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Lexington, KY 40510

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TEST REPORT

Report Number: 3178809LEX-001
Project Number: 3178809

Evaluation of the Lexmark 802.11bgn Wireless Adapter
Model Number: LEX-M01-003

FCC ID: *IYLM01003*

Industry Canada ID: *2376A-M01003*

Tested to the Criteria in
FCC Part 15 Subpart C (15.247),
FCC Part 15 Subpart B (15.107 and 15.109),
ICES-003, RSS-210 Issue 7, and RSS-Gen Issue 2

For

Lexmark International, Inc.

Test Performed by:	Test Authorized by:
Intertek	Lexmark International, Inc.
731 Enterprise Drive	740 West New Circle Road
Lexington, KY 40510	Lexington, KY 40511

Prepared By:_____ **Date:** 6/18/2009

Bryan Taylor, Team Leader

Approved By:_____ **Date:** 6/18/2009

Jason Centers, Senior Project Engineer

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1 JOB DESCRIPTION

1.1 Test Sample Information

The LEX-M01-003 is an 802.11b/g/n wireless print server. It allows the printer, that it is installed in, to be shared on a wireless network without the use of CAT5, USB, or Serial connections. It is sold as an option on some printer models.

Company Information	
Manufacturer:	Lexmark International, Inc.
Address:	740 West New Circle Road Lexington KY 40511
Contact Name:	Mike Klave
Telephone Number:	(859) 232-3512
Fax Number:	(859) 232-7345
Email Address:	mklave@lexmark.com

Test sample			
Lexmark Model Number:	LEX-M01-003		
Serial Number:	Not Labled		
FCC ID:	IYLM01003		
Industry Canada ID:	2376A-M01003		
Device Category:	Mobile		
RF Exposure Category:	General Population/Uncontrolled Environment		
Transmission Modes:	**802.11b**	**802.11g**	**802.11n**
Frequency Range, MHz:	2412MHz – 2462MHz	2412MHz – 2462MHz	2412MHz – 2462MHz
Maximum Peak Conducted Output Power:	17dBm	16.4dBm	16.8dBm
Antenna Type:	PCB Antenna and External Antenna (Acon)		
Antenna Location:	On PCB and External		
Antenna Gain:	2.66 dBi (PCB), 2.2dBi (External)		
Sample Receive Date:	5/7/2009		

Test Signal Mode	
Test Commands:	X
Base Station Simulator:	
802.11b, g Test Channels	1, 6, 11
802.11n (20MHz) Test Channels	1, 6, 11
802.11n (40MHz) Test Channels	3, 6, 9

1.2 System Support Equipment

A Compaq laptop (Model EVO N410c) was used to configure the transmit mode of the 802.11bgn Wireless Adapter prior to each test. It also provided DC power to the test sample via the USB connection. No other support equipment was used.

1.3 Cables associated with EUT

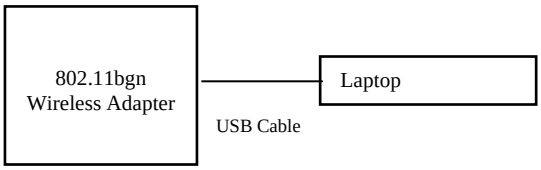
Table 1-1 contains the details of the cables associated with the EUT.

Table 1-1: Interconnecting cables between modules of EUT

Cables					
Description	**Length**	**Shielding**	**Ferrites**	**Connection**	
				From	**To**
DC Cable	6 ft.	None	None	Laptop	AC/DC Power Converter for Laptop
AC Power Cable	6 ft.	None	None	AC/DC Power Converter for Laptop	120VAC Power Source
USB Cable	3 ft.	Yes	None	EUT	Laptop

1.4 System Block Diagram

The diagram shown below details the interconnection of the EUT and its accessories during the testing.



1.5 Mode(s) of operation

The 802.11bgn Wireless Adapter was powered via a USB cable (5VDC) connected to a laptop computer. The laptop was powered by an 18VDC power brick which was connected to 120VAC / 60Hz. In order to force the 802.11bgn Wireless Adapter to transmit during the evaluation a control program was used to communicate with the module via the same USB cable. This software enabled the user to adjust the output power of the transmitter, change the transmission modulation scheme, and to select the transmit channel. During the evaluation the 802.11bgn Wireless Adapter was set to transmit at maximum output power as instructed by Lexmark International, Inc.

Two antennas were provided with the 802.11bgn Wireless Adapter. One was an onboard PCB trace antenna with 2.66dBi of gain. The other was an external antenna manufactured by Acon with 2.2dBi of gain. The radiated tests were performed with each antenna.

1.6 Modifications required for compliance

No modifications were required for compliance.

1.7 Related Submittal(s) Grants

None

2 EXECUTIVE SUMMARY

Testing performed for: Lexmark International, Inc.

Equipment Under Test: Model LEX-M01-003

Test Start Date: 5/7/2009

Test End Date: 6/8/2009

This device meets the requirements for modular approval.

Testing was performed using the methods outlined in KDB 558074.

IC Rule	FCC Rule	Description Of Test	Result	Page
RSS-210 (A8.2, A8.2, A8.4(4))	§15.247(a)(b)(d)	Conducted RF Power	**Compliant**	8
RSS-210 A8.4(4)	§15.247(b)	Effective Radiated Power	**Compliant**	8
RSS-210 (A8.2, A8.2, A8.4(4))	§15.247(a)(b)(d)	Measurement of 6dB Bandwidth	**Compliant**	12
RSS-210 (A8.2, A8.2, A8.4(4))	§15.247(a)(b)(d)	Power Density	**Compliant**	19
RSS-102	§15.247(b)(5)	Maximum Permissible Exposure (MPE) Calculations	**Compliant**	26
RSS-210 A8.5	§15.247(c)	Out of Band Emissions at Antenna Terminals	**Compliant**	27
RSS-210 2.2	§15.247(c) and §15.209(f)	Field Strength of Spurious Radiation (General Requirements and Restricted Band Requirements)	**Compliant**	30
ICES-003, RSS-Gen (7.2.3)	§15.109	Receiver Spurious Emissions	**Compliant**	55
ICES-003, RSS-Gen (7.2.2)	§15.107, §15.207	Power Line Conducted Emissions	**Compliant**	58

3 TEST FACILITY

The INTERTEK-Lexington is located at 731 Enterprise Drive, Lexington Kentucky, 40510. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1 and ANSI C63.4. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters.

The test site is listed with the FCC under registration number 485103. The test site is listed with Industry Canada under site number IC 2042M-1.

3.1 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Calibration due date
RF Power Meter	Giga-tronics	8541C	1838539	7/29/2009
RF Power Sensor	Giga-tronics	80601A	1832667	7/29/2009
Signal Generator	Hewlett Packard	83620B	3614A00199	9/8/2009
Environmental Chamber	Thermotron	SM-8-C	32692	1/29/2010
EMI Receiver	Rohde & Schwarz	ESI 26	1088.7490	8/28/2009
EMC Analyzer	Agilent Technologies	E7405	2142	9/5/2009
Horn Antenna	Antenna Research	DRG-118/A	1086	7/28/2009
Horn Antenna	EMCO	3115	6556	8/8/2009
Horn Antenna	EMCO	3116	9310-2222	5/18/2010
Bilog Antenna	ETS	3142C	00051864	12/24/2009
High Pass Filter	Microwave Circuits	H3G020G2	3986-01 DC0408	Verify at Time of Use
LISN	TESEQ	NNB52	3333	2/23/2010
Pre-Amp	Miteq	AFS44-00102000-30-10P-44	987410	6/20/2009
Pre-Amp	Miteq	JS4-18004000-30-5P-S	965178	9/2/2009

4 CONDUCTED RF POWER AND EIRP

4.1 Test Procedure (FCC Rule: §15.247(b) Conducted RF Power and EIRP)

The antenna port of the 802.11bgn Wireless Adapter was connected to the input of a peak power meter. The power was read directly from the power meter and corrected for cable loss to obtain the power at the antenna terminals. Conducted power was measured on all channels and for all data rates and modulation modes.

The peak radiated RF output power for the 802.11bgn Wireless Adapter was calculated using the measured peak output power at the antenna terminals as follows:

$$EIRP = P_1 + G$$

where,

P_1 is the measured peak output power

G is the gain of the transmitting antenna in dBi.

The output power was measured in each modulation type and data rate, and the worst case was selected from the transmit modes and used throughout the remainder of the evaluation.

4.2 Radiated and Conducted Output Power Criteria

The maximum allowable transmitter power (conducted or radiated) for antennas with gains of 6dBi or less is 1watt (30dBm).

4.3 Test Results

The 802.11bgn Wireless Adapter met the RF power output of FCC Part 15 Subpart C (15.247). The test results are located in Table 4-1 through Table 4-3. None of the conducted power or EIRP measurements exceeded the 30dBm limit.

Table 4-1 RF Output Power Measurements (Low Channel)

Test Channel	Mode	Modulation	Data Rate (Mbps)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP(mW)	Conducted Power (mW)
Low Channel	802.11b	BPSK	1	16.2	2.66	18.86	76.91	41.69
		QPSK	2	16.2	2.66	18.86	76.91	41.69
		CCK	5.5	16.3	2.66	18.96	78.70	42.66
		CCK	11	16.1	2.66	18.76	75.16	40.74
	802.11g	OFDM	6	15.85	2.66	18.51	70.96	38.46
		OFDM	9	15.96	2.66	18.62	72.78	39.45
		OFDM	12	16.21	2.66	18.87	77.09	41.78
		OFDM	18	16.25	2.66	18.91	77.80	42.17
		OFDM	24	16.13	2.66	18.79	75.68	41.02
		OFDM	36	16.06	2.66	18.72	74.47	40.36
		OFDM	48	15.83	2.66	18.49	70.63	38.28
		OFDM	54	16.09	2.66	18.75	74.99	40.64
	802.11n (20MHz)	OFDM	MCS0	16.6	2.66	19.26	84.33	45.71
		OFDM	MCS1	16.5	2.66	19.16	82.41	44.67
		OFDM	MCS2	16.5	2.66	19.16	82.41	44.67
		OFDM	MCS3	16.4	2.66	19.06	80.54	43.65
		OFDM	MCS4	16.4	2.66	19.06	80.54	43.65
		OFDM	MCS5	16.3	2.66	18.96	78.70	42.66
		OFDM	MCS6	16.4	2.66	19.06	80.54	43.65
		OFDM	MCS7	16.4	2.66	19.06	80.54	43.65
	802.11n (40MHz)	OFDM	MCS0	16.5	2.66	19.16	82.41	44.67
		OFDM	MCS1	16.4	2.66	19.06	80.54	43.65
		OFDM	MCS2	16.4	2.66	19.06	80.54	43.65
		OFDM	MCS3	16.3	2.66	18.96	78.70	42.66
		OFDM	MCS4	16.3	2.66	18.96	78.70	42.66
		OFDM	MCS5	16.3	2.66	18.96	78.70	42.66
		OFDM	MCS6	16.3	2.66	18.96	78.70	42.66
		OFDM	MCS7	16.3	2.66	18.96	78.70	42.66

Table 4-2 RF Output Power Measurements (Mid Channel)

Test Channel	Mode	Modulation	Data Rate (Mbps)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP(mW)	Conducted Power (mW)
Mid Channel	802.11b	BPSK	1	16.4	2.66	19.06	80.54	43.65
		QPSK	2	16.5	2.66	19.16	82.41	44.67
		CCK	5.5	16.5	2.66	19.16	82.41	44.67
		CCK	11	16.4	2.66	19.06	80.54	43.65
	802.11g	OFDM	6	16.4	2.66	19.06	80.54	43.65
		OFDM	9	16.2	2.66	18.86	76.91	41.69
		OFDM	12	16.2	2.66	18.86	76.91	41.69
		OFDM	18	16.05	2.66	18.71	74.30	40.27
		OFDM	24	16.1	2.66	18.76	75.16	40.74
		OFDM	36	16.2	2.66	18.86	76.91	41.69
		OFDM	48	16.3	2.66	18.96	78.70	42.66
		OFDM	54	16.11	2.66	18.77	75.34	40.83
	802.11n (20MHz)	OFDM	MCS0	16.4	2.66	19.06	80.54	43.65
		OFDM	MCS1	16.6	2.66	19.26	84.33	45.71
		OFDM	MCS2	16.6	2.66	19.26	84.33	45.71
		OFDM	MCS3	16.6	2.66	19.26	84.33	45.71
		OFDM	MCS4	16.5	2.66	19.16	82.41	44.67
		OFDM	MCS5	16.6	2.66	19.26	84.33	45.71
		OFDM	MCS6	16.5	2.66	19.16	82.41	44.67
		OFDM	MCS7	16.5	2.66	19.16	82.41	44.67
	802.11n (40MHz)	OFDM	MCS0	16.5	2.66	19.16	82.41	44.67
		OFDM	MCS1	16.8	2.66	19.46	88.31	47.86
		OFDM	MCS2	16.7	2.66	19.36	86.30	46.77
		OFDM	MCS3	16.6	2.66	19.26	84.33	45.71
		OFDM	MCS4	16.6	2.66	19.26	84.33	45.71
		OFDM	MCS5	16.6	2.66	19.26	84.33	45.71
		OFDM	MCS6	16.5	2.66	19.16	82.41	44.67
		OFDM	MCS7	16.4	2.66	19.06	80.54	43.65

Table 4-3 RF Output Power Measurements (High Channel)

Test Channel	Mode	Modulation	Data Rate (Mbps)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP(mW)	Conducted Power (mW)
High Channel	802.11b	BPSK	1	16.9	2.66	19.56	90.36	48.98
		QPSK	2	16.9	2.66	19.56	90.36	48.98
		CCK	5.5	17	2.66	19.66	92.47	50.12
		CCK	11	17	2.66	19.66	92.47	50.12
	802.11g	OFDM	6	16.05	2.66	18.71	74.30	40.27
		OFDM	9	15.98	2.66	18.64	73.11	39.63
		OFDM	12	15.96	2.66	18.62	72.78	39.45
		OFDM	18	16	2.66	18.66	73.45	39.81
		OFDM	24	15.79	2.66	18.45	69.98	37.93
		OFDM	36	15.63	2.66	18.29	67.45	36.56
		OFDM	48	15.92	2.66	18.58	72.11	39.08
		OFDM	54	15.91	2.66	18.57	71.94	38.99
	802.11n (20MHz)	OFDM	MCS0	16	2.66	18.66	73.45	39.81
		OFDM	MCS1	16.2	2.66	18.86	76.91	41.69
		OFDM	MCS2	16	2.66	18.66	73.45	39.81
		OFDM	MCS3	15.9	2.66	18.56	71.78	38.90
		OFDM	MCS4	16.1	2.66	18.76	75.16	40.74
		OFDM	MCS5	16	2.66	18.66	73.45	39.81
		OFDM	MCS6	15.9	2.66	18.56	71.78	38.90
		OFDM	MCS7	16	2.66	18.66	73.45	39.81
	802.11n (40MHz)	OFDM	MCS0	16.3	2.66	18.96	78.70	42.66
		OFDM	MCS1	16.2	2.66	18.86	76.91	41.69
		OFDM	MCS2	16.2	2.66	18.86	76.91	41.69
		OFDM	MCS3	16	2.66	18.66	73.45	39.81
		OFDM	MCS4	16	2.66	18.66	73.45	39.81
		OFDM	MCS5	16	2.66	18.66	73.45	39.81
		OFDM	MCS6	16.1	2.66	18.76	75.16	40.74
		OFDM	MCS7	15.9	2.66	18.56	71.78	38.90

5 MEASUREMENT OF 6DB BANDWIDTH

5.1 Test Procedure (FCC Rule: §15.247(a), 6dB Bandwidth)

The antenna port of the 802.11bgn Wireless Adapter was connected to the input of a spectrum analyzer. The analyzer amplitude was offset for the associated cable loss. The analyzer resolution and video bandwidths were set to 100kHz and the max hold function was turned on. A marker peak search was performed on the resultant trace to find the peak amplitude. Markers were then positioned on either side of the peak amplitude such that they were 6dB lower than that amplitude. The 6dB bandwidth was the frequency difference between the marker on the lower side and the marker on the higher side of the peak amplitude. The 6dB bandwidth was measured for the highest data rate for each possible modulation mode on the high, middle, and low channels.

5.2 6dB Bandwidth Criteria

The minimum 6dB bandwidth shall be at least 500kHz

5.3 Test Results

The LEX-M01-003 802.11bgn Wireless Adapter met the 6dB bandwidth requirements of FCC Part 15 Subpart C (15.247). The test results are located in Table 5-1 and in Figure 5-1 through Figure 5-12.

Table 5-1: 6dB BandwidthMeasurements

Mode	Channel	Frequency (MHz)	6dB Bandwidth
802.11b	1	2411	9.5MHz
802.11b	6	2437	9.0MHz
802.11b	11	2462	9.0MHz
802.11g	1	2411	16.8MHz
802.11g	6	2437	16.7MHz
802.11g	11	2462	16.7MHz
802.11n (20MHz)	1	2411	18.0MHz
802.11n (20MHz)	6	2437	18.0MHz
802.11n (20MHz)	11	2462	18.0MHz
802.11n (40MHz)	3	2411	36.7
802.11n (40MHz)	6	2437	36.7MHz
802.11n (40MHz)	9	2462	36.7

