ELECTROMAGNETIC COMPATIBILITY

EMC TEST REPORT

FCC 47 CFR PART 15 SUBPART C
AND
INDUSTRY CANADA RSS-210 ISSUE 6

FOR

802.11bg WLAN MODULE

MODEL: IX100XUSI-WLBT

INSTALLED IN

ITRONIX CORPORATION

IX100X SERIES RUGGED HANDHELD PC

UTILIZING AN

INTERNAL DIPOLE ANTENNA

FCC ID: KBCIX100XUSI-WLBT

IC: 1943A-IX100Xg

Test Report Serial No.

042406KBC-T750-E15W

Test Report Revision No.

Revision 1.0 (Initial Release)

Test Location

Celltech Compliance Testing & Engineering Lab
(Celltech Labs Inc.)
1955 Moss Court
Kelowna, BC
Canada
V1Y 9L3

DECLARATION OF COMPLIANCE

Test Lab and Location	CELLTECH LABS INC. Testing and Engineering Services 1955 Moss Court Kelowna, B.C. Canada V1Y 9L3	Company Information	ITRONIX CORPORATION 12825 E. Mirabeau Parkway Spokane Valley, WA 99216 United States
Phone:	250-448-7047		
Fax:	250-448-7048		
e-mail:	info@celltechlabs.com		
web site:	www.celltechlabs.com		

Lab Registration No.(s):	FCC:	714830	IC:	3874
Rule Part(s):	FCC:	§15.247; §2.1091; §1.1310	IC:	RSS-210 Issue 6
Device Classification:	FCC:	Digital Transmission System (DTS)	IC:	Low Power Licence-Exempt Transmitter
Device Identification:	FCC ID:	KBCIX100XUSI-WLBT	IC:	1943A-IX100Xg

DUT Description:

Model:	IX100XUSI-WLBT					
Transmitter Type:	802.11bg WLAN Module		USI WM-BG-MR-01		S/N Tested: 8601-600160-30	
Co-located Transmitter:	Bluetooth (Combo Module)		USI WM-BG-MR-01		S/N Tested: 8601-600160-30	
Host PC Type:	Rugged Handheld PC		Itronix IX100X Series		S/N Tested: DZGEG5326ZZ5091	
Tx Frequency Range:	2412 - 2462 MHz					
Max. RF Output Power:	15.93 dBm	0.039 Watts	Peak Conducted	802.11b	2462 MHz	11 Mbps
	14.98 dBm	0.031 Watts	Peak Conducted	802.11g	2462 MHz	48 Mbps
Modulation Type(s):	OFDM, DSSS, DBPSK, DQPSK, CCK, 16QAM, 64QAM					
Antenna Type(s):	802.11bg WLAN	Internal	Top Center above LCD Display		Gain:	-4 dBi
	Bluetooth	Internal	Right Side of LCD Display		Gain:	2.5 dBi
Power Source(s):	Lithium-ion Battery	4 V, 3.0 Ah		P/N: 46-0155-001		
	AC Power Adapter	Magic Power Technology Co., Ltd.		Model: MPE-C045-12-R		

This wireless device has demonstrated compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in FCC 47 CFR Part 15C and Industry Canada RSS-210 Issue 6.

I attest to the accuracy of the data. All measurements reported herein were performed by me or were under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc.
The results and statements contained in this report pertain only to the device(s) evaluated.

Test Report Approved By:
Spencer Watson
EMC Lab Manager
Celltech Labs Inc.

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FIGURES

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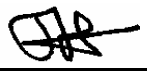
TEST SUMMARY

Appendix	Test Description	Procedure Reference	Limit Reference	Test Start Date	Test End Date	Result
Referenced Standard: FCC CFR Title 47 Part 15 Subpart C						
A	6 dB Bandwidth	KDB 558074	§15.247(2)	28Jun06	28Jun06	Pass
B	Peak Conducted Output Power	KDB 558074	§15.247 (b) (3)	1May06	1May06	Pass
C	Radiated Spurious Emissions	FCC 97-114	§15.247(c), 15.209	29May06	19Jun06	Pass
D	Bandedge Measurements	FCC 97-114	§15.205, 15.209	29Jun06	29Jun06	Pass
E	Peak Power Spectral Density	KDB 558074	§15.247(d)	29Jun06	29Jun06	Pass
F	Powerline Conducted Emissions	ANSI C63.4	§15.207	19Jul06	19Jul06	Pass
Referenced Standard: IC RSS-210 Issue 6						
A	6 dB Bandwidth	RSS-GEN §4.4.2	RSS-210 § A8.2(1)	28Jun06	28Jun06	Pass
B	Peak Conducted Output Power	RSS-GEN §4.6	RSS-210 § A8.4(4)	1May06	1May06	Pass
C	Radiated Spurious Emissions	RSS-212, ANSI C63.4	RSS-210 §6.2.2 (o)(e1)	29May06	19Jun06	Pass
D	Bandedge Measurements	RSS-212, ANSI C63.4	RSS-210 §6.2.2 (o)(e1)	29Jun06	29Jun06	Pass
E	Peak Power Spectral Density	RSS-GEN §4.6	RSS-210 § A8.2(2)	29Jun06	29Jun06	Pass
F	Powerline Conducted Emissions	RSS-212, ANSI C63.4	RSS-GEN § 7.2.2	19Jul06	19Jul06	Pass
G	Conducted Rx Spurious Emissions	RSS-GEN §4.8	RSS-GEN §6	26Sept06	26Sept06	Pass

REVISION LOG

Revision	Description	Implemented By	Implementation Date
1.0	Initial Release	Jonathan Hughes	September 27, 2006

SIGNATORIES

Prepared By		September 27, 2006
Name/Title	Spencer Watson / EMC Lab Manager	Date
Reviewed By		September 27, 2006
Name/Title	Jonathan Hughes / General Manager	Date

1.0 SCOPE

This report outlines the measurements made and results collected during the electromagnetic emissions testing of the 802.11b/g WLAN Module installed in the Itronix Corporation IX100X Series Rugged Handheld PC. The results were applied against the EMC requirements and limits outlined in the technical rules and regulations set forth in the Federal Communication Commission Code of Federal Regulations Title 47 Part 15 Subpart C and Industry Canada RSS-210 Issue 6.

