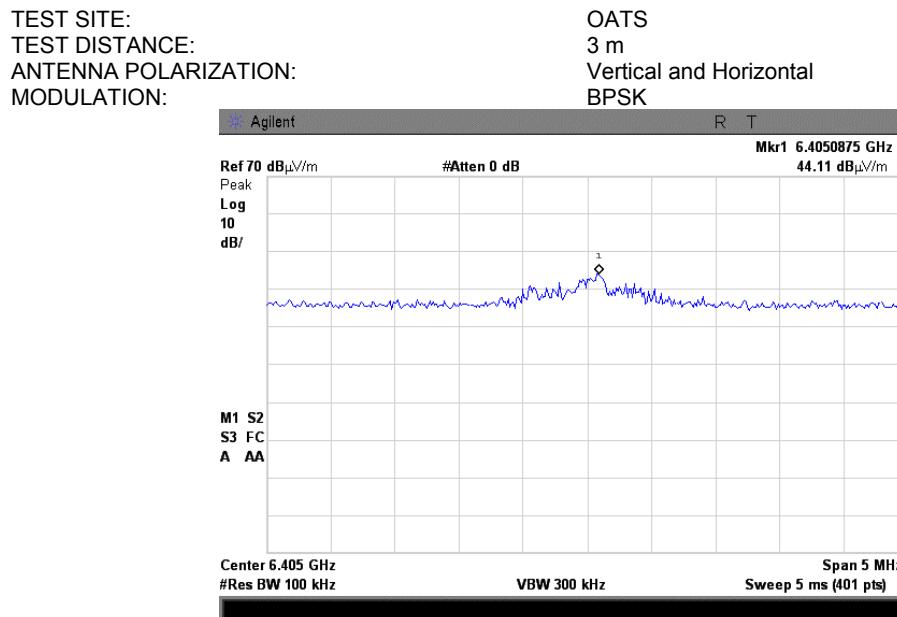


Plot 8.3.48 Radiated emission measurements at the seventh harmonic of low carrier frequency

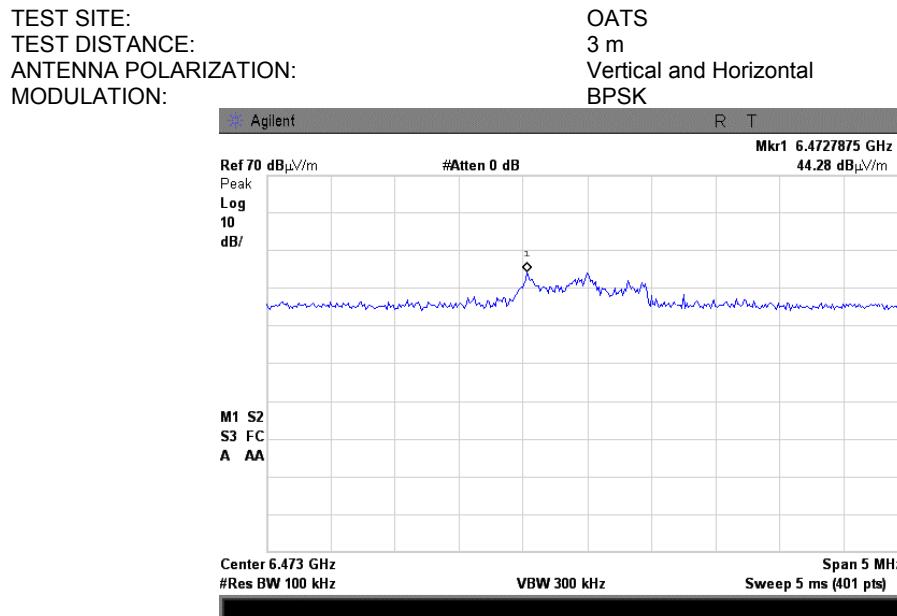


Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict: PASS	
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.49 Radiated emission measurements at the seventh harmonic of mid carrier frequency



Plot 8.3.50 Radiated emission measurements at the seventh harmonic of high carrier frequency



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.51 Radiated emission measurements at the eighth harmonic of low carrier frequency

TEST SITE:

OATS

TEST DISTANCE:

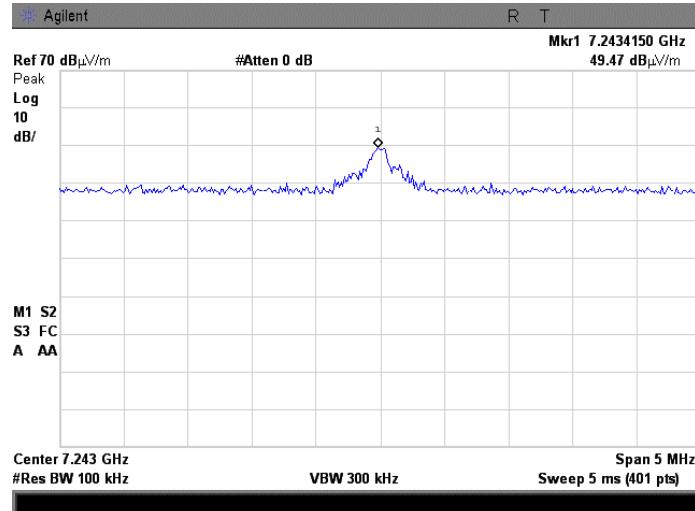
3 m

ANTENNA POLARIZATION:

Vertical and Horizontal

MODULATION:

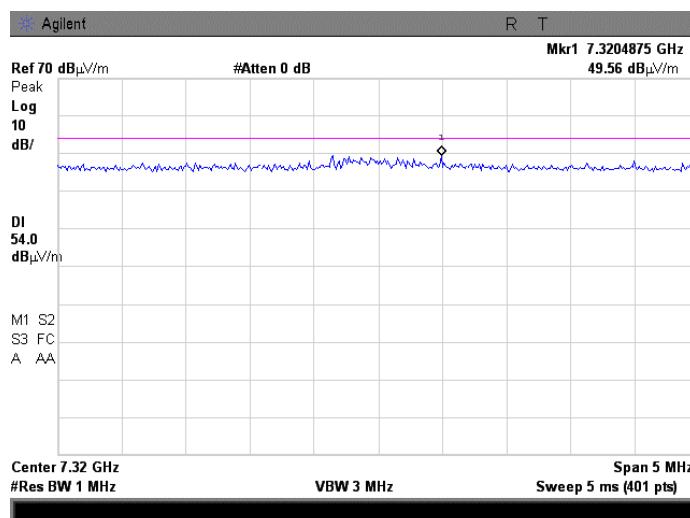
BPSK



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

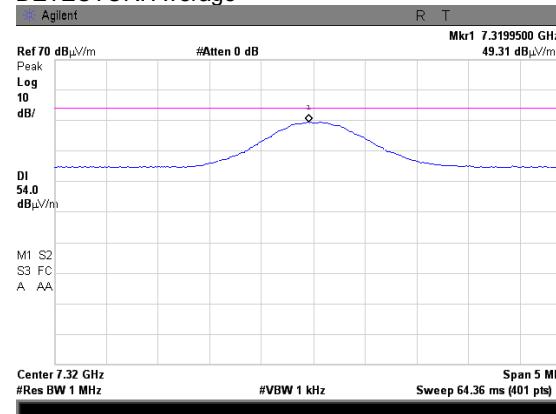
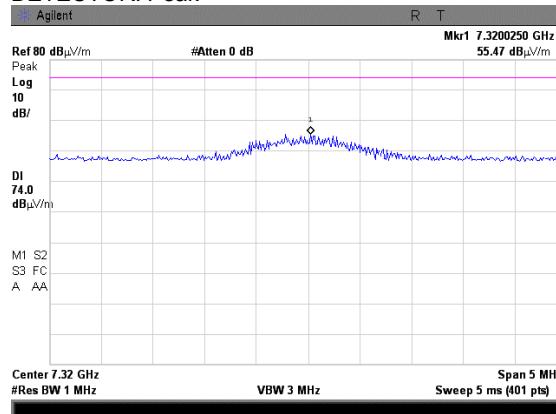
Plot 8.3.52 Radiated emission measurements at the eighth harmonic of mid carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
MODULATION: BPSK