Figure 5-1: 6dB Bandwidth, 802.11b, Channel 1

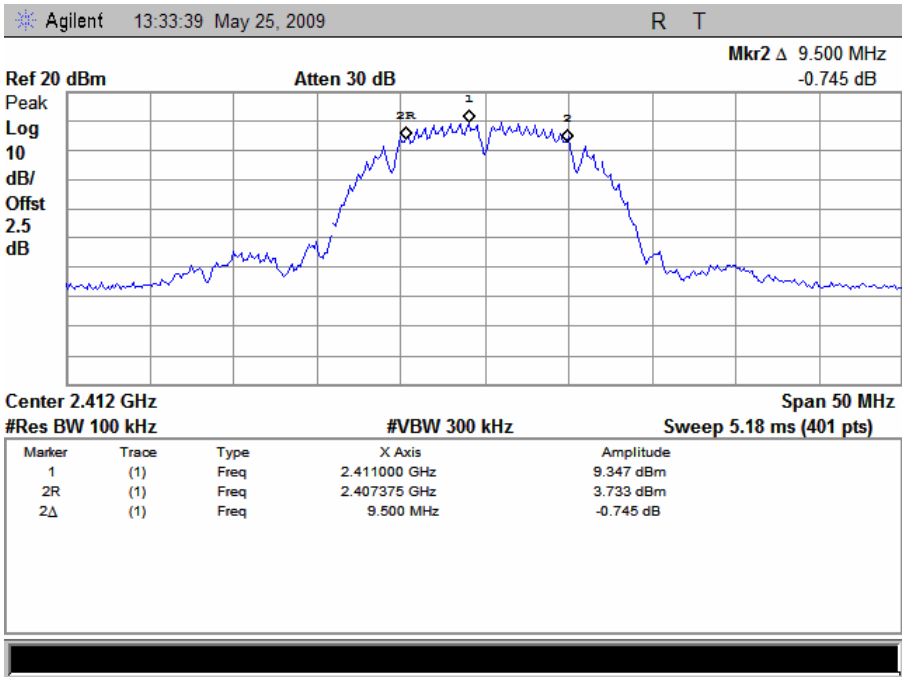


Figure 5-2: 6dB Bandwidth, 802.11b, Channel 6

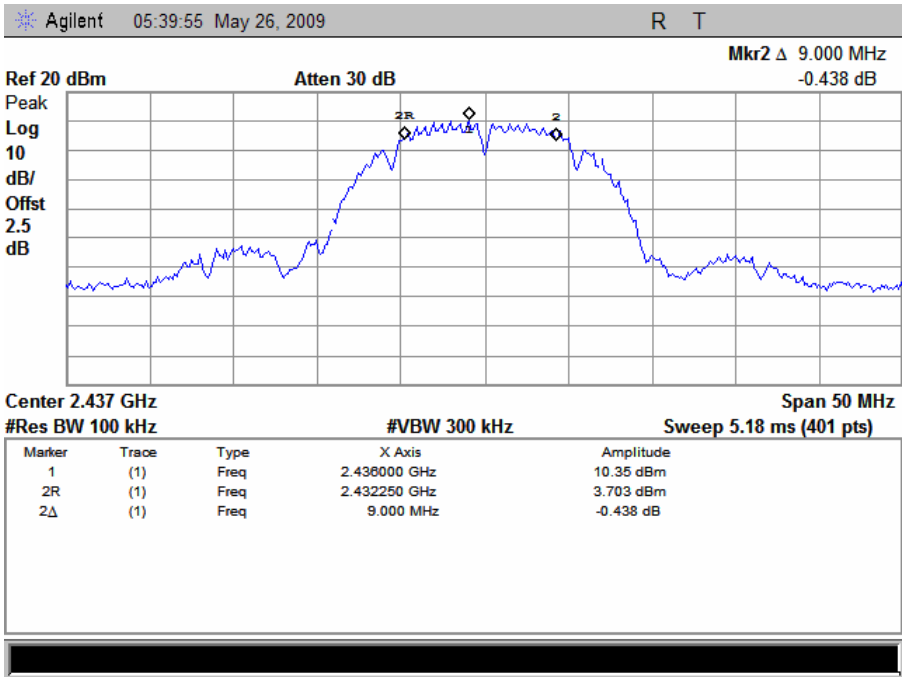


Figure 5-3: 6 dB Bandwidth, 802.11b, Channel 11

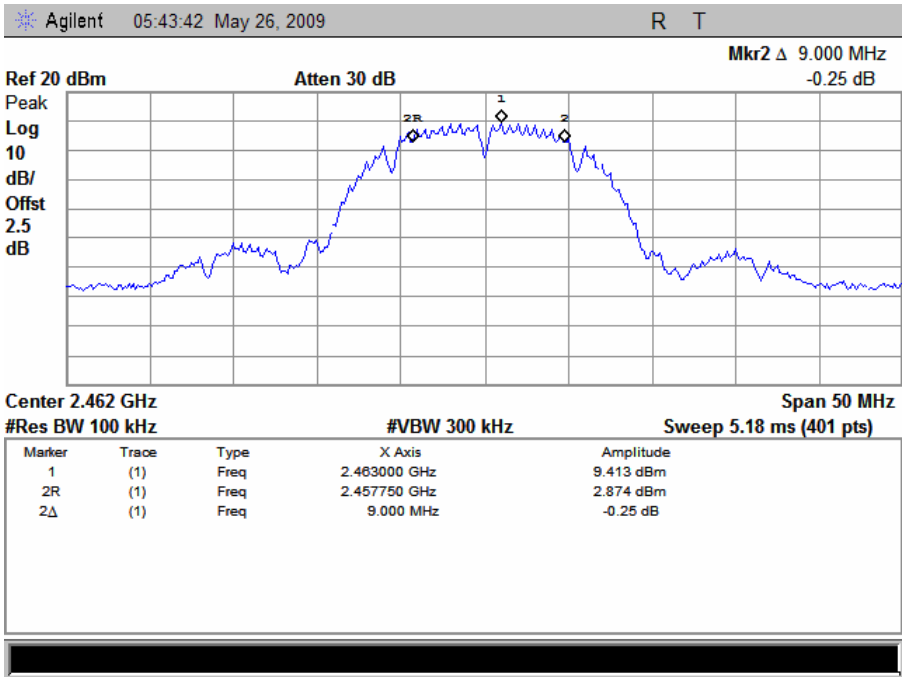


Figure 5-4: 6dB Bandwidth, 802.11g, Channel 1

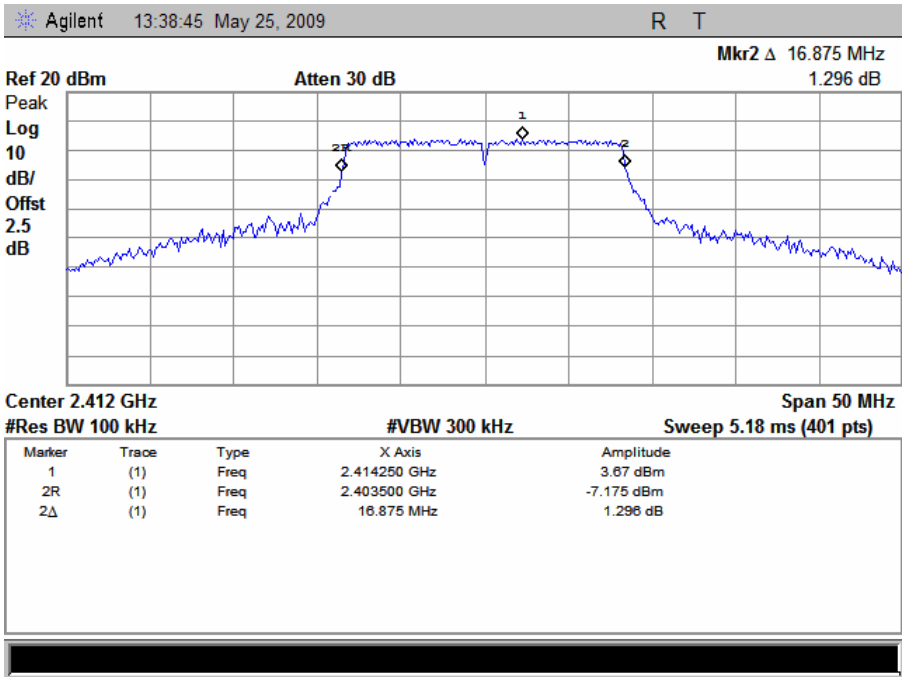


Figure 5-5: 6dB Bandwidth, 802.11g, Channel 6

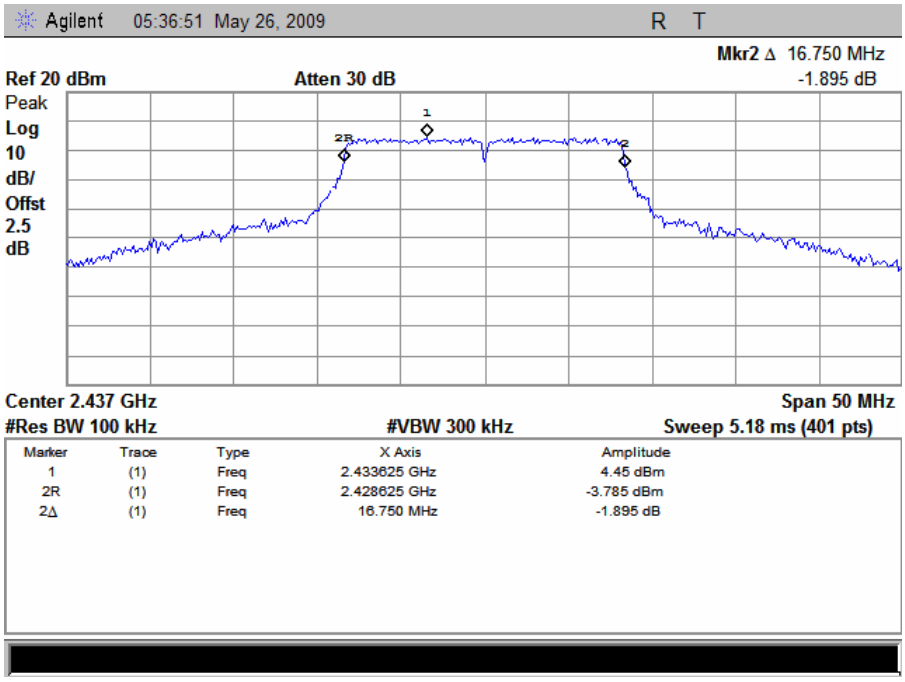


Figure 5-6: 6dB Bandwidth, 802.11g, Channel 11

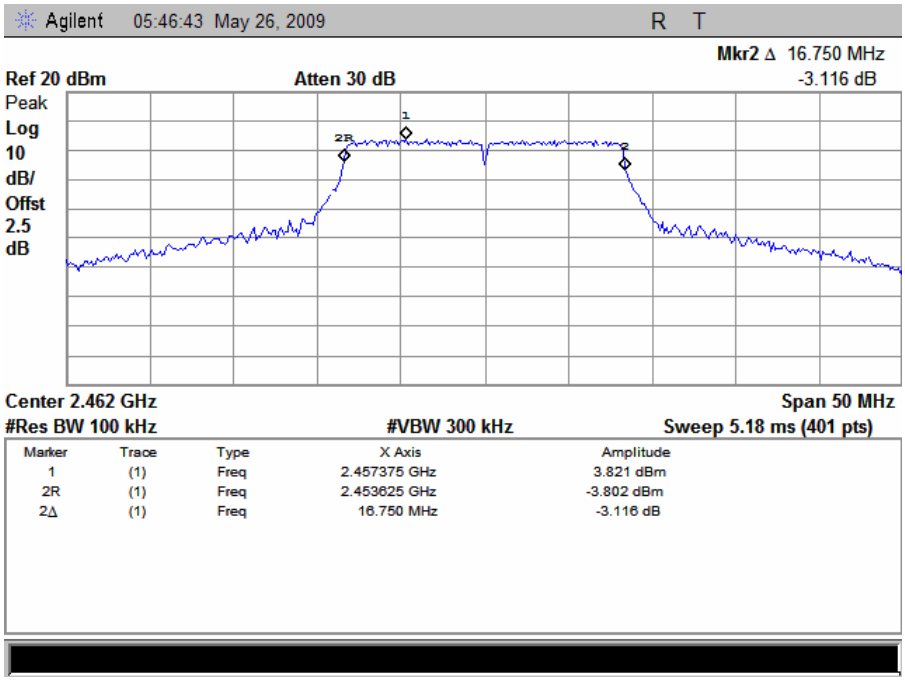


Figure 5-7: 6dB Bandwidth, 802. 11n (20MHz), Channel 1

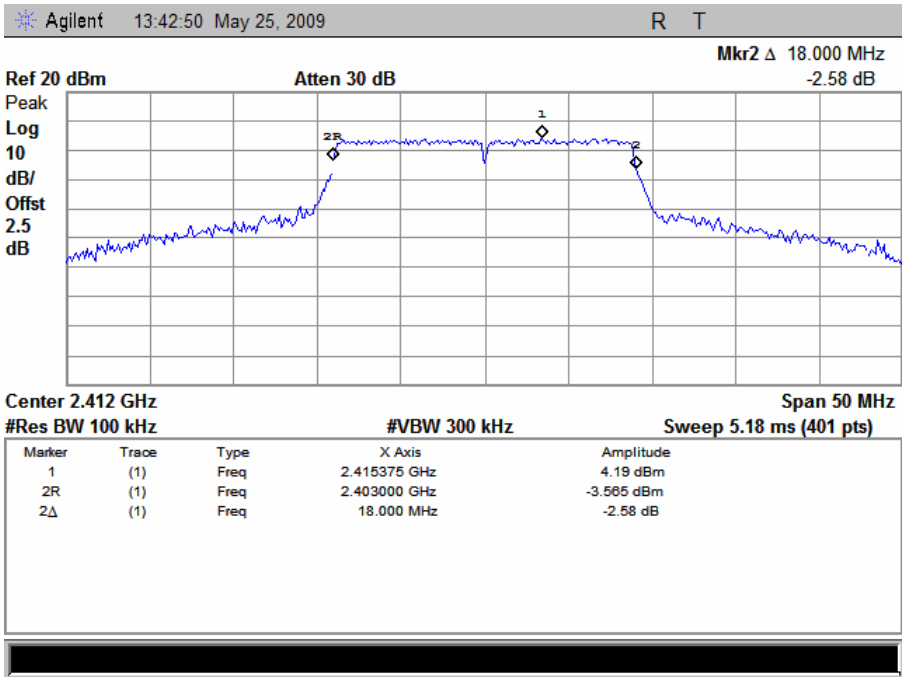


Figure 5-8: 6dB Bandwidth, 802. 11n (20MHz), Channel 6

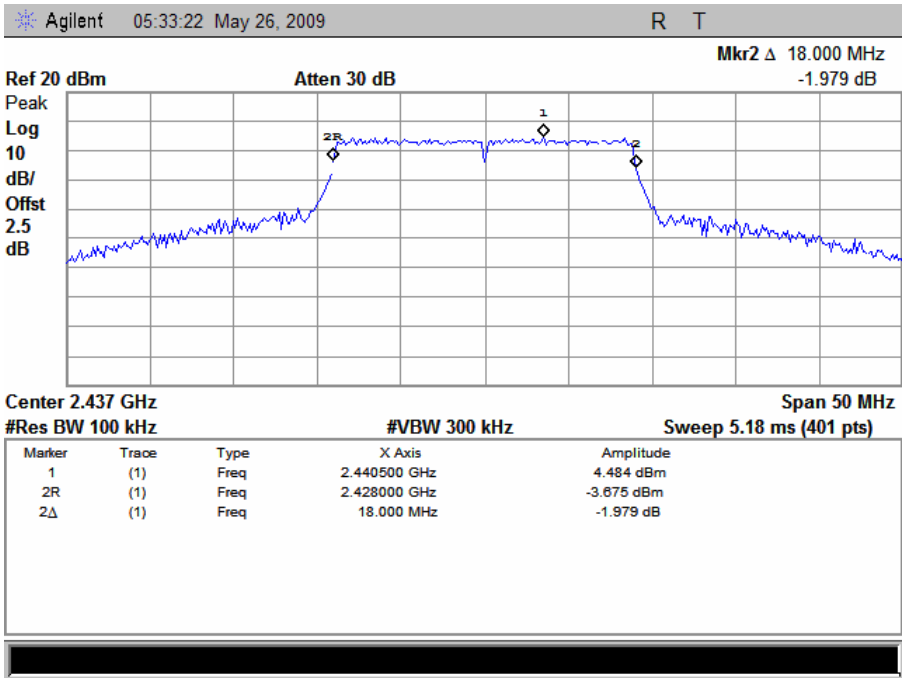


Figure 5-9: 6dB Bandwidth, 802.11n (20MHz), Channel 11

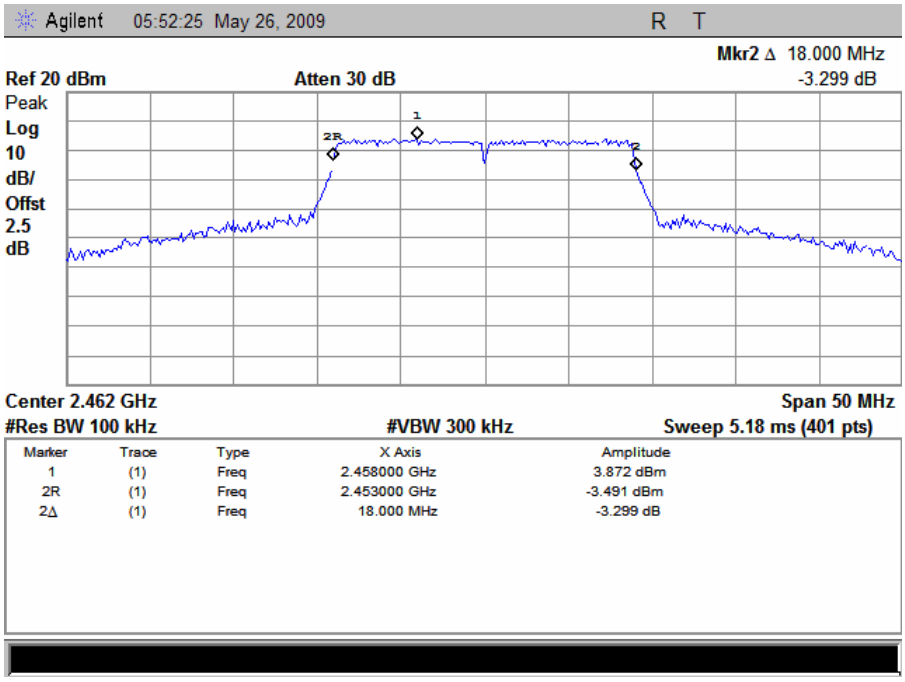


Figure 5-10: 6dB Bandwidth, 802. 11n (40MHz), Channel 3

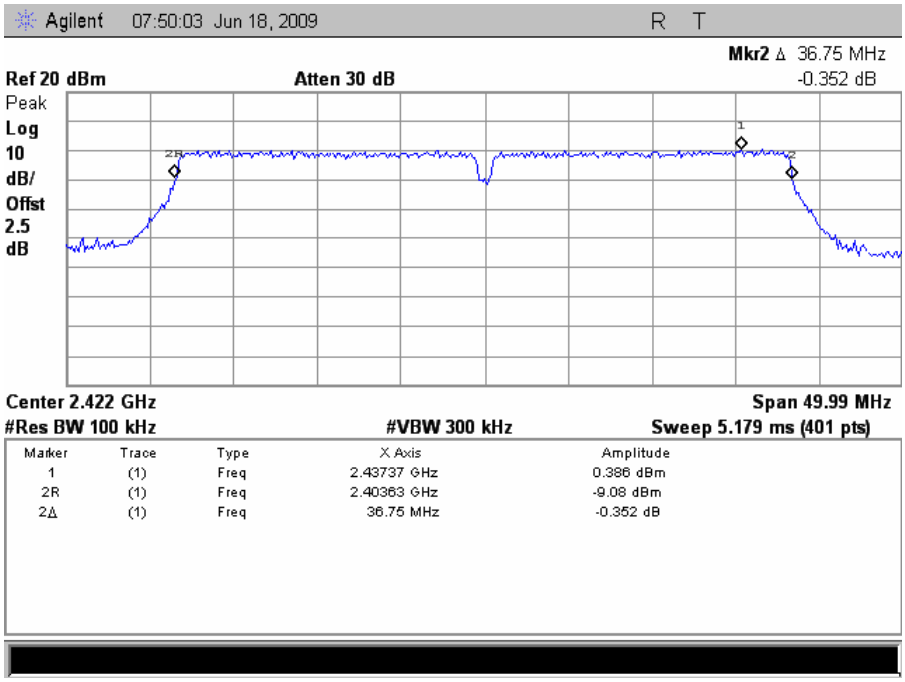


Figure 5-11: 6dB Bandwidth, 802. 11n (40MHz), Channel 6

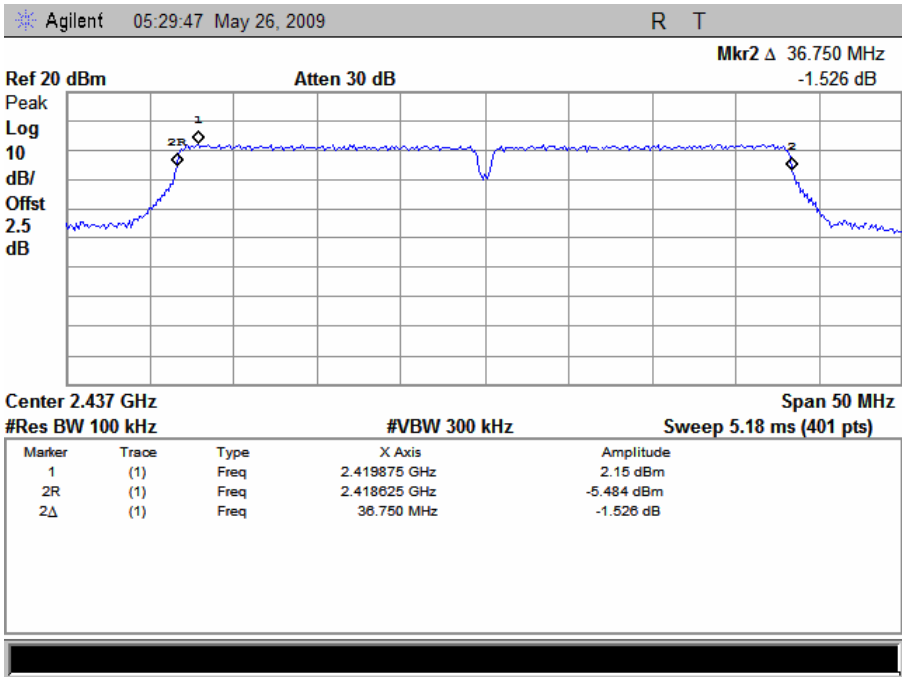
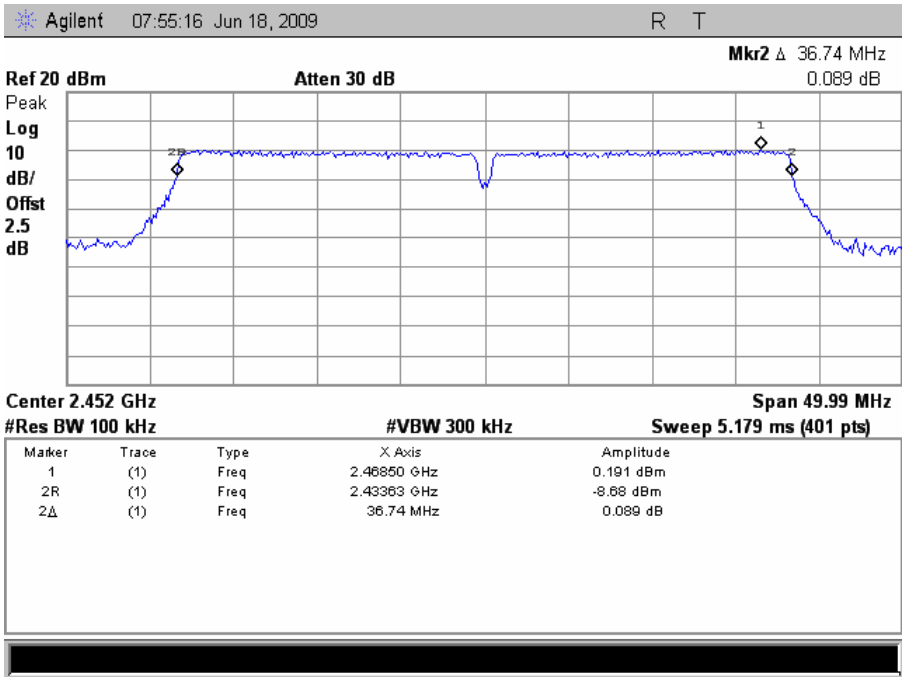


Figure 5-12: 6dB Bandwidth, 802.11n (40MHz), Channel 9



6 POWER DENSITY

6.1 Test Procedure (FCC Rule: §15.247(d) (b) Power Density)

The antenna port of the 802.11bgn Wireless Adapter was connected to the input of a spectrum analyzer. The analyzer amplitude was offset for the associated cable loss. The analyzer resolution and video bandwidths were set to 3kHz and the max hold function was turned on. The frequency span was set to 600kHz around the highest amplitude occurring in the peak emission envelope. The total sweep time was calculated as follows:

Sweep time (Sec.) = (Fstop – Fstart)/Resolution Bandwidth

Sweep time (Sec) = 600kHz / 3kHz

Sweep time (Sec) = 200 Seconds

A peak search was then performed on the resultant trace. The amplitude of that peak was recorded as the maximum power density in dBm. Power density was measured for low, mid, and high channels.

6.2 Power Density Criteria

The peak power spectral density shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

6.3 Test Results

The LEX-M01-003 802.11bgn Wireless Adapter met the power density requirements of FCC Part 15 Subpart C (15.247). The test results are located in Table 6-1 and in Figure 6-1 through Figure 6-12.

Table 6-1 Power Density Measurements

Mode	Channel	Frequency (MHz)	Power Density (dBm)
802.11b	1	2411	-7.484
802.11b	6	2437	-6.631
802.11b	11	2462	-7.767
802.11g	1	2411	-8.345
802.11g	6	2437	-8.061
802.11g	11	2462	-9.066
802.11n (20MHz)	1	2411	-8.188
802.11n (20MHz)	6	2437	-7.701
802.11n (20MHz)	11	2462	-8.829
802.11n (40MHz)	3	2411	-13.73
802.11n (40MHz)	6	2437	-13.79
802.11n (40MHz)	9	2462	-13.78