2.0 REFERENCES

2.1 Normative References

ANSI/ISO 17025:2005	General Requirements for competence of testing and calibration laboratories
IEEE/ANSI C63.4-2003	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
IEEE/ANSI Std C95.1-1999	American National Standard Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields
CFR Title 47 Part 2:2005	Code of Federal Regulations Title 47: Telecommunication Part 2: Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
CFR Title 47 Part 15:2005	Code of Federal Regulations Title 47: Telecommunication Part 15: Radio Frequency Devices
FCC Public Notice DA 00-705	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems March 30, 2000
FCC Knowledge Database Pub.	558074 (March 23, 2005)
IC Spectrum Management & Telecommunications Policy	Radio Standards Specification RSS-212 Issue 1 (Provisional) - Test Facilities & Test Methods for Radio Equipment RSS-210 Issue 6 - Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands): Category 1 Equipment RSS-102 Issue 2 - Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

TERMS AND DEFINITIONS

AVG	Average
CFR	Code of Federal Regulations
dB	decibel
dBm	dB referenced to 1 mW
dBuV	dB referenced to 1 uV
DSSS	Direct Sequence Spread Spectrum
DUT	Device under Test
dBc	dB down from carrier
EBW	Emission Bandwidth
EMC	Electromagnetic Compatibility
FCC	Federal Communication Commission
FHSS	Frequency Hopping Spread Spectrum
HP	Hewlett Packard
HPF	High Pass Filter
Hpol	Horizontal Polarization
IC	Industry Canada
kHz	kilohertz
LNA	Low Noise Amplifier
m	meter
MHz	Megahertz
Mbps	megabits per second
na	not applicable
n/a	not available
PK	Peak
PPSD	Peak Power Spectral Density
QP	Quasi-peak
RBW	Resolution Bandwidth
R&S	Rohde & Schwarz
RSS	Radio Standard Specification
SA	Spectrum Analyzer
VBW	Video Bandwidth
Vpol	Vertical Polarization
WLAN	Wireless Local Area Network

3.0 FACILITIES AND ACCREDITATIONS

The facilities used in collecting the test results outlined in this report are located at 1955 Moss Court, Kelowna, British Columbia, Canada, V1Y 9L3. The radiated and conducted emissions sites conform with the requirements set forth in ANSI C63.4 and are filed and listed with the FCC under Registration Number 714830 and Industry Canada under File Number IC 3874.

4.0 GENERAL INFORMATION

4.1 Mode(s) of Operation Tested

Customer supplied the software, which was used to set the WLAN card in the appropriate mode, channel, and power level for the specific measurement.

Tx Frequency Range:	2412 - 2462 MHz Ch. 1 (2412 MHz), Ch. 6 (2437 MHz) & Ch. 11 (2462 MHz) measured unless otherwise noted
Software Power Gain Settings:	The RF output power was tuned according to manufacturer specifications for maximum rated output power
Modes / Data Rates Tested:	802.11b (11 Mbps determined to be worst-case output power and used unless otherwise noted)
	802.11g (48 Mbps determined to be worst-case output power and used unless otherwise noted)
	Bluetooth Co-transmit operations for the WLAN and Bluetooth were evaluated for Radiated Spurious emissions and found to be in compliance. The Bluetooth was evaluated for single-transmit operations under the DSS test procedures and the test report can be found in the DSS filing of this composite device application.
Power Source(s) Tested:	All tests were performed with the AC Power Adapter powering the DUT

4.1.1 DUT Exercising Software Description

The DUT was configured and exercised using customer supplied test software that allows an operator to set the parameters of the WLAN operation. The settings used are described in each appendix. Software power settings were set as defined by the manufacturer for typical operation.

4.2 Configuration Description

The DUT was configured as described by the client to being representative of what would be delivered to the end user. This configuration included the WLAN and internal antenna (with co-located Bluetooth and internal antenna) as described in the Declaration of Compliance. More specific details may be included in each appendix.

4.2.1 Configuration Justification

The DUT was tested in a configuration described by the client as being worst-case but typical of normal use. Conducted power measurement results were used to determine the worst-case data rate for all subsequent testing, unless otherwise noted.

5.0 PASS/FAIL CRITERIA

Unless otherwise noted in the Appendices, the pass/fail criteria is the limit set forth in the reference standards. The DUT is considered to have passed the requirements if the data collected during the described measurement procedure is less than or equal to the specified limits as defined. The pass/fail statements made in this report only apply to the unit tested.

APPENDICES

Appendix A - 6 dB Bandwidth Measurement

A.1. REFERENCES

Normative Reference Standard	FCC CFR 47 §15.247 (2)
Procedure Reference	FCC Document KDB Publication Number 558074

A.2. LIMITS

A.2.1. FCC CFR 47

FCC CFR 47 §15.247	*(2) Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz*

A.3. ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

A.4. EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00015	Agilent	E4408B	Spectrum Analyzer	02Feb06	02Feb07
00102	Pasternack	PE7015-3010	30dB 10 Watt Attenuator	na*	na*

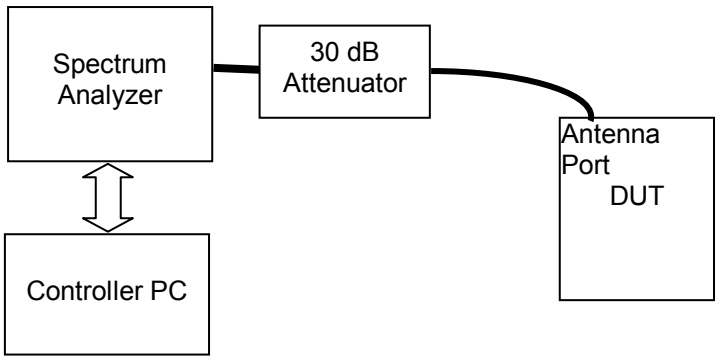
*Attenuator verified with power meter prior to use

A.5. MEASUREMENT EQUIPMENT SETUP

Measurement Equipment Connections	The equipment was connected as shown in the setup drawing in A.6.
Measurement Equipment Settings	To evaluate the occupied bandwidth, software and a PC controller were used to set the spectrum analyzer using the following setting: RBW – 100 kHz VBW – 100kHz Span – 50 MHz Detector – Sample Average – Power Average Count – 100 Offset – appropriate for external attenuation (-31.4 dB)

