CKC LABORATORIES, INC. Testing the Future

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EMC/SAFETY

ADDENDUM TO WATCHGUARD TECHNOLOGIES INC. TEST REPORT FC04-065

FOR THE

FIREBOX X EDGE, MF16S32E9W

FCC PART 15 SUBPART C SECTIONS 15.207, 15.209 AND15.247 AND RSS-210

COMPLIANCE

DATE OF ISSUE: OCTOBER 8, 2004

PREPARED FOR:

Watchguard Technologies Inc.
505 Fifth avenue South, Suite 500
Seattle, WA 98104-3892

PREPARED BY:

Mary Ellen Clayton
CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

P.O. No.: 241145
W.O. No.: 82546

Date of test: August 17-25, 2004

Report No.: FC04-065A

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ADMINISTRATIVE INFORMATION

DATE OF TEST:	August 17-25, 2004
DATE OF RECEIPT:	August 17, 2004
PURPOSE OF TEST:	To demonstrate the compliance of the Firebox X Edge, MF16S32E9W, with the requirements for FCC Part 15 Subpart C Sections 15.207, 15.209 and 15.247 and RSS-210 devices. **Addendum A** is to revise the data in Table 3.
TEST METHOD:	ANSI C63.4 (2001) and RSS-212
MANUFACTURER:	Sercomm Corporation 10F, No 19-13, San-chung Road, Nan Kang Taipei, Taiwan, R.O.C.
REPRESENTATIVE:	George Stults
TEST LOCATION:	CKC Laboratories, Inc. 480 Los Viboras Road Hollister, CA 95023

SUMMARY OF RESULTS

As received, the Watchguard Technologies Inc. Firebox X Edge, MF16S32E9W was found to be fully compliant with the following standards and specifications:

Canadian Standard	Canadian Section	FCC Standard	FCC Section	Test Description
RSS 210	5.5	47CFR	15.203	Antenna Connector Requirements
RSS 210	6.2.1	47CFR	15.209	General Radiated Emissions Requirement
RSS 210	6.3	47CFR	15.205	Restricted Bands of Operation
RSS 210	6.4	47CFR	15.215(c)	Frequency Stability Recommendation
RSS 210	6.5	47CFR	15.35(c)	Pulsed Operation
RSS 210	6.6	47CFR	15.207	AC Mains Conducted Emissions Requirement
RSS 210	6.2.2(o)(b)	47CFR	15.247(d)	Peak Power Spectral Density
RSS 210	6.2.2(o)(b)	47CFR	15.247(b)(3)	RF Power Output
RSS 210	6.2.2(o)(b)	47CFR	15.247(a)(2)	Minimum 6dB Bandwidth
RSS 210	6.2.2(o)(e1)	47CFR	15.247(c)	Spurious Emissions
	IC 3171-B		90479	Site File No.

CONDITIONS FOR COMPLIANCE
No modifications to the EUT were necessary to comply.

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:

Joyce Walker, Quality Assurance Administrative Manager

TEST PERSONNEL:

Matthew Pettersen, EMC Test Engineer

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The EUT tested by CKC Laboratories was a production unit.

FCC 15.31(e) Voltage Variations

Channel	FREQUENCY MHz	CORRECTED READING dBµV/m 85%	CORRECTED READING dBµV/m 100%	CORRECTED READING dBµV/m 115%	SPEC LIMIT dBµV/m
1	2410	117.6	117.6	117.8	137.0
6	2436	117.9	117.9	117.8	137.0
11	2460	118.8	118.6	118.9	137.0

FCC 15.31(m) Number Of Channels

This device was tested on three channels.

FCC 15.33(a) Frequency Ranges Tested

15.207 Conducted Emissions: 150 kHz – 30 MHz
15.209/15.247 Radiated Emissions: 30 MHz – 25 GHz

FCC SECTION 15.35: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	25 GHz	1 MHz

FCC 15.203 Antenna Requirements

The antenna is a removable with a reverse sex SMA connector which is unique; therefore the EUT complies with Section 15.203 of the FCC rules.

FCC 15.205 Restricted Bands

The fundamental operating frequency lies outside the restricted bands and therefore complies with the requirements of Section 15.205 of the FCC rules. Any spurious emission coming from the EUT was investigated to determine if any portion lies inside the restricted band. If any portion of a spurious emissions signal was found to be within a restricted band, investigation was performed to ensure compliance with Section 15.209.

Eut Operating Frequency
The EUT was operating at 2.4 – 2.483.5 GHz.

EQUIPMENT UNDER TEST

Wireless Internet Firewall and VPN Encryption
Manuf: Watchguard Technologies Inc.
Model: MF16S32E9W
Serial: 001
FCC ID: Q6G-MF16S32E9W (pending)

Power Supply
Manuf: Watchguard Technologies Inc.
Model: MW48 1201200
Serial: NA
FCC ID: NA

Switching AC Adapter
Manuf: Watchguard Technologies Inc.
Model: GT-21089-1512-T2
Serial: 00363129/03
FCC ID: NA

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Wireless USB Adapter
Manuf: D-Link
Model: DWL-G120
Serial: BN6G241012624
FCC ID: KA2DWLG120B1

Laptop
Manuf: Toshiba
Model: Tecra 8100 PT810U
Serial: 60748626U
FCC ID: DoC

REPORT OF MEASUREMENTS

The following tables report the six highest worst case levels recorded during the tests performed on the EUT. All readings taken are peak readings unless otherwise noted. The data sheets from which these tables were compiled are contained in Appendix C.

Table 1: FCC 15.207 Six Highest Conducted Emission Levels

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Lisn dB		Cable dB	dB	CORRECTED READING dBµV	SPEC LIMIT dBµV	MARGIN dB	NOTES
0.881253	42.5	0.1		0.2		42.8	46.0	-3.2	W-A
0.898265	41.9	0.0		0.2		42.1	46.0	-3.9	B-A
1.110915	42.7	0.0		0.2		42.9	46.0	-3.1	B-S
1.115168	42.6	0.1		0.2		42.9	46.0	-3.1	W-S
1.876455	40.0	0.1		0.3		40.4	46.0	-5.6	B-S
18.238100	43.8	0.3		0.7		44.8	50.0	-5.2	B-S

Test Method: ANSI C63.4 (2001)
Spec Limit: FCC Part 15 Subpart C Section 15.207

NOTES: B = Black Lead
W = White Lead
A = Power Supply
S = Switching Power Supply

COMMENTS: The EUT is a wireless internet firewall and VPN encryption device. The EUT is connected to two support PCs, which are located underneath the turntable, via 10 unshielded RJ45 cables. The support PCs are pinging the EUT and the EUT is returning the ping. In order for the EUT is receive and return the ping and exercise the digital circuitry properly, the EUT must be in non-continuous transmit normal operating mode. The EUT has continuous transmit disabled and the EUT is continuously searching for the best data rate connection speed. The EUT is also connected to a laptop via a serial link cable. The laptop controls command and setup functions for the EUT. A wireless USB adapter is connected to the laptop and is continuously monitoring the data rate and connection speed that the EUT is transmitting. The EUT was operating in 802.11g mode and adaptively transmitting OFDM or CCK or PSK depending on conditions, between 54 Mbps and 1 Mbps on channel 6. The EUT was operating in 802.11g mode and adaptively transmitting OFDM or CCK or PSK depending on conditions, between 54 Mbps and 1 Mbps. At the time of testing, the EUT was found to be consistently transmitting CCK at 11Mbps on the channel indicated in each reading. Channels 1, 6 & 11 were investigated. Antennas are connected to both antenna ports of the EUT. The temperature is 71°F and the relative humidity is 43%. The EUT transmits and receives with the same antenna and uses antenna diversity to switch to the best antenna to acquire the fastest and best connection. The EUT cannot receive only and does not have a dedicated receive only port. AC Line Conducted emissions. Frequency range investigated 150kHz - 30MHz.

Table 2: FCC 15.209/15.247 Six Highest Radiated Emission Levels: 30 MHz – 25 GHz

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN DB	NOTES
56.201	55.9	7.6	-26.6	1.1		38.0	40.0	-2.0	VQ
124.992	53.2	11.5	-26.4	1.8		40.1	43.5	-3.4	VQ
149.976	51.4	12.1	-26.3	1.9		39.1	43.5	-4.4	V
666.628	46.8	20.2	-27.7	3.9		43.2	46.0	-2.8	V
666.636	45.7	20.2	-27.7	3.9		42.1	46.0	-3.9	V
2165.233	53.3	27.6	-38.3	7.3		49.9	54.0	-4.1	V

Test Method: ANSI C63.4 (2001)
Spec Limit: FCC Part 15 Subpart C Sections 15.209/15.247
Test Distance: 3 Meters

NOTES: Q = Quasi Peak Reading
V = Vertical Polarization

COMMENTS: The EUT is a wireless internet firewall and VPN encryption device. The EUT is connected to two support PCs, which are located underneath the turntable, via 10 unshielded RJ45 cables. The support PCs are pinging the EUT and the EUT is returning the ping. In order for the EUT is receive and return the ping and exercise the digital circuitry properly, the EUT must be in non-continuous transmit normal operating mode. The EUT has continuous transmit disabled and the EUT is continuously searching for the best data rate connection speed. The EUT is also connected to a laptop via a serial link cable. The laptop controls command and setup functions for the EUT. A wireless USB adapter is connected to the laptop and is continuously monitoring the data rate and connection speed that the EUT is transmitting. The EUT was operating in 802.11g mode and adaptively transmitting OFDM or CCK or PSK depending on conditions, between 54 Mbps and 1 Mbps. At the time of testing, the EUT was found to be consistently transmitting CCK at 11Mbps on the channel indicated in each reading. Channels 1, 6 & 11 were investigated. Antennas are connected to both antenna ports of the EUT. The temperature is 71°F and the relative humidity is 43%. The EUT transmits and receives with the same antenna and uses antenna diversity to switch to the best antenna to acquire the fastest and best connection. The EUT cannot receive only and does not have a dedicated receive only port. Frequency range investigated was 30 MHz to 25GHz.

Table 3: FCC 15.209/15.247 Six Highest Radiated Emission Levels: 2.4 – 25 GHz

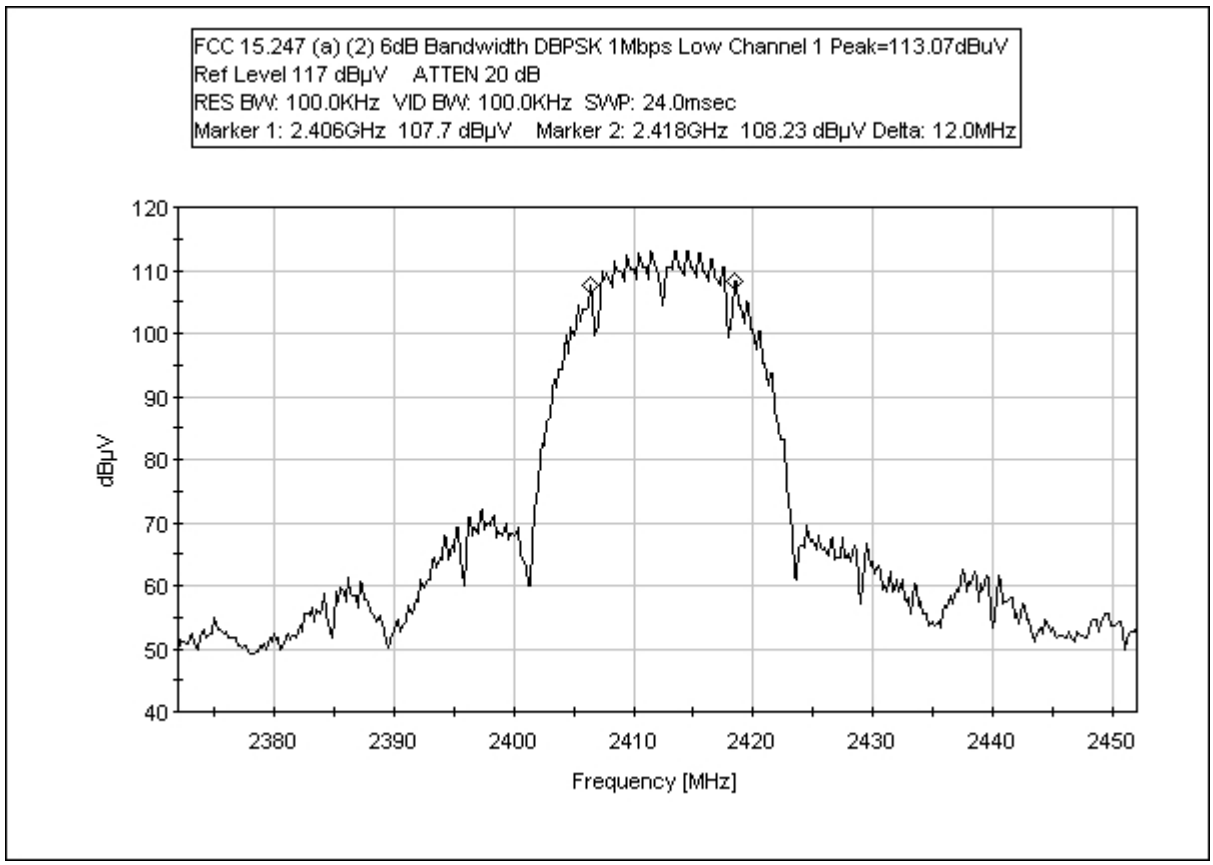
FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	Dist dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN DB	NOTES
4823.958	38.3	33.0	-37.3	12.3	10.0	56.3	93.8	-37.5	HA
4874.500	37.7	33.1	-37.3	12.4	10.0	55.9	93.8	-37.9	HA
4924.050	35.2	33.2	-37.2	12.5	10.0	53.7	93.8	-40.1	VA
4924.300	38.5	33.2	-37.2	12.5	10.0	57.0	93.8	-36.8	HA
7236.200	31.6	34.5	-37.1	16.5	10.0	55.5	93.8	-38.3	H
7254.750	32.5	34.6	-37.2	16.5	10.0	56.4	93.8	-37.4	V

Test Method: ANSI C63.4 (2001)
Spec Limit: FCC Part 15 Subpart C Sections 15.209/15.247(c)
Test Distance: 3 Meters

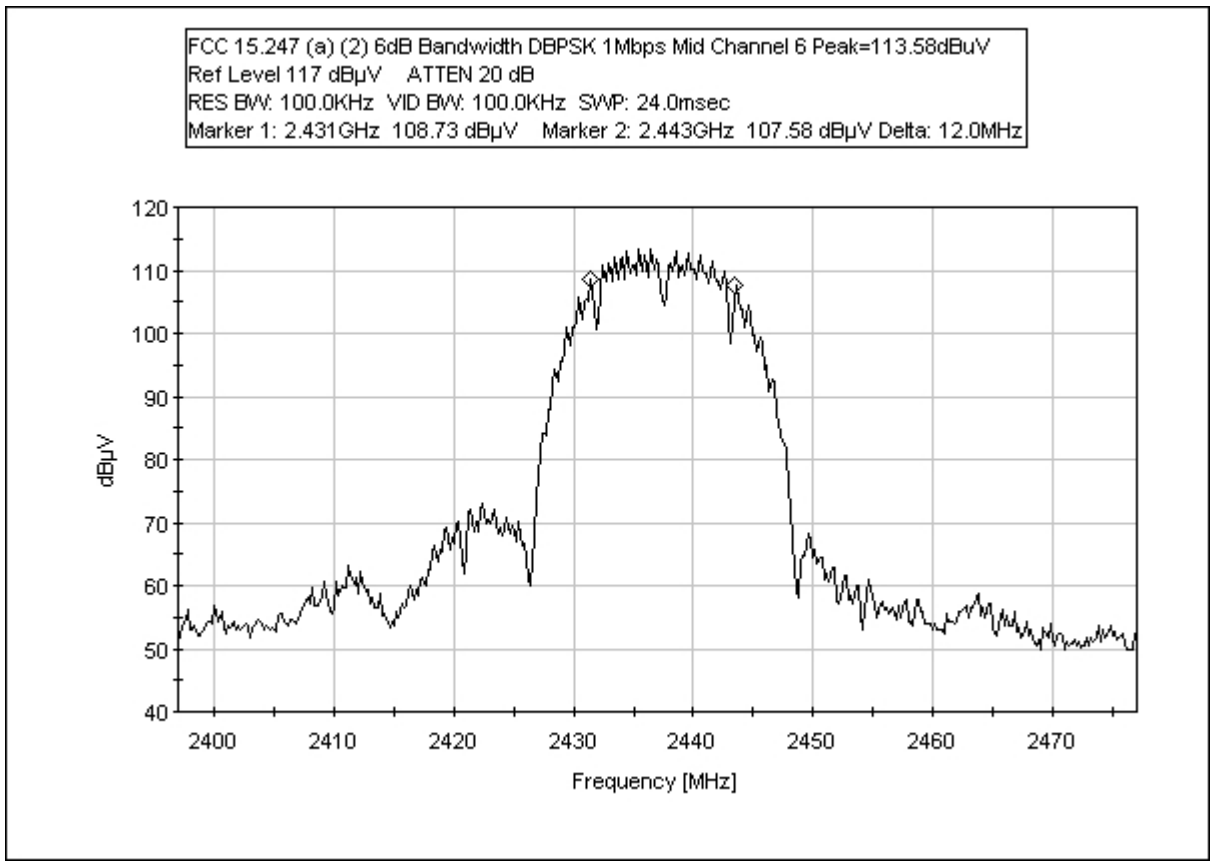
NOTES: H = Horizontal Polarization
V = Vertical Polarization
A = Average Reading

COMMENTS: The EUT is a wireless internet firewall and VPN encryption device. The EUT is connected to two support PCs, which are located underneath the turntable, via 10 unshielded RJ45 cables. The support PCs are pinging the EUT and the EUT is returning the ping. In order for the EUT is receive and return the ping and exercise the digital circuitry properly, the EUT must be in non-continuous transmit normal operating mode. The EUT has continuous transmit disabled and the EUT is continuously searching for the best data rate connection speed. The EUT is also connected to a laptop via a serial link cable. The laptop controls command and setup functions for the EUT. A wireless USB adapter is connected to the laptop and is continuously monitoring the data rate and connection speed that the EUT is transmitting. The EUT was operating in 802.11g mode and adaptively transmitting OFDM or CCK or PSK depending on conditions, between 54 Mbps and 1 Mbps. At the time of testing, the EUT was found to be consistently transmitting CCK at 11Mbps on the channel indicated in each reading. Channels 1, 6 & 11 were investigated. Antennas are connected to both antenna ports of the EUT. The temperature is 71°F and the relative humidity is 43%. The EUT transmits and receives with the same antenna and uses antenna diversity to switch to the best antenna to acquire the fastest and best connection. The EUT cannot receive only and does not have a dedicated receive only port. Radiated TX Spurious. Frequency range investigated was 2.4GHz to 25GHz.

FCC 15.247(a)(2) 6dB Bandwidth DBPSK 1 Mbps Low Channel



FCC 15.247(a)(2) 6dB Bandwidth DBPSK 1 Mbps Mid Channel



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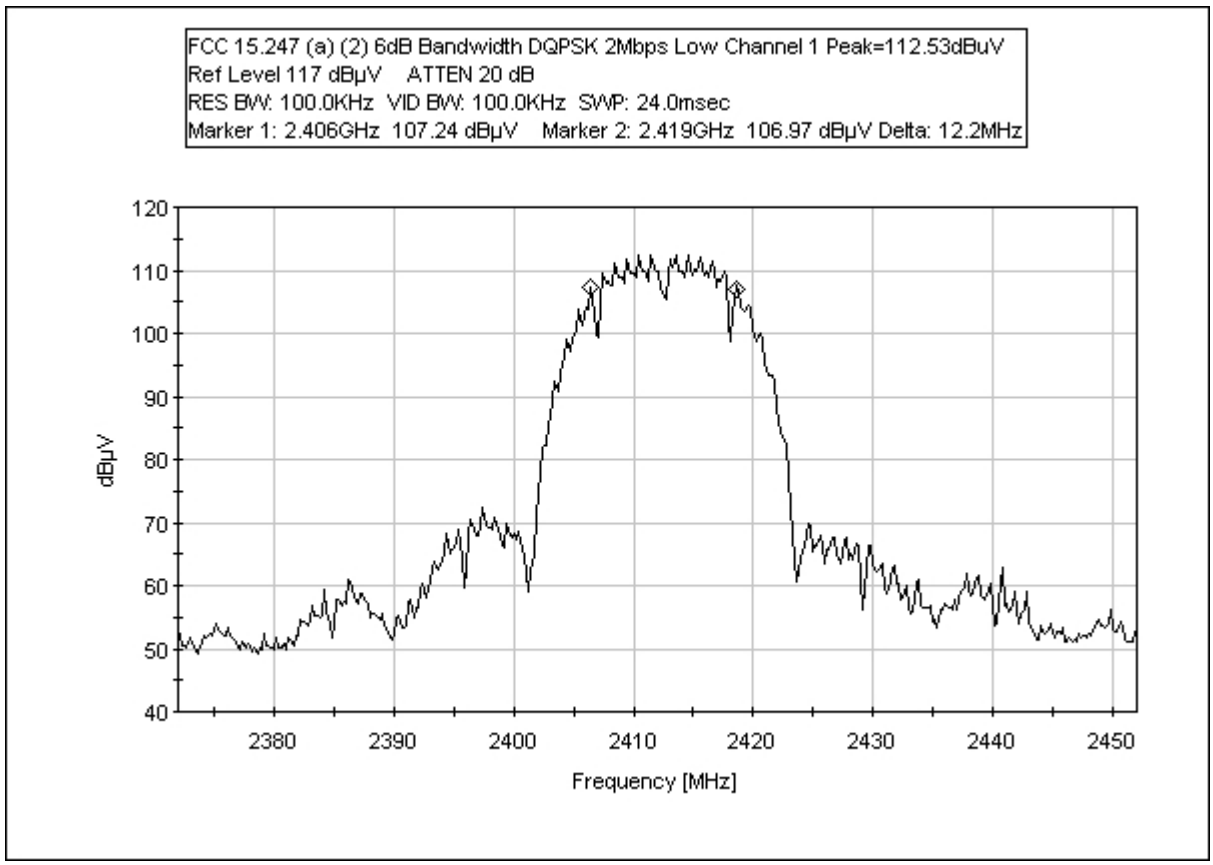

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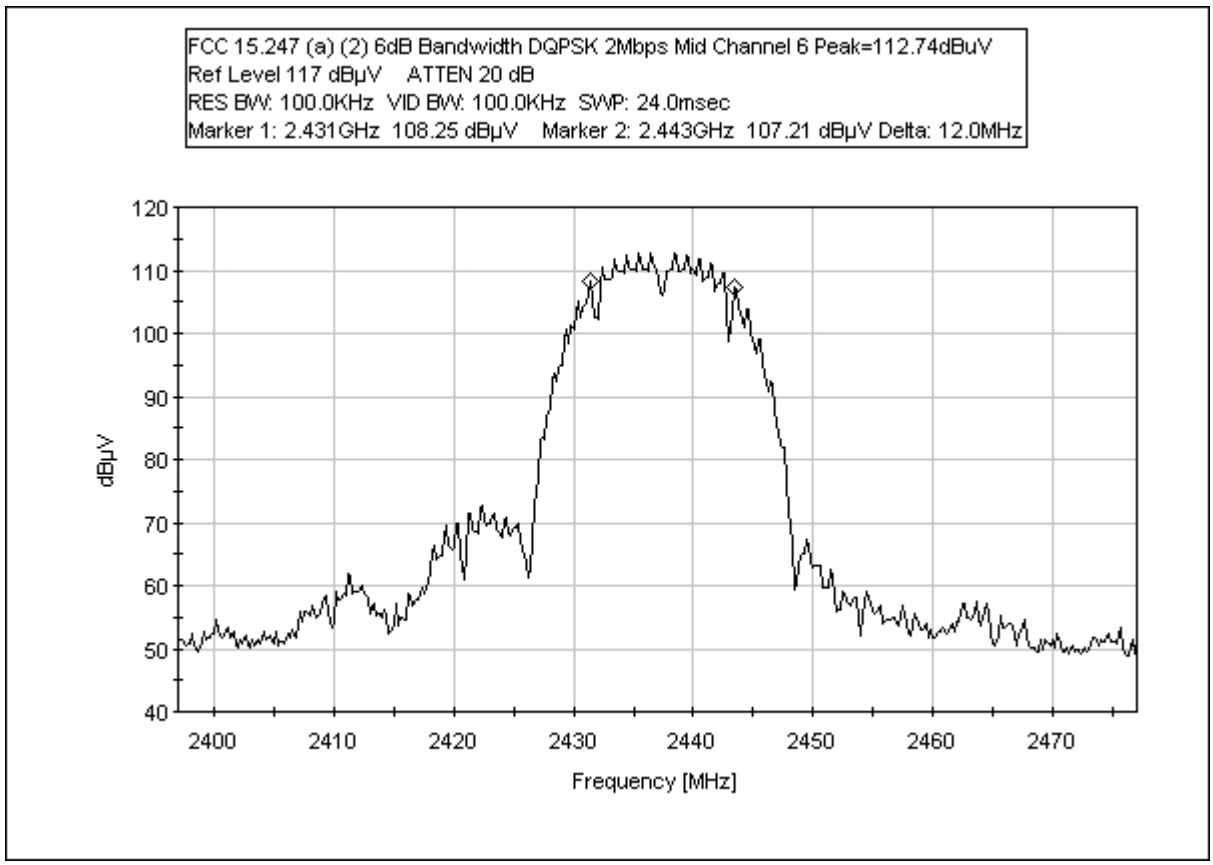
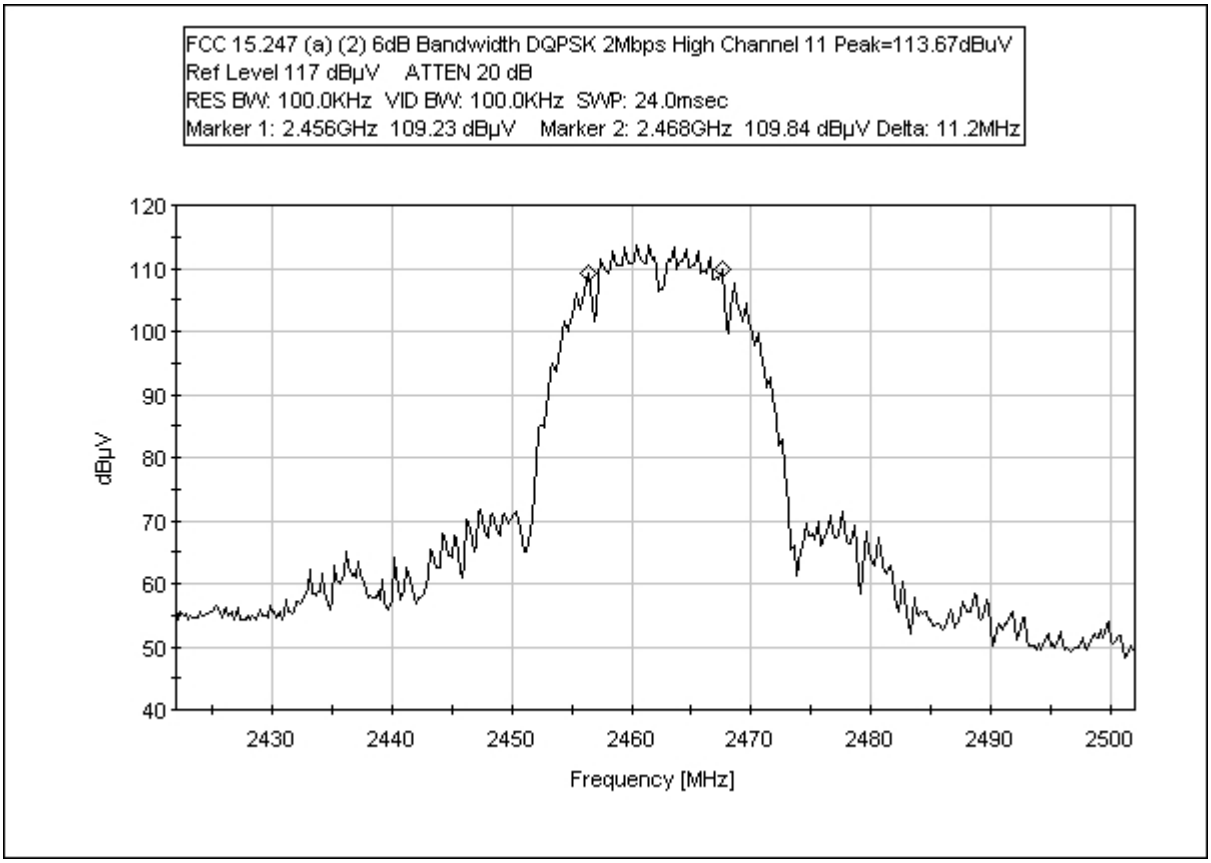