Figure 6-1: Power Density Measurement, 802.11b, Channel 1

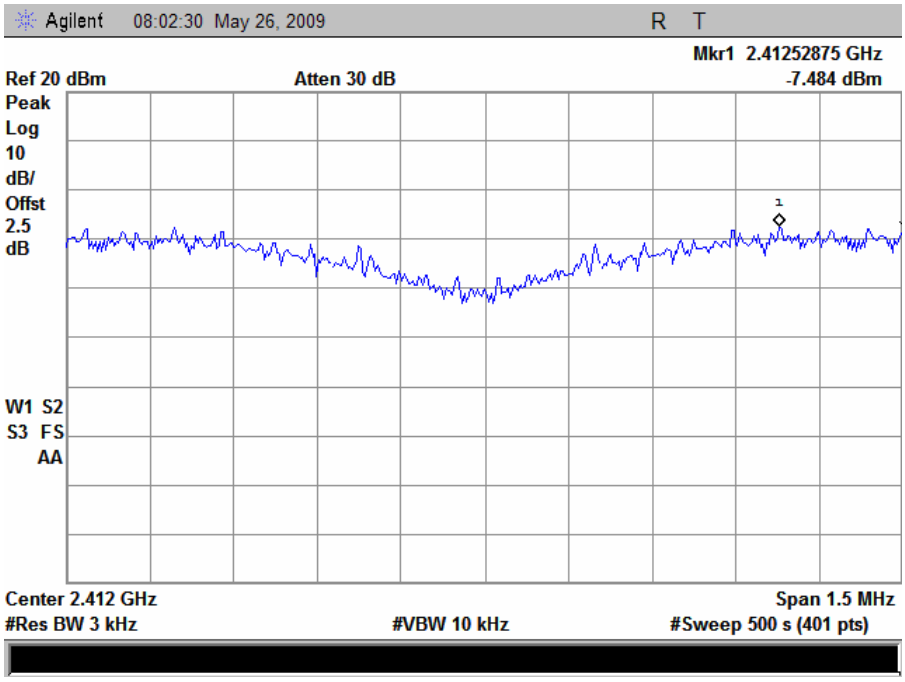


Figure 6-2: Power Density Measurement, 802.11b, Channel 6

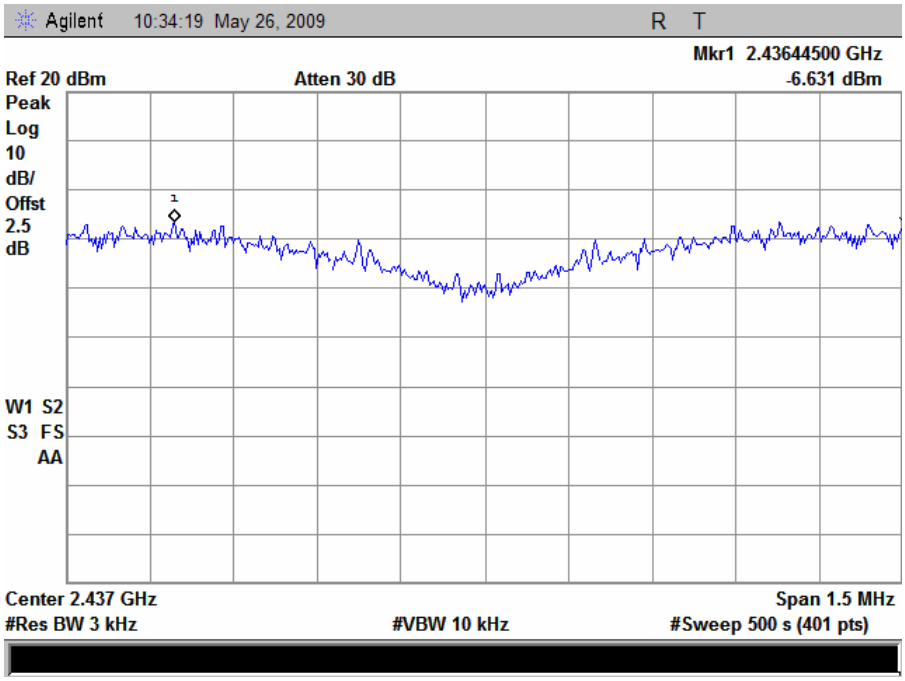


Figure 6-3: Power Density Measurement, 802.11b, Channel 11

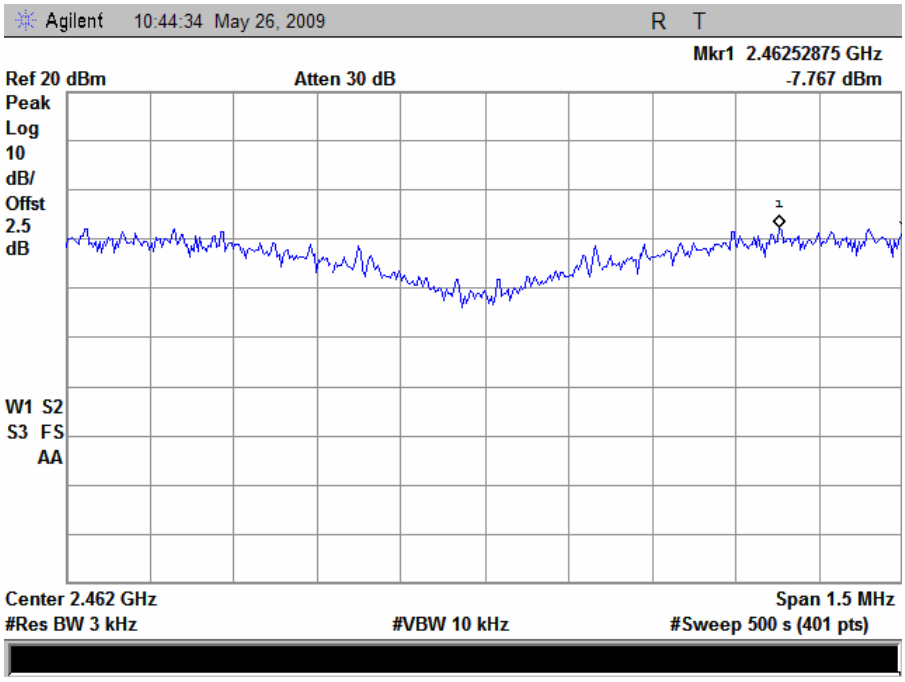


Figure 6-4: Power Density Measurement, 802.11g, Channel 1

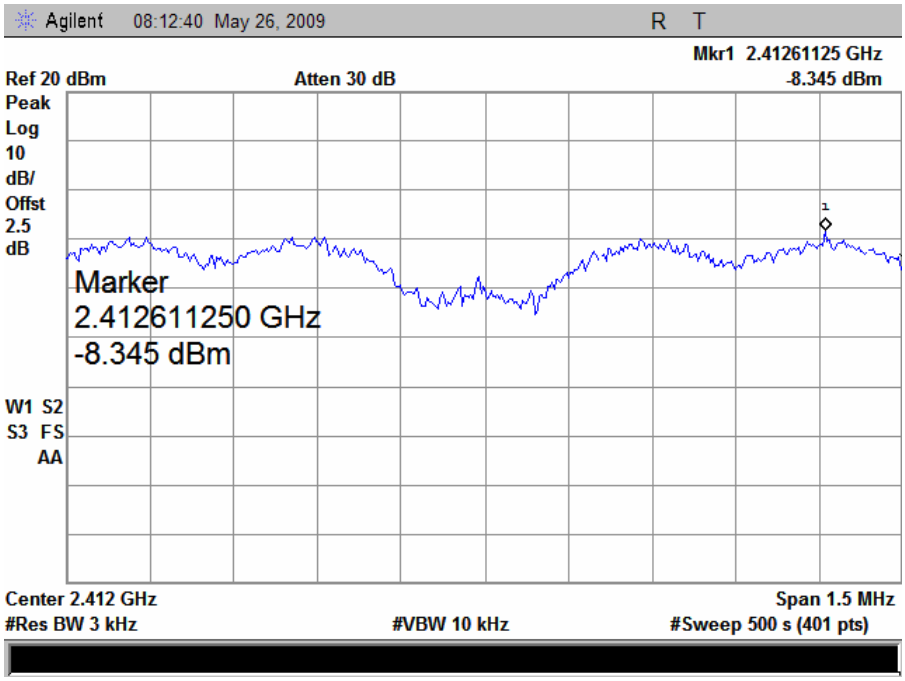


Figure 6-5: Power Density Measurement, 802.11g, Channel 6

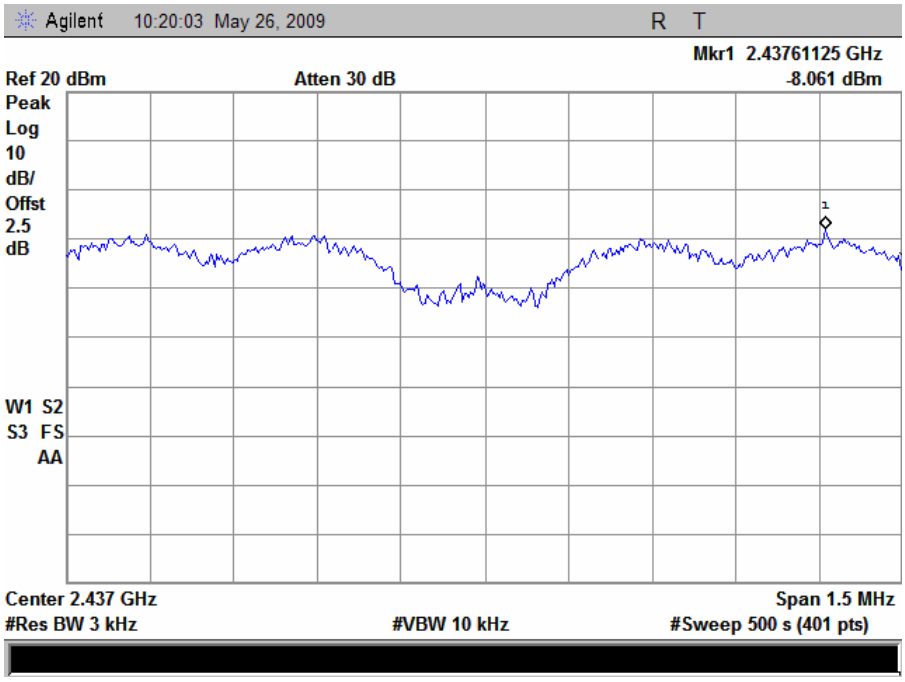


Figure 6-6: Power Density Measurement, 802.11g, Channel 11

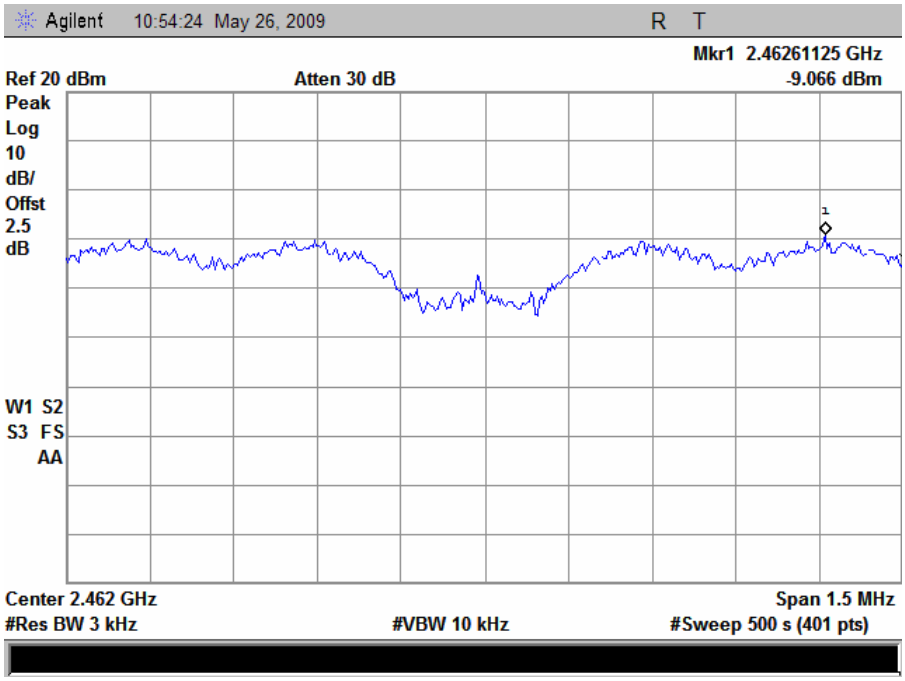


Figure 6-7: Power Density Measurement, 802.11n (20MHz), Channel 1

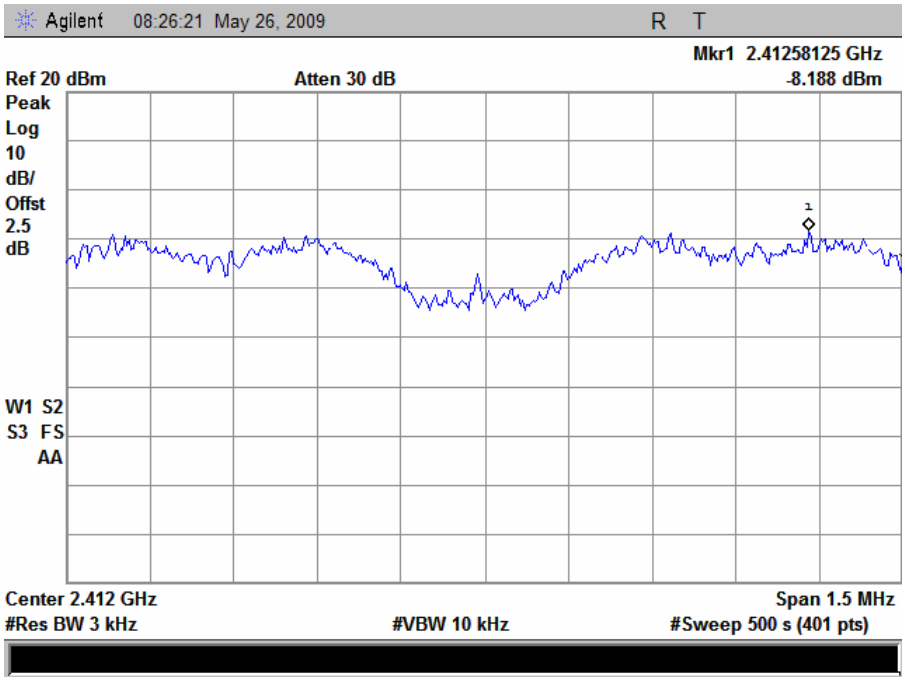


Figure 6-8: Power Density Measurement, 802.11n (20MHz), Channel 6

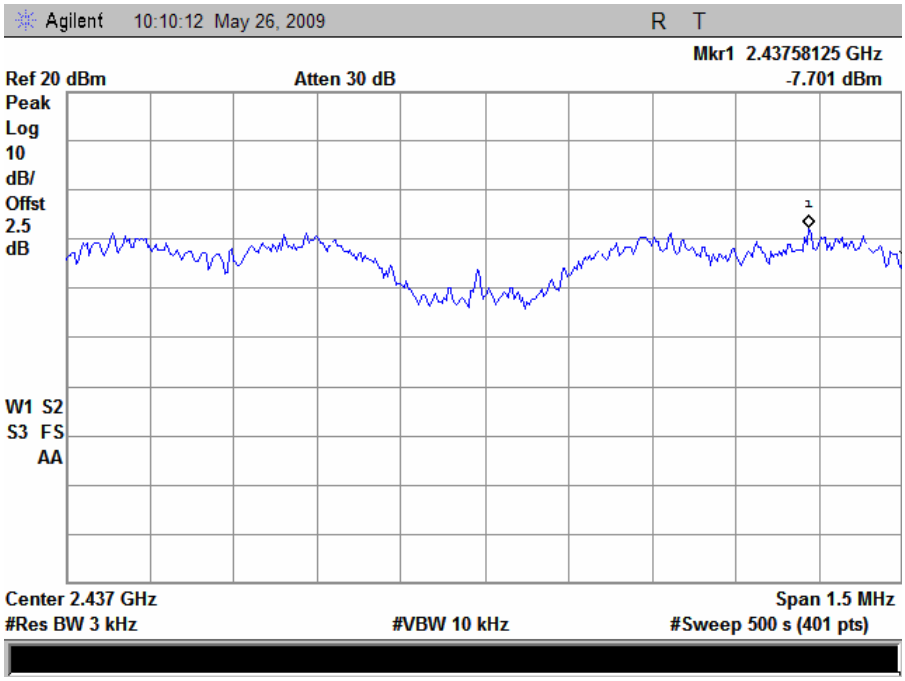


Figure 6-9: Power Density Measurement, 802.11n (20MHz), Channel 11

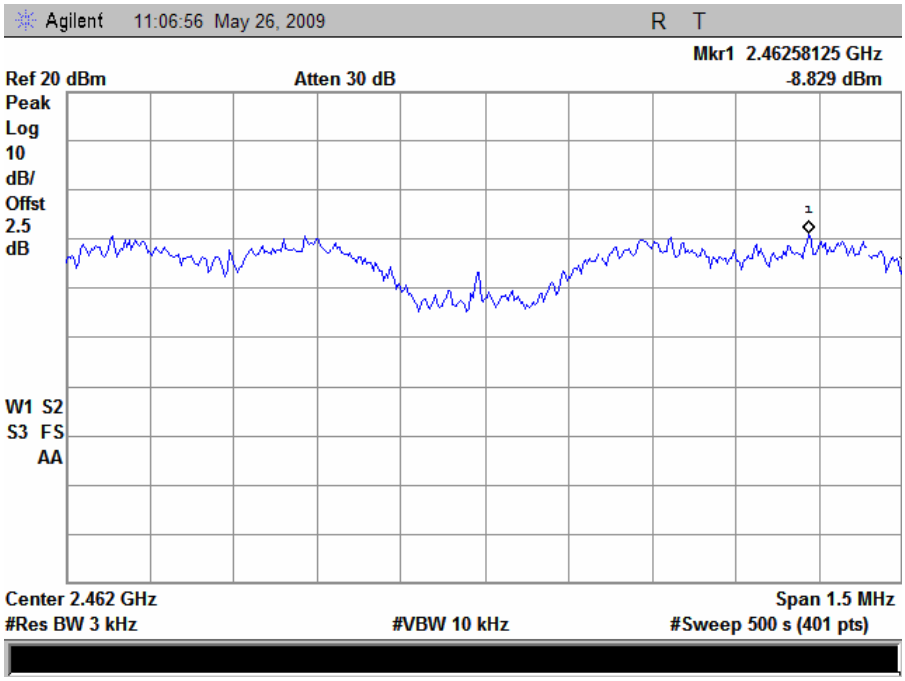


Figure 6-10: Power Density Measurement, 802.11n (40MHz), Channel 3

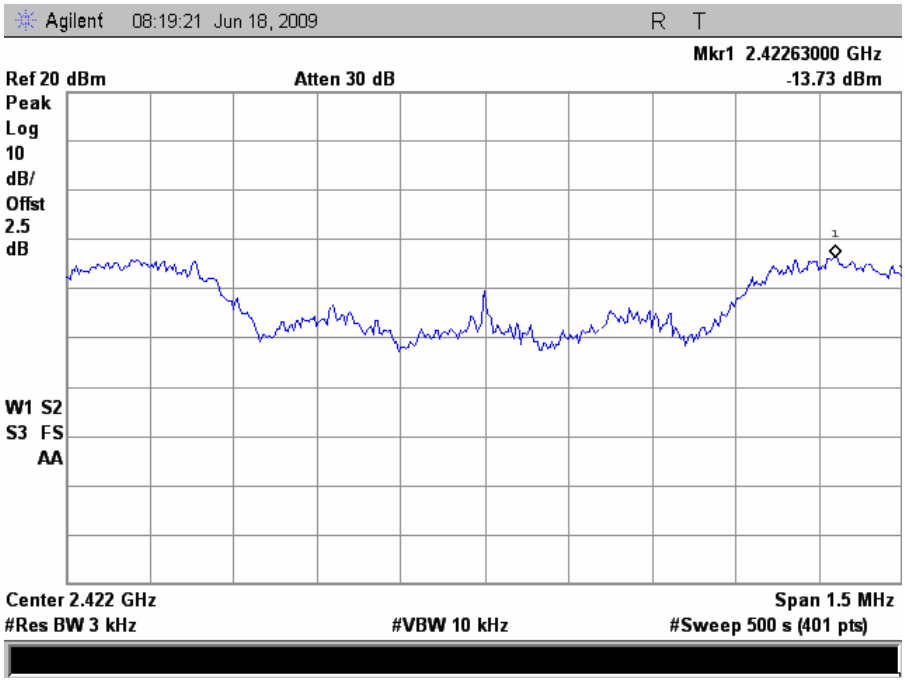


Figure 6-11: Power Density Measurement, 802.11n (40MHz), Channel 6

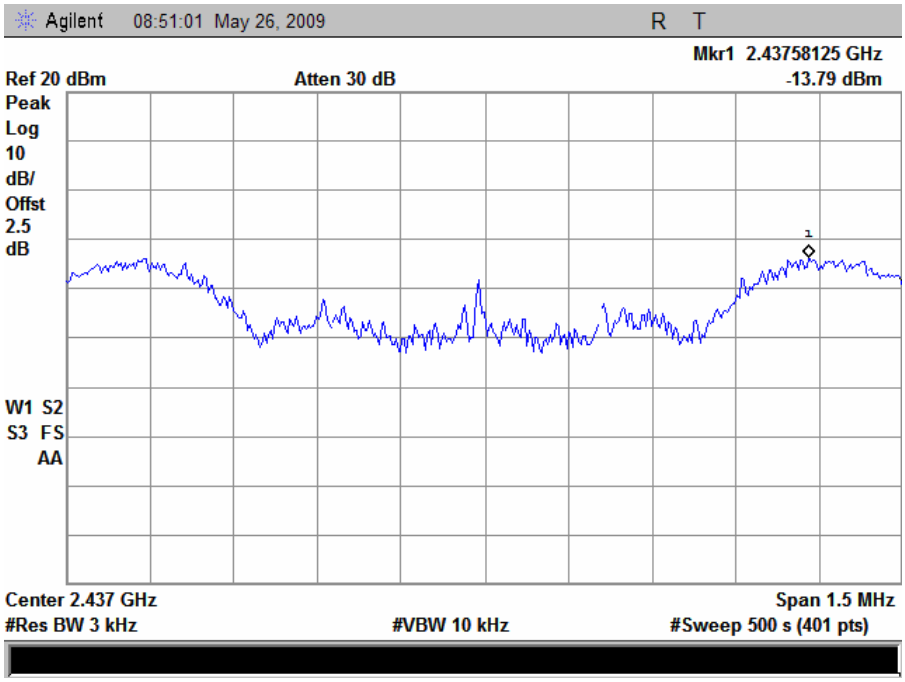
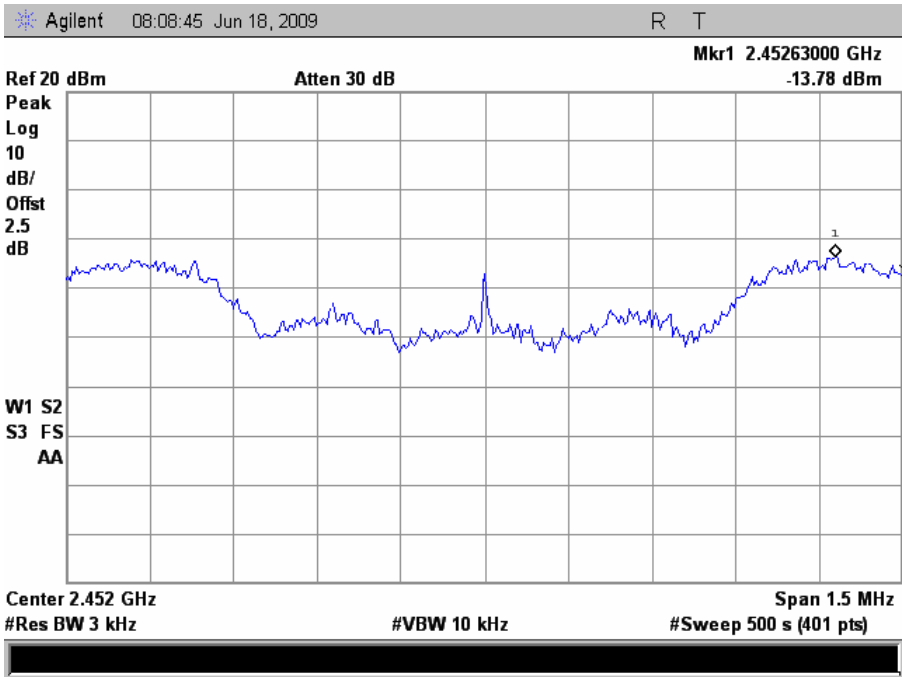


Figure 6-12: Power Density Measurement, 802.11n (40MHz), Channel 9



7 MAXIMUM PERMISSIBLE EXPOSURE (MPE) CALCULATIONS

The § 1.1310 Radiofrequency radiation exposure limits are listed in the table below.

	Frequency Range (MHz)	Power Density Limit (mW/cm^2)
Limits for Occupational/Controlled Exposures	0.3-3.0	100
	3.0-30	900/ Frequency2
	30-300	1.0
	300-1500	Frequency/300
	1500-100,000	5.0
Limits for General Population/Uncontrolled Exposure	0.3-1.34	100
	1.34-30	180/Frequency2
	30-300	0.2
	300-1500	Frequency/1500
	1500-100,000	1.0

7.1 Test Procedure (FCC Rule: §15.247(b)(5))

The EIRP was calculated in the previous report section. The radiated RF power was used to calculate the maximum RF exposure at a 20 cm distance using the formula:

$$\text{Maximum RF Exposure at 20cm} = (\text{EIRP in mW})/(4\text{Pi}(20\text{cm})^2)$$

Once the Maximum RF Exposure calculations were complete the results were compared to the MPE limits above.

7.2 Test Results

The following calculations show the Maximum RF Exposure from the 802.11bgn Wireless Adapter at 20cm for the worst case calculated EIRP. The MPE level is well below the limits for the general population described in the table above.

$$\text{Maximum Measured EIRP} = 19.66\ \text{dBm} = 92.47\ \text{mW}$$

$$\text{MPE} = 92.47\ \text{mW} / (4\text{Pi}(20\text{cm})^2) = 0.018\text{mW/cm}^2$$

8 OUT OF BAND EMISSIONS AT ANTENNA TERMINALS

8.1 Test Procedure (FCC Rule §15.247(c))

The antenna port of the 802.11bgn Wireless Adapter was connected to the input of a spectrum analyzer. The analyzer resolution and video bandwidths were set to 100kHz. The 802.11bgn Wireless Adapter was set to transmit at its highest output power level and with the modulation scheme that produced the highest conducted output power level. The spectrum analyzer was scanned from 30MHz to 26GHz using the max hold function to detect any out of band spurious emissions. The resulting trace was corrected for the cable loss between the test sample and the spectrum analyzer.

8.2 Out of Band Emissions at Antenna Terminals Criteria

In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, the RF power shall be at least 20dB below that of the carrier.

8.3 Test Results

The 802.11bgn Wireless Adapter met the out of band emission at antenna terminal requirements. The graphs in Figure 8-1 through Figure 8-4 illustrate the output power of the low, mid, and high channels and also show that there are no spurious emissions within 20dB of the peak carrier power.

