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TEST REPORT

ACCORDING TO: FCC part 15 subpart C, §15.247, parts 22, 24 and subpart B; RSS-210 issue 6

FOR:

Motorola Israel Ltd.

X-Pad handheld data terminal

Model:F4423A

FCC ID:AZ489FT7010

This report is in conformity with ISO/ IEC 17025. The A2LA logo endorsement applies only to the test methods and the standards 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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1 Applicant information

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Contact name:	Mr. Yaron Haim

2 Equipment under test attributes

Product name:	X-Pad handheld data terminal
Model(s):	F4423A
Serial number:	PXX5020068
Receipt date	3/24/2005

3 Manufacturer information

Manufacturer name:	Motorola Israel Ltd.
Address:	3 Kremenetski street, P.O.B. 25016, 67899 Tel Aviv, Israel
Telephone:	+972 3565 8888
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E-Mail:	yaron.haim@motorola.com
Contact name:	Mr. Yaron Haim

4 Test details

Project ID:	16387
Location:	Hermon Laboratories Ltd. P.O.Box 23, Binyamina 30500, Israel
Test started:	3/24/2005
Test performed:	3/24/2005 to 4/14/2005, 2/14/2006 to 2/24/2006
Test specification(s):	FCC part 15, subpart C, §15.247(DTS), §15.247(FHSS) and subpart B; FCC parts 22, 24; RSS-210 issue 6, Annex 8
Test suite:	FCC_15.247 and RSS-210_DTS_without_RF_connector (7/22/2004 5:08:51 PM, modified)

5 Tests summary

Test	Status
Transmitter characteristics according to §15.247 (DTS), RSS-210 issue 6	
FCC section 15.247(a)2, RSS-210 section A8.2(1), 6 dB bandwidth	Pass
FCC section 15.247(b)3, RSS-210 section A8.4(4), Peak output power	Pass
FCC section 15.247(b)5, RSS-Gen, Section 5.5, RF exposure	Not required
FCC section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions	Pass
FCC section 15.247(d), RSS-210 section A8.2(2), Peak power density	Pass
FCC section 15.207(a), RSS-Gen, Section 7.2.2, Conducted emission	Not required
Transmitter characteristics according to §15.247 (FHSS), RSS-210 issue 6	
Section 15.247(a)1, (g), (h), RSS-210 section A8.1(1), Frequency hopping requirements	Pass
Section 15.247(a)1, RSS-210 section A8.1(1), 20 dB bandwidth	Pass
Section 15.247(a)1, RSS-210 section A8.1(2), Frequency separation	Pass
Section 15.247(a)1, RSS-210 section A8.1(3), Number of hopping frequencies	Pass
Section 15.247(a)1, RSS-210 section A8.1(4), Average time of occupancy	Pass
Section 15.247(b), RSS-210 section A8.4(2), Peak output power	Pass
Section 15.247(b)5, RSS-Gen, Section 5.5, RF exposure	Not required
Section 15.247(c), RSS-210 section A8.5, Emissions at band edges	Pass
Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions	Pass
Section 15.203, RSS-Gen, Section 7.1.4, Antenna requirements	Pass
Section 15.207(a), RSS-Gen, Section 7.2.2, Conducted emission	Not required
Transmitter characteristics according to parts 22, 24	
Sections 22.913, 24.232, RF output power	Pass
Sections 24.238(b), 2.1049, Occupied bandwidth	Pass
Sections 22.917, 24.238, Radiated spurious emissions	Pass
Sections 22.917, 24.238, Emissions at band edges	Pass
Sections 22.355, 24.235, Frequency stability	Pass
Unintentional emissions	
FCC section 15.107, ICES-03, RSS-210 section 5.17, conducted emission at AC power port	Not required
FCC section 15.109, ICES-003, RSS-Gen, Section 7.2.3.2, Radiated emission	Pass
FCC Part 15, Section 111 / RSS-Gen, Section 7.2.3.1, Conducted emission at receiver antenna port	Not required

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

This test report replaces the previously issued test report identified by Doc ID:MOTRAD_FCC.16387_rev1.

	Name and Title	Date	Signature
Tested by:	Mr. A. Adelberg, A. Lane, test engineers	November 30, 2005; February 24, 2006	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	March 8, 2006	
Approved by:	Mr. M. Nikishin, EMC and Radio group leader	March 13, 2006	

6 EUT description

6.1 General information

The X-Pad handheld data terminal is a rugged device, designed for field applications where fast data acquisition is required.
The X-Pad carries the functionality of a state-of-the-art Personal Digital Assistant (PDA) that enables portable access to mobile applications, such as mobile messaging, queries and Computer Aided Dispatch.
It contains a variety of options, including built-in CMOS imager for barcode labels and image capture, Bluetooth®, Wi-Fi® LAN (Local Area Network) and General Packet Radio Service (GPRS) wireless radios, all with internal antennas for increased ruggedization.

6.2 Operating frequencies

Source	Frequency, MHz				
	Digital	WLAN	Bluetooth	GSM850	PCS1900
Processor	416	NA	NA	NA	NA
SDRAM	104	NA	NA	NA	NA
AC97	12.288	NA	NA	NA	NA
Clock	NA	22	15.36	26	26
Receiver	NA	2412 - 2462	2402 - 2480	869 - 894	1930 – 1990
Transmitter	NA	2412 - 2462	2402 - 2480	824.2 – 848.8	1850.2 – 1909.8
LO	NA	NA	NA	695.36 – 715.04	772.08 -795.92

6.3 Changes made in the EUT

No changes were implemented.

6.4 Transmitter characteristics

6.4.1 Bluetooth module characteristics (module BCM 2035)

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
	mobile	Always at a distance more than 20 cm from all people
X	portable	May operate at a distance closer than 20 cm to human body

Assigned frequency range	2400 – 2483.5 MHz
Operating frequency range	2402 - 2480 MHz
RF channel spacing	1000 kHz
Maximum rated output power	At transmitter 50 Ω RF output connector 1.77 dBm (1.5 mW)

Is transmitter output power variable?					
	X	No			
		Yes		continuous variable	
				stepped variable with stepsize	dB

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
Monopole	Motorola	8508851K37	+2.5 dBi

Transmitter 99% power bandwidth	1000 kHz				
Transmitter aggregate data rate/s	1.0 Mbps				
Transmitter aggregate symbol (baud) rate/s	0.125 Msymbols per second (MBaud)				
Type of modulation	GFSK				
Type of multiplexing	TDD				
Modulating test signal (baseband)	PRBS				
Maximum transmitter duty cycle in normal use	91.8 %	**Tx ON time**		**Period**	
Transmitter duty cycle supplied for test	100 %	**Tx ON time**	msec	**Period**	msec

Transmitter power source					
X	Battery	**Nominal rated voltage**	7.2 VDC	Battery type	Lithium
		Nominal rated voltage			

Common power source for transmitter and receiver	X yes	no
Emission designator	1M00F1D	

Spread spectrum parameters for transmitters tested per FCC 15.247 only		
FHSS	total number of hops	79
	dwell time	0.458 msec
	bandwidth per hop	1.0 MHz
	max. separation of hops	1.0 MHz

6.4.2 Wireless LAN module characteristics (module Samsung 2350)

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
	mobile	Always at a distance more than 20 cm from all people
X	portable	May operate at a distance closer than 20 cm to human body

Assigned frequency range	2400 – 2483.5 MHz			
Operating frequency range	2412 - 2462 MHz			
RF channel spacing	5 MHz			
Maximum rated average output power	At transmitter 50 Ω RF output connector			17.47 dBm (56 mW)
Is transmitter output power variable?	X	No		
		Yes		continuous variable
				stepped variable with stepsize dB

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
Couple folded dipole ½ lambda	Motorola	8508851K38	+2.7 dBi

Transmitter 99% power bandwidth	22 MHz				
Transmitter aggregate data rate/s	1.0, 2.0, 5.5 and 11.0 Mbps				
Transmitter aggregate symbol (baud) rate/s	0.125, 0.25, 06785 and 1.375 Msymbols per second (MBaud)				
Type of modulation	DSSS:1M – DBPSK, 2M – DQPSK and CCK: 5.5M – DQPSK, 11M - QPSK				
Type of multiplexing	TDD				
Modulating test signal (baseband)	PRBS				
Maximum transmitter duty cycle in normal use	1M – 99.9% 2M – 99.8% 5.5M – 99.6 % 11M – 99.3%	**Tx ON time**	18.8 msec 9.5 msec 3.6 msec 1.9 msec	**Period**	18.8126 msec 9.5126 msec 3.6126 msec 1.9126 msec
Transmitter duty cycle supplied for test	100 %	**Tx ON time**	msec	**Period**	msec

Transmitter power source					
X	Battery	**Nominal rated voltage**	7.2 VDC	Battery type	Lithium

Common power source for transmitter and receiver	X	yes	no
Emission designator	11M5G1D		

Spread spectrum parameters for transmitters tested per FCC 15.247 only		
DSSS	Chip sequence length	8 bits
	Spectrum width	22 MHz

6.4.3 G20, GSM850/PCS1900 transmitter, manufactured by Motorola, Inc

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
	mobile	Always at a distance more than 20 cm from all people
X	portable	May operate at a distance closer than 20 cm to human body

Assigned frequency range	824 – 849 MHz/1850 – 1910 MHz
Operating frequency range	824.2 – 848.8 MHz/1850.2 – 1909.8 MHz
RF channel spacing	200 kHz

Maximum rated output power	At transmitter 50 Ω RF output connector	850 – 28 dBm (631 mW) 1900 – 29.07 dBm (807 mW)
	Effective radiated power (for equipment with no RF connector)	850 – 23.7 dBm (234 mW) 1900 – 31 dBm (1259 mW)

Is transmitter output power variable?		No			
	X	Yes		continuous variable	
			X	stepped variable with stepsize	2 dB
			minimum RF power		850 –3.2 mW 1900 –1 mW
			maximum RF power		850 – 630 mW 1900 – 807 mW

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
PIFA Quad-Band, 850/900/2; 1800/1900/4	Motorola	8587526V07	850/900: -4.3 dBi 1800/1900: +2 dBi

Transmitter 99% power bandwidth	245 kHz				
Transmitter aggregate data rate/s	21 kbps				
Transmitter aggregate symbol (baud) rate/s	21 ksymbols per second (kBaud)				
Type of modulation	GMSK				
Type of multiplexing	TDMA				
Modulating test signal (baseband)	GSM				
Maximum transmitter duty cycle in normal use	12.5 %	**Tx ON time**	0.576 msec	**Period**	4.7 msec
Transmitter duty cycle supplied for test	12.5 %	**Tx ON time**	0.576 msec	**Period**	4.7 msec

Transmitter power source

X	Battery	**Nominal rated voltage**	7.2 VDC	Battery type	Lithium
		Nominal rated voltage			

Common power source for transmitter and receiver	yes	X	no	

Test specification:	**FCC section 15.247(a)2, RSS-210 section A8.2(1), 6 dB bandwidth**		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/6/2005 10:45:16 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

7 Transmitter tests according to 47CFR part 15 subpart C and RSS-210 requirements (DTS)

7.1 Minimum 6 dB bandwidth

7.1.1 General

This test was performed to measure 6 dB bandwidth of the EUT carrier frequency. Specification test limits according to FCC part 15 section 15.247(a)2 and RSS-210 section 6.2.2(o)(iv) are given in Table 7.1.1.

Table 7.1.1 The 6 dB bandwidth limits

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

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

7.1.2 Test procedure

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

7.1.2.2 The EUT was set to transmit modulated carrier.

7.1.2.3 The transmitter minimum 6 dB bandwidth was measured with spectrum analyzer as frequency delta between reference points on modulation envelope and provided in Table 7.1.2 and associated plot.

Figure 7.1.1 The 6 dB bandwidth test setup

Test specification:	**FCC section 15.247(a)2, RSS-210 section A8.2(1), 6 dB bandwidth**		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/6/2005 10:45:16 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 7.1.2 The 6 dB bandwidth test results

ASSIGNED FREQUENCY BAND:	2400-2483.5 MHz
DETECTOR USED:	Peak
SWEEP MODE:	Single
SWEEP TIME:	Auto
RESOLUTION BANDWIDTH:	100 kHz
VIDEO BANDWIDTH:	300 kHz
MODULATION ENVELOPE REFERENCE POINTS:	6.0 dBc
MODULATION:	DBPSK, DQPSK, DQPSK and QPSK
MODULATING SIGNAL:	PRBS
BIT RATE:	1, 2, 5.5 and 11 Mbps

Carrier frequency, MHz	6 dB bandwidth, MHz	Limit, kHz	Margin, MHz	Verdict
Low frequency				
1 Mbps				
2412	12.10	>500	11.60	Pass
2 Mbps				
2412	12.30	>500	11.80	Pass
5.5 Mbps				
2412	12.25	>500	11.75	Pass
11 Mbps				
2412	12.40	>500	11.90	Pass
Mid frequency				
1 Mbps				
2437	12.60	>500	12.10	Pass
2 Mbps				
2437	12.40	>500	11.90	Pass
5.5 Mbps				
2437	12.35	>500	11.85	Pass
11 Mbps				
2437	12.40	>500	11.90	Pass
High frequency				
1 Mbps				
2462	12.10	>500	11.60	Pass
2 Mbps				
2462	12.50	>500	12.00	Pass
5.5 Mbps				
2462	12.10	>500	11.60	Pass
11 Mbps				
2462	12.45	>500	11.95	Pass

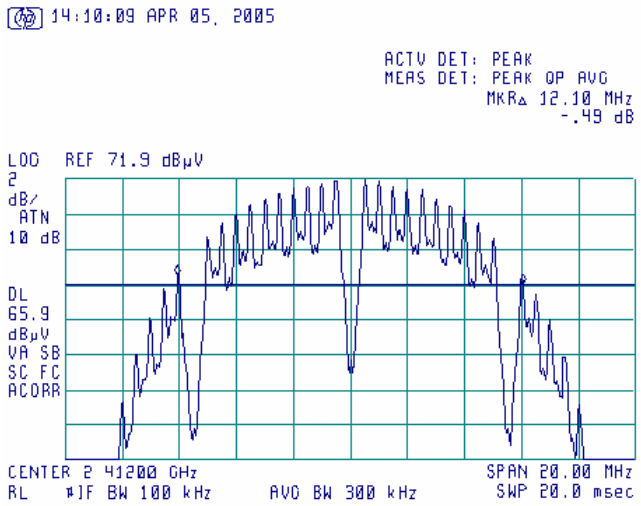
Reference numbers of test equipment used

HL 0038	HL 0287	HL 1365	HL 1430	HL 1947	HL 2432			

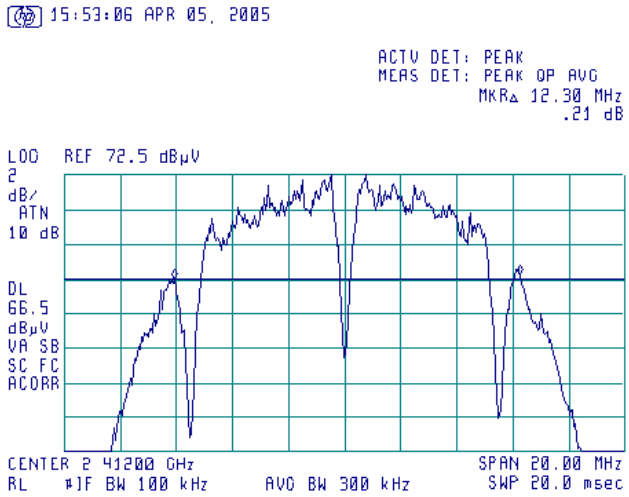
Full description is given in Appendix A.

Test specification:	**FCC section 15.247(a)2, RSS-210 section A8.2(1), 6 dB bandwidth**		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/6/2005 10:45:16 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.1.1 The 6 dB bandwidth test result at low frequency, bitrate 1 Mbit/s

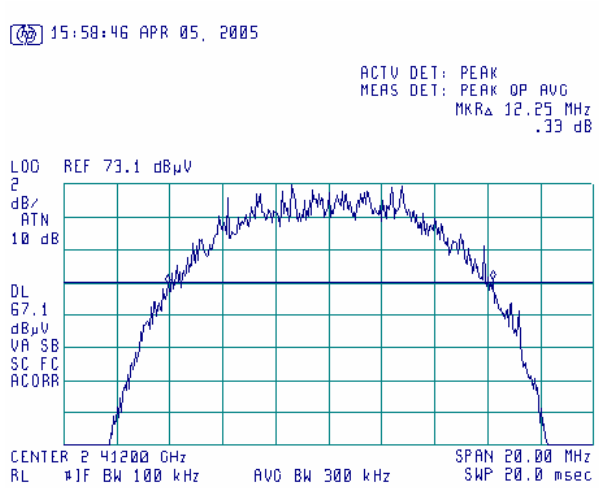


Plot 7.1.2 The 6 dB bandwidth test result at low frequency, bitrate 2 Mbit/s

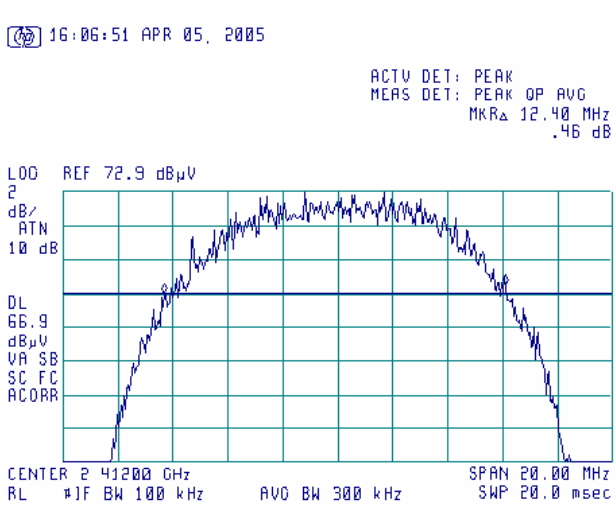


Test specification:	**FCC section 15.247(a)2, RSS-210 section A8.2(1), 6 dB bandwidth**		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/6/2005 10:45:16 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.1.3 The 6 dB bandwidth test result at low frequency, bitrate 5.5 Mbit/s

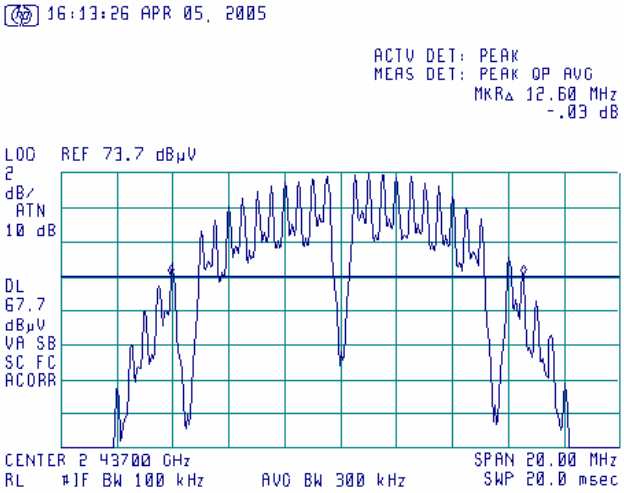


Plot 7.1.4 The 6 dB bandwidth test result at low frequency, bitrate 11 Mbit/s

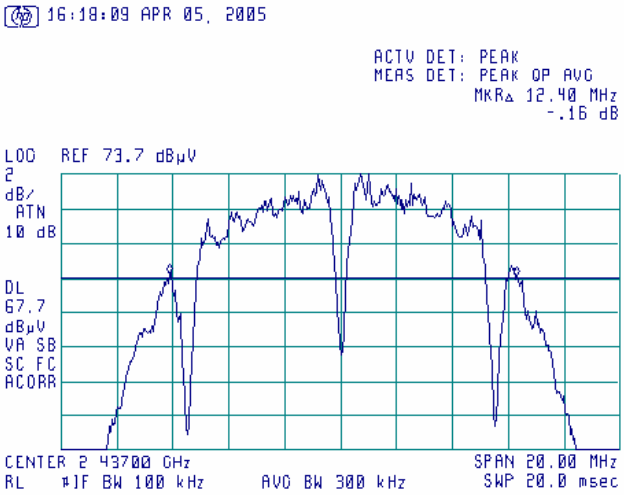


Test specification:	**FCC section 15.247(a)2, RSS-210 section A8.2(1), 6 dB bandwidth**		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/6/2005 10:45:16 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.1.5 The 6 dB bandwidth test result at mid frequency, bitrate 1 Mbit/s

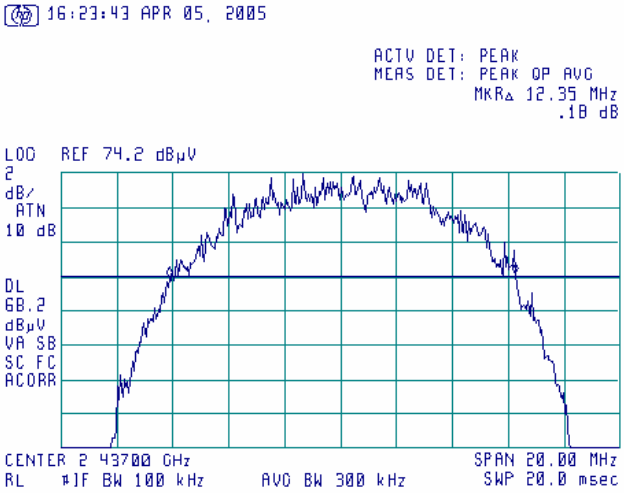


Plot 7.1.6 The 6 dB bandwidth test result at mid frequency, bitrate 2 Mbit/s

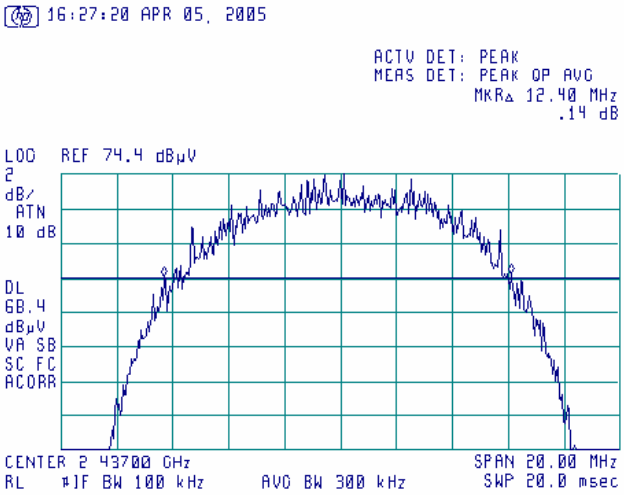


Test specification:	**FCC section 15.247(a)2, RSS-210 section A8.2(1), 6 dB bandwidth**		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/6/2005 10:45:16 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.1.7 The 6 dB bandwidth test result at mid frequency, bitrate 5.5 Mbit/s

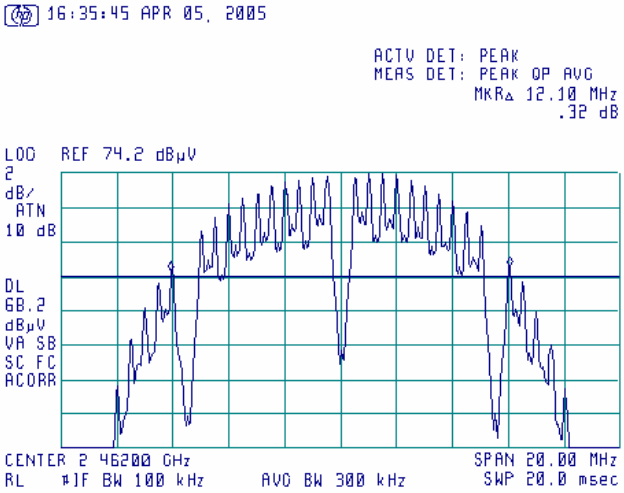


Plot 7.1.8 The 6 dB bandwidth test result at mid frequency, bitrate 11 Mbit/s

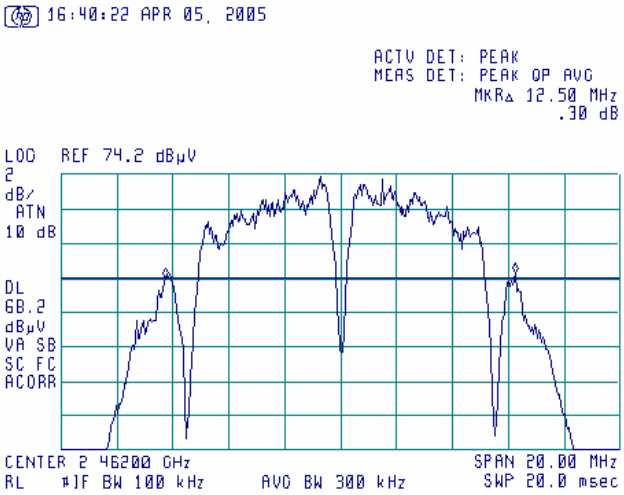


Test specification:	**FCC section 15.247(a)2, RSS-210 section A8.2(1), 6 dB bandwidth**		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/6/2005 10:45:16 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.1.9 The 6 dB bandwidth test result at high frequency, bitrate 1 Mbit/s

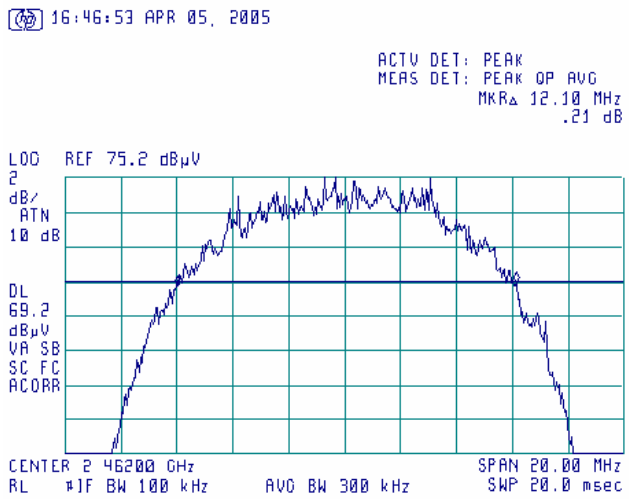


Plot 7.1.10 The 6 dB bandwidth test result at high frequency, bitrate 2 Mbit/s

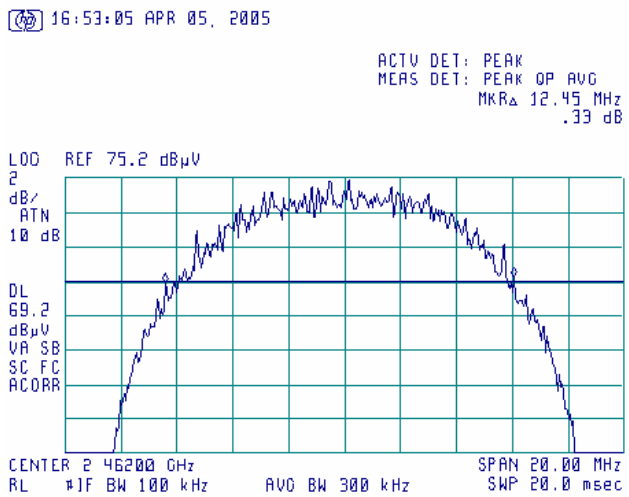


Test specification:	**FCC section 15.247(a)2, RSS-210 section A8.2(1), 6 dB bandwidth**		
Test procedure:	FR Vol.62, page 26243, Section 15.247(a)2		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/6/2005 10:45:16 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.1.11 The 6 dB bandwidth test result at high frequency, bitrate 5.5 Mbit/s



Plot 7.1.12 The 6 dB bandwidth test result at high frequency, bitrate 11 Mbit/s



Test specification:	**FCC 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 & Time:	4/6/2005 10:43:20 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

7.2 Peak output power

7.2.1 General

This test was performed to measure the maximum peak output power radiated by transmitter. Specification test limits according to FCC part 15 section 15.247(b)3 and RSS-210 section 6.2.2(o)(b) are given in Table 7.2.1.

Table 7.2.1 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×P×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.

7.2.2 Test procedure

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

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

7.2.2.3 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 360^0 and the measuring antenna height was swept in both vertical and horizontal polarizations.

7.2.2.4 The maximum field strength of the EUT carrier frequency was measured as provided in Table 7.2.2 and associated plots.

7.2.2.5 The maximum peak output power was calculated from the field strength of carrier as follows:

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

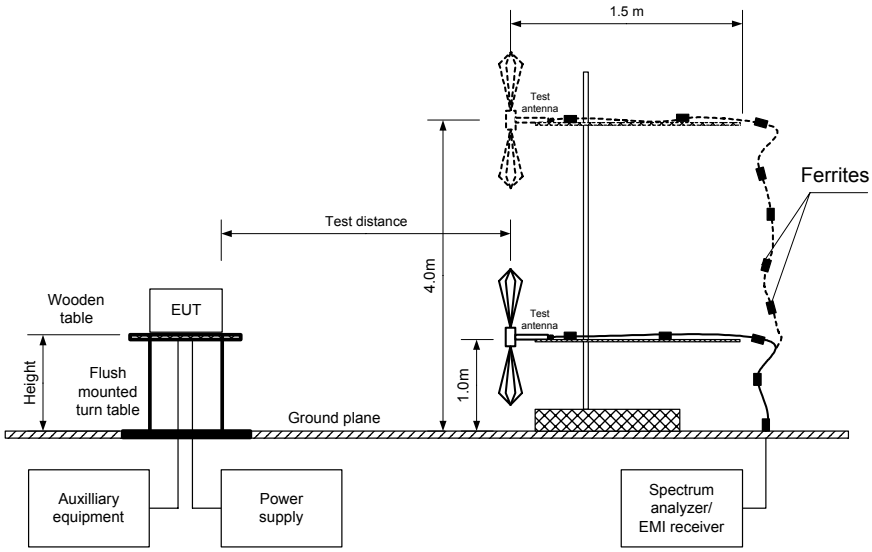
where P is the peak output power in W, E is the field strength in V/m, d is the test distance and G is the transmitter numeric antenna gain over an isotropic radiator.
The above equation was converted in logarithmic units for 3 m test distance:

Peak output power in dBm = Field strength in dB(µV/m) - Transmitter antenna gain in dBi – 95.2 dB

7.2.2.6 The worst test results (the lowest margins) were recorded in Table 7.2.2.

Test specification:	**FCC 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 & Time:	4/6/2005 10:43:20 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Figure 7.2.1 Setup for carrier field strength measurements



Test specification:	**FCC 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 & Time:	4/6/2005 10:43:20 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 7.2.2 Peak output power test results

ASSIGNED FREQUENCY: 2400-2483.5 MHz
TEST DISTANCE: 3 m
TEST SITE: OATS
EUT HEIGHT: 0.8 m
DETECTOR USED: Peak
TEST ANTENNA TYPE: Double ridged guide horn
MODULATION: DBPSK, QPSK
MODULATING SIGNAL: PRBS
BIT RATE: 1 and 11 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
DETECTOR USED: Peak

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
1 Mbit/s									
2412	114.1	H	1.44	181	2.7	16.17	30	13.83	Pass
2437	115.3	H	1.37	162	2.7	17.37	30	12.63	Pass
2462	115.1	H	1.45	175	2.7	17.17	30	12.83	Pass
11 Mbit/s									
2412	114.0	H	1.44	181	2.7	16.07	30	13.93	Pass
2437	115.4	H	1.37	162	2.7	17.47	30	12.53	Pass
2462	115.1	H	1.45	175	2.7	17.17	30	12.83	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: *Peak output power in dBm = Field strength in dB(µV/m) - Transmitter antenna gain in dBi – 95.2 dB*
***- Margin = Peak output power – specification limit.

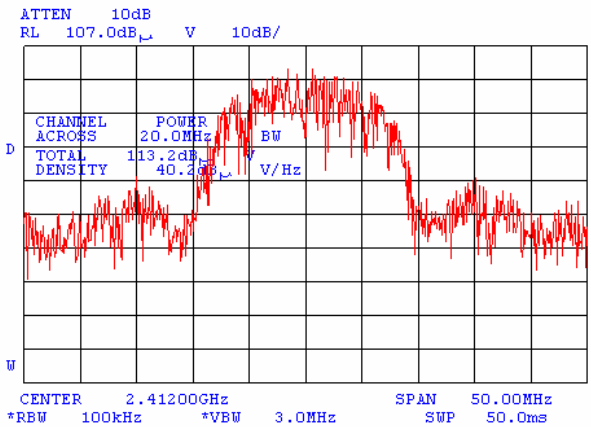
Reference numbers of test equipment used

HL 0038	HL 0287	HL 1365	HL 1424	HL 1947	HL 2432		

Full description is given in Appendix A.

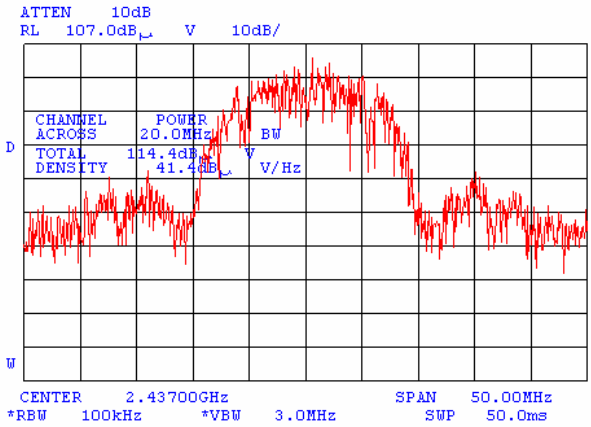
Test specification:	**FCC section 15.247(b)3, RSS-210 section A8.4(4), Peak output power**		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/6/2005 10:43:20 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.2.1 Field strength of carrier at low frequency, bitrate 1 Mbit/s



2432+1947+1365 were used instead of 1984+1947. Correction factor =0.9 dB

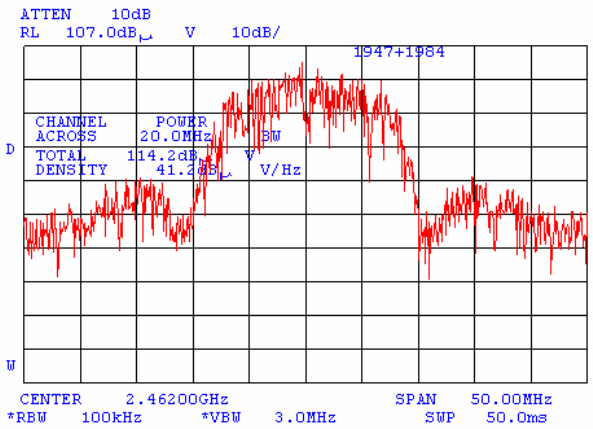
Plot 7.2.2 Field strength of carrier at mid frequency, bitrate 1 Mbit/s



2432+1947+1365 were used instead of 1984+1947. Correction factor =0.9 dB

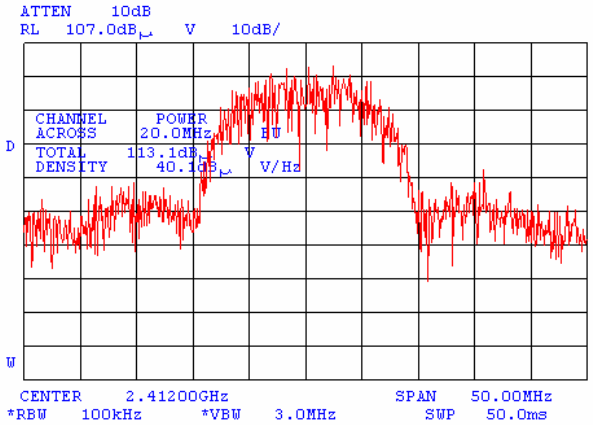
Test specification:	**FCC section 15.247(b)3, RSS-210 section A8.4(4), Peak output power**		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/6/2005 10:43:20 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.2.3 Field strength of carrier at high frequency, bitrate 1 Mbit/s



2432+1947+1365 were used instead of 1984+1947. Correction factor =0.9 dB

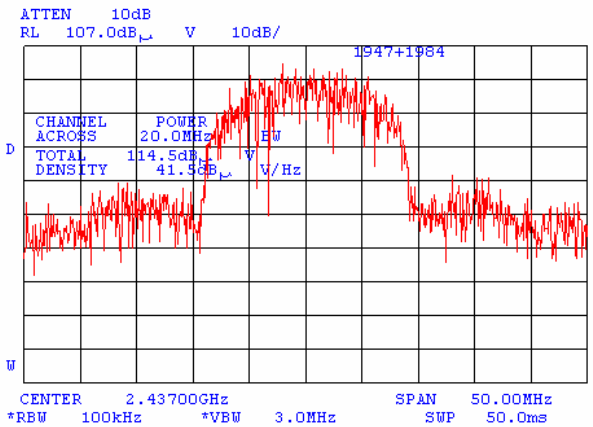
Plot 7.2.4 Field strength of carrier at low frequency, bitrate 11 Mbit/s



2432+1947+1365 were used instead of 1984+1947. Correction factor =0.9 dB

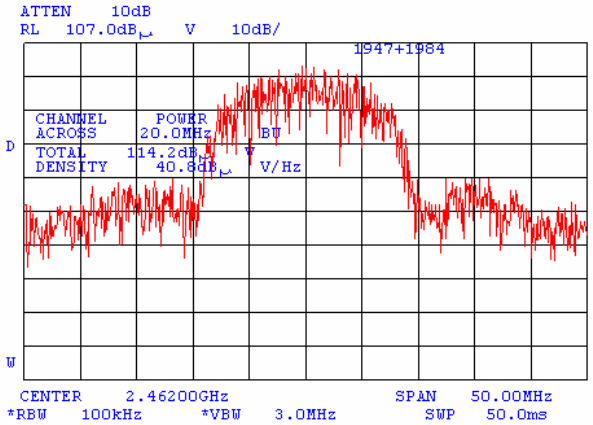
Test specification:	**FCC section 15.247(b)3, RSS-210 section A8.4(4), Peak output power**		
Test procedure:	FR Vol.62, page 26243, Section 15.247(b)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/6/2005 10:43:20 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.2.5 Field strength of carrier at mid frequency, bitrate 11 Mbit/s



2432+1947+1365 were used instead of 1984+1947. Correction factor =0.9 dB

Plot 7.2.6 Field strength of carrier at high frequency, bitrate 11 Mbit/s



2432+1947+1365 were used instead of 1984+1947. Correction factor =0.9 dB

Test specification:	FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 ºC	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

7.3 Field strength of spurious emissions

7.3.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limits according to FCC part 15 section 15.247(c) and RSS-210 section 6.2.2(o)(e1) are given in Table 7.3.1.

Table 7.3.1 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 – 0.490*	NA	128.5 – 93.8**	NA	20.0
0.490 – 1.705*		73.8 – 63.0**		
1.705 – 30.0*		69.5**		
30 – 88		40.0		
88 – 216		43.5		
216 – 960		46.0		
960 - 1000		54.0		
Above 1000	74.0	NA	54.0	

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

$$Lim_{S2} = Lim_{S1} + 40 \log (S_1/S_2),$$

where S_1 and S_2 – standard defined and test distance respectively in meters.
**- The limit decreases linearly with the logarithm of frequency.
*** - 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.

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

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

7.3.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^0 and the measuring antenna was rotated around its vertical axis.

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

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

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

7.3.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal.

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

Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

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

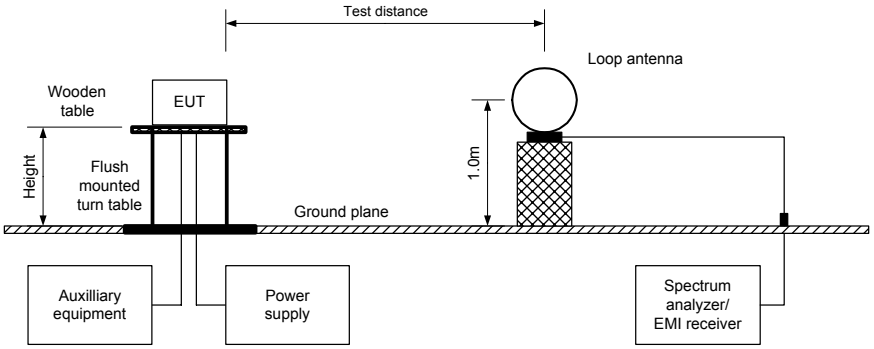
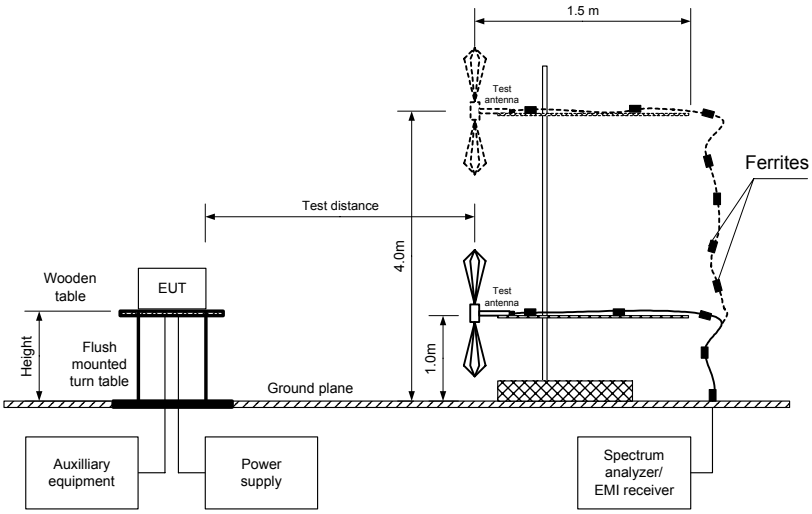


Figure 7.3.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 7.3.2 Field strength of emissions outside restricted bands

OPERATING FREQUENCY BAND:	2412-2462 MHz MHz
INVESTIGATED FREQUENCY RANGE:	0.009 - 25000 MHz
TEST DISTANCE:	3 m
MODULATION:	BT: CW, WLAN:DBPSK
MODULATING SIGNAL:	PRBS
BIT RATE:	1 Mbps
DUTY CYCLE:	100 %
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									
3215.96	52.33	H	1.32	243	102.50	50.17	20	30.17	Pass
Mid carrier frequency									
3249.29	52.50	H	1.32	243	97.10	44.60	20	24.60	Pass
High carrier frequency									
3282.62	46.50	H	1.32	243	102.90	56.40	20	36.40	Pass

*****- EUT front panel refers to 0 degrees position of turntable.
******- Margin = Attenuation below carrier – specification limit.

Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 7.3.3 Field strength of spurious emissions above 1 GHz within restricted bands

OPERATING FREQUENCY BAND:	2412-2462 MHz MHz
INVESTIGATED FREQUENCY RANGE:	1 - 25 GHz
TEST DISTANCE:	3 m
MODULATION:	BT: CW, WLAN:DBPSK
MODULATING SIGNAL:	PRBS
DUTY CYCLE:	100 %
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
DETECTOR USED:	Peak, average
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)	Margin, dB***	
BIT RATE: 1 Mbps											
Low carrier frequency											
2385.8	H	1.0	0	58.78	74	15.22	50.64	50.64	54	3.36	Pass
4824	H	1.15	150	53.33	74	20.67	50.00	50.00	54	4.00	Pass
Mid carrier frequency											
4874	H	1.15	150	53.83	74	20.17	50.83	50.83	54	3.17	Pass
High carrier frequency											
2483.5	H	1.0	0	60.43	74	13.57	52.18	52.18	54	1.82	Pass
4924	H	1.15	150	53.33	74	20.67	50.00	50.00	54	4.00	Pass
BIT RATE: 11 Mbps											
Low carrier frequency											
2390	H	1.0	0	60.59	74	13.41	48.15	48.15	54	5.85	Pass
High carrier frequency											
2483.5	H	1.0	0	61.83	74	12.17	49.89	49.89	54	4.11	Pass

*****- 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 7.3.4 Average factor calculation

Transmission pulse		Transmission burst		Transmission train duration, ms	Average factor, dB
Duration, ms	Period, ms	Duration, ms	Period, ms		
Duty cycle 100%					0

Test specification:	FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 ºC	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

Table 7.3.5 Field strength of spurious emissions below 1 GHz within restricted bands

OPERATING FREQUENCY BAND:	2412-2462 MHz MHz
INVESTIGATED FREQUENCY RANGE:	0.009 – 1000 MHz
TEST DISTANCE:	3 m
MODULATION:	BT: CW, WLAN:DBPSK
MODULATING SIGNAL:	PRBS
BIT RATE:	1 Mbps
DUTY CYCLE:	100 %
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
RESOLUTION BANDWIDTH:	0.2 kHz (9 kHz – 150 kHz) 9.0 kHz (150 kHz – 30 MHz) 120 kHz (30 MHz – 1000 MHz)
VIDEO BANDWIDTH:	> Resolution bandwidth
TEST ANTENNA TYPE:	Active loop (9 kHz – 30 MHz) Biconilog (30 MHz – 1000 MHz)

Frequency, MHz	Peak emission, dB(µV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
Low carrier frequency								
All spurious emissions were found at least 20 dB below specified limit								Pass
Mid carrier frequency								
All spurious emissions were found at least 20 dB below specified limit								Pass
High carrier frequency								
All spurious emissions were found at least 20 dB below specified limit								Pass

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

Table 7.3.6 Restricted bands

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.37625 - 8.38675	73 - 74.6	399.9 - 410	2655 - 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

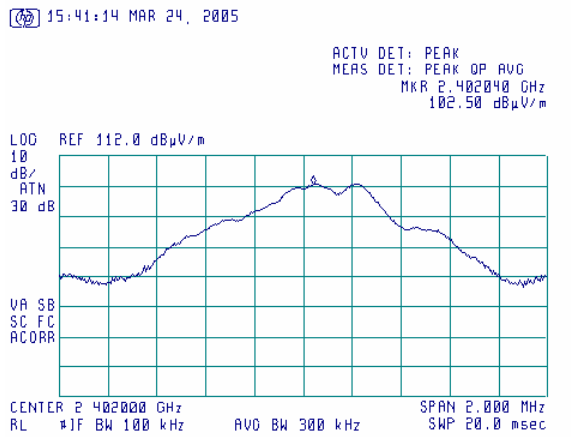
HL 0038	HL 0091	HL 0287	HL 0410	HL 0446	HL 0465	HL 0521	HL 0589
HL 0604	HL 0768	HL 0769	HL 1200	HL 1424	HL 1942	HL 1947	HL 1984
HL 2009	HL 2259	HL 2432	HL 2499				

Full description is given in Appendix A.

Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.3.1 Radiated emission measurements at the low carrier frequency

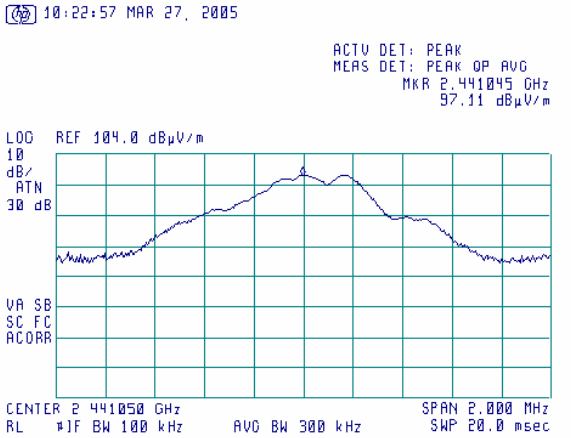
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and horizontal



The Bluetooth transmitter was measured to calculate the limit of spurious emissions because its power is less than the power of WLAN transmitter.

Plot 7.3.2 Radiated emission measurements at the mid carrier frequency

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

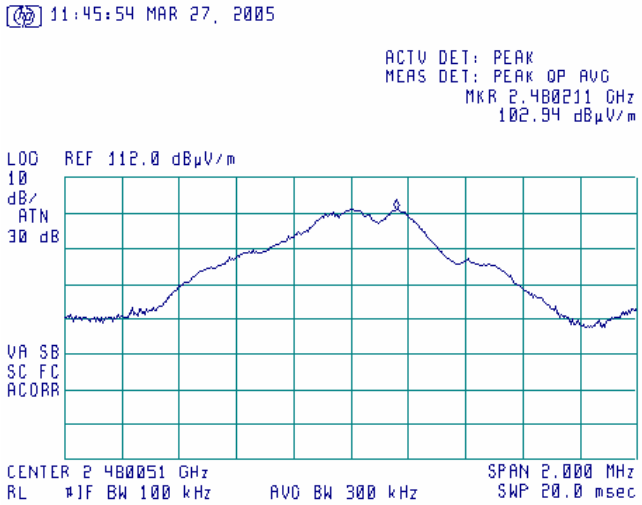


The Bluetooth transmitter was measured to calculate the limit of spurious emissions because its power is less than the power of WLAN transmitter.

Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.3.3 Radiated emission measurements at the high carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal

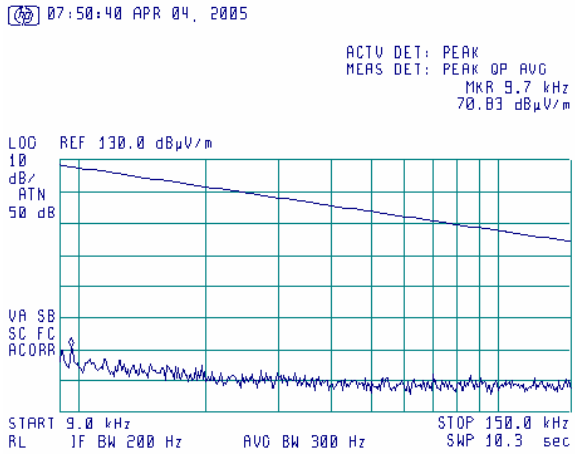


The Bluetooth transmitter was measured to calculate the limit of spurious emissions because its power is less than the power of WLAN transmitter.

Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

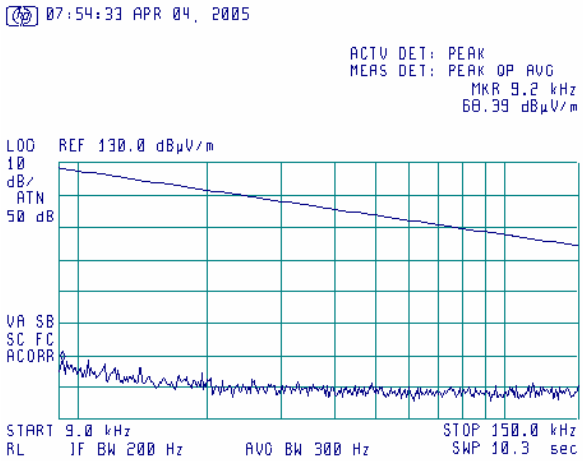
Plot 7.3.4 Radiated emission measurements from 9 to 150 kHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Plot 7.3.5 Radiated emission measurements from 9 to 150 kHz at the mid carrier frequency

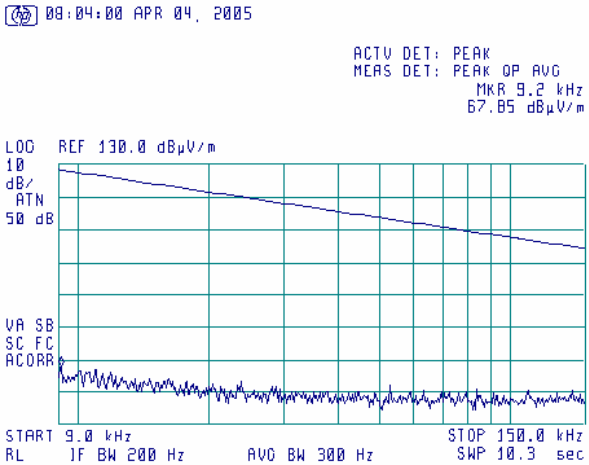
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

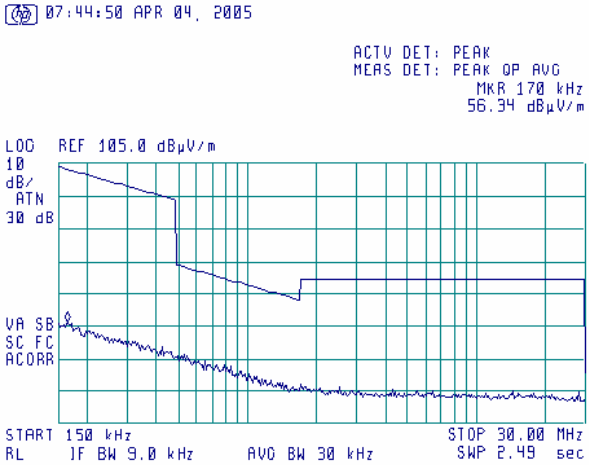
Plot 7.3.6 Radiated emission measurements from 9 to 150 kHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Plot 7.3.7 Radiated emission measurements from 0.15 to 30 MHz at the low carrier frequency

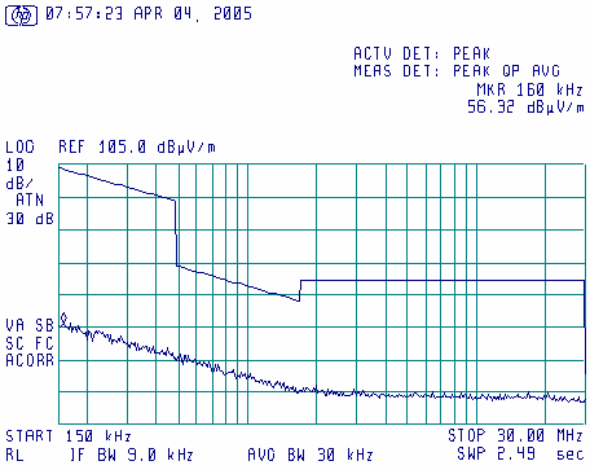
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

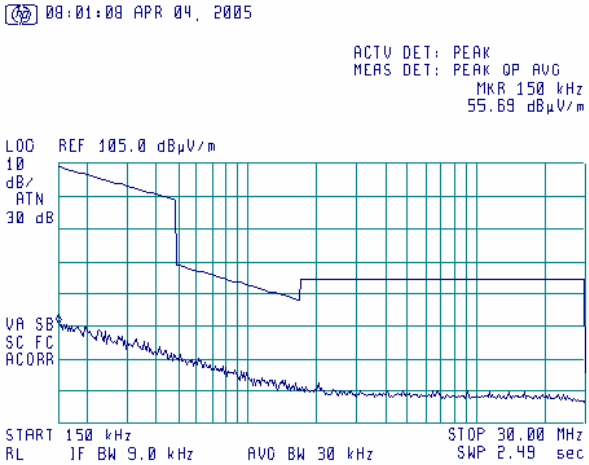
Plot 7.3.8 Radiated emission measurements from 0.15 to 30 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Plot 7.3.9 Radiated emission measurements from 0.15 to 30 MHz at the high carrier frequency

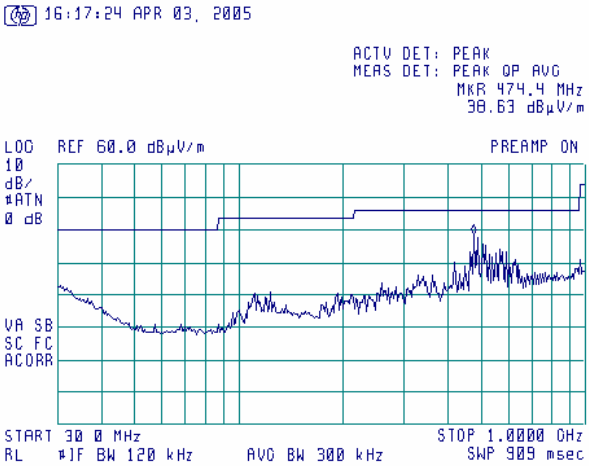
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

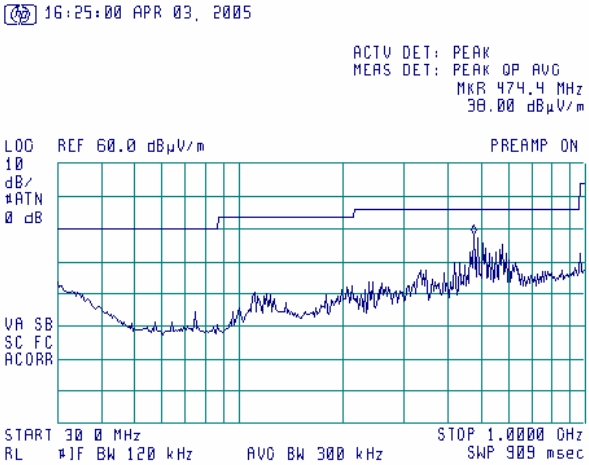
Plot 7.3.10 Radiated emission measurements from 30 to 1000 MHz at the low carrier frequency

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 7.3.11 Radiated emission measurements from 30 to 1000 MHz at the mid carrier frequency

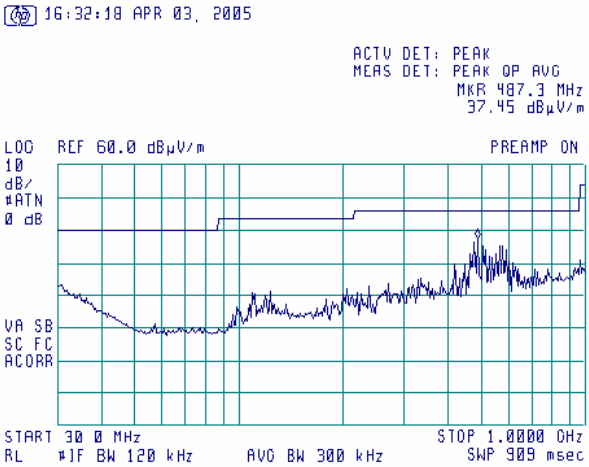
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.3.12 Radiated emission measurements from 30 to 1000 MHz at the high carrier frequency

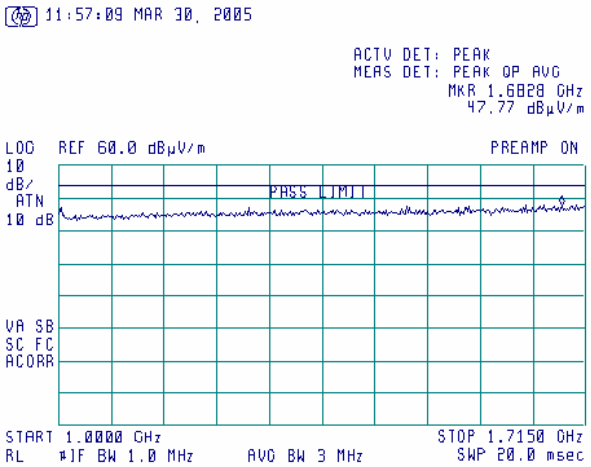
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

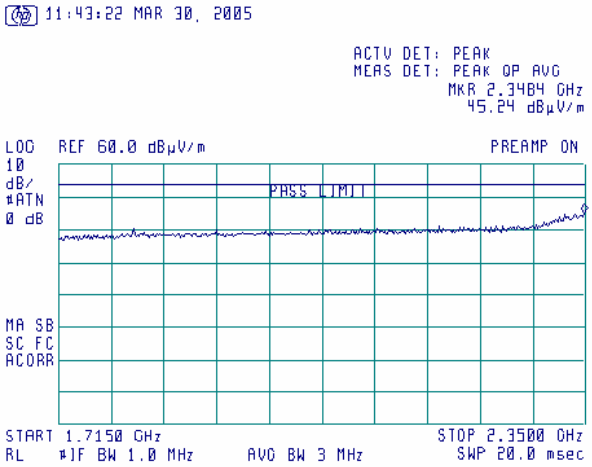
Plot 7.3.13 Radiated emission measurements from 1000 to 1715 MHz at the low carrier frequency

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 7.3.14 Radiated emission measurements from 1715 to 2350 MHz at the low carrier frequency

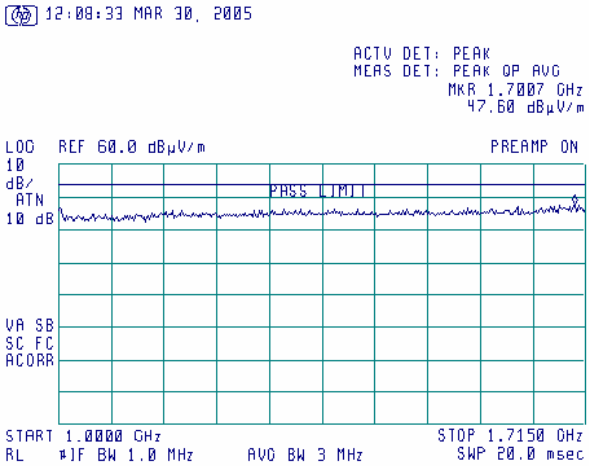
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

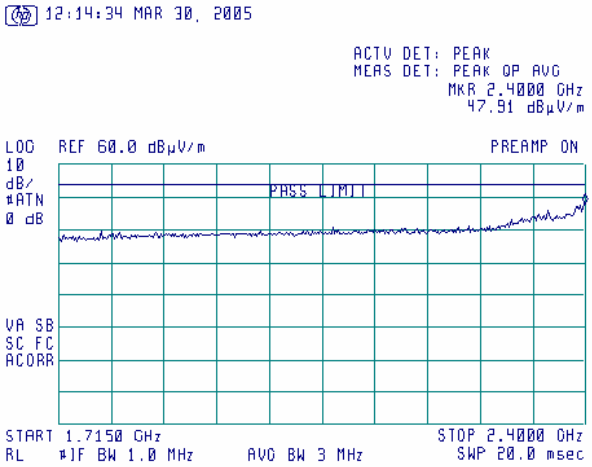
Plot 7.3.15 Radiated emission measurements from 1000 to 1715 MHz at the mid carrier frequency

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 7.3.16 Radiated emission measurements from 1715 to 2400 MHz at the mid carrier frequency

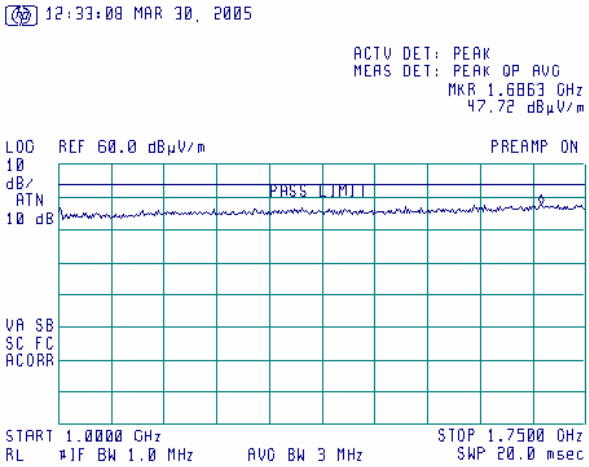
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

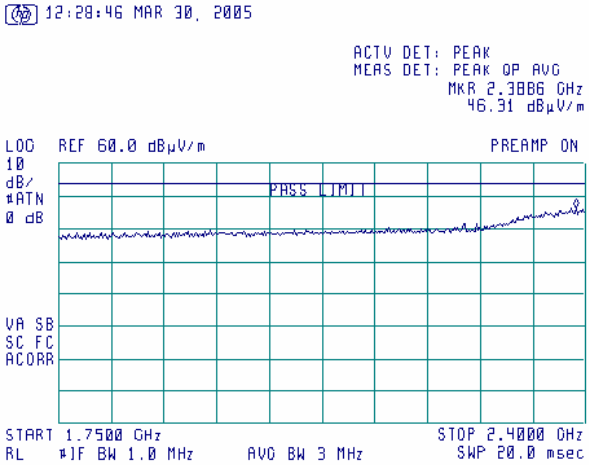
Plot 7.3.17 Radiated emission measurements from 1000 to 1750 MHz at the high carrier frequency

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 7.3.18 Radiated emission measurements from 1750 to 2400 MHz at the high carrier frequency

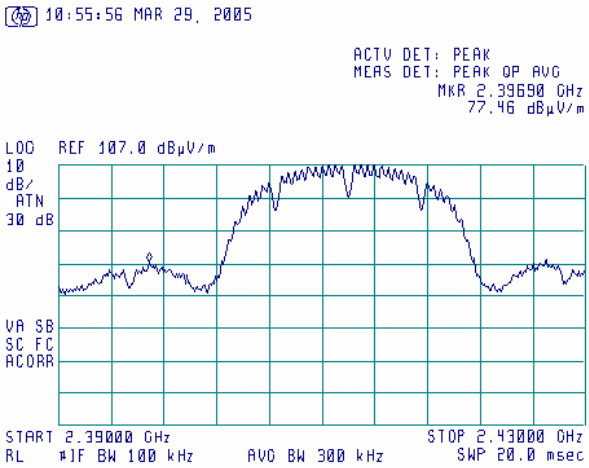
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.3.19 Radiated emission measurements at band edge at the low carrier frequency, bitrate 1 MBit/s

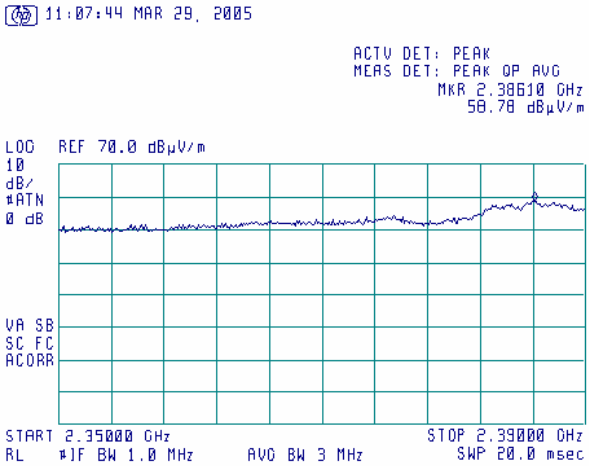
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

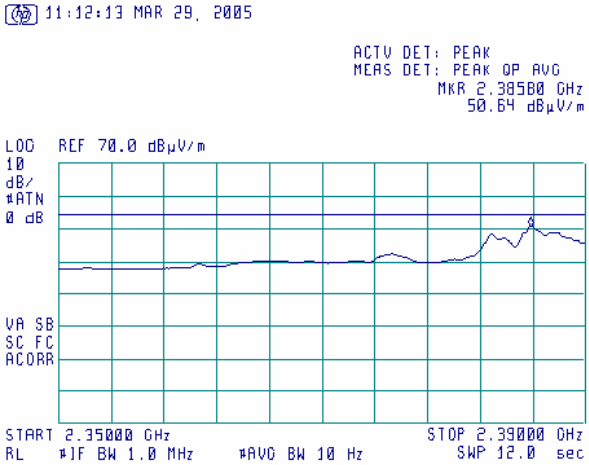
Plot 7.3.20 Radiated emission measurements at band edge at the low carrier frequency, bitrate 1 MBit/s

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



Plot 7.3.21 Radiated emission measurements at band edge at the low carrier frequency, bitrate 1 MBit/s

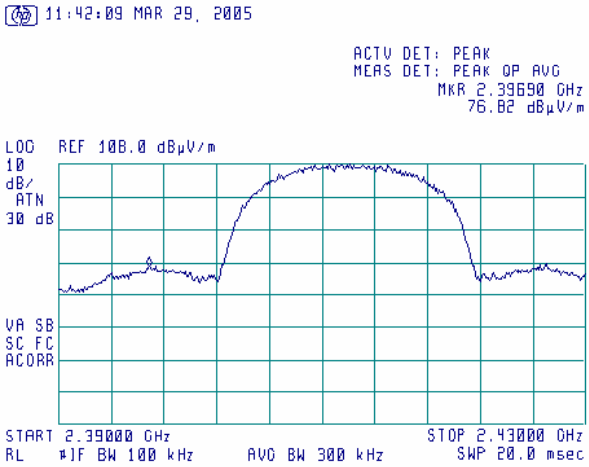
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

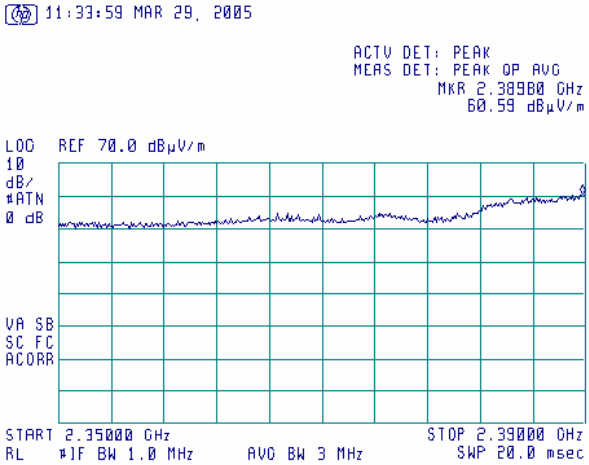
Plot 7.3.22 Radiated emission measurements at band edge at the low carrier frequency, bitrate 11 MBit/s

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



Plot 7.3.23 Radiated emission measurements at band edge at the low carrier frequency, bitrate 11 MBit/s

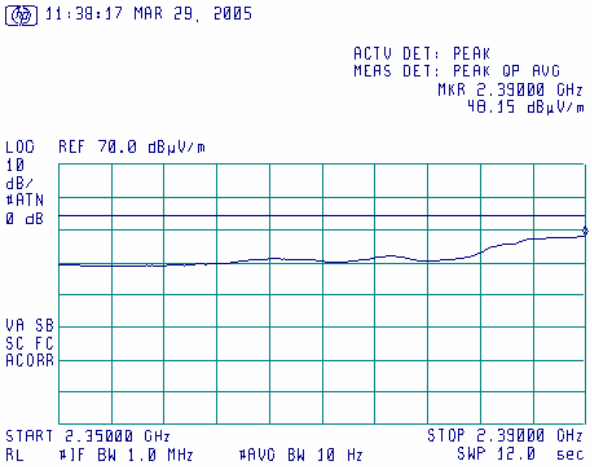
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.3.24 Radiated emission measurements at band edge at the low carrier frequency, bitrate 11 MBit/s

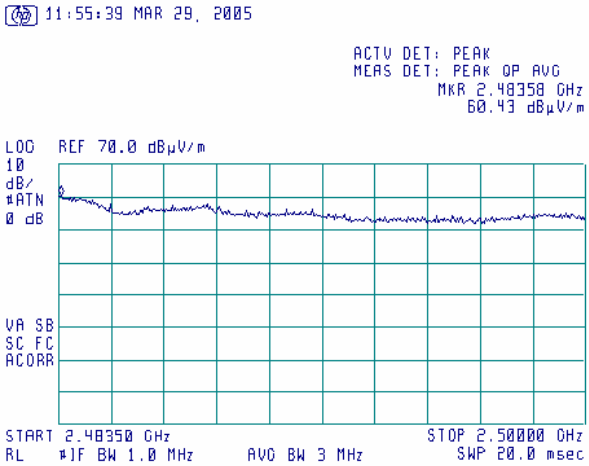
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

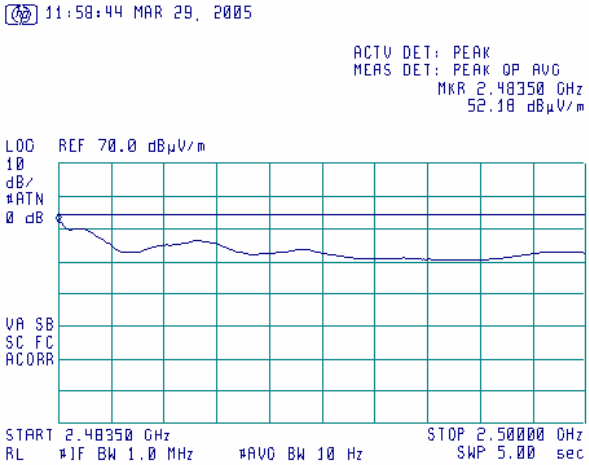
Plot 7.3.25 Radiated emission measurements at band edge at the high carrier frequency, bitrate 1 MBit/s

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



Plot 7.3.26 Radiated emission measurements at band edge at the high carrier frequency, bitrate 1 MBit/s

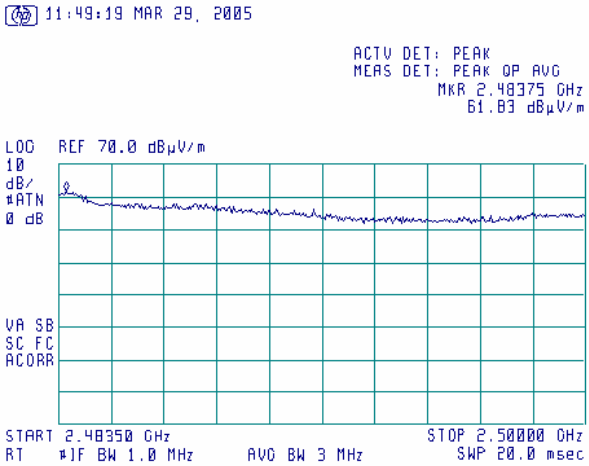
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

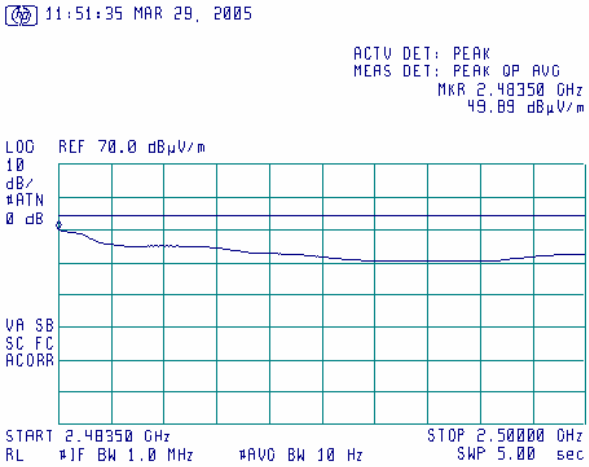
Plot 7.3.27 Radiated emission measurements at band edge at the high carrier frequency, bitrate 11 MBit/s

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



Plot 7.3.28 Radiated emission measurements at band edge at the high carrier frequency, bitrate 11 MBit/s

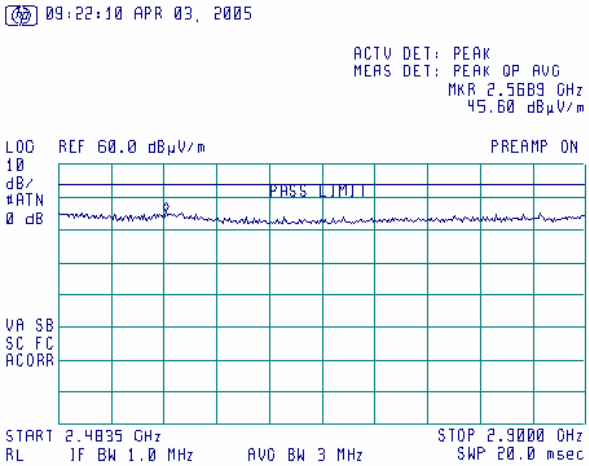
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

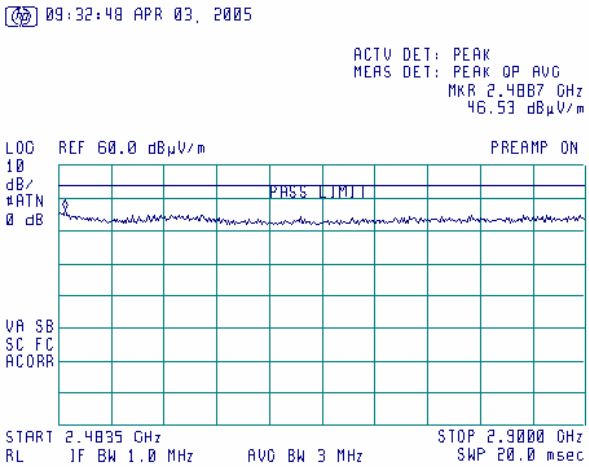
Plot 7.3.29 Radiated emission measurements from 2483.5 to 2900 MHz at the low carrier frequency

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 7.3.30 Radiated emission measurements from 2483.5 to 2900 MHz at the mid carrier frequency

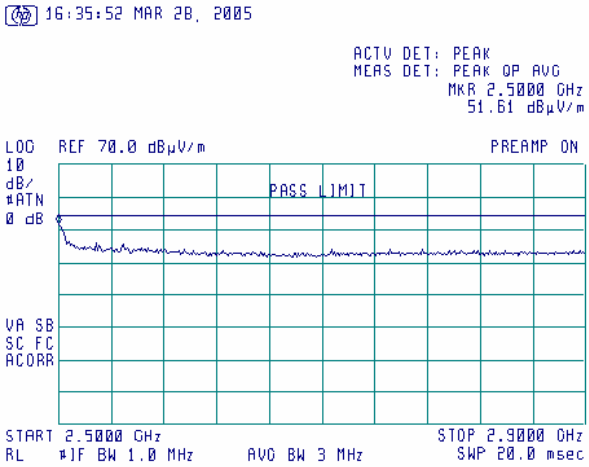
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.3.31 Radiated emission measurements from 2500 to 2900 MHz at the high carrier frequency

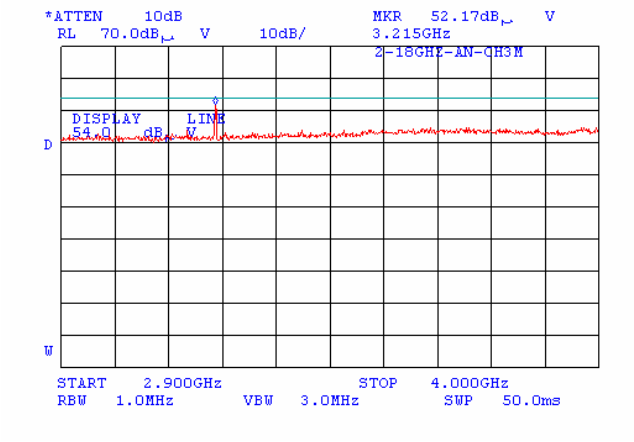
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.3.32 Radiated emission measurements from 2900 to 4000 MHz at the low carrier frequency

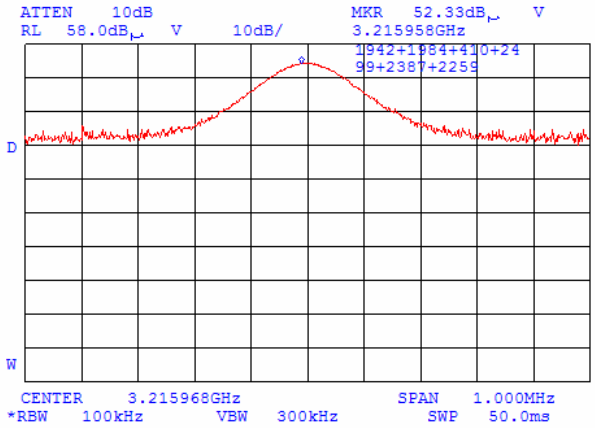
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



3216 MHz - not restricted band

Plot 7.3.33 Radiated emission measurements at 3215.96 MHz at the low carrier frequency

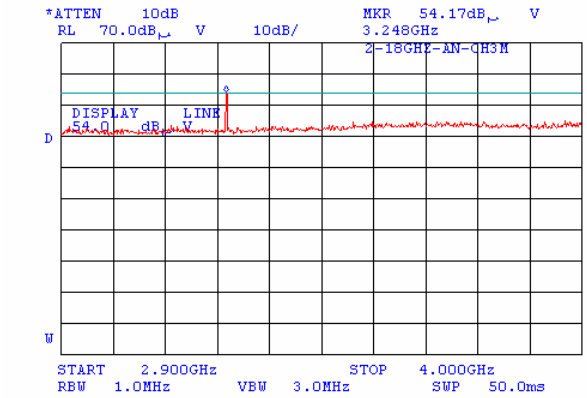
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.3.34 Radiated emission measurements from 2900 to 4000 MHz at the mid carrier frequency

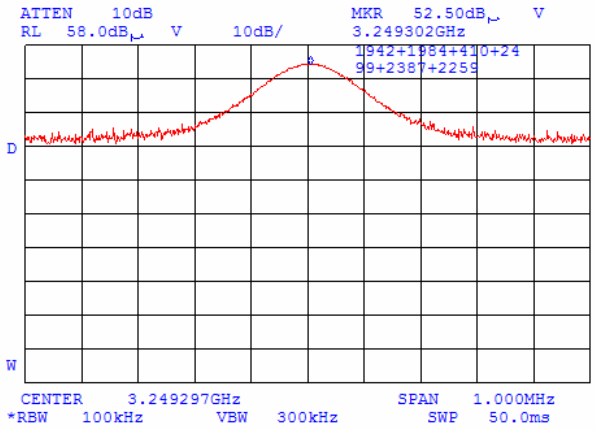
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



3249.29 MHz - not restricted band

Plot 7.3.35 Radiated emission measurements at 3249.29 MHz at the mid carrier frequency

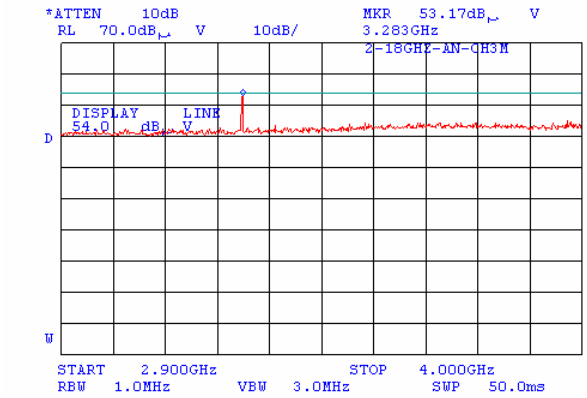
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.3.36 Radiated emission measurements from 2900 to 4000 MHz at the high carrier frequency

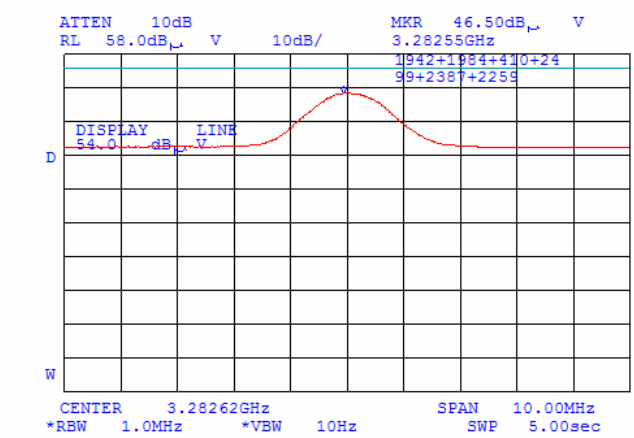
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



3282.62 MHz – not restricted band

Plot 7.3.37 Radiated emission measurements at 3282.62 MHz at the high carrier frequency

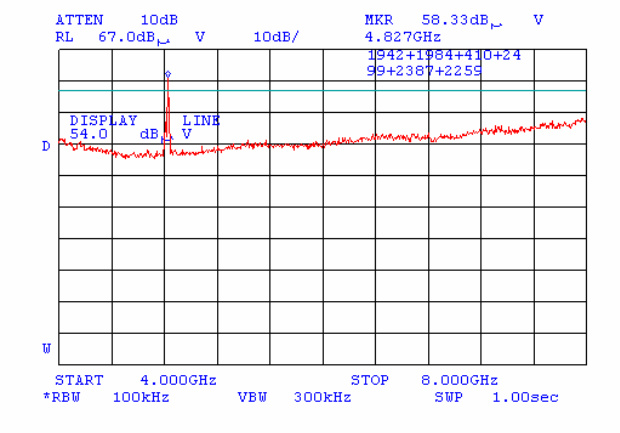
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

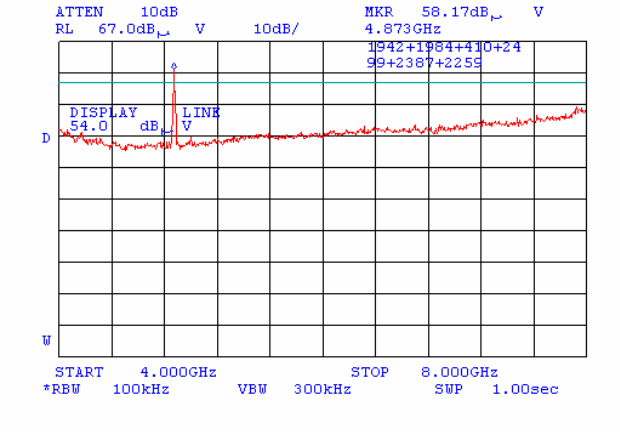
Plot 7.3.38 Radiated emission measurements from 4000 to 8000 MHz at the low carrier frequency (WLAN + BT)

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



Plot 7.3.39 Radiated emission measurements from 4000 to 8000 MHz at the mid carrier frequency (WLAN + BT)

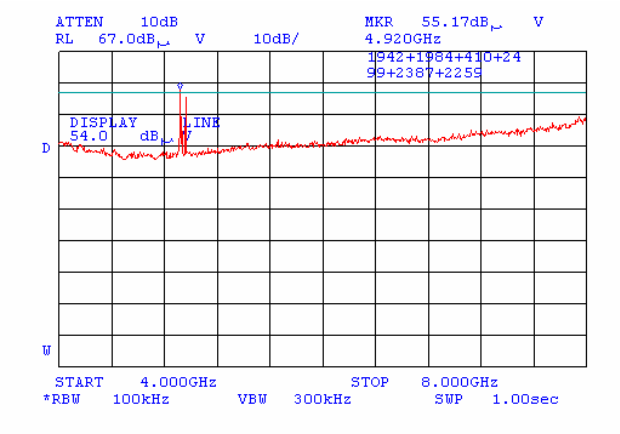
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.3.40 Radiated emission measurements from 4000 to 8000 MHz at the high carrier frequency (WLAN + BT)

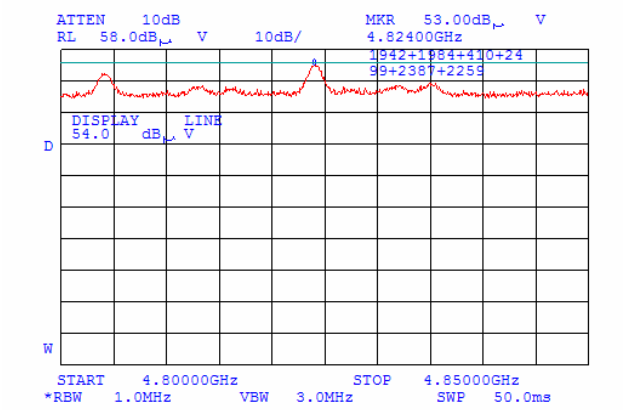
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

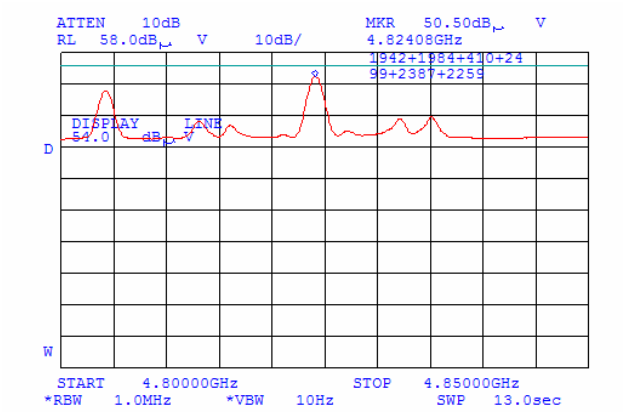
Plot 7.3.41 Radiated emission measurements from 4800 to 4850 MHz at the low carrier frequency (WLAN and BT second harmonic)

