HERMON LABORATORIES

ELECTRICAL TESTING
0839.01

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TEST REPORT

ACCORDING TO: FCC 47CFR part 15 subpart C § 15.247 (DTS), subpart B

FOR:

Wavion Ltd.

Wi-Fi base station

Model: WBSn-2400

Table of contents

1 Applicant information

Client name:	Wavion Ltd.
Address:	5 Hamada street, P.O.B. 580, Yokneam 20692, Israel
Telephone:	+972 4909 7329
Fax:	+972 4909 7322
E-mail:	ben@WavionNetworks.com
Contact name:	Mr. Ben Zickel

2 Equipment under test attributes

Product name:	Wi-Fi base station
Product type:	Transceiver
Model(s):	WBSn-2400
Hardware version:	PCA00053
Software release:	NART
Receipt date	4/28/2011

3 Manufacturer information

Manufacturer name:	Wavion Ltd.
Address:	5 Hamada street, P.O.B. 580, Yokneam 20692, Israel
Telephone:	+972 4909 7329
Fax:	+972 4909 7322
E-Mail:	ben@WavionNetworks.com
Contact name:	Mr. Ben Zickel

4 Test details

Project ID:	21936
Location:	Hermon Laboratories Ltd. Harakevet Industrial Zone, Binyamina 30500, Israel
Test started:	4/28/2011
Test completed:	7/12/2011
Test specification(s):	FCC 47CFR part 15 subpart C §15.247; subpart B

5 Tests summary

Test	Status
Transmitter characteristics	
Section 15.247(a)(2), 6 dB bandwidth	Pass
Section 15.247(b)(3), Peak output power	Pass
Section 15.247(i), RF exposure	Pass, provided in Exhibit for Application for certification
Section 15.247(d), Conducted spurious emissions	Pass
Section 15.247(d), Radiated spurious emissions	Pass
Section 15.247(e), Peak power density	Pass
Section 15.207(a), Conducted emission	Pass
Section 15.203, Antenna requirement	Pass
Unintentional emissions	
Section 15.107, Conducted emission at AC power port	Pass
Section 15.109, Radiated emission	Pass

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

	Name and Title	Date	Signature
Tested by:	Mr. S. Samokha, test engineer	July 12, 2011	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	July 14, 2011	
Approved by:	Mr. M. Nikishin, EMC and radio group manager	July 21, 2011	

6 EUT description

6.1 General information

The EUT, WBSn-2400, is an outdoor Wi-Fi base station compliant with the 802.11n IEEE standard. Throughout all tests the integral 12 dBi sector antenna was set in V/V/V polarization, the external 7.4 dBi antenna wqs set in V-polarization as the worst cases for these antennas.

6.2 Ports and lines

Port type	Port description	Connected from	Connected to	Qty.	Cable type	Cable length, m
Power+Ethernet	DC Power+signal	POE	EUT	1	STP	2
Power	AC Power	AC mains	POE	1	Unshielded	1.5
RF	Antenna	EUT	Antenna	3	Coax	0.5*

6.3 Support and test equipment

Description	Manufacturer	Model number	Serial number
Power supply (POE)	PHIHONG	POE61U-560DG(W)	NA
Laptop (CPU)	IBM	ThinkPad T23	78KWCHH
Laptop	IBM	ThinkPad T23	78KWBTT
AC/DC adaptor for CPU	IBM	08K8206	NA
AC/DC adaptor for Laptop	IBM	08K8207	NA
Switch	D-Link	DGS-1008D	QB3Q1A500439
AC/DC adapter for Switch	D-Link	AF0605-E	NA

6.4 Operating frequencies

Source	Frequency, MHz		
Tx CS 20 MHz	2412	2437	2462
Tx CS 40 MHz	2422	2437	2452

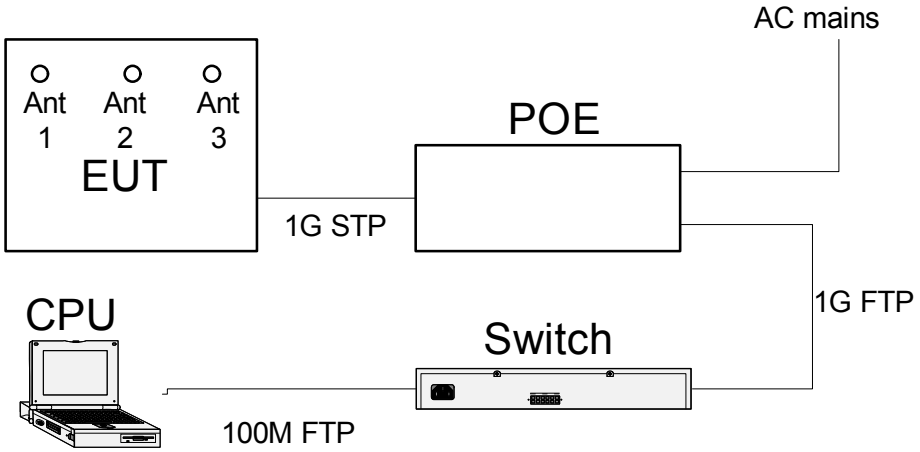
6.5 Changes made in the EUT

To withstand the standard requirements the following changes were implemented in the EUT during testing:

1) The power supply (POE) was changed for another one, model number PS00032, manufactured by Telkor, the EUT grounds were connected to chassis;
2) The enclosure of the EUT with sector antenna was improved with conductive foil.

It is manufacturer responsibility to implement the change in the production version of the EUT. In any case the test report applies to the tested item only.

6.6 Test configuration



6.7 Transmitter characteristics

Type of equipment					
X	Stand-alone (Equipment with or without its own control provisions)				
Intended use	**Condition of use**				
X	fixed	Always at a distance more than 2 m from all people			
Assigned frequency range	2400.0 – 2483.5 MHz				
Operating frequency range	2412 - 2462 MHz				
Maximum rated output power		17.7 dBm per chain, total 22.47 dBm			
Antenna connection					
Unique coupling	X	Standard connector, N-type	Integral	X	with temporary RF connector
					without temporary RF connector

Antenna/s technical characteristics			
Type	Manufacturer	Model number	Gain
Integral sector antenna	Wavion	TOP00039-AA	12 dBi
External	GlobalWave	GW-341017/N/A	7.4 dBi

Transmitter 99% power bandwidth	**Transmitter aggregate data rate/s, MBps**			**Type of modulation**
20 MHz 802.11b	1.0 2.0 5.5 11.0			CCK CCK CCK CCK
20 MHz 802.11g	6.0 9.0, 12.0 18.0, 24.0 36.0, 48.0, 54.0			BPSK QPSK 16QAM 64QAM
20 MHz 802.11n	1 Stream	2 Streams	3 Streams	
	6.5 13.0, 19.5 26.0, 39.0 52.0, 58.5, 65.0	13.0 26.0, 39.0 52.0, 78.0 104.0,117.0, 130.0	19.5 39.0, 58.5 78.0, 117.0 156.0,175.5, 195.0	BPSK QPSK 16QAM 64QAM
40 MHz 802.11n	1 Stream	2 Streams	3 Streams	
	13.5 27.0, 40.5 54.0, 81.0 108.0, 121.5, 135.0	27.0 54.0, 81.0 108.0, 162.0 216.0, 243.0, 270.0	40.5 81.0, 121.5 162.0, 243.0 324.0, 364.5, 405.0	BPSK QPSK 16QAM 64QAM

Type of multiplexing	OFDM, CCK
Modulating test signal (baseband)	PRBS
Maximum transmitter duty cycle in normal use	99%
Transmitter duty cycle supplied for test	99-100%

Transmitter power source					
	Battery	**Nominal rated voltage**		Battery type	Lithium
X	DC	**Nominal rated voltage**	48 VDC via POE		
	AC mains	**Nominal rated voltage**		Frequency	

Common power source for transmitter and receiver	X	yes	no

Test specification:	Section 15.247(a)(2), 6 dB bandwidth		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(a)(2)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 23 ºC	Air Pressure: 1015 hPa	Relative Humidity: 52 %	Power Supply: 48VDC
Remarks:			

7 Transmitter tests according to 47CFR part 15 subpart C requirements

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 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.

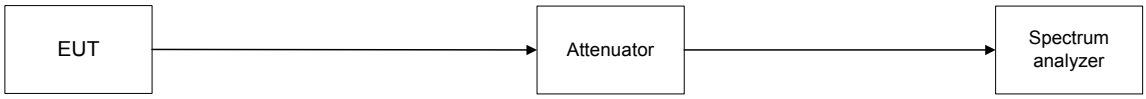
7.1.2 Test procedure

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 RBW=100 kHz as frequency delta between reference points on modulation envelope and provided in Table 7.1.2 and the associated plots.

Figure 7.1.1 The 6 dB bandwidth test setup



Test specification:	**Section 15.247(a)(2), 6 dB bandwidth**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(a)(2)		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	6/19/2011		
Temperature: 23 ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 52 %	**Power Supply:** 48VDC
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
MODULATING SIGNAL:	PRBS

Carrier frequency, MHz	Transmit power setting, dBm	CBW, MHz	Modulation	Bit rate, Mbps	6 dB bandwidth, MHz	Limit, MHz	Margin*, MHz	Verdict
Low	18	20	CCK	1	10.14	0.5	-9.64	Pass
Mid	18	20	CCK	1	9.21	0.5	-8.71	Pass
High	18	20	CCK	1	8.25	0.5	-7.75	Pass
Low	18	20	CCK	11	9.90	0.5	-9.40	Pass
Mid	18	20	CCK	11	11.10	0.5	-10.60	Pass
High	18	20	CCK	11	9.48	0.5	-8.98	Pass
Low	18	20	OFDM	6	16.62	0.5	-16.12	Pass
Mid	18	20	OFDM	6	16.50	0.5	-16.00	Pass
High	18	20	OFDM	6	16.56	0.5	-16.06	Pass
Low	18	20	OFDM	54	16.56	0.5	-16.06	Pass
Mid	18	20	OFDM	54	16.53	0.5	-16.03	Pass
High	18	20	OFDM	54	16.56	0.5	-16.06	Pass
Low	18	20	OFDM	65	17.76	0.5	-17.26	Pass
Mid	18	20	OFDM	65	17.76	0.5	-17.26	Pass
High	18	20	OFDM	65	17.79	0.5	-17.29	Pass
Low	16	40	OFDM	13.5	36.60	0.5	-36.10	Pass
Mid	16	40	OFDM	13.5	36.30	0.5	-35.80	Pass
High	16	40	OFDM	13.5	36.60	0.5	-36.10	Pass
Low	16	40	OFDM	135	36.55	0.5	-36.05	Pass
Mid	16	40	OFDM	135	36.55	0.5	-36.05	Pass
High	16	40	OFDM	135	36.55	0.5	-36.05	Pass

*-Margin=Limit- 6dB bandwidth

Reference numbers of test equipment used

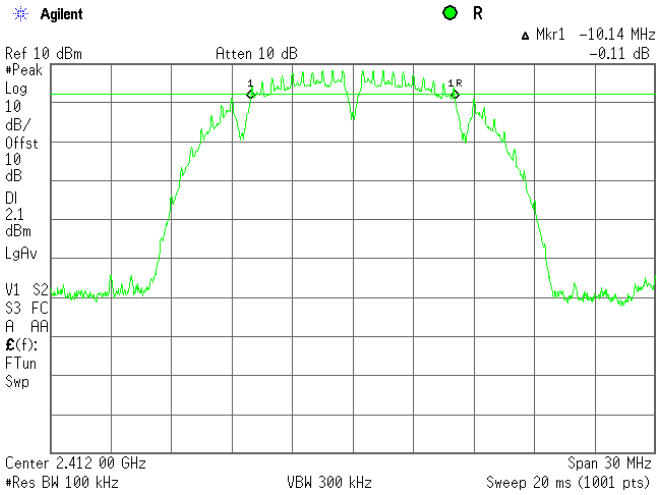
HL 2953	HL 3785	HL 3818						

Full description is given in Appendix A.

Test specification:	Section 15.247(a)(2), 6 dB bandwidth		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(a)(2)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 23 ºC	Air Pressure: 1015 hPa	Relative Humidity: 52 %	Power Supply: 48VDC
Remarks:			

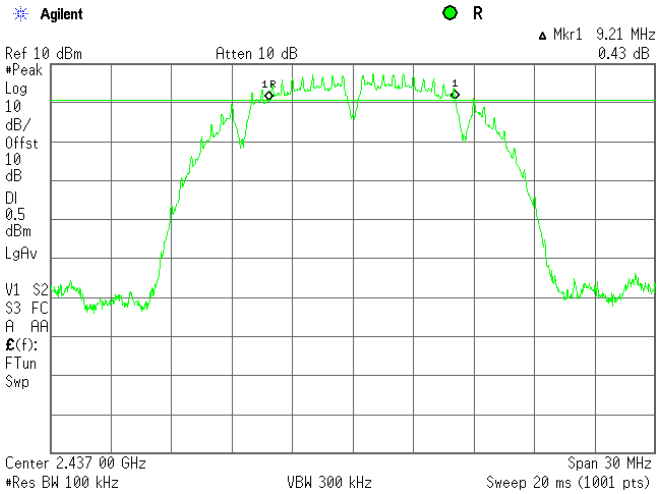
Plot 7.1.1 The 6 dB bandwidth test result at low frequency

TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	CCK
BITRATE:	1Mbps



Plot 7.1.2 The 6 dB bandwidth test result at mid frequency

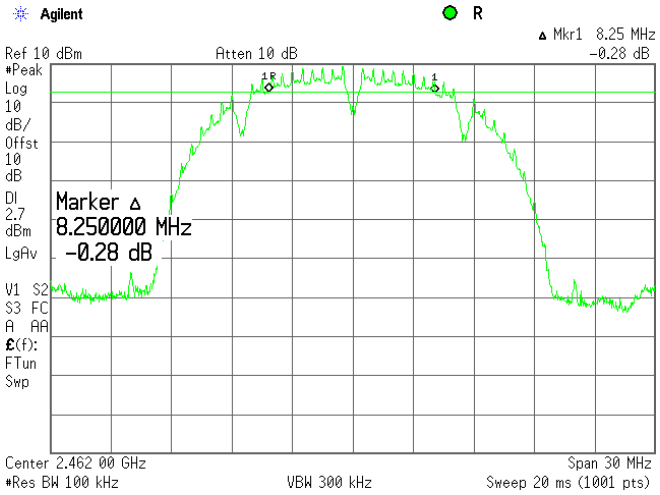
TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	CCK
BITRATE:	1Mbps



Test specification:	Section 15.247(a)(2), 6 dB bandwidth		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(a)(2)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 23 ºC	Air Pressure: 1015 hPa	Relative Humidity: 52 %	Power Supply: 48VDC
Remarks:			

Plot 7.1.3 The 6 dB bandwidth test result at high frequency

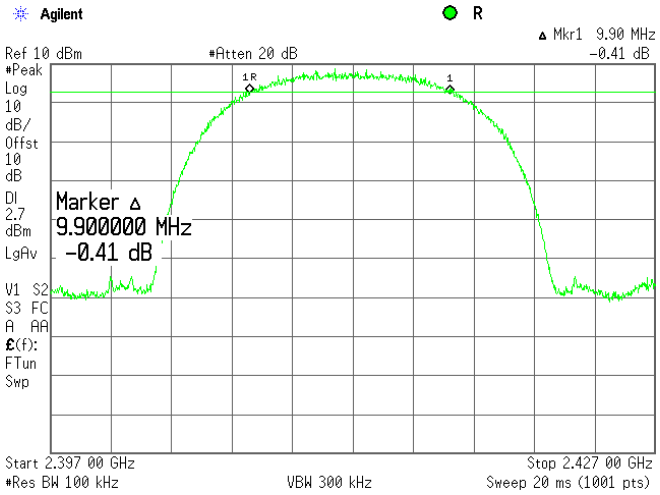
TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	CCK
BITRATE:	1Mbps



Test specification:	Section 15.247(a)(2), 6 dB bandwidth		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(a)(2)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 23 ºC	Air Pressure: 1015 hPa	Relative Humidity: 52 %	Power Supply: 48VDC
Remarks:			

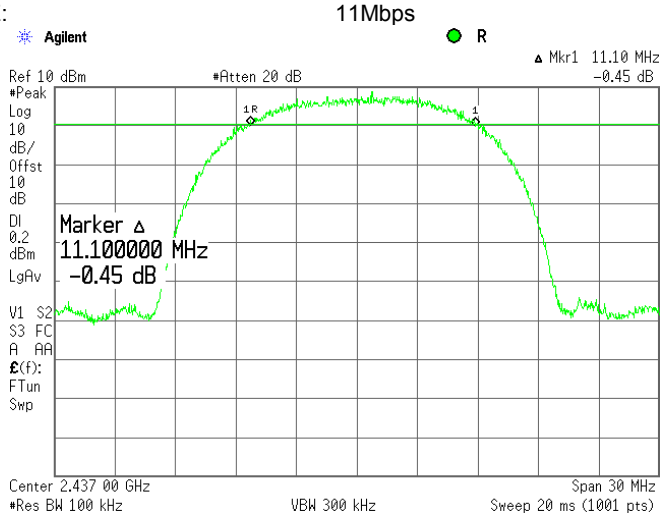
Plot 7.1.4 The 6 dB bandwidth test result at low frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
MODULATION: CCK
BITRATE: 11Mbps



Plot 7.1.5 The 6 dB bandwidth test result at mid frequency

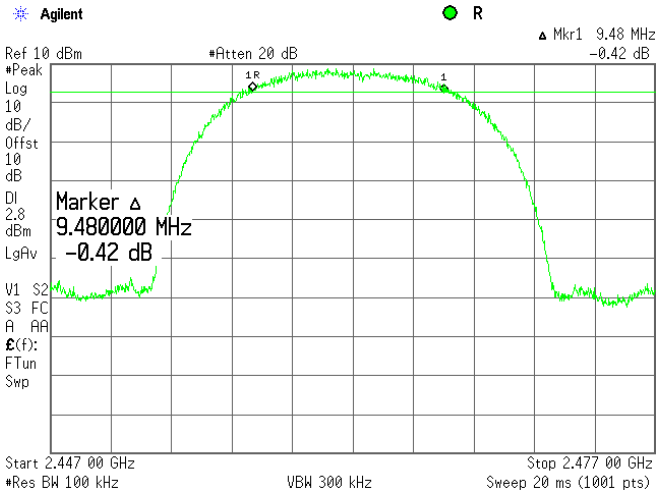
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
MODULATION: CCK
BITRATE: 11Mbps



Test specification:	Section 15.247(a)(2), 6 dB bandwidth		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(a)(2)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 23 ºC	Air Pressure: 1015 hPa	Relative Humidity: 52 %	Power Supply: 48VDC
Remarks:			

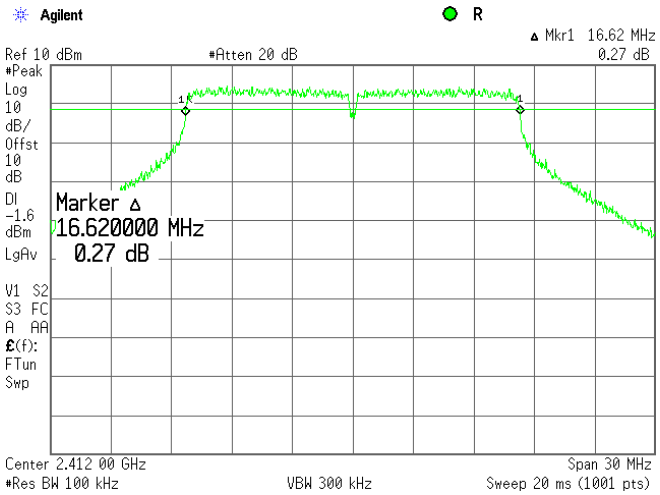
Plot 7.1.6 The 6 dB bandwidth test result at high frequency

TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	CCK
BITRATE:	11Mbps



Plot 7.1.7 The 6 dB bandwidth test result at low frequency

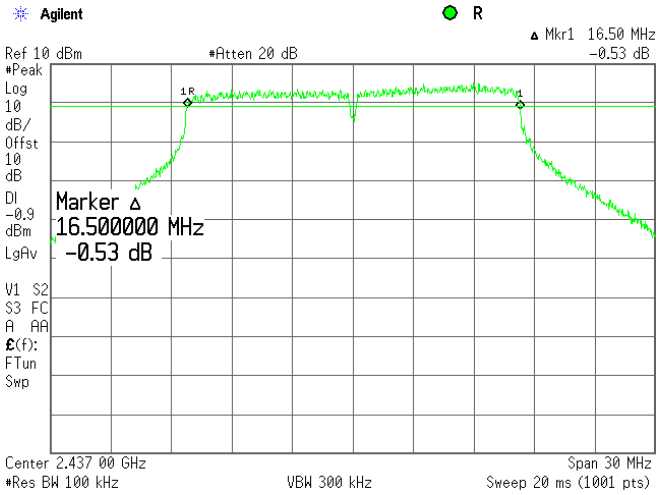
TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	OFDM
BITRATE:	6Mbps



Test specification:	Section 15.247(a)(2), 6 dB bandwidth		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(a)(2)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 23 ºC	Air Pressure: 1015 hPa	Relative Humidity: 52 %	Power Supply: 48VDC
Remarks:			

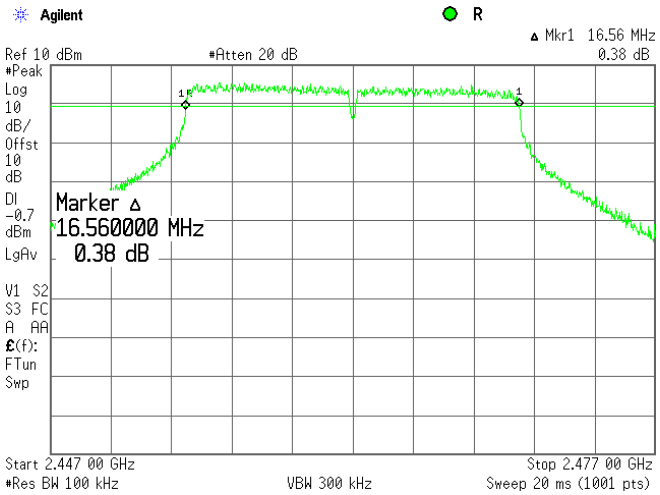
Plot 7.1.8 The 6 dB bandwidth test result at mid frequency

TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	OFDM
BITRATE:	6Mbps



Plot 7.1.9 The 6 dB bandwidth test result at high frequency

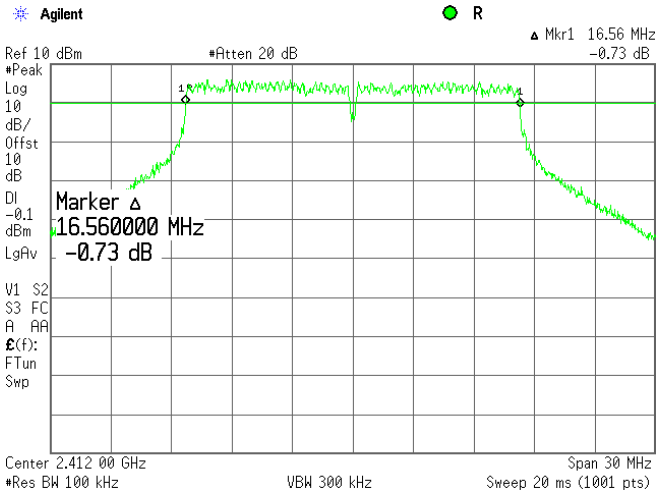
TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	OFDM
BITRATE:	6Mbps



Test specification:	Section 15.247(a)(2), 6 dB bandwidth		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(a)(2)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 23 ºC	Air Pressure: 1015 hPa	Relative Humidity: 52 %	Power Supply: 48VDC
Remarks:			

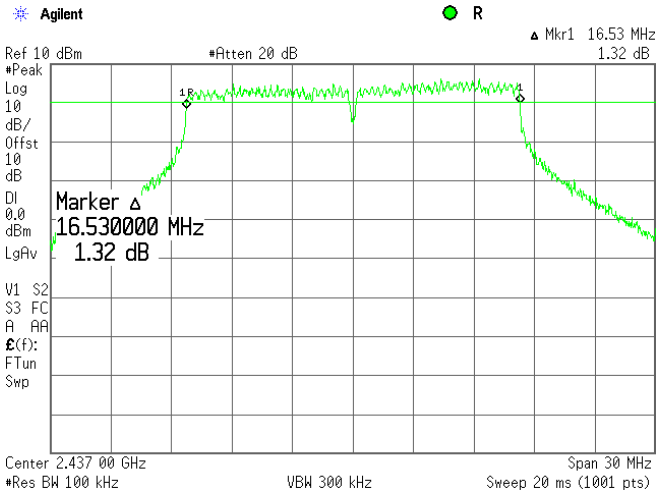
Plot 7.1.10 The 6 dB bandwidth test result at low frequency

TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	OFDM
BITRATE:	54Mbps



Plot 7.1.11 The 6 dB bandwidth test result at mid frequency

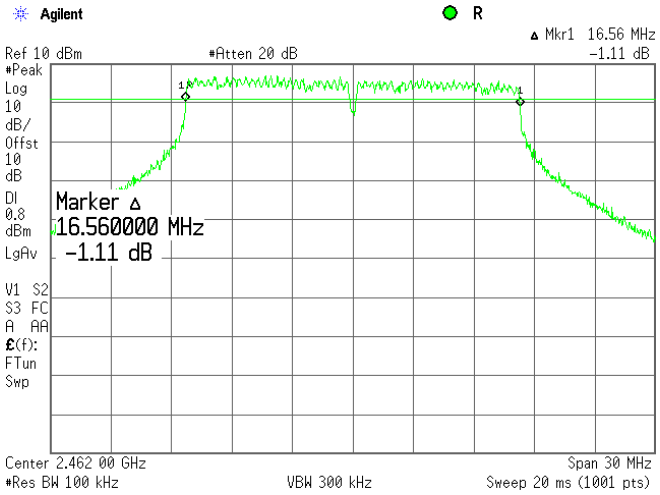
TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	OFDM
BITRATE:	54Mbps



Test specification:	Section 15.247(a)(2), 6 dB bandwidth		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(a)(2)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 23 ºC	Air Pressure: 1015 hPa	Relative Humidity: 52 %	Power Supply: 48VDC
Remarks:			

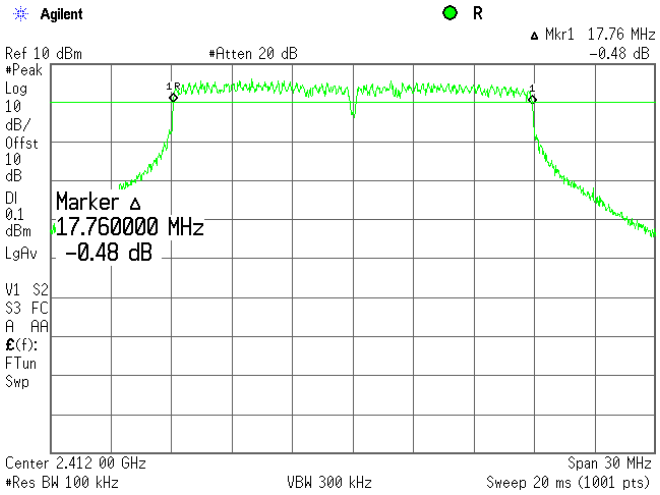
Plot 7.1.12 The 6 dB bandwidth test result at high frequency

TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	OFDM
BITRATE:	54Mbps



Plot 7.1.13 The 6 dB bandwidth test result at low frequency

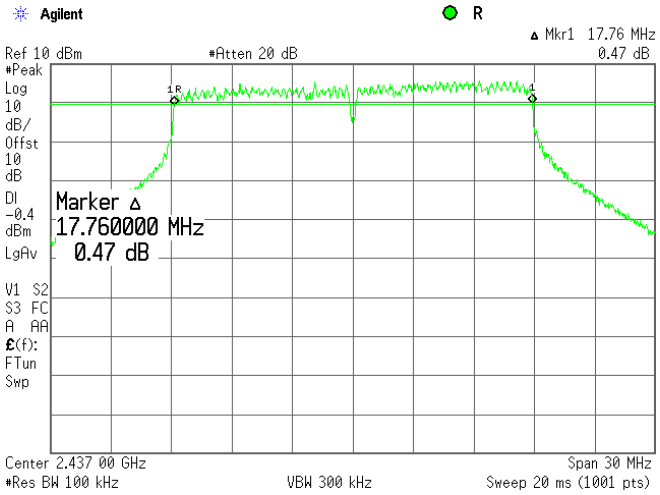
TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	OFDM
BITRATE:	65Mbps



Test specification:	Section 15.247(a)(2), 6 dB bandwidth		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(a)(2)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 23 ºC	Air Pressure: 1015 hPa	Relative Humidity: 52 %	Power Supply: 48VDC
Remarks:			

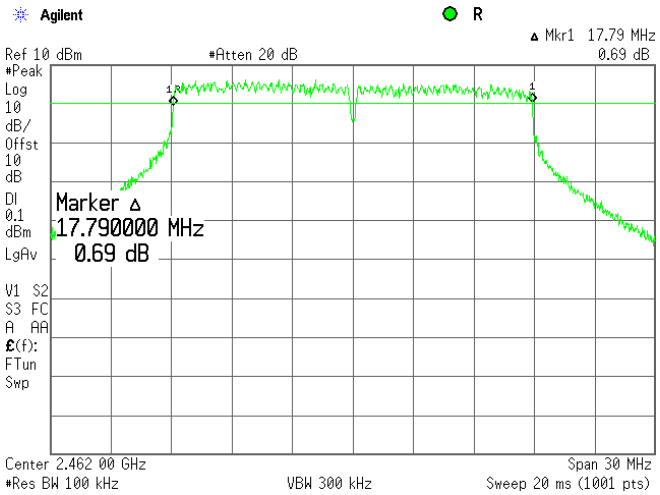
Plot 7.1.14 The 6 dB bandwidth test result at mid frequency

TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	OFDM
BITRATE:	65Mbps



Plot 7.1.15 The 6 dB bandwidth test result at high frequency

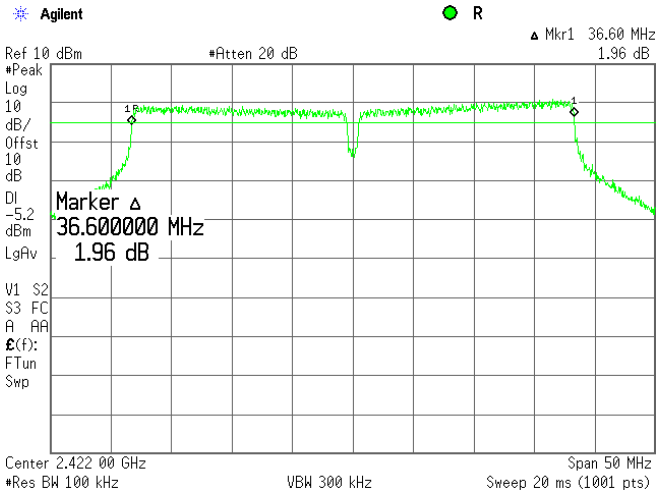
TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	OFDM
BITRATE:	65Mbps



Test specification:	Section 15.247(a)(2), 6 dB bandwidth		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(a)(2)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 23 ºC	Air Pressure: 1015 hPa	Relative Humidity: 52 %	Power Supply: 48VDC
Remarks:			

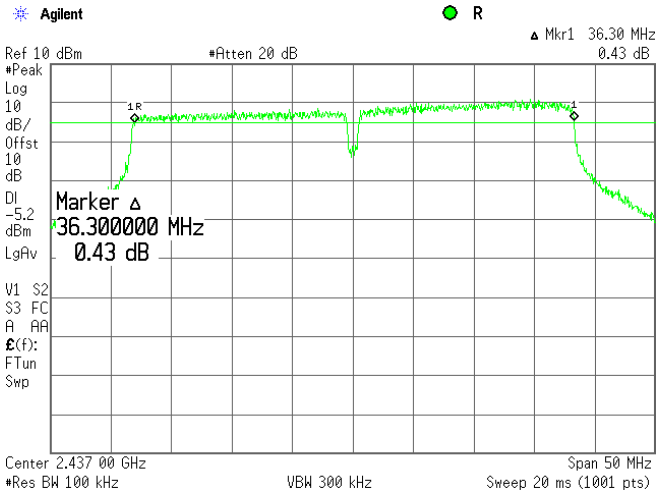
Plot 7.1.16 The 6 dB bandwidth test result at low frequency

TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	OFDM
BITRATE:	13.5Mbps



Plot 7.1.17 The 6 dB bandwidth test result at mid frequency

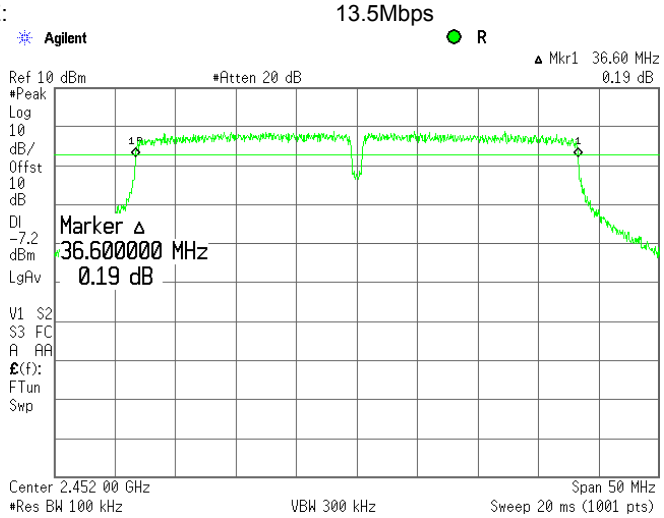
TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
MODULATION:	OFDM
BITRATE:	13.5Mbps



Test specification:	Section 15.247(a)(2), 6 dB bandwidth		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(a)(2)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 23 ºC	Air Pressure: 1015 hPa	Relative Humidity: 52 %	Power Supply: 48VDC
Remarks:			

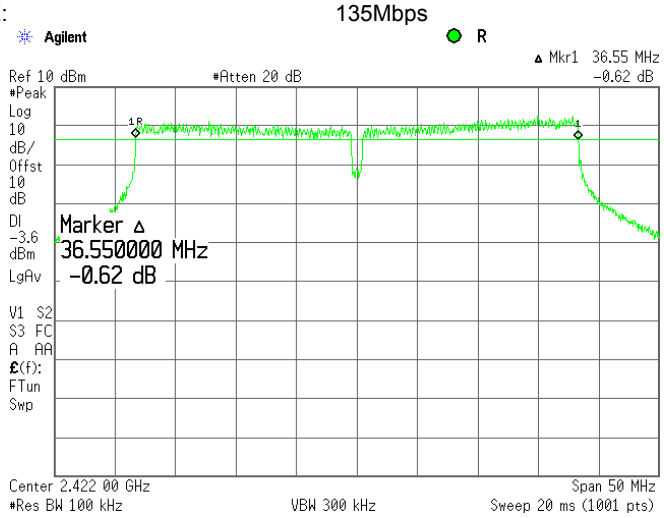
Plot 7.1.18 The 6 dB bandwidth test result at high frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
MODULATION: OFDM
BITRATE: 13.5Mbps



Plot 7.1.19 The 6 dB bandwidth test result at low frequency

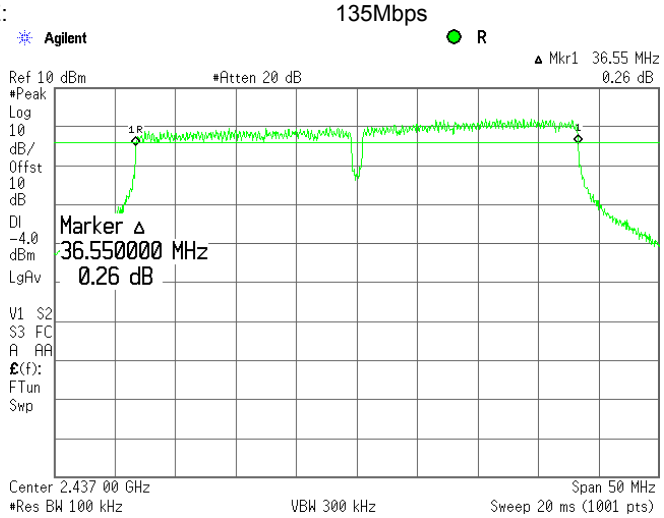
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
MODULATION: OFDM
BITRATE: 135Mbps



Test specification:	Section 15.247(a)(2), 6 dB bandwidth		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(a)(2)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 23 ºC	Air Pressure: 1015 hPa	Relative Humidity: 52 %	Power Supply: 48VDC
Remarks:			

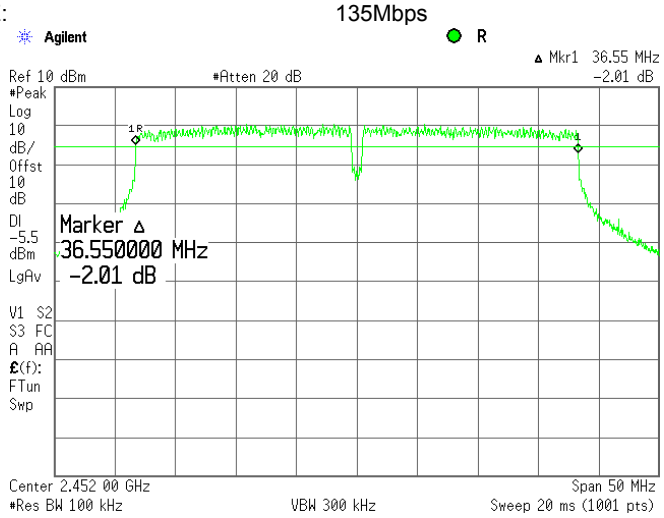
Plot 7.1.20 The 6 dB bandwidth test result at mid frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
MODULATION: OFDM
BITRATE: 135Mbps



Plot 7.1.21 The 6 dB bandwidth test result at high frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
MODULATION: OFDM
BITRATE: 135Mbps



Test specification:	Section 15.247(b)(3), Peak output power		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(b), Option 2, Method #3		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

7.2 Peak output power

7.2.1 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 7.2.1.

Table 7.2.1 Peak output power limits

Assigned frequency range, MHz	Maximum antenna gain, dBi	Peak output power*	
		W	dBm
902.0 – 928.0	6.0	1.0	30.0
2400.0 – 2483.5			
5725.0 – 5850.0			

*- For transmitting antennas of directional gain greater than 6 dBi the peak output power limit was calculated in accordance with section 15.247 (c).

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 for 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 maximum peak output power was measured as provided in Table 7.2.2, Table 7.2.3 and the associated plots.

Figure 7.2.1 Peak output power test setup

Test specification:	**Section 15.247(b)(3), Peak output power**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(b), Option 2, Method #3		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	**Air Pressure:** 1013 hPa	**Relative Humidity:** 42 %	**Power Supply:** 48VDC
Remarks:			

Table 7.2.2 Peak output power test results

ASSIGNED FREQUENCY: 2400-2483.5MHz
MODULATING SIGNAL: PRBS
MEASURE EQUEPMENT: Average power meter
ANTENNA TYPE: Omni
ANTANNA GAIN: 7.4 dBi

Carrier frequency, MHz	Transmit power setting, dBm	CBW, MHz	Modulation	Bitrate, Mbps	Power meter reading, dBm	Chain correction factor***, dB	Peak output power,** dBm	Limit, dBm	Margin*, dB	Verdict
2412	17.5	20	CCK	1	16.70	4.77	21.47	28	-6.53	Pass
2437	18	20	CCK	1	17.10	4.77	21.87	28	-6.13	Pass
2462	16	20	CCK	1	16.15	4.77	20.92	28	-7.08	Pass
2412	17.5	20	CCK	11	17.00	4.77	21.77	28	-6.23	Pass
2437	18	20	CCK	11	17.10	4.77	21.87	28	-6.13	Pass
2462	16	20	CCK	11	15.90	4.77	20.67	28	-7.33	Pass
2412	17.5	20	OFDM	6	17.70	4.77	22.47	28	-5.53	Pass
2437	18	20	OFDM	6	17.70	4.77	22.47	28	-5.53	Pass
2462	16	20	OFDM	6	16.10	4.77	20.87	28	-7.13	Pass
2412	17.5	20	OFDM	54	17.60	4.77	22.37	28	-5.63	Pass
2437	18	20	OFDM	54	17.10	4.77	21.87	28	-6.13	Pass
2462	16	20	OFDM	54	15.30	4.77	20.07	28	-7.93	Pass
2412	17.5	20	OFDM	65	17.00	4.77	21.77	28	-6.23	Pass
2437	18	20	OFDM	65	17.15	4.77	21.92	28	-6.08	Pass
2462	16	20	OFDM	65	15.20	4.77	19.97	28	-8.03	Pass
2422	16	40	OFDM	13.5	16.10	4.77	20.87	28	-7.13	Pass
2437	16	40	OFDM	13.5	15.70	4.77	20.47	28	-7.53	Pass
2452	16	40	OFDM	13.5	15.10	4.77	19.87	28	-8.13	Pass
2422	16	40	OFDM	135	16.20	4.77	20.97	28	-7.03	Pass
2437	16	40	OFDM	135	15.71	4.77	20.48	28	-7.52	Pass
2452	16	40	OFDM	135	15.10	4.77	19.87	28	-8.13	Pass

* - Margin = Peak output power – specification limit.
** - Peak power over EBW = Power meter reading + Chain Correction Factor
***-Chain Correction Factor=10*log(3)

Test specification:	Section 15.247(b)(3), Peak output power		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(b), Option 2, Method #3		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

Table 7.2.2 Peak output power test results (continued)

ASSIGNED FREQUENCY: 2400-2483.5MHz
MODULATING SIGNAL: PRBS
MEASURE EQUEPMENT: Average power meter
ANTENNA TYPE: Sector
ANTENNA GAIN: 12 dBi

Carrier frequency, MHz	Transmit power setting, dBm	CBW, MHz	Modulation	Bitrate, Mbps	Power meter reading, dBm	Chain correction factor***, dB	Peak output power,** dBm	Limit, dBm	Margin*, dB	Verdict
2412	14	20	CCK	1	13.20	4.77	17.97	26.4	-8.43	Pass
2437	14	20	CCK	1	13.18	4.77	17.95	26.4	-8.45	Pass
2462	11	20	CCK	1	11.00	4.77	15.77	26.4	-10.63	Pass
2412	14	20	CCK	11	13.50	4.77	18.27	26.4	-8.13	Pass
2437	14	20	CCK	11	13.00	4.77	17.77	26.4	-8.63	Pass
2462	11	20	CCK	11	10.62	4.77	15.39	26.4	-11.01	Pass
2412	14	20	OFDM	6	13.45	4.77	18.22	26.4	-8.18	Pass
2437	14	20	OFDM	6	13.10	4.77	17.87	26.4	-8.53	Pass
2462	11	20	OFDM	6	10.50	4.77	15.27	26.4	-11.13	Pass
2412	14	20	OFDM	54	12.80	4.77	17.57	26.4	-8.83	Pass
2437	14	20	OFDM	54	12.50	4.77	17.27	26.4	-9.13	Pass
2462	11	20	OFDM	54	10.15	4.77	14.92	26.4	-11.48	Pass
2412	14	20	OFDM	65	12.75	4.77	17.52	26.4	-8.88	Pass
2437	14	20	OFDM	65	12.50	4.77	17.27	26.4	-9.13	Pass
2462	11	20	OFDM	65	10.20	4.77	14.97	26.4	-11.43	Pass
2422	8	40	OFDM	13.5	7.42	4.77	12.19	26.4	-14.21	Pass
2437	11.5	40	OFDM	13.5	11.00	4.77	15.77	26.4	-10.63	Pass
2452	6	40	OFDM	13.5	5.00	4.77	9.77	26.4	-16.63	Pass
2422	8	40	OFDM	135	7.40	4.77	12.17	26.4	-14.23	Pass
2437	11.5	40	OFDM	135	11.10	4.77	15.87	26.4	-10.53	Pass
2452	6	40	OFDM	135	4.95	4.77	9.72	26.4	-16.68	Pass

* - Margin = Peak output power – specification limit.
** - Peak power over EBW = Power meter reading + Chain Correction Factor
***-Chain Correction Factor=10*log(3)

Test specification:	Section 15.247(b)(3), Peak output power		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(b), Option 2, Method #3		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

Table 7.2.3 Peak output power test results at: Unom, 115%Unom, 85%Unom

ASSIGNED FREQUENCY: 2400-2483.5MHz
MODULATING SIGNAL: PRBS
MEASURE EQUEPMENT: Average power meter
ANTENNA TYPE: Omni
ANTENNA GAIN: 7.4 dBi

Carrier frequency, MHz	Voltage, Volt	Transmit power setting, dBm	CBW, MHz	Modulation	Bitrate, Mbps	Power meter reading, dBm	Chain correction factor***, dB	Peak output power,** dBm	Limit, dBm	Margin*, dB	Verdict
2412	48	17.5	20	OFDM	6	17.00	4.77	21.77	28	-6.23	Pass
2412	56	17.5	20	OFDM	6	16.93	4.77	21.7	28	-6.3	Pass
2412	41	17.5	20	OFDM	6	16.92	4.77	21.69	28	-6.31	Pass
2437	48	18	20	OFDM	6	17.10	4.77	21.87	28	-6.13	Pass
2437	56	18	20	OFDM	6	17.20	4.77	21.97	28	-6.03	Pass
2437	41	18	20	OFDM	6	17.15	4.77	21.92	28	-6.08	Pass
2462	48	16	20	OFDM	6	15.50	4.77	20.27	28	-7.73	Pass
2462	56	16	20	OFDM	6	15.52	4.77	20.29	28	-7.71	Pass
2462	41	16	20	OFDM	6	15.48	4.77	20.25	28	-7.75	Pass
2422	48	16	40	OFDM	13.5	16.30	4.77	21.07	28	-6.93	Pass
2422	56	16	40	OFDM	13.5	16.20	4.77	20.97	28	-7.03	Pass
2422	41	16	40	OFDM	13.5	16.10	4.77	20.87	28	-7.13	Pass
2437	48	16	40	OFDM	13.5	15.60	4.77	20.37	28	-7.63	Pass
2437	56	16	40	OFDM	13.5	15.62	4.77	20.39	28	-7.61	Pass
2437	41	16	40	OFDM	13.5	15.58	4.77	20.35	28	-7.65	Pass
2452	48	16	40	OFDM	13.5	15.40	4.77	20.17	28	-7.83	Pass
2452	56	16	40	OFDM	13.5	15.37	4.77	20.14	28	-7.86	Pass
2452	41	16	40	OFDM	13.5	15.35	4.77	20.12	28	-7.88	Pass

* - Margin = Peak output power – specification limit.
** - Peak power over EBW = Power meter reading + Chain Correction Factor
***-Chain Correction Factor=10*log(3)

Test specification:	Section 15.247(b)(3), Peak output power		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(b), Option 2, Method #3		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

Table 7.2.3 Peak output power test results at: Unom, 115%Unom, 85%Unom

ASSIGNED FREQUENCY: 2400-2483.5 MHz
MODULATING SIGNAL: PRBS
MEASURE EQUEPMENT: Average power meter
ANTENNA TYPE: Sector
ANTENNA GAIN: 12 dBi

Carrier frequency, MHz	Voltage, V	Transmit power setting, dBm	CBW, MHz	Modulation	Bitrate, Mbps	Power meter reading, dBm	Chain correction factor***, dB	Peak output power,** dBm	Limit, dBm	Margin*, dB	Verdict
2412	48	14	20	OFDM	6	12.80	4.77	17.57	26.4	-8.83	Pass
2412	56	14	20	OFDM	6	12.75	4.77	17.52	26.4	-8.88	Pass
2412	41	14	20	OFDM	6	12.70	4.77	17.47	26.4	-8.93	Pass
2437	48	14	20	OFDM	6	12.60	4.77	17.37	26.4	-9.03	Pass
2437	56	14	20	OFDM	6	12.61	4.77	17.38	26.4	-9.02	Pass
2437	41	14	20	OFDM	6	12.60	4.77	17.37	26.4	-9.03	Pass
2462	48	11	20	OFDM	6	11.40	4.77	16.17	26.4	-10.23	Pass
2462	56	11	20	OFDM	6	11.42	4.77	16.19	26.4	-10.21	Pass
2462	41	11	20	OFDM	6	11.45	4.77	16.22	26.4	-10.18	Pass
2422	48	8	40	OFDM	13.5	7.58	4.77	12.35	26.4	-14.05	Pass
2422	56	8	40	OFDM	13.5	7.62	4.77	12.39	26.4	-14.01	Pass
2422	41	8	40	OFDM	13.5	7.64	4.77	12.41	26.4	-13.99	Pass
2437	48	11.5	40	OFDM	13.5	11.09	4.77	15.86	26.4	-10.54	Pass
2437	56	11.5	40	OFDM	13.5	11.11	4.77	15.88	26.4	-10.52	Pass
2437	41	11.5	40	OFDM	13.5	11.20	4.77	15.97	26.4	-10.43	Pass
2452	48	6	40	OFDM	13.5	5.12	4.77	9.89	26.4	-16.51	Pass
2452	56	6	40	OFDM	13.5	5.15	4.77	9.92	26.4	-16.48	Pass
2452	41	6	40	OFDM	13.5	5.21	4.77	9.98	26.4	-16.42	Pass

* - Margin = Peak output power – specification limit.
** - Peak power over EBW = Power meter reading + Chain Correction Factor
***-Chain Correction Factor=10*log(3)
Note:
1) Tx power limit calculation per chain with 7.4 dBi antenna:
30 – {7.4 + 10*log10(3) – 6}/3 - 10*log10(3) = 23.2 [dBm].
For 3 chains (total) power: 23.2 + 10*log10(3) = 28 [dBm].
2) Tx power limit calculation per chain with 12 dBi antenna:
30 – {12 + 10*log10(3) – 6}/3 - 10*log10(3) = 21.6 [dBm].
For 3 chains (total) power: 21.6 + 10*log10(3) = 26.4 [dBm].

Reference numbers of test equipment used

HL 2952	HL 3301	HL 3763					

Full description is given in Appendix A.

Test specification:	Section 15.247(d), Conducted spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 24 ºC	Air Pressure: 1015 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

7.3 Spurious emissions at RF antenna connector

7.3.1 General

This test was performed to measure spurious emissions at RF antenna connector. Specification test limits are given in Table 7.3.1. The test results are provided in Table 7.3.2 and associated plots.

Table 7.3.1 Spurious emission limits

Frequency*, MHz	Attenuation below carrier*, dBc
0.009 – 10th harmonic	20.0

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

7.3.2 Test procedure

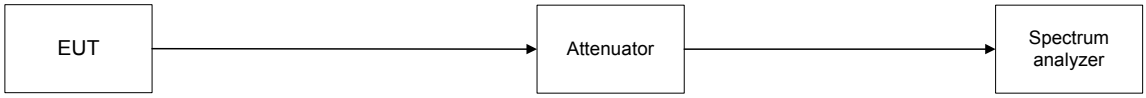
7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.

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

7.3.2.3 The highest emission level within the authorized band was measured.

7.3.2.4 The spurious emission was measured with spectrum analyzer as provided in Table 7.3.2 and the associated plots and referenced to the highest emission level measured within the authorized band.

Figure 7.3.1 Spurious emission test setup



Test specification:	Section 15.247(d), Conducted spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 24 ºC	Air Pressure: 1015 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

Table 7.3.2 Spurious emission test results

ASSIGNED FREQUENCY RANGE:	2400-2483.5MHz
INVESTIGATED FREQUENCY RANGE:	0.009 - 25000MHz
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	100 kHz
VIDEO BANDWIDTH:	300 kHz
CBW:	20MHz
MODULATING SIGNAL:	PRBS
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum

Frequency, MHz	Spurious emission, dBm	Emission at carrier, dBm	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
No emissions was found						

Verdict: Pass

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

Reference numbers of test equipment used

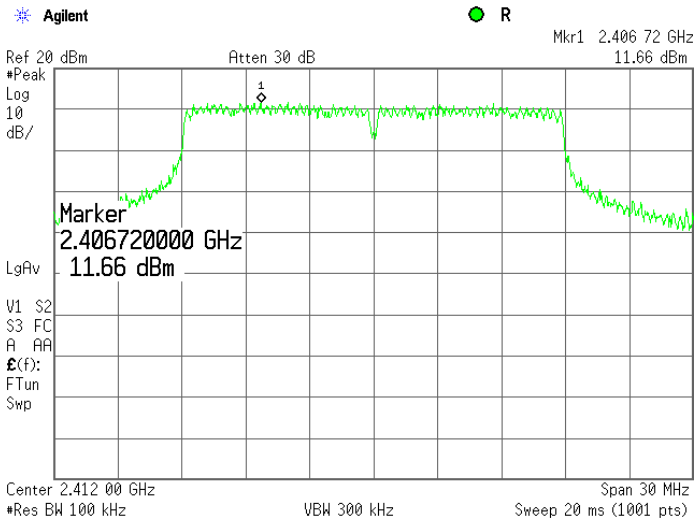
HL 3455	HL 3818	HL 3903					

Full description is given in Appendix A.

