FCC Part 15 Subpart C
Transmitter Certification

Direct Sequence Spread Spectrum Transmitter

Test Report

FCC ID: KDZLXEMX7P1

FCC Rule Part: 15.247

ACS Report Number: 05-0341-15C-B

Manufacturer: LXE, Inc.
Model: MX7

Test Begin Date: September 22, 2005
Test End Date: November 28, 2005

Report Issue Date: December 09, 2005

FOR THE SCOPE OF ACCREDITATION UNDER LAB Code 200612

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This report contains 24 pages

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1.0 GENERAL

1.1 Purpose
The purpose of this report is to demonstrate compliance with Part 15, Subpart C of the FCC's Code of Federal Regulations.

1.2 Product Description

1.2.1 General
The LXE® MX7 is a rugged, portable, hand-held Microsoft® Windows® CE 5.0 equipped mobile computer capable of wireless data communications. The mobile device can transmit information using an 802.11 radio and it can store information for later transmission through an RS-232 or USB port. The mobile device is vertically oriented and features backlighting for the display. The touch-screen display supports graphic features and Windows icons that the Windows CE 5.0 operating system supports. Keypads are available in 55-key alphanumeric and 32-key numeric-alpha versions. Also available is a 5250 55-key keypad overlay.

The MX7 keypad consists of patterns of gold traces on the CPU circuit board, and carbon pills on the keypad elastomer. When a key is pressed the carbon pill contacts the gold traces on the CPU board and is sensed by the system. The MX7 design uses a single CPU board for both the 32 and 55 key versions. The only difference between the two versions is the keypad elastomer that is installed into the system. This sharing of the same CPU board for both versions is accomplished by very creative placement of the keypad contacts (gold traces) on the CPU board such that both keypad elastomers have contacts for all their keys. The result of this design is that a single electrical design is able to handle both keypads.

This device is a Windows CE 5.0 compatible computer that can be scaled from a limited function batch computer to an integrated RF scanning computer. The attached stylus is used to assist in entering data and configuring the mobile device. Protective film for the touchscreen is available as an accessory. A trigger handle is available as an accessory.

The MX7 is powered by a 2200 mAh Lithium-Ion main battery pack and an internal NiCd backup battery.

The 55 key version was selected for both EMC and SAR evaluations for the purpose of this filing.

1.2.2 Manufacturer Information

LXE, Inc
125 Technology Parkway
Norcross, GA 30092

2.0 TEST FACILITIES

2.1 Location

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions
5015 B.U. Bowman Drive
Buford, GA 30518
Phone: (770) 831-8048
Fax: (770) 831-8598

2.2 Laboratory Accreditations/Recognitions/Certifications

The Semi-Anechoic Chamber Test Site, Open Area Test Site (OATS) and Conducted Emissions Site have been fully described, submitted to, and accepted by the FCC, Industry Canada and the Japanese Voluntary Control Council for Interference by information technology equipment. In addition, ACS is compliant to ISO 17025 as certified by the National Institute of Standards and Technology under their National Voluntary Laboratory Accreditation Program. The following certification numbers have been issued in recognition of these accreditations and certifications:

FCC Registration Number: 89450
Industry Canada Lab Code: IC 4175
VCCI Member Number: 1831

- VCCI OATS Registration Number R-1526
- VCCI Conducted Emissions Site Registration Number: C-1608

NVLAP Lab Code: 200612

2.3 Radiated Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

The Semi-Anechoic Chamber Test Site consists of a 20' x 30' x 18' shielded enclosure. The chamber is lined with Toyo Ferrite Grid Absorber, model number FFG-1000. The ferrite tile grid is 101 x 101 x 19mm thick and weighs approximately 550 grams. These tiles are mounted on steel panels and installed directly on the inner walls of the chamber.

The turntable is 150cm in diameter and is located 160cm from the back wall of the chamber. The chamber is grounded via 1 - 8' copper ground rod, installed at the center of the back wall, it is bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is all steel, flush mounted table installed in an all steel frame. The table is remotely operated from inside the control room located 25' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Behind the turntable is a 3' x 6' x 4' deep shielded pit used for support equipment if necessary. The pit is equipped with 1 - 4" PVC chases from the turntable to the pit that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit.

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3-1 below:

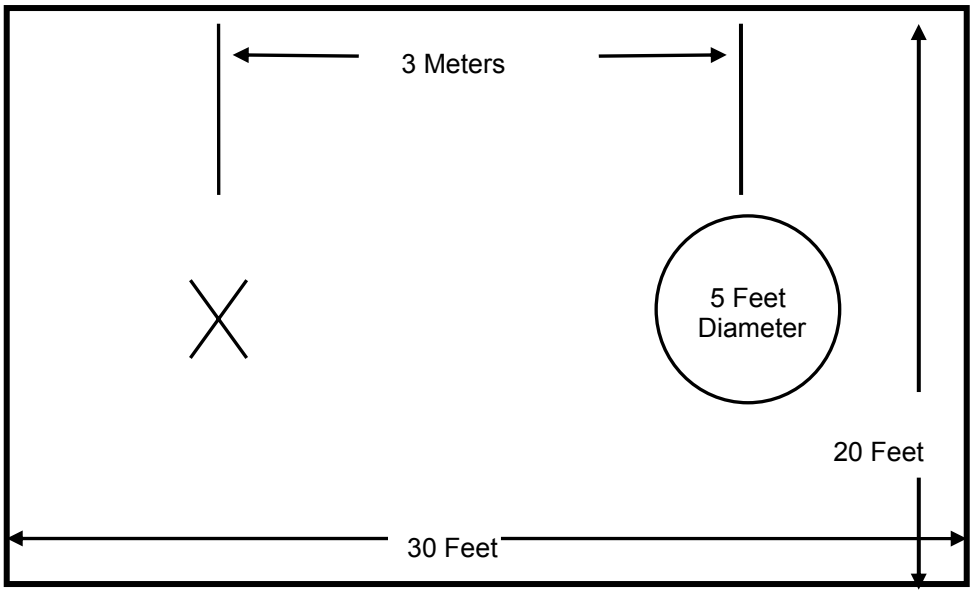

Figure 2.3-1: Semi-Anechoic Chamber Test Site

2.3.2 Open Area Tests Site (OATS)

The open area test site consists of a 40' x 66' concrete pad covered with a perforated electro-plated galvanized sheet metal. The perforations in the sheet metal are 1/8" holes that are staggered every 3/16". The individual sheets are placed to overlap each other by 1/4" and are riveted together to provide a continuous seam. Rivets are spaced every 3" in a 3 x 20 meter perimeter around the antenna mast and EUT area. Rivets in the remaining area are spaced as necessary to properly secure the ground plane and maintain the electrical continuity.

The entire ground plane extends 12' beyond the turntable edge and 16' beyond the antenna mast when set to a 10 meter measurement distance. The ground plane is grounded via 4 - 8' copper ground rods, each installed at a corner of the ground plane and bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is an all aluminum 10' flush mounted table installed in an all aluminum frame. The table is remotely operated from inside the control room located 40' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Adjacent to the turntable is a 7' x 7' square and 4' deep concrete pit used for support equipment if necessary. The pit is equipped with 5 - 4" PVC chases from the pit to the control room that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit. The pit is covered with 2 sheets of 1/4" diamond style re-enforced steel sheets. The sheets are painted to match the perforated steel ground plane; however the underside edges have been masked off to maintain the electrical continuity of the ground plane. All reflecting objects are located outside of the ellipse defined in ANSI C63.4.

A diagram of the Open Area Test Site is shown in Figure 2.3-2 below:

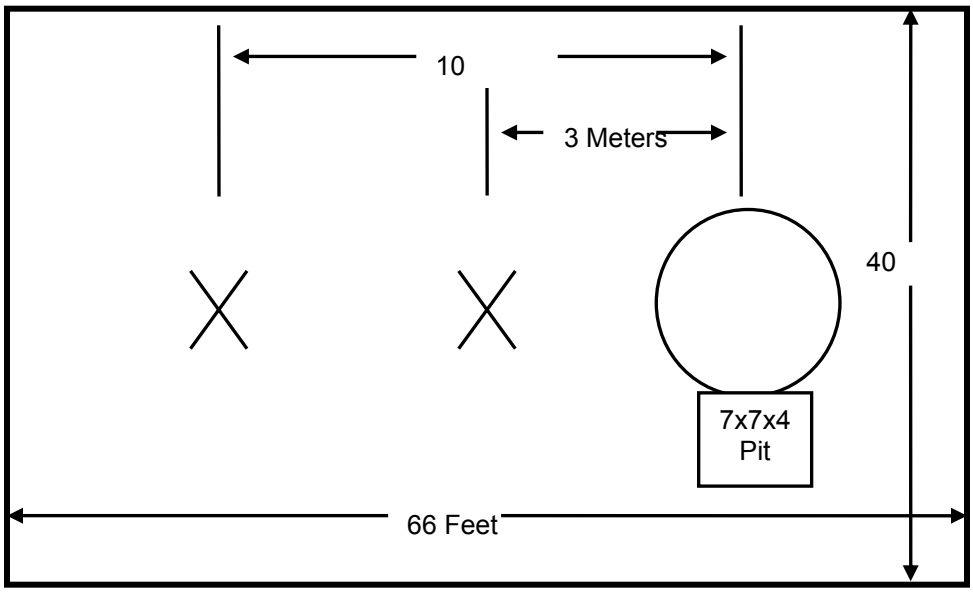

Figure 2.3-2: Open Area Test Site

2.4 Conducted Emissions Test Site Description
The AC mains conducted EMI site is a shielded room with the following dimensions:

- Height: 3.0 Meters
- Width: 3.6 Meters
- Length: 4.9 Meters

The room is manufactured by Rayproof Corporation and installed by Panashield, Inc. Earth ground is provided to the room via an 8' copper ground rod. Each panel of the room is connected electrically at intervals of 4".