A.6. SETUP DRAWING

Figure A.6-1 - Setup Drawing



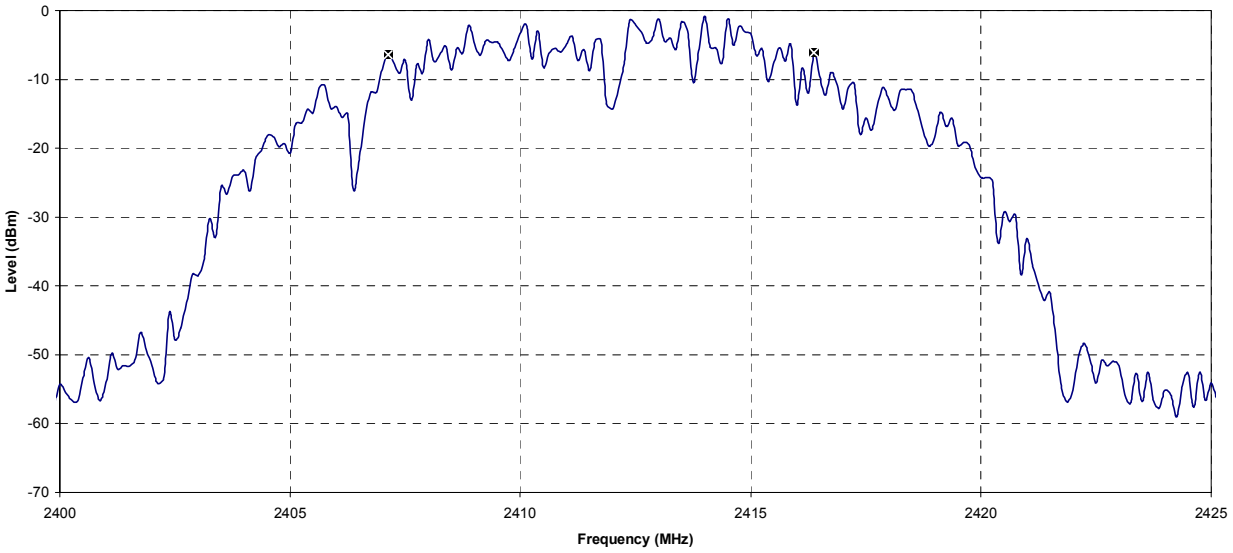
A.7. DUT OPERATING DESCRIPTION

The worst-case data rate was determined from conducted power measurements. Measurements were made at three channels throughout the band, Low Channel (2412 MHz), Mid Channel (2437 MHz), High Channel (2462 MHz) for both Modes b and g.

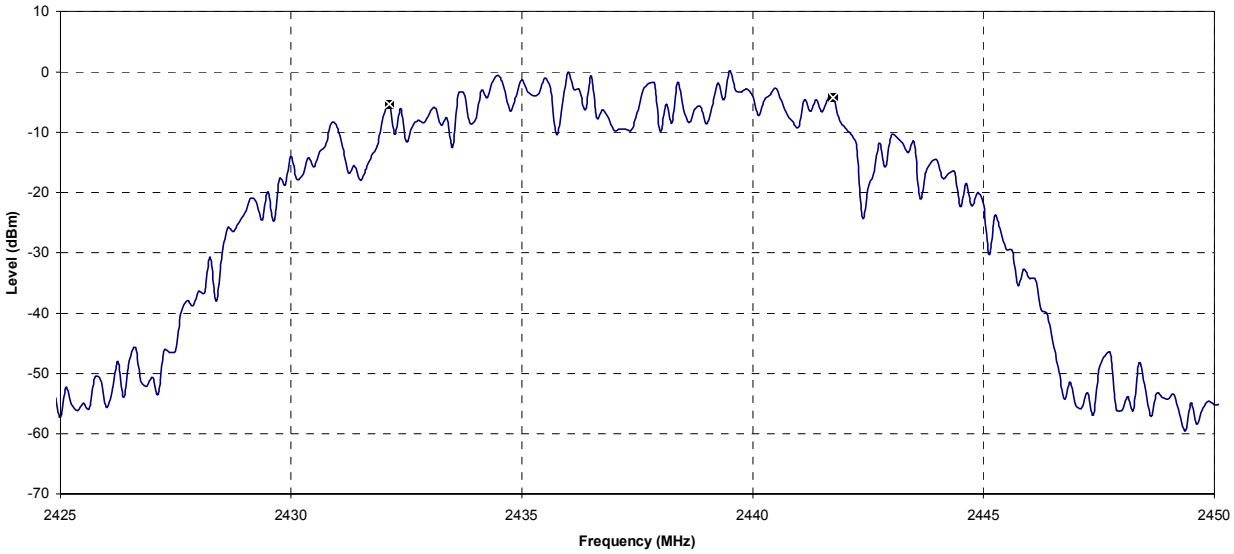
A.8. TEST RESULTS

A.8.1. Mode b Occupied Bandwidth

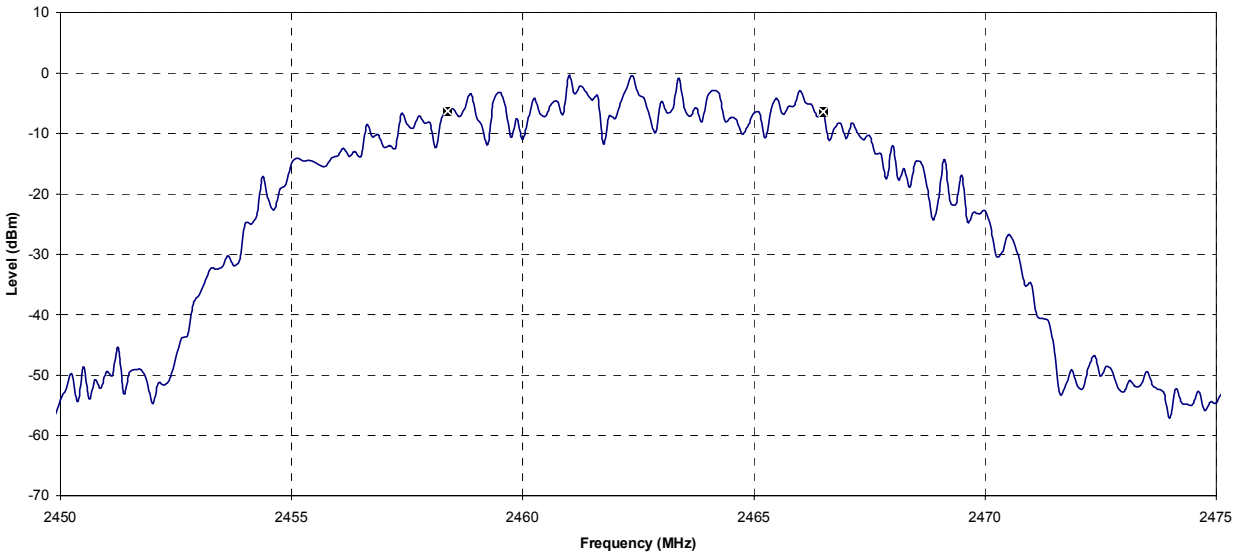
Itronix IX100X - USI WLAN, Frequency = 2412 MHz, Mode b,
-6 dB OBW = 9.25 MHz with an RBW of 100 kHz