Test specification:	Section 15.247(d), Conducted spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 24 ºC	Air Pressure: 1015 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

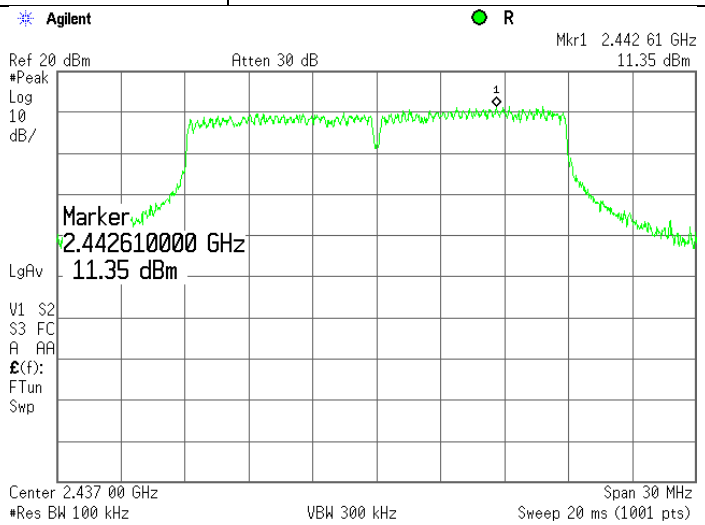
Plot 7.3.1 The highest emission level within the assigned band at low carrier frequency

MODULATION:	OFDM
BITRATE:	65Mbps



Plot 7.3.2 The highest emission level within the assigned band at mid carrier frequency

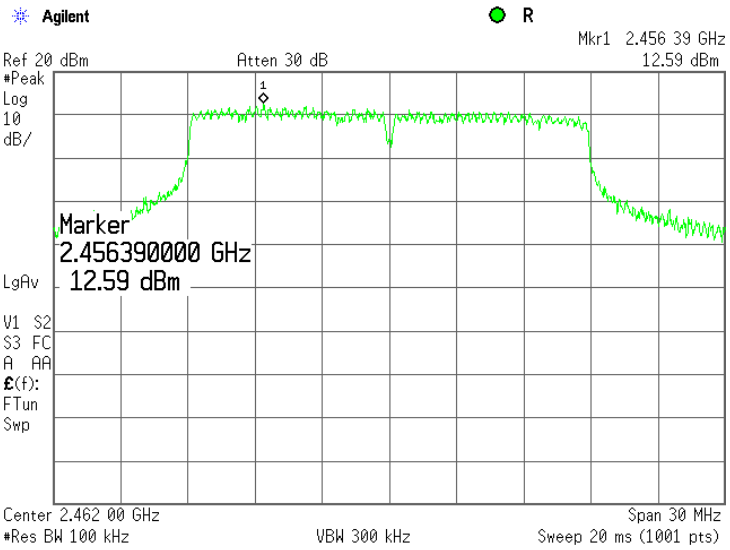
MODULATION:	OFDM
BITRATE:	65Mbps



Test specification:	Section 15.247(d), Conducted spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 24 ºC	Air Pressure: 1015 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

Plot 7.3.3 The highest emission level within the assigned band at high carrier frequency

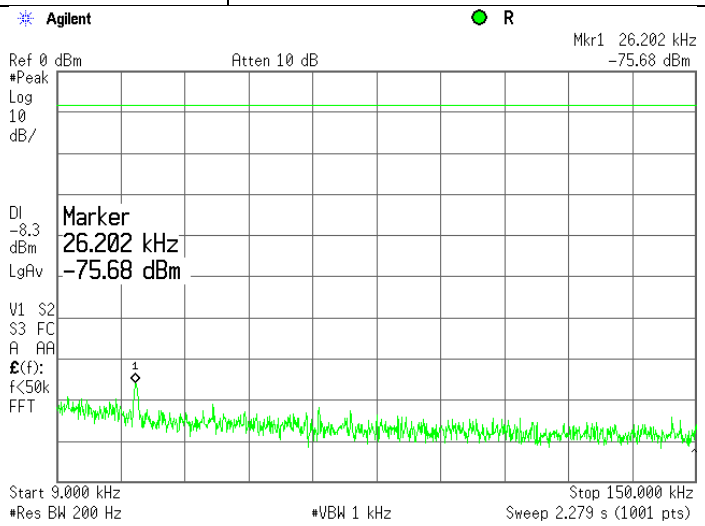
MODULATION:	OFDM
BITRATE:	65Mbps



Test specification:	Section 15.247(d), Conducted spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 24 ºC	Air Pressure: 1015 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

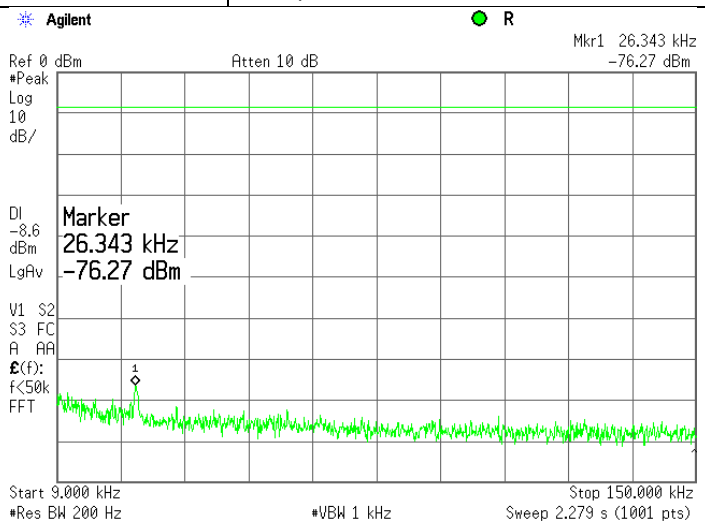
Plot 7.3.4 Spurious emission measurements in 9 - 150 kHz range at low carrier frequency

MODULATION:	OFDM
BITRATE:	65Mbps



Plot 7.3.5 Spurious emission measurements in 9 - 150 kHz range at mid carrier frequency

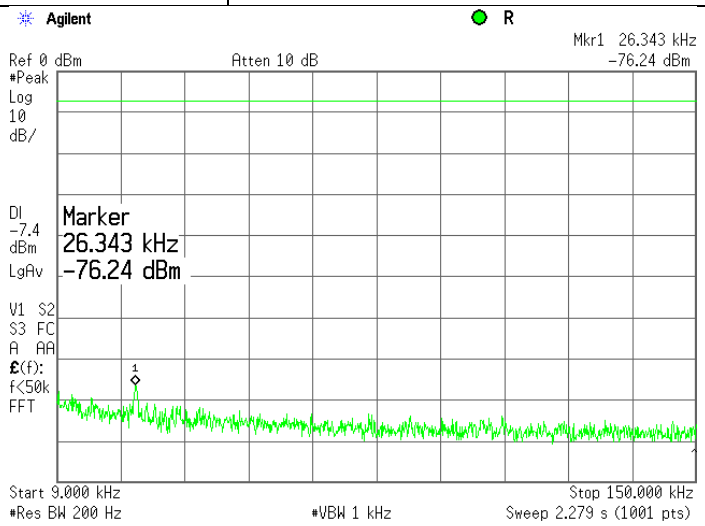
MODULATION:	OFDM
BITRATE:	65Mbps



Test specification:	Section 15.247(d), Conducted spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 24 ºC	Air Pressure: 1015 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

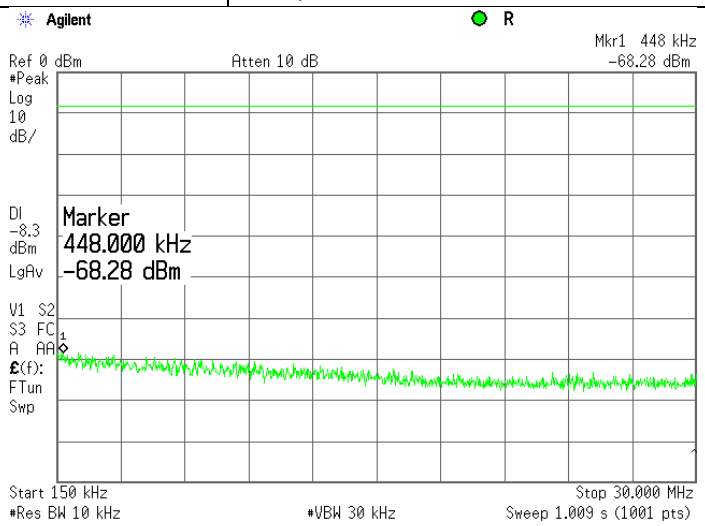
Plot 7.3.6 Spurious emission measurements in 9 - 150 kHz range at high carrier frequency

MODULATION:	OFDM
BITRATE:	65Mbps



Plot 7.3.7 Spurious emission measurements in 0.15 - 30 MHz range at low carrier frequency

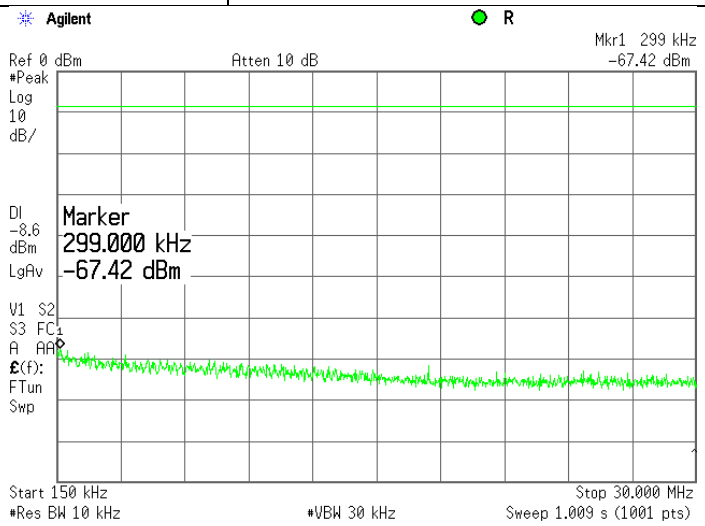
MODULATION:	OFDM
BITRATE:	65Mbps



Test specification:	Section 15.247(d), Conducted spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 24 ºC	Air Pressure: 1015 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

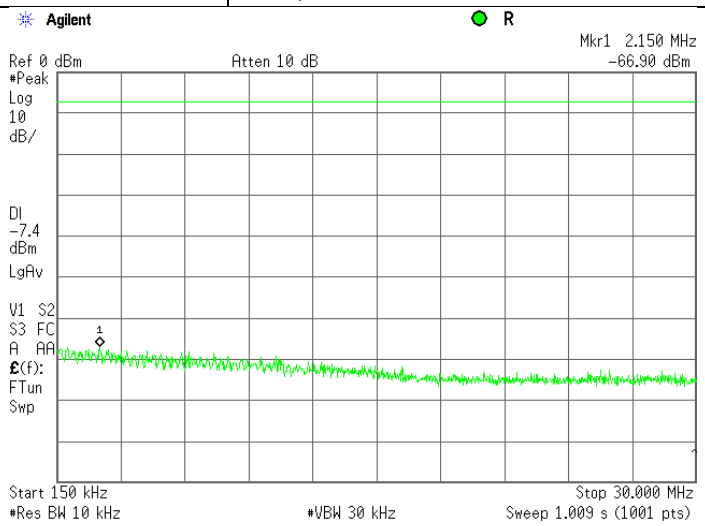
Plot 7.3.8 Spurious emission measurements in 0.15 - 30 MHz range at mid carrier frequency

MODULATION:	OFDM
BITRATE:	65Mbps



Plot 7.3.9 Spurious emission measurements in 0.15 - 30 MHz range at high carrier frequency

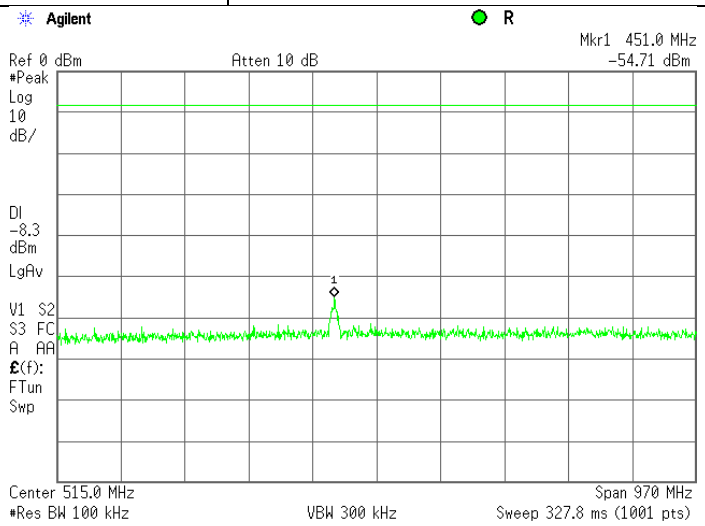
MODULATION:	OFDM
BITRATE:	65Mbps



Test specification:	Section 15.247(d), Conducted spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 24 ºC	Air Pressure: 1015 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

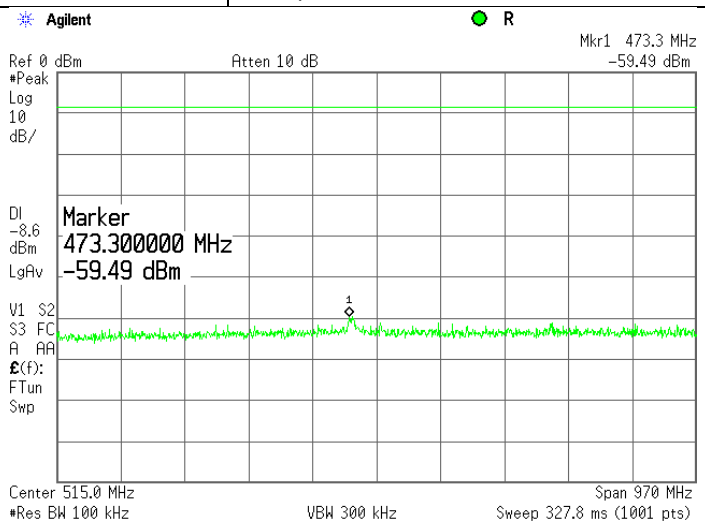
Plot 7.3.10 Spurious emission measurements in 30 - 1000 MHz range at low carrier frequency

MODULATION:	OFDM
BITRATE:	65Mbps



Plot 7.3.11 Spurious emission measurements in 30 - 1000 MHz range at mid carrier frequency

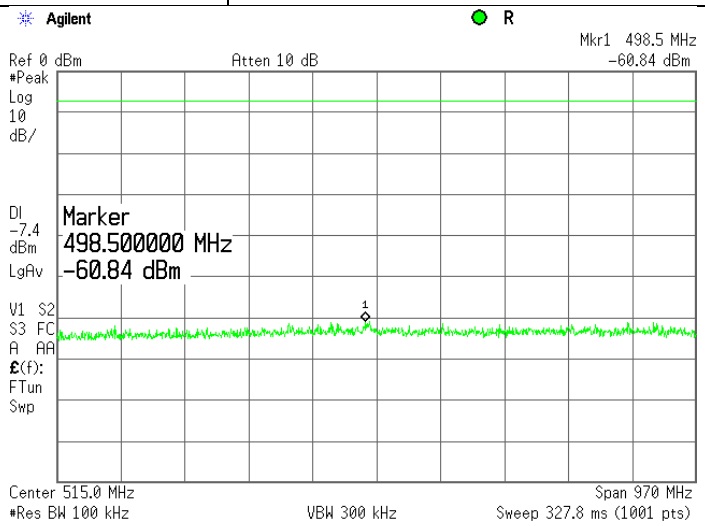
MODULATION:	OFDM
BITRATE:	65Mbps



Test specification:	Section 15.247(d), Conducted spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 24 ºC	Air Pressure: 1015 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

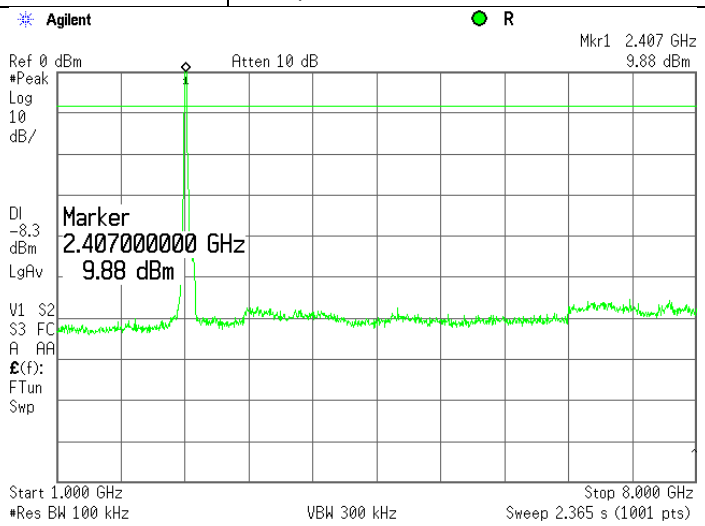
Plot 7.3.12 Spurious emission measurements in 30 - 1000 MHz range at high carrier frequency

MODULATION:	OFDM
BITRATE:	65Mbps



Plot 7.3.13 Spurious emission measurements in 1000 –8000 MHz range at low carrier frequency

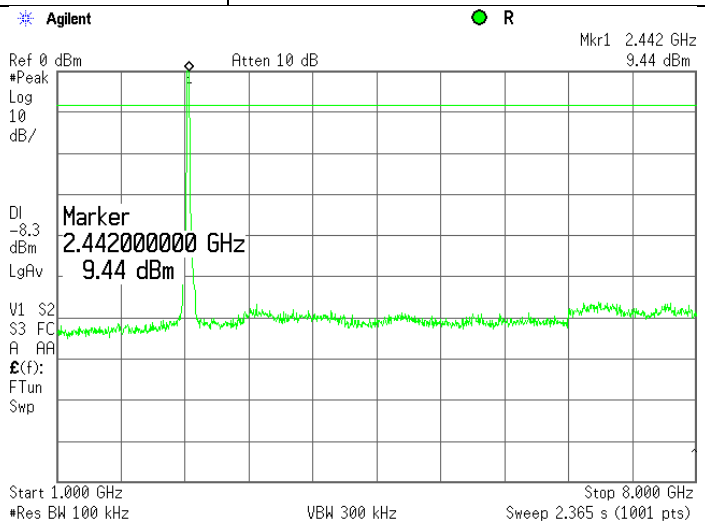
MODULATION:	OFDM
BITRATE:	65Mbps



Test specification:	Section 15.247(d), Conducted spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 24 ºC	Air Pressure: 1015 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

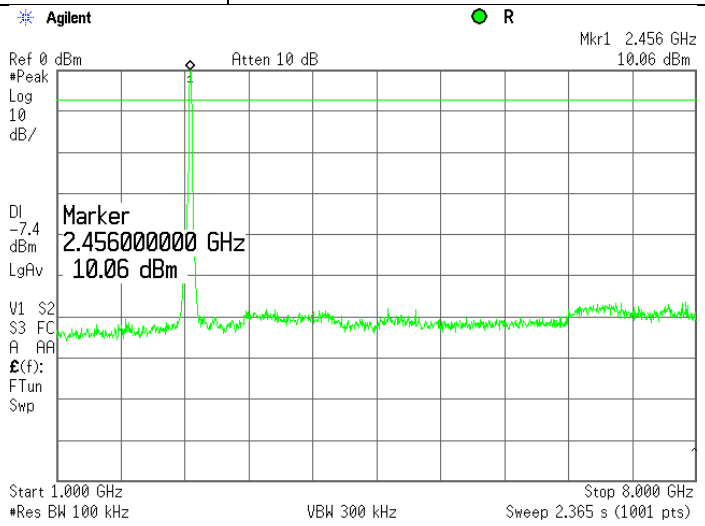
Plot 7.3.14 Spurious emission measurements in 1000 –8000 MHz range at mid carrier frequency

MODULATION:	OFDM
BITRATE:	65Mbps



Plot 7.3.15 Spurious emission measurements in 1000 –8000 MHz range at high carrier frequency

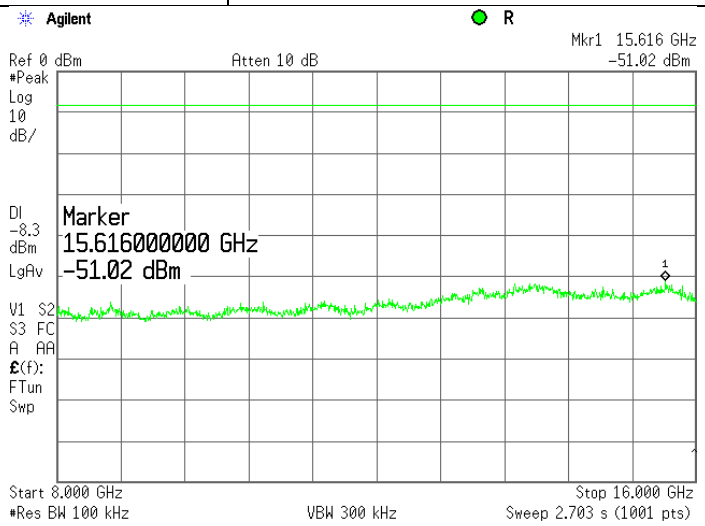
MODULATION:	OFDM
BITRATE:	65Mbps



Test specification:	Section 15.247(d), Conducted spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 24 ºC	Air Pressure: 1015 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

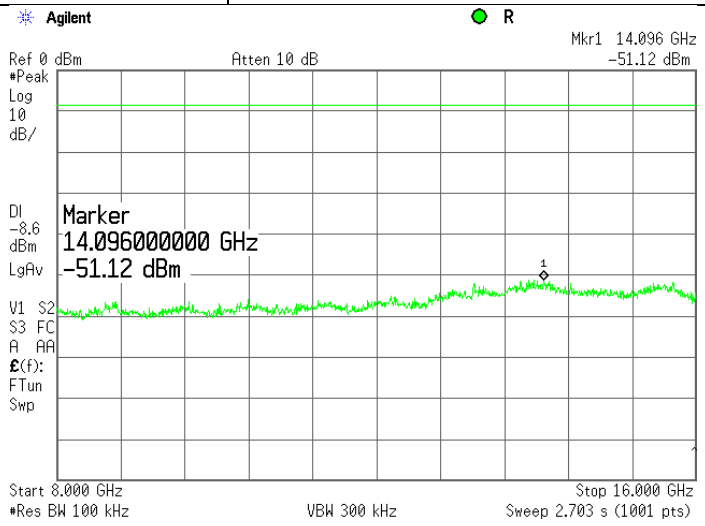
Plot 7.3.16 Spurious emission measurements in 8000 –16000 MHz range at low carrier frequency

MODULATION:	OFDM
BITRATE:	65Mbps



Plot 7.3.17 Spurious emission measurements in 8000 –16000 MHz range at mid carrier frequency

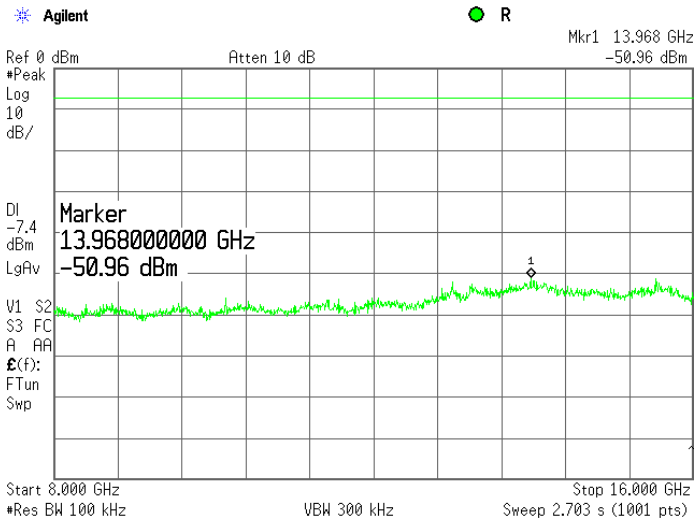
MODULATION:	OFDM
BITRATE:	65Mbps



Test specification:	Section 15.247(d), Conducted spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 24 ºC	Air Pressure: 1015 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

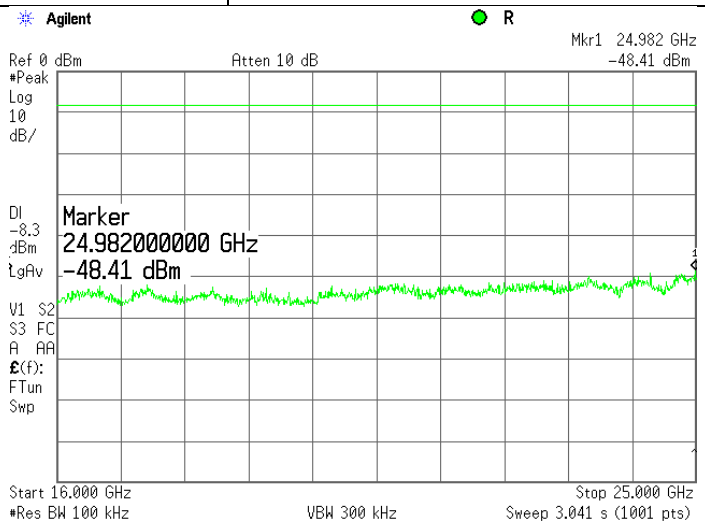
Plot 7.3.18 Spurious emission measurements in 8000 –16000 MHz range at high carrier frequency

MODULATION:	OFDM
BITRATE:	65Mbps



Plot 7.3.19 Spurious emission measurements in 16000 –25000 MHz range at low carrier frequency

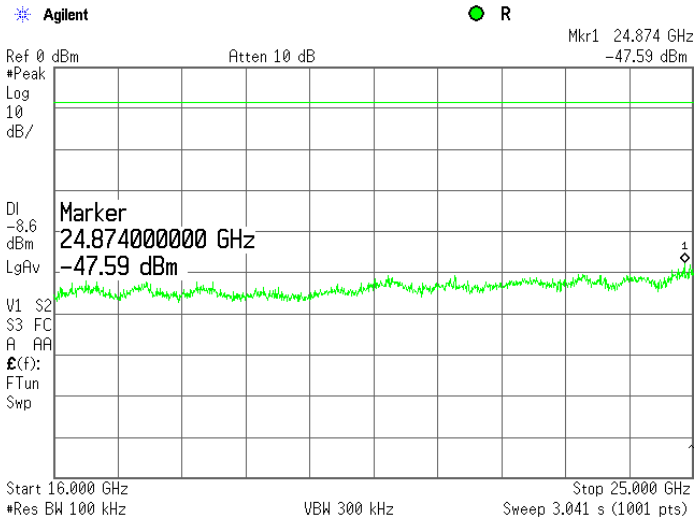
MODULATION:	OFDM
BITRATE:	65Mbps



Test specification:	Section 15.247(d), Conducted spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/19/2011		
Temperature: 24 ºC	Air Pressure: 1015 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

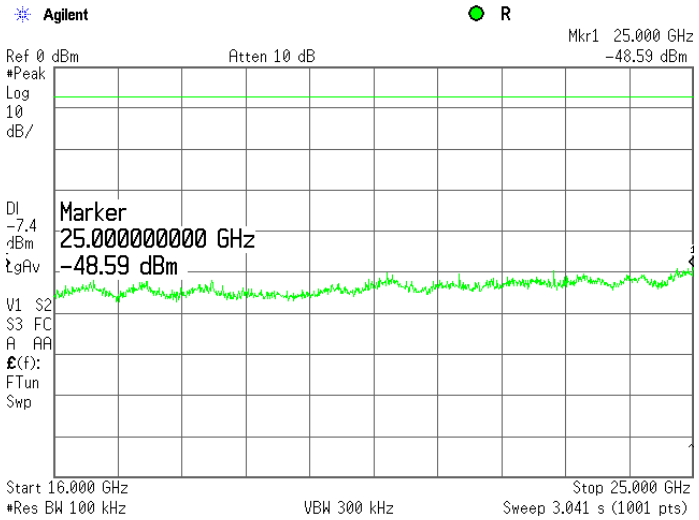
Plot 7.3.20 Spurious emission measurements in 16000 –25000 MHz range at mid carrier frequency

MODULATION:	OFDM
BITRATE:	65Mbps



Plot 7.3.21 Spurious emission measurements in 16000 –25000 MHz range at high carrier frequency

MODULATION:	OFDM
BITRATE:	65Mbps



Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

7.4 Band edge emissions, sector antenna configuration

7.4.1 General

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

Table 7.4.1 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m within restricted bands, dB(μV/m)*			Attenuation of field strength of spurious versus carrier outside restricted bands, dBc***
	Peak	Quasi Peak	Average	
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**	20.0
0.090 – 0.110	NA	108.5 – 106.8**	NA	
0.110 – 0.490	126.8 – 113.8	NA	106.8 – 93.8**	
0.490 – 1.705	NA	73.8 – 63.0**	NA	
1.705 – 30.0*		69.5		
30 – 88		40.0		
88 – 216		43.5		
216 – 960		46.0		
960 - 1000		54.0		
1000 – 10thharmonic	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.

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

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

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

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

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

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

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

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

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

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

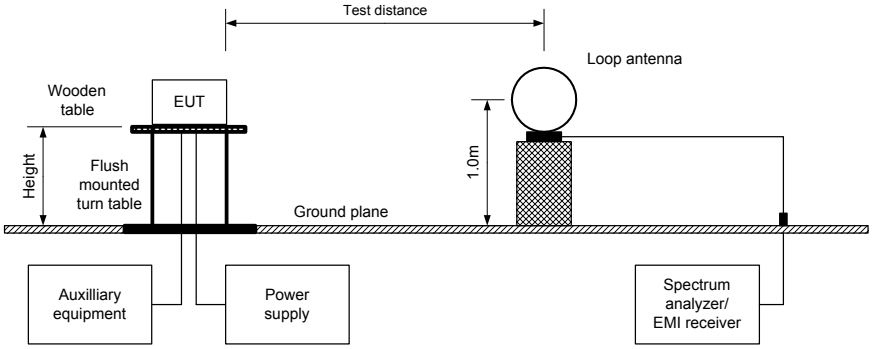
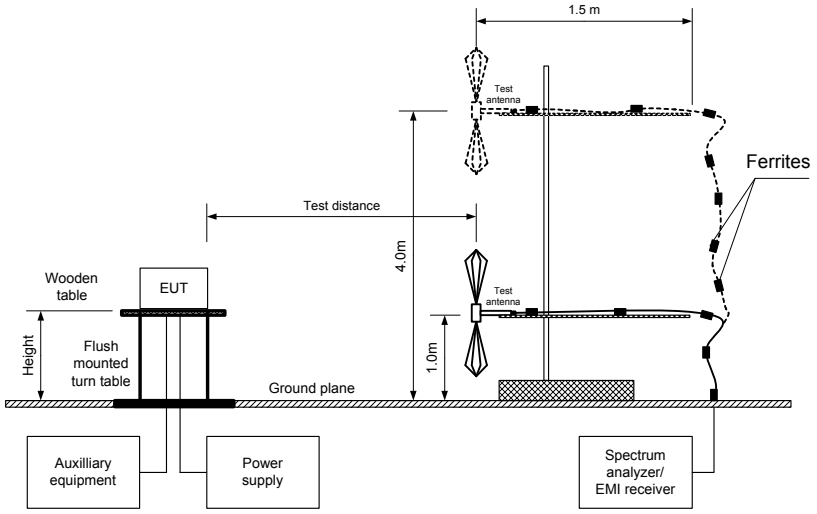


Figure 7.4.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Table 7.4.2 Field strength of spurious emissions above 1 GHz within restricted bands

INVESTIGATED FREQUENCY RANGE:	2400-2483.5MHz
TEST DISTANCE:	3 m
DUTY CYCLE:	100 %
DETECTOR USED:	Peak
CBW:	20 MHz
TEST ANTENNA TYPE:	Double ridged guide
ANTENNA POLARIZATION:	Vertical
ANTENNA HEIGHT:	1.2 m

Frequency, MHz	Transmit power setting, dBm	Bit rate, Mbps	Modulation	Azimuth, degrees*	Peak field strength (VBW=3 MHz)			Average field strength (VBW=10 Hz)			Verdict
					Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2412 MHz carrier frequency											
2387.52	14	1	CCK	220	64.16	74	-9.84	NA	54	NA	Pass
2390.00	14	1	CCK	220	NA	74	NA	50.7	54	-3.3	
2389.60	14	54	OFDM	215	66.93	74	-7.07	NA	54	NA	
2390.00	14	54	OFDM	215	NA	74	NA	52.27	54	-1.73	
2389.76	14	65	OFDM	238	66.53	74	-7.47	NA	54	NA	
2390.00	14	65	OFDM	238	NA	74	NA	53.35	54	-0.65	
2437 MHz carrier frequency											
2387.60	14	1	CCK	225	62.65	74	-11.35	NA	54	NA	Pass
2388.96	14	1	CCK	225	NA	74	NA	50.61	54	-3.39	
2385.12	14	54	OFDM	180	67.39	74	-6.61	NA	54	NA	
2387.44	14	54	OFDM	180	NA	74	NA	53.83	54	-0.17	
2386.16	14	65	OFDM	200	67.65	74	-6.35	NA	54	NA	
2388.96	14	65	OFDM	200	NA	74	NA	53.86	54	-0.14	
2499.5545	14	1	CCK	140	64.89	74	-9.11	NA	54	NA	
2499.835	14	1	CCK	140	NA	74	NA	53.32	54	-0.68	
2483.863	14	54	OFDM	185	69.27	74	-4.73	NA	54	NA	
2483.50	14	54	OFDM	185	NA	74	NA	53.12	54	-0.88	
2500.00	14	54	OFDM	185	NA	74	NA	52.73	54	-1.27	
2483.7145	14	65	OFDM	212	67.21	74	-6.79	NA	54	NA	
2499.9835	14	65	OFDM	212	NA	74	NA	53.95	54	-0.05	
2483.50	14	65	OFDM	212	NA	74	NA	53.36	54	-0.64	

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Table 7.4.2 Field strength of spurious emissions above 1 GHz within restricted bands (continued)

Frequency, MHz	Transmit power setting, dBm	Bit rate, Mbps	Modulation	Azimuth, degrees*	Peak field strength (VBW=3 MHz)			Average field strength (VBW=10 Hz)			Verdict
					Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
2452 MHz carrier frequency											
2495.545	14	1	CCK	218	70.39	74	-3.61	NA	54	NA	
2492.0635	14	1	CCK	218	NA	74	NA	51.29	54	-2.71	
2484.3745	14	54	OFDM	280	70.98	74	-3.02	NA	54	NA	
2491.9975	14	54	OFDM	280	NA	74	NA	53.99	54	-0.01	
2485.117	14	65	OFDM	258	71.04	74	-2.96	NA	54	-54	
2491.915	14	65	OFDM	258	NA	74	NA	53.96	54	-0.04	
2457 MHz carrier frequency											
2493.6805	12	1	CCK	185	67.41	74	-6.59	NA	54	NA	
2500.00	12	1	CCK	185	NA	74	NA	51.22	54	-2.78	
2500.00	12	54	OFDM	120	71.91	74	-2.09	NA	54	NA	
2496.9805	12	54	OFDM	120	NA	74	NA	53.99	54	-0.01	Pass
2484.7705	12	65	OFDM	156	68.99	74	-5.01	NA	54	NA	
2497.063	12	65	OFDM	156	NA	74	NA	53.73	54	-0.27	
2483.50	12	65	OFDM	156	NA	74	NA	53.39	54	-0.61	
2462 MHz carrier frequency											
2499.5875	11	1	CCK	112	65.52	74	-8.48	NA	54	NA	
2500.00	11	1	CCK	112	NA	74	NA	52.96	54	-1.04	
2484.3745	11	54	OFDM	218	67.06	74	-6.94	NA	54	NA	
2483.50	11	54	OFDM	218	NA	74	NA	52.72	54	-1.28	
2484.1765	11	65	OFDM	248	68.45	74	-5.55	NA	54	NA	
2500.00	11	65	OFDM	248	NA	74	NA	53.81	54	-0.19	
2483.50	11	65	OFDM	248	NA	74	NA	53.7	54	-0.3	

*****- EUT front panel refers to 0 degrees position of turntable.
******- Margin = Measured field strength - specification limit.

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Table 7.4.3 Field strength of spurious emissions above 1 GHz within restricted bands

INVESTIGATED FREQUENCY RANGE:	2400-2483.5MHz
TEST DISTANCE:	3 m
DUTY CYCLE:	100 %
DETECTOR USED:	Peak
CBW:	40 MHz
TEST ANTENNA TYPE:	Double ridged guide
ANTENNA POLARIZATION:	Vertical
ANTENNA HEIGHT:	1.2m

Frequency, MHz	Transmit power setting, dBm	Bit rate, Mbps	Modulation	Azimuth, degrees*	Peak field strength(VBW=3 MHz)			Average field strength (VBW=10 Hz)			Verdict
					Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
2422 MHz carrier frequency											
2389.92	8	13.5	OFDM	140	71.8	74	-2.2	NA	54	NA	Pass
2390.00	8	13.5	OFDM	140	NA	74	NA	53.98	54	-0.02	
2389.36	8	135	OFDM	125	72.23	74	-1.77	NA	54	NA	
2390.00	8	135	OFDM	125	NA	74	NA	53.87	54	-0.13	
2427 MHz carrier frequency											
2389.84	11	13.5	OFDM	130	69.12	74	-4.88	NA	54	NA	Pass
2390.00	11	13.5	OFDM	130	NA	74	NA	53.94	54	-0.06	
2390.00	11	135	OFDM	156	69.63	74	-4.37	NA	54	NA	
2390.00	11	135	OFDM	156	NA	74	NA	53.97	54	-0.03	
2437 MHz carrier frequency											
2388.48	11.5	13.5	OFDM	182	64.63	74	-9.37	NA	54	NA	Pass
2390.00	11.5	13.5	OFDM	182	NA	74	NA	51.32	54	-2.68	
2386.56	11.5	135	OFDM	179	64.26	74	-9.74	NA	54	NA	
2390.00	11.5	135	OFDM	179	NA	74	NA	51.31	54	-2.69	
2486.008	11.5	13.5	OFDM	181	67.69	74	-6.31	NA	54	NA	
2483.6155	11.5	13.5	OFDM	181	NA	74	NA	53.67	54	-0.33	
2483.764	11.5	135	OFDM	212	68.29	74	-5.71	NA	54	NA	
2483.5165	11.5	135	OFDM	212	NA	74	NA	53.74	54	-0.26	
2447 MHz carrier frequency											
2483.9785	11.5	13.5	OFDM	119	70.45	74	-3.55	NA	54	NA	Pass
2483.632	11.5	13.5	OFDM	119	NA	74	NA	53.86	54	-0.14	
2484.094	11.5	135	OFDM	128	72.71	74	-1.29	NA	54	NA	
2483.50	11.5	135	OFDM	128	NA	74	NA	53.82	54	-0.18	

Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Table 7.4.3 Field strength of spurious emissions above 1 GHz within restricted bands (continued)

Frequency, MHz	Transmit power setting, dBm	Bit rate, Mbps	Modulation	Azimuth, degrees*	Peak field strength(VBW=3 MHz)			Average field strength (VBW=10 Hz)			Verdict
					Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2452 MHz carrier frequency											
2483.50	6	13.5	OFDM	192	72.55	74	-1.45	NA	54	NA	Pass
2483.50	6	13.5	OFDM	192	NA	74	NA	53.97	54	-0.03	
2483.5165	6	135	OFDM	182	73.32	74	-0.68	NA	54	NA	
2483.50	6	135	OFDM	182	NA	74	NA	53.95	54	-0.05	

*****- EUT front panel refers to 0 degrees position of turntable.
******- Margin = Measured field strength - specification limit.

Table 7.4.4 Restricted bands

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.37625 - 8.38675	73 - 74.6	399.9 - 410	2690 - 2900	10.6 - 12.7
0.495 - 0.505	8.41425 - 8.41475	74.8 - 75.2	608 - 614	3260 - 3267	13.25 - 13.4
2.1735 - 2.1905	12.29 - 12.293	108 - 121.94	960 - 1240	3332 - 3339	14.47 - 14.5
4.125 - 4.128	12.51975 - 12.52025	123 - 138	1300 - 1427	3345.8 - 3358	15.35 - 16.2
4.17725 - 4.17775	12.57675 - 12.57725	149.9 - 150.05	1435 - 1626.5	3600 - 4400	17.7 - 21.4
4.20725 - 4.20775	13.36 - 13.41	156.52475 - 156.52525	1645.5 - 1646.5	4500 - 5150	22.01 - 23.12
6.215 - 6.218	16.42 - 16.423	156.7 - 156.9	1660 - 1710	5350 – 5460	23.6 - 24
6.26775 - 6.26825	16.69475 - 16.69525	162.0125 - 167.17	1718.8 - 1722.2	7250 - 7750	31.2 - 31.8
6.31175 - 6.31225	16.80425 - 16.80475	167.72 - 173.2	2200 - 2300	8025 – 8500	36.43 - 36.5
8.291 - 8.294	25.5 - 25.67	240 - 285	2310 - 2390	9000 - 9200	Above 38.6
8.362 - 8.366	37.5 - 38.25	322 - 335.4	2483.5 - 2500	9300 - 9500	

Reference numbers of test equipment used

HL 0604	HL 1984	HL 2871	HL 3344	HL 3356	HL 3623		

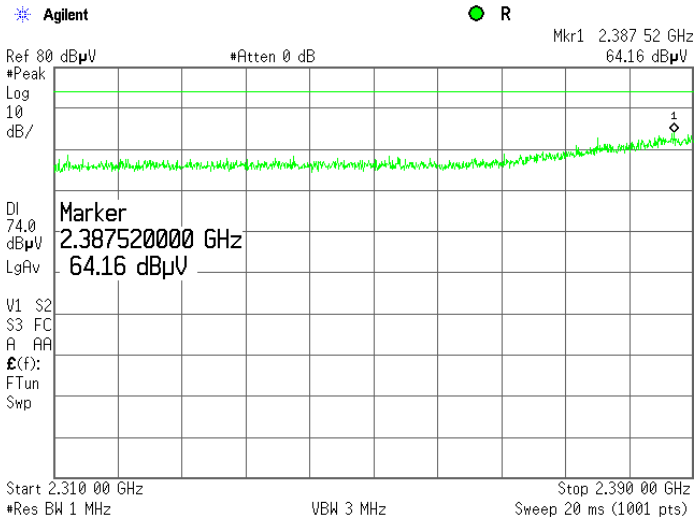
Full description is given in Appendix A.

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Plot 7.4.1 Radiated emission measurements from 2310 to 2390 MHz at the 2412 MHz carrier frequency

TEST SITE:	Semi anechoic chamber
BITRATE:	1Mbps
CHAIN:	All 3 chains
ANTENNA POLARIZATION:	Vertical

Peak



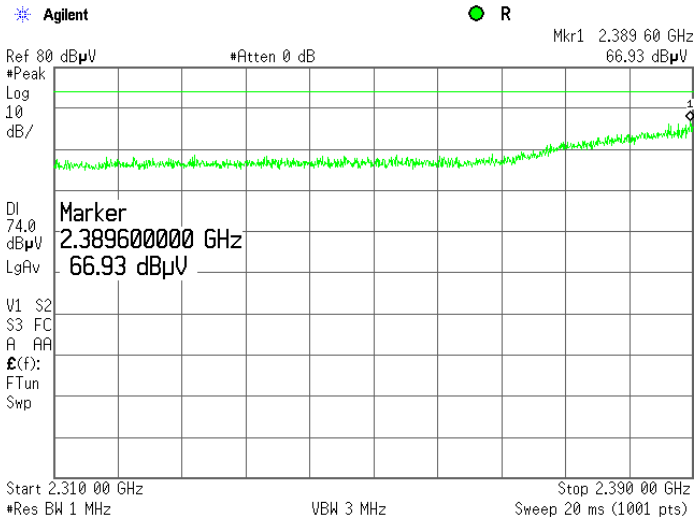
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Plot 7.4.2 Radiated emission measurements from 2310 to 2390 MHz at the 2412 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 54Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



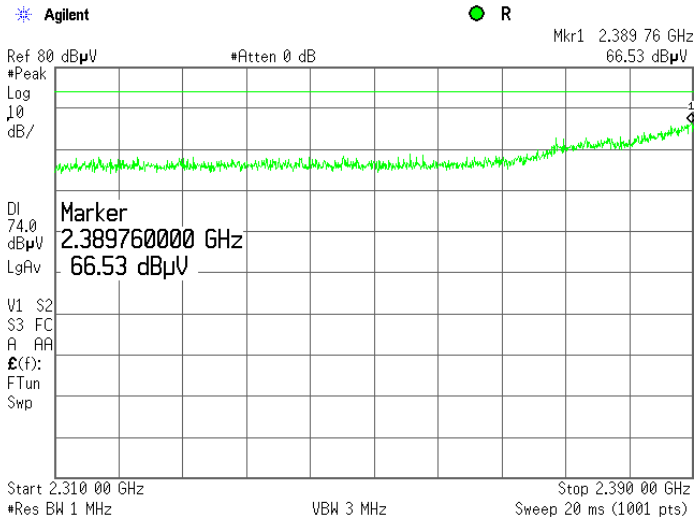
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Plot 7.4.3 Radiated emission measurements from 2310 to 2390 MHz at the 2412 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



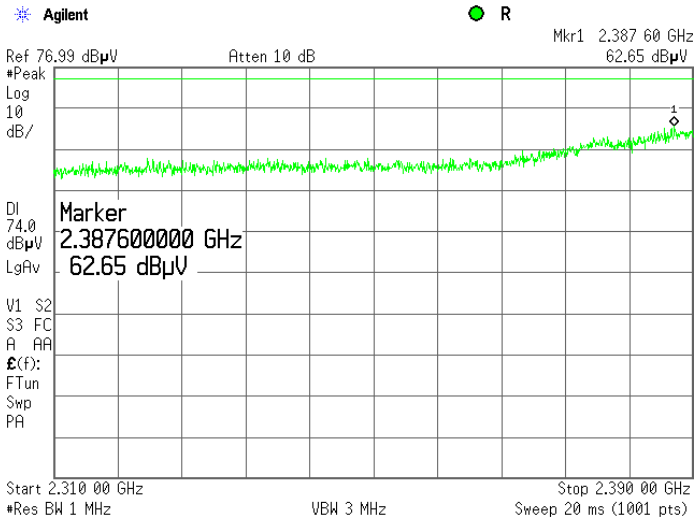
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Plot 7.4.4 Radiated emission measurements from 2310 to 2390 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BIT RATE: 1Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



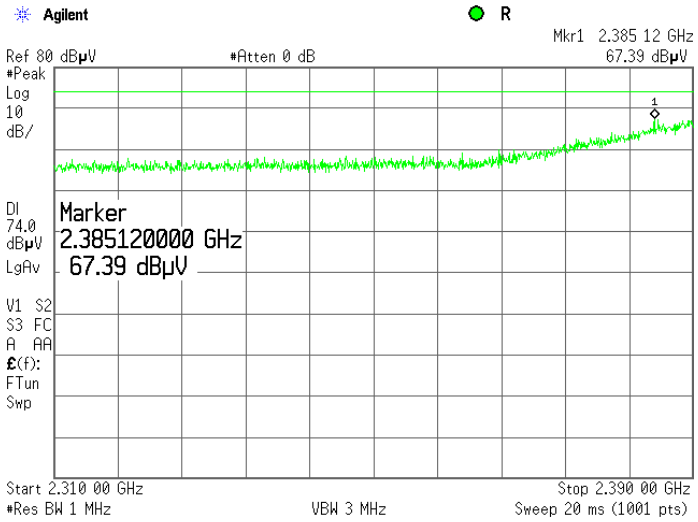
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

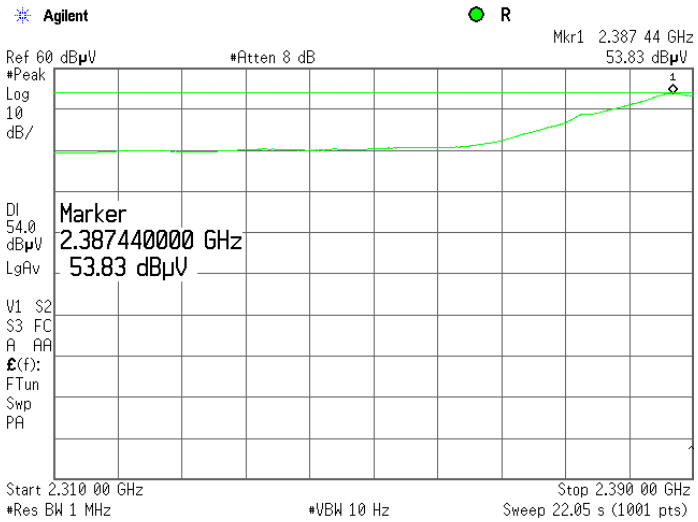
Plot 7.4.5 Radiated emission measurements from 2310 to 2390 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 54Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

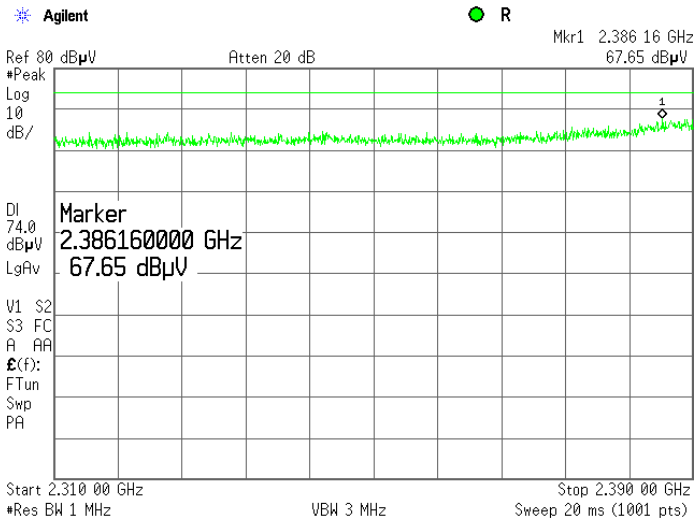


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Plot 7.4.6 Radiated emission measurements from 2310 to 2390 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



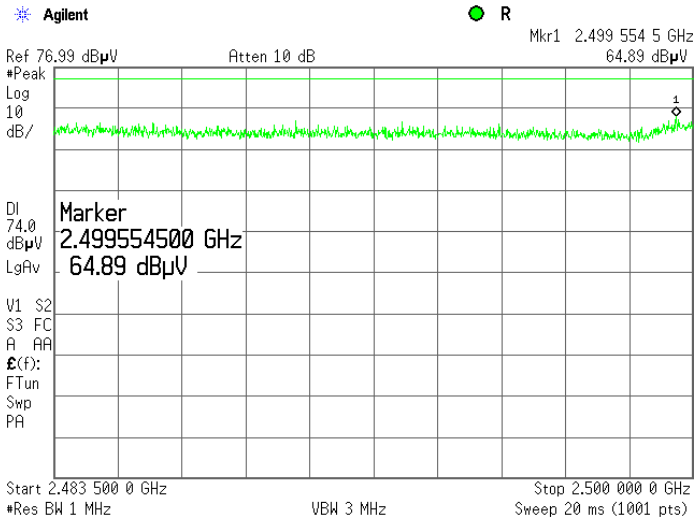
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

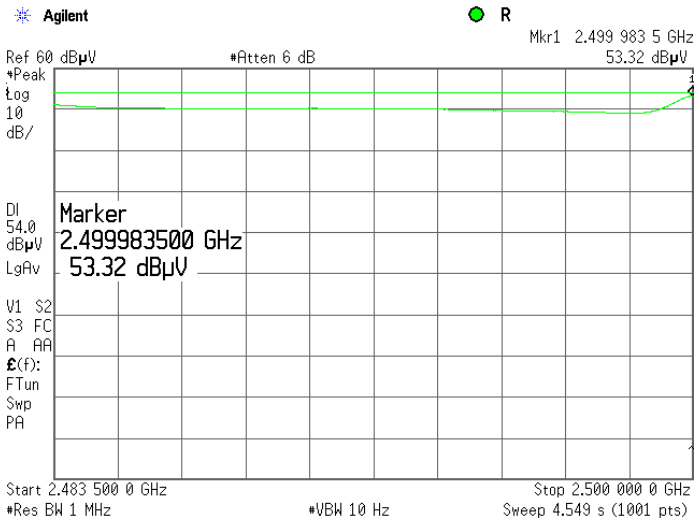
Plot 7.4.7 Radiated emission measurements from 2483.5 to 2500 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 1Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

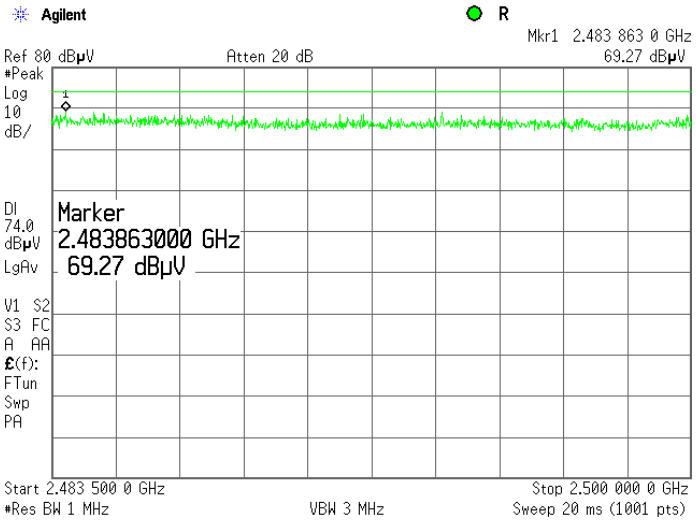


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

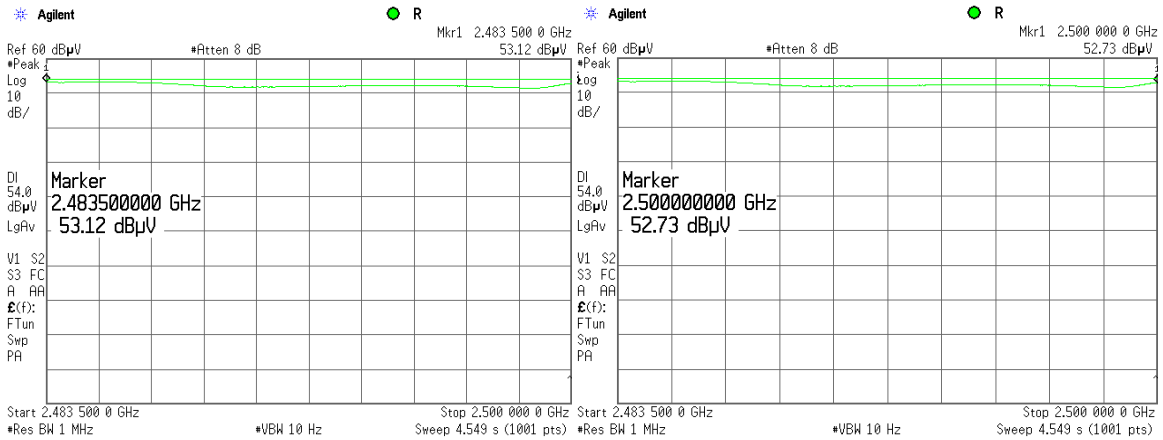
Plot 7.4.8 Radiated emission measurements from 2483.5 to 2500 MHz at the 2437 MHz carrier frequency

TEST SITE:	Semi anechoic chamber
BITRATE:	54Mbps
CHAIN:	All 3 chains
ANTENNA POLARIZATION:	Vertical

Peak



Average

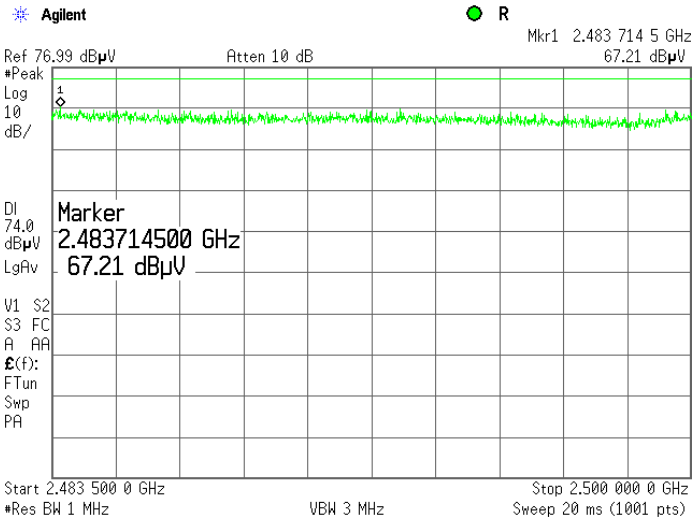


Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

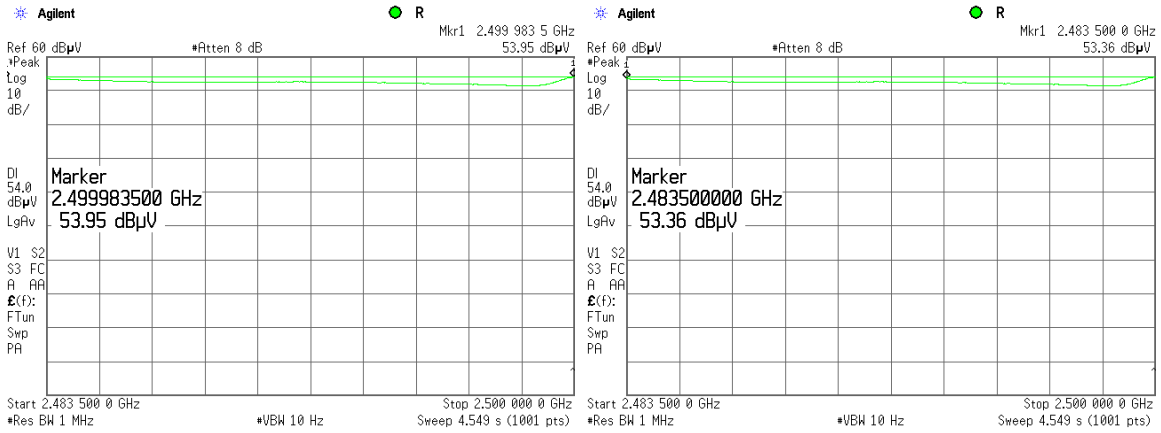
Plot 7.4.9 Radiated emission measurements from 2483.5 to 2500 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

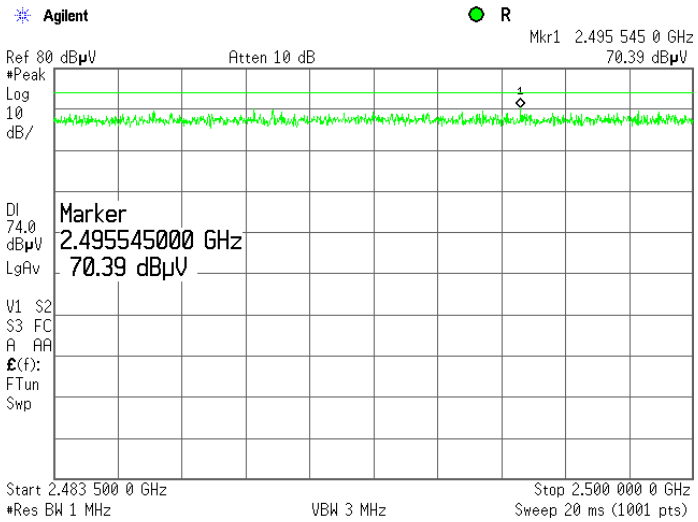


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

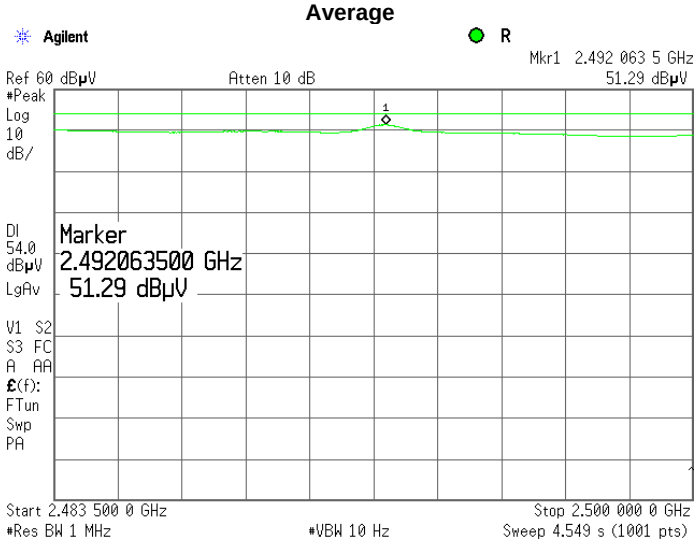
Plot 7.4.10 Radiated emission measurements from 2483.5 to 2500 MHz at the 2452 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 1Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

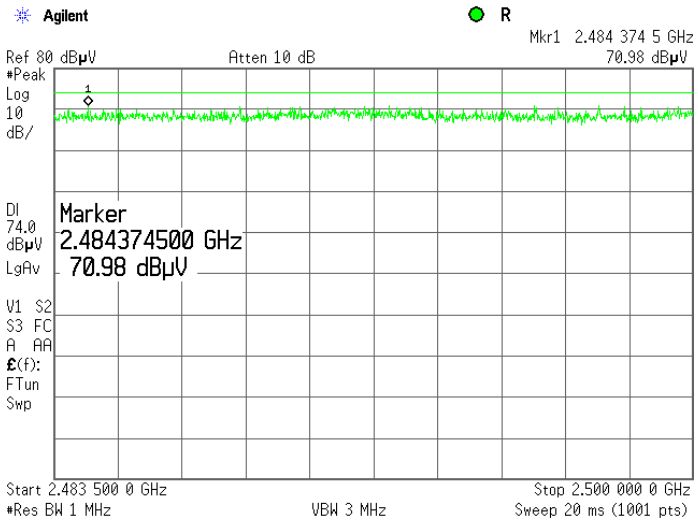


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

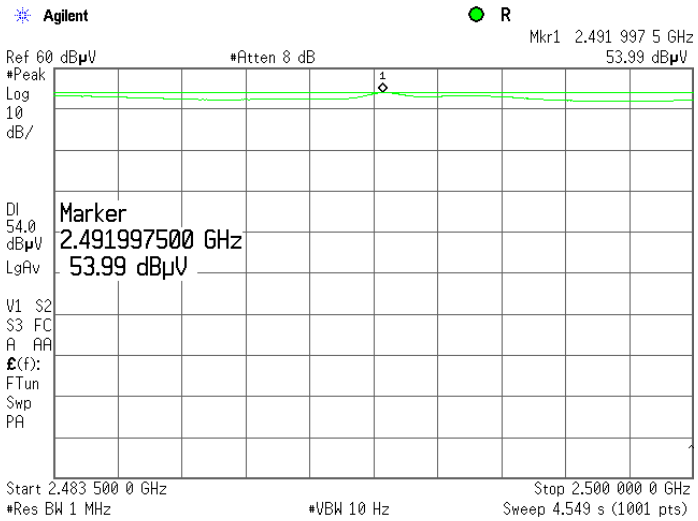
Plot 7.4.11 Radiated emission measurements from 2483.5 to 2500 MHz at the 2452 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 54Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

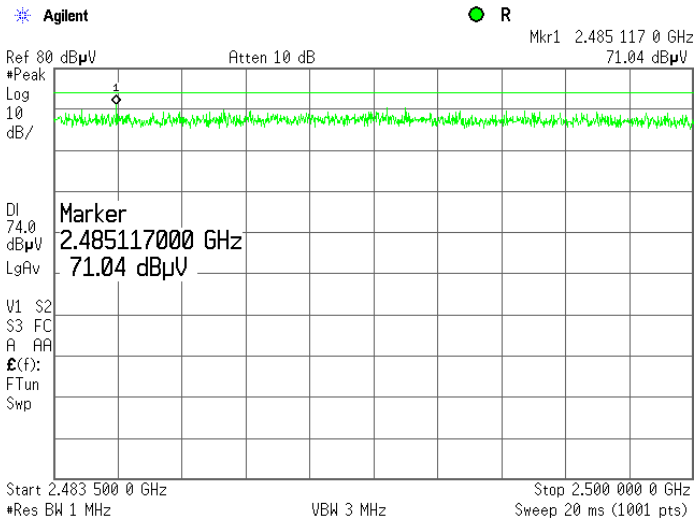


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

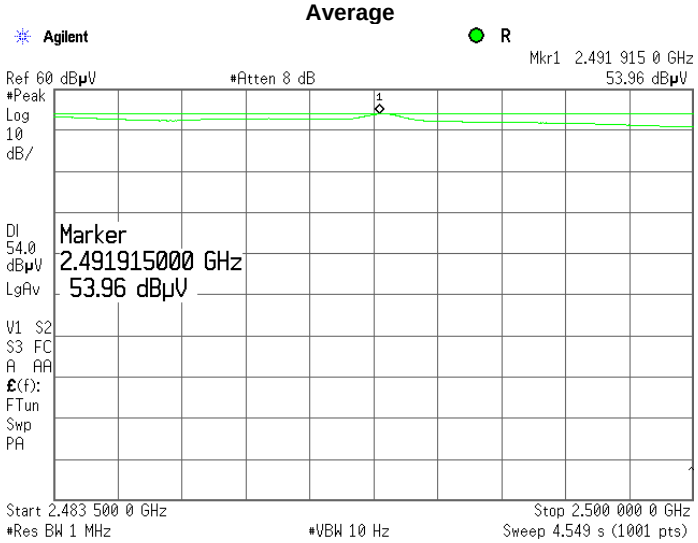
Plot 7.4.12 Radiated emission measurements from 2483.5 to 2500 MHz at the 2452 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

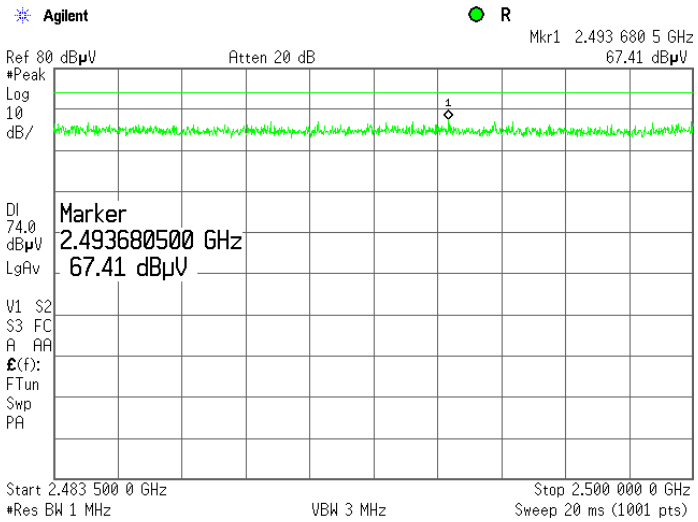


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

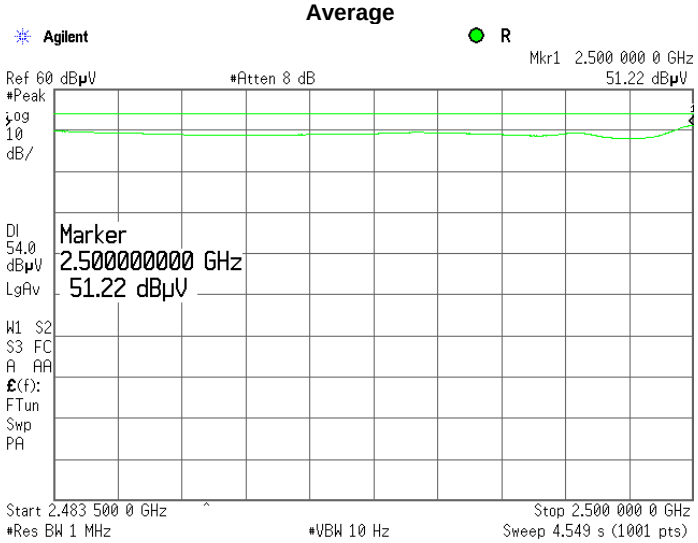
Plot 7.4.13 Radiated emission measurements from 2483.5 to 2500 MHz at the 2457 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 1Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

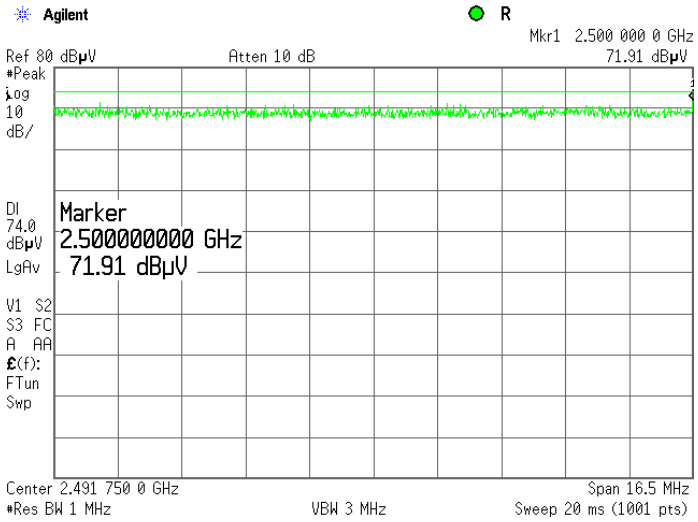


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Plot 7.4.14 Radiated emission measurements from 2483.5 to 2500 MHz at the 2457 MHz carrier frequency,

TEST SITE: Semi anechoic chamber
BITRATE: 54Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



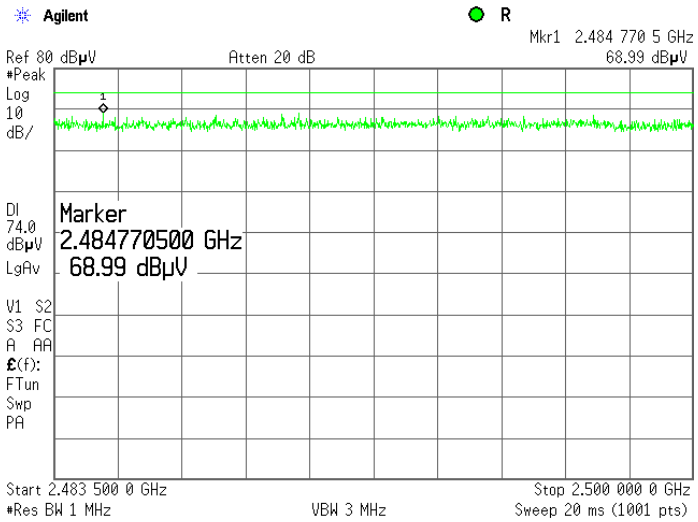
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

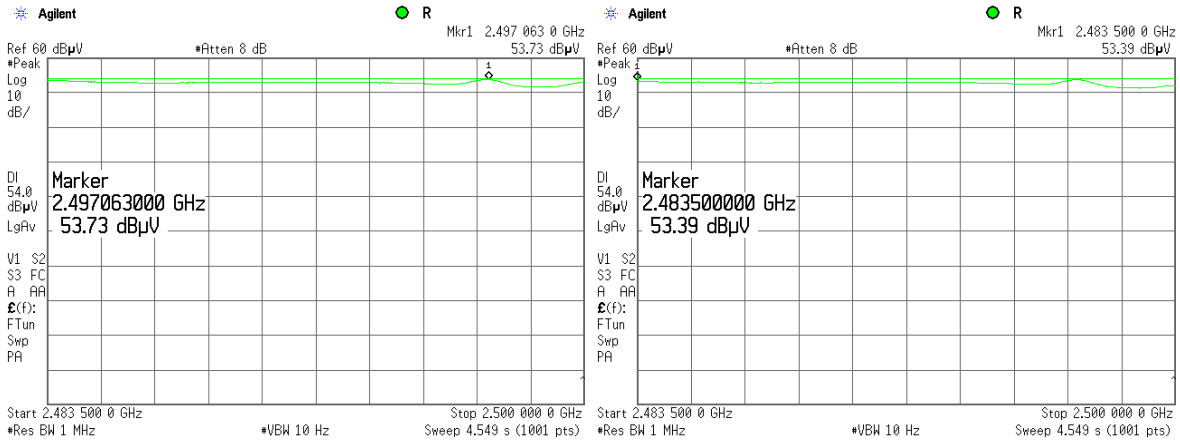
Plot 7.4.15 Radiated emission measurements from 2483.5 to 2500 MHz at the 2457 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