Plot 8.3.53 Radiated emission measurements at the eighth harmonic of mid carrier frequency

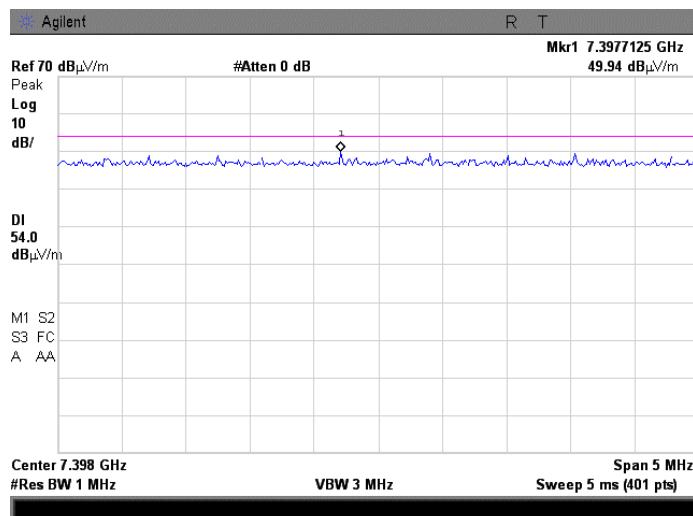
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
MODULATION: BPSK
DETECTOR: Peak



Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

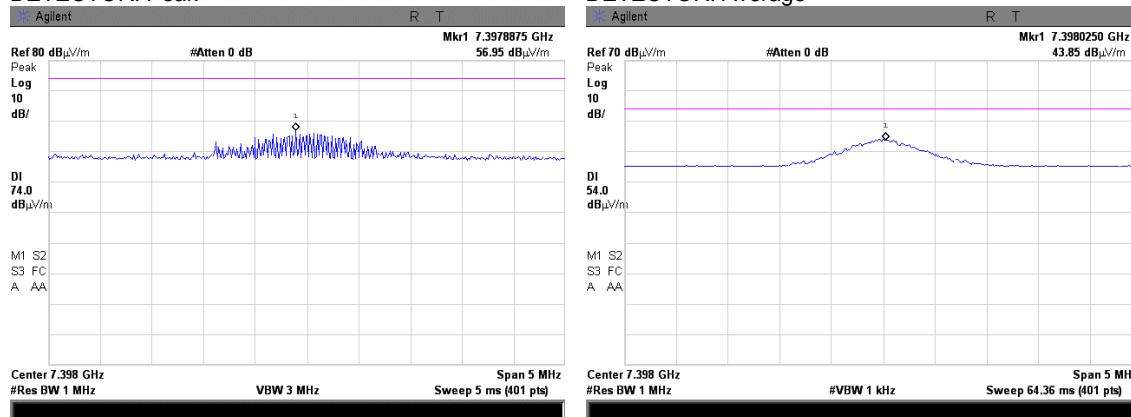
Plot 8.3.54 Radiated emission measurements at the eighth harmonic of high carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
MODULATION: BPSK
DETECTOR: Peak DETECTOR: Average



Plot 8.3.55 Radiated emission measurements at the eighth harmonic of high carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
MODULATION: BPSK
DETECTOR: Peak DETECTOR: Average

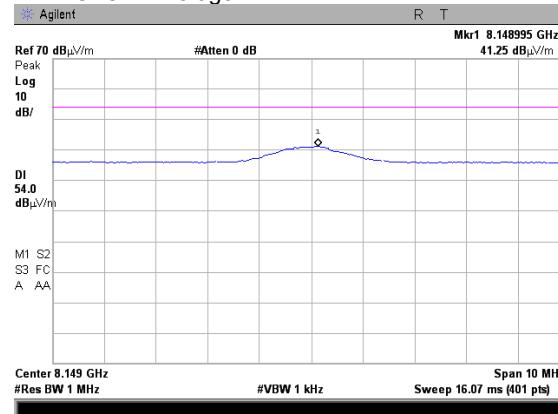
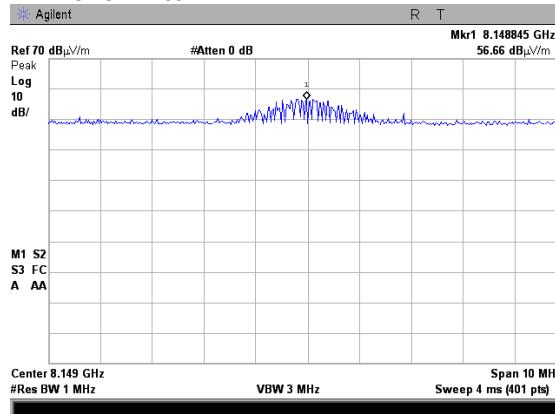


Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.56 Radiated emission measurements at the ninth harmonic of low carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

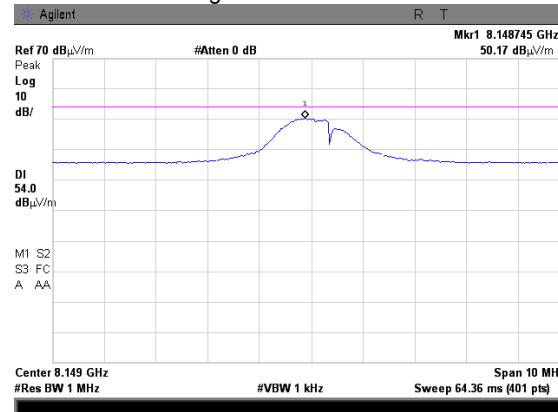
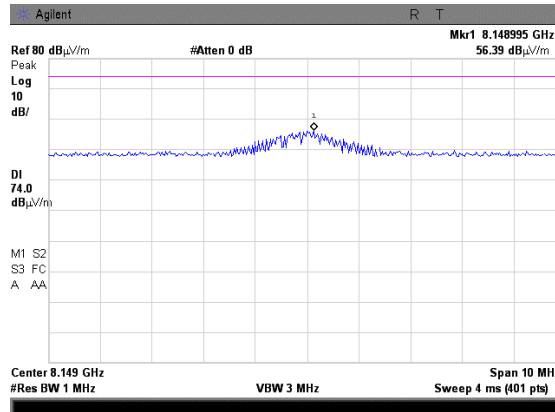
OATS
3 m
Vertical
BPSK
DETECTOR: Average



Plot 8.3.57 Radiated emission measurements at the ninth harmonic of low carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

OATS
3 m
Horizontal
BPSK
DETECTOR: Average

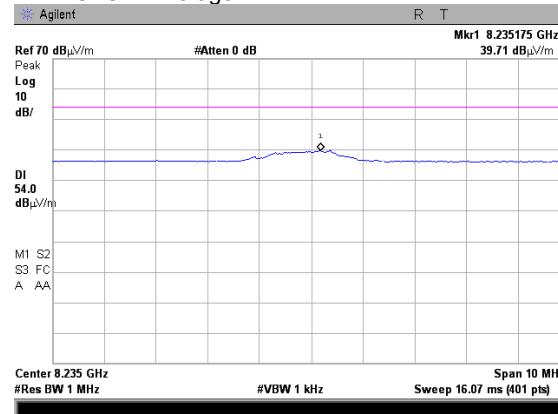
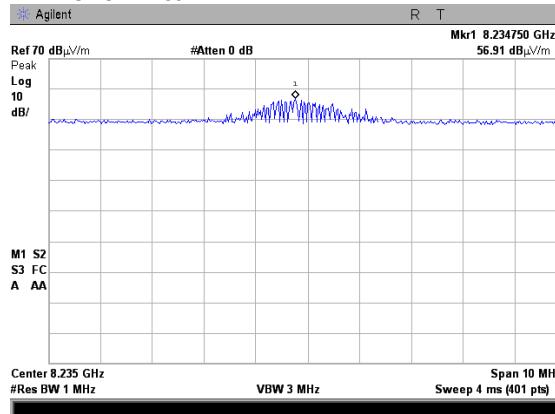


Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.58 Radiated emission measurements at the ninth harmonic of mid carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