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal



Plot 7.3.42 Radiated emission measurements from 4800 to 4850 MHz at the low carrier frequency (WLAN and BT second harmonic)

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal

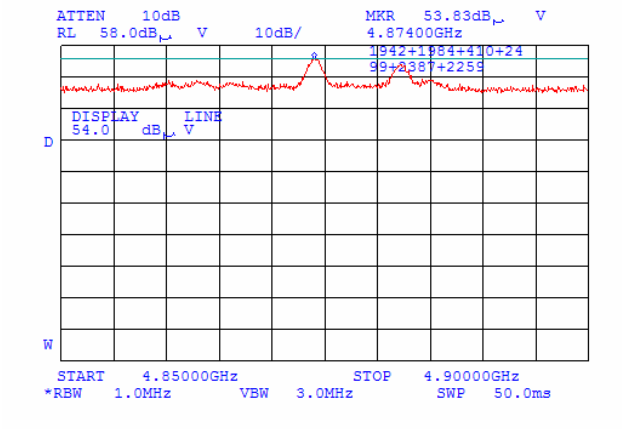


WLAN: 4824 MHz 50.5 dBuV/m
BT: 4804 MHz 45.8 dBuV/m

Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

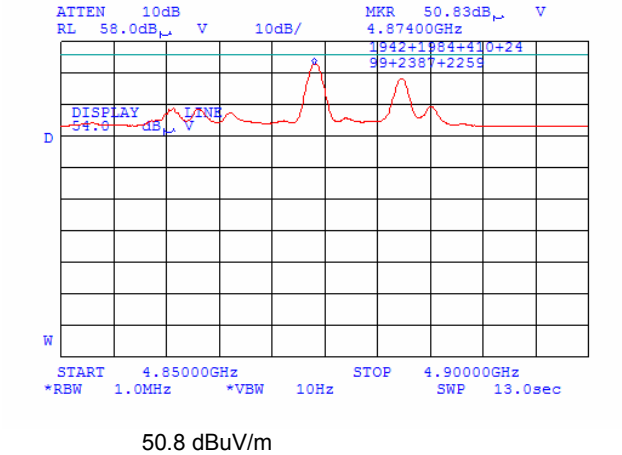
Plot 7.3.43 Radiated emission measurements from 4850 to 4900 MHz at the mid carrier frequency (WLAN and BT second harmonic)

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal



Plot 7.3.44 Radiated emission measurements from 4850 to 4900 MHz at the mid carrier frequency (WLAN and BT second harmonic)

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal

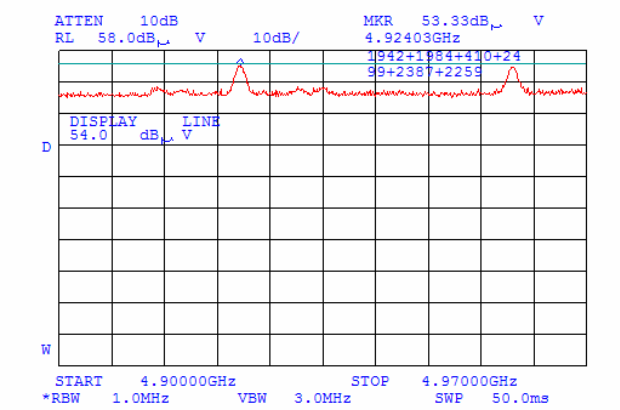


WLAN:	4874 MHz	50.8 dBuV/m
BT:	4882 MHz	46.2 dBuV/m

Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

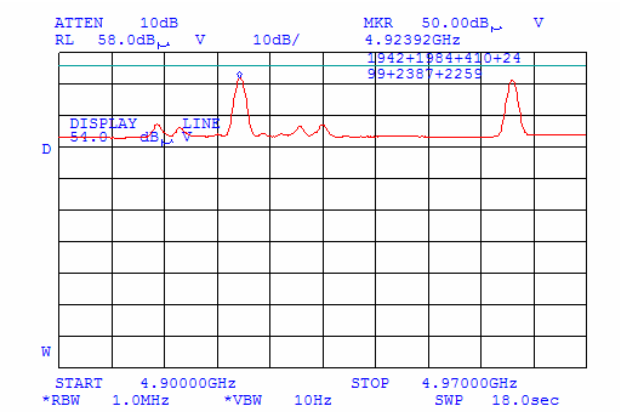
Plot 7.3.45 Radiated emission measurements from 4900 to 4970 MHz at the high carrier frequency (WLAN and BT second harmonic)

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal



Plot 7.3.46 Radiated emission measurements from 4900 to 4970 MHz at the high carrier frequency (WLAN and BT second harmonic)

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal

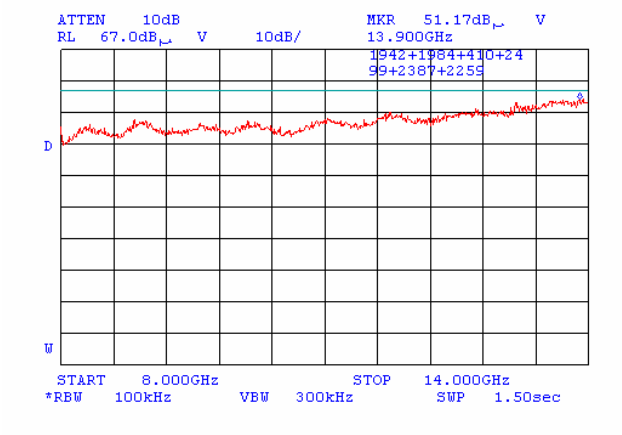


WLAN:	4924 MHz	50 dBuV/m
BT:	4960 MHz	49.2 dBuV/m

Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

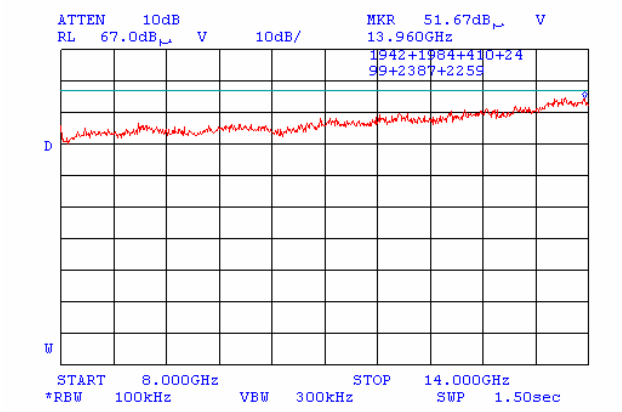
Plot 7.3.47 Radiated emission measurements from 8000 to 14000 MHz at the low carrier frequency (WLAN + BT)

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



Plot 7.3.48 Radiated emission measurements from 8000 to 14000 MHz at the mid carrier frequency (WLAN + BT)

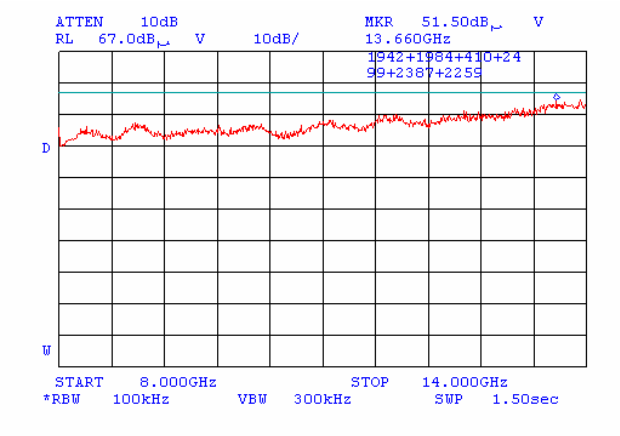
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

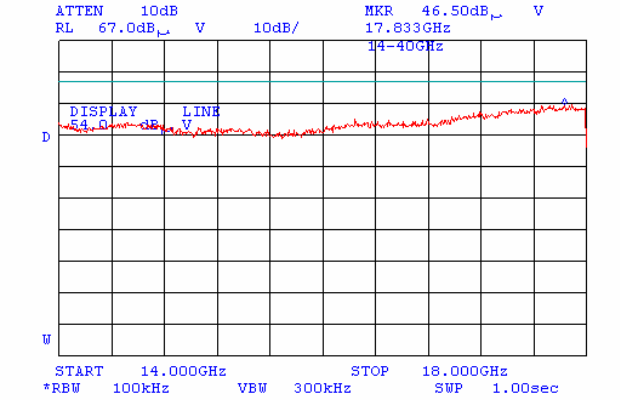
Plot 7.3.49 Radiated emission measurements from 8000 to 14000 MHz at the high carrier frequency (WLAN + BT)

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



Plot 7.3.50 Radiated emission measurements from 14000 to 18000 MHz at the low carrier frequency (WLAN + BT)

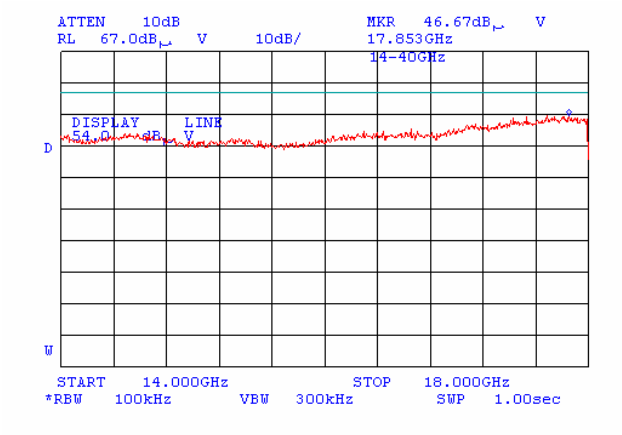
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

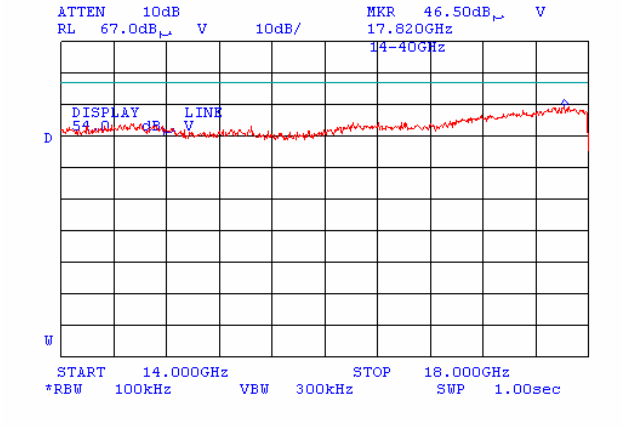
Plot 7.3.51 Radiated emission measurements from 14000 to 18000 MHz at the mid carrier frequency (WLAN + BT)

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



Plot 7.3.52 Radiated emission measurements from 14000 to 18000 MHz at the high carrier frequency (WLAN + BT)

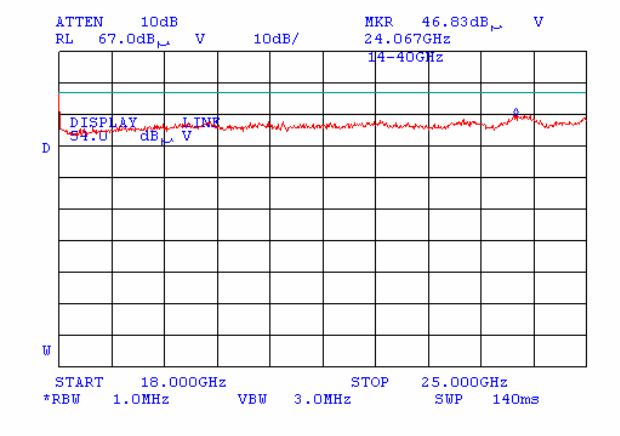
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

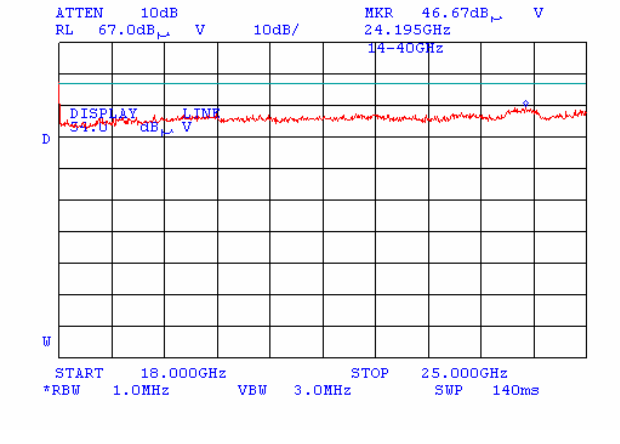
Plot 7.3.53 Radiated emission measurements from 18000 to 25000 MHz at the low carrier frequency (WLAN + BT)

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



Plot 7.3.54 Radiated emission measurements from 18000 to 25000 MHz at the mid carrier frequency (WLAN + BT)

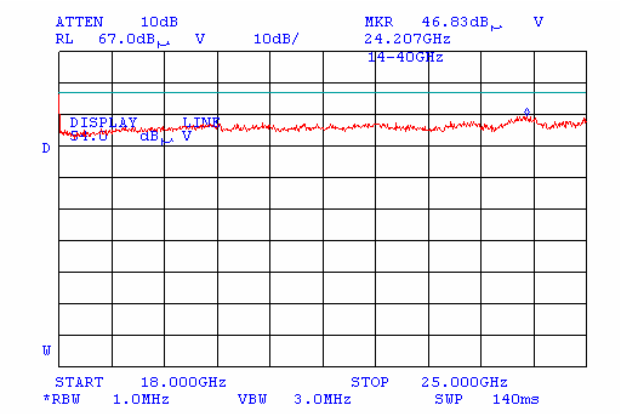
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**FCC section 15.247(c), 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 & Time:	4/14/2005 9:31:41 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.3.55 Radiated emission measurements from 18000 to 25000 MHz at the high carrier frequency (WLAN + BT)

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



Test specification:	**FCC section 15.247(d), RSS-210 section A8.2(2), Peak power density**		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/29/2005 12:19:29 PM		
Temperature: 22 ºC	**Air Pressure:** 1018 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

7.4 Peak spectral power density

7.4.1 General

This test was performed to measure the peak spectral power density radiated by the transmitter RF antenna. Specification test limits according to FCC part 15 section 15.247(d) and RSS-210 section 6.2.2(o)(b) are given in Table 7.4.1.

Table 7.4.1 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×P)/r, where P is peak spectral power density and r is antenna to EUT distance in meters.

7.4.2 Test procedure for field strength measurements

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

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

7.4.2.3 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 360^0 and the measuring antenna height was swept in both vertical and horizontal polarizations.

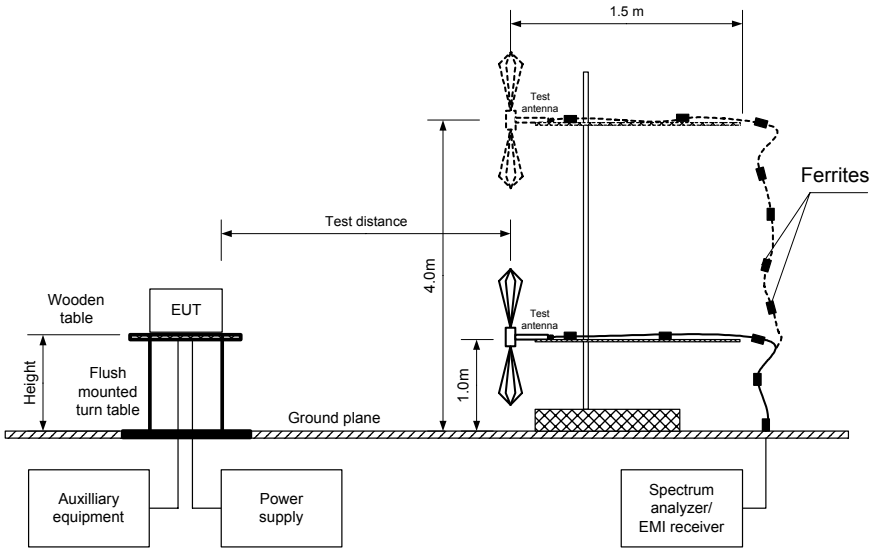
7.4.2.4 The frequency span of spectrum analyzer was set to capture the entire 6 dB band of the transmitter, in peak hold mode with resolution bandwidth set to 3.0 kHz, video bandwidth wider than resolution bandwidth, auto sweep time and sufficient number of sweeps was allowed for trace stabilization. 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.

7.4.2.5 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 7.4.2 and associated plots.

7.4.2.6 The EUT was found to comply with the standard requirements.

Test specification:	**FCC section 15.247(d), RSS-210 section A8.2(2), Peak power density**		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/29/2005 12:19:29 PM		
Temperature: 22 ºC	**Air Pressure:** 1018 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Figure 7.4.1 Setup for carrier field strength measurements



Test specification:	**FCC section 15.247(d), RSS-210 section A8.2(2), Peak power density**		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/29/2005 12:19:29 PM		
Temperature: 22 ºC	**Air Pressure:** 1018 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 7.4.2 Field strength measurement of peak spectral power density

ASSIGNED FREQUENCY:	2400-2483.5 MHz
TEST DISTANCE:	3 m
TEST SITE:	OATS
EUT HEIGHT:	0.8 m
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	3 kHz
VIDEO BANDWIDTH:	10 kHz
TEST ANTENNA TYPE:	Double ridged guide (above 1000 MHz)
MODULATION:	DBPSK, QPSK
MODULATING SIGNAL:	PRBS
BIT RATE:	1, 11Mbps
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
1 Mbit/s							
2412	91.5	2.7	103.2	-14.4	H	1.2	163
2437	93.3	2.7	103.2	-12.6	H	1.2	165
2462	92.4	2.7	103.2	-13.5	H	1.2	165
11 MBit/s							
2412	91.1	2.7	103.2	-14.8	H	1.2	163
2437	92.1	2.7	103.2	-13.8	H	1.2	165
2462	91.8	2.7	103.2	-14.1	H	1.2	165

*****- Margin = Field strength - EUT antenna gain - calculated field strength limit.
******- EUT front panel refer to 0 degrees position of turntable.

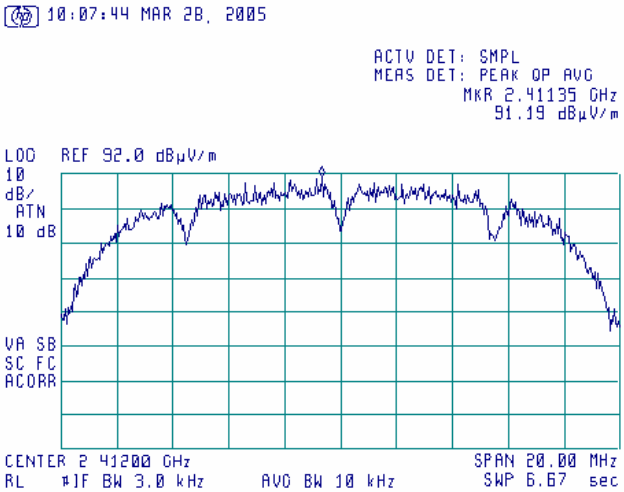
Reference numbers of test equipment used

HL 0038	HL 0287	HL 1365	HL 1430	HL 1947	HL 2432		

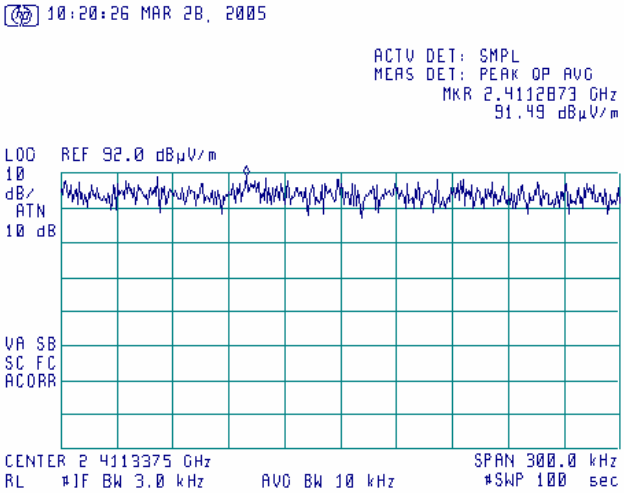
Full description is given in Appendix A.

Test specification:	**FCC section 15.247(d), RSS-210 section A8.2(2), Peak power density**		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/29/2005 12:19:29 PM		
Temperature: 22 °C	**Air Pressure:** 1018 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.4.1 Peak spectral power density at low frequency within 6 dB band, 1MBit/s

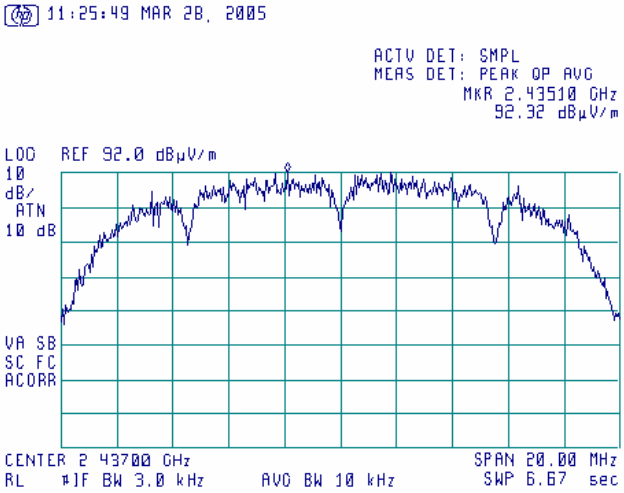


Plot 7.4.2 Peak spectral power density at low frequency zoomed at the peak, 1 MBit/s

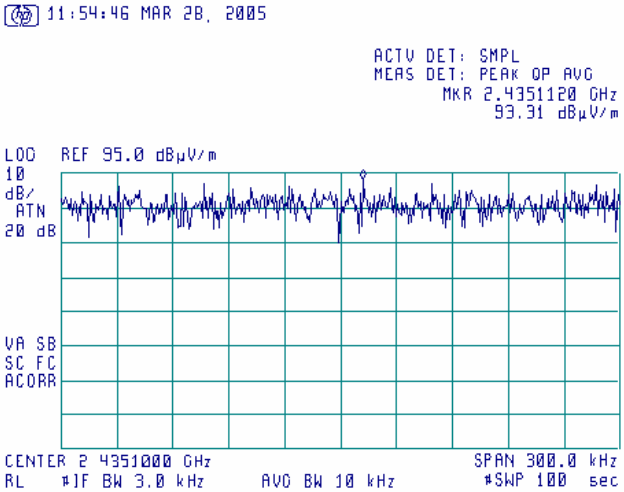


Test specification:	**FCC section 15.247(d), RSS-210 section A8.2(2), Peak power density**		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/29/2005 12:19:29 PM		
Temperature: 22 °C	**Air Pressure:** 1018 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.4.3 Peak spectral power density at mid frequency within 6 dB band, 1MBit/s

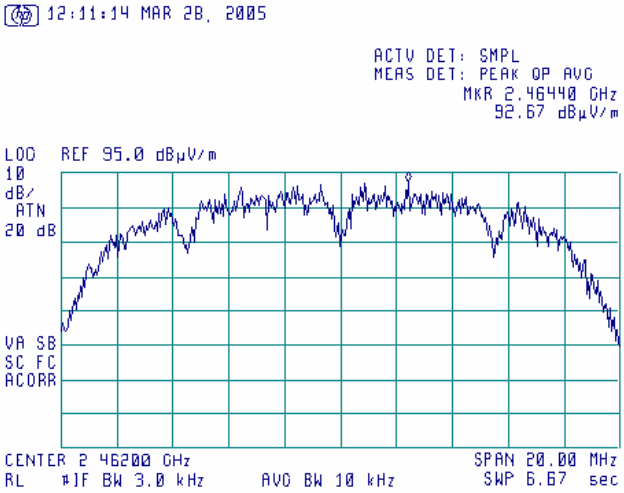


Plot 7.4.4 Peak spectral power density at mid frequency zoomed at the peak, 1MBit/s

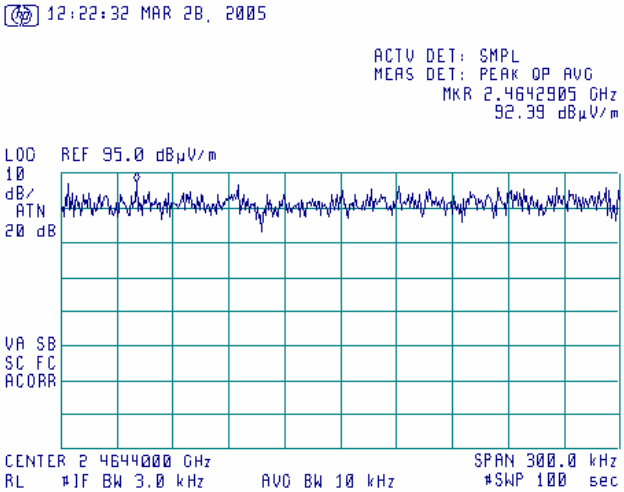


Test specification:	**FCC section 15.247(d), RSS-210 section A8.2(2), Peak power density**		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/29/2005 12:19:29 PM		
Temperature: 22 °C	**Air Pressure:** 1018 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.4.5 Peak spectral power density at high frequency within 6 dB band, 1MBit/s

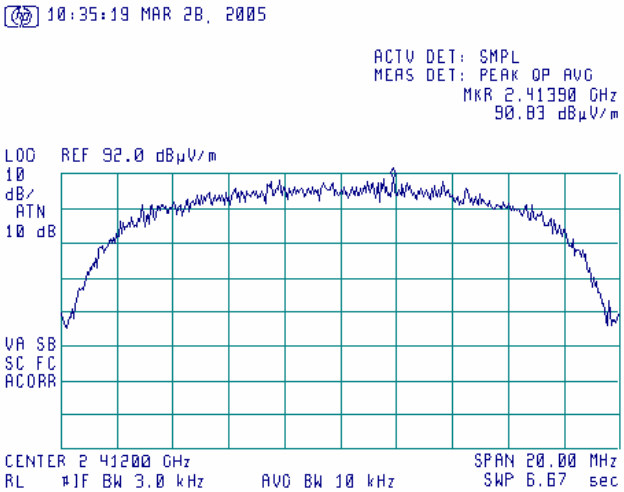


Plot 7.4.6 Peak spectral power density at high frequency zoomed at the peak, 1MBit/s

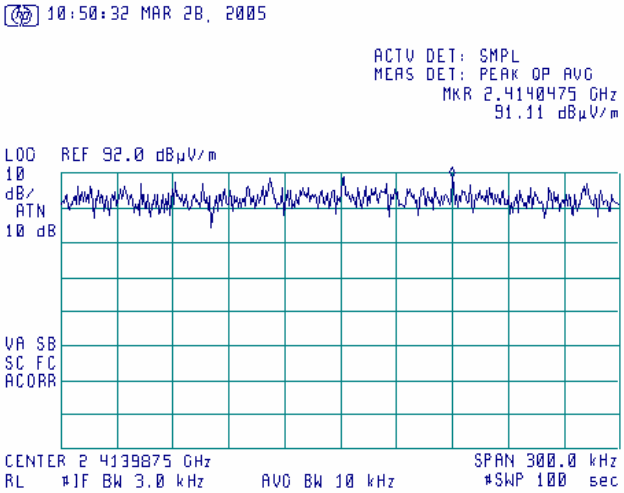


Test specification:	**FCC section 15.247(d), RSS-210 section A8.2(2), Peak power density**		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/29/2005 12:19:29 PM		
Temperature: 22 °C	**Air Pressure:** 1018 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.4.7 Peak spectral power density at low frequency within 6 dB band, 11MBit/s

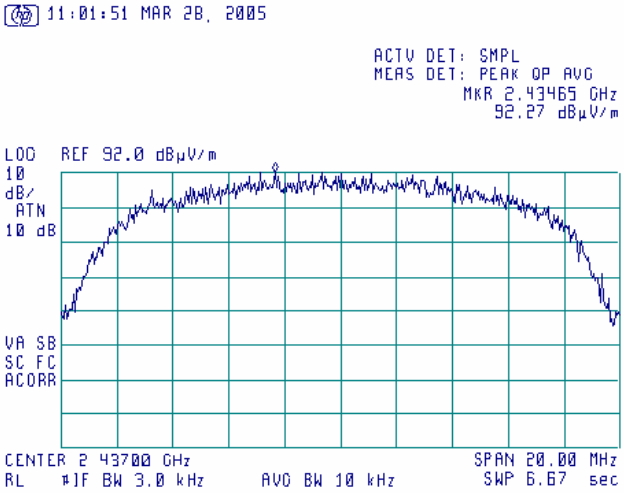


Plot 7.4.8 Peak spectral power density at low frequency zoomed at the peak, 11 MBit/s

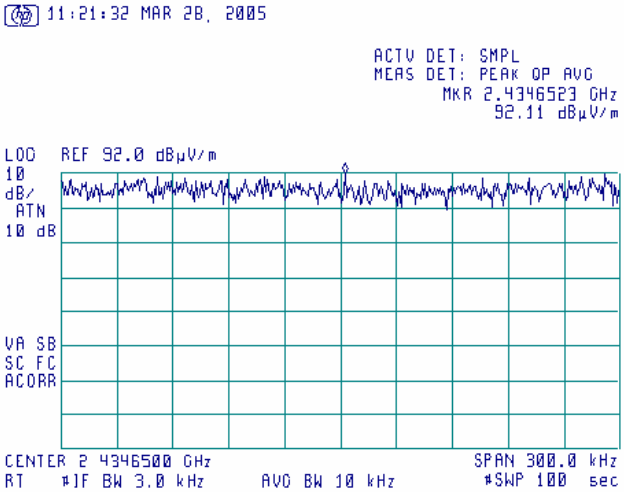


Test specification:	**FCC section 15.247(d), RSS-210 section A8.2(2), Peak power density**		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/29/2005 12:19:29 PM		
Temperature: 22 °C	**Air Pressure:** 1018 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.4.9 Peak spectral power density at mid frequency within 6 dB band, 11 MBit/s

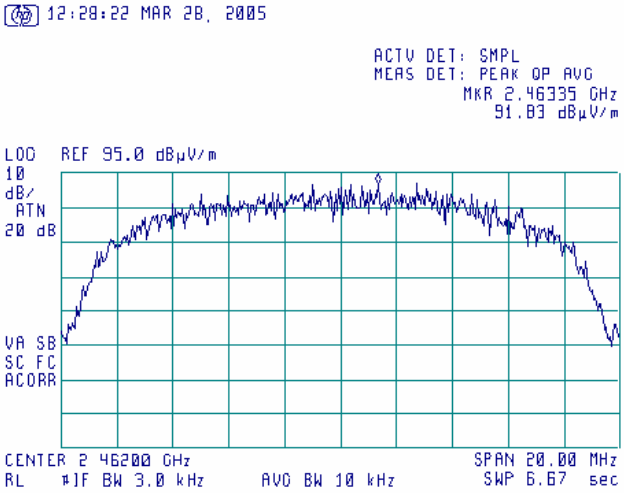


Plot 7.4.10 Peak spectral power density at mid frequency zoomed at the peak, 11 MBit/s

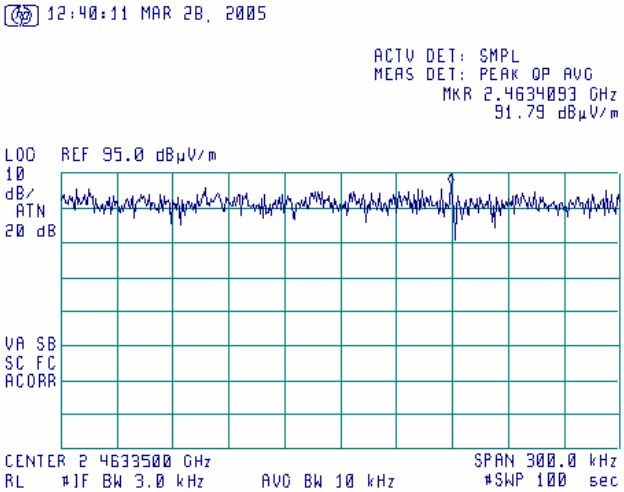


Test specification:	**FCC section 15.247(d), RSS-210 section A8.2(2), Peak power density**		
Test procedure:	FR Vol. 62, page 26243, Section 15.247(d)		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/29/2005 12:19:29 PM		
Temperature: 22 °C	**Air Pressure:** 1018 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 7.4.11 Peak spectral power density at high frequency within 6 dB band, 11 MBit/s



Plot 7.4.12 Peak spectral power density at high frequency zoomed at the peak, 11 MBit/s



Test specification:	**Section 15.247(a)1, (g), (h), RSS-210 section A8.1(1), Frequency hopping requirements**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/14/2005 2:38:36 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

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

8.1 Frequency hopping requirements

The EUT was verified for compliance with frequency hopping requirements listed below:

- The EUT shall hop to channel frequencies that are selected from a pseudorandomly ordered list;
- Each hopping frequency shall be used equally on the average;
- The EUT receiver shall have input bandwidth that match the hopping channel bandwidth of the corresponding transmitter and shall shift frequencies in synchronization with the transmitted signals;
- The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

The rationale for compliance with the above requirements was either test results or supplier declaration. The summary of results is provided in Table 8.1.1.

Table 8.1.1 Frequency hopping requirements

Requirement	Rationale	Verdict
The EUT shall hop to channel frequencies that are selected from a pseudorandomly ordered list	Supplier declaration	Comply
Each hopping frequency shall be used equally on the average	Supplier declaration	Comply
The EUT receiver shall have input bandwidth that match the hopping channel bandwidth of the corresponding transmitter	Supplier declaration	Comply
The EUT receiver shall shift frequencies in synchronization with the transmitted signals	Supplier declaration	Comply
Each transmitter operates independently and there is no synchronization with other transmitters for purposes other than to avoid simultaneous channel occupancy	Supplier declaration	Comply

Test specification:	**Section 15.247(a)1, RSS-210 section A8.1(1), 20 dB bandwidth**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/30/2005 8:47:14 PM		
Temperature: 24 ºC	**Air Pressure:** 1011 hPa	**Relative Humidity:** 42 %	**Power Supply:** 7.2 V battery
Remarks:			

8.2 20 dB bandwidth

8.2.1 General

This test was performed to measure 20 dB bandwidth of the transmitter hopping channel. Specification test limits are given in Table 8.2.1.

Table 8.2.1 The 20 dB bandwidth limits

Assigned frequency, MHz	Minimum bandwidth, kHz	Modulation envelope reference points*, dBc
902.0 – 928.0	500	20
2400.0 – 2483.5	NA	
5725.0 – 5850.0	1000	

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

8.2.2 Test procedure

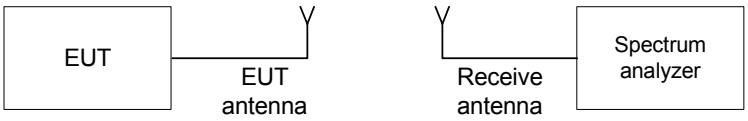
8.2.2.1 The EUT was set up as shown in Figure 8.2.1, energized and its proper operation was checked.

8.2.2.2 The EUT was set to transmit modulated carrier at maximum data rate.

8.2.2.3 The transmitter bandwidth was measured with spectrum analyzer as frequency delta between reference points on modulation envelope and provided in Table 8.2.2 and associated plot.

8.2.2.4 The test was repeated for each data rate and each modulation format.

Figure 8.2.1 The 20 dB bandwidth test setup



Test specification:	**Section 15.247(a)1, RSS-210 section A8.1(1), 20 dB bandwidth**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/30/2005 8:47:14 PM		
Temperature: 24 °C	**Air Pressure:** 1011 hPa	**Relative Humidity:** 42 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 8.2.2 The 20 dB bandwidth test results

ASSIGNED FREQUENCY BAND:	2400-2483.5 MHz
DETECTOR USED:	Peak
SWEEP TIME:	Auto
RESOLUTION BANDWIDTH:	≥ 1% of the 20 dB bandwidth
VIDEO BANDWIDTH:	≥ RBW
MODULATION ENVELOPE REFERENCE POINTS:	20.0 dBc
MODULATING SIGNAL:	PRBS
FREQUENCY HOPPING:	Disabled

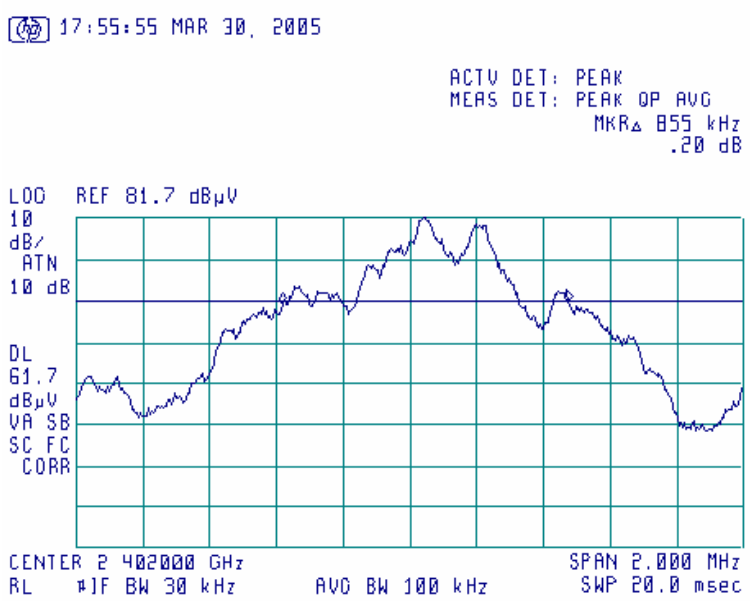
Carrier frequency, MHz	Type of modulation	Data rate, Mbps	Symbol rate, Msymbols/s	20 dB bandwidth, kHz	Limit, kHz	Margin, kHz	Verdict
Low frequency							
2402	GFSK	1	0.125	855	1000	-145	Pass
Mid frequency							
2441	GFSK	1	0.125	845	1000	-155	Pass
High frequency							
2480	GFSK	1	0.125	855	1000	-145	Pass

Reference numbers of test equipment used

HL 1430								

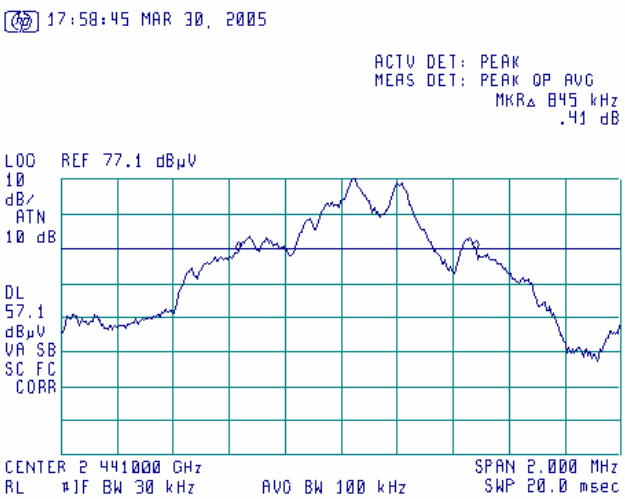
Full description is given in Appendix A.

Plot 8.2.1 The 20 dB bandwidth test result at low frequency

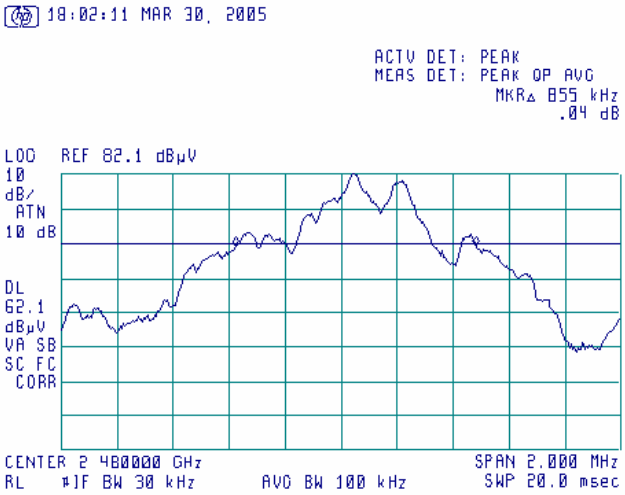


Test specification:	**Section 15.247(a)1, RSS-210 section A8.1(1), 20 dB bandwidth**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/30/2005 8:47:14 PM		
Temperature: 24 °C	**Air Pressure:** 1011 hPa	**Relative Humidity:** 42 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.2.2 The 20 dB bandwidth test result at mid frequency



Plot 8.2.3 The 20 dB bandwidth test result at high frequency



Test specification:	**Section 15.247(a)1, RSS-210 section A8.1(2), Frequency separation**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/6/2005 10:51:10 AM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

8.3 Carrier frequency separation

8.3.1 General

This test was performed to measure frequency separation between the peaks of adjacent channels. Specification test limits are given in Table 8.3.1.

Table 8.3.1 Carrier frequency separation limits

Assigned frequency range, MHz	Carrier frequency separation
902.0 – 928.0	25 kHz or 20 dB bandwidth of the hopping channel, whichever is greater
2400.0 – 2483.5	
5725.0 – 5850.0	

8.3.2 Test procedure

8.3.2.1 The EUT was set up as shown in Figure 8.3.1, energized with frequency hopping function enabled and its proper operation was checked.

8.3.2.2 The spectrum analyzer span was set to capture the carrier frequency and both of adjacent channels, the lower and the higher. The resolution bandwidth was set wider than 1 % of the frequency span.

8.3.2.3 The spectrum analyzer was set in max hold mode and allowed trace to stabilize.

8.3.2.4 The frequency separation between the peaks of adjacent channels was measured as provided in Table 8.3.2 and associated plots.

Figure 8.3.1 Carrier frequency separation test setup

Test specification:	**Section 15.247(a)1, RSS-210 section A8.1(2), Frequency separation**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/6/2005 10:51:10 AM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 8.3.2 Carrier frequency separation test results

ASSIGNED FREQUENCY:	2400-2483.5 MHz
MODULATION:	GFSK
MODULATING SIGNAL:	PRBS
BIT RATE:	1 Mbps
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	≥ 1% of the span
VIDEO BANDWIDTH:	≥ RBW
FREQUENCY HOPPING:	Enabled
20 dB BANDWIDTH:	kHz

Carrier frequency separation, kHz	Limit, kHz	Margin*	Verdict
1000	855	145	Pass

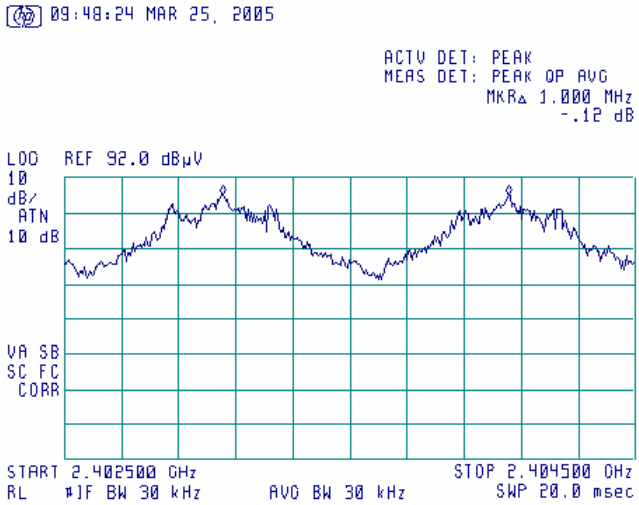
* - Margin = Carrier frequency separation – specification limit.

