TEST REPORT

Report Number: 3127731LEX-001
Project Number: 3127731

Evaluation of the Lexmark MarkNet N8052
Model Number: 4032-852
FCCID: IYLN8052

Tested to the Criteria in FCC Part 15, Subpart C Section 247
For

Lexmark International

Test Performed by:	Test Authorized by:
Intertek	Lexmark International
731 Enterprise Drive	740 West New Circle Road
Lexington, KY 40510	Lexington, KY 40550

Prepared By:_____**Date:**____9/13/2007_____

Bryan C. Taylor, EMC Team Leader

Approved By:_____**Date:**____9/13/2007_____

Jason Centers, Senior Project Engineer

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1 JOB DESCRIPTION

1.1 Test Sample Information

The Lexmark MarkNet N8052, model 4032-852 is an 802.11a, b, and g wireless print server. It allows the printer 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
Address:	740 West New Circle Road Lexington KY 40550
Contact Name:	Thomas Bugbee
Telephone Number:	(859)-825-4432
Fax Number:	(859)-232-3014
Email Address:	bugbee@lexmark.com

Test sample				
Trade Name:	Lexmark MarkNet N8052			
Lexmark Model Number:	4032-852			
Serial Number:	Not Labled			
FCC ID:	IYLN8052			
Device Category:	Mobile			
RF Exposure Category:	General Population/Uncontrolled Environment			
Transmission Modes:	**802.11a (UNII)**	**802.11a**	**802.11b**	**802.11g**
Frequency Range, MHz:	5180MHz – 5240MHz	5745MHz – 5825MHz	2412MHz – 2462MHz	2412MHz – 2462MHz
Maximum Peak Conducted Output Power:	15.72 dBm	13.25 dBm	17.94 dBm	16.44 dBm
Antenna Type:	Nearson 90 Degree with Swivel Joint			
Antenna Location:	External Back Side of the Test Sample			
Antenna Gain:	2dBi			
Antenna Connector	Reverse Polarity SMA Plug			
Sample Receive Date:	7/9/2007			

Test Signal Mode	
Test Commands:	X
Base Station Simulator:	

1.2 System Support Equipment

Manufacturer	Model Number	Description	Comments
Dell	Latitude D610	Laptop Computer	Computer used to initiate test commands
Lexmark	T640	Laser Printer	Host laser printer that the Lexmark MarkNet N8052 was installed in

1.3 Cables associated with EUT

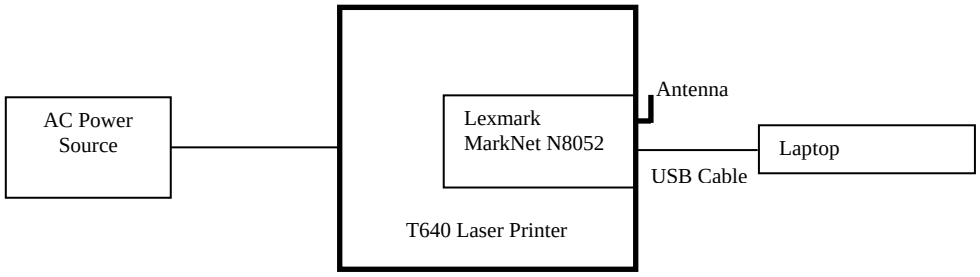
Table 1-1 contains the details of the cables used during the testing.

Table 1-1: Interconnecting Cables Used During Testing

Cables					
Description	**Length**	**Shielding**	**Ferrites**	**Connection**	
				From	**To**
AC Cable for Printer	6 ft	None	None	AC Power Source	Power Port on the Printer
USB Cable for Printer	6 ft	Yes	Yes	USB Port on Laptop	USB Port on the Printer
AC Cable for Laptop	8 ft	None	Yes	AC Power Source	Power Port on the 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 Lexmark MarkNet N8052 was installed in a T640 laser printer manufactured by Lexmark International. The printer was powered by 120VAC / 60Hz. In order to force the Lexmark MarkNet N8052 to transmit during the evaluation a control program was used to communicate with the printer via a USB cable connected between a laptop computer and the printer. 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 Lexmark MarkNet N8052 was set to transmit at maximum output power. The laptop computer was left connected to the printer during the tesing.

1.6 Modifications required for compliance

No modifications were implemented by Intertek. All results in this report pertain to the un-modified sample provided to Intertek.

1.7 Related Submittal(s) Grants

There is also an accompanying submittal for the part 15.407 radio (802.11a) which uses some UNII frequencies.

2 EXECUTIVE SUMMARY AND STATEMENT OF COMPLIANCE

Testing was performed for Lexmark International on the Lexmark MarkNet N8052 model 4032-852 starting on 7/9/2007 and ending on 7/18/2007. All testing was performed by Bryan Taylor and Jason Centers at the Intertek laboratory located at 731 Enterprise Drive, Lexington Kentucky, 40510

The Lexmark International model 4032-852 was tested to and meets the requirements of FCC Part 15 Subpart C (15.247).

FCC RULE	DESCRIPTION OF TEST	RESULT	PAGE
§15.247(b)	Conducted RF Power	**Compliant**	8
§15.247(a)	6dB Bandwidth	**Compliant**	9
§15.247(e)	Peak Power Spectral Density	**Compliant**	19
§15.247(d)	Out of Band Emissions at Antenna Terminals	**Compliant**	29
§15.247(d) and §15.209(f)	Field Strength of Spurious Radiation	**Compliant**	33
§15.109, §15.209	Receiver Spurious Emissions	**Compliant**	50
§15.107, §15.207	Power Line Conducted Emissions	**Compliant**	52

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: 1993 and ANSI C63.4: 1992. 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 2055.

3.1 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Calibration due date
EMI Receiver	Rohde & Schwarz	ESI 26	1088.7490	9/6/2007
Spectrum Analyzer	Rohde & Schwarz	FSEK 30	1088.3494.35	3/12/2008
Spectrum Analyzer	Rohde & Schwarz	FSP 7	1164.4391.07	8/2/2007
Horn Antenna	Antenna Research	DRG-118/A	1086	7/20/2007
Horn Antenna	EMCO	3115	6556	7/28/2007
Horn Antenna	EMCO	3116	9310-2222	4/10/2008
Bilog Antenna	ETS	3142C	00051864	11/14/2007
High Pass Filter	Microwave Circuits	H3G020G2	3986-01 DC0408	Verify at Time of Use
LISN	Fischer Custom Communication	FCC-LISN-50-50-2M	1025	5/11/2008
Signal Generator	Hewlett Packard	83620B	3614A00199	8/15/2007
Preamplifier	Miteq	JS418004000	818197	2/6/2008
Preamplifier	Miteq	JS418004000	965178	8/7/2007

4 CONDUCTED RF POWER

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

The antenna port of the Lexmark MarkNet N8052 was connected to the input of a spectrum analyzer. The band power function of the analyzer was used to measure the maximum conducted output power delivered to the antenna.

4.2 Conducted Output Power Criteria

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

4.3 Test Results

The Lexmark MarkNet N8052 met the RF power output of FCC Part 15 Subpart C (15.247). The test results are located in Table 4-1. None of the conducted power measurements exceeded the 30dBm limit.

Table 4-1 RF Output Power Measurements

Mode	Channel	Frequency (MHz)	Output Power (dBm)
802.11b	1	2411	14.87
802.11b	6	2437	**17.93**
802.11b	11	2462	11.52
802.11g	1	2411	14.23
802.11g	6	2437	16.44
802.11g	11	2462	11.00
802.11a	149	5745	13.25
802.11a	157	5785	12.73
802.11a	165	5825	10.72

5 6DB BANDWIDTH

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

The antenna port of the Lexmark MarkNet N8052 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 on the high, middle, and low channels for each transmit band.

5.2 6dB Bandwidth Criteria

The minimum 6dB bandwidth shall be at least 500kHz

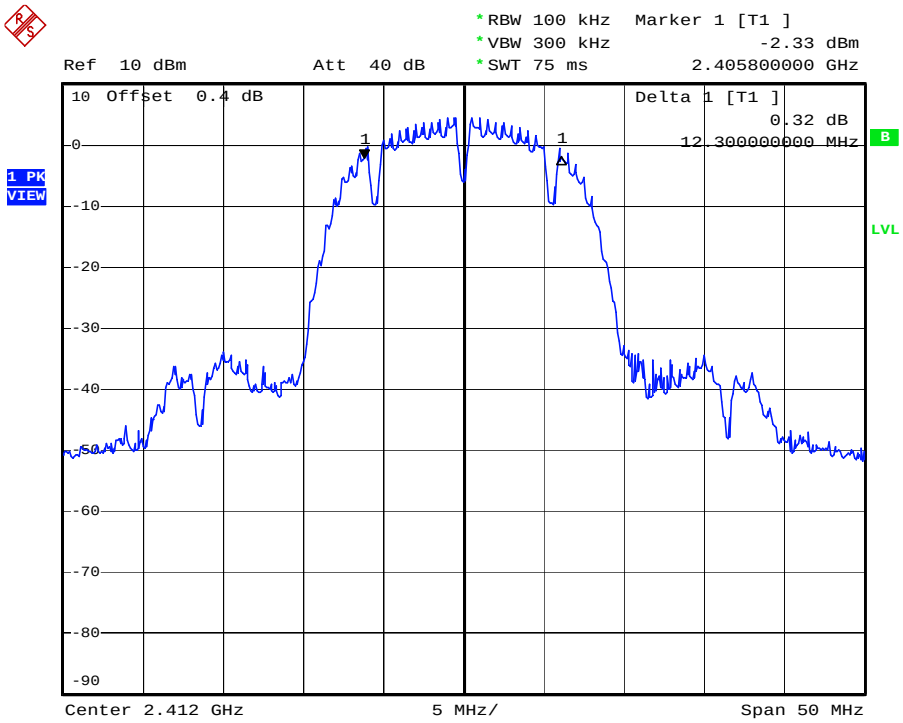
5.3 Test Results

The Lexmark MarkNet N8052 met the 6dB bandwidth of FCC Part 15 Subpart C (15.247). The test results are located in Table 5-1.

Table 5-1 6dB Bandwidth Measurements

Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)
802.11b	1	2411	12.3
802.11b	6	2437	12.3
802.11b	11	2462	12.5
802.11g	1	2411	15.8
802.11g	6	2437	15.8
802.11g	11	2462	15.6
802.11a	149	5745	15.5
802.11a	157	5785	15.9
802.11a	165	5825	15.8