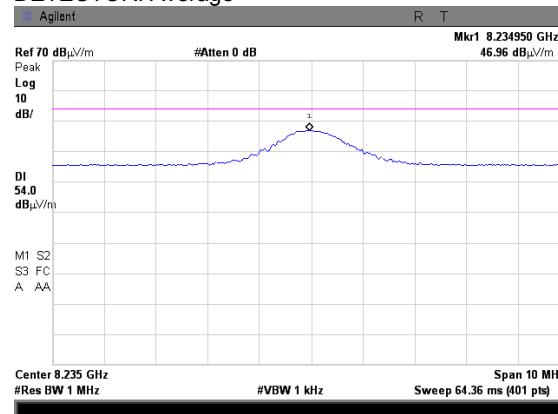
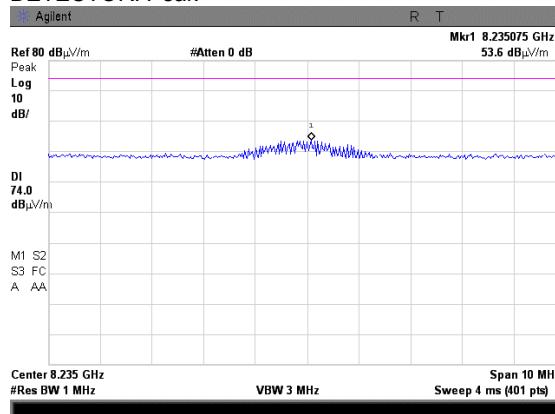
OATS
3 m
Vertical
BPSK
DETECTOR: Average



Plot 8.3.59 Radiated emission measurements at the ninth harmonic of mid carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

OATS
3 m
Horizontal
BPSK
DETECTOR: Average

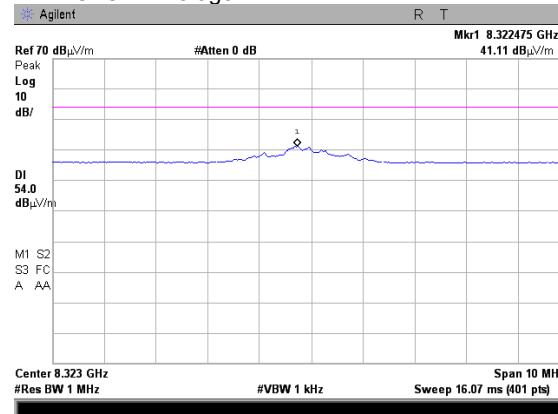
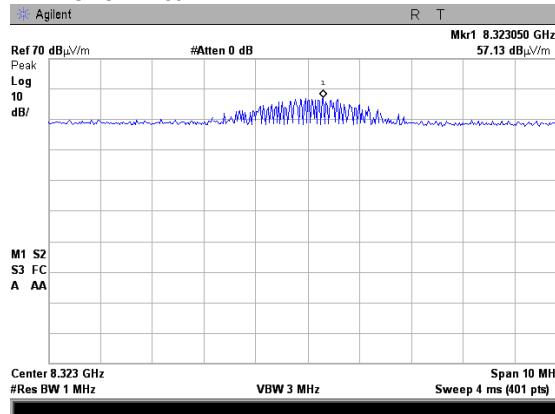


Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.60 Radiated emission measurements at the ninth harmonic of high carrier frequency

TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

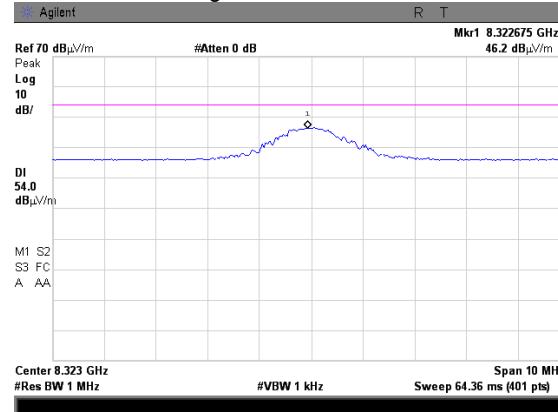
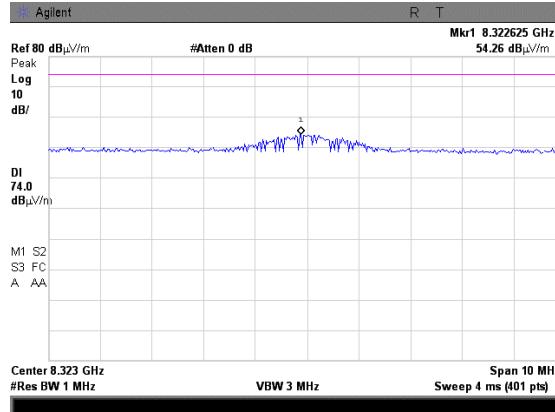
OATS
3 m
Vertical
BPSK
DETECTOR: Average



Plot 8.3.61 Radiated emission measurements at the ninth harmonic of high carrier frequency

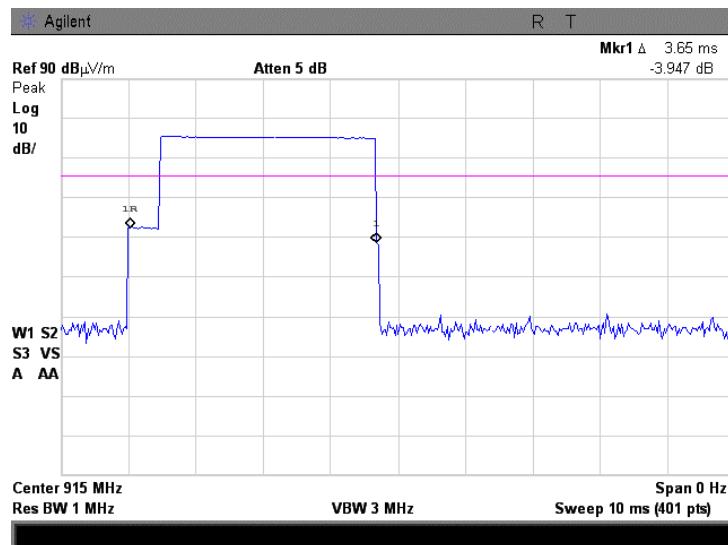
TEST SITE:
TEST DISTANCE:
ANTENNA POLARIZATION:
MODULATION:
DETECTOR: Peak

OATS
3 m
Horizontal
BPSK
DETECTOR: Average

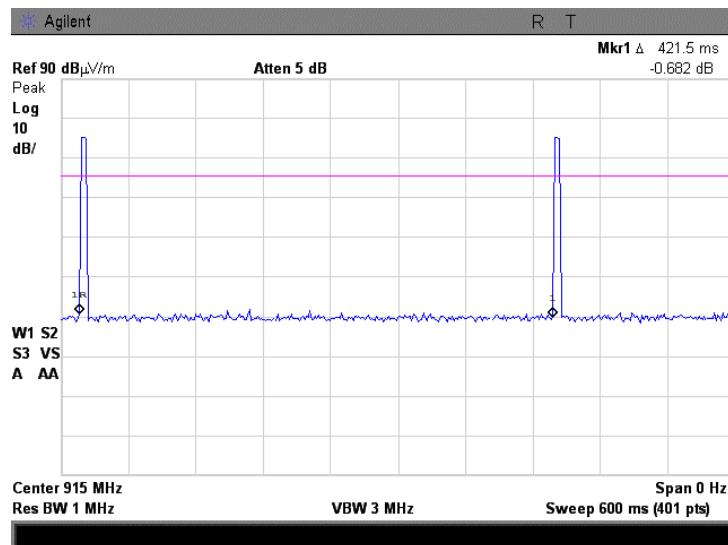


Test specification:	Section 15.247(d), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict: PASS	
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 22.0 °C	Air Pressure: 1008 hPa	Relative Humidity: 55 %	Power Supply: Battery
Remarks:			

Plot 8.3.62 Transmission pulse duration, BPSK modulation



Plot 8.3.63 Transmission pulse period, BPSK modulation



Test specification:	Section 15.247(d), RSS-210 section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	
Date(s):	8/22/2011	PASS	
Temperature: 23.3 °C	Air Pressure: 1008 hPa	Relative Humidity: 44 %	Power Supply: Battery
Remarks:			

8.4 Band edge radiated emissions

8.4.1 General

This test was performed to measure emissions, radiated from the EUT at the assigned frequency band edges. Specification test limits are given in Table 8.4.1.