Reference numbers of test equipment used

HL 1430							

Full description is given in Appendix A.

Plot 8.3.1 Carrier frequency separation



Test specification:	**Section 15.247(a)1, RSS-210 section A8.1(3), Number of hopping frequencies**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/25/2005 11:00:33 AM		
Temperature: 24 ºC	**Air Pressure:** 1017 hPa	**Relative Humidity:** 34 %	**Power Supply:** 7.2 V battery
Remarks:			

8.4 Number of hopping frequencies

8.4.1 General

This test was performed to calculate the number of hopping frequencies used by the EUT. Specification test limits are given in Table 8.4.1.

Table 8.4.1 Minimum number of hopping frequencies

Assigned frequency range, MHz	Number of hopping frequencies
902.0 – 928.0	50 (if the 20 dB bandwidth is less than 250 kHz) 25 (if the 20 dB bandwidth is 250 kHz or greater)
2400.0 – 2483.5	15
5725.0 – 5850.0	75

8.4.2 Test procedure

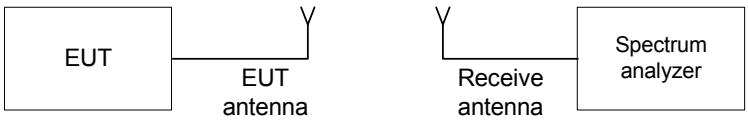
8.4.2.1 The EUT was set up as shown in Figure 8.4.1, energized with frequency hopping function enabled and its proper operation was checked.

8.4.2.2 Initially the spectrum analyzer span was set equal to frequency band of operation and the resolution bandwidth was set wider than 1 % of the frequency span. If the separate hopping channels were not clearly resolved the frequency band of operation was broken to sections and the resolution bandwidth was set wider than 1 % of the frequency span of each section.

8.4.2.3 The spectrum analyzer was set in max hold mode and allowed trace to stabilize.

8.4.2.4 The number of frequency hopping channels was calculated as provided in Table 8.4.2 and associated plots.

Figure 8.4.1 Hopping frequencies test setup



Test specification:	**Section 15.247(a)1, RSS-210 section A8.1(3), Number of hopping frequencies**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/25/2005 11:00:33 AM		
Temperature: 24 ºC	**Air Pressure:** 1017 hPa	**Relative Humidity:** 34 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 8.4.2 Hopping frequencies test results

ASSIGNED FREQUENCY:	2400-2483.5 MHz
MODULATION:	GFSK
MODULATING SIGNAL:	PRBS
BIT RATE:	1 Mbps
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	100 kHz
VIDEO BANDWIDTH:	≥ RBW
FREQUENCY HOPPING:	Enabled

Number of hopping frequencies	Minimum number of hopping frequencies	Margin*	Verdict
79	15	64	Pass

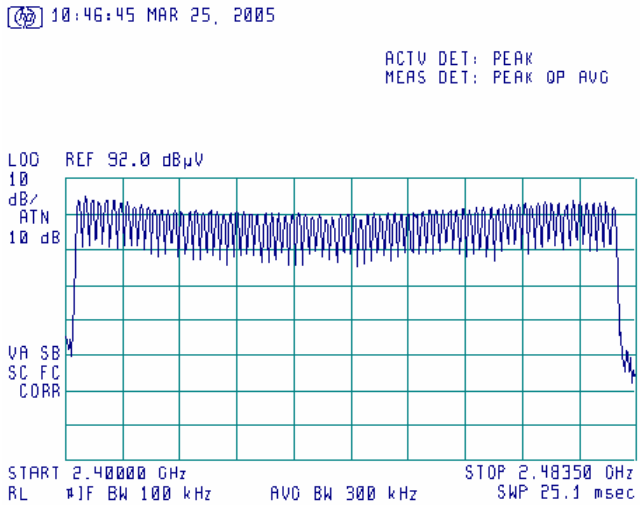
* - Margin = Number of hopping frequencies – Minimum number of hopping frequencies.

Reference numbers of test equipment used

HL 1430							

Full description is given in Appendix A.

Plot 8.4.1 Number of hopping frequencies



Test specification:	**Section 15.247(a)1, RSS-210 section A8.1(4), Average time of occupancy**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/27/2005 6:47:16 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

8.5 Average time of occupancy

8.5.1 General

This test was performed to calculate the average time of occupancy (dwell time) on any frequency channel of the EUT. Specification test limits are given in Table 8.5.1.

Table 8.5.1 Average time of occupancy limits

Assigned frequency range, MHz	Maximum average time of occupancy, s	Investigated period, s	Number of hopping frequencies
902.0 – 928.0	0.4	20.0	≥ 50
902.0 – 928.0	0.4	10.0	< 50
2400.0 – 2483.5	0.4	0.4 × N	N (≥ 15)
5725.0 – 5850.0	0.4	30.0	≥ 75

8.5.2 Test procedure

8.5.2.1 The EUT was set up as shown in Figure 8.5.1 , energized with frequency hopping function enabled and its proper operation was checked.

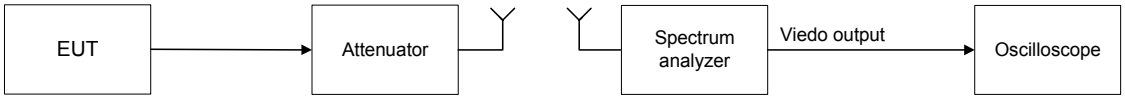
8.5.2.2 The spectrum analyzer span was set to zero centered on a hopping channel.

8.5.2.3 The single transmission duration and period were measured with oscilloscope.

8.5.2.4 The average time of occupancy was calculated as the single transmission time multiplied by the investigated period and divided by the single transmission period.

8.5.2.5 The test was repeated at each data rate and modulation type as provided in Table 8.5.2 and associated plots.

Figure 8.5.1 Average time of occupancy test setup



Test specification:	**Section 15.247(a)1, RSS-210 section A8.1(4), Average time of occupancy**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/27/2005 6:47:16 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 8.5.2 Average time of occupancy test results

ASSIGNED FREQUENCY:	2400-2483.5 MHz
MODULATION:	GFSK
MODULATING SIGNAL:	PRBS
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	1 MHz
VIDEO BANDWIDTH:	3 MHz
NUMBER OF HOPPING FREQUENCIES:	79
INVESTIGATED PERIOD:	31.6 s
FREQUENCY HOPPING:	Enabled

Carrier frequency, MHz	Single transmission duration, ms	Single transmission period, ms	Average time of occupancy*, s	Bit rate, Mbps	Symbol rate, Msymbol/s	Limit, s	Margin, s**	Verdict
2402-2480	0.454	1.274	0.143	1	1	0.4	0.257	Pass

* - Average time of occupancy = (Single transmission duration × Investigated period) / (Single transmission period × number of hopping channels).
** - Margin = Average time of occupancy – specification limit.

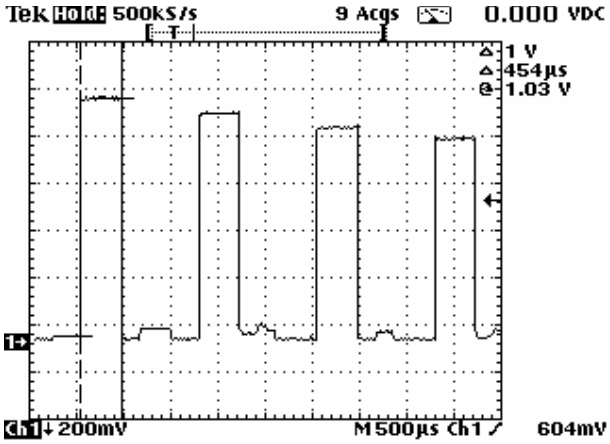
Reference numbers of test equipment used

HL 1562	HL 2258	HL 2483					

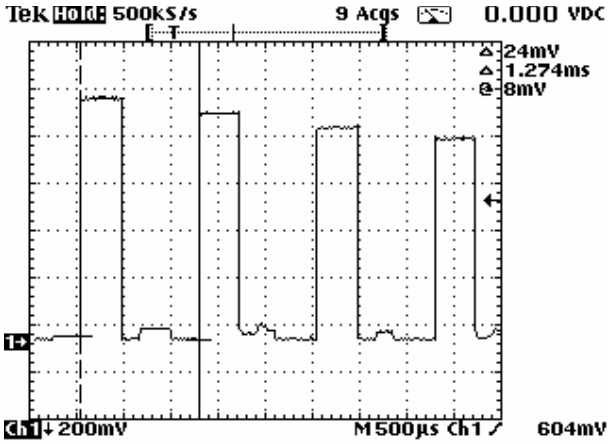
Full description is given in Appendix A.

Test specification:	**Section 15.247(a)1, RSS-210 section A8.1(4), Average time of occupancy**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/27/2005 6:47:16 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.5.1 Single transmission duration



Plot 8.5.2 Single transmission period



Test specification:	Section 15.247(b), RSS-210 section A8.4(2), Peak output power		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	
Date & Time:	4/13/2005 3:26:38 PM		
Temperature: 22 ºC	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

8.6 Peak output power

8.6.1 General

This test was performed to measure the maximum peak output power at the transmitter RF antenna connector. Specification test limits are given in Table 8.6.1.

Table 8.6.1 Peak output power limits

Assigned frequency range, MHz	Peak output power*		Maximum antenna gain, dBi
	W	dBm	
902.0 – 928.0	0.125	21.0	6.0*
2400.0 – 2483.5	0.125 (<75 hopping channels) 1.0 (≥75 hopping channels)	21.0 (<75 hopping channels) 30.0 (≥75 hopping channels)	
5725.0 – 5850.0	1.0	30.0	

*- 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.

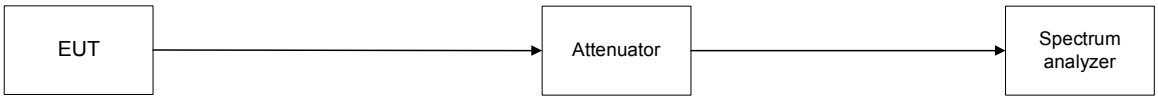
8.6.2 Test procedure

8.6.2.1 The EUT was set up as shown in Figure 8.6.1, energized and its proper operation was checked.

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

8.6.2.3 The frequency span of spectrum analyzer was set approximately 5 times wider than 20 dB bandwidth of the EUT and the resolution bandwidth was set wider than 20 dB bandwidth of the EUT. The spectrum analyzer trace was allowed to stabilize and the maximum peak output power was measured as provided in Table 8.6.2 and associated plots.

Figure 8.6.1 Peak output power test setup



Test specification:	**Section 15.247(b), RSS-210 section A8.4(2), Peak output power**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 3:26:38 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 8.6.2 Peak output power test results

ASSIGNED FREQUENCY:	2400 - 2483.5 MHz
MODULATION:	GFSK
MODULATING SIGNAL:	PRBS
BIT RATE:	1 Mbps
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	2 MHz
VIDEO BANDWIDTH:	3 MHz
FREQUENCY HOPPING:	Disabled

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	Peak output power, dBm	Limit, dBm	Margin*, dB	Verdict
2402	1.77	included	included	1.77	30	-28.23	Pass
2440	-3.07	included	included	-3.07	30	-33.07	Pass
2480	0.67	included	included	0.67	30	-29.33	Pass

* - Margin = Peak output power – specification limit.

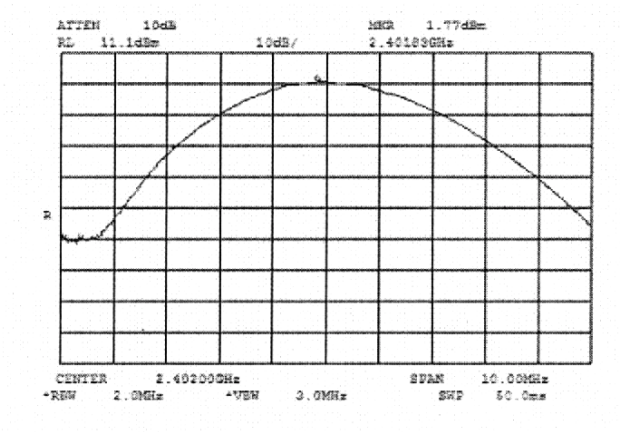
Reference numbers of test equipment used

HL 1424	HL 2254	HL 2524					

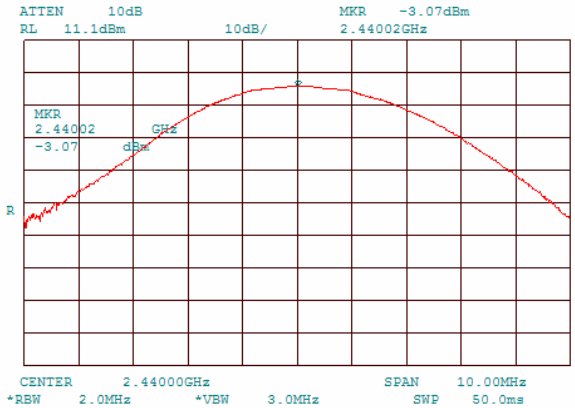
Full description is given in Appendix A.

Test specification:	**Section 15.247(b), RSS-210 section A8.4(2), Peak output power**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 3:26:38 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.6.1 Field strength of carrier at low frequency

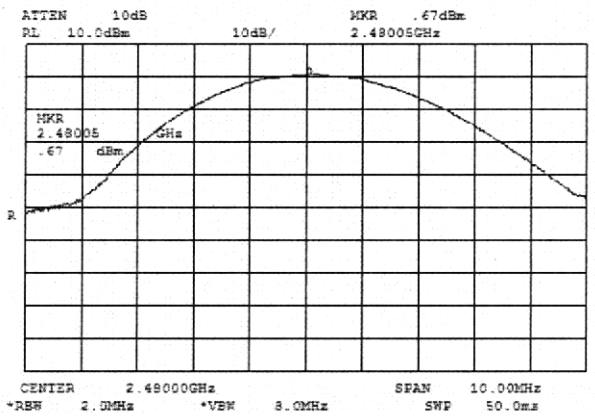


Plot 8.6.2 Field strength of carrier at mid frequency



Test specification:	Section 15.247(b), RSS-210 section A8.4(2), Peak output power		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	Verdict:	
Date & Time:	4/13/2005 3:26:38 PM		
Temperature: 22 ºC	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

Plot 8.6.3 Field strength of carrier at high frequency



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Emissions at band edges**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/27/2005 5:53:42 PM		
Temperature: 24 ºC	**Air Pressure:** 1016 hPa	**Relative Humidity:** 42 %	**Power Supply:** 7.2 V battery
Remarks:			

8.7 Band edge radiated emissions

8.7.1 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 8.7.1.

Table 8.7.1 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.

8.7.2 Test procedure

8.7.2.1 The EUT was set up as shown in Figure 8.7.1, energized normally modulated at the maximum data rate with its hopping function disabled and its proper operation was checked.

8.7.2.2 The EUT was adjusted to produce maximum available to end user RF output power at the lowest carrier frequency.

8.7.2.3 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.

8.7.2.4 The spectrum analyzer was set in max hold mode and allowed trace to stabilize. The highest emission level within the authorized band was measured.

8.7.2.5 The maximum band edge emission and modulation product outside of the band were measured as provided in Table 8.7.2 and associated plots and referenced to the highest emission level measured within the authorized band.

8.7.2.6 The above procedure was repeated with the EUT adjusted to produce maximum RF output power at the highest carrier frequency.

8.7.2.7 The above procedure was repeated with the frequency hopping function enabled.

Figure 8.7.1 Band edge emission test setup

Test specification:	**Section 15.247(c), RSS-210 section A8.5, Emissions at band edges**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/27/2005 5:53:42 PM		
Temperature: 24 ºC	**Air Pressure:** 1016 hPa	**Relative Humidity:** 42 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 8.7.2 Band edge emission test results

ASSIGNED FREQUENCY RANGE: 2400-2483.5MHz
DETECTOR USED: Peak
MODULATION: GFSK
MODULATING SIGNAL: PRBS
BIT RATE: 1 Mbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
TRANSMITTER OUTPUT POWER: dBm at low carrier frequency
dBm at high carrier frequency
RESOLUTION BANDWIDTH: ≥ 1% of the span
VIDEO BANDWIDTH: ≥ RBW

Frequency, MHz	Band edge emission, dBuV/m	Emission at carrier, dBuV/m	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
Frequency hopping disabled						
2400	63.2	102.5	39.3	20	19.3	Pass
2484.08	60.7	102.9	42.2	20	22.2	Pass
Frequency hopping enabled						
2400	62.0	102.5	40.5	20	20.5	Pass
2484.08	60.2	102.9	42.7	20	22.7	Pass

*- Margin = Attenuation below carrier – specification limit.

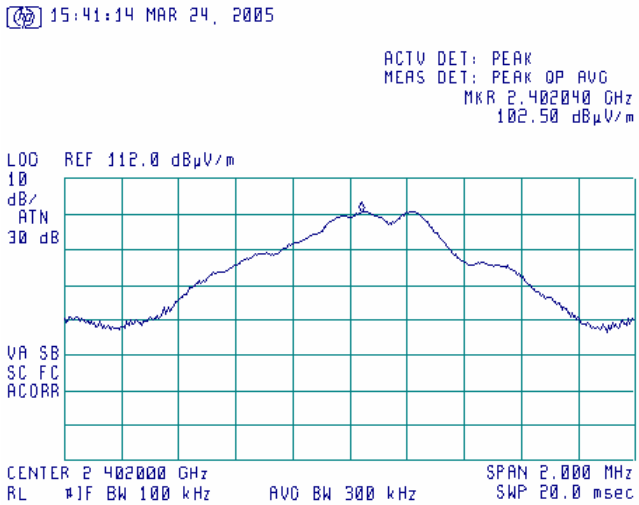
Reference numbers of test equipment used

HL 0038	HL 0287	HL 1365	HL 1430	HL 1947	HL 2432		

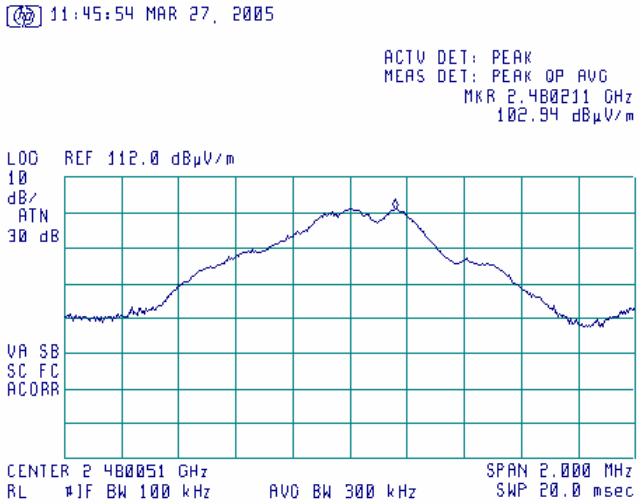
Full description is given in Appendix A.

Test specification:	**Section 15.247(c), RSS-210 section A8.5, Emissions at band edges**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/27/2005 5:53:42 PM		
Temperature: 24 °C	**Air Pressure:** 1016 hPa	**Relative Humidity:** 42 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.7.1 The highest emission level within the assigned band at low carrier frequency

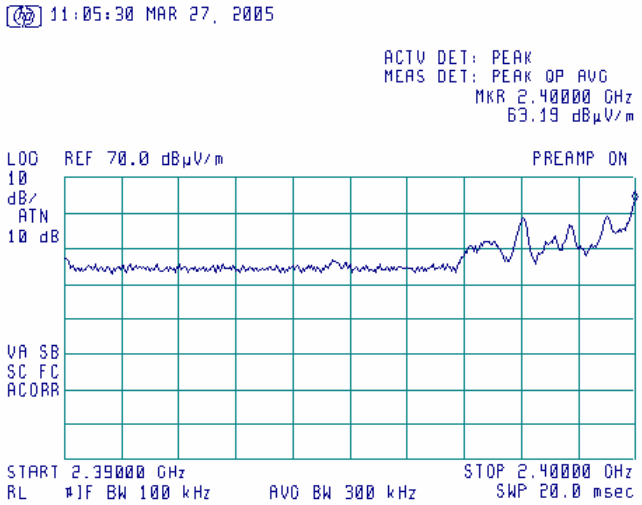


Plot 8.7.2 The highest emission level within the assigned band at high carrier frequency

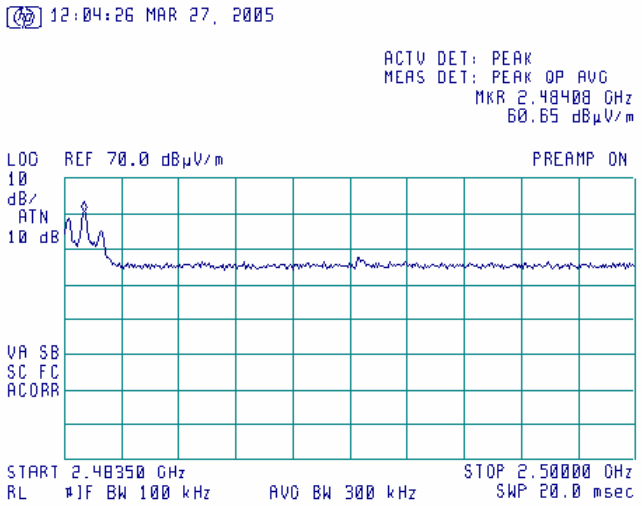


Test specification:	**Section 15.247(c), RSS-210 section A8.5, Emissions at band edges**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/27/2005 5:53:42 PM		
Temperature: 24 °C	**Air Pressure:** 1016 hPa	**Relative Humidity:** 42 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.7.3 The highest band edge emission at low carrier frequency with hopping function disabled

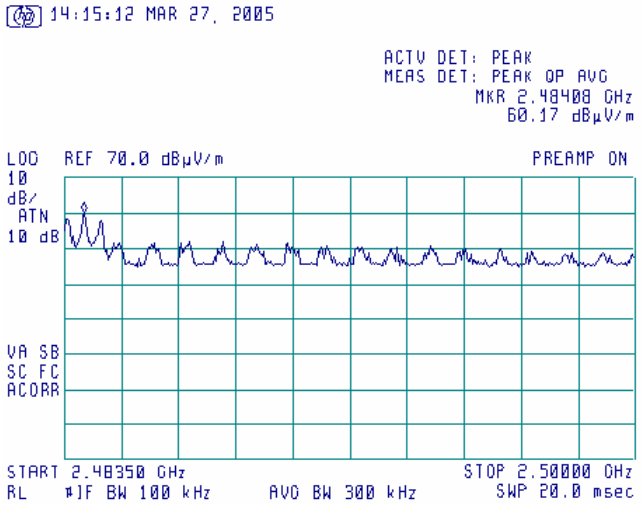


Plot 8.7.4 The highest band edge emission at high carrier frequency with hopping function disabled

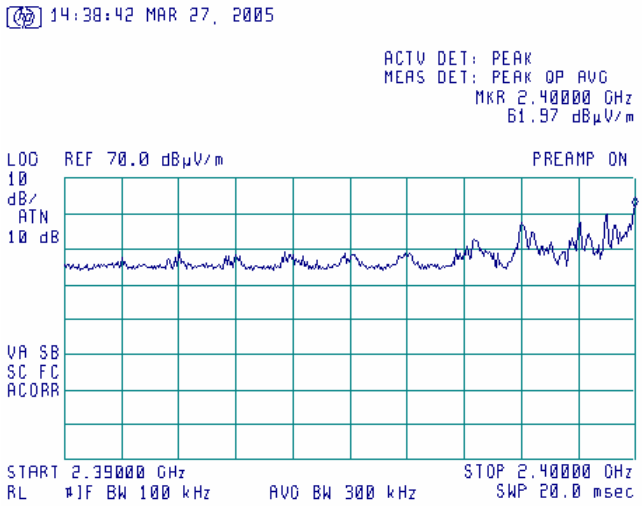


Test specification:	**Section 15.247(c), RSS-210 section A8.5, Emissions at band edges**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	3/27/2005 5:53:42 PM		
Temperature: 24 °C	**Air Pressure:** 1016 hPa	**Relative Humidity:** 42 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.7.5 The higher band edge emissions with hopping function enabled



Plot 8.7.6 The lower band edge emission with hopping function enabled



Test specification:	Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 ºC	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

8.8 Field strength of spurious emissions

8.8.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limits are given in Table 8.8.1.

Table 8.8.1 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 – 0.490*	NA	128.5 – 93.8**	NA	20.0
0.490 – 1.705*		73.8 – 63.0**		
1.705 – 30.0*		69.5**		
30 – 88		40.0		
88 – 216		43.5		
216 – 960		46.0		
960 - 1000		54.0		
Above 1000	74.0	NA	54.0	

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

$$Lim_{S2} = Lim_{S1} + 40 \log (S_1/S_2),$$

where S_1 and S_2 – standard defined and test distance respectively in meters.
**- The limit decreases linearly with the logarithm of frequency.
*** - 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.

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

8.8.2.1 The EUT was set up as shown in Figure 8.8.1, energized and the performance check was conducted.

8.8.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^0 and the measuring antenna was rotated around its vertical axis.

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

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

8.8.3.1 The EUT was set up as shown in Figure 8.8.2, energized and the performance check was conducted.

8.8.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal.

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

Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Figure 8.8.1 Setup for spurious emission field strength measurements below 30 MHz

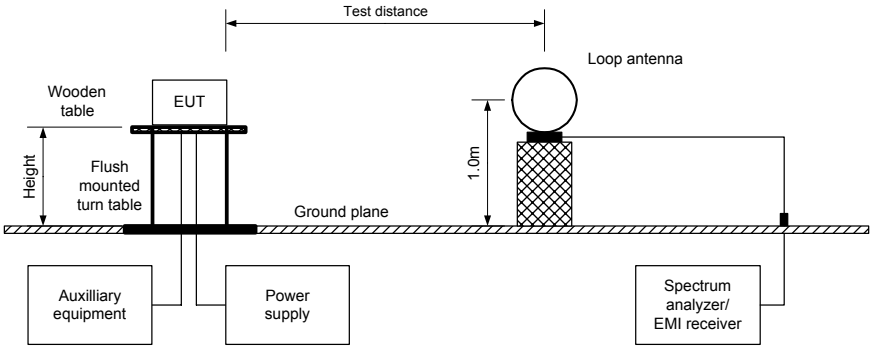
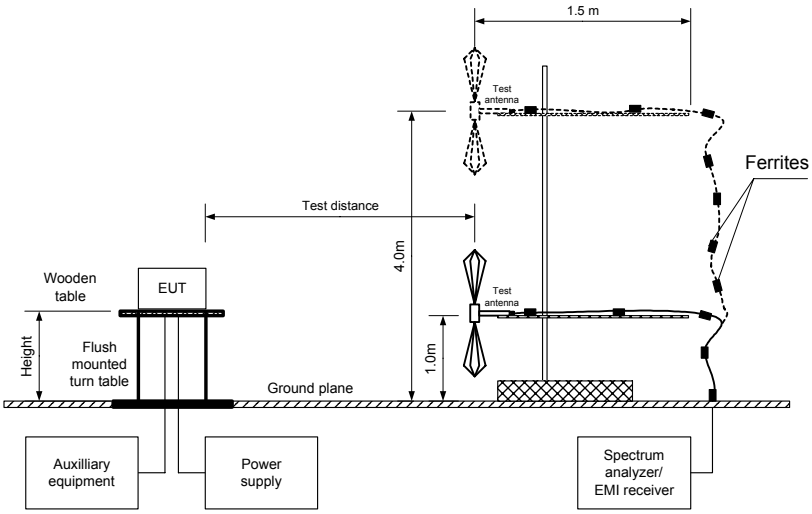


Figure 8.8.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 8.8.2 Field strength of emissions outside restricted bands

ASSIGNED FREQUENCY:	2400 – 2483.5 MHz
INVESTIGATED FREQUENCY RANGE:	0.009 - 25000 MHz
TEST DISTANCE:	3 m
MODULATION:	FSK
MODULATING SIGNAL:	PRBS
BIT RATE:	1.0 Mbps
DUTY CYCLE:	100 %
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) Biconical (30 MHz – 200 MHz) Log periodic (200 MHz – 1000 MHz) Biconilog (30 MHz – 1000 MHz) Double ridged guide (above 1000 MHz)
FREQUENCY HOPPING:	Disabled

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	Verdict
Low carrier frequency								
At least 20 dB below the limit					102.50	>20	20	Pass
Mid carrier frequency								
At least 20 dB below the limit					97.10	>20	20	Pass
High carrier frequency								
At least 20 dB below the limit					102.90	>20	20	Pass

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

Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 8.8.3 Field strength of spurious emissions above 1 GHz within restricted bands

ASSIGNED FREQUENCY:	2400 – 2483.5 MHz
INVESTIGATED FREQUENCY RANGE:	1 - 25000 MHz
TEST DISTANCE:	3 m
MODULATION:	FSK
MODULATING SIGNAL:	PRBS
BIT RATE:	1.0 Mbps
DUTY CYCLE:	100 %
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	1000 kHz
TEST ANTENNA TYPE:	Double ridged guide
FREQUENCY HOPPING:	Disabled

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)	Margin, dB***	
Low carrier frequency											
4804	H	1.15	150	51.50	74	22.50	45.80	45.80	54	8.20	Pass
Mid carrier frequency											
4882	H	1.15	150	52.00	74	22.00	46.20	46.20	54	7.80	Pass
High carrier frequency											
4960	H	1.15	150	53.83	74	20.17	49.20	49.20	54	5.80	Pass

*****- 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 8.8.4 Average factor calculation

Transmission pulse		Transmission burst		Transmission train duration, ms	Average factor, dB
Duration, ms	Period, ms	Duration, ms	Period, ms		
Duty cycle 100%					0

Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 8.8.5 Field strength of spurious emissions below 1 GHz within restricted bands

ASSIGNED FREQUENCY: 2400 – 2483.5 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz
TEST DISTANCE: 3 m
MODULATION: FSK
MODULATING SIGNAL: PRBS
BIT RATE: 1.0 Mbps
DUTY CYCLE: 100 %
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
RESOLUTION BANDWIDTH: 0.2 kHz (9 kHz – 150 kHz)
9.0 kHz (150 kHz – 30 MHz)
120 kHz (30 MHz – 1000 MHz)
VIDEO BANDWIDTH: > Resolution bandwidth
FREQUENCY HOPPING: Disabled

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*				
Low carrier frequency								
No spurious emissions were found								Pass
Mid carrier frequency								
No spurious emissions were found								Pass
High carrier frequency								
No spurious emissions were found								Pass

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

Table 8.8.6 Restricted bands

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.37625 - 8.38675	73 - 74.6	399.9 - 410	2655 - 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

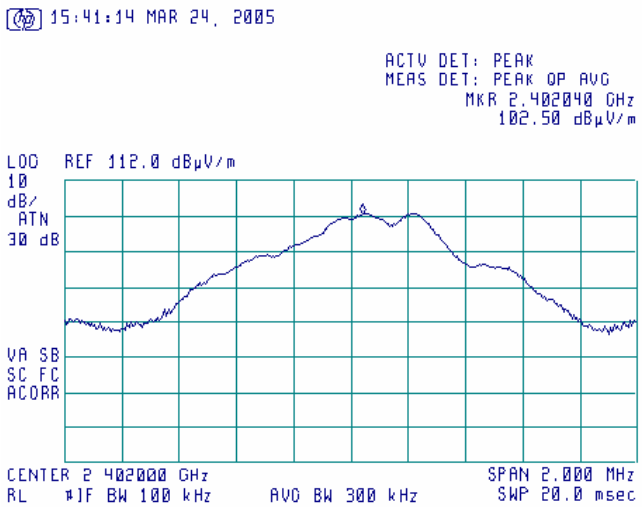
HL 0038	HL 0091	HL 0287	HL 0410	HL 0446	HL 0465	HL 0521	HL 0589
HL 0604	HL 0768	HL 0769	HL 1200	HL 1424	HL 1942	HL 1947	HL 1984
HL 2009	HL 2259	HL 2432	HL 2499				

Full description is given in Appendix A.

Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

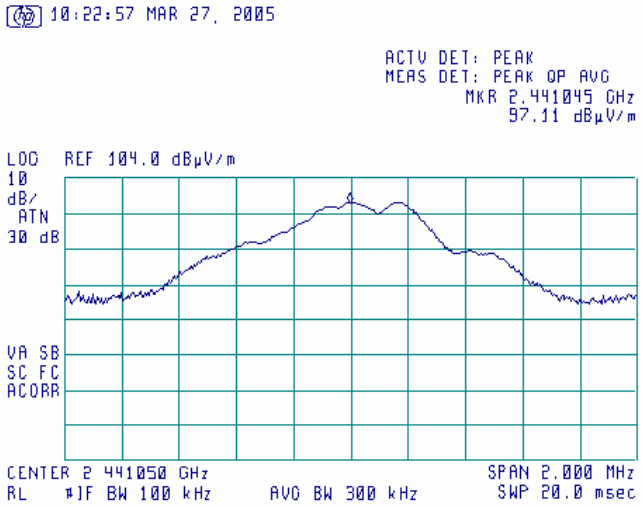
Plot 8.8.1 Radiated emission measurements at the low carrier frequency

TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal



Plot 8.8.2 Radiated emission measurements at the mid carrier frequency

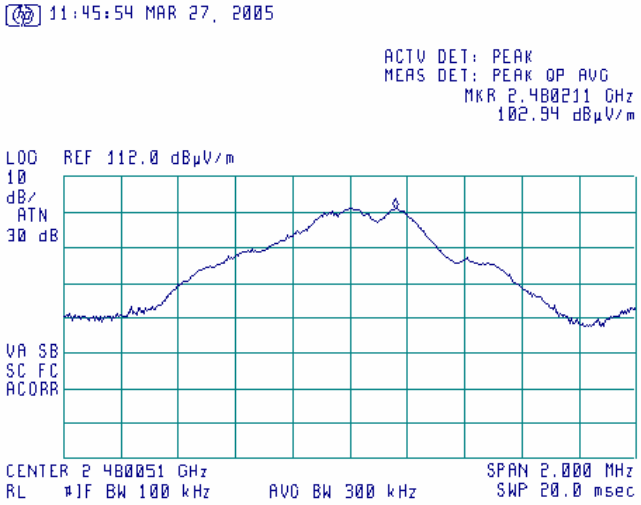
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.8.3 Radiated emission measurements at the high carrier frequency

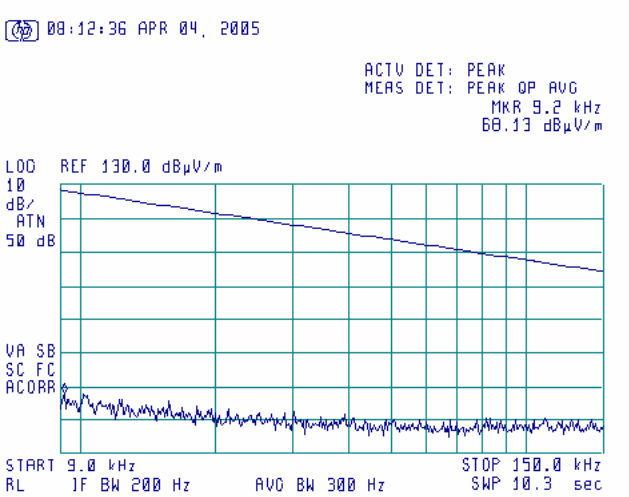
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal



Test specification:	Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

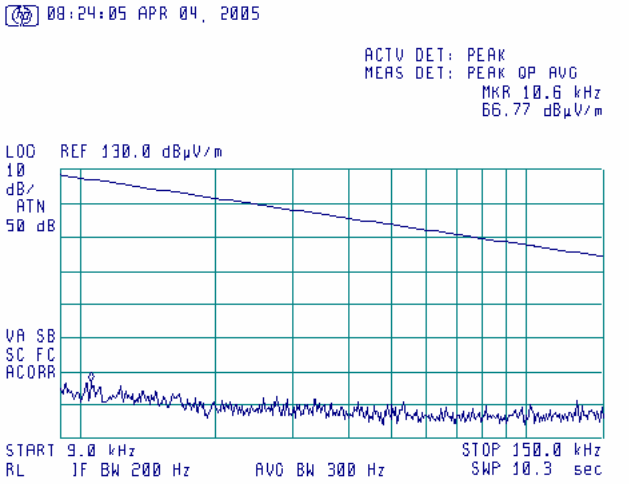
Plot 8.8.4 Radiated emission measurements from 9 to 150 kHz at the low carrier frequency (BT+G20-850)

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Plot 8.8.5 Radiated emission measurements from 9 to 150 kHz at the mid carrier frequency (BT+G20-850)

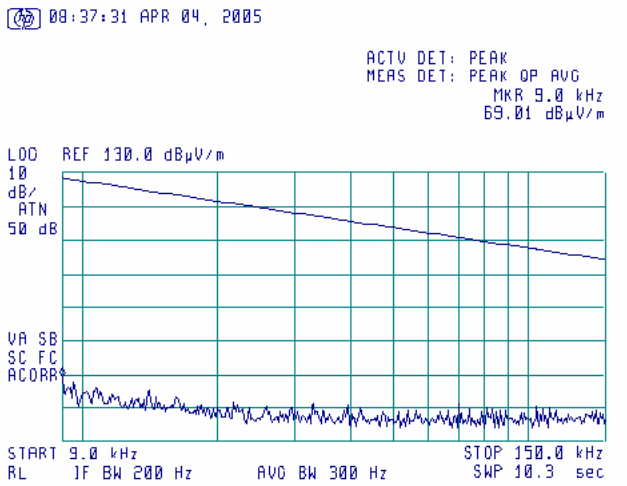
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

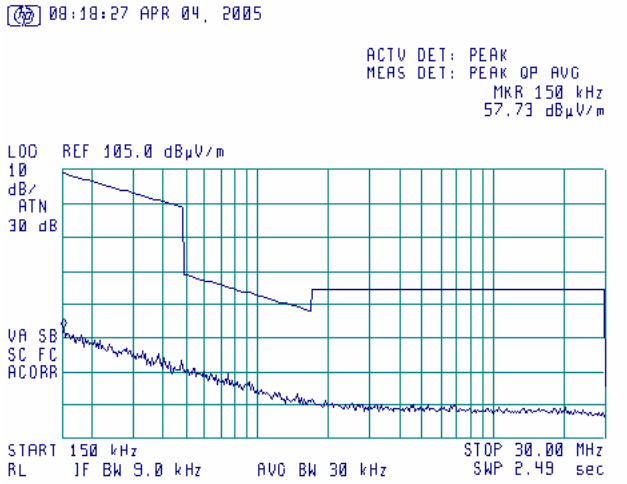
Plot 8.8.6 Radiated emission measurements from 9 to 150 kHz at the high carrier frequency (BT+G20-850)

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Plot 8.8.7 Radiated emission measurements from 0.15 to 30 MHz at the low carrier frequency (BT+G20-850)

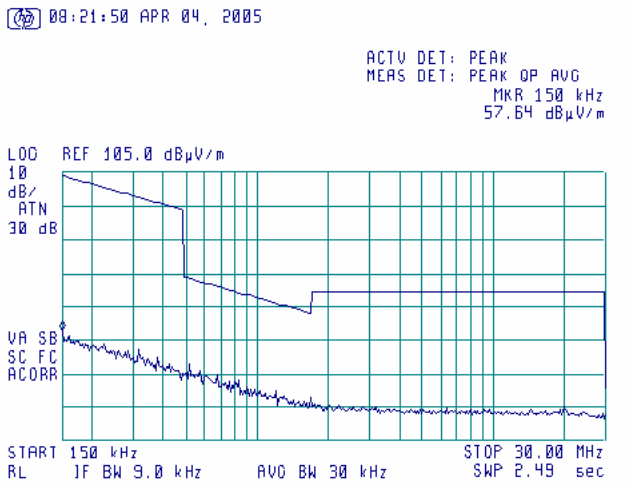
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

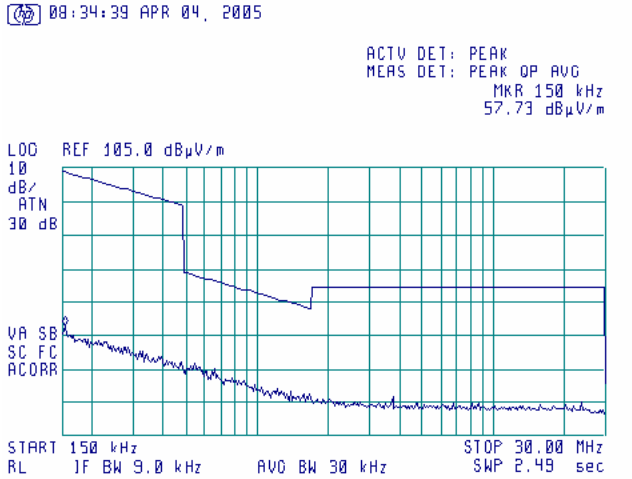
Plot 8.8.8 Radiated emission measurements from 0.15 to 30 MHz at the mid carrier frequency (BT+G20-850)

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Plot 8.8.9 Radiated emission measurements from 0.15 to 30 MHz at the high carrier frequency (BT+G20-850)

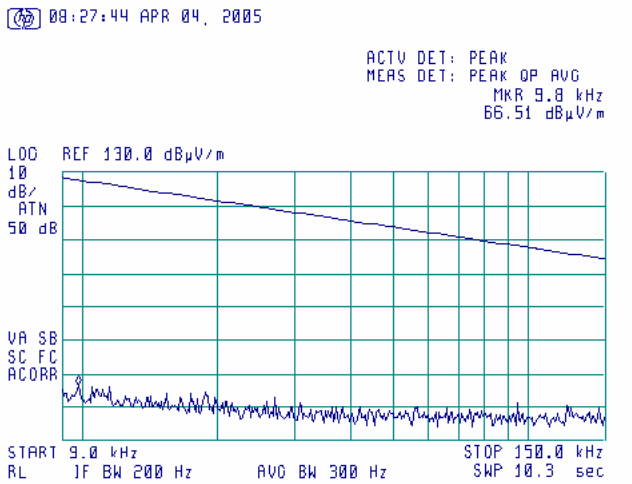
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

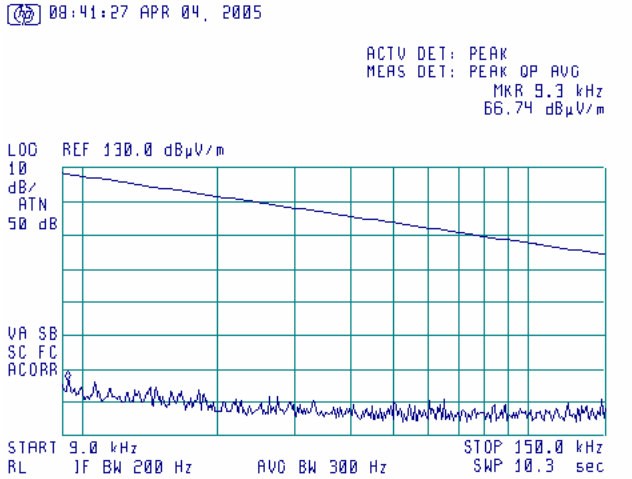
Plot 8.8.10 Radiated emission measurements from 9 to 150 kHz at the low carrier frequency (BT+G20-1900)

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Plot 8.8.11 Radiated emission measurements from 9 to 150 kHz at the mid carrier frequency (BT+G20-1900)