Power to the room is filtered to prevent ambient noise from coupling to the EUT and measurement equipment. Filters are models 1B42-60P manufactured by Rayproof Corporation.

The room is of sufficient size to test table top and floor standing equipment in accordance with section 6.1.4 of ANSI C63.4.

A diagram of the room is shown below in figure 2.4-1:

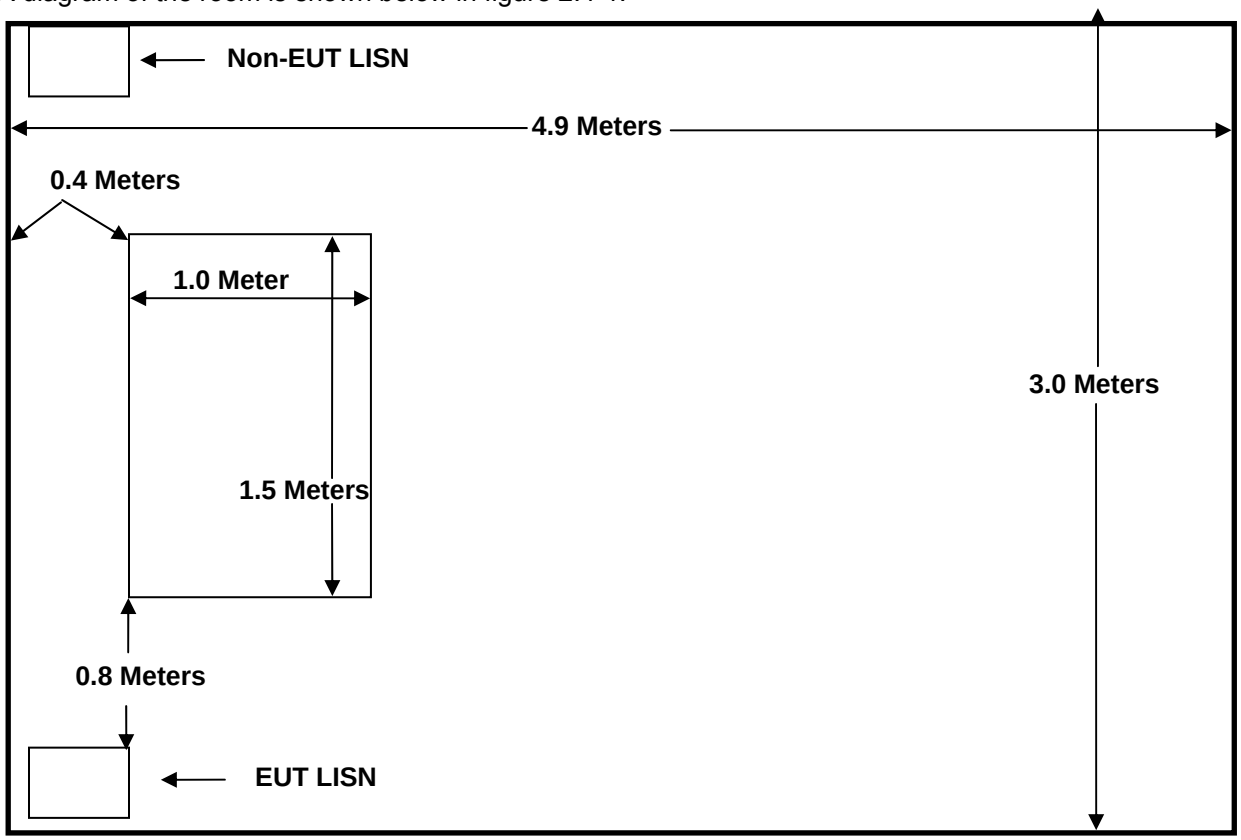

Figure 2.4-1: AC Mains Conducted EMI Site

3.0 APPLICABLE STANDARD REFERENCES
The following standards were used:

1 - ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the 9 KHz to 40GHz
2 - US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators (October 2004)
3 - FCC OET Bulletin 65 Appendix C - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

4.0 LIST OF TEST EQUIPMENT

All test equipment used for regulatory testing is calibrated yearly or according to manufacturer's specifications.

Table 4.0-1: Test Equipment

Equipment Calibration Information					
ACS#	**Mfg.**	**Eq. type**	**Model**	**S/N**	**Cal. Due**
☐ 25	Chase	Bi-Log Antenna	CBL6111	1043	05/23/06
☐ 26	Chase	Bi-Log Antenna	CBL6111	1044	06/02/06
☐ 152	EMCO	LISN	3825/2	9111-1905	01/18/06
☐ 165	ACS	Conducted EMI Cable Set	RG8	165	01/06/06
☐ 22	Agilent	Pre-Amplifier	8449B	3008A00526	05/06/06
☐ 73	Agilent	Pre-Amplifier	8447D	272A05624	05/18/06
☐ 30	Spectrum Technologies	Horn Antenna	DRH-0118	970102	05/09/06
☐ 209	Microwave Circuits	High Pass Filters	H3G020G2	4382-01 DC0421	06/09/06
☐ 1	Rohde & Schwarz	Receiver Display	804.8932.52	833771/007	03/07/06
☐ 2	Rohde & Schwarz	ESMI Receiver	1032.5640.53	839587/003	03/07/06
☐ 3	Rohde & Schwarz	Receiver Display	804.8932.52	839379/011	12/15/05
☐ 4	Rohde & Schwarz	ESMI Receiver	1032.5640.53	833827/003	12/15/05
☐ ---	Agilent	Spectrum Analyzer	E7402A	US41110277	11/10/05
☐ 204	ACS	Cable	RG8	204	12/29/05
☐ 6	Harbour Industries	HF RF Cable	LL-335	00006	03/16/06
☐ 7	Harbour Industries	HF RF Cable	LL-335	00007	03/16/06
☐ 208	Harbour Industries	HF RF Cable	LL142	00208	06/24/06
☐ NA	Agilent	Spectrum Analyzer	E4440A PSA Series	MY43362209	09/08/06
☐ 167	ACS	Chamber EMI Cable Set	RG6	167	12/29/05
☐ 204	ACS	Chamber EMI RF cable	RG8	204	01/07/06
☐ 193	ACS	OATS Cable Set	RG8	193	1/07/06
☐ 225	Andrew	OATS RF cable	Heliax	225	1/06/06

5.0 SUPPORT EQUIPMENT

Table 5-3: Support Equipment

Item	Equipment Type	Manufacturer	Model Number	Serial Number	FCC ID
The EUT operates stand alone and no support equipment was utilized.					