Table 8.4.1 Band edge emission limits

Assigned frequency, MHz	Attenuation below carrier*, dBc	Field strength at 3 m within restricted bands, dB(µV/m)	
		Peak	Average
902.0 – 928.0	20.0	74.0	54.0
2400.0 – 2483.5			
5725.0 – 5850.0			

* - Band edge emission limit is provided in terms of attenuation below the peak of modulated carrier measured with the same resolution bandwidth.

8.4.2 Test procedure

- 8.4.2.1 The EUT was set up as shown in Figure 8.4.1, energized normally modulated at the maximum data rate with its hopping function disabled and its proper operation was checked.
- 8.4.2.2 The EUT was adjusted to produce maximum available to end user RF output power at the lowest carrier frequency.
- 8.4.2.3 The spectrum analyzer span was set to capture the carrier frequency and associated modulation products. The resolution bandwidth was set wider than 1 % of the frequency span.
- 8.4.2.4 The spectrum analyzer was set in max hold mode and allowed trace to stabilize. The highest emission level within the authorized band was measured.
- 8.4.2.5 The maximum band edge emission and modulation product outside of the band were measured as provided in Table 8.4.2 and associated plots and referenced to the highest emission level measured within the authorized band.
- 8.4.2.6 The above procedure was repeated with the EUT adjusted to produce maximum RF output power at the highest carrier frequency.
- 8.4.2.7 The above procedure was repeated with the frequency hopping function enabled.

Figure 8.4.1 Band edge emission test setup





Test specification:	Section 15.247(d), RSS-210 section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	
Date(s):	8/22/2011	PASS	
Temperature: 23.3 °C	Air Pressure: 1008 hPa	Relative Humidity: 44 %	Power Supply: Battery
Remarks:			

Table 8.4.2 Band edge emission test results

ASSIGNED FREQUENCY RANGE: 902 – 928 MHz
 DETECTOR USED: Peak
 MODULATION: BPSK
 MODULATING SIGNAL: PRBS
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 RESOLUTION BANDWIDTH: $\geq 1\%$ of the span
 VIDEO BANDWIDTH: \geq RBW

Frequency, MHz	Bit rate, bps	Band edge emission, dB μ V	Emission at carrier, dB μ V	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
Low frequency							
902.000	900	54.67	87.67	33.00	20.0	-13.00	Pass
High frequency							
928.000	900	59.17	86.83	27.66	20.0	-7.66	Pass

*- Margin = Attenuation below carrier – specification limit.

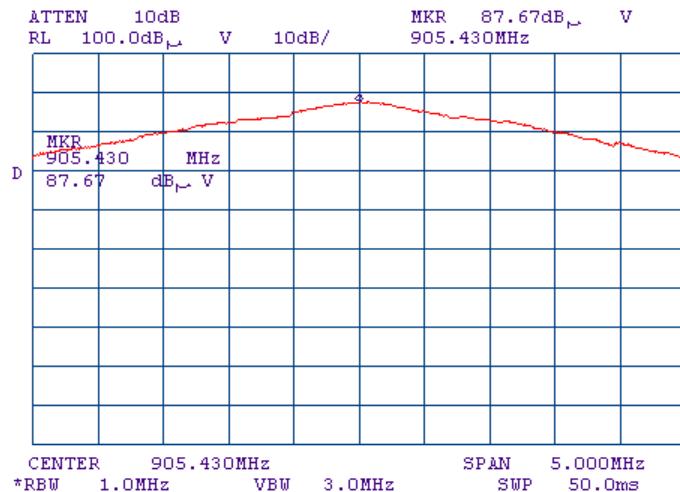
Reference numbers of test equipment used

HL 0337	HL 1451	HL 3001					
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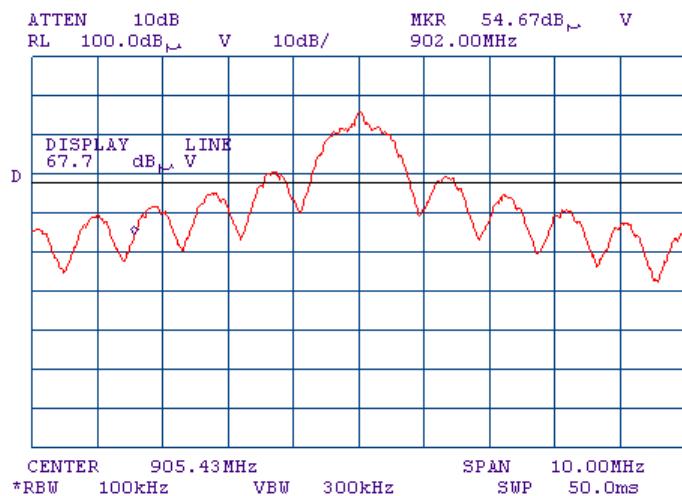
Full description is given in Appendix A.

Test specification:	Section 15.247(d), RSS-210 section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date(s):	8/22/2011		
Temperature: 23.3 °C	Air Pressure: 1008 hPa	Relative Humidity: 44 %	Power Supply: Battery
Remarks:			

Plot 8.4.1 The highest emission level within the assigned band at low carrier frequency

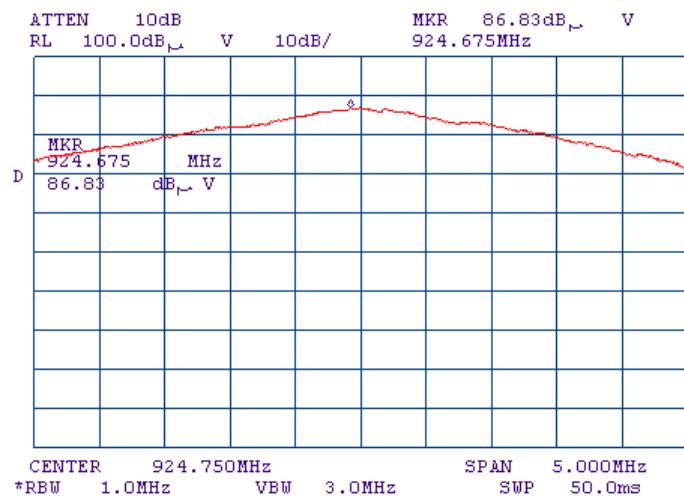


Plot 8.4.2 The highest band edge emission at low carrier frequency

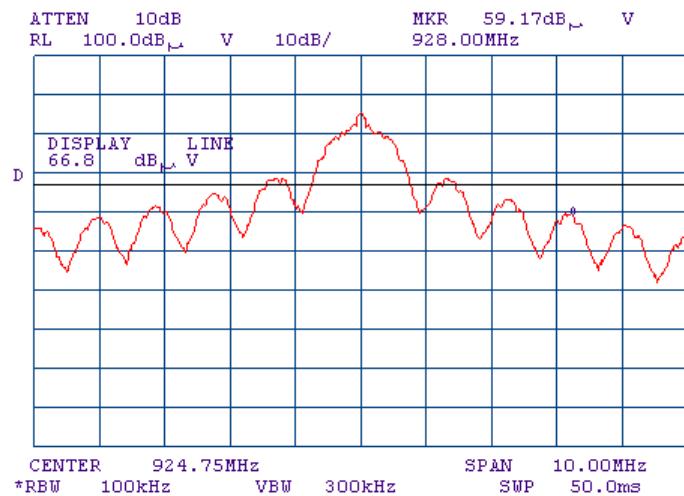


Test specification:	Section 15.247(d), RSS-210 section A8.5, Emissions at band edges		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	PASS
Date(s):	8/22/2011		
Temperature: 23.3 °C	Air Pressure: 1008 hPa	Relative Humidity: 44 %	Power Supply: Battery
Remarks:			

Plot 8.4.3 The highest emission level within the assigned band at high carrier frequency



Plot 8.4.4 The highest band edge emission at high carrier frequency



Test specification:	Section 15.247(e), RSS-210 section A8.2(b), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011		PASS
Temperature: 23 °C	Air Pressure: 1008 hPa	Relative Humidity: 56 %	Power Supply: Battery
Remarks:			

8.5 Peak spectral power density

8.5.1 General

This test was performed to measure the peak spectral power density radiated by the transmitter RF antenna. Specification test limits are given in Table 8.5.1.