Figure 8-1: Out of band emissions at antenna terminals – Channel 1, 6, and 11 (802.11b Mode)

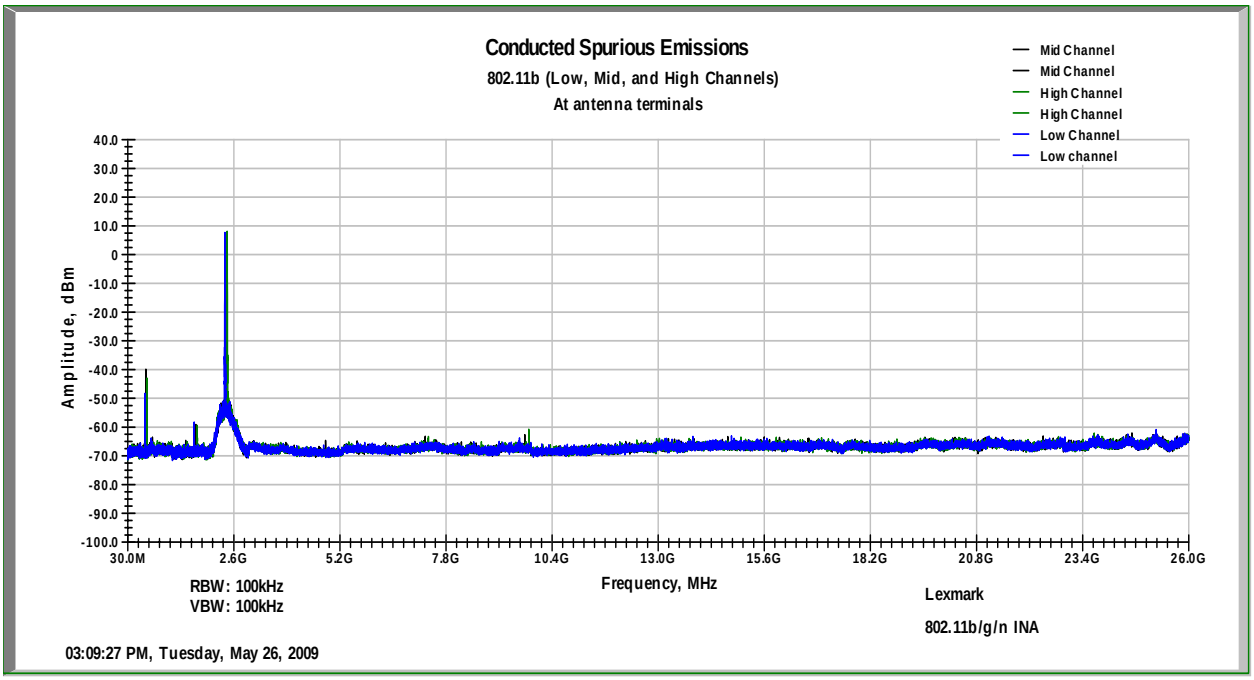


Figure 8-2: Out of band emissions at antenna terminals – Channel 1, 6, and 11 (802.11g mode)

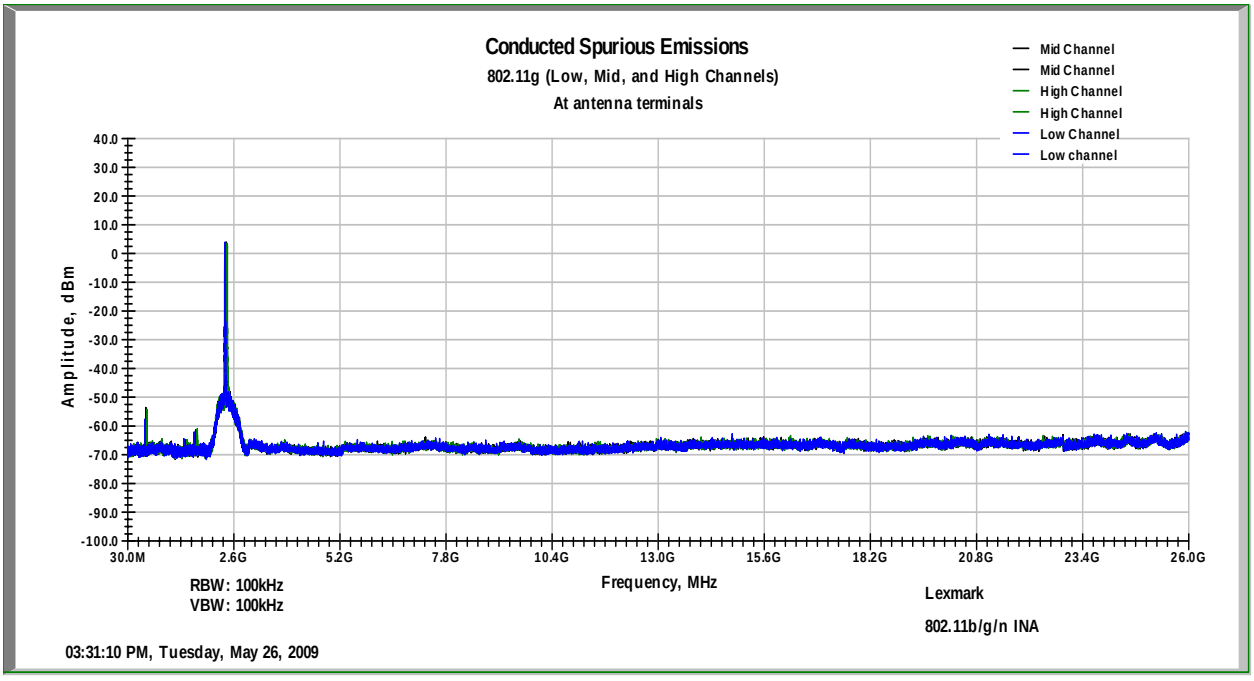


Figure 8-3: Out of band emissions at antenna terminals – Channel 1, 6, and 11 (802.11n, 20GHz Mode)

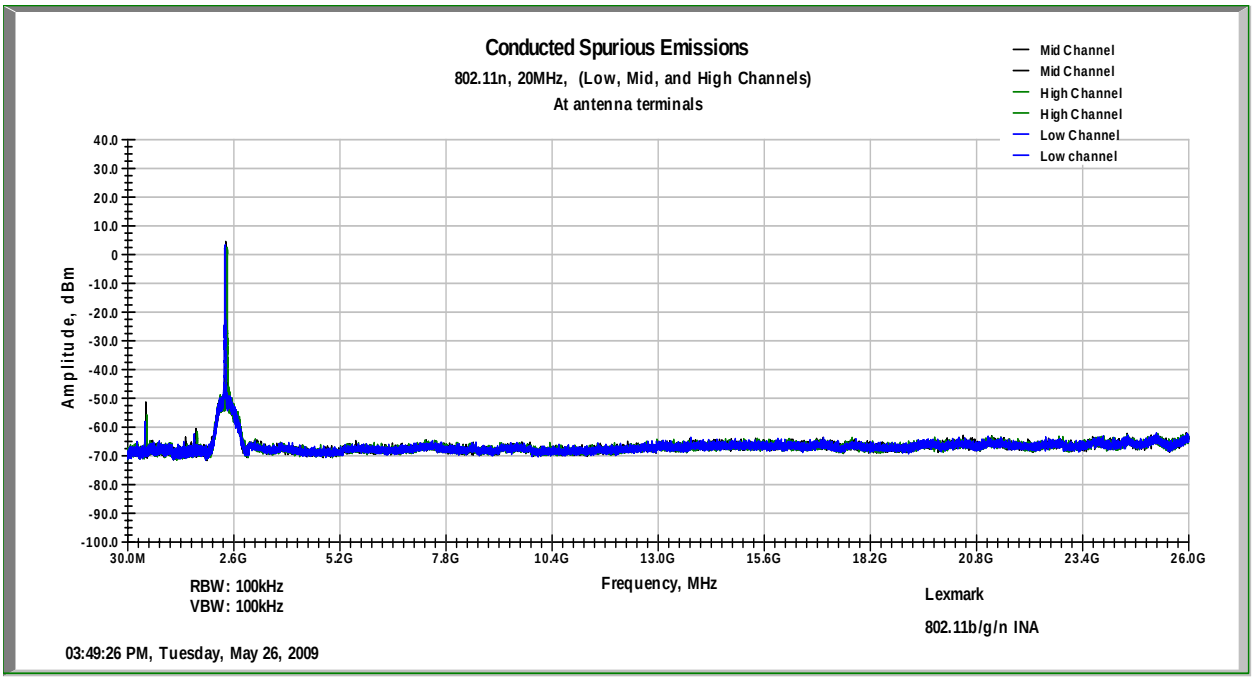
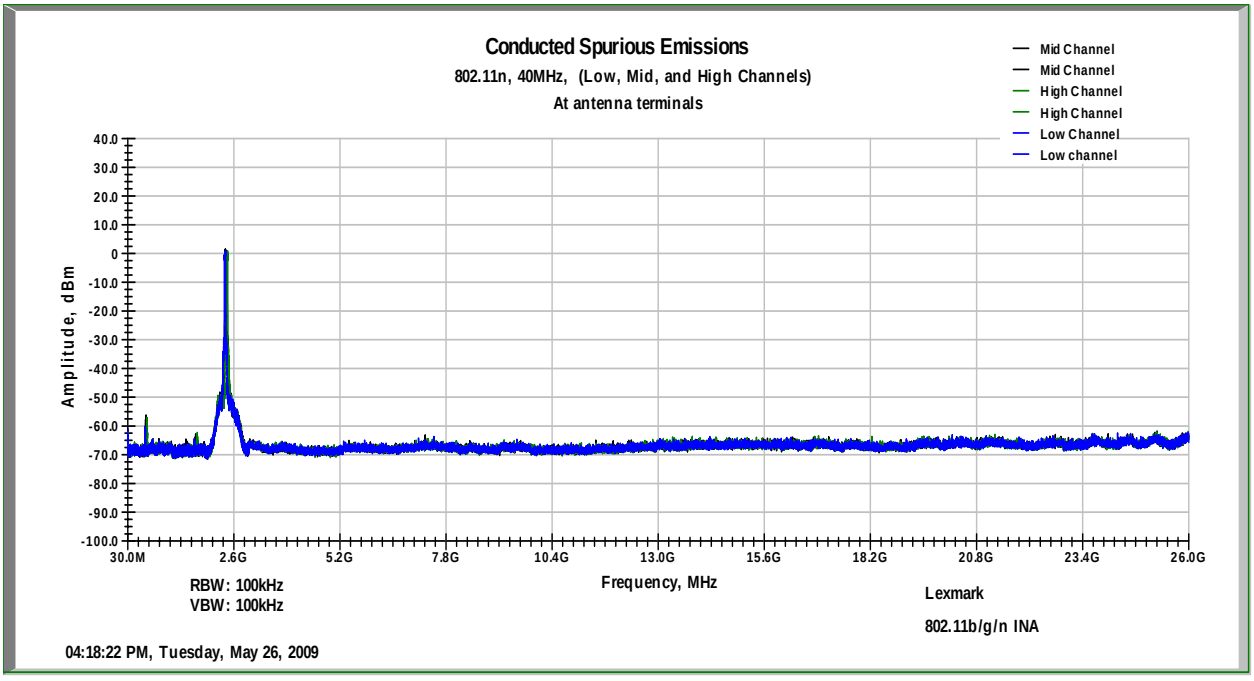


Figure 8-4: Out of band emissions at antenna terminals – Channel 3, 6, and 9 (802.11n, 40GHz mode)



9 FIELD STRENGTH OF SPURIOUS RADIATION (GENERAL REQUIREMENTS AND RESTRICTED BAND REQUIREMENTS)

9.1 Test Procedure (FCC Rule §15.247(c) for Radiated Measurements)

The 802.11bgn Wireless Adapter was placed on a non-conductive table. It was then set to transmit at its highest output power level and with the modulation scheme that produced the highest conducted output power level. The 30MHz – 3GHz range was measured with a bilog antenna, no external preamplifier, and no external filtering in the measurement path. The 3GHz-26GHz range was measured with an in line preamplifier and high pass filter with a pass band above 3GHz in order to keep the fundamental transmission from overloading the receiver. All measurements were performed with the receiving antenna 3 meters from the EUT with the exception of the 18-26GHz range which was performed at a distance of 1m. During the tests, the antenna height and EUT azimuth were varied in order to identify the maximum level of emissions from the EUT.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequencies (low, middle, and high channels) in each operating band. The field strength of each spurious emission within 20dB of the limit was measured using the procedure outlined in ANSI C63.4. Radiated emissions which fell into restricted bands were investigated using a 1MHz resolution bandwidth on the spectrum analyzer.

Also, a scan was performed looking specifically at the band edge of the high and low test channels in order to show that the restricted bands ranging from 2310MHz to 2390MHz and 2483.5MHz to 2500 MHz were not intruded upon. To perform this measurement, the spectrum analyzer was manually set to show the band edge of the high and low channels as well as the entire adjacent restricted band. The amplitude was offset to account for cable loss, antenna factor, and preamplifier gain. The turntable and tower were maximized with the analyzer set to max hold. These scans were performed in peak and average detection mode.

9.2 Field Strength of Spurious Radiation Criteria

In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, the RF power shall be at least 20dB below that of the carrier. In addition, emissions within the restricted bands as specified in §15.205(a), must also comply with the limits specified in §15.209(a). Those limits are in the table below.

Table 9-1 Radiated Emission Limit for FCC §15.209(a)

Radiated Emission Limits at 3 meters	
Frequency (MHz)	**Quasi-Peak limits, dB (μV/m)**
30 to 88	40.0
88 to 216	43.5
216 to 960	46.0
960 and up	54.0

9.3 Test Results

The LEX-M01-003 802.11bgn Wireless Adapter met the field strength of spurious radiation requirements of FCC §15.209 and §15.247(c). All harmonics and spurious emissions were at least 20dB below the carrier. There were no emissions within the restricted bands exceeding the limits specified in §15.209(a). The maximized spurious emissions for the PCB antenna are shown in Table 9-2 through Table 9-5. The maximized spurious emissions for the external Acon antenna are shown in Table 9-6 through Table 9-9. There were no emissions which exceeded the peak or average limits. All other emissions falling in the restricted bands were below the measurement noise floor.

Figure 9-1 through Figure 9-16 show the band edge data for the PCB antenna. Figure 9-17 through Figure 9-32 show the band edge data for the external Acon antenna.

Table 9-2 Spurious Radiated Emissions (802.11b Mode)

TX Mode	Freqency	Pol.	Reading	Cable	Antenna	Corrected Reading	Limit	Delta	Detector
802.11b Ch 1	4.8242 GHz	H	39.07	-31.41	32.88	40.54	74	-33.46	PK
802.11b Ch 1	7.2374 GHz	H	36.92	-27.93	35.92	44.91	74	-29.09	PK
802.11b Ch 1	4.8242 GHz	H	25.93	-31.41	32.88	27.4	54	-26.6	AVG
802.11b Ch 1	7.2374 GHz	H	23.76	-27.93	35.92	31.75	54	-22.25	AVG
802.11b Ch 1	4.8242 GHz	V	39.07	-31.41	32.92	40.58	74	-33.42	PK
802.11b Ch 1	7.2374 GHz	V	37.06	-27.93	36.06	45.19	74	-28.81	PK
802.11b Ch 1	4.8242 GHz	V	26.51	-31.41	32.92	28.02	54	-25.98	AVG
802.11b Ch 1	7.2374 GHz	V	23.81	-27.93	36.06	31.94	54	-22.06	AVG
802.11b Ch 6	4.874 GHz	H	40.81	-30.67	32.97	43.11	74	-30.89	PK
802.11b Ch 6	7.3093 GHz	H	35.87	-27.26	36.1	44.71	74	-29.29	PK
802.11b Ch 6	4.874 GHz	H	27.08	-30.67	32.97	29.38	54	-24.62	AVG
802.11b Ch 6	7.3093 GHz	H	23.22	-27.26	36.1	32.06	54	-21.94	AVG
802.11b Ch 6	4.8741 GHz	V	41.35	-30.67	33	43.68	74	-30.32	PK
802.11b Ch 6	7.3093 GHz	V	37.67	-27.26	36.27	46.68	74	-27.32	PK
802.11b Ch 6	4.8741 GHz	V	28.1	-30.67	33	30.43	54	-23.57	AVG
802.11b Ch 6	7.3093 GHz	V	24.81	-27.26	36.27	33.82	54	-20.18	AVG
802.11b Ch 11	4.924 GHz	H	37.3	-31.02	33.06	39.34	74	-34.66	PK
802.11b Ch 11	7.3865 GHz	H	31.54	-27.15	36.3	40.69	74	-33.31	PK
802.11b Ch 11	4.924 GHz	H	24.75	-31.02	33.06	26.79	54	-27.21	AVG
802.11b Ch 11	7.3865 GHz	H	22.32	-27.15	36.3	31.47	54	-22.53	AVG
802.11b Ch 11	4.9241 GHz	V	38.69	-31.02	33.08	40.75	74	-33.25	PK
802.11b Ch 11	7.3865 GHz	V	35.46	-27.15	36.48	44.79	74	-29.21	PK
802.11b Ch 11	4.9241 GHz	V	25.27	-31.02	33.08	27.33	54	-26.67	AVG
802.11b Ch 11	7.3865 GHz	V	22.39	-27.15	36.48	31.72	54	-22.28	AVG

The final peak or average amplitude is computed from the measured receiver amplitude by adding a correction factor associated with the Antenna and cable loss as shown in the formula below.

FM = RA + CF + AF where,

FM = Final Measurement

RA = Receiver Amplitude

CF = Cable Factor

AF = Antenna Factor

Table 9-3 Spurious Radiated Emissions (802.11g Mode)

TX Mode	Freqency	Pol.	Reading	Cable	Antenna	Corrected Reading	Limit	Delta	Detector
802.11g Ch 1	4.8242 GHz	H	41.54	-31.41	32.88	43.01	74	-30.99	PK
802.11g Ch 1	7.2374 GHz	H	39.33	-27.93	35.92	47.32	74	-26.68	PK
802.11g Ch 1	4.8242 GHz	H	27.8	-31.41	32.88	29.27	54	-24.73	AVG
802.11g Ch 1	7.2374 GHz	H	25.78	-27.93	35.92	33.77	54	-20.23	AVG
802.11g Ch 1	4.8242 GHz	V	42.03	-31.41	32.92	43.54	74	-30.46	PK
802.11g Ch 1	7.2374 GHz	V	38.31	-27.93	36.06	46.44	74	-27.56	PK
802.11g Ch 1	4.8242 GHz	V	28.16	-31.41	32.92	29.67	54	-24.33	AVG
802.11g Ch 1	7.2374 GHz	V	24.11	-27.93	36.06	32.24	54	-21.76	AVG
802.11g Ch 6	4.8743 GHz	H	41.54	-30.67	32.97	43.84	74	-30.16	PK
802.11g Ch 6	7.3094 GHz	H	38.44	-27.26	36.1	47.28	74	-26.72	PK
802.11g Ch 6	4.8743 GHz	H	28.67	-30.67	32.97	30.97	54	-23.03	AVG
802.11g Ch 6	7.3094 GHz	H	25.34	-27.26	36.1	34.18	54	-19.82	AVG
802.11g Ch 6	4.8743 GHz	V	45.54	-30.67	33	47.87	74	-26.13	PK
802.11g Ch 6	7.3093 GHz	V	37.55	-27.26	36.27	46.56	74	-27.44	PK
802.11g Ch 6	4.8743 GHz	V	32.56	-30.67	33	34.89	54	-19.11	AVG
802.11g Ch 6	7.3093 GHz	V	24.16	-27.26	36.27	33.17	54	-20.83	AVG
802.11g Ch 11	4.9249 GHz	H	39.07	-31.03	33.06	41.1	74	-32.9	PK
802.11g Ch 11	7.3865 GHz	H	37.93	-27.15	36.3	47.08	74	-26.92	PK
802.11g Ch 11	4.9249 GHz	H	26.3	-31.03	33.06	28.33	54	-25.67	AVG
802.11g Ch 11	7.3865 GHz	H	24.32	-27.15	36.3	33.47	54	-20.53	AVG
802.11g Ch 11	4.9249 GHz	V	43.58	-31.03	33.08	45.63	74	-28.37	PK
802.11g Ch 11	7.3865 GHz	V	37.17	-27.15	36.48	46.5	74	-27.5	PK
802.11g Ch 11	4.9249 GHz	V	29.94	-31.03	33.08	31.99	54	-22.01	AVG
802.11g Ch 11	7.3865 GHz	V	23.24	-27.15	36.48	32.57	54	-21.43	AVG

The final quasi or average amplitude is computed from the measured receiver amplitude by adding a correction factor associated with the Antenna and cable loss as shown in the formula below.

FM = RA + CF + AF where,

FM = Final Measurement

RA = Receiver Amplitude

CF = Cable Factor

AF = Antenna Factor

Table 9-4 Spurious Radiated Emissions (802.11n, 20MHz Mode)

TX Mode	Freqency	Pol.	Reading	Cable	Antenna	Corrected Reading	Limit	Delta	Detector
802.11n (20MHz) Ch 1	4.8242 GHz	H	36.66	-31.41	32.88	38.13	74	-35.87	PK
802.11n (20MHz) Ch 1	7.2374 GHz	H	36.52	-27.93	35.92	44.51	74	-29.49	PK
802.11n (20MHz) Ch 1	4.8242 GHz	H	28.18	-31.41	32.88	29.65	54	-24.35	AVG
802.11n (20MHz) Ch 1	7.2374 GHz	H	26.24	-27.93	35.92	34.23	54	-19.77	AVG
802.11n (20MHz) Ch 1	4.8242 GHz	V	35.73	-31.41	32.92	37.24	74	-36.76	PK
802.11n (20MHz) Ch 1	7.2347 GHz	V	35.32	-27.78	36.06	43.6	74	-30.4	PK
802.11n (20MHz) Ch 1	4.8242 GHz	V	30.12	-31.41	32.92	31.63	54	-22.37	AVG
802.11n (20MHz) Ch 1	7.2347 GHz	V	24.7	-27.78	36.06	32.98	54	-21.02	AVG
802.11n (20MHz) Ch 6	4.8743 GHz	H	36.13	-30.67	32.97	38.43	74	-35.57	PK
802.11n (20MHz) Ch 6	7.3094 GHz	H	35.47	-27.26	36.1	44.31	74	-29.69	PK
802.11n (20MHz) Ch 6	4.8743 GHz	H	26.4	-30.67	32.97	28.7	54	-25.3	AVG
802.11n (20MHz) Ch 6	7.3094 GHz	H	24.68	-27.26	36.1	33.52	54	-20.48	AVG
802.11n (20MHz) Ch 6	4.8682 GHz	V	39.69	-30.62	32.99	42.06	74	-31.94	PK
802.11n (20MHz) Ch 6	7.3093 GHz	V	34.66	-27.26	36.27	43.67	74	-30.33	PK
802.11n (20MHz) Ch 6	4.8682 GHz	V	30.61	-30.62	32.99	32.98	54	-21.02	AVG
802.11n (20MHz) Ch 6	7.3093 GHz	V	24.77	-27.26	36.27	33.78	54	-20.22	AVG
802.11n (20MHz) Ch 11	4.9249 GHz	H	36.26	-31.03	33.06	38.29	74	-35.71	PK
802.11n (20MHz) Ch 11	7.3865 GHz	H	34.38	-27.15	36.3	43.53	74	-30.47	PK
802.11n (20MHz) Ch 11	4.9249 GHz	H	27.4	-31.03	33.06	29.43	54	-24.57	AVG
802.11n (20MHz) Ch 11	7.3865 GHz	H	25.51	-27.15	36.3	34.66	54	-19.34	AVG
802.11n (20MHz) Ch 11	4.9249 GHz	V	35.6	-31.03	33.08	37.65	74	-36.35	PK
802.11n (20MHz) Ch 11	7.3932 GHz	V	35.46	-27.18	36.5	44.78	74	-29.22	PK
802.11n (20MHz) Ch 11	4.9249 GHz	V	26.01	-31.03	33.08	28.06	54	-25.94	AVG
802.11n (20MHz) Ch 11	7.3932 GHz	V	23.13	-27.18	36.5	32.45	54	-21.55	AVG

The final peak or average amplitude is computed from the measured receiver amplitude by adding a correction factor associated with the Antenna and cable loss as shown in the formula below.