FCC 15.247(a)(2) 6dB Bandwidth DQPSK 2 Mbps High Channel



Peak Power Output Antenna Conducted 15.247(b)(3)

Frequency (MHz)	Power Meter Reading (dBm)	Attenuation (dB)	Corrected Peak Power Output (dBm)	Modulation Type	Date Transfer rate	Channel
2412	9.39	8.16	17.55	DBPSK	1Mbps	1
2437	8.42	8.16	16.58	DBPSK	1Mbps	6
2462	8.35	8.16	16.51	DBPSK	1Mbps	11
2472	8.50	8.16	16.66	DBPSK	1Mbps	13
2412	8.58	8.16	16.74	DQPSK	2Mbps	1
2437	8.49	8.16	16.65	DQPSK	2Mbps	6
2462	9.14	8.16	17.3	DQPSK	2Mbps	11
2472	8.52	8.16	16.68	DQPSK	2Mbps	13
2412	8.24	8.16	16.4	CCK	11Mbps	1
2437	8.53	8.16	16.69	CCK	11Mbps	6
2462	8.50	8.16	16.66	CCK	11Mbps	11
2472	8.55	8.16	16.71	CCK	11Mbps	13
2412	6.12	8.16	14.28	OFDM	36Mbps	1
2437	6.01	8.16	14.17	OFDM	36Mbps	6
2462	6.40	8.16	14.56	OFDM	36Mbps	11
2472	6.20	8.16	14.36	OFDM	36Mbps	13
2412	4.55	8.16	12.71	OFDM	54Mbps	1
2437	4.94	8.16	13.1	OFDM	54Mbps	6
2462	4.88	8.16	13.04	OFDM	54Mbps	11
2472	4.84	8.16	13	OFDM	54Mbps	13

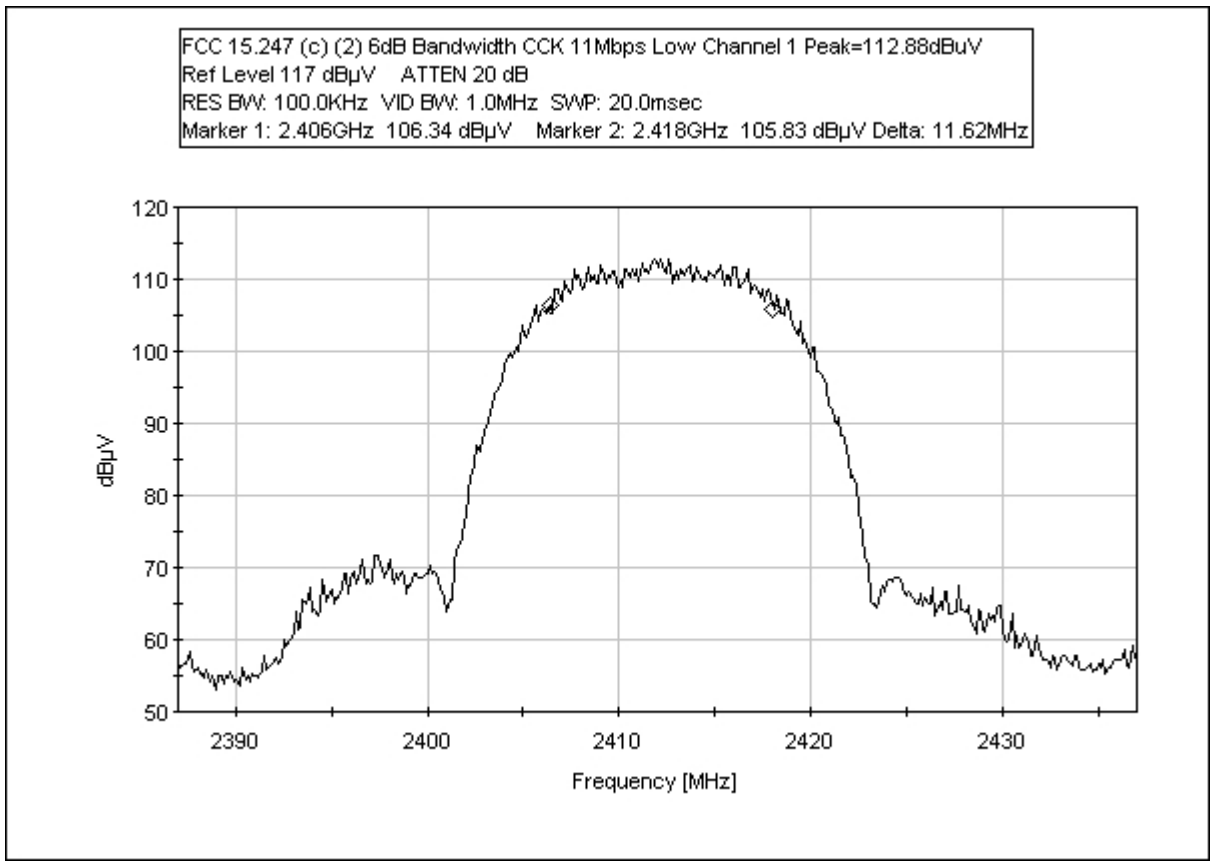
Table 4: FCC 15.247(c) Six Highest Radiated Emission Levels - Antenna Conducted

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	dB	dB	dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN DB	NOTES
7308.250	57.3	0.5				57.8	93.8	-36.0	N
7308.950	57.1	0.5				57.6	93.8	-36.2	N
7311.300	57.0	0.5				57.5	93.8	-36.3	N
7382.850	59.9	0.5				60.4	93.8	-33.4	N
7384.950	59.6	0.5				60.1	93.8	-33.7	N
7385.130	59.3	0.5				59.8	93.8	-34.0	N

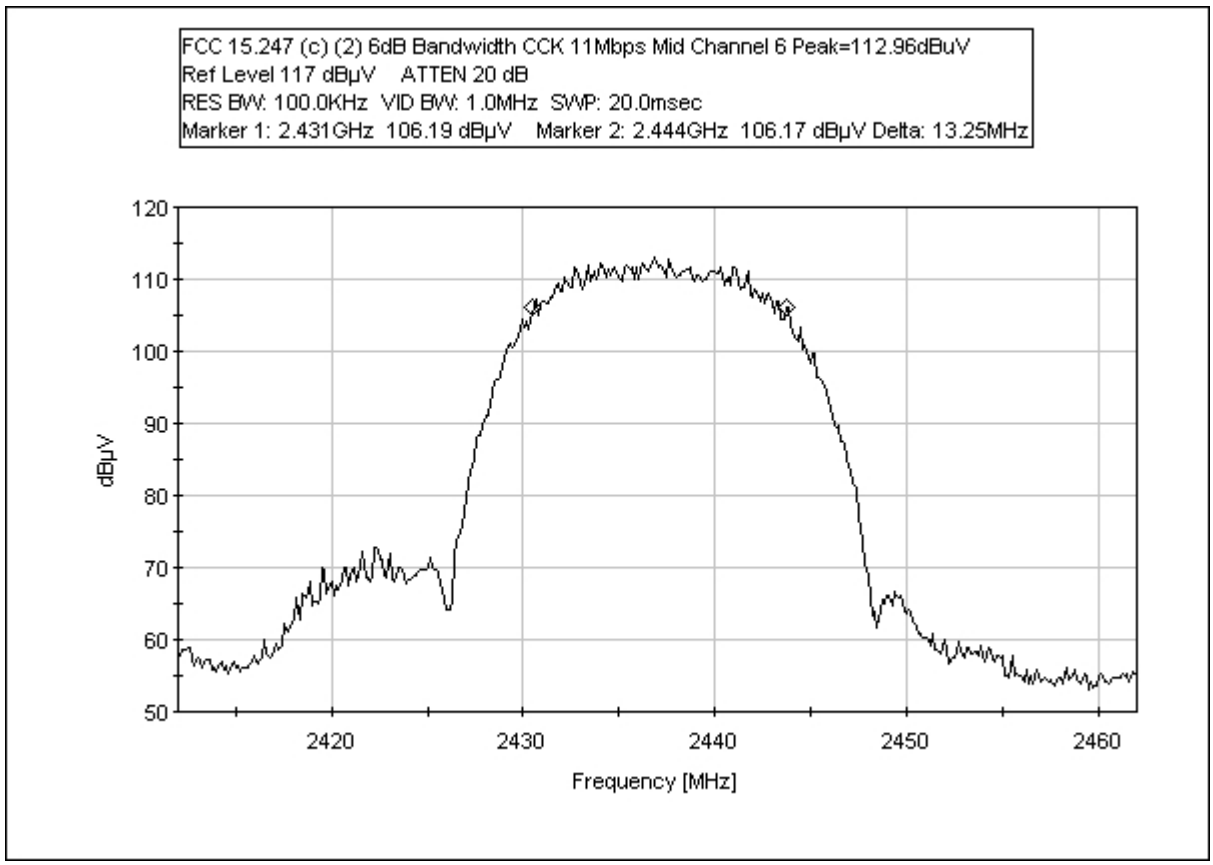
Test Method: ANSI C63.4 (2001) NOTES: N = No Polarization
Spec Limit: FCC Part 15 Subpart C Sections 15.247(c)

COMMENTS: See individual data sheets for test conditions.

FCC 15.247(c)(2) 6dB Bandwidth CCK 11 Mbps Low Channel



FCC 15.247(c)(2) 6dB Bandwidth CCK 11 Mbps Mid Channel



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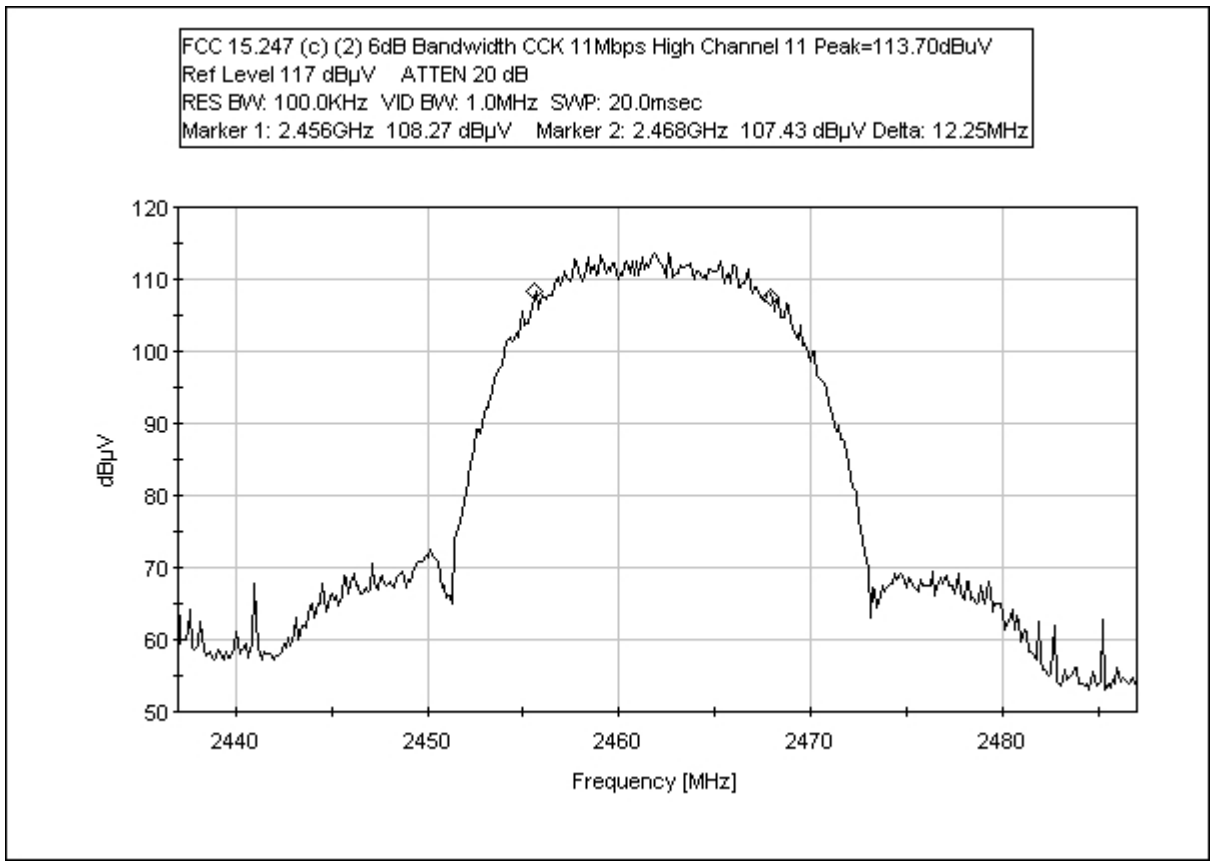

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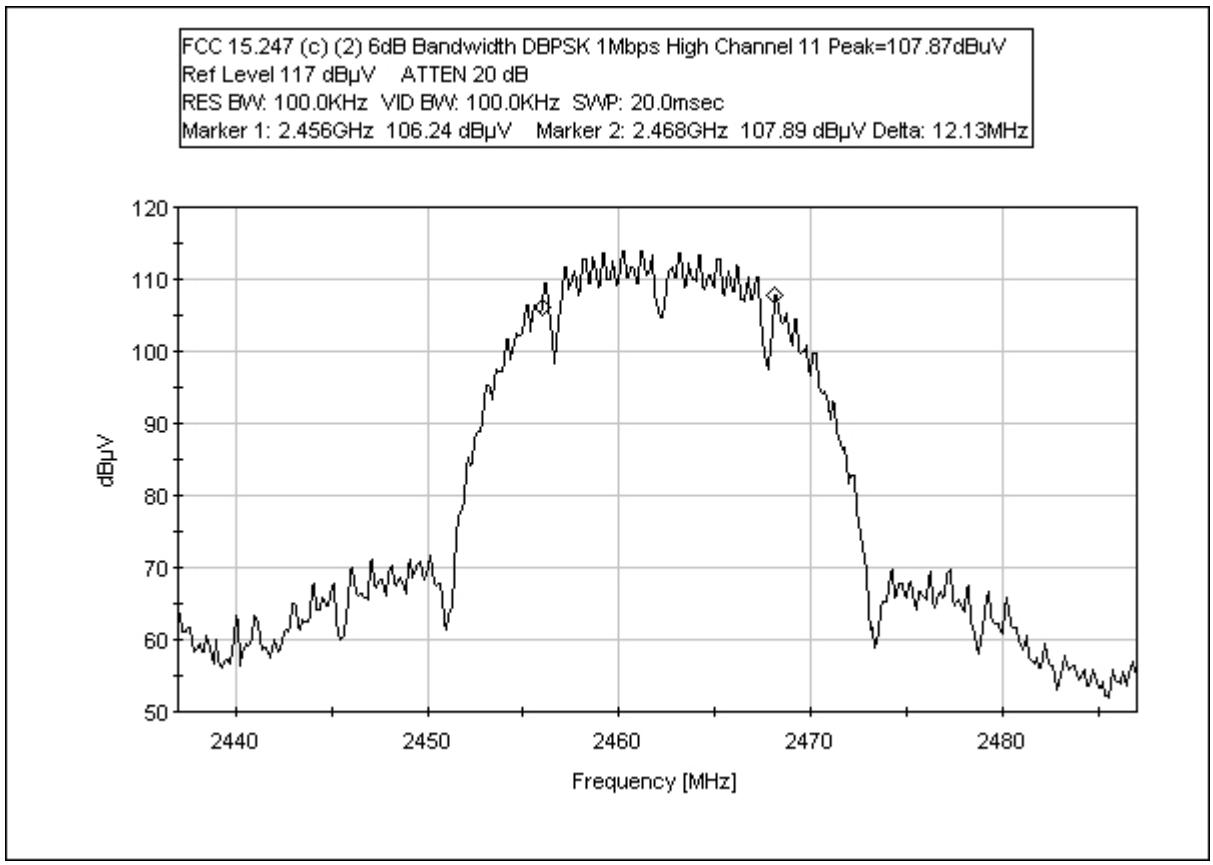
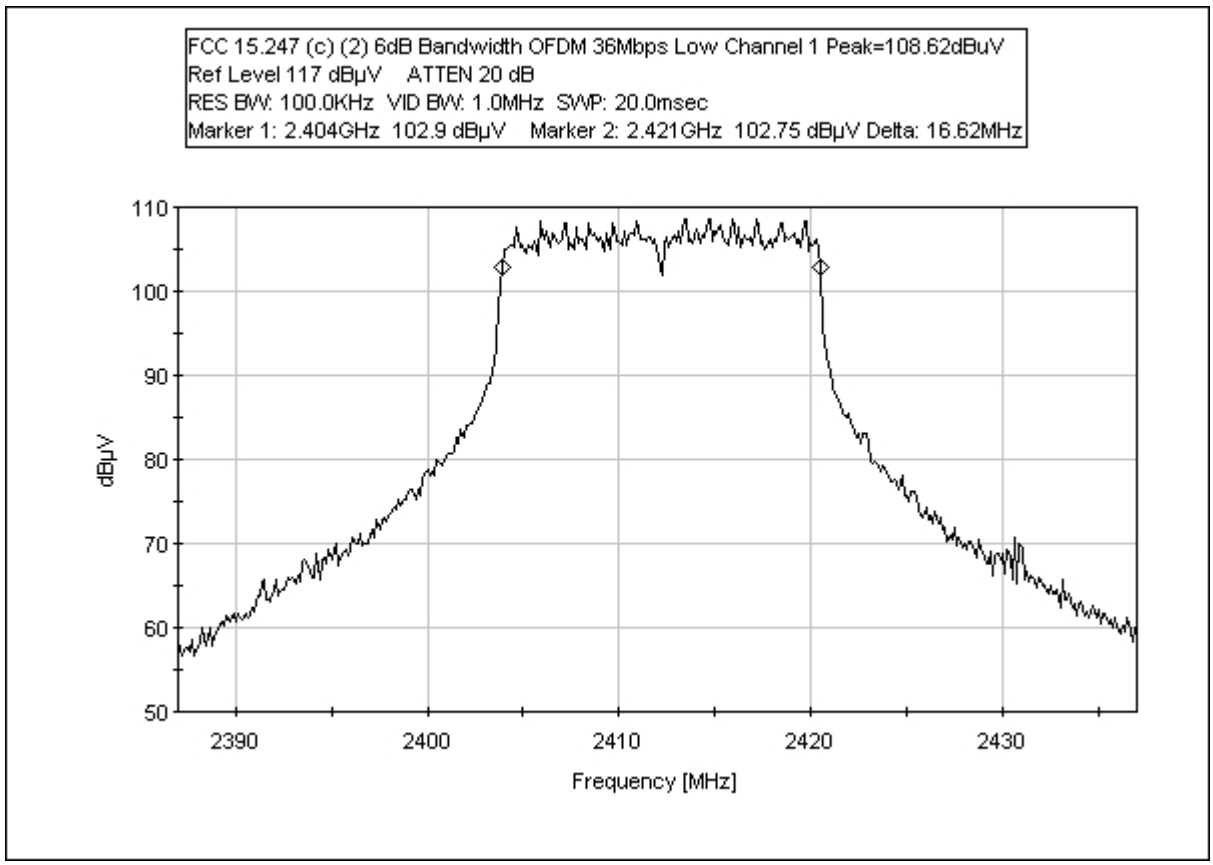


FCC 15.247(c)(2) 6dB Bandwidth OFDM 36 Mbps Low Channel



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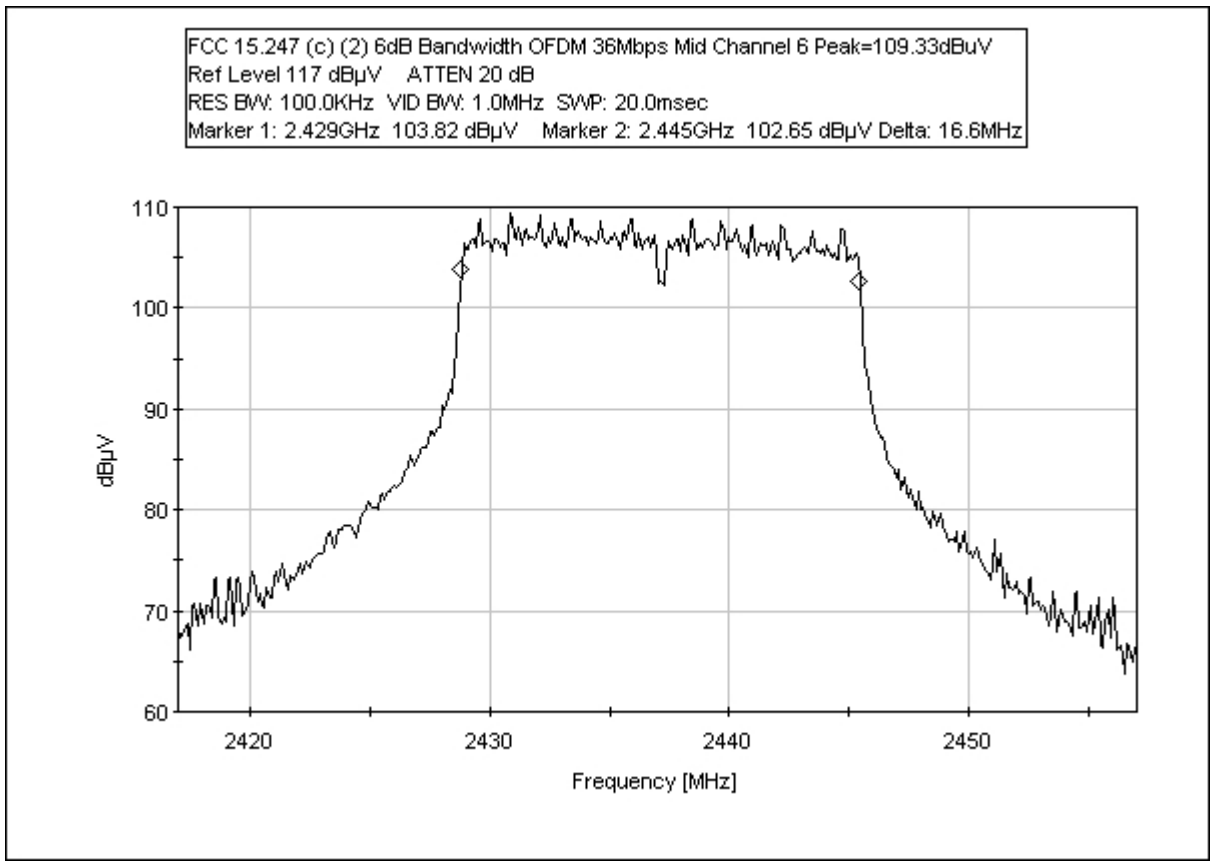

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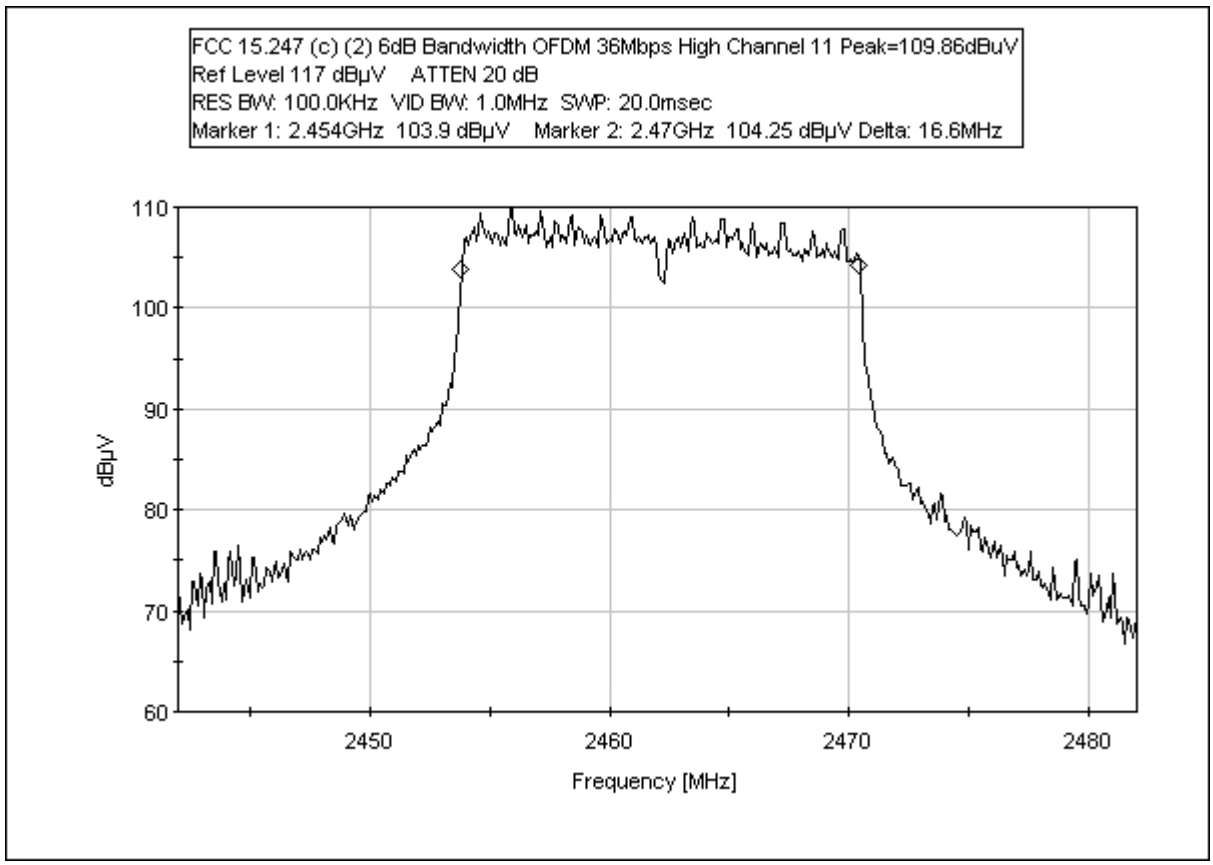