Figure 5-1: 6dB Bandwidth Plot

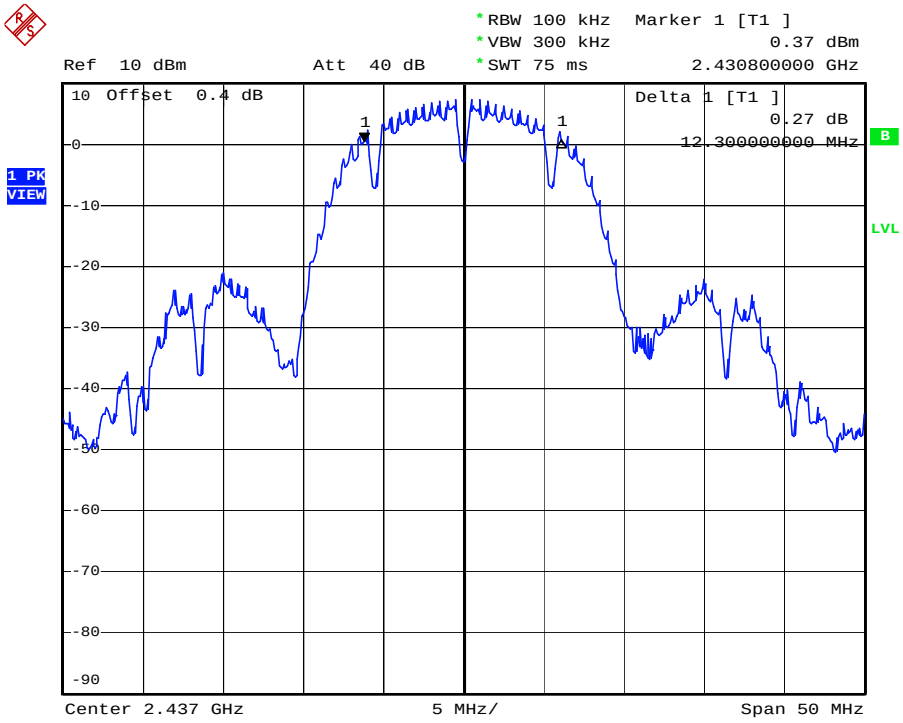


Channel: 1

Mode: 802.11b

6dB Bandwidth: 12.3MHz

Figure 5-2: 6dB Bandwidth Plot



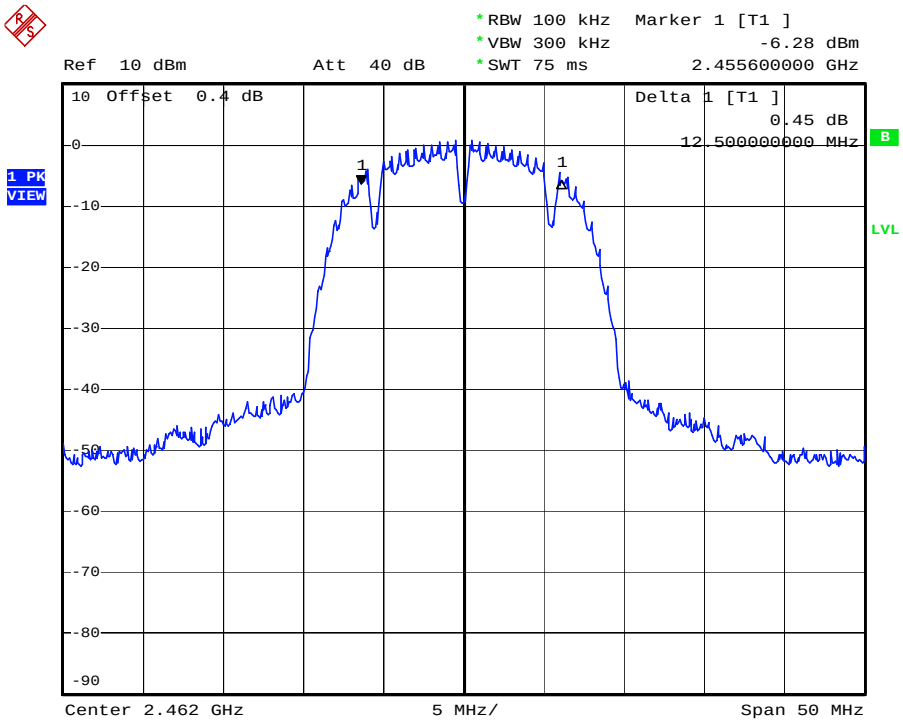
Date: 10.JUL.2007 10:35:52

Channel: 6

Mode: 802.11b

6dB Bandwidth: 12.3MHz

Figure 5-3: 6dB Bandwidth Plot

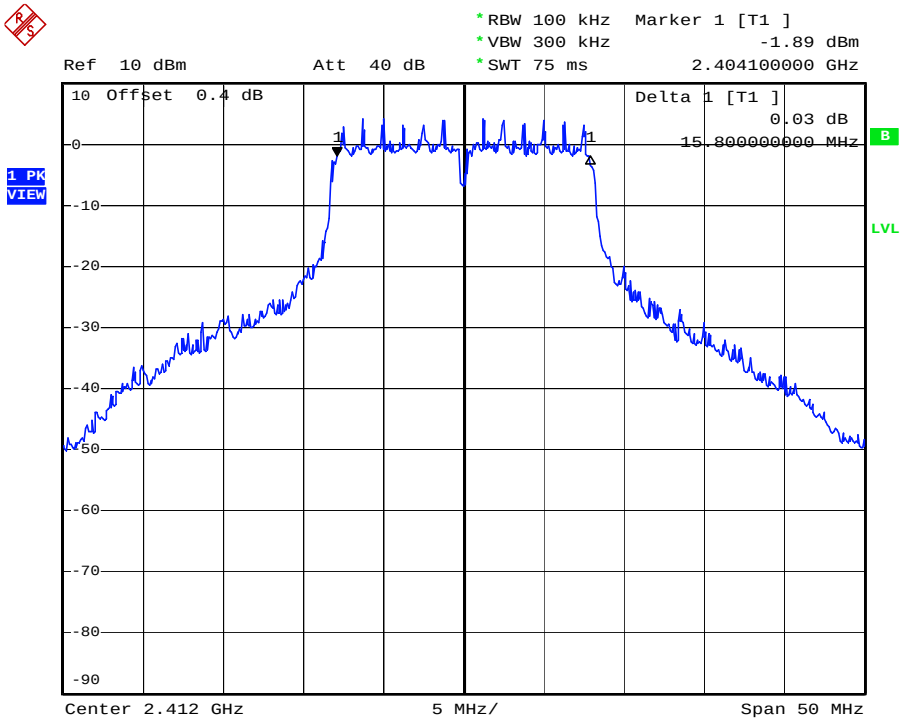


Channel: 11

Mode: 802.11b

6dB Bandwidth: 12.5MHz

Figure 5-4: 6dB Bandwidth Plot

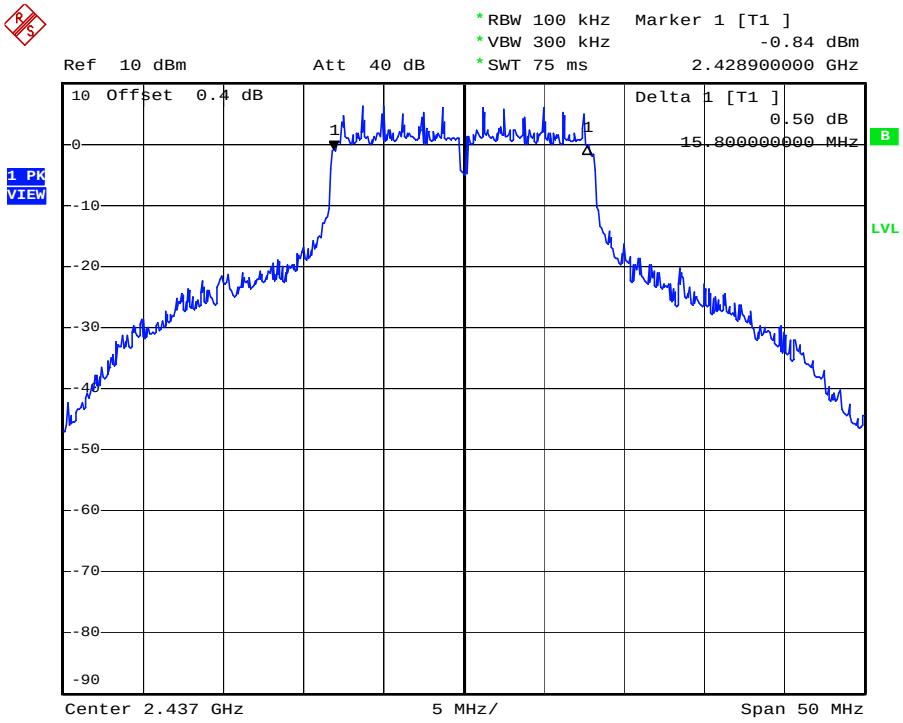


Channel: 1

Mode: 802.11g

6dB Bandwidth: 15.8MHz

Figure 5-5: 6dB Bandwidth Plot

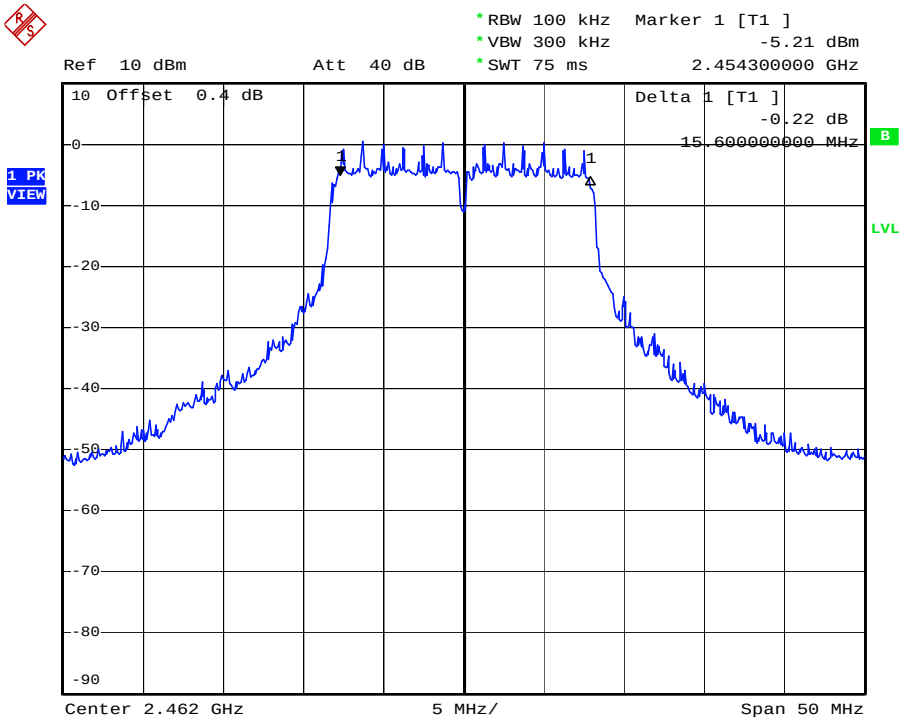


Channel: 6

Mode: 802.11g

6dB Bandwidth: 15.8MHz

Figure 5-6: 6dB Bandwidth Plot

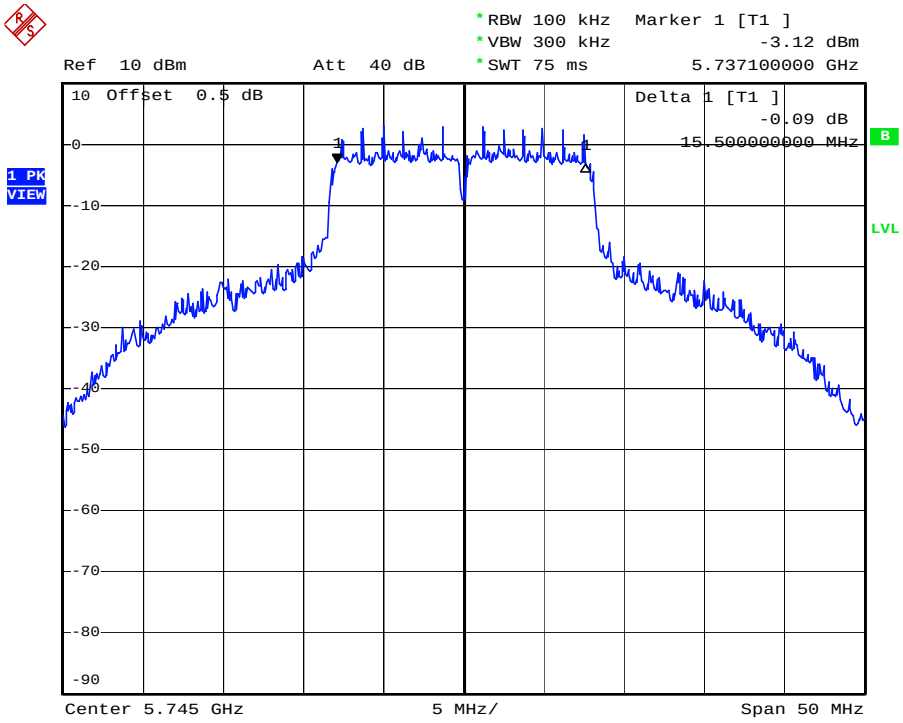


Channel: 11

Mode: 802.11g

6dB Bandwidth: 15.6MHz

Figure 5-7: 6dB Bandwidth Plot



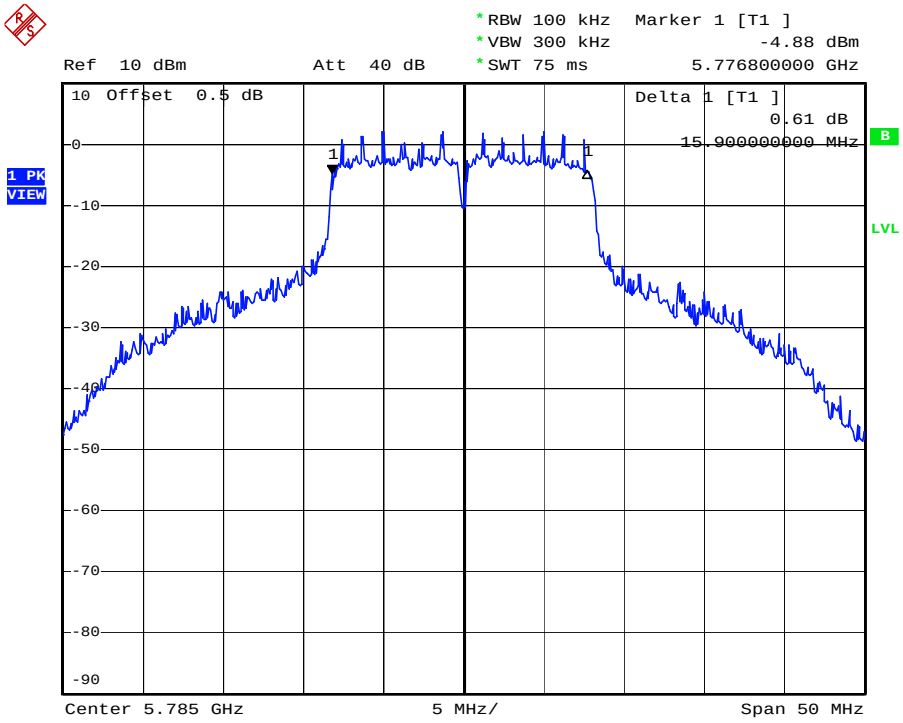
Date: 10.JUL.2007 10:54:15

Channel: 149

Mode: 802.11a

6dB Bandwidth: 15.5MHz

Figure 5-8: 6dB Bandwidth Plot



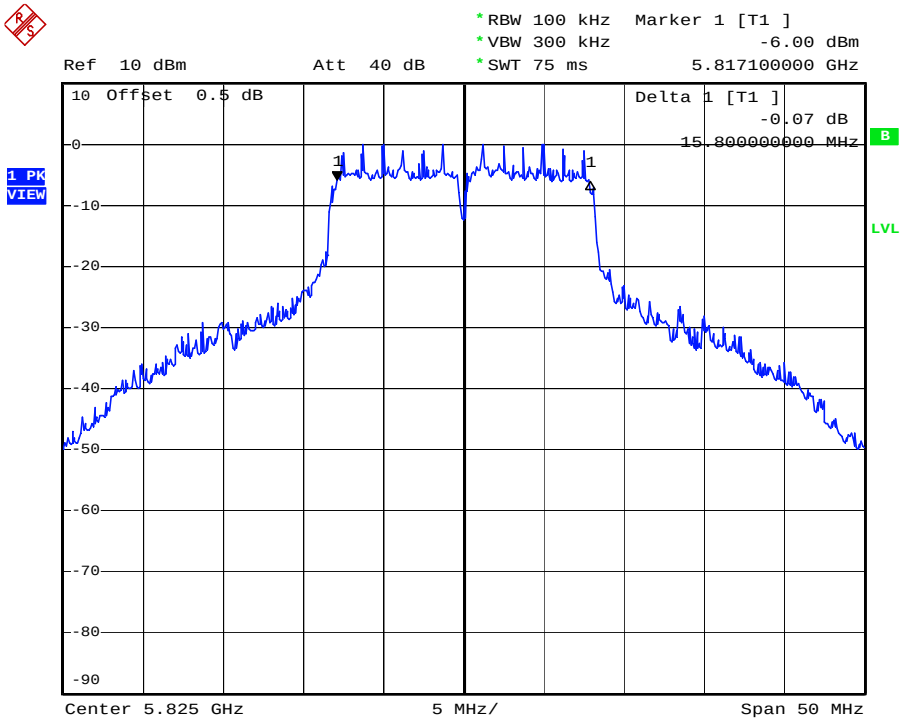
Date: 10.JUL.2007 10:57:04

Channel: 157

Mode: 802.11a

6dB Bandwidth: 15.9MHz

Figure 5-9: 6dB Bandwidth Plot



Channel: 165

Mode: 802.11a

6dB Bandwidth: 15.8MHz

6 PEAK POWER SPECTRAL DENSITY

Test Procedure (FCC Rule: §15.247(e) Power Density)

The antenna port of the Lexmark MarkNet N8052 was connected to the input of a spectrum analyzer. The analyzer amplitude was offset for the associated cable loss. The analyzer resolution bandwidths were set to 3kHz and the max hold function was turned on. The frequency span was set to 1.5MHz 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) = 1500kHz / 3kHz

Sweep time (Sec) = 500 Seconds

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

6.1 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.

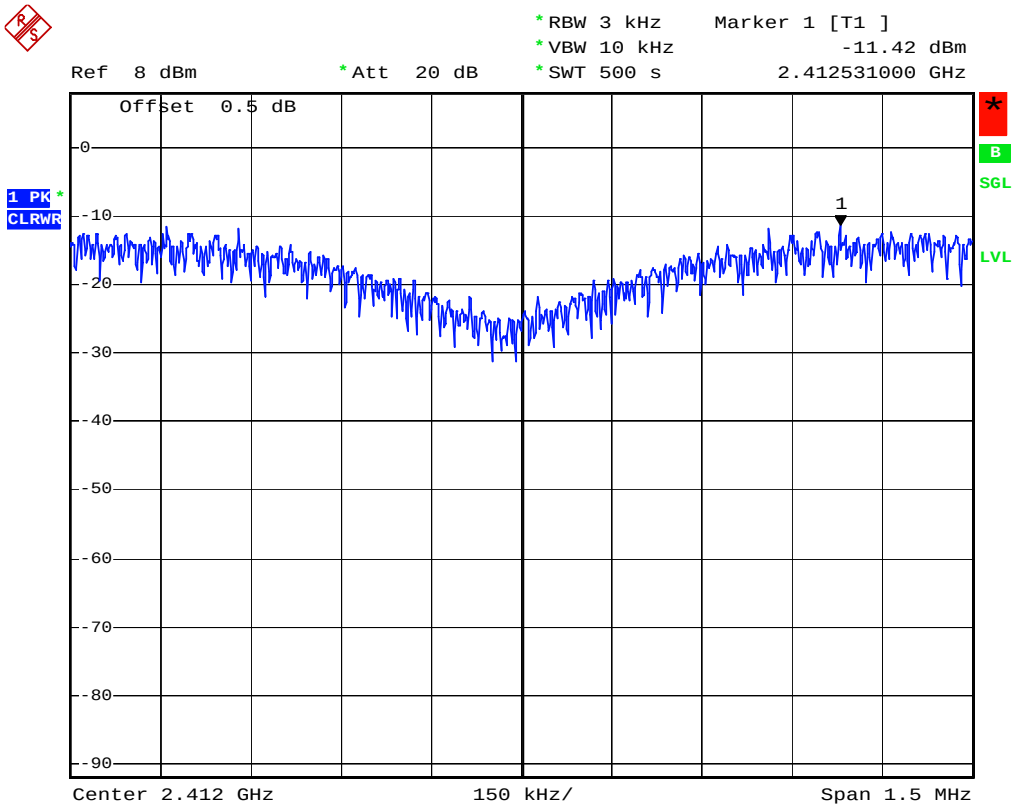
6.2 Test Results

The Lexmark MarkNet N8052 met the peak power spectral density requirements of FCC Part 15 Subpart C (15.247). The test results are located in Table 6-1. None of the measurements exceeded the 8dBm limit.

Table 6-1 Peak Power Spectral Density Measurements

Mode	Channel	Frequency (MHz)	Peak Power Spectral Density (dBm)
802.11b	1	2411	-11.42
802.11b	6	2437	**-8.79**
802.11b	11	2462	-15.11
802.11g	1	2411	-12.73
802.11g	6	2437	-10.75
802.11g	11	2462	-16.25
802.11a	149	5745	-13.82
802.11a	157	5785	-13.82
802.11a	165	5825	-17.02