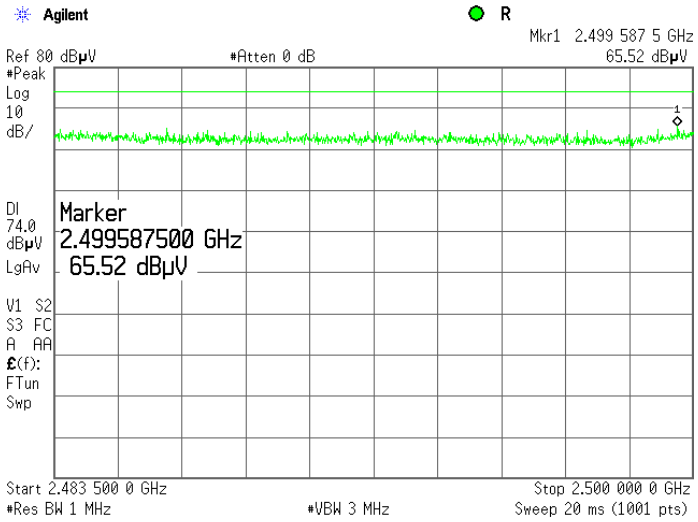


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

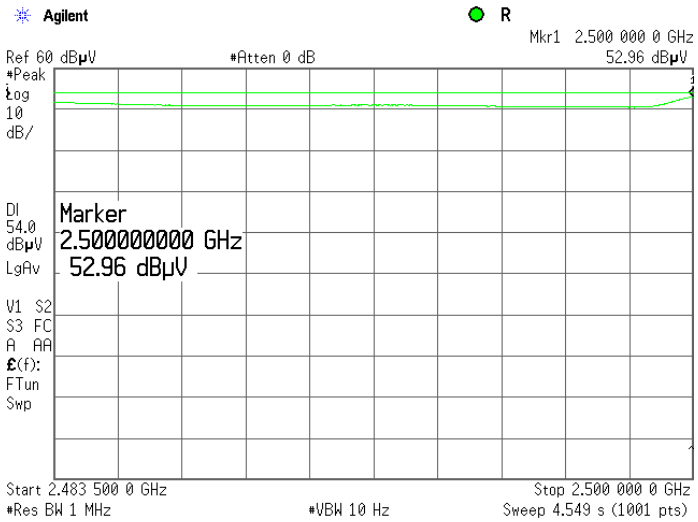
Plot 7.4.16 Radiated emission measurements from 2483.5 to 2500 MHz at the 2462 MHz carrier frequency

TEST SITE:	Semi anechoic chamber
BITRATE:	1Mbps
CHAIN:	All 3 chains
ANTENNA POLARIZATION:	Vertical

Peak



Average

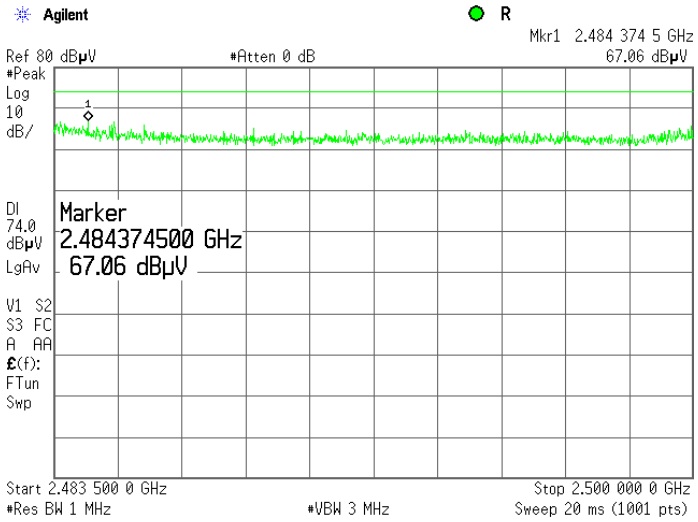


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

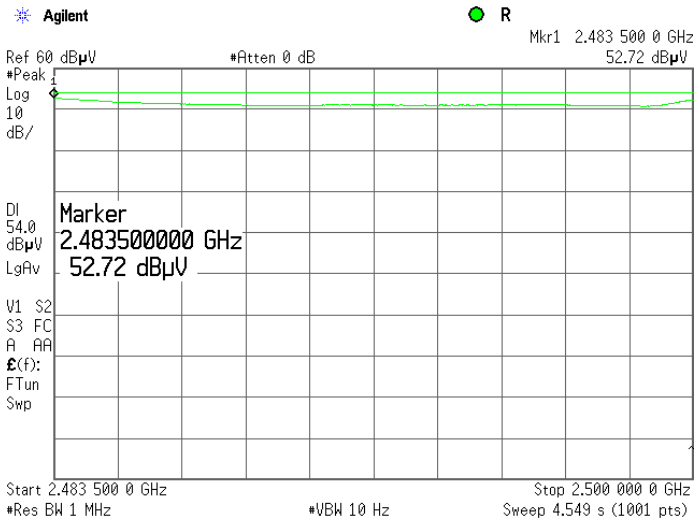
Plot 7.4.17 Radiated emission measurements from 2483.5 to 2500 MHz at the 2462 MHz carrier frequency

TEST SITE:	Semi anechoic chamber
BITRATE:	54Mbps
CHAIN:	All 3 chains
ANTENNA POLARIZATION:	Vertical

Peak



Average

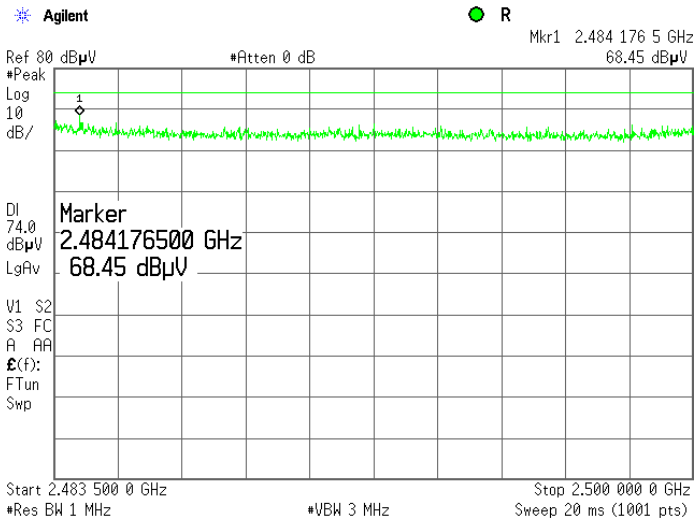


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

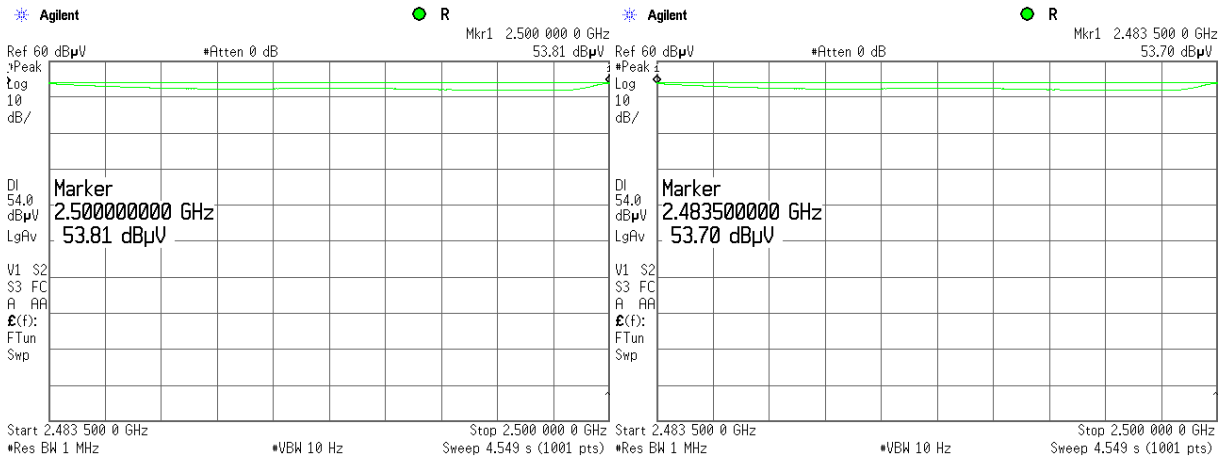
Plot 7.4.18 Radiated emission measurements from 2483.5 to 2500 MHz at the 2462 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

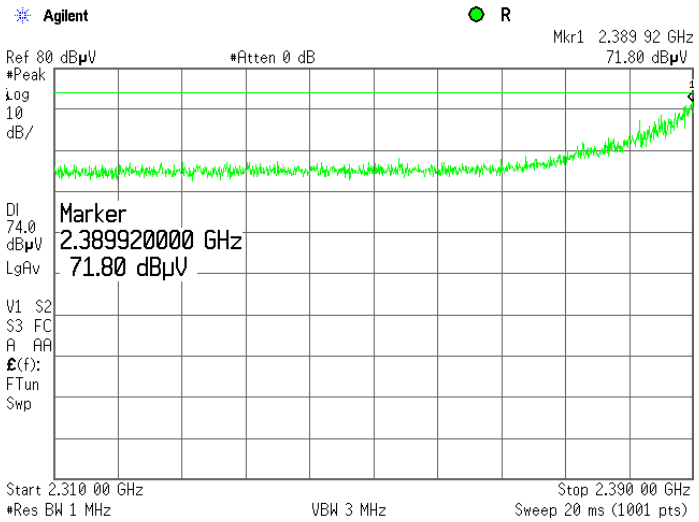


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

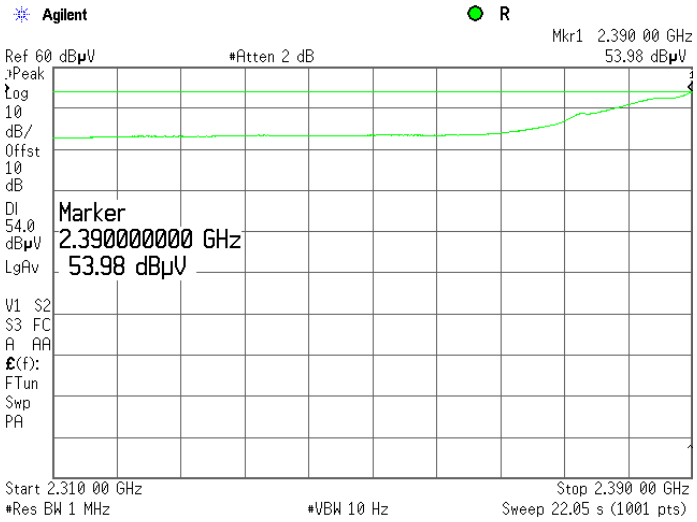
Plot 7.4.19 Radiated emission measurements from 2310 to 2390 MHz at the 2422 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 13.5Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

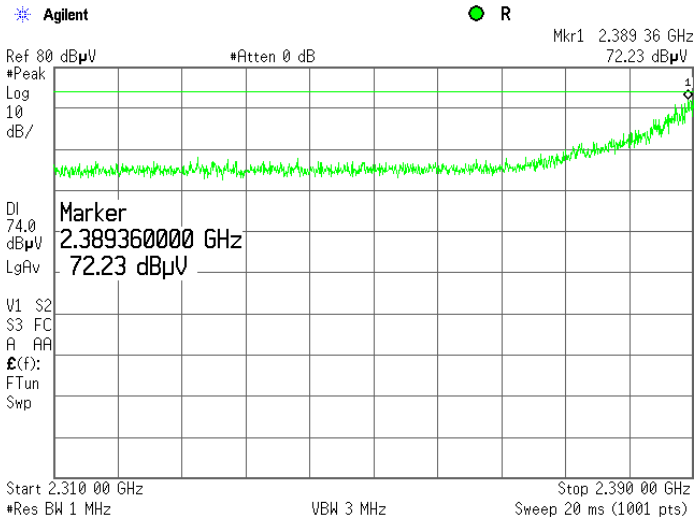


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Plot 7.4.20 Radiated emission measurements from 2310 to 2390 MHz at the 2422 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 135Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



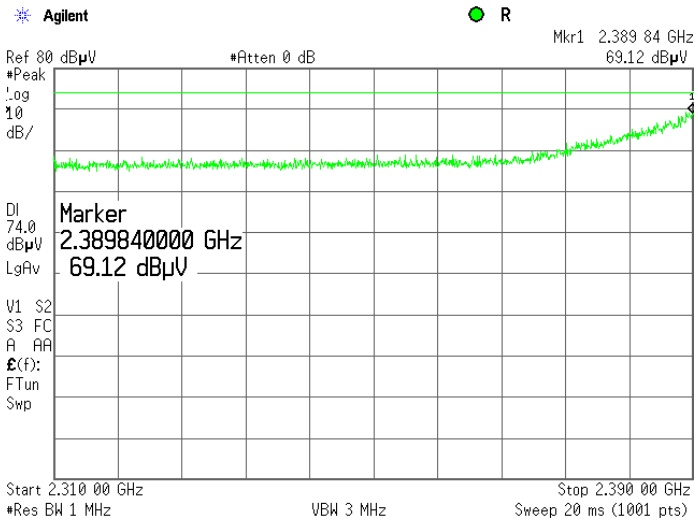
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Plot 7.4.21 Radiated emission measurements from 2310 to 2390 MHz at the 2427 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 13.5Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



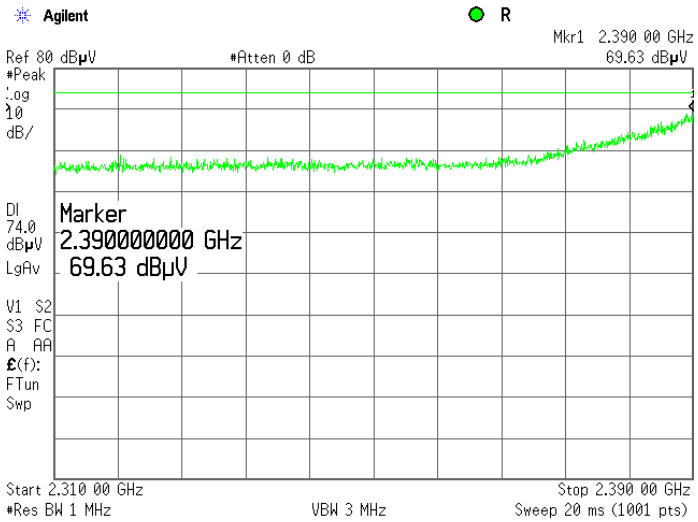
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Plot 7.4.22 Radiated emission measurements from 2310 to 2390 MHz at the 2427 MHz carrier frequency

TEST SITE:	Semi anechoic chamber
MODULATION:	OFDM
BITRATE:	135Mbps
CHAIN:	All 3 chains
ANTENNA POLARIZATION:	Vertical

Peak



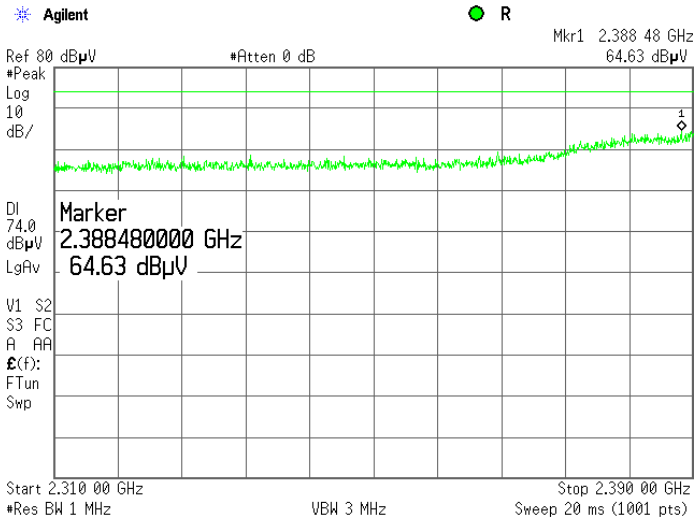
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Plot 7.4.23 Radiated emission measurements from 2310 to 2390 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 13.5Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



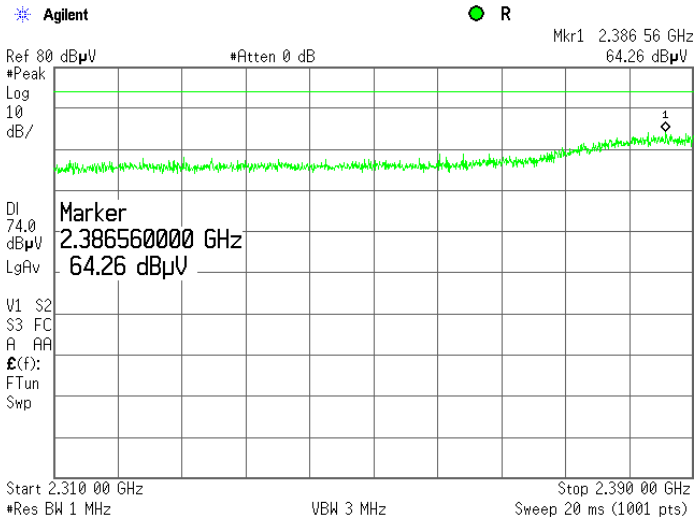
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Plot 7.4.24 Radiated emission measurements from 2310 to 2390 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 135Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



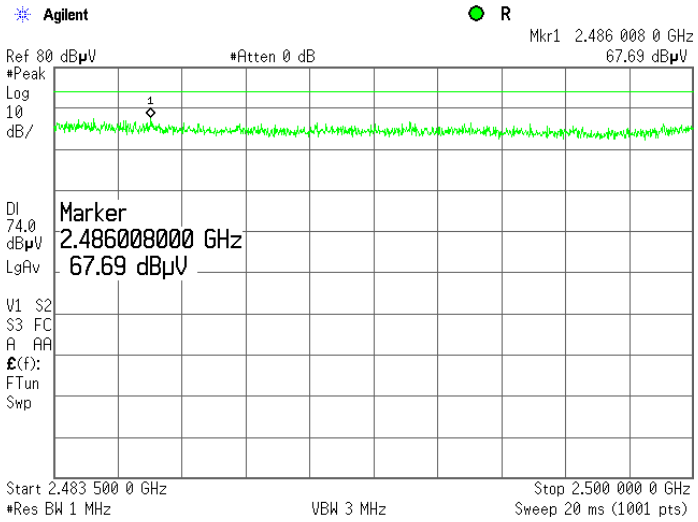
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

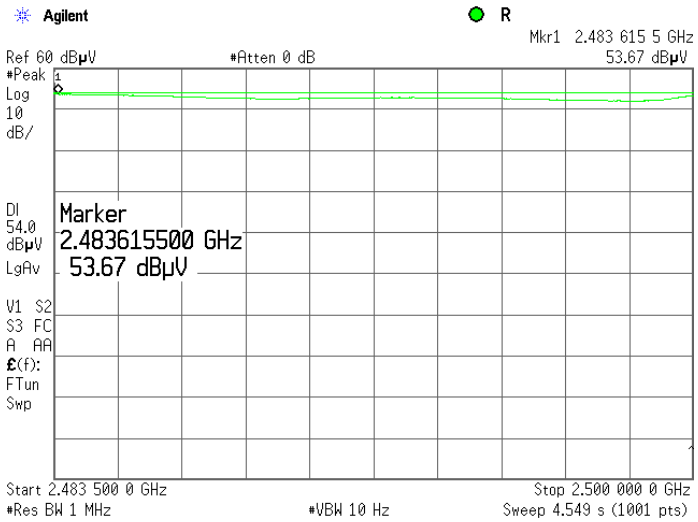
Plot 7.4.25 Radiated emission measurements from 2483.5 to 2500 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 13.5Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

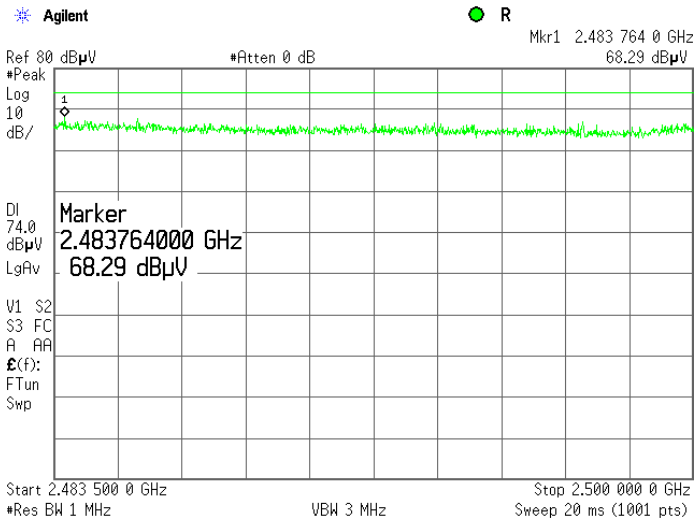


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

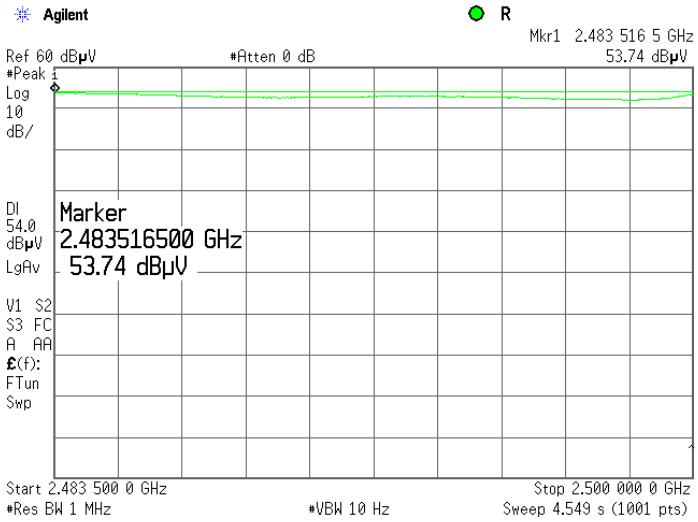
Plot 7.4.26 Radiated emission measurements from 2483.5 to 2500 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 135Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

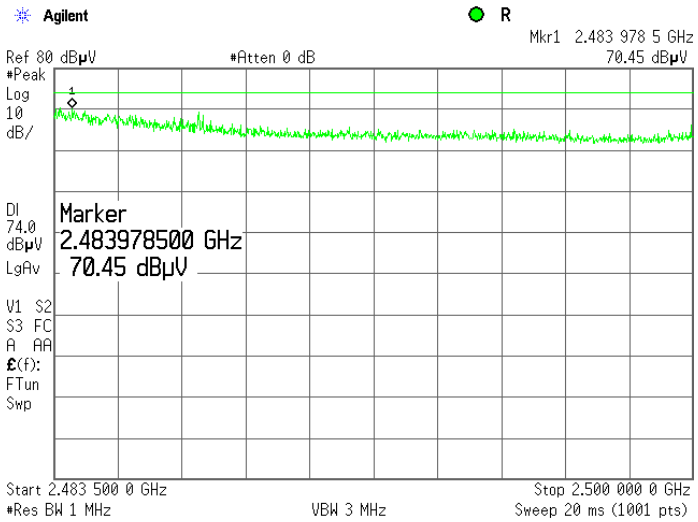


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

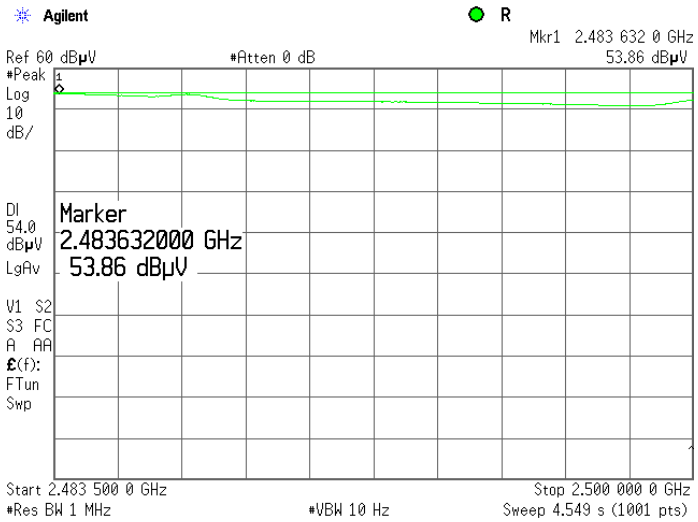
Plot 7.4.27 Radiated emission measurements from 2483.5 to 2500 MHz at the 2447 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 13.5Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

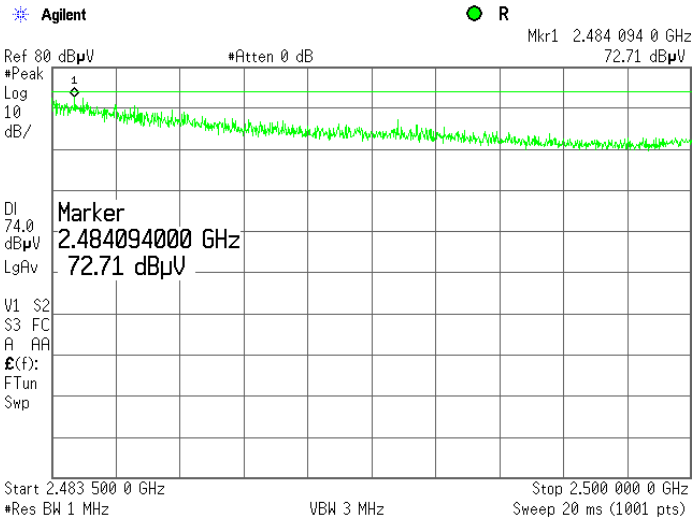


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

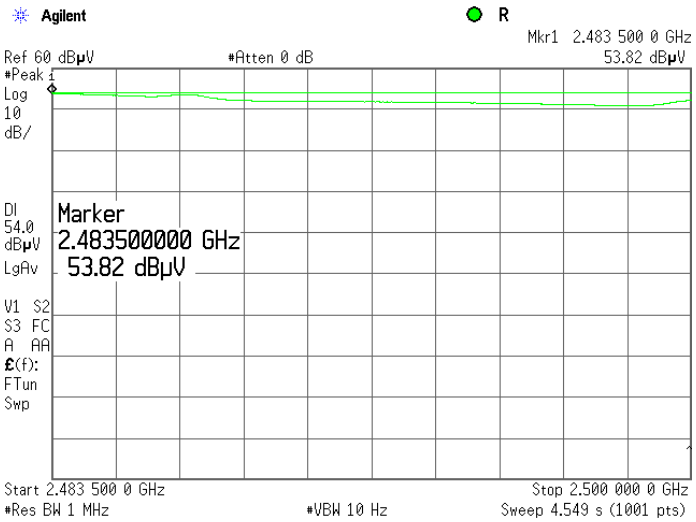
Plot 7.4.28 Radiated emission measurements from 2483.5 to 2500 MHz at the 2447 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 135Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

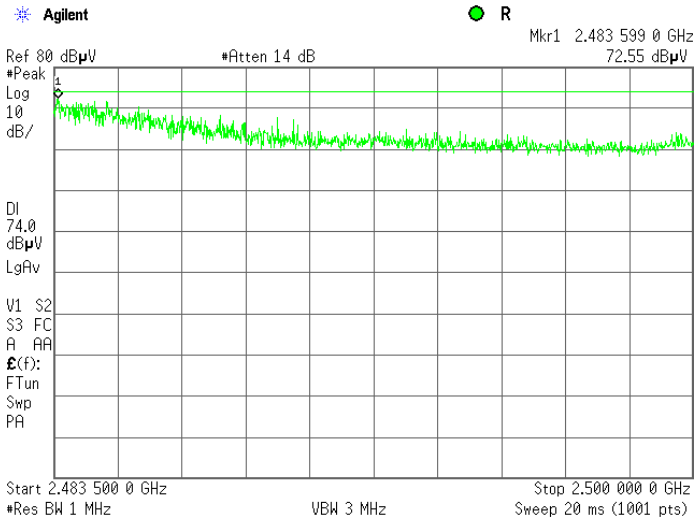


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

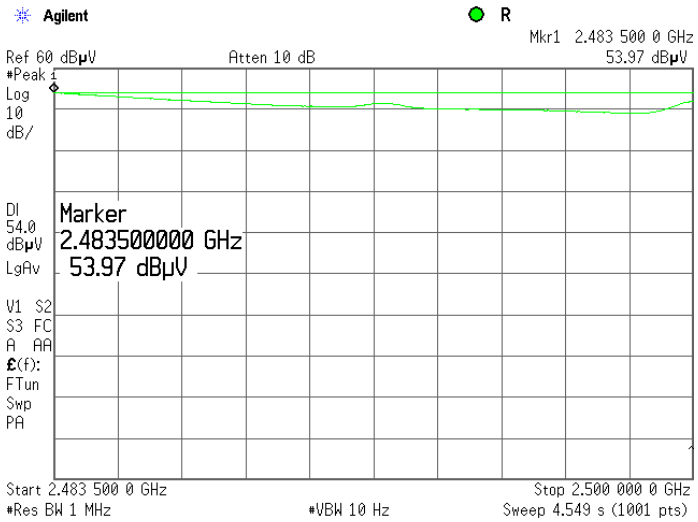
Plot 7.4.29 Radiated emission measurements from 2483.5 to 2500 MHz at the 2452 MHz carrier frequency

TEST SITE:	Semi anechoic chamber
BITRATE:	13.5Mbps
CHAIN:	All 3 chains
ANTENNA POLARIZATION:	Vertical

Peak



Average

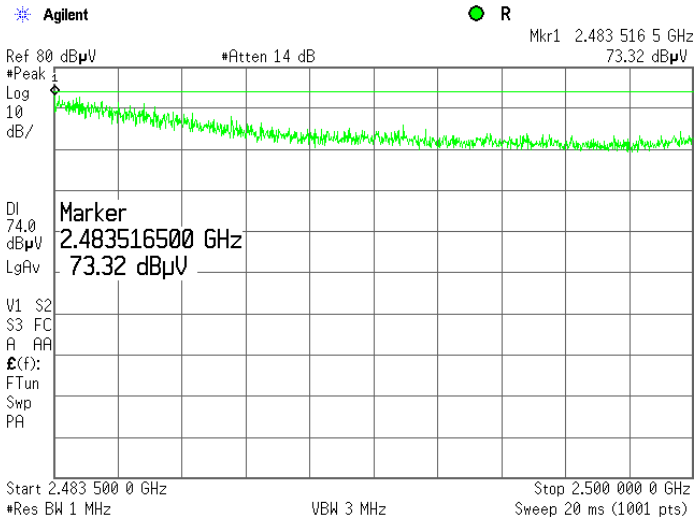


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 24 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

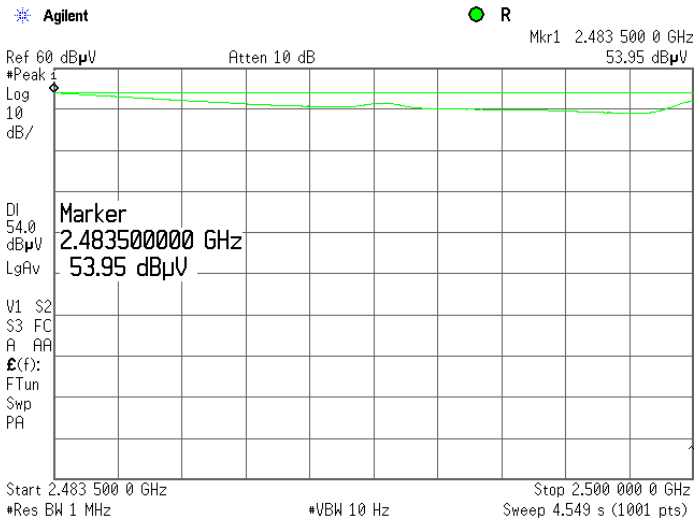
Plot 7.4.30 Radiated emission measurements from 2483.5 to 2500 MHz at the 2452 MHz carrier frequency

TEST SITE:	Semi anechoic chamber
BITRATE:	135Mbps
CHAIN:	All 3 chains
ANTENNA POLARIZATION:	Vertical

Peak



Average



Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

7.5 Band edge emissions, OMNI antenna configuration

7.5.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limits are given in Table 7.5.1.

Table 7.5.1 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m within restricted bands, dB(μV/m)*			Attenuation of field strength of spurious versus carrier outside restricted bands, dBc***
	Peak	Quasi Peak	Average	
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**	20.0
0.090 – 0.110	NA	108.5 – 106.8**	NA	
0.110 – 0.490	126.8 – 113.8	NA	106.8 – 93.8**	
0.490 – 1.705	NA	73.8 – 63.0**	NA	
1.705 – 30.0*		69.5		
30 – 88		40.0		
88 – 216		43.5		
216 – 960		46.0		
960 - 1000		54.0		
1000 – 10thharmonic	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.

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

7.5.2.1 The EUT was set up as shown in Figure 7.5.1, energized and the performance check was conducted.

7.5.2.2 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.

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

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

7.5.3.1 The EUT was set up as shown in Figure 7.5.2, energized and the performance check was conducted.

7.5.3.2 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.

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

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Figure 7.5.1 Setup for spurious emission field strength measurements below 30 MHz

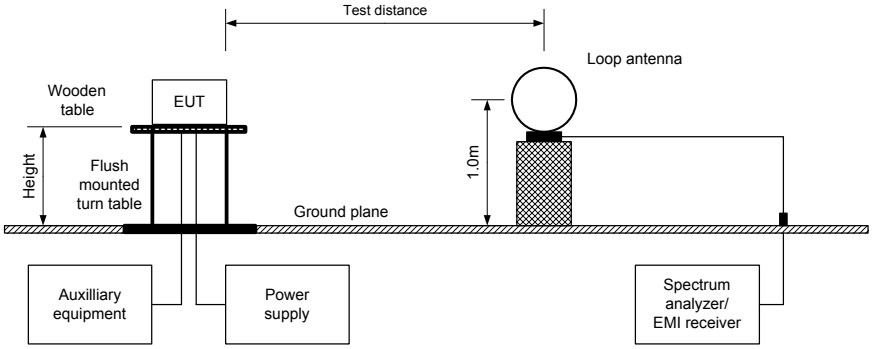
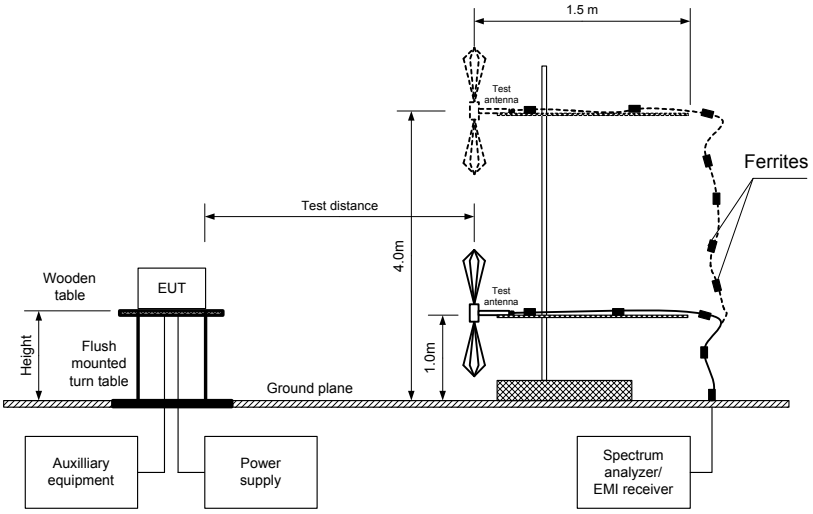


Figure 7.5.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Table 7.5.2 Field strength of spurious emissions above 1 GHz within restricted bands

INVESTIGATED FREQUENCY RANGE: 2400-2483.5 MHz
TEST DISTANCE: 3 m
DUTY CYCLE: 100 %
DETECTOR USED: Peak
CBW: 20 MHz
TEST ANTENNA TYPE: Double ridged guide
ANTENNA POLARIZATION: Vertical
ANTENNA HEIGHT: 1.2m

Frequency, MHz	Transmit power setting, dBm	Bitrate, Mbps	Modulation	Azimuth, degrees*	Peak field strength (VBW=3 MHz)			Average field strength (VBW=10 Hz)			Verdict
					Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2412 MHz carrier frequency											
2378.48	17.5	1	CCK	11	69.23	74	-4.77	NA	54	NA	Pass
2387.76	17.5	1	CCK	11	NA	74	NA	50.01	54	-3.99	
2389.28	17.5	54	OFDM	58	69.09	74	-4.91	NA	54	NA	
2390.00	17.5	54	OFDM	58	NA	74	NA	52.31	54	-1.69	
2389.76	17.5	65	OFDM	64	69.43	74	-4.57	NA	54	NA	
2390.00	17.5	65	OFDM	64	NA	74	NA	53.65	54	-0.35	
2437 MHz carrier frequency											
2388.64	18	1	CCK	100	63.24	74	-10.76	NA	54	NA	Pass
2389.36	18	1	CCK	100	NA	74	NA	50.7	54	-3.3	
2389.60	18	54	OFDM	95	72.14	74	-1.86	NA	54	NA	
2390.00	18	54	OFDM	95	NA	74	NA	53.94	54	-0.06	
2387.60	18	65	OFDM	88	68.64	74	-5.36	NA	54	NA	
2390.00	18	65	OFDM	88	NA	74	NA	49.56	54	-4.44	
2499.835	18	1	CCK	121	63.92	74	-10.08	NA	54	NA	
2499.835	18	1	CCK	121	NA	74	NA	52.23	54	-1.77	
2500.00	18	54	OFDM	165	64.26	74	-9.74	NA	54	NA	
2483.50	18	54	OFDM	165	NA	74	NA	51.43	54	-2.57	
2499.868	18	65	OFDM	138	65.46	74	-8.54	NA	54	NA	
2483.5165	18	65	OFDM	138	NA	74	NA	52.94	54	-1.06	
2500.00	18	65	OFDM	138	NA	74	NA	52.2	54	-1.8	

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Table 7.5.2 Field strength of spurious emissions above 1 GHz within restricted bands (continued)

Frequency, MHz	Transmit power setting, dBm	Bitrate, Mbps	Modulation	Azimuth, degrees*	Peak field strength (VBW=3 MHz)			Average field strength (VBW=10 Hz)			Verdict
					Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
2457 MHz carrier frequency											
2500.00	18	1	CCK	165	66.9	74	-7.1	NA	54	NA	Pass
2499.967	18	1	CCK	165	NA	74	NA	53.41	54	-0.59	
2499.373	18	54	OFDM	189	66.85	74	-7.15	NA	54	NA	
2499.472	18	54	OFDM	189	NA	74	NA	53.36	54	-0.64	
2499.9835	18	65	OFDM	195	67.97	74	-6.03	NA	54	NA	
2483.5495	18	65	OFDM	195	NA	74	NA	53.7	54	-0.3	
2500.00	18	65	OFDM	195	NA	74	NA	53.4	54	-0.6	
2462 MHz carrier frequency											
2494.621	16	1	CCK	111	70.14	74	-3.86	NA	54	NA	Pass
2490.6115	16	1	CCK	111	NA	74	NA	50.6	54	-3.4	
2499.505	16	54	OFDM	145	69.82	74	-4.18	NA	54	NA	
2483.50	16	54	OFDM	145	NA	74	NA	53.09	54	-0.91	
2500.00	16	54	OFDM	145	NA	74	NA	53.13	55	-1.87	
2483.764	16	65	OFDM	99	70.3	74	-3.7	NA	54	NA	
2483.50	16	65	OFDM	99	NA	74	NA	53.86	54	-0.14	
2500.00	16	65	OFDM	99	NA	74	NA	52.42	54	-1.58	

*- EUT front panel refers to 0 degrees position of turntable.
**- Margin = Measured field strength - specification limit.

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Table 7.5.3 Field strength of spurious emissions above 1 GHz within restricted bands

INVESTIGATED FREQUENCY RANGE: 2400-2483.5MHz
TEST DISTANCE: 3 m
DUTY CYCLE: 100 %
DETECTOR USED: Peak
CBW: 40 MHz
TEST ANTENNA TYPE: Double ridged guide
ANTENNA POLARIZATION: Vertical
ANTENNA HEIGHT: 1.2 m

Frequency, MHz	Transmit power setting, dBm	Bitrate, Mbps	Modulation	Azimuth, degrees*	Peak field strength(VBW=3 MHz)			Average field strength(VBW=10 Hz)			Verdict
					Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2422 MHz carrier frequency											
2389.92	16	13.5	OFDM	251	73.61	74	-0.39	NA	54	NA	Pass
2390.00	16	13.5	OFDM	251	NA	74	NA	53.95	54	-0.05	
2390.00	16	135	OFDM	213	73.35	74	-0.65	NA	54	NA	
2390.00	16	135	OFDM	213	NA	74	NA	53.58	54	-0.42	
2437 MHz carrier frequency											
2387.76	16	13.5	OFDM	288	68.53	74	-5.47	NA	54	NA	Pass
2389.04	16	13.5	OFDM	288	NA	74	NA	53.99	54	-0.01	
2387.84	16	135	OFDM	265	70.26	74	-3.74	NA	54	NA	
2386.88	16	135	OFDM	265	NA	74	NA	53.88	54	-0.12	
2499.7195	16	13.5	OFDM	198	68.2	74	-5.8	NA	54	NA	
2499.9835	16	13.5	OFDM	198	NA	74	NA	52.94	54	-1.06	
2499.5545	16	13.5	OFDM	188	66.95	74	-7.05	NA	54	NA	
2500.00	16	13.5	OFDM	188	NA	74	NA	52.93	54	-1.07	
2452 MHz carrier frequency											
2483.5165	16	13.5	OFDM	125	67.54	74	-6.46	NA	54	NA	Pass
2483.50	16	13.5	OFDM	125	NA	74	NA	53.24	54	-0.76	
2483.6485	16	135	OFDM	148	69.71	74	-4.29	NA	54	NA	
2483.50	16	135	OFDM	148	NA	74	NA	53.45	54	-0.55	

*****- EUT front panel refers to 0 degrees position of turntable.
******- Margin = Measured field strength - specification limit.

Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Omni antenna configuration in V-polarization			

Table 7.5.4 Restricted bands

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.37625 - 8.38675	73 - 74.6	399.9 - 410	2690 - 2900	10.6 - 12.7
0.495 - 0.505	8.41425 - 8.41475	74.8 - 75.2	608 - 614	3260 - 3267	13.25 - 13.4
2.1735 - 2.1905	12.29 - 12.293	108 - 121.94	960 - 1240	3332 - 3339	14.47 - 14.5
4.125 - 4.128	12.51975 - 12.52025	123 - 138	1300 - 1427	3345.8 - 3358	15.35 - 16.2
4.17725 - 4.17775	12.57675 - 12.57725	149.9 - 150.05	1435 - 1626.5	3600 - 4400	17.7 - 21.4
4.20725 - 4.20775	13.36 - 13.41	156.52475 - 156.52525	1645.5 - 1646.5	4500 - 5150	22.01 - 23.12
6.215 - 6.218	16.42 - 16.423	156.7 - 156.9	1660 - 1710	5350 – 5460	23.6 - 24
6.26775 - 6.26825	16.69475 - 16.69525	162.0125 - 167.17	1718.8 - 1722.2	7250 - 7750	31.2 - 31.8
6.31175 - 6.31225	16.80425 - 16.80475	167.72 - 173.2	2200 - 2300	8025 – 8500	36.43 - 36.5
8.291 - 8.294	25.5 - 25.67	240 - 285	2310 - 2390	9000 - 9200	Above 38.6
8.362 - 8.366	37.5 - 38.25	322 - 335.4	2483.5 - 2500	9300 - 9500	

Reference numbers of test equipment used

HL 0604	HL 1984	HL 2871	HL 3344	HL 3356	HL 3623		

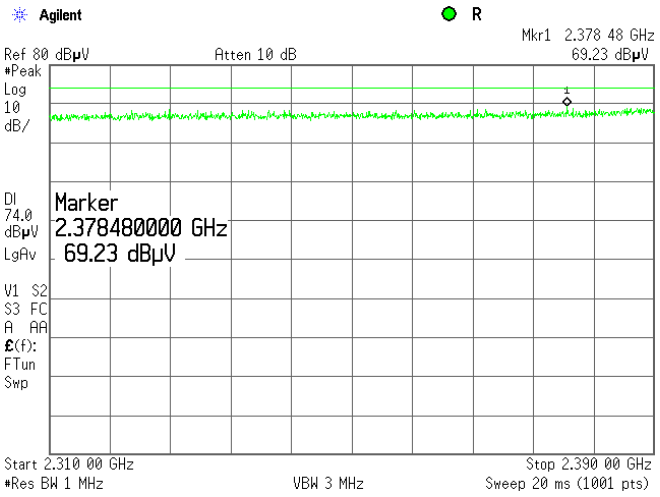
Full description is given in Appendix A.

Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Omni antenna configuration in V-polarization			

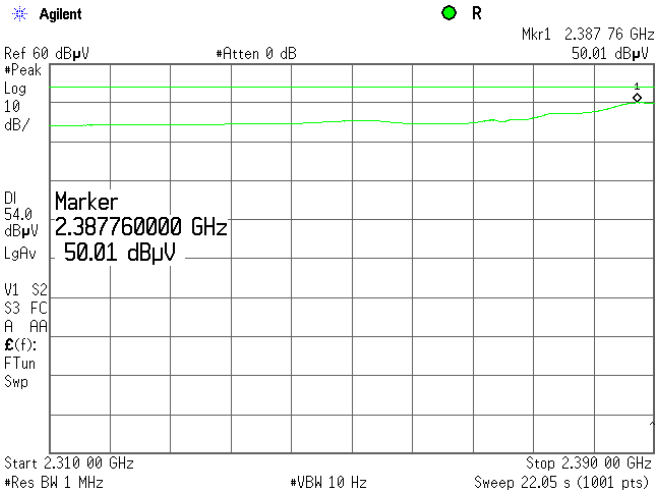
Plot 7.5.1 Radiated emission measurements from 2310 to 2390 MHz at the 2412 MHz carrier frequency,

TEST SITE: Semi anechoic chamber
BITRATE: 1Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

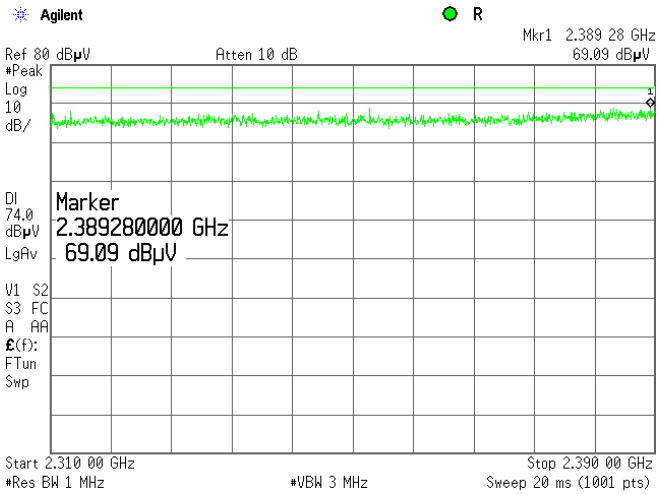


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Plot 7.5.2 Radiated emission measurements from 2310 to 2390 MHz at the 2412 MHz carrier frequency,

TEST SITE: Semi anechoic chamber
BITRATE: 54Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



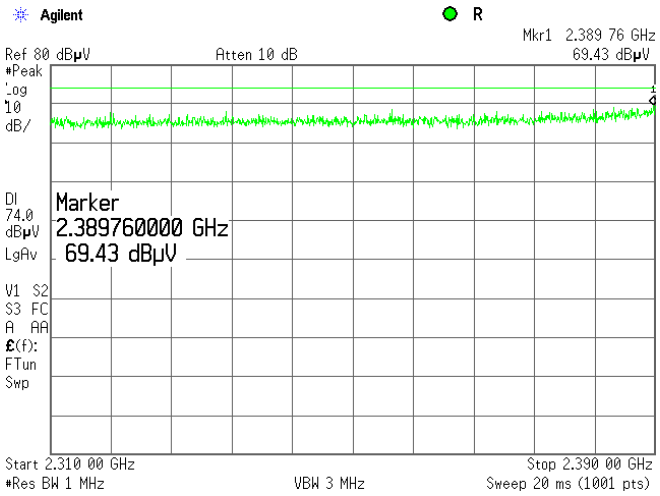
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

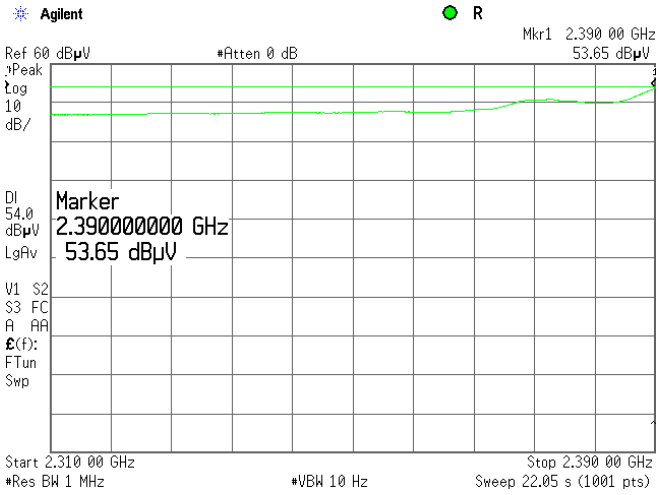
Plot 7.5.3 Radiated emission measurements from 2310 to 2390 MHz at the 2412 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

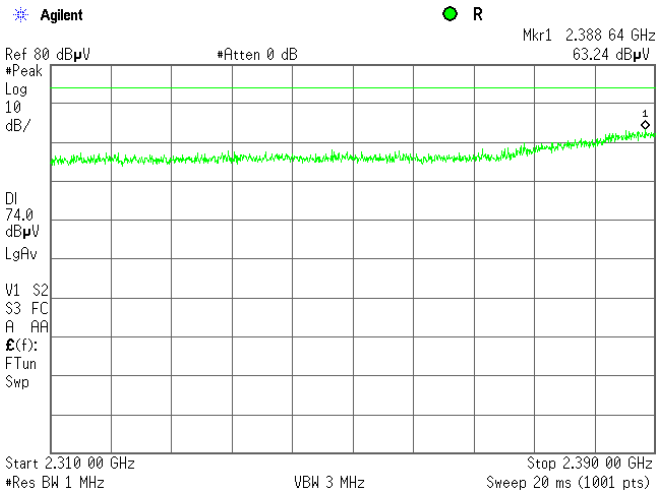


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Plot 7.5.4 Radiated emission measurements from 2310 to 2390 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 1Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



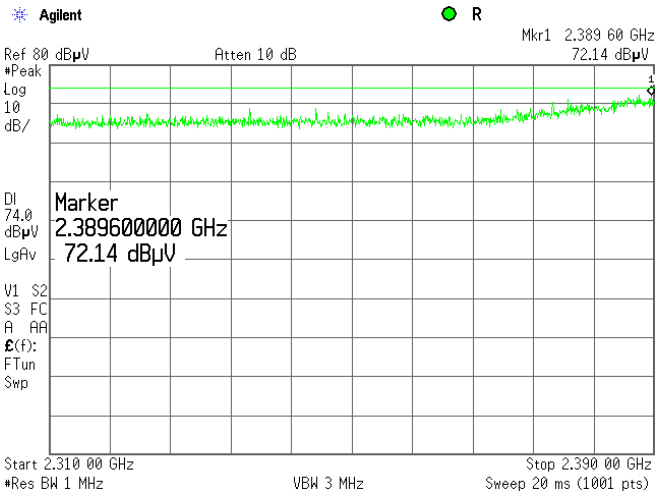
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

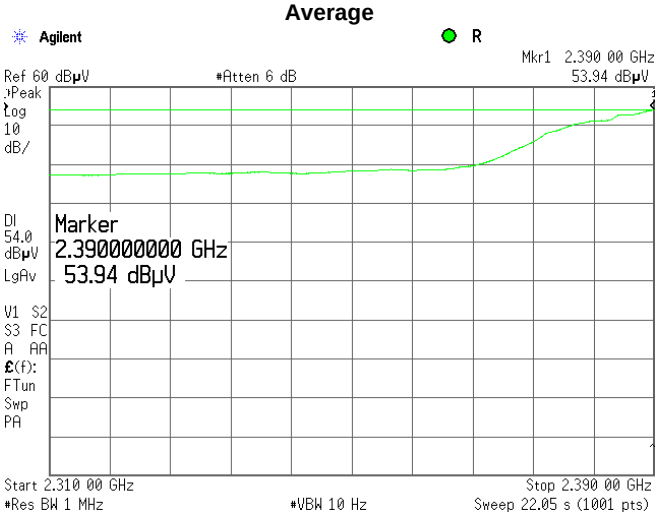
Plot 7.5.5 Radiated emission measurements from 2310 to 2390 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 54Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

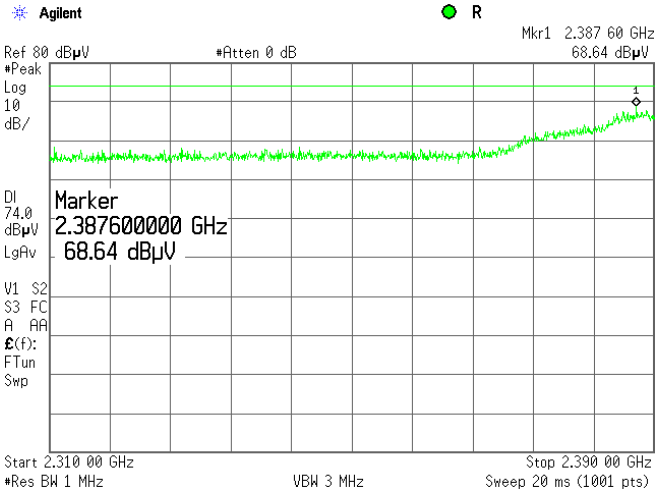


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Plot 7.5.6 Radiated emission measurements from 2310 to 2390 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



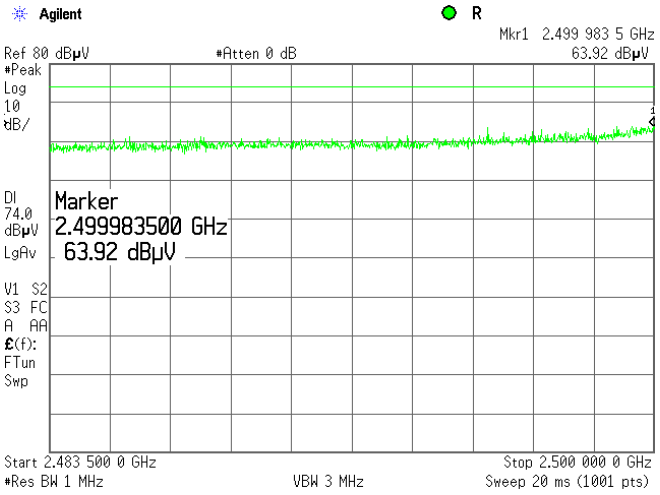
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

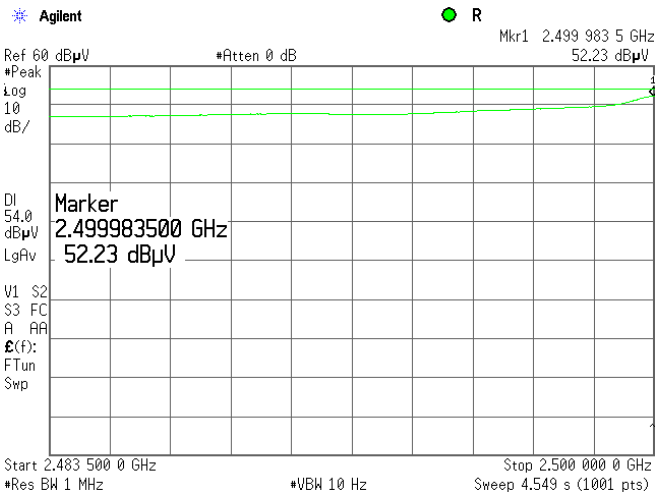
Plot 7.5.7 Radiated emission measurements from 2483.5 to 2500 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 1Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

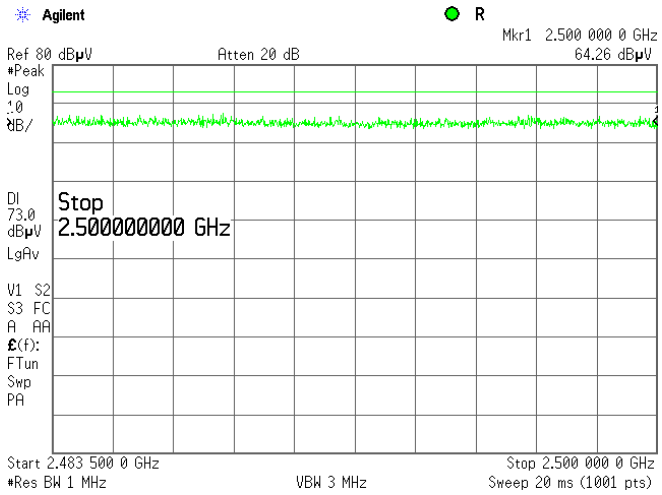


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

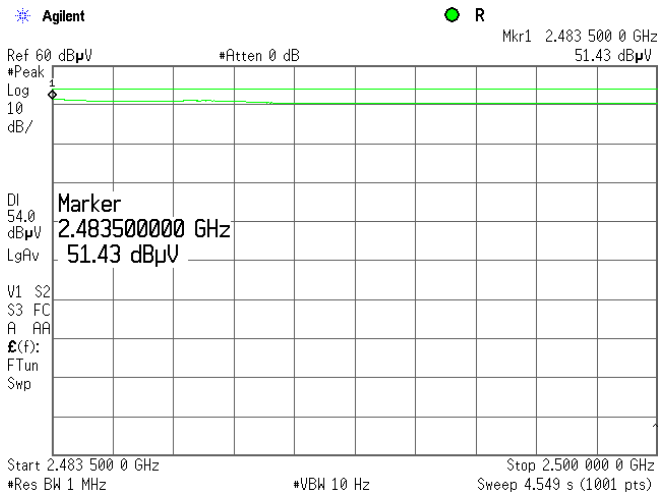
Plot 7.5.8 Radiated emission measurements from 2483.5 to 2500 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 54Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

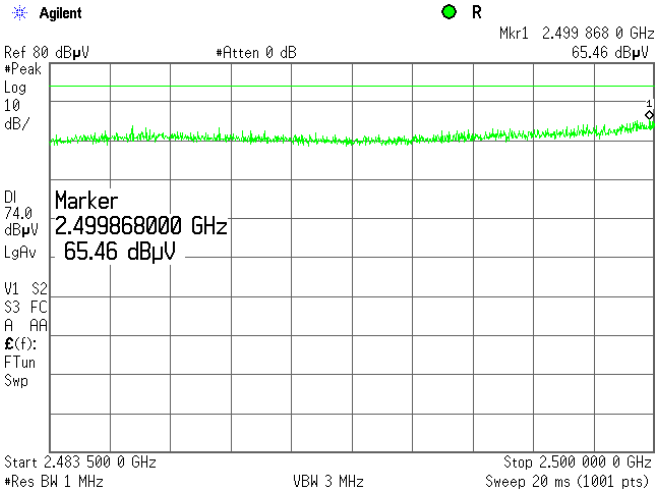


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

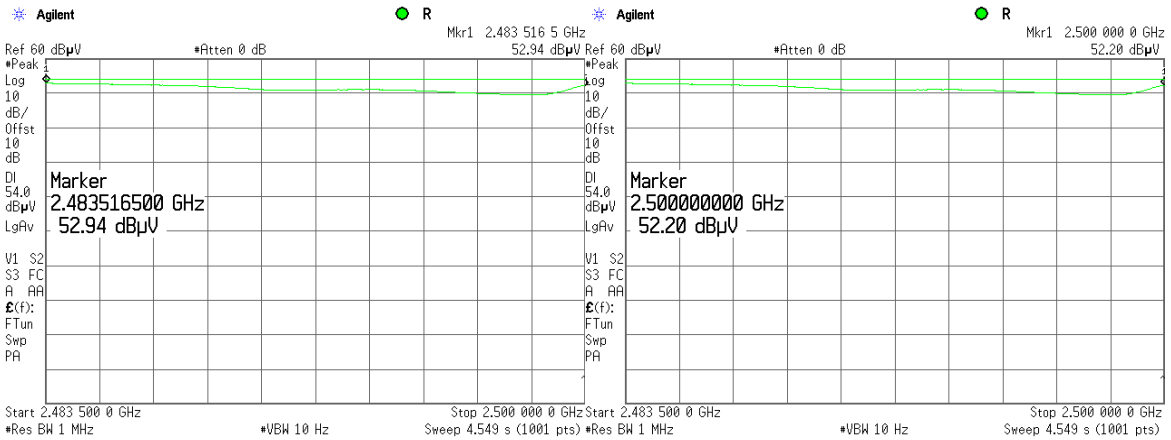
Plot 7.5.9 Radiated emission measurements from 2483.5 to 2500 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