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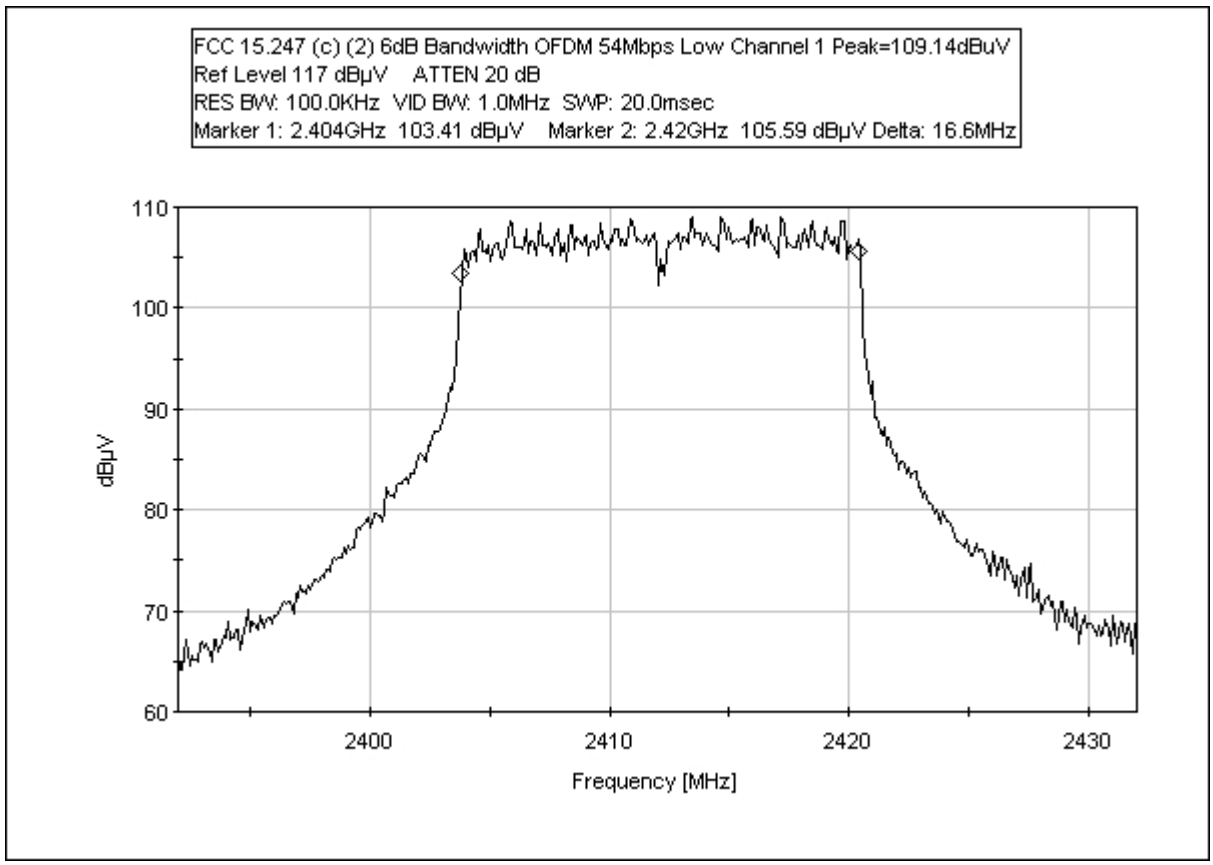

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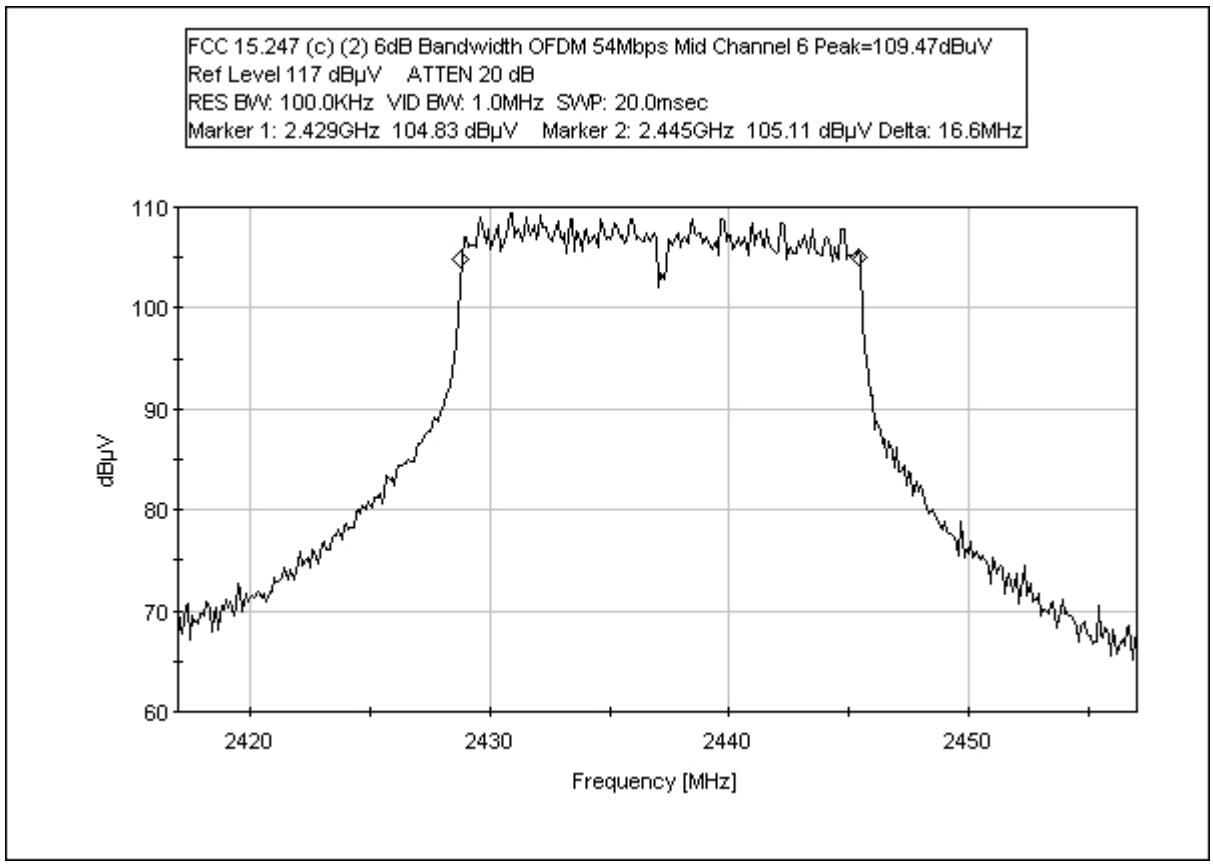

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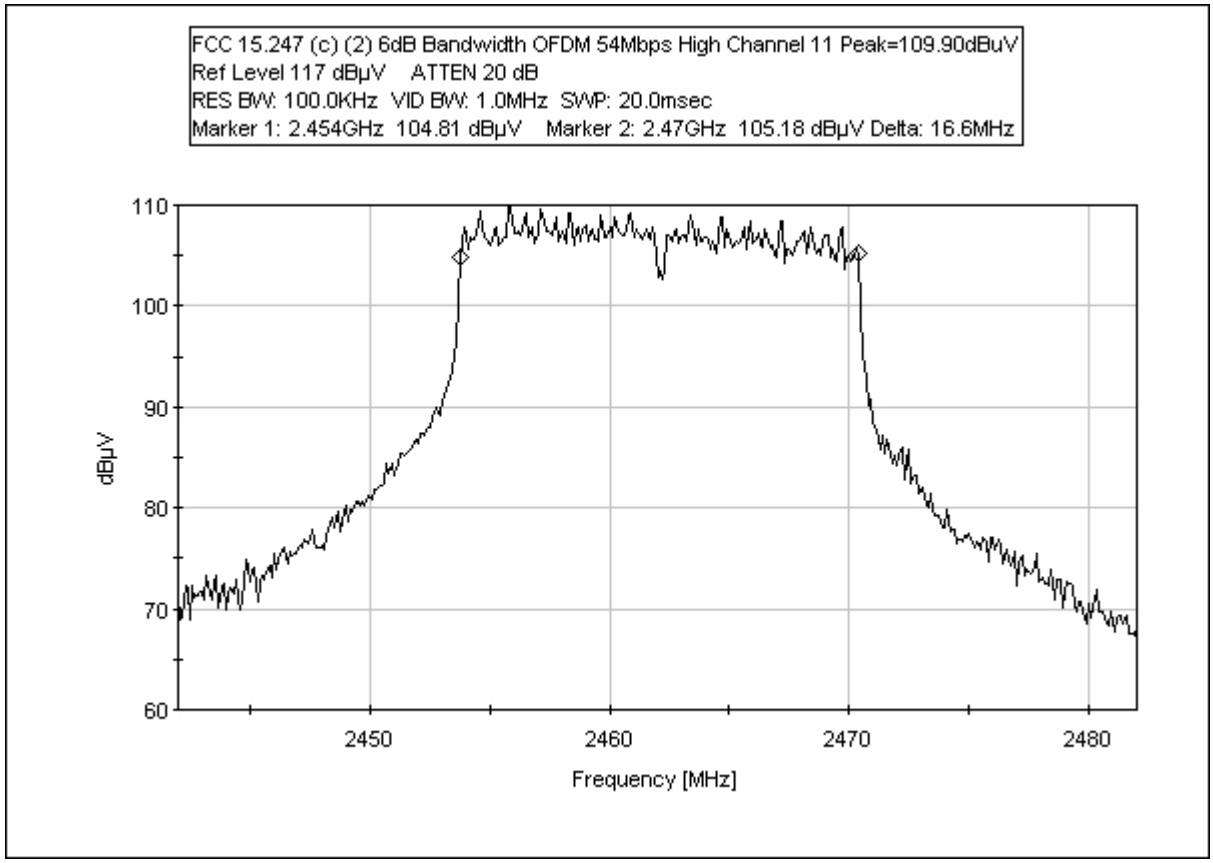
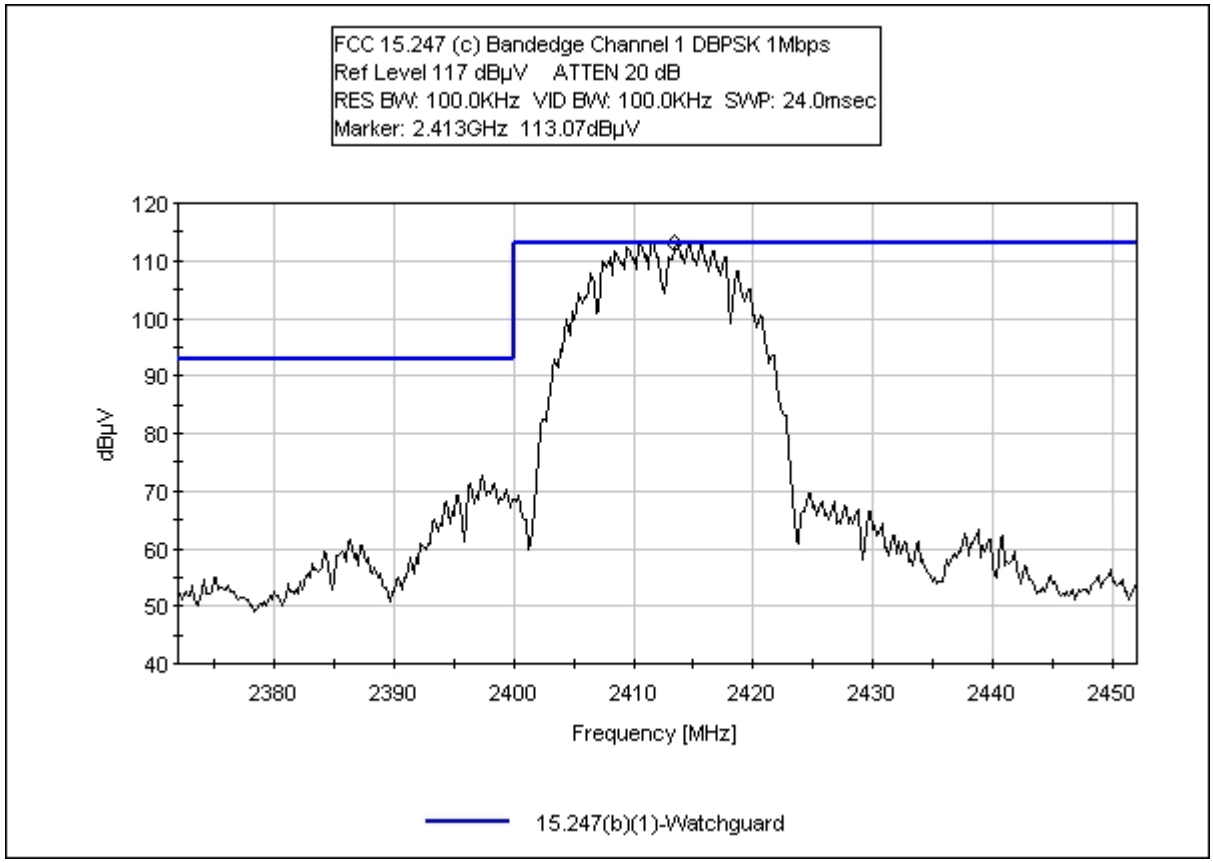


FCC 15.247(c) Bandedge Channel 1 DPSK 1 Mbps



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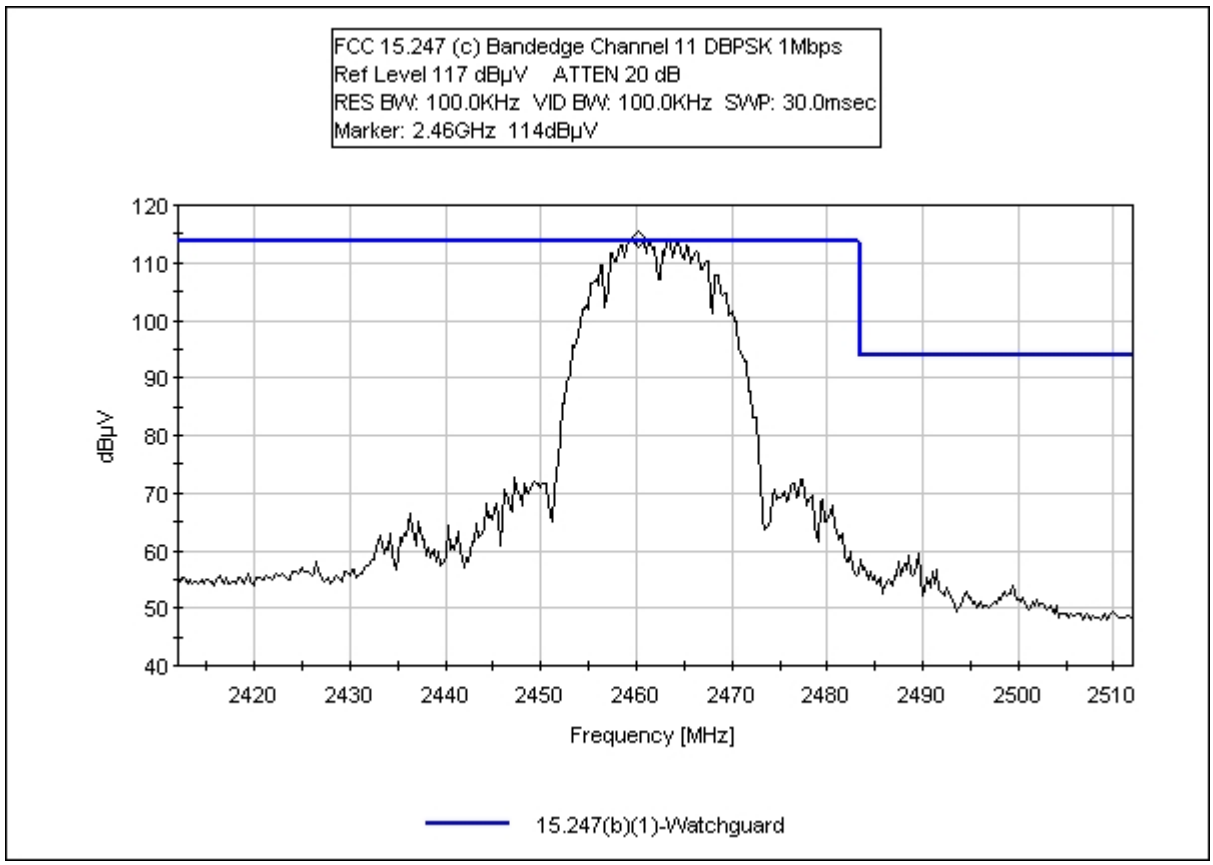

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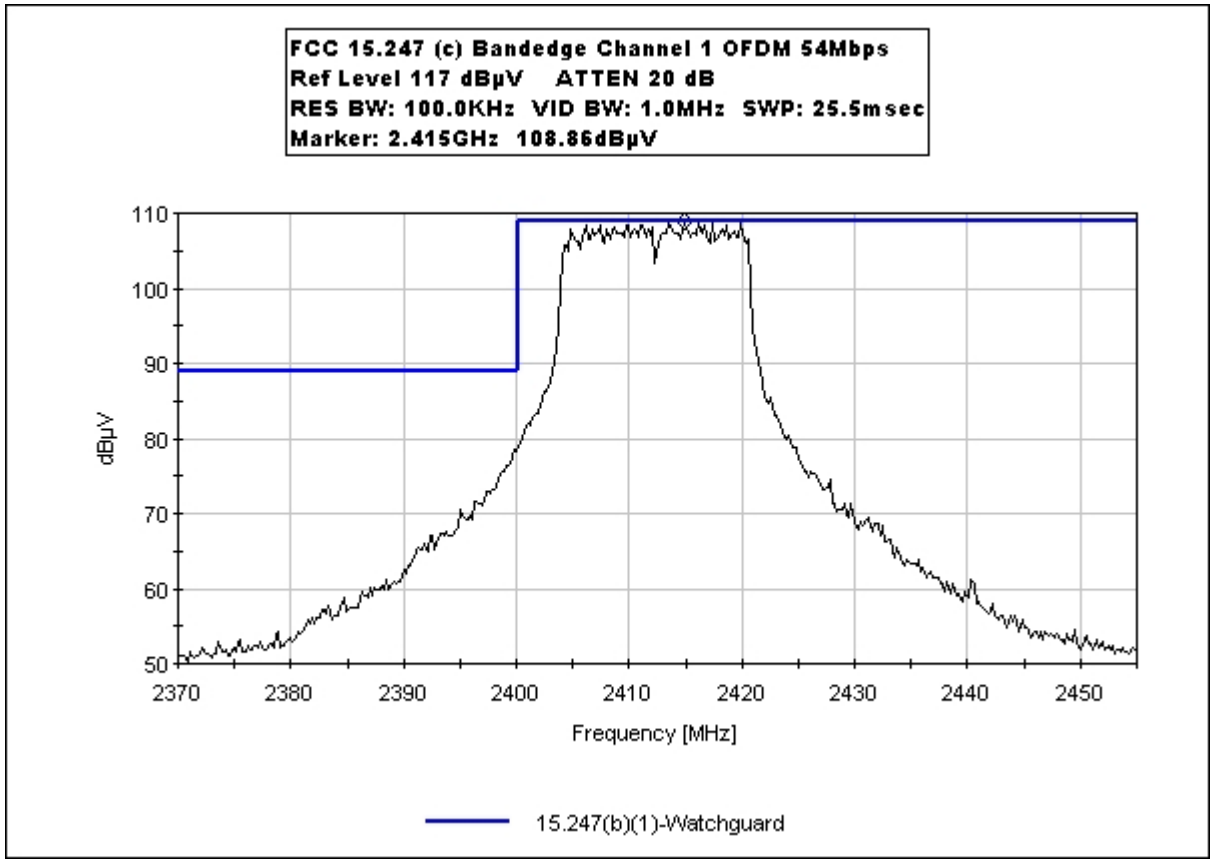

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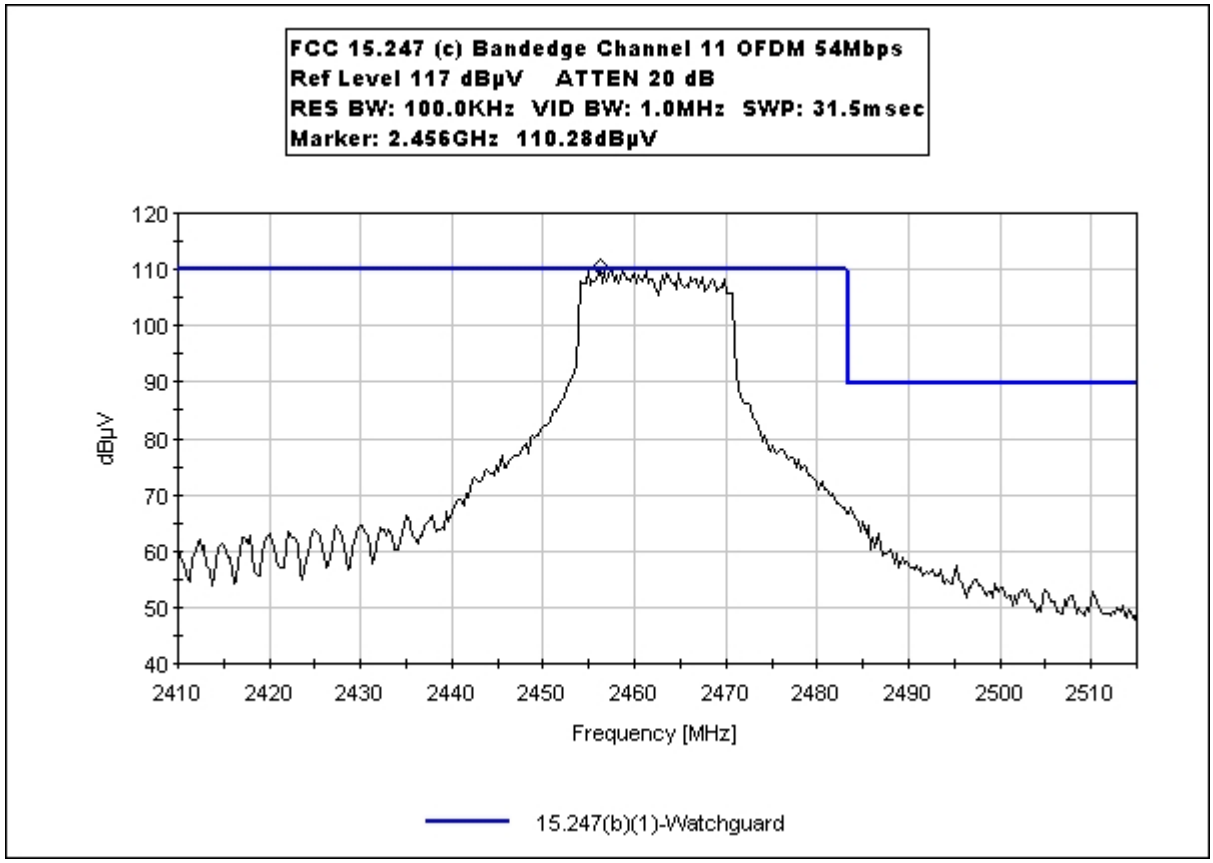

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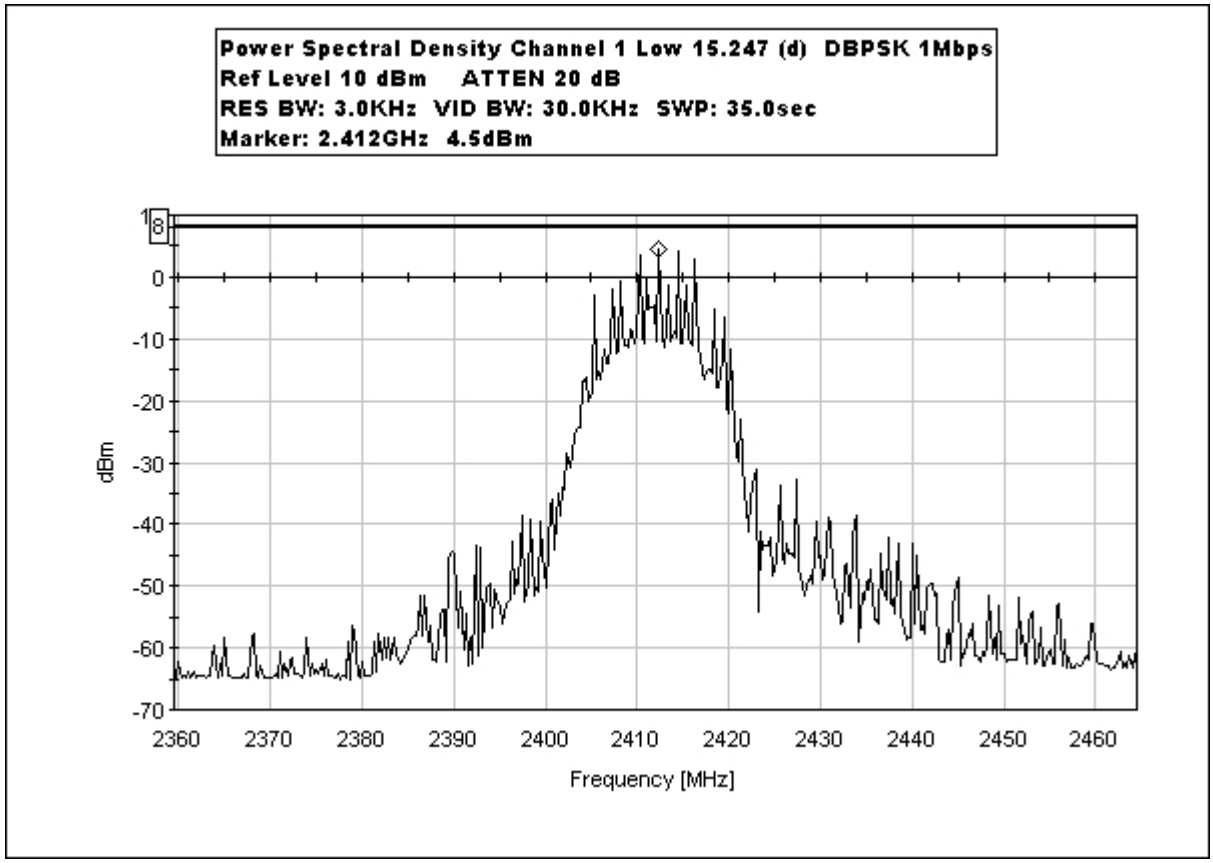
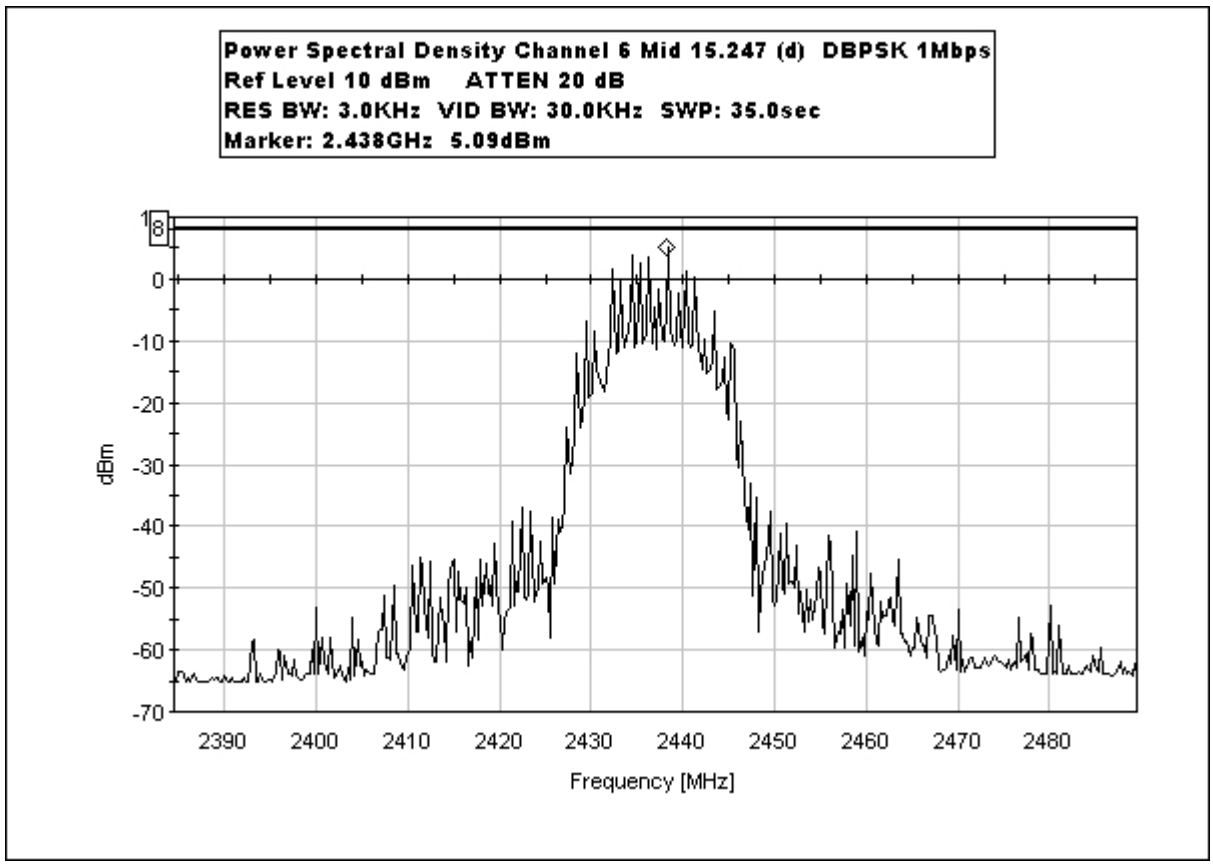
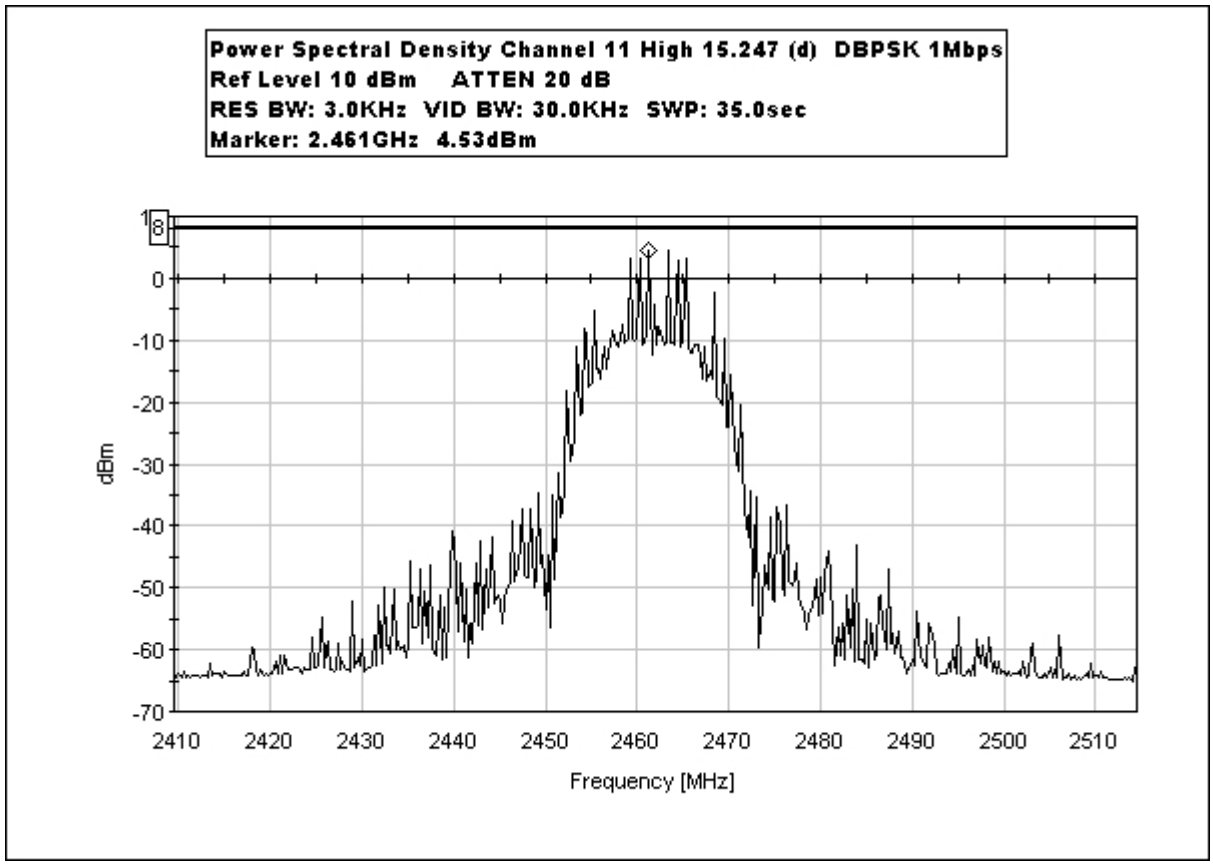