Itronix IX100X - USI WLAN, Frequency = 2437 MHz, Mode b,
-6 dB OBW = 9.63 MHz with an RBW of 100 kHz



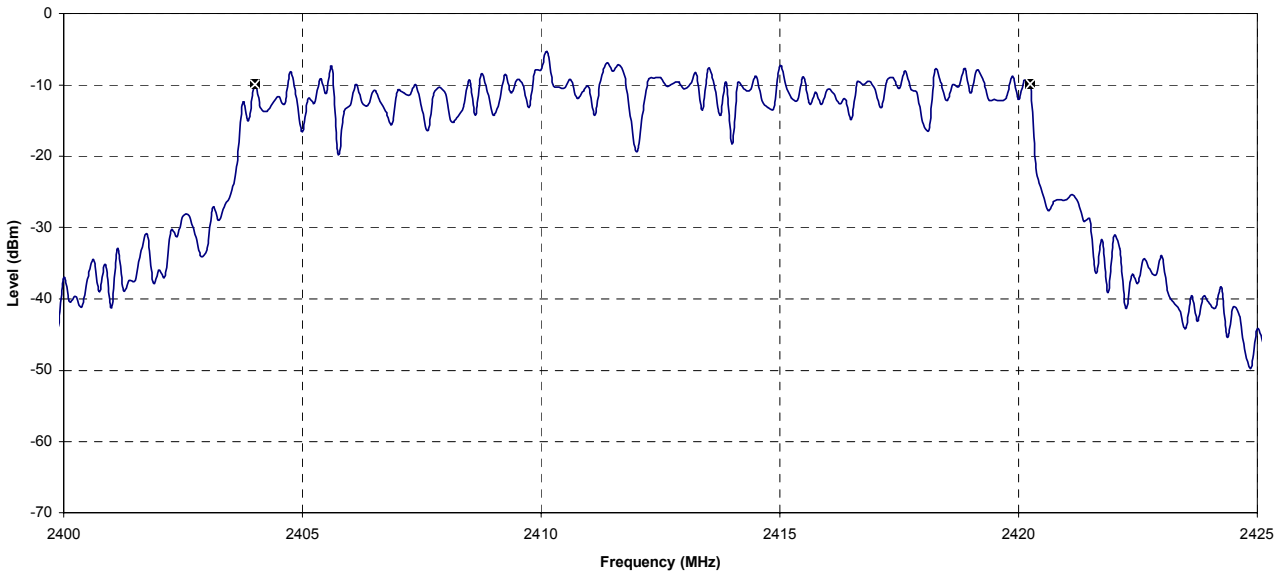
Itronix IX100X - USI WLAN, Frequency = 2462 MHz, Mode b,
-6 dB OBW = 8.13 MHz with an RBW of 100 kHz



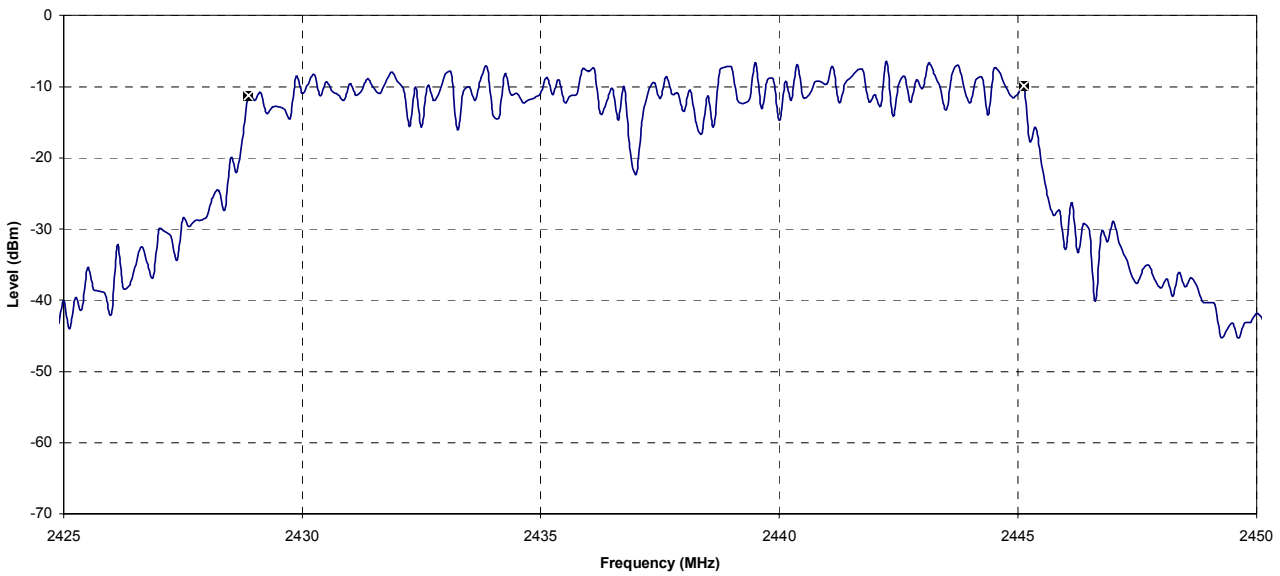
Channel	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/Fail
1	2412	9.25	0.5	PASS
6	2437	9.63	0.5	PASS
11	2462	8.13	0.5	PASS