FM = RA + CF + AF where,

FM = Final Measurement

RA = Receiver Amplitude

CF = Cable Factor

AF = Antenna Factor

Table 9-5 Spurious Radiated Emissions (802.11n, 40MHz Mode)

TX Mode	Freqency	Pol.	Reading	Cable	Antenna	Corrected Reading	Limit	Delta	Detector
802.11n (40MHz) Ch 3	4.8242 GHz	H	34.79	-31.41	32.88	36.26	74	-37.74	PK
802.11n (40MHz) Ch 3	7.2374 GHz	H	32.91	-27.93	35.92	40.9	74	-33.1	PK
802.11n (40MHz) Ch 3	4.8242 GHz	H	27.33	-31.41	32.88	28.8	54	-25.2	AVG
802.11n (40MHz) Ch 3	7.2374 GHz	H	25.63	-27.93	35.92	33.62	54	-20.38	AVG
802.11n (40MHz) Ch 3	4.8242 GHz	V	35.6	-31.41	32.92	37.11	74	-36.89	PK
802.11n (40MHz) Ch 3	7.2346 GHz	V	36.78	-27.78	36.06	45.06	74	-28.94	PK
802.11n (40MHz) Ch 3	4.8242 GHz	V	28.03	-31.41	32.92	29.54	54	-24.46	AVG
802.11n (40MHz) Ch 3	7.2346 GHz	V	25.19	-27.78	36.06	33.47	54	-20.53	AVG
802.11n (40MHz) Ch 6	4.8743 GHz	H	35.99	-30.67	32.97	38.29	74	-35.71	PK
802.11n (40MHz) Ch 6	7.3093 GHz	H	33.72	-27.26	36.1	42.56	74	-31.44	PK
802.11n (40MHz) Ch 6	4.8743 GHz	H	28.11	-30.67	32.97	30.41	54	-23.59	AVG
802.11n (40MHz) Ch 6	7.3093 GHz	H	24.66	-27.26	36.1	33.5	54	-20.5	AVG
802.11n (40MHz) Ch 6	4.8743 GHz	V	37.05	-30.67	33	39.38	74	-34.62	PK
802.11n (40MHz) Ch 6	7.3093 GHz	V	32.77	-27.26	36.27	41.78	74	-32.22	PK
802.11n (40MHz) Ch 6	4.8743 GHz	V	30.77	-30.67	33	33.1	54	-20.9	AVG
802.11n (40MHz) Ch 6	7.3093 GHz	V	25.31	-27.26	36.27	34.32	54	-19.68	AVG
802.11n (40MHz) Ch 9	4.9249 GHz	H	36.26	-31.03	33.06	38.29	74	-35.71	PK
802.11n (40MHz) Ch 9	7.3865 GHz	H	34.38	-27.15	36.3	43.53	74	-30.47	PK
802.11n (40MHz) Ch 9	4.9249 GHz	H	27.4	-31.03	33.06	29.43	54	-24.57	AVG
802.11n (40MHz) Ch 9	7.3865 GHz	H	25.51	-27.15	36.3	34.66	54	-19.34	AVG
802.11n (40MHz) Ch 9	4.9249 GHz	V	36.52	-31.03	33.08	38.57	74	-35.43	PK
802.11n (40MHz) Ch 9	7.3865 GHz	V	33.05	-27.15	36.48	42.38	74	-31.62	PK
802.11n (40MHz) Ch 9	4.9249 GHz	V	30	-31.03	33.08	32.05	54	-21.95	AVG
802.11n (40MHz) Ch 9	7.3865 GHz	V	24.93	-27.15	36.48	34.26	54	-19.74	AVG

The final peak or average amplitude is computed from the measured receiver amplitude by adding a correction factor associated with the Antenna and cable loss as shown in the formula below.

FM = RA + CF + AF where,

FM = Final Measurement

RA = Receiver Amplitude

CF = Cable Factor

AF = Antenna Factor

Table 9-6 Spurious Radiated Emissions (802.11b Mode, Acon Antenna)

TX Mode	Freqency	Pol.	Reading	Cable	Antenna	Corrected Reading	Limit	Delta	Detector
802.11b Ch 1	4.8241 GHz	H	43.95	-31.41	32.88	45.42	74	-28.58	PK
802.11b Ch 1	7.2374 GHz	H	41.29	-27.93	35.92	49.28	74	-24.72	PK
802.11b Ch 1	4.8241 GHz	H	38.24	-31.41	32.88	39.71	54	-14.29	AVG
802.11b Ch 1	7.2374 GHz	H	32.53	-27.93	35.92	40.52	54	-13.48	AVG
802.11b Ch 1	4.8241 GHz	V	49.69	-31.41	32.92	51.2	74	-22.8	PK
802.11b Ch 1	7.2374 GHz	V	42.04	-27.93	36.06	50.17	74	-23.83	PK
802.11b Ch 1	4.8241 GHz	V	46.72	-31.41	32.92	48.23	54	-5.77	AVG
802.11b Ch 1	7.2374 GHz	V	33.88	-27.93	36.06	42.01	54	-11.99	AVG
802.11b Ch 6	4.874 GHz	H	46.76	-30.67	32.97	49.06	74	-24.94	PK
802.11b Ch 6	7.3093 GHz	H	39.97	-27.26	36.1	48.81	74	-25.19	PK
802.11b Ch 6	4.874 GHz	H	42.91	-30.67	32.97	45.21	54	-8.79	AVG
802.11b Ch 6	7.3093 GHz	H	31.66	-27.26	36.1	40.5	54	-13.5	AVG
802.11b Ch 6	4.8739 GHz	V	50.34	-30.67	33	52.67	74	-21.33	PK
802.11b Ch 6	7.3093 GHz	V	42.29	-27.26	36.27	51.3	74	-22.7	PK
802.11b Ch 6	4.8739 GHz	V	47.52	-30.67	33	49.85	54	-4.15	AVG
802.11b Ch 6	7.3093 GHz	V	35.63	-27.26	36.27	44.64	54	-9.36	AVG
802.11b Ch 11	4.924 GHz	H	46.26	-31.02	33.06	48.3	74	-25.7	PK
802.11b Ch 11	7.3882 GHz	H	40.69	-27.18	36.31	49.82	74	-24.18	PK
802.11b Ch 11	4.924 GHz	H	41.99	-31.02	33.06	44.03	54	-9.97	AVG
802.11b Ch 11	7.3882 GHz	H	31.81	-27.18	36.31	40.94	54	-13.06	AVG
802.11b Ch 11	4.9239 GHz	V	48.53	-31.02	33.08	50.59	74	-23.41	PK
802.11b Ch 11	7.3865 GHz	V	42.96	-27.15	36.48	52.29	74	-21.71	PK
802.11b Ch 11	4.9239 GHz	V	45.21	-31.02	33.08	47.27	54	-6.73	AVG
802.11b Ch 11	7.3865 GHz	V	35.48	-27.15	36.48	44.81	54	-9.19	AVG

The final peak or average amplitude is computed from the measured receiver amplitude by adding a correction factor associated with the Antenna and cable loss as shown in the formula below.

FM = RA + CF + AF where,

FM = Final Measurement

RA = Receiver Amplitude

CF = Cable Factor

AF = Antenna Factor

Table 9-7 Spurious Radiated Emissions (802.11g Mode, Acon Antenna)

TX Mode	Freqency	Pol.	Reading	Cable	Antenna	Corrected Reading	Limit	Delta	Detector
802.11g Ch 1	4.8242 GHz	H	43.08	-31.41	32.88	44.55	74	-29.45	PK
802.11g Ch 1	7.2356 GHz	H	49.82	-27.83	35.91	57.9	74	-16.1	PK
802.11g Ch 1	4.8242 GHz	H	30.03	-31.41	32.88	31.5	54	-22.5	AVG
802.11g Ch 1	7.2356 GHz	H	31.35	-27.83	35.91	39.43	54	-14.57	AVG
802.11g Ch 1	4.8242 GHz	V	45.31	-31.41	32.92	46.82	74	-27.18	PK
802.11g Ch 1	7.2374 GHz	V	53.88	-27.93	36.06	62.01	74	-11.99	PK
802.11g Ch 1	4.8242 GHz	V	31.68	-31.41	32.92	33.19	54	-20.81	AVG
802.11g Ch 1	7.2374 GHz	V	35.41	-27.93	36.06	43.54	54	-10.46	AVG
802.11g Ch 6	4.8743 GHz	H	43.08	-30.67	32.97	45.38	74	-28.62	PK
802.11g Ch 6	7.3094 GHz	H	48.28	-27.26	36.1	57.12	74	-16.88	PK
802.11g Ch 6	4.8743 GHz	H	29.49	-30.67	32.97	31.79	54	-22.21	AVG
802.11g Ch 6	7.3094 GHz	H	30.52	-27.26	36.1	39.36	54	-14.64	AVG
802.11g Ch 6	4.8743 GHz	V	44.45	-30.67	33	46.78	74	-27.22	PK
802.11g Ch 6	7.3093 GHz	V	52.05	-27.26	36.27	61.06	74	-12.94	PK
802.11g Ch 6	4.8743 GHz	V	31.52	-30.67	33	33.85	54	-20.15	AVG
802.11g Ch 6	7.3093 GHz	V	35.04	-27.26	36.27	44.05	54	-9.95	AVG
802.11g Ch 11	4.9249 GHz	H	41.05	-31.03	33.06	43.08	74	-30.92	PK
802.11g Ch 11	7.3865 GHz	H	43.21	-27.15	36.3	52.36	74	-21.64	PK
802.11g Ch 11	4.9249 GHz	H	28.11	-31.03	33.06	30.14	54	-23.86	AVG
802.11g Ch 11	7.3865 GHz	H	26.36	-27.15	36.3	35.51	54	-18.49	AVG
802.11g Ch 11	4.9249 GHz	V	41.78	-31.03	33.08	43.83	74	-30.17	PK
802.11g Ch 11	7.3865 GHz	V	44.58	-27.15	36.48	53.91	74	-20.09	PK
802.11g Ch 11	4.9249 GHz	V	28.2	-31.03	33.08	30.25	54	-23.75	AVG
802.11g Ch 11	7.3865 GHz	V	28.82	-27.15	36.48	38.15	54	-15.85	AVG

The final peak or average amplitude is computed from the measured receiver amplitude by adding a correction factor associated with the Antenna and cable loss as shown in the formula below.

FM = RA + CF + AF where,

FM = Final Measurement

RA = Receiver Amplitude

CF = Cable Factor

AF = Antenna Factor

Table 9-8 Spurious Radiated Emissions (802.11n, 20MHz Mode, Acon Antenna)

TX Mode	Freqency	Pol.	Reading	Cable	Antenna	Corrected Reading	Limit	Delta	Detector
802.11n (20MHz) Ch 1	4.8242 GHz	H	41.42	-31.41	32.88	42.89	74	-31.11	PK
802.11n (20MHz) Ch 1	7.2375 GHz	H	47.89	-27.93	35.92	55.88	74	-18.12	PK
802.11n (20MHz) Ch 1	4.8242 GHz	H	28.44	-31.41	32.88	29.91	54	-24.09	AVG
802.11n (20MHz) Ch 1	7.2375 GHz	H	31.14	-27.93	35.92	39.13	54	-14.87	AVG
802.11n (20MHz) Ch 1	4.8242 GHz	V	45.66	-31.41	32.92	47.17	74	-26.83	PK
802.11n (20MHz) Ch 1	7.2347 GHz	V	50.98	-27.78	36.06	59.26	74	-14.74	PK
802.11n (20MHz) Ch 1	4.8242 GHz	V	32.61	-31.41	32.92	34.12	54	-19.88	AVG
802.11n (20MHz) Ch 1	7.2347 GHz	V	33.28	-27.78	36.06	41.56	54	-12.44	AVG
802.11n (20MHz) Ch 6	4.8743 GHz	H	41.17	-30.67	32.97	43.47	74	-30.53	PK
802.11n (20MHz) Ch 6	7.3094 GHz	H	47.65	-27.26	36.1	56.49	74	-17.51	PK
802.11n (20MHz) Ch 6	4.8743 GHz	H	27.98	-30.67	32.97	30.28	54	-23.72	AVG
802.11n (20MHz) Ch 6	7.3094 GHz	H	28.39	-27.26	36.1	37.23	54	-16.77	AVG
802.11n (20MHz) Ch 6	4.8683 GHz	V	46.38	-30.63	32.99	48.74	74	-25.26	PK
802.11n (20MHz) Ch 6	7.3093 GHz	V	49.69	-27.26	36.27	58.7	74	-15.3	PK
802.11n (20MHz) Ch 6	4.8683 GHz	V	32.8	-30.63	32.99	35.16	54	-18.84	AVG
802.11n (20MHz) Ch 6	7.3093 GHz	V	32.86	-27.26	36.27	41.87	54	-12.13	AVG
802.11n (20MHz) Ch 11	4.9249 GHz	H	40.32	-31.03	33.06	42.35	74	-31.65	PK
802.11n (20MHz) Ch 11	7.3865 GHz	H	44.58	-27.15	36.3	53.73	74	-20.27	PK
802.11n (20MHz) Ch 11	4.9249 GHz	H	27.11	-31.03	33.06	29.14	54	-24.86	AVG
802.11n (20MHz) Ch 11	7.3865 GHz	H	27.65	-27.15	36.3	36.8	54	-17.2	AVG
802.11n (20MHz) Ch 11	4.9249 GHz	V	47.39	-31.03	33.08	49.44	74	-24.56	PK
802.11n (20MHz) Ch 11	7.3932 GHz	V	44.83	-27.18	36.5	54.15	74	-19.85	PK
802.11n (20MHz) Ch 11	4.9249 GHz	V	32.49	-31.03	33.08	34.54	54	-19.46	AVG
802.11n (20MHz) Ch 11	7.3932 GHz	V	27.55	-27.18	36.5	36.87	54	-17.13	AVG

The final peak or average amplitude is computed from the measured receiver amplitude by adding a correction factor associated with the Antenna and cable loss as shown in the formula below.

FM = RA + CF + AF where,

FM = Final Measurement

RA = Receiver Amplitude

CF = Cable Factor

AF = Antenna Factor

Table 9-9 Spurious Radiated Emissions (802.11n, 40MHz Mode, Acon Antenna)

TX Mode	Freqency	Pol.	Reading	Cable	Antenna	Corrected Reading	Limit	Delta	Detector
802.11n (40MHz) Ch 3	4.8242 GHz	H	39.07	-31.41	32.88	40.54	74	-33.46	PK
802.11n (40MHz) Ch 3	7.2374 GHz	H	41.54	-27.93	35.92	49.53	74	-24.47	PK
802.11n (40MHz) Ch 3	4.8242 GHz	H	26.21	-31.41	32.88	27.68	54	-26.32	AVG
802.11n (40MHz) Ch 3	7.2374 GHz	H	27.08	-27.93	35.92	35.07	54	-18.93	AVG
802.11n (40MHz) Ch 3	4.8243 GHz	V	42.43	-31.41	32.92	43.94	74	-30.06	PK
802.11n (40MHz) Ch 3	7.2346 GHz	V	46.5	-27.78	36.06	54.78	74	-19.22	PK
802.11n (40MHz) Ch 3	4.8243 GHz	V	27.81	-31.41	32.92	29.32	54	-24.68	AVG
802.11n (40MHz) Ch 3	7.2346 GHz	V	31.28	-27.78	36.06	39.56	54	-14.44	AVG
802.11n (40MHz) Ch 6	4.8743 GHz	H	41.42	-30.67	32.97	43.72	74	-30.28	PK
802.11n (40MHz) Ch 6	7.3094 GHz	H	44.46	-27.26	36.1	53.3	74	-20.7	PK
802.11n (40MHz) Ch 6	4.8743 GHz	H	28.03	-30.67	32.97	30.33	54	-23.67	AVG
802.11n (40MHz) Ch 6	7.3094 GHz	H	28.25	-27.26	36.1	37.09	54	-16.91	AVG
802.11n (40MHz) Ch 6	4.8743 GHz	V	44.96	-30.67	33	47.29	74	-26.71	PK
802.11n (40MHz) Ch 6	7.3093 GHz	V	46.89	-27.26	36.27	55.9	74	-18.1	PK
802.11n (40MHz) Ch 6	4.8743 GHz	V	30.84	-30.67	33	33.17	54	-20.83	AVG
802.11n (40MHz) Ch 6	7.3093 GHz	V	31.18	-27.26	36.27	40.19	54	-13.81	AVG
802.11n (40MHz) Ch 9	4.9249 GHz	H	40.32	-31.03	33.06	42.35	74	-31.65	PK
802.11n (40MHz) Ch 9	7.3866 GHz	H	40.19	-27.15	36.31	49.35	74	-24.65	PK
802.11n (40MHz) Ch 9	4.9249 GHz	H	27.06	-31.03	33.06	29.09	54	-24.91	AVG
802.11n (40MHz) Ch 9	7.3866 GHz	H	26.14	-27.15	36.31	35.3	54	-18.7	AVG
802.11n (40MHz) Ch 9	4.9249 GHz	V	44.83	-31.03	33.08	46.88	74	-27.12	PK
802.11n (40MHz) Ch 9	7.3865 GHz	V	40.56	-27.15	36.48	49.89	74	-24.11	PK
802.11n (40MHz) Ch 9	4.9249 GHz	V	32.21	-31.03	33.08	34.26	54	-19.74	AVG
802.11n (40MHz) Ch 9	7.3865 GHz	V	25.4	-27.15	36.48	34.73	54	-19.27	AVG

The final peak or average amplitude is computed from the measured receiver amplitude by adding a correction factor associated with the Antenna and cable loss as shown in the formula below.

FM = RA + CF + AF where,

FM = Final Measurement

RA = Receiver Amplitude

CF = Cable Factor

AF = Antenna Factor

Figure 9-1: Channel 1 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11b) – Peak Detector

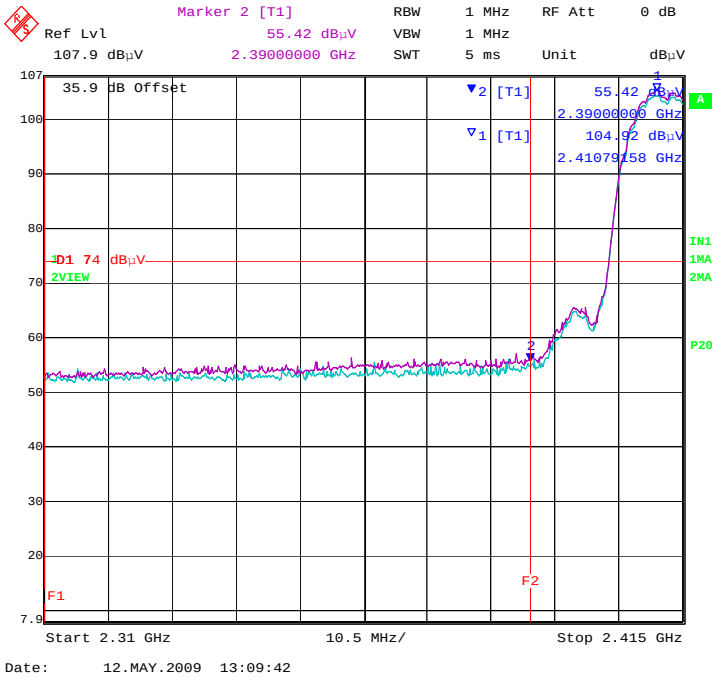


Figure 9-2: Channel 1 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11b) – Average Detector

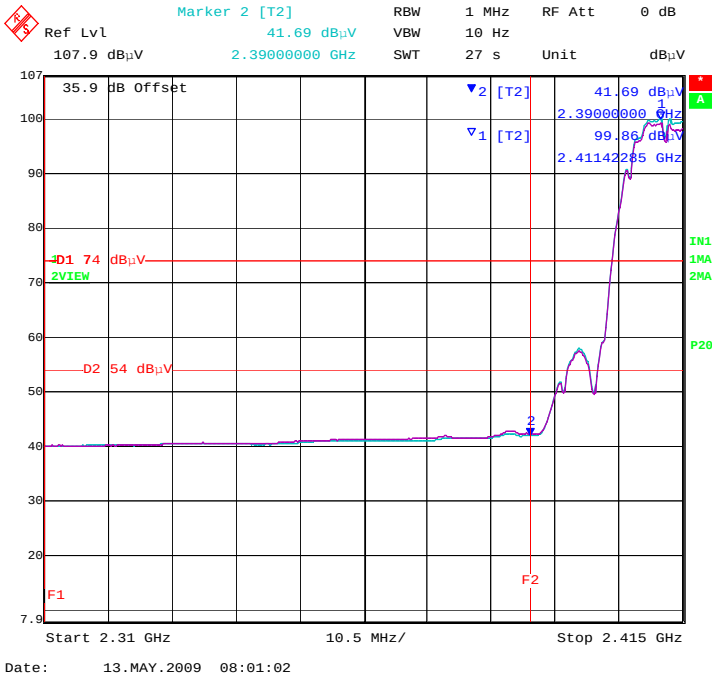


Figure 9-3: Channel 1 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11g) – Peak Detector

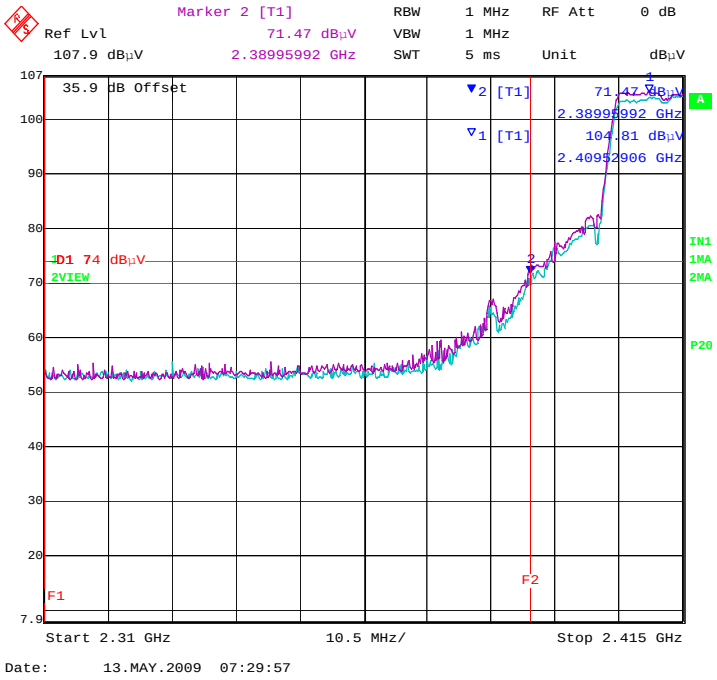


Figure 9-4: Channel 1 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11g) – Average Detector

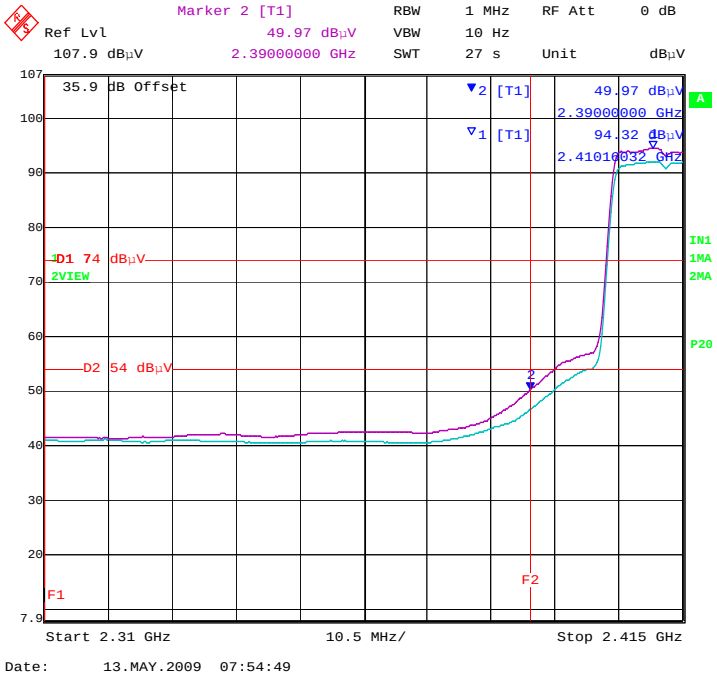


Figure 9-5: Channel 1 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11n, 20MHz) – Peak Detector

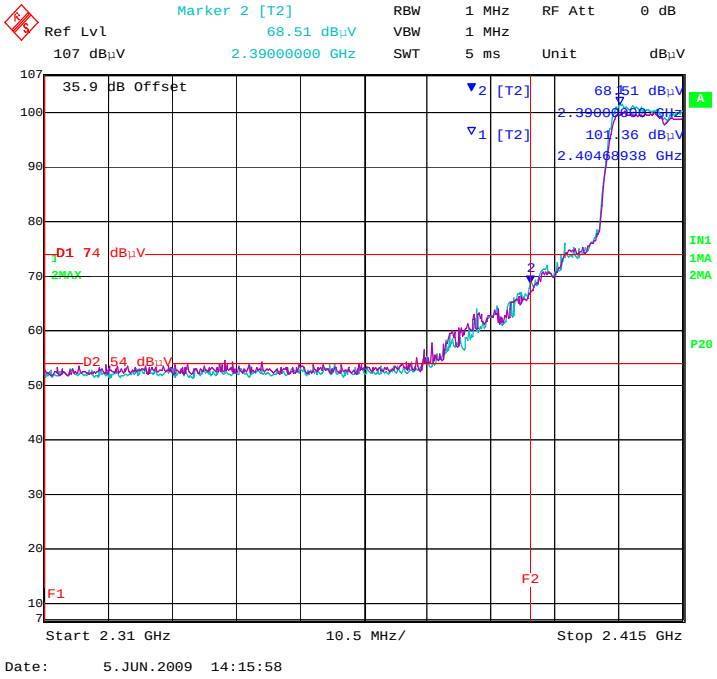


Figure 9-6: Channel 1 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11n, 20MHz) – Average Detector