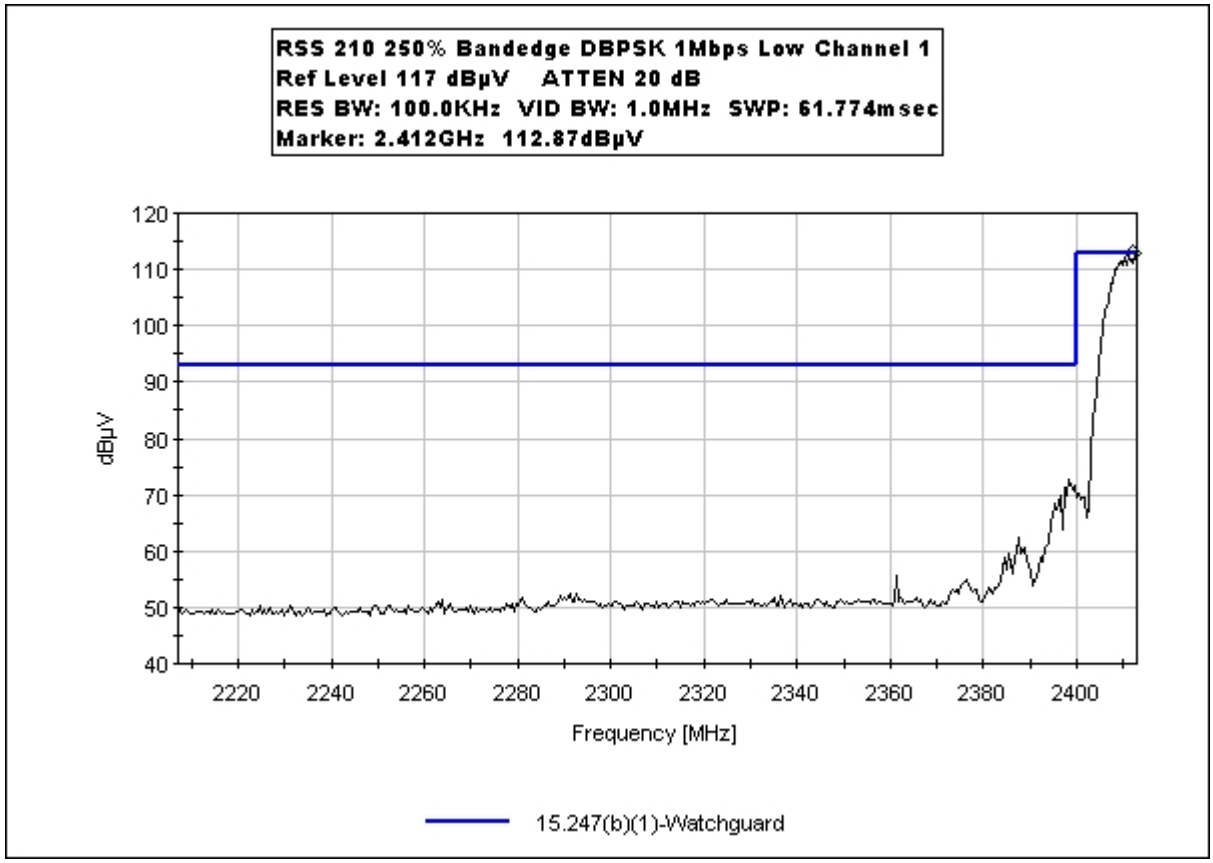
FCC 15.247 (d) Power Spectral Density Channel 6 Mid DBPSK 1 Mbps



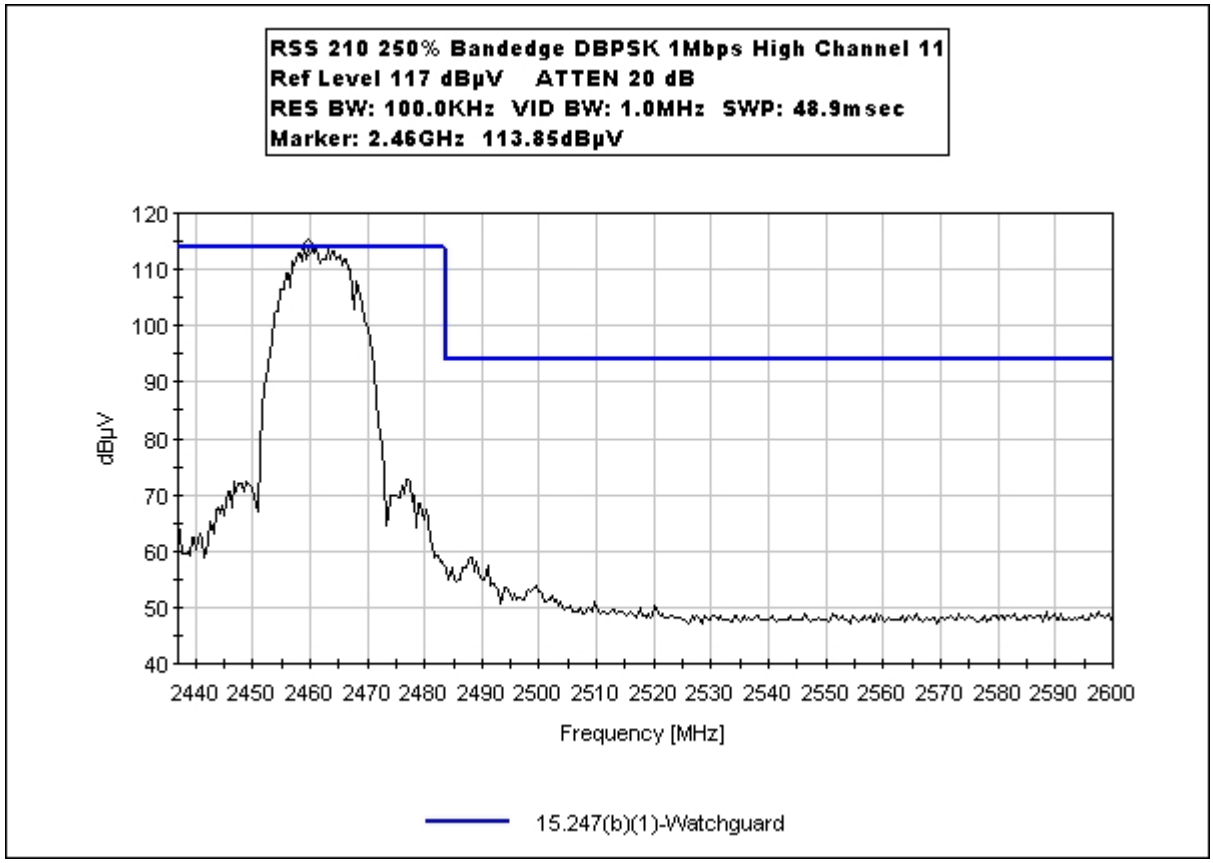
FCC 15.247 (d) Power Spectral Density Channel 11 High DBPSK 1 Mbps



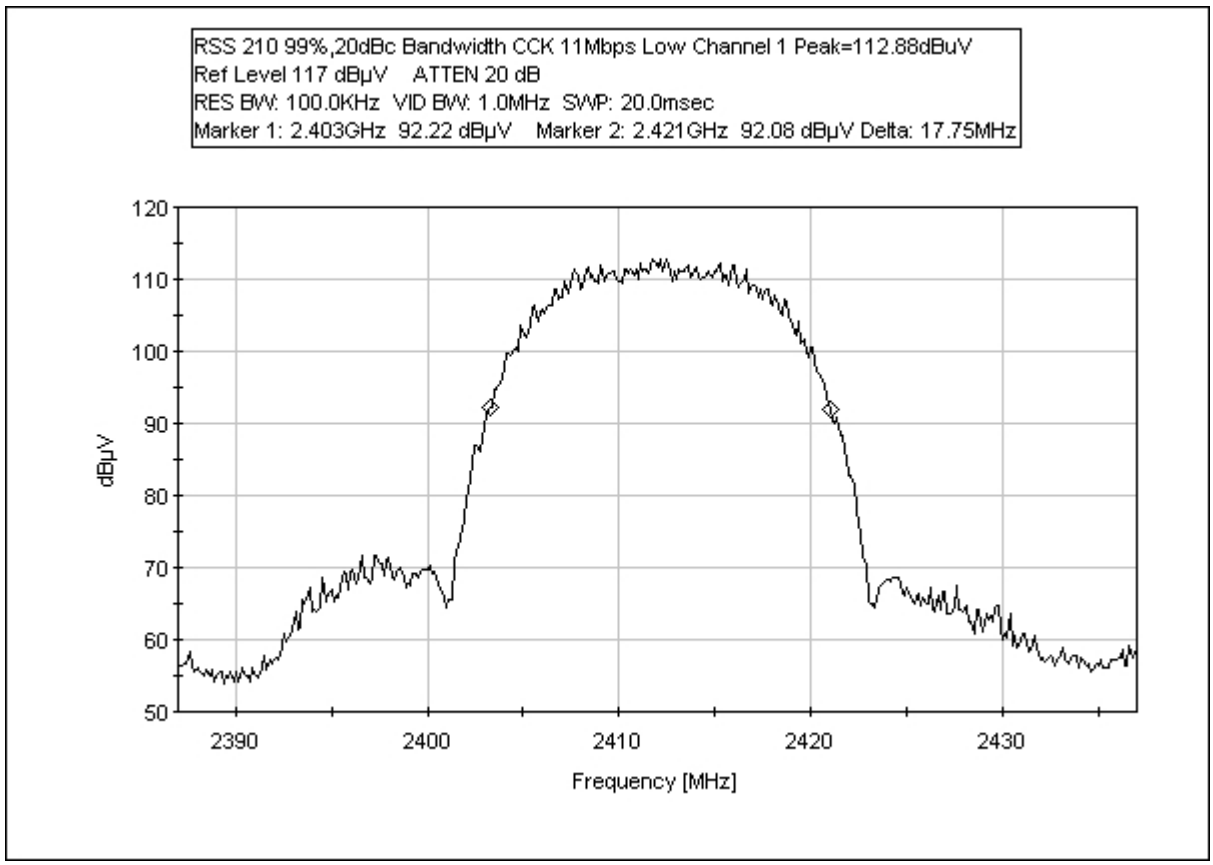
RSS-210 250% Bandedge DBPSK 1 Mpbs Low Channel 1



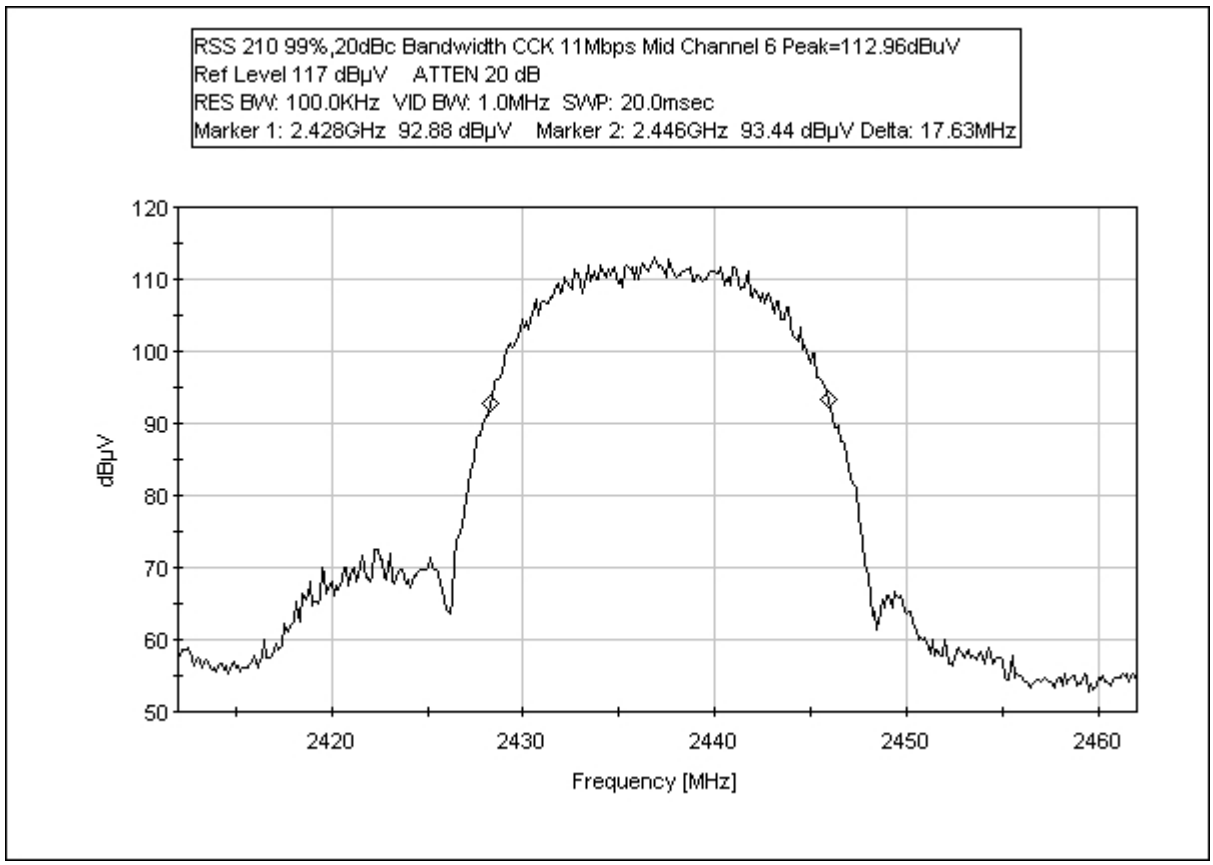
RSS-210 250% Bandedge DBPSK 1 Mbps High Channel 11



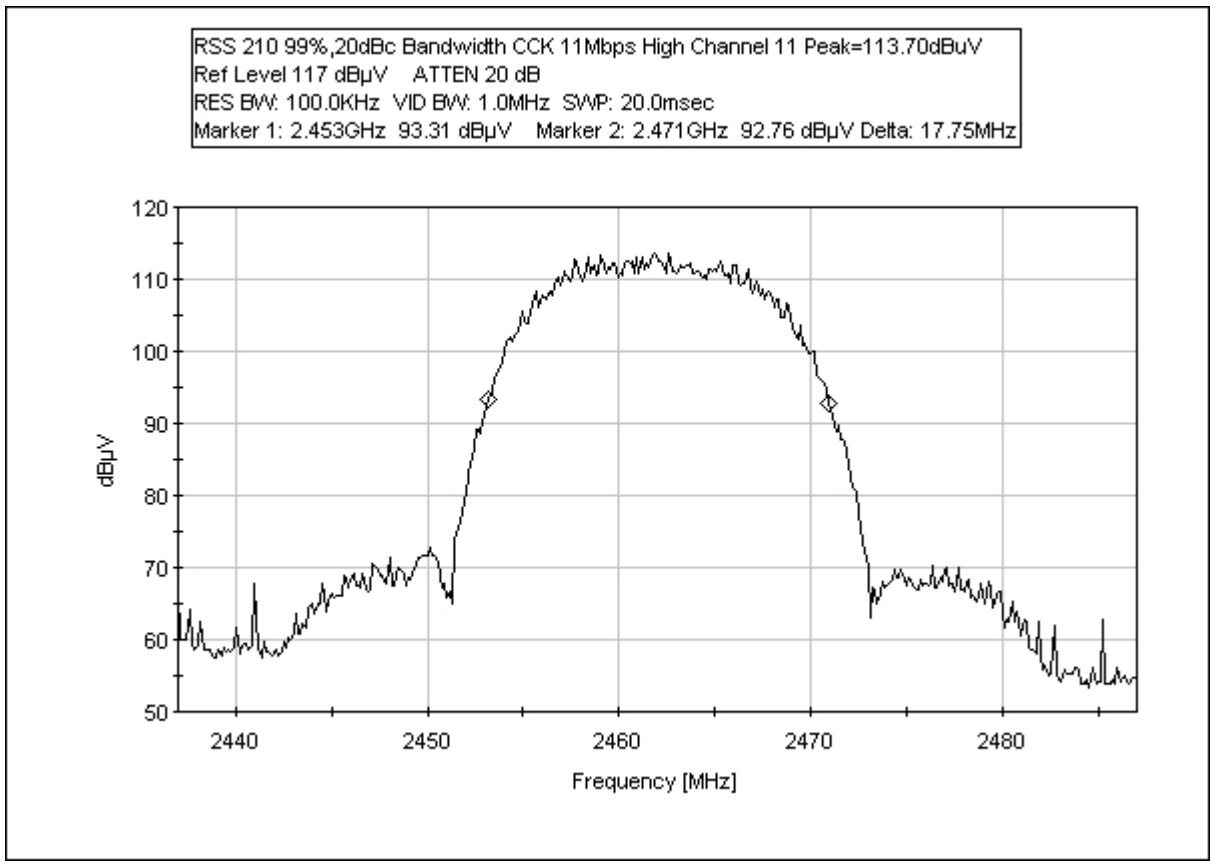
RSS-210 99% 20 dBc Bandwidth CCK 11 Mbps Low Channel 1



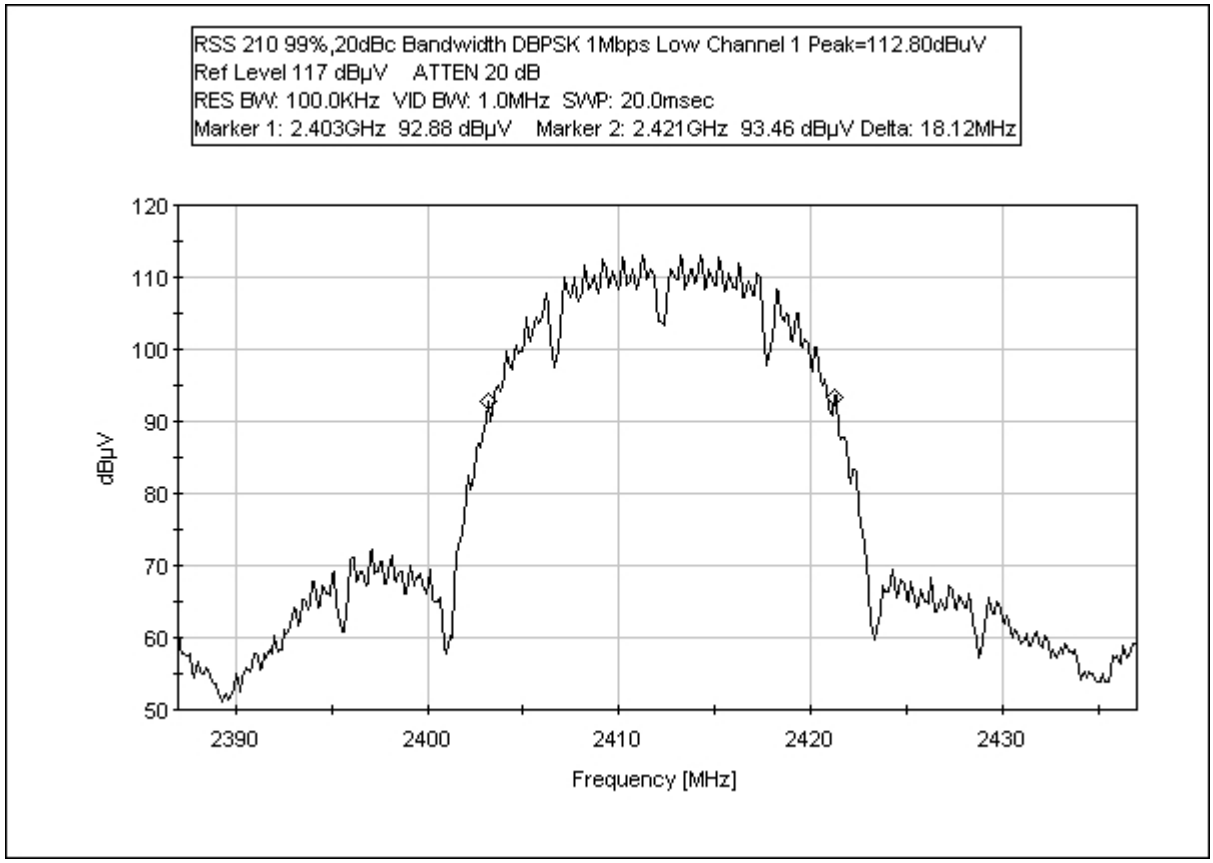
RSS-210 99% 20 dBc Bandwidth CCK 11 MBPS Mid Channel 6



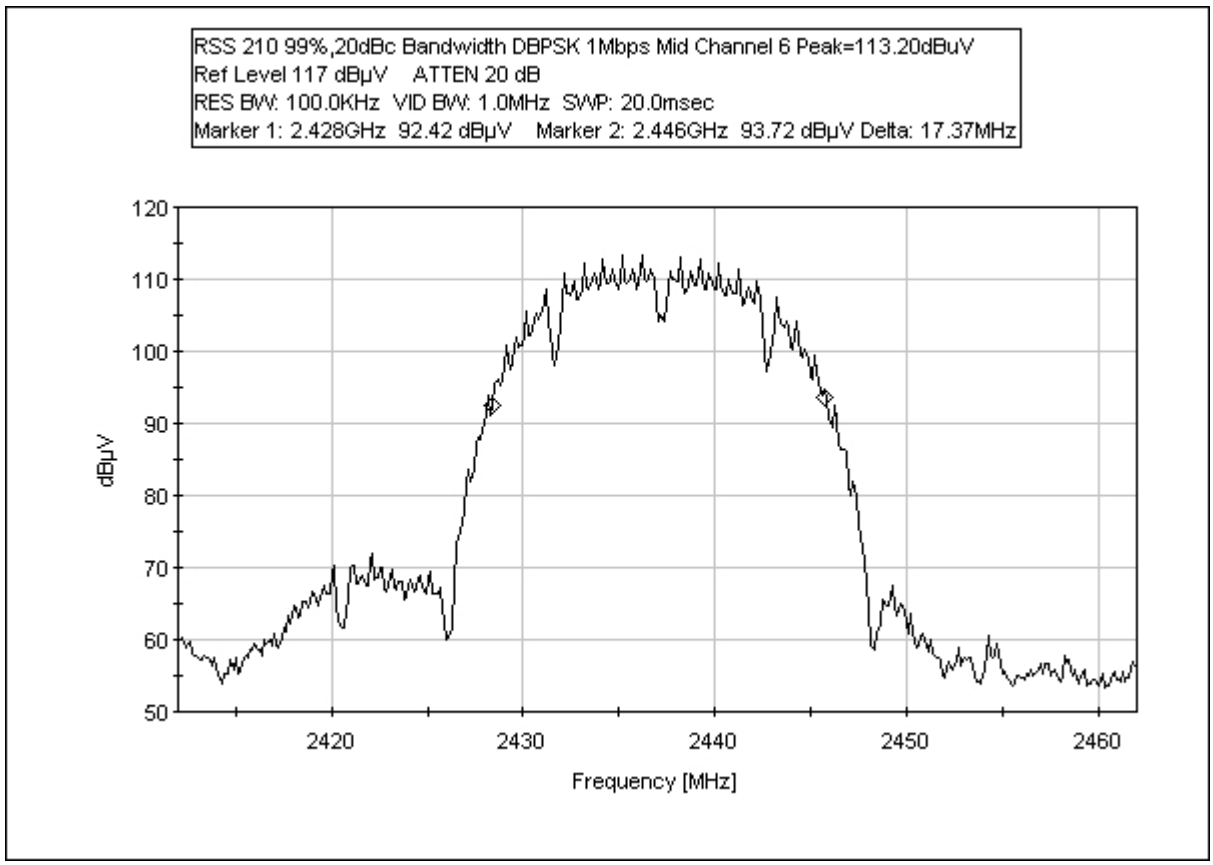
RSS-210 99% 20 dBc Bandwidth CCK 11 Mbps High Channel 11