Table 8.5.1 Peak spectral power density limits

Assigned frequency range, MHz	Measurement bandwidth, kHz	Peak spectral power density, dBm	Equivalent field strength limit @ 3m, dB(µV/m)*
902.0 – 928.0	3.0	8.0	103.2
2400.0 – 2483.5			
5725.0 – 5850.0			

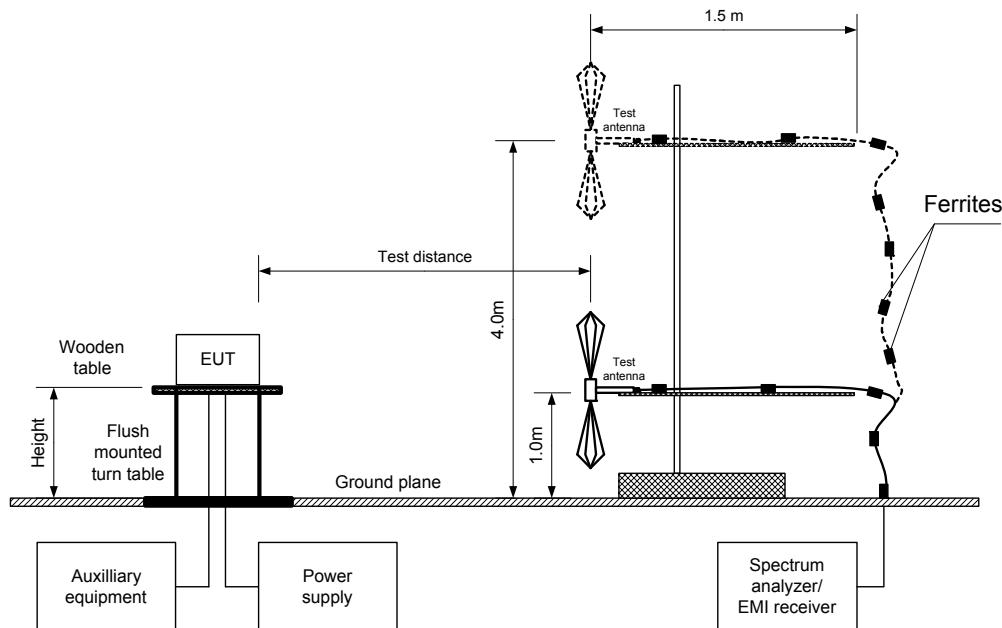
* - Equivalent field strength limit was calculated from the peak spectral power density as follows: $E = \sqrt{30 \times P} / r$, where P is peak spectral power density and r is antenna to EUT distance in meters.

8.5.2 Test procedure for field strength measurements

- 8.5.2.1 The EUT was set up as shown in Figure 8.5.1, energized and its proper operation was checked.
- 8.5.2.2 The EUT was adjusted to produce maximum available to end user RF output power.
- 8.5.2.3 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° and the measuring antenna height was swept in both vertical and horizontal polarizations.
- 8.5.2.4 The frequency span of spectrum analyzer was set to capture the entire 6 dB band of the transmitter, in peak hold mode with resolution bandwidth set to 3.0 kHz, video bandwidth wider than resolution bandwidth, auto sweep time and sufficient number of sweeps was allowed for trace stabilization. The spectrum lines spacing was verified to be wider than 3 kHz. Otherwise the resolution bandwidth was reduced until individual spectrum lines were resolved and the power of individual spectrum lines was integrated over 3 kHz band.
- 8.5.2.5 The peak of emission was zoomed with span set just wide enough to capture the emission peak area and sweep time was set equal to span width divided by resolution bandwidth. Spectrum analyzer was set in peak hold mode, sufficient number of sweeps was allowed for trace stabilization and peak spectral power density was measured as provided in Table 8.5.2 and associated plots.

Test specification:	Section 15.247(e), RSS-210 section A8.2(b), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 23 °C	Air Pressure: 1008 hPa	Relative Humidity: 56 %	Power Supply: Battery
Remarks:			

Figure 8.5.1 Setup for carrier field strength measurements



Test specification:	Section 15.247(e), RSS-210 section A8.2(b), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011		PASS
Temperature: 23 °C	Air Pressure: 1008 hPa	Relative Humidity: 56 %	Power Supply: Battery
Remarks:			

Table 8.5.2 Field strength measurement of peak spectral power density

ASSIGNED FREQUENCY: 902 - 928 MHz
 TEST DISTANCE: 3 m
 TEST SITE: Semi anechoic chamber
 EUT HEIGHT: 0.8 m
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 3 kHz
 VIDEO BANDWIDTH: 10 kHz
 TEST ANTENNA TYPE: Biconilog (30 MHz – 1000 MHz)
 MODULATION: BPSK
 MODULATING SIGNAL: PRBS
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Frequency, MHz	Field strength, dB(µV/m)	EUT antenna gain, dBi	Limit, dB(µV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
905.43	102.17	0.5	103.23	-1.56	Vertical	1	8	Pass
915.00	103.63	0.5	103.23	-0.10	Vertical	1	357	Pass
924.75	102.71	0.5	103.23	-1.02	Vertical	1	8	Pass

*- Margin = Field strength - EUT antenna gain - calculated field strength limit.

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

Reference numbers of test equipment used

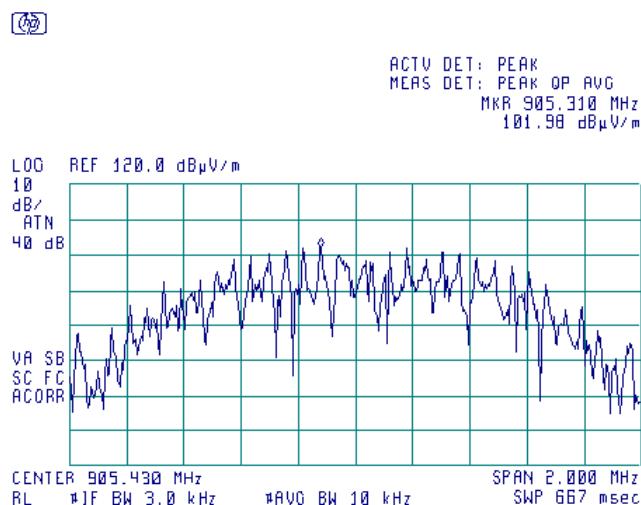
HL 0521	HL 0604	HL 2871	HL 3623				
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Full description is given in Appendix A.

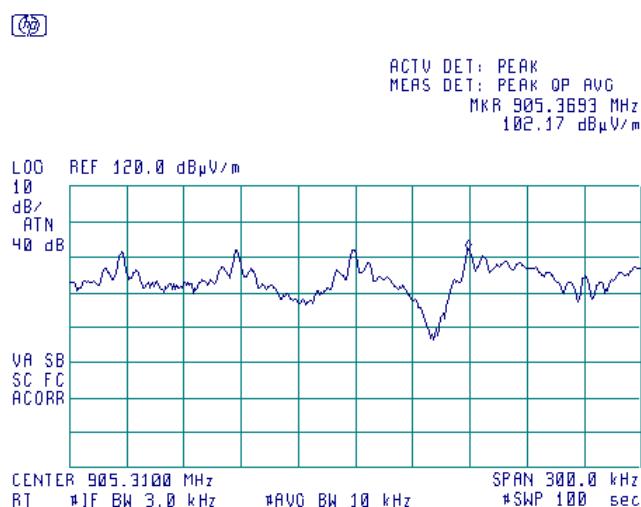


Test specification:	Section 15.247(e), RSS-210 section A8.2(b), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 23 °C	Air Pressure: 1008 hPa	Relative Humidity: 56 %	Power Supply: Battery
Remarks:			