Figure 6-1: Peak Power Spectral Density Plot

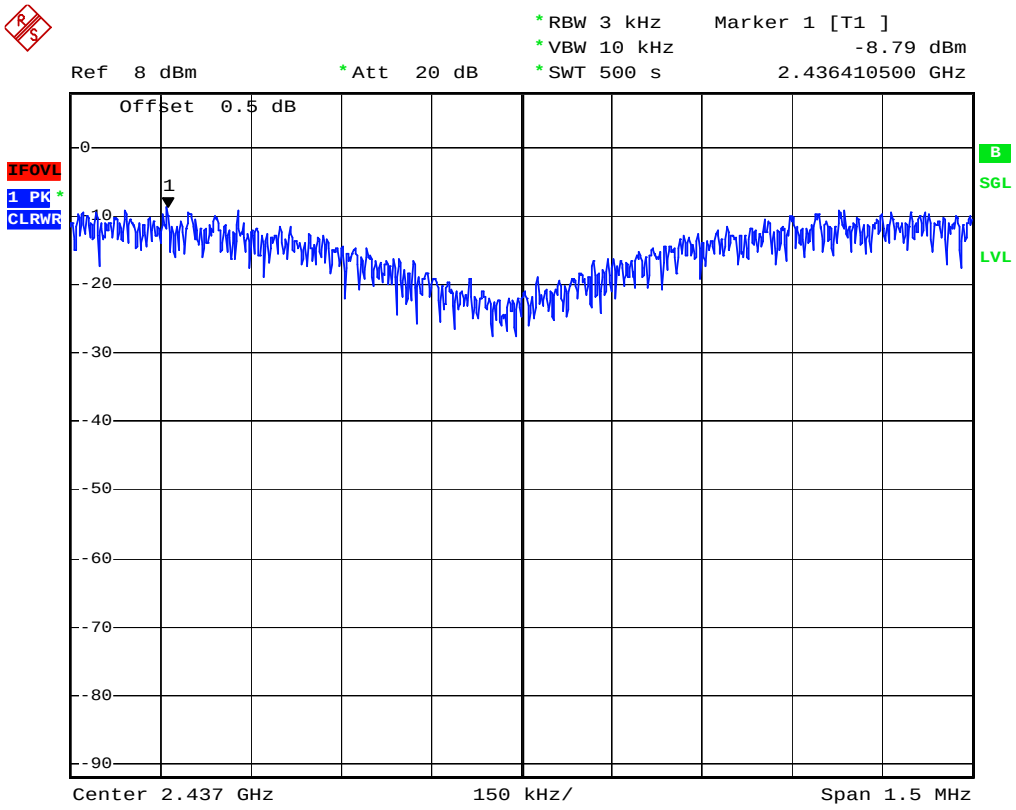


Channel: 1

Mode: 802.11b

PSD: -11.42dBm

Figure 6-2: Peak Power Spectral Density Plot

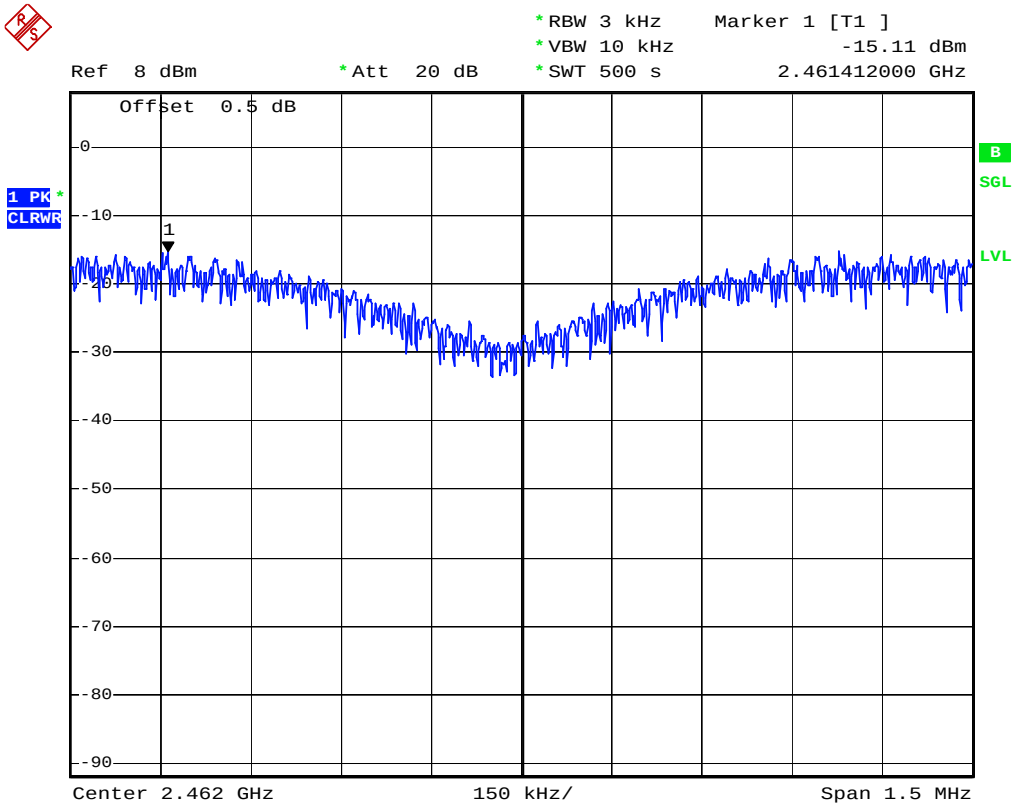


Channel: 6

Mode: 802.11b

PSD: -8.79dBm

Figure 6-3: Peak Power Spectral Density Plot



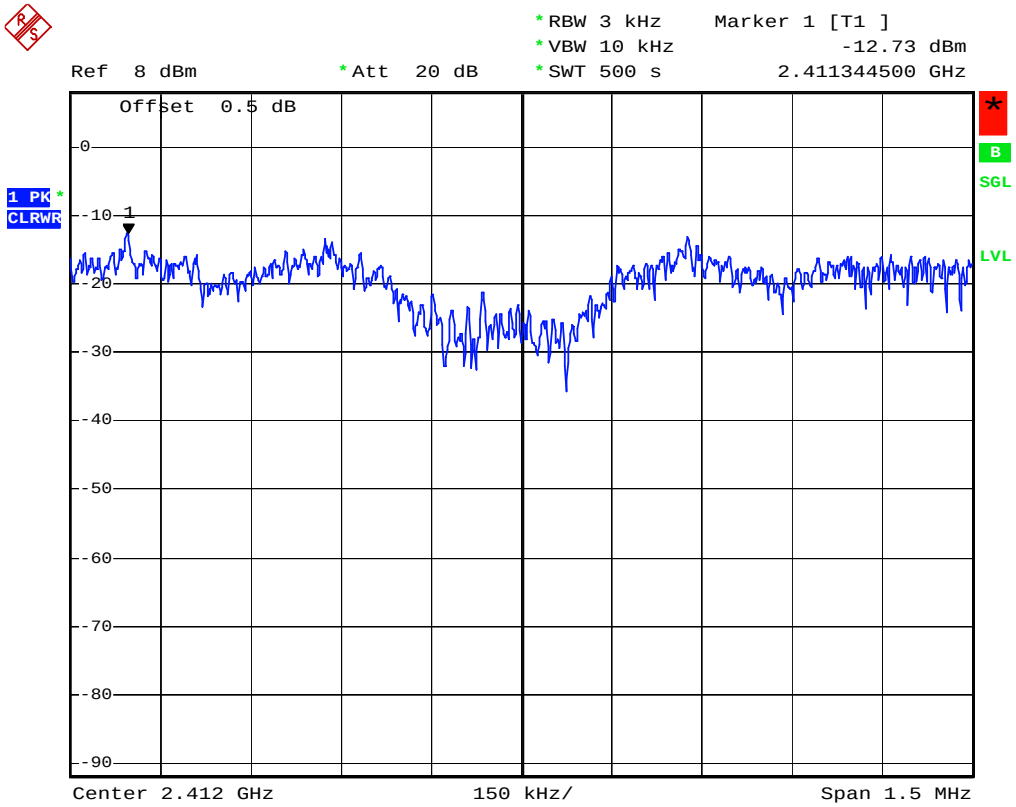
Date: 12.JUL.2007 16:36:00

Channel: 11

Mode: 802.11b

PSD: -15.11dBm

Figure 6-4: Peak Power Spectral Density Plot



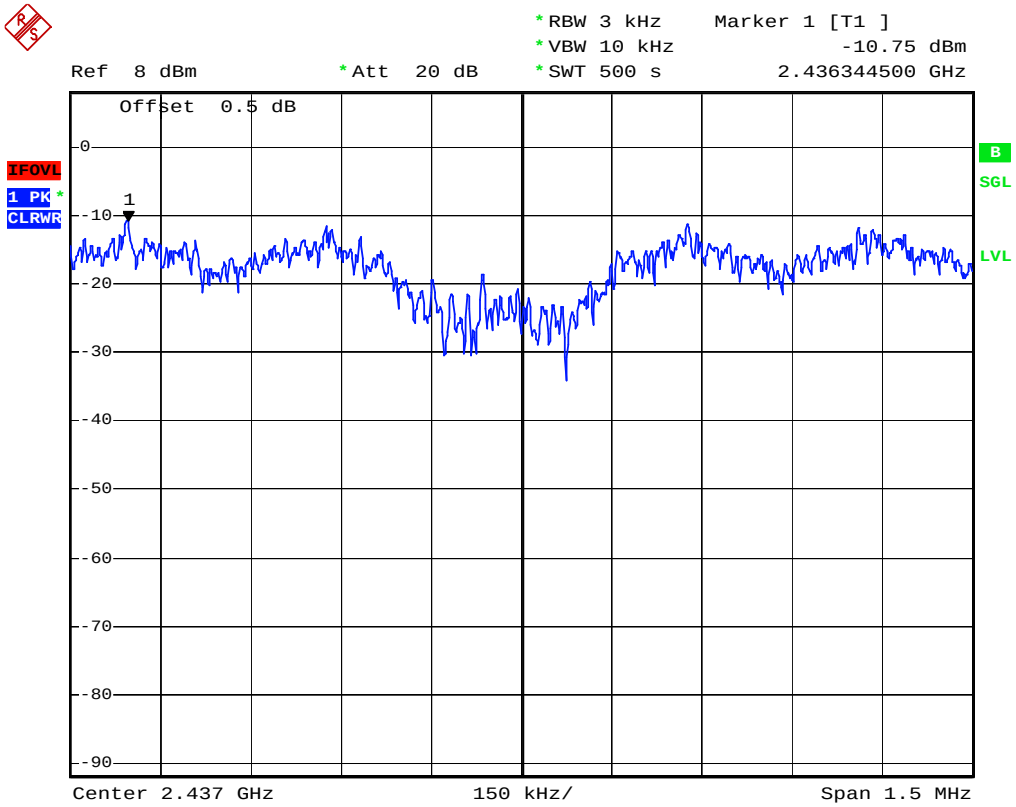
Date: 12.JUL.2007 16:45:13

Channel: 1

Mode: 802.11g

PSD: -12.73dBm

Figure 6-5: Peak Power Spectral Density Plot

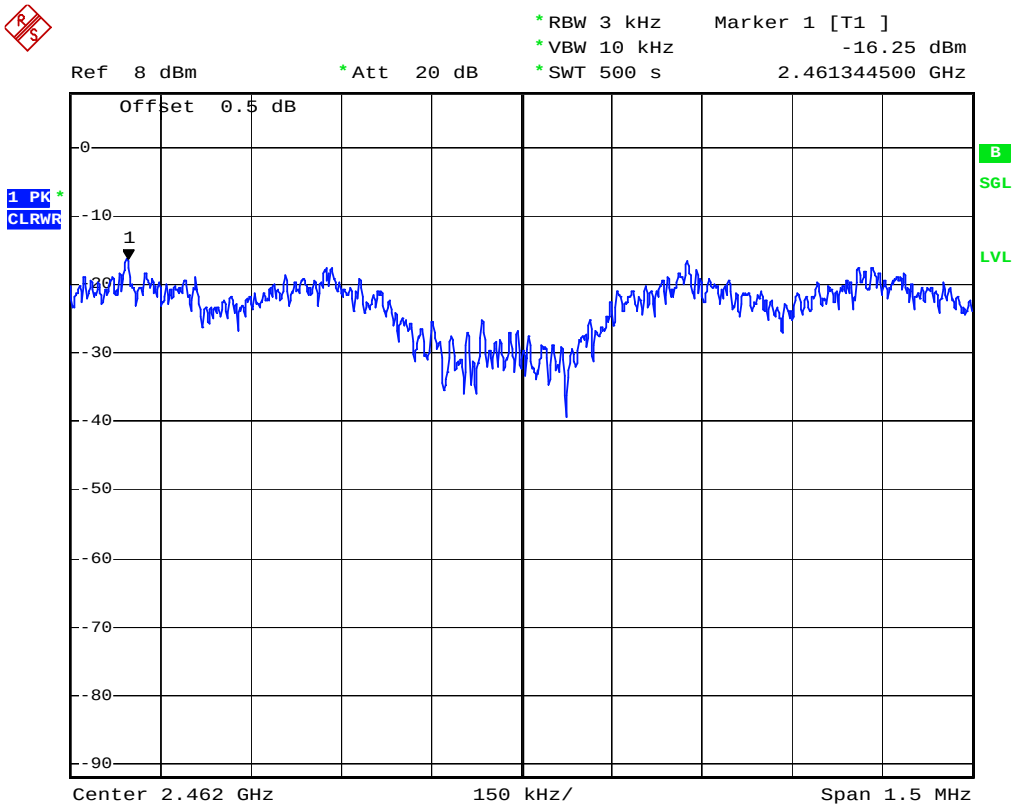


Channel: 6

Mode: 802.11g

PSD: -10.75dBm

Figure 6-6: Peak Power Spectral Density Plot

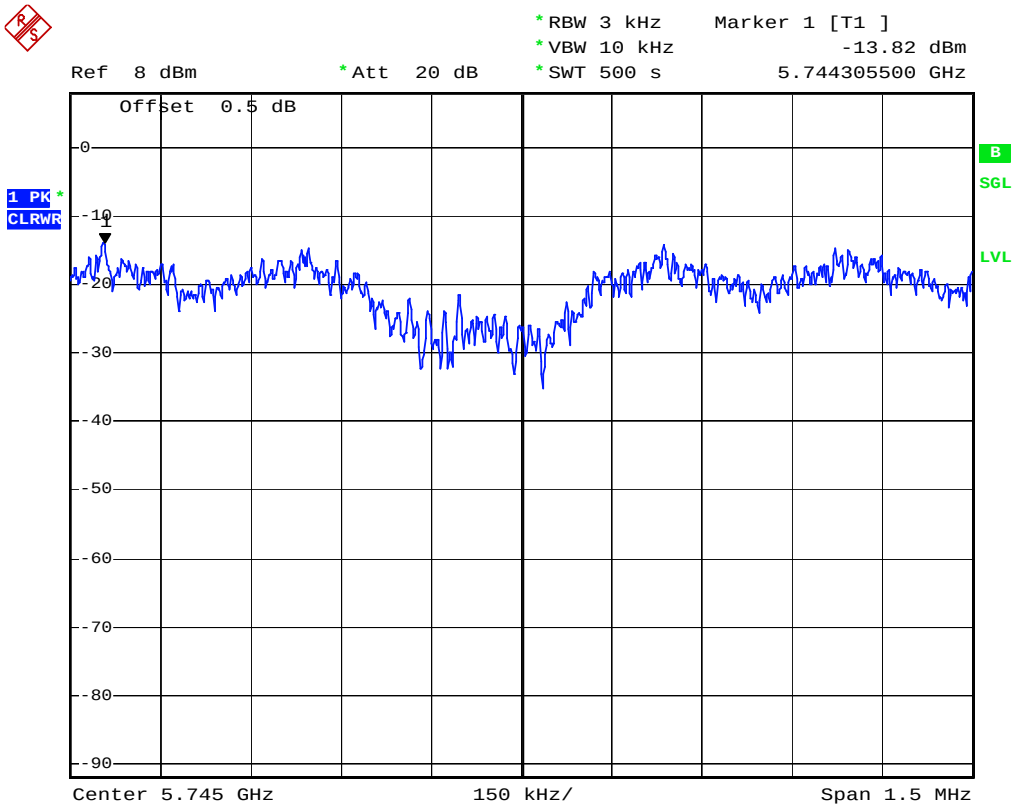


Channel: 11

Mode: 802.11g

PSD: -16.25dBm

Figure 6-7: Peak Power Spectral Density Plot



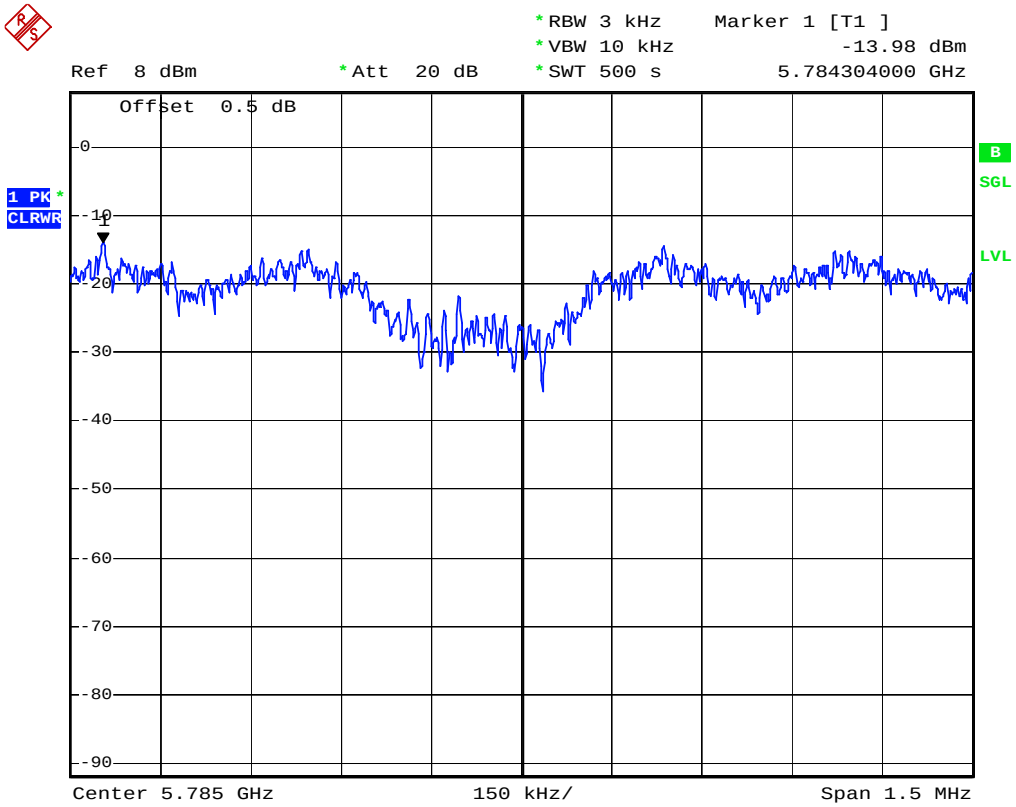
Date: 12.JUL.2007 17:19:37

Channel: 149

Mode: 802.11a

PSD: -13.82dBm

Figure 6-8: Peak Power Spectral Density Plot



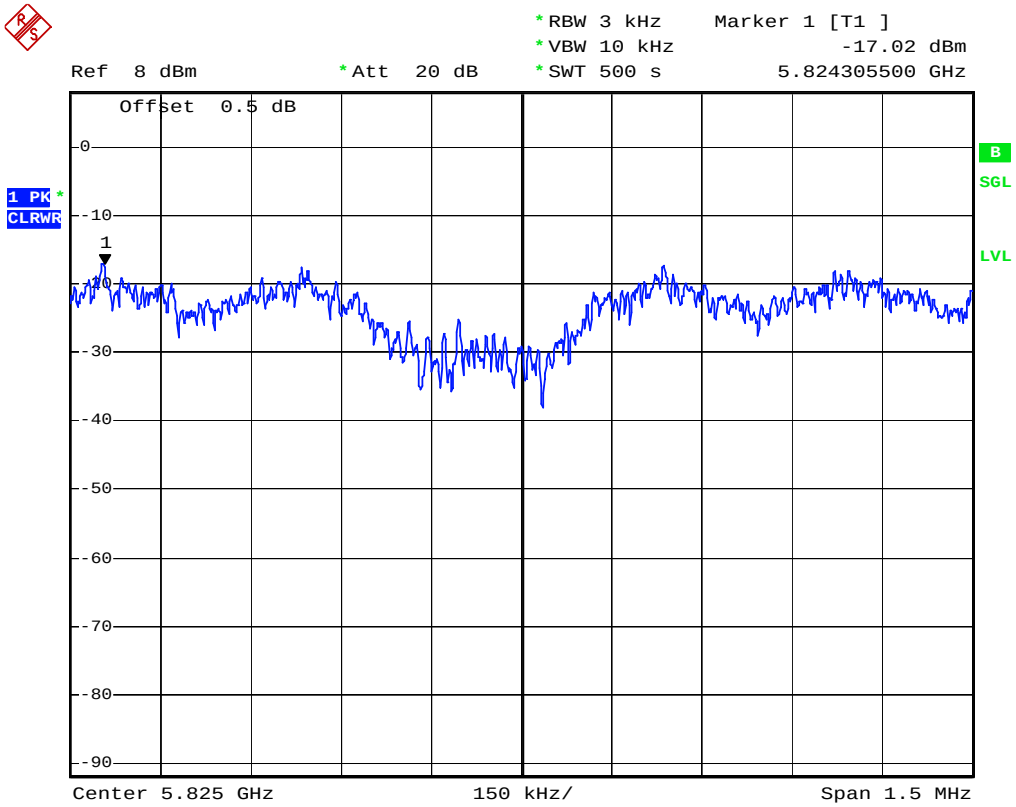
Date: 12.JUL.2007 17:59:11

Channel: 157

Mode: 802.11a

PSD: -13.82dBm

Figure 6-9: Peak Power Spectral Density Plot



Date: 12.JUL.2007 18:12:57

Channel: 165

Mode: 802.11a

PSD: -17.02dBm

7 OUT OF BAND EMISSIONS AT ANTENNA TERMINALS

7.1 Test Procedure (FCC Rule §15.247(d))

The antenna port of the Lexmark MarkNet N8052 was connected to the input of a spectrum analyzer. The analyzer resolution and video bandwidths were set to 1MHz. The Lexmark MarkNet N8052 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 40GHz 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.