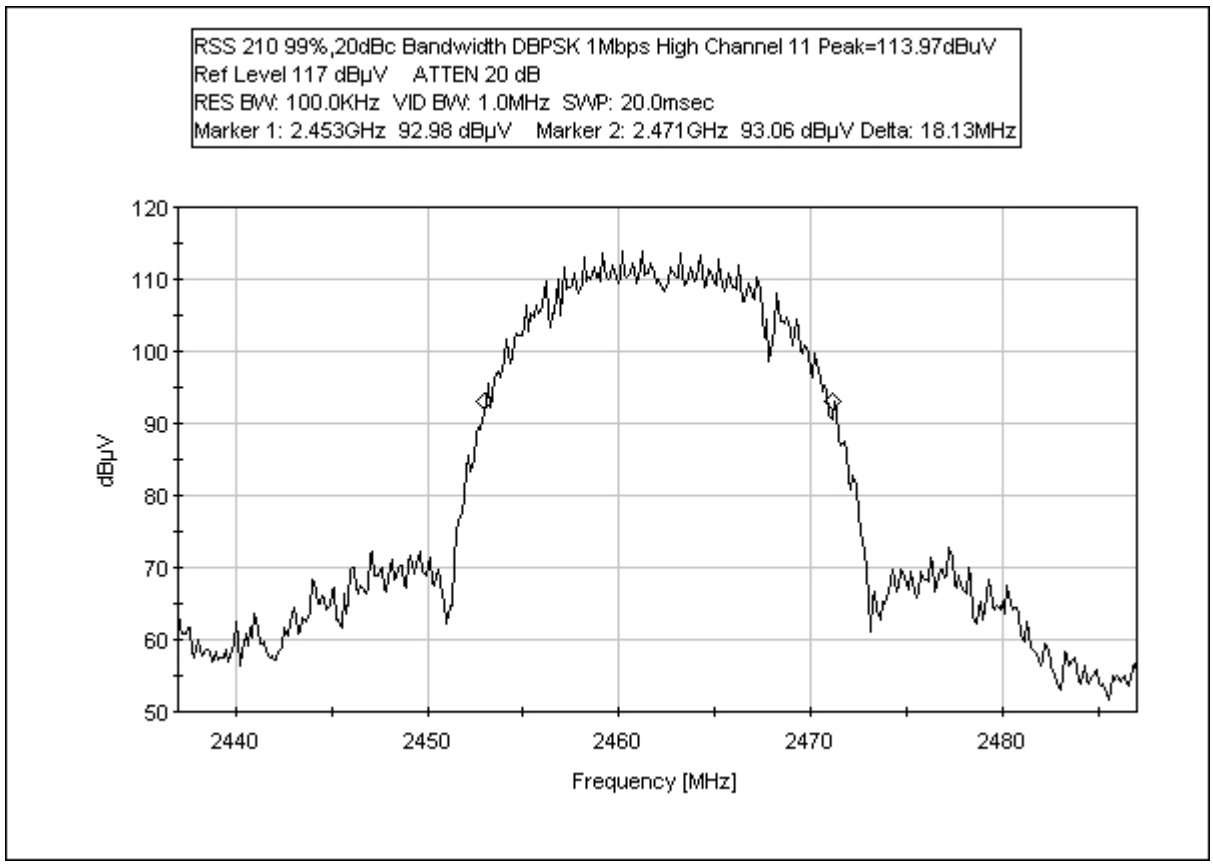
RSS-210 99% 20 dBc Bandwidth DBPSK 1 MBPS Low Channel 1



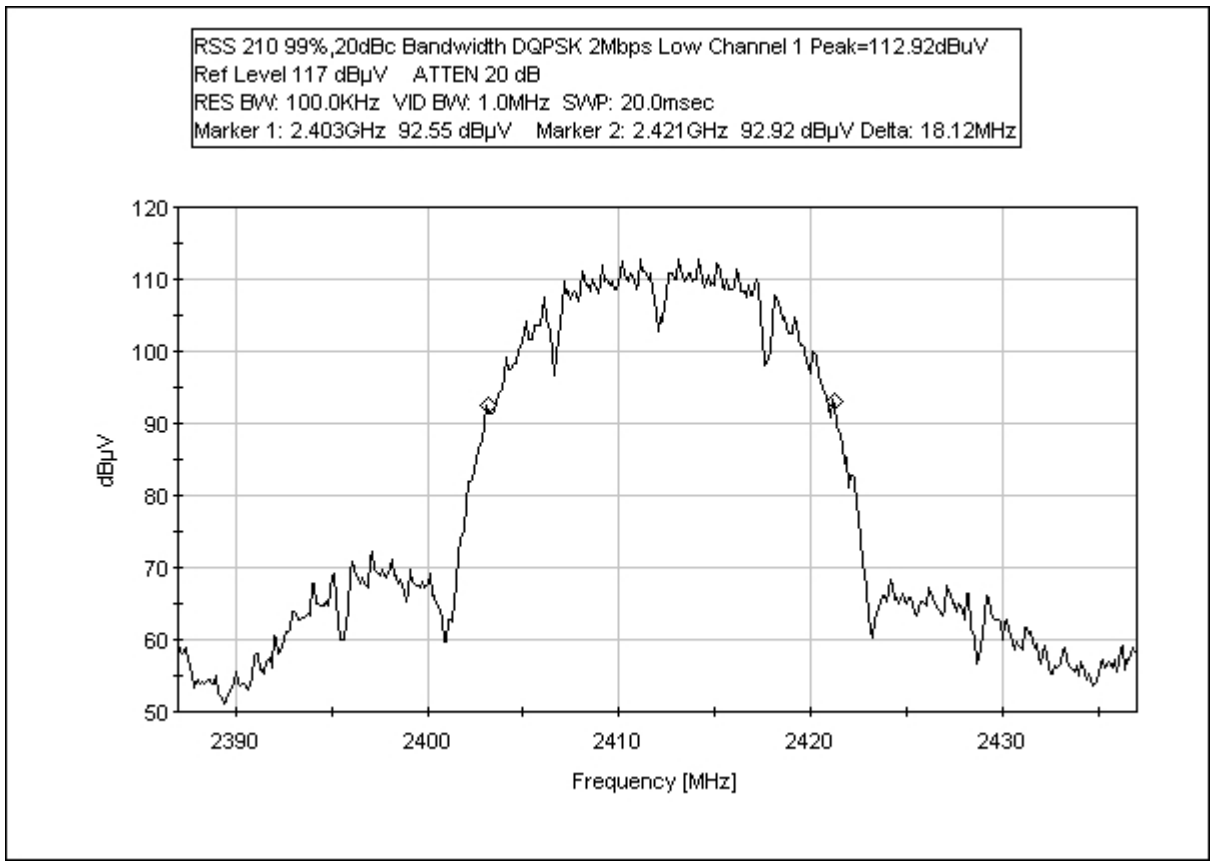
RSS-210 99% 20 dBc Bandwidth DBPSK 1 MBPS Mid Channel 6



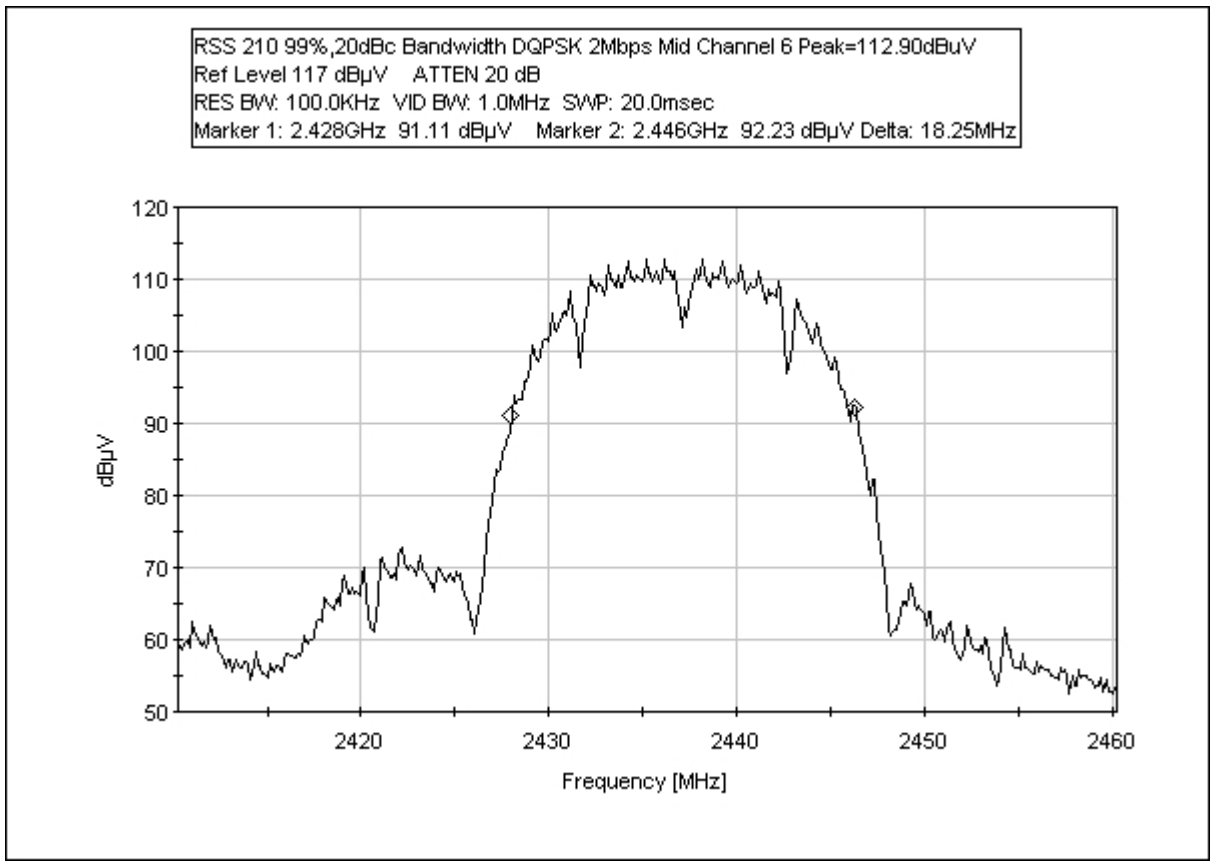
RSS-210 99% 20 dBc Bandwidth DBPSK 1 MBPS High Channel 11



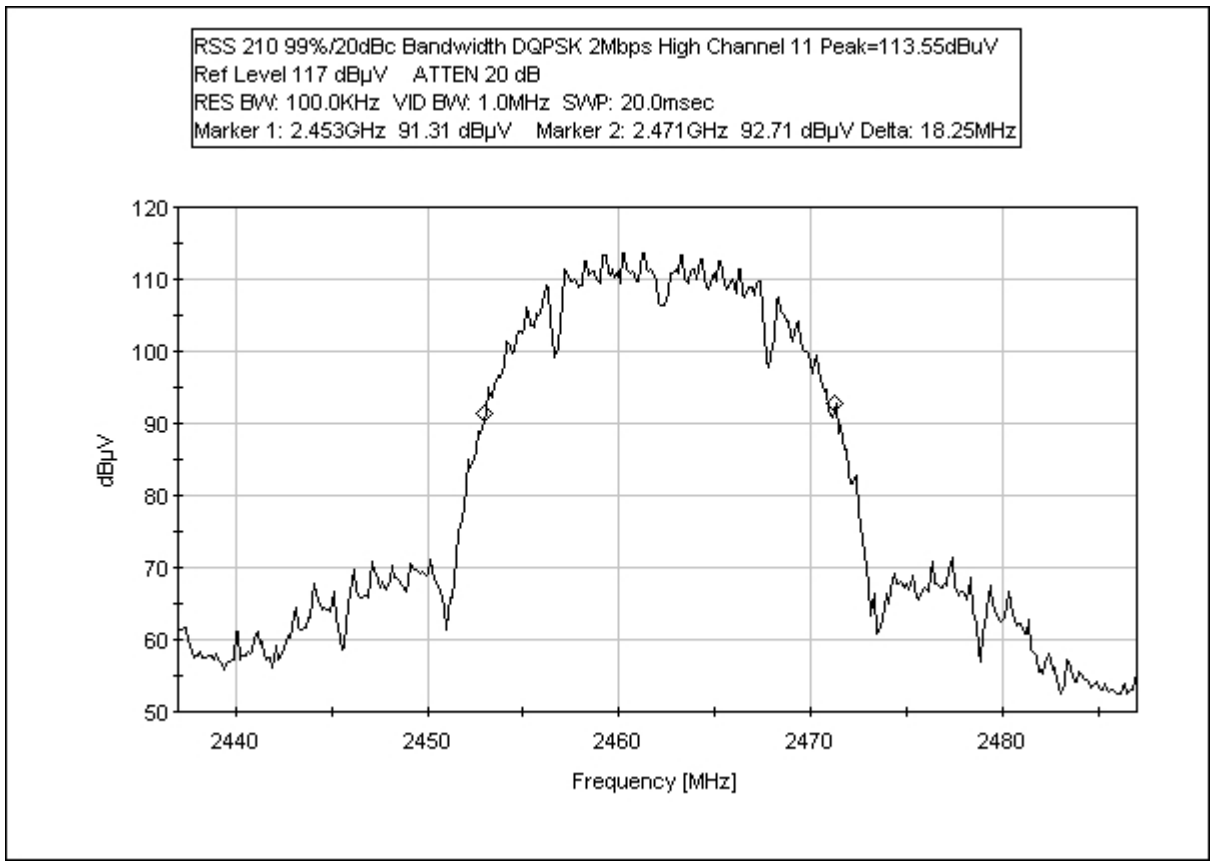
RSS-210 99% 20 dBc Bandwidth DQPSK 2 MBPS Low Channel 1



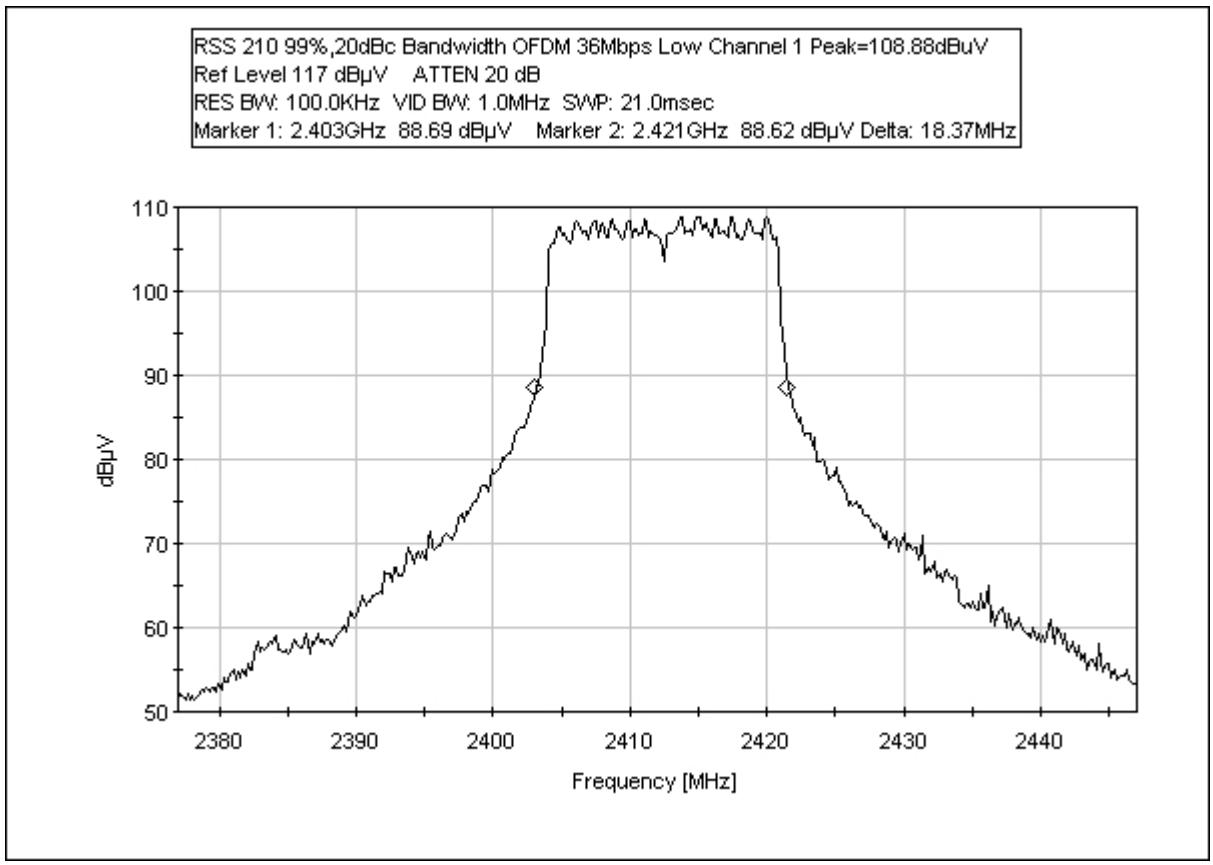
RSS-210 99% 20 dBc Bandwidth DQPSK 2 MBPS Mid Channel 6



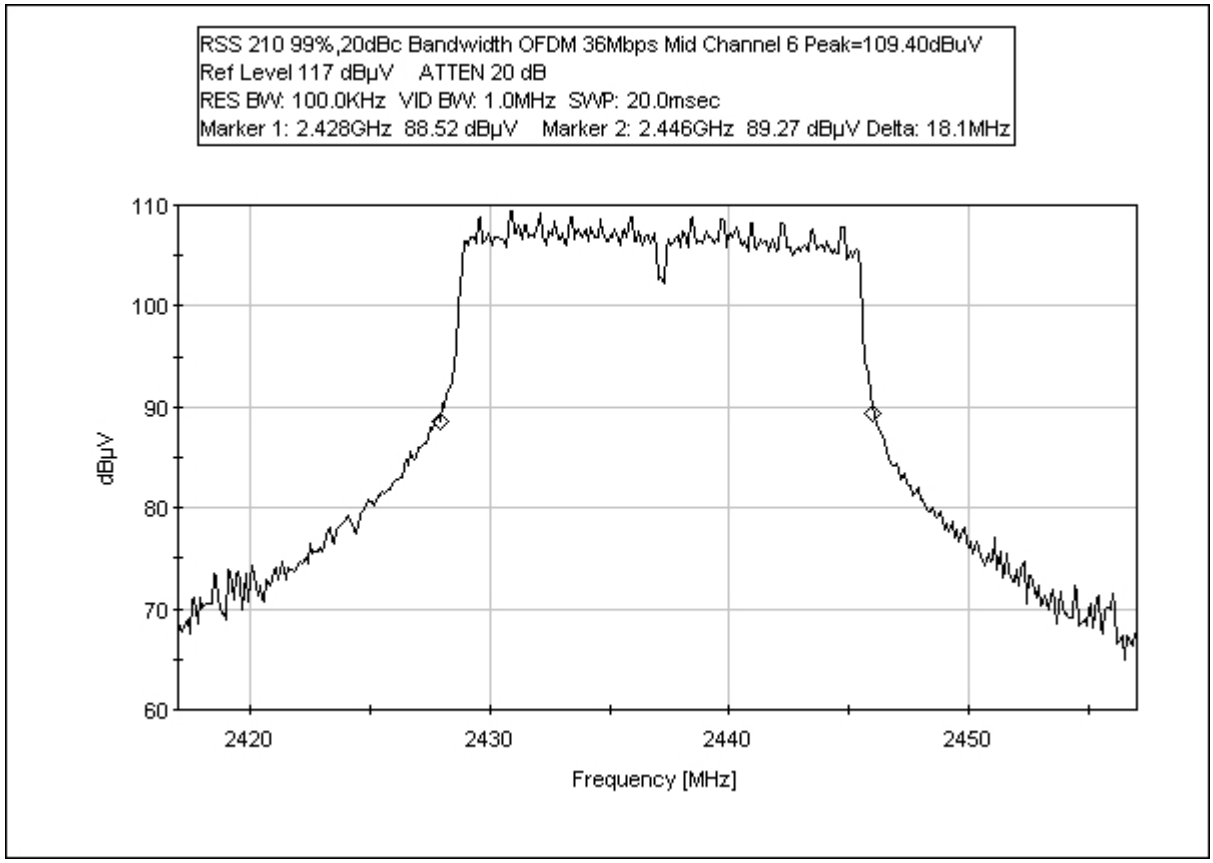
RSS-210 99% 20 dBc Bandwidth DQPSK 2 MBPS High Channel 11



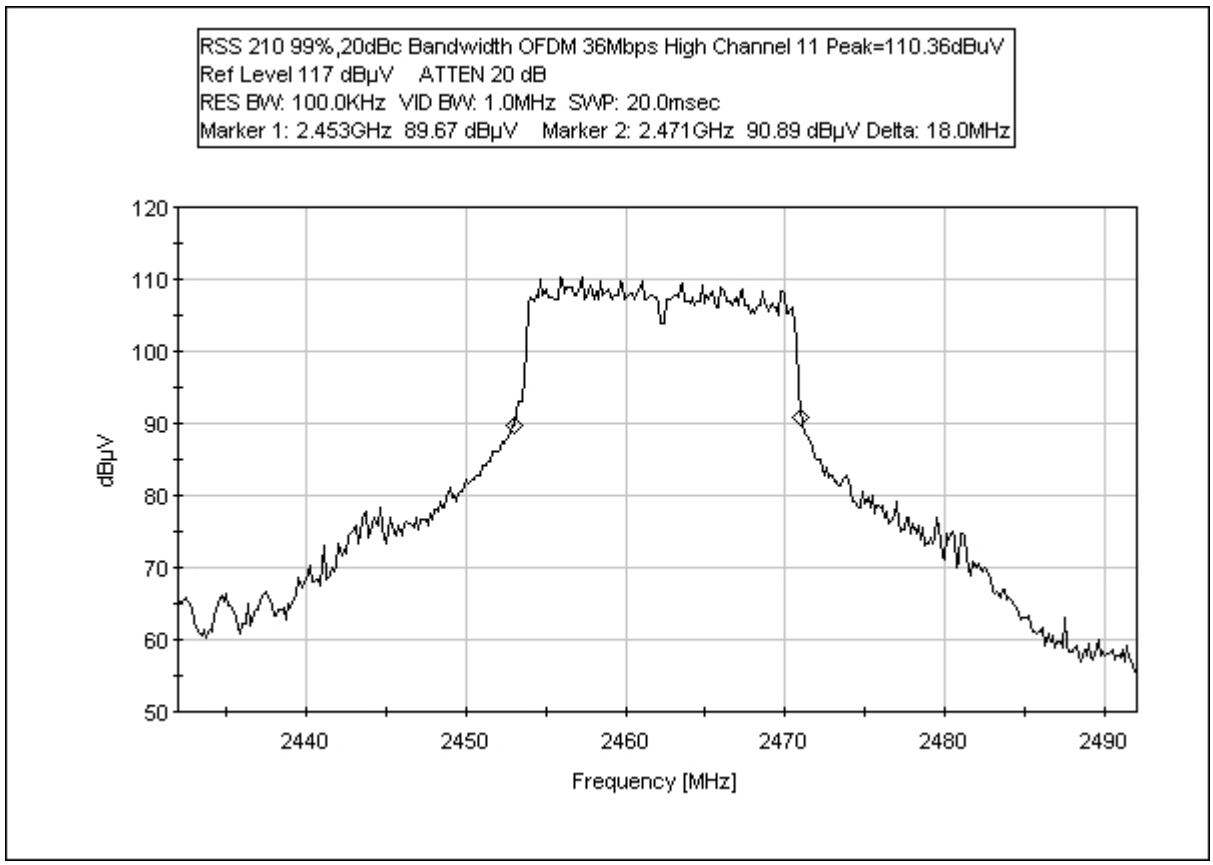
RSS-210 99% 20 dBc Bandwidth OFDM 36 MBPS Low Channel 1



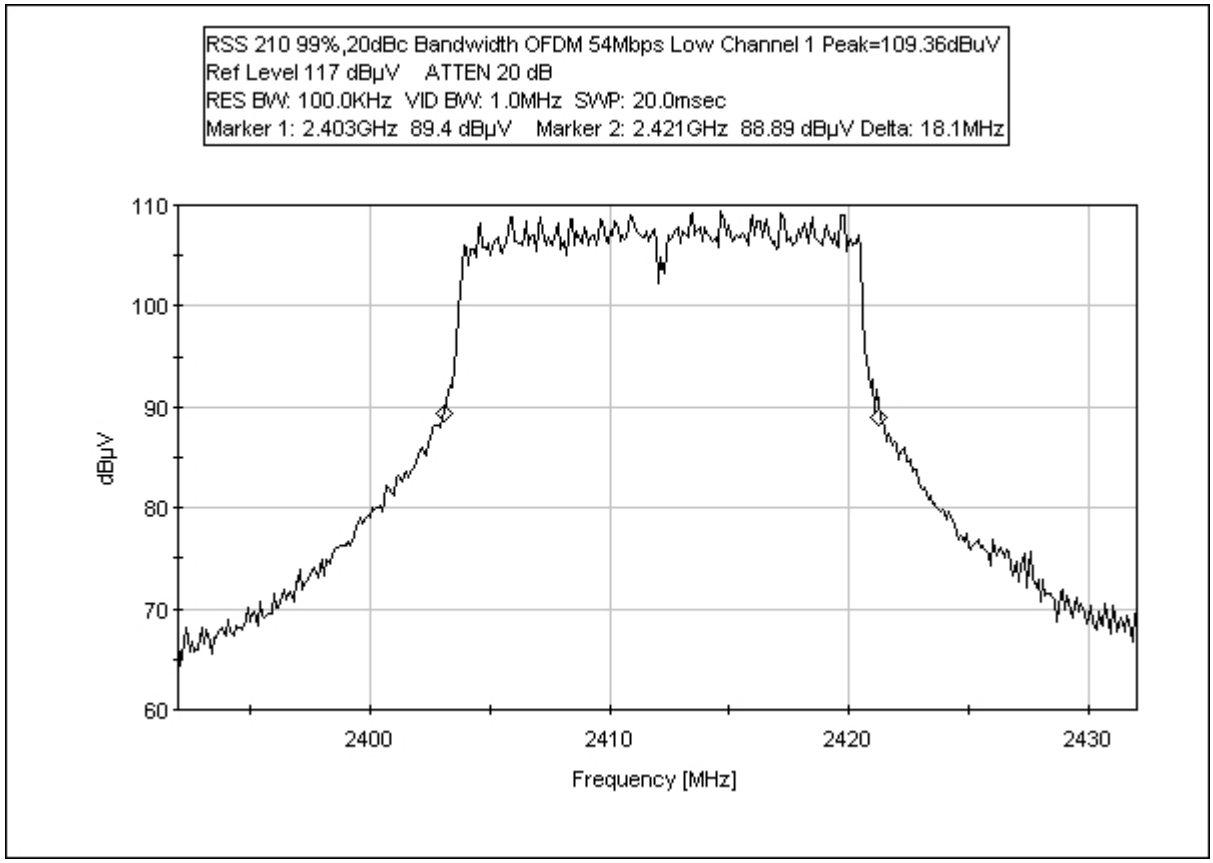
RSS-210 99% 20 dBc Bandwidth OFDM 36 MBPS Mid Channel 6