6.0 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

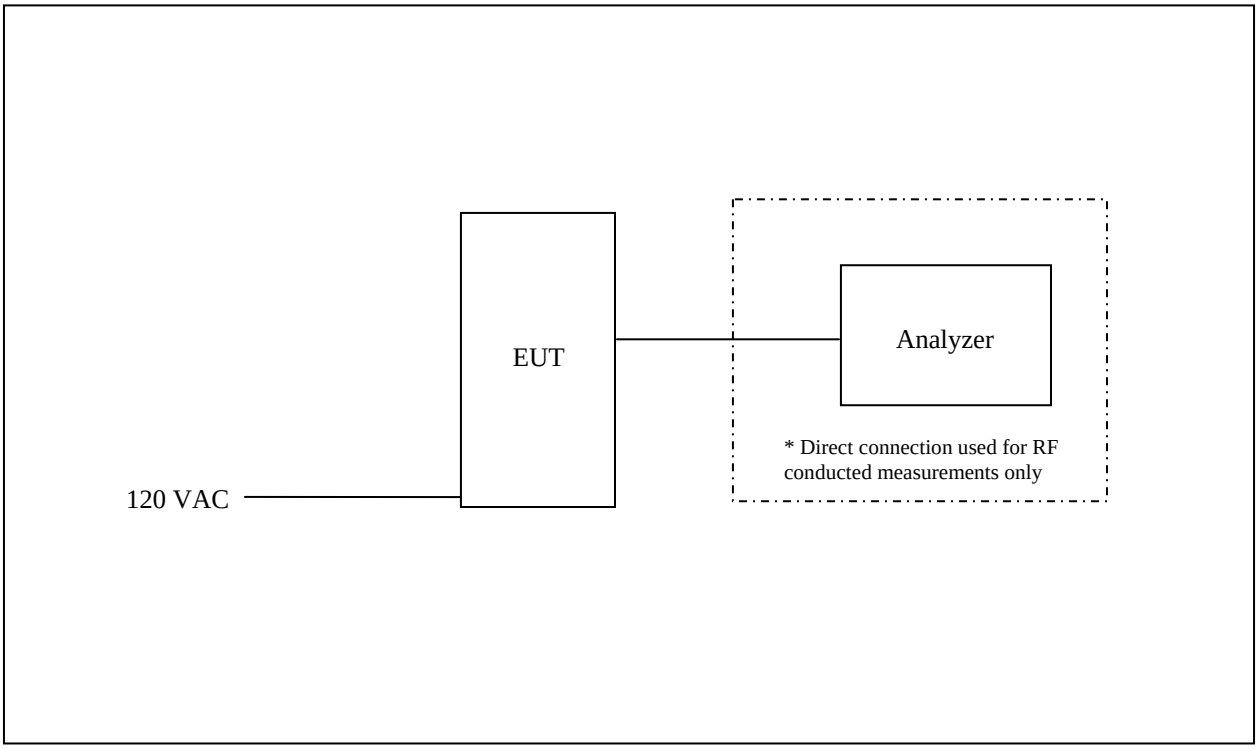

Figure 6-1: EUT Test Setup

7.0 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement - FCC Section 15.203

The EUT employs an integral antenna which satisfies the requirements of CFR 47 Part 15.203. The antenna type is internal omni-directional.

7.2 Power Line Conducted Emissions - FCC Section 15.207

7.2.1 Test Methodology

Conducted emissions were performed from 150kHz to 30MHz with the spectrum analyzer's resolution bandwidth set to 9kHz and the video bandwidth set to 30kHz. The EUT was tested in transmit mode and with the bar code scanner operating continuously. The calculation for the conducted emissions is as follows:

Corrected Reading = Analyzer Reading + LISN Loss + Cable Loss
Margin = Applicable Limit - Corrected Reading

Results of the test are shown below in and Tables 7.2.2-1 through 7.2.2-4 and Figure 7.2.2-1 through 7.2.2-2

7.2.2 Test Results

Table 7.2.2-1: Line 1 Conducted EMI Results (Quasi-Peak)

Frequency MHz	Level dBµV	Transducer dB	Limit dBµV	Margin dB	Line	PE
0.180	47.9	9.9	64.4	16.5	L1	GND
0.546	32.3	9.9	56	23.6	L1	GND
1.140	33.7	10.0	56	22.2	L1	GND
1.320	33.5	10.0	56	22.4	L1	GND
3.018	35.4	10.0	56	20.5	L1	GND
13.476	39.7	10.2	60	20.2	L1	GND
14.472	39.8	10.2	60	20.1	L1	GND
14.976	43.1	10.2	60	16.8	L1	GND
15.972	36.3	10.2	60	23.6	L1	GND
16.470	36.5	10.2	60	23.5	L1	GND

Table 7.2.2-2: Line 1 Conducted EMI Results (Average)

Frequency MHz	Level dBµV	Transducer dB	Limit dBµV	Margin dB	Line	PE
0.180	33.9	9.9	54.4	20.5	L1	GND
0.552	20.7	9.9	46	25.2	L1	GND
1.152	23.0	10.0	46	22.9	L1	GND
1.320	21.9	10.0	46	24.0	L1	GND
3.000	21.1	10.0	46	24.8	L1	GND
13.476	39.2	10.2	50	10.7	L1	GND
14.478	38.9	10.2	50	11.0	L1	GND
14.976	42.2	10.2	50	7.7	L1	GND
15.972	33.9	10.2	50	16.0	L1	GND
16.476	34.2	10.2	50	15.7	L1	GND

Table 7.2.2-3: Line 2 Conducted EMI Results (Quasi-Peak)

Frequency MHz	Level dBµV	Transducer dB	Limit dBµV	Margin dB	Line	PE
0.180	47.1	9.9	64.4	17.3	L2	GND
1.152	33.0	10.0	56	22.9	L2	GND
1.320	33.0	10.0	56	22.9	L2	GND
2.820	36.0	10.0	56	19.9	L2	GND
4.020	31.6	10.0	56	24.3	L2	GND
13.482	40.4	10.2	60	19.5	L2	GND
14.484	36.6	10.2	60	23.3	L2	GND
14.982	43.5	10.2	60	16.4	L2	GND
15.480	38.4	10.2	60	21.5	L2	GND
16.482	37.2	10.2	60	22.7	L2	GND

Table 7.2.2-4: Line 2 Conducted EMI Results (Average)

Frequency MHz	Level dBµV	Transducer dB	Limit dBµV	Margin dB	Line	PE
0.186	29.1	9.9	54.2	25.0	L2	GND
1.140	22.4	10.0	46	23.5	L2	GND
1.380	19.8	10.0	46	26.2	L2	GND
2.880	18.7	10.0	46	27.2	L2	GND
4.038	17.8	10.0	46	28.1	L2	GND
13.482	39.1	10.2	50	10.8	L2	GND
14.484	35.0	10.2	50	14.9	L2	GND
14.982	42.9	10.2	50	7.0	L2	GND
15.480	35.5	10.2	50	14.4	L2	GND
16.482	35.4	10.2	50	14.5	L2	GND