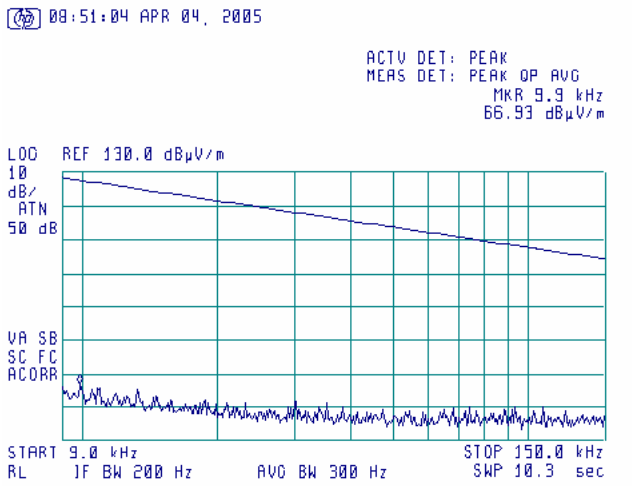
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

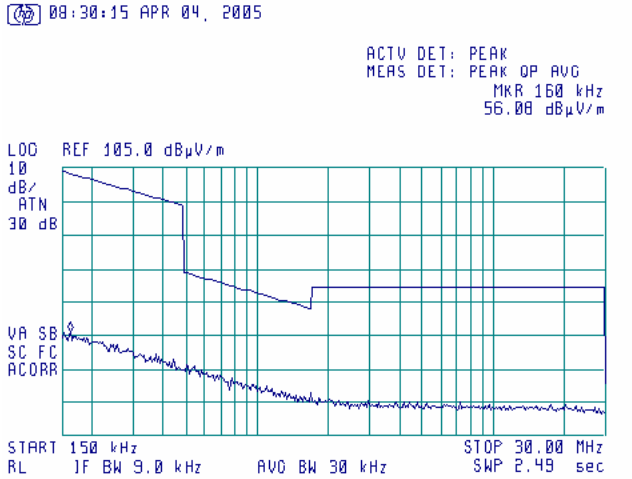
Plot 8.8.12 Radiated emission measurements from 9 to 150 kHz at the high carrier frequency (BT+G20-1900)

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Plot 8.8.13 Radiated emission measurements from 0.15 to 30 MHz at the low carrier frequency (BT+G20-1900)

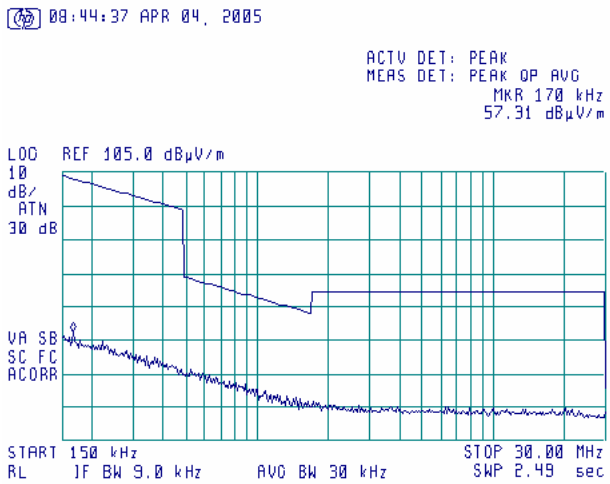
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

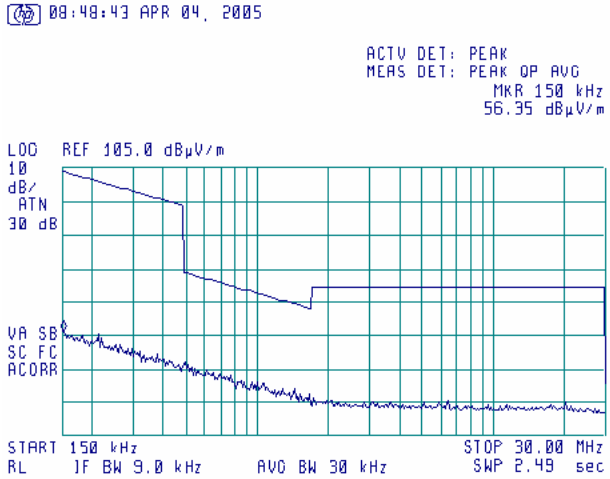
Plot 8.8.14 Radiated emission measurements from 0.15 to 30 MHz at the mid carrier frequency (BT+G20-1900)

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Plot 8.8.15 Radiated emission measurements from 0.15 to 30 MHz at the high carrier frequency (BT+G20-1900)

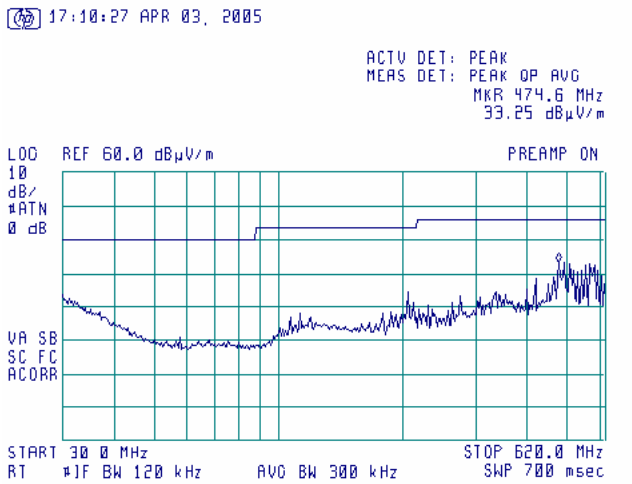
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

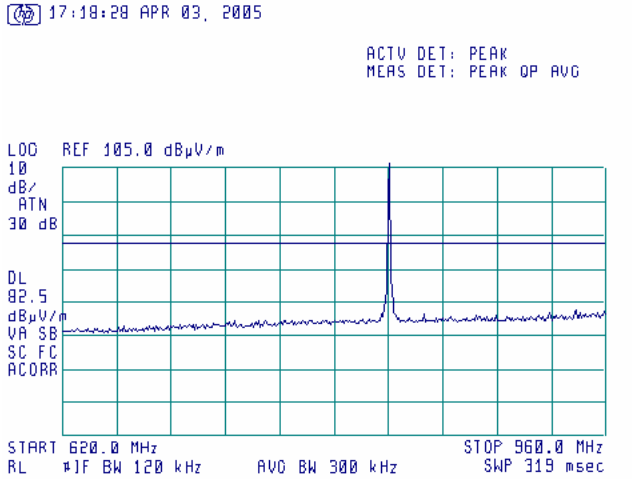
Plot 8.8.16 Radiated emission measurements from 30 to 620 MHz at the low carrier frequency (BT+G20-850)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.17 Radiated emission measurements from 620 to 960 MHz at the low carrier frequency (BT+G20-850)

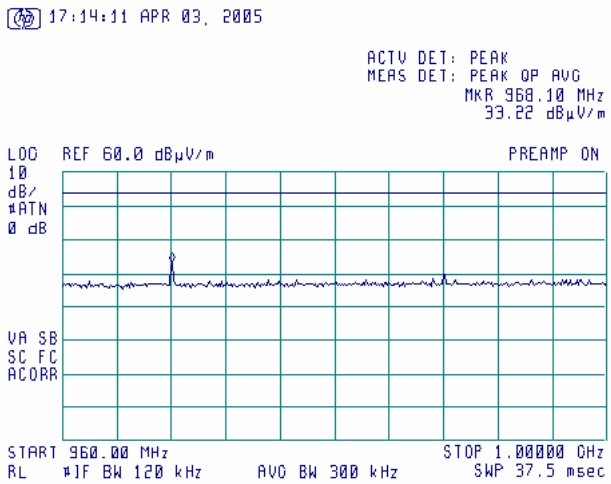
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

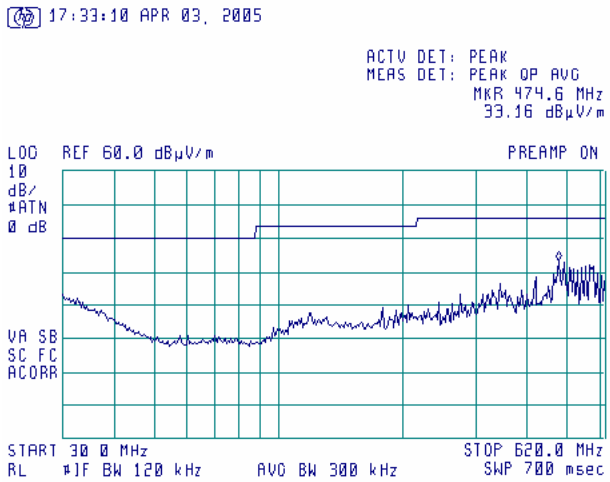
Plot 8.8.18 Radiated emission measurements from 960 to 1000 MHz at the low carrier frequency (BT+G20-850)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.19 Radiated emission measurements from 30 to 620 MHz at the mid carrier frequency (BT+G20-850)

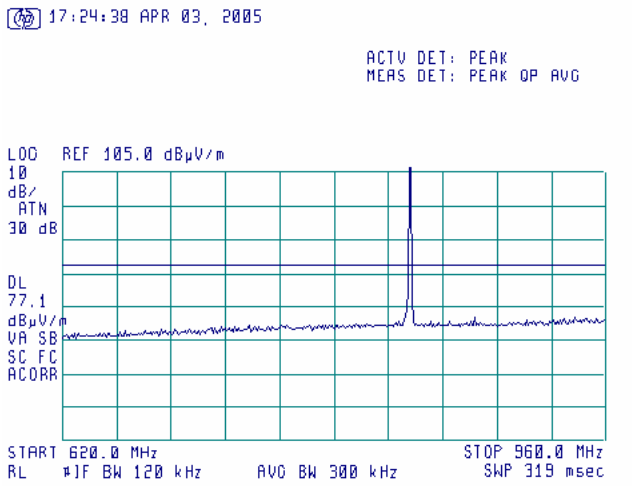
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

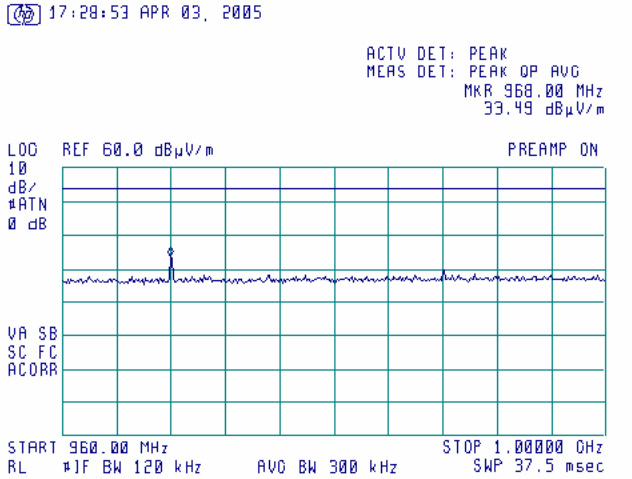
Plot 8.8.20 Radiated emission measurements from 620 to 960 MHz at the mid carrier frequency (BT+G20-850)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.21 Radiated emission measurements from 960 to 1000 MHz at the mid carrier frequency (BT+G20-850)

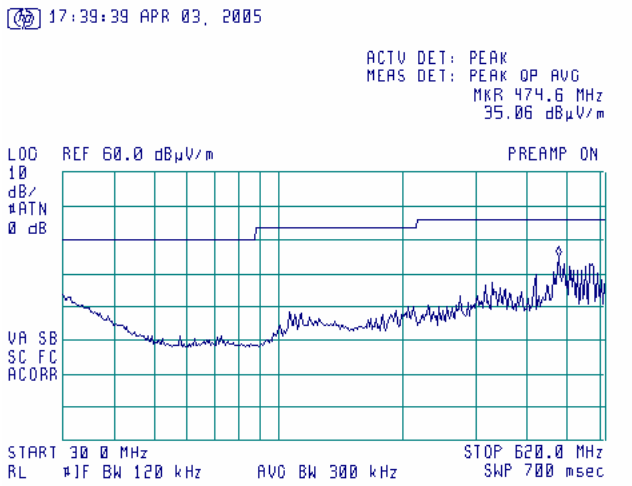
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

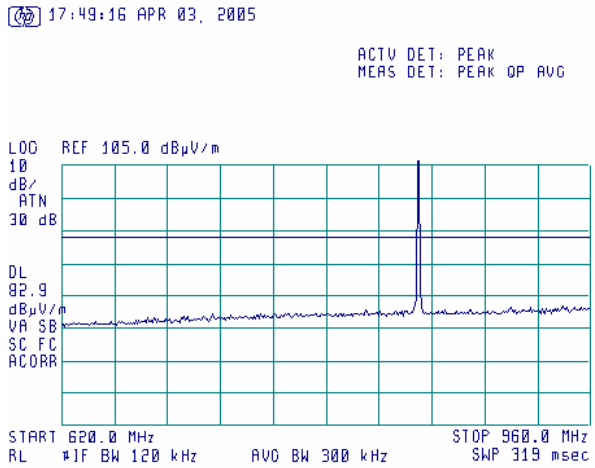
Plot 8.8.22 Radiated emission measurements from 30 to 620 MHz at the high carrier frequency (BT+G20-850)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.23 Radiated emission measurements from 620 to 960 MHz at the high carrier frequency (BT+G20-850)

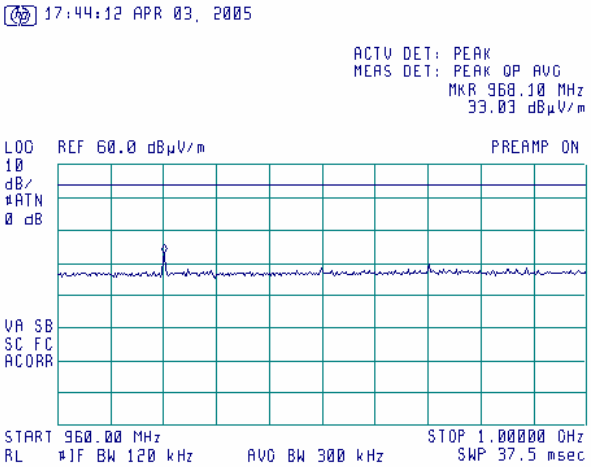
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

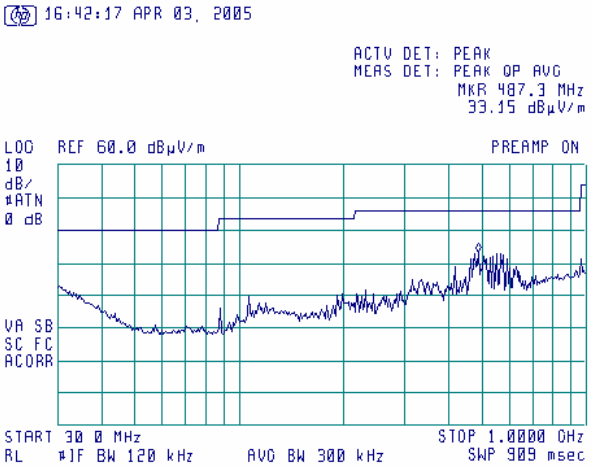
Plot 8.8.24 Radiated emission measurements from 960 to 1000 MHz at the high carrier frequency (BT+G20-850)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.25 Radiated emission measurements from 30 to 1000 MHz at the low carrier frequency (BT+G20-1900)

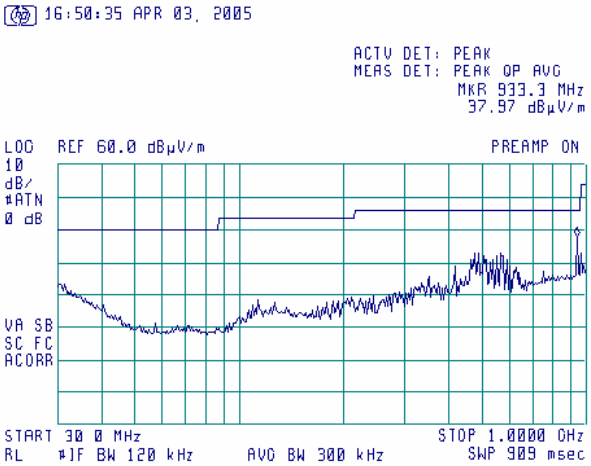
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.8.26 Radiated emission measurements from 30 to 1000 MHz at the mid carrier frequency (BT+G20-1900)

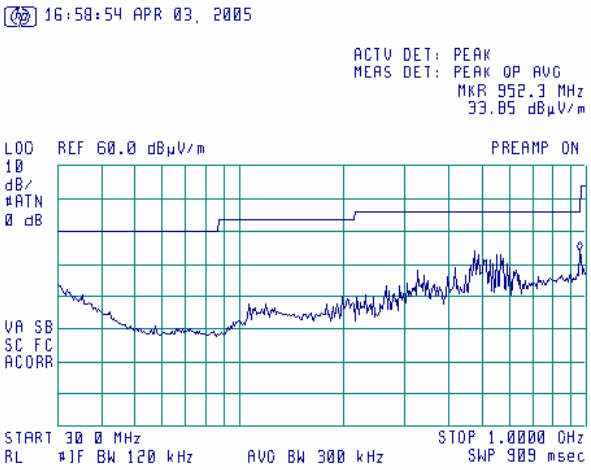
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



940=1880/2 – not restricted band, not digital part

Plot 8.8.27 Radiated emission measurements from 30 to 1000 MHz at the high carrier frequency (BT+G20-1900)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal

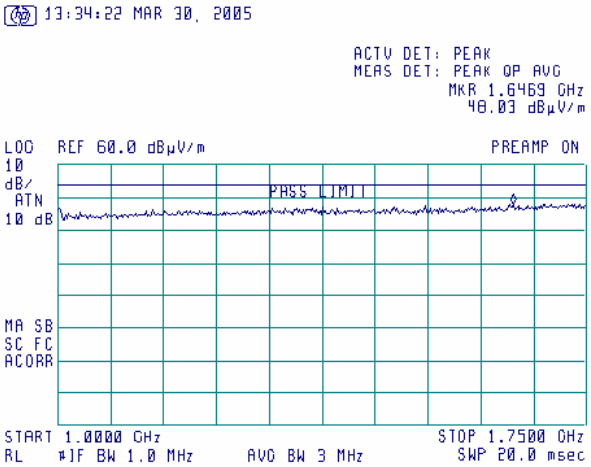


954.9=1909.8/2 - not restricted band, not digital part

Test specification:	Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

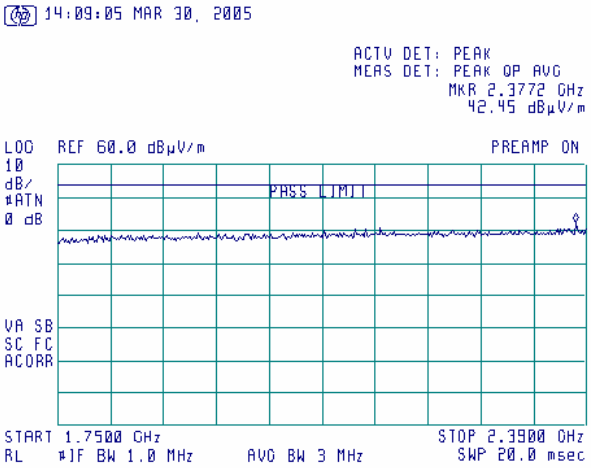
Plot 8.8.28 Radiated emission measurements from 1000 to 1750 MHz at the low carrier frequency (BT and G20-850)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.29 Radiated emission measurements from 1750 to 2390 MHz at the low carrier frequency (BT and G20-850)

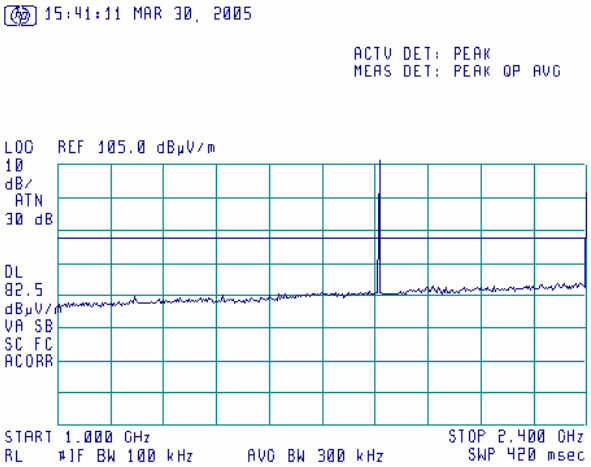
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.8.30 Radiated emission measurements from 1000 to 2400 MHz at the low carrier frequency (BT and G20-1900)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal

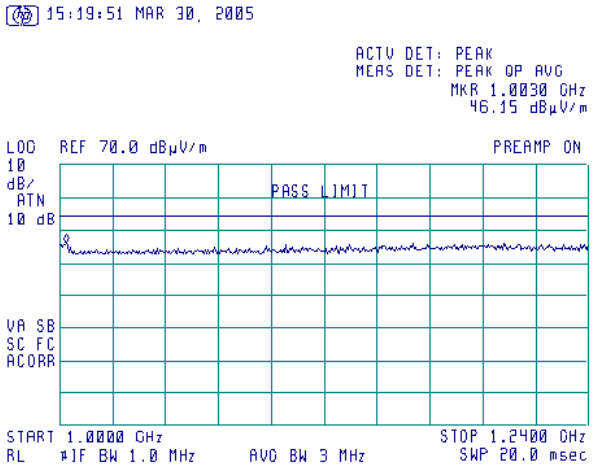


Intended emission of GPRS module

Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

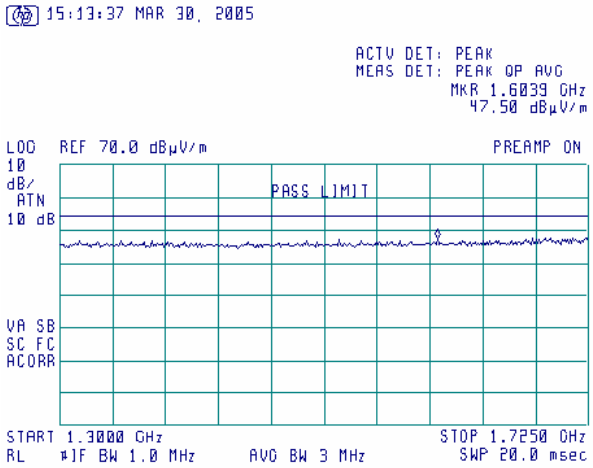
Plot 8.8.31 Radiated emission measurements from 1000 to 1240 MHz at the low carrier frequency (BT and G20-1900)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.32 Radiated emission measurements from 1300 to 1725 MHz at the low carrier frequency (BT and G20-1900)

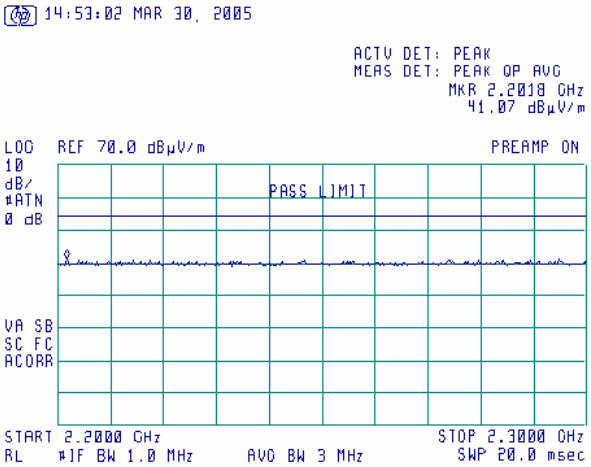
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

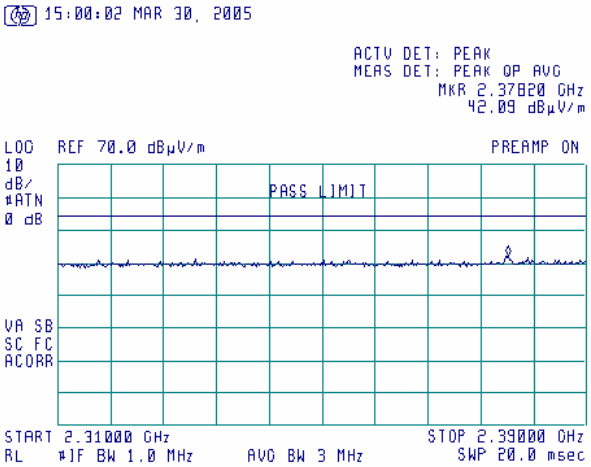
Plot 8.8.33 Radiated emission measurements from 2200 to 2300 MHz at the low carrier frequency (BT and G20-1900)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.34 Radiated emission measurements from 2310 to 2390 MHz at the low carrier frequency (BT and G20-1900)

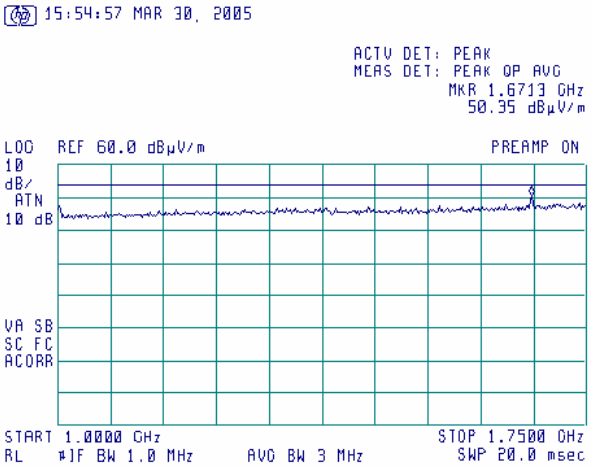
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.8.35 Radiated emission measurements from 1000 to 1750 MHz at the mid carrier frequency (BT and G20-850)

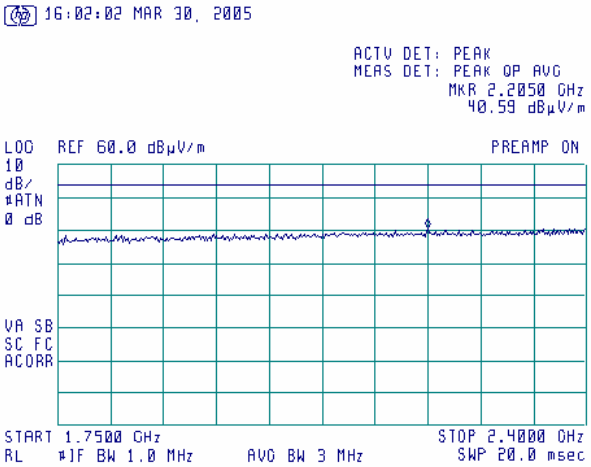
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



No spurious emissions except of the second harmonic of G20

Plot 8.8.36 Radiated emission measurements from 1750 to 2400 MHz at the mid carrier frequency (BT and G20-850)

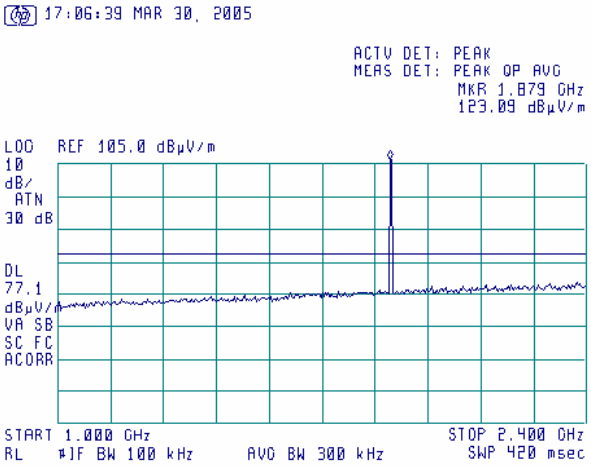
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

Plot 8.8.37 Radiated emission measurements from 1000 to 2400 MHz at the mid carrier frequency (BT and G20-1900)

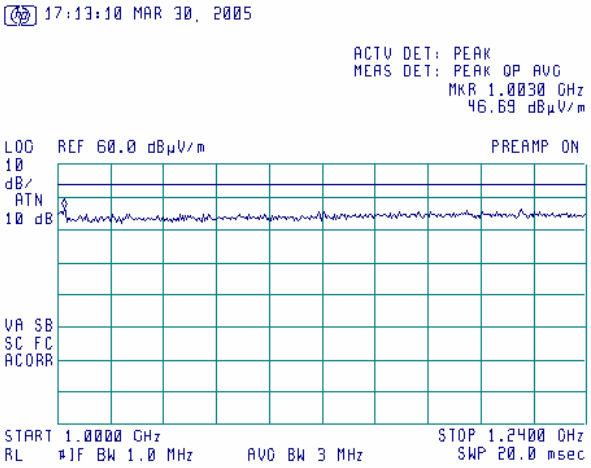
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Intended emission of GPRS module

Plot 8.8.38 Radiated emission measurements from 1000 to 1240 MHz at the mid carrier frequency (BT and G20-1900)

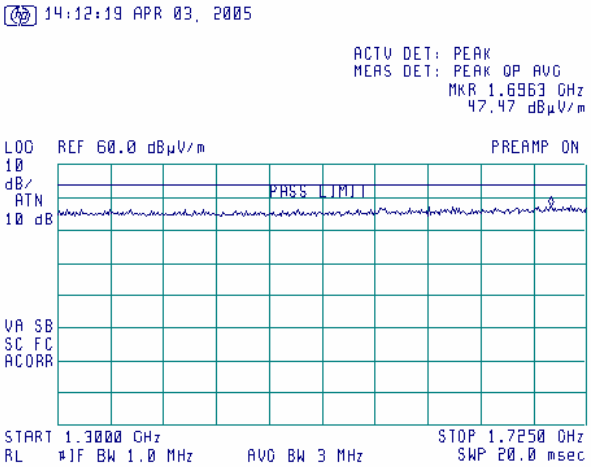
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

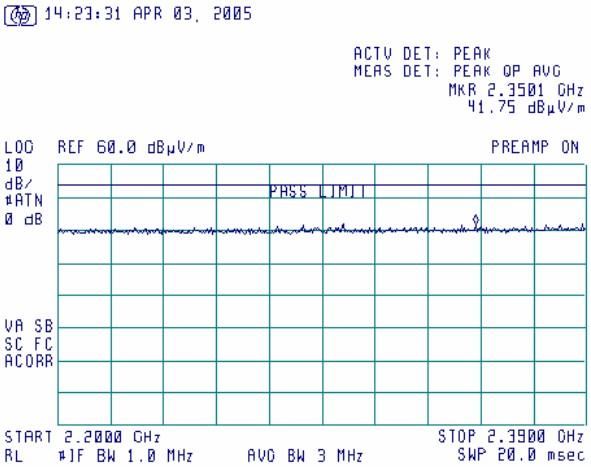
Plot 8.8.39 Radiated emission measurements from 1300 to 1750 MHz at the mid carrier frequency (BT and G20-1900)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.40 Radiated emission measurements from 2200 to 2390 MHz at the mid carrier frequency (BT and G20-1900)

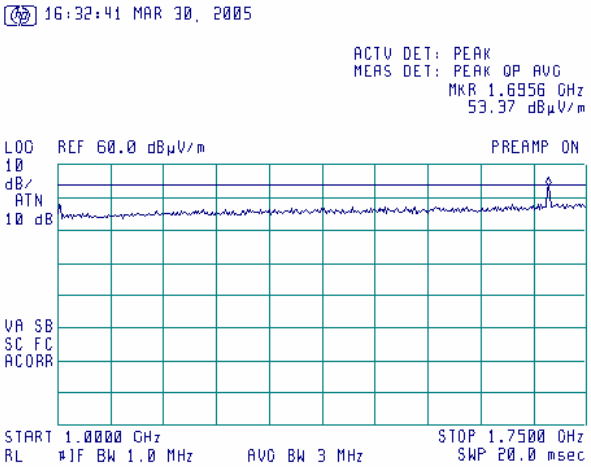
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.8.41 Radiated emission measurements from 1000 to 1750 MHz at the high carrier frequency (BT and G20-850)

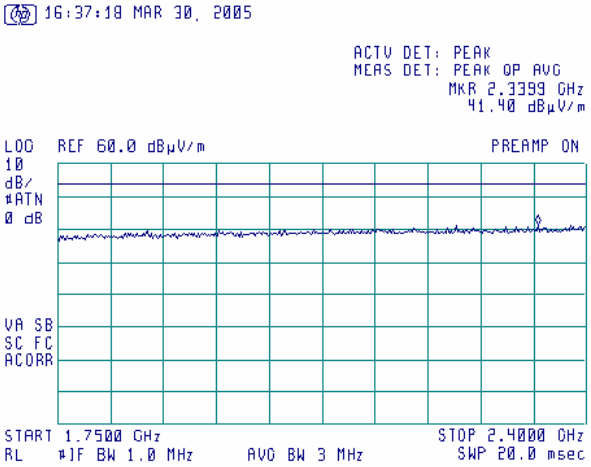
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



No spurious except of second harmonic of G20

Plot 8.8.42 Radiated emission measurements from 1750 to 2400 MHz at the high carrier frequency (BT and G20-850)

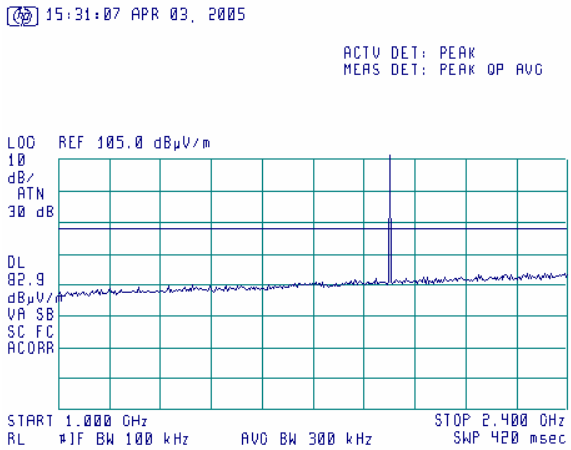
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.8.43 Radiated emission measurements from 1000 to 2400 MHz at the high carrier frequency (BT and G20-1900)

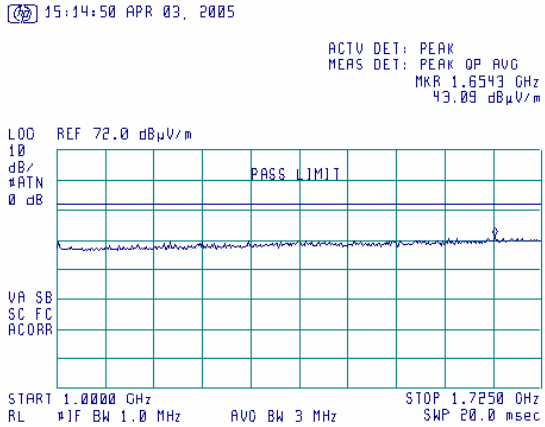
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Intended emission of GPRS module

Plot 8.8.44 Radiated emission measurements from 1000 to 1725 MHz at the high carrier frequency (BT and G20-1900)

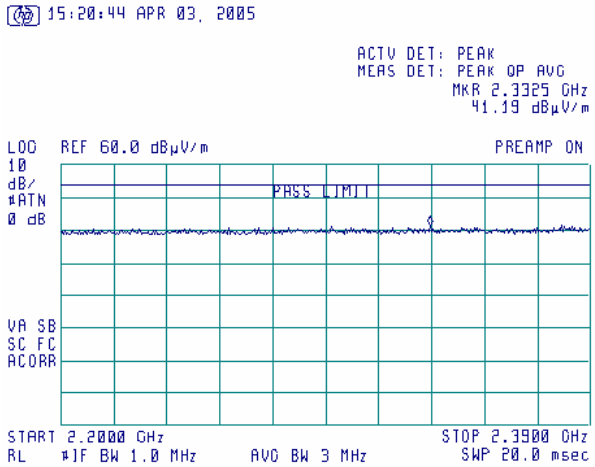
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

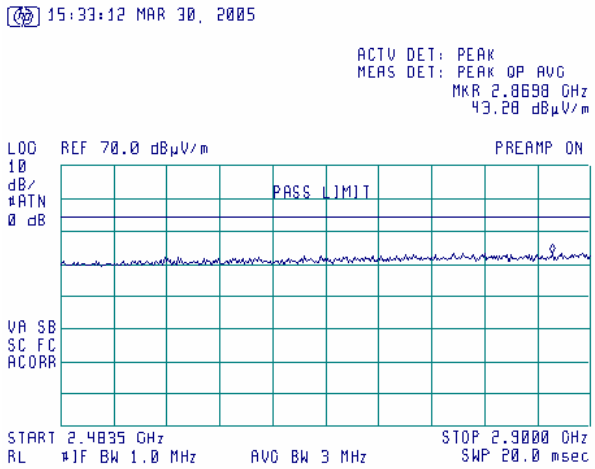
Plot 8.8.45 Radiated emission measurements from 2200 to 2390 MHz at the high carrier frequency (BT and G20-1900)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.46 Radiated emission measurements from 2483.5 to 2900 MHz at the low carrier frequency (BT and G20-850)

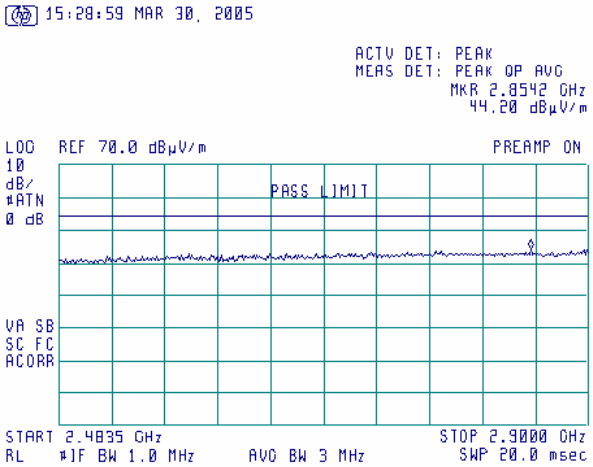
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

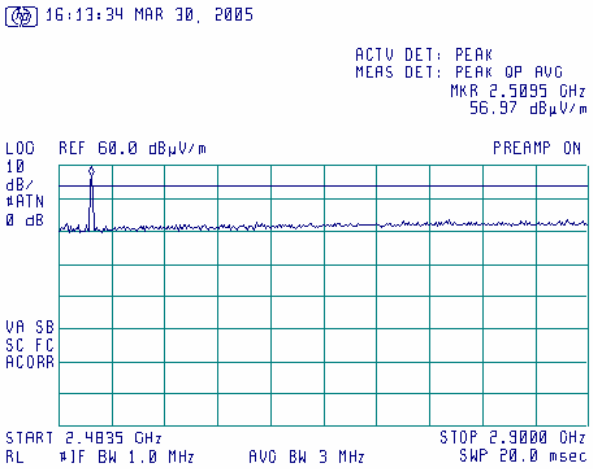
Plot 8.8.47 Radiated emission measurements from 2483.5 to 2900 MHz at the low carrier frequency (BT and G20-1900)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.48 Radiated emission measurements from 2483.5 to 2900 MHz at the mid carrier frequency (BT and G20-850)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal

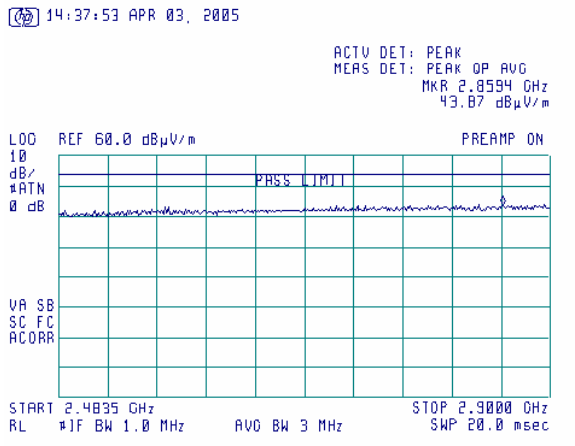


No spurious except of the third harmonic of G20

Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

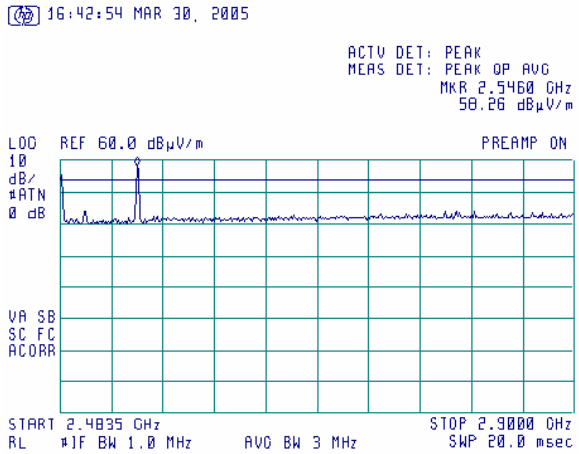
Plot 8.8.49 Radiated emission measurements from 2483.5 to 2900 MHz at the mid carrier frequency (BT and G20-1900)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.50 Radiated emission measurements from 2483.5 to 2900 MHz at the high carrier frequency (BT and G20-850)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal

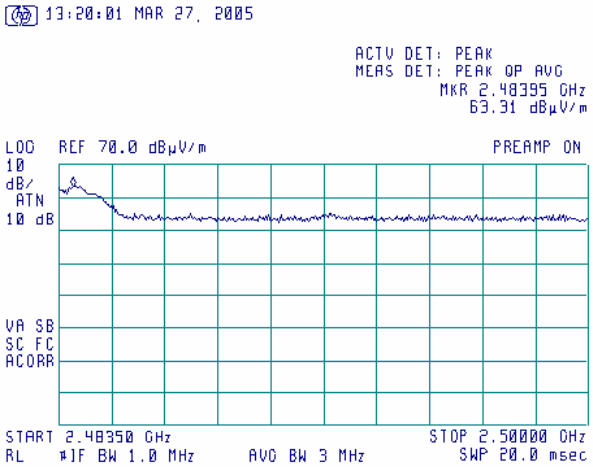


No spurious except of the third harmonic of G20

Test specification:	Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

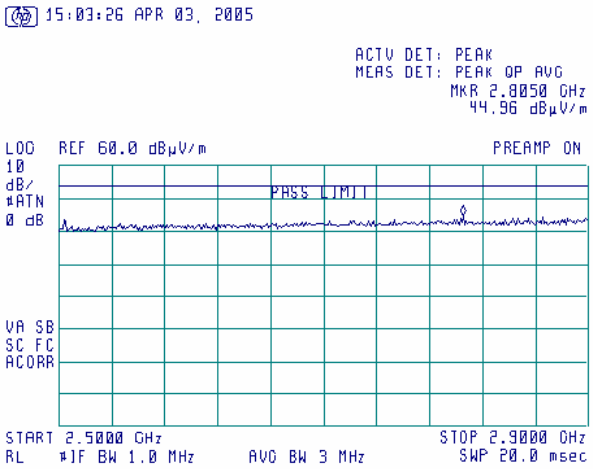
Plot 8.8.51 Radiated emission measurements from 2483.5 to 2500 MHz at the high carrier frequency (BT and G20-1900)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.52 Radiated emission measurements from 2500 to 2900 MHz at the high carrier frequency (BT and G20-1900)

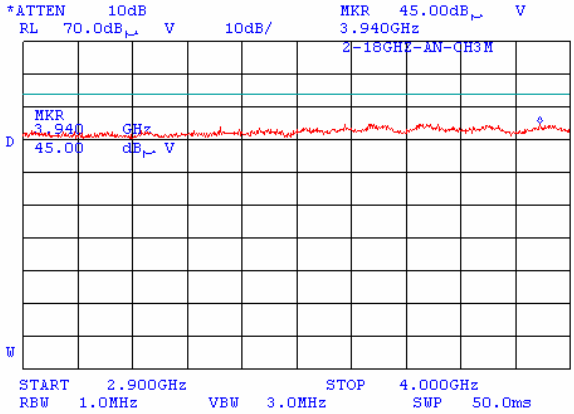
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

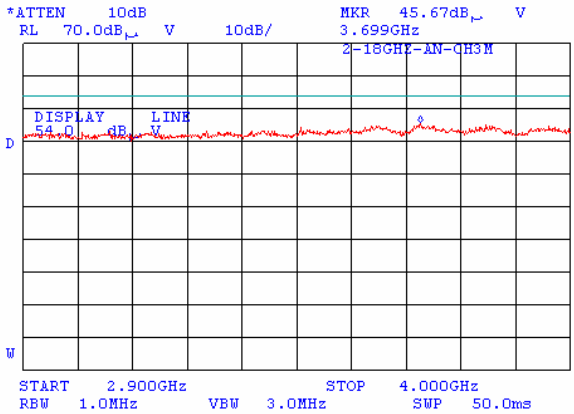
Plot 8.8.53 Radiated emission measurements from 2900 to 4000 MHz at the low carrier frequency (BT and G20-850)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.54 Radiated emission measurements from 2900 to 4000 MHz at the mid carrier frequency (BT and G20-850)

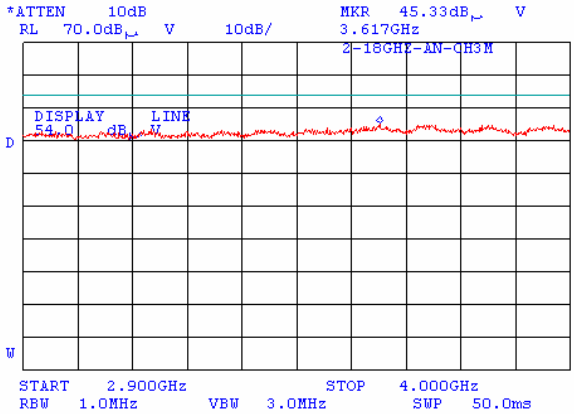
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

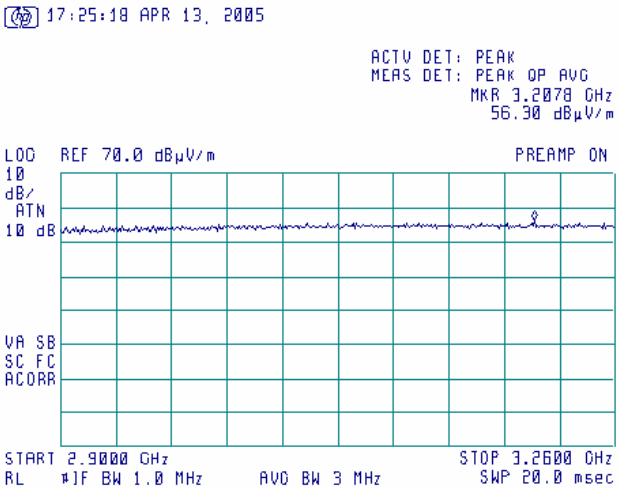
Plot 8.8.55 Radiated emission measurements from 2900 to 4000 MHz at the high carrier frequency (BT and G20-850)

TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 8.8.56 Radiated emission measurements from 2900 to 3260 MHz at the low carrier frequency (BT and G20-1900)

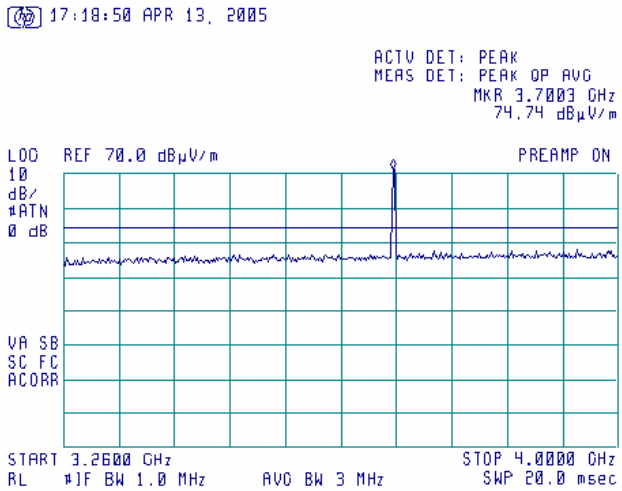
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

Plot 8.8.57 Radiated emission measurements from 3260 to 4000 MHz at the low carrier frequency (BT and G20-1900)

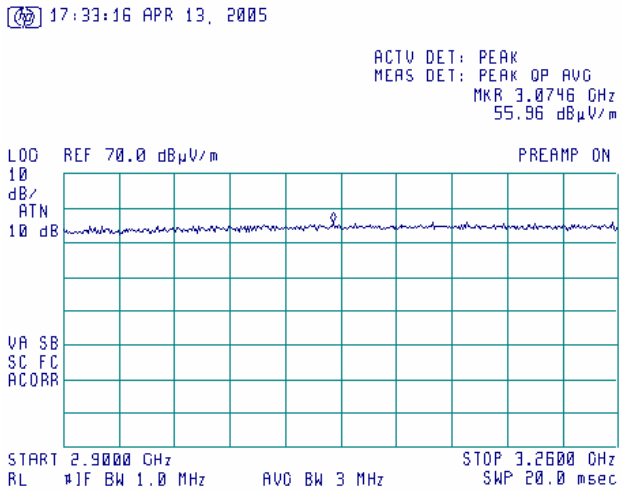
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



No spurious except of second harmonic of G20.