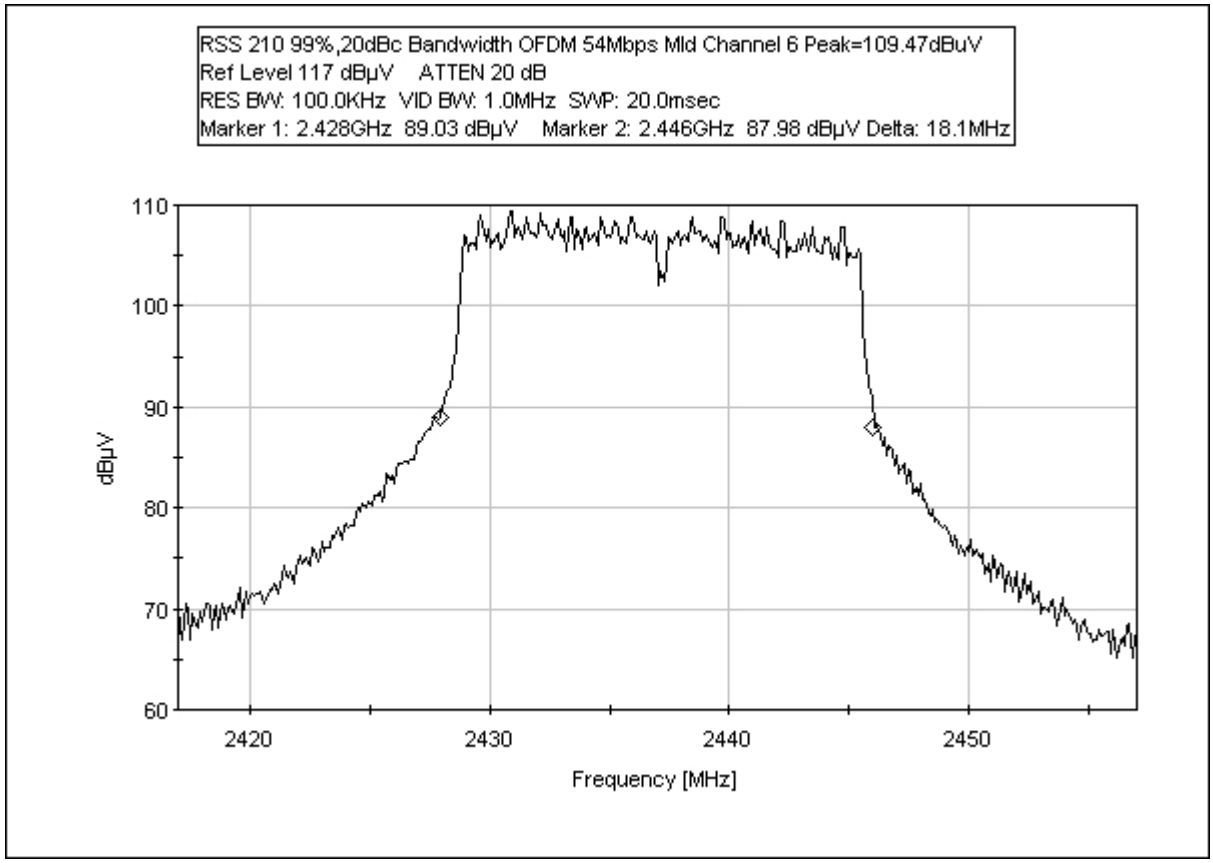
RSS-210 99% 20 dBc Bandwidth OFDM 36 MBPS High Channel 11



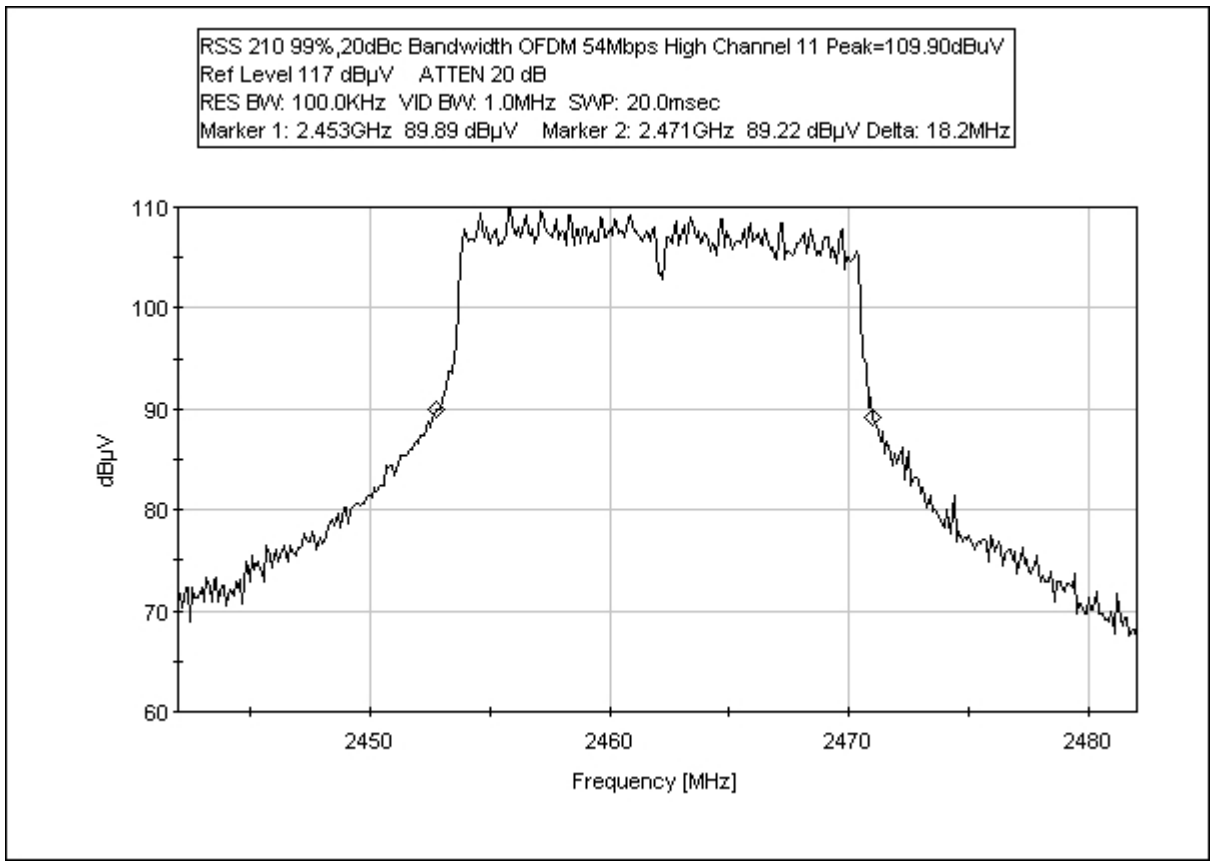
RSS-210 99% 20 dBc Bandwidth OFDM 54 MBPS Low Channel 1



RSS-210 99% 20 dBc Bandwidth OFDM 54 MBPS Mid Channel 6



RSS-210 99% 20 dBc Bandwidth OFDM 54 MBPS High Channel 11



TEMPERATURE AND HUMIDITY DURING TESTING
The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

EUT SETUP
The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables. The corrected data was then compared to the applicable emission limits to determine compliance.

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available I/O ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. I/O cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The radiated and conducted emissions data of the EUT was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in Table A.

Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS
The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula in Table A. This reading was then compared to the applicable specification limit to determine compliance.

TABLE A: SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Table A were used to collect both the radiated and conducted emissions data for the EUT. For radiated measurements from 30 to 1000 MHz, the biconilog antenna was used. The horn antenna was used for frequencies above 1000 MHz. Conducted emissions tests required the use of the FCC type LISNs.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. For conducted emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. A 10 dB external attenuator was also used during conducted tests, with internal offset correction in the analyzer. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dBµV, and a vertical scale of 10 dB per division.

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the Tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the six highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

EUT TESTING

Mains Conducted Emissions

During conducted emissions testing, the EUT was located on a wooden table measuring approximately 80 cm high, 1 meter deep, and 1.5 meters in length. One wall of the room where the EUT was located has a minimum 2 meter by 2 meter conductive plane. The EUT was mounted on the wooden table 40 cm away from the conductive plane, and 80 cm from any other conductive surface.

The vertical metal plane used for conducted emissions was grounded to the earth. Power to the EUT was provided through a LISN. The LISN was grounded to the ground plane. All other objects were kept a minimum of 80 cm away from the EUT during the conducted test.

The LISNs used were 50 µH-/+50 ohms. Above 150 kHz, a 0.15 µF series capacitor was added in-line prior to connecting the analyzer to restore the proper impedance for the range. A 30 to 50 second sweep time was used for automated measurements in the frequency bands of 150 kHz to 500 kHz, and 500 kHz to 30 MHz. All readings within 20 dB of the limit were recorded, and those within 6 dB of the limit were examined with additional measurements using a slower sweep time.

Antenna Conducted Emissions

For measuring the signal strength on the RF output port of the EUT, the spectrum analyzer was connected directly to the EUT. The sweep time of the analyzer was adjusted so that the spectrum analyzer readings were always in a calibrated range. All readings within 20 dB of the limit were recorded.

Radiated Emissions

The EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters.

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode. The frequency range of 30 MHz to 1000 MHz was scanned with the biconilog antenna located about 1.5 meter above the ground plane in the vertical polarity. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. A scan of the FM band from 88 to 110 MHz was then made using a reduced resolution bandwidth and frequency span. The biconilog antenna was changed to the horizontal polarity and the above steps were repeated. For frequencies exceeding 1000 MHz, the horn antenna was used. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable and raising and lowering the antenna from one to four meters as needed. The test engineer maximized the readings with respect to the table rotation, antenna height and configuration of EUT. Maximizing of the EUT was achieved by monitoring the spectrum analyzer on a closed circuit television monitor.

APPENDIX A

INFORMATION ABOUT THE EQUIPMENT UNDER TEST

INFORMATION ABOUT THE EQUIPMENT UNDER TEST	
Test Software/Firmware:	Sercom Release 05
CRT was displaying:	Ping
Power Supply Manufacturer:	GlobTek
Power Supply Part Number:	MW48-1201200
AC Line Filter Manufacturer:	
AC Line Filter Part Number:	

I/O PORTS	
Type	#
Ethernet RJ45 10/100	10
Serial, DB9	1

CRYSTAL OSCILLATORS	
Type	Freq In MHz
2 x Crystal	25MHz
1 x Oscillator	33 MHz
1 x Oscillator	32.768kHz

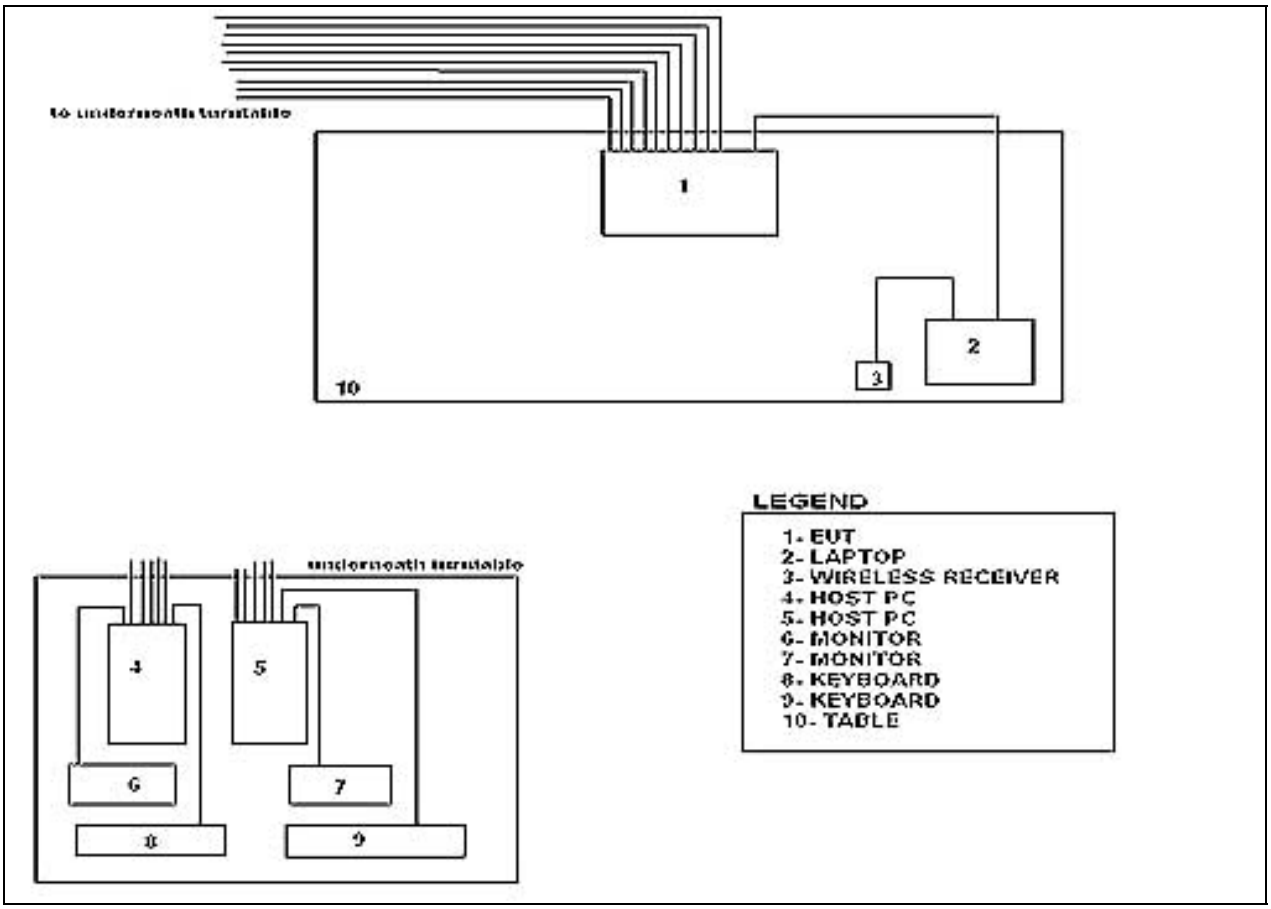
PRINTED CIRCUIT BOARDS				
Function	Model & Rev	Clocks, MHz	Layers	Location
PCA Main Board	1724-001		4	Chassis
Module, Wireless	1771-001			Daughter Card

CABLE INFORMATION

Cable #:		Cable(s) of this type:	10
Cable Type:	Cat 5 Ethernet	Shield Type:	None
Construction:	UTP	Length In Meters:	15
Connected To End (1):	EUT	Connected To End (2):	Remote PCs
Connector At End (1):	RJ45	Connector At End (2):	RJ45
Shield Grounded At (1):	None	Shield Grounded At (2):	None
Part Number:	Generic	Number of Conductors:	8
Notes and/or description:			

Cable #:		Cable(s) of this type:	
Cable Type:	Serial	Shield Type:	Foil
Construction:	Straight	Length In Meters:	2
Connected To End (1):	EUT – Console	Connected To End (2):	Desktop PC – serial port
Connector At End (1):	DB9	Connector At End (2):	DB9
Shield Grounded At (1):	Yes	Shield Grounded At (2):	Yes
Part Number:	Generic	Number of Conductors:	9
Notes and/or description:			

EQUIPMENT TEST SETUP DIAGRAM



PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS

Mains Conducted Emissions - Front View

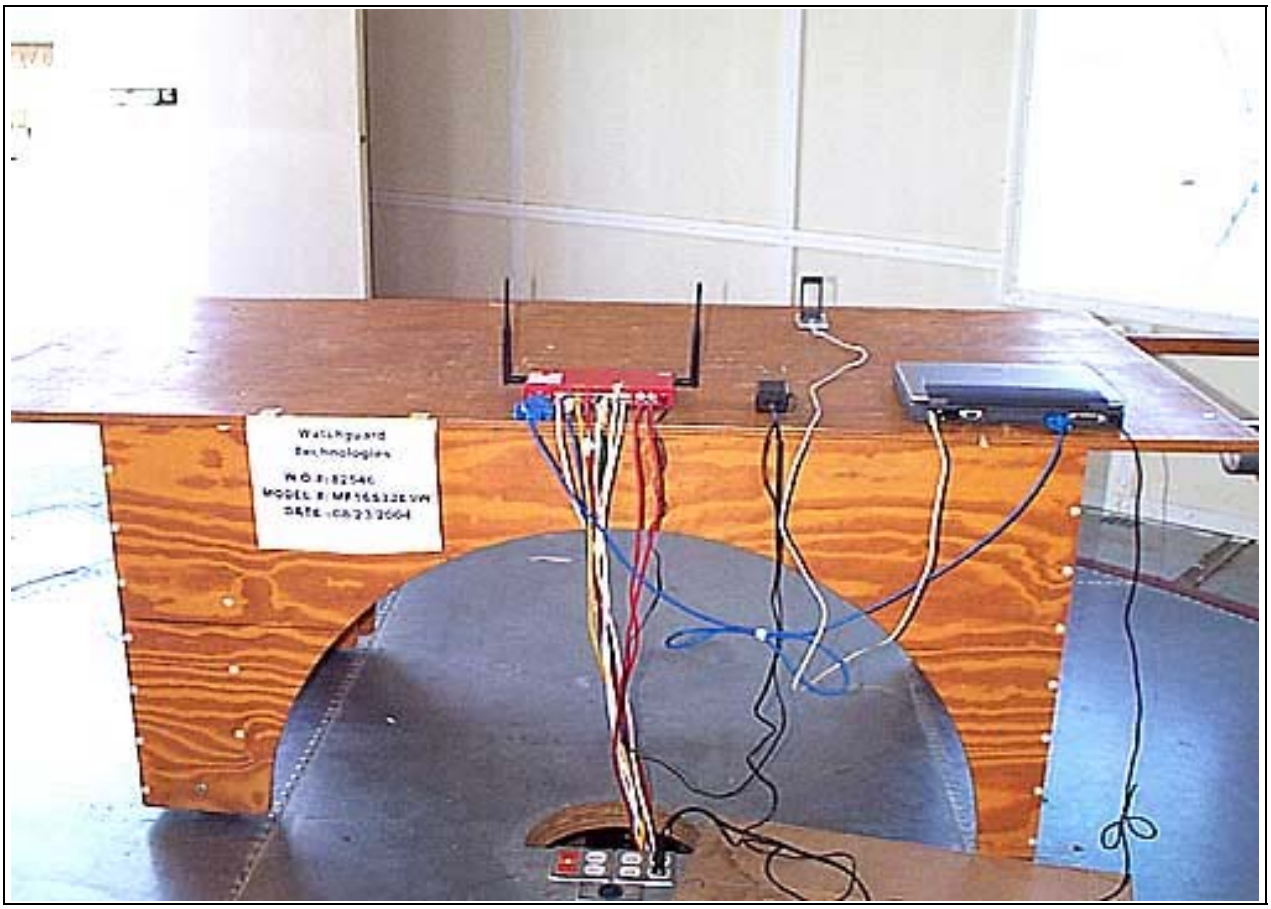
PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS

Mains Conducted Emissions - Side View

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Front View

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Back View

PHOTOGRAPH SHOWING DIRECT CONNECT TEST SETUP

APPENDIX B

TEST EQUIPMENT LIST

15.207

Function	S/N	Calibration Date	Cal Due Date	Asset #
S.A., RF Section HP-8568B	2601A02378	03/11/2003	03/11/2005	1377
S.A., Display HP-85662A	2542A10641	03/11/2003	03/11/2005	1377
QP Adapter HP-85650A	2043A00188	10/08/2002	10/08/2004	1508
LISN, Emco 3816/2	9408-1006	05/13/2003	05/13/2005	493
Cable, H-B Cond.	cond_cab_03_hol_b	08/04/2003	08/04/2005	0

15.209/15.247

Function	S/N	Calibration Date	Cal Due Date	Asset #
SA HP 8564E	3623A00539	08/02/2004	08/02/2005	1406
Ant., Bilog, Chase CBL6111C	2630	03/16/2004	03/16/2006	852
Preamp, HP-8447F	2944A03850	03/05/2003	03/05/2005	501
S.A., RF Section HP-8568B	2601A02378	03/11/2003	03/11/2005	1377
S.A., Display HP-85662A	2542A10641	03/11/2003	03/11/2005	1377
QP Adapter HP-85650A	2043A00188	10/08/2002	10/08/2004	1508
Cable, H-B 3M Rad., .01-1000MHz	rad_cab_3M_03_hol-b.01-1000MHz	08/04/2003	08/04/2005	0
Ant., Horn, Emco 3115	9307-5655	02/26/2003	02/26/2005	2157
Cable, HF, 2-ft, 1-18GHz	hol-hf-002-01	10/02/2002	10/02/2004	0
Cable, H-B 3M Rad. 1-13.5GHz	Hol-B 3-m rad cable-01-1GHz-13.5GHz	10/02/2002	10/02/2004	0
Preamp, HP-83017A	3123A00283	05/13/2003	05/13/2005	785
HF Cable SemFlex Inc. 58758-23	0038	01/21/2003	01/21/2005	0

15.247(b)(3)

Function	S/N	Calibration Date	Cal Due Date	Asset #
Signal Generator HP 8673	2447A00198	08/09/2004	08/09/2005	2547
O'scope HP 54615B	US35420829	08/29/2003	08/29/2005	697
Power Meter HP 437B	2912U01452	08/28/2003	08/28/2005	2258
Power Sensor HP 8482B	2703A04102	08/29/2003	08/29/2005	2572
Detector Diode Agilent 8472B	MY4224 0286	06/26/2003	06/26/2005	2589
Cable Semflex 58758-23	0038	01/21/2003	01/21/2005	P01403

15.247(c)

Function	S/N	Calibration Date	Cal Due Date	Asset #
SA HP 8564E	3623A00539	07/02/2004	07/02/2006	1406
Copper Hardline Cable	none	04/09/2003	04/09/2005	0

15.31(e)

Function	S/N	Calibration Date	Cal Due Date	Asset #
Copper Hardline Cable	none	04/09/2003	04/09/2005	0
S.A., HP-8596E	3346A00209	01/19/2003	01/19/2005	00784

APPENDIX C
MEASUREMENT DATA SHEETS

Test Location:	CKC Laboratories •480 Los Viboras Rd • Hollister, CA 95023 • 831-637-8176		
Customer:	**Watchguard Technologies**		
Specification:	**FCC 15.207 COND [AVE]**		
Work Order #:	**82546**	Date:	08/25/2004
Test Type:	**Conducted Emissions**	Time:	13:10:57
Equipment:	**Wireless Internet Firewall and VPN Encryption**	Sequence#:	14
Manufacturer:	Watchguard Technologies	Tested By:	Matthew Pettersen
Model:	MF16S32E9W		120V 60Hz
S/N:	001		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Wireless Internet Firewall and VPN Encryption*	Watchguard Technologies	MF16S32E9W	001
Power Supply	Watchguard Technologies	MW48 1201200	None

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Toshiba	Tecra 8100 PT810U	60748626U
Wireless USB Adapter	D-Link	DWL-G120	BN6G241012624

Test Conditions / Notes:

The EUT is a wireless internet firewall and VPN encryption device. The EUT is connected to two support PCs, which are located underneath the turntable, via 10 unshielded RJ45 cables. The support PCs are pinging the EUT and the EUT is returning the ping. In order for the EUT is receive and return the ping and exercise the digital circuitry properly, the EUT must be in non-continuous transmit normal operating mode. The EUT has continuous transmit disabled and the EUT is continuously searching for the best data rate connection speed. The EUT is also connected to a laptop via a serial link cable. The laptop controls command and setup functions for the EUT. A wireless USB adapter is connected to the laptop and is continuously monitoring the data rate and connection speed that the EUT is transmitting. The EUT was operating in 802.11g mode and adaptively transmitting OFDM or CCK or PSK depending on conditions, between 54 Mbps and 1 Mbps. At the time of testing, the EUT was found to be consistently transmitting CCK at 11Mbps on the channel indicated in each reading. Channels 1, 6 & 11 were investigated. Antennas are connected to both antenna ports of the EUT. The temperature is 71°F and the relative humidity is 43%. The EUT transmits and receives with the same antenna and uses antenna diversity to switch to the best antenna to acquire the fastest and best connection. The EUT cannot receive only and does not have a dedicated receive only port. AC Line Conducted emissions. Frequency range investigated 150kHz - 30MHz.