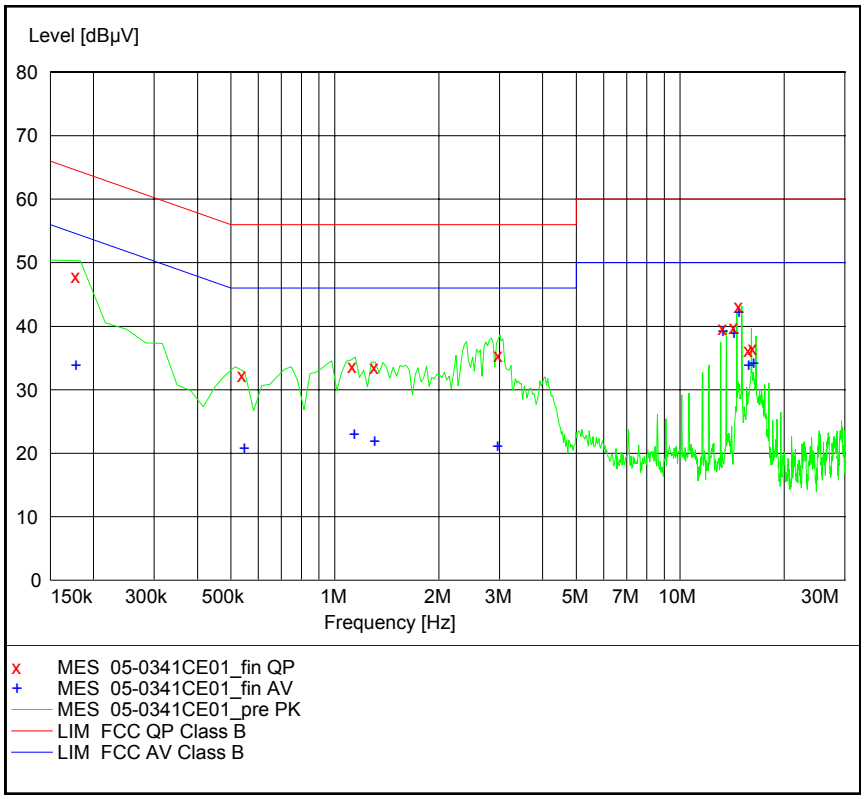

Figure 7.2.2-1: Conducted Emissions Graph – Line 1

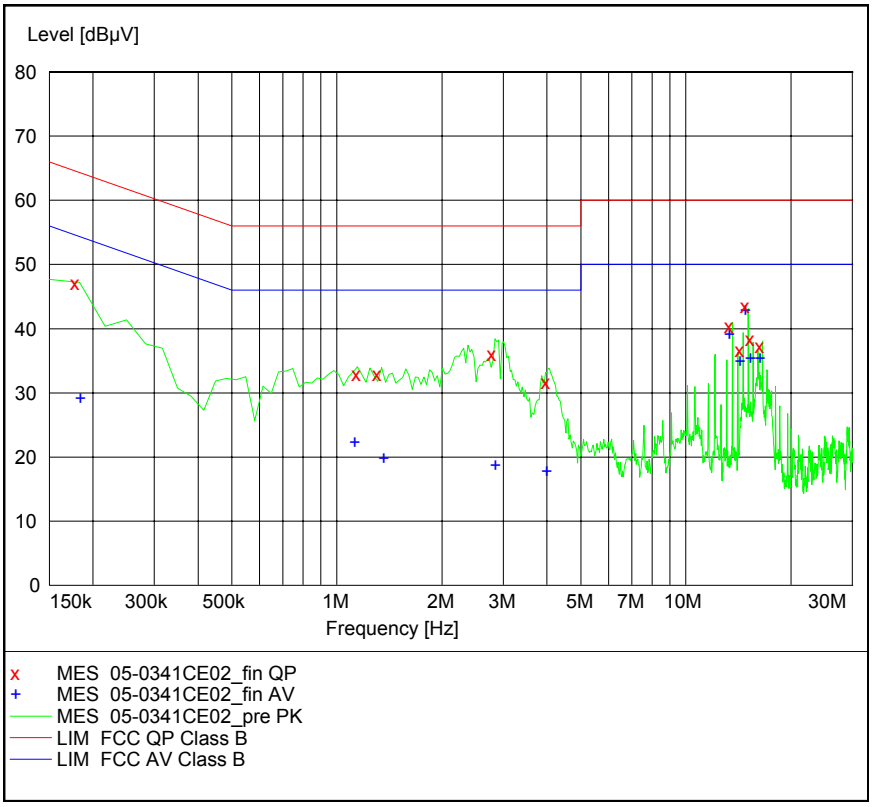

Figure 7.2.2-2: Conducted Emissions Graph – Line 2

7.3 Radiated Emissions - FCC Section 15.109(Unintentional Radiation) – Class A

7.3.1 Test Methodology

Radiated emissions tests were performed over the frequency range of 30MHz to 1 GHz. Measurements of the radiated field strength were made at a distance of 10m from the boundary of the equipment under test (EUT) and the receiving antenna. The antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. Radiated measurements were made with the Spectrum Analyzer's resolution bandwidth set to 120 KHz for measurements above 30MHz. Average measurements are taken with the RBW and VBW were set to 1MHz and 10 Hz respectively for measurements above 1000MHz.

7.3.2 Test Results

Results of the test are given below in Table 7.3.2-1:

Table 7.3.2-1: Radiated Emissions

Frequency (MHz)	Uncorrected Reading (dBµV/m)	Antenna Polarity (H/V)	Total Correction Factor (dB)	Corrected Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)
32.32	33.98	v	-8.16	25.82	39	13.2
44.24	42.32	v	-15.62	26.70	39	12.3
81.28	42.56	v	-10.71	31.85	39	7.1
156.08	37.53	v	-14.39	23.14	43.5	20.4
243.84	42.05	v	-12.20	29.85	46.5	16.7
497.68	40.84	v	-6.20	34.64	46.5	11.9
663.52	38.94	v	-3.52	35.42	46.5	11.1
688.08	40.05	v	-2.55	37.50	46.5	9.0
696.8	33.94	h	-2.24	31.70	46.5	14.8
838	36.44	v	0.87	37.31	46.5	9.2

* Note: All emissions above 838 MHz were attenuated at least 20 dB below the permissible limit.

7.4 6dB Bandwidth – FCC Section 15.247(a)

7.4.1 Test Methodology

The 6dB bandwidth was measured in accordance with the FCC publication "New Guidance on Measurements for Digital Transmission Systems in Section 15.247". The RBW of the spectrum analyzer was set to 100 kHz and VBW 100 kHz. Span was set large enough to capture the entire emissions and >> RBW.

7.4.2 Test Results

Results are shown below in table 7.4.2-1 -7.4.2-2 and figures 7.4.2-1 – 7.4.2-6:

Table 7.4.2-1: 6dB Bandwidth – 802.11b

Frequency [MHz]	Bandwidth [MHz]	Limit	Result
2412	13.1	≥ 500 kHz	PASS
2437	13.1	≥ 500 kHz	PASS
2462	13.1	≥ 500 kHz	PASS

Table 7.4.2-1: 6dB Bandwidth – 802.11g

Frequency [MHz]	Bandwidth [MHz]	Limit	Result
2412	16.1	≥ 500 kHz	PASS
2437	16.3	≥ 500 kHz	PASS
2462	16.1	≥ 500 kHz	PASS