A.8.2. Mode g Occupied Bandwidth

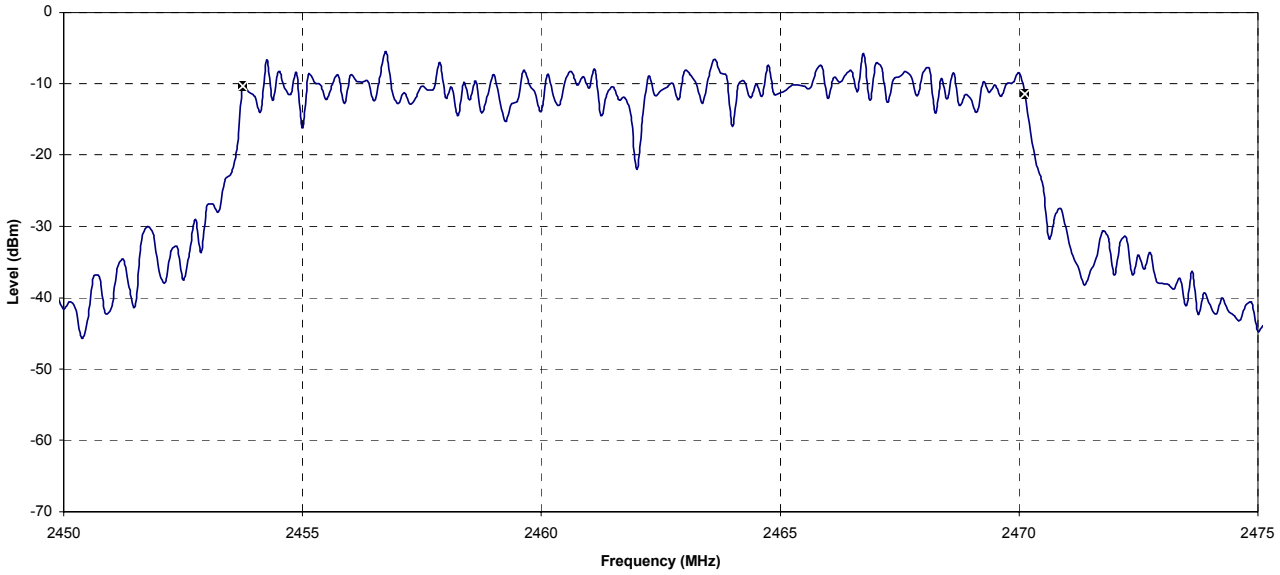
Itronix IX100X - USI WLAN, Frequency = 2412 MHz, Mode g,
-6 dB OBW = 16.25 MHz with an RBW of 100 kHz



Itronix IX100X - USI WLAN, Frequency = 2437 MHz, Mode g,
-6 dB OBW = 16.25 MHz with an RBW of 100 kHz



Itronix IX100X - USI WLAN, Frequency = 2462 MHz, Mode g,
-6 dB OBW = 16.38 MHz with an RBW of 100 kHz



Channel	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/Fail
1	2412	16.25	0.5	PASS
6	2437	16.25	0.5	PASS
11	2462	16.38	0.5	PASS

Appendix B - Peak Conducted RMS Power Measurement

B.1. REFERENCES

Normative Reference Standard	FCC CFR 47 §15.247(b) (3)
Procedure Reference	FCC Document KDB Publication Number 558074

B.2. LIMITS

B.2.1. FCC CFR

§15.247(b): The maximum peak output power of the intentional radiator shall not exceed the following:
§15.247(b) (3) For system using digital modulation in the 902 – 928 MHz, 2400 – 2483.5 MHz, and 5725 – 5850 MHz bands: 1 Watt.

B.3. ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

B.4. EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00015	Agilent	E4408B	Spectrum Analyzer	02Feb06	02Feb07
00076	Pasternack	PE7014-30	30dB 2 Watt Attenuator	na*	na*

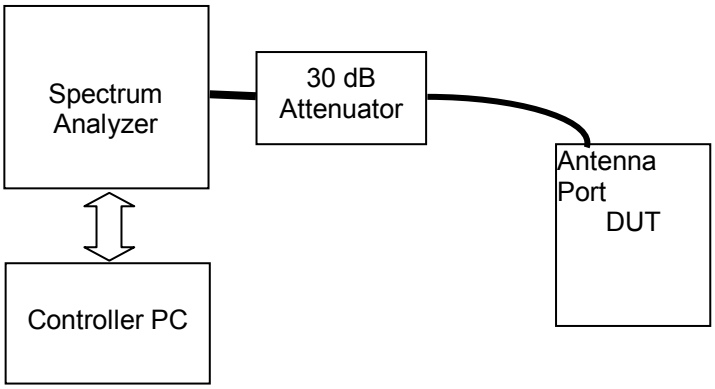
*Cable and attenuator verified with power meter prior to use

B.5. MEASUREMENT EQUIPMENT SETUP

Measurement Equipment Connections	The equipment was connected as shown in the setup drawing in B.6.
Measurement Equipment Settings	To evaluate the maximum peak power, with the following spectrum analyzer settings were used: RBW – 3 MHz VBW – 3 MHz Detector – Peak Trace – Max Hold Span -25 MHz
Measurement Procedure	A PC controller was used to record the spectrum analyzer display and integrate the power across the 26 dB EBW.

B.6. SETUP DRAWING

Figure B.6-1 - Setup Drawing



B.7. DUT OPERATING DESCRIPTION

Measurements were made at three channels throughout the band, Low Channel (2412 MHz), Mid Channel (2437 MHz), High Channel (2462 MHz) for both Modes b and g. The measurements were made from the lowest to the highest data rate available for the mode.