7.2 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.

7.3 Test Results

The Lexmark MarkNet N8052 met the out of band emission at antenna terminal requirements. The following plots illustrate show that there are no spurious emissions within 20dB of the peak carrier power.

Figure 7-1: Out of band emissions at antenna terminals – Channel 1, 6, and 11 (802.11b Mode)

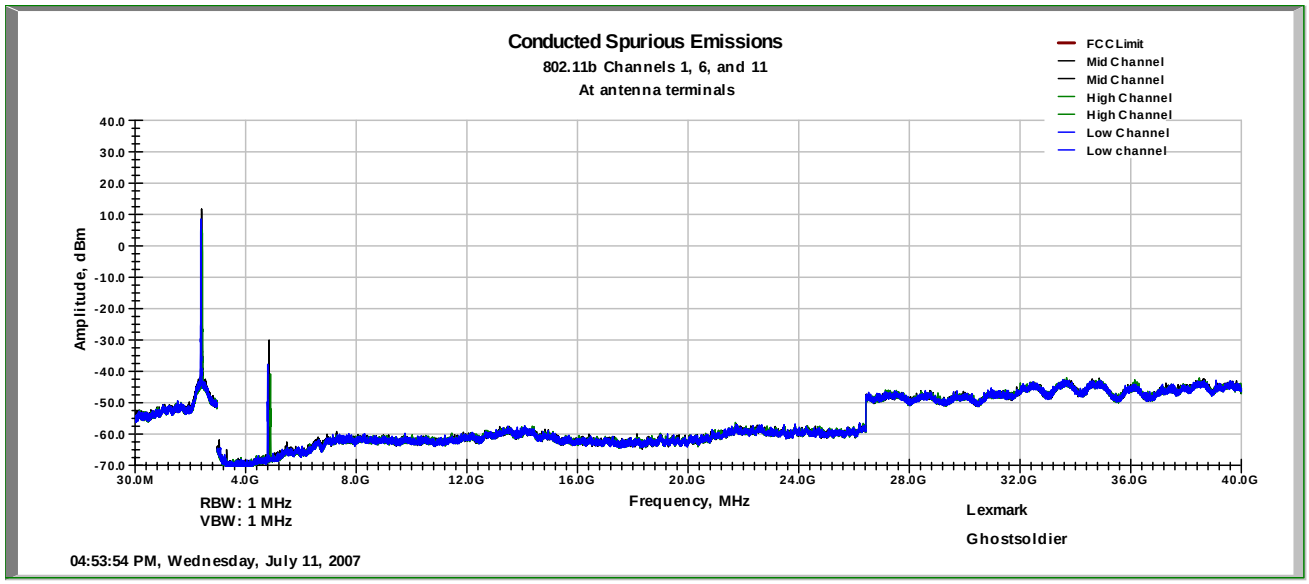


Figure 7-2: Out of band emissions at antenna terminals – Channel 1, 6, and 11 (802.11b Mode)

Zoomed In Around Fundamentals

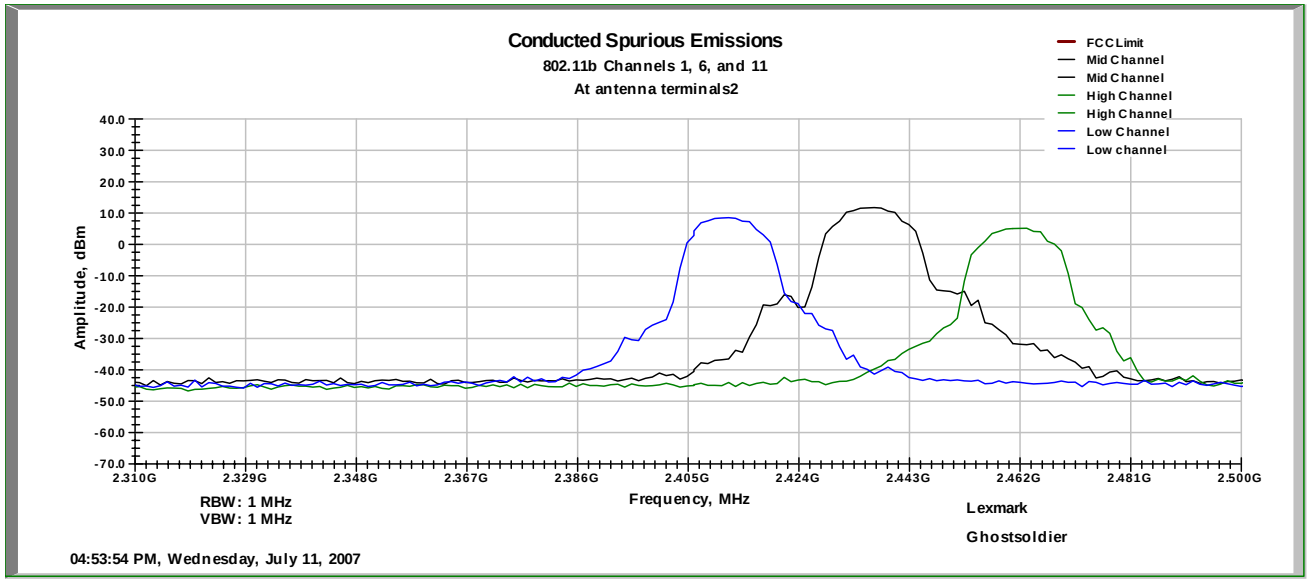


Figure 7-3: Out of band emissions at antenna terminals – Channel 1, 6, and 11 (802.11g mode)

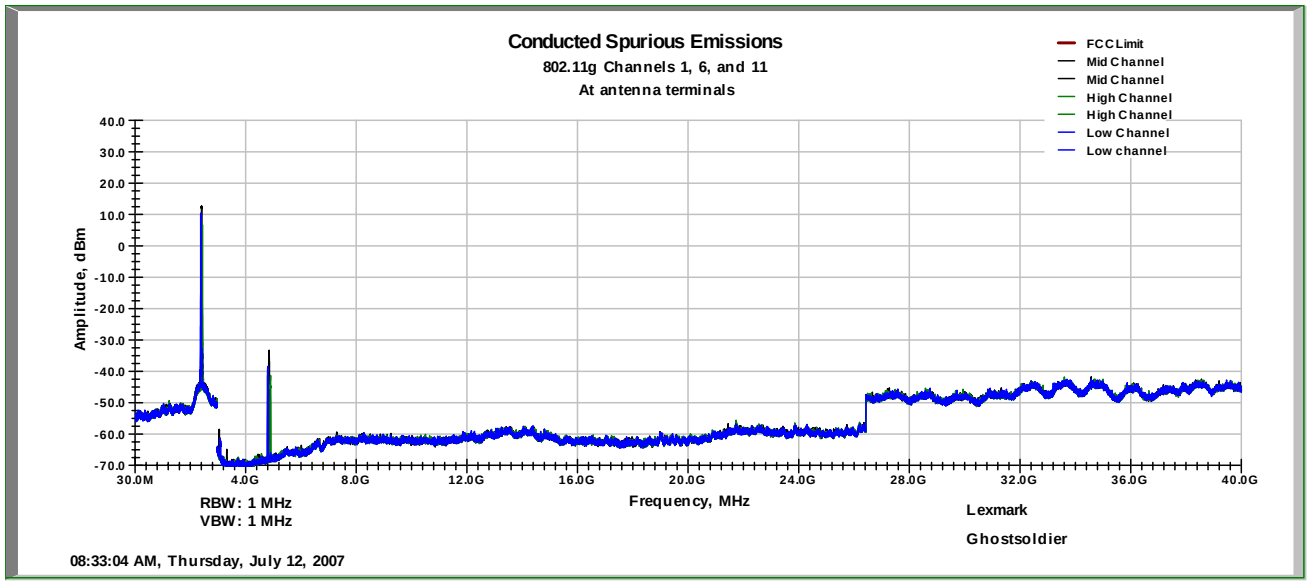


Figure 7-4: Out of band emissions at antenna terminals – Channel 1, 6, and 11 (802.11g mode)

Zoomed In Around Fundamentals

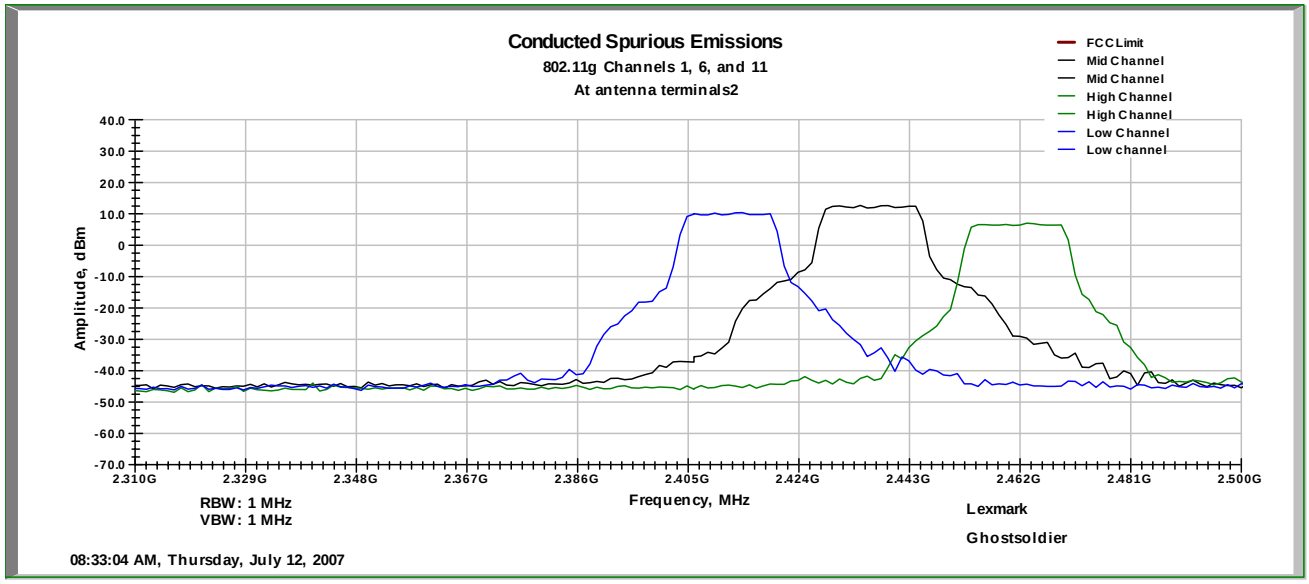


Figure 7-5: Out of band emissions at antenna terminals – Channel 149, 157, and 165 (802.11a mode)

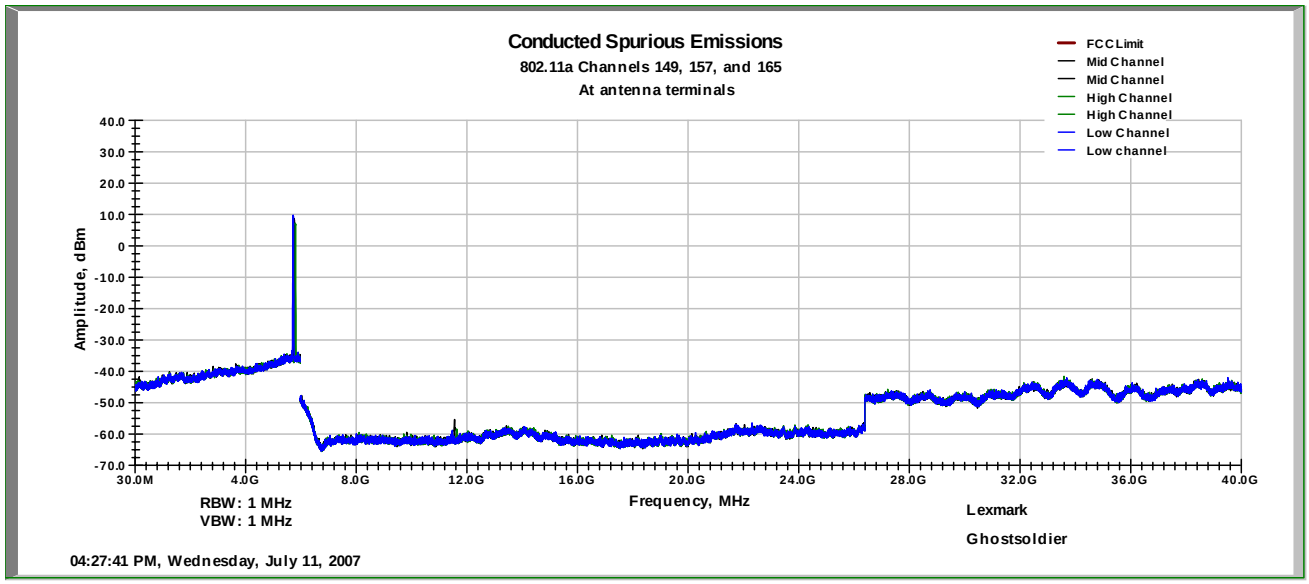
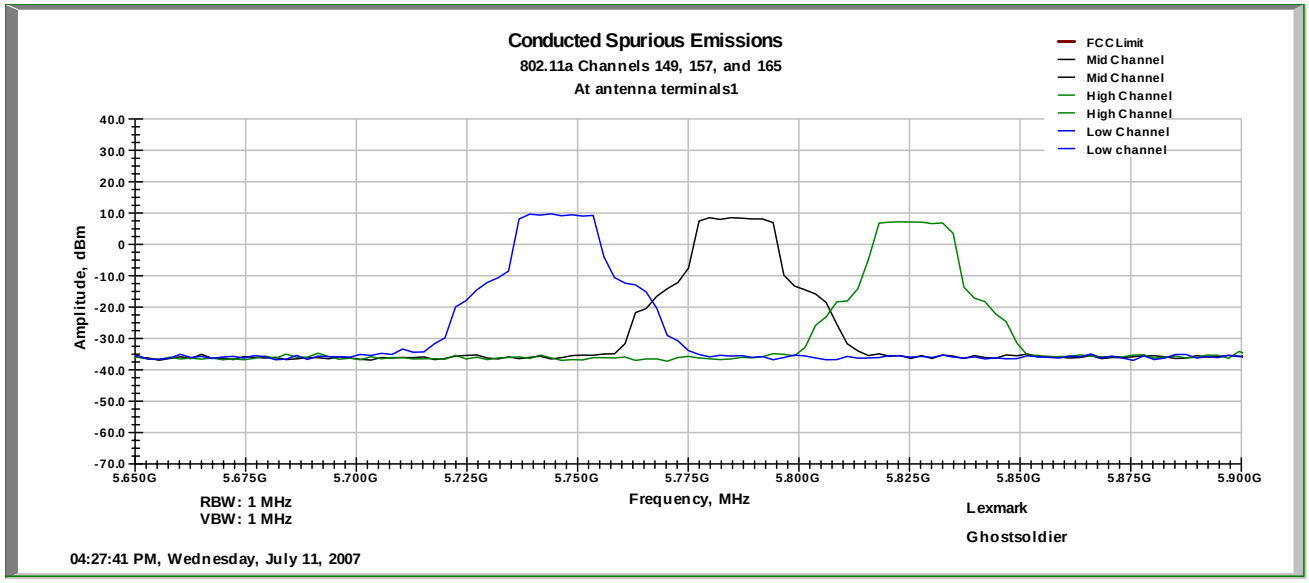


Figure 7-6: Out of band emissions at antenna terminals – Channel 149, 157, and 165 (802.11a mode)

Zoomed In Around Fundamentals



8 FIELD STRENGTH OF SPURIOUS RADIATION

8.1 Test Procedure (FCC Rule §15.247(d) for Radiated Measurements)

The Lexmark MarkNet N8052 was placed on a non-conductive turntable. It was then set to transmit at its highest output power level. When necessary, a high pass filter was inserted in line with the measurement path in order to keep the fundamental emission from overloading the preamplifier. All measurements were performed with the receiving antenna 3 meters from the EUT with the exception of the 20-40GHz 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 investigated was 30MHz up to the tenth harmonic or 40GHz (whichever was lower) for each of three fundamental frequencies (low, middle, and high channels) in each operating band.

8.2 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 8-1 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

8.3 Test Results

The Lexmark MarkNet N8052 met the field strength of spurious radiation requirements of FCC §15.209 and §15.247(c). The following graphs in Figure 8-1 through Figure 8-19 show that all harmonics and spurious emissions are at least 20dB below the carrier and that there are no emissions within the restricted bands exceeding the limits specified in §15.209(a).