Transducer Legend:

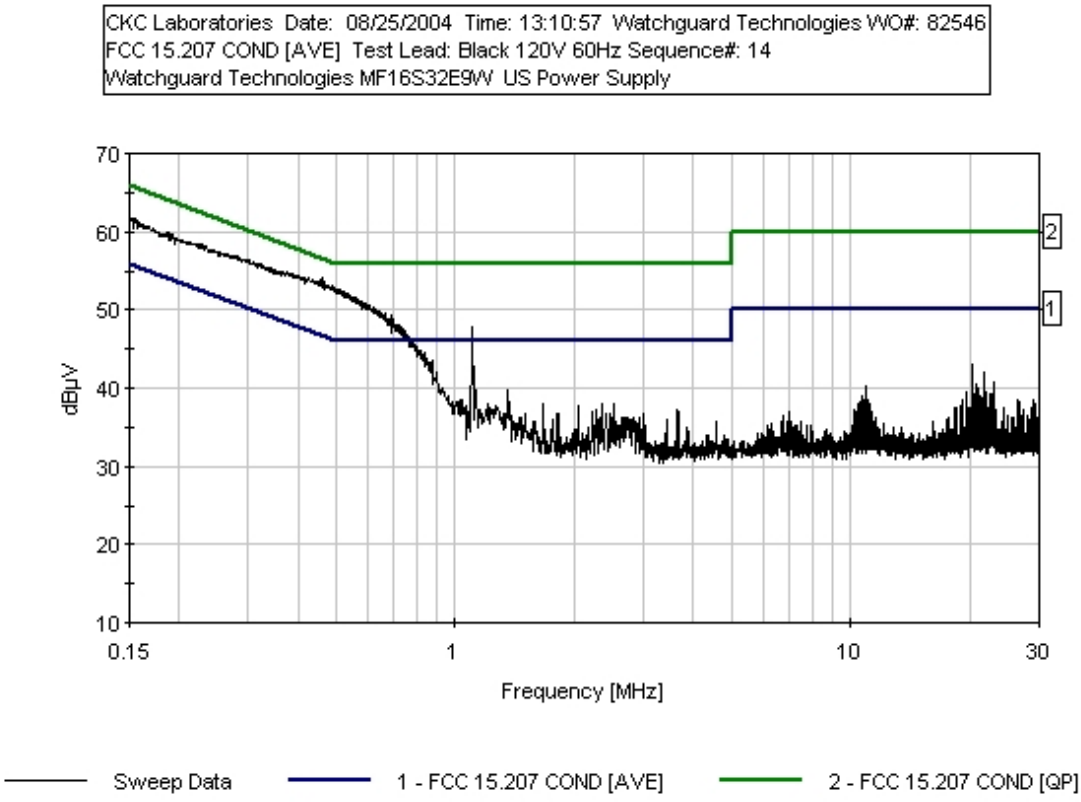
T1=Conducted Cable Cal for Hol-B	T2=LISN Loss Black 1006 a/n- 00493

Measurement Data: Reading listed by margin. Test Lead: Black

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	898.265k	41.9	+0.2	+0.0			+0.0	42.1	46.0	-3.9	Black
2	1.358M	39.6	+0.2	+0.0			+0.0	39.8	46.0	-6.2	Black
3	20.247M	41.9	+0.8	+0.4			+0.0	43.1	50.0	-6.9	Black
4	1.204M	37.9	+0.2	+0.0			+0.0	38.1	46.0	-7.9	Black
5	1.668M	37.7	+0.3	+0.1			+0.0	38.1	46.0	-7.9	Black

6	2.510M	37.8	+0.3	+0.0		+0.0	38.1	46.0	-7.9	Black
7	21.662M	40.9	+0.8	+0.4		+0.0	42.1	50.0	-7.9	Black
8	2.344M	37.6	+0.3	+0.1		+0.0	38.0	46.0	-8.0	Black
9	2.051M	37.4	+0.3	+0.1		+0.0	37.8	46.0	-8.2	Black
10	3.650M	36.8	+0.4	+0.1		+0.0	37.3	46.0	-8.7	Black
11	2.280M	36.8	+0.3	+0.1		+0.0	37.2	46.0	-8.8	Black
12	1.498M	36.4	+0.3	+0.1		+0.0	36.8	46.0	-9.2	Black
13	2.408M	36.4	+0.3	+0.1		+0.0	36.8	46.0	-9.2	Black
14	2.999M	36.4	+0.3	+0.0		+0.0	36.7	46.0	-9.3	Black
15	23.130M	39.4	+0.9	+0.4		+0.0	40.7	50.0	-9.3	Black
16	2.468M	36.3	+0.3	+0.0		+0.0	36.6	46.0	-9.4	Black
17	20.319M	39.3	+0.8	+0.4		+0.0	40.5	50.0	-9.5	Black
18	20.806M	39.3	+0.8	+0.4		+0.0	40.5	50.0	-9.5	Black
19	2.838M	36.0	+0.3	+0.0		+0.0	36.3	46.0	-9.7	Black
20	2.651M	35.9	+0.3	+0.0		+0.0	36.2	46.0	-9.8	Black
21	2.710M	35.9	+0.3	+0.0		+0.0	36.2	46.0	-9.8	Black
22	2.935M	35.9	+0.3	+0.0		+0.0	36.2	46.0	-9.8	Black
23	10.932M	39.5	+0.6	+0.1		+0.0	40.2	50.0	-9.8	Black
24	20.986M	38.9	+0.8	+0.4		+0.0	40.1	50.0	-9.9	Black
25	3.429M	35.6	+0.3	+0.0		+0.0	35.9	46.0	-10.1	Black
26	4.577M	35.2	+0.5	+0.1		+0.0	35.8	46.0	-10.2	Black
27	21.049M	38.5	+0.8	+0.4		+0.0	39.7	50.0	-10.3	Black
28	21.130M	38.5	+0.8	+0.4		+0.0	39.7	50.0	-10.3	Black
29	153.000k Ave	44.8	+0.1	+0.1		+0.0	45.0	55.8	-10.8	Black
^	152.909k	61.6	+0.1	+0.1		+0.0	61.8	55.8	+6.0	Black

31 Ave	160.000k	43.3	+0.1	+0.1	+0.0	43.5	55.5	-12.0	Black
^	160.000k	61.0	+0.1	+0.1	+0.0	61.2	55.5	+5.7	Black
33 Ave	170.000k	41.9	+0.0	+0.1	+0.0	42.0	55.0	-13.0	Black
^	170.000k	60.4	+0.0	+0.1	+0.0	60.5	55.0	+5.5	Black
35 Ave	200.000k	37.7	+0.0	+0.0	+0.0	37.7	53.6	-15.9	Black
^	200.000k	59.2	+0.0	+0.0	+0.0	59.2	53.6	+5.6	Black
37 Ave	1.102M	23.1	+0.2	+0.0	+0.0	23.3	46.0	-22.7	Black
^	1.102M	47.5	+0.2	+0.0	+0.0	47.7	46.0	+1.7	Black



Test Location: CKC Laboratories •480 Los Viboras Rd • Hollister, CA 95023 • 831-637-8176

Customer:	**Watchguard Technologies**		
Specification:	**FCC 15.207 COND [AVE]**		
Work Order #:	**82546**	Date:	08/25/2004
Test Type:	**Conducted Emissions**	Time:	13:19:36
Equipment:	**Wireless Internet Firewall and VPN Encryption**	Sequence#:	15
Manufacturer:	Watchguard Technologies	Tested By:	Matthew Pettersen
Model:	MF16S32E9W		120V 60Hz
S/N:	001		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Wireless Internet Firewall and VPN Encryption*	Watchguard Technologies	MF16S32E9W	001
Power Supply	Watchguard Technologies	MW48 1201200	None

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Toshiba	Tecra 8100 PT810U	60748626U
Wireless USB Adapter	D-Link	DWL-G120	BN6G241012624

Test Conditions / Notes:

The EUT is a wireless internet firewall and VPN encryption device. The EUT is connected to two support PCs, which are located underneath the turntable, via 10 unshielded RJ45 cables. The support PCs are pinging the EUT and the EUT is returning the ping. In order for the EUT is receive and return the ping and exercise the digital circuitry properly, the EUT must be in non-continuous transmit normal operating mode. The EUT has continuous transmit disabled and the EUT is continuously searching for the best data rate connection speed. The EUT is also connected to a laptop via a serial link cable. The laptop controls command and setup functions for the EUT. A wireless USB adapter is connected to the laptop and is continuously monitoring the data rate and connection speed that the EUT is transmitting. The EUT was operating in 802.11g mode and adaptively transmitting OFDM or CCK or PSK depending on conditions, between 54 Mbps and 1 Mbps. At the time of testing, the EUT was found to be consistently transmitting CCK at 11Mbps on the channel indicated in each reading. Channels 1, 6 & 11 were investigated. Antennas are connected to both antenna ports of the EUT. The temperature is 71°F and the relative humidity is 43%. The EUT transmits and receives with the same antenna and uses antenna diversity to switch to the best antenna to acquire the fastest and best connection. The EUT cannot receive only and does not have a dedicated receive only port. AC Line Conducted emissions. Frequency range investigated 150kHz - 30MHz.

Transducer Legend:

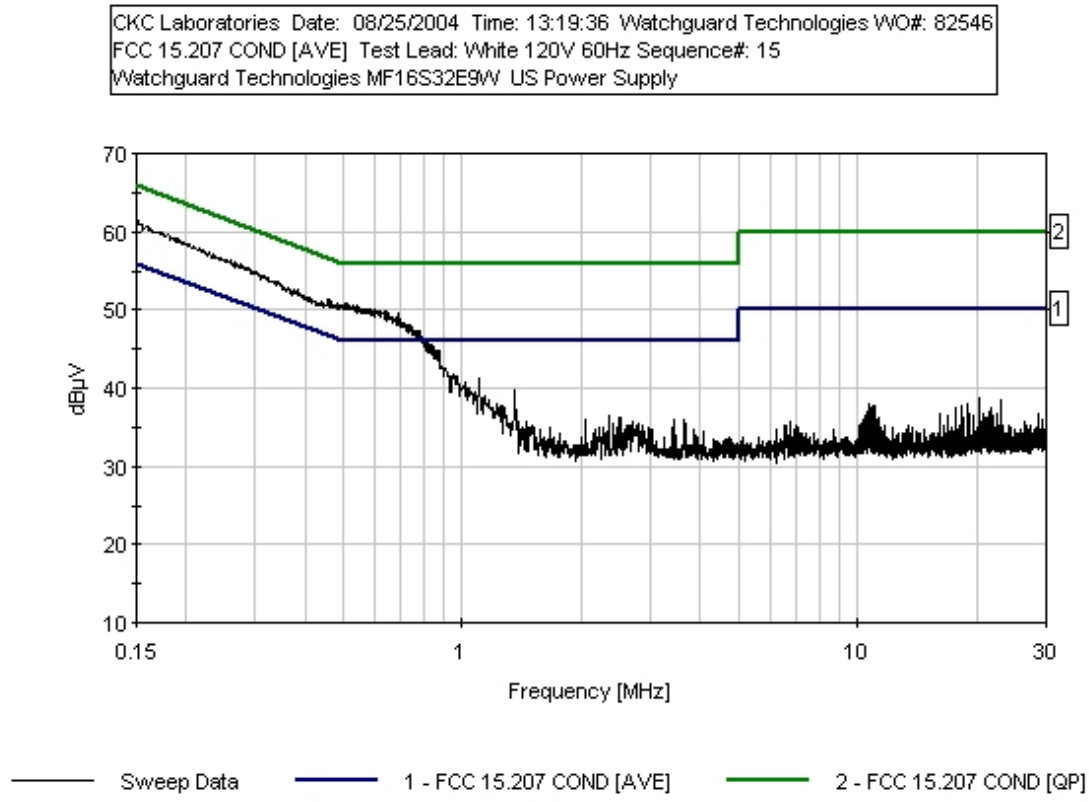
T1=Conducted Cable Cal for Hol-B	T2=LISN Loss White 1006 a/n- 00493

Measurement Data: Reading listed by margin. Test Lead: White

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	881.253k	42.5	+0.2	+0.1			+0.0	42.8	46.0	-3.2	White
2	1.358M	39.4	+0.2	+0.1			+0.0	39.7	46.0	-6.3	White
3	2.344M	36.0	+0.3	+0.1			+0.0	36.4	46.0	-9.6	White
4	2.510M	35.9	+0.3	+0.1			+0.0	36.3	46.0	-9.7	White
5	3.650M	35.5	+0.4	+0.1			+0.0	36.0	46.0	-10.0	White

6	2.042M	35.5	+0.3	+0.1		+0.0	35.9	46.0	-10.1	White
7	3.425M	35.5	+0.3	+0.1		+0.0	35.9	46.0	-10.1	White
8	1.447M	35.2	+0.3	+0.1		+0.0	35.6	46.0	-10.4	White
9	2.714M	35.2	+0.3	+0.1		+0.0	35.6	46.0	-10.4	White
10	2.404M	35.1	+0.3	+0.1		+0.0	35.5	46.0	-10.5	White
11	151.000k Ave	44.9	+0.1	+0.0		+0.0	45.0	55.9	-10.9	White
^	150.727k	61.3	+0.1	+0.0		+0.0	61.4	56.0	+5.4	White
13	2.221M	34.6	+0.3	+0.1		+0.0	35.0	46.0	-11.0	White
14	1.672M	34.5	+0.3	+0.1		+0.0	34.9	46.0	-11.1	White
15	2.280M	34.5	+0.3	+0.1		+0.0	34.9	46.0	-11.1	White
16	1.566M	34.3	+0.3	+0.1		+0.0	34.7	46.0	-11.3	White
17	2.161M	34.3	+0.3	+0.1		+0.0	34.7	46.0	-11.3	White
18	20.256M	37.5	+0.8	+0.4		+0.0	38.7	50.0	-11.3	White
19	23.130M	37.0	+0.9	+0.6		+0.0	38.5	50.0	-11.5	White
20	18.896M	37.1	+0.7	+0.3		+0.0	38.1	50.0	-11.9	White
21	160.000k Ave	43.4	+0.1	+0.0		+0.0	43.5	55.5	-12.0	White
^	160.000k	60.6	+0.1	+0.0		+0.0	60.7	55.5	+5.2	White
23	10.725M	37.2	+0.6	+0.1		+0.0	37.9	50.0	-12.1	White
24	10.932M	37.1	+0.6	+0.1		+0.0	37.8	50.0	-12.2	White
25	11.031M	37.1	+0.6	+0.1		+0.0	37.8	50.0	-12.2	White
26	18.292M	36.8	+0.7	+0.3		+0.0	37.8	50.0	-12.2	White
27	21.662M	36.3	+0.8	+0.5		+0.0	37.6	50.0	-12.4	White
28	10.833M	36.8	+0.6	+0.1		+0.0	37.5	50.0	-12.5	White
29	17.680M	36.5	+0.7	+0.3		+0.0	37.5	50.0	-12.5	White
30	10.508M	36.3	+0.6	+0.1		+0.0	37.0	50.0	-13.0	White

31	21.463M	35.6	+0.8	+0.5	+0.0	36.9	50.0	-13.1	White
32	19.148M	35.6	+0.8	+0.4	+0.0	36.8	50.0	-13.2	White
33	20.806M	35.5	+0.8	+0.5	+0.0	36.8	50.0	-13.2	White
34	200.000k Ave	37.9	+0.0	+0.1	+0.0	38.0	53.6	-15.6	White
^	200.000k	58.7	+0.0	+0.1	+0.0	58.8	53.6	+5.2	White



Test Location: CKC Laboratories •480 Los Viboras Rd • Hollister, CA 95023 • 831-637-8176

Customer:	**Watchguard Technologies**		
Specification:	**FCC 15.207 COND [AVE]**		
Work Order #:	**82546**	Date:	08/25/2004
Test Type:	**Conducted Emissions**	Time:	4:42:48 PM
Equipment:	**Wireless Internet Firewall and VPN Encryption**	Sequence#:	22
Manufacturer:	Watchguard Technologies	Tested By:	Matthew Pettersen
Model:	MF16S32E9W		120V 60Hz
S/N:	001		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Wireless Internet Firewall and VPN Encryption*	Watchguard Technologies	MF16S32E9W	001
Switching AC Adapter	Watchguard Technologies	GT-21089-1512-T2	00363129/03

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Toshiba	Tecra 8100 PT810U	60748626U
Wireless USB Adapter	D-Link	DWL-G120	BN6G241012624

Test Conditions / Notes:

The EUT is a wireless internet firewall and VPN encryption device. The EUT is connected to two support PCs, which are located underneath the turntable, via 10 unshielded RJ45 cables. The support PCs are pinging the EUT and the EUT is returning the ping. In order for the EUT is receive and return the ping and exercise the digital circuitry properly, the EUT must be in non-continuous transmit normal operating mode. The EUT has continuous transmit disabled and the EUT is continuously searching for the best data rate connection speed. The EUT is also connected to a laptop via a serial link cable. The laptop controls command and setup functions for the EUT. A wireless USB adapter is connected to the laptop and is continuously monitoring the data rate and connection speed that the EUT is transmitting. The EUT was operating in 802.11g mode and adaptively transmitting OFDM or CCK or PSK depending on conditions, between 54 Mbps and 1 Mbps. At the time of testing, the EUT was found to be consistently transmitting CCK at 11Mbps on the channel indicated in each reading. Channels 1, 6 & 11 were investigated. Antennas are connected to both antenna ports of the EUT. The temperature is 71°F and the relative humidity is 43%. The EUT transmits and receives with the same antenna and uses antenna diversity to switch to the best antenna to acquire the fastest and best connection. The EUT cannot receive only and does not have a dedicated receive only port. AC Line Conducted emissions. Frequency range investigated 150kHz - 30MHz.

Transducer Legend:

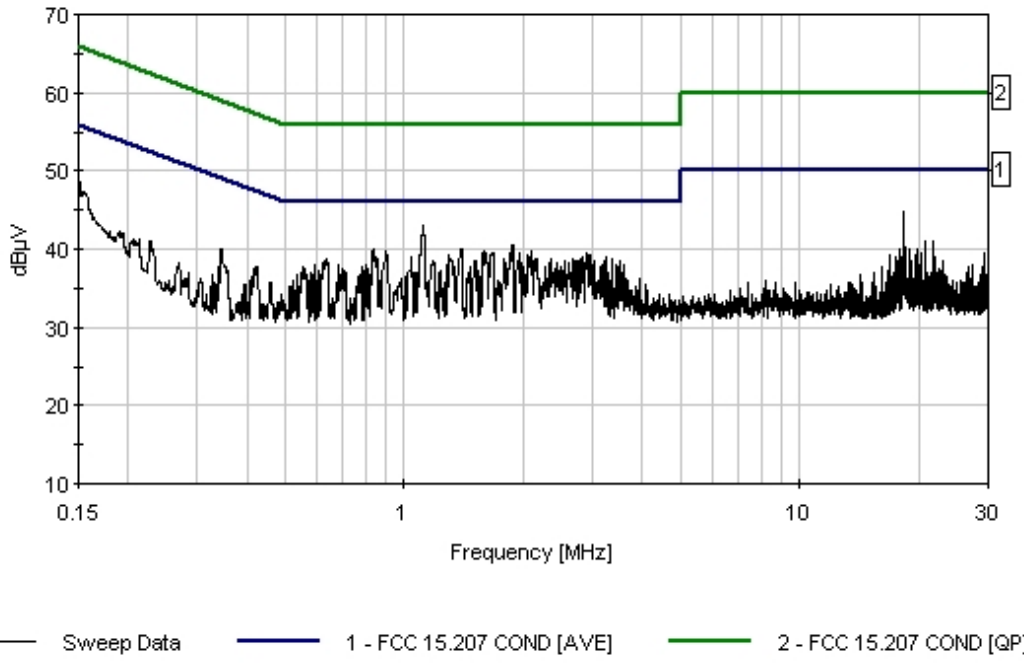
T1=Conducted Cable Cal for Hol-B	T2=LISN Loss Black 1006 a/n- 00493

Measurement Data: Reading listed by margin. Test Lead: Black

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1.111M	42.7	+0.2	+0.0			+0.0	42.9	46.0	-3.1	Black
2	18.238M	43.8	+0.7	+0.3			+0.0	44.8	50.0	-5.2	Black
3	1.876M	40.0	+0.3	+0.1			+0.0	40.4	46.0	-5.6	Black
4	834.295k	39.7	+0.2	+0.1			+0.0	40.0	46.0	-6.0	Black
5	1.392M	39.7	+0.2	+0.0			+0.0	39.9	46.0	-6.1	Black

6	1.600M	39.4	+0.3	+0.1	+0.0	39.8	46.0	-6.2	Black
7	902.518k	39.5	+0.2	+0.0	+0.0	39.7	46.0	-6.3	Black
8	2.102M	39.3	+0.3	+0.1	+0.0	39.7	46.0	-6.3	Black
9	1.664M	39.1	+0.3	+0.1	+0.0	39.5	46.0	-6.5	Black
10	1.962M	39.0	+0.3	+0.1	+0.0	39.4	46.0	-6.6	Black
11	2.901M	39.1	+0.3	+0.0	+0.0	39.4	46.0	-6.6	Black
12	1.298M	39.0	+0.2	+0.0	+0.0	39.2	46.0	-6.8	Black
13	2.940M	38.9	+0.3	+0.0	+0.0	39.2	46.0	-6.8	Black
14	1.047M	38.9	+0.2	+0.0	+0.0	39.1	46.0	-6.9	Black
15	2.816M	38.7	+0.3	+0.0	+0.0	39.0	46.0	-7.0	Black
16	3.233M	38.6	+0.3	+0.0	+0.0	38.9	46.0	-7.1	Black
17	1.787M	38.4	+0.3	+0.1	+0.0	38.8	46.0	-7.2	Black
18	2.672M	38.5	+0.3	+0.0	+0.0	38.8	46.0	-7.2	Black
19	633.588k	38.6	+0.1	+0.0	+0.0	38.7	46.0	-7.3	Black
20	2.353M	38.3	+0.3	+0.1	+0.0	38.7	46.0	-7.3	Black
21	3.369M	38.4	+0.3	+0.0	+0.0	38.7	46.0	-7.3	Black
22	151.454k	48.3	+0.1	+0.1	+0.0	48.5	55.9	-7.4	Black
23	2.714M	38.3	+0.3	+0.0	+0.0	38.6	46.0	-7.4	Black
24	1.183M	38.3	+0.2	+0.0	+0.0	38.5	46.0	-7.5	Black
25	1.511M	38.0	+0.3	+0.1	+0.0	38.4	46.0	-7.6	Black
26	2.544M	38.1	+0.3	+0.0	+0.0	38.4	46.0	-7.6	Black
27	2.765M	38.1	+0.3	+0.0	+0.0	38.4	46.0	-7.6	Black
28	3.501M	37.9	+0.4	+0.1	+0.0	38.4	46.0	-7.6	Black
29	2.442M	37.9	+0.3	+0.1	+0.0	38.3	46.0	-7.7	Black
30	594.319k	38.0	+0.1	+0.0	+0.0	38.1	46.0	-7.9	Black

CKC Laboratories Date: 08/25/2004 Time: 4:42:48 PM Watchguard Technologies WO#: 82546
FCC 15.207 COND [AVE] Test Lead: Black 120V 60Hz Sequence#: 22
Watchguard Technologies MF16S32E9W Switching Power Supply



Test Location: CKC Laboratories •480 Los Viboras Rd • Hollister, CA 95023 • 831-637-8176

Customer:	**Watchguard Technologies**		
Specification:	**FCC 15.207 COND [AVE]**		
Work Order #:	**82546**	Date:	08/25/2004
Test Type:	**Conducted Emissions**	Time:	4:48:49 PM
Equipment:	**Wireless Internet Firewall and VPN Encryption**	Sequence#:	23
Manufacturer:	Watchguard Technologies	Tested By:	Matthew Pettersen
Model:	MF16S32E9W		120V 60Hz
S/N:	001		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Wireless Internet Firewall and VPN Encryption*	Watchguard Technologies	MF16S32E9W	001
Switching AC Adapter	Watchguard Technologies	GT-21089-1512-T2	00363129/03

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Toshiba	Tecra 8100 PT810U	60748626U
Wireless USB Adapter	D-Link	DWL-G120	BN6G241012624

Test Conditions / Notes:

The EUT is a wireless internet firewall and VPN encryption device. The EUT is connected to two support PCs, which are located underneath the turntable, via 10 unshielded RJ45 cables. The support PCs are pinging the EUT and the EUT is returning the ping. In order for the EUT is receive and return the ping and exercise the digital circuitry properly, the EUT must be in non-continuous transmit normal operating mode. The EUT has continuous transmit disabled and the EUT is continuously searching for the best data rate connection speed. The EUT is also connected to a laptop via a serial link cable. The laptop controls command and setup functions for the EUT. A wireless USB adapter is connected to the laptop and is continuously monitoring the data rate and connection speed that the EUT is transmitting. The EUT was operating in 802.11g mode and adaptively transmitting OFDM or CCK or PSK depending on conditions, between 54 Mbps and 1 Mbps. At the time of testing, the EUT was found to be consistently transmitting CCK at 11Mbps on the channel indicated in each reading. Channels 1, 6 & 11 were investigated. Antennas are connected to both antenna ports of the EUT. The temperature is 71°F and the relative humidity is 43%. The EUT transmits and receives with the same antenna and uses antenna diversity to switch to the best antenna to acquire the fastest and best connection. The EUT cannot receive only and does not have a dedicated receive only port. AC Line Conducted emissions. Frequency range investigated 150kHz - 30MHz.

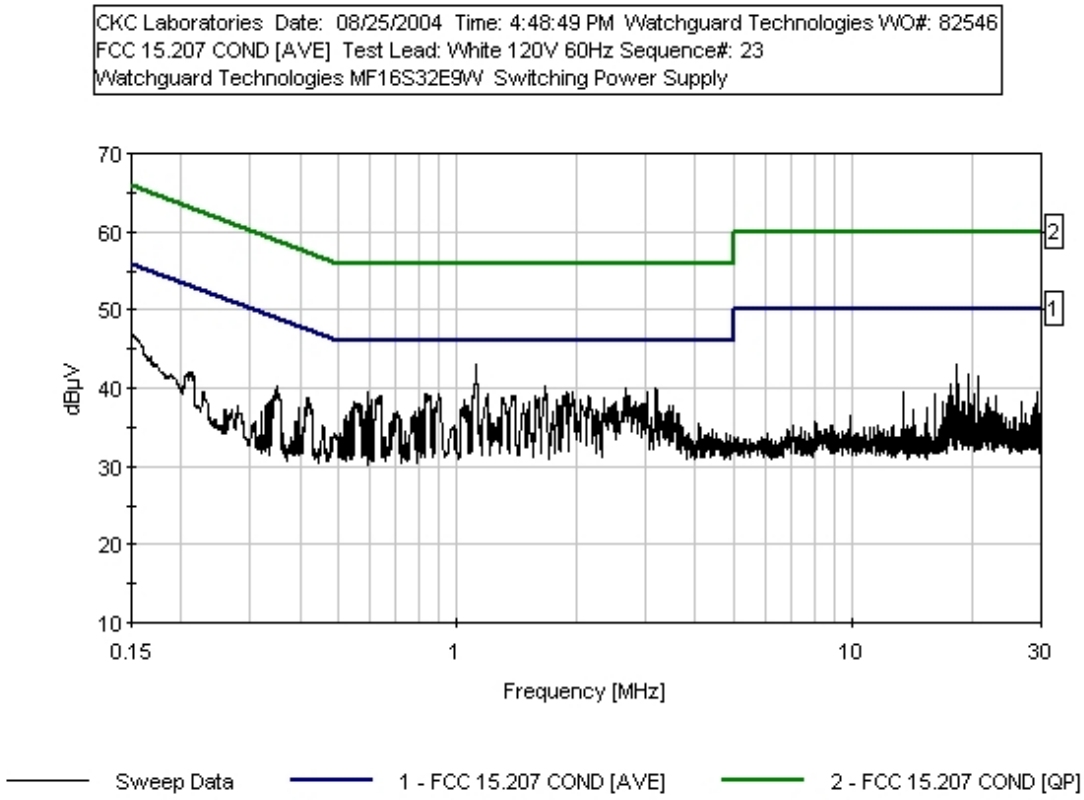
Transducer Legend:

T1=Conducted Cable Cal for Hol-B	T2=LISN Loss White 1006 a/n- 00493

Measurement Data: Reading listed by margin. Test Lead: White

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1.115M	42.6	+0.2	+0.1			+0.0	42.9	46.0	-3.1	White
2	1.677M	39.9	+0.3	+0.1			+0.0	40.3	46.0	-5.7	White
3	3.182M	39.7	+0.3	+0.1			+0.0	40.1	46.0	-5.9	White
4	2.659M	39.5	+0.3	+0.1			+0.0	39.9	46.0	-6.1	White
5	1.898M	39.2	+0.3	+0.1			+0.0	39.6	46.0	-6.4	White

6	1.957M	39.1	+0.3	+0.1	+0.0	39.5	46.0	-6.5	White
7	596.501k	39.3	+0.1	+0.0	+0.0	39.4	46.0	-6.6	White
8	898.265k	39.0	+0.2	+0.1	+0.0	39.3	46.0	-6.7	White
9	1.192M	39.0	+0.2	+0.1	+0.0	39.3	46.0	-6.7	White
10	832.114k	38.9	+0.2	+0.1	+0.0	39.2	46.0	-6.8	White
11	1.906M	38.8	+0.3	+0.1	+0.0	39.2	46.0	-6.8	White
12	635.042k	39.0	+0.1	+0.0	+0.0	39.1	46.0	-6.9	White
13	2.144M	38.7	+0.3	+0.1	+0.0	39.1	46.0	-6.9	White
14	1.404M	38.7	+0.2	+0.1	+0.0	39.0	46.0	-7.0	White
15	1.579M	38.5	+0.3	+0.1	+0.0	38.9	46.0	-7.1	White
16	18.238M	41.9	+0.7	+0.3	+0.0	42.9	50.0	-7.1	White
17	1.302M	38.5	+0.2	+0.1	+0.0	38.8	46.0	-7.2	White
18	1.039M	38.2	+0.2	+0.1	+0.0	38.5	46.0	-7.5	White
19	2.055M	38.1	+0.3	+0.1	+0.0	38.5	46.0	-7.5	White
20	611.045k	38.3	+0.1	+0.0	+0.0	38.4	46.0	-7.6	White
21	1.783M	38.0	+0.3	+0.1	+0.0	38.4	46.0	-7.6	White
22	549.960k	38.2	+0.1	+0.0	+0.0	38.3	46.0	-7.7	White
23	1.515M	37.8	+0.3	+0.1	+0.0	38.2	46.0	-7.8	White
24	1.468M	37.6	+0.3	+0.1	+0.0	38.0	46.0	-8.0	White
25	600.137k	37.7	+0.1	+0.0	+0.0	37.8	46.0	-8.2	White
26	1.817M	37.4	+0.3	+0.1	+0.0	37.8	46.0	-8.2	White
27	19.707M	40.6	+0.8	+0.4	+0.0	41.8	50.0	-8.2	White
28	539.052k	37.3	+0.2	+0.0	+0.0	37.5	46.0	-8.5	White
29	872.837k	37.2	+0.2	+0.1	+0.0	37.5	46.0	-8.5	White
30	20.815M	40.1	+0.8	+0.5	+0.0	41.4	50.0	-8.6	White


CKC Laboratories Date: 08/25/2004 Time: 4:48:49 PM Watchguard Technologies WO#: 82546
FCC 15.207 COND [AVE] Test Lead: White 120V 60Hz Sequence#: 23
Watchguard Technologies MF16S32E9W Switching Power Supply
70
60
50
40
30
20
10
dBµV
0.15
1
10
30
Frequency [MHz]
2
1
Sweep Data
1 - FCC 15.207 COND [AVE]
2 - FCC 15.207 COND [QP]

Test Location: CKC Laboratories •480 Los Viboras Rd • Hollister, CA 95023 • 831-637-8176

Customer: **Watchguard Technologies**
Specification: **FCC 15.247 / 15.209**
Work Order #: **82546** Date: 08/24/2004
Test Type: **Maximized Emissions** Time: 15:16:02
Equipment: **Wireless Internet Firewall and VPN Encryption** Sequence#: 10
Manufacturer: Watchguard Technologies Tested By: Matthew Pettersen
Model: MF16S32E9W
S/N: 001

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Wireless Internet Firewall and VPN Encryption*	Watchguard Technologies	MF16S32E9W	001
Power Supply	Watchguard Technologies	MW48 1201200	None

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Toshiba	Tecra 8100 PT810U	60748626U
Wireless USB Adapter	D-Link	DWL-G120	BN6G241012624

Test Conditions / Notes:

The EUT is a wireless internet firewall and VPN encryption device. The EUT is connected to two support PCs, which are located underneath the turntable, via 10 unshielded RJ45 cables. The support PCs are pinging the EUT and the EUT is returning the ping. In order for the EUT is receive and return the ping and exercise the digital circuitry properly, the EUT must be in non-continuous transmit normal operating mode. The EUT has continuous transmit disabled and the EUT is continuously searching for the best data rate connection speed. The EUT is also connected to a laptop via a serial link cable. The laptop controls command and setup functions for the EUT. A wireless USB adapter is connected to the laptop and is continuously monitoring the data rate and connection speed that the EUT is transmitting. The EUT was operating in 802.11g mode and adaptively transmitting OFDM or CCK or PSK depending on conditions, between 54 Mbps and 1 Mbps. At the time of testing, the EUT was found to be consistently transmitting CCK at 11Mbps on the channel indicated in each reading. Channels 1, 6 & 11 were investigated. Antennas are connected to both antenna ports of the EUT. The temperature is 71°F and the relative humidity is 43%. The EUT transmits and receives with the same antenna and uses antenna diversity to switch to the best antenna to acquire the fastest and best connection. The EUT cannot receive only and does not have a dedicated receive only port. Frequency range investigated was 30 MHz to 25GHz. No signal detected above 1 GHz.