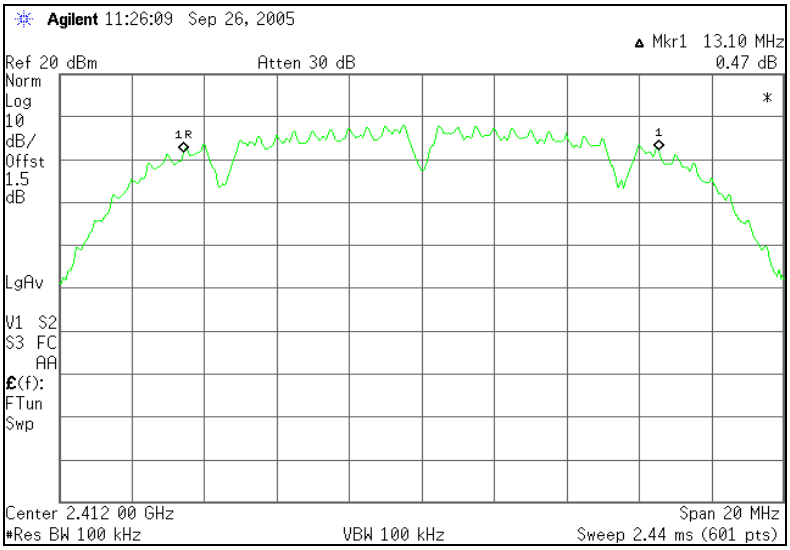

Figure 7.4.2-1: 6dB Bandwidth Plot – 802.11b Low Channel

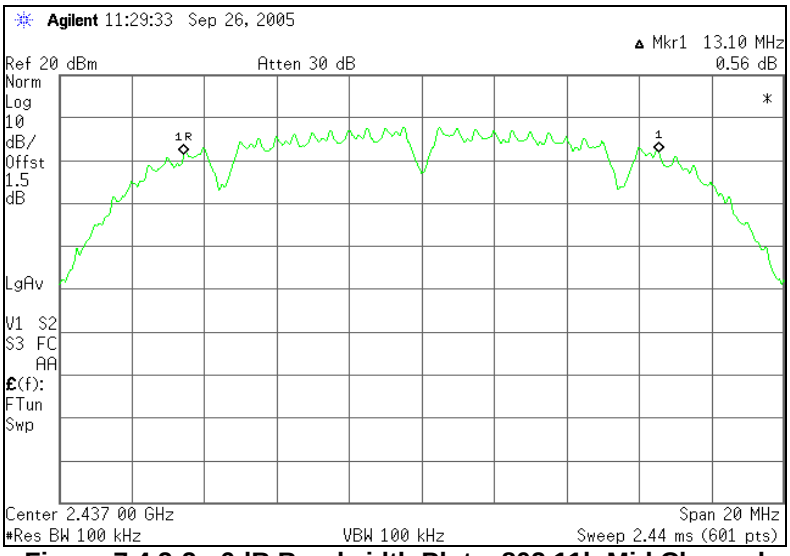

Figure 7.4.2-2: 6dB Bandwidth Plot – 802.11b Mid Channel

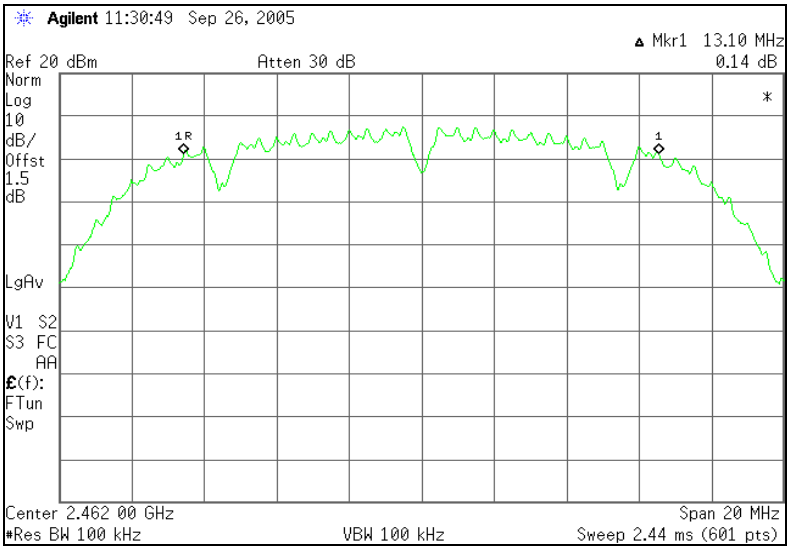

Figure 7.4.2-3: 6dB Bandwidth Plot – 802.11b High Channel

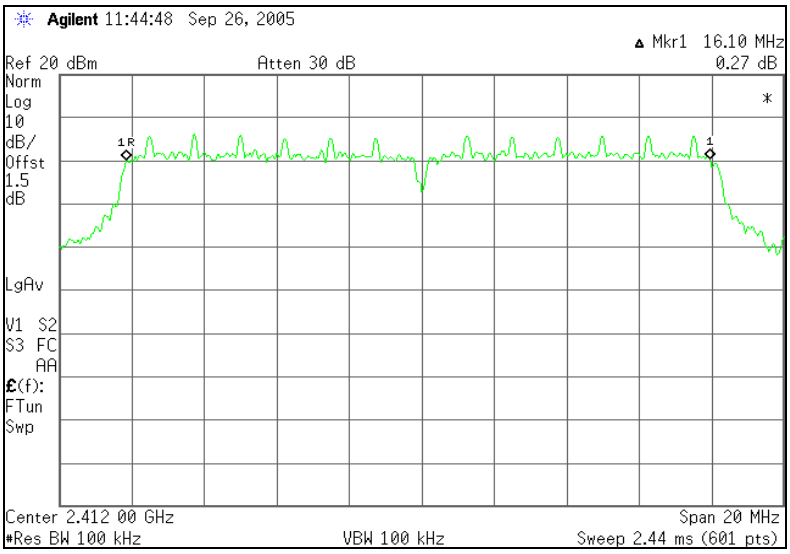

Figure 7.4.2-4: 6dB Bandwidth Plot – 802.11g Low Channel

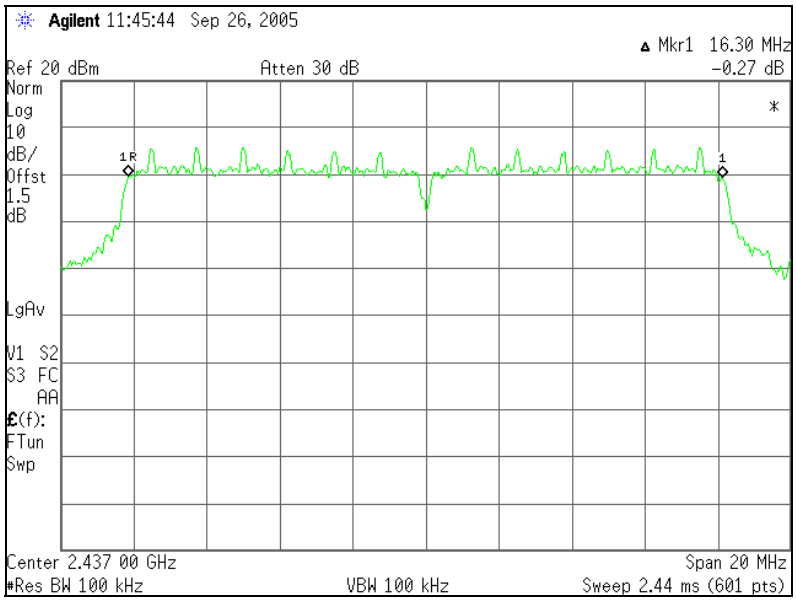

Figure 7.4.2-5: 6dB Bandwidth Plot – 802.11g Mid Channel

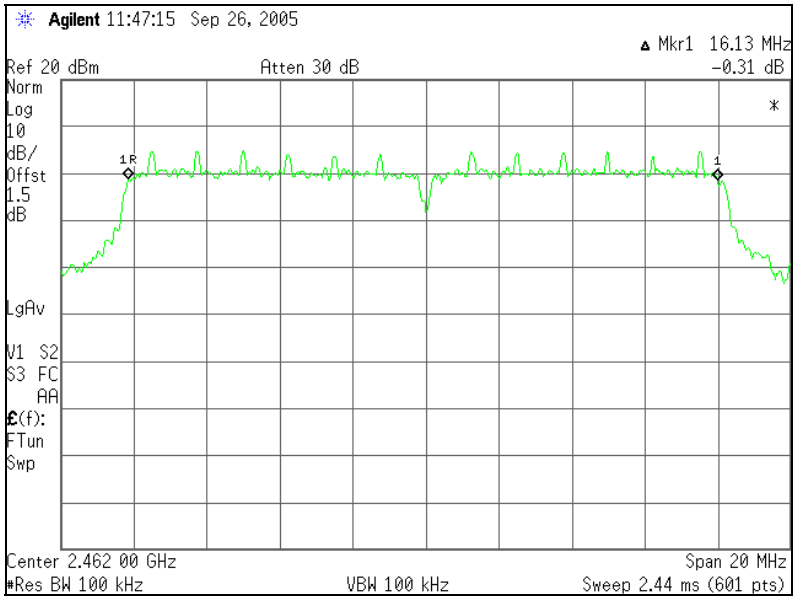

Figure 7.4.2-6: 6dB Bandwidth Plot – 802.11g High Channel

7.5 Peak Output Power Requirement - FCC Section 15.247(b)

7.5.1 Test Methodology

The Peak Output Power was measured in accordance with the FCC publication "New Guidance on Measurements for Digital Transmission Systems in Section 15.247" Power Option 2. The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer. The resolution bandwidth of the spectrum analyzer was set to 1 MHz. The measurement was performed using the spectrum analyzer's band power measurement function according to Option 2 as stated above.

Data was collected with the EUT operating at maximum power and in continuous transmit operation.

7.5.2 Test Results

Results are shown below in Table 7.5.2-1 – 7.5.2-2

Table 7.5.2-1: Peak Output Power – 802.11b

Frequency (MHz)	Output Power (dBm)
2412	18.67
2437	18.40
2462	17.99

Table 7.5.2-2: Peak Output Power – 802.11g

Frequency (MHz)	Output Power (dBm)
2412	16.35
2437	16.12
2462	15.29

7.6 Band-Edge Compliance and Spurious Emissions - FCC Section 15.247(d)

7.6.1 Band-Edge Compliance of RF Emissions

7.6.1.1 Test Methodology

The EUT was investigated at the low and high channels of operation to determine band-edge compliance. Both 802.11b and 802.11g modes of operation were evaluated. Because the upper band-edge coincides with a restricted band, band-edge compliance for the upper band-edge was determined using the radiated mark-delta method as outlined in FCC DA 00-705. The radiated field strength of the fundamental emission was first determined and then the mark-delta method was used to determine the field strength of the band-edge emissions.

The lower band-edge compliance was determined using the marker-delta method in which the radio frequency power that is produced by the EUT is at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power. Because the device complies with Power Option 2 according to the FCC publication "New Guidance on Measurements for Digital Transmission Systems in Section 15.247" and section 7.5 of this report, the limit is 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power.

7.6.1.2 Test Results

Band-edge compliance is displayed in Table 7.6.1.2-1 – 7.6.1.2-2 and Figures 7.6.1.2-1 – 7.6.1.2-4.