Table 8-2 Spurious Radiated Emissions in the Restricted Bands (802.11b and g)

TX Mode	Freqency	Pol.	Reading (dBuV)	Cable Loss (dB)	Antenna Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Detector
802.11b Ch 1	233.15 MHz	H	18.9	2.11	11.89	32.9	46	-13.1	qp
802.11b Ch 1	198.68 MHz	V	8.32	1.93	10.27	20.52	43.52	-23	qp
802.11b Ch 1	366.44 MHz	V	16.76	2.67	15.56	34.99	46	-11.01	qp
802.11b Ch 1	4.824 GHz	V	27.95	-32	32.97	28.92	54	-25.08	avg
802.11b Ch 1	7.236 GHz	V	25.07	-27.86	36.32	33.53	54	-20.47	avg
802.11b Ch 1	4.824 GHz	V	40.89	-32	32.97	41.86	74	-32.14	peak
802.11b Ch 1	7.236 GHz	V	38.27	-27.86	36.32	46.73	74	-27.27	peak
802.11b Ch 6	233.15 MHz	H	18.9	2.11	11.89	32.9	46	-13.1	qp
802.11b Ch 6	366.43 MHz	V	19.92	2.67	15.56	38.15	46	-7.85	qp
802.11b Ch 6	4.874 GHz	V	38.04	-31.31	33.12	39.85	54	-14.15	avg
802.11b Ch 6	7.311 GHz	V	25.29	-27.2	36.7	34.79	54	-19.21	avg
802.11b Ch 6	12.185 GHz	V	20.64	-24.45	38.92	35.11	54	-18.89	avg
802.11b Ch 6	4.874 GHz	H	28.01	-31.31	33.17	29.87	54	-24.13	avg
802.11b Ch 6	7.311 GHz	H	24.39	-27.2	36.61	33.8	54	-20.2	avg
802.11b Ch 6	4.874 GHz	V	45.48	-31.31	33.12	47.29	74	-26.71	peak
802.11b Ch 6	7.311 GHz	V	38.79	-27.2	36.7	48.29	74	-25.71	peak
802.11b Ch 6	12.185 GHz	V	33.7	-24.45	38.92	48.17	74	-25.83	peak
802.11b Ch 6	4.874 GHz	H	41.27	-31.31	33.17	43.13	74	-30.87	peak
802.11b Ch 6	7.311 GHz	H	37.29	-27.2	36.61	46.7	74	-27.3	peak
802.11b Ch 11	366.4 MHz	V	19.17	2.67	15.56	37.4	46	-8.6	qp
802.11b Ch 11	366.45 MHz	H	14.51	2.67	15.72	32.9	46	-13.1	avg
802.11b Ch 11	4.924 GHz	V	31.61	-31.53	33.3	33.38	54	-20.62	avg
802.11b Ch 11	7.386 GHz	V	24.63	-27.25	36.7	34.08	54	-19.92	avg
802.11b Ch 11	4.924 GHz	V	42.79	-31.53	33.3	44.56	74	-29.44	peak
802.11b Ch 11	7.386 GHz	V	37.78	-27.25	36.7	47.23	74	-26.77	peak
802.11g Ch 1	366.41 MHz	V	19.26	2.67	15.56	37.49	46	-8.51	qp
802.11g Ch 1	4.824 GHz	V	27.54	-32	32.97	28.51	54	-25.49	avg
802.11g Ch 1	7.236 GHz	V	25.29	-27.86	36.32	33.75	54	-20.25	avg
802.11g Ch 1	4.824 GHz	V	40.53	-32	32.97	41.5	74	-32.5	peak
802.11g Ch 1	7.236 GHz	V	38.02	-27.86	36.32	46.48	74	-27.52	peak
802.11g Ch 6	366.41 MHz	V	18.99	2.67	15.56	37.22	46	-8.78	qp
802.11g Ch 6	4.874 GHz	V	18.52	-31.31	33.12	20.33	54	-33.67	avg
802.11g Ch 6	7.3141 GHz	V	25.13	-27.34	36.7	34.49	54	-19.51	avg
802.11g Ch 6	4.874 GHz	V	31.51	-31.31	33.12	33.32	74	-40.68	peak
802.11g Ch 6	7.3141 GHz	V	37.66	-27.34	36.7	47.02	74	-26.98	peak
802.11g Ch 11	366.41 MHz	V	18.65	2.67	15.56	36.88	46	-9.12	qp
802.11g Ch 11	4.924 GHz	V	31.49	-31.53	33.3	33.26	54	-20.74	avg
802.11g Ch 11	7.386 GHz	V	24.37	-27.25	36.7	33.82	54	-20.18	avg
802.11g Ch 11	4.924 GHz	V	42.25	-31.53	33.3	44.02	74	-29.98	peak
802.11g Ch 11	7.386 GHz	V	37.78	-27.25	36.7	47.23	74	-26.77	peak

*The Corrected Reading (in dBuV/m) is obtained by summing the Reading, Cable Loss (which in some cases includes a preamplifier factor), and the antenna factor.

Figure 8-1: Field Strength of Spurious Radiation Channel 1 (30MHz – 26GHz) – 802.11b

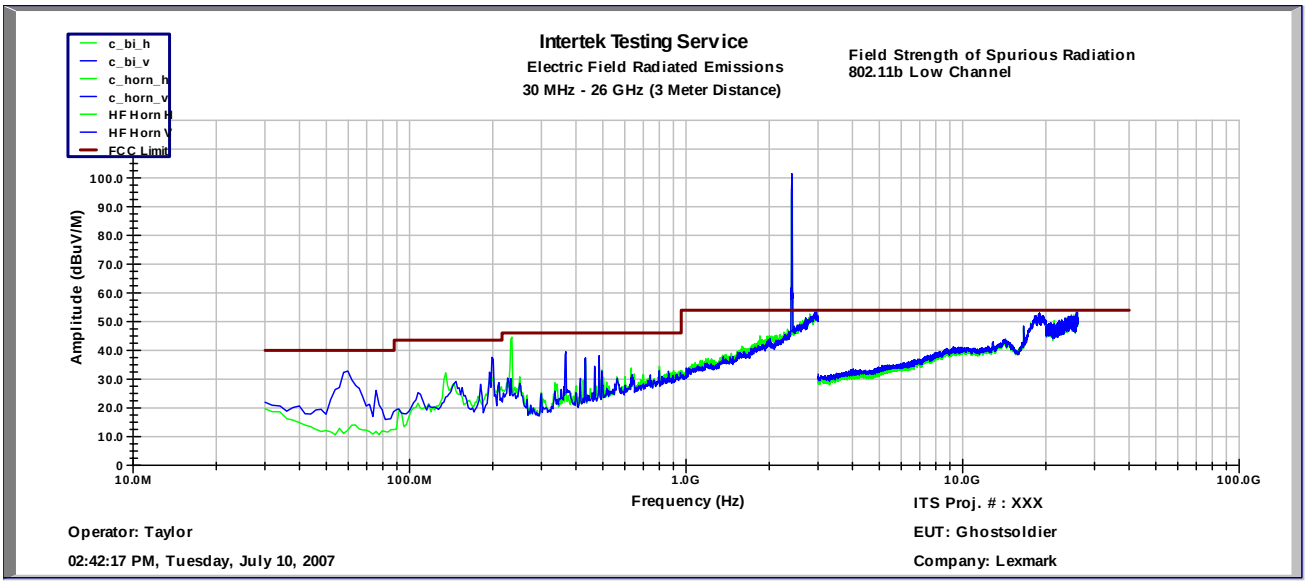


Figure 8-2: Field Strength of Spurious Radiation Channel 6 (30MHz – 26GHz) – 802.11b

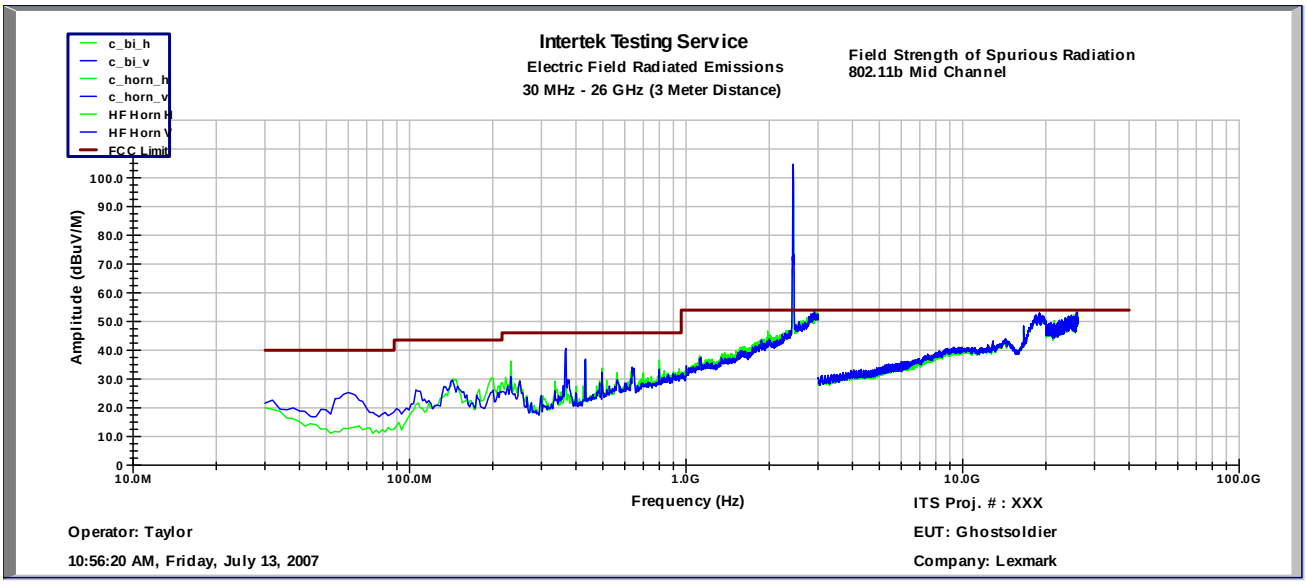


Figure 8-3: Field Strength of Spurious Radiation Channel 11 (30MHz – 26GHz) – 802.11b

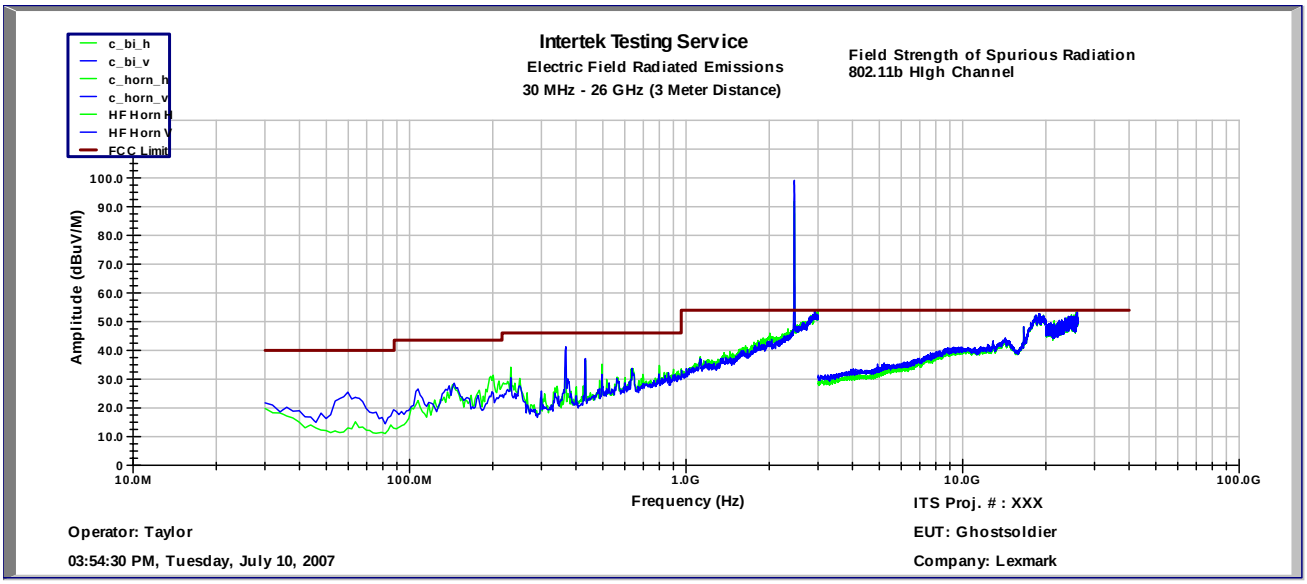


Figure 8-4: Field Strength of Spurious Radiation Channel 1 (30MHz – 26GHz) – 802.11g

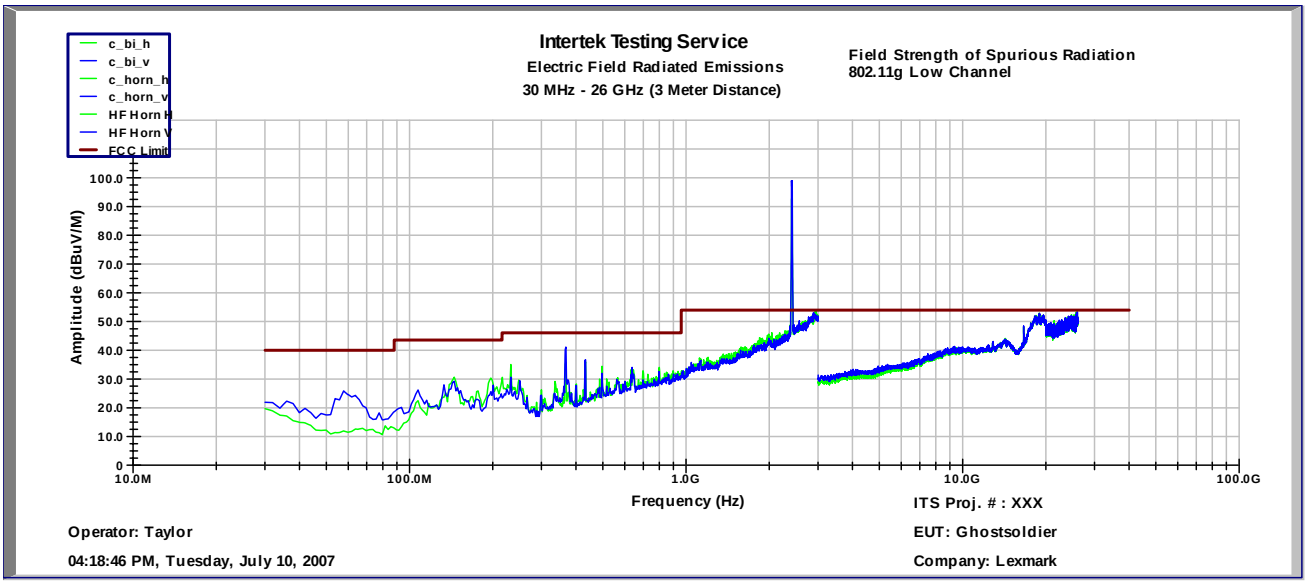


Figure 8-5: Field Strength of Spurious Radiation Channel 6 (30MHz – 26GHz) – 802.11g

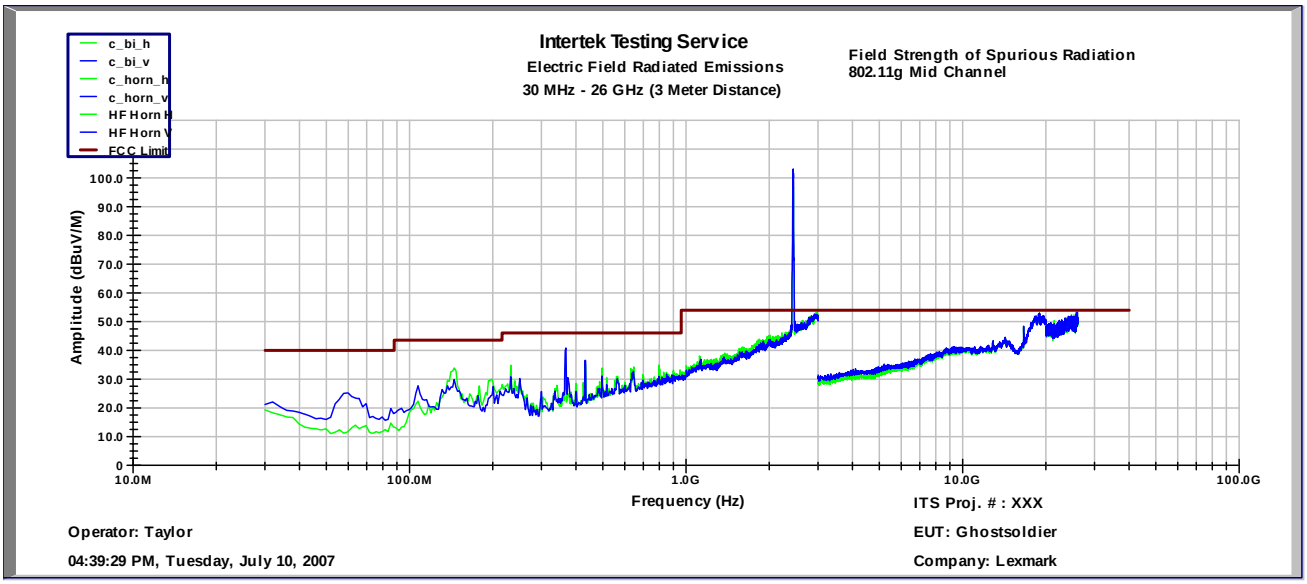


Figure 8-6: Field Strength of Spurious Radiation Channel 11 (30MHz – 26GHz) – 802.11g

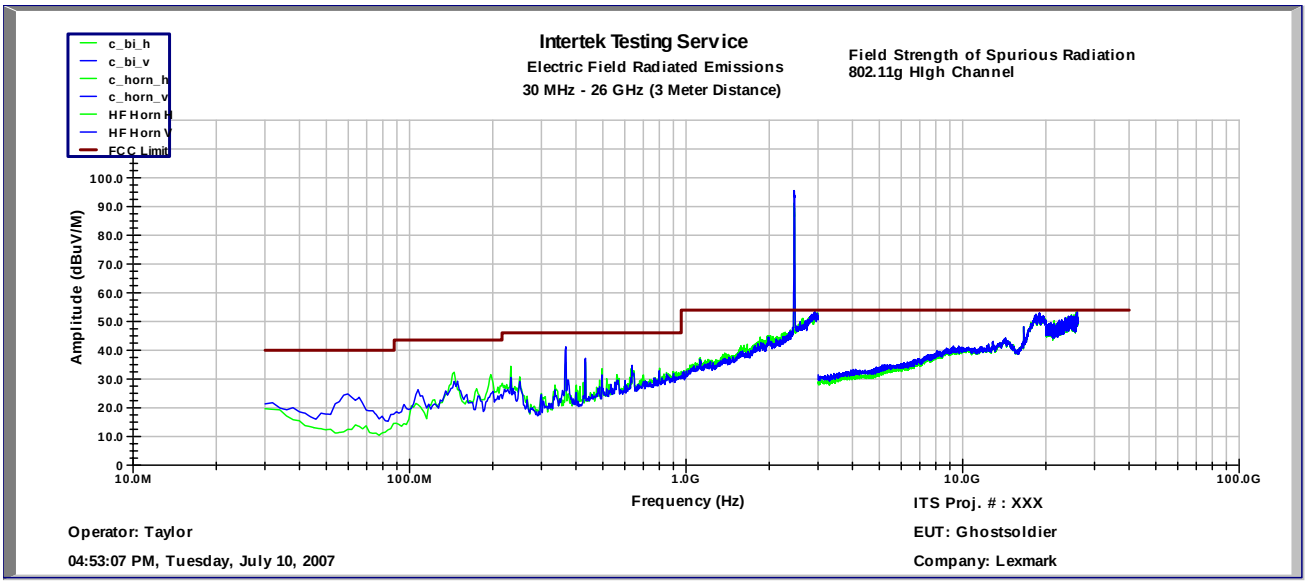


Table 8-3 Spurious Radiated Emissions in the Restricted Bands (802.11a)

TX Mode	Freqency	Pol.	Reading (dBuV)	Cable Loss (dB)	Antenna Factor (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Detector
802.11a Ch 149	11.49 GHz	V	26.77	-24.14	38.86	41.49	74	-32.51	peak
802.11a Ch 149	11.49 GHz	V	21.71	-24.14	38.86	36.43	54	-17.57	avg
802.11a Ch 157	11.57 GHz	V	36.25	-23.75	39.04	51.54	74	-22.46	peak
802.11a Ch 157	11.57 GHz	V	22.1	-23.75	39.04	37.39	54	-16.61	avg
802.11a Ch 165	11.65 GHz	V	36.64	-24.05	39.2	51.79	74	-22.21	peak
802.11a Ch 165	11.65 GHz	V	23.91	-24.05	39.2	39.06	54	-14.94	avg

*The Corrected Reading (in dBuV/m) is obtained by summing the Reading, Cable Loss (which in some cases includes a preamplifier factor), and the antenna factor.