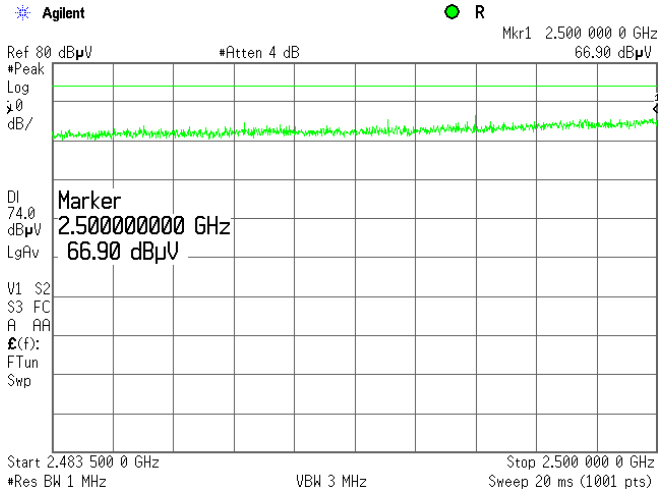


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

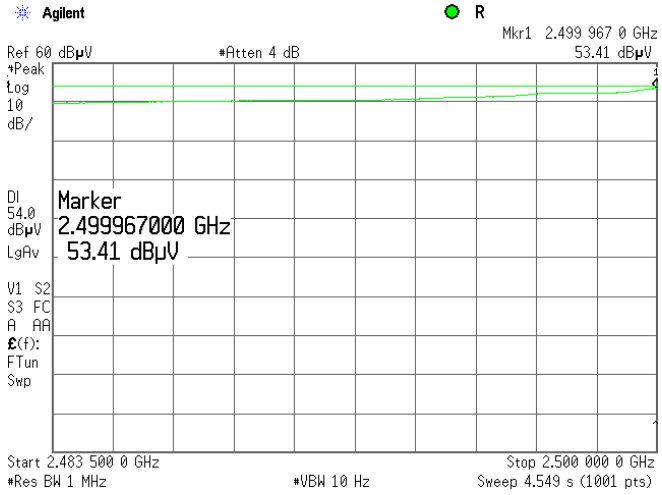
Plot 7.5.10 Radiated emission measurements from 2483.5 to 2500 MHz at the 2457 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 1Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

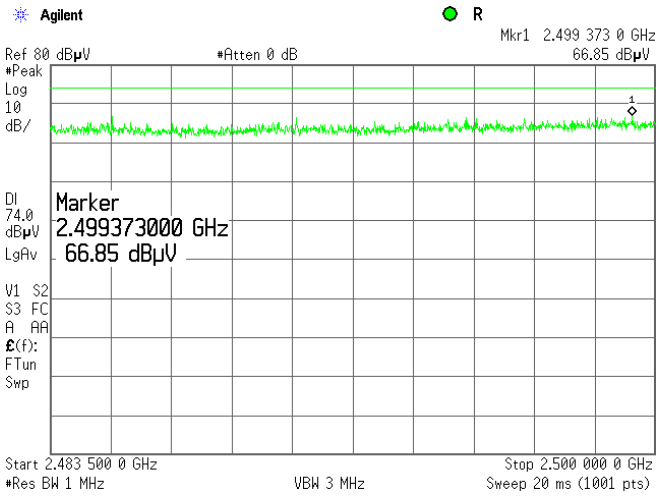


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Plot 7.5.11 Radiated emission measurements from 2483.5 to 2500 MHz at the 2457 MHz carrier frequency

TEST SITE:	Semi anechoic chamber
BITRATE:	54Mbps
CHAIN:	All 3 chains
ANTENNA POLARIZATION:	Vertical

Peak



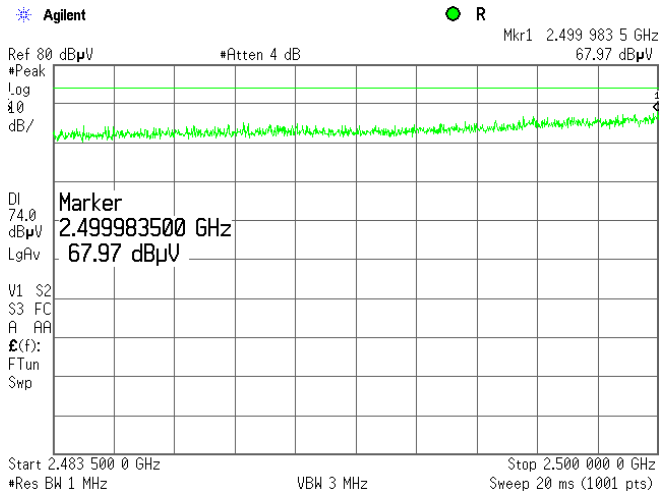
Average

Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Omni antenna configuration in V-polarization			

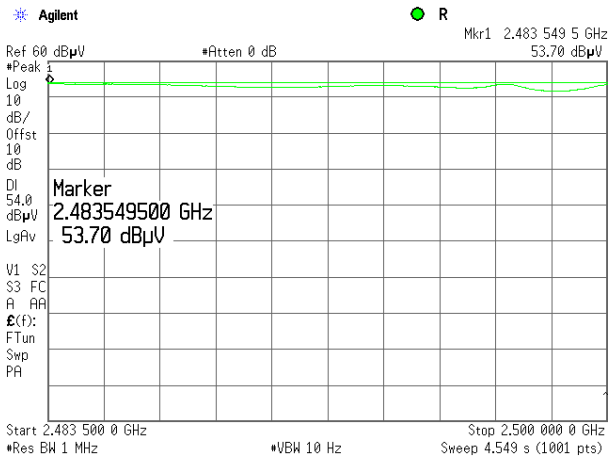
Plot 7.5.12 Radiated emission measurements from 2483.5 to 2500 MHz at the 2457 MHz carrier frequency

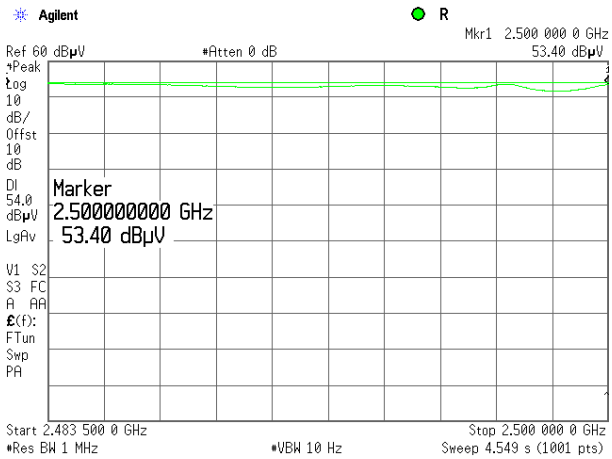
TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average



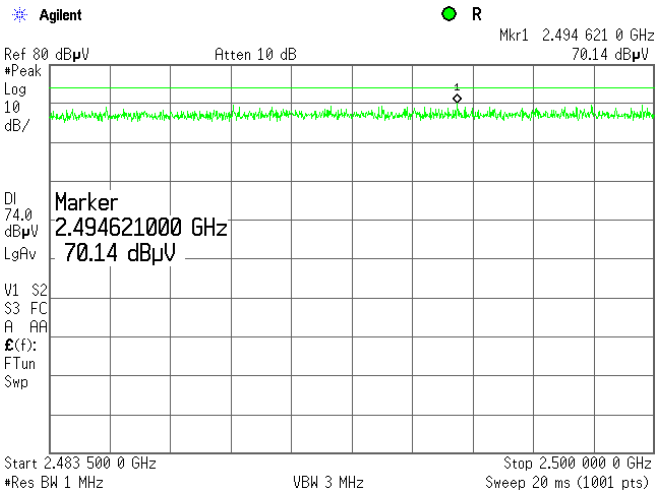


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

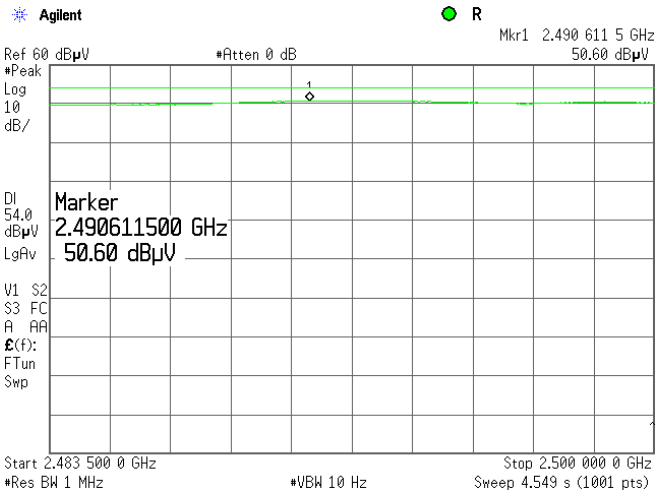
Plot 7.5.13 Radiated emission measurements from 2483.5 to 2500 MHz at the 2462 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 1Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

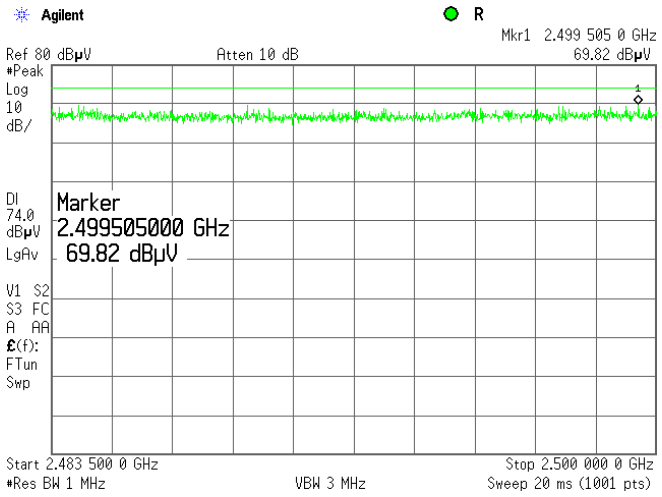


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

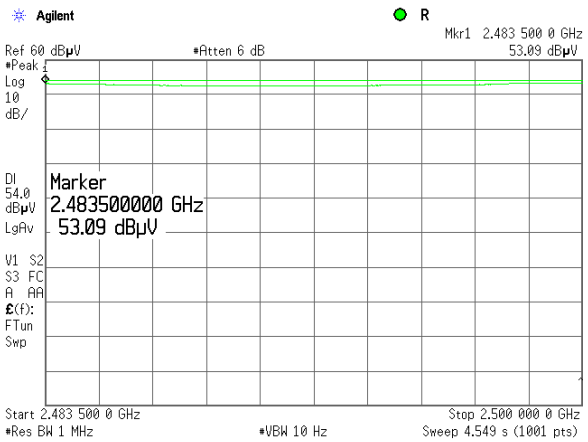
Plot 7.5.14 Radiated emission measurements from 2483.5 to 2500 MHz at the 2462 MHz carrier frequency

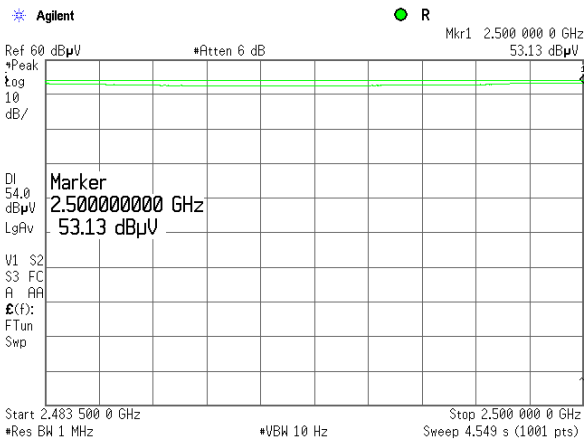
TEST SITE:	Semi anechoic chamber
BITRATE:	54Mbps
CHAIN:	All 3 chains
ANTENNA POLARIZATION:	Vertical

Peak



Average



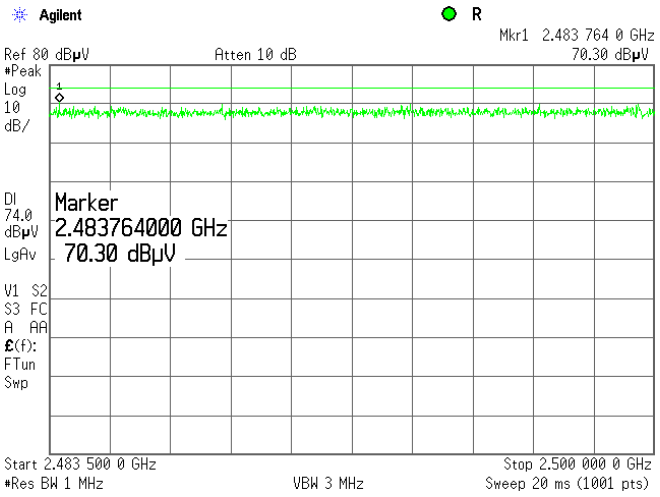


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

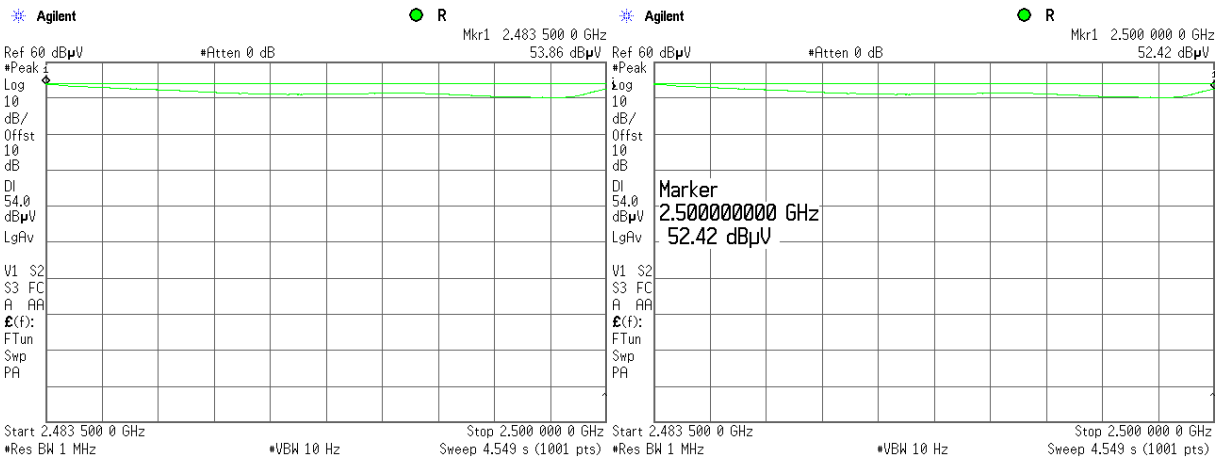
Plot 7.5.15 Radiated emission measurements from 2483.5 to 2500 MHz at the 2462 MHz carrier frequency

TEST SITE:	Semi anechoic chamber
BITRATE:	65Mbps
CHAIN:	All 3 chains
ANTENNA POLARIZATION:	Vertical

Peak



Average

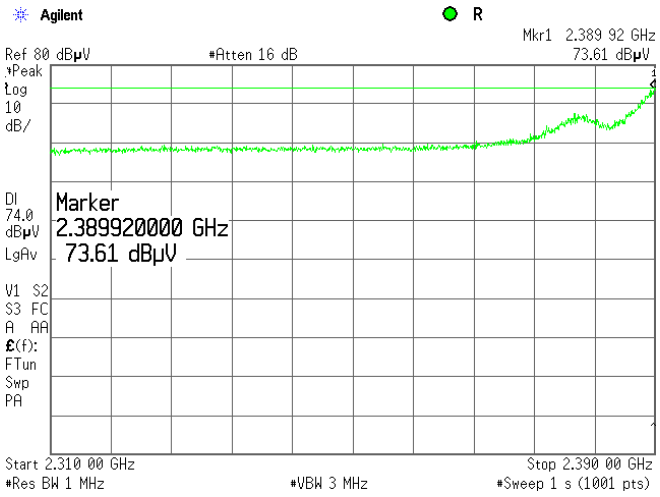


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

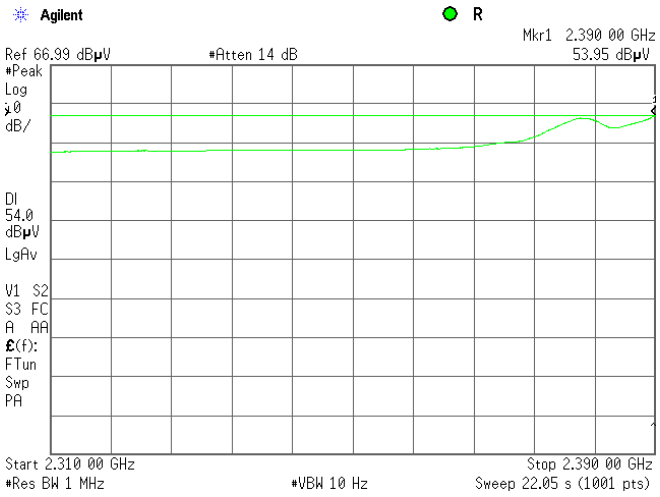
Plot 7.5.16 Radiated emission measurements from 2310 to 2390 MHz at the 2422 MHz carrier frequency

TEST SITE:	Semi anechoic chamber
BITRATE:	13.5Mbps
CHAIN:	All 3 chains
ANTENNA POLARIZATION:	Vertical

Peak



Average

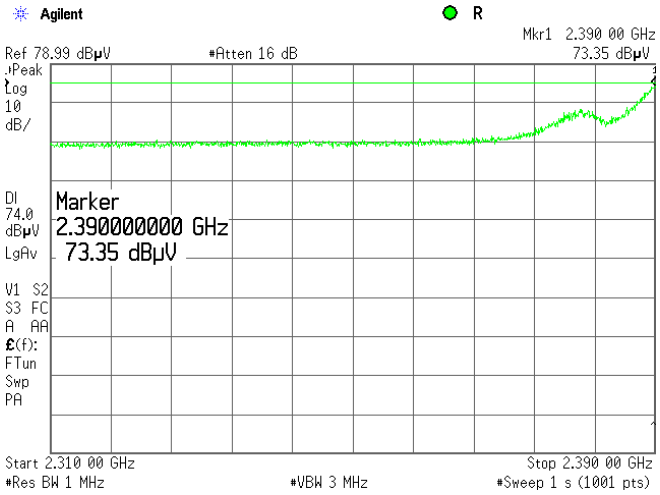


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Plot 7.5.17 Radiated emission measurements from 2310 to 2390 MHz at the 2422 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 135Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



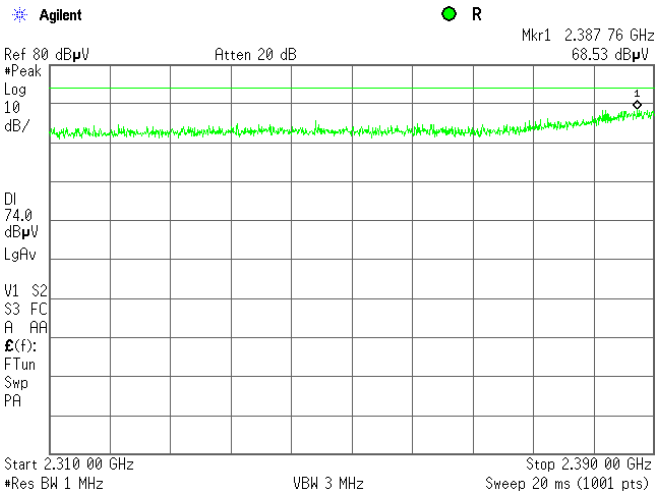
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Plot 7.5.18 Radiated emission measurements from 2310 to 2390 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 13.5Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



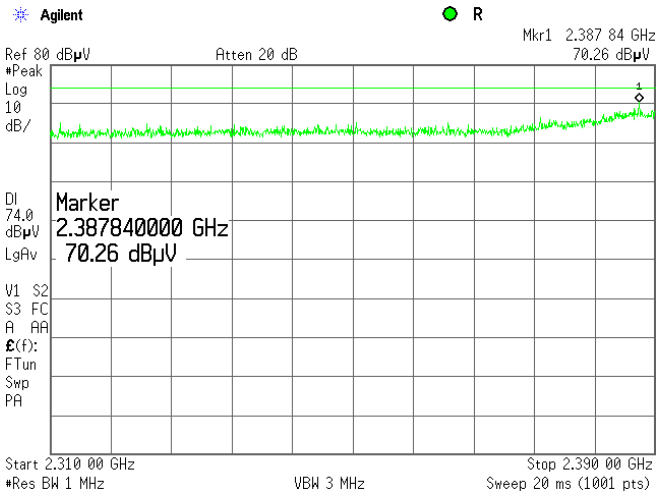
Average

Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

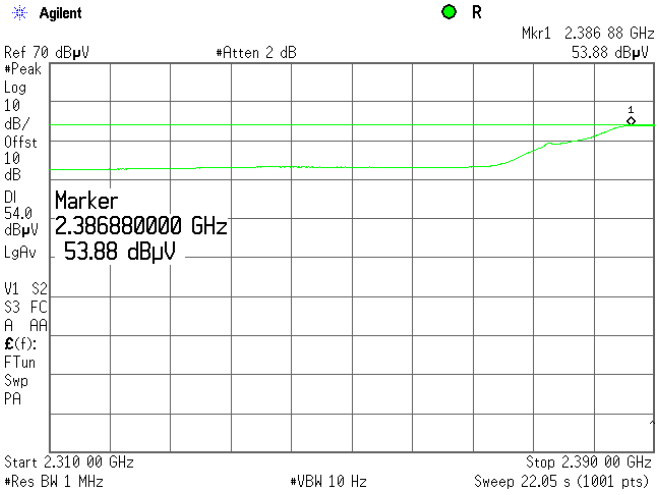
Plot 7.5.19 Radiated emission measurements from 2310 to 2390 MHz at the 2437 MHz carrier frequency

TEST SITE:	Semi anechoic chamber
BITRATE:	135Mbps
CHAIN:	All 3 chains
ANTENNA POLARIZATION:	Vertical

Peak



Average

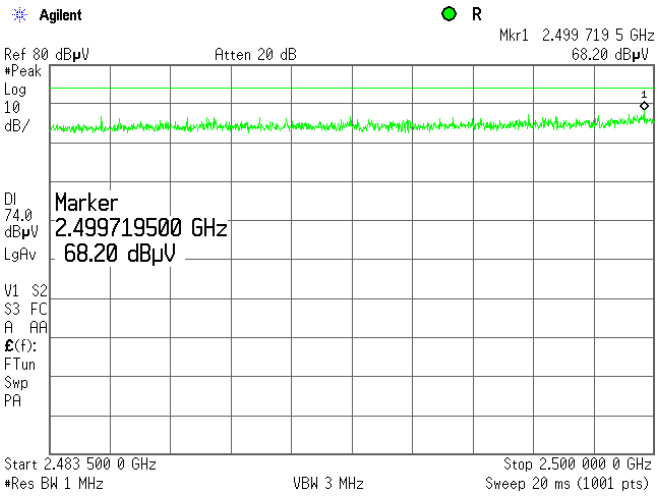


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

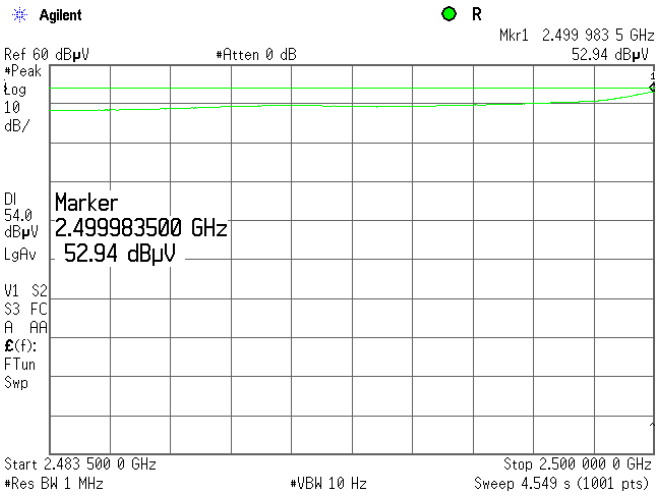
Plot 7.5.20 Radiated emission measurements from 2483.5 to 2500 MHz at the 2437 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 13.5Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

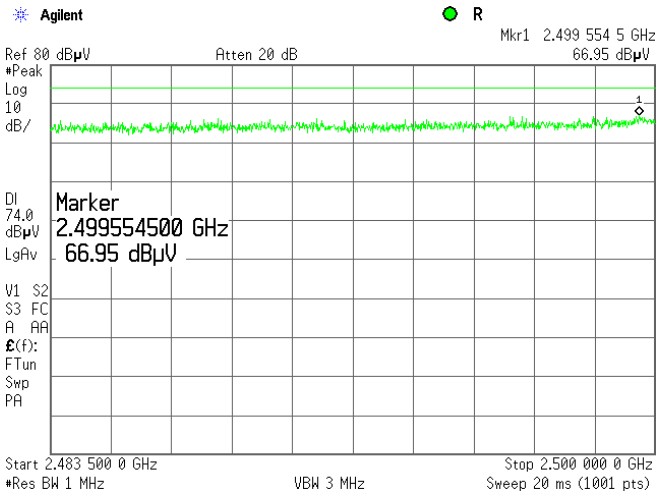


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

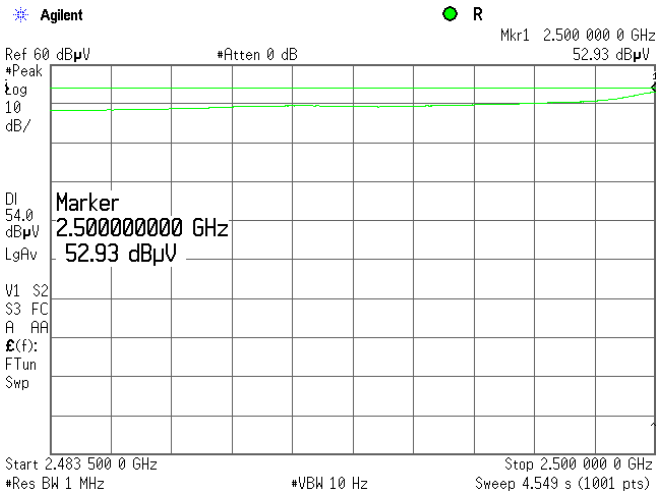
Plot 7.5.21 Radiated emission measurements from 2483.5 to 2500 MHz at the 2437 MHz carrier frequency

TEST SITE:	Semi anechoic chamber
BITRATE:	135Mbps
CHAIN:	All 3 chains
ANTENNA POLARIZATION:	Vertical

Peak



Average

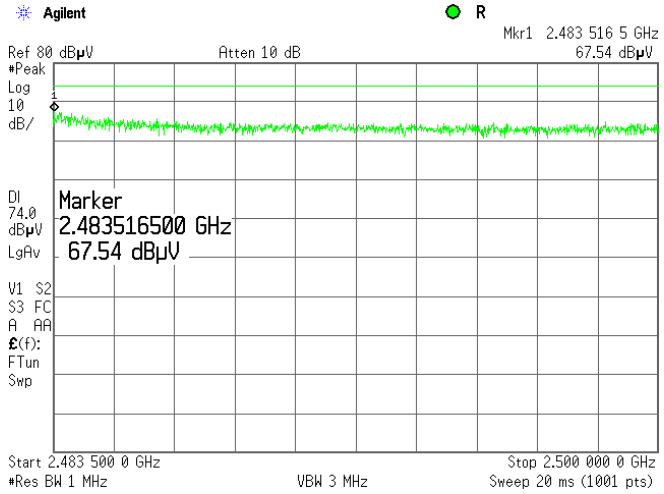


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

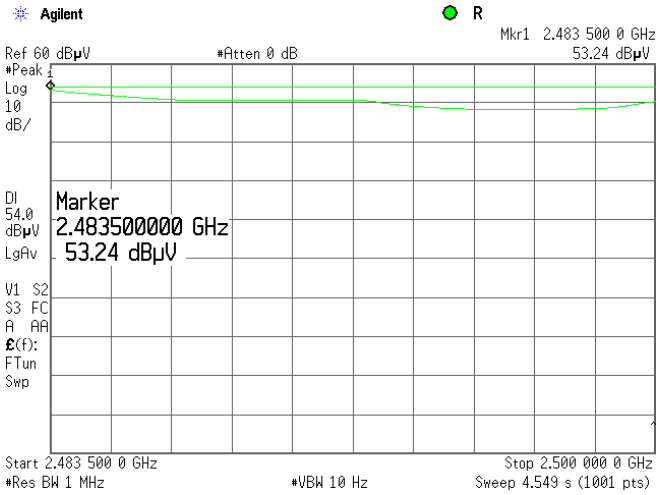
Plot 7.5.22 Radiated emission measurements from 2483.5 to 2500 MHz at the 2452 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 13.5Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average

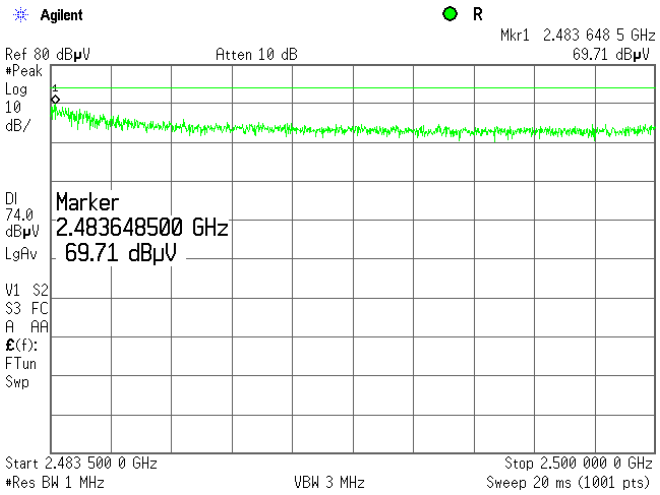


Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/8/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

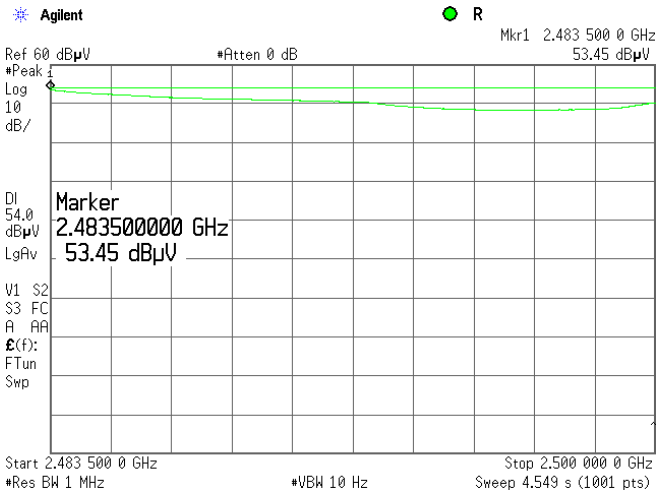
Plot 7.5.23 Radiated emission measurements from 2483.5 to 2500 MHz at the 2452 MHz carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 135Mbps
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical

Peak



Average



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

7.6 Field strength of spurious emissions, sector antenna configuration

7.6.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limits are given in Table 7.6.1.

Table 7.6.1 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m within restricted bands, dB(μV/m)*			Attenuation of field strength of spurious versus carrier outside restricted bands, dBc***
	Peak	Quasi Peak	Average	
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**	20.0
0.090 – 0.110	NA	108.5 – 106.8**	NA	
0.110 – 0.490	126.8 – 113.8	NA	106.8 – 93.8**	
0.490 – 1.705	NA	73.8 – 63.0**	NA	
1.705 – 30.0*		69.5		
30 – 88		40.0		
88 – 216		43.5		
216 – 960		46.0		
960 - 1000		54.0		
1000 – 10thharmonic	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.

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

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

7.6.2.2 The 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.

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

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

7.6.3.1 The EUT was set up as shown in Figure 7.6.2, energized and the performance check was conducted.

7.6.3.2 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.

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

Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Figure 7.6.1 Setup for spurious emission field strength measurements below 30 MHz

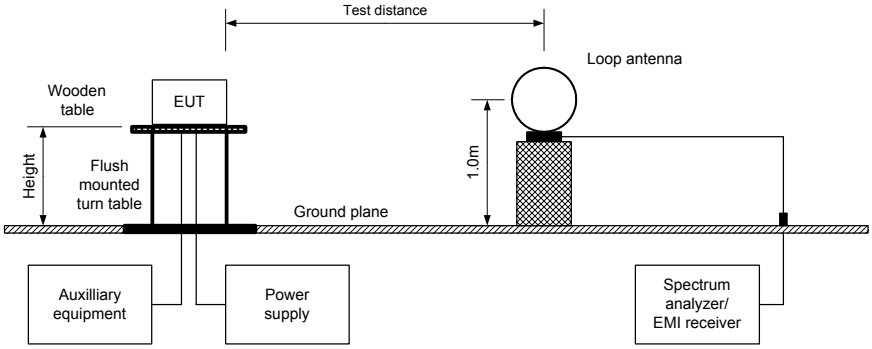
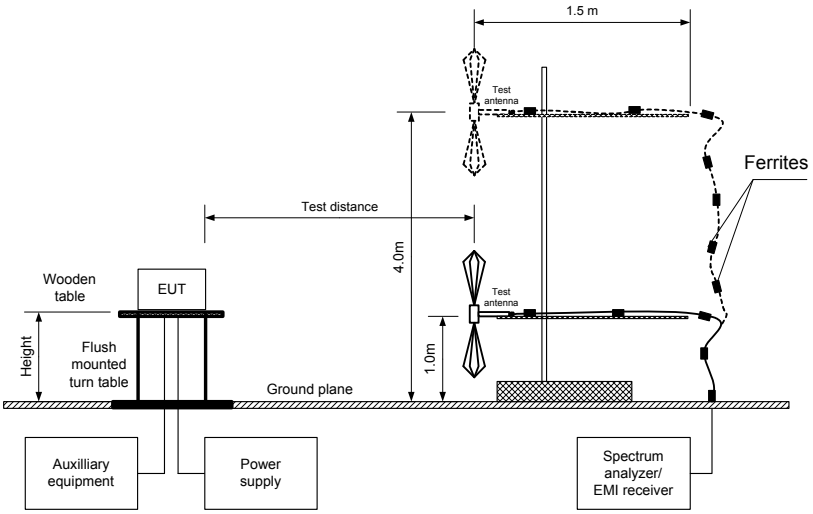


Figure 7.6.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Table 7.6.2 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:	OFDM
BIT RATE:	65Mbps
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
No emission were found									

Verdict: Pass

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

Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Table 7.6.3 Field strength of spurious emissions above 1 GHz within restricted bands

ASSIGNED FREQUENCY:	2400-2483.5 MHz
INVESTIGATED FREQUENCY RANGE:	1000-25000 MHz
TEST DISTANCE:	3 m
MODULATION:	OFDM
BIT RATE:	65Mbps
DUTY CYCLE:	100 %
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	1000 kHz
TEST ANTENNA TYPE:	Double ridged guide

Frequency, MHz	Antenna		Azimuth, degrees*	Peak field strength(VBW=3 MHz)			Average field strength(VBW=10 Hz)			Verdict
	Polarization	Height, m		Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
No emission were found										

Verdict: Pass

*- EUT front panel refers to 0 degrees position of turntable.
**- Margin = Measured field strength - specification limit.

Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Table 7.6.4 Field strength of spurious emissions below 1 GHz within restricted bands

ASSIGNED FREQUENCY:	2400-2483.5MHz
INVESTIGATED FREQUENCY RANGE:	0.009 – 1000 MHz
TEST DISTANCE:	3 m
MODULATION:	OFDM
MODULATING SIGNAL:	PRBS
BIT RATE:	65Mbps
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								
332.4	40.12	38.2	46	-7.72	Vertical	1.2	110	PASS
Mid carrier frequency								
333.36	39.11	37.29	46	-8.71	Vertical	1.2	100	PASS
1000	46.19	42.25	54	-11.75	Vertical	1	188	
High carrier frequency								
335.2	38.5	36.52	46	-9.48	Vertical	1.2	105	PASS
1000	44.28	40.89	54	-13.11	Vertical	1	251	

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

Table 7.6.5 Restricted bands

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.37625 - 8.38675	73 - 74.6	399.9 - 410	2690 - 2900	10.6 - 12.7
0.495 - 0.505	8.41425 - 8.41475	74.8 - 75.2	608 - 614	3260 - 3267	13.25 - 13.4
2.1735 - 2.1905	12.29 - 12.293	108 - 121.94	960 - 1240	3332 - 3339	14.47 - 14.5
4.125 - 4.128	12.51975 - 12.52025	123 - 138	1300 - 1427	3345.8 - 3358	15.35 - 16.2
4.17725 - 4.17775	12.57675 - 12.57725	149.9 - 150.05	1435 - 1626.5	3600 - 4400	17.7 - 21.4
4.20725 - 4.20775	13.36 - 13.41	156.52475 - 156.52525	1645.5 - 1646.5	4500 - 5150	22.01 - 23.12
6.215 - 6.218	16.42 - 16.423	156.7 - 156.9	1660 - 1710	5350 – 5460	23.6 - 24
6.26775 - 6.26825	16.69475 - 16.69525	162.0125 - 167.17	1718.8 - 1722.2	7250 - 7750	31.2 - 31.8
6.31175 - 6.31225	16.80425 - 16.80475	167.72 - 173.2	2200 - 2300	8025 – 8500	36.43 - 36.5
8.291 - 8.294	25.5 - 25.67	240 - 285	2310 - 2390	9000 - 9200	Above 38.6
8.362 - 8.366	37.5 - 38.25	322 - 335.4	2483.5 - 2500	9300 - 9500	

Reference numbers of test equipment used

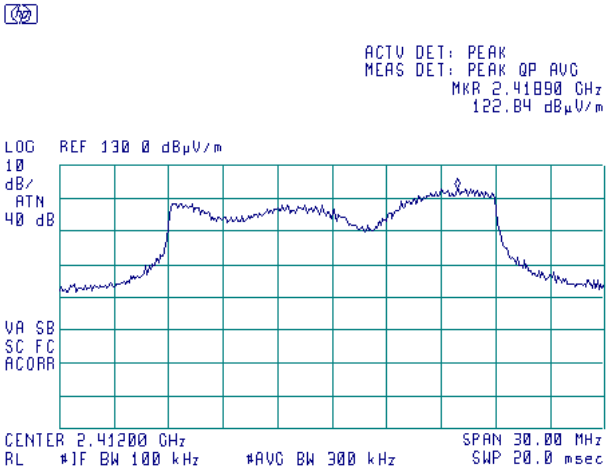
HL 0446	HL 0604	HL1984	HL2871	HL3344	HL3356	HL3531	HL3623

Full description is given in Appendix A.

Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

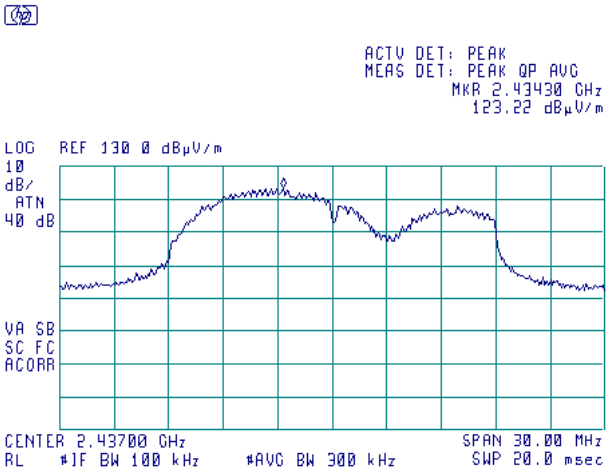
Plot 7.6.1 Radiated emission measurements at the low carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical



Plot 7.6.2 Radiated emission measurements at the mid carrier frequency

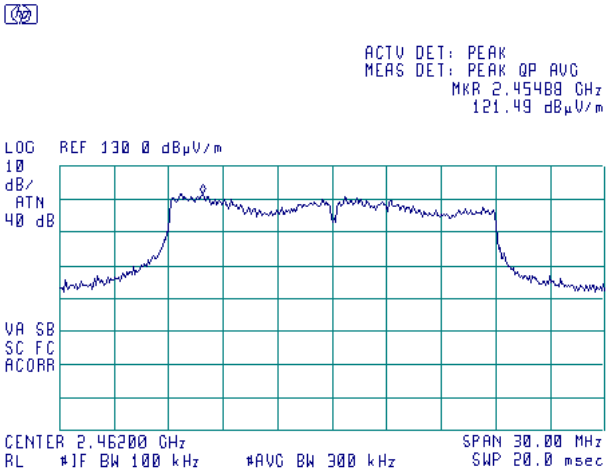
TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

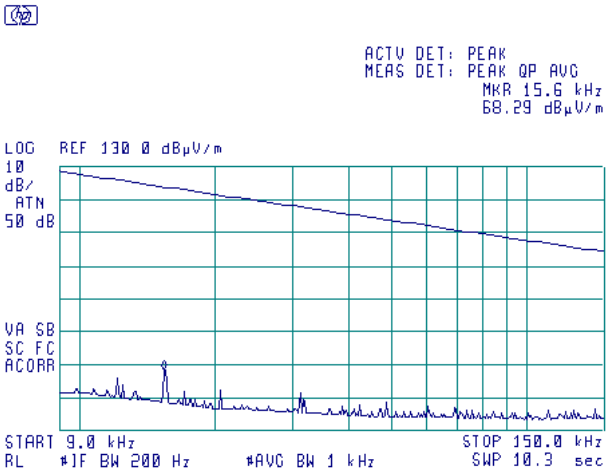
Plot 7.6.3 Radiated emission measurements at the high carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains
ANTENNA POLARIZATION: Vertical



Plot 7.6.4 Radiated emission measurements 9-150 KHz at the low carrier frequency

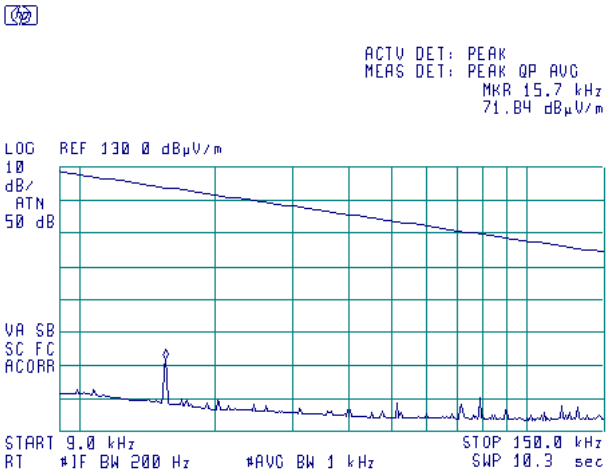
TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

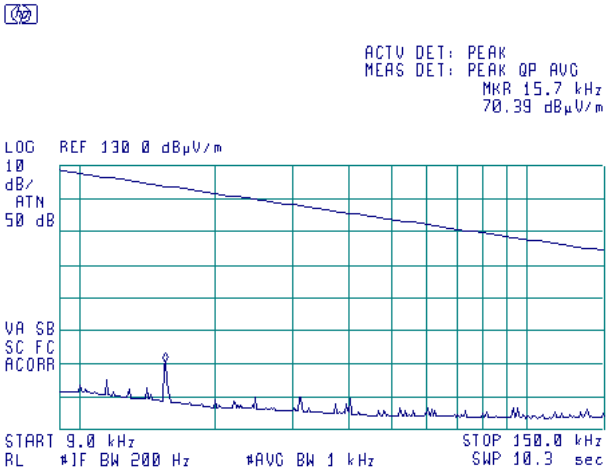
Plot 7.6.5 Radiated emission measurements 9-150 KHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Plot 7.6.6 Radiated emission measurements 9-150 KHz at the high carrier frequency

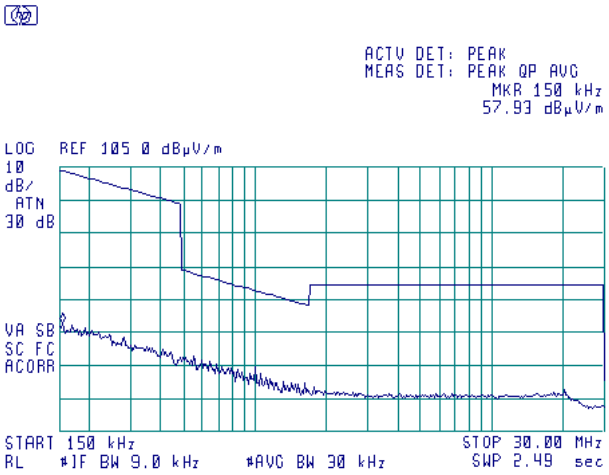
TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

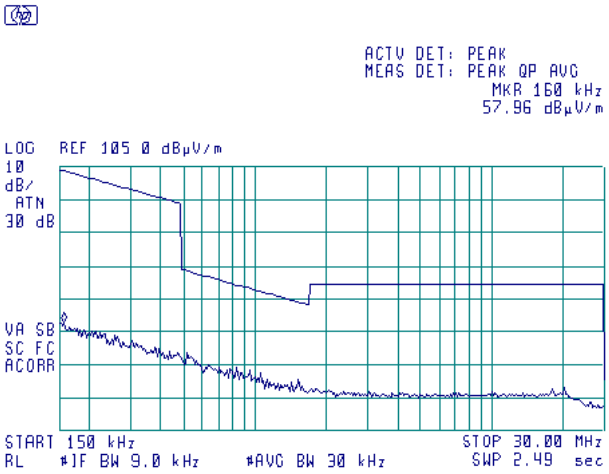
Plot 7.6.7 Radiated emission measurements 0.15-30 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Plot 7.6.8 Radiated emission measurements 0.15-30 MHz at the mid carrier frequency

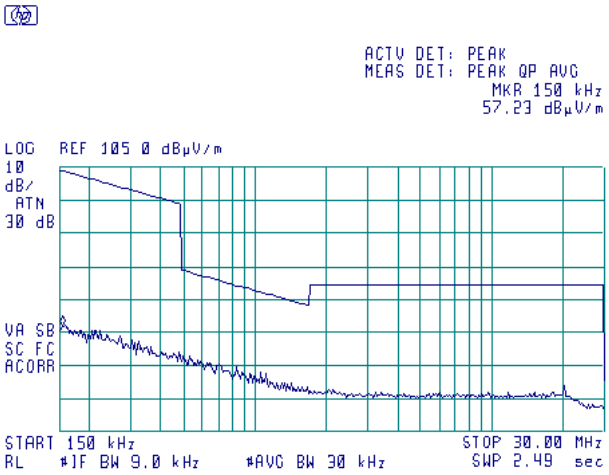
TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

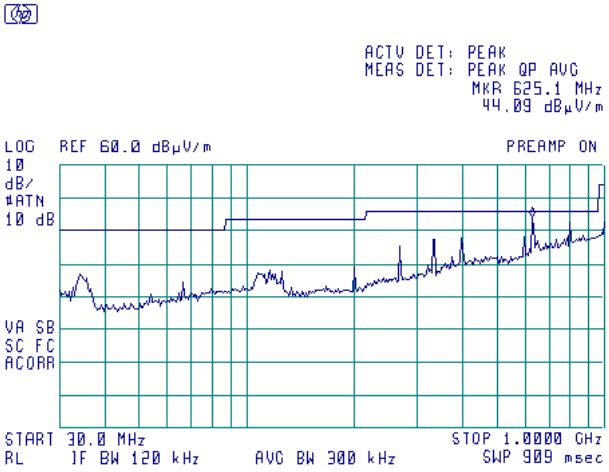
Plot 7.6.9 Radiated emission measurements 0.15-30 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Plot 7.6.10 Radiated emission measurements 30-1000 MHz at the low carrier frequency

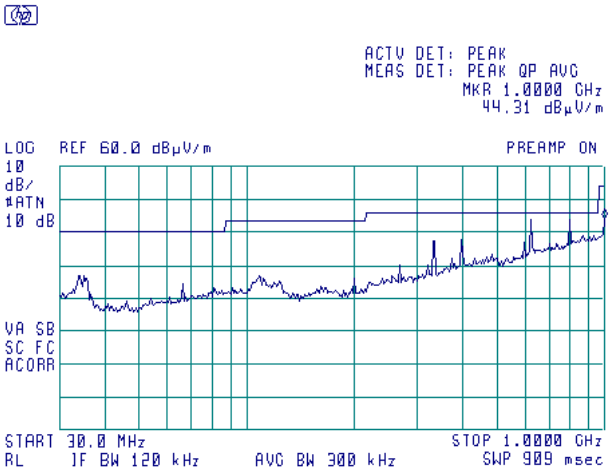
TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

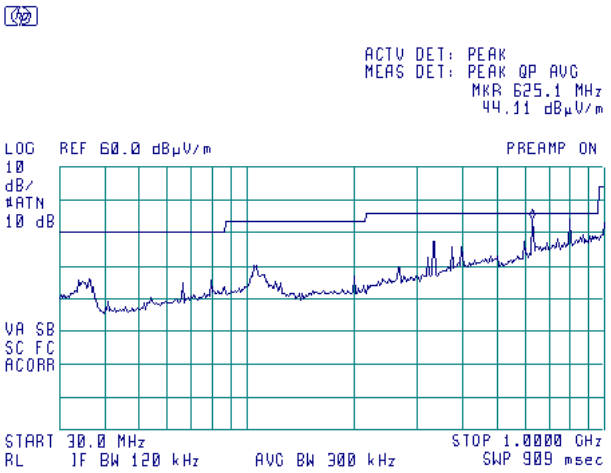
Plot 7.6.11 Radiated emission measurements 30-1000 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Plot 7.6.12 Radiated emission measurements 30-1000 MHz at the high carrier frequency

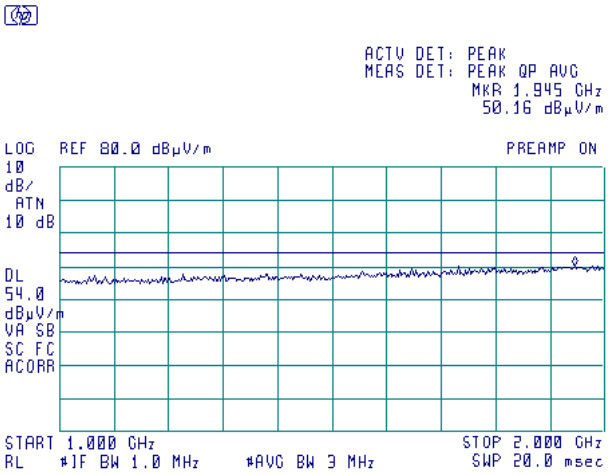
TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

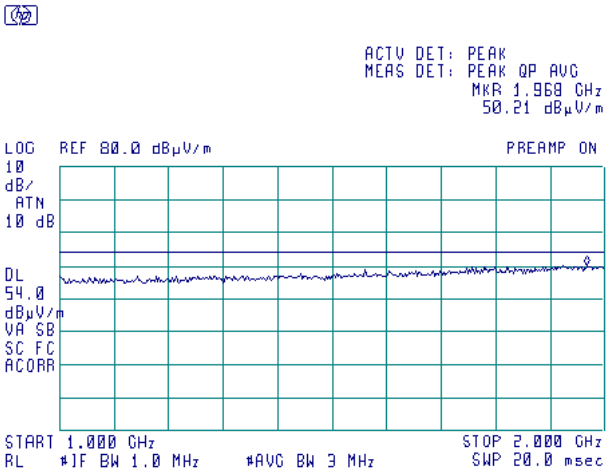
Plot 7.6.13 Radiated emission measurements 1000-2000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Plot 7.6.14 Radiated emission measurements 1000-2000 MHz at the mid carrier frequency

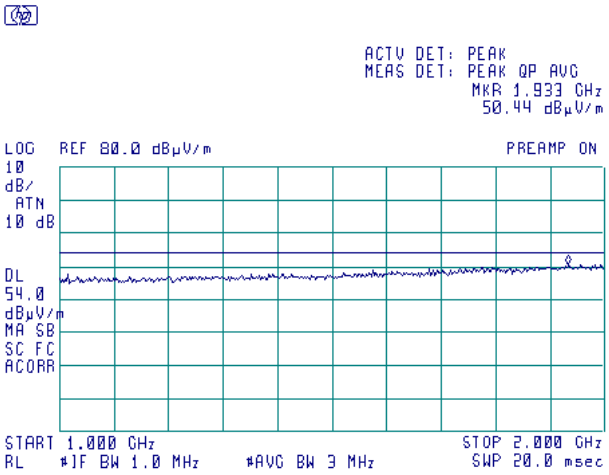
TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Plot 7.6.15 Radiated emission measurements 1000-2000 MHz at the high carrier frequency

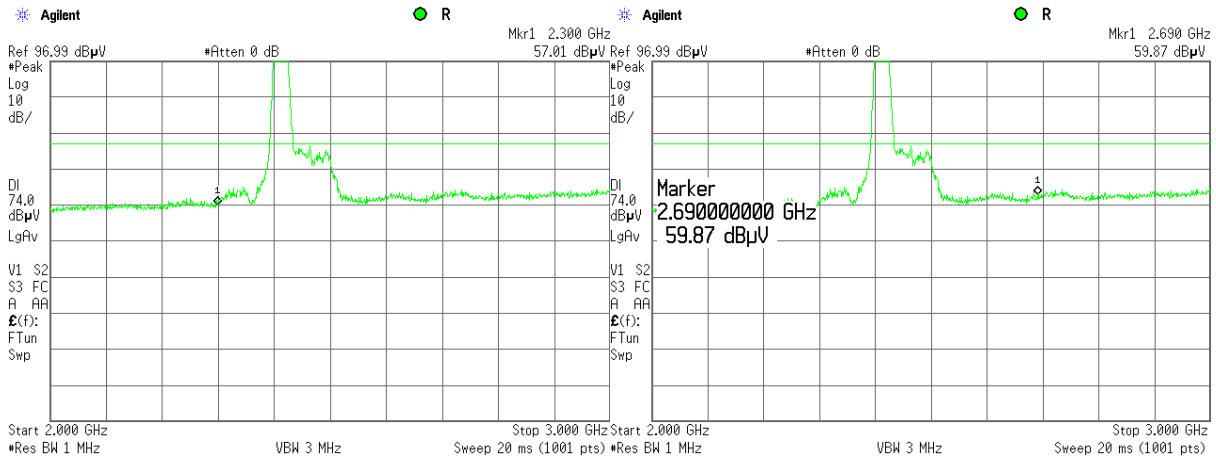
TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

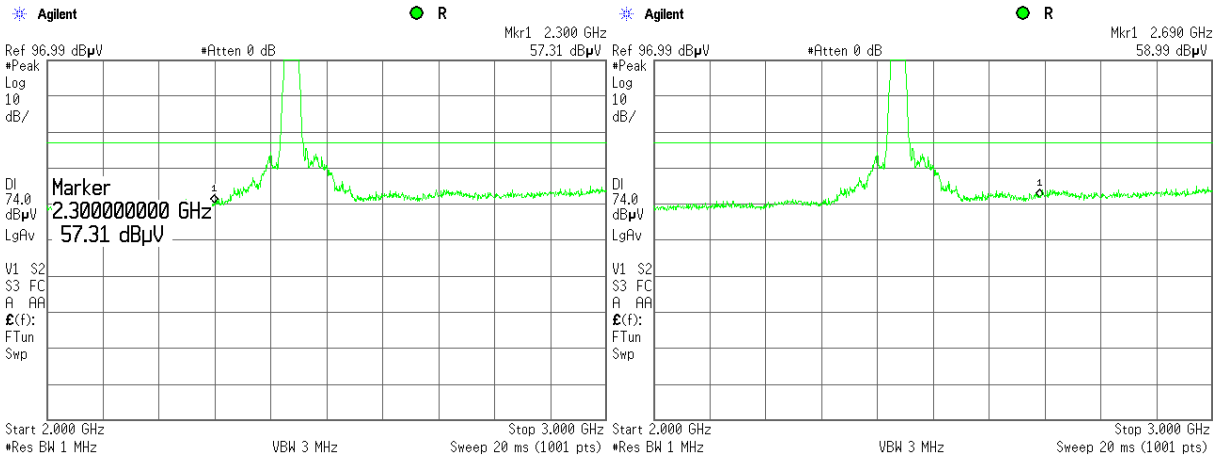
Plot 7.6.16 Radiated emission measurements 2000-3000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Plot 7.6.17 Radiated emission measurements 2000-3000 MHz at the mid carrier frequency

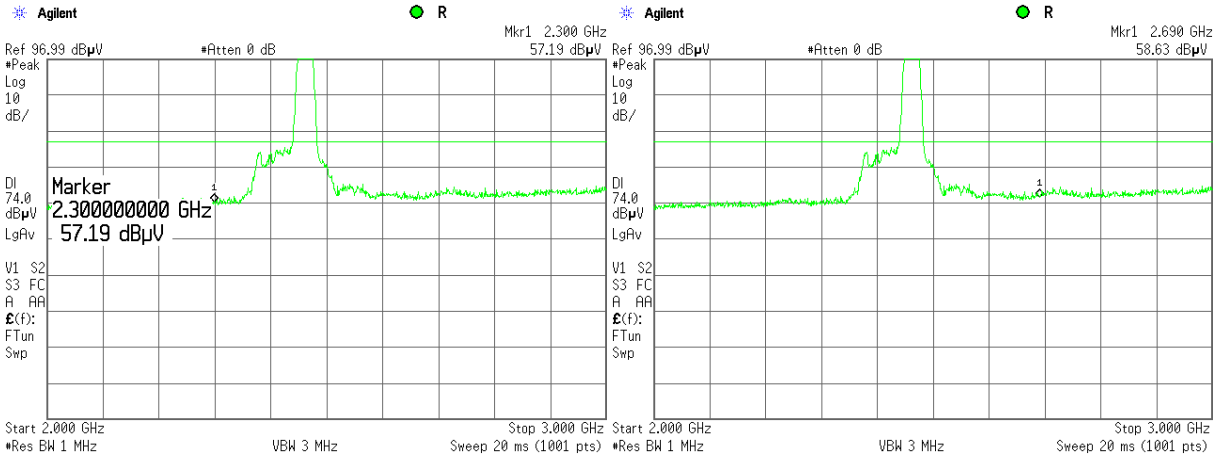
TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

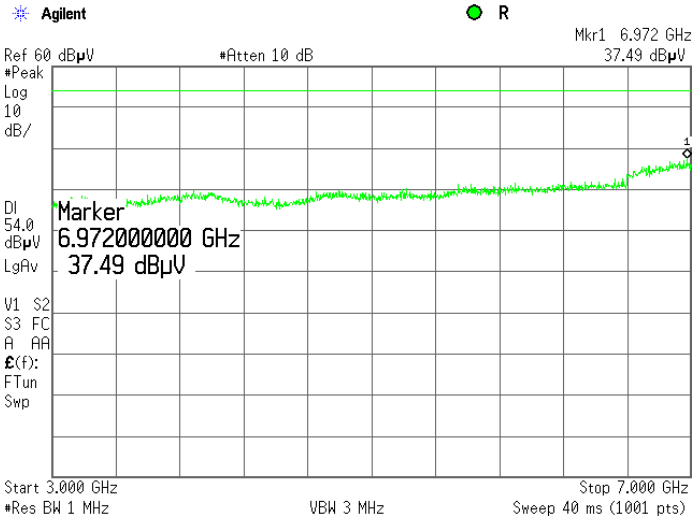
Plot 7.6.18 Radiated emission measurements 2000-3000 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Plot 7.6.19 Radiated emission measurements 3000-7000 MHz at the low carrier frequency

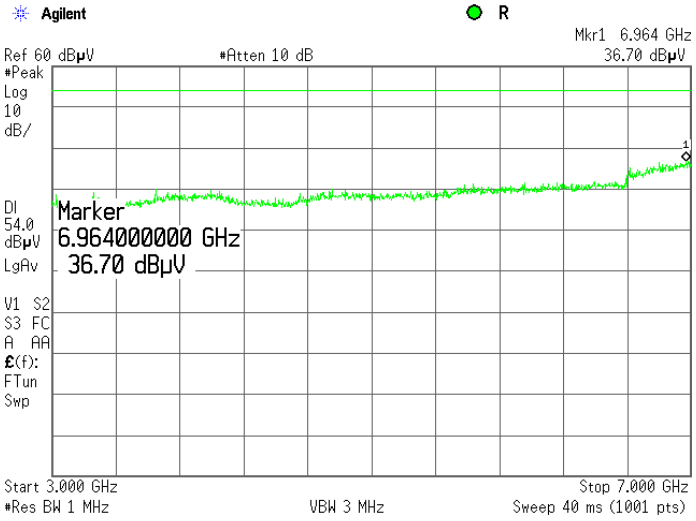
TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

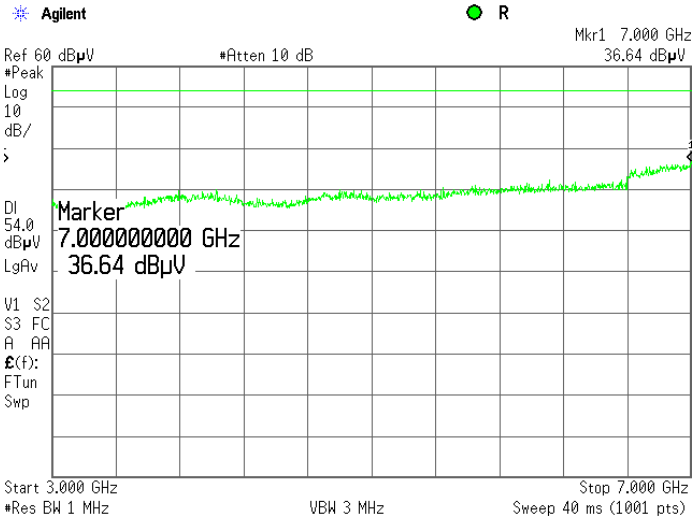
Plot 7.6.20 Radiated emission measurements 3000-7000 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Plot 7.6.21 Radiated emission measurements 3000-7000 MHz at the high carrier frequency

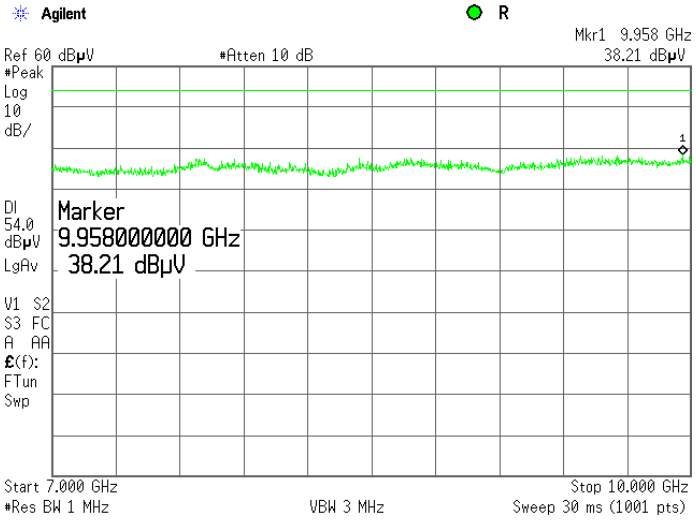
TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