B.8. TEST RESULTS

Channel & Frequency (MHz)		802.11b				Channel & Frequency (MHz)		802.11g			
		Data Rate	Peak Conducted Power*		Limit			Data Rate	Peak Conducted Power*		Limit
		Mb/s	dBm	Watts	Watts			Mb/s	dBm	Watts	Watts
High	2462	1	13.76	0.0238	1	High	2462	6	14.10	0.0257	1
High	2462	2	14.05	0.0254	1	High	2462	9	14.30	0.0269	1
High	2462	5.5	15.85	0.0385	1	High	2462	12	13.20	0.0209	1
High	2462	11	15.93	0.0392	1	High	2462	18	14.15	0.0260	1
Low	2412	11	15.46	0.0352	1	High	2462	24	14.85	0.0305	1
Mid	2437	11	15.62	0.0365	1	High	2462	36	14.69	0.0294	1
Left Blank						High	2462	48	14.98	0.0315	1
						High	2462	54	14.91	0.0310	1
						Low	2412	48	14.52	0.0283	1
						Mid	2437	48	14.68	0.0294	1

Appendix C - Radiated Spurious Emissions Measurement

C.1. REFERENCES

Normative Reference Standard	FCC CFR 47 §15.247(c)
Procedure Reference	ANSI C63.4; FCC 97-114

C.2. LIMITS

C.2.1. FCC CFR 47

§15.247 (c): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power, based on either an RF conducted or a radiated measurement. ***Attenuation below the general limits specified in 15.209 (a) is not required****.*

§15.205 (a): Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
[1] 0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	[2]
13.36–13.41.			

[1] Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.
[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions of 15.35 apply to these measurements.

§15.209 (a): Except as provided in this subpart, the emission from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength		Measurement distance (m)
	uV/m	dBuV/m	
0.009-0.49	2400/F(kHz)	48.52 – 13.80	300
0.49-1.705	24000/F(kHz)	33.80 – 22.97	30
1.705-30	30	29.54	30
30-88	100	40.00	3
88-216	150	43.52	3
216-960	200	46.02	3
Above 906	500	53.98	3

(b) In the emission table above, the tighter limit applies at the band edges.

C.3. ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

C.4. EQUIPMENT LIST

	ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
1	00072	EMCO	2075	Mini-mast	n/a	n/a
2	00073	EMCO	2080	Turn Table	n/a	n/a
3	00071	EMCO	2090	Multi-Device Controller	n/a	n/a
4	00085	EMCO	6502	Loop Antenna	12Aug05	12Aug07
5	00050	Chase	CBL-6111A	Bilog Antenna	04Apr06	04Apr07
6	00055	EMCO	3121C	Dipole Antenna	04Apr06	04Apr07
7	00034	ETS	3115	Double Ridged Guide Horn	11Aug05	11Aug07
8	00035	ETS	3115	Double Ridged Guide Horn	03Apr06	03Apr08
9	00161	Waveline	899	Standard Gain Horn Antenna	n/a	n/a
10	00051	HP	8566B	Spectrum Analyzer RF Section	04Apr06	04Apr07
11	00049	HP	85650A	Quasi-peak Adapter	04Apr06	04Apr07
12	00047	HP	85685A	RF Preselector	05Apr06	05Apr07
13	00048	Gore	65474	Microwave Cable	16Aug05	16Aug07
14	00015	Agilent	4408B	Spectrum Analyzer	02Feb06	02Feb07
15	00115	Miteq	J54-00102600-35-5A	LNA	18Apr06	18Apr07
16	00093	Microtronics	HPM50111	High Pass Filter	18Apr06	18Apr07
17	00119	INMAT	18AH-10	10dB attenuator	18Apr06	18Apr07
18	00006	R & S	SMR 20	Signal Generator (10MHz-40GHz)	06Apr06	06Apr07
19	00114	Amplifier Research	DC7154	Directional Coupler (0.8-4.2 GHz)	n/a	n/a
20	00078	Pasternack	PE2214-20	Directional Coupler (1-18 GHz)	n/a	n/a
21	00106	Amplifier Research	5S1G4	Power Amplifier (5W, 800MHz-4.2GHz)	n/a	n/a
22	00041	Amplifier Research	10W1000C	Power Amplifier (0.5 – 1 GHz)	n/a	n/a
23	00110	Gigatronics	8652A	Power Meter	12Apr06	12Apr07
24	00011	Gigatronics	80701A	Power Sensor	03Feb06	03Feb07

C.5. MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS

The measurement equipment was connected as shown in the C.6. A number of antennas were used to cover the applicable frequency range test. The ranges in which each antenna was used are as follows:

Frequency Range	Spectrum Analyzer Asset #	LNA/Filter/Attenuator Asset #	Antenna Asset #
2 GHz – 7 GHz	00051	00093/00115	00035
7 GHz – 18 GHz	00015	00093/00115	00035
18 GHz – 26 GHz	00015	00115	00161/00166

MEASUREMENT EQUIPMENT SETTINGS

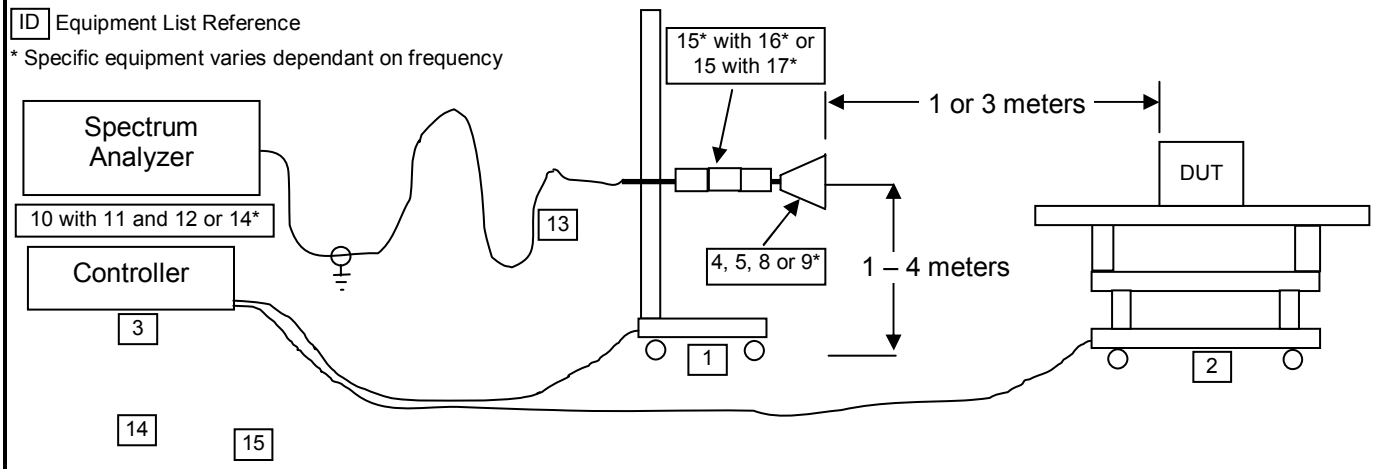
The spectrum analyzer was set to the following settings:

Frequency Range	RBW	VBW	Detector
MHz	kHz	kHz	
< 1000	1000*	1000	Peak*
> 1000	1000*	1000	Peak*

*As a worst-case measurement, the average/QP limit was applied to measurements made with a peak detector using a RBW of 1 MHz (vs the specified 100 kHz), unless otherwise noted. Average measurements were performed with video averaging using a VBW of 30 Hz.