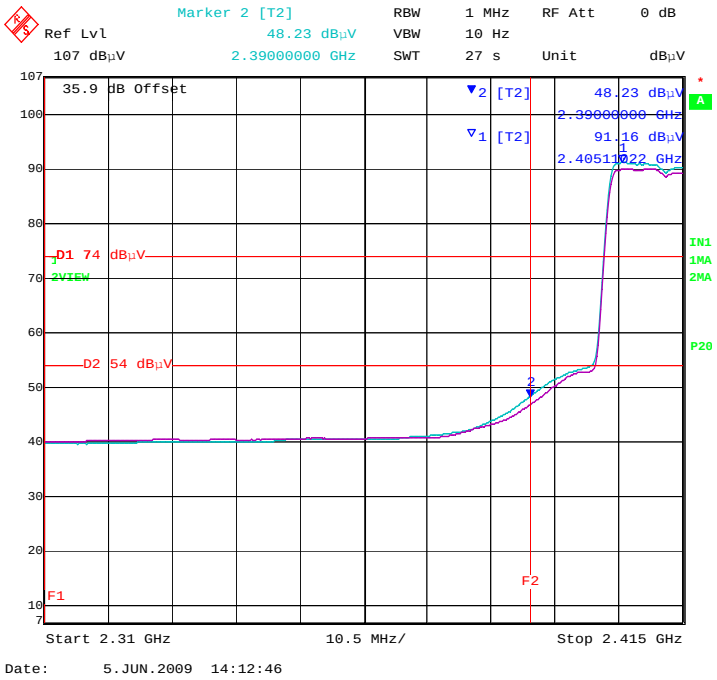


Figure 9-7: Channel 3 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11n, 40MHz) – Peak Detector

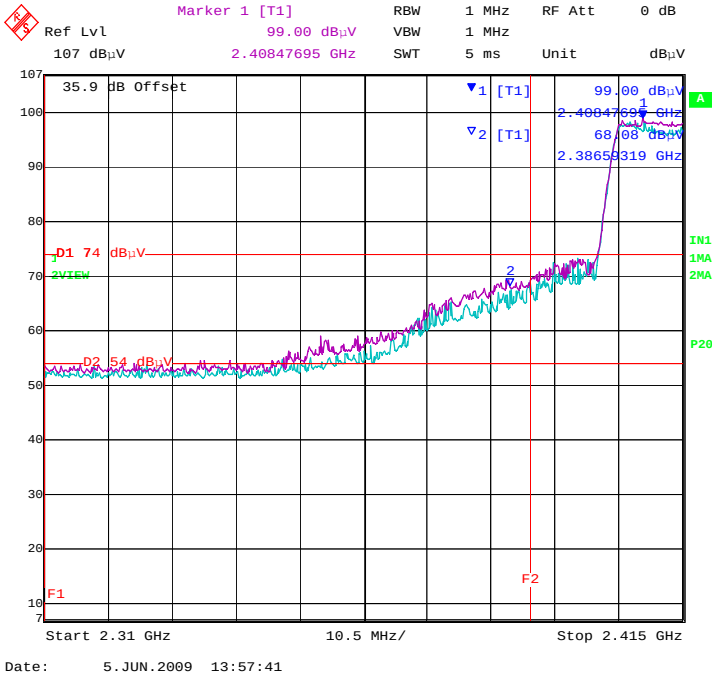


Figure 9-8: Channel 3 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11n, 40MHz) – Average Detector

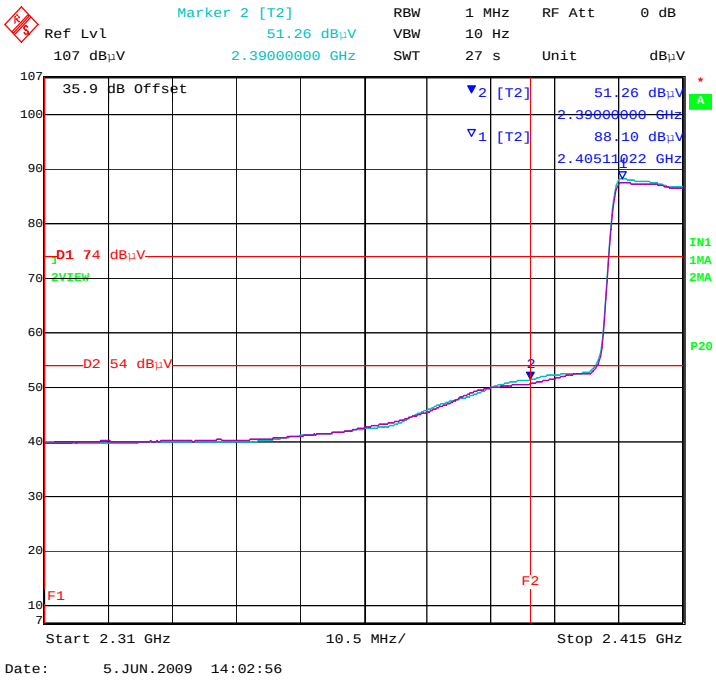


Figure 9-9: Channel 11 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11b) - Peak Detector

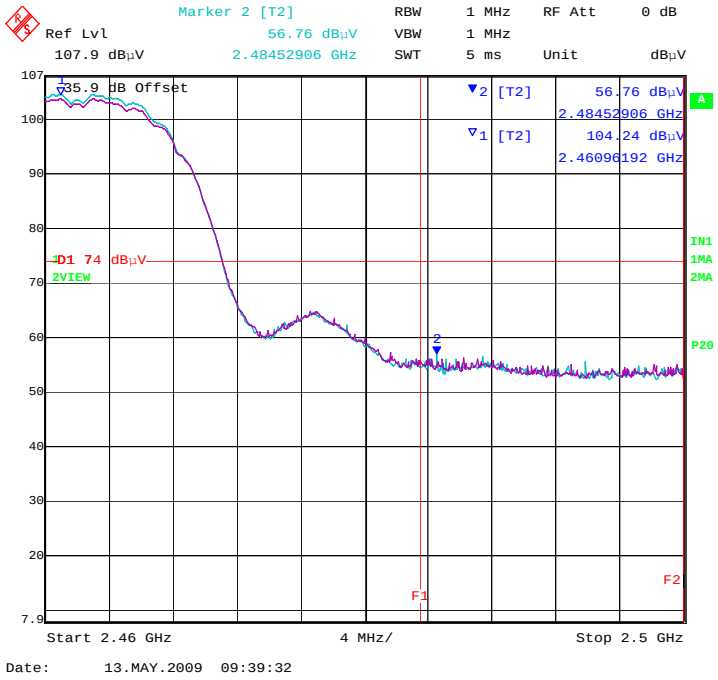


Figure 9-10: Channel 11 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11b) – Average Detector

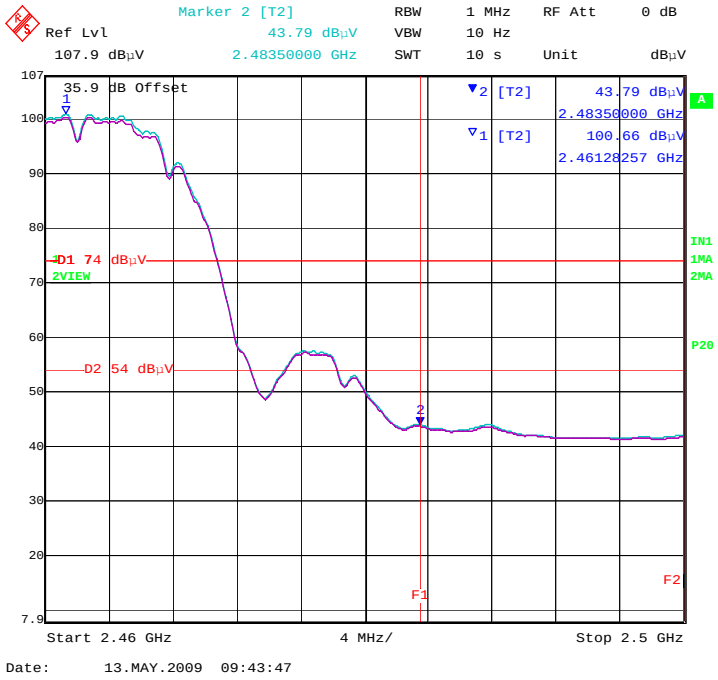


Figure 9-11: Channel 11 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11g) - Peak Detector

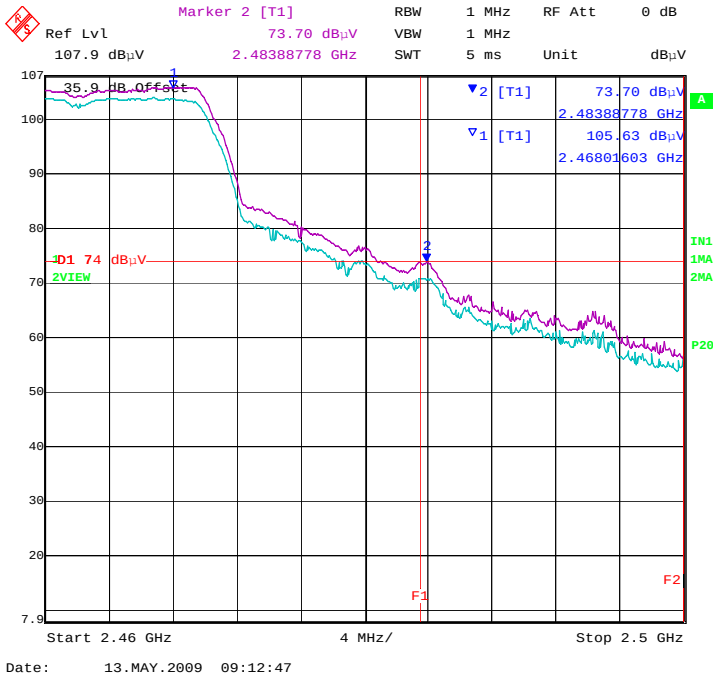


Figure 9-12: Channel 11 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11g) – Average Detector

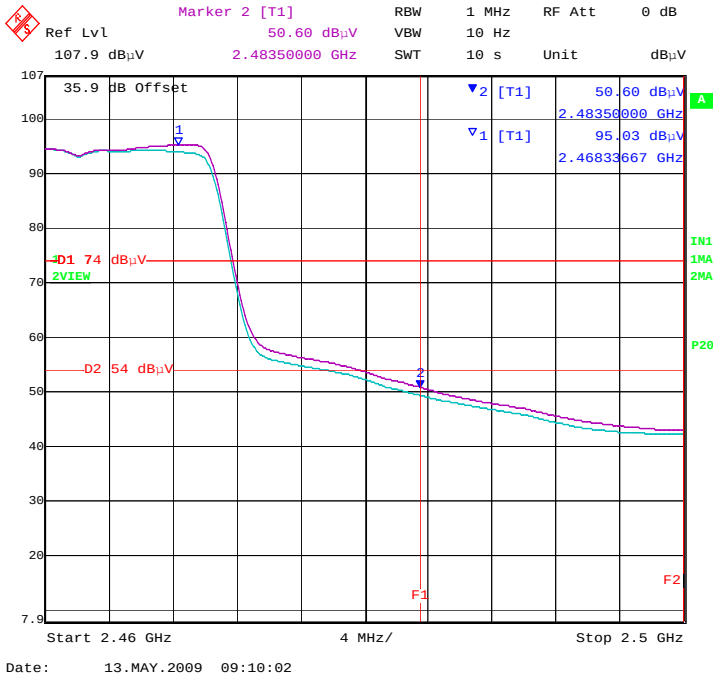


Figure 9-13: Channel 11 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11n, 20MHz) - Peak Detector

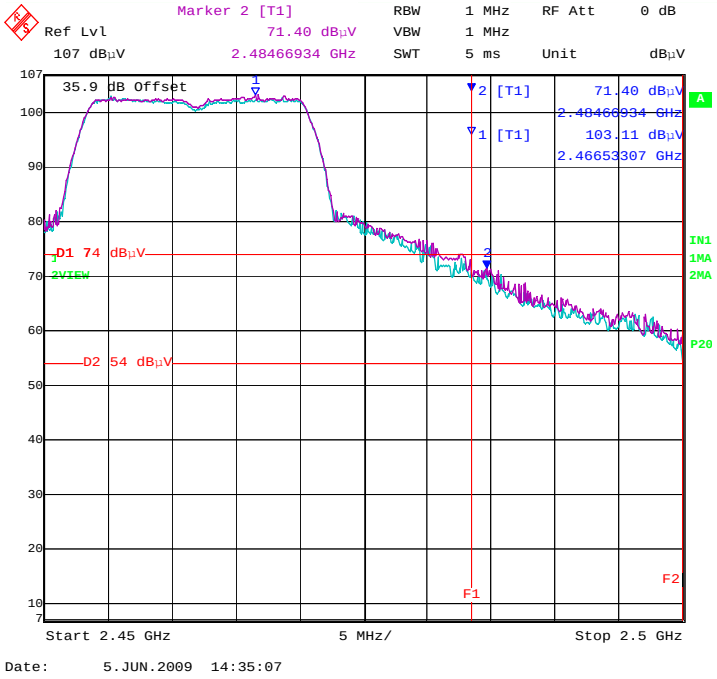


Figure 9-14: Channel 11 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11n, 20MHz) – Average Detector

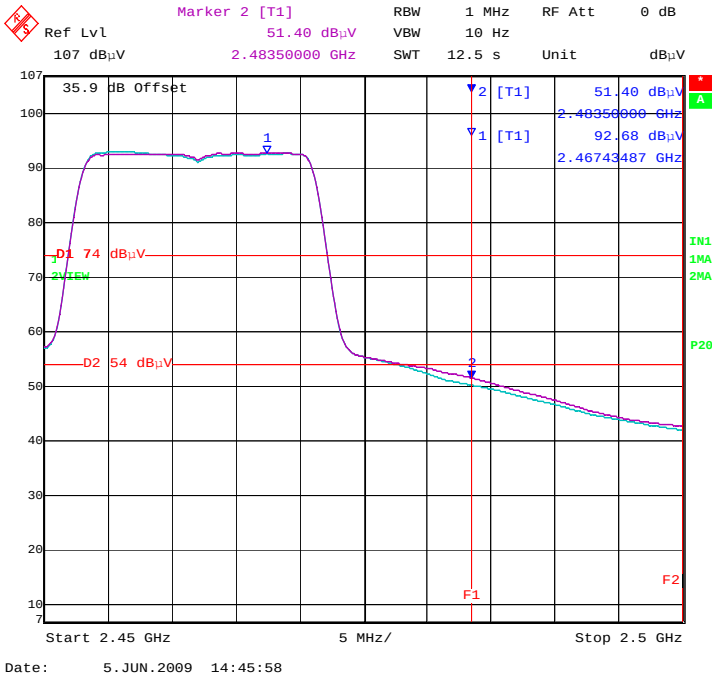


Figure 9-15: Channel 9 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11n, 40MHz) - Peak Detector

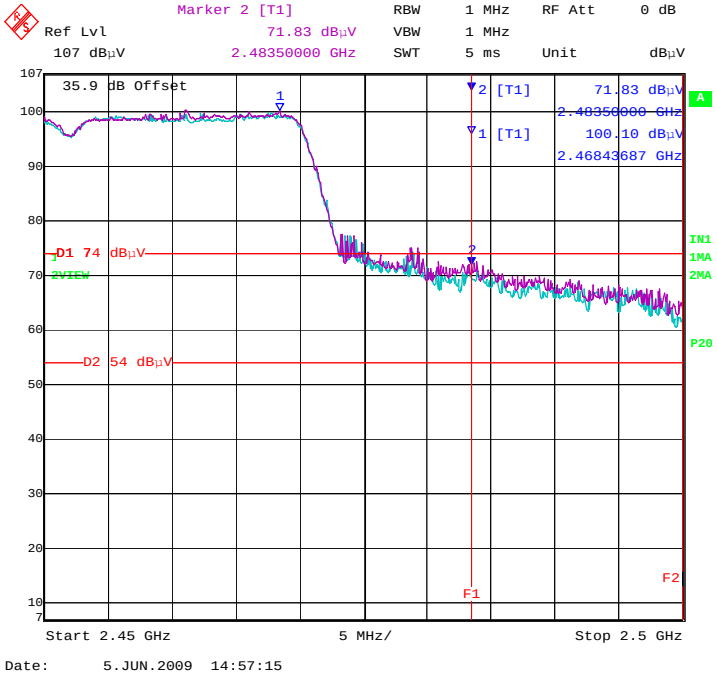


Figure 9-16: Channel 9 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11n, 40MHz) – Average Detector

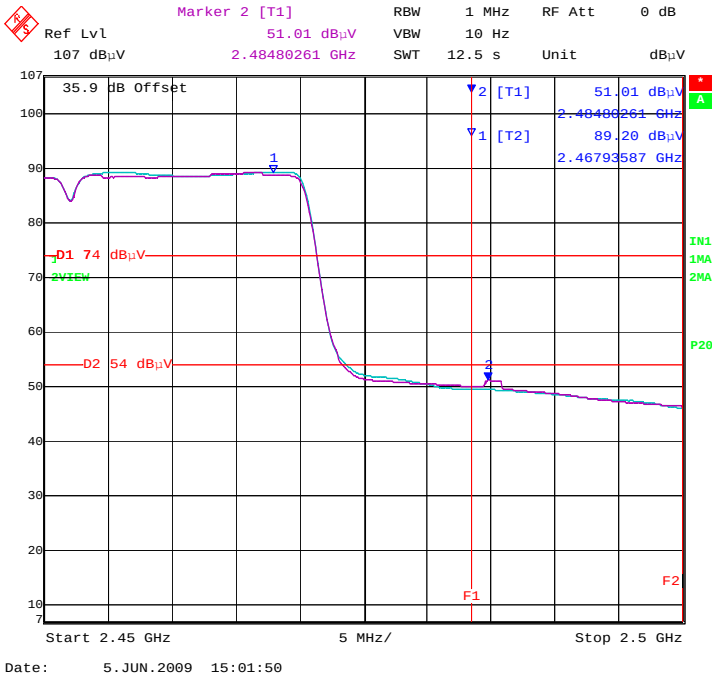


Figure 9-17: Channel 1 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11b) – Peak Detector, Acon Antenna

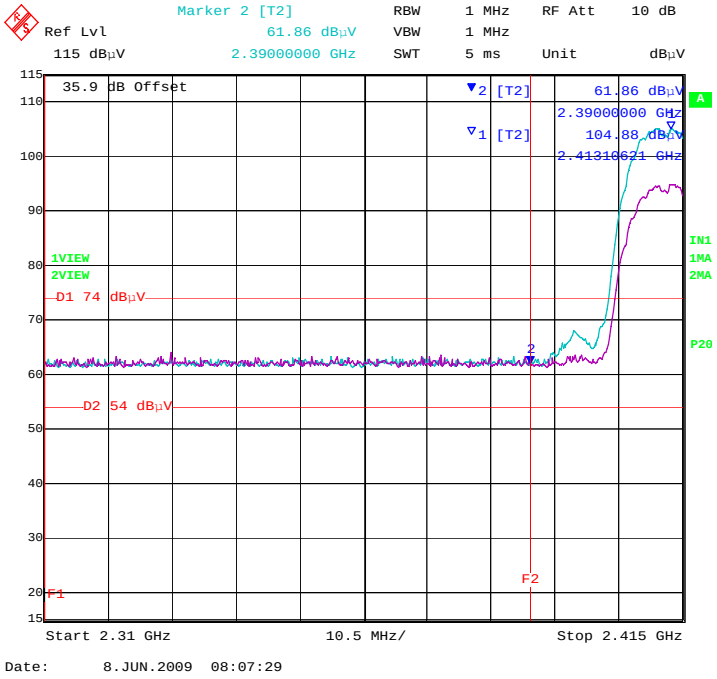


Figure 9-18: Channel 1 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11b) – Average Detector, Acon Antenna

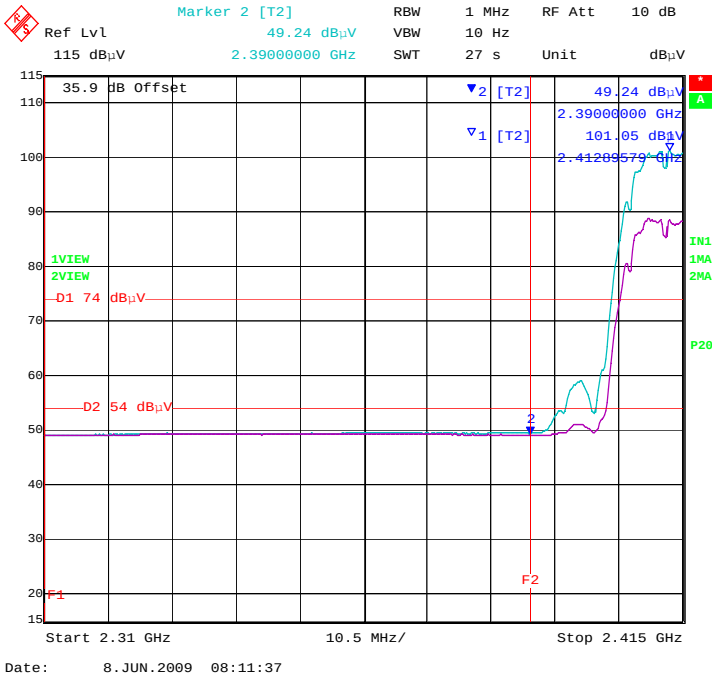


Figure 9-19: Channel 1 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11g) – Peak Detector, Acon Antenna

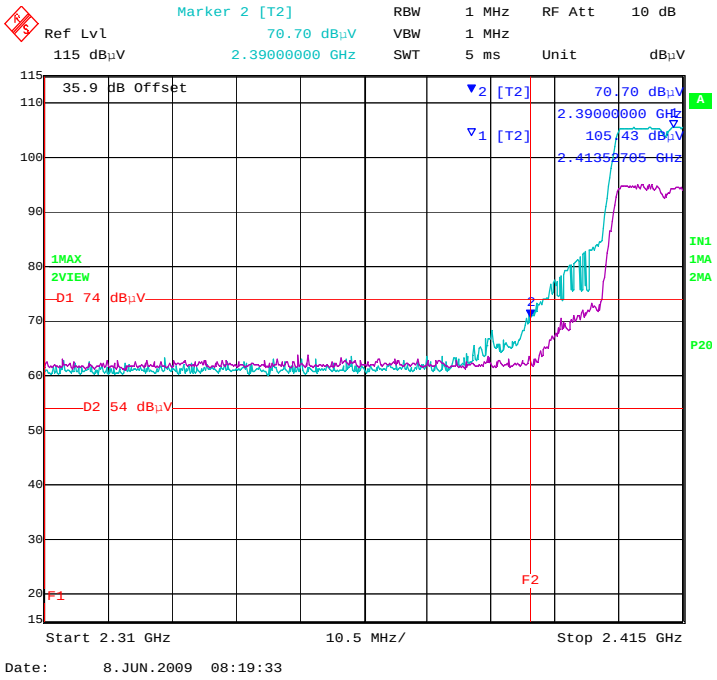


Figure 9-20: Channel 1 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11g) – Average Detector, Acon Antenna