Plot 8.8.58 Radiated emission measurements from 2900 to 3260 MHz at the mid carrier frequency (BT and G20-1900)

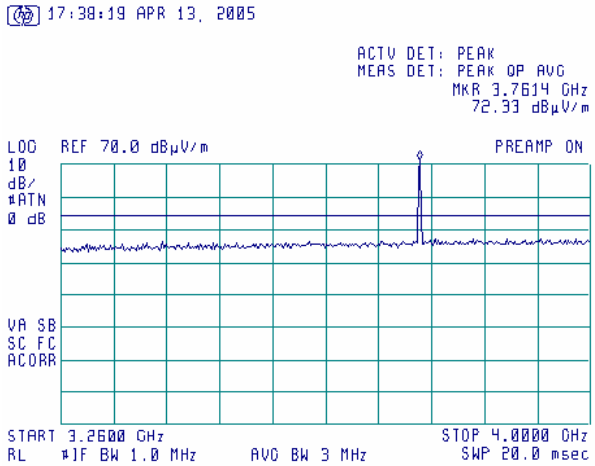
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.8.59 Radiated emission measurements from 3260 to 4000 MHz at the mid carrier frequency (BT and G20-1900)

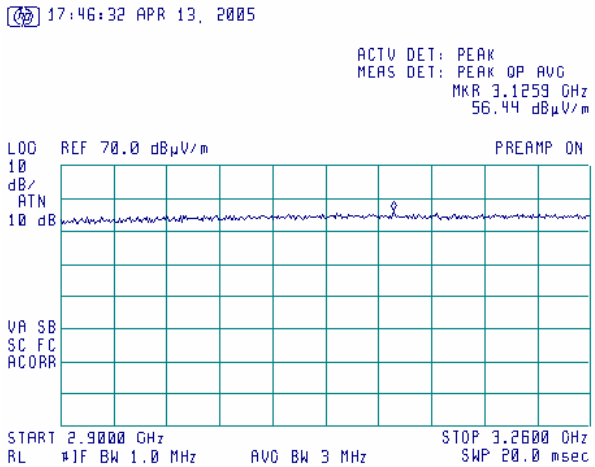
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



No spurious except of second harmonic of G20

Plot 8.8.60 Radiated emission measurements from 2900 to 3260 MHz at the high carrier frequency (BT and G20-1900)

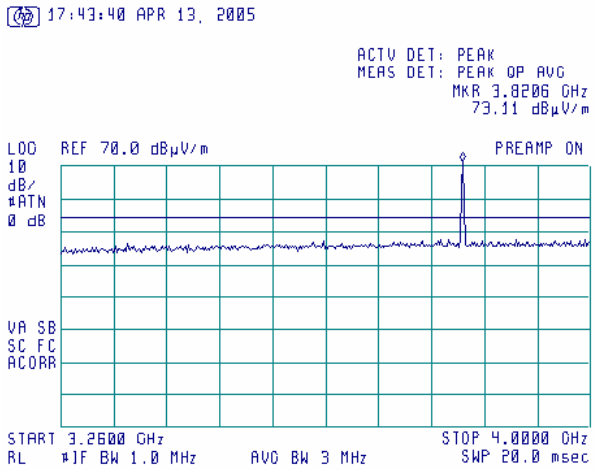
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	Air Pressure: 1022 hPa	Relative Humidity: 43 %	Power Supply: 7.2 V battery
Remarks:			

Plot 8.8.61 Radiated emission measurements from 3260 to 4000 MHz at the high carrier frequency (BT and G20-1900)

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

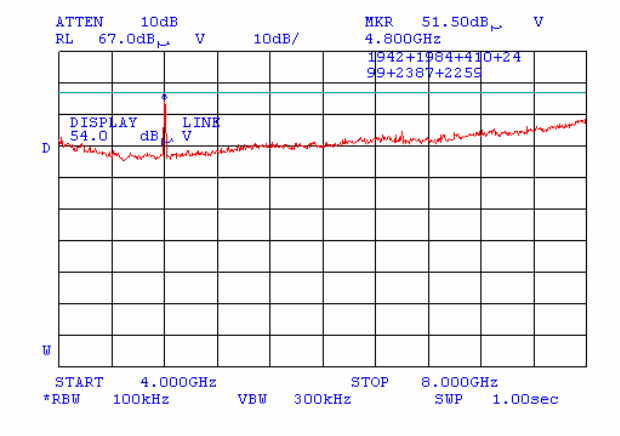


No spurious except of second harmonic of G20

Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.8.62 Radiated emission measurements from 4000 to 8000 MHz at the low carrier frequency (BT and G20-850)

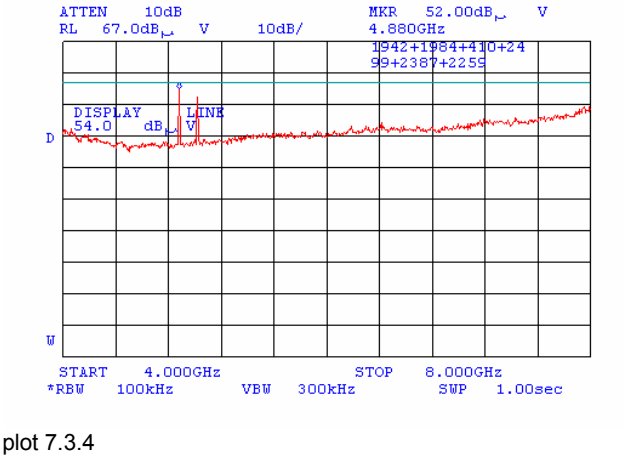
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



For average test result refer to plot 7.3.42

Plot 8.8.63 Radiated emission measurements from 4000 to 8000 MHz at the mid carrier frequency (BT and G20-850)

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

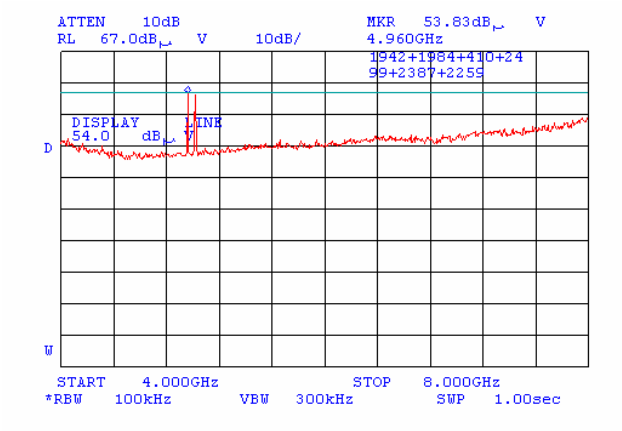


For average test result refer to plot 7.3.4
5020 MHz-ambient noise

Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.8.64 Radiated emission measurements from 4000 to 8000 MHz at the high carrier frequency (BT and G20-850)

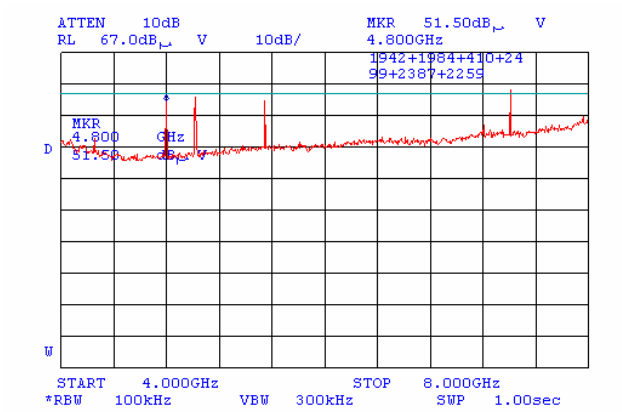
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



For average test result refer to plot 7.3.46
5020 MHz-ambient noise

Plot 8.8.65 Radiated emission measurements from 4000 to 8000 MHz at the low carrier frequency (BT and G20-1900)

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

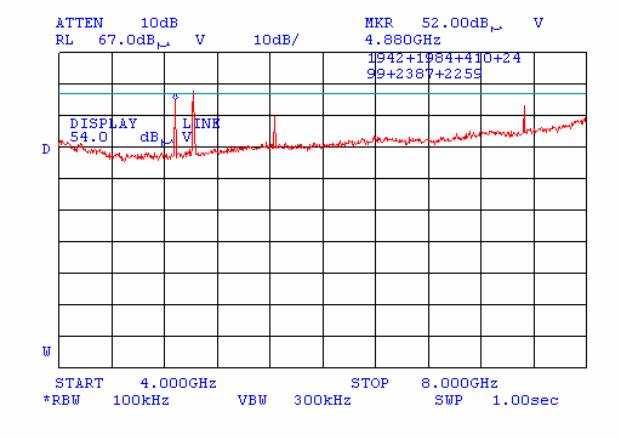


5020 MHz-ambient noise, 5550.6 and 7400.8 MHz-harmonics of G20.

Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Plot 8.8.66 Radiated emission measurements from 4000 to 8000 MHz at the mid carrier frequency (BT and G20-1900)

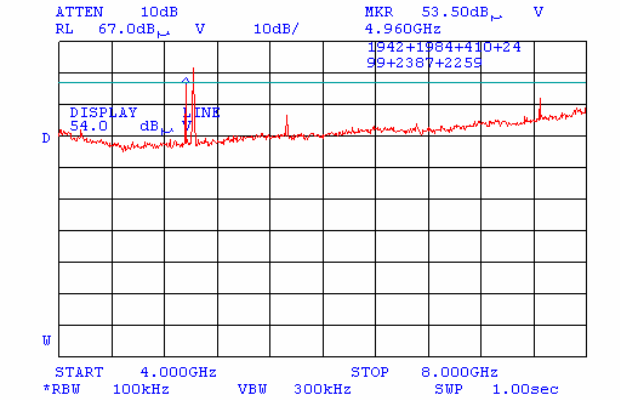
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



5020 MHz-ambient noise, 5640 and 7520 MHz-harmonics of G20.

Plot 8.8.67 Radiated emission measurements from 4000 to 8000 MHz at the high carrier frequency (BT and G20-1900)

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

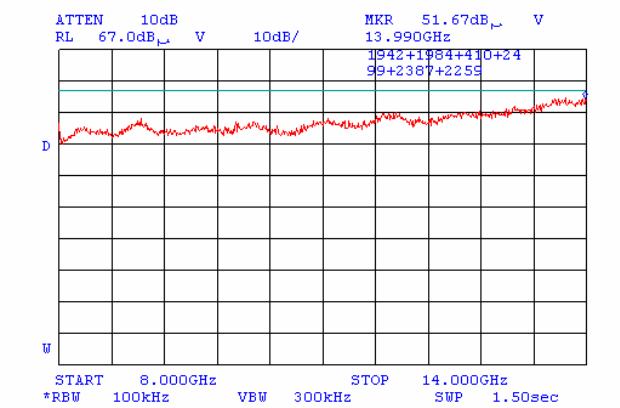


5020 MHz-ambient noise, 5729.4 and 7639.2 MHz-harmonics of G20.

Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

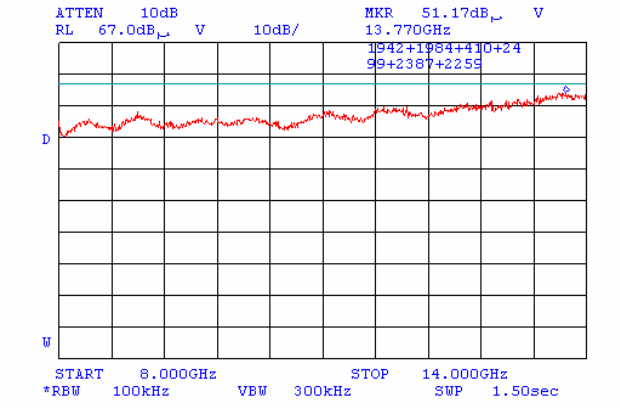
Plot 8.8.68 Radiated emission measurements from 8000 to 14000 MHz at the low carrier frequency (BT and G20-850)

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



Plot 8.8.69 Radiated emission measurements from 8000 to 14000 MHz at the mid carrier frequency (BT and G20-850)

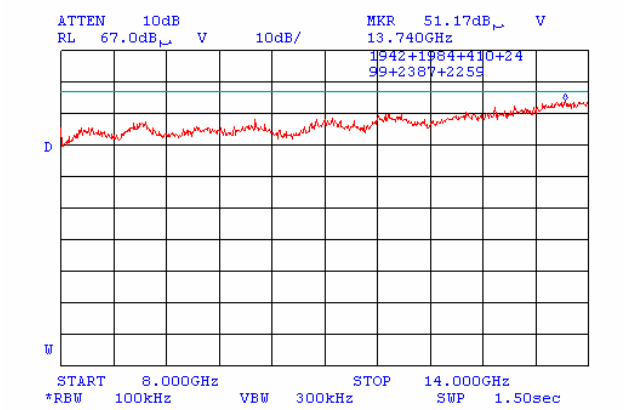
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

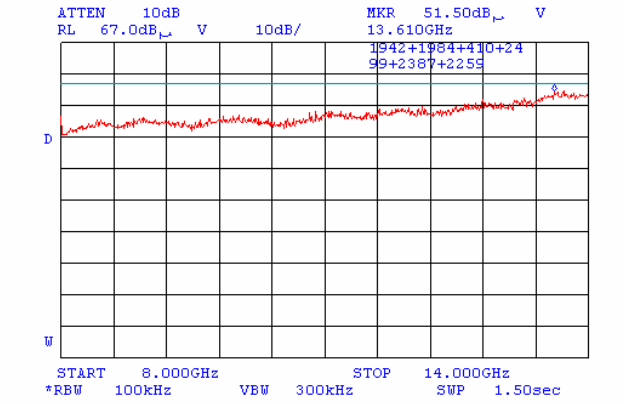
Plot 8.8.70 Radiated emission measurements from 8000 to 14000 MHz at the high carrier frequency (BT and G20-850)

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



Plot 8.8.71 Radiated emission measurements from 8000 to 14000 MHz at the low carrier frequency (BT and G20-1900)

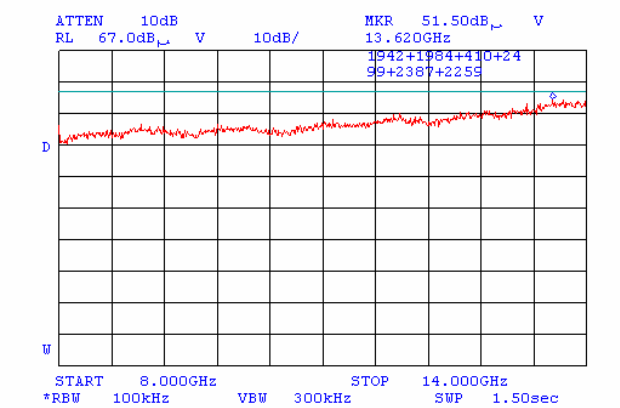
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

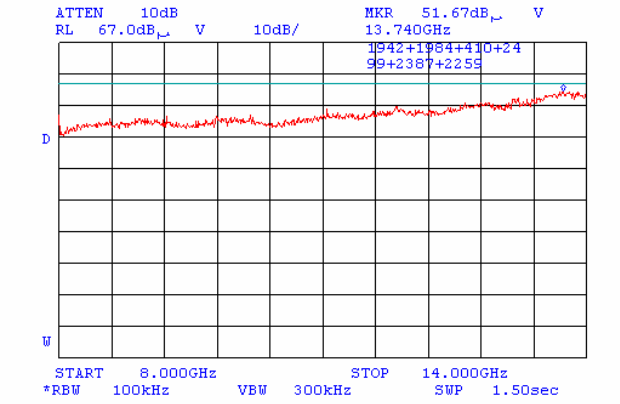
Plot 8.8.72 Radiated emission measurements from 8000 to 14000 MHz at the mid carrier frequency (BT and G20-1900)

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



Plot 8.8.73 Radiated emission measurements from 8000 to 14000 MHz at the high carrier frequency (BT and G20-1900)

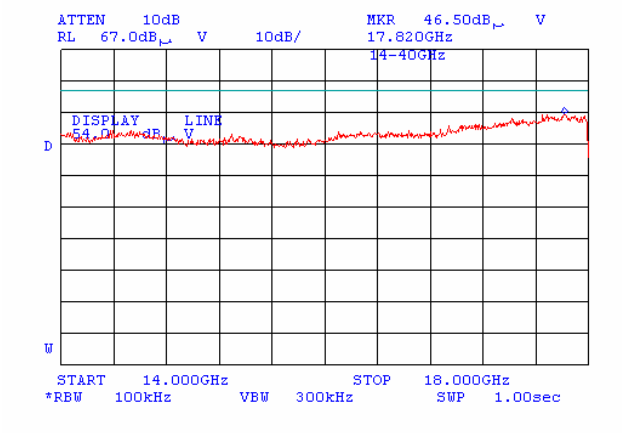
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

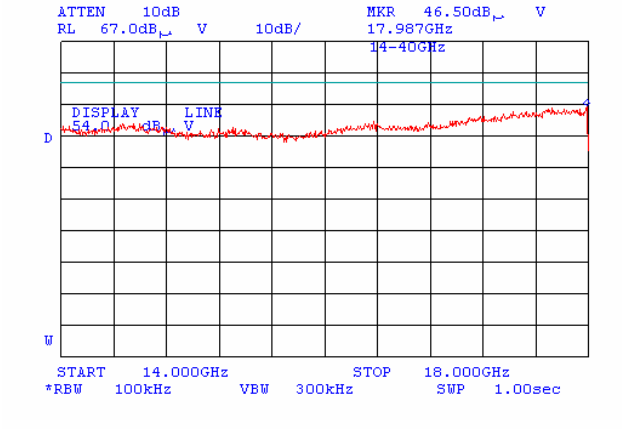
Plot 8.8.74 Radiated emission measurements from 14000 to 18000 MHz at the low carrier frequency (BT and G20-850)

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



Plot 8.8.75 Radiated emission measurements from 14000 to 18000 MHz at the mid carrier frequency (BT and G20-850)

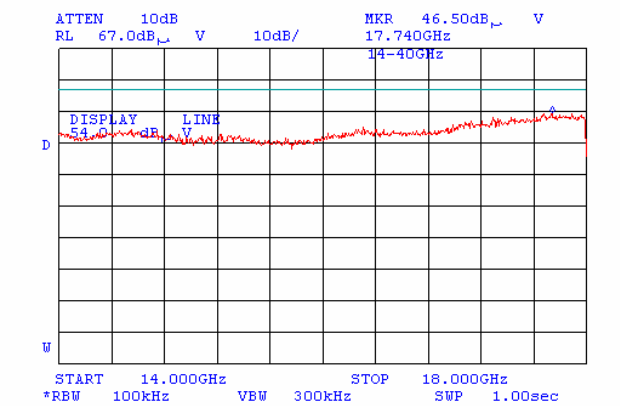
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

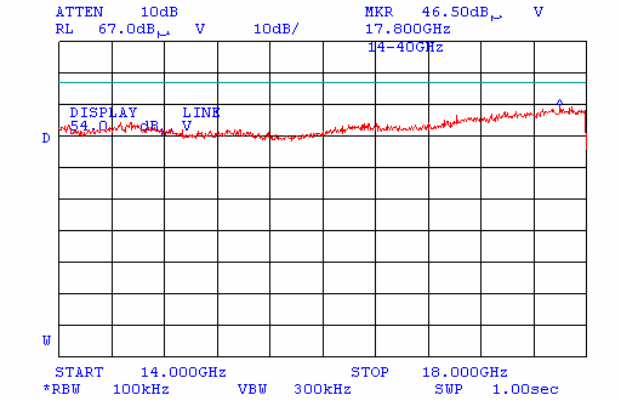
Plot 8.8.76 Radiated emission measurements from 14000 to 18000 MHz at the high carrier frequency (BT and G20-850)

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



Plot 8.8.77 Radiated emission measurements from 14000 to 18000 MHz at the low carrier frequency (BT and G20-1900)

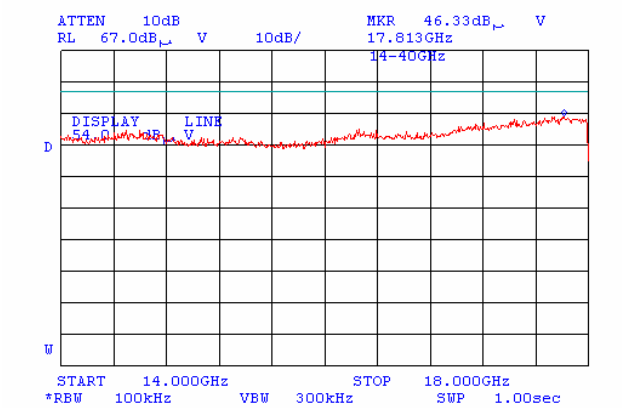
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

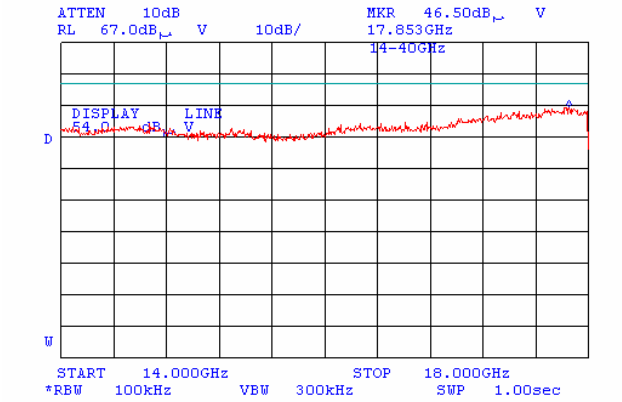
Plot 8.8.78 Radiated emission measurements from 14000 to 18000 MHz at the mid carrier frequency (BT and G20-1900)

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



Plot 8.8.79 Radiated emission measurements from 14000 to 18000 MHz at the high carrier frequency (BT and G20-1900)

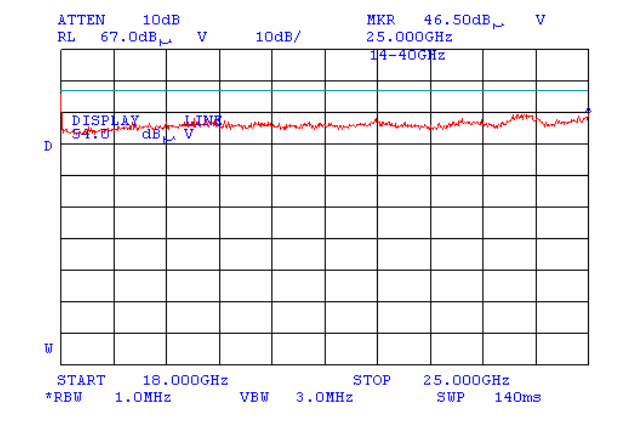
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

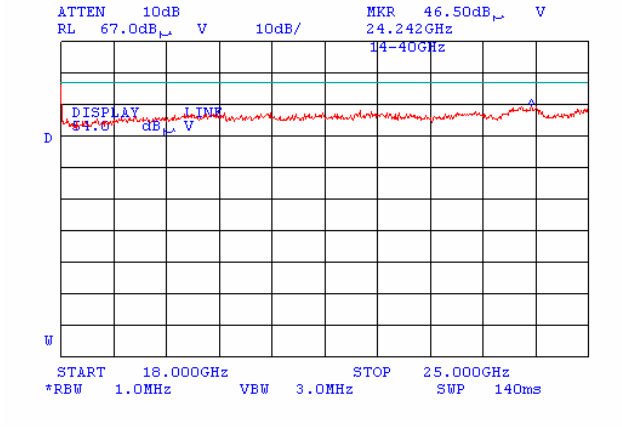
Plot 8.8.80 Radiated emission measurements from 18000 to 25000 MHz at the low carrier frequency (BT and G20-850)

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



Plot 8.8.81 Radiated emission measurements from 18000 to 25000 MHz at the mid carrier frequency (BT and G20-850)

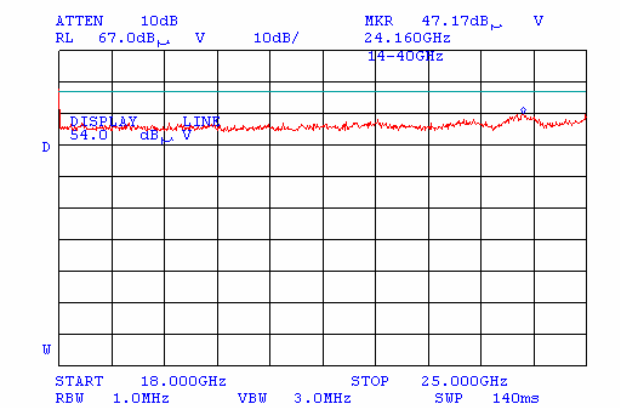
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

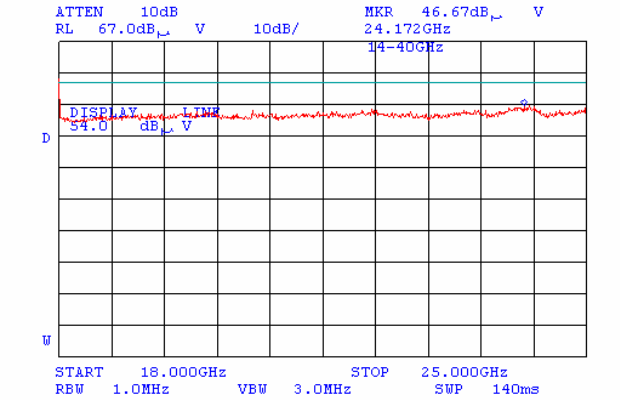
Plot 8.8.82 Radiated emission measurements from 18000 to 25000 MHz at the high carrier frequency (BT and G20-850)

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



Plot 8.8.83 Radiated emission measurements from 18000 to 25000 MHz at the low carrier frequency (BT and G20-1900)

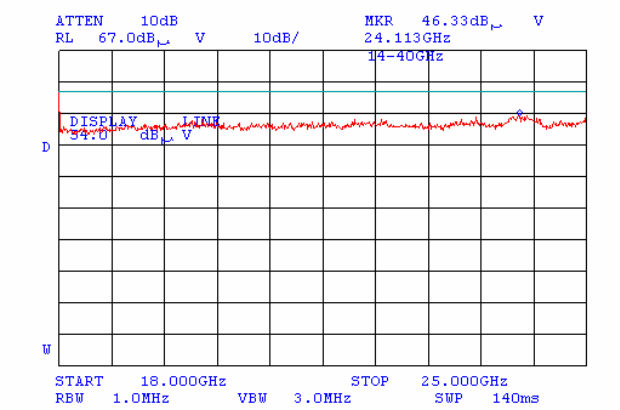
TEST SITE: OATS
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(c), RSS-210 section A8.5, Radiated spurious emissions**		
Test procedure:	Public notice DA 00-705/ 47 CFR, Section 15.247(c) / ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/13/2005 6:02:34 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

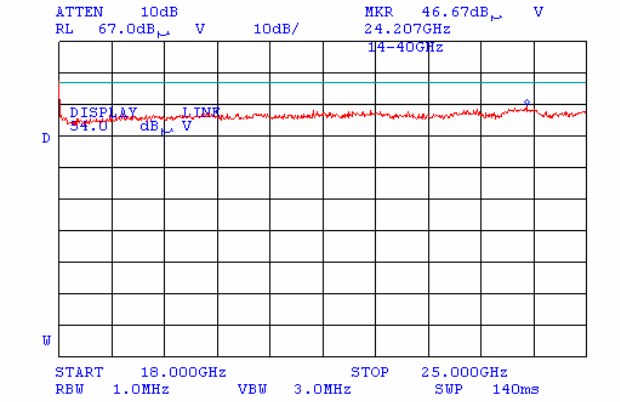
Plot 8.8.84 Radiated emission measurements from 18000 to 25000 MHz at the mid carrier frequency (BT and G20-1900)

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



Plot 8.8.85 Radiated emission measurements from 18000 to 25000 MHz at the high carrier frequency (BT and G20-1900)

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



Test specification:	**Section 15.203, RSS-Gen section 7.1.4, Antenna requirements**		
Test procedure:	Public notice DA 00-705		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/14/2005 2:39:38 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

8.9 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 8.9.1.

Table 8.9.1 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:	**Section 22.913, Section 24.232; Peak output power**		
Test procedure:	FCC part 22, Section 22.913; part 24, Section 24.232		
Test mode:	Compliance	Verdict:	PASS
Date& Time:	2/14/2006 3:46:51 PM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

9 Transmitter tests according to 47CFR part 22 and part 24 requirements

9.1 Peak output power (conducted)

9.1.1 General

This test was performed to measure the peak output power at RF antenna connector. Specification test limits are given in Table 9.1.1.

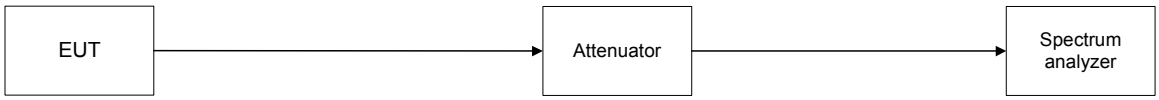
Table 9.1.1 Peak output power limits

Assigned frequency range, MHz	Maximum peak output power	
	W	dBm
824 – 849	7.0	38.45
1850 – 1910	2.0	33.00

9.1.2 Test procedure

9.1.2.1 The EUT was set up as shown in Figure 9.1.1, energized and its proper operation was checked.
9.1.2.2 The EUT was adjusted to produce maximum available to the end user RF output power.
9.1.2.3 The output power was measured with spectrum analyzer as provided in Table 9.1.2 and associated plots.

Figure 9.1.1 Peak output power test setup



Test specification:	**Section 22.913, Section 24.232; Peak output power**		
Test procedure:	FCC part 22, Section 22.913; part 24, Section 24.232		
Test mode:	Compliance	Verdict:	PASS
Date& Time:	2/14/2006 3:46:51 PM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Table 9.1.2 Peak output power test results

OPERATING FREQUENCY RANGE: 824 - 849 MHz
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 1000 kHz
VIDEO BANDWIDTH: 3000 kHz
MODULATION: GMSK
MODULATING SIGNAL: PRBS
BIT RATE: 270 kbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm	Limit, dBm	Margin, dB	Verdict
824.2	28.43	Included	Included	28.43	38.45	-10.02	Pass
836.6	28.41	Included	Included	28.41	38.45	-10.04	Pass
848.8	28.35	Included	Included	28.35	38.45	-10.10	Pass

OPERATING FREQUENCY RANGE: 1850 - 1910 MHz
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 1000 kHz
VIDEO BANDWIDTH: 3000 kHz
MODULATION: GMSK
MODULATING SIGNAL: PRBS
BIT RATE: 270 kbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum

Carrier frequency, MHz	Spectrum analyzer reading, dBm	External attenuation, dB	Cable loss, dB	RF output power, dBm	Limit, dBm	Margin, dB	Verdict
1850.2	29.08	Included	Included	29.08	33.00	-3.92	Pass
1880.0	29.24	Included	Included	29.24	33.00	-3.76	Pass
1909.8	29.40	Included	Included	29.40	33.00	-3.60	Pass

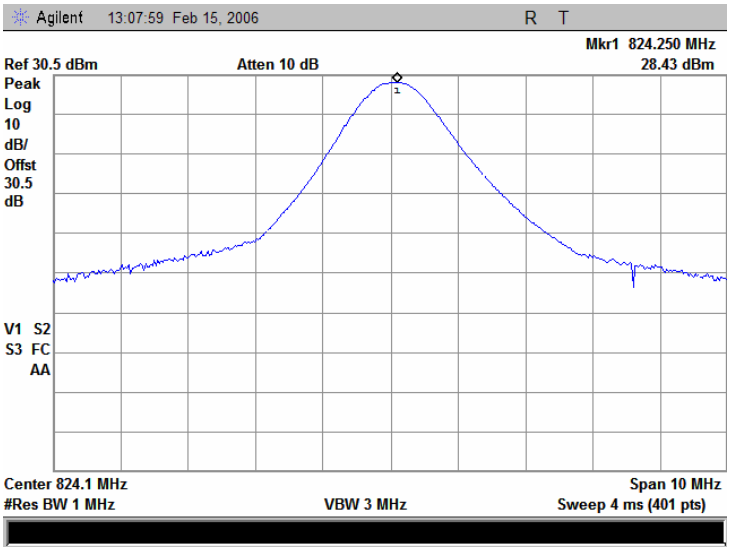
Reference numbers of test equipment used

HL 2780							

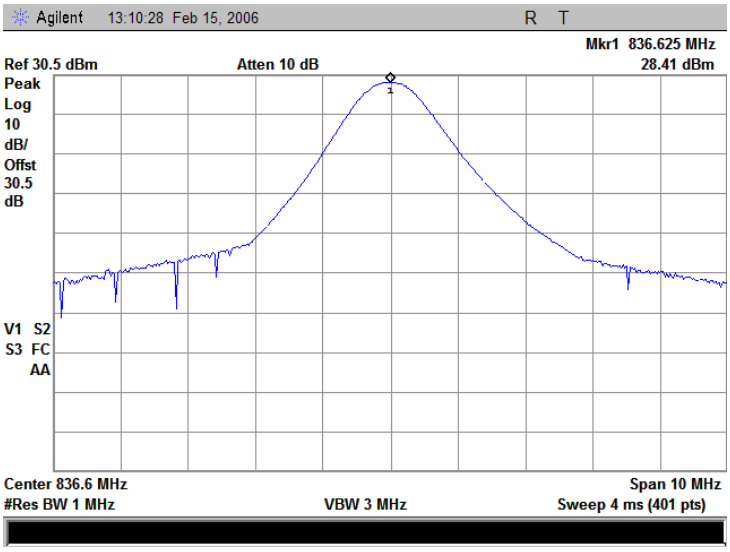
Full description is given in Appendix A.

Test specification:	**Section 22.913, Section 24.232; Peak output power**		
Test procedure:	FCC part 22, Section 22.913; part 24, Section 24.232		
Test mode:	Compliance	Verdict:	PASS
Date& Time:	2/14/2006 3:46:51 PM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.1.1 Peak output power test results at 824.2 MHz frequency

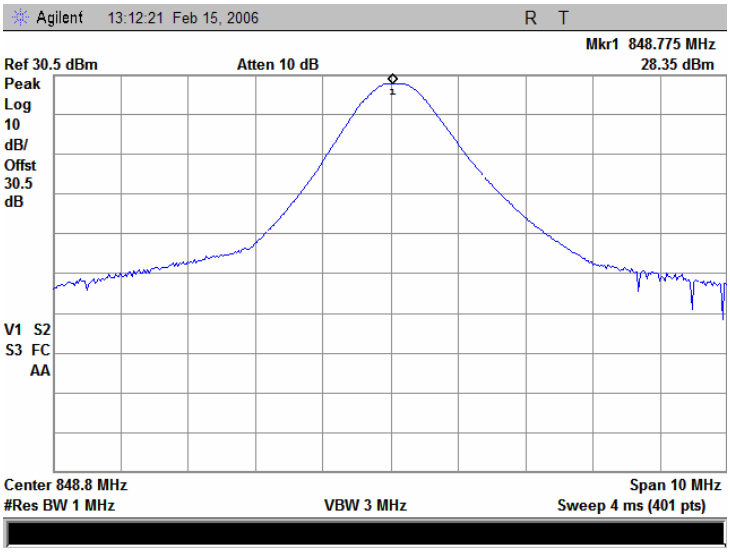


Plot 9.1.2 Peak output power test results at 836.6 MHz frequency

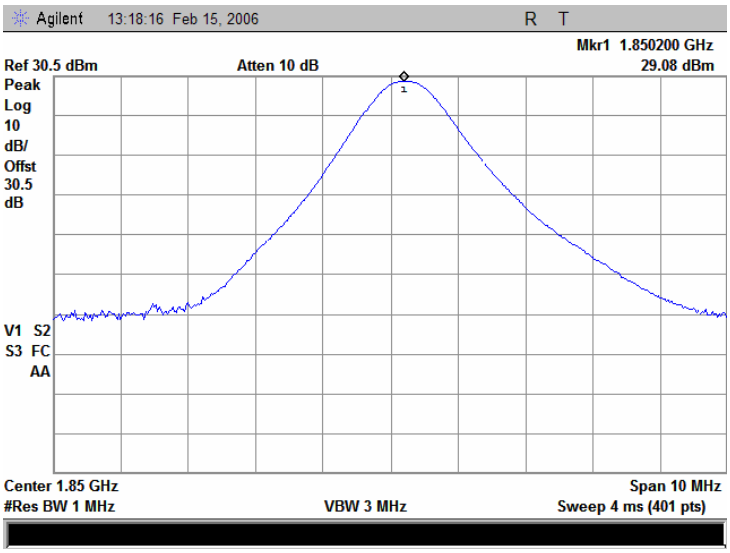


Test specification:	**Section 22.913, Section 24.232; Peak output power**		
Test procedure:	FCC part 22, Section 22.913; part 24, Section 24.232		
Test mode:	Compliance	Verdict:	PASS
Date& Time:	2/14/2006 3:46:51 PM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.1.3 Peak output power test results at 848.8 MHz frequency

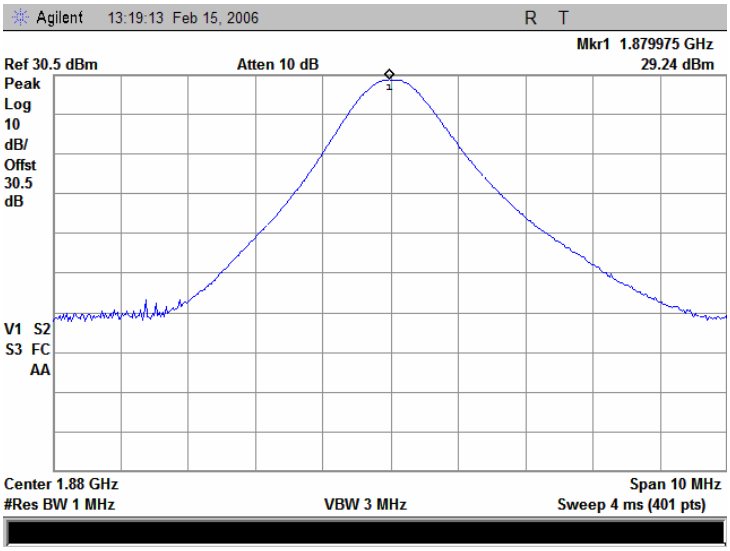


Plot 9.1.4 Peak output power test results at 1850.2 MHz frequency

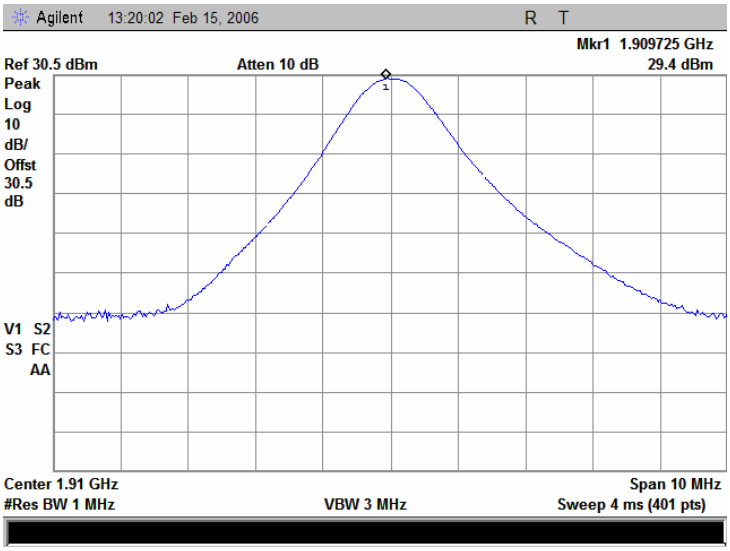


Test specification:	**Section 22.913, Section 24.232; Peak output power**		
Test procedure:	FCC part 22, Section 22.913; part 24, Section 24.232		
Test mode:	Compliance	Verdict:	PASS
Date& Time:	2/14/2006 3:46:51 PM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.1.5 Peak output power test results at 1880.0 MHz frequency



Plot 9.1.6 Peak output power test results at 1909.8 frequency



Test specification:	Section 22.913, Section 24.232; Peak output power		
Test procedure:	FCC part 22, Section 22.913; part 24, Section 24.232		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/14/2006 3:46:51 PM		
Temperature: 21ºC	Air Pressure: 1007 hPa	Relative Humidity: 40%	Power Supply: 7.2 VDC battery
Remarks:			

9.2 Peak output power (radiated)

9.2.1 General

This test was performed to measure the maximum peak output power radiated by transmitter. Specification test limits are given in Table 9.2.1.