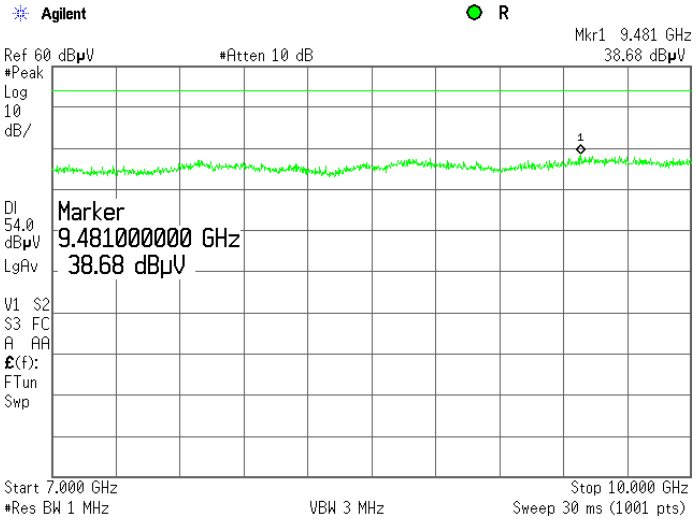
Plot 7.6.22 Radiated emission measurements 7000-10000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Plot 7.6.23 Radiated emission measurements 7000-10000 MHz at the mid carrier frequency

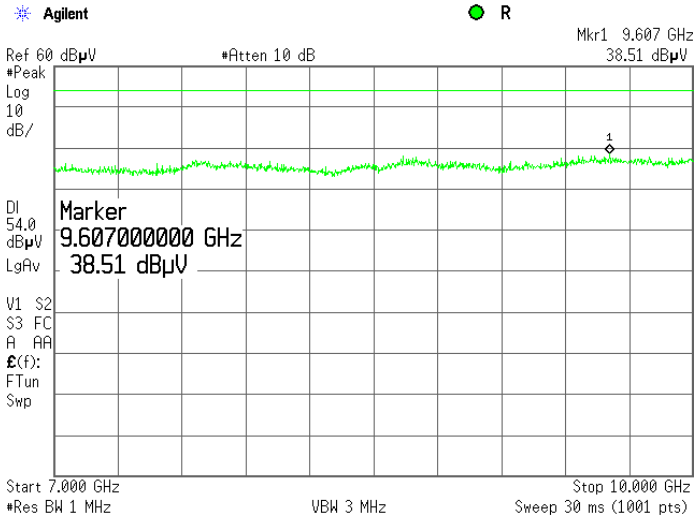
TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

Plot 7.6.24 Radiated emission measurements 7000-10000 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains

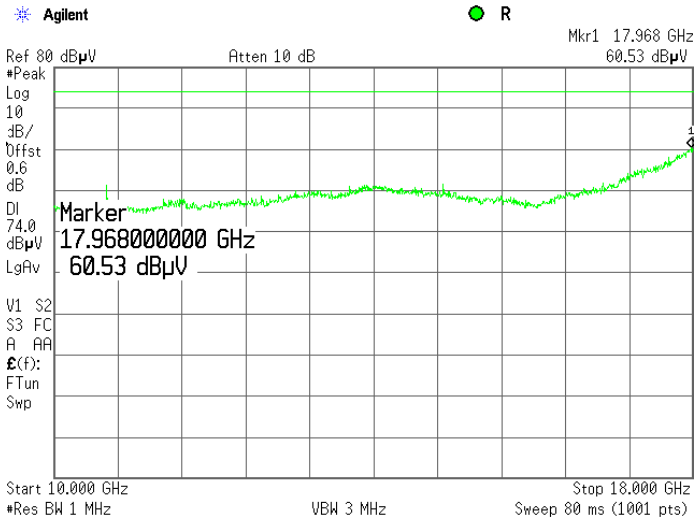


Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

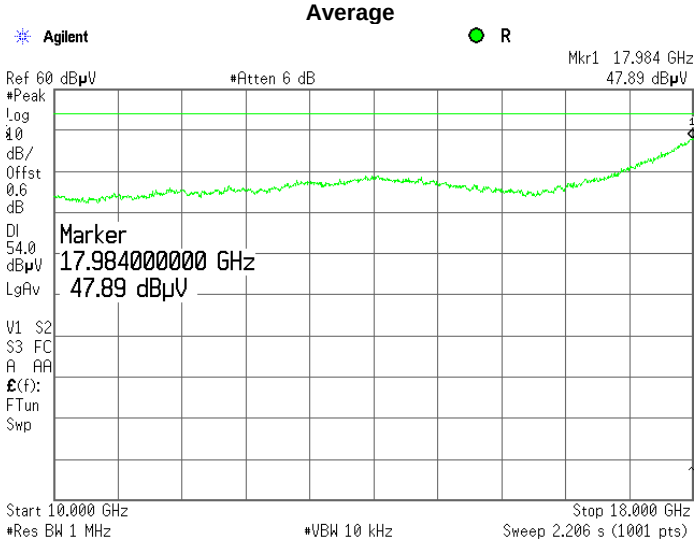
Plot 7.6.25 Radiated emission measurements 10000-18000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains

Peak



Average

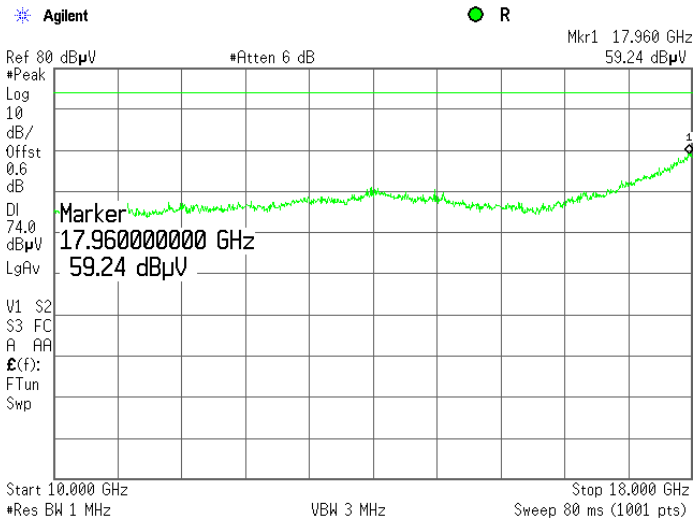


Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

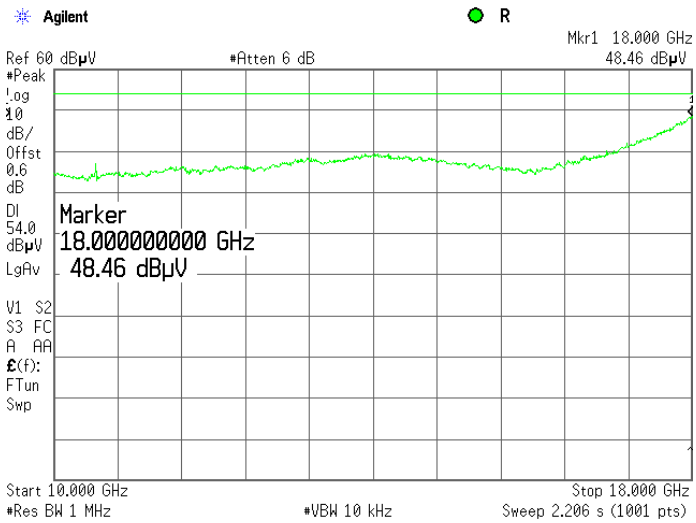
Plot 7.6.26 Radiated emission measurements 10000-18000 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains

Peak



Average

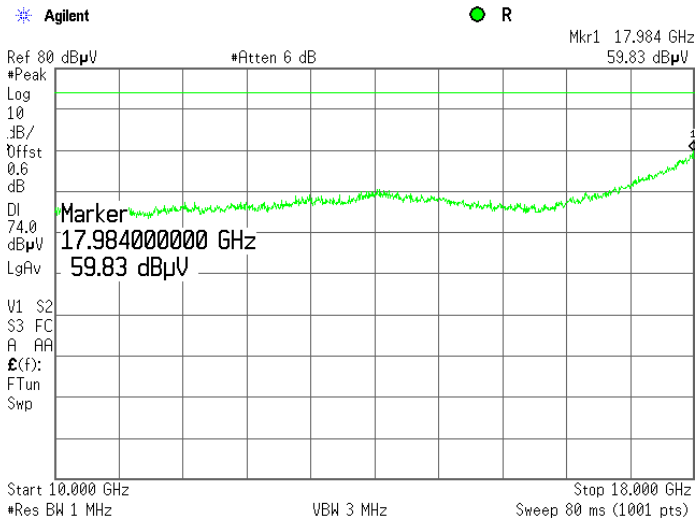


Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

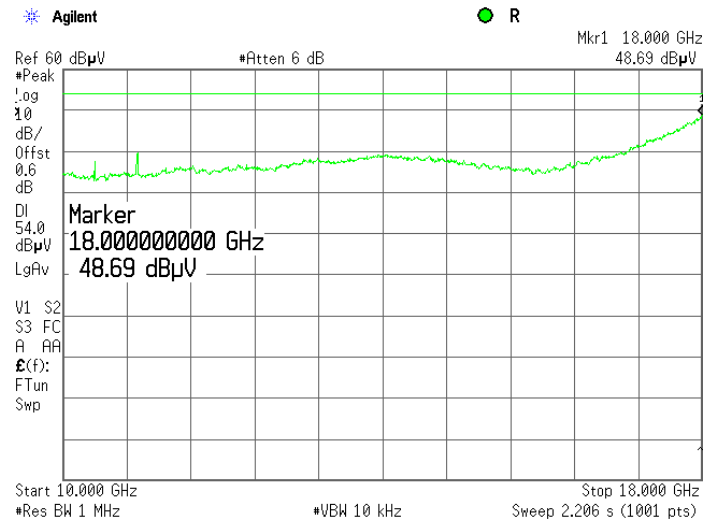
Plot 7.6.27 Radiated emission measurements 10000-18000 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains

Peak



Average

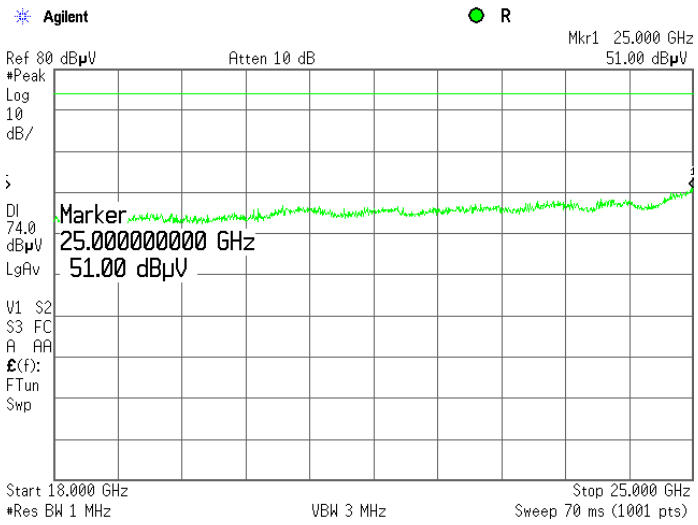


Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

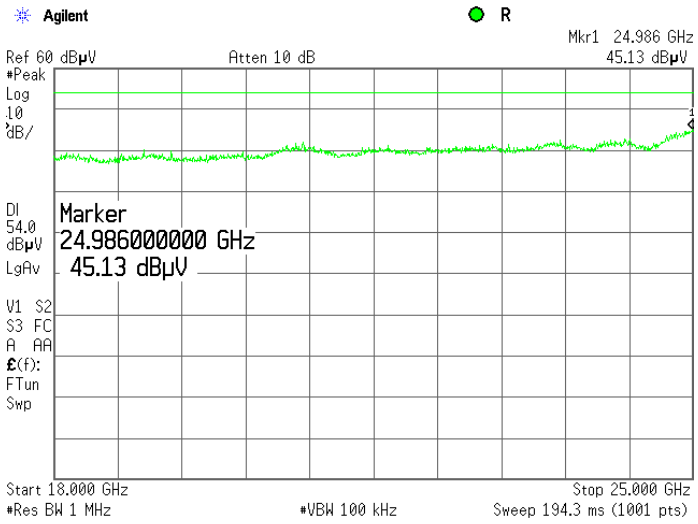
Plot 7.6.28 Radiated emission measurements 18000-25000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains

Peak



Average

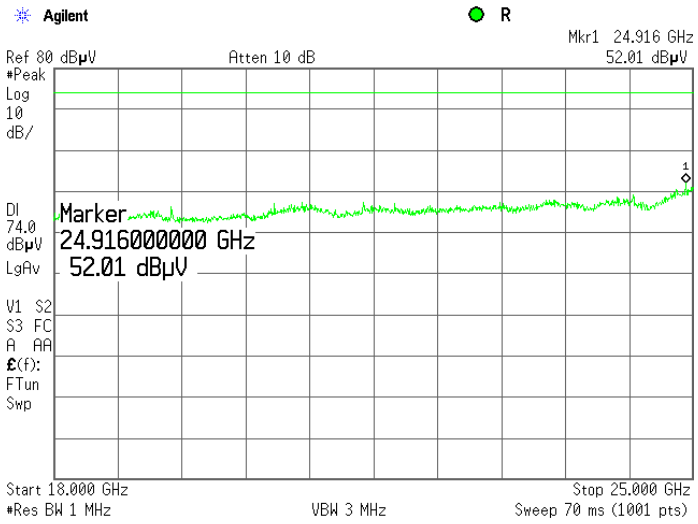


Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

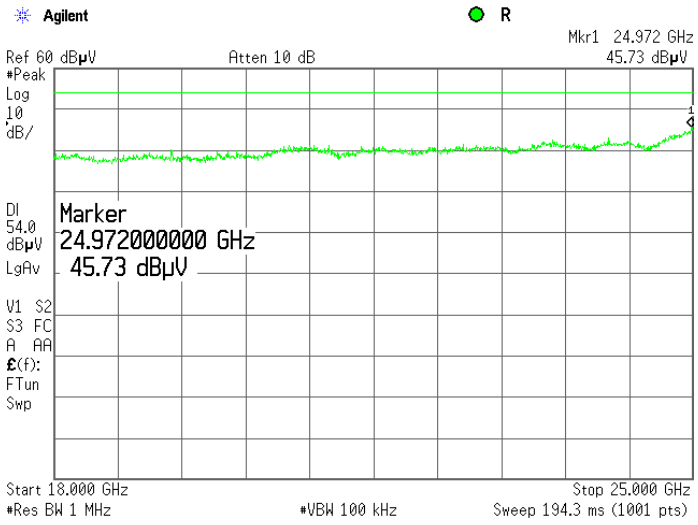
Plot 7.6.29 Radiated emission measurements 18000-25000 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains

Peak



Average

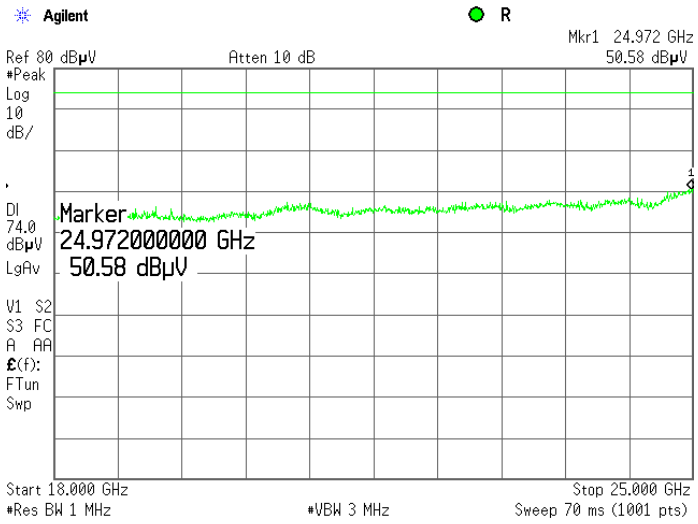


Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011 - 7/12/2011		
Temperature: 24 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Sector antenna configuration in V/V/V polarization			

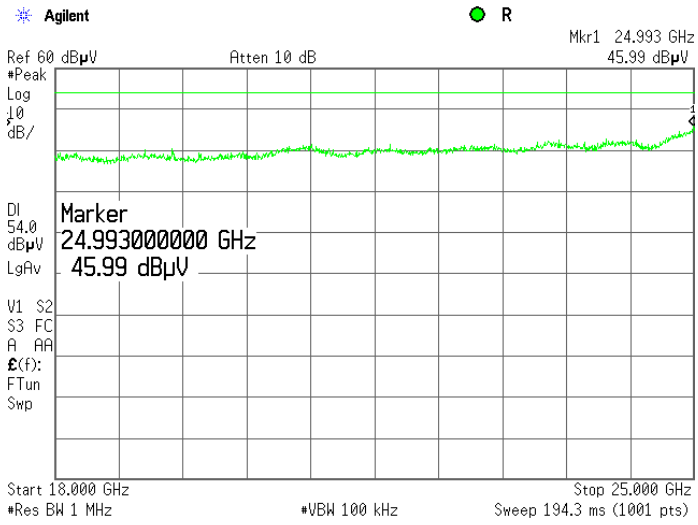
Plot 7.6.30 Radiated emission measurements 18000-25000 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
CHAIN: All 3 chains

Peak



Average



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

7.7 Field strength of spurious emissions, OMNI antenna configuration

7.7.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limits are given in Rable 7.7.1.

Table 7.7.1 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m within restricted bands, dB(μV/m)*			Attenuation of field strength of spurious versus carrier outside restricted bands, dBc***
	Peak	Quasi Peak	Average	
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**	20.0
0.090 – 0.110	NA	108.5 – 106.8**	NA	
0.110 – 0.490	126.8 – 113.8	NA	106.8 – 93.8**	
0.490 – 1.705	NA	73.8 – 63.0**	NA	
1.705 – 30.0*		69.5		
30 – 88		40.0		
88 – 216		43.5		
216 – 960		46.0		
960 - 1000		54.0		
1000 – 10thharmonic	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.

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

7.7.2.1 The EUT was set up as shown in Figure 7.7.1, energized and the performance check was conducted.

7.7.2.2 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.

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

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

7.7.3.1 The EUT was set up as shown in Figure 7.7.2, energized and the performance check was conducted.

7.7.3.2 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.

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

Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Figure 7.7.1 Setup for spurious emission field strength measurements below 30 MHz

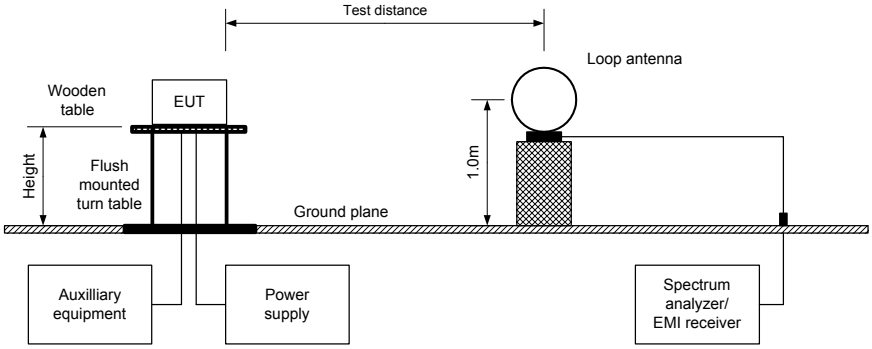
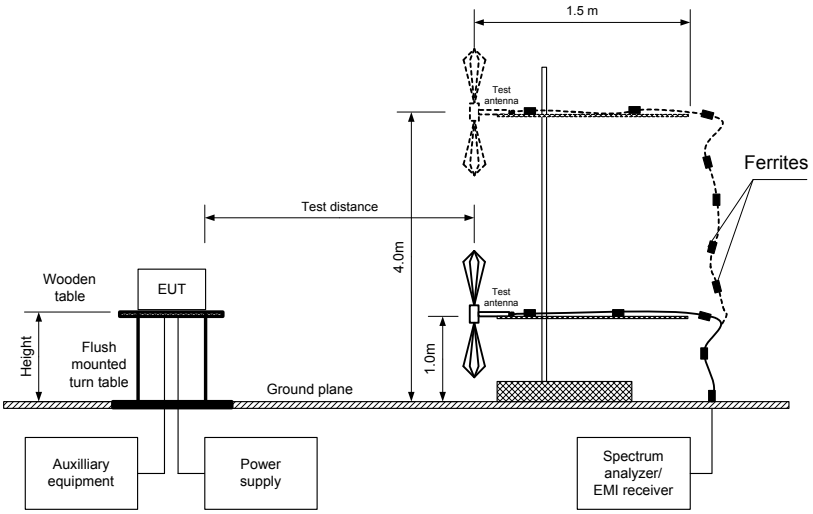


Figure 7.7.2 Setup for spurious emission field strength measurements above 30 MHz



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Table 7.7.2 Field strength of emissions outside restricted bands

ASSIGNED FREQUENCY:	2400-2483.5MHz
INVESTIGATED FREQUENCY RANGE:	0.009 –25000 MHz
TEST DISTANCE:	3 m
MODULATION:	OFDM
BIT RATE:	65Mbps
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									
595.5	47.1	Vertical	1.25	220	120.62	73.52	20	-53.52	Pass
625.1	39.9	Vertical	1.25	250	120.62	80.72		-80.72	
Mid carrier frequency									
595.5	40.87	Vertical	1.25	160	119.72	78.85	20	-58.85	Pass
625.1	41.3	Vertical	1.25	180	119.72	78.42		-78.42	
High carrier frequency									
595.5	38.66	Vertical	1.25	155	118.42	79.76	20	-59.76	Pass
625.1	36	Vertical	1.25	168	118.42	82.42		-82.42	

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

Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Omni antenna configuration in V-polarization			

Table 7.7.3 Field strength of spurious emissions above 1 GHz within restricted bands

ASSIGNED FREQUENCY:	2400-2483.5 MHz
INVESTIGATED FREQUENCY RANGE:	1000 –25000 MHz
TEST DISTANCE:	3 m
MODULATION:	OFDM
BIT RATE:	65Mbps
DUTY CYCLE:	100 %
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	1000 kHz
TEST ANTENNA TYPE:	Double ridged guide

Frequency, MHz	Antenna		Azimuth, degrees*	Peak field strength (VBW=3 MHz)			Average field strength(VBW=10 Hz)			Verdict
	Polarization	eight, r		Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
Low carrier frequency										
2300	Vertical	1.2	120	63.04	74	-10.96	48.54	54	-5.46	Pass
2690	Vertical	1.2	120	65.04	74	-8.96	50.88	54	-3.12	
Mid carrier frequency										
2300	Vertical	1.2	155	62.77	74	-11.23	48.45	54	-5.55	Pass
2690	Vertical	1.2	155	65.08	74	-8.92	50.6	54	-3.40	
High carrier frequency										
2300	Vertical	1.2	187	62.91	74	-11.09	48.36	54	-5.64	Pass
2690	Vertical	1.2	187	64.88	74	-9.12	50.77	54	-3.23	

*****- EUT front panel refers to 0 degrees position of turntable.
******- Margin = Measured field strength - specification limit.

Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Table 7.7.4 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:	OFDM
BIT RATE:	65Mbps
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								
115	25.1	14.2	120.62	-106.42	Vertical	1.25	185	Pass
125	26.6	23.7	120.62	-96.92	Vertical	1.25	160	
Mid carrier frequency								
120.4	20.6	16.3	119.72	-103.42	Vertical	1.25	160	Pass
125	25	22.1	119.72	-97.62	Vertical	1.25	140	
High carrier frequency								
121.2	22.7	20.8	118.42	-97.62	Vertical	1.25	130	Pass
123.2	21.9	19.6	118.42	-98.82	Vertical	1.25	145	

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

Table 7.7.5 Restricted bands

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.37625 - 8.38675	73 - 74.6	399.9 - 410	2690 - 2900	10.6 - 12.7
0.495 - 0.505	8.41425 - 8.41475	74.8 - 75.2	608 - 614	3260 - 3267	13.25 - 13.4
2.1735 - 2.1905	12.29 - 12.293	108 - 121.94	960 - 1240	3332 - 3339	14.47 - 14.5
4.125 - 4.128	12.51975 - 12.52025	123 - 138	1300 - 1427	3345.8 - 3358	15.35 - 16.2
4.17725 - 4.17775	12.57675 - 12.57725	149.9 - 150.05	1435 - 1626.5	3600 - 4400	17.7 - 21.4
4.20725 - 4.20775	13.36 - 13.41	156.52475 - 156.52525	1645.5 - 1646.5	4500 - 5150	22.01 - 23.12
6.215 - 6.218	16.42 - 16.423	156.7 - 156.9	1660 - 1710	5350 – 5460	23.6 - 24
6.26775 - 6.26825	16.69475 - 16.69525	162.0125 - 167.17	1718.8 - 1722.2	7250 - 7750	31.2 - 31.8
6.31175 - 6.31225	16.80425 - 16.80475	167.72 - 173.2	2200 - 2300	8025 – 8500	36.43 - 36.5
8.291 - 8.294	25.5 - 25.67	240 - 285	2310 - 2390	9000 - 9200	Above 38.6
8.362 - 8.366	37.5 - 38.25	322 - 335.4	2483.5 - 2500	9300 - 9500	

Reference numbers of test equipment used

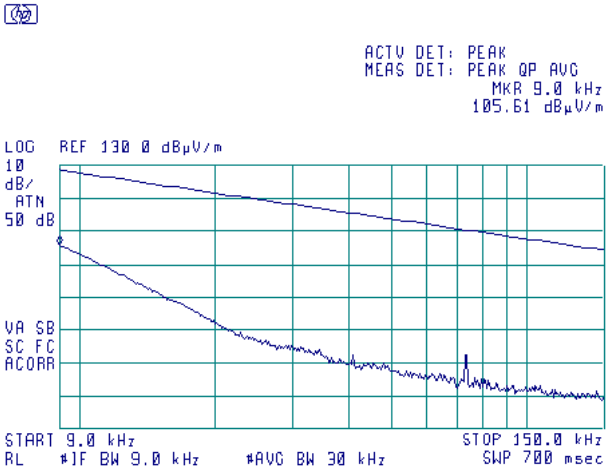
HL 0446	HL 0604	HL 1984	HL 2871	HL 3344	HL 3356	HL 3531	HL 3623

Full description is given in Appendix A.

Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

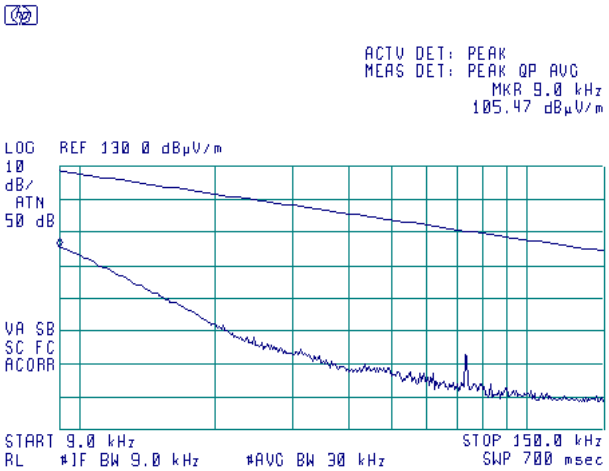
Plot 7.7.1 Radiated emission measurements 9-150 KHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Plot 7.7.2 Radiated emission measurements 9-150 KHz at the mid carrier frequency

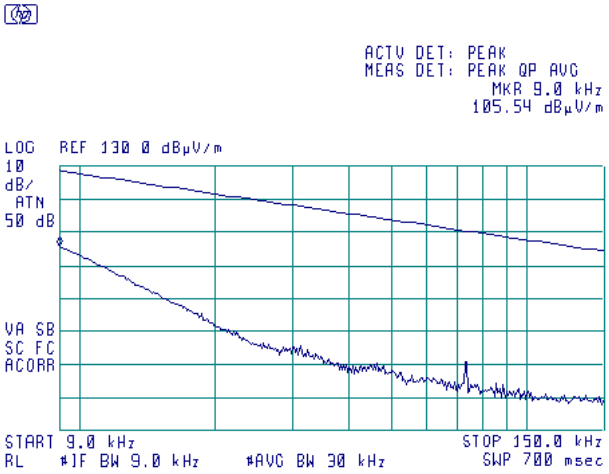
TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

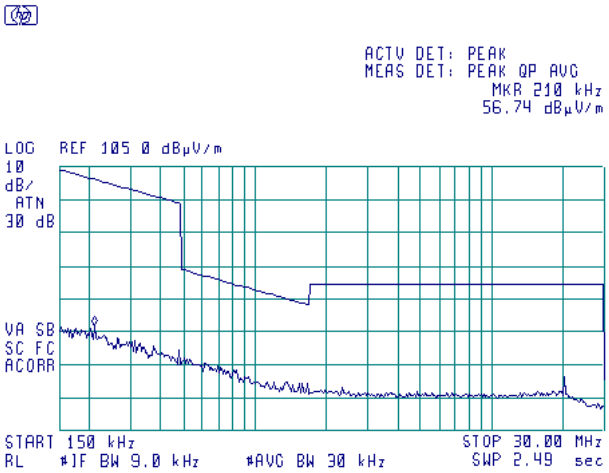
Plot 7.7.3 Radiated emission measurements 9-150 KHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Plot 7.7.4 Radiated emission measurements 0.15-30 MHz at the low carrier frequency

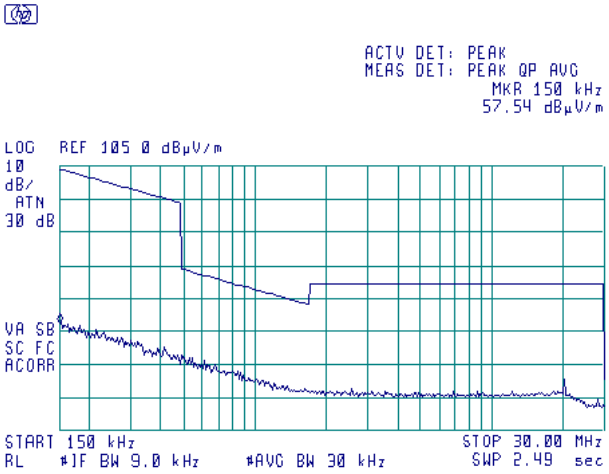
TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

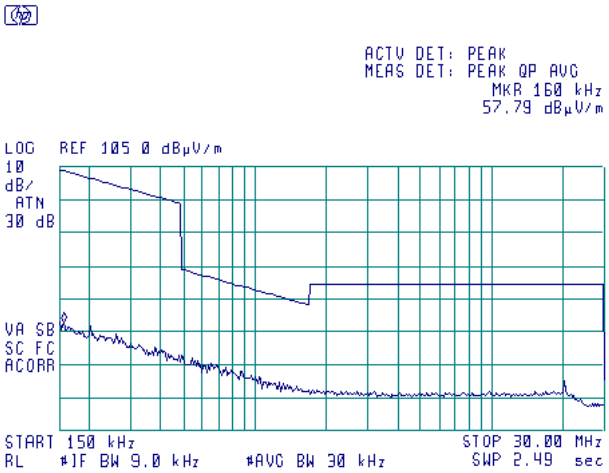
Plot 7.7.5 Radiated emission measurements 0.15-30 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Plot 7.7.6 Radiated emission measurements 0.15-30 MHz at the high carrier frequency

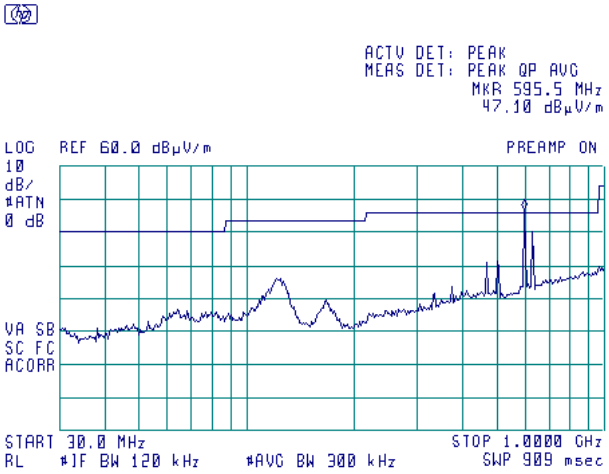
TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

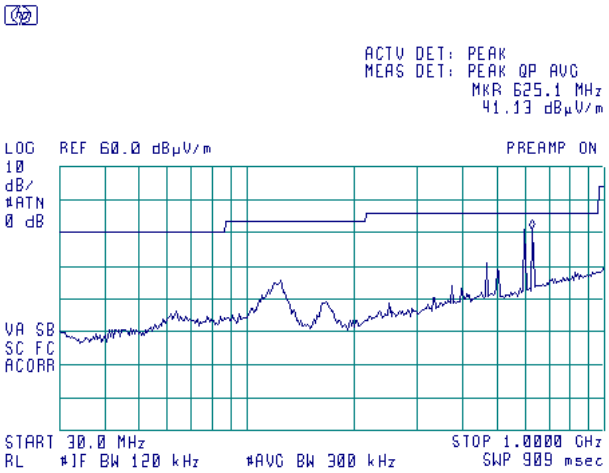
Plot 7.7.7 Radiated emission measurements 30-1000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Plot 7.7.8 Radiated emission measurements 30-1000 MHz at the mid carrier frequency

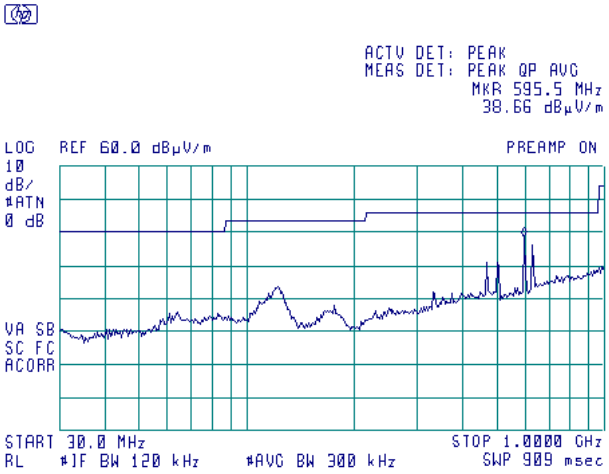
TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

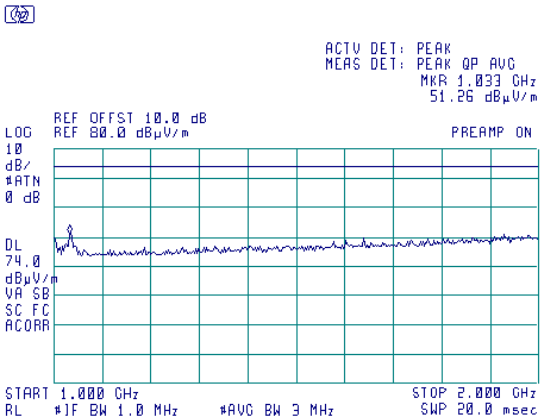
Plot 7.7.9 Radiated emission measurements 30-1000 MHz at the high carrier frequency

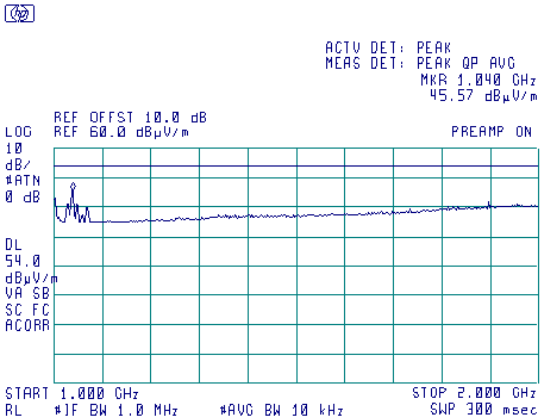
TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Plot 7.7.10 Radiated emission measurements 1000-2000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains

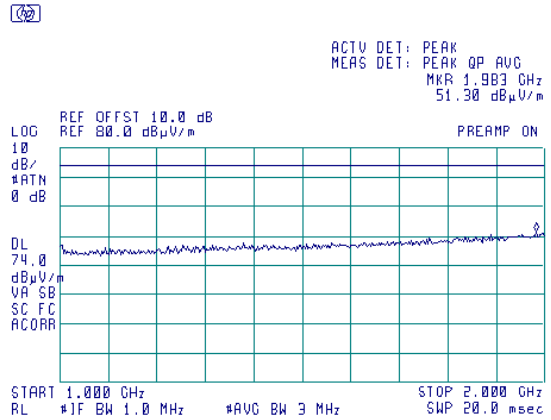


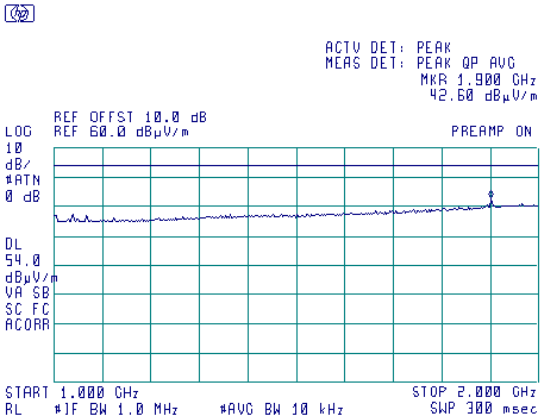


Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Plot 7.7.11 Radiated emission measurements 1000-2000 MHz at the mid carrier frequency

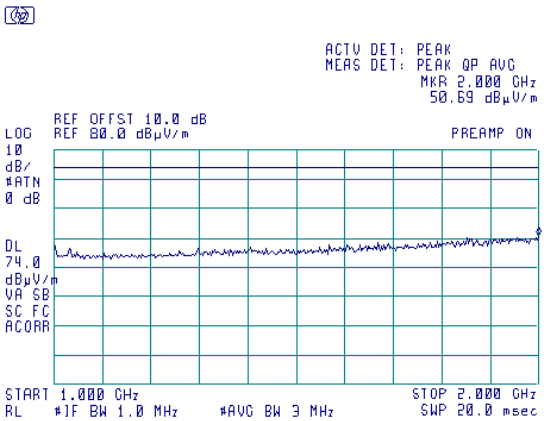
TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains

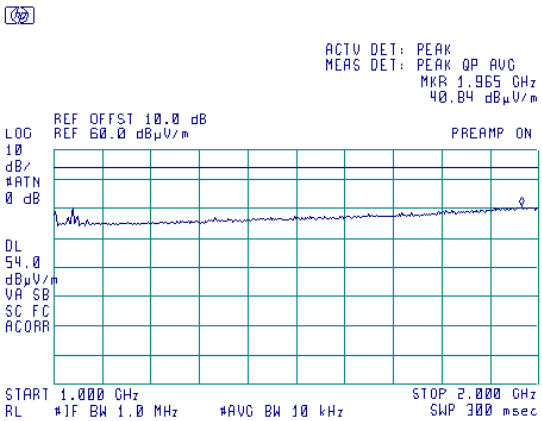




Plot 7.7.12 Radiated emission measurements 1000-2000 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



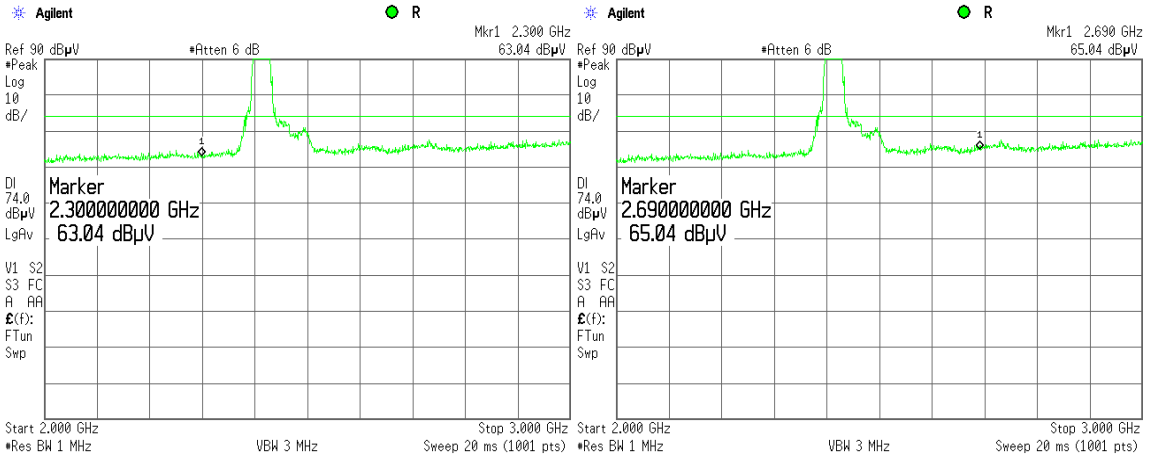


Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Omni antenna configuration in V-polarization			

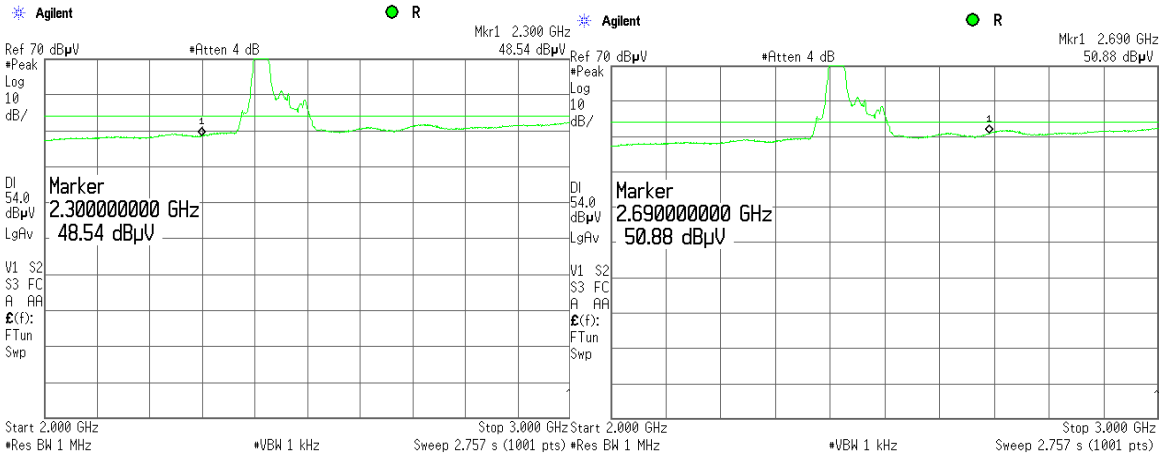
Plot 7.7.13 Radiated emission measurements 2000-3000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains

Peak



Average

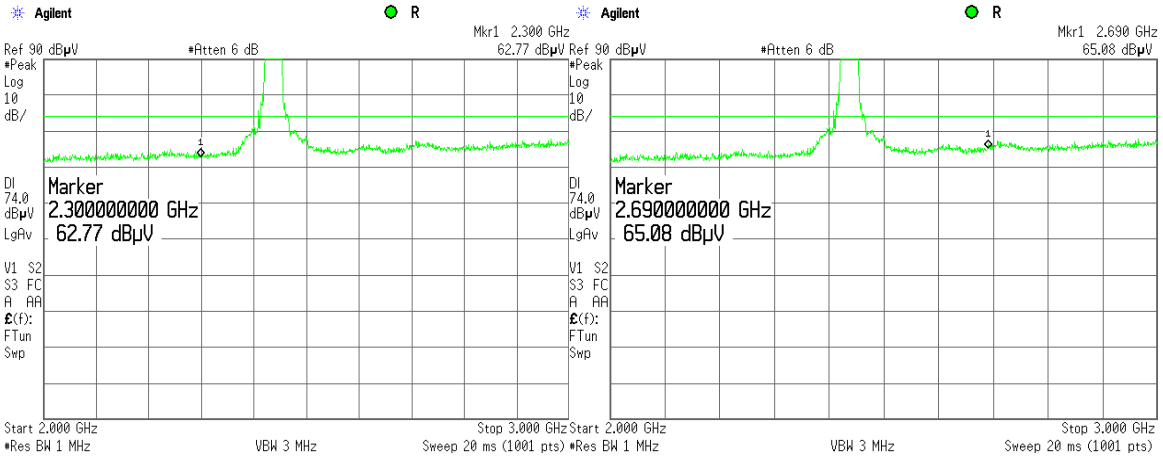


Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Omni antenna configuration in V-polarization			

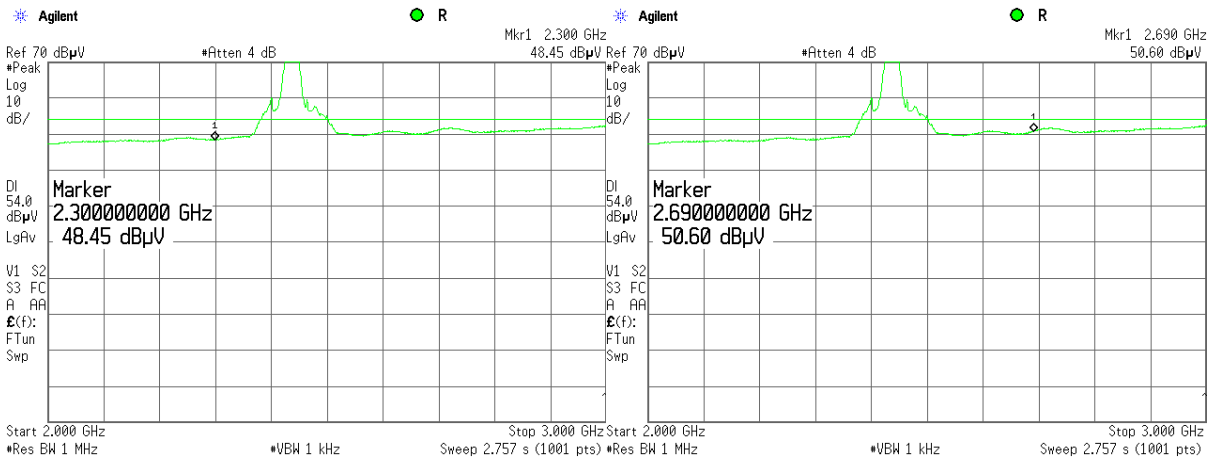
Plot 7.7.14 Radiated emission measurements 2000-3000 MHz at the mid carrier frequency

TEST SITE:	Semi anechoic chamber
BITRATE:	65Mbps
CHAIN:	All 3 chains

Peak



Average

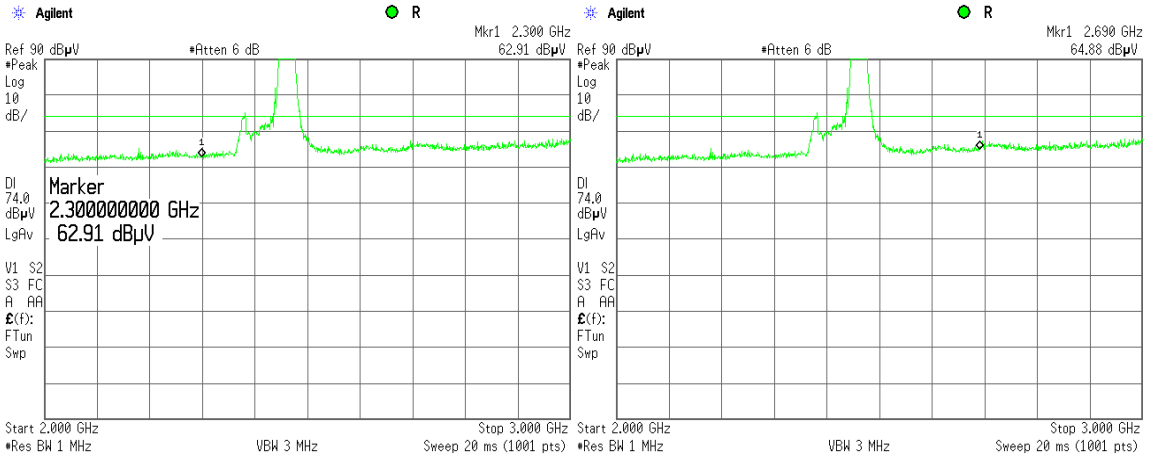


Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	**Air Pressure:** 1008 hPa	**Relative Humidity:** 48 %	**Power Supply:** 48VDC
Remarks: Omni antenna configuration in V-polarization			

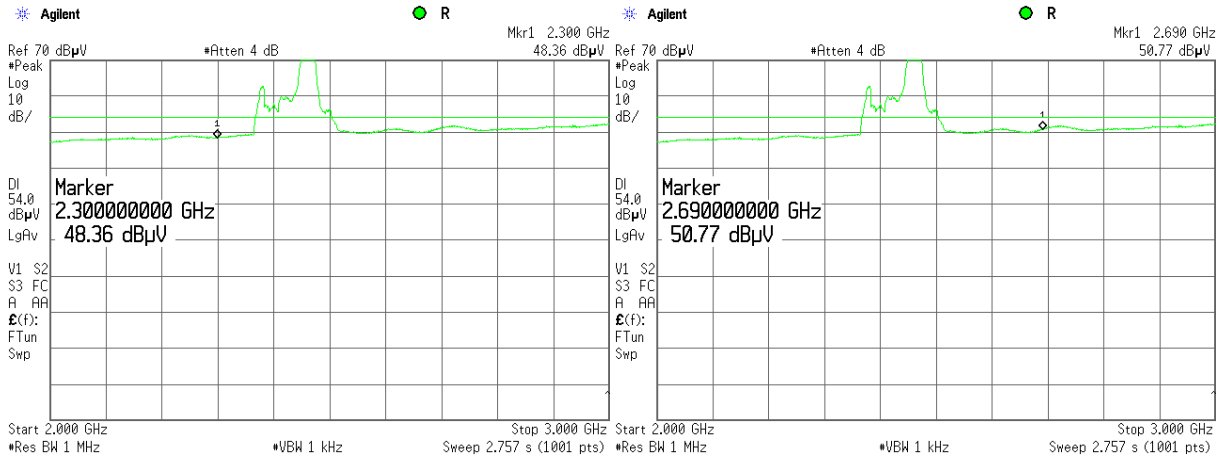
Plot 7.7.15 Radiated emission measurements 2000-3000 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains

Peak



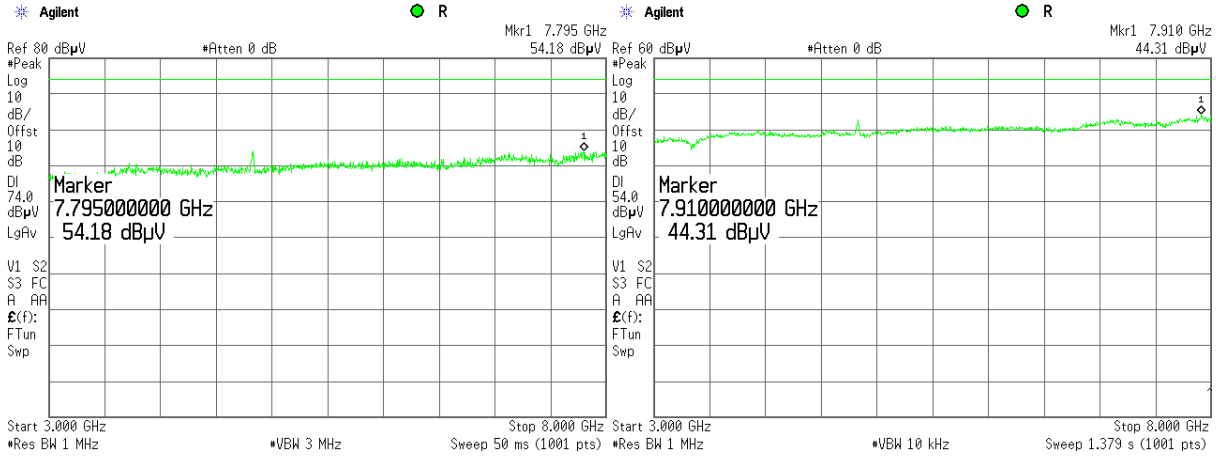
Average



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

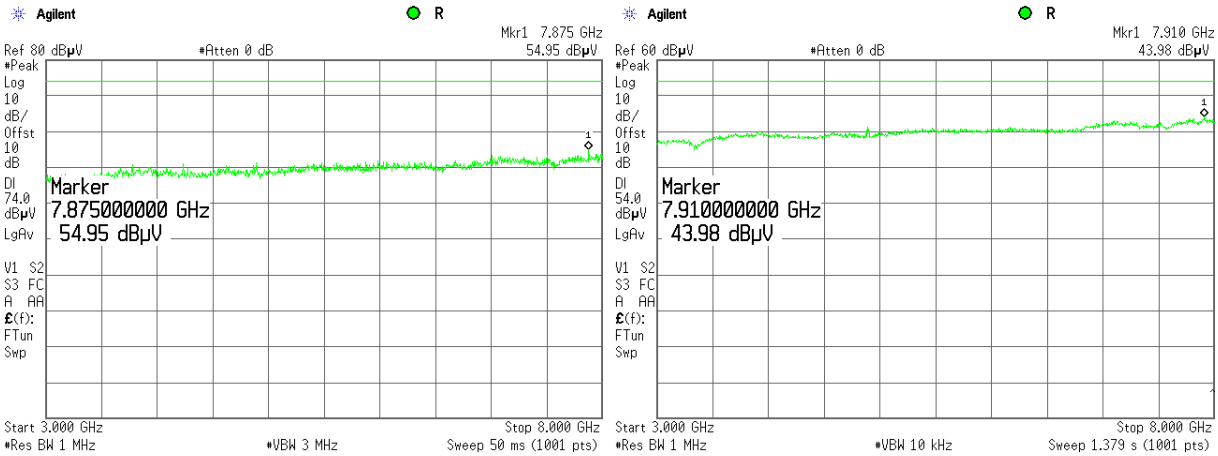
Plot 7.7.16 Radiated emission measurements 3000-8000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Plot 7.7.17 Radiated emission measurements 3000-8000 MHz at the mid carrier frequency

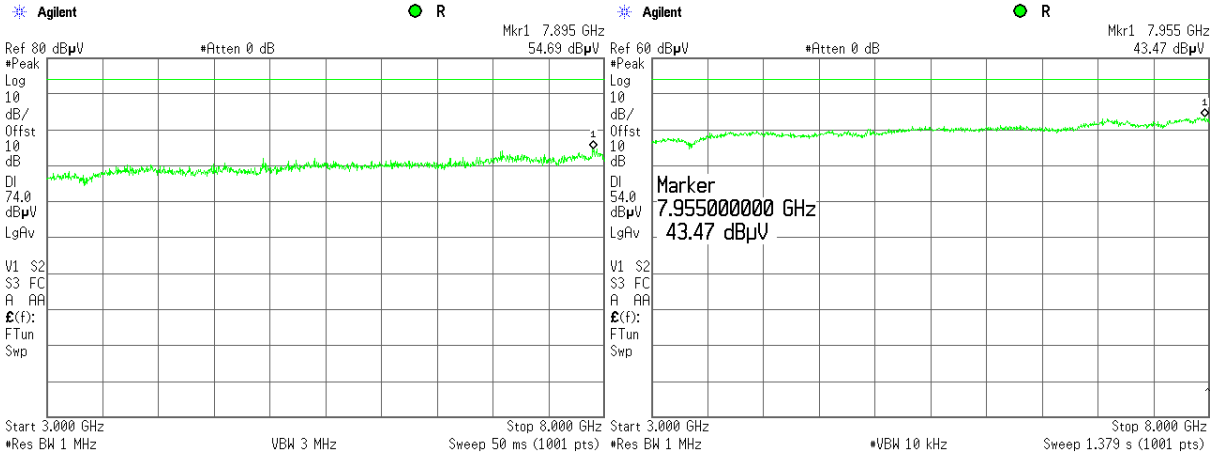
TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Plot 7.7.18 Radiated emission measurements 3000-8000 MHz at the high carrier frequency

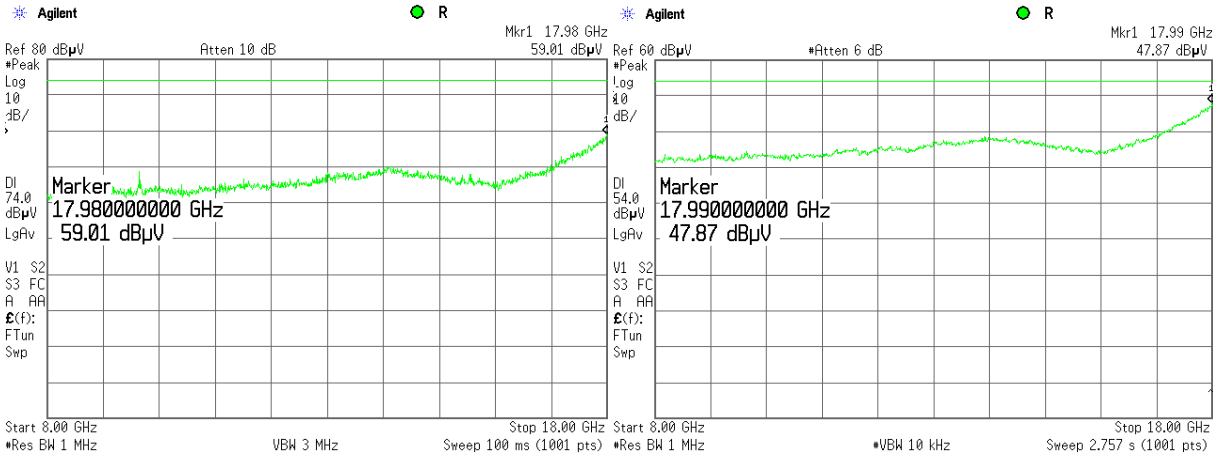
TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

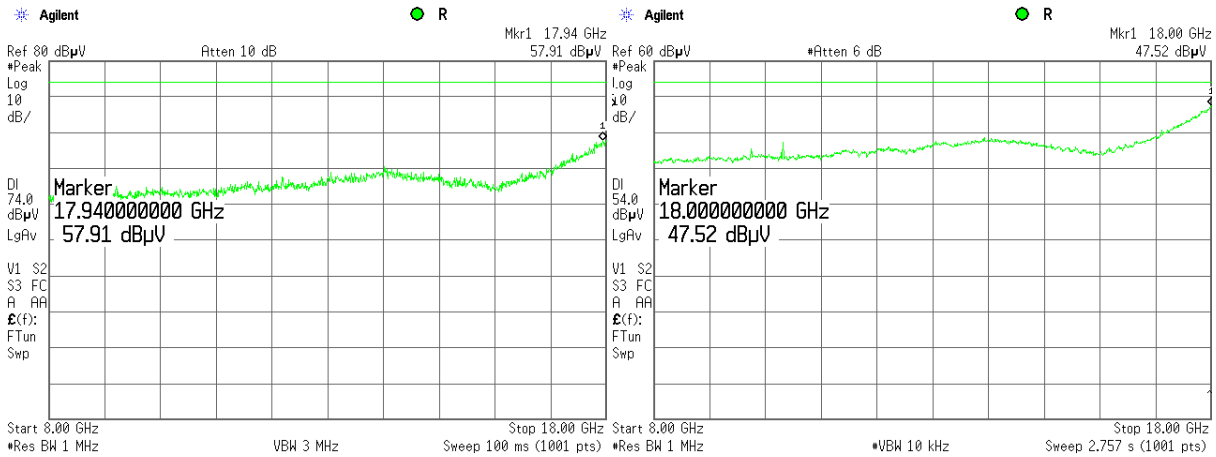
Plot 7.7.19 Radiated emission measurements 8000-18000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Plot 7.7.20 Radiated emission measurements 8000-18000 MHz at the mid carrier frequency

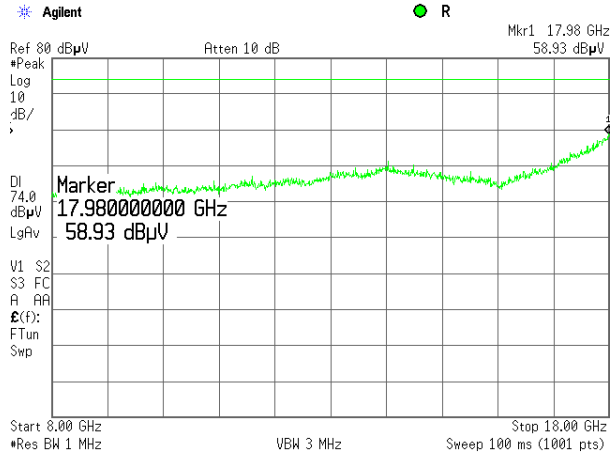
TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains

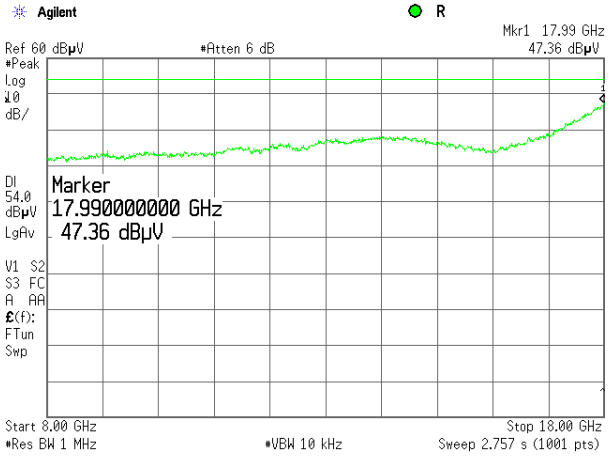


Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

Plot 7.7.21 Radiated emission measurements 8000-18000 MHz at the high carrier frequency

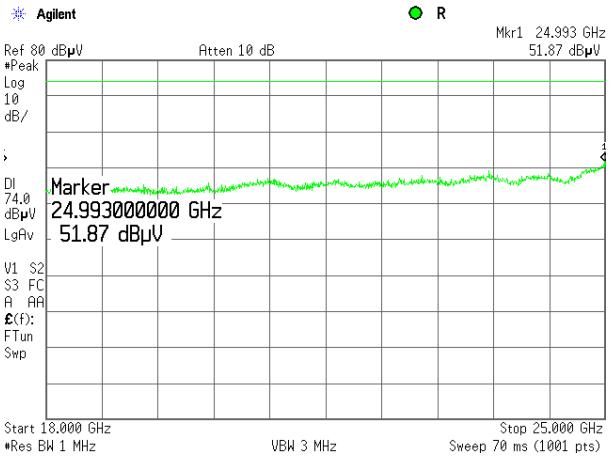
TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains

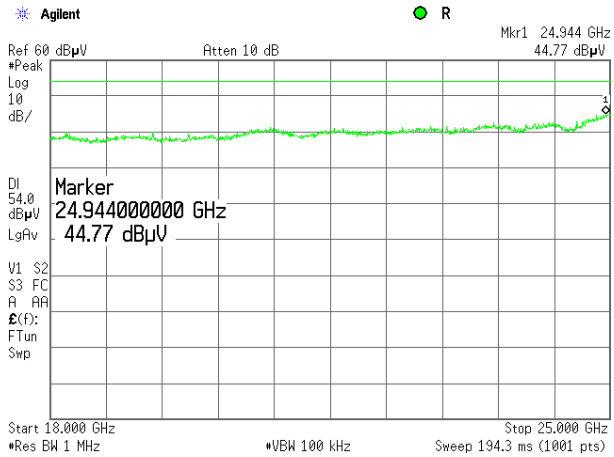




Plot 7.7.22 Radiated emission measurements 18000-25000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains

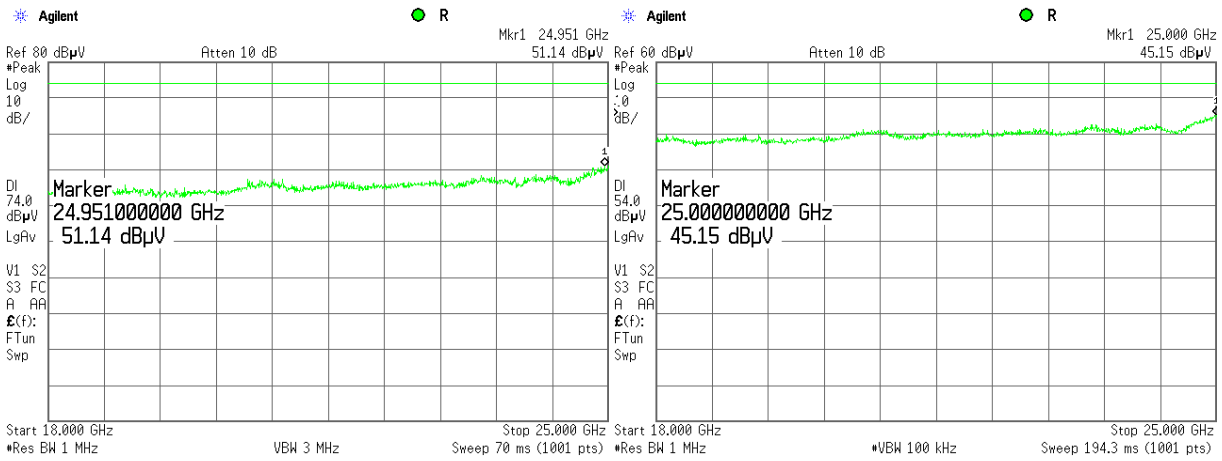




Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(c)/ANSI C63.4, Section 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/21/2011 - 7/6/2011		
Temperature: 23 ºC	Air Pressure: 1008 hPa	Relative Humidity: 48 %	Power Supply: 48VDC
Remarks: Omni antenna configuration in V-polarization			

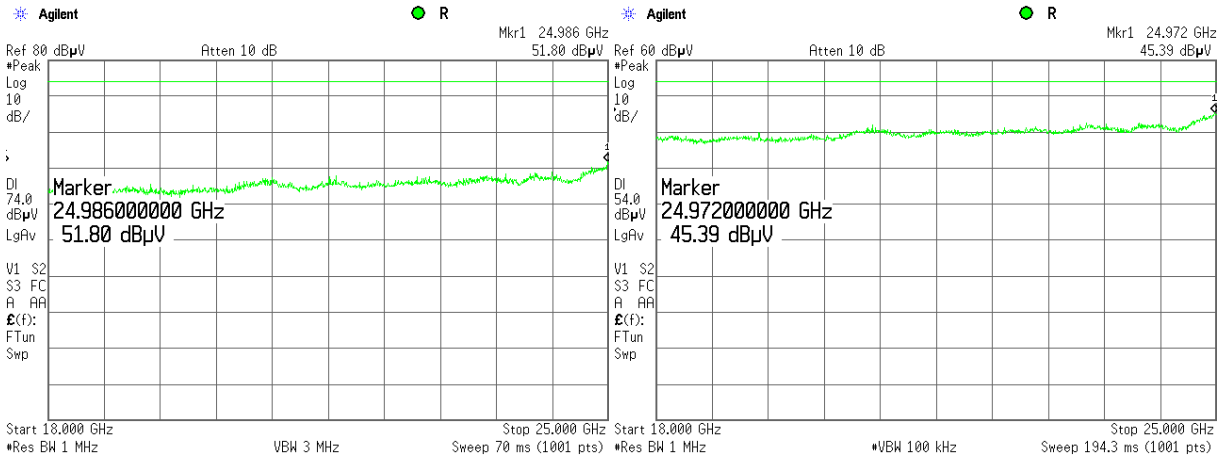
Plot 7.7.23 Radiated emission measurements 18000-25000 MHz at the mid carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Plot 7.7.24 Radiated emission measurements 18000-25000 MHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
BITRATE: 65Mbps
CHAIN: All 3 chains



Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

7.8 Peak spectral power density

7.8.1 General

This test was performed to measure the peak spectral power density at the transmitter RF antenna connector. Specification test limits are given in Table 7.8.1.