Table 7.6.1.2-1: Upper Band-edge Marker Delta Method – 802.11b

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Fundamental Field Strength (dBuV/m)		Delta-Marker (dB)	Band-edge Field Strength (dBuV/m)		Margin to Limit (dBuV/m) 74 / 54	
	pk	avg	(H/V)	(dB)	pk	avg		pk	avg	pk	avg
Fundamental Frequency											
2462	107.50	104.54	V	0.44	107.94	104.98	43.3	64.64	51.22	9.36	2.78

Table 7.6.1.2-2: Upper Band-edge Marker Delta Method – 802.11g

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Fundamental Field Strength (dBuV/m)		Delta-Marker (dB)	Band-edge Field Strength (dBuV/m)		Margin to Limit (dBuV/m) 74 / 54	
	pk	avg	(H/V)	(dB)	pk	avg		pk	avg	pk	avg
Fundamental Frequency											
2462	107.47	98.08	V	0.44	107.03	97.64	39.08	67.95	48.10	6.05	5.90

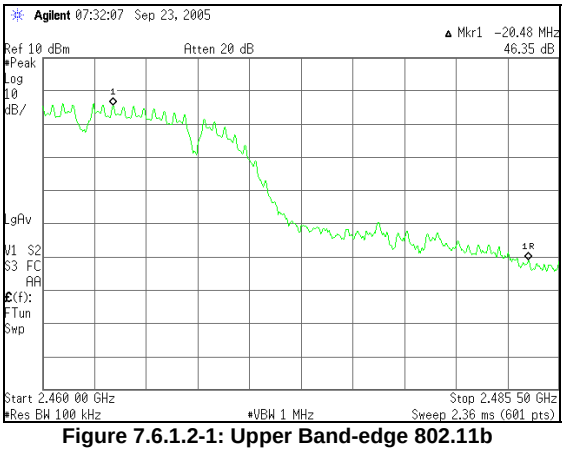

Figure 7.6.1.2-1: Upper Band-edge 802.11b

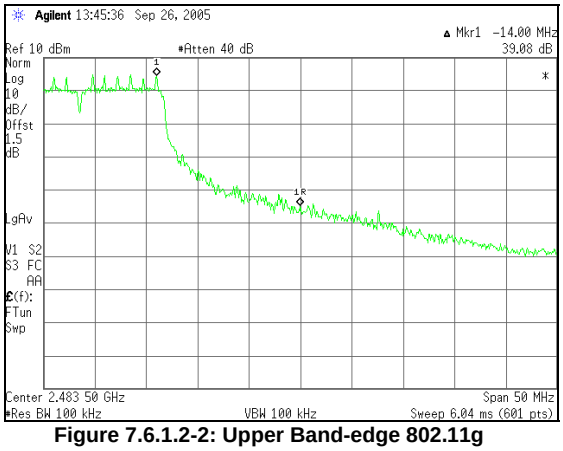

Figure 7.6.1.2-2: Upper Band-edge 802.11g

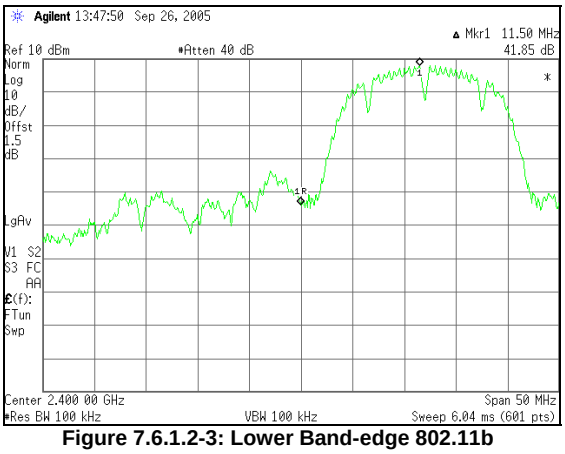

Figure 7.6.1.2-3: Lower Band-edge 802.11b

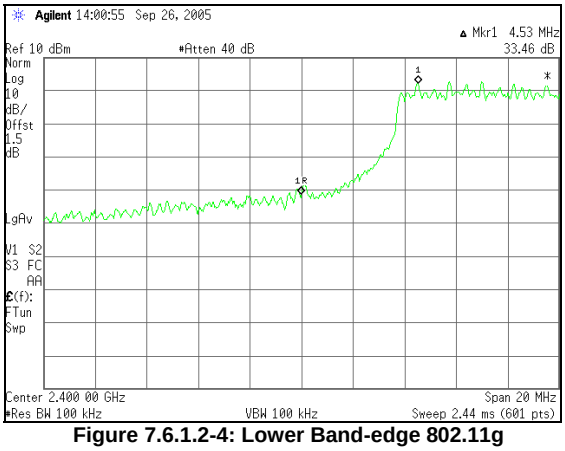

Figure 7.6.1.2-4: Lower Band-edge 802.11g

7.6.2 RF Conducted Spurious Emissions

The RF Conducted Spurious Emissions were measured in accordance with the FCC publication "New Guidance on Measurements for Digital Transmission Systems in Section 15.247". The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer. The EUT was investigated for conducted spurious emissions from 30MHz to 25GHz, 10 times the highest fundamental frequency. For each measurement, the spectrum analyzer's RBW was set to 100 kHz and the VBW was set to 300 kHz. The peak detector and Max Hold function of the analyzer were utilized.

7.6.2.2 Test Results

In a 100 kHz bandwidth, the radio frequency power that was produced by the EUT emissions is at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power. (30 dB if Power Option 2 is utilized) RF Conducted Emissions are displayed in Figures 7.6.2.2-1 through 7.6.2.2-2.

802.11b:

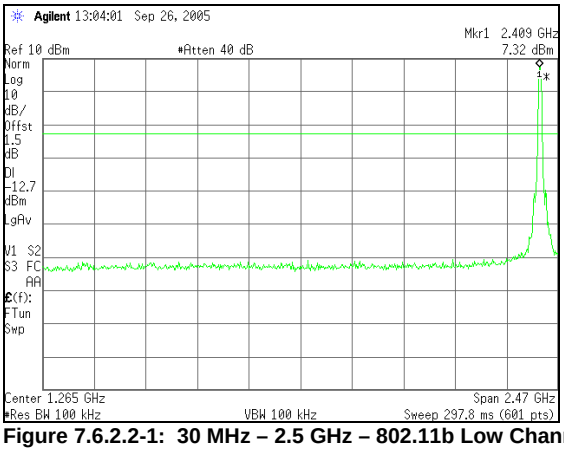

Figure 7.6.2.2-1: 30 MHz – 2.5 GHz – 802.11b Low Channel

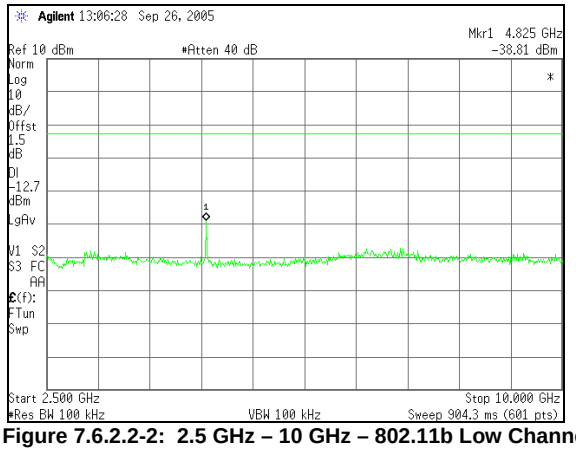

Figure 7.6.2.2-2: 2.5 GHz – 10 GHz – 802.11b Low Channel

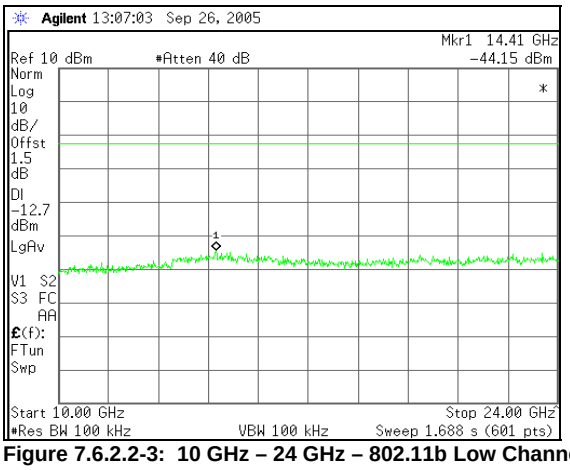

Figure 7.6.2.2-3: 10 GHz – 24 GHz – 802.11b Low Channel

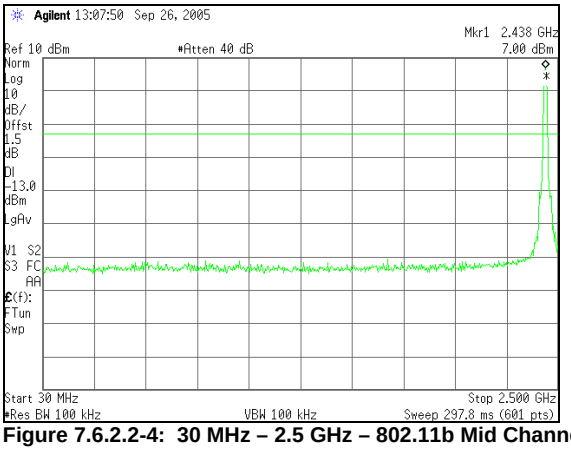

Figure 7.6.2.2-4: 30 MHz – 2.5 GHz – 802.11b Mid Channel

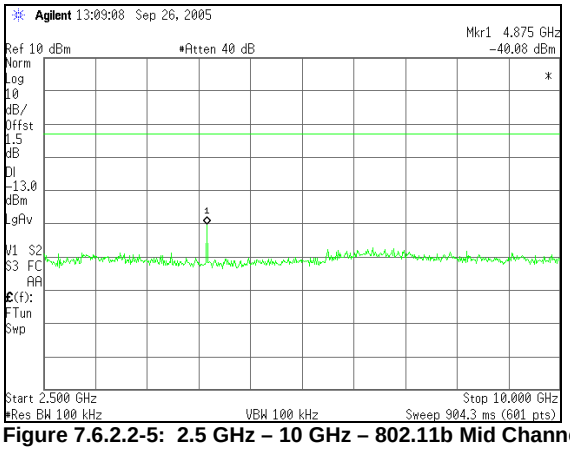

Figure 7.6.2.2-5: 2.5 GHz – 10 GHz – 802.11b Mid Channel

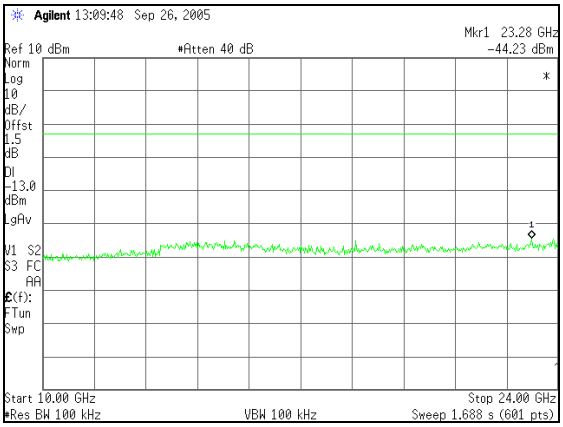

Figure 7.6.2.2-6: 10 GHz – 24 GHz – 802.11b Mid Channel

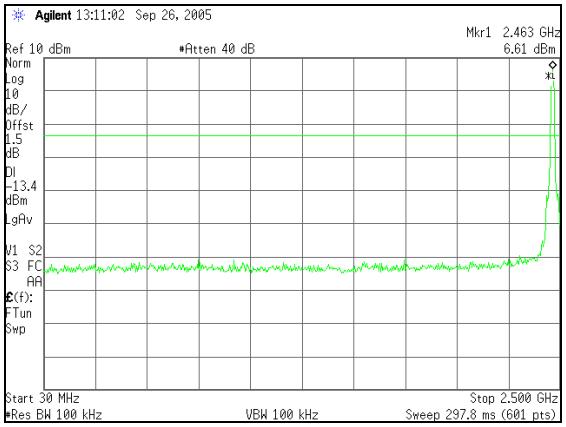

Figure 7.6.2.2-7: 30 MHz – 2.5 GHz – 802.11b High Channel

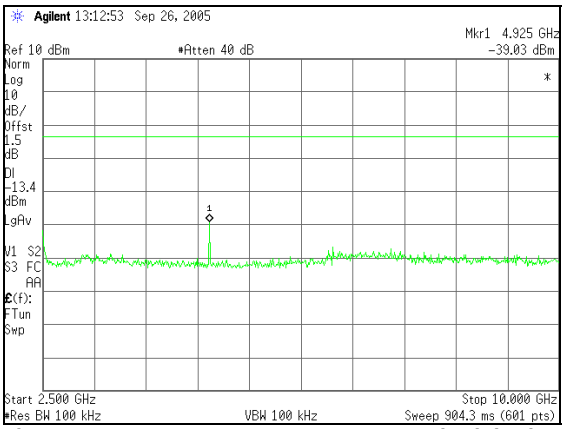

Figure 7.6.2.2-8: 2.5 GHz – 10 GHz – 802.11b High Channel

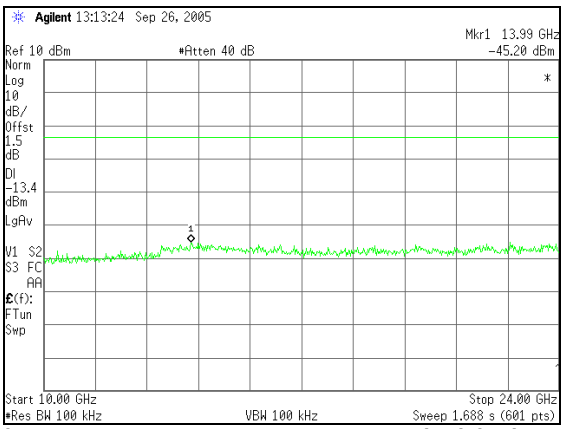

Figure 7.6.2.2-9: 10 GHz – 24 GHz – 802.11b High Channel

802.11g:

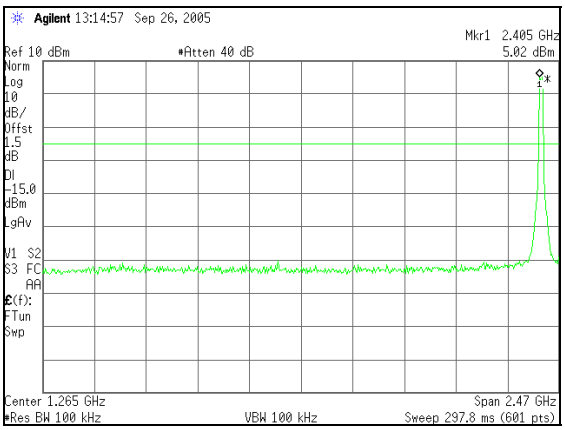

Figure 7.6.2.2-10: 30 MHz – 2.5 GHz – 802.11g Low Channel

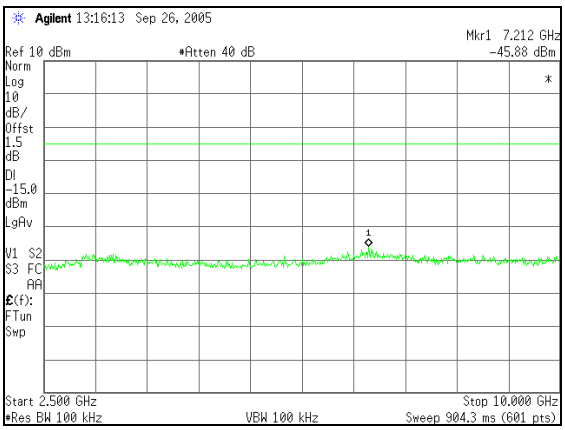

Figure 7.6.2.2-11: 2.5 GHz – 10 GHz – 802.11g Low Channel

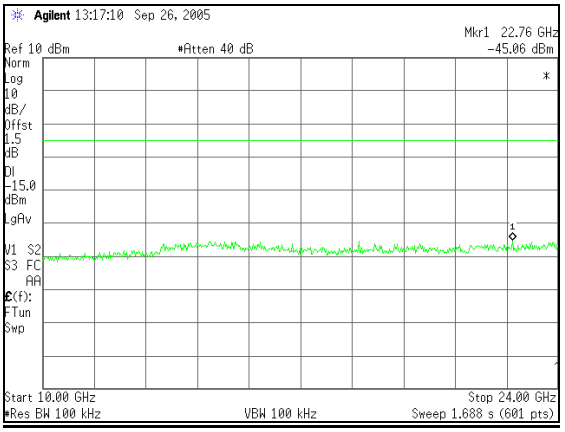

Figure 7.6.2.2-12: 10 GHz – 24 GHz – 802.11g Low Channel

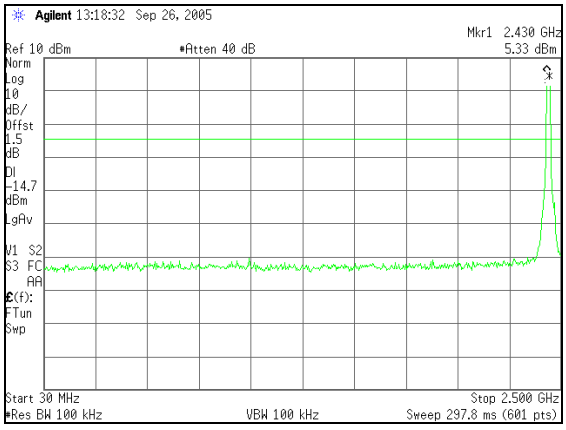

Figure 7.6.2.2-13: 30 MHz – 2.5 GHz – 802.11g Mid Channel

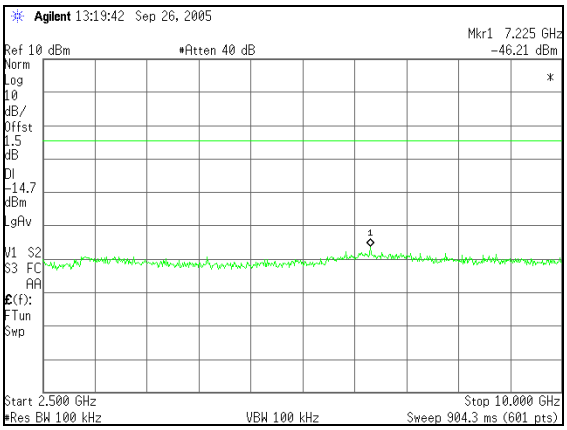

Figure 7.6.2.2-14: 2.5 GHz – 10 GHz – 802.11g Mid Channel

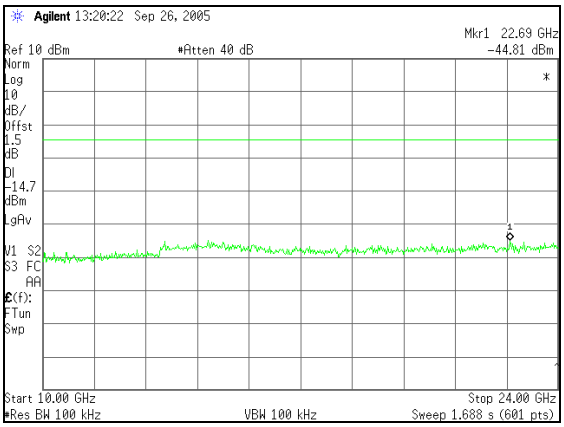

Figure 7.6.2.2-15: 10 GHz – 24 GHz – 802.11g Mid Channel

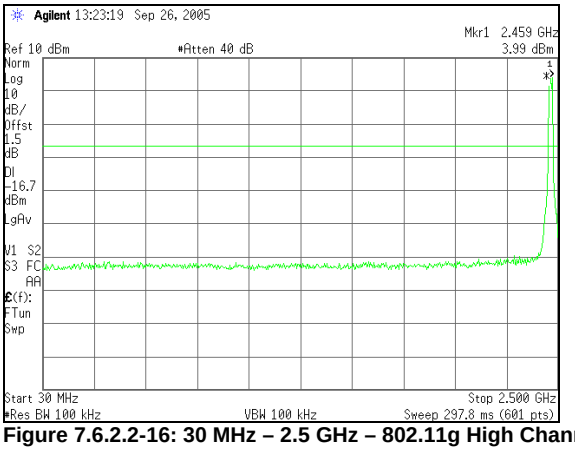

Figure 7.6.2.2-16: 30 MHz – 2.5 GHz – 802.11g High Channel

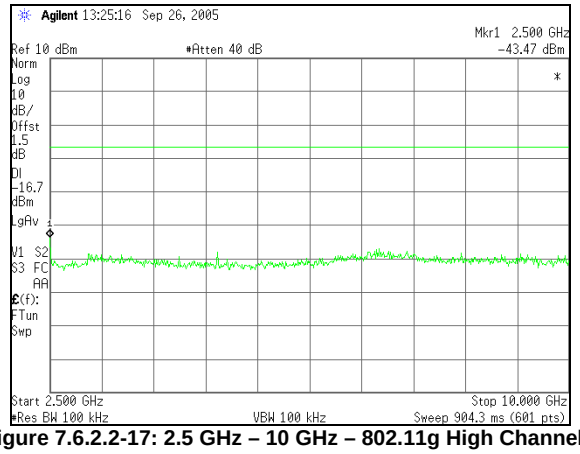

Figure 7.6.2.2-17: 2.5 GHz – 10 GHz – 802.11g High Channel

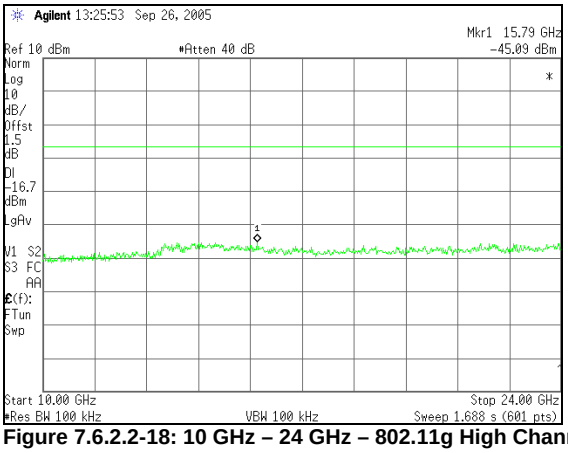

Figure 7.6.2.2-18: 10 GHz – 24 GHz – 802.11g High Channel

7.6.3 Radiated Spurious Emissions (Restricted Bands) - FCC Section 15.205

7.6.3.1 Test Methodology

Radiated emissions tests were made over the frequency range of 30MHz to 25GHz, 10 times the highest fundamental frequency.

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 300 kHz. For frequencies above 1000MHz, peak measurements made with RBW and VBW of 1 MHz. Average measurements were made with RBW of 1MHz and a VBW of 10Hz. The average emissions were further corrected by applying the duty cycle correction of the EUT to the average measurements for comparison to the average limit.

7.6.3.2 Duty Cycle Correction

For average radiated measurements, the measured level was reduced by a factor 18.42dB to account for the duty cycle of the EUT. The duty cycle correction factor is determined using the formula: 20log (0.12) = -18.42dB.

A detailed analysis of the duty cycle is provided with this filing.

7.6.3.3 Test Results

Using the procedures set forth in the FCC publication "New Guidance on Measurements for Digital Transmission Systems in Section 15.247", radiated spurious emissions found in the band of 30MHz to 25GHz are reported in Table 7.6.3.3-1 – 7.6.3.3-2. Each emission found to be in a restricted band as defined by section 15.205, was compared to the radiated emission limits as defined in section 15.209.

Table 7.6.3.3-1: Radiated Spurious Emissions – 802.11b

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	avg	(H/V)	(dB)	pk	avg	pk	avg	pk	avg
4824	47.16	42.49	H	12.34	59.50	36.41	74	54	14.50	17.59
4824	45.08	38.71	V	12.34	57.42	32.63	74	54	16.58	21.37
4874	49.83	46.40	H	12.51	62.34	40.50	74	54	11.66	13.50
4874	48.02	43.34	V	12.51	60.53	37.44	74	54	13.47	16.56
4924	49.28	46.76	H	12.69	61.97	41.03	74	54	12.03	12.97
4924	47.12	42.72	V	12.69	59.81	36.99	74	54	14.19	17.01
2487.8	66.82	61.06	V	0.56	67.38	43.20	74	54	6.62	10.80
2487.8	67.71	61.72	H	0.56	68.27	43.86	74	54	5.73	10.14

Table 7.6.3.3-2: Radiated Spurious Emissions – 802.11g

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	avg	(H/V)	(dB)	pk	avg	pk	avg	pk	avg
2486.25	71.59	55.00	V	0.55	72.14	37.13	74	54	1.86	16.87
2486.25	71.86	55.20	H	0.55	72.41	37.33	74	54	1.59	16.67

7.6.3.4 Sample Calculation:

$R_C = R_U + CF_T$

Where:

CF_T	=	Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only)
R_U	=	Uncorrected Reading
R_C	=	Corrected Level
AF	=	Antenna Factor
CA	=	Cable Attenuation
AG	=	Amplifier Gain
DC	=	Duty Cycle Correction Factor

Example Calculation: Peak

Corrected Level: 47.16 + 12.34 = 59.50 dBuV/m
Margin: 74dBuV/m – 59.50 dBuV/m = 14.50 dB

Example Calculation: Average

Corrected Level: 42.49 + 12.34 -18.42 = 36.41 dBuV
Margin: 54dBuV – 36.41 dBuV = 17.59 dB

7.7 Peak Power Spectral Density- FCC Section 15.247(d)

7.7.1 Test Methodology
The power spectral density was measured in accordance with the FCC publication "New Guidance on Measurements for Digital Transmission Systems in Section 15.247". The emission peaks within the pass band were located and zoomed in on. The spectrum analyzer RBW was set to 3 kHz and VBW 10 kHz. Span was adjusted to 500 kHz and the sweep time was calculated to be 167s (Span/3 kHz). The EUT was configured for the mode of operation that produced the worst case results.

7.7.2 Test Results
Results are shown below in table 7.7.2-1 – 7.7.2-2 and figure 7.7.2-1 – 7.7.2-6:

Table 7.7.2-1: Peak Power Spectral Density – 802.11b

Frequency [MHz]	Level [dBm]	Limit [dBm]	Result
2412	-7.48	8	PASS
2437	-7.64	8	PASS
2462	-8.15	8	PASS

Table 7.7.2-2: Peak Power Spectral Density – 802.11g

Frequency [MHz]	Level [dBm]	Limit [dBm]	Result
2412	-17.21	8	PASS
2437	-17.57	8	PASS
2462	-18.37	8	PASS

8.0 CONCLUSION
In the opinion of ACS, Inc. the MX7, manufactured by LXE, Inc. does meet the requirements of FCC Part 15 subpart C.