Plot 8.5.1 Peak spectral power density at low frequency within 6 dB band



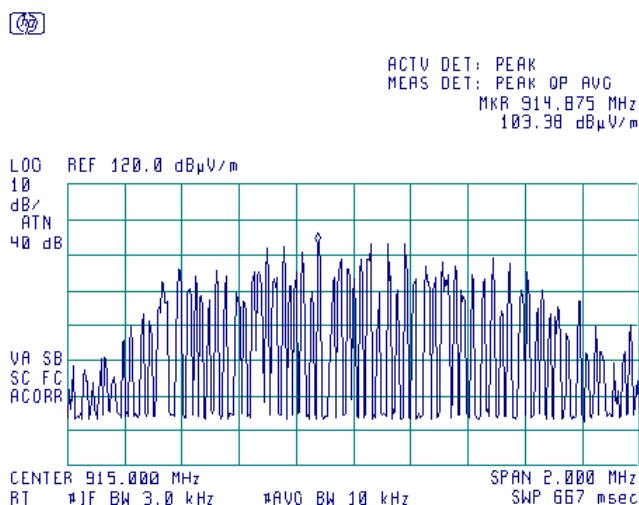
Plot 8.5.2 Peak spectral power density at low frequency zoomed at the peak



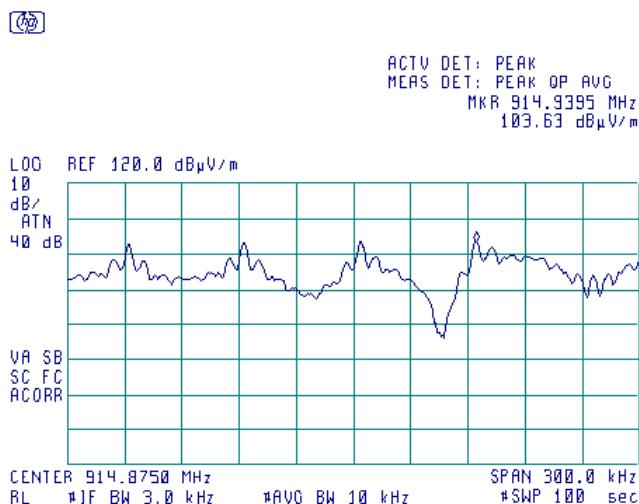


Test specification:	Section 15.247(e), RSS-210 section A8.2(b), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	8/15/2011 - 8/31/2011		
Temperature: 23 °C	Air Pressure: 1008 hPa	Relative Humidity: 56 %	Power Supply: Battery
Remarks:			

Plot 8.5.3 Peak spectral power density at mid frequency within 6 dB band

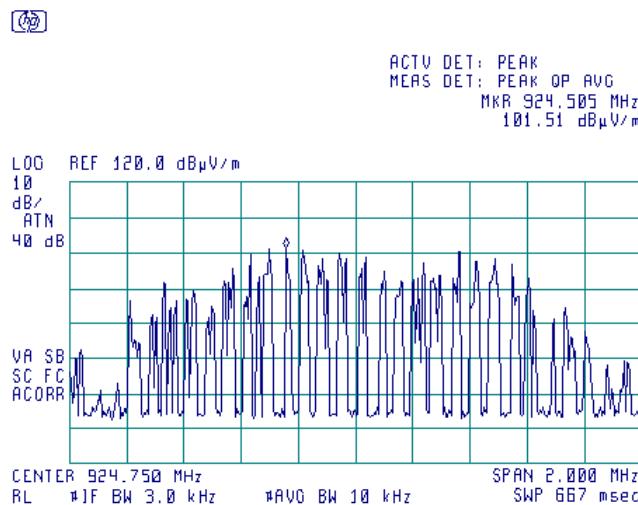


Plot 8.5.4 Peak spectral power density at mid frequency zoomed at the peak

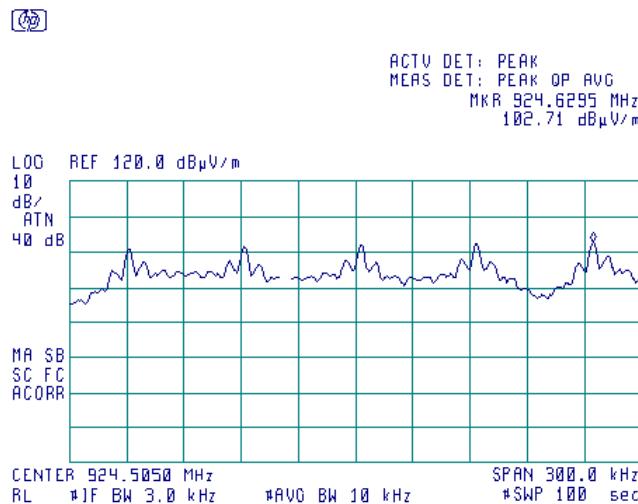


Test specification:	Section 15.247(e), RSS-210 section A8.2(b), Peak power density		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	Verdict:	
Date(s):	8/15/2011 - 8/31/2011	PASS	
Temperature: 23 °C	Air Pressure: 1008 hPa	Relative Humidity: 56 %	Power Supply: Battery
Remarks:			

Plot 8.5.5 Peak spectral power density at high frequency within 6 dB band



Plot 8.5.6 Peak spectral power density at high frequency zoomed at the peak



Test specification:	Section 15.203, RSS-Gen section 7.1.2, Antenna requirement		
Test procedure:	Visual inspection		
Test mode:	Compliance	Verdict:	PASS
Date(s):	9/19/2011		
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 38 %	Power Supply: Battery
Remarks:			

8.6 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 8.6.1.

Table 8.6.1 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	

Test specification:	FCC section 15.109, RSS-Gen section 6.1, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	9/19/2011	PASS	
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 38 %	Power Supply: Battery
Remarks:			

9 Unintentional emissions tests according to 47CFR part 15 subpart B and RSS-Gen requirements

9.1 Radiated emission measurements

9.1.1 General

This test was performed to measure radiated emissions from the EUT enclosure. Specification test limits are given in Table 9.1.1.

Table 9.1.1 Radiated emission test limits according to FCC Part 15 Section 15.109

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*
Above 960	43.5*	54.0	49.5	60.0*

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

Table 9.1.2 Radiated emission limits according to RSS-Gen, Section 6.1

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

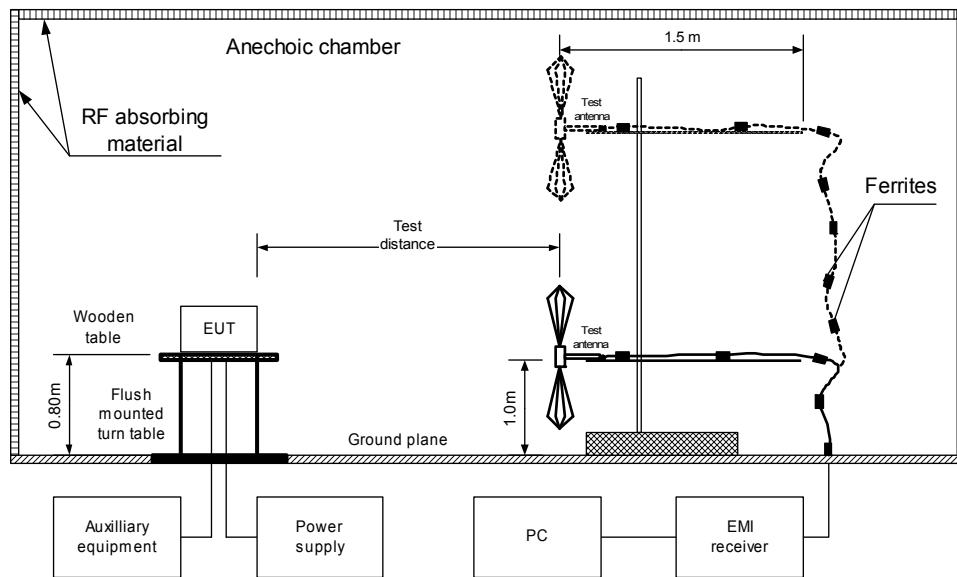
** - harmonic of the highest frequency the EUT generates, uses, operates or tunes to.

9.1.2 Test procedure for measurements in semi-anechoic chamber

- 9.1.2.1 The EUT was set up as shown in Figure 9.1.1, energized and the performance check was conducted.
- 9.1.2.2 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.
- 9.1.2.3 The worst test results (the lowest margins) were recorded in Table 9.1.3 and shown in the associated plots.