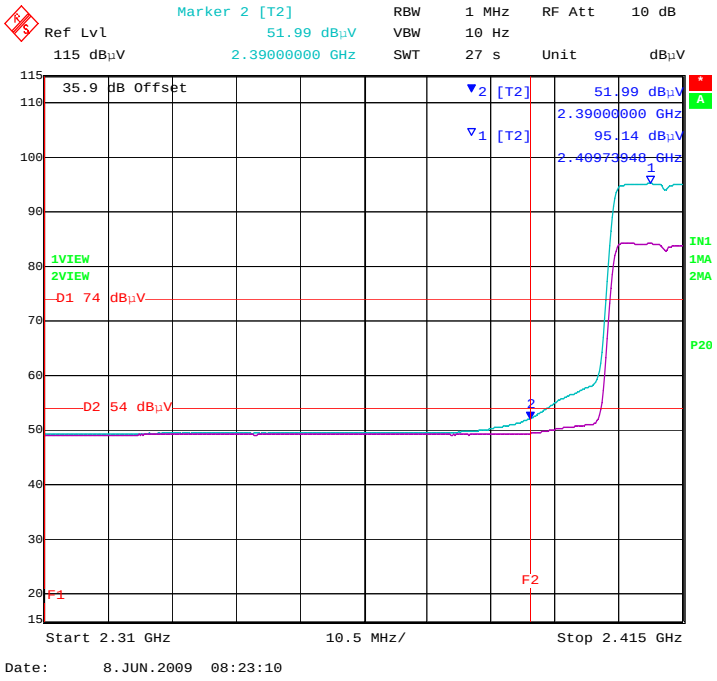


Figure 9-21: Channel 1 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11n, 20MHz) – Peak Detector, Acon Antenna

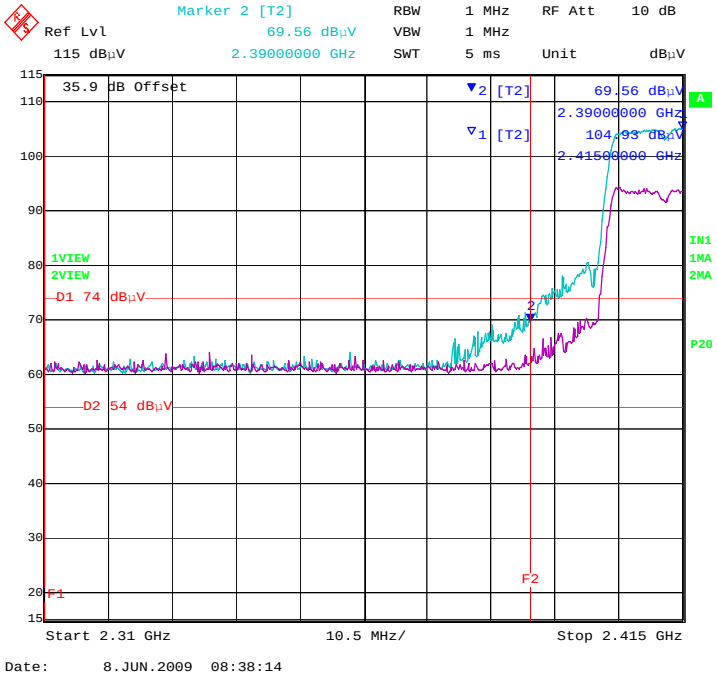


Figure 9-22: Channel 1 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11n, 20MHz) – Average Detector, Acon Antenna

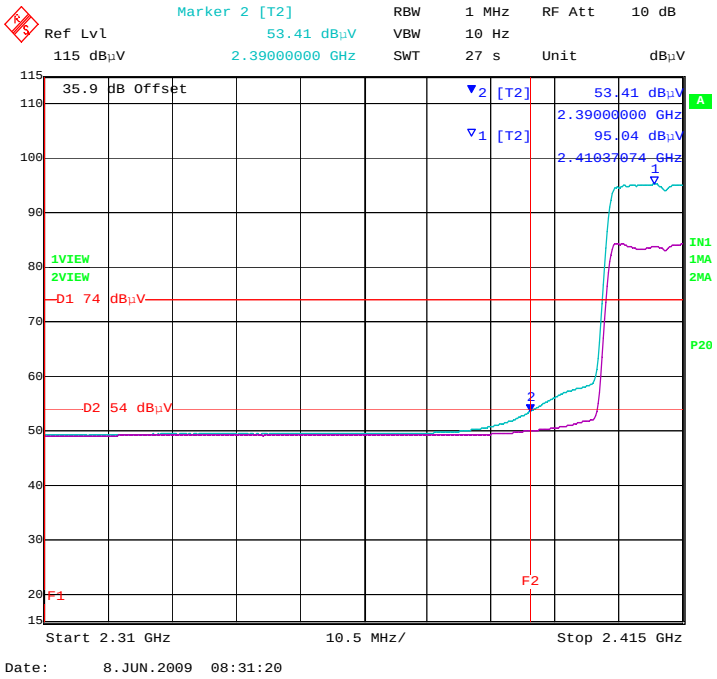


Figure 9-23: Channel 3 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11n, 40MHz) – Peak Detector, Acon Antenna

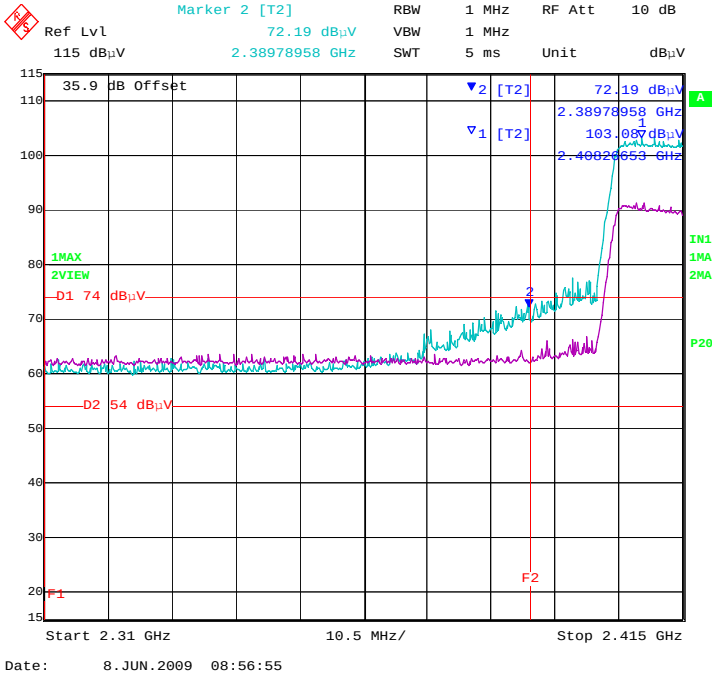


Figure 9-24: Channel 3 Band Edge Showing the Restricted Band from 2310 to 2390 MHz (802.11n, 40MHz) – Average Detector, Acon Antenna

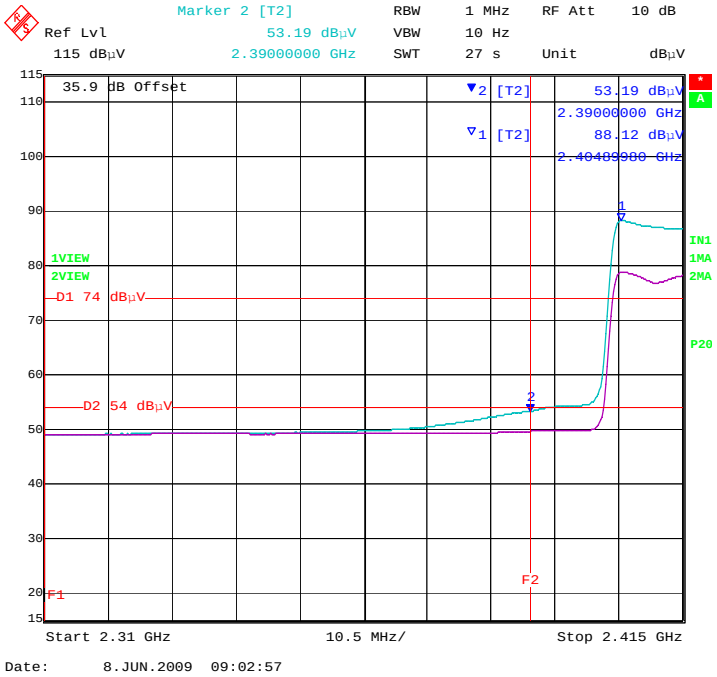


Figure 9-25: Channel 11 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11b) - Peak Detector, Acon Antenna

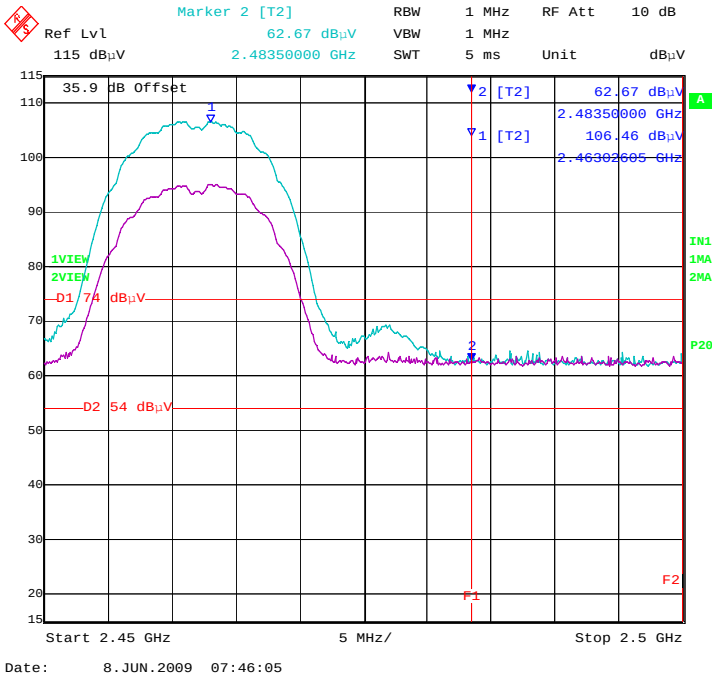


Figure 9-26: Channel 11 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11b) – Average Detector, Acon Antenna

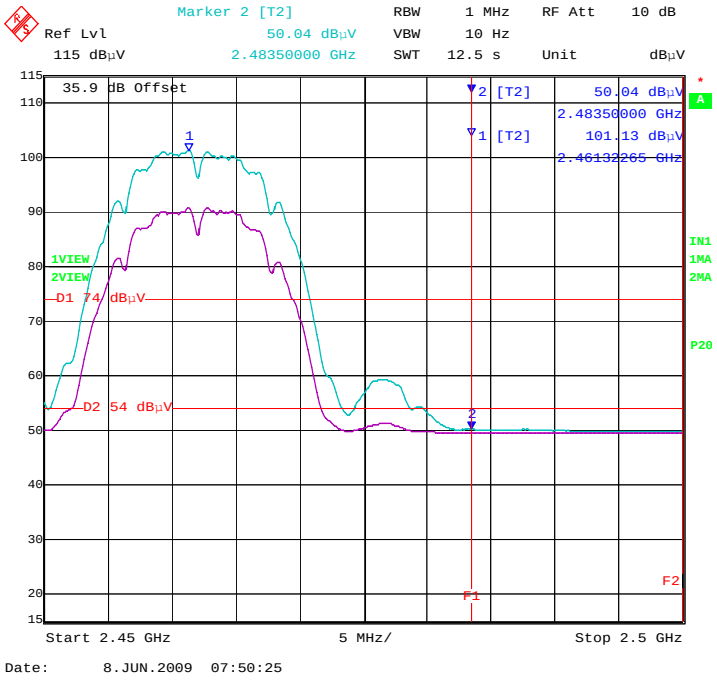


Figure 9-27: Channel 11 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11g) - Peak Detector, Acon Antenna

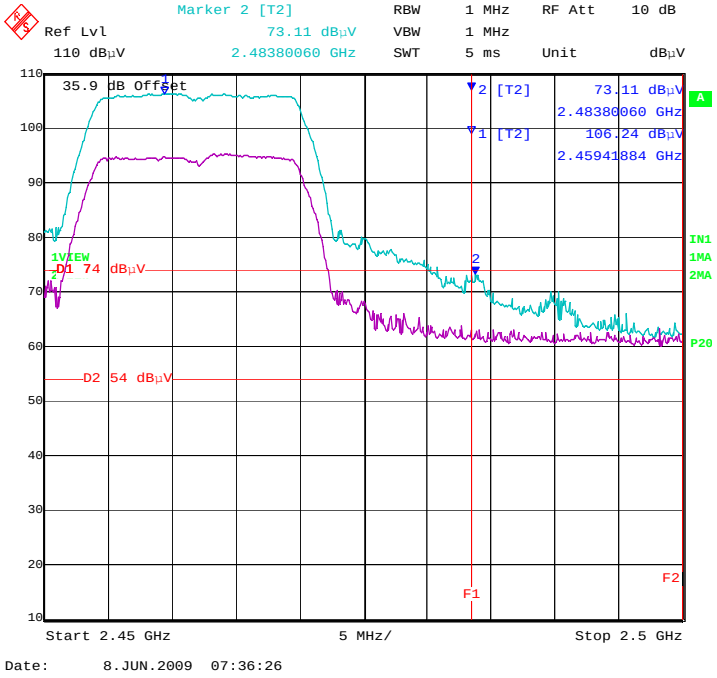


Figure 9-28: Channel 11 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11g) – Average Detector, Acon Antenna

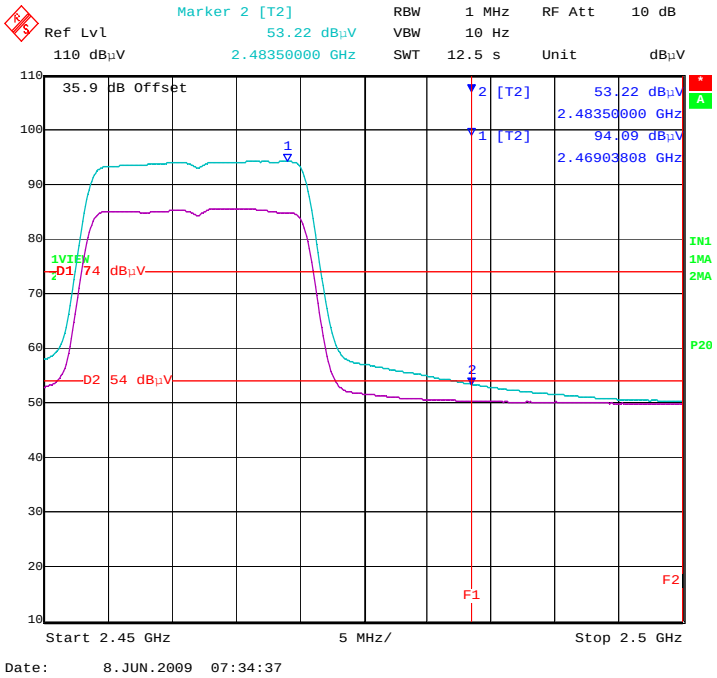


Figure 9-29: Channel 11 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11n, 20MHz) - Peak Detector, Acon Antenna

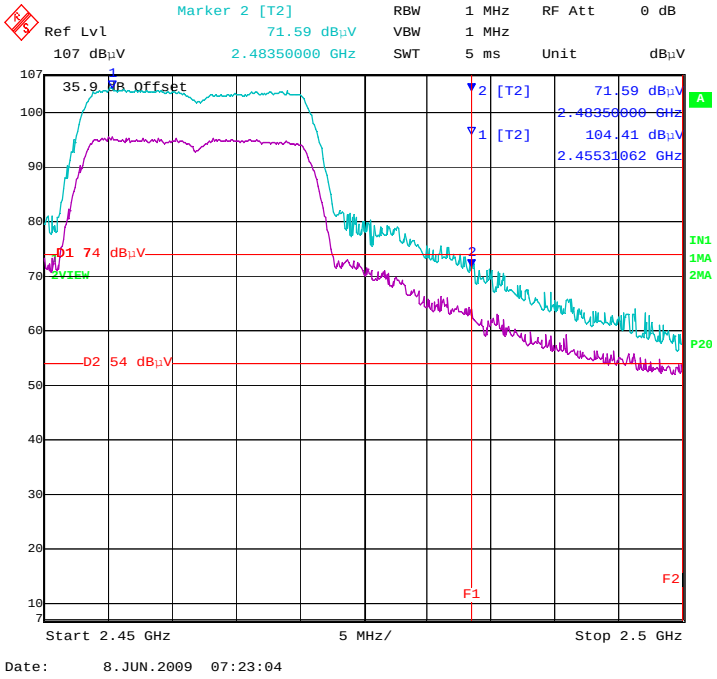


Figure 9-30: Channel 11 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11n, 20MHz) – Average Detector, Acon Antenna

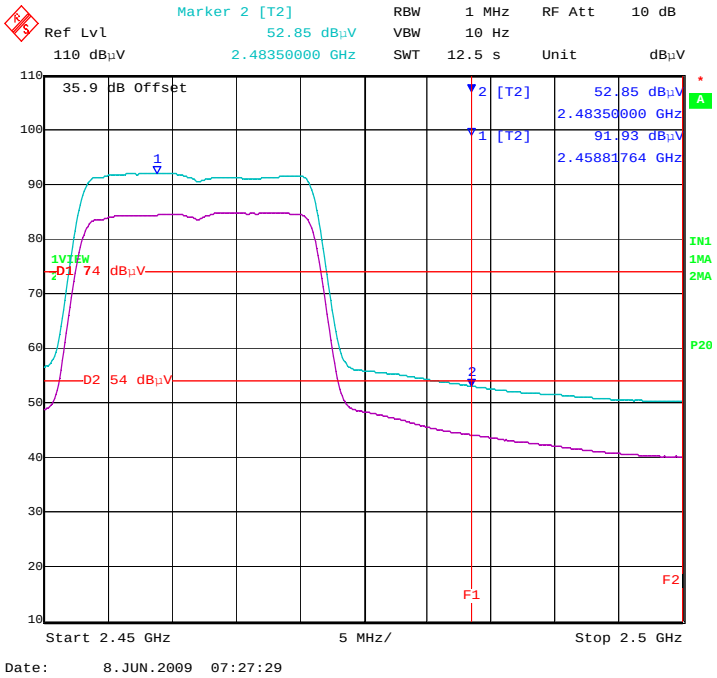


Figure 9-31: Channel 9 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11n, 40MHz) - Peak Detector, Acon Antenna

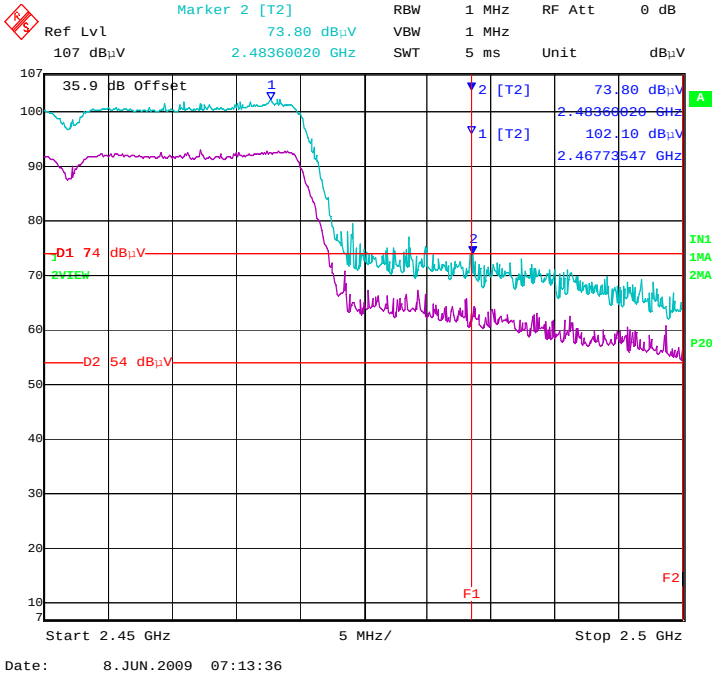
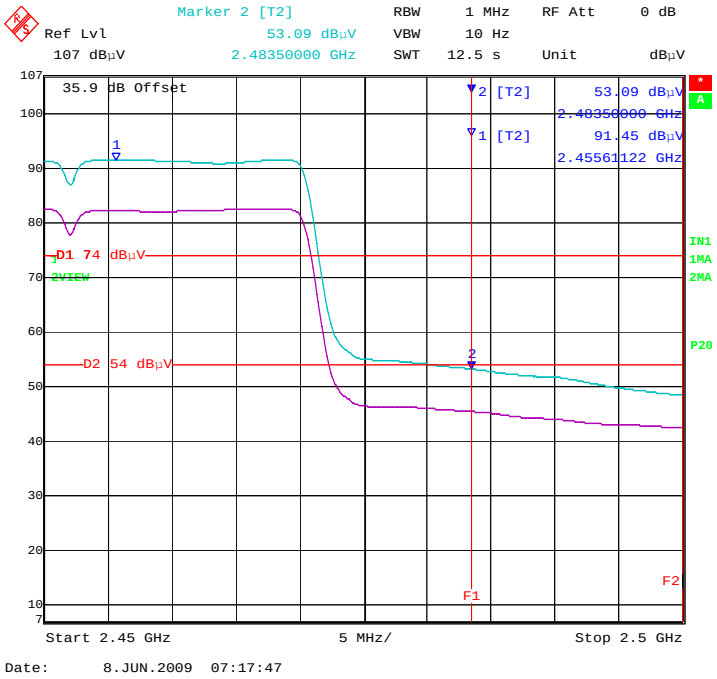


Figure 9-32: Channel 9 Band Edge Showing the Restricted Band from 2483.5 to 2500 MHz (802.11n, 40MHz) – Average Detector, Acon Antenna



10 RECEIVER SPURIOUS EMISSIONS

10.1 Test Procedure (FCC §15.109, ICES-003 §5.6)

Measurements are made over the frequency range of 30 MHz to five times the highest frequency operating within the device. The measuring receiver meets the requirements of Section One of CISPR 16 and the measuring antenna correlates to a balanced dipole. From 30 to 1000 MHz, a quasi-peak detector was used for measurement. Above 1000 MHz, average measurements were performed.

Measurements of the radiated field are made with the antenna located at a distance of 3 meters from the EUT. If the field-strength measurements at 3m cannot be made because of high ambient noise level or for other reasons, measurements may be made at a closer distance, for example 1m. An inverse proportionality factor of 20 dB per decade should be used to normalize the measured data to the specified distance for determining compliance.

The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4.

10.2 Receiver Spurious Emissions Criteria

Table 10-1 Radiated Emission Limit for FCC §15.109

Radiated Emission Limits at 3 meters	
Frequency (MHz)	**Quasi-Peak limits, dB (µV/m)**
30 to 88	40.0
88 to 216	43.5
216 to 960	46.0
960 and up	54.0

10.3 Test Results

The LEX-M01-003 802.11bgn Wireless Adapter is **compliant** with the radiated disturbance requirements of FCC §15.109 for a class B device. The data shown in Figure 10-1 through Figure 10-4 show that there are no emissions above the limits specified in §15.109.

Figure 10-1 FCC §15.109 Maximized Quasi-Peak Emissions (PCB Antenna)

Frequency	Polarity (H/V)	Cab. (dB)	Ant. (dB)	Corr. Reading. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (deg)	Tower (cm)	Results
259.87 MHz	H	3.49	12.69	39.78	46.02	-6.24	101	110	**Compliant**
664.5 MHz	H	5.48	20.75	37.59	46.02	-8.43	96	108	**Compliant**
863.72 MHz	H	6.27	22.62	42.93	46.02	-3.09	241	100	**Compliant**
98.901 MHz	V	2.28	9.51	35.14	43.52	-8.38	91	99	**Compliant**
132.71 MHz	V	2.58	7.55	32.6	43.52	-10.92	342	100	**Compliant**
166.43 MHz	V	2.82	10.16	36.23	43.52	-7.29	251	100	**Compliant**
259.87 MHz	V	3.49	12.6	34.13	46.02	-11.89	119	172	**Compliant**
598.14 MHz	V	5.24	19.44	38.97	46.02	-7.05	93	100	**Compliant**
664.13 MHz	V	5.48	19.68	37.4	46.02	-8.62	-5	100	**Compliant**

The final quasi peak or average amplitude is computed from the measured receiver amplitude by adding a correction factor associated with the Antenna and cable loss as shown in the formula below.