Figure 8-7: Field Strength of Spurious Radiation Channel 149 (30MHz – 40GHz) – 802.11a

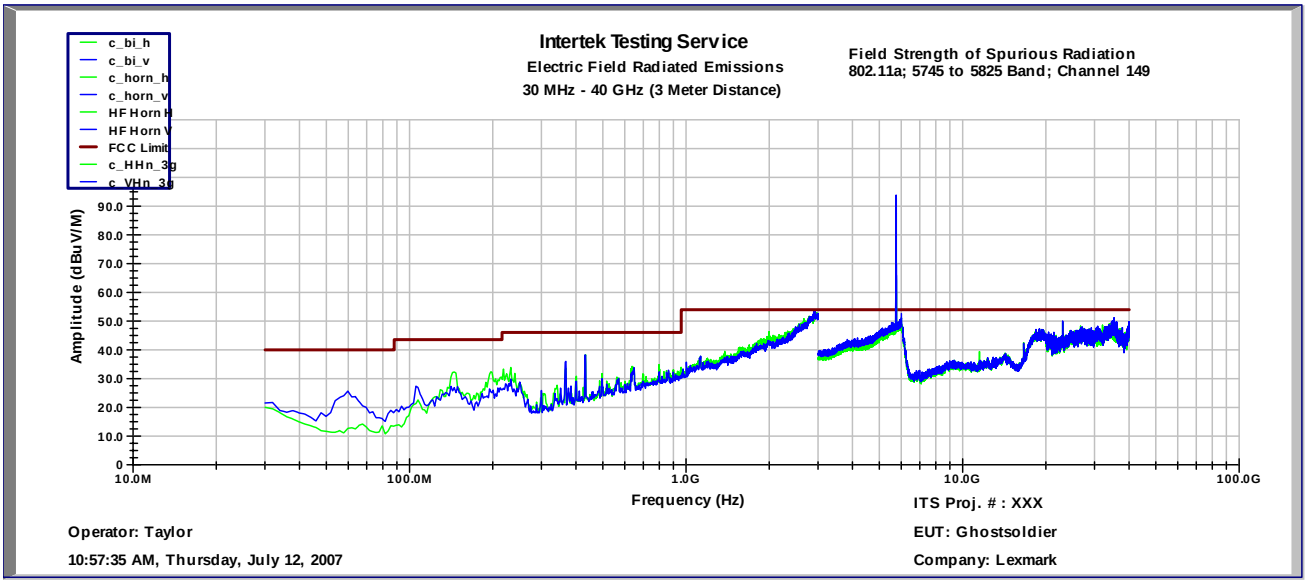


Figure 8-8: Field Strength of Spurious Radiation Channel 157 (30MHz – 40GHz) – 802.11a

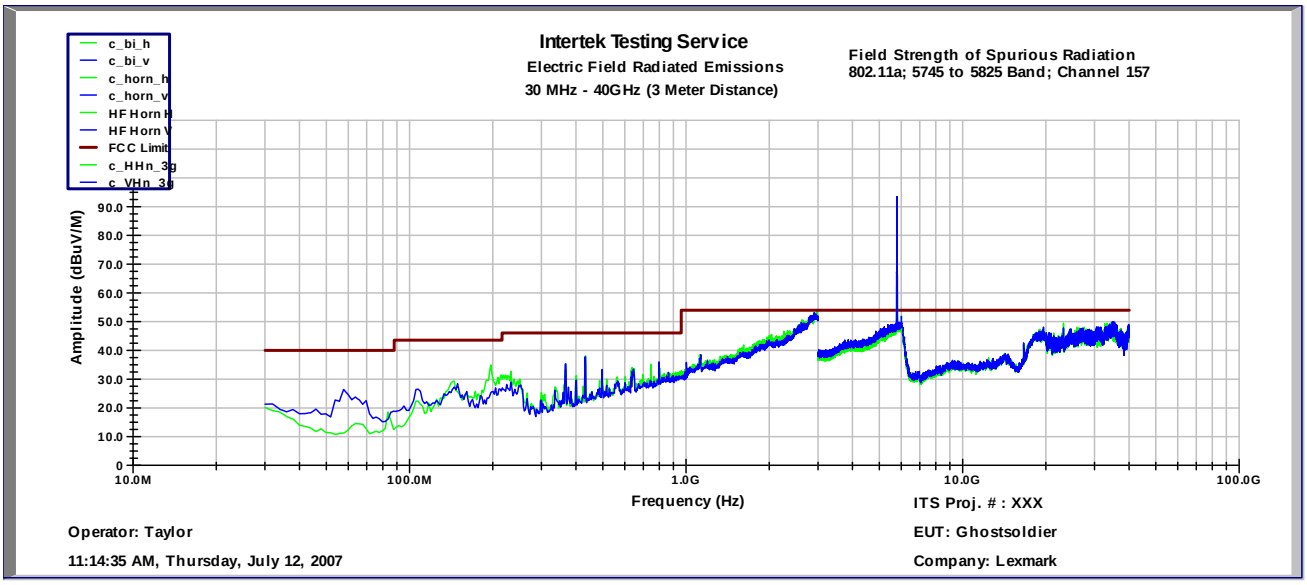


Figure 8-9: Field Strength of Spurious Radiation Channel 165 (30MHz – 40GHz) – 802.11a

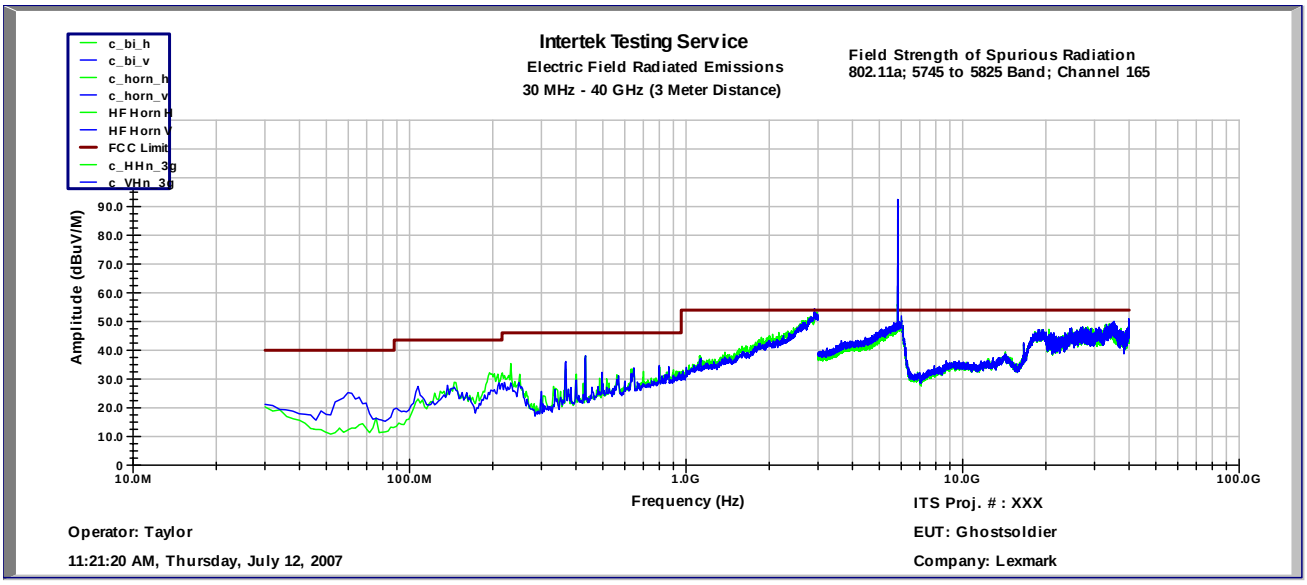


Figure 8-10: Lower Bandedge with Peak Detection (802.11b)

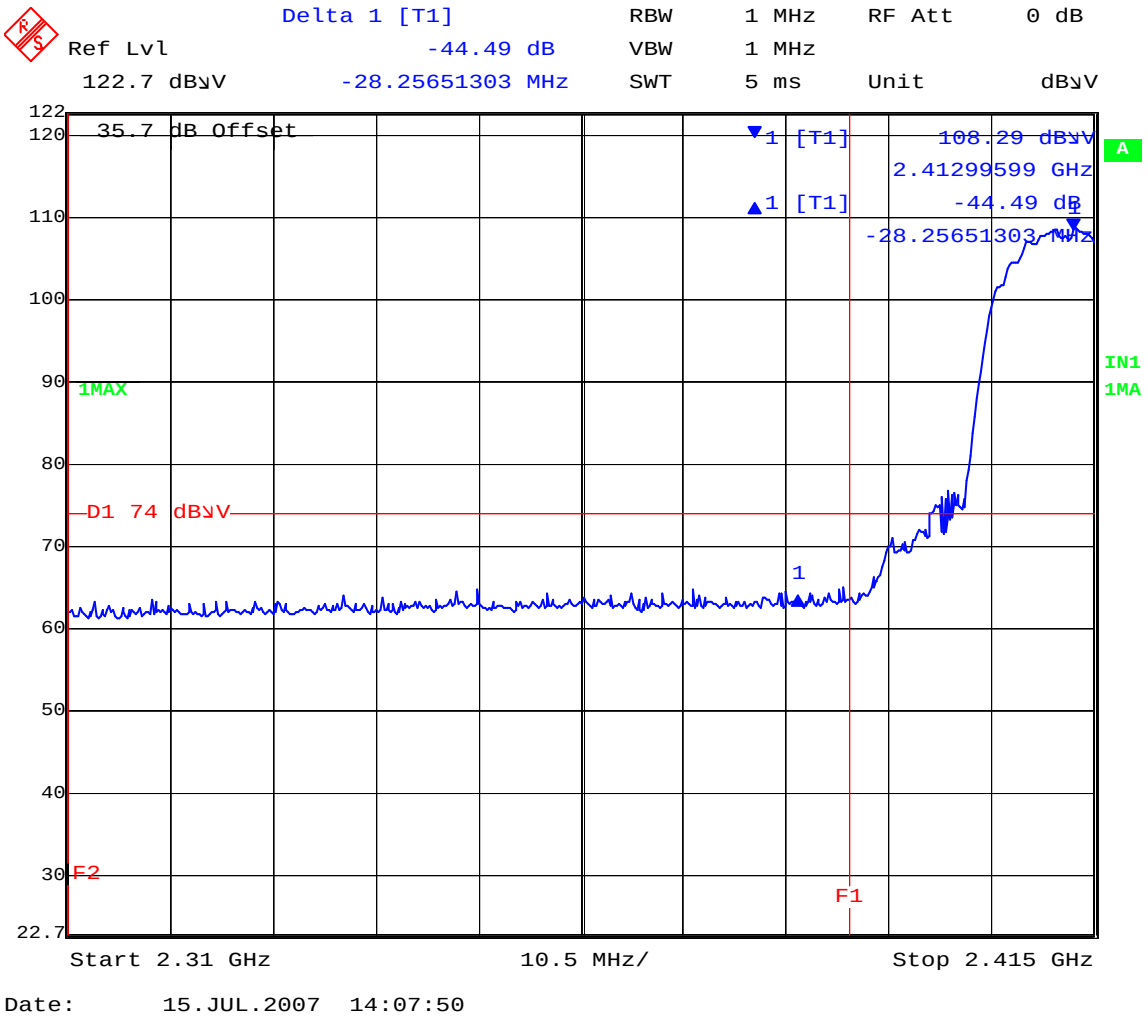


Figure 8-11: Lower Bandedge with Average Detection (802.11b)

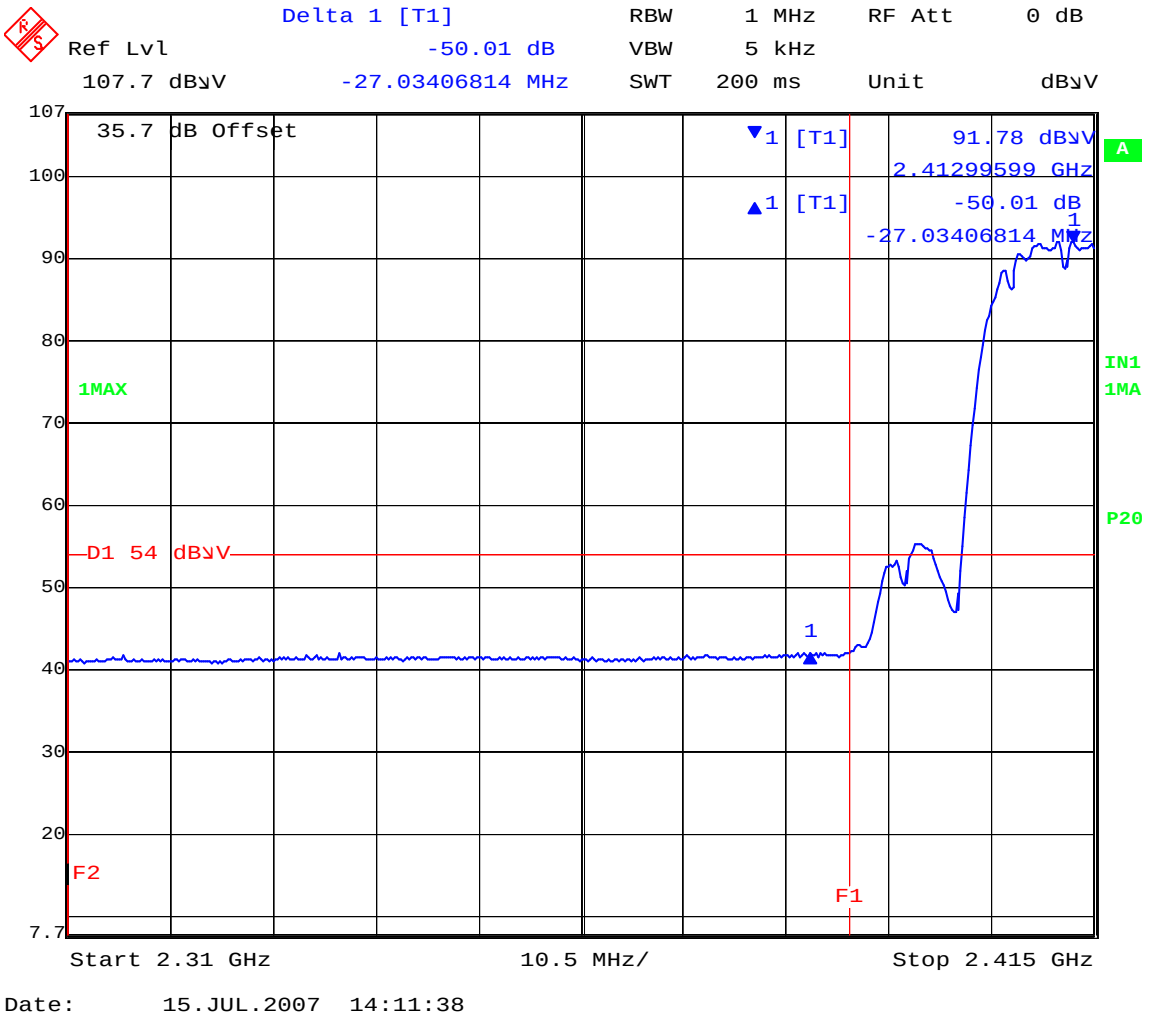


Figure 8-12: Lower Bandedge with Peak Detection (802.11g)