Test specification:	FCC section 15.109, RSS-Gen section 6.1, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	9/19/2011	PASS	
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 38 %	Power Supply: Battery
Remarks:			

Figure 9.1.1 Setup for radiated emission measurements in anechoic chamber, table-top equipment



Test specification:	FCC section 15.109, RSS-Gen section 6.1, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	9/19/2011	PASS	
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 38 %	Power Supply: Battery
Remarks:			

Table 9.1.3 Radiated emission test results

EUT SET UP:

TABLE-TOP

LIMIT:

Class B

EUT OPERATING MODE:

Receive / Stand-by

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*									
No emissions were found													
Pass													

DETECTORS USED:

PEAK / AVERAGE

FREQUENCY RANGE:

1000 MHz – 2900 MHz

RESOLUTION BANDWIDTH:

1000 kHz

Frequency, MHz	Peak			Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict				
	Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*	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

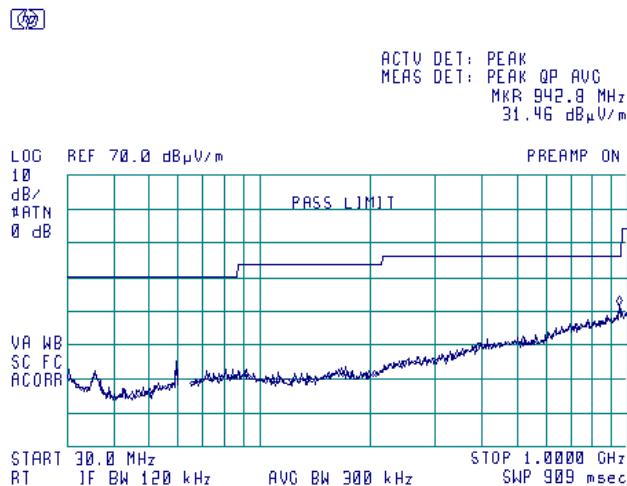
HL 0521	HL 0604	HL 1984	HL 2871	HL 3121		
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Full description is given in Appendix A.

Test specification:	FCC section 15.109, RSS-Gen section 6.1, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	
Date(s):	9/19/2011	PASS	
Temperature: 24 °C	Air Pressure: 1011 hPa	Relative Humidity: 38 %	Power Supply: Battery
Remarks:			

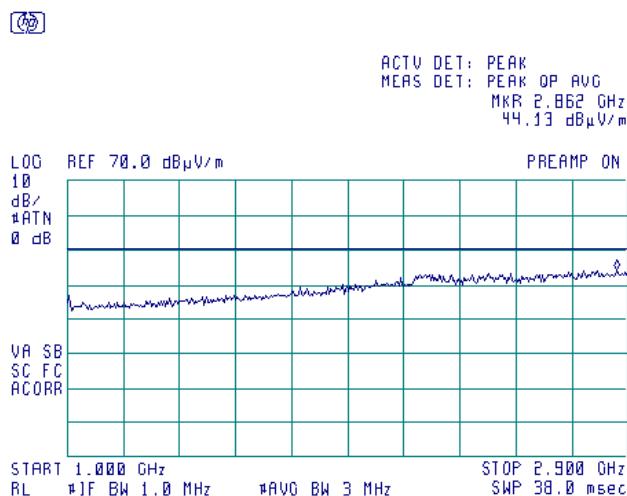
Plot 9.1.1 Radiated emission measurements in 30 - 1000 MHz range, vertical & horizontal antenna polarization

TEST SITE: Semi anechoic chamber
LIMIT: Class B
TEST DISTANCE: 3 m
EUT OPERATING MODE: Receive / Stand-by



Plot 9.1.2 Radiated emission measurements above 1000 MHz, vertical & horizontal antenna polarization

TEST SITE: Semi anechoic chamber
LIMIT: Class B
TEST DISTANCE: 3 m
EUT OPERATING MODE: Receive / Stand-by



10 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal./Check	Due Cal./Check
0337	Probe Set, Hand held, 5 probes	Electro-Metrics	EHFP-30	238	07-Jun-11	07-Jun-12
0415	Cable, Coax, RF, RG-214	Hermon Laboratories	CC-3	056	01-Dec-10	01-Dec-11
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	03-Jul-11	03-Jul-12
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard	8546A	3617A 00319, 3448A002 53	29-Aug-11	29-Sep-12
0583	Antenna, Log Periodic, 200 - 1000 MHz	Hermon Laboratories	LP 200/1000	035	04-Jul-11	04-Jul-12
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	11-Jan-11	11-Jan-12
0812	Cable Coax, RG-214, 11.5 m, N-type connectors	Hermon Laboratories	C214-11	148	01-Dec-10	01-Dec-11
1431	Receiver RF Section, 9 kHz-2.9 GHz, part of HL1430 system	Agilent Technologies	85422E	308070026 2	25-Nov-10	25-Nov-11
1451	Cable, 1.5 m, N/N-Type	Harbour Industries	MIL 17/60-RG142	1451	01-Sep-11	01-Sep-12
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W	EMC Test Systems	3115	9911-5964	16-Nov-10	16-Nov-11
2871	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-8155-00	2871	20-Sep-11	20-Sep-12
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY414447 62	08-May-11	08-May-12
3001	EMC Analyzer, 9 kHz to 3 GHz	Agilent Technologies	E7402A	US394401 80	26-Dec-10	26-Dec-11
3121	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-9155-00	3121	01-Jan-11	01-Jan-12
3623	Cable RF, 6.0 m, N type-N type, DC-6.5 GHz	Belden	MIL C-17	NA	19-May-11	19-May-12
3903	Microwave Cable Assembly, 40.0 GHz, 1.5 m, SMA/SMA	Huber-Suhner	SUCOFLE X 102A	1226/2A	07-Feb-11	07-Feb-12

11 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Conducted carrier power at RF antenna connector	Below 12.4 GHz: ± 1.7 dB 12.4 GHz to 40 GHz: ± 2.3 dB
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB 2.9 GHz to 6.46 GHz: ± 3.5 dB 6.46 GHz to 13.2 GHz: ± 4.3 dB 13.2 GHz to 22.0 GHz: ± 5.0 dB 22.0 GHz to 26.8 GHz: ± 5.5 dB 26.8 GHz to 40.0 GHz: ± 4.8 dB
Occupied bandwidth	± 8.0 %
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB 150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 3 m measuring distance Horizontal polarization	Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB
Vertical polarization	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.

12 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), Registration Numbers 90624 for OATS and 90623 for the anechoic chamber; by Industry Canada for electromagnetic emissions (file numbers IC 2186A-1 for OATS, IC 2186A-2 for anechoic chamber, IC 2186A-3 for full-anechoic chamber for RE measurements above 1 GHz), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, G-27 for full-anechoic chamber for RE measurements above 1 GHz, C-845 for conducted emissions site, T-1606 for conducted emissions at telecommunication ports), has a status of a Telefication - Listed Testing Laboratory, Certificate No. L138/00. 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). The FCC Designation Number is US1003.

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Person for contact: Mr. Alex Usoskin, CEO.

13 APPENDIX D Specification references

FCC 47CFR part 15: 2010	Radio Frequency Devices
FR Vol.62	Federal Register, Volume 62, May 13, 1997
FCC New Guidance:2004	FCC New Guidance on Measurements for DTS
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 8: 2010	Low Power Licence- Exempt Radiocommunication Devices
RSS-Gen Issue 3: 2010	General Requirements and Information for the Certification of Radiocommunication Equipment

14 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(μ V) to convert it into field intensity in dB(μ V/m).

**Antenna factor
Log periodic antenna
Hermon Laboratories, model LP 200/1000
Ser.No.035, HL 0583**

Frequency, MHz	Antenna factor, dB(1/m)
200	12.0
250	12.5
300	14.5
350	15.7
400	16.0
450	16.7
500	18.1
550	18.2
600	18.8
650	20.1
700	21.8
750	21.4
800	21.4
850	22.4
900	22.8
950	23.4
1000	24.6

The antenna factor shall be added to receiver reading in dB μ V to obtain field strength 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).