Transducer Legend:

T1=Chase bilog a/n 00852, s/n 2630	T2=Amp Cal.HP-8447F OPT H64, S/N-2944A03850
T3=H-B 3m Rad cable .01-1000MHz	T4=Horn 1-18 GHz (Hollister)
T5=hol-hf-002-01 (Site B 2 ft cable)	T6=HP-83017A, S/N 3123A00283
T7=H-B 3 meter rad. cable 1-13.5 GHz	

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	56.201M QP	55.9	+7.6	-26.6	+1.1		+0.0	38.0	40.0 Channel 1	-2.0	Vert
^	56.201M	58.2	+7.6	-26.6	+1.1		+0.0	40.3	40.0 Channel 1	+0.3	Vert
3	666.628M	46.8	+20.2	-27.7	+3.9		+0.0	43.2	46.0 Channel 11	-2.8	Vert

4	124.992M QP	53.2	+11.5	-26.4	+1.8		+0.0	40.1	43.5 Channel 1	-3.4	Vert
^	124.992M	54.5	+11.5	-26.4	+1.8		+0.0	41.4	43.5 Channel 1	-2.1	Vert
^	124.985M	52.9	+11.5	-26.4	+1.8		+0.0	39.8	43.5 Channel 6	-3.7	Vert
^	125.000M	52.7	+11.5	-26.4	+1.8		+0.0	39.6	43.5 Channel 11	-3.9	Vert
8	666.636M	45.7	+20.2	-27.7	+3.9		+0.0	42.1	46.0 Channel 6	-3.9	Vert
9	2165.233M	53.3	+0.0 +0.3	+0.0 -38.3	+0.0 +7.0	+27.6	+0.0	49.9	54.0	-4.1	Vert
10	149.976M	51.4	+12.1	-26.3	+1.9		+0.0	39.1	43.5 Channel 11	-4.4	Vert
11	666.659M	45.0	+20.2	-27.7	+3.9		+0.0	41.4	46.0 Channel 1	-4.6	Vert
12	60.227M QP	54.0	+6.5	-26.6	+1.2		+0.0	35.1	40.0 Channel 11	-4.9	Vert
^	60.222M	56.5	+6.5	-26.6	+1.2		+0.0	37.6	40.0 Channel 11	-2.4	Vert
14	279.992M	53.5	+10.7	-25.8	+2.6		+0.0	41.0	46.0 Channel 1	-5.0	Horiz
15	60.465M	53.3	+6.5	-26.6	+1.2		+0.0	34.4	40.0 Channel 1	-5.6	Vert
16	149.996M	50.1	+12.1	-26.3	+1.9		+0.0	37.8	43.5 Channel 6	-5.7	Vert
17	56.016M QP	52.0	+7.6	-26.6	+1.1		+0.0	34.1	40.0 Channel 11	-5.9	Vert
18	56.020M QP	51.8	+7.6	-26.6	+1.1		+0.0	33.9	40.0 Channel 6	-6.1	Vert
^	56.003M	55.6	+7.6	-26.6	+1.1		+0.0	37.7	40.0 Channel 11	-2.3	Vert
^	56.021M	55.3	+7.6	-26.6	+1.1		+0.0	37.4	40.0 Channel 6	-2.6	Vert
21	149.997M	49.6	+12.1	-26.3	+1.9		+0.0	37.3	43.5 Channel 1	-6.2	Vert
22	60.950M QP	52.2	+6.5	-26.6	+1.2		+0.0	33.3	40.0 Channel 6	-6.7	Vert
^	60.950M	55.0	+6.5	-26.6	+1.2		+0.0	36.1	40.0 Channel 6	-3.9	Vert
24	250.007M	52.0	+10.6	-25.9	+2.5		+0.0	39.2	46.0 Channel 1	-6.8	Horiz
25	279.991M	50.9	+10.7	-25.8	+2.6		+0.0	38.4	46.0 Channel 11	-7.6	Horiz
26	249.996M	50.7	+10.6	-25.9	+2.5		+0.0	37.9	46.0 Channel 11	-8.1	Horiz
27	249.986M	50.4	+10.6	-25.9	+2.5		+0.0	37.6	46.0 Channel 6	-8.4	Horiz
28	1498.933M	52.5	+0.0 +0.0	+0.0 -39.0	+0.0 +5.8	+25.5	+0.0	44.8	54.0	-9.2	Vert

29	279.976M	48.0	+10.7	-25.8	+2.6		+0.0	35.5	46.0 Channel 6	-10.5	Horiz
30	1713.567M	46.3	+0.0 +0.0	+0.0 -38.7	+0.0 +6.3	+26.2	+0.0	40.1	54.0	-13.9	Horiz
31	1282.367M	49.3	+0.0 +0.0	+0.0 -39.9	+0.0 +5.4	+24.8	+0.0	39.6	54.0	-14.4	Vert
32	1200.067M	49.2	+0.0 +0.1	+0.0 -40.3	+0.0 +5.2	+24.5	+0.0	38.7	54.0	-15.3	Vert
33	1000.007M	49.0	+0.0 +0.1	+0.0 -41.3	+0.0 +4.7	+23.7	+0.0	36.2	54.0	-17.8	Vert
34	1466.700M	43.7	+0.0 +0.0	+0.0 -39.1	+0.0 +5.7	+25.4	+0.0	35.7	54.0	-18.3	Horiz
35	1092.667M	44.8	+0.0 +0.1	+0.0 -40.8	+0.0 +4.9	+24.1	+0.0	33.1	54.0	-20.9	Horiz
36	1000.000M	45.5	+0.0 +0.1	+0.0 -41.3	+0.0 +4.7	+23.7	+0.0	32.7	54.0	-21.3	Horiz

Test Location:	CKC Laboratories •480 Los Viboras Rd • Hollister, CA 95023 • 831-637-8176		
Customer:	**Watchguard Technologies**		
Specification:	**FCC 15.247(c)-Watchguard**		
Work Order #:	**82546**	Date:	08/25/2004
Test Type:	**Maximized Emissions**	Time:	12:16:24
Equipment:	**Wireless Internet Firewall and VPN Encryption**	Sequence#:	13
Manufacturer:	Watchguard Technologies	Tested By:	Matthew Pettersen
Model:	MF16S32E9W		
S/N:	001		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Wireless Internet Firewall and VPN Encryption*	Watchguard Technologies	MF16S32E9W	001
Power Supply	Watchguard Technologies	MW48 1201200	None

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Toshiba	Tecra 8100 PT810U	60748626U
Wireless USB Adapter	D-Link	DWL-G120	BN6G241012624
Keyboard	Microsoft	E06401COMB	71305-584-0682401-40038
Keyboard	Generic	none	020324356
Monitor	NEC	MultiSync LCD 1550V	none
Monitor	NEC	MultiSync LCD 1550V	none
Support PC	Computer Sonics	none	none
Support PC	Computer Sonics	none	none

Test Conditions / Notes:

The EUT is a wireless internet firewall and VPN encryption device. The EUT is connected to two support PCs, which are located underneath the turntable, via 10 unshielded RJ45 cables. The support PCs are pinging the EUT and the EUT is returning the ping. In order for the EUT is receive and return the ping and exercise the digital circuitry properly, the EUT must be in non-continuous transmit normal operating mode. The EUT has continuous transmit disabled and the EUT is continuously searching for the best data rate connection speed. The EUT is also connected to a laptop via a serial link cable. The laptop controls command and setup functions for the EUT. A wireless USB adapter is connected to the laptop and is continuously monitoring the data rate and connection speed that the EUT is transmitting. The EUT was operating in 802.11g mode and adaptively transmitting OFDM or CCK or PSK depending on conditions, between 54 Mbps and 1 Mbps. At the time of testing, the EUT was found to be consistently transmitting CCK at 11Mbps on the channel indicated in each reading. Channels 1, 6 & 11 were investigated. Antennas are connected to both antenna ports of the EUT. The temperature is 71°F and the relative humidity is 43%. The EUT transmits and receives with the same antenna and uses antenna diversity to switch to the best antenna to acquire the fastest and best connection. The EUT cannot receive only and does not have a dedicated receive only port. Radiated TX Spurious. Frequency range investigated was 2.4GHz to 25GHz.

Transducer Legend:

T1=Horn 1-18 GHz (Hollister)	T2=hol-hf-002-01 (Site B 2 ft cable)
T3=HP-83017A, S/N 3123A00283	T4=H-B 3 meter rad. cable 1-13.5 GHz

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	4924.300M Ave	38.5	+33.2	+0.8	-37.2	+11.7	+10.0	57.0	93.8 Channel 11	-36.8	Horiz
^	4924.300M	40.7	+33.2	+0.8	-37.2	+11.7	+10.0	59.2	93.8 Channel 11	-34.6	Horiz

3	7254.750M	32.5	+34.6	+1.5	-37.2	+15.0	+10.0	56.4	93.8 Channel 1	-37.4	Vert
4	4823.958M Ave	38.3	+33.0	+0.8	-37.3	+11.5	+10.0	56.3	93.8 Channel 1	-37.5	Horiz
^	4823.958M	43.3	+33.0	+0.8	-37.3	+11.5	+10.0	61.3	93.8 Channel 1	-32.5	Horiz
6	4874.500M Ave	37.7	+33.1	+0.8	-37.3	+11.6	+10.0	55.9	93.8 Channel 6	-37.9	Horiz
^	4874.500M	44.7	+33.1	+0.8	-37.3	+11.6	+10.0	62.9	93.8 Channel 6	-30.9	Horiz
8	7236.200M	31.6	+34.5	+1.5	-37.1	+15.0	+10.0	55.5	93.8 Channel 1	-38.3	Horiz
9	4924.050M Ave	35.2	+33.2	+0.8	-37.2	+11.7	+10.0	53.7	93.8 Channel 11	-40.1	Vert
^	4924.050M	65.9	+33.2	+0.8	-37.2	+11.7	+10.0	84.4	93.8 Channel 11	-9.4	Vert
11	7386.000M	28.7	+34.8	+1.5	-37.2	+15.1	+10.0	52.9	93.8 Channel 11	-40.9	Horiz
12	7386.300M	28.4	+34.8	+1.5	-37.2	+15.1	+10.0	52.6	93.8 Channel 11	-41.2	Horiz
13	9748.370M	20.7	+39.2	+0.5	-36.3	+18.0	+10.0	52.1	93.8 Channel 6	-41.7	Vert
14	7386.500M Ave	27.9	+34.8	+1.5	-37.2	+15.1	+10.0	52.1	93.8 Channel 11	-41.7	Vert
^	7386.500M	36.9	+34.8	+1.5	-37.2	+15.1	+10.0	61.1	93.8 Channel 11	-32.7	Vert
16	7309.000M Ave	27.7	+34.7	+1.5	-37.2	+15.1	+10.0	51.8	93.8 Channel 6	-42.0	Vert
^	7309.000M	37.5	+34.7	+1.5	-37.2	+15.1	+10.0	61.6	93.8 Channel 6	-32.2	Vert
18	4924.000M	32.8	+33.2	+0.8	-37.2	+11.7	+10.0	51.3	93.8 Channel 11	-42.5	Horiz
19	7311.500M	25.9	+34.7	+1.5	-37.2	+15.1	+10.0	50.0	93.8 Channel 6	-43.8	Horiz
20	4874.130M Ave	23.9	+33.1	+0.8	-37.3	+11.5	+10.0	42.0	93.8 Channel 6	-51.8	Vert
^	4874.130M	62.7	+33.1	+0.8	-37.3	+11.6	+10.0	80.9	93.8 Channel 6	-12.9	Vert
22	4824.130M Ave	23.9	+33.0	+0.8	-37.3	+11.5	+10.0	41.9	93.8 Channel 1	-51.9	Vert
^	4824.130M	61.1	+33.0	+0.8	-37.3	+11.5	+10.0	79.1	93.8 Channel 1	-14.7	Vert

Test Location: CKC Laboratories •480 Los Viboras Rd • Hollister, CA 95023 • 831-637-8176

Customer:	**Watchguard Technologies**		
Specification:	**FCC 15.247(c)-Watchguard**		
Work Order #:	**82546**	Date:	08/19/2004
Test Type:	**Maximized Emissions**	Time:	15:04:26
Equipment:	**Wireless Internet Firewall and VPN Encryption**	Sequence#:	2
Manufacturer:	Watchguard Technologies	Tested By:	Matthew Pettersen
Model:	MF16S32E9W		
S/N:	001		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Power Supply	Watchguard Technologies	MW48 1201200	None
Wireless Internet Firewall and VPN Encryption*	Watchguard Technologies	MF16S32E9W	001

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Toshiba	Tecra 8100 PT810U	60748626U

Test Conditions / Notes:

EUT is transmitting continuously with highest power output modulation (DBPSK @ 1Mbps) on the channel indicated in each reading. A laptop is connected to the EUT via a serial cable and the laptop is controlling the operational mode of the EUT. The spectrum analyzer is connected directly to the EUT transmitter port via a hardline cable. The temperature is 71°F and the relative humidity is 57%. Measurements made with the SA RES BW & Vid BW set to 100 kHz. The EUT transmits and receives on the same port. The EUT cannot receive only and does not have a dedicated recieve only port.

Transducer Legend:

T1=CABLE - HF Kit ANP04292

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	7385.130M	59.3	+0.5				+0.0	59.8	93.8 Channel 11	-34.0	None
2	7308.250M	57.3	+0.5				+0.0	57.8	93.8 Channel 6	-36.0	None
3	7234.950M	56.6	+0.5				+0.0	57.1	93.8 Channel 1	-36.7	None
4	4924.130M	55.9	+0.4				+0.0	56.3	93.8 Channel 11	-37.5	None
5	4874.130M	54.1	+0.4				+0.0	54.5	93.8 Channel 6	-39.3	None
6	4824.050M	53.9	+0.3				+0.0	54.2	93.8 Channel 1	-39.6	None
7	9747.949M	52.2	+0.4				+0.0	52.6	93.8 Channel 6	-41.2	None
8	12060.500 M	51.4	+0.9				+0.0	52.3	93.8 Channel 1	-41.5	None

9	12309.500 M	51.1	+0.9		+0.0	52.0	93.8 Channel 11	-41.8	None
10	12185.200 M	50.8	+0.9		+0.0	51.7	93.8 Channel 6	-42.1	None
11	9647.950M	50.6	+0.5		+0.0	51.1	93.8 Channel 1	-42.7	None
12	9848.250M	49.6	+0.4		+0.0	50.0	93.8 Channel 11	-43.8	None

Test Location: CKC Laboratories •480 Los Viboras Rd • Hollister, CA 95023 • 831-637-8176

Customer: **Watchguard Technologies**
Specification: **FCC 15.247(c)-Watchguard**
Work Order #: **82546** Date: 08/19/2004
Test Type: **Maximized Emissions** Time: 15:26:04
Equipment: **Wireless Internet Firewall and VPN Encryption** Sequence#: 3
Manufacturer: Watchguard Technologies Tested By: Matthew Pettersen
Model: MF16S32E9W
S/N: 001

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Power Supply	Watchguard Technologies	MW48 1201200	None
Wireless Internet Firewall and VPN Encryption*	Watchguard Technologies	MF16S32E9W	001

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Toshiba	Tecra 8100 PT810U	60748626U

Test Conditions / Notes:

EUT is transmitting continuously with highest power output modulation (DQPSK @ 2Mbps) on the channel indicated in each reading. A laptop is connected to the EUT via a serial cable and the laptop is controlling the operational mode of the EUT. The spectrum analyzer is connected directly to the EUT transmitter port via a hardline cable. The temperature is 71°F and the relative humidity is 57%. Measurements made with the SA RES BW & Vid BW set to 100 kHz. The EUT transmits and receives on the same port. The EUT cannot receive only and does not have a dedicated receive only port.

Transducer Legend:

T1=CABLE - HF Kit ANP04292

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	7384.950M	59.6	+0.5				+0.0	60.1	93.8 Channel 11	-33.7	None
2	7308.950M	57.1	+0.5				+0.0	57.6	93.8 Channel 6	-36.2	None
3	4924.100M	56.0	+0.4				+0.0	56.4	93.8 Channel 11	-37.4	None
4	7236.950M	55.7	+0.5				+0.0	56.2	93.8 Channel 1	-37.6	None
5	4874.050M	54.4	+0.4				+0.0	54.8	93.8 Channel 6	-39.0	None
6	4824.050M	53.1	+0.3				+0.0	53.4	93.8 Channel 1	-40.4	None
7	12185.850 M	52.1	+0.9				+0.0	53.0	93.8 Channel 6	-40.8	None
8	12059.950 M	50.8	+0.9				+0.0	51.7	93.8 Channel 1	-42.1	None

9	9847.950M	50.7	+0.4	+0.0	51.1	93.8 Channel 11	-42.7	None
10	9647.950M	50.5	+0.5	+0.0	51.0	93.8 Channel 1	-42.8	None
11	9747.900M	50.5	+0.4	+0.0	50.9	93.8 Channel 6	-42.9	None
12	12309.950 M	49.7	+0.9	+0.0	50.6	93.8 Channel 11	-43.2	None

Test Location: CKC Laboratories •480 Los Viboras Rd • Hollister, CA 95023 • 831-637-8176

Customer:	**Watchguard Technologies**		
Specification:	**FCC 15.247(c)-Watchguard**		
Work Order #:	**82546**	Date:	08/19/2004
Test Type:	**Maximized Emissions**	Time:	15:36:42
Equipment:	**Wireless Internet Firewall and VPN Encryption**	Sequence#:	4
Manufacturer:	Watchguard Technologies	Tested By:	Matthew Pettersen
Model:	MF16S32E9W		
S/N:	001		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Power Supply	Watchguard Technologies	MW48 1201200	None
Wireless Internet Firewall and VPN Encryption*	Watchguard Technologies	MF16S32E9W	001

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Toshiba	Tecra 8100 PT810U	60748626U

Test Conditions / Notes:

EUT is transmitting continuously with highest power output modulation CCK @ 11Mbps) on the channel indicated in each reading. A laptop is connected to the EUT via a serial cable and the laptop is controlling the operational mode of the EUT. The spectrum analyzer is connected directly to the EUT transmitter port via a hardline cable. The temperature is 71°F and the relative humidity is 57%. Measurements made with the SA RES BW & Vid BW set to 100 kHz. The EUT transmits and receives on the same port. The EUT cannot receive only and does not have a dedicated receive only port.

Transducer Legend:

T1=CABLE - HF Kit ANP04292

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	7382.850M	59.9	+0.5				+0.0	60.4	93.8 Channel 11	-33.4	None
2	7311.300M	57.0	+0.5				+0.0	57.5	93.8 Channel 6	-36.3	None
3	4924.100M	55.6	+0.4				+0.0	56.0	93.8 Channel 11	-37.8	None
4	7239.050M	55.4	+0.5				+0.0	55.9	93.8 Channel 1	-37.9	None
5	4874.050M	54.3	+0.4				+0.0	54.7	93.8 Channel 6	-39.1	None
6	4824.050M	53.8	+0.3				+0.0	54.1	93.8 Channel 1	-39.7	None
7	12059.750 M	51.3	+0.9				+0.0	52.2	93.8 Channel 1	-41.6	None
8	12310.000 M	50.2	+0.9				+0.0	51.1	93.8 Channel 11	-42.7	None

9	12184.950 M	50.0	+0.9	+0.0	50.9	93.8 Channel 6	-42.9	None
10	9647.950M	49.9	+0.5	+0.0	50.4	93.8 Channel 1	-43.4	None
11	9847.950M	49.7	+0.4	+0.0	50.1	93.8 Channel 11	-43.7	None
12	9747.949M	49.5	+0.4	+0.0	49.9	93.8 Channel 6	-43.9	None

Test Location: CKC Laboratories •480 Los Viboras Rd • Hollister, CA 95023 • 831-637-8176

Customer: **Watchguard Technologies**
Specification: **FCC 15.247(c)-Watchguard**
Work Order #: **82546** Date: 08/19/2004
Test Type: **Maximized Emissions** Time: 15:51:05
Equipment: **Wireless Internet Firewall and VPN Encryption** Sequence#: 5
Manufacturer: Watchguard Technologies Tested By: Matthew Pettersen
Model: MF16S32E9W
S/N: 001

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Power Supply	Watchguard Technologies	MW48 1201200	None
Wireless Internet Firewall and VPN Encryption*	Watchguard Technologies	MF16S32E9W	001

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Toshiba	Tecra 8100 PT810U	60748626U

Test Conditions / Notes:

EUT is transmitting continuously with highest power output modulation (OFDM @ 36Mbps) on the channel indicated in each reading. A laptop is connected to the EUT via a serial cable and the laptop is controlling the operational mode of the EUT. The spectrum analyzer is connected directly to the EUT transmitter port via a hardline cable. The temperature is 71°F and the relative humidity is 57%. Measurements made with the SA RES BW & Vid BW set to 100 kHz. The EUT transmits and receives on the same port. The EUT cannot receive only and does not have a dedicated receive only port.

Transducer Legend:

T1=CABLE - HF Kit ANP04292

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	7387.850M	56.2	+0.5				+0.0	56.7	93.8 Channel 11	-37.1	None
2	7310.950M	51.5	+0.5				+0.0	52.0	93.8 Channel 6	-41.8	None
3	7236.000M	51.0	+0.5				+0.0	51.5	93.8 Channel 1	-42.3	None
4	4925.300M	46.0	+0.4				+0.0	46.4	93.8 Channel 11	-47.4	None
5	12061.050 M	43.7	+0.9				+0.0	44.6	93.8 Channel 1	-49.2	None
6	4875.350M	44.1	+0.4				+0.0	44.5	93.8 Channel 6	-49.3	None
7	4825.300M	43.8	+0.3				+0.0	44.1	93.8 Channel 1	-49.7	None
8	12310.200 M	41.3	+0.9				+0.0	42.2	93.8 Channel 11	-51.6	None

9	12185.350 M	40.3	+0.9	+0.0	41.2	93.8 Channel 6	-52.6	None
10	9748.350M	40.3	+0.4	+0.0	40.7	93.8 Channel 6	-53.1	None
11	9647.450M	39.5	+0.5	+0.0	40.0	93.8 Channel 1	-53.8	None
12	9848.250M	38.8	+0.4	+0.0	39.2	93.8 Channel 11	-54.6	None

Test Location: CKC Laboratories •480 Los Viboras Rd • Hollister, CA 95023 • 831-637-8176

Customer: **Watchguard Technologies**
Specification: **FCC 15.247(c)-Watchguard**
Work Order #: **82546** Date: 08/19/2004
Test Type: **Maximized Emissions** Time: 16:02:31
Equipment: **Wireless Internet Firewall and VPN Encryption** Sequence#: 6
Manufacturer: Watchguard Technologies Tested By: Matthew Pettersen
Model: MF16S32E9W
S/N: 001

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Power Supply	Watchguard Technologies	MW48 1201200	None
Wireless Internet Firewall and VPN Encryption*	Watchguard Technologies	MF16S32E9W	001

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Toshiba	Tecra 8100 PT810U	60748626U

Test Conditions / Notes:

EUT is transmitting continuously with highest power output modulation (OFDM @ 54Mbps) on the channel indicated in each reading. A laptop is connected to the EUT via a serial cable and the laptop is controlling the operational mode of the EUT. The spectrum analyzer is connected directly to the EUT transmitter port via a hardline cable. The temperature is 71°F and the relative humidity is 57%. Measurements made with the SA RES BW & Vid BW set to 100 kHz. The EUT transmits and receives on the same port. The EUT cannot receive only and does not have a dedicated receive only port.

Transducer Legend:

T1=CABLE - HF Kit ANP04292

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	7388.100M	55.8	+0.5				+0.0	56.3	93.8 Channel 11	-37.5	None
2	7235.950M	52.5	+0.5				+0.0	53.0	93.8 Channel 1	-40.8	None
3	7316.900M	52.3	+0.5				+0.0	52.8	93.8 Channel 6	-41.0	None
4	4925.300M	45.9	+0.4				+0.0	46.3	93.8 Channel 11	-47.5	None
5	4875.350M	44.8	+0.4				+0.0	45.2	93.8 Channel 6	-48.6	None
6	12058.700 M	44.2	+0.9				+0.0	45.1	93.8 Channel 1	-48.7	None
7	4825.350M	43.8	+0.3				+0.0	44.1	93.8 Channel 1	-49.7	None
8	12182.600 M	42.4	+0.9				+0.0	43.3	93.8 Channel 6	-50.5	None

9	12309.100 M	42.0	+0.9	+0.0	42.9	93.8 Channel 11	-50.9	None
10	9655.000M	39.7	+0.5	+0.0	40.2	93.8 Channel 1	-53.6	None
11	9739.500M	39.7	+0.4	+0.0	40.1	93.8 Channel 6	-53.7	None
12	9846.750M	39.3	+0.4	+0.0	39.7	93.8 Channel 11	-54.1	None