C.6. SETUP DRAWING

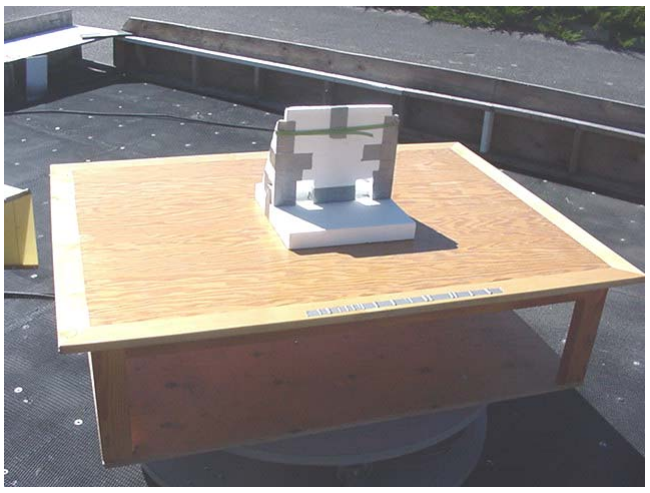
Figure C.6-1 - Setup Drawing



C.7. SETUP PHOTOGRAPHS

Photograph C-1 - Horn Receive Antenna in Horizontal Polarization

Photograph C-2 - Horn Receive Antenna in Vertical Polarization



C.8. DUT OPERATING DESCRIPTION

The worst-case data rate was determined from conducted power measurements. The orientation was determined by radiated field strength measurements of the fundamental. Measurements were made at three channels throughout the band, Low Channel (2412 MHz), Mid Channel (2437 MHz), High Channel (2462 MHz) for modes b and g.

C.9. TEST RESULTS

C.9.1. Mode b - Fundamental Field Strengths @ Specified Distance (100 kHz RBW)

Project Number: 750 **Standard:** FCC15.247a
Company: Itronix **Test Start Date:** 04May06
Product: IX100X with USI WLAN **Test End Date:** 04May06

Configuration				Polarity	Distance	Carrier Channel	Frequency	Maximized SA Signal Level (uncorrected)	Rx AF	Rx CL	Antenna Correction Factors	Field Strength
EUT#	Orientation	Power Source	Accessory		m		MHz	dBuV	dB/m	dB	dB	dBuV/m
Radiated Carrier Field Strength - Mode b												
5091	Short Edge Up	P/S	None	H	3	WLAN-CH1	2412.0000	56.80	28.21	6.83	35.04	91.84
5091	Short Edge Up	P/S	None	V	3	WLAN-CH1	2412.0000	50.60	28.21	6.83	35.04	85.64
5091	Short Edge Up	P/S	None	H	3	WLAN-CH6	2437.0000	58.00	28.25	6.84	35.09	93.09
5091	Short Edge Up	P/S	None	V	3	WLAN-CH6	2437.0000	52.80	28.25	6.84	35.09	87.89
5091	Short Edge Up	P/S	None	H	3	WLAN-CH11	2462.0000	59.50	28.29	6.91	35.19	94.69
5091	Short Edge Up	P/S	None	V	3	WLAN-CH11	2462.0000	54.90	28.29	6.91	35.19	90.09

Formulae:
Total CF = AF + CL + Other
Field Strength = SA Level + Total CF

C.9.2. Mode g - Fundamental Field Strengths @ Specified Distance (100 kHz RBW)

Project Number: 750 **Standard:** FCC15.247a
Company: Itronix **Test Start Date:** 05May06
Product: IX100X with USI WLAN **Test End Date:** 05May06

Configuration				Polarity	Distance	Carrier Channel	Frequency	Maximized SA Signal Level (uncorrected)	Rx AF	Rx CL	Total Correction Factors	Field Strength
EUT#	Orientation	Power Source	Accessory		m		MHz	dBuV	dB/m	dB	dB	dBuV/m
Radiated Carrier Field Strength - Mode g												
5091	Short Edge Up	P/S	None	H	3	WLAN-CH1	2412.0000	54.00	28.21	6.83	35.04	89.04
5091	Short Edge Up	P/S	None	V	3	WLAN-CH1	2412.0000	47.60	28.21	6.83	35.04	82.64
5091	Short Edge Up	P/S	None	H	3	WLAN-CH6	2437.0000	53.40	28.25	6.84	35.09	88.49
5091	Short Edge Up	P/S	None	V	3	WLAN-CH6	2437.0000	47.70	28.25	6.84	35.09	82.79
5091	Short Edge Up	P/S	None	H	3	WLAN-CH11	2462.0000	54.30	28.29	6.91	35.19	89.49
5091	Short Edge Up	P/S	None	V	3	WLAN-CH11	2462.0000	50.20	28.29	6.91	35.19	85.39

Formulae:
Total CF = AF + CL + Other
Field Strength = SA Level + Total CF

C.9.3. Mode b - Out-of-Band Spurious Emission Field Strengths @ Specified Distance

Horizontal Receive Antenna Polarization

Project Number:	750	**Standard(s):**	FCC15.247c, FCC15.209
Company:	Itronix	**Test Start Date:**	19-Jun-06
Product:	IX100X with USI WLAN	**Test End Date:**	20-Jun-06