Table 9.2.1 Peak output power limits

Assigned frequency range, MHz	Peak output power		Equivalent field strength limit @ 3m, dB(µV/m)*
	W	dBm	
824 – 849	7.0	38.45	133.68
1850 – 1910	2.0	33.00	128.23

*- Equivalent field strength limit was calculated from the peak output power as follows: E=sqrt(30×P×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.

9.2.2 Test procedure for field strength measurements

9.2.2.1 The EUT was set up as shown in Figure 9.2.1, energized and its proper operation was checked.

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

9.2.2.3 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 360^0 and the measuring antenna height was swept in both vertical and horizontal polarizations.

9.2.2.4 The measurements were performed in 3 orthogonal positions of the EUT.

9.2.2.5 The maximum field strength of the EUT carrier frequency was measured as provided in Table 9.2.2 and associated plots.

9.2.3 Test procedure for substitution power measurements

9.2.3.1 The test equipment was set up as shown in Figure 9.2.2 and energized.

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

9.2.3.3 The test antenna height was swept to find maximum emission from substitution antenna and RF signal generator output was fine adjusted to produce the same field strength as it was measured from the EUT.

9.2.3.4 The maximum peak output power was calculated as a sum of signal generator output power in dBm and substitution antenna gain in dBi reduced by cable loss in dB.

9.2.3.5 The above procedure was performed in both horizontal and vertical polarizations of the substitution antenna.

9.2.3.6 The worst test results (the lowest margins) were recorded in Table 9.2.3 and shown in the associated plots.

Test specification:	**Section 22.913, Section 24.232; Peak output power**		
Test procedure:	FCC part 22, Section 22.913; part 24, Section 24.232		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/14/2006 3:46:51 PM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Figure 9.2.1 Setup for carrier field strength measurements

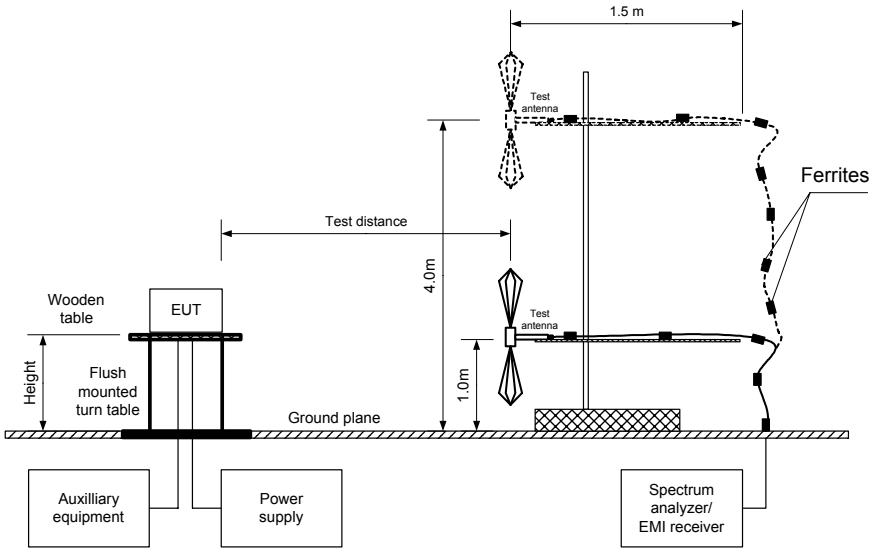
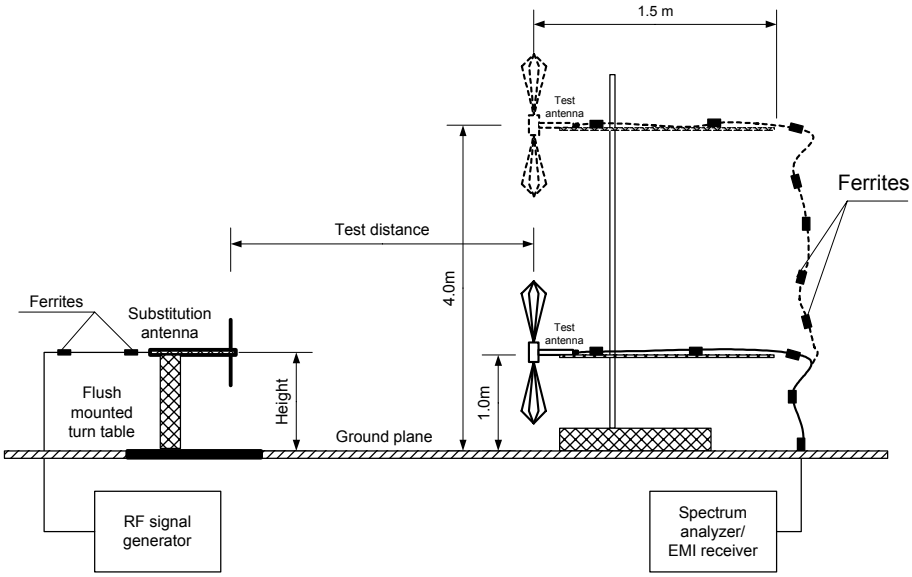


Figure 9.2.2 Setup for substitution peak output power measurements



Test specification:	**Section 22.913, Section 24.232; Peak output power**		
Test procedure:	FCC part 22, Section 22.913; part 24, Section 24.232		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/14/2006 3:46:51 PM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Table 9.2.2 Field strength measurement of peak output power

TEST DISTANCE:	3 m
TEST SITE:	Semi anechoic chamber
EUT HEIGHT:	0.8 m
EUT POSITION:	3 orthogonal axes
DETECTOR USED:	Peak
TEST ANTENNA TYPE:	Biconilog (30 MHz – 1000 MHz) Double ridged guide (above 1000 MHz)
MODULATION:	GMSK
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
DETECTOR USED:	Peak

OPERATING FREQUENCY RANGE: 824 - 849 MHz

Frequency, MHz	Field strength, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees	EUT position
824.20	124.38	133.68	-9.30	Horizontal	1.2	277	Y-axis
836.60	124.34	133.68	-9.34	Horizontal	1.0	270	Y-axis
848.80	124.79	133.68	-8.89	Horizontal	1.0	277	Y-axis

OPERATING FREQUENCY RANGE: 1850 - 1910 MHz

Frequency, MHz	Field strength, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	Antenna polarization	Antenna height, m	Turn-table position**, degrees	EUT position
1850.20	127.93	128.23	-0.30	Horizontal	1.0	25	Z-axis
1880.00	129.55	128.23	1.32	Horizontal	1.0	20	Z-axis
1909.80	126.14	128.23	-2.09	Horizontal	1.0	26	Z-axis

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

Test specification:	**Section 22.913, Section 24.232; Peak output power**		
Test procedure:	FCC part 22, Section 22.913; part 24, Section 24.232		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/14/2006 3:46:51 PM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Table 9.2.3 Substitution measurement of peak output power

TEST DISTANCE: 3 m
SUBSTITUTION ANTENNA HEIGHT: 0.8 m
DETECTOR USED: Peak
SUBSTITUTION ANTENNA TYPE: Tunable dipole (30 MHz – 1000 MHz)
Double ridged guide (above 1000 MHz)

OPERATING FREQUENCY RANGE: 824 - 849 MHz

Frequency, MHz	Field strength, dB(µV/m)	Antenna polarization	RF generator output, dBm	Antenna gain, dBd	Cable loss, dB	Peak output power, ERP dBm	Limit, dBm	Margin, dB*	Verdict
824.20	124.38	H	23.45	-1.10	0.84	21.51	38.45	-16.94	Pass
836.60	124.34	H	23.41	-1.10	0.84	21.47	38.45	-16.98	Pass
848.80	124.79	H	23.86	-1.10	0.84	21.92	38.45	-16.53	Pass

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

OPERATING FREQUENCY RANGE: 1850 - 1910 MHz

Frequency, MHz	Field strength, dB(µV/m)	Antenna polarization	RF generator output, dBm	Antenna gain, dBi	Cable loss, dB	Peak output power,EiRP dBm	Limit, dBm	Margin, dB*	Verdict
1850.20	127.93	H	23.95	7.88	1.24	30.59	33.00	-2.41	Pass
1880.00	129.55	H	25.57	7.88	1.24	32.21	33.00	-0.79	Pass
1909.80	126.14	H	22.16	7.88	1.24	28.80	33.00	-4.20	Pass

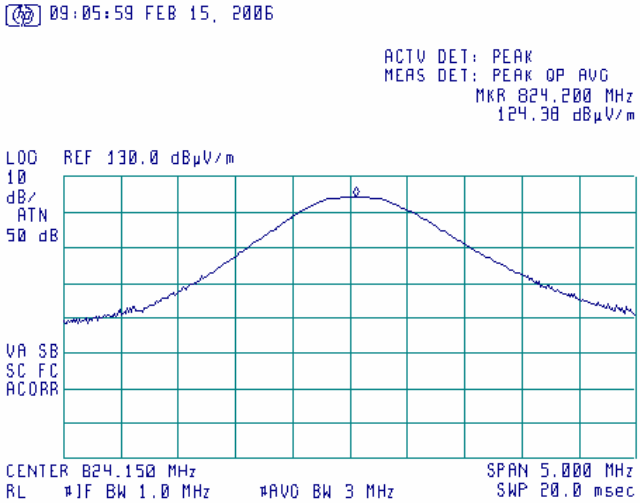
Reference numbers of test equipment used

HL 0465	HL 0521	HL 0567	HL 0589	HL 0592	HL 0593	HL 0594	HL 0604
HL 1984	HL 1947	HL 2400	HL 2432				

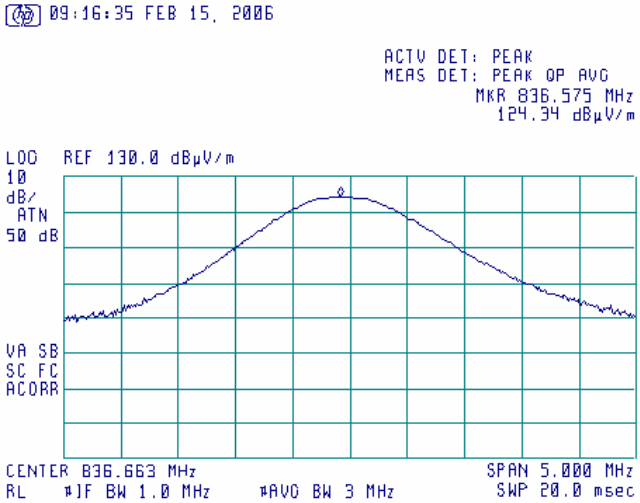
Full description is given in Appendix A.

Test specification:	**Section 22.913, Section 24.232; Peak output power**		
Test procedure:	FCC part 22, Section 22.913; part 24, Section 24.232		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/14/2006 3:46:51 PM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.2.1 Peak output power test results at 824.2 MHz, vertical &horizontal antenna polarization

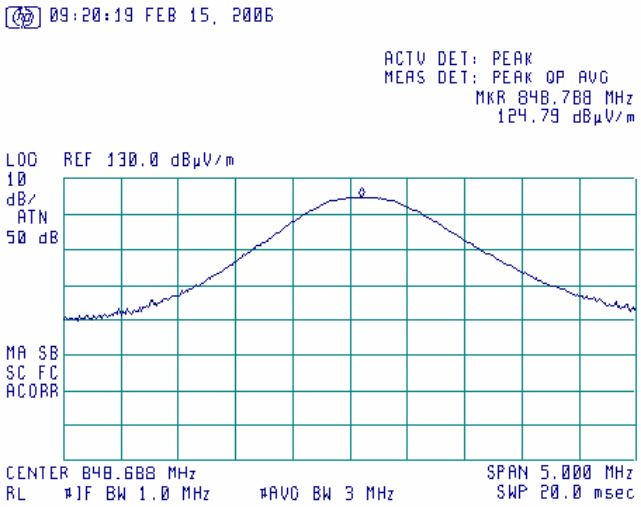


Plot 9.2.2 Peak output power test results at 836.6 MHz, vertical &horizontal antenna polarization

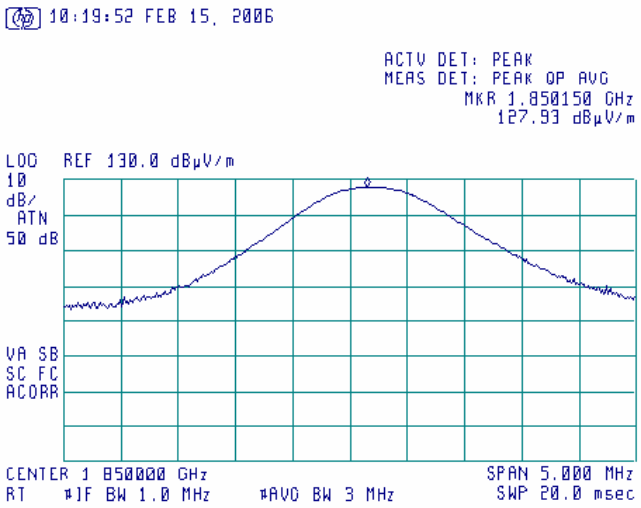


Test specification:	**Section 22.913, Section 24.232; Peak output power**		
Test procedure:	FCC part 22, Section 22.913; part 24, Section 24.232		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/14/2006 3:46:51 PM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.2.3 Peak output power test results at 848.8 MHz, vertical &horizontal antenna polarization

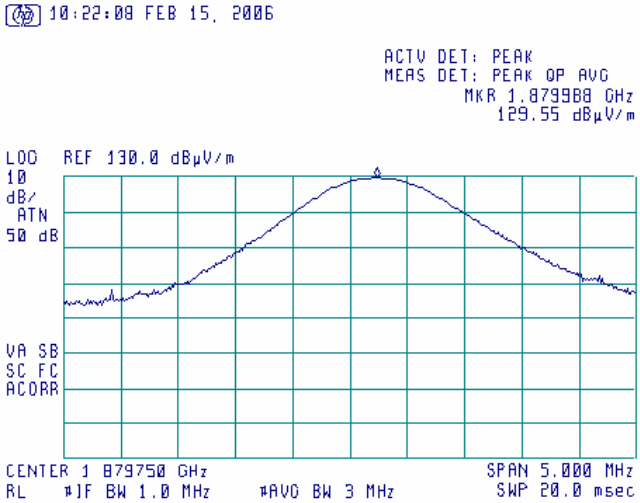


Plot 9.2.4 Peak output power test results at 1850.2 MHz, vertical &horizontal antenna polarization

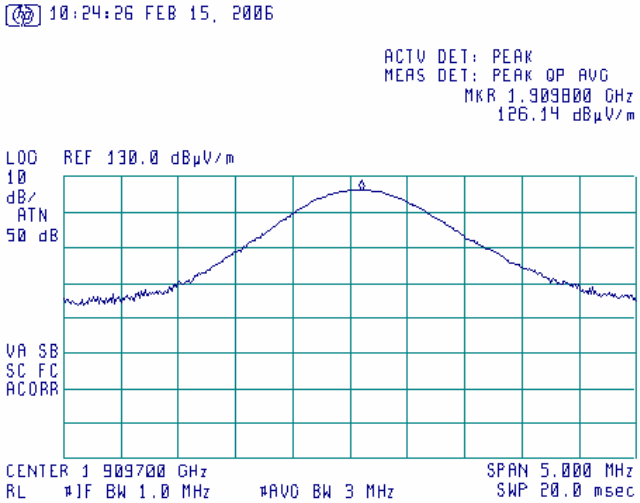


Test specification:	**Section 22.913, Section 24.232; Peak output power**		
Test procedure:	FCC part 22, Section 22.913; part 24, Section 24.232		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	2/14/2006 3:46:51 PM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.2.5 Peak output power test results at 1880.0 MHz, vertical &horizontal antenna polarization



Plot 9.2.6 Peak output power test results at 1909.8 MHz, vertical & horizontal antenna polarization



Test specification:	**Section 2.1049, Section 24.238(b); Occupied bandwidth**		
Test procedure:	FCC part 2, Section 2.1049; FCC part 24, Section 24.238		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/14/2006 9:39:03 AM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

9.3 Occupied bandwidth test

9.3.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 9.3.1.

Table 9.3.1 Occupied bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points*, dBc
824 - 849	26
1850 - 1910	26

* - Modulation envelope reference points are provided in terms of attenuation below the unmodulated carrier.

9.3.2 Test procedure

9.3.2.1 The EUT was set up as shown in Figure 9.3.1, energized and its proper operation was checked.
9.3.2.2 The EUT was set to transmit the unmodulated carrier and the reference peak power level was measured.
9.3.2.3 The EUT was set to transmit the normally modulated carrier.
9.3.2.4 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and the results provided in Table 9.3.2, Table 9.3.3 and the associated plots.

Figure 9.3.1 Occupied bandwidth test setup

Test specification:	**Section 2.1049, Section 24.238(b); Occupied bandwidth**		
Test procedure:	FCC part 2, Section 2.1049; FCC part 24, Section 24.238		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/14/2006 9:39:03 AM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Table 9.3.2 Occupied bandwidth test results in 824 – 849 MHz range

DETECTOR USED:	Peak hold
RESOLUTION BANDWIDTH:	3 kHz
VIDEO BANDWIDTH:	10 kHz
MODULATION ENVELOPE REFERENCE POINTS:	26 dBc
MODULATION:	GMSK
MODULATING SIGNAL:	PRBS
BIT RATE:	270 kbps

Carrier frequency, MHz	Lower reference point, MHz	Upper reference point, MHz	Occupied bandwidth, kHz
824.2	824.0675	824.3375	270
836.6	836.4625	836.7400	277
848.8	848.6600	848.9400	280

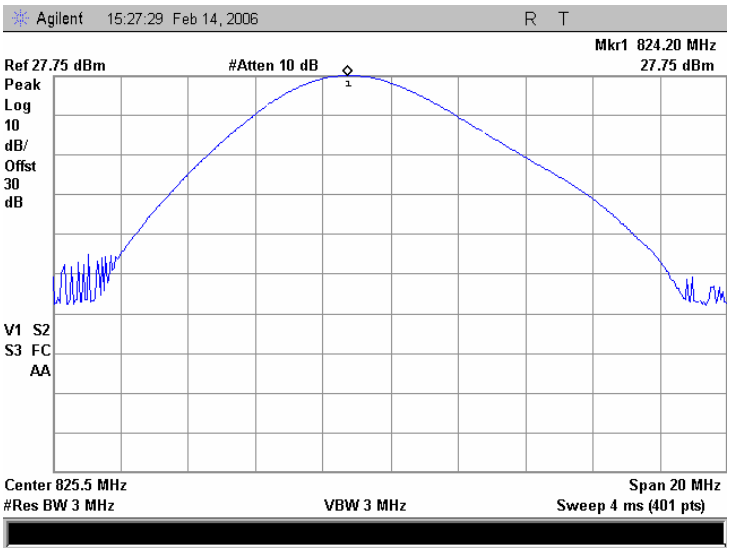
Reference numbers of test equipment used

HL 2780						

Full description is given in Appendix A.

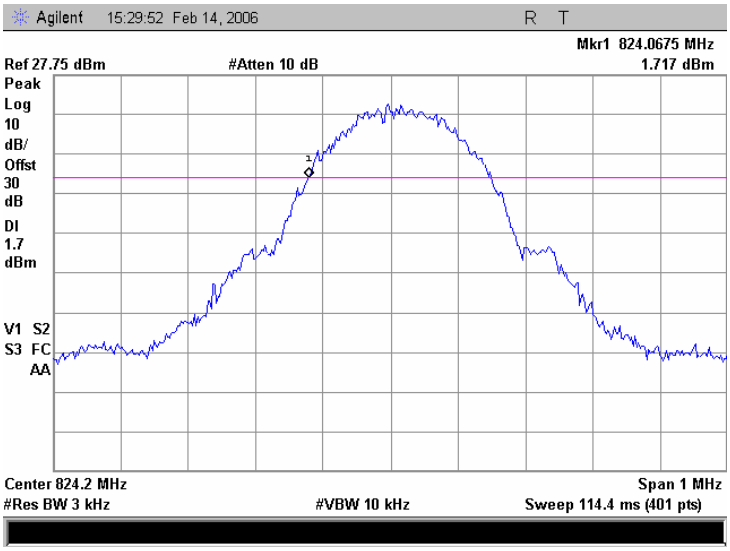
Test specification:	**Section 2.1049, Section 24.238(b); Occupied bandwidth**		
Test procedure:	FCC part 2, Section 2.1049; FCC part 24, Section 24.238		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/14/2006 9:39:03 AM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.3.1 Occupied bandwidth test result at low frequency, reference level

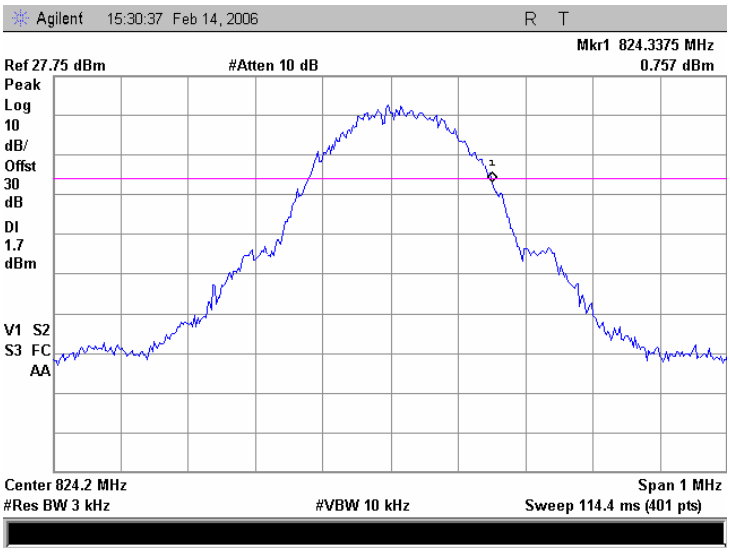


Test specification:	**Section 2.1049, Section 24.238(b); Occupied bandwidth**		
Test procedure:	FCC part 2, Section 2.1049; FCC part 24, Section 24.238		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/14/2006 9:39:03 AM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.3.2 Occupied bandwidth test result at low frequency, lower reference point

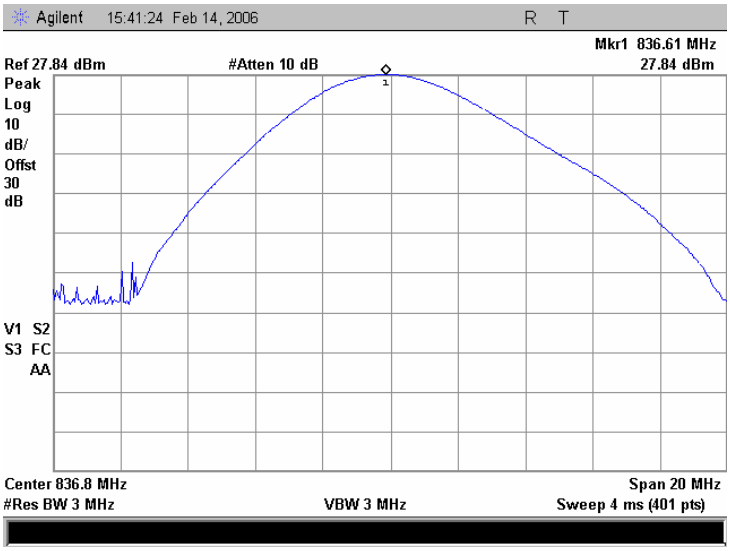


Plot 9.3.3 Occupied bandwidth test result at low frequency, higher reference point

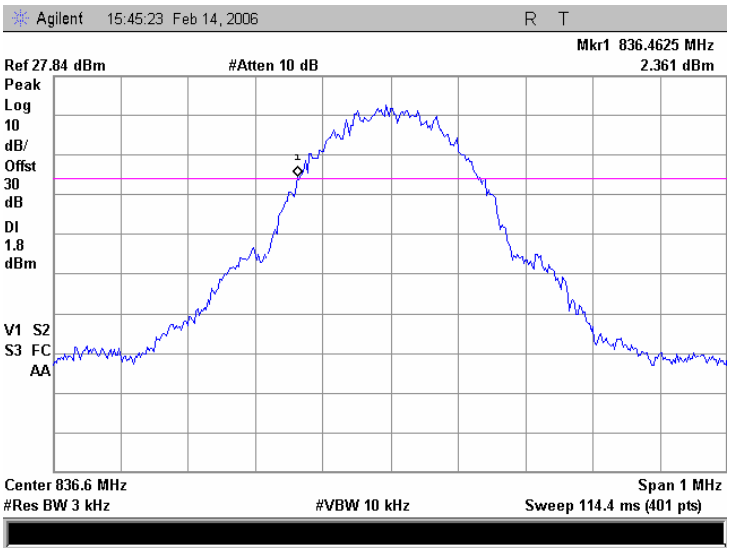


Test specification:	**Section 2.1049, Section 24.238(b); Occupied bandwidth**		
Test procedure:	FCC part 2, Section 2.1049; FCC part 24, Section 24.238		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/14/2006 9:39:03 AM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.3.4 Occupied bandwidth test result at mid frequency, reference level

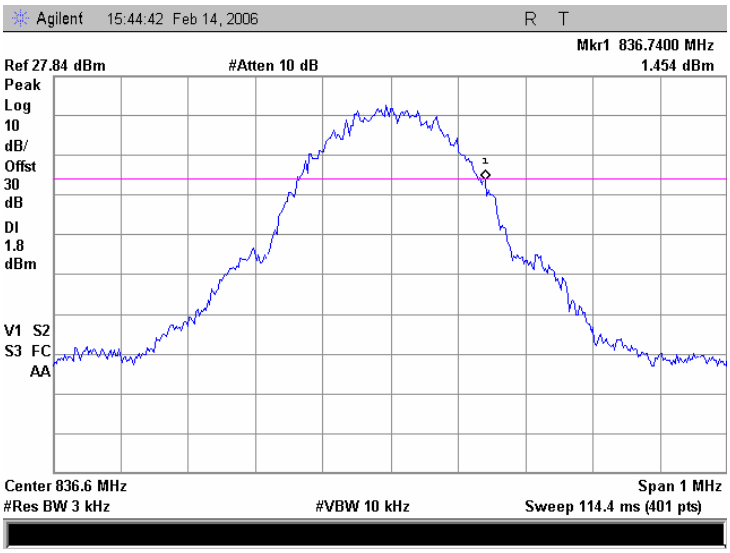


Plot 9.3.5 Occupied bandwidth test result at mid frequency, lower reference point

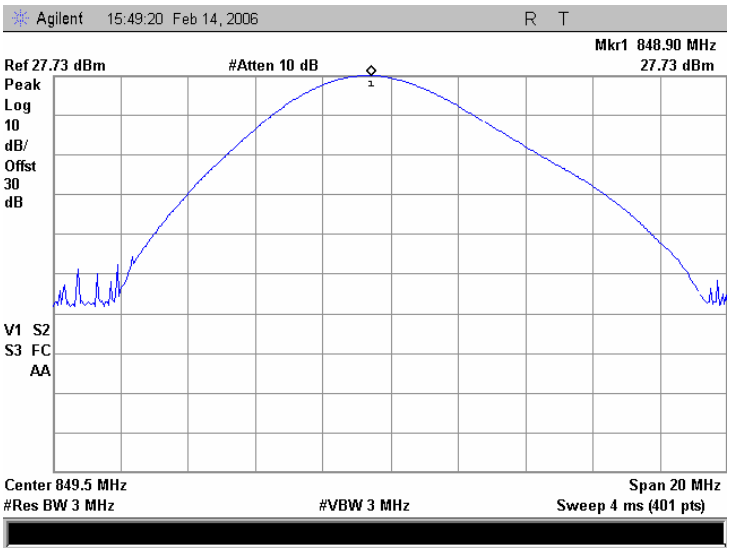


Test specification:	**Section 2.1049, Section 24.238(b); Occupied bandwidth**		
Test procedure:	FCC part 2, Section 2.1049; FCC part 24, Section 24.238		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/14/2006 9:39:03 AM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.3.6 Occupied bandwidth test result at mid frequency, higher reference point

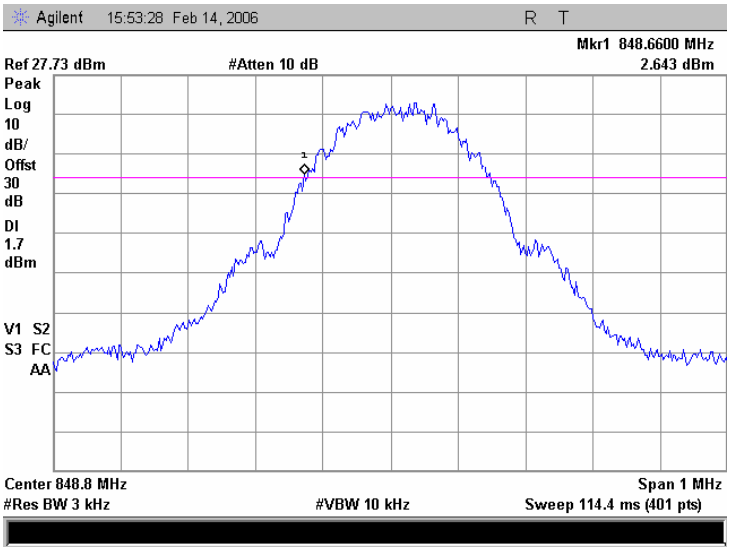


Plot 9.3.7 Occupied bandwidth test result at high frequency, reference level

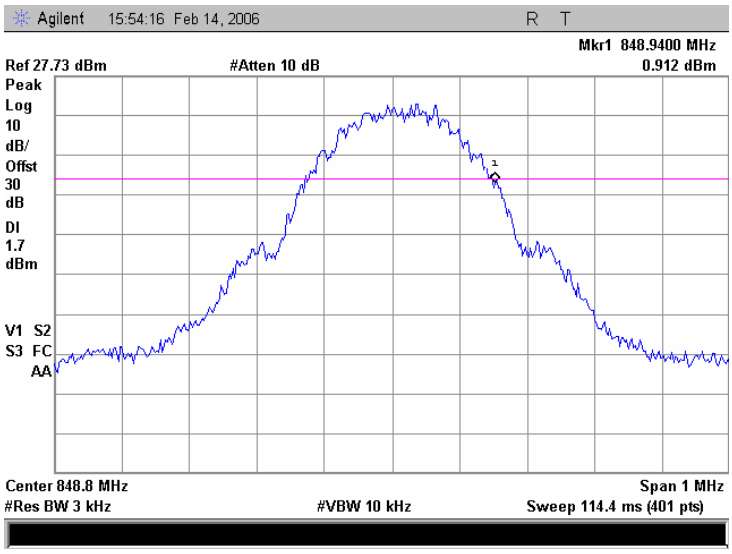


Test specification:	**Section 2.1049, Section 24.238(b); Occupied bandwidth**		
Test procedure:	FCC part 2, Section 2.1049; FCC part 24, Section 24.238		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/14/2006 9:39:03 AM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.3.8 Occupied bandwidth test result at high frequency, lower reference point



Plot 9.3.9 Occupied bandwidth test result at high frequency, higher reference point



Test specification:	**Section 2.1049, Section 24.238(b); Occupied bandwidth**		
Test procedure:	FCC part 2, Section 2.1049; FCC part 24, Section 24.238		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/14/2006 9:39:03 AM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Table 9.3.3 Occupied bandwidth test results in 1850 – 1910 MHz range

DETECTOR USED:	Peak hold
RESOLUTION BANDWIDTH:	3 kHz
VIDEO BANDWIDTH:	10 kHz
MODULATION ENVELOPE REFERENCE POINTS:	26 dBc
MODULATION:	GMSK
MODULATING SIGNAL:	PRBS
BIT RATE:	270 kbps

Carrier frequency, MHz	Lower reference point, MHz	Upper reference point, MHz	Occupied bandwidth, kHz
1850.2	1850.0675	1850.3375	270
1880.0	1879.8625	1880.1350	272
1909.8	1909.6650	1909.9325	267

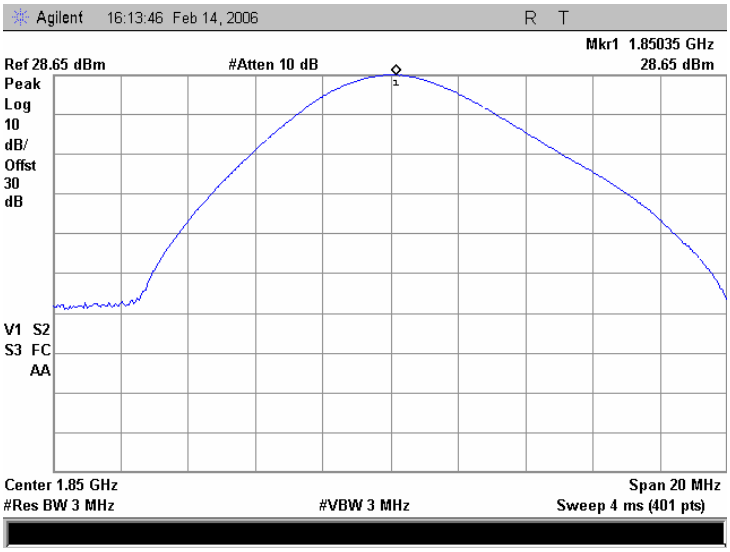
Reference numbers of test equipment used

HL 2780						

Full description is given in Appendix A.

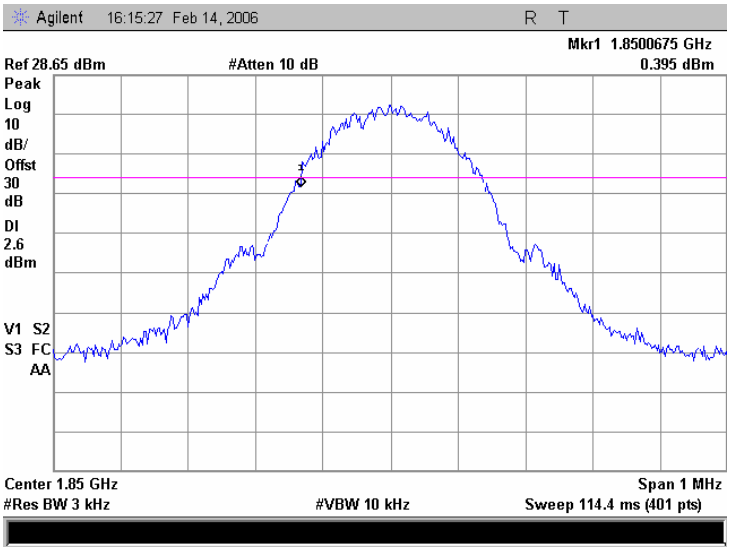
Test specification:	**Section 2.1049, Section 24.238(b); Occupied bandwidth**		
Test procedure:	FCC part 2, Section 2.1049; FCC part 24, Section 24.238		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/14/2006 9:39:03 AM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.3.10 Occupied bandwidth test result at low frequency, reference level

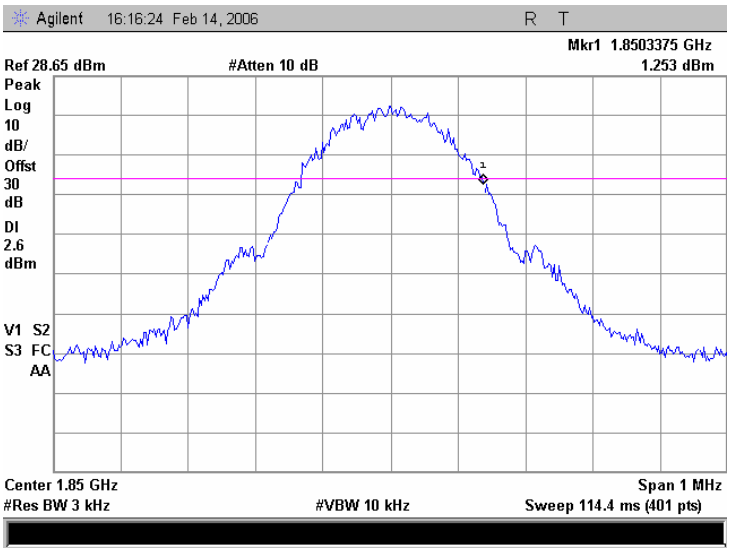


Test specification:	**Section 2.1049, Section 24.238(b); Occupied bandwidth**		
Test procedure:	FCC part 2, Section 2.1049; FCC part 24, Section 24.238		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/14/2006 9:39:03 AM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.3.11 Occupied bandwidth test result at low frequency, lower reference point

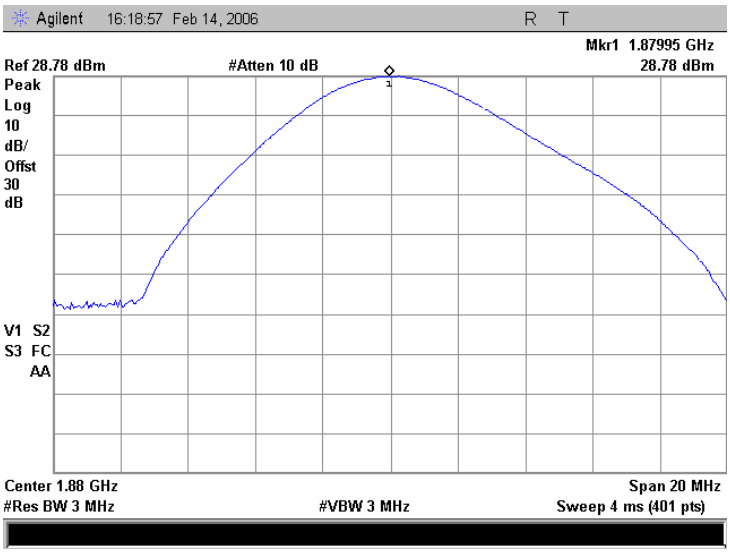


Plot 9.3.12 Occupied bandwidth test result at low frequency, higher reference point

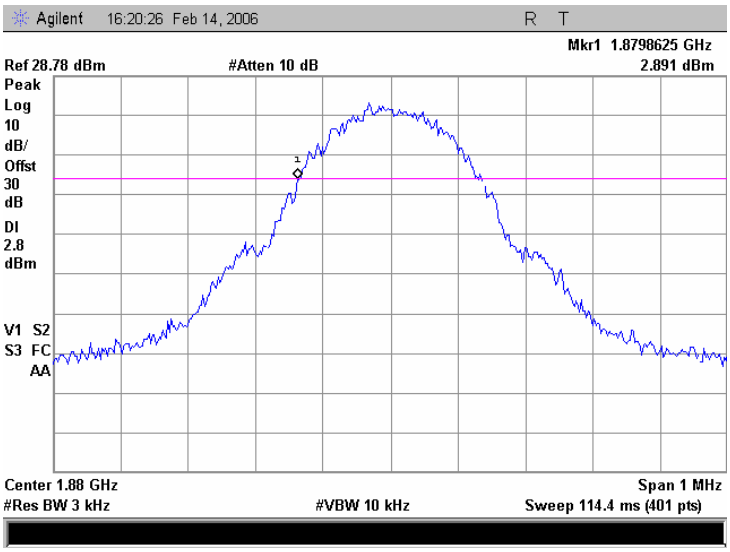


Test specification:	**Section 2.1049, Section 24.238(b); Occupied bandwidth**		
Test procedure:	FCC part 2, Section 2.1049; FCC part 24, Section 24.238		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/14/2006 9:39:03 AM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.3.13 Occupied bandwidth test result at mid frequency, reference level

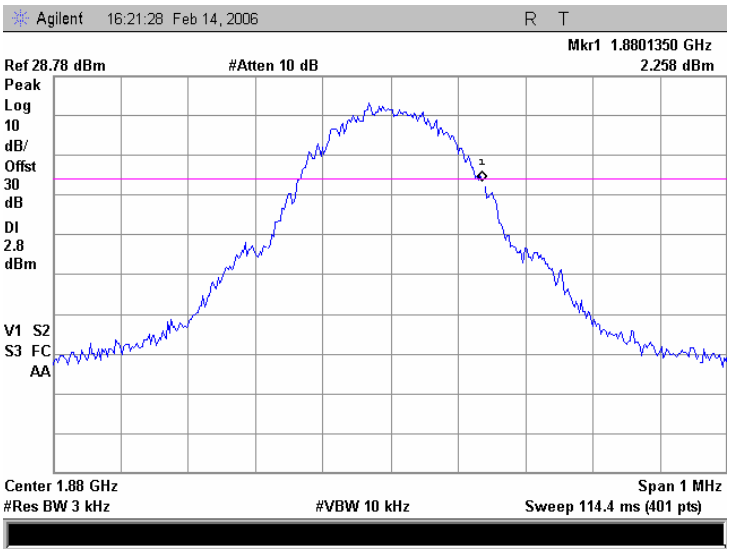


Plot 9.3.14 Occupied bandwidth test result at mid frequency, lower reference point

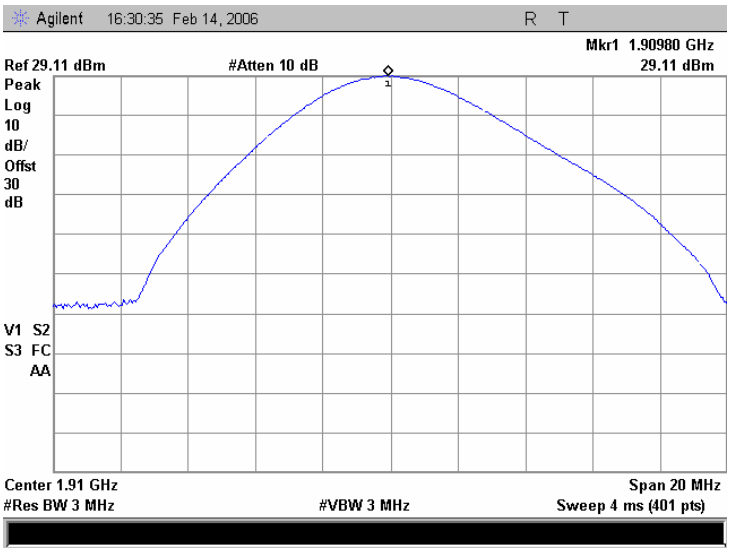


Test specification:	**Section 2.1049, Section 24.238(b); Occupied bandwidth**		
Test procedure:	FCC part 2, Section 2.1049; FCC part 24, Section 24.238		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/14/2006 9:39:03 AM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.3.15 Occupied bandwidth test result at mid frequency, higher reference point

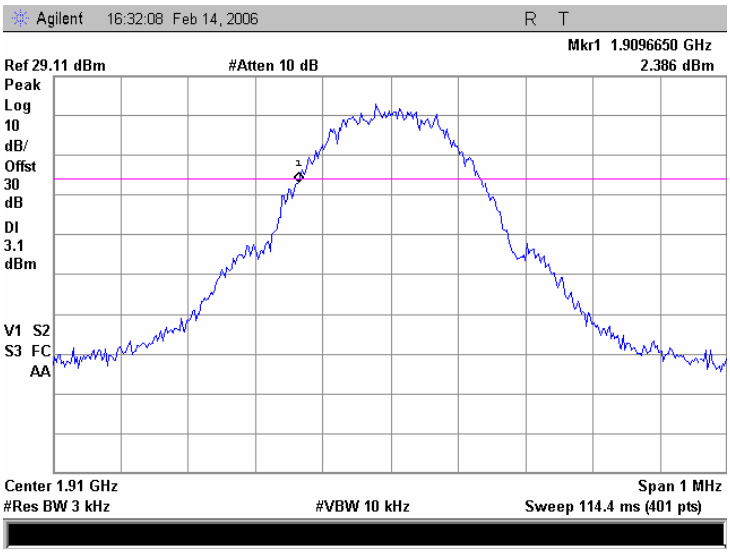


Plot 9.3.16 Occupied bandwidth test result at high frequency, reference level

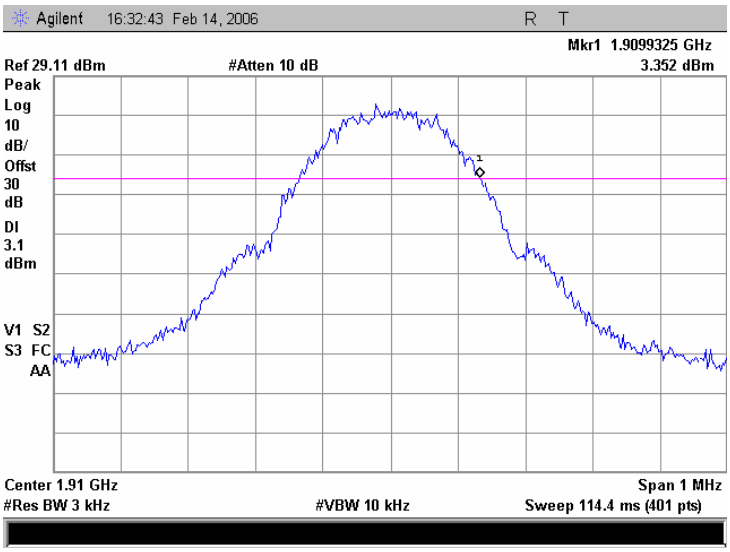


Test specification:	**Section 2.1049, Section 24.238(b); Occupied bandwidth**		
Test procedure:	FCC part 2, Section 2.1049; FCC part 24, Section 24.238		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/14/2006 9:39:03 AM		
Temperature: 21ºC	**Air Pressure:** 1007 hPa	**Relative Humidity:** 40%	**Power Supply:** 7.2 VDC battery
Remarks:			

Plot 9.3.17 Occupied bandwidth test result at high frequency, lower reference point



Plot 9.3.18 Occupied bandwidth test result at high frequency, higher reference point



Test specification:	**Section 22.355, Section 24.235, Frequency stability test**		
Test procedure:	FCC part 22, Section 22.355; part 24, Section 24.235; part 2 section 2.1055		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/24/2006 13:48:01 PM		
Temperature: 20ºC	**Air Pressure:** 1017 hPa	**Relative Humidity:** 45 %	**Power Supply:** 7.2 VDC battery
Remarks:			

9.4 Frequency stability test

9.4.1 General

This test was performed to measure frequency stability of transmitter RF carrier. Specification test limits are given in Table 9.4.1.