Cable loss
Cable Coaxial, RG-58/RG-214, s/n 056, HL 0415
+ Cable Coaxial, RG-214, 11.5m, s/n 148, HL 0812

No.	Frequency, MHz	Cable loss, dB	Measured uncertainty, dB
1	20	0.73	± 0.12
2	30	0.91	
3	50	1.2	
4	80	1.56	
5	100	1.76	
6	200	2.59	
7	300	3.26	
8	400	3.93	
9	500	4.42	
10	600	4.92	
11	700	5.36	
12	800	5.88	
13	900	6.41	
14	1000	6.71	
15	1500	8.63	
16	2000	10.39	

Cable loss
**Cable coaxial, Huber-Suhner, 18 GHz, 6.4 m, SMA - SMA, model 198-8155-00,
 HL 2871**

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.12	5750	2.34	12000	3.55
30	0.14	6000	2.39	12250	3.61
100	0.27	6250	2.46	12500	3.67
250	0.45	6500	2.52	12750	3.74
500	0.63	6750	2.58	13000	3.79
750	0.76	7000	2.64	13250	3.82
1000	0.89	7250	2.68	13500	3.83
1250	1.01	7500	2.73	13750	3.83
1500	1.12	7750	2.78	14000	3.88
1750	1.23	8000	2.83	14250	3.93
2000	1.32	8250	2.88	14500	3.96
2250	1.41	8500	2.94	14750	4.01
2500	1.49	8750	2.97	15000	4.00
2750	1.58	9000	3.02	15250	4.01
3000	1.66	9250	3.07	15500	4.00
3250	1.73	9500	3.13	15750	4.13
3500	1.80	9750	3.18	16000	4.22
3750	1.87	10000	3.21	16250	4.29
4000	1.93	10250	3.26	16500	4.29
4250	2.01	10500	3.30	16750	4.32
4500	2.06	10750	3.36	17000	4.37
4750	2.12	11000	3.39	17250	4.45
5000	2.17	11250	3.44	17500	4.49
5250	2.24	11500	3.48	17750	4.53
5500	2.29	11750	3.52	18000	4.55

Cable loss
Microwave Cable Assembly, 18 GHz, 6.4 m, SMA – SMA, Huber-Suhner, model 198-9155-00
HL 3121

Frequency, MHz	Cable loss, dB								
10	0.08	3600	2.10	7400	3.08	11200	3.85	15100	4.58
30	0.18	3700	2.14	7500	3.11	11300	3.85	15200	4.60
50	0.26	3800	2.18	7600	3.14	11400	3.86	15300	4.63
100	0.34	3900	2.19	7700	3.16	11500	3.86	15400	4.65
200	0.47	4000	2.25	7800	3.18	11600	3.87	15500	4.71
300	0.59	4100	2.25	7900	3.20	11700	3.85	15600	4.70
400	0.66	4200	2.28	8000	3.22	11800	3.96	15700	4.69
500	0.75	4300	2.35	8100	3.26	11900	3.92	15800	4.71
600	0.83	4400	2.35	8200	3.27	12000	3.92	15900	4.74
700	0.90	4500	2.38	8300	3.29	12100	3.94	16000	4.69
800	0.96	4600	2.43	8400	3.30	12200	3.94	16100	4.72
900	1.02	4700	2.43	8500	3.31	12300	3.99	16200	4.71
1000	1.07	4800	2.45	8600	3.33	12400	4.02	16300	4.74
1100	1.12	4900	2.48	8700	3.35	12500	4.10	16400	4.74
1200	1.15	5000	2.55	8800	3.36	12600	4.09	16500	4.75
1300	1.22	5100	2.54	8900	3.38	12700	4.15	16600	4.78
1400	1.28	5200	2.56	9000	3.40	12800	4.15	16700	4.86
1500	1.29	5300	2.58	9100	3.41	12900	4.08	16800	4.84
1600	1.36	5400	2.61	9200	3.45	13000	4.21	16900	4.83
1700	1.40	5500	2.64	9300	3.48	13100	4.19	17000	4.86
1800	1.45	5600	2.69	9400	3.52	13200	4.29	17100	4.83
1900	1.51	5700	2.67	9500	3.54	13300	4.24	17200	4.90
2000	1.50	5800	2.71	9600	3.59	13400	4.26	17300	4.91
2100	1.56	5900	2.73	9700	3.59	13500	4.26	17400	4.94
2200	1.59	6000	2.75	9800	3.62	13600	4.29	17500	4.93
2300	1.63	6100	2.81	9900	3.70	13700	4.35	17600	4.93
2400	1.73	6200	2.80	10000	3.70	13800	4.31	17700	5.00
2500	1.73	6300	2.82	10100	3.72	13900	4.29	17800	5.01
2600	1.78	6400	2.85	10200	3.73	14000	4.32	17900	5.00
2700	1.84	6500	2.87	10300	3.75	14100	4.33	18000	5.00
2800	1.84	6600	2.90	10400	3.76	14200	4.34		
2900	1.91	6700	2.91	10500	3.77	14300	4.36		
3000	1.91	6800	2.94	10600	3.79	14400	4.38		
3100	1.97	6900	2.96	10700	3.80	14600	4.42		
3200	1.98	7000	2.98	10800	3.81	14700	4.42		
3300	2.04	7100	3.01	10900	3.81	14800	4.55		
3400	2.04	7200	3.02	11000	3.83	14900	4.55		
3500	2.10	7300	3.04	11100	3.84	15000	4.55		

Cable loss
Cable coaxial, MIL C-17, N type-N type, 6 m
Belden, HL 3623

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.13	2600	4.38	5400	7.76
30	0.25	2700	4.53	5500	7.79
50	0.33	2800	4.64	5600	7.88
100	0.49	2900	4.79	5700	7.93
200	0.76	3000	4.93	5800	8.05
300	0.97	3100	5.02	5900	8.03
400	1.18	3200	5.18	6000	8.07
500	1.38	3300	5.27	6100	8.14
600	1.54	3400	5.41	6200	8.21
700	1.71	3500	5.57	6300	8.28
800	1.88	3600	5.65	6400	8.35
900	2.04	3700	5.82	6500	8.43
1000	2.19	3800	5.89		
1100	2.38	3900	6.02		
1200	2.61	4000	6.15		
1300	2.63	4100	6.26		
1400	2.79	4200	6.37		
1500	2.90	4300	6.52		
1600	3.08	4400	6.63		
1700	3.21	4500	6.74		
1800	3.31	4600	6.86		
1900	3.47	4700	6.98		
2000	3.59	4800	7.09		
2100	3.74	4900	7.17		
2200	3.86	5000	7.30		
2300	3.98	5100	7.41		
2400	4.12	5200	7.59		
2500	4.24	5300	7.71		

Cable loss
Microwave Cable Assembly, Huber-Suhner, 40 GHz, 1.5 m, SMA-SMA, S/N 1226/2A
HL 3903

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	-0.02	9500	1.84	21000	2.98
100	0.15	10000	1.86	22000	3.07
500	0.38	10500	1.93	23000	3.13
1000	0.56	11000	1.99	24000	3.21
1500	0.69	11500	2.04	25000	3.26
2000	0.82	12000	2.10	26000	3.48
2500	0.90	12500	2.15	27000	3.44
3000	0.98	13000	2.21	28000	3.53
3500	1.06	13500	2.25	29000	3.59
4000	1.11	14000	2.29	30000	3.66
4500	1.17	14500	2.34	31000	3.70
5000	1.24	15000	2.36	32000	3.79
5500	1.32	15500	2.40	33000	3.88
6000	1.40	16000	2.45	34000	3.94
6500	1.50	16500	2.48	35000	3.91
7000	1.56	17000	2.56	36000	4.05
7500	1.62	17500	2.58	37000	4.22
8000	1.68	18000	2.60	38000	4.25
8500	1.74	19000	2.84	39000	4.27
9000	1.78	20000	2.88	40000	4.33

15 APPENDIX F Abbreviations and acronyms

A	ampere
AC	alternating current
A/m	ampere per meter
AM	amplitude modulation
AVRG	average (detector)
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(µV)	decibel referred to one microvolt
dB(µV/m)	decibel referred to one microvolt per meter
dB(µA)	decibel referred to one microampere
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
min	minute
mm	millimeter
ms	millisecond
µs	microsecond
NA	not applicable
NB	narrow band
OATS	open area test site
Ω	Ohm
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
WB	wideband

END OF DOCUMENT