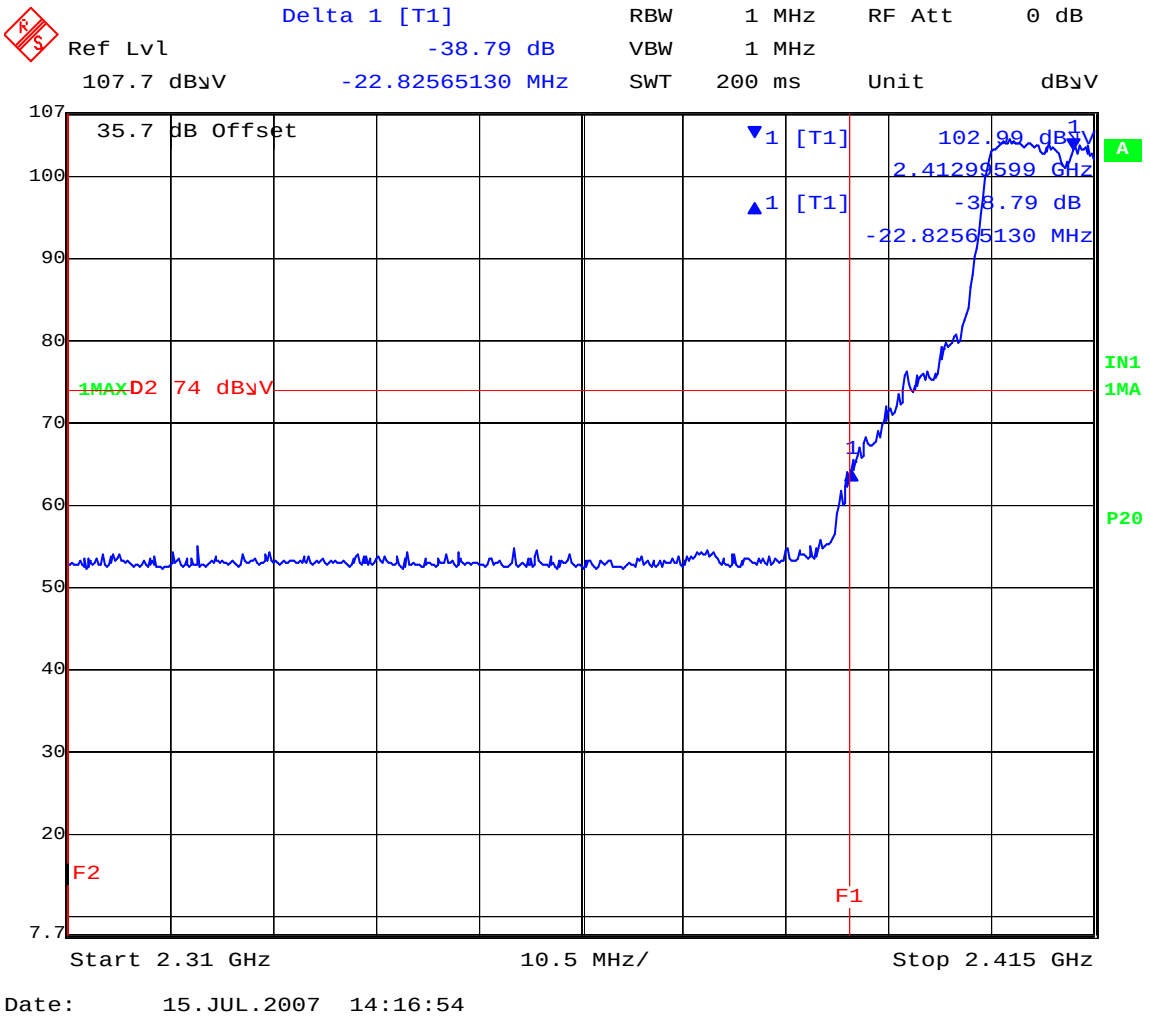


Figure 8-13: Lower Bandedge with Average Detection (802.11g)

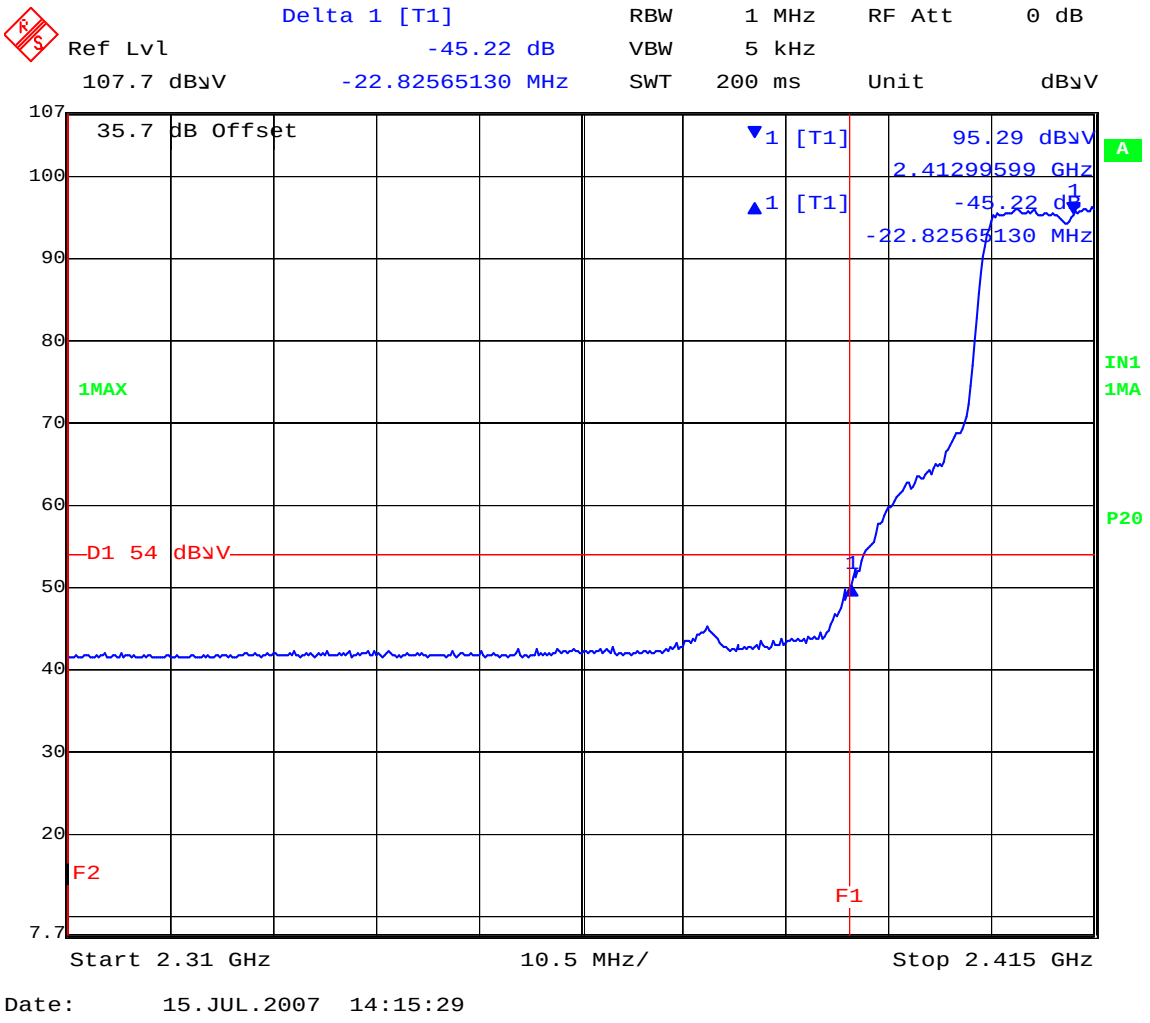


Figure 8-14: Upper Bandedge with Peak Detection (802.11b)

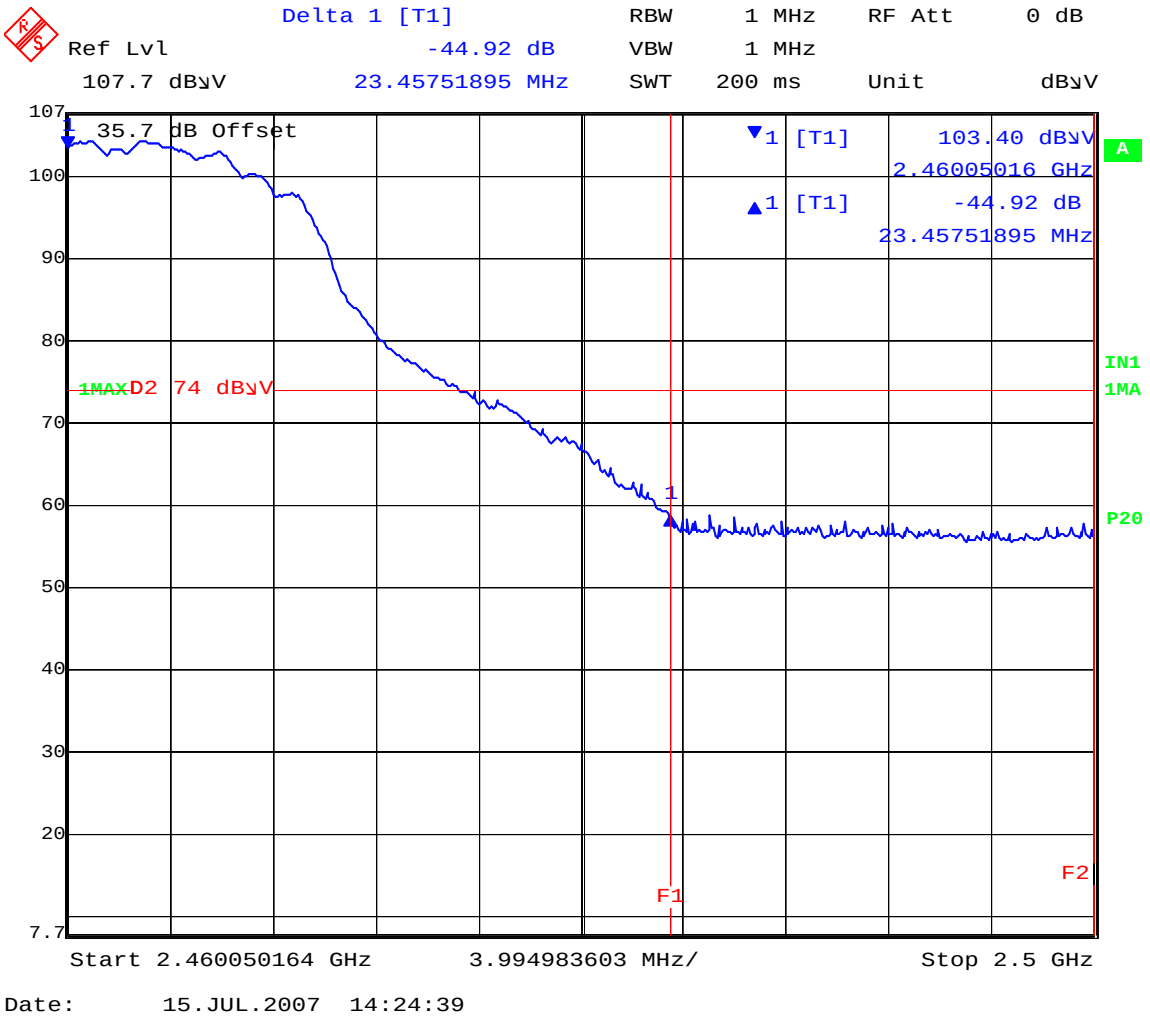


Figure 8-15: Upper Bandedge with Average Detection (802.11b)

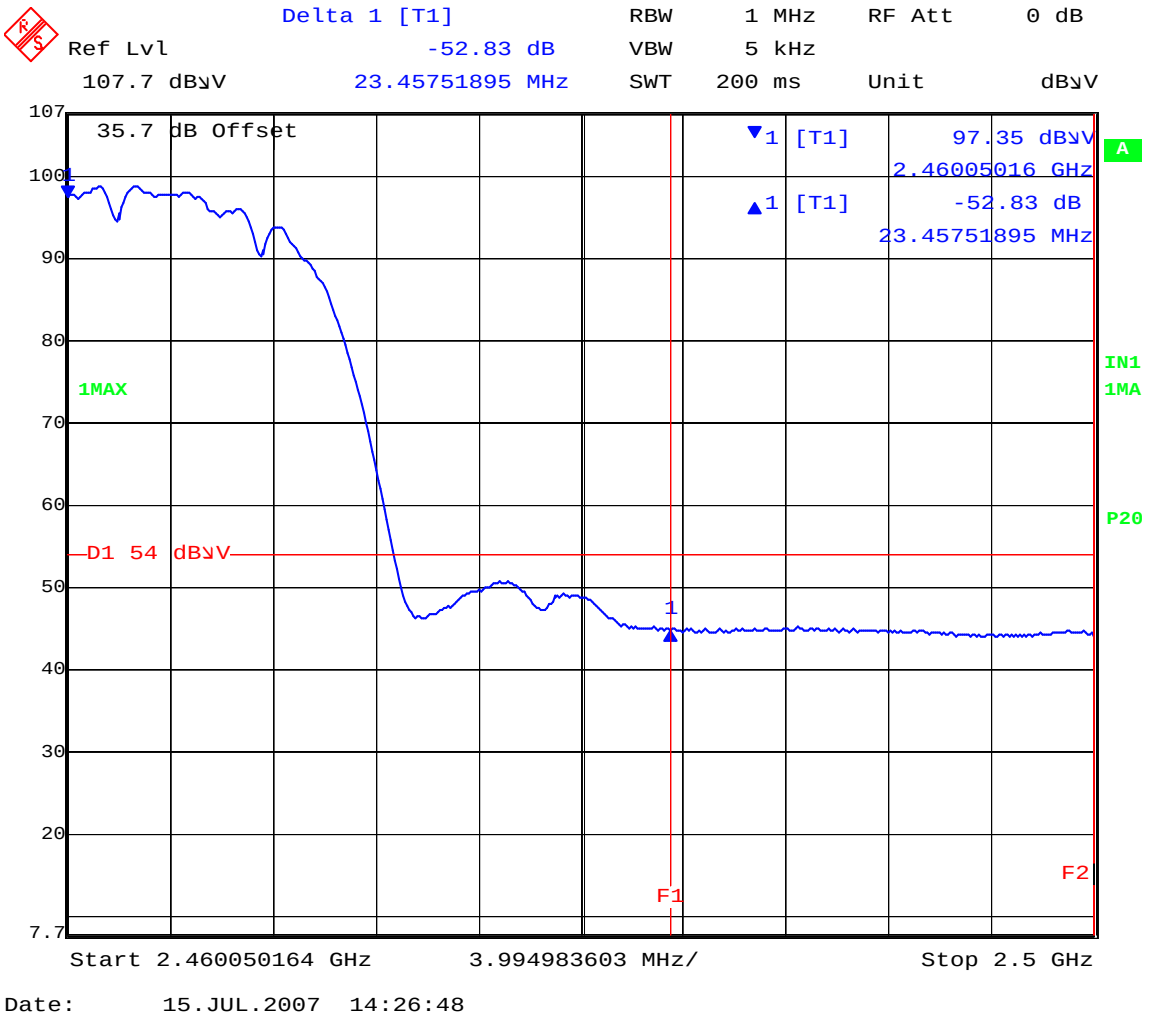


Figure 8-16: Upper Bandedge with Peak Detection (802.11g)

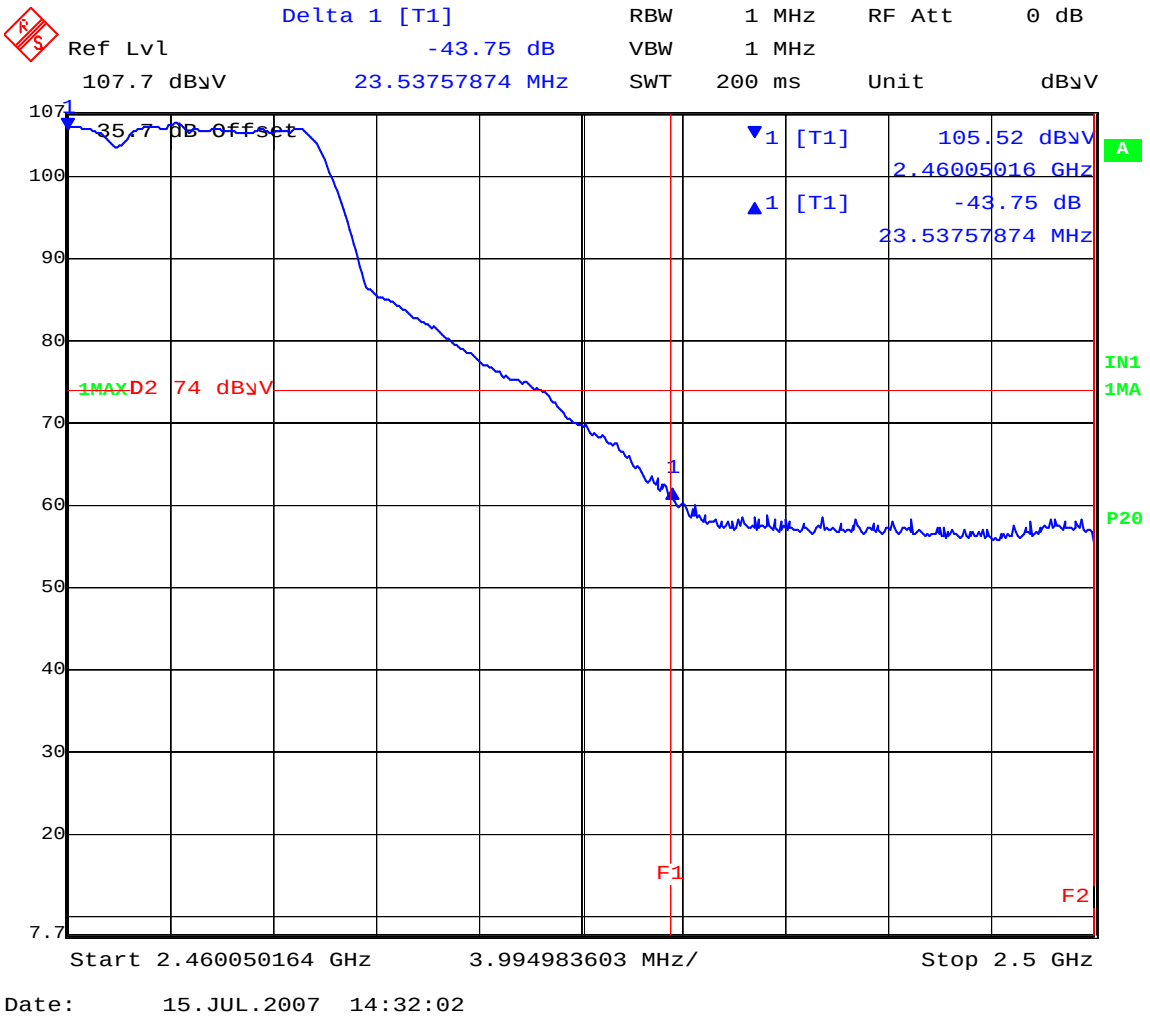


Figure 8-17: Upper Bandedge with Average Detection (802.11g)