Table 7.8.1 Peak spectral power density limits

Assigned frequency range, MHz	Measurement bandwidth, kHz	Peak spectral power density, dBm
2400-2483.5	3.0	8.0

7.8.2 Test procedure

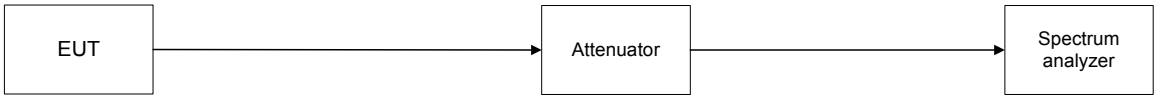
7.8.2.1 The EUT was set up as shown in Figure 7.8.1, energized and its proper operation was checked.

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

7.8.2.3 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.

7.8.2.4 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 7.8.2 and associated plots.

Figure 7.8.1 Peak spectral power density test setup



Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

Table 7.8.2 Peak spectral power density test results

ASSIGNED FREQUENCY: 2400-2483.5 MHz
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 3 kHz
VIDEO BANDWIDTH: 9.1 kHz
ANTENNA: OMNI

Carrier frequency, MHz	Transmit power setting, dBm	CBW, MHz	Modulation	Bit rate, Mbps	Spectrum analyzer reading, dBm	Chain correction factor**, dB	Peak power density, dB(mW/3 kHz)	Limit, dBm	Margin*, dB	Verdict
2412	17.5	20	CCK	1	-6.13	4.77	-1.36	8	-9.36	Pass
2437	18	20	CCK	1	-5.73	4.77	-0.96	8	-8.96	Pass
2462	16	20	CCK	1	-5.6	4.77	-0.83	8	-8.83	Pass
2412	17.5	20	CCK	11	-5.7	4.77	-0.93	8	-8.93	Pass
2437	18	20	CCK	11	-5.73	4.77	-0.96	8	-8.96	Pass
2462	16	20	CCK	11	-6.81	4.77	-2.04	8	-10.04	Pass
2412	17.5	20	OFDM	6	-6.67	4.77	-1.90	8	-9.90	Pass
2437	18	20	OFDM	6	-6.79	4.77	-2.02	8	-10.02	Pass
2462	16	20	OFDM	6	-8.13	4.77	-3.36	8	-11.36	Pass
2412	17.5	20	OFDM	54	-6.03	4.77	-1.26	8	-9.26	Pass
2437	18	20	OFDM	54	-6.73	4.77	-1.96	8	-9.96	Pass
2462	16	20	OFDM	54	-9.12	4.77	-4.35	8	-12.35	Pass
2412	17.5	20	OFDM	65	-7.9	4.77	-3.13	8	-11.13	Pass
2437	18	20	OFDM	65	-7.98	4.77	-3.21	8	-11.21	Pass
2462	16	20	OFDM	65	-8.53	4.77	-3.76	8	-11.76	Pass
2422	16	40	OFDM	13.5	-9.74	4.77	-4.97	8	-12.97	Pass
2437	16	40	OFDM	13.5	-9.59	4.77	-4.82	8	-12.82	Pass
2452	16	40	OFDM	13.5	-12.96	4.77	-8.19	8	-16.19	Pass
2422	16	40	OFDM	135	-10.35	4.77	-5.58	8	-13.58	Pass
2437	16	40	OFDM	135	-11.32	4.77	-6.55	8	-14.55	Pass
2452	16	40	OFDM	135	-13.85	4.77	-9.08	8	-17.08	Pass

* - Margin = Peak power density – specification limit.
**- Chain Correction Factor = 10log(3)

Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

Table 7.8.3 Peak spectral power density test results

ASSIGNED FREQUENCY: 2400-2483.5 MHz
MODULATING SIGNAL: PRBS
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 3 kHz
VIDEO BANDWIDTH: 9.1 kHz
ANTENNA: Sector

Carrier frequency, MHz	Transmit power setting,dBm	CBW, MHz	Modulation	Bit rate, Mbps	Spectrum analyzer reading, dBm	Chain correction factor**, dB	Peak power density, dB(mW/3 kHz)	Limit ,dBm	Margin*, dB	Verdict
2412	14	20	CCK	1	-9.3	4.77	-4.53	8	-12.53	Pass
2437	14	20	CCK	1	-10.53	4.77	-5.76	8	-13.76	Pass
2462	11	20	CCK	1	-11.46	4.77	-6.69	8	-14.69	Pass
2412	14	20	CCK	11	-8.23	4.77	-3.46	8	-11.46	Pass
2437	14	20	CCK	11	-8.82	4.77	-4.05	8	-12.05	Pass
2462	11	20	CCK	11	-11.8	4.77	-7.03	8	-15.03	Pass
2412	14	20	OFDM	6	-11.21	4.77	-6.44	8	-14.44	Pass
2437	14	20	OFDM	6	-10.48	4.77	-5.71	8	-13.71	Pass
2462	11	20	OFDM	6	-13.57	4.77	-8.80	8	-16.80	Pass
2412	14	20	OFDM	54	-12.22	4.77	-7.45	8	-15.45	Pass
2437	14	20	OFDM	54	-11.55	4.77	-6.78	8	-14.78	Pass
2462	11	20	OFDM	54	-12.96	4.77	-8.19	8	-16.19	Pass
2412	14	20	OFDM	65	-12.21	4.77	-7.44	8	-15.44	Pass
2437	14	20	OFDM	65	-11.32	4.77	-6.55	8	-14.55	Pass
2462	11	20	OFDM	65	-13.3	4.77	-8.53	8	-16.53	Pass
2422	8	40	OFDM	13.5	-18.67	4.77	-13.90	8	-21.90	Pass
2437	11.5	40	OFDM	13.5	-15	4.77	-10.23	8	-18.23	Pass
2452	6	40	OFDM	13.5	-21.32	4.77	-16.55	8	-24.55	Pass
2422	8	40	OFDM	135	-18.75	4.77	-13.98	8	-21.98	Pass
2437	11.5	40	OFDM	135	-16.17	4.77	-11.40	8	-19.40	Pass
2452	6	40	OFDM	135	-22.79	4.77	-18.02	8	-26.02	Pass

* - Margin = Peak power density – specification limit.
**- Chain Correction Factor = 10log(3)

Reference numbers of test equipment used

HL 2952	HL 2953	HL 3473	HL 3785	HL 3868			

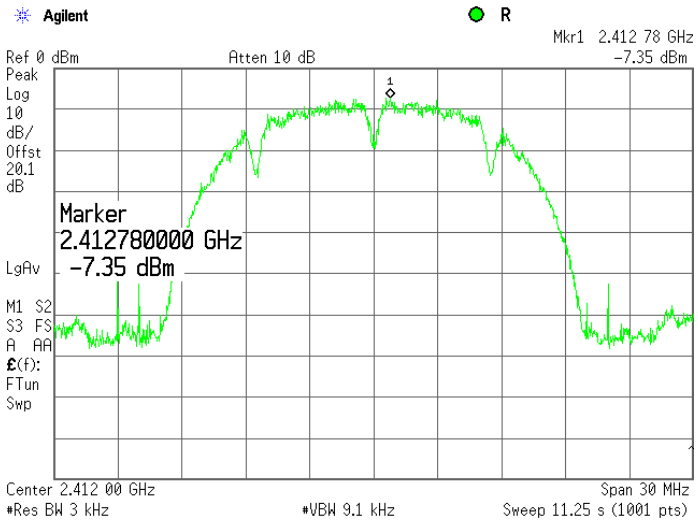
Full description is given in Appendix A.

Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

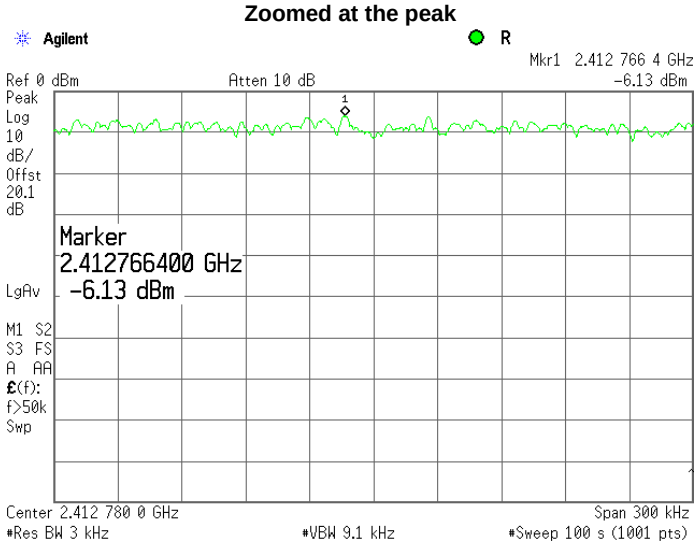
Plot 7.8.1 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	CCK
BITRATE:	1Mbps

Within 6 dB band



Zoomed at the peak

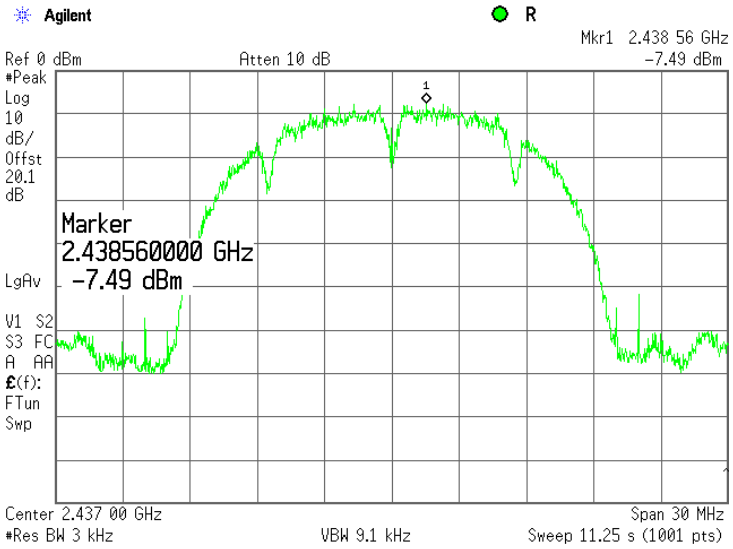


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

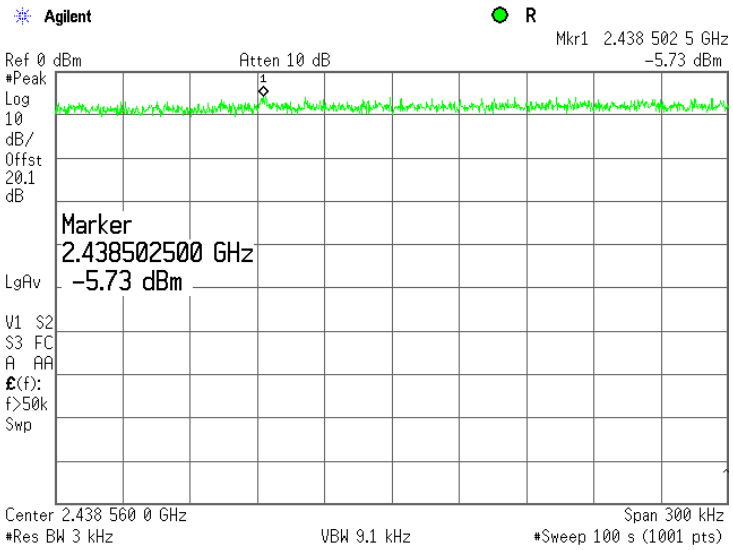
Plot 7.8.2 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	CCK
BITRATE:	1Mbps

Within 6 dB band



Zoomed at the peak

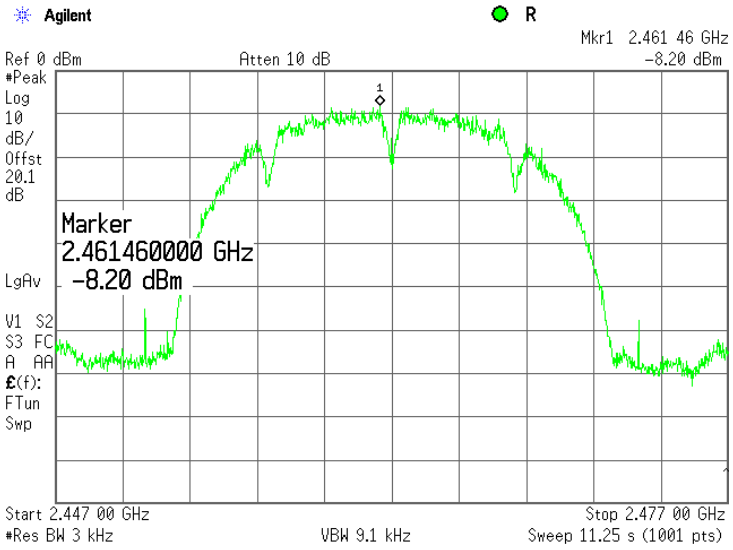


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

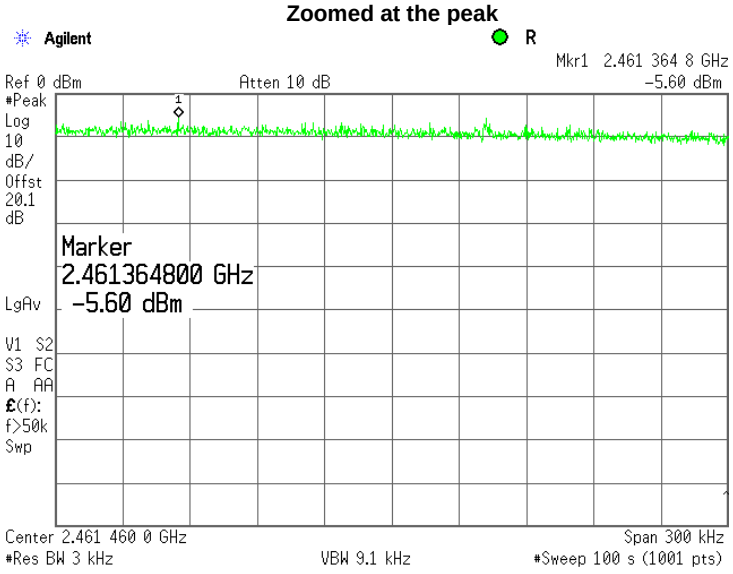
Plot 7.8.3 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	CCK
BITRATE:	1Mbps

Within 6 dB band



Zoomed at the peak

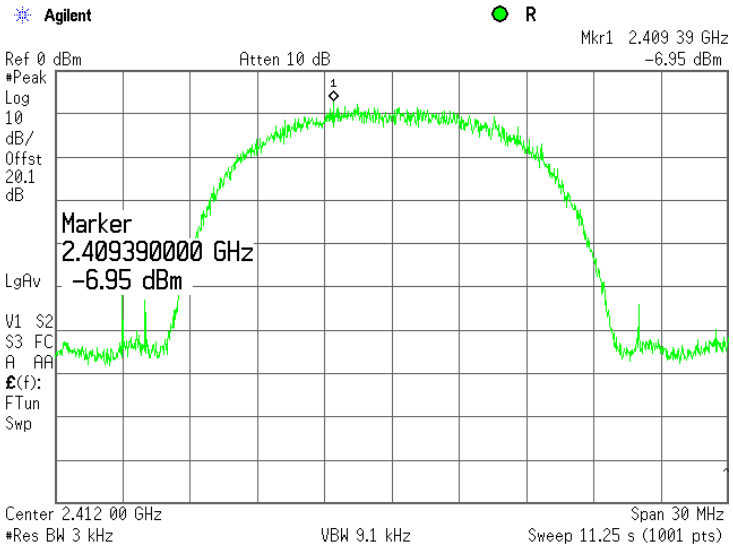


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

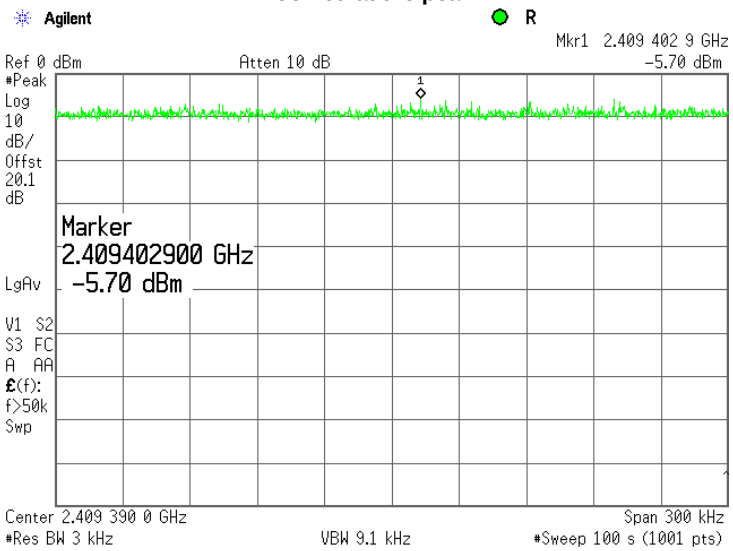
Plot 7.8.4 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	CCK
BITRATE:	11Mbps

Within 6 dB band



Zoomed at the peak

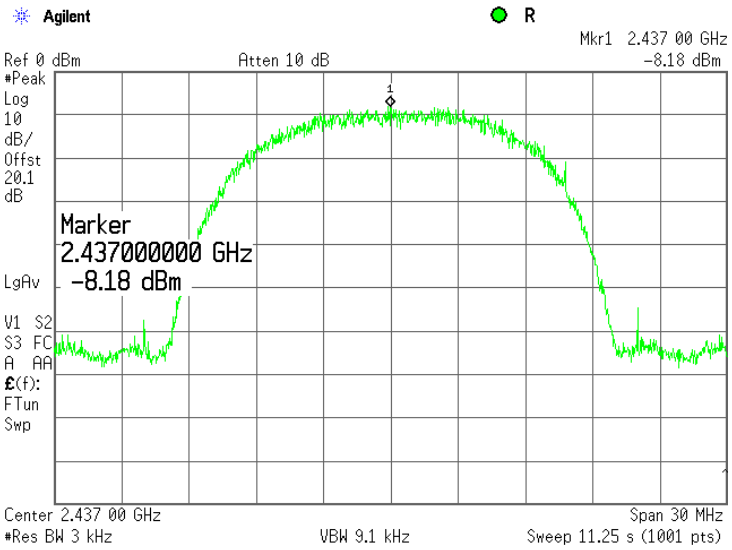


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

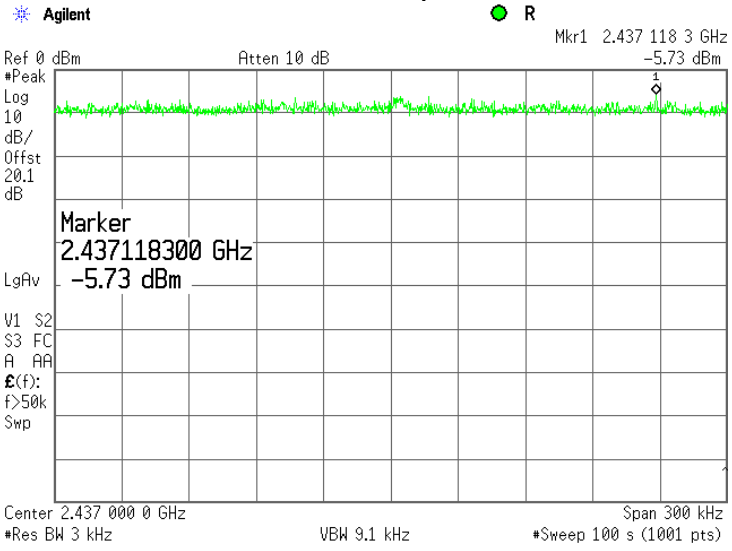
Plot 7.8.5 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	CCK
BITRATE:	11Mbps

Within 6 dB band



Zoomed at the peak

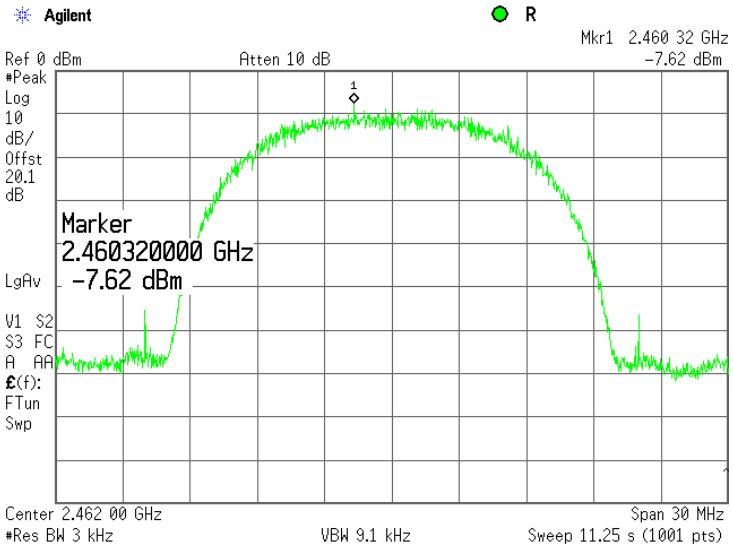


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

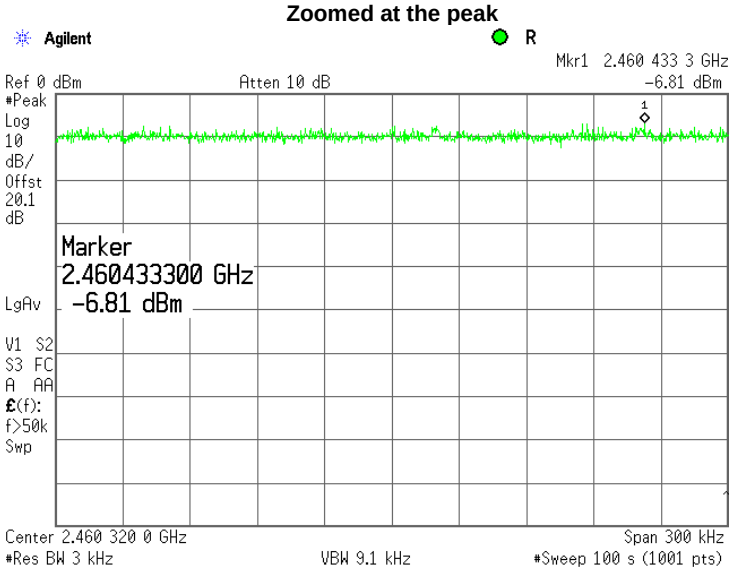
Plot 7.8.6 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	CCK
BITRATE:	11Mbps

Within 6 dB band



Zoomed at the peak

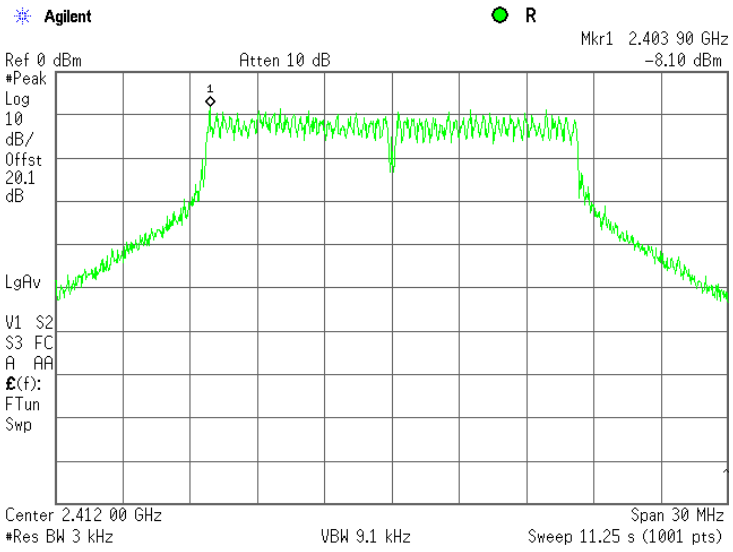


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

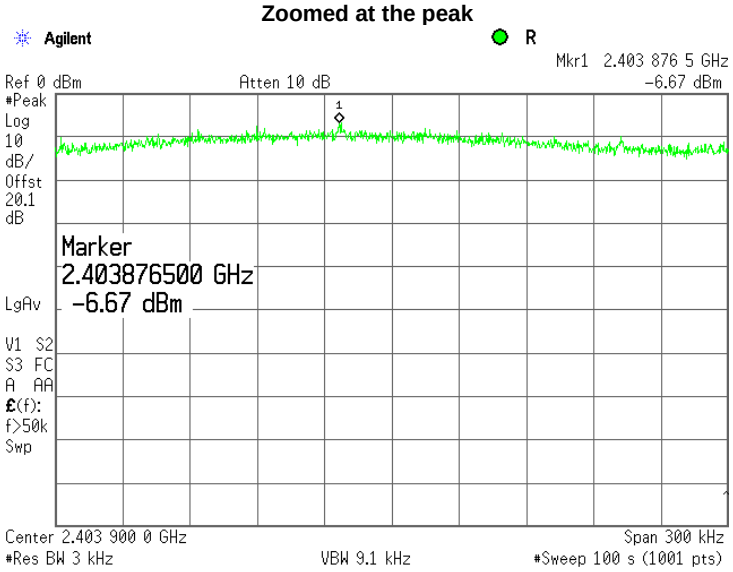
Plot 7.8.7 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	OFDM
BITRATE:	6Mbps

Within 6 dB band



Zoomed at the peak

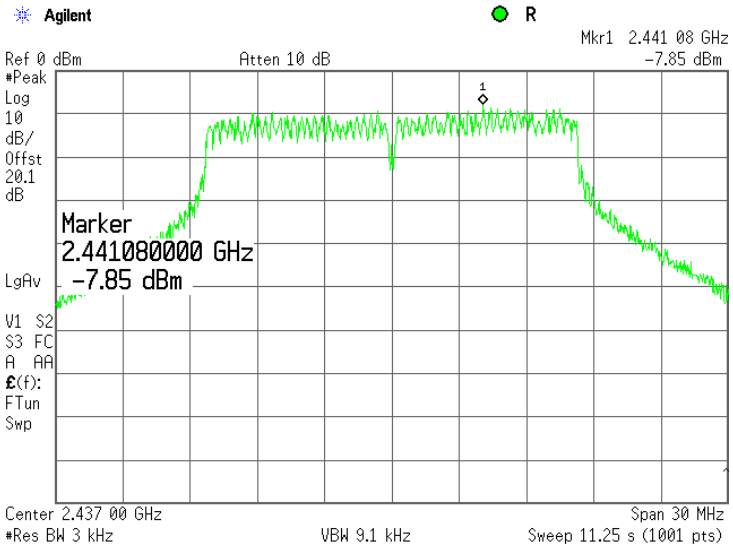


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

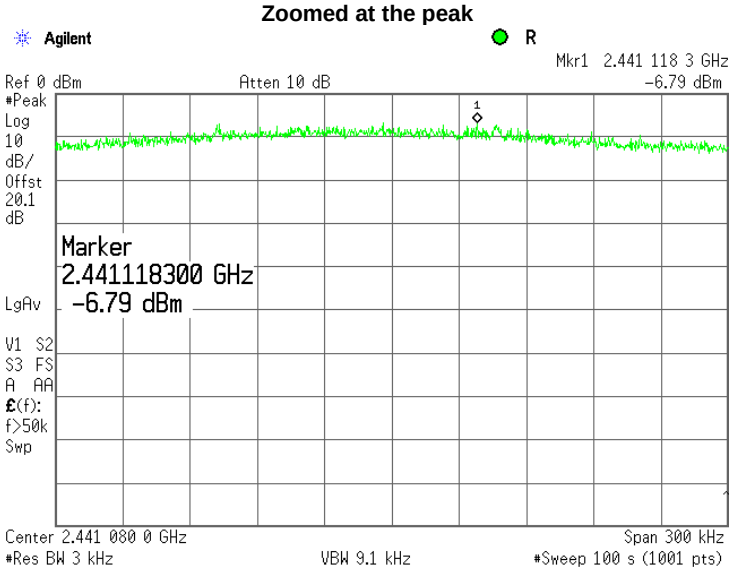
Plot 7.8.8 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	OFDM
BITRATE:	6Mbps

Within 6 dB band



Zoomed at the peak

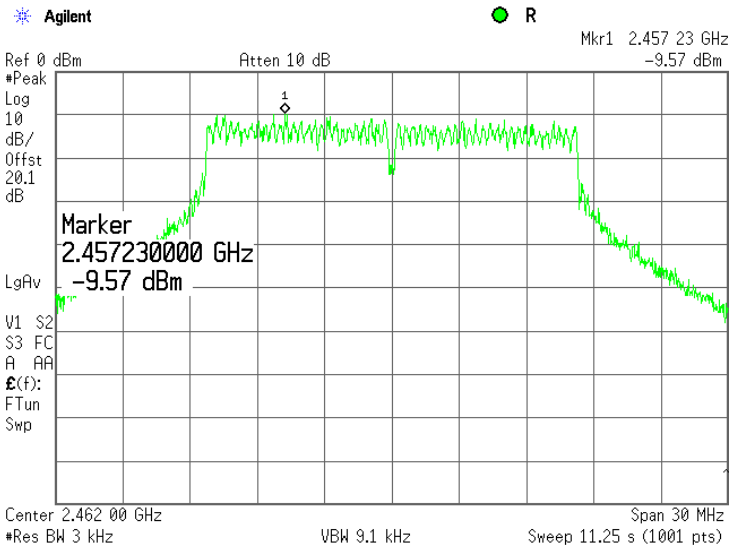


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

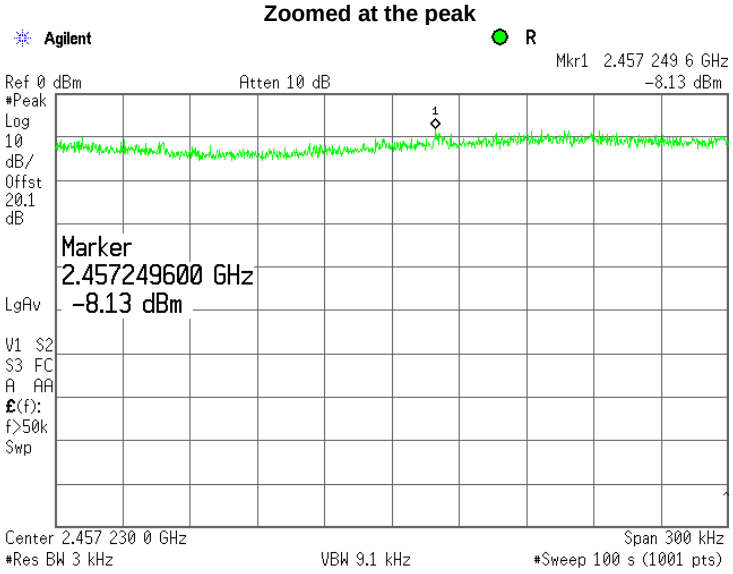
Plot 7.8.9 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	OFDM
BITRATE:	6Mbps

Within 6 dB band



Zoomed at the peak

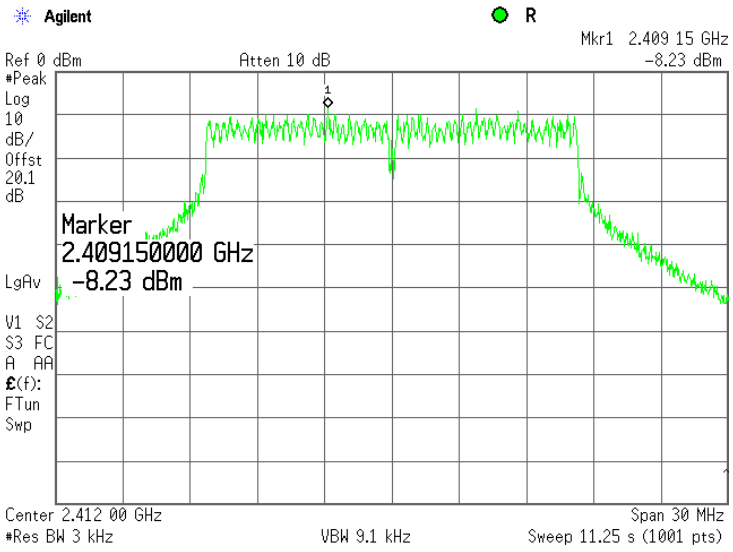


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

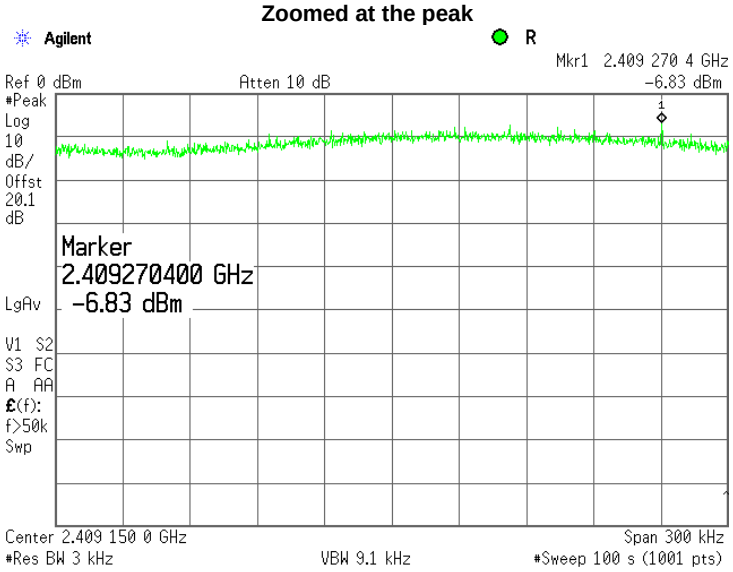
Plot 7.8.10 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	OFDM
BITRATE:	54Mbps

Within 6 dB band



Zoomed at the peak

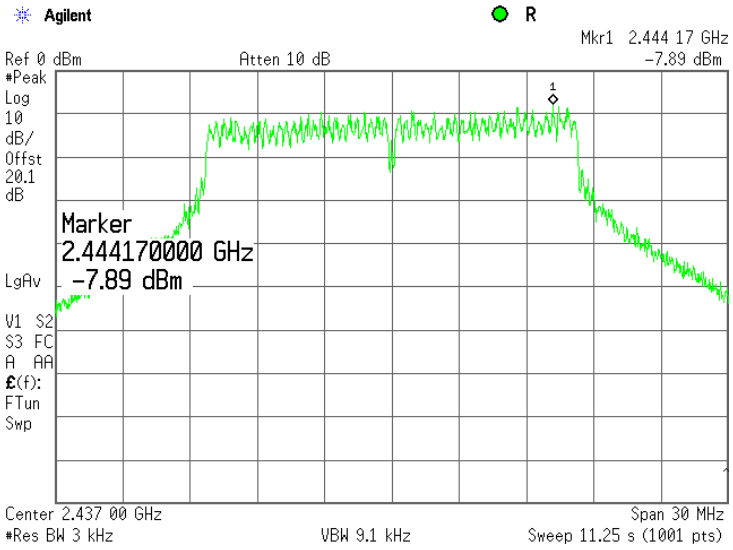


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

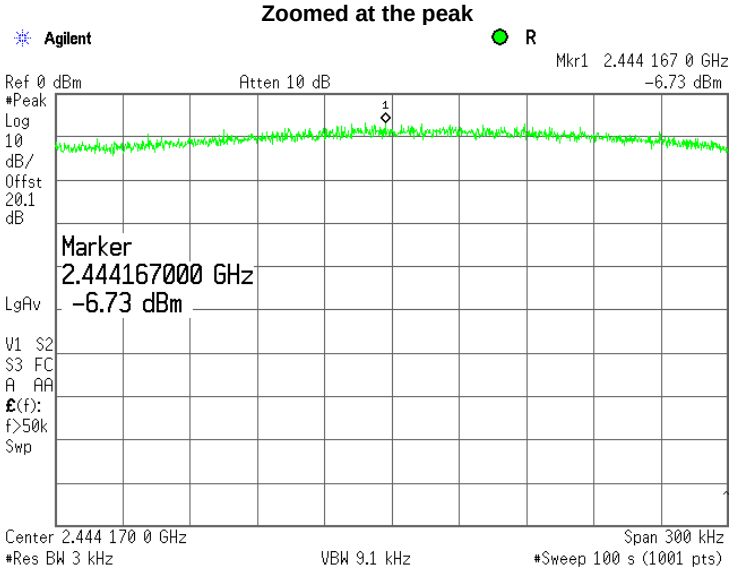
Plot 7.8.11 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	OFDM
BITRATE:	54Mbps

Within 6 dB band



Zoomed at the peak

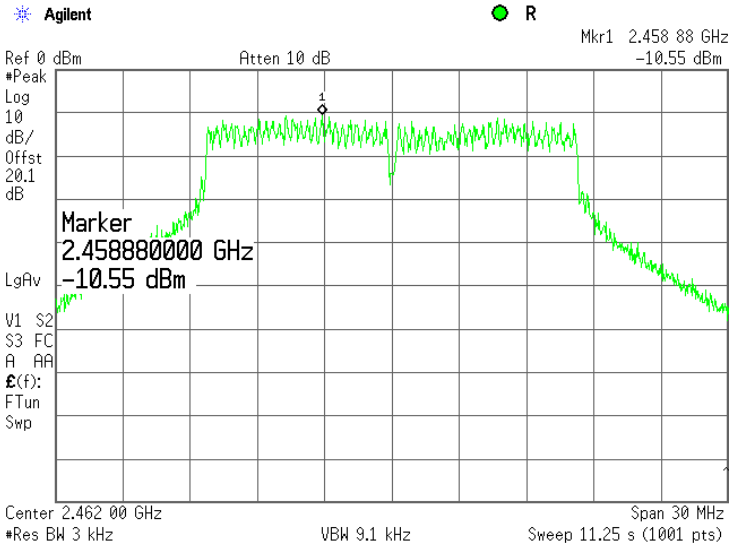


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

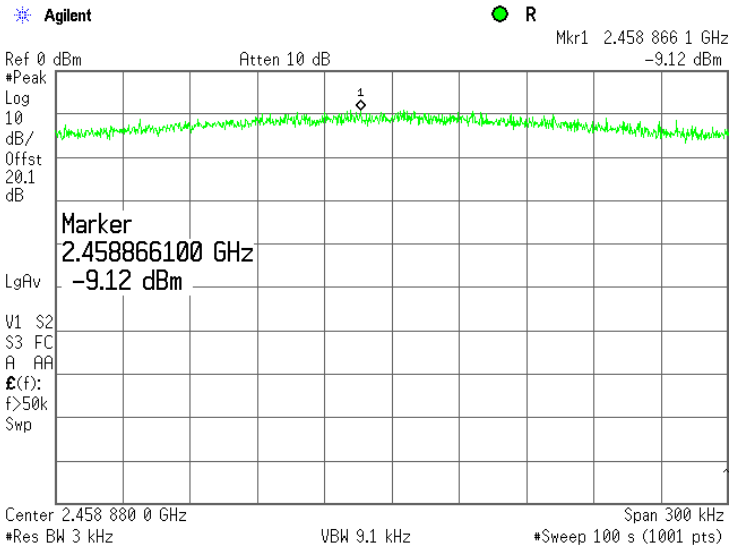
Plot 7.8.12 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	OFDM
BITRATE:	54Mbps

Within 6 dB band



Zoomed at the peak

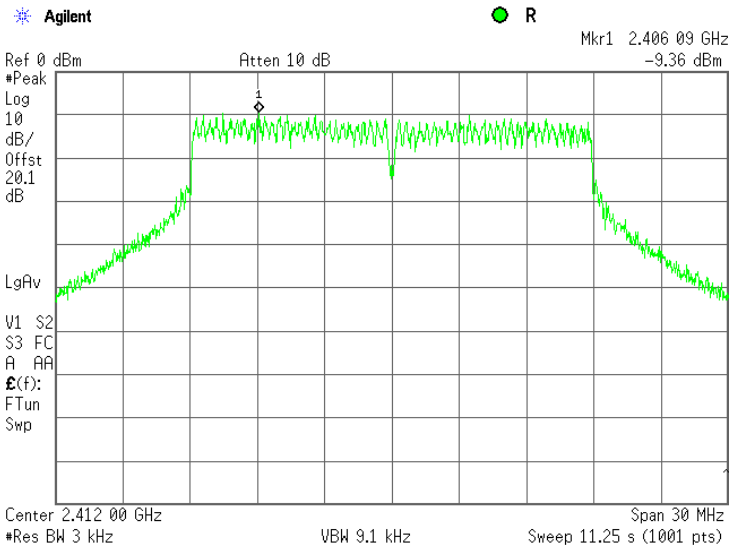


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

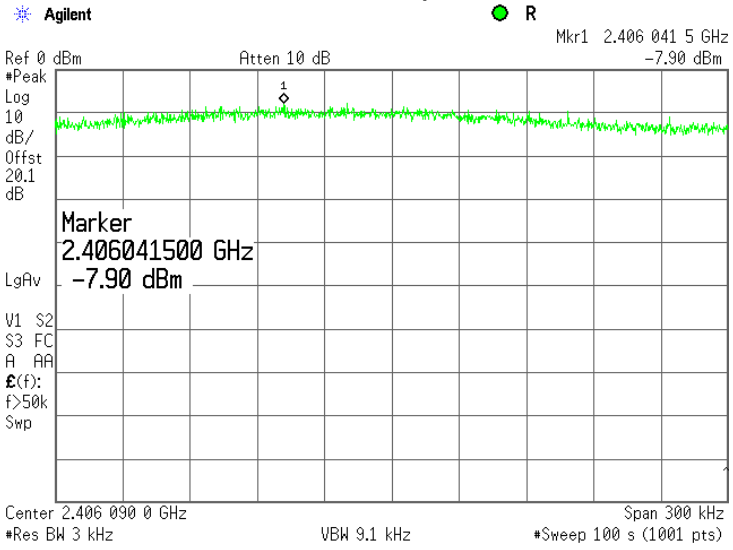
Plot 7.8.13 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	OFDM
BITRATE:	65Mbps

Within 6 dB band



Zoomed at the peak

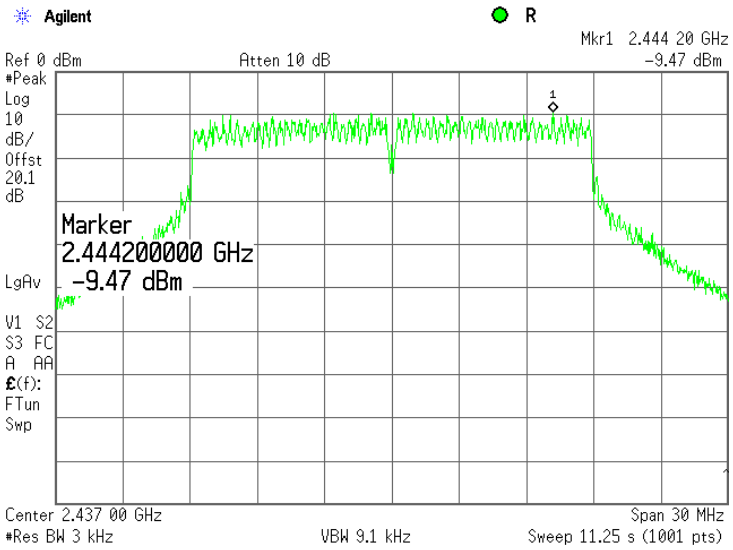


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

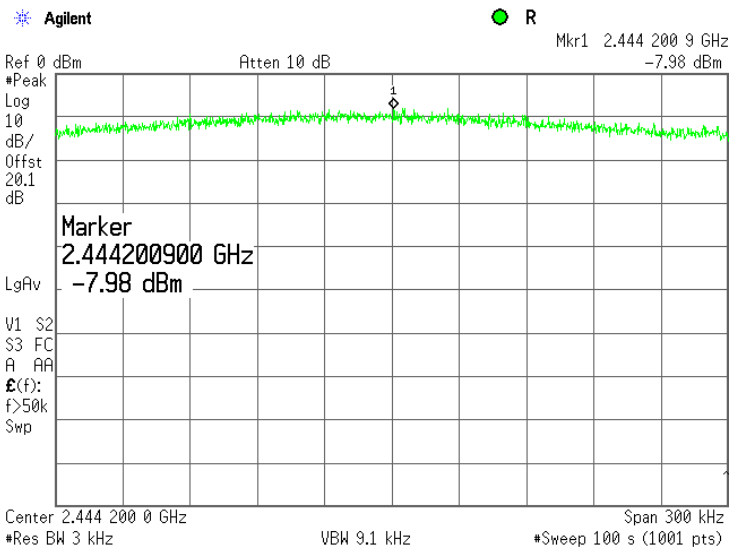
Plot 7.8.14 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	OFDM
BITRATE:	65Mbps

Within 6 dB band



Zoomed at the peak

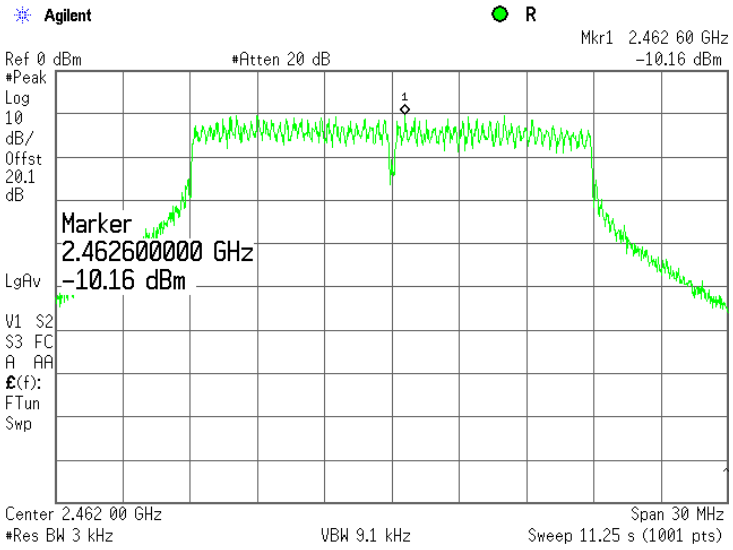


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

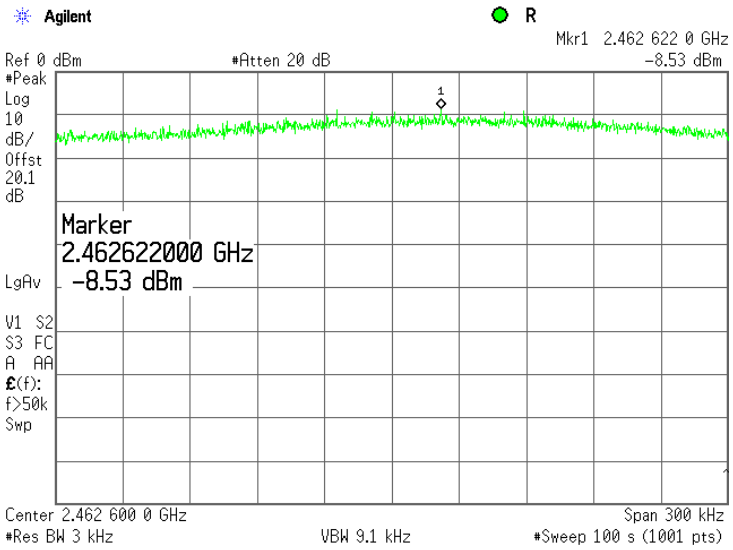
Plot 7.8.15 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	OFDM
BITRATE:	65Mbps

Within 6 dB band



Zoomed at the peak

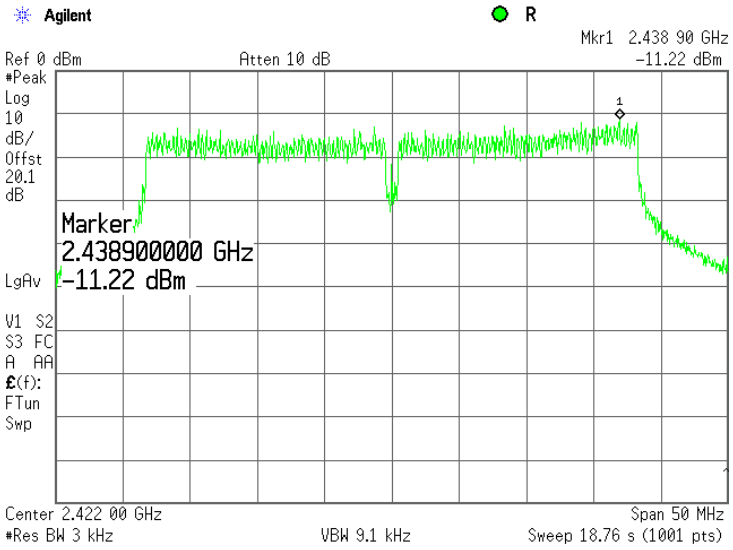


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

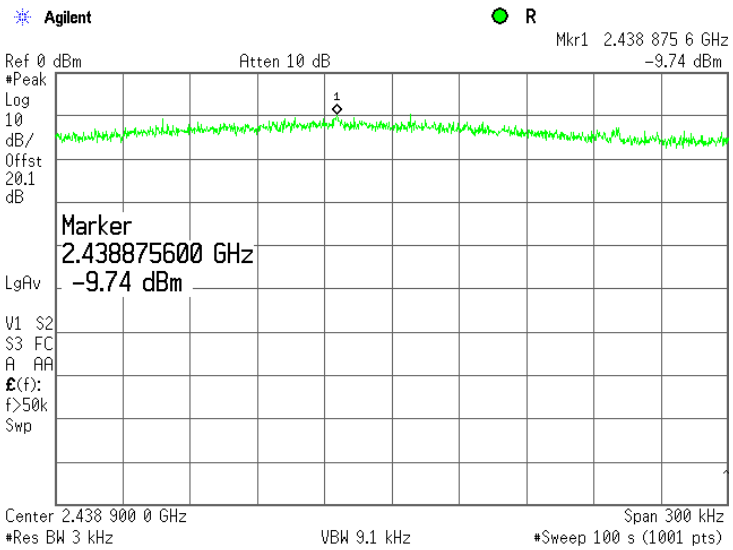
Plot 7.8.16 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	OFDM
BITRATE:	13.5Mbps

Within 6 dB band



Zoomed at the peak

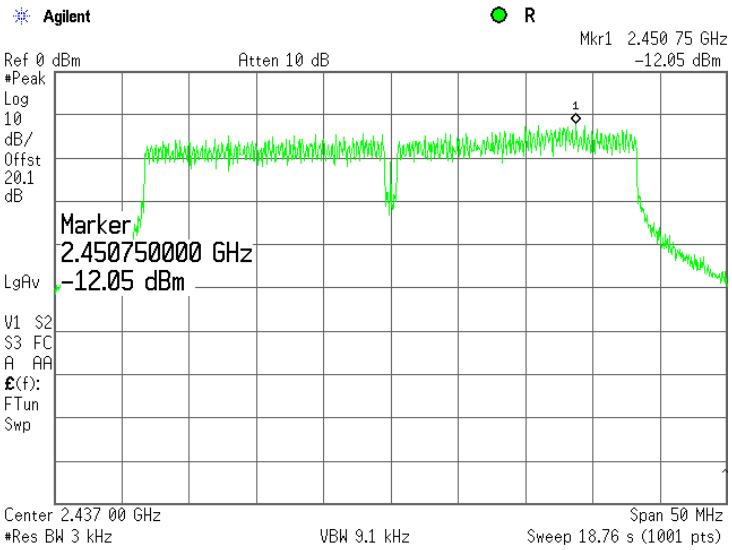


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

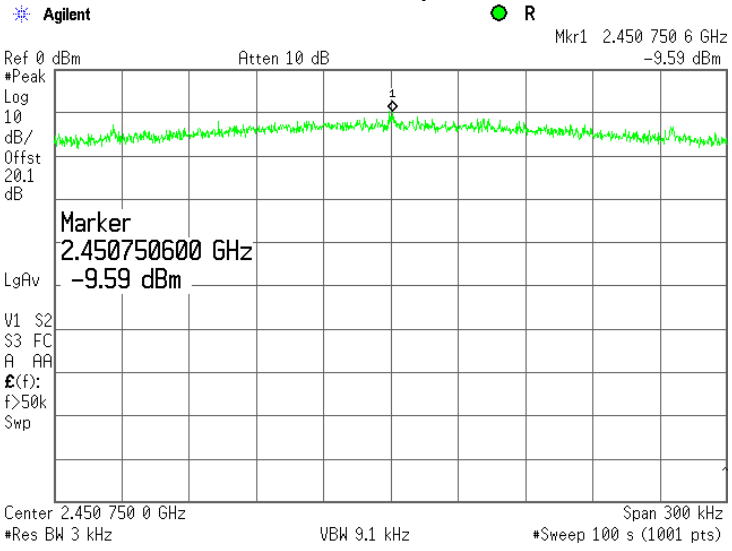
Plot 7.8.17 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	OFDM
BITRATE:	13.5Mbps

Within 6 dB band



Zoomed at the peak

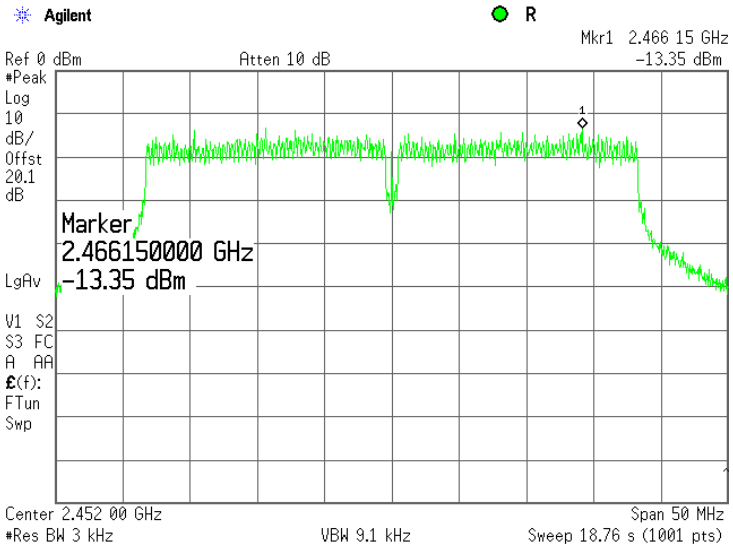


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

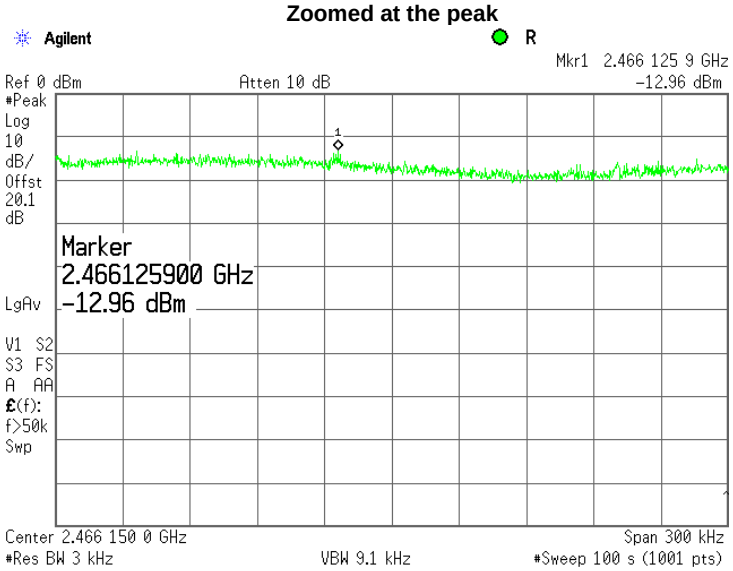
Plot 7.8.18 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	OFDM
BITRATE:	13.5Mbps

Within 6 dB band



Zoomed at the peak

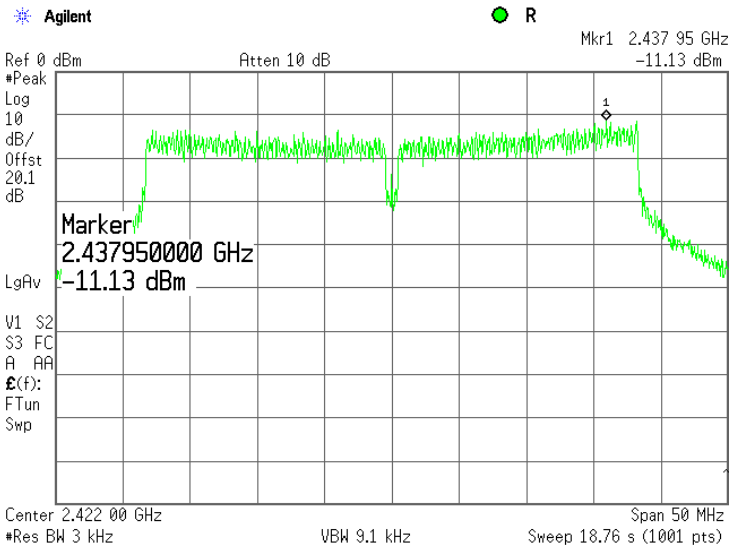


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

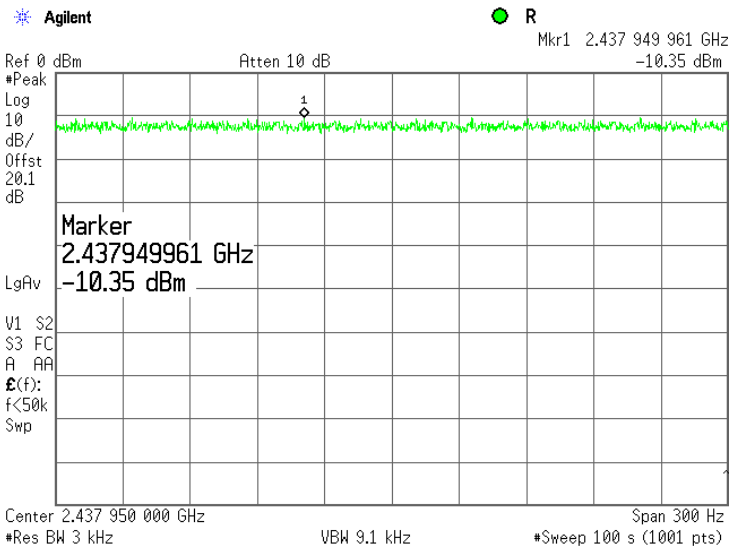
Plot 7.8.19 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	OFDM
BITRATE:	135Mbps