FM = RA + CF + AF where,

FM = Final Measurement

RA = Receiver Amplitude

CF = Cable Factor

AF = Antenna Factor

Figure 10-2 FCC §15.109 Receiver Spurious Emission (PCB Antenna)

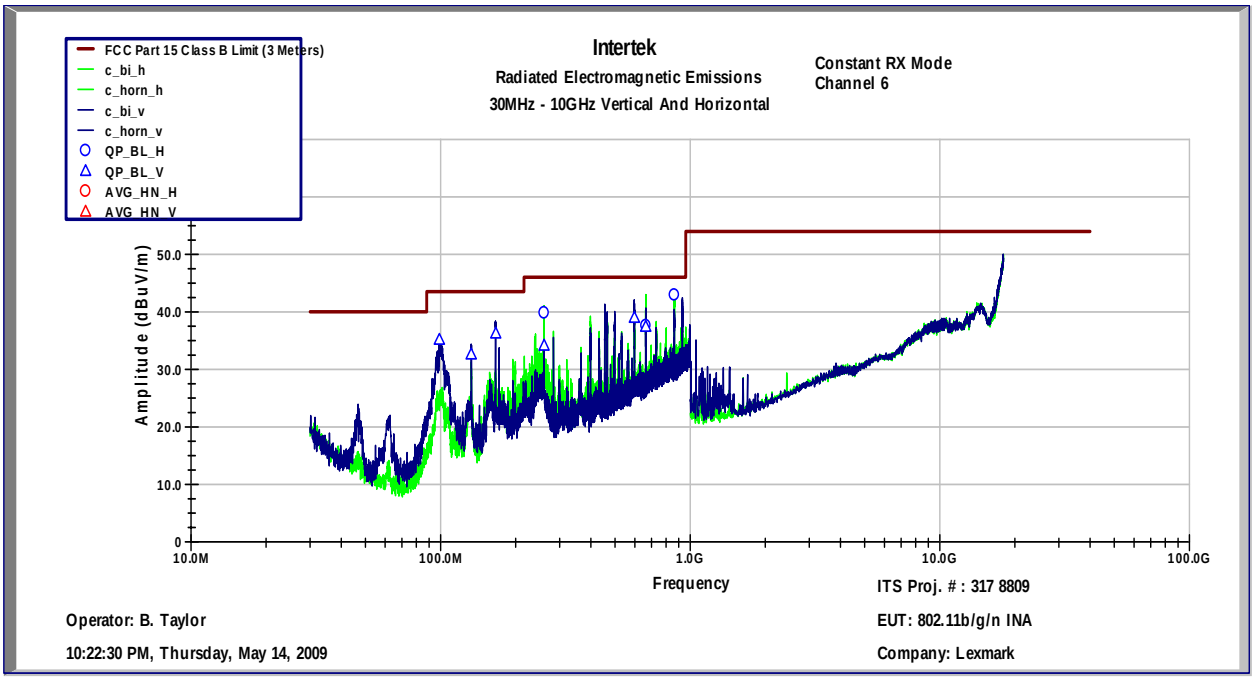


Figure 10-3 FCC §15.109 Maximized Quasi-Peak Emissions (Acon Antenna)

Frequency	Polarity (H/V)	Cab. (dB)	Ant. (dB)	Corr. Reading. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (deg)	Tower (cm)	Results
194.9 MHz	H	3.03	10.91	38.17	43.52	-5.35	61	145	**Compliant**
259.86 MHz	H	3.49	12.69	39.5	46.02	-6.52	52	99	**Compliant**
283.5 MHz	H	3.64	12.9	41.71	46.02	-4.31	230	125	**Compliant**
398.73 MHz	H	4.28	16.77	43.24	46.02	-2.78	48	100	**Compliant**
664.7 MHz	H	5.48	20.77	36.71	46.02	-9.31	355	112	**Compliant**
863.77 MHz	H	6.27	22.63	38.87	46.02	-7.15	352	99	**Compliant**

The final quasi peak or average amplitude is computed from the measured receiver amplitude by adding a correction factor associated with the Antenna and cable loss as shown in the formula below.

FM = RA + CF + AF where,

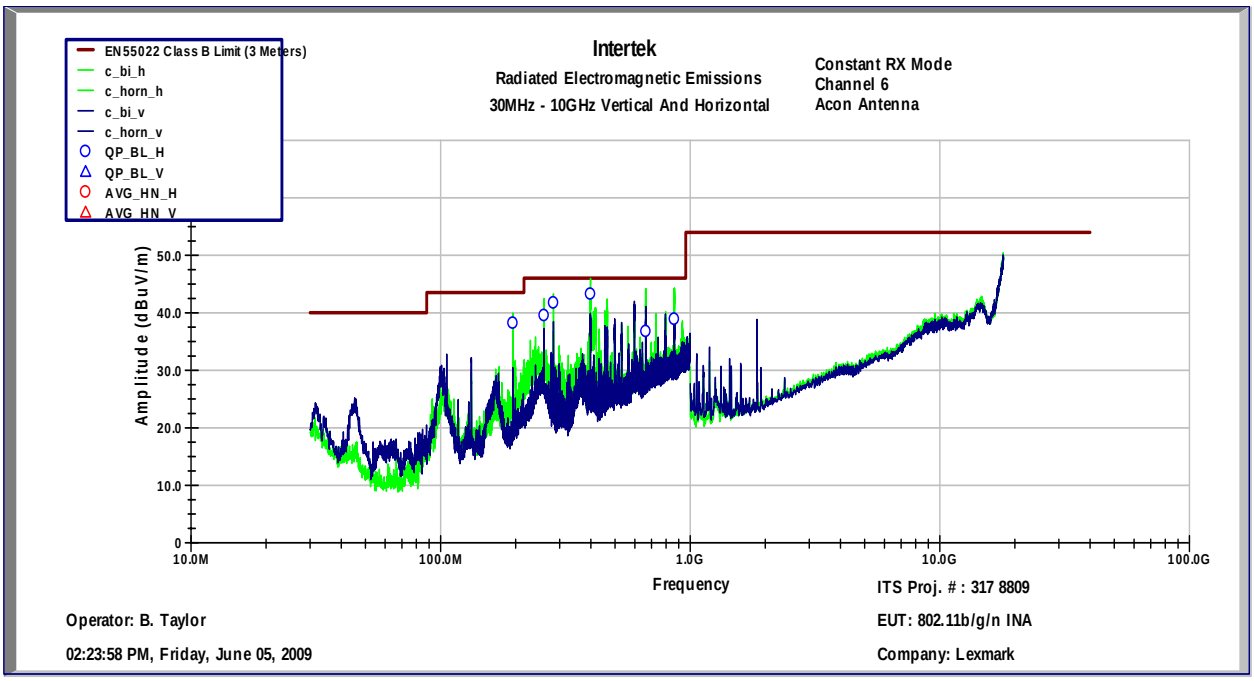
FM = Final Measurement

RA = Receiver Amplitude

CF = Cable Factor

AF = Antenna Factor

Figure 10-4 FCC §15.109 Receiver Spurious Emission (Acon Antenna)



11 POWER LINE CONDUCTED EMISSIONS

11.1 Test Procedure (FCC §15.207, ICES-003 §5.3)

Measurements are carried out using quasi-peak and average detector receivers in accordance with CISPR 16. An AMN is required to provide a defined impedance at high frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN as defined in CISPR 16 shall be used.

The EUT is located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

Where a flexible mains cord is provided by the manufacturer, this shall be 1m long or if in excess of 1m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4m in length.

The EUT is arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance is measured between the phase lead and the reference ground, and between the neutral lead and the reference ground. Both measured values are reported.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Floor standing EUTs are placed on a horizontal metal ground plane and isolated from the ground plane by 3 to 12 mm of insulating material. The metal ground plane extends at least 0.5m beyond the boundaries of the EUT and has minimum dimensions of 2m by 2m.

Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.4.

11.2 Power Line Conducted Emissions Criteria

The RF energy radiated back onto the public utility (AC Power Lines) shall not exceed the values in the following table when measured with the corresponding detector function.

Table 11-1 Conducted Emission Limit for FCC §15.207(a)

Frequency Range (MHz)	FCC Part 15.207(a) Quasi Peak Limit (dBuV)	FCC Part 15.207(a) Average Limit (dBuV)
0.15 – 0.5 MHz	66 to 56	56 to 46
0.5 – 5.0 MHz	56	46
5.0 - 30 MHz	60	50

11.3 Test Results

The LEX-M01-003 802.11bgn Wireless Adapter met the power line conducted emission requirements of §15.107 and §15.207. See Figure 11-1 for tabular data with the device in transmit and receive modes. See Figure 11-2 through Figure 11-6 for graphical results of the device in transmit and receive modes. The test was performed on the AC input to the laptop computer providing the DC voltage to the LEX-M01-003 802.11bgn Wireless Adapter.

Figure 11-1: FCC §15.107 and §15.207 Power Line Conducted Emissions

Operating Mode	Line	Frequency	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
Receive	Line 1	150.0 KHz	47.34	66	-18.66	19.68	56	-36.32	**Compliant**
Receive	Line 1	201.8 KHz	52.01	63.54	-11.53	43.02	53.54	-10.52	**Compliant**
Receive	Line 1	505.2 KHz	41.88	56	-14.12	35.83	46	-10.17	**Compliant**
Receive	Line 2	150.0 KHz	46.9	66	-19.1	19.14	56	-36.86	**Compliant**
Receive	Line 2	201.8 KHz	52.44	63.54	-11.1	42.3	53.54	-11.24	**Compliant**
Receive	Line 2	492.1 KHz	34.17	56.13	-21.97	30.24	46.13	-15.9	**Compliant**
802.11b	Line 1	159.0 KHz	48.48	65.52	-17.04	32.32	55.52	-23.2	**Compliant**
802.11b	Line 1	198.8 KHz	53.06	63.66	-10.6	43.5	53.66	-10.16	**Compliant**
802.11b	Line 1	490.6 KHz	42.3	56.16	-13.86	37.46	46.16	-8.7	**Compliant**
802.11b	Line 2	159.0 KHz	47.47	65.52	-18.05	32.27	55.52	-23.25	**Compliant**
802.11b	Line 2	168.0 KHz	46.83	65.06	-18.23	32.47	55.06	-22.59	**Compliant**
802.11b	Line 2	198.8 KHz	53.47	63.66	-10.19	42.45	53.66	-11.21	**Compliant**
802.11b	Line 2	493.6 KHz	39.8	56.11	-16.31	35.57	46.11	-10.54	**Compliant**
802.11g	Line 1	150.0 KHz	49.45	66	-16.55	24.8	56	-31.2	**Compliant**
802.11g	Line 1	199.2 KHz	52.73	63.64	-10.92	43.11	53.64	-10.54	**Compliant**
802.11g	Line 1	297.3 KHz	43.05	60.32	-17.26	34.78	50.32	-15.53	**Compliant**
802.11g	Line 1	494.7 KHz	41.19	56.09	-14.9	36.26	46.09	-9.83	**Compliant**
802.11g	Line 2	150.0 KHz	49.04	66	-16.96	27.09	56	-28.91	**Compliant**
802.11g	Line 2	199.2 KHz	53.32	63.64	-10.33	41.12	53.64	-12.53	**Compliant**
802.11g	Line 2	396.7 KHz	40.03	57.92	-17.89	34.66	47.92	-13.26	**Compliant**
802.11g	Line 2	496.0 KHz	39.07	56.07	-17	34.08	46.07	-11.99	**Compliant**
802.11n (20MHz)	Line 1	202.8 KHz	50.96	63.5	-12.54	40.88	53.5	-12.62	**Compliant**
802.11n (20MHz)	Line 1	303.0 KHz	41.68	60.16	-18.48	32.97	50.16	-17.19	**Compliant**
802.11n (20MHz)	Line 1	495.1 KHz	41.11	56.08	-14.98	35.6	46.08	-10.49	**Compliant**
802.11n (20MHz)	Line 2	198.4 KHz	53.06	63.68	-10.62	40.36	53.68	-13.32	**Compliant**
802.11n (20MHz)	Line 2	294.9 KHz	40.92	60.39	-19.46	33.54	50.39	-16.84	**Compliant**
802.11n (20MHz)	Line 2	495.0 KHz	39.2	56.08	-16.89	34.29	46.08	-11.8	**Compliant**
802.11n (40MHz)	Line 1	150.0 KHz	49.23	66	-16.77	21.88	56	-34.12	**Compliant**
802.11n (40MHz)	Line 1	201.6 KHz	51.92	63.54	-11.63	43.28	53.54	-10.27	**Compliant**
802.11n (40MHz)	Line 1	487.4 KHz	34.19	56.21	-22.02	21.86	46.21	-24.35	**Compliant**
802.11n (40MHz)	Line 2	150.0 KHz	48.1	66	-17.9	20.81	56	-35.19	**Compliant**
802.11n (40MHz)	Line 2	202.1 KHz	52.51	63.52	-11.01	41.33	53.52	-12.19	**Compliant**
802.11n (40MHz)	Line 2	491.4 KHz	39.6	56.14	-16.55	31.26	46.14	-14.89	**Compliant**

The final quasi peak or average amplitude is computed from the measured receiver amplitude by adding a correction factor associated with the LISN and cable loss as shown in the formula below.

FM = RA + CF + LF where,

FM = Final Measurement

RA = Receiver Amplitude

CF = Cable Factor

LF = LISN Factor

Figure 11-2: FCC §15.207 Power Line Conducted Emissions 802.11b Mode (Lines 1 and 2)

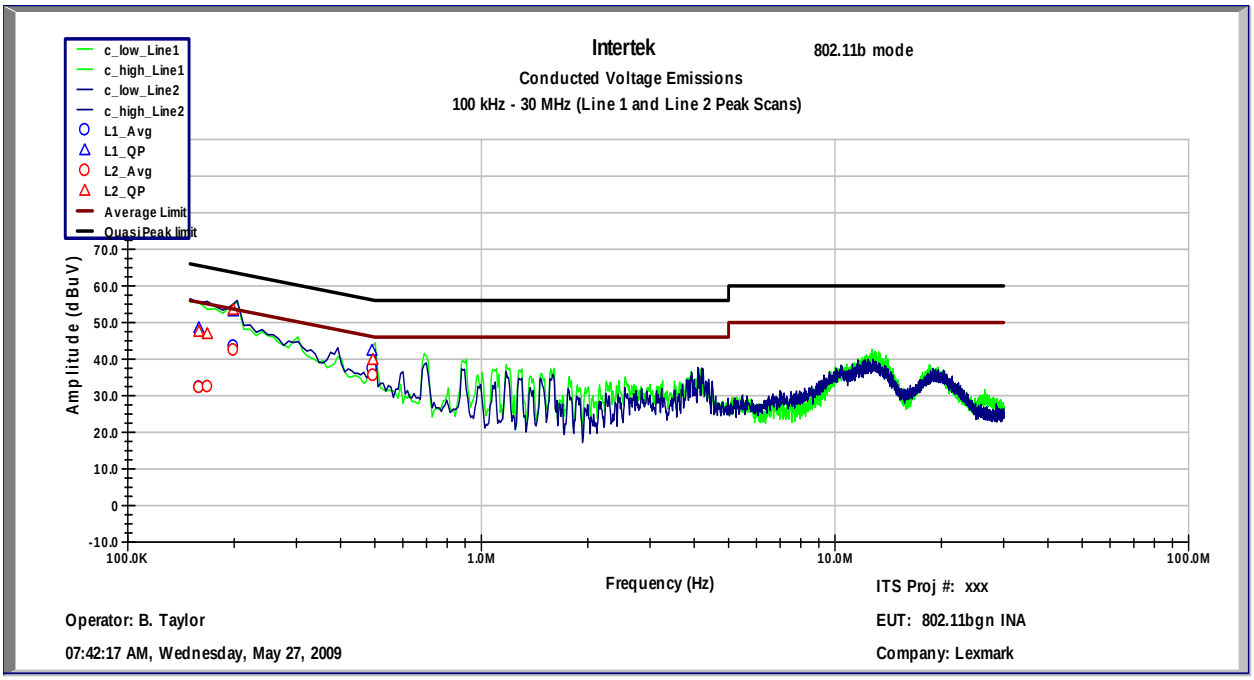


Figure 11-3: FCC §15.207 Power Line Conducted Emissions 802.11g Mode (Lines 1 and 2)

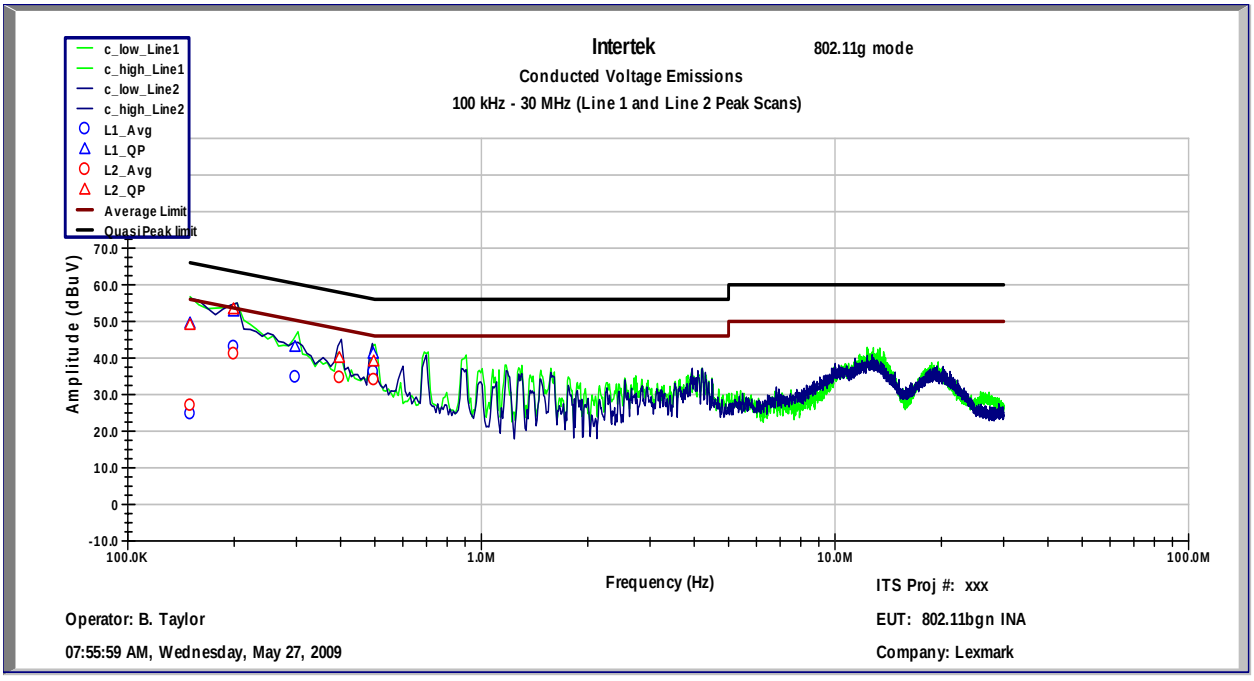


Figure 11-4: FCC §15.207 Power Line Conducted Emissions 802.11n (20MHz Mode) (Lines 1 and 2)

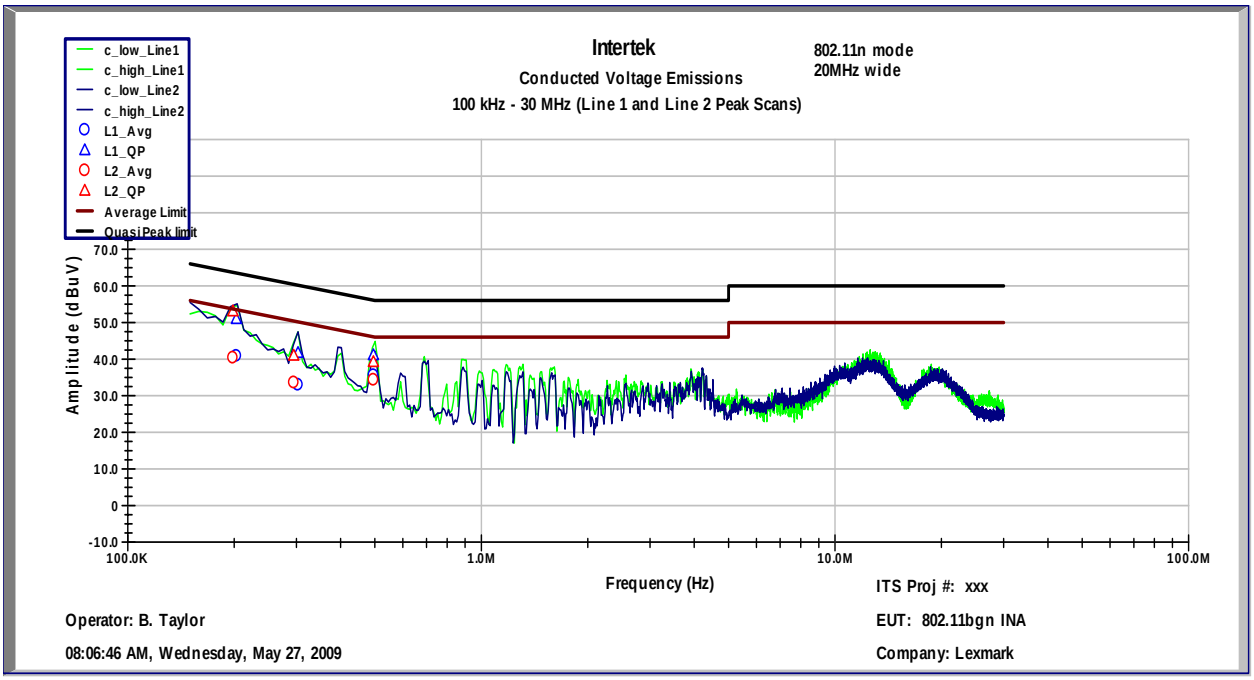


Figure 11-5: FCC §15.207 Power Line Conducted Emissions 802.11n (40MHz Mode) (Lines 1 and 2)

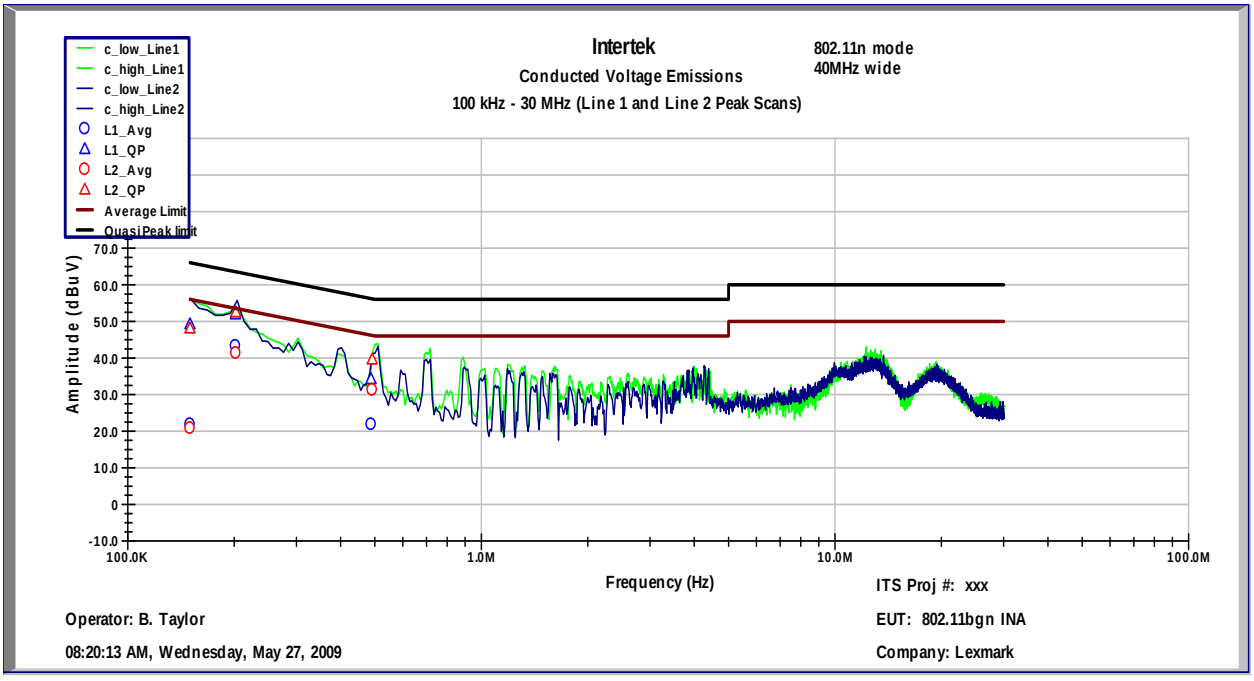


Figure 11-6: FCC §15.107 Power Line Conducted Emissions Receive Mode (Lines 1 and 2)