Table 9.4.1 Frequency stability limits

Assigned frequency, MHz	Limit, ppm	Limits, Hz
824.2	2.5	2060
836.4		2091
848.8		2120
1850.2	26 dBc points including frequency tolerance shall remain within the authorized frequency block	
1880.0		
1909.8		

9.4.2 Test procedure

9.4.2.1 The EUT was set up as shown in Figure 9.4.1, energized and its proper operation was checked.

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

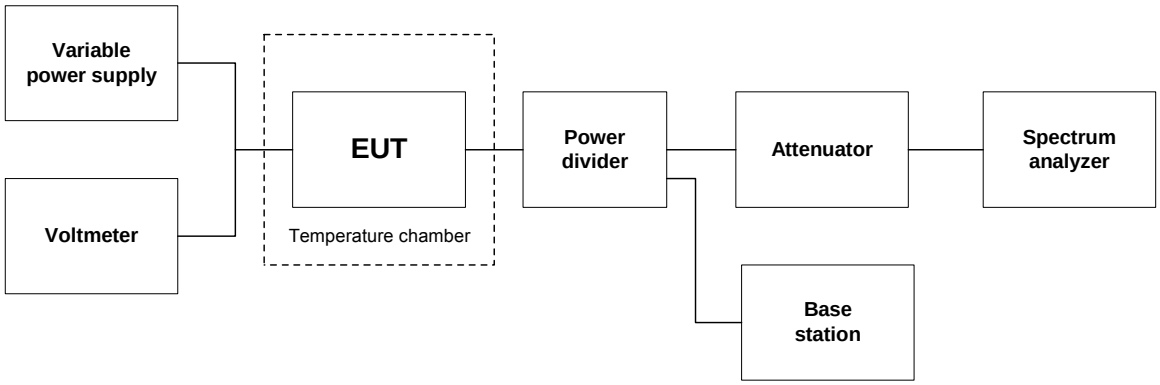
9.4.2.3 The EUT was powered on and carrier frequency was measured at start up moment and then every minute until frequency had been stabilized or 10 minutes elapsed whichever reached the last. The EUT was powered off.

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

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

9.4.2.6 Frequency displacement was calculated and compared with the limit as provided in the associated tables.

Figure 9.4.1 Frequency stability test setup



Test specification:	**Section 22.355, Section 24.235, Frequency stability test**		
Test procedure:	FCC part 22, Section 22.355; part 24, Section 24.235; part 2 section 2.1055		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/24/2006 13:48:01 PM		
Temperature: 20ºC	**Air Pressure:** 1017 hPa	**Relative Humidity:** 45 %	**Power Supply:** 7.2 VDC battery
Remarks:			

Table 9.4.2 Frequency stability test results

OPERATING FREQUENCY: 824.2 – 848.8 MHz
NOMINAL POWER VOLTAGE: 7.2 VDC
TEMPERATURE STABILIZATION PERIOD: 20 min
POWER DURING TEMPERATURE TRANSITION: Off
SPECTRUM ANALYZER MODE: Counter
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 100 kHz
MODULATION: GMSK

T, ºC	Voltage, V	Frequency, MHz							Max frequency drift, Hz	
		Start up	1st min	2nd min	3rd min	4th min	5th min	10th min	Positive	Negative
Low carrier frequency, limit 2060 Hz										
-30	nominal	824.201000	824.201050	824.201000	824.201100	824.201100	824.201150	824.201250	0	1450
-20	nominal	824.201100	NA	NA	NA	NA	NA	824.201250	0	1350
-10	nominal	824.201300	NA	NA	NA	NA	NA	824.201450	0	1150
0	nominal	824.201600	824.201650	824.201650	824.201700	824.201700	824.201750	824.201850	0	850
10	nominal	824.202050	NA	NA	NA	NA	NA	824.802150	0	400
20	15%	NA	NA	NA	NA	NA	NA	NA	NA	NA
20	nominal	824.202450	NA	NA	NA	NA	NA	824.202450 *	0	0
20	-15%	824.202450	NA	NA	NA	NA	NA	824.202150	0	300
30	nominal	824.202100	NA	NA	NA	NA	NA	824.201850	0	600
40	nominal	824.201800	NA	NA	NA	NA	NA	824.201500	0	950
50	nominal	824.201850	824.201850	836.201800	836.201550	836.201700	836.201650	824.201550	0	900
Mid carrier frequency, limit 2090 Hz										
-30	nominal	836.601550	836.601550	836.601650	836.601700	836.601650	836.601700	836.601750	0	1850
-20	nominal	836.601600	NA	NA	NA	NA	NA	836.601750	0	1800
-10	nominal	836.601600	NA	NA	NA	NA	NA	836.601900	0	1800
0	nominal	836.601750	836.601850	836.601800	836.601950	836.602100	836.602100	836.602300	0	1650
10	nominal	836.602300	NA	NA	NA	NA	NA	836.602350	0	1100
20	15%	NA	NA	NA	NA	NA	NA	NA	NA	NA
20	nominal	836.602500	NA	NA	NA	NA	NA	836.603400 *	0	900
20	-15%	836.602150	NA	NA	NA	NA	NA	836.601850	0	1250
30	nominal	836.602100	NA	NA	NA	NA	NA	836.601800	0	1600
40	nominal	836.601800	NA	NA	NA	NA	NA	836.601700	0	1700
50	nominal	836.601550	836.601550	836.601600	836.601600	836.601550	836.601550	836.601550	0	1850
High carrier frequency, limit 2120 Hz										
-30	nominal	848.801550	848.801500	848.801450	848.801450	848.801350	848.801300	848.801250	0	900
-20	nominal	848.801650	NA	NA	NA	NA	NA	848.801400	0	750
-10	nominal	848.801600	NA	NA	NA	NA	NA	848.801550	0	600
0	nominal	848.801650	848.801.550	848.801.550	848.801700	848.801750	848.801750	848.801950	0	200
10	nominal	848.801850	NA	NA	NA	NA	NA	848.802050	0	300
20	15%	NA	NA	NA	NA	NA	NA	NA	NA	NA
20	nominal	848.803100	NA	NA	NA	NA	NA	848.802150 *	950	0
20	-15%	848.802450	NA	NA	NA	NA	NA	848.801900	300	0
30	nominal	848.802300	NA	NA	NA	NA	NA	848.801950	0	200
40	nominal	802.802150	NA	NA	NA	NA	NA	848.802100	0	50
50	nominal	848.801850	848.801.85	848.801950	848.801.900	848.802050	848.802150	848.802150	0	300

* - Reference frequency

Verdict: Pass

Test specification:	**Section 22.355, Section 24.235, Frequency stability test**		
Test procedure:	FCC part 22, Section 22.355; part 24, Section 24.235; part 2 section 2.1055		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/24/2006 13:48:01 PM		
Temperature: 20ºC	**Air Pressure:** 1017 hPa	**Relative Humidity:** 45 %	**Power Supply:** 7.2 VDC battery
Remarks:			

Table 9.4.3 Frequency stability test results

OPERATING FREQUENCY: 1850.2 – 1909.8 MHz
NOMINAL POWER VOLTAGE: 7.2 VDC
TEMPERATURE STABILIZATION PERIOD: 20 min
POWER DURING TEMPERATURE TRANSITION: Off
SPECTRUM ANALYZER MODE: Counter
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 100 kHz
MODULATION: GMSK

T, ºC	Voltage, V	Frequency, MHz							Max frequency drift, Hz	
		Start up	1st min	2nd min	3rd min	4th min	5th min	10th min	Positive	Negative
Low carrier frequency										
-30	nominal	1850.201900	1850.201900	1850.201900	1850.201850	1850.201900	1850.201850	1850.201850	0	900
-20	nominal	1850.202050	NA	NA	NA	NA	NA	1850.201950	0	800
-10	nominal	1850.202250	NA	NA	NA	NA	NA	1850.202000	0	750
0	nominal	1850.202450	1850.202450	1850.202350	1850.202400	1850.202350	1850.202400	1850.202300	0	450
10	nominal	1850.202700	NA	NA	NA	NA	NA	1850.202650	0	100
20	15%	NA	NA	NA	NA	NA	NA	NA	NA	NA
20	nominal	1850.203100	NA	NA	NA	NA	NA	1850.202750	350	0
20	-15%l	1850.203100	NA	NA	NA	NA	NA	1850.202150	0	600
30	nominal	1850.202850	NA	NA	NA	NA	NA	1850.202300	0	450
40	nominal	1850.202800	NA	NA	NA	NA	NA	1850.202450	0	300
50	nominal	1850.202750	1850.202700	1850.202700	1850.202650	1850.202600	1850.202500	1850.202500	0	250
Mid carrier frequency										
-30	nominal	1880.002200	1880.002200	1880.002000	1880.001950	1880.001900	1880.001900	1880.001850	0	650
-20	nominal	1880.002500	NA	NA	NA	NA	NA	1880.001950	0	550
-10	nominal	1880.002500	NA	NA	NA	NA	NA	1880.002000	0	500
0	nominal	1880.003000	1880.003000	1880.002500	1880.002500	1880.002000	1880.002000	1880.002000	0	500
10	nominal	1880.003000	NA	NA	NA	NA	NA	1880.002000	0	500
20	15%	NA	NA	NA	NA	NA	NA	NA	NA	NA
20	nominal	1880.003100	NA	NA	NA	NA	NA	1880.002500	600	0
20	-15%l	1880.002300	NA	NA	NA	NA	NA	1880.002800	300	0
30	nominal	1880.002250	NA	NA	NA	NA	NA	1880.002400	0	250
40	nominal	1880.002200	NA	NA	NA	NA	NA	1880.002250	0	300
50	nominal	1880.002150	1880.002100	1880.002150	1880.002150	1880.002200	1880.002150	1880.002150	0	350
High carrier frequency										
-30	nominal	1909.801850	1909.801850	1909.801800	1909.801750	1909.801650	1909.801550	1909.801550	0	950
-20	nominal	1909.801850	NA	NA	NA	NA	NA	1909.801650	0	850
-10	nominal	1909.801900	NA	NA	NA	NA	NA	1909.801700	0	800
0	nominal	1909.801850	1909.801850	1909.801800	1909.801850	1909.801800	1909.801800	1909.801800	0	700
10	nominal	1909.801900	NA	NA	NA	NA	NA	1909.802200	0	600
20	15%	NA	NA	NA	NA	NA	NA	NA	NA	NA
20	nominal	1909.801900	NA	NA	NA	NA	NA	1909.802500	0	600
20	-15%l	1909.802450	NA	NA	NA	NA	NA	1909.801550	0	950
30	nominal	1909.802050	NA	NA	NA	NA	NA	1909.801750	0	750
40	nominal	1909.802250	NA	NA	NA	NA	NA	1909.802050	0	450
50	nominal	1909.802450	1909.802450	1909.802400	1909.802350	1909.802300	1909.802200	1909.802150	0	350

* - Reference frequency

Test specification:	**Section 22.355, Section 24.235, Frequency stability test**		
Test procedure:	FCC part 22, Section 22.355; part 24, Section 24.235; part 2 section 2.1055		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	2/24/2006 13:48:01 PM		
Temperature: 20ºC	**Air Pressure:** 1017 hPa	**Relative Humidity:** 45 %	**Power Supply:** 7.2 VDC battery
Remarks:			

Table 9.4.4 Transmitter operating range including frequency drift

Carrier frequency, MHz	Lower reference point, MHz	Upper reference point, MHz	Maximum negative drift, Hz	Maximum positive drift, Hz	Frequency tolerance, MHz	Limit, MHz	Margin, kHz	Verdict
1850.200	1850.0675	1850.3375	350	900	1850.067150	1850.00	67.15	Pass
1880.000	1879.8625	1880.1350	600	650	NA	NA	NA	NA
1909.800	1909.6650	1909.9325	0	950	1909.933450	1910.00	-66.55	Pass

Reference numbers of test equipment used

HL 0493	HL 0808	HL 1097	HL 1488	HL 2171	HL 2634	

Full description is given in Appendix A.

Test specification:	**FCC section 15.109 / RSS-Gen, Section 7.2.3.2 / ICES-003, Radiated emission**		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/5/2005 8:18:06 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

|

10 Emission tests according to 47CFR part 15 subpart B requirements

10.1 Radiated emission measurements

10.1.1 General

This test was performed to measure radiated emissions from the EUT enclosure. Specification test limits according to FCC Part 15, Section 109 are given in Table 10.1.1, according to ICES-003, Section 5 in Table 10.1.2 and according to RSS-210, Section 7.3 in Table 10.1.3.

Table 10.1.1 Radiated emission limits according to FCC Part 15, Section 109

Frequency, MHz	Class B limit, dB(µV/m)		Class A limit, dB(µV/m)	
	10 m distance	3 m distance	10 m distance	3 m distance
30 - 88	29.5*	40.0	39.0	49.5*
88 - 216	33.0*	43.5	43.5	54.0*
216 - 960	35.5*	46.0	46.4	56.9*
960 - 5th harmonic**	43.5*	54.0	49.5	60.0*

Table 10.1.2 Radiated emission limits according to ICES-003, Section 5

Frequency, MHz	Class B limit, dB(µV/m)		Class A limit, dB(µV/m)
	10 m distance	3 m distance	10 m distance
30 - 230	30	40.5*	40
230 - 1000	37	47.5*	47

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

Table 10.1.3 Radiated emission limits according to RSS-210, Section 7.3

Frequency, MHz	Field strength limit at 3 m test distance, dB(µV/m)
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
960 - 1610	54.0
1610 - 3rd harmonic**	60.0

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

10.1.2 Test procedure for measurements in semi-anechoic chamber

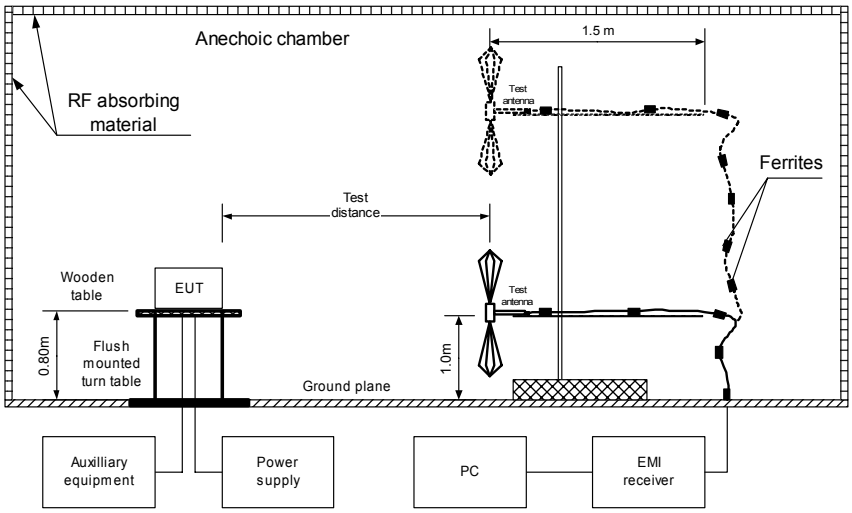
10.1.2.1 The EUT was set up as shown in Figure 10.1.1, energized and the performance check was conducted.

10.1.2.2 The specified frequency range was investigated with biconilog antenna connected to EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal and the EUT cables position was varied.

10.1.2.3 The worst test results (the lowest margins) were recorded in Table 10.1.4 and shown in the associated plots.

Test specification:	**FCC section 15.109 / RSS-Gen, Section 7.2.3.2 / ICES-003, Radiated emission**		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/5/2005 8:18:06 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Figure 10.1.1 Setup for radiated emission measurements in anechoic chamber, table-top equipment



Test specification:	**FCC section 15.109 / RSS-Gen, Section 7.2.3.2 / ICES-003, Radiated emission**		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/5/2005 8:18:06 PM		
Temperature: 22 ºC	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

Table 10.1.4 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

FCC section 15.109; RSS-210, section 7.3

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*				
370.505000	32.02	29.97	46.00	-16.03	V	1.1	35	PASS
439.995000	45.20	44.25	46.00	-1.75	V	1.1	127	
461.996250	44.70	43.73	46.00	-2.27	V	1.1	127	
474.477500	41.08	38.55	46.00	-7.45	V	1.1	125	
483.997500	39.61	35.90	46.00	-10.10	V	1.1	132	
500.497500	37.95	35.83	46.00	-10.17	V	1.1	120	

ICES-003

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*				
370.505000	32.02	29.97	47.50	-17.53	V	1.1	35	PASS
439.995000	45.20	44.25	47.50	-3.25	V	1.1	127	
461.996250	44.70	43.73	47.50	-3.77	V	1.1	127	
474.477500	41.08	38.55	47.50	-8.95	V	1.1	125	
483.997500	39.61	35.90	47.50	-11.60	V	1.1	132	
500.497500	37.95	35.83	47.50	-11.67	V	1.1	120	

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

Reference numbers of test equipment used

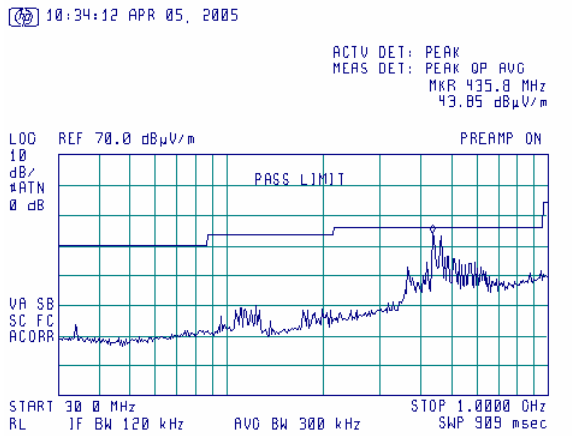
HL 0521	HL 0589	HL 0604	HL 1947	HL 2009	HL 2432		

Full description is given in Appendix A.

Test specification:	**FCC section 15.109 / RSS-Gen, Section 7.2.3.2 / ICES-003, Radiated emission**		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/5/2005 8:18:06 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

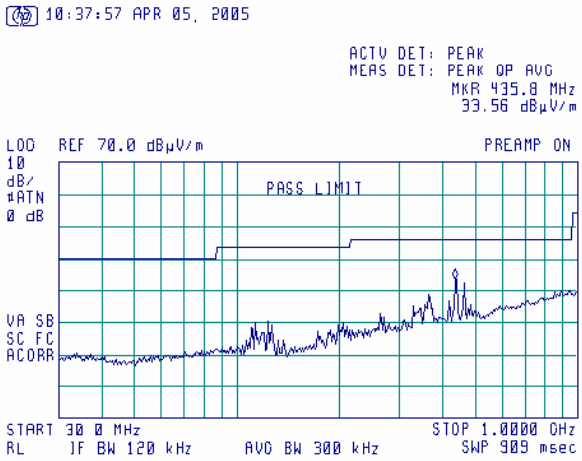
Plot 10.1.1 Radiated emission measurements in 30- 1000 MHz range, vertical antenna polarization

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



Plot 10.1.2 Radiated emission measurements in 30- 1000 MHz range, horizontal antenna polarization

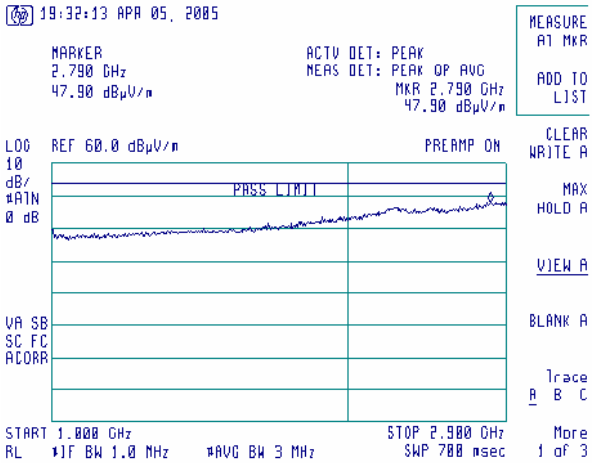
TEST SITE: Semi anechoic chamber
LIMIT: Class B
TEST DISTANCE: 3 m
EUT OPERATING MODE: Receive / Stand-by



Test specification:	**FCC section 15.109 / RSS-Gen, Section 7.2.3.2 / ICES-003, Radiated emission**		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	**Verdict:**	
Date & Time:	4/5/2005 8:18:06 PM		
Temperature: 22 °C	**Air Pressure:** 1022 hPa	**Relative Humidity:** 43 %	**Power Supply:** 7.2 V battery
Remarks:			

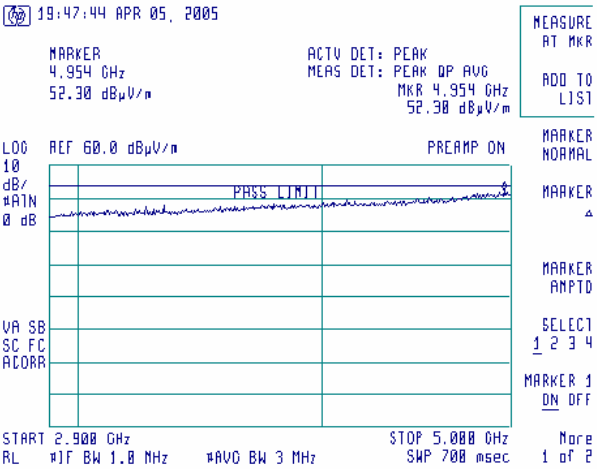
Plot 10.1.3 Radiated emission measurements above 1000 MHz, vertical & horizontal antenna polarization

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



Plot 10.1.4 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



11 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0038	Antenna Mast, 1-4 meter, motorized	HL	AM - 1	028	03-Feb-06	03-Feb-07
0091	Position Controller, for Antenna Mast + Turn Table, OFTS	HL	CRL-2	032	20-Apr-05	20-Apr-06
0287	Turntable, Motorized Diameter, 2 m (OATS)	HL	TMD-2	042	11-Nov-05	11-Nov-06
0410	Cable, Coax, Microwave, DC-18 GHz, N-N, 1 m	Gore	PFP01P0 1039.4	9338767	11-Nov-05	11-Nov-06
0446	Antenna, Loop active, 10kHz-30MHz	EMCO	6502	2857	28-Jun-05	28-Jun-06
0465	Anechoic Chamber 9(L) x 6.5(W) x 5.5(H) m	HL	AC - 1	023	10-Oct-05	10-Oct-06
0493	Oven temperature -45…175 deg C	Thermotron	S-1.2 Mini-Max	14016	10-Oct-05	10-Oct-06
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard	8546A	3617A 00319, 3448A002 53	10-Oct-05	10-Oct-06
0567	Antenna, Dipole, Tunable 500 - 1000 MHz	Electro-Metrics	TDS-25/30-2	298	10-Oct-05	10-Oct-06
0589	Cable Coaxial, GORE A2P01POL118, 2.3 m	HL	GORE-3	176	10-Oct-05	10-Oct-06
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE 26 - 2000 MHz	EMCO	3141	9611-1011	10-Oct-05	10-Oct-06
0768	Antenna Standard Gain Horn,18-26.5 GHz, WR-42, K-band, Gain - 25 dB	Quinstar Technology	QWH-4200-BA	110	10-Jan-06	10-Jan-07
0769	Antenna Standard Gain Horn, 26.5-40 GHz, WR28, Ka band, Gain 25 dB	Quinstar Technology	QWH-2800-BA	112	10-Jan-06	10-Jan-07
0808	Analyzer Spectrum 100 Hz to 2.2 GHz	Anritsu	MS2601B	M178731	27-Mar-06	27-Mar-07
1097	Attenuator, 50 Ohm, 5 W, DC to 8 GHz, 20 dB	Midwest Microwave	0793-20-NN-07	1097	15-Jan-06	15-Jan-07
1200	Quadruplexer 1-12 GHz (1-2 GHz; 2-4GHz;4-8 GHz; 8-12GHz)	Elettronica S.p.A. - Roma	UE 84	D/00240	10-Feb-06	10-Feb-07
1365	Cable Coaxial, S-FLC 12-50, 5 m	HL	C214-5	1365	02-Dec-05	02-Dec-06
1424	Spectrum Analyzer, 30 Hz- 40 GHz	Agilent Technologies (HP)	8564EC	3946A002 19	30-Aug-05	30-Aug-06
1430	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1431, HL1432	Agilent Technologies (HP)	8542E	3807A002 62,3705A0 0217	01-Sep-05	01-Sep-06
1488	Power Divider 0.5 - 18 GHz	Omni Spectra	2090-6204-00		05-Dec-05	05-Dec-06
1562	Oscilloscope 100 MHz, DMM	Tektronix	THS720A	B039444	20-Sep-05	20-Sep-06
1942	Cable 18GHz, 4 m, blue	Rhophase Microwave Limited	SPS-1803A-4000-NPS	T4658	20-Sep-05	20-Sep-06
1947	Cable 18 GHz, 6.5 m, blue	Rhophase Microwave Limited	NPS-1803A-6500-NPS	T4974	17-Oct-05	17-Oct-06
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W, N-type	EMC Test Systems	3115	9911-5964	22-Mar-06	22-Mar-07
2009	Cable RF, 8 m	Alpha Wire	RG-214	C-56	02-Dec-05	02-Dec-06
2171	Multimeter	Fluke	177	79960418	07-Jun-05	07-Jun-06
2254	Cable 40GHz, 0.8 m, blue	Rhophase Microwave Limited	KPS-1503A-800-KPS	W4907	24-Jun-05	24-Jun-06
2258	Amplifier Low Noise 2-20 GHz	Sophia Wireless	LNA0220-C	0222	05-Nov-05	05-Nov-06

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
2259	Amplifier Low Noise 2-20 GHz	Sophia Wireless	LNA0220-C	0223	05-Nov-05	05-Nov-06
2400	Cable 40GHz, 1.5 m, green	Rhophase Microwave Limited	KPS-1503A-1500-KPS	X2946	24-Jun-05	24-Jun-06
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	22-Mar-06	22-Mar-07
2483	Detector 0.001-12 GHz	HP	36-51	2483	22-Mar-06	22-Mar-07
2499	Quadruplexer 1-12 GHz (1-2 GHz; 2-4GHz;4-8 GHz; 8-12GHz)	Elettronica S.p.A. - Roma	UE 84	D/00239	10-Feb-06	10-Feb-07
2524	Attenuator, 10 dB, DC-18 GHz	Midwest Microwave	263-10	2524	03-Jan-06	03-Jan-07
2634	Power Supply, 0-36.0 VDC, 0-12.0 A	Nemic-Lambda	UP36-12	2634	29-Aug-05	29-Aug-06
2780	EMS analyzer, 100 Hz to 26.5 GHz	Agilent Technologies (HP)	E7405A	MY4510246	29-Aug-05	29-Aug-06

12 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 %
Radiated emissions at 3 m measuring distance Horizontal polarization Vertical polarization	 Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 6.0 dB Biconical antenna: ± 5.7 dB Log periodic antenna: ± 6.0 dB Double ridged horn antenna: ± 6.0 dB

The test equipment has been calibrated according to its recommended procedures and is within the manufacturer's published limit of error. The standards and instruments used in the calibration system conform to the present requirements of ISO/IEC 17025 (or alternately ANSI/NCSL Z540-1).
The laboratory calibrates its measurement standards by a third party (traceable to NIST, USA) on a regular basis according to equipment manufacturer requirements. The Hermon Labs EMC measurements uncertainty is given in the table above.

13 APPENDIX C Test facility description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, safety, environmental and telecommunication testing facility. Hermon Laboratories is listed by the Federal Communications Commission (USA) for all parts of Code of Federal Regulations 47 (CFR 47) and by Industry Canada for electromagnetic emissions (file numbers IC 2186-1 for OATS and IC 2186-2 for anechoic chamber), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, C-845 for conducted emissions site), assessed by TNO Certification EP&S (Netherlands) for a number of EMC, telecommunications, environmental, safety standards, and by AMTAC (UK) for safety of medical devices. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing and environmental simulation (for exact scope please refer to Certificate No. 839.01).

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Person for contact: Mr. Alex Usoskin, CEO.

14 APPENDIX D Specification references

47CFR part 15: 2005	Radio Frequency Devices.
FR Vol.62	Federal Register, Volume 62, May 13, 1997
Public notice DA 00- 705: 2000	Filing and measurement guidelines for frequency hopping spread spectrum systems.
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
RSS-210 Issue 6: 2005	Low Power Licence- Exempt Radiocommunication Devices (all frequency bands), Category I Equipment
RSS-Gen Issue 1:2005	General Requirements and Information for the Certification of Radiocommunication Equipment
ICES-003 Issue 4: 2004	Digital Apparatus
CAN/CSA-CEI/IEC CISPR 22: 02	Information Technology Equipment- Radio Disturbance Characteristics- Limits and Methods of measurement

15 APPENDIX E 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
dBΩ	decibel referred to one Ohm
DC	direct current
DTS	digital transmission system
EIRP	equivalent isotropically radiated power
ERP	effective radiated power
EUT	equipment under test
F	frequency
FHSS	frequency hopping spread spectrum
GHz	gigahertz
GND	ground
H	height
HL	Hermon laboratories
Hz	hertz
ITE	information technology equipment
k	kilo
kHz	kilohertz
LISN	line impedance stabilization network
LO	local oscillator
m	meter
MHz	megahertz
min	minute
mm	millimeter
ms	millisecond
μs	microsecond
NA	not applicable
NT	not tested
OATS	open area test site
Ω	Ohm
PCB	printed circuit board
PM	pulse modulation
PS	power supply
ppm	part per million (10^{-6})
QP	quasi-peak
RE	radiated emission
RF	radio frequency
rms	root mean square
Rx	receive
s	second
T	temperature
Tx	transmit
V	volt
VA	volt-ampere

16 APPENDIX F Test equipment correction factors

Antenna Factor
Active Loop Antenna
EMC Test Systems, model 6502, serial number 2857, HL 0446

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

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

Antenna factor
Standard gain horn antenna
Quinstar Technology
Model QWH
Ser.No.112, HL 0768, 0769, 0770

Frequency min, GHz	Frequency max, GHz	Antenna factor, dB(1/m)
18.000	26.500	32.01
26.500	40.000	35.48
40.000	60.000	39.03
60.000	90.000	42.55
90.000	140.000	46.23
140.000	220.000	50.11

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

Antenna factor

Biconilog antenna EMCO, model 3141, serial number 1011, HL 0604

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

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

Antenna factor
Double-ridged wave guide horn antenna
EMC Test Systems, model 3115, serial no: 9911-5964, HL 1984

Frequency, MHz	Antenna gain, dBi	Antenna factor. dB(1/m)
1000.0	5.8	24.5
1500.0	9.0	24.8
2000.0	8.6	27.7
2500.0	9.5	28.7
3000.0	8.9	30.8
3500.0	8.2	32.9
4000.0	9.6	32.7
4500.0	11.2	32.1
5000.0	10.6	33.6
5500.0	9.8	35.3
6000.0	10.1	35.7
6500.0	10.7	35.8
7000.0	10.9	36.2
7500.0	10.5	37.2
8000.0	11.1	37.2
8500.0	10.8	38.1
9000.0	10.7	38.6
9500.0	11.5	38.3
10000.0	11.8	38.4
10500.0	12.3	38.3
11000.0	12.3	38.8
11500.0	11.5	39.9
12000.0	12.2	39.6
12500.0	12.6	39.5
13000.0	12.0	40.5
13500.0	11.7	41.1
14000.0	11.7	41.5
14500.0	12.7	40.8
15000.0	14.2	39.5
15500.0	16.0	38.1
16000.0	16.2	38.1
16500.0	14.5	40.1
17000.0	12.2	42.6
17500.0	9.7	45.4
18000.0	6.6	48.7

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

Antenna factor
Double-ridged wave guide horn antenna
EMC Test Systems, model 3115, serial no: 00027177, HL 2432

Frequency, MHz	Antenna gain, dBi	Antenna factor. dB(1/m)
1000.0	5.5	24.7
1500.0	8.0	25.7
2000.0	8.4	27.8
2500.0	9.3	28.9
3000.0	9.0	30.7
3500.0	9.3	31.8
4000.0	9.3	33.0
4500.0	10.4	32.8
5000.0	10.0	34.2
5500.0	10.1	34.9
6000.0	10.6	35.2
6500.0	11.0	35.4
7000.0	10.8	36.3
7500.0	10.4	37.3
8000.0	10.8	37.5
8500.0	10.8	38.0
9000.0	11.0	38.3
9500.0	11.5	38.3
10000.0	11.5	38.7
10500.0	11.9	38.7
11000.0	12.2	38.9
11500.0	11.9	39.5
12000.0	12.3	39.5
12500.0	12.7	39.4
13000.0	12.0	40.5
13500.0	12.0	40.8
14000.0	11.6	41.5
14500.0	12.2	41.3
15000.0	13.6	40.2
15500.0	15.3	38.7
16000.0	15.8	38.5
16500.0	14.8	39.8
17000.0	12.9	41.9
17500.0	9.2	45.8
18000.0	6.2	49.1

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

Cable loss
Cable coaxial, RG-214, 5m, model: C214-5, HL 1365

No.	Frequency, MHz	Measured, dB	Measured uncertainty dB
1	1000	0.41	±0.12
2	1200	0.44	
3	1400	0.48	
4	1600	0.52	
5	1800	0.55	
6	2000	0.58	
7	2200	0.61	
8	2400	0.64	±0.17
9	2600	0.67	
10	2800	0.7	
11	3000	0.73	
12	3300	0.79	
13	3600	0.84	
14	3900	0.94	
15	4200	1.22	

Cable loss
Cable GORE, HL 0410

No.	Frequency, GHz	Cable loss, dB
1	0.5	0.16
2	1	0.28
3	2	0.38
4	4	0.55
5	6	0.85
6	8	0.90
7	10	1.07
8	12	1.11
9	14	1.29
10	16	1.41
11	18	1.73

Cable loss
Cable 18 GHz, 4 m, blue, model: SPS-1803A-4000-NPS, S/N T4658, HL 1942

Frequency, GHz	Cable loss, dB
0.03	0.21
0.05	0.26
0.10	0.36
0.20	0.50
0.30	0.61
0.40	0.70
0.50	0.78
0.60	0.85
0.70	0.93
0.80	0.99
0.90	1.04
1.00	1.10
1.10	1.16
1.20	1.22
1.30	1.26
1.40	1.31
1.50	1.35
1.60	1.41
1.70	1.45
1.80	1.49
1.90	1.53
2.00	1.57
2.10	1.61
2.20	1.65
2.30	1.69
2.40	1.72
2.50	1.76
2.60	1.79
2.70	1.83
2.80	1.87
2.90	1.90
3.10	1.97
3.30	2.04
3.50	2.11
3.70	2.18
3.90	2.24
4.10	2.31
4.30	2.38
4.50	2.43
4.70	2.53
4.90	2.53
5.10	2.63
5.30	2.65
5.50	2.72
5.70	2.76
5.90	2.79

Frequency, GHz	Cable loss, dB
6.10	2.88
6.30	2.90
6.50	2.97
6.70	3.02
6.90	3.04
7.10	3.07
7.30	3.12
7.50	3.13
7.70	3.19
7.90	3.24
8.10	3.30
8.30	3.36
8.50	3.45
8.70	3.41
8.90	3.45
9.10	3.42
9.30	3.55
9.50	3.48
9.70	3.58
9.90	3.61
10.10	3.66
10.30	3.68
10.50	3.70
10.70	3.70
10.90	3.75
11.10	3.78
11.30	3.86
11.50	3.98
11.70	4.10
11.90	4.12
12.10	4.09
12.40	4.13
13.00	4.23
13.50	4.35
14.00	4.40
14.50	4.44
15.00	4.57
15.50	4.66
16.00	4.64
16.50	4.66
17.00	4.75
17.50	4.85
18.00	4.93

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

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

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

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

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

Cable loss
Cable Coaxial, GORE A2P01POL118, 2.3 m, model:GORE-3, HL 0589
+ Cable Coaxial, ANDREW PSWJ4, 6m, model: ANDREW-6, HL 1004

No.	Frequency, MHz	Cable loss, dB	Tolerance (Specification), dB	Measurement uncertainty, dB
1	30	0.33	≤ 6.5	±0.12
2	50	0.40		
3	100	0.57		
4	300	0.97		
5	500	1.25		
6	800	1.59		
7	1000	1.81		
8	1200	1.97		
9	1400	2.15		
10	1600	2.28		
11	1800	2.43		
12	2000	2.61		
13	2200	2.75		
14	2400	2.89		
15	2600	2.97		
16	2800	3.21	≤ 6.5	±0.12
17	3000	3.32		
18	3300	3.47		
19	3600	3.62		
20	3900	3.84		
21	4200	3.92		±0.17
22	4500	4.07		
23	4800	4.36		
24	5100	4.62		
25	5400	4.78		
26	5700	5.16		
27	6000	5.67		
28	6500	5.99		

Cable loss
Cable coaxial, 40GHz, 1.5 m, green, Rhophase Microwave Limited, model: KPS-1503A-1500-KPS, HL 2400

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
0.03	0.06	6.5	1.46	15.50	2.34
0.05	0.08	6.7	1.49	16.00	2.34
0.1	0.15	6.9	1.50	16.50	2.40
0.2	0.23	7.1	1.51	17.00	2.46
0.3	0.29	7.3	1.55	17.50	2.54
0.5	0.37	7.5	1.56	18.00	2.61
0.7	0.46	7.7	1.58	18.50	2.59
0.9	0.53	7.9	1.60	19.00	2.59
1.1	0.58	8.1	1.61	19.50	2.67
1.3	0.65	8.3	1.68	20.00	2.62
1.5	0.66	8.5	1.68	20.50	2.73
1.7	0.72	8.7	1.75	21.00	2.71
1.9	0.76	8.9	1.74	21.50	2.78
2.1	0.79	9.1	1.81	22.00	2.83
2.3	0.85	9.3	1.79	22.50	2.81
2.5	0.90	9.5	1.86	23.50	2.91
2.7	0.91	9.7	1.85	24.00	2.97
2.9	0.97	9.9	1.87	24.50	2.98
3.1	0.97	10.1	1.88	25.00	2.97
3.3	1.03	10.30	1.82	25.50	3.03
3.5	1.06	10.50	1.92	26.00	3.04
3.7	1.10	10.70	1.86	26.50	3.11
3.9	1.13	10.90	1.96	27.00	2.97
4.1	1.16	11.10	1.90	28.00	3.15
4.3	1.18	11.30	1.99	29.00	3.07
4.5	1.21	11.50	1.95	30.00	3.13
4.7	1.23	11.70	2.00	31.00	3.13
4.9	1.26	11.90	2.01	32.00	3.18
5.1	1.28	12.10	1.99	33.00	3.31
5.3	1.31	12.40	2.06	34.00	3.32
5.5	1.32	13.00	2.11	35.00	3.37
5.7	1.36	13.50	2.17	36.00	3.36
5.9	1.37	14.00	2.36	37.00	3.46
6.1	1.38	14.50	2.32	39.00	3.49
6.3	1.44	15.00	2.30	40.00	3.52