Within 6 dB band



Zoomed at the peak

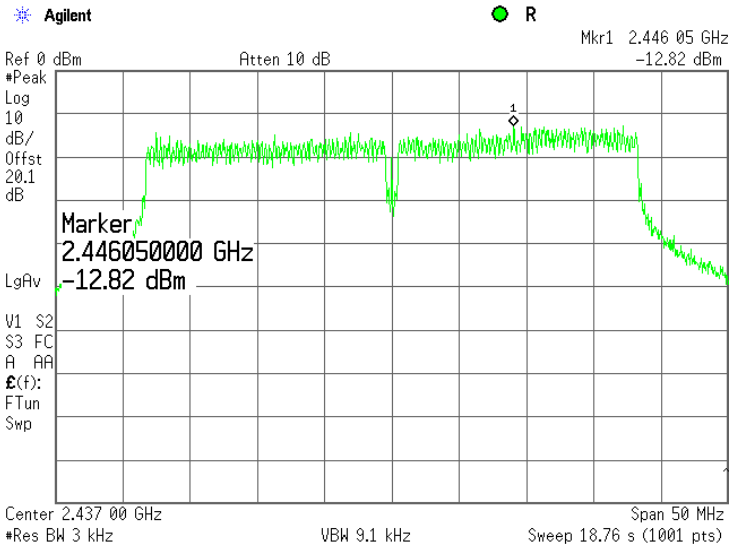


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

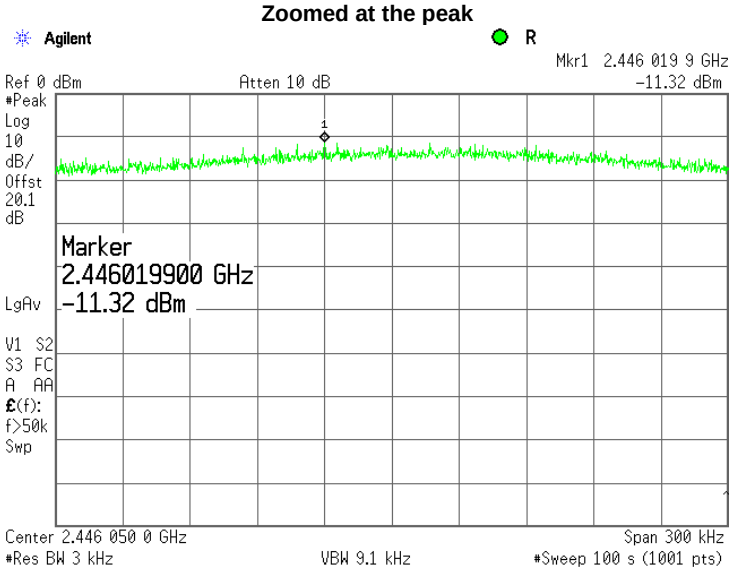
Plot 7.8.20 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	OFDM
BITRATE:	135Mbps

Within 6 dB band



Zoomed at the peak

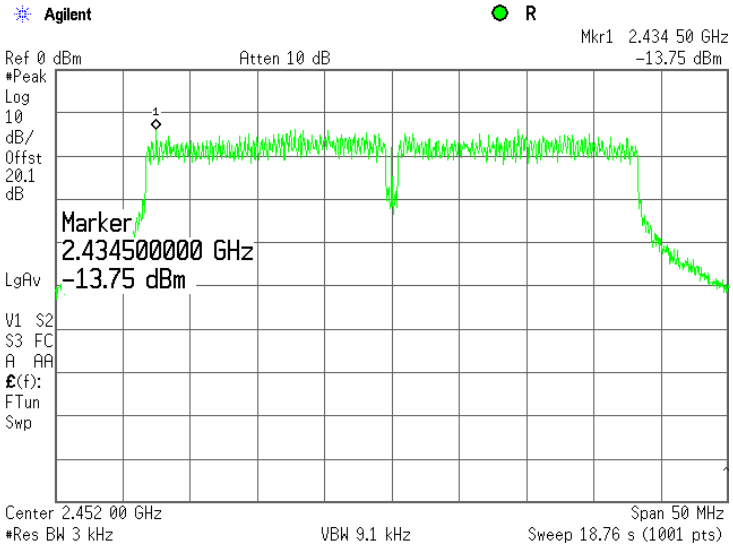


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

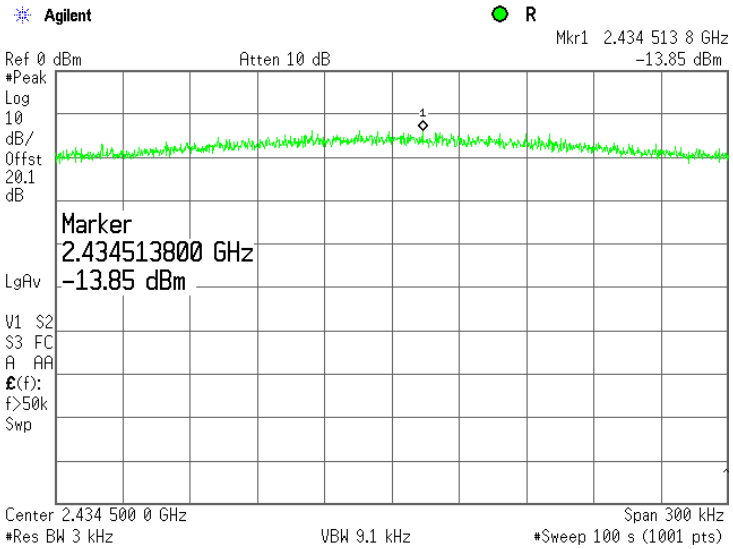
Plot 7.8.21 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	OFDM
BITRATE:	135Mbps

Within 6 dB band



Zoomed at the peak

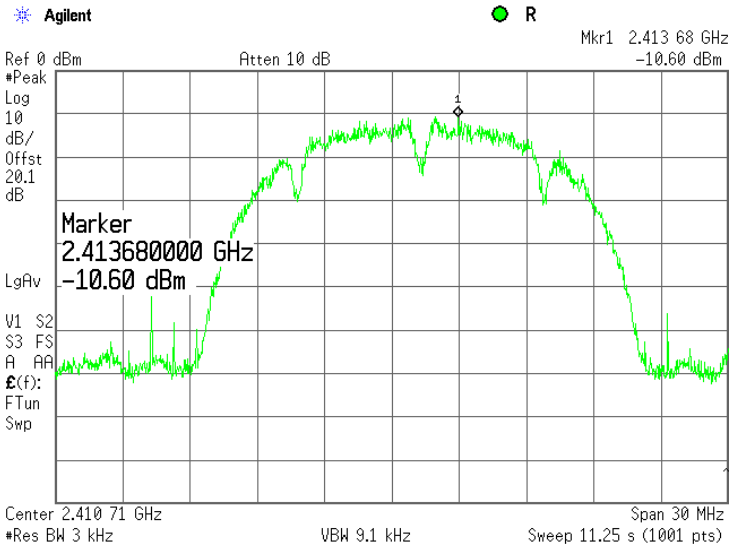


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

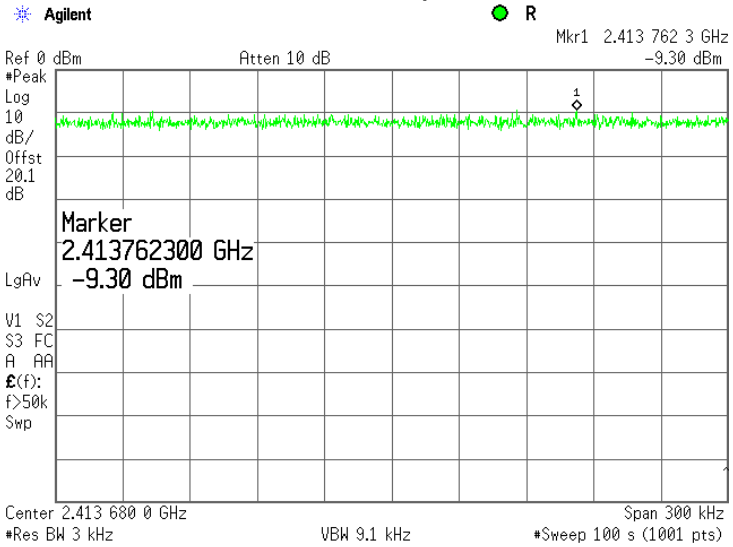
Plot 7.8.22 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	CCK
BITRATE:	1Mbps

Within 6 dB band



Zoomed at the peak

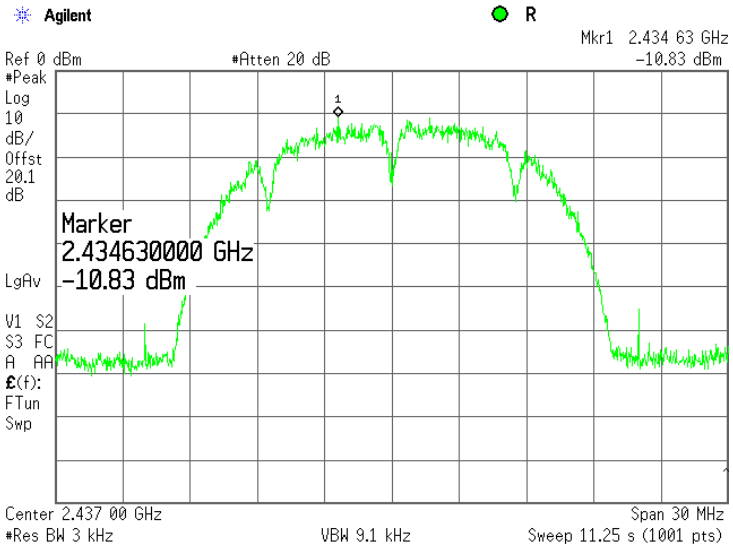


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

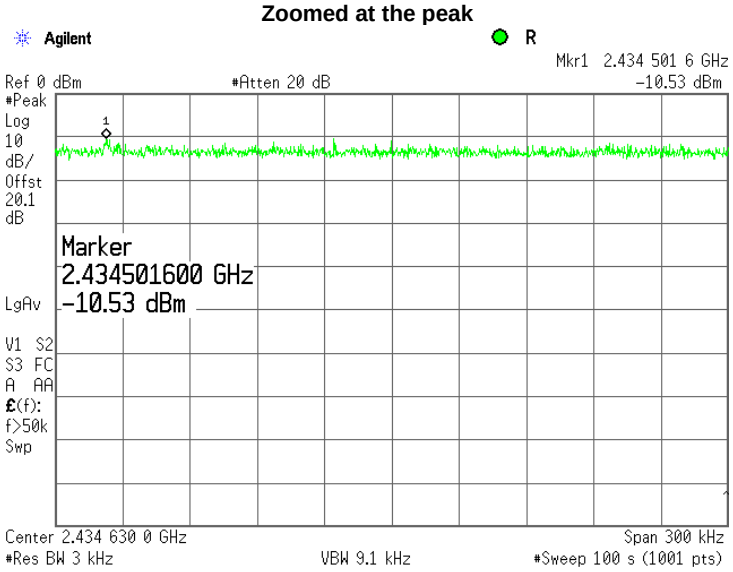
Plot 7.8.23 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	CCK
BITRATE:	1Mbps

Within 6 dB band



Zoomed at the peak

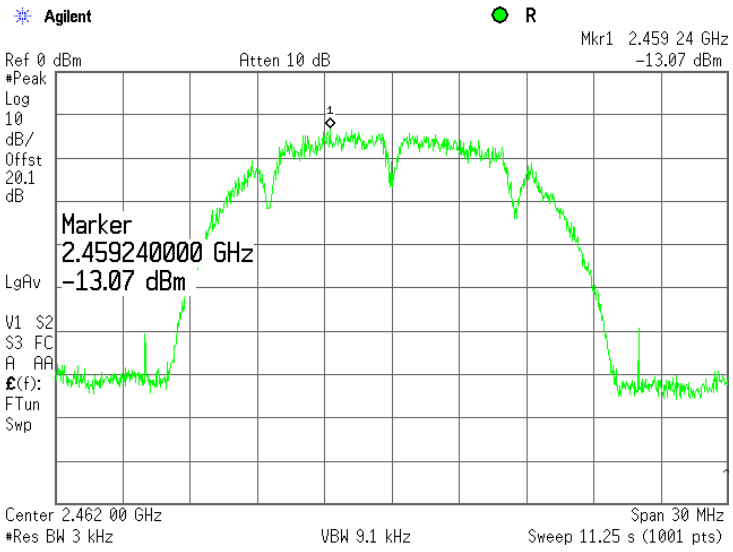


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

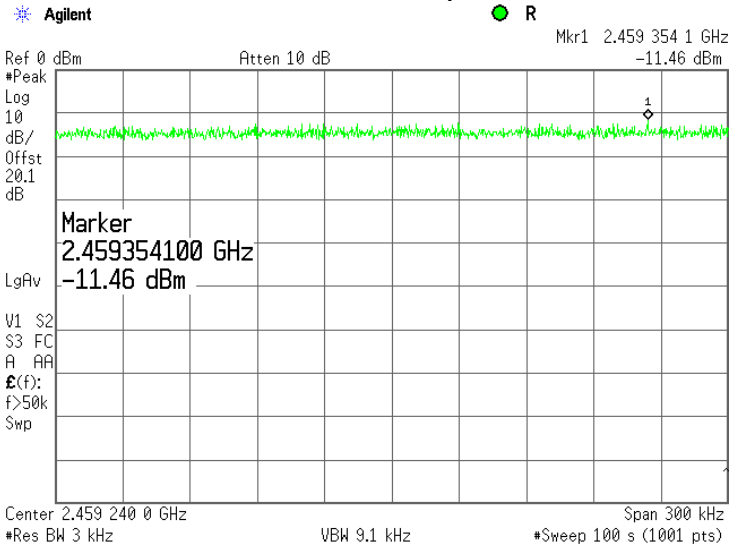
Plot 7.8.24 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	CCK
BITRATE:	1Mbps

Within 6 dB band



Zoomed at the peak

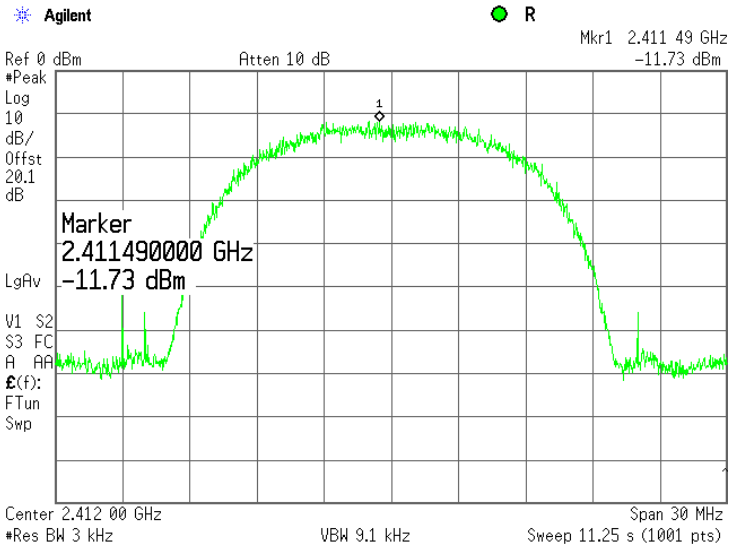


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

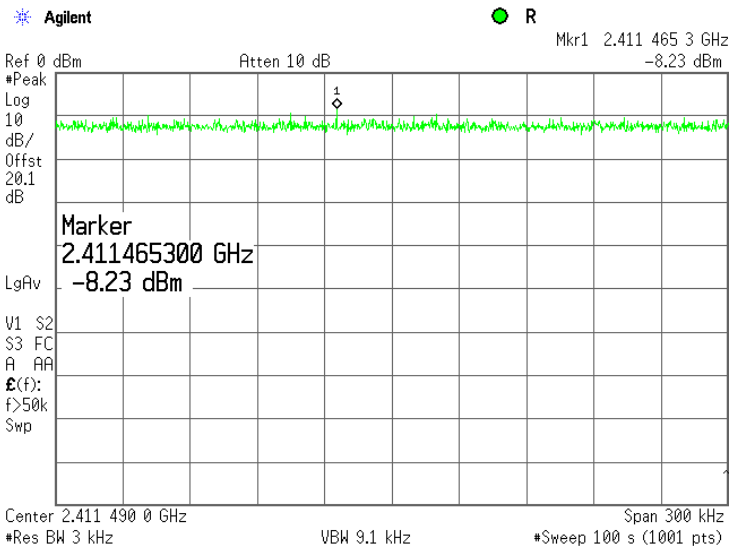
Plot 7.8.25 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	CCK
BITRATE:	11Mbps

Within 6 dB band



Zoomed at the peak

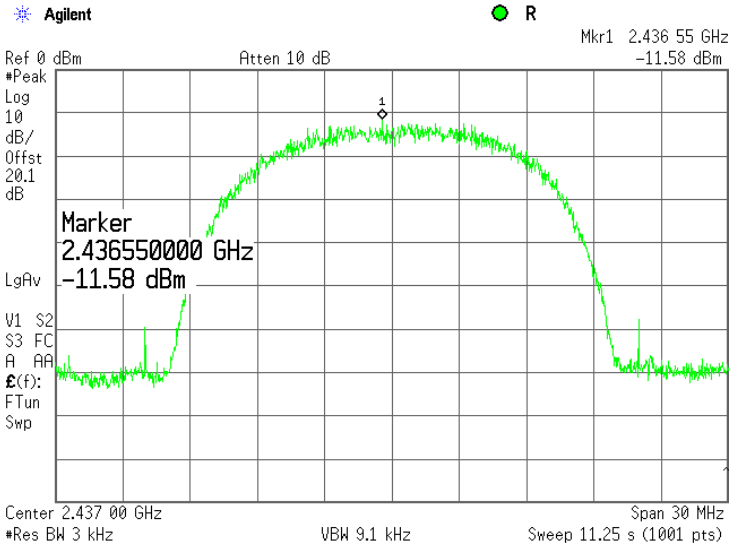


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

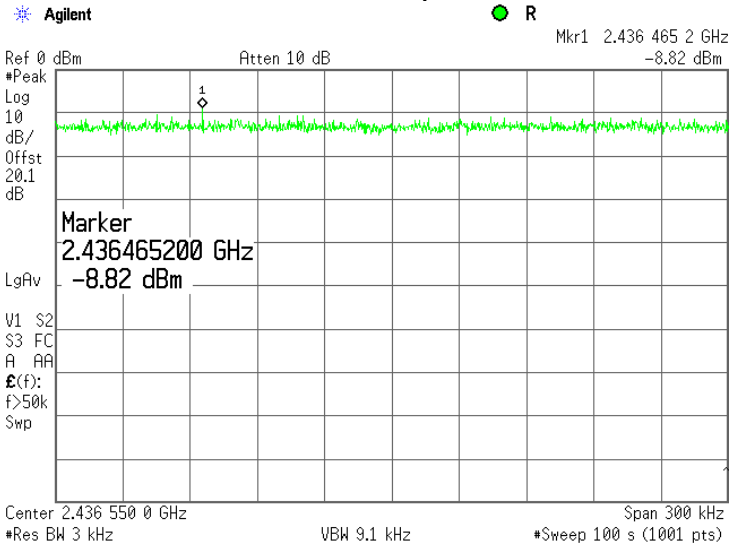
Plot 7.8.26 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	CCK
BITRATE:	11Mbps

Within 6 dB band



Zoomed at the peak

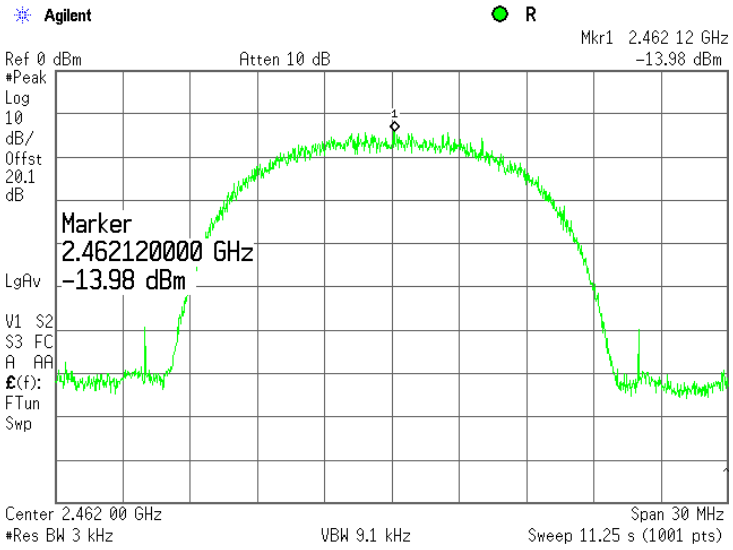


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

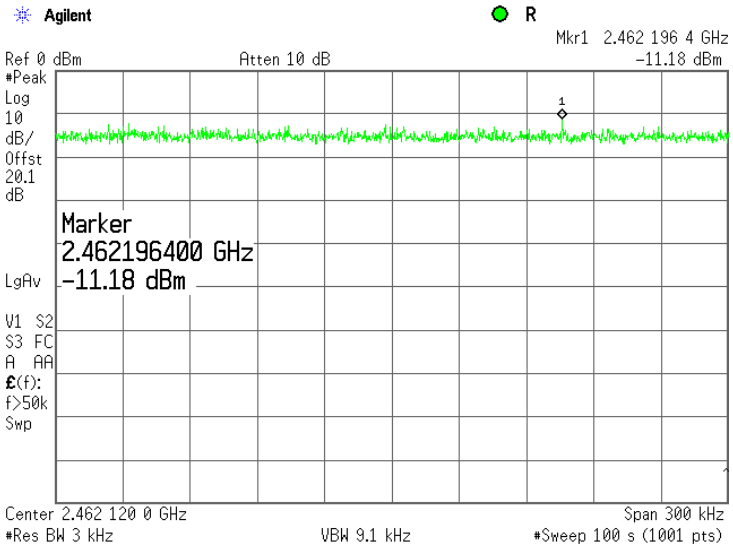
Plot 7.8.27 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	CCK
BITRATE:	11Mbps

Within 6 dB band



Zoomed at the peak

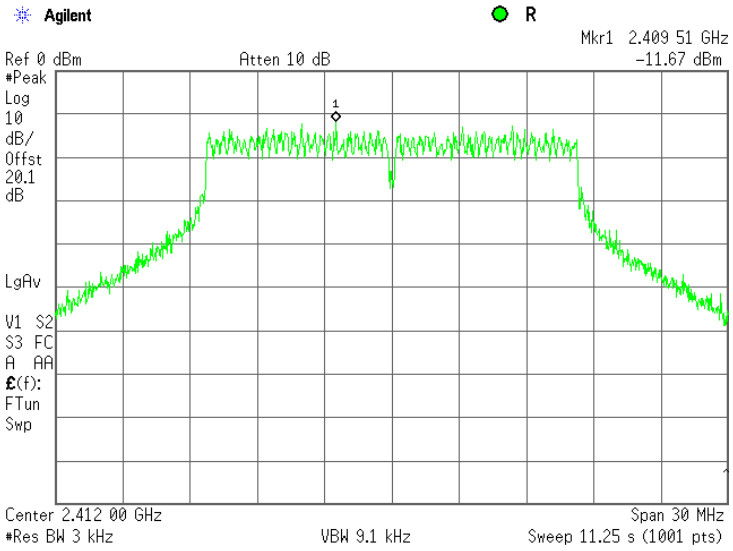


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

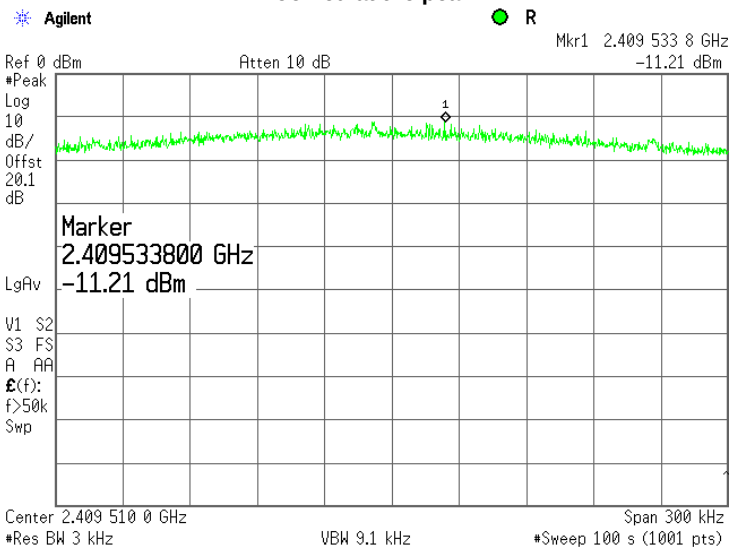
Plot 7.8.28 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	OFDM
BITRATE:	6Mbps

Within 6 dB band



Zoomed at the peak

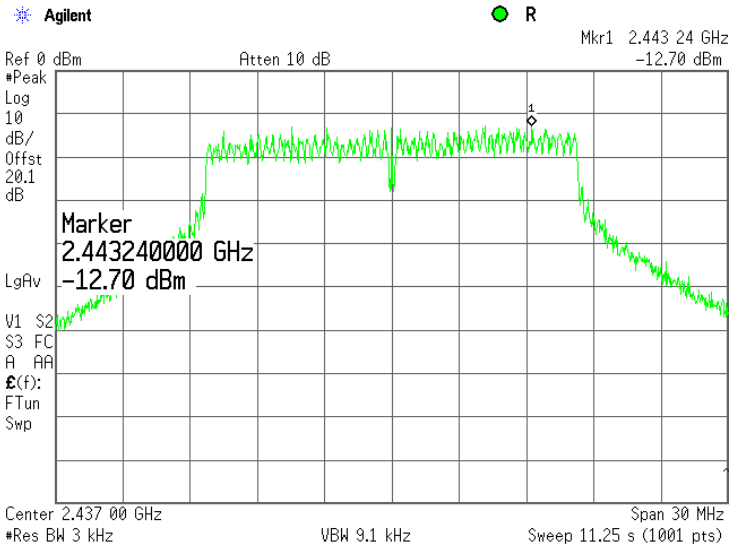


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

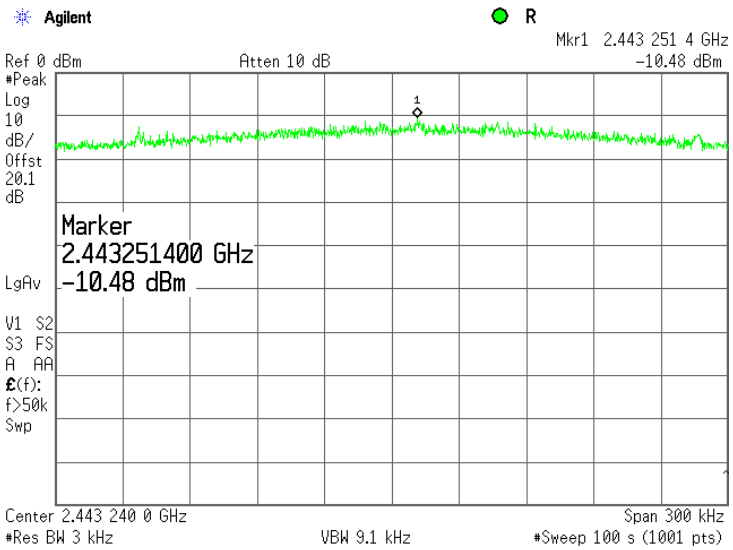
Plot 7.8.29 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	OFDM
BITRATE:	6Mbps

Within 6 dB band



Zoomed at the peak

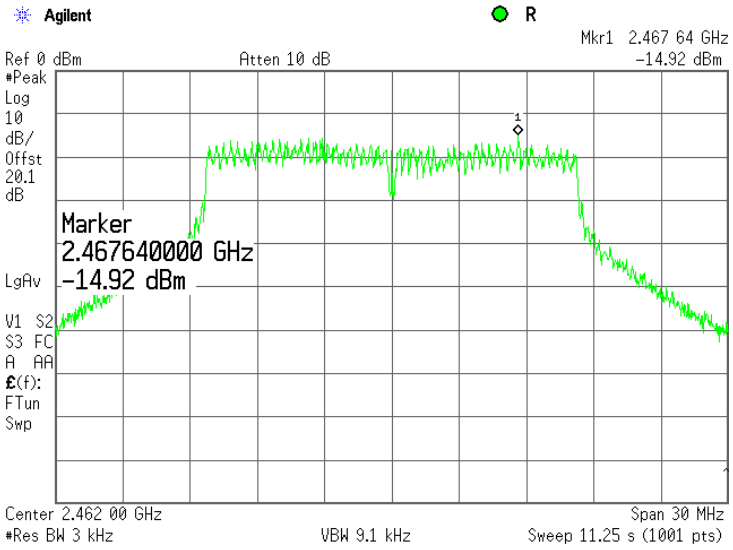


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

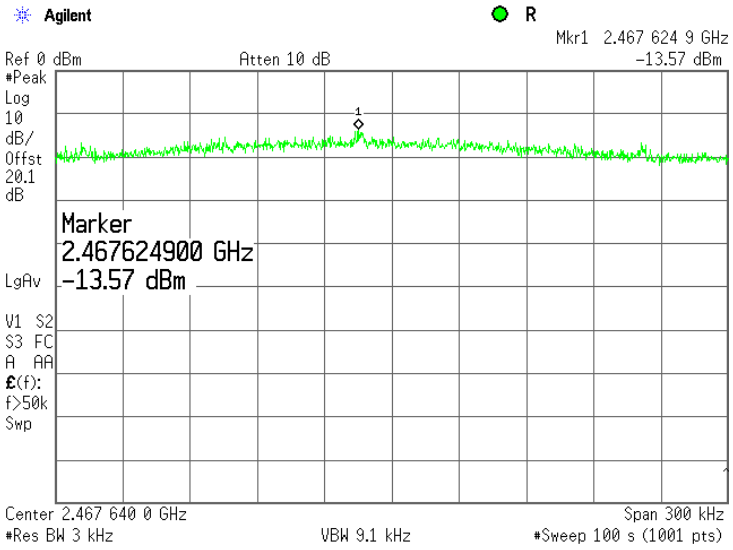
Plot 7.8.30 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	OFDM
BITRATE:	6Mbps

Within 6 dB band



Zoomed at the peak

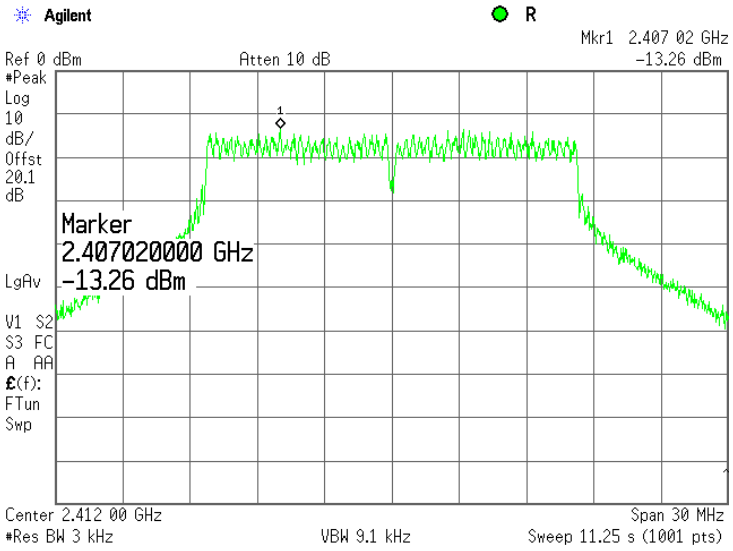


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

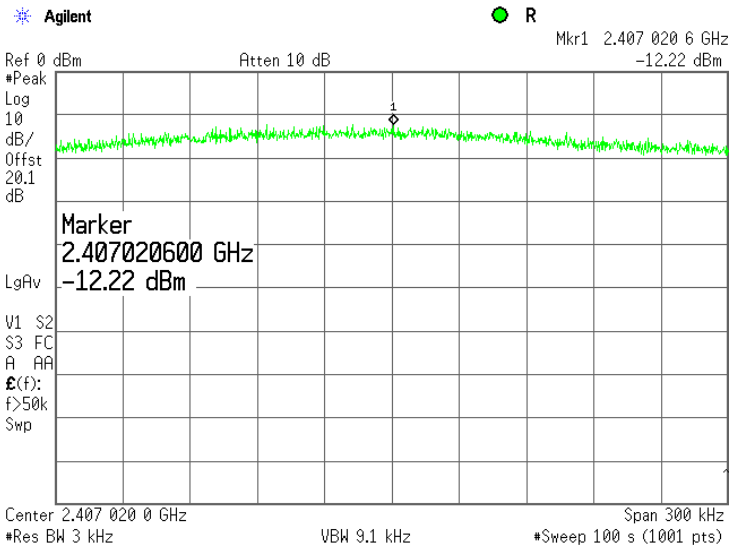
Plot 7.8.31 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	OFDM
BITRATE:	54Mbps

Within 6 dB band



Zoomed at the peak

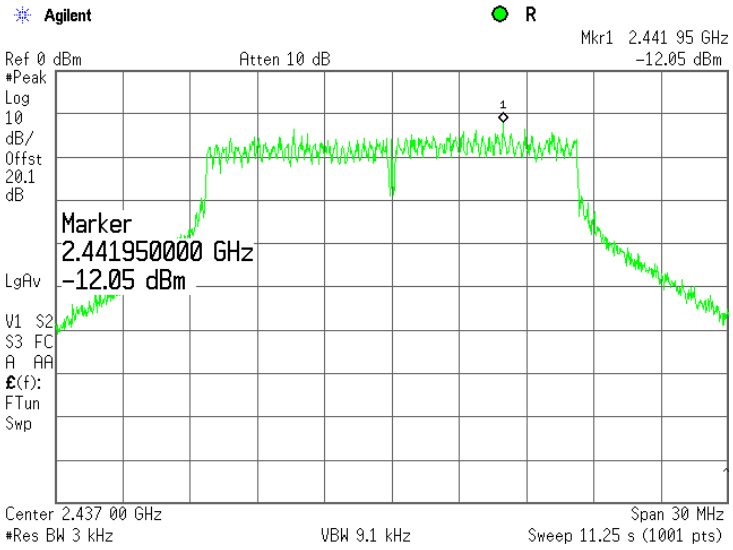


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

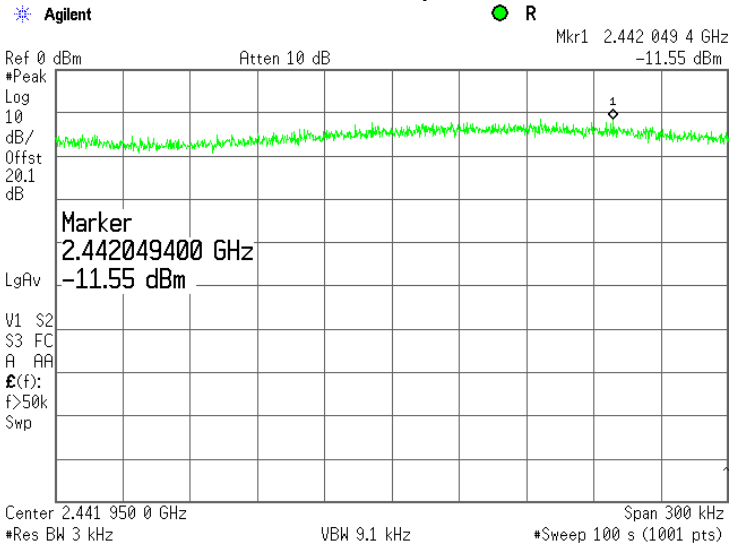
Plot 7.8.32 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	OFDM
BITRATE:	54Mbps

Within 6 dB band



Zoomed at the peak

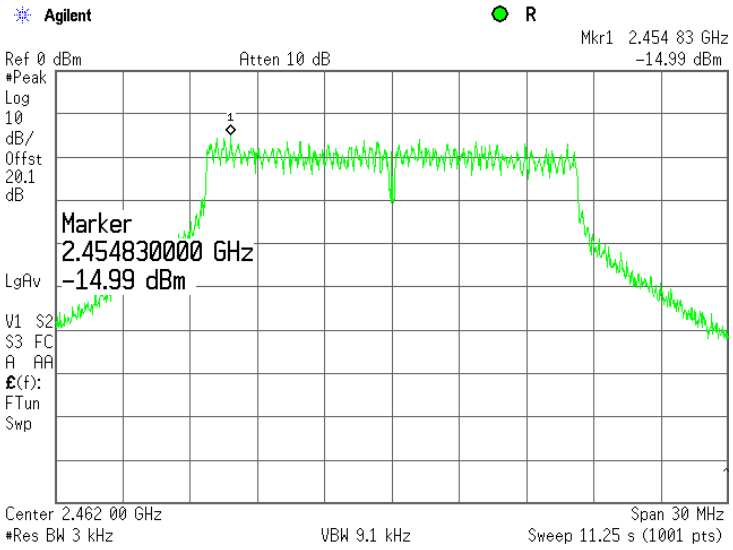


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

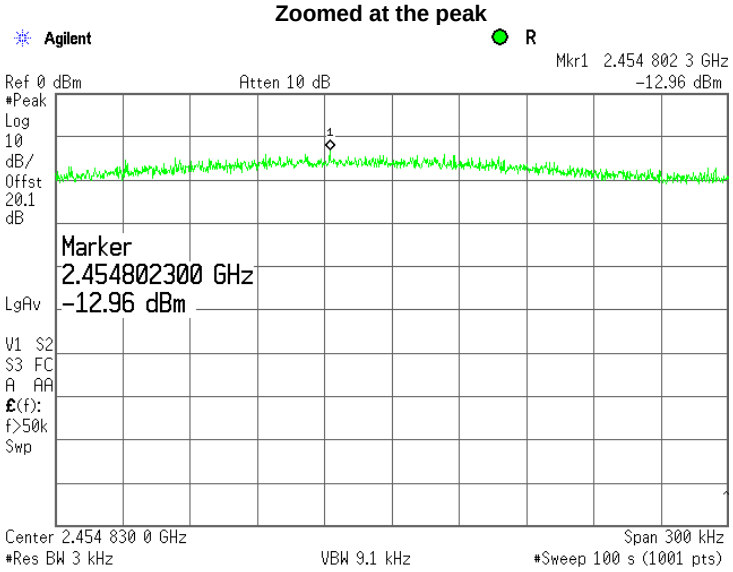
Plot 7.8.33 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	OFDM
BITRATE:	54Mbps

Within 6 dB band



Zoomed at the peak

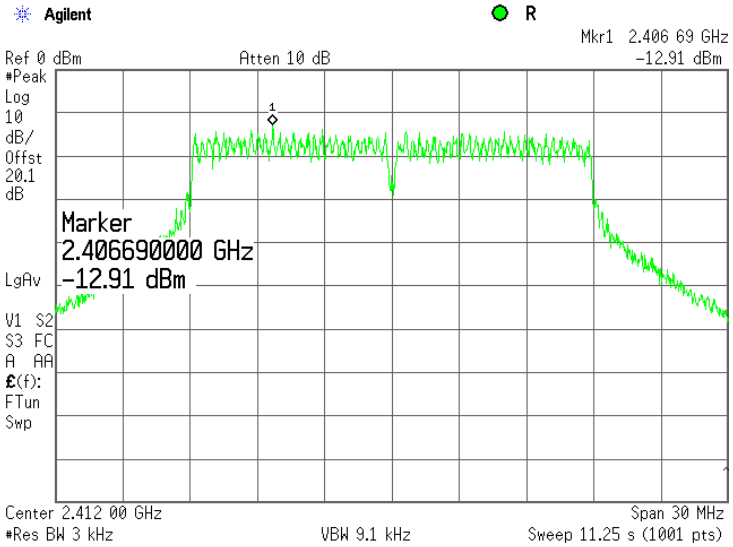


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

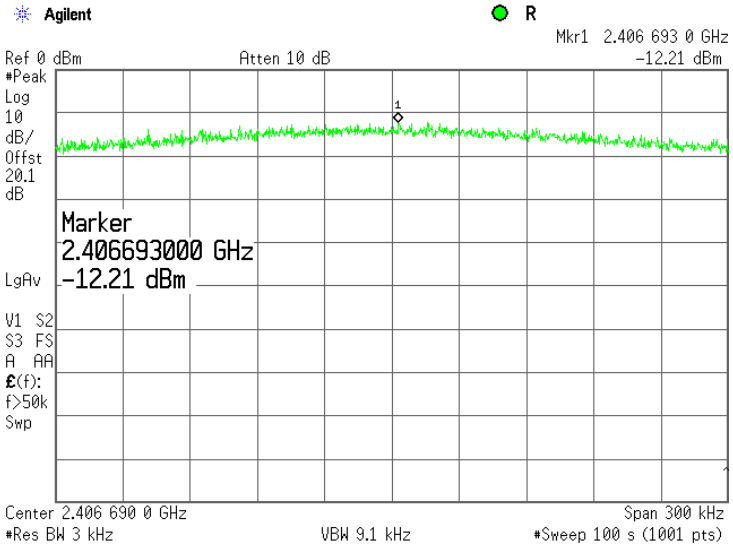
Plot 7.8.34 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	OFDM
BITRATE:	65Mbps

Within 6 dB band



Zoomed at the peak

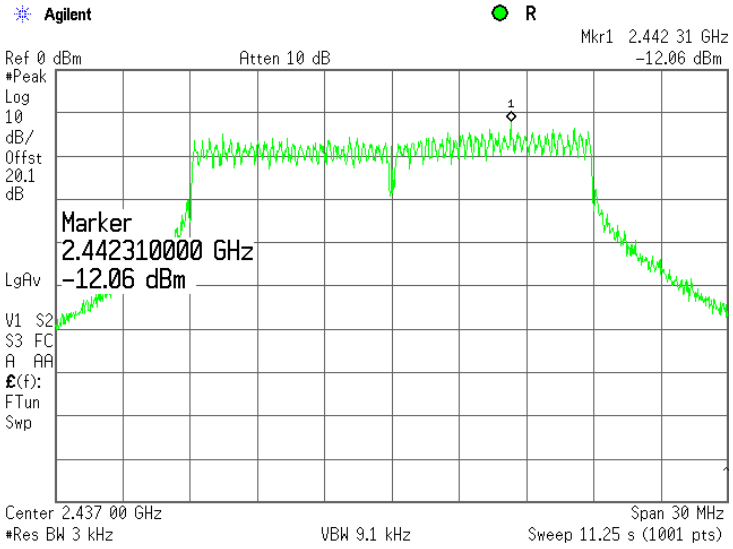


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

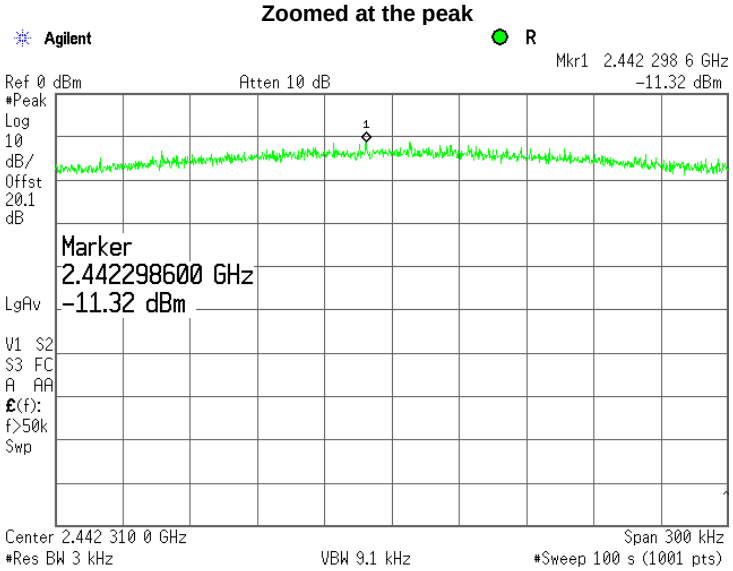
Plot 7.8.35 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	OFDM
BITRATE:	65Mbps

Within 6 dB band



Zoomed at the peak

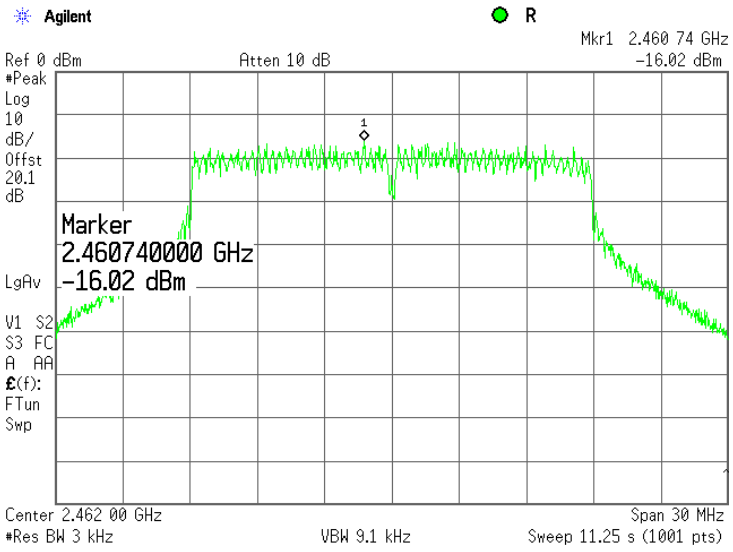


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

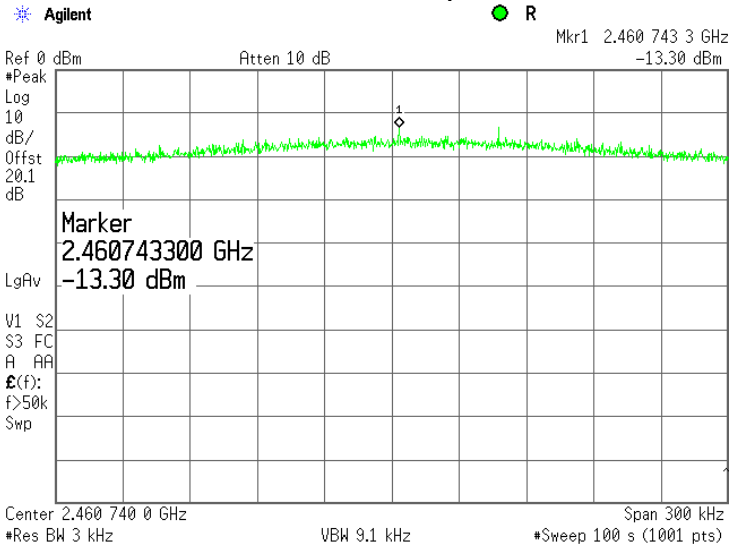
Plot 7.8.36 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	OFDM
BITRATE:	65Mbps

Within 6 dB band



Zoomed at the peak

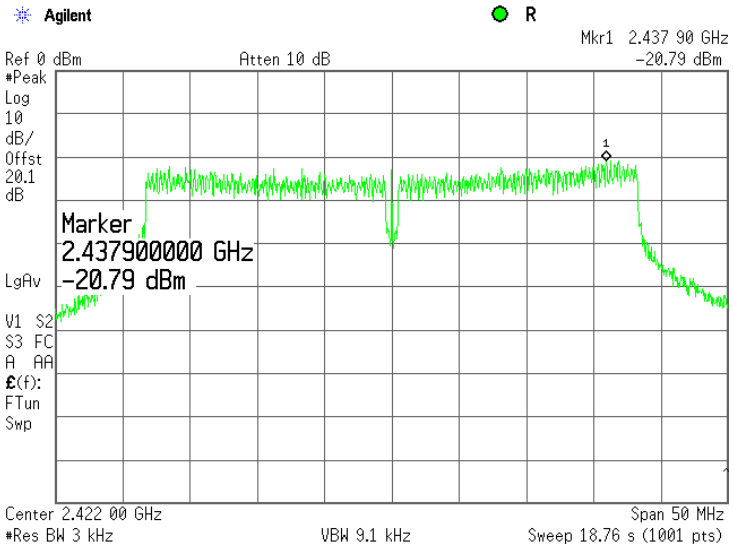


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

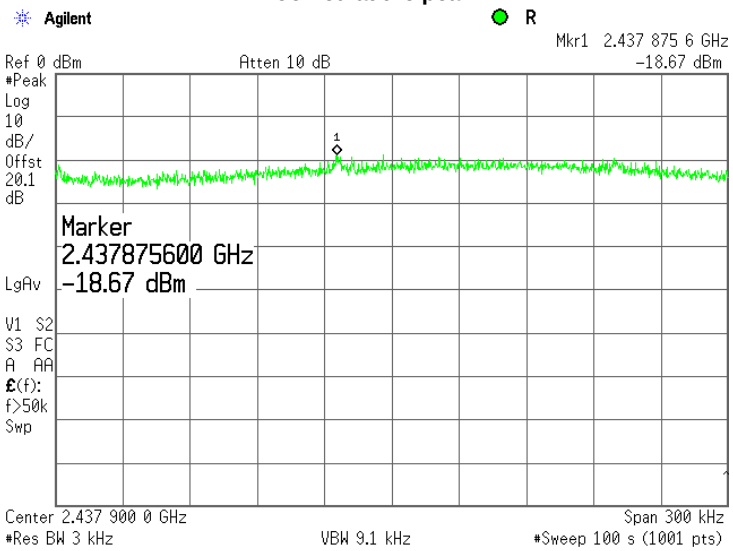
Plot 7.8.37 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	OFDM
BITRATE:	13.5Mbps

Within 6 dB band



Zoomed at the peak

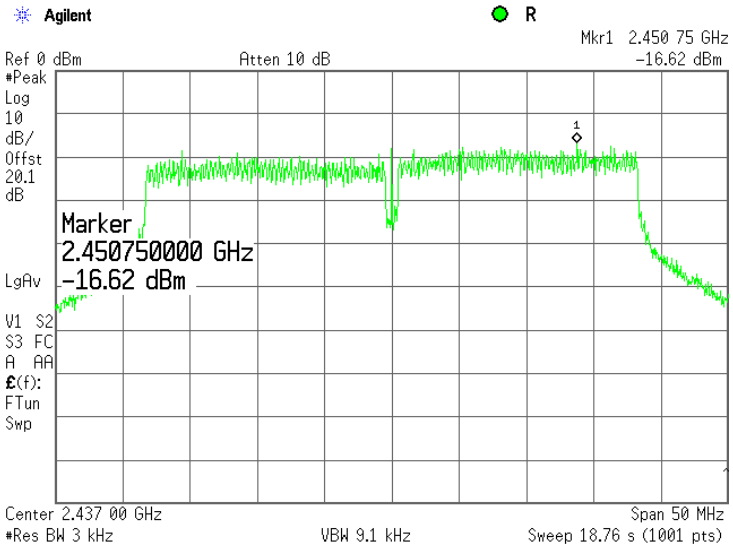


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

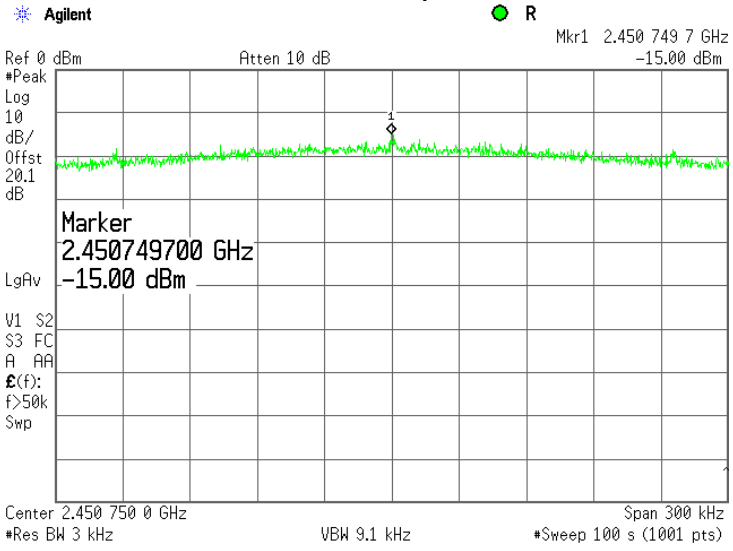
Plot 7.8.38 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	OFDM
BITRATE:	13.5Mbps

Within 6 dB band



Zoomed at the peak

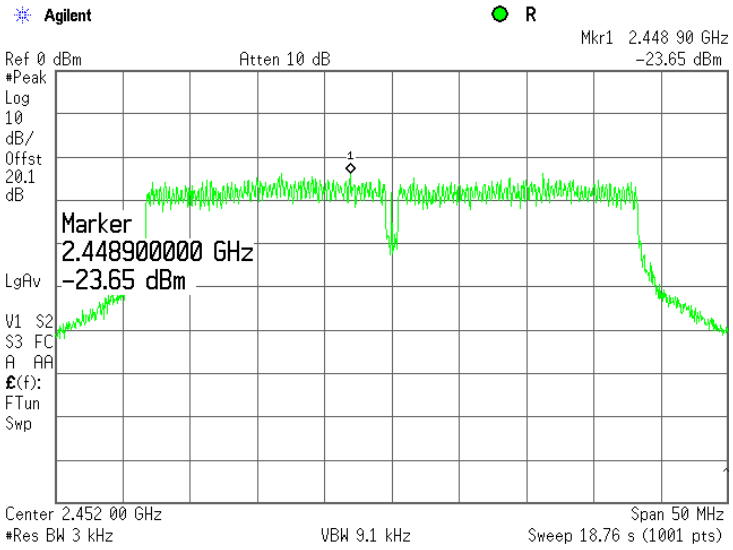


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

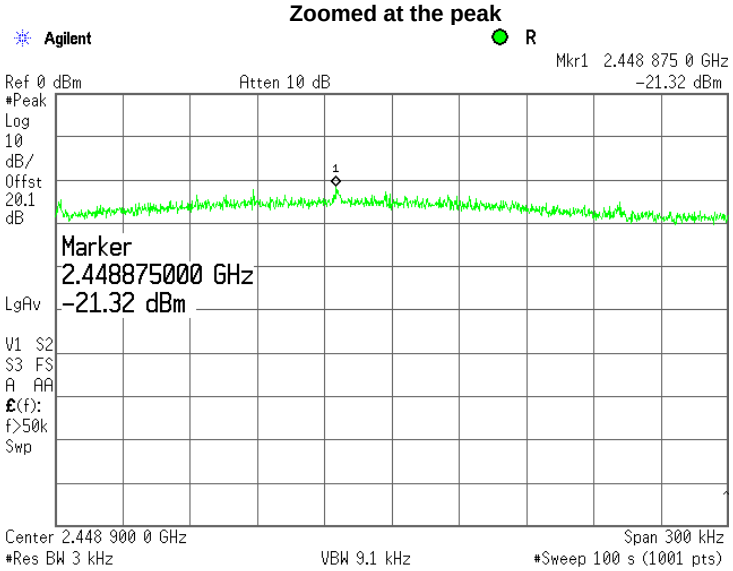
Plot 7.8.39 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	OFDM
BITRATE:	13.5Mbps

Within 6 dB band



Zoomed at the peak

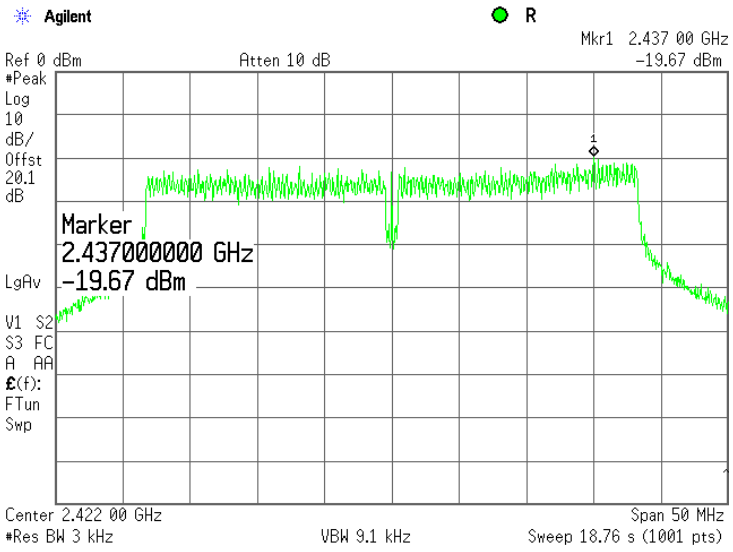


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

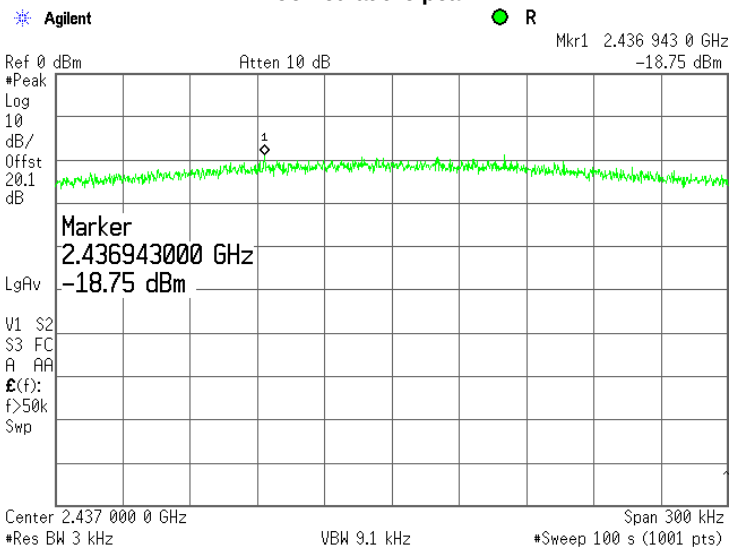
Plot 7.8.40 Peak spectral power density test results at low frequency

FREQUENCY	Low
MODULATION:	OFDM
BITRATE:	135Mbps

Within 6 dB band



Zoomed at the peak

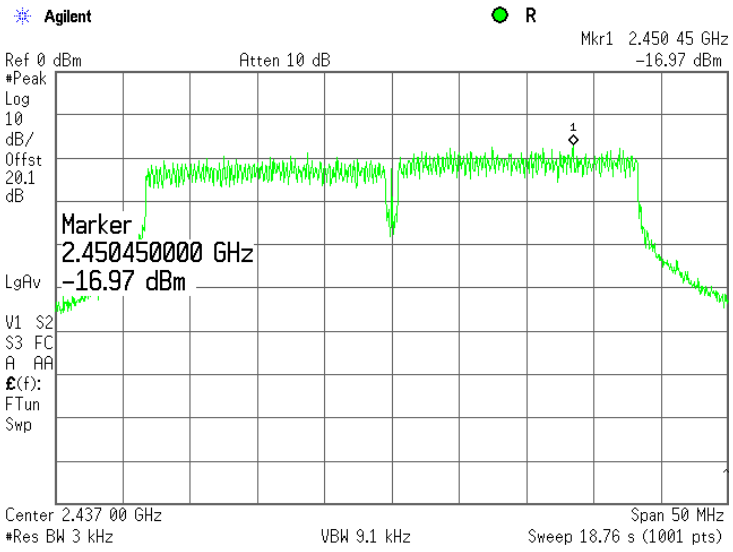


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

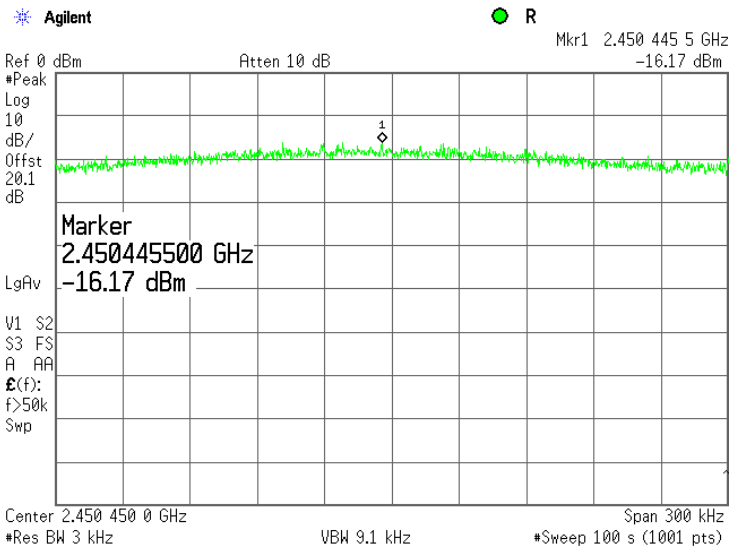
Plot 7.8.41 Peak spectral power density test results at mid frequency

FREQUENCY	Mid
MODULATION:	OFDM
BITRATE:	135Mbps

Within 6 dB band



Zoomed at the peak

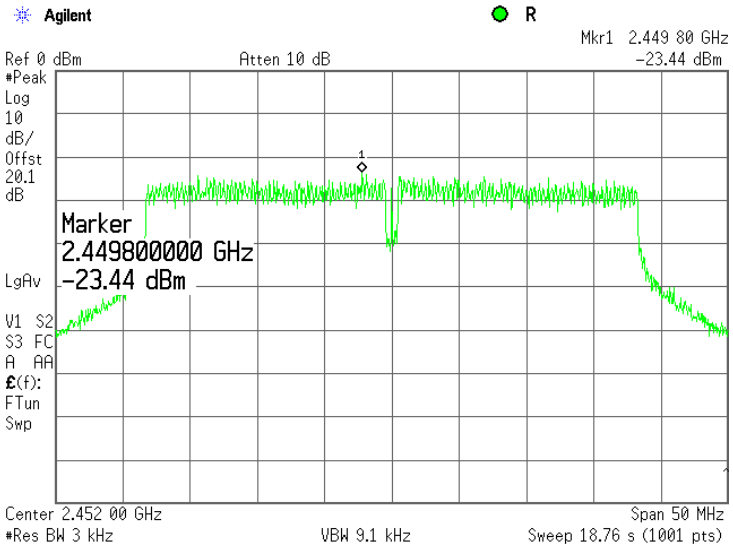


Test specification:	Section 15.247(e), Peak power density		
Test procedure:	FCC New Guidance on Measurements for DTS in section 15.247(d), Option 2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	6/15/2011		
Temperature: 24 ºC	Air Pressure: 1013 hPa	Relative Humidity: 42 %	Power Supply: 48VDC
Remarks:			

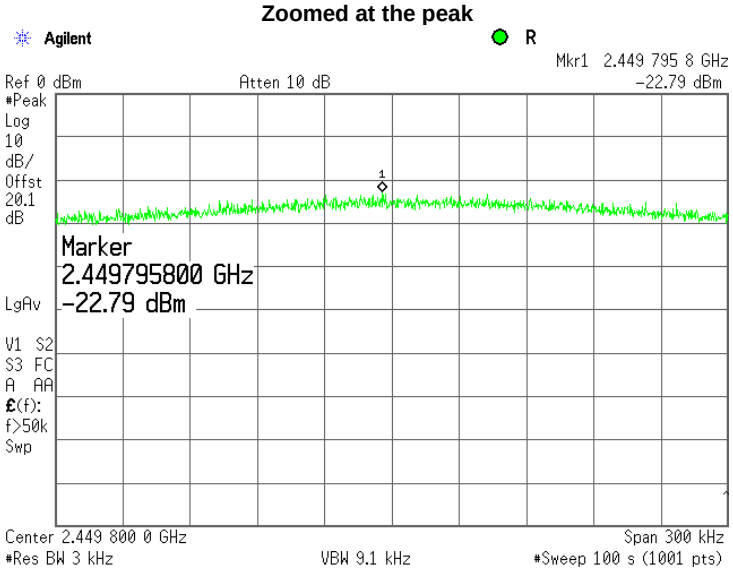
Plot 7.8.42 Peak spectral power density test results at high frequency

FREQUENCY	High
MODULATION:	OFDM
BITRATE:	135Mbps

Within 6 dB band



Zoomed at the peak



Test specification:	Section 15.207(a), Conducted emission		
Test procedure:	ANSI C63.4, Section 13.1.3		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/4/2011		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: POE: Telkor, EUT grounds connected to chassis			

7.9 Conducted emissions

7.9.1 General

This test was performed to measure common mode conducted emissions at the power port. Specification test limits are given in Table 7.9.1.