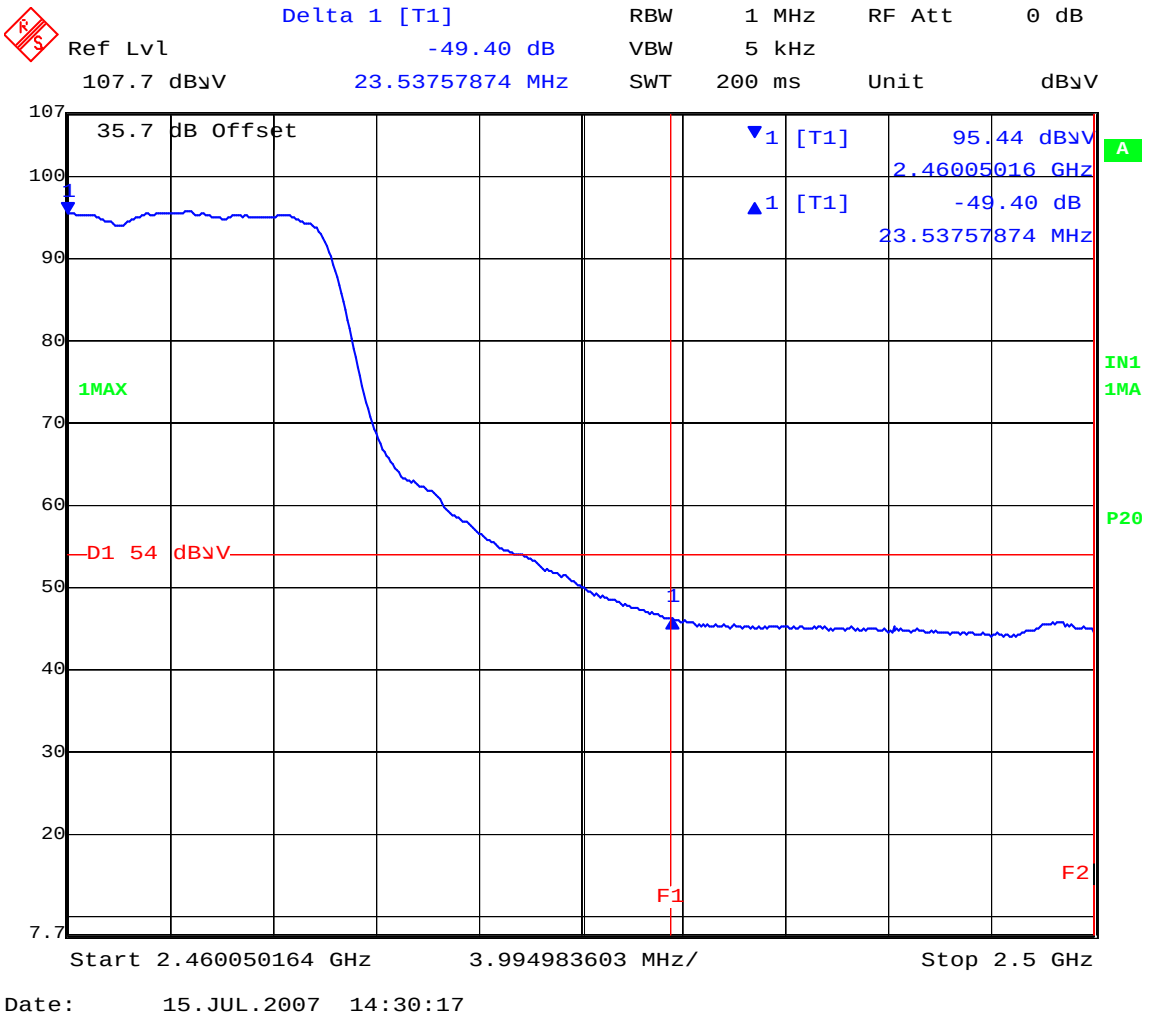


Figure 8-18: Lower Bandedge with Peak Detection (802.11a)

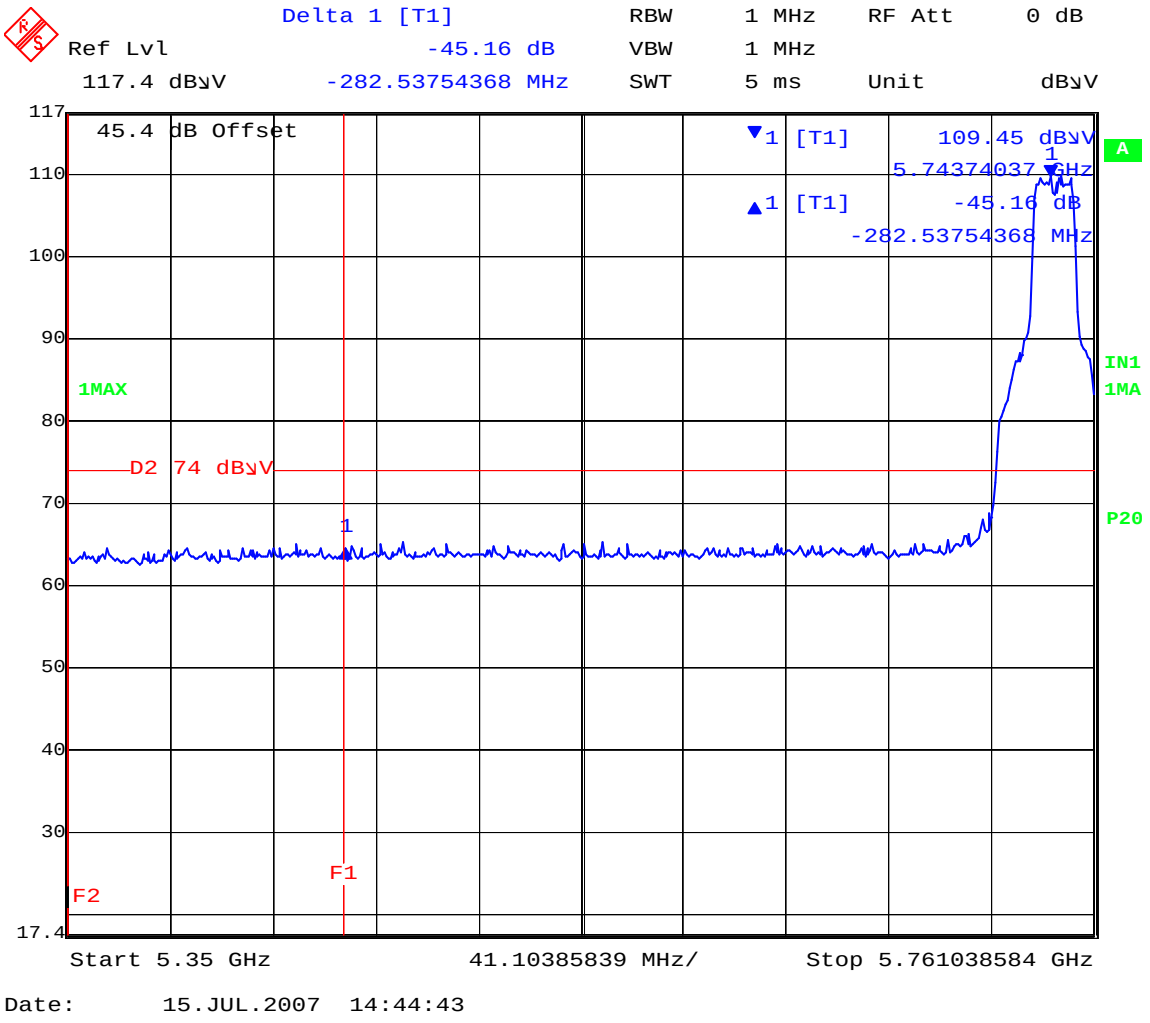
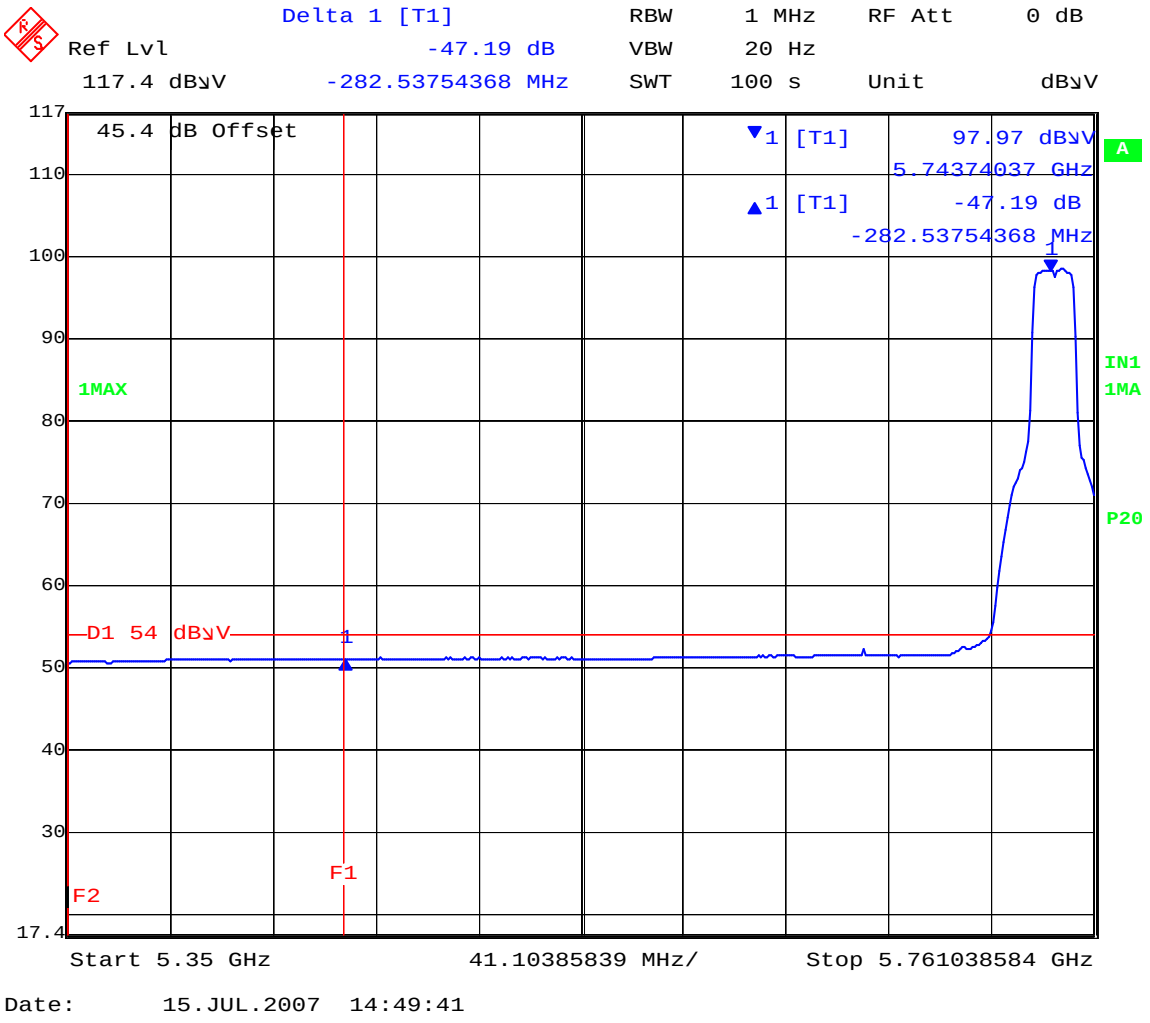


Figure 8-19: Lower Bandedge with Average Detection (802.11a)



9 RECEIVER SPURIOUS EMISSIONS

9.1 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.

9.2 Receiver Spurious Emissions Criteria

Table 9-1 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

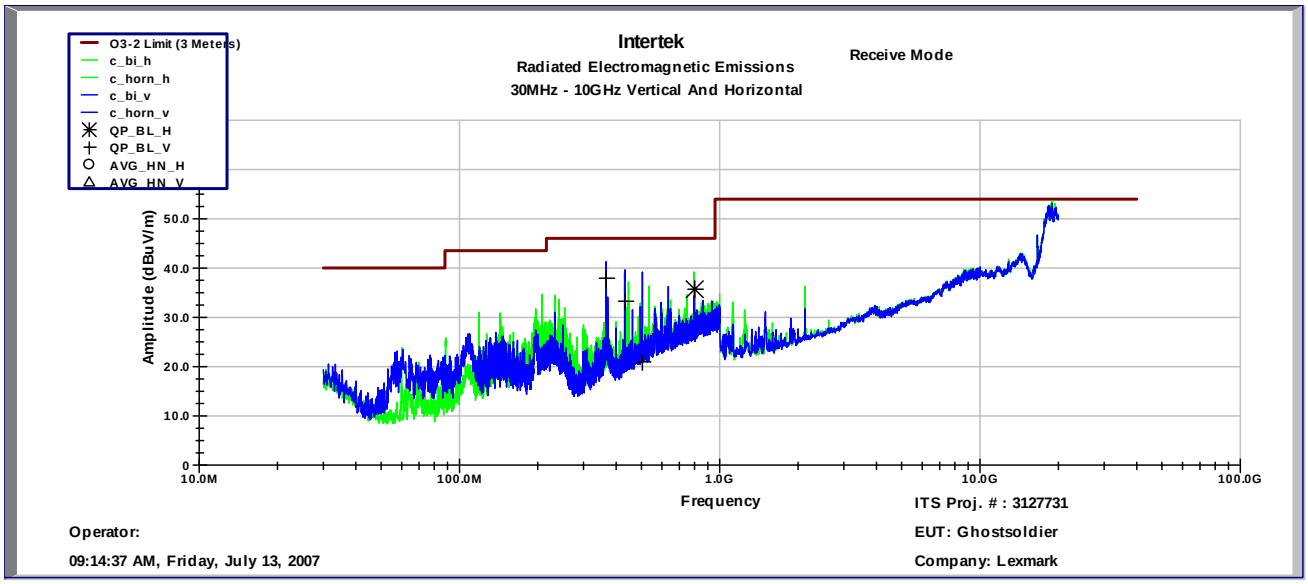
9.3 Test Results

The Lexmark MarkNet N8052 is **compliant** with the radiated disturbance requirements of FCC §15.109 and §15.209 for a class B device. The table in Figure 9-1 and the graph in Figure 9-2 show that there are no emissions above the limit.

Figure 9-1 FCC §15.109 Receiver Spurious Emission (Receive Mode)

Frequency (MHz)	Polarity (H/V)	Cab. (dB)	Ant. (dB)	Corr. Reading. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (deg)	Tower (m)	Results
801.82 MHz	H	4.1	22.04	35.68	46.02	-10.34	309	2	**Compliant**
366.4 MHz	V	2.67	15.56	37.92	46.02	-8.1	200	1	**Compliant**
433.1 MHz	V	2.94	15.79	33.25	46.02	-12.77	309	1	**Compliant**
504.9 MHz	V	3.19	17.7	20.95	46.02	-25.07	199	1	**Compliant**

Figure 9-2 FCC §15.109 Receiver Spurious Emission (Receive Mode)



10 POWER LINE CONDUCTED EMISSIONS

10.1 Test Procedure (FCC §15.107 and §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.

10.2 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 10-1 Conducted Emission Limit for FCC §15.107 and §15.207

Frequency Range (MHz)	Quasi Peak Limit (dBuV)	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

10.3 Test Results

The Lexmark MarkNet N8052 met the power line conducted emission requirements of §15.107 and §15.207. The graphical data, measured with peak detection, was all below the class B quasi-peak and average limits. The test was performed on the AC input to printer that was housing the Lexmark MarkNet N8052. This test was performed in receive and transmit modes.

Figure 10-1: Power Line Conducted Emissions Receive Mode (Lines 1 and 2)

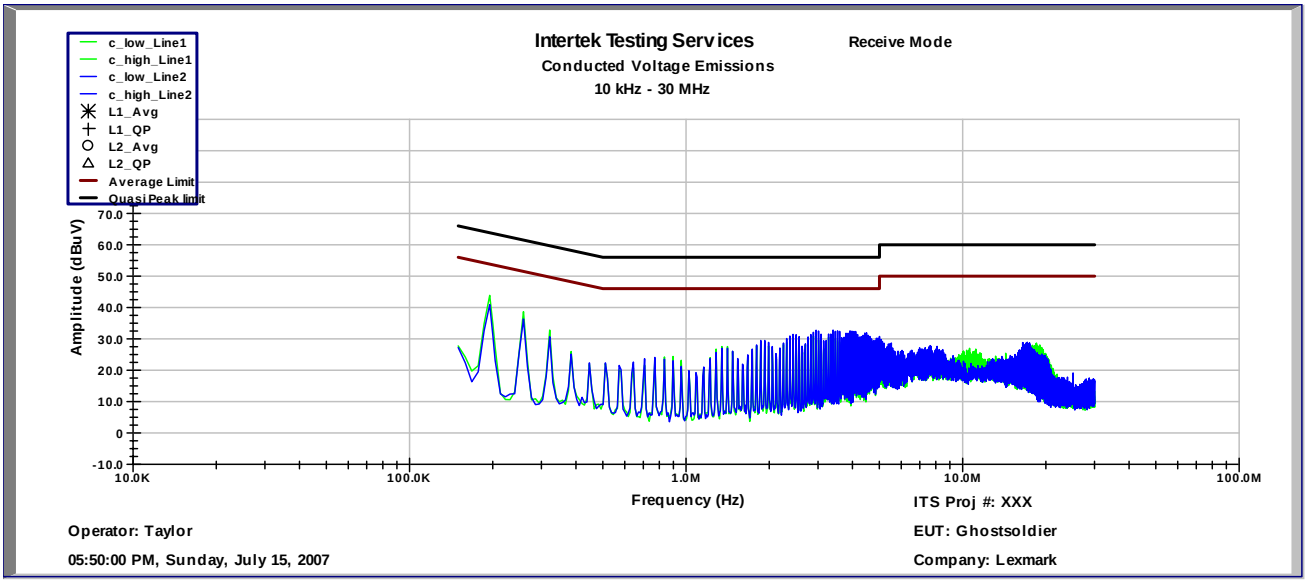


Figure 10-2: Power Line Conducted Emissions Transmit Mode (Lines 1 and 2)