Table 7.9.1 Limits for conducted emissions

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

* The limit decreases linearly with the logarithm of frequency.

7.9.2 Test procedure

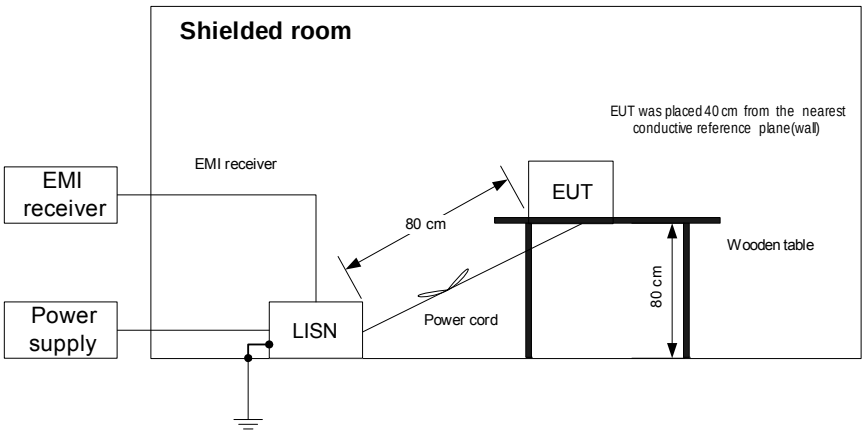
7.9.2.1 The EUT was set up as shown in Figure 7.9.1, energized and the performance check was conducted.

7.9.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer in the frequency range referred to in Table 7.9.2. Unused coaxial connector of the LISN was terminated with 50 Ohm. Quasi-peak and average detectors were used throughout the testing.

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

7.9.2.4 The worst test results (the lowest margins) were recorded in Table 7.9.2 and shown in the associated plots.

Figure 7.9.1 Setup for conducted emission measurements, table-top equipment



Test specification:	**Section 15.207(a), Conducted emission**		
Test procedure:	ANSI C63.4, Section 13.1.3		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	7/4/2011		
Temperature: 23 ºC	**Air Pressure:** 1009 hPa	**Relative Humidity:** 48 %	**Power Supply:** 120 VAC
Remarks: POE: Telkor, EUT grounds connected to chassis			

Table 7.9.2 Conducted emission test results

LINE: AC mains
EUT SET UP: TABLE-TOP
EUT OPERATION MODE: Transmit
TEST SITE: SHIELDED ROOM
DETECTORS USED: PEAK / QUASI-PEAK / AVERAGE
FREQUENCY RANGE: 150 kHz - 30 MHz
RESOLUTION BANDWIDTH: 9 kHz

Frequency, MHz	Peak emission, dB(μV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*	Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*		
0.162625	57.03	55.89	65.38	-9.49	47.26	55.38	-8.12	L1	Pass
0.216065	50.06	47.76	63.04	-15.28	39.76	53.04	-13.28		
0.270265	42.43	39.80	61.17	-21.37	31.16	51.17	-20.01		
0.493895	40.36	37.41	56.11	-18.70	34.43	46.11	-11.68		
18.057260	40.55	33.36	60.00	-26.64	25.33	50.00	-24.67		
23.399828	44.70	39.40	60.00	-20.60	32.25	50.00	-17.75		
0.162160	56.52	54.70	65.41	-10.71	43.53	55.41	-11.88	L2	Pass
0.215675	48.39	45.81	63.05	-17.24	31.77	53.05	-21.28		
0.270245	41.78	39.16	61.17	-22.01	26.33	51.17	-24.84		
0.431985	40.61	38.17	57.27	-19.10	34.11	47.27	-13.16		
0.495715	40.27	37.88	56.08	-18.20	34.13	46.08	-11.95		
24.334345	46.67	39.92	60.00	-20.08	32.82	50.00	-17.18		

*****- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

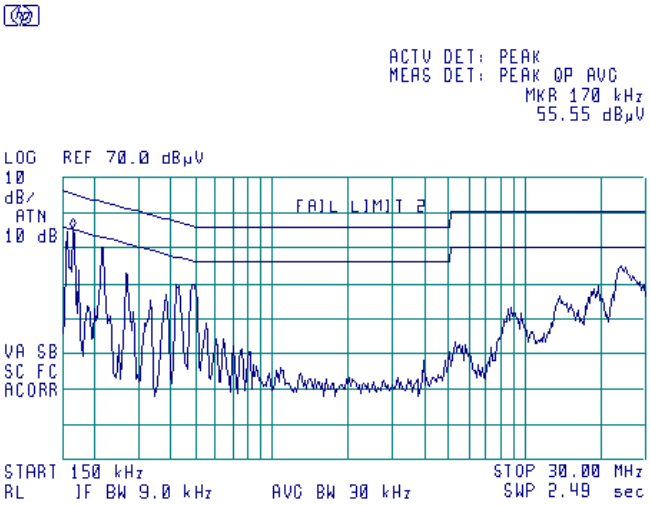
HL 0580	HL 1425	HL 1513	HL 2888	HL 3612	HL 3773		

Full description is given in Appendix A.

Test specification:	Section 15.207(a), Conducted emission		
Test procedure:	ANSI C63.4, Section 13.1.3		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/4/2011		
Temperature: 23 ºC	Air Pressure: 1009 hPa	Relative Humidity: 48 %	Power Supply: 120 VAC
Remarks: POE: Telkor, EUT grounds connected to chassis			

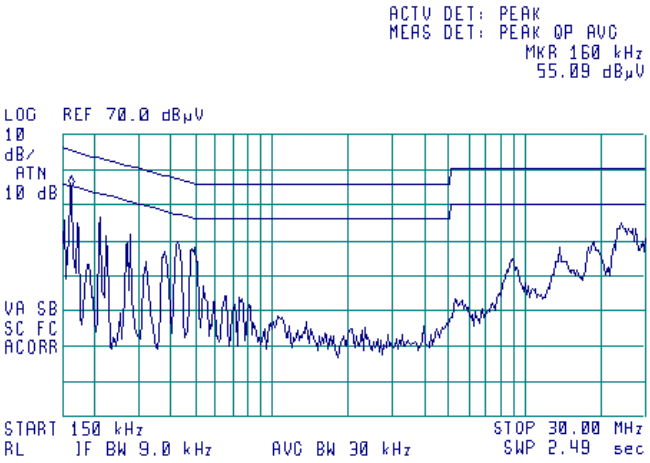
Plot 7.9.1 Conducted emission measurements

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



Plot 7.9.2 Conducted emission measurements

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



Test specification:	Section 15.203, Antenna requirement		
Test procedure:	Visual inspection		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011		
Temperature: 25 ºC	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 48VDC
Remarks: Sector & OMNI antennas			

7.10 Antenna requirements

The EUT was verified for compliance with antenna requirements. A transmitter shall be designed to ensure that no antenna other than that furnished by the responsible party will be used with the device. It may be either permanently attached or employs a unique antenna connector for every antenna proposed for use with the EUT. This requirement does not apply to professionally installed transmitters.
The rationale for compliance with the above requirements was either visual inspection results or supplier declaration. The summary of results is provided in Table 7.10.1.

Table 7.10.1 Antenna requirements

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

Photograph 7.10.1 Antenna assembly Omni

Test specification:	Section 15.203, Antenna requirement		
Test procedure:	Visual inspection		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/7/2011		
Temperature: 25 ºC	Air Pressure: 1009 hPa	Relative Humidity: 43 %	Power Supply: 48VDC
Remarks: Sector & OMNI antennas			

Photograph 7.10.2 Antenna assembly Sector

Test specification:	Section 15.107, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/11/2011		
Temperature: 25 ºC	Air Pressure: 1006 hPa	Relative Humidity: 42 %	Power Supply: 120 VAC
Remarks: POE: Telkor, EUT grounds connected to chassis			

8 Emissions tests according to 47CFR part 15 subpart B requirements

8.1 Conducted emissions

8.1.1 General

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

Table 8.1.1 Limits for conducted emissions

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

* The limit decreases linearly with the logarithm of frequency.

8.1.2 Test procedure

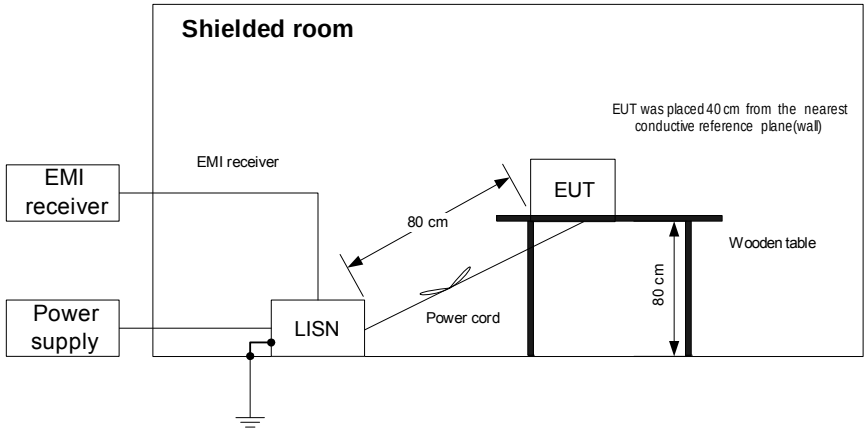
8.1.2.1 The EUT was set up as shown in Figure 8.1.1, energized and the EUT performance was checked.

8.1.2.2 The measurements were performed at the EUT mains terminals with the LISN, connected to the EMI receiver in the frequency range referred to in Table 7.9.2. The unused coaxial connector of the LISN was terminated with 50 Ohm.

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

8.1.2.4 The worst test results with respect to the limits were recorded in Table 7.9.2 and shown in the associated plots.

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



Test specification:	**Section 15.107, Conducted emission at AC power port**		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	7/11/2011		
Temperature: 25 ºC	**Air Pressure:** 1006 hPa	**Relative Humidity:** 42 %	**Power Supply:** 120 VAC
Remarks: POE: Telkor, EUT grounds connected to chassis			

Table 8.1.2 Conducted emission test results

LINE: AC mains
EUT OPERATION MODE: Standby
EUT SET UP: TABLE-TOP
TEST SITE: SHIELDED ROOM
DETECTORS USED: PEAK / QUASI-PEAK / AVERAGE
FREQUENCY RANGE: 150 kHz - 30 MHz
RESOLUTION BANDWIDTH: 9 kHz

Frequency, MHz	Peak emission, dB(μV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*	Measured emission, dB(μV)	Limit, dB(μV)	Margin, dB*		
0.18	50.99	50.02	64.32	-14.30	36.72	54.32	-17.60	L1	Pass
0.23	45.46	43.78	62.35	-18.57	32.95	52.35	-19.40		
0.37	41.47	40.15	58.55	-18.40	35.74	48.55	-12.81		
13.24	45.88	40.38	60.00	-19.62	29.73	50.00	-20.27		
25.68	48.61	44.49	60.00	-15.51	37.97	50.00	-12.03		
26.15	48.09	43.56	60.00	-16.44	37.33	50.00	-12.67		
0.18	50.63	49.72	64.34	-14.62	43.85	54.34	-10.49	L2	Pass
0.23	46.24	44.97	62.53	-17.56	40.74	52.53	-11.79		
0.46	41.31	39.88	56.71	-16.83	36.40	46.71	-10.31		
14.87	46.43	42.00	60.00	-18.00	35.88	50.00	-14.12		
25.37	49.60	44.30	60.00	-15.70	37.90	50.00	-12.10		
26.49	47.61	42.85	60.00	-17.15	36.41	50.00	-13.59		

*****- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

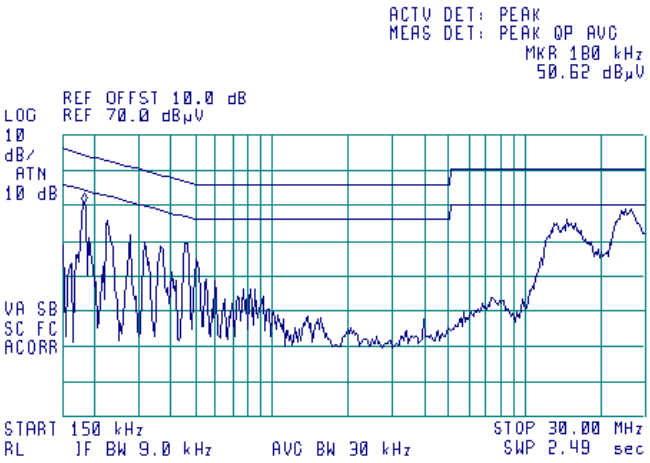
HL 3612	HL 3993	HL 0580	HL 1425	HL 2888			

Full description is given in Appendix A.

Test specification:	Section 15.107, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/11/2011		
Temperature: 25 ºC	Air Pressure: 1006 hPa	Relative Humidity: 42 %	Power Supply: 120 VAC
Remarks: POE: Telkor, EUT grounds connected to chassis			

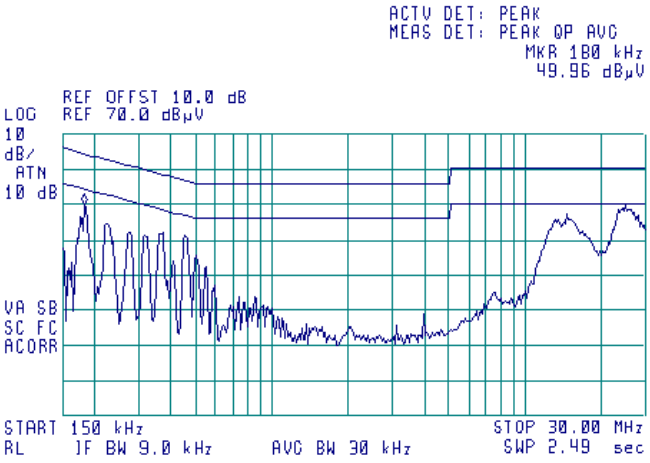
Plot 8.1.1 Conducted emission measurements

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



Plot 8.1.2 Conducted emission measurements

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



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/12/2011		
Temperature: 25 ºC	Air Pressure: 1004 hPa	Relative Humidity: 41 %	Power Supply: 48VDC
Remarks: Sector antenna, the EUT enclosure was improved with conductive foil			

8.2 Radiated emission measurements with sector antenna

8.2.1 General

This test was performed to measure radiated emissions from the EUT enclosure. Specification test limits are given in Table 8.2.1.

Table 8.2.1 Radiated emission test limits

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

* The limit for 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.

8.2.2 Test procedure for measurements in semi-anechoic chamber

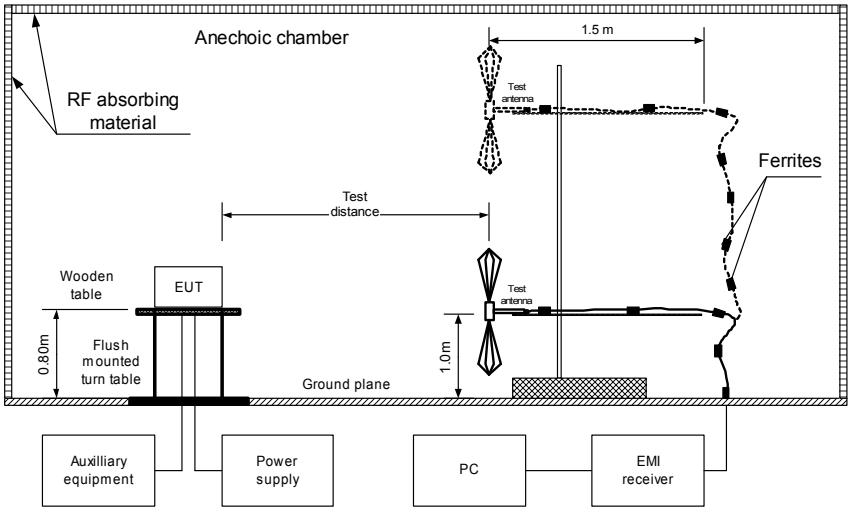
8.2.2.1 The EUT was set up as shown in Figure 8.2.1, energized and the performance check was conducted.

8.2.2.2 The specified frequency range was investigated with biconilog antenna connected to EMI receiver. To find maximum radiation the turntable was rotated 360^0, 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.

8.2.2.3 The worst test results (the lowest margins) were recorded in Table 8.2.2 and shown in the associated plots.

Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/12/2011		
Temperature: 25 ºC	Air Pressure: 1004 hPa	Relative Humidity: 41 %	Power Supply: 48VDC
Remarks: Sector antenna, the EUT enclosure was improved with conductive foil			

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



Test specification:	**Section 15.109, Radiated emission**		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	7/12/2011		
Temperature: 25 ºC	**Air Pressure:** 1004 hPa	**Relative Humidity:** 41 %	**Power Supply:** 48VDC
Remarks: Sector antenna, the EUT enclosure was improved with conductive foil			

Table 8.2.2 Radiated emission test results

EUT SET UP: TABLE-TOP
LIMIT: Class B
EUT OPERATING MODE: Stand-by
TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / QUASI-PEAK
FREQUENCY RANGE: 30 MHz – 1000 MHz
RESOLUTION BANDWIDTH: 120 kHz

Frequency, MHz	Peak emission, dB(μV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*				
35.60	24.21	17.62	40.00	-22.38	Vertical	1	200	PASS
333.34	37.00	34.98	46.00	-11.02	Vertical	1	115	
625.03	45.57	43.47	46.00	-2.53	Vertical	1.7	162	
999.99	47.49	44.56	54.00	-9.44	Vertical	1	16	

TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / AVERAGE
FREQUENCY RANGE: 1000-18000MHz -
RESOLUTION BANDWIDTH: 1000 kHz

Frequency, MHz	Peak			Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
	Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*				
No emission was found										

Verdict:Pass

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

Reference numbers of test equipment used

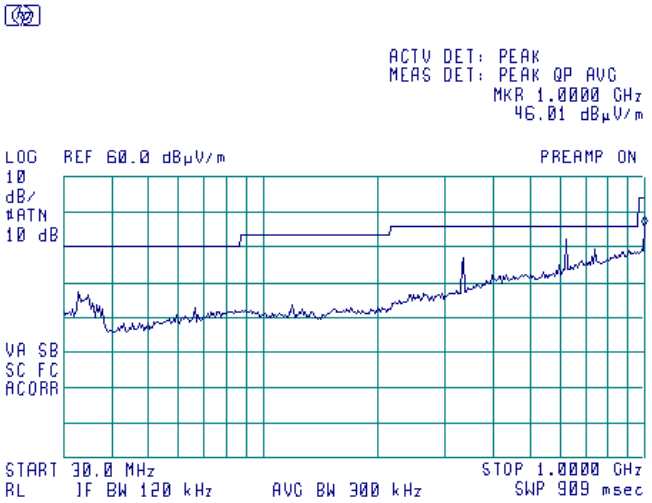
HL 0604	HL 0768	HL 1984	HL 2387	HL 2871	HL 2909	HL 3123	HL 3343
HL 3344	HL 3472	HL 3535	HL 3553	HL 3902			

Full description is given in Appendix A.

Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	7/12/2011		
Temperature: 25 ºC	Air Pressure: 1004 hPa	Relative Humidity: 41 %	Power Supply: 48VDC
Remarks: Sector antenna, the EUT enclosure was improved with conductive foil			

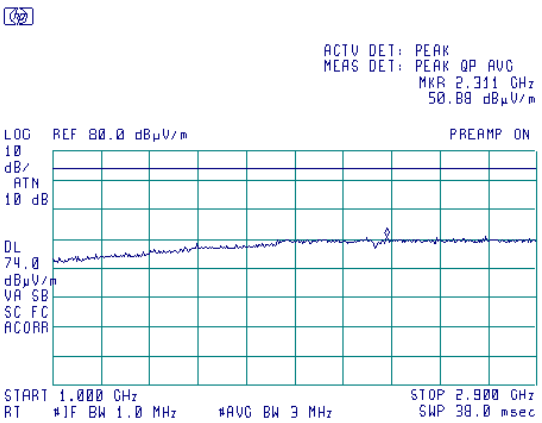
Plot 8.2.1 Radiated emission measurements in 30 - 1000 MHz range, vertical and horizontal antenna polarization

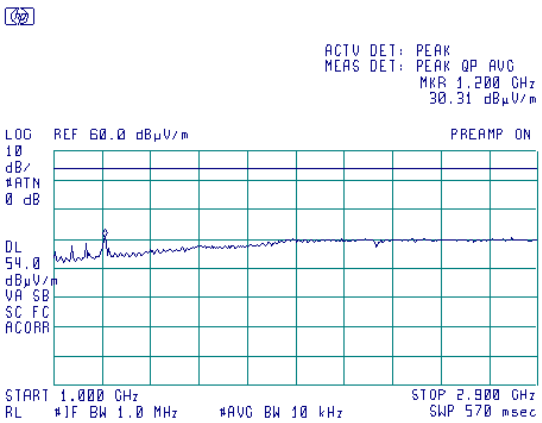
TEST SITE: Semi anechoic chamber
LIMIT: Class B
TEST DISTANCE: 3 m
EUT OPERATING MODE: Stand-by



Plot 8.2.2 Radiated emission measurements 1000-2900 MHz, vertical and horizontal antenna polarization

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

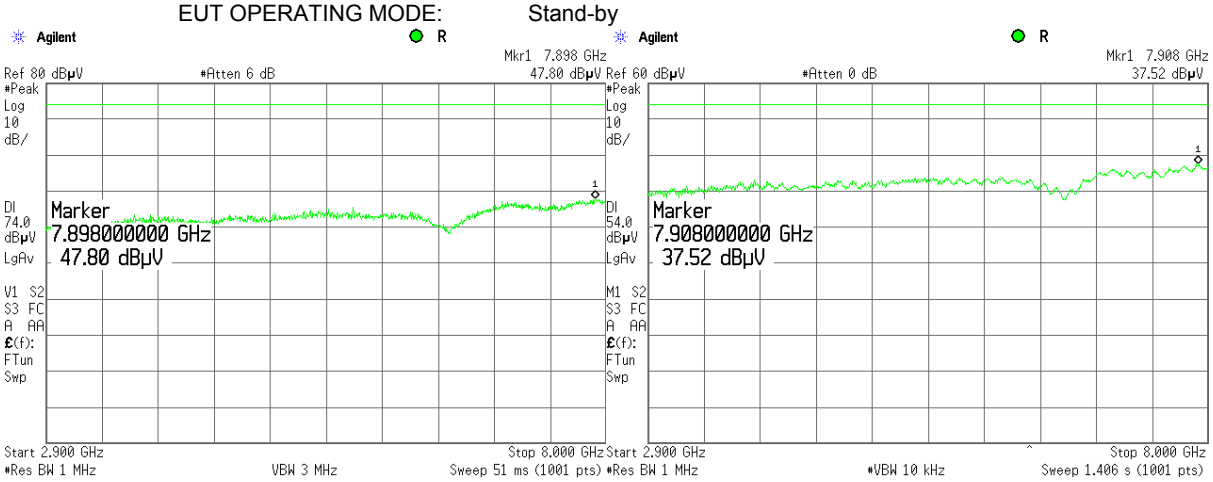




Test specification:	**Section 15.109, Radiated emission**		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	7/12/2011		
Temperature: 25 ºC	**Air Pressure:** 1004 hPa	**Relative Humidity:** 41 %	**Power Supply:** 48VDC
Remarks: Sector antenna, the EUT enclosure was improved with conductive foil			

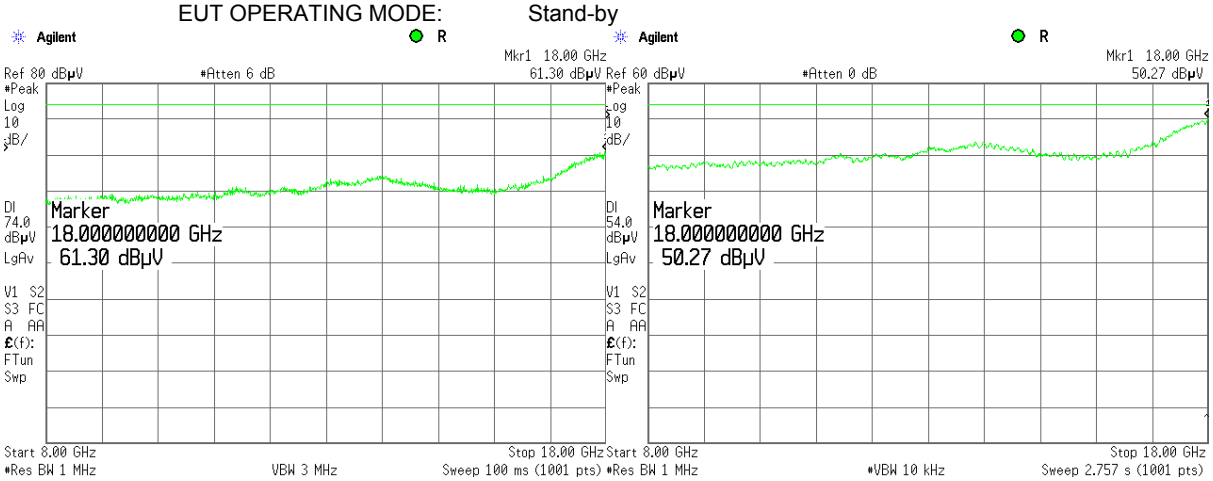
Plot 8.2.3 Radiated emission measurements 2900 –8000 MHz, vertical and horizontal antenna polarization

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



Plot 8.2.4 Radiated emission measurements 8000 –18000 MHz, vertical and horizontal antenna polarization

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



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/25/2011		
Temperature: 23 ºC	Air Pressure: 1014 hPa	Relative Humidity: 44 %	Power Supply: 48VDC
Remarks: OMNI antenna			

8.3 Radiated emission measurements with OMNI antenna

8.3.1 General

This test was performed to measure radiated emissions from the EUT enclosure. Specification test limits are given in Table 8.3.1.

Table 8.3.1 Radiated emission test limits

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

* The limit for 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.

8.3.2 Test procedure for measurements in semi-anechoic chamber

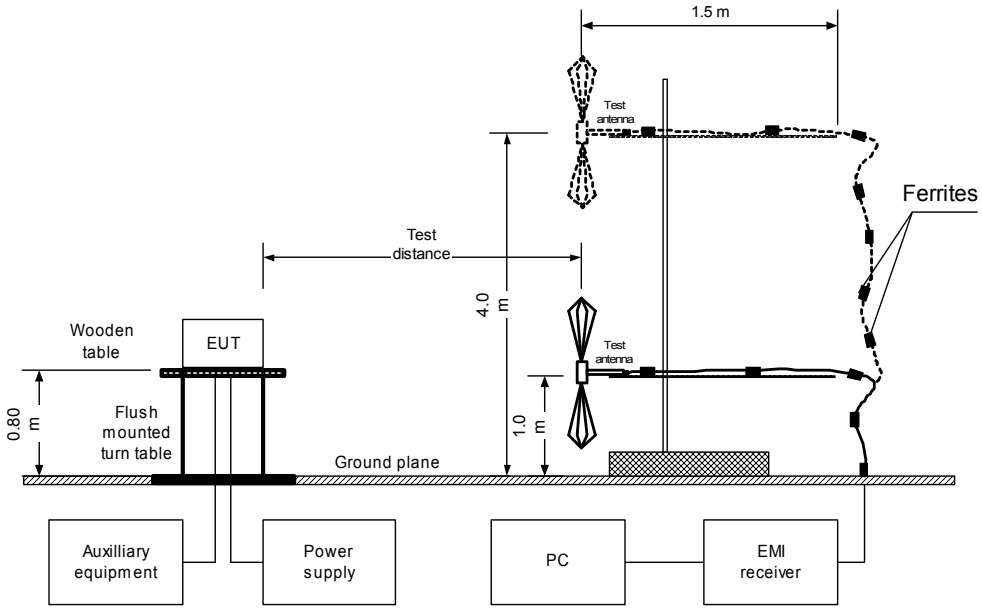
8.3.2.1 The EUT was set up as shown in Figure 8.3.1, energized and the performance check was conducted.

8.3.2.2 The specified frequency range was investigated with 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.

8.3.2.3 The worst test results (the lowest margins) were recorded in Table 8.3.2 and shown in the associated plots.

Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/25/2011		
Temperature: 23 ºC	Air Pressure: 1014 hPa	Relative Humidity: 44 %	Power Supply: 48VDC
Remarks: OMNI antenna			

Figure 8.3.1 Setup for radiated emission measurements, table-top equipment



Test specification:	**Section 15.109, Radiated emission**		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	5/25/2011		
Temperature: 23 ºC	**Air Pressure:** 1014 hPa	**Relative Humidity:** 44 %	**Power Supply:** 48VDC
Remarks: OMNI antenna			

Table 8.3.2 Radiated emission test results

EUT SET UP: TABLE-TOP
LIMIT: B
EUT OPERATING MODE: Stand-by
TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK
FREQUENCY RANGE: 30 MHz – 1000 MHz
RESOLUTION BANDWIDTH: 120 kHz

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

TEST SITE: OATS / SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / AVERAGE
FREQUENCY RANGE: 1000 MHz – 18000 MHz
RESOLUTION BANDWIDTH: 1000 kHz

Frequency, MHz	Peak			Average			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
	Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*	Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
No emission was found										

Verdict:Pass

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

Reference numbers of test equipment used

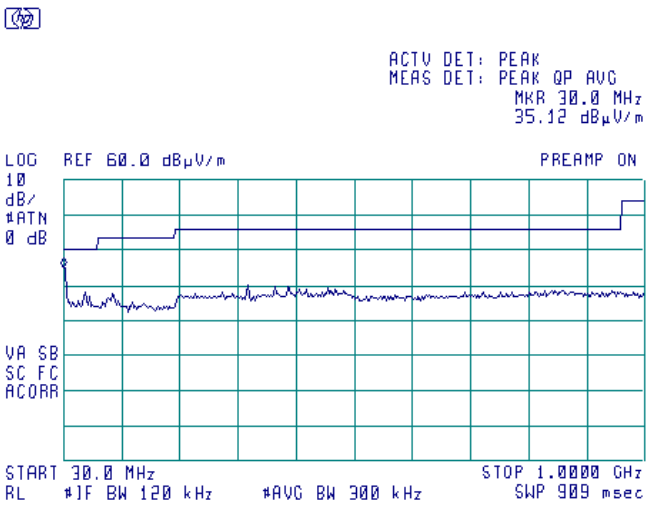
HL 0604	HL 0768	HL 1984	HL 2387	HL 2871	HL 2909	HL 3123	HL 3343
HL 3344	HL 3472	HL 3535	HL 3553	HL 3902			

Full description is given in Appendix A.

Test specification:	**Section 15.109, Radiated emission**		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	5/25/2011		
Temperature: 23 ºC	**Air Pressure:** 1014 hPa	**Relative Humidity:** 44 %	**Power Supply:** 48VDC
Remarks: OMNI antenna			

Plot 8.3.1 Radiated emission measurements in 30 - 1000 MHz range, vertical and horizontal antenna polarization

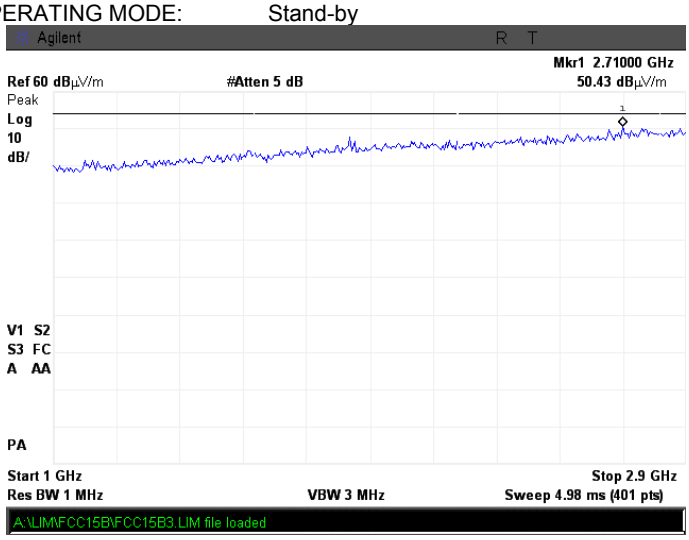
TEST SITE:	Semi anechoic chamber
LIMIT:	B
TEST DISTANCE:	3 m
EUT OPERATING MODE:	Stand-by



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/25/2011		
Temperature: 23 ºC	Air Pressure: 1014 hPa	Relative Humidity: 44 %	Power Supply: 48VDC
Remarks: OMNI antenna			

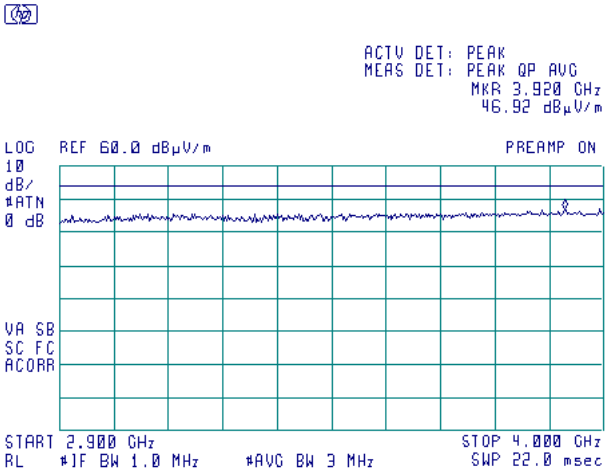
Plot 8.3.2 Radiated emission measurements in 1000 – 2900 MHz range, vertical and horizontal antenna polarization

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



Plot 8.3.3 Radiated emission measurements in 2900 - 4000 MHz range, vertical and horizontal antenna polarization

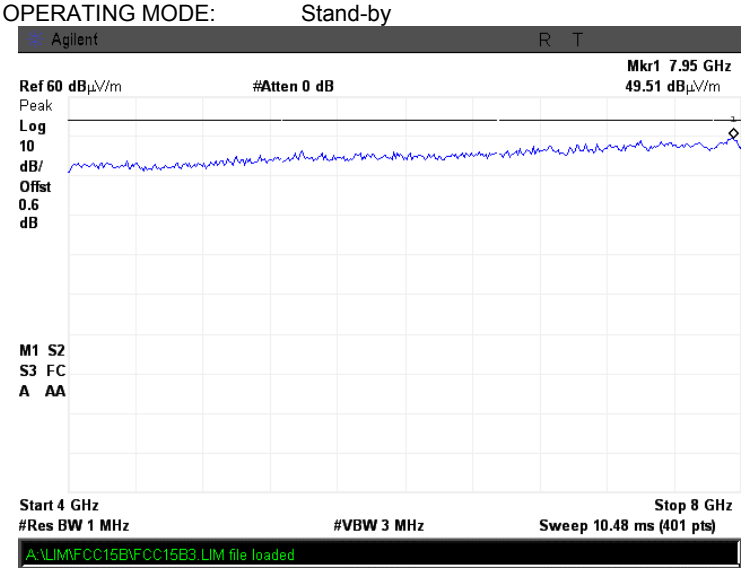
TEST SITE: Semi anechoic chamber
LIMIT: B
TEST DISTANCE: 3 m
EUT OPERATING MODE: Stand-by



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date(s):	5/25/2011		
Temperature: 23 ºC	Air Pressure: 1014 hPa	Relative Humidity: 44 %	Power Supply: 48VDC
Remarks: OMNI antenna			

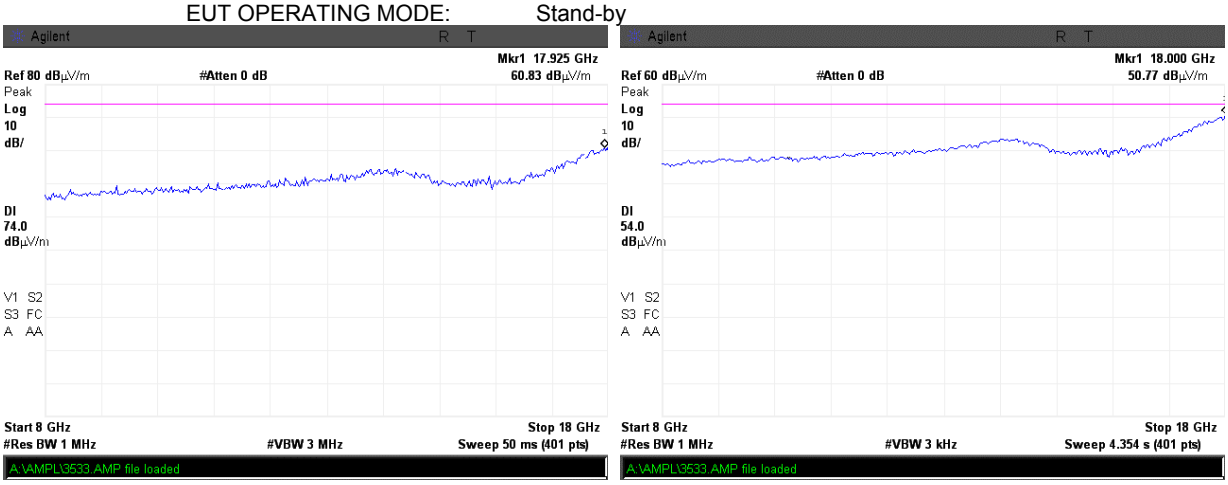
Plot 8.3.4 Radiated emission measurements in 4000 - 8000 MHz range, vertical and horizontal antenna polarization

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



Plot 8.3.5 Radiated emission measurements in 8000 - 18000 MHz range, vertical and horizontal antenna polarization

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



9 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal./ Check	Due Cal./ Check
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	03-Jul-11	03-Jul-12
0580	DC block adaptor 10 kHz - 2.2 GHz	Anritsu	MA8601 A	580	23-Nov-10	23-Nov-11
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	11-Jan-11	11-Jan-12
0768	Antenna Standard Gain Horn,18-26.5 GHz, WR-42, 25 dB gain	Quinstar Technology	QWH-4200-BA	110	26-Jan-11	26-Jan-14
1425	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1426, HL1427	Agilent Technologies	8542E	3710A00222, 3705A00204	24-Aug-10	24-Aug-11
1513	Cable RF, 8 m, BNC/BNC	Belden	M17/167 MIL-C-17	1513	01-Sep-10	01-Sep-11
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W	EMC Test Systems	3115	9911-5964	16-Nov-10	16-Nov-11
2387	Filter Bandpass, 8-14 GHz	Hermon Laboratories	FBP8-14	2387	05-Oct-09	05-Oct-11
2871	Microwave Cable Assembly, 18 GHz, 6.4 m, SMA - SMA	Huber-Suhner	198-8155-00	2871	14-Sep-10	14-Sep-11
2888	LISN Two-line V-Network 50 Ohm / 50 uH + 5 Ohm, 16A, MIL STD 461E, CISPR 16-1	Rolf Heine	NNB-2/16Z	02/10018	10-Jul-11	10-Jul-12
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY41444762	08-May-11	08-May-12
2952	Cable, RF, 18 GHz, 1.2 m, SMA-SMA	Gore	10020014	NA	04-Oct-10	04-Oct-11
2953	Cable, RF, 18 GHz, 1.2 m, SMA-SMA	Gore	10020014	NA	04-Oct-10	04-Oct-11
3123	Microwave Cable Assembly, 18 GHz, 5.0 m, SMA - SMA	Huber-Suhner	198-9155-00	3123	09-Jun-11	09-Jun-12
3301	Power Meter, P-series, 50 MHz to 40 GHz	Agilent Technologies	N1911A	MY45101057	13-Dec-10	13-Dec-11
3343	High Pass Filter, 50 Ohm, 2650 to 6500 MHz	Mini-Circuits	VHF-2700+	NA	04-Oct-10	04-Oct-11
3344	High Pass Filter, 50 Ohm, 3400 to 9900 MHz.	Mini-Circuits	VHF-3100+	NA	04-Oct-10	04-Oct-11
3356	Low Pass Filter, 50 Ohm, DC to 1800 MHz.	Mini-Circuits	VLF-1800+	NA	04-Oct-10	04-Oct-11
3455	Medium Power Fixed Coaxial Attenuator DC to 40 GHz, 20 dB, 5 W	Aeroflex / Weinschel	75A-20-12	1182	27-Mar-11	27-Mar-12
3472	Cable, Coax, Microwave, DC-18 GHz, SMA-SMA, 1.0 m	Gore	GORE 65474	1003478	09-May-11	09-May-12
3473	Cable, Coax, Microwave, DC-18 GHz, SMA-SMA, 0.6 m	Gore	GORE 65474	1003478	09-May-11	09-May-12
3531	Amplifier, low noise, 2 to 8 GHz	Quinstar Technology	QLJ-02084040-J0	11159002002	23-Dec-10	23-Dec-11
3535	Amplifier, low noise, 18 to 40 GHz	Quinstar Technology	QLJ-18404537-J0	11159003001	11-Jul-11	11-Jul-12
3612	Cable RF, 17.5 m, N type-N type	Teldor	RG-214/U	NA	01-Dec-10	01-Dec-11
3623	Cable RF, 6.0 m, N type-N type, DC-6.5 GHz	Belden	MIL C-17	NA	19-May-11	19-May-12
3763	Precision Fixed Attenuator, 50 Ohm, 5 W, 20 dB, DC to 18 GHz	Mini-Circuits	BW-S20W5+	NA	07-Dec-10	07-Dec-11
3773	Attenuator, N-type, 10 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW-N10W5+	NA	31-Aug-10	31-Aug-11

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal./ Check	Due Cal./ Check
3785	Precision Fixed Attenuator, 50 Ohm, 5 W, 10 dB, DC to 18 GHz	Mini-Circuits	BW-S10W5+	NA	07-Dec-10	07-Dec-11
3818	PSA Series Spectrum Analyzer, 3 Hz- 44 GHz	Agilent Technologies	E4446A	MY48250288	25-Sep-09	25-Sep-11
3868	Directional coupler, 2 GHz to 8 GHz, 10 dB, SMA Female	Narda	4203-10	06978	13-Dec-10	13-Dec-12
3902	Microwave Cable Assembly, 40.0 GHz, 1.5 m, SMA/SMA	Huber-Suhner	SUCOFLEX 102A	1227/2A	07-Feb-11	07-Feb-12
3903	Microwave Cable Assembly, 40.0 GHz, 1.5 m, SMA/SMA	Huber-Suhner	SUCOFLEX 102A	1226/2A	07-Feb-11	07-Feb-12
3993	Attenuator, N-type, 10 dB, DC to 18 GHz, 5 W	Mini-Circuits	BW-N10W5+	NA	01-Jan-11	01-Jan-12

10 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Transmitter tests	
Carrier power conducted at antenna connector	± 1.7 dB
Carrier power radiated (substitution method)	± 4.5 dB
Occupied bandwidth	±8%
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
Spurious emissions radiated 30 MHz – 40 GHz (substitution method)	± 4.5 dB
Frequency error	30 – 300 MHz: ± 50.5 Hz (1.68 ppm) 300 – 1000 MHz: ± 168 Hz (0.56 ppm)
Spectral power density	± 2.6 dB
Frequency range	± 0.49 ppm

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

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

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

11 APPENDIX C Test laboratory description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, safety, environmental and telecommunication testing facility.
Hermon Laboratories is listed by the Federal Communications Commission (USA) for all parts of Code of Federal Regulations 47 (CFR 47), Registration Numbers 90624 for OATS and 90623 for the anechoic chamber; by Industry Canada for electromagnetic emissions (file numbers IC 2186A-1 for OATS, IC 2186A-2 for anechoic chamber, IC 2186A-3 for full-anechoic chamber for RE measurements above 1 GHz), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, G-27 for full-anechoic chamber for RE measurements above 1 GHz, C-845 for conducted emissions site, T-1606 for conducted emissions at telecommunication ports), has a status of a Telefication - Listed Testing Laboratory, Certificate No. L138/00. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing and environmental simulation (for exact scope please refer to Certificate No. 839.01). The FCC Designation Number is US1003.

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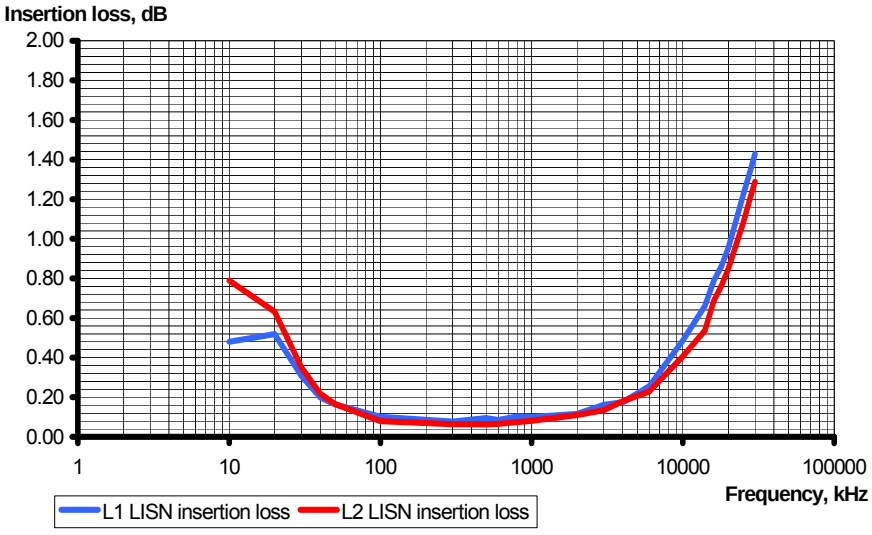
12 APPENDIX D Specification references

FCC 47CFR part 15: 2010	Radio Frequency Devices
Public notice DA 00- 705: 2000	Filing and measurement guidelines for frequency hopping spread spectrum systems.
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications
ANSI C63.4: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

13 APPENDIX E Test equipment correction factors

Correction factor
Line impedance stabilization network
Model NNB-2/16Z, Rolf Heine, HL 2888

Frequency, kHz	Insertion loss,dB		Measurement Uncertainty, dB
	L1	N	
10	0.48	0.79	±0.6
20	0.52	0.63	
30	0.31	0.35	
40	0.20	0.22	
50	0.16	0.17	
100	0.10	0.08	
300	0.08	0.06	
500	0.10	0.06	
600	0.09	0.07	
800	0.10	0.07	
1000	0.10	0.08	
2000	0.12	0.11	
3000	0.16	0.14	
4000	0.17	0.18	
6000	0.26	0.23	
10000	0.49	0.41	
14000	0.66	0.54	
16000	0.79	0.69	
18000	0.86	0.76	
20000	0.96	0.85	
25000	1.22	1.08	
28000	1.35	1.21	
30000	1.43	1.29	



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

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

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

Antenna factor
Standard gain horn antenna
Quinstar Technology
Model QWH
Ser.No.110, HL 0768

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
Ser.No.1011, HL 0604

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

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

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

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

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

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

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

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

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

Cable loss
Cable coaxial, Gore, 25.5 GHz, 1.2 m, SMA-SMA, S/N 10020014
HL 2953

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.06	8750	1.28	18000	1.84
30	0.06	9000	1.30	18250	1.91
100	0.12	9250	1.35	18500	1.94
250	0.19	9500	1.34	18750	1.92
500	0.27	9750	1.36	19000	1.95
750	0.34	10000	1.33	19250	2.00
1000	0.40	10250	1.38	19500	1.96
1250	0.45	10500	1.39	19750	2.02
1500	0.50	10750	1.39	20000	1.92
1750	0.54	11000	1.43	20250	2.04
2000	0.57	11250	1.42	20500	2.00
2250	0.60	11500	1.48	20750	2.09
2500	0.64	11750	1.49	21000	2.01
2750	0.67	12000	1.59	21250	2.07
3000	0.70	12250	1.50	21500	2.20
3250	0.74	12500	1.55	21750	2.10
3500	0.76	12750	1.55	22000	2.24
3750	0.80	13000	1.61	22250	2.25
4000	0.83	13250	1.62	22500	2.12
4250	0.85	13500	1.56	22750	2.05
4500	0.87	13750	1.61	23000	2.10
4750	0.91	14000	1.57	23250	2.03
5000	0.92	14250	1.66	23500	2.08
5250	0.96	14500	1.58	23750	2.14
5500	0.99	14750	1.69	24000	2.16
5750	0.99	15000	1.71	24250	2.25
6000	1.03	15250	1.74	24500	2.17
6250	1.05	15500	1.75	24750	2.32
6500	1.07	15750	1.72	25000	2.32
6750	1.08	16000	1.89	25250	2.32
7000	1.12	16250	1.79	25500	2.41
7250	1.13	16500	1.84	25750	2.31
7500	1.15	16750	1.82	26000	2.28
7750	1.20	17000	1.79	26250	2.32
8000	1.20	17250	1.78	26500	2.29
8250	1.23	17500	1.85		
8500	1.27	17750	1.83		

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

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.11	3600	1.97	7400	3.12	11200	3.90	15100	4.74
30	0.17	3700	1.97	7500	3.13	11300	3.93	15200	4.70
50	0.25	3800	2.03	7600	3.16	11400	3.88	15300	4.73
100	0.32	3900	2.04	7700	3.18	11500	3.87	15400	4.78
200	0.46	4000	2.10	7800	3.20	11600	3.90	15500	4.75
300	0.58	4100	1.97	7900	3.23	11700	3.86	15600	4.76
400	0.65	4200	1.97	8000	3.25	11800	3.88	15700	4.75
500	0.74	4300	2.03	8100	3.26	11900	3.86	15800	4.78
600	0.82	4400	2.04	8200	3.28	12000	3.89	15900	4.79
700	0.89	4500	2.10	8300	3.31	12100	3.94	16000	4.73
800	0.95	4600	1.97	8400	3.31	12200	3.92	16100	4.78
900	1.01	4700	1.97	8500	3.32	12300	3.96	16200	4.84
1000	1.07	4800	2.03	8600	3.34	12400	4.01	16300	4.90
1100	1.11	4900	2.04	8700	3.35	12500	4.07	16400	4.87
1200	1.17	5000	2.10	8800	3.37	12600	4.08	16500	4.90
1300	1.22	5100	2.53	8900	3.39	12700	4.17	16600	4.98
1400	1.27	5200	2.55	9000	3.42	12800	4.26	16700	5.05
1500	1.29	5300	2.60	9100	3.43	12900	4.16	16800	5.04
1600	1.35	5400	2.61	9200	3.51	13000	4.21	16900	5.02
1700	1.40	5500	2.64	9300	3.52	13100	4.24	17000	5.09
1800	1.44	5600	2.70	9400	3.54	13200	4.27	17100	5.07
1900	1.51	5700	2.67	9500	3.63	13300	4.31	17200	5.10
2000	1.49	5800	2.71	9600	3.61	13400	4.33	17300	5.13
2100	1.55	5900	2.74	9700	3.71	13500	4.25	17400	5.23
2200	1.58	6000	2.80	9800	3.66	13600	4.27	17500	5.21
2300	1.62	6100	2.79	9900	3.77	13700	4.33	17600	5.22
2400	1.72	6200	2.81	10000	3.75	13800	4.33	17700	5.36
2500	1.76	6300	2.83	10100	3.77	13900	4.31	17800	5.35
2600	1.78	6400	2.86	10200	3.80	14000	4.30	17900	5.45
2700	1.80	6500	2.88	10300	3.79	14100	4.30	18000	5.43
2800	1.86	6600	2.90	10400	3.87	14200	4.31		
2900	1.90	6700	2.92	10500	3.83	14300	4.37		
3000	1.90	6800	2.98	10600	3.88	14400	4.35		
3100	1.97	6900	2.98	10700	3.86	14600	4.53		
3200	1.97	7000	3.00	10800	3.87	14700	4.50		
3300	2.03	7100	3.02	10900	3.90	14800	4.62		
3400	2.04	7200	3.04	11000	3.84	14900	4.65		
3500	2.10	7300	3.06	11100	3.88	15000	4.79		

Cable loss
Cable coaxial, Microwave, SMA-SMA, 18 GHz, 1.0 m
Gore, HL 3472

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.01	5000	0.47	10200	0.72	15500	0.75
30	0.03	5100	0.47	10300	0.67	15600	0.89
50	0.04	5200	0.47	10400	0.77	15700	0.82
100	0.04	5300	0.47	10500	0.67	15800	0.89
200	0.08	5400	0.49	10600	0.74	15900	0.89
300	0.11	5500	0.48	10700	0.81	16000	0.93
400	0.11	5600	0.49	10800	0.77	16100	0.90
500	0.12	5700	0.49	10900	0.82	16200	0.92
600	0.14	5800	0.51	11000	0.86	16300	0.90
700	0.15	5900	0.50	11100	0.78	16400	0.94
800	0.16	6000	0.51	11200	0.82	16500	0.93
900	0.18	6100	0.53	11300	0.77	16600	0.95
1000	0.17 620	0	0.52	11400	0.84	16700	0.98
1100	0.19 630	0	0.53	11500	0.74	16800	1.00
1200	0.22 640	0	0.54	11600	0.81	16900	0.94
1300	0.21 650	0	0.55	11700	0.73	17000	1.00
1400	0.22 660	0	0.54	11800	0.75	17100	0.93
1500	0.23 670	0	0.57	11900	0.73	17200	1.00
1600	0.24 680	0	0.54	12000	0.75	17300	0.93
1700	0.24 690	0	0.58	12100	0.66	17400	0.93
1800	0.25 700	0	0.58	12200	0.66	17500	0.96
1900	0.26 710	0	0.58	12300	0.72	17600	0.94
2000	0.28 720	0	0.61	12400	0.64	17700	0.99
2100	0.27 730	0	0.59	12500	0.75	17800	0.97
2200	0.29 740	0	0.55	12600	0.67	17900	0.90
2300	0.29 750	0	0.63	12700	0.75	18000	0.78
2400	0.30 760	0	0.60	12800	0.66		
2500	0.30 770	0	0.61	12900	0.81		
2600	0.32 780	0	0.64	13000	0.75		
2700	0.32 790	0	0.60	13100	0.80		
2800	0.33 800	0	0.58	13200	0.80		
2900	0.34 810	0	0.61	13300	0.81		
3000	0.34 820	0	0.62	13400	0.88		
3100	0.35 830	0	0.62	13500	0.82		
3200	0.35 840	0	0.68	13600	1.00		
3300	0.36 850	0	0.63	13700	0.93		
3400	0.37 860	0	0.61	13800	0.86		
3500	0.38 870	0	0.63	13900	0.84		
3600	0.38 880	0	0.62	14000	1.00		
3700	0.40 890	0	0.64	14100	0.86		
3800	0.40 900	0	0.62	14200	0.98		
3900	0.40 910	0	0.64	14300	0.99		
4000	0.40 920	0	0.62	14400	0.82		
4100	0.43 930	0	0.62	14600	0.89		
4200	0.43 940	0	0.62	14700	0.84		
4300	0.43 950	0	0.63	14800	0.90		
4400	0.44 960	0	0.64	14900	0.89		
4500	0.45 970	0	0.60	15000	0.89		
4600	0.45 980	0	0.65	15100	0.86		
4700	0.46 990	0	0.60	15200	0.87		
4800	0.46	10000	0.67	15300	0.86		
4900	0.46	10100	0.69	15400	0.87		

Cable loss
Cable coaxial, Microwave, SMA-SMA, 18 GHz, 0.6 m
Gore, HL 3473

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.01	5000	0.48	10200	0.72	15500	0.85
30	0.03	5100	0.48	10300	0.70	15600	0.93
50	0.04	5200	0.48	10400	0.75	15700	0.87
100	0.04	5300	0.48	10500	0.68	15800	0.88
200	0.08	5400	0.50	10600	0.77	15900	0.94
300	0.11	5500	0.48	10700	0.80	16000	0.94
400	0.12	5600	0.50	10800	0.77	16100	0.99
500	0.13	5700	0.50	10900	0.85	16200	0.96
600	0.15	5800	0.52	11000	0.83	16300	0.96
700	0.15	5900	0.51	11100	0.79	16400	0.94
800	0.17	6000	0.52	11200	0.82	16500	0.94
900	0.19	6100	0.54	11300	0.79	16600	1.03
1000	0.18 620	0	0.53	11400	0.81	16700	1.04
1100	0.20 630	0	0.54	11500	0.76	16800	1.07
1200	0.22 640	0	0.55	11600	0.78	16900	0.94
1300	0.22 650	0	0.56	11700	0.74	17000	1.05
1400	0.23 660	0	0.56	11800	0.76	17100	0.96
1500	0.24 670	0	0.60	11900	0.79	17200	1.07
1600	0.25 680	0	0.55	12000	0.74	17300	0.98
1700	0.25 690	0	0.60	12100	0.69	17400	1.16
1800	0.26 700	0	0.59	12200	0.69	17500	1.05
1900	0.27 710	0	0.60	12300	0.75	17600	1.13
2000	0.29 720	0	0.61	12400	0.66	17700	1.05
2100	0.28 730	0	0.60	12500	0.76	17800	1.22
2200	0.30 740	0	0.57	12600	0.70	17900	1.02
2300	0.30 750	0	0.63	12700	0.77	18000	1.04
2400	0.31 760	0	0.60	12800	0.69		
2500	0.31 770	0	0.63	12900	0.79		
2600	0.33 780	0	0.66	13000	0.81		
2700	0.33 790	0	0.61	13100	0.83		
2800	0.35 800	0	0.58	13200	0.80		
2900	0.35 810	0	0.62	13300	0.82		
3000	0.35 820	0	0.62	13400	0.90		
3100	0.35 830	0	0.63	13500	0.85		
3200	0.36 840	0	0.67	13600	1.04		
3300	0.38 850	0	0.63	13700	0.93		
3400	0.38 860	0	0.61	13800	0.91		
3500	0.40 870	0	0.64	13900	0.89		
3600	0.40 880	0	0.62	14000	0.96		
3700	0.40 890	0	0.64	14100	0.88		
3800	0.41 900	0	0.64	14200	1.01		
3900	0.41 910	0	0.64	14300	0.99		
4000	0.41 920	0	0.63	14400	0.83		
4100	0.45 930	0	0.63	14600	0.88		
4200	0.43 940	0	0.63	14700	0.91		
4300	0.46 950	0	0.64	14800	0.91		
4400	0.44 960	0	0.65	14900	0.88		
4500	0.47 970	0	0.62	15000	0.89		
4600	0.46 980	0	0.66	15100	0.91		
4700	0.47 990	0	0.61	15200	0.88		
4800	0.47	10000	0.70	15300	0.94		
4900	0.48	10100	0.70	15400	0.91		

Cable loss
Cable coaxial, RG-214/U, N type-N type, 17 m
Teldor, HL 3612

Frequency, MHz	Cable loss, dB
0.1	0.05
0.5	0.07
1	0.10
3	0.22
5	0.29
10	0.39
30	0.68
50	0.90
100	1.27
150	1.58
200	1.80
250	2.12
300	2.36
350	2.60
400	2.82
450	2.99
500	3.23
550	3.40
600	3.56
650	3.71
700	3.90
750	4.04
800	4.23
850	4.39
900	4.55
950	4.65
1000	4.79

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

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

Cable loss
Microwave Cable Assembly, Huber-Suhner, 40 GHz, 1.5 m, SMA-SMA, S/N 1227/2A
HL 3902

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	-0.02	9500	1.84	21000	2.93
100	0.15	10000	1.86	22000	3.04
500	0.38	10500	1.93	23000	3.08
1000	0.56	11000	1.99	24000	3.18
1500	0.69	11500	2.04	25000	3.23
2000	0.82	12000	2.10	26000	3.34
2500	0.90	12500	2.15	27000	3.39
3000	0.98	13000	2.21	28000	3.49
3500	1.06	13500	2.25	29000	3.55
4000	1.11	14000	2.29	30000	3.64
4500	1.17	14500	2.34	31000	3.68
5000	1.24	15000	2.36	32000	3.77
5500	1.32	15500	2.40	33000	3.87
6000	1.40	16000	2.45	34000	3.93
6500	1.50	16500	2.48	35000	3.89
7000	1.56	17000	2.56	36000	4.00
7500	1.62	17500	2.58	37000	4.15
8000	1.68	18000	2.60	38000	4.20
8500	1.74	19000	2.80	39000	4.25
9000	1.78	20000	2.85	40000	4.32

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

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

14 APPENDIX F Abbreviations and acronyms

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

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