Polarity	Distance	Receive Antenna	Carrier Channel	Frequency	Maximized SA Signal Level (uncorrected)	Rx AF	Rx CL	Other Corrections	Total Correction Factors	Corrected Field Strength	Detector	Limit	Margin	Pass/Fail
	m			MHz	dBuV	dB/m	dB	dB	dBm	dBuV/m	(PK/AV/QP)	dBuV/m	dB	
H	3	Horn SN6267	WLAN-CH1	4824.00	40.10	33.03	10.58	-32.34	11.27	51.37	PK*	54.0	02.6	PASS
H	3	Horn SN6267	WLAN-CH1	7241.13	41.26	35.81	6.41	-32.16	10.06	51.32	PK*	64.2	12.9	PASS
H	3	Horn SN6267	WLAN-CH1	9648.00	38.44	37.98	7.51	-31.96	13.53	51.97	PK*	64.2	12.2	PASS
H	3	Horn SN6267	WLAN-CH1	12060.00	36.91	38.78	8.62	-31.76	15.64	52.55	PK*	54.0	01.4	PASS
H	3	Horn SN6267	WLAN-CH1	14472.00	39.44	41.73	9.73	-31.53	19.93	59.37	PK	74.0	14.6	PASS
H	3	Horn SN6267	WLAN-CH1	14472.00	28.95	41.73	9.73	-31.53	19.93	48.88	AV	54.0	05.1	PASS
H	3	Horn SN6267	WLAN-CH6	4874.00	40.10	33.14	10.62	-32.34	11.43	51.53	PK*	54.0	02.5	PASS
H	3	Horn SN6267	WLAN-CH6	7310.50	40.29	35.98	6.44	-32.14	10.29	50.58	PK*	54.0	03.4	PASS
H	3	Horn SN6267	WLAN-CH6	9745.00	38.25	38.04	7.55	-31.99	13.60	51.85	PK*	64.2	12.3	PASS
H	3	Horn SN6267	WLAN-CH6	12185.00	36.65	38.66	8.68	-31.71	15.62	52.27	PK*	54.0	01.7	PASS
H	3	Horn SN6267	WLAN-CH6	14620.00	39.48	41.29	9.80	-31.68	19.41	58.89	PK	74.7	15.8	PASS
H	3	Horn SN6267	WLAN-CH6	14620.00	29.35	41.29	9.80	-31.68	19.41	48.76	AV	64.2	15.4	PASS
H	3	Horn SN6267	WLAN-CH11	4924.00	39.80	33.26	10.73	-32.29	11.70	51.50	PK*	54.0	02.5	PASS
H	3	Horn SN6267	WLAN-CH11	7386.00	39.27	36.17	6.47	-32.17	10.47	49.74	PK*	54.0	04.2	PASS
H	3	Horn SN6267	WLAN-CH11	9848.00	38.23	38.10	7.60	-31.98	13.73	51.96	PK*	64.2	12.2	PASS
H	3	Horn SN6267	WLAN-CH11	12310.00	38.11	38.54	8.74	-31.76	15.52	53.63	PK*	54.0	00.3	PASS
H	3	Horn SN6267	WLAN-CH11	14772.00	41.23	40.70	9.87	-31.81	18.76	59.99	PK	74.7	14.7	PASS
H	3	Horn SN6267	WLAN-CH11	14772.00	29.42	40.70	9.87	-31.81	18.76	48.18	AV	64.2	16.0	PASS

Notes:
*PK denotes QP or Average limits applied to emissions measured with a peak detector
BOLD signifies the highest signal measured near a carrier harmonic frequency
No EUT emissions levels were measured above those reported
Formulae:
Total CF = Antenna Factor + Cable Factor + Other Factor (Amplifier Gain, filter loss, etc)
Field Strength = SA Reading + Total CF
Margin = Limit - Field Strength

Limit based on highest radiated carrier

Mode b - Vertical Receive Antenna Polarization

Project Number: 750 **Standard(s):** FCC15.247c, FCC15.209
Company: Itronix **Test Start Date:** 19-Jun-06
Product: IX100X with USI WLAN **Test End Date:** 20-Jun-06

Polarity	Distance	Receive Antenna	Carrier Channel	Frequency	Maximized SA Signal Level (uncorrected)	Rx AF	Rx CL	Other Corrections	Total Correction Factors	Corrected Field Strength	Detector	Limit	Margin	Pass/Fail
	m			MHz	dBuV	dB/m	dB	dB	dBm	dBuV/m	(PK/AV/QP)	dBuV/m	dB	
V	3	Horn SN6267	WLAN-CH1	4824.00	40.00	33.03	10.58	-32.34	11.27	51.27	PK*	54.0	02.7	PASS
V	3	Horn SN6267	WLAN-CH1	7236.00	42.25	35.80	6.41	-32.16	10.04	52.29	PK	70.1	17.8	PASS
V	3	Horn SN6267	WLAN-CH1	7236.00	30.20	35.80	6.41	-32.16	10.04	40.24	AV	59.9	19.6	PASS
V	3	Horn SN6267	WLAN-CH1	9648.00	38.30	37.98	7.51	-31.96	13.53	51.83	PK	70.1	18.3	PASS
V	3	Horn SN6267	WLAN-CH1	9648.00	29.65	37.98	7.51	-31.96	13.53	43.18	AV	59.9	16.7	PASS
V	3	Horn SN6267	WLAN-CH1	12060.00	39.00	38.78	8.62	-31.76	15.64	54.64	PK	74.0	19.3	PASS
V	3	Horn SN6267	WLAN-CH1	12060.00	29.90	38.78	8.62	-31.76	15.64	45.54	AV	54.0	08.4	PASS
V	3	Horn SN6267	WLAN-CH1	14472.00	39.68	41.73	9.73	-31.53	19.93	59.61	PK	74.0	14.4	PASS
V	3	Horn SN6267	WLAN-CH1	14472.00	28.59	41.73	9.73	-31.53	19.93	48.52	AV	54.0	05.5	PASS
V	3	Horn SN6267	WLAN-CH6	4874.00	40.10	33.14	10.62	-32.34	11.43	51.53	PK*	54.0	02.5	PASS
V	3	Horn SN6267	WLAN-CH6	7311.88	45.10	35.99	6.44	-32.14	10.29	55.39	PK	74.0	18.6	PASS
V	3	Horn SN6267	WLAN-CH6	7311.88	35.30	35.99	6.44	-32.14	10.29	45.59	AV	54.0	08.4	PASS
V	3	Horn SN6267	WLAN-CH6	9745.00	38.35	38.04	7.55	-31.99	13.60	51.95	PK*	54.0	02.0	PASS
V	3	Horn SN6267	WLAN-CH6	12185.00	37.20	38.66	8.68	-31.71	15.62	52.82	PK*	54.0	01.2	PASS
V	3	Horn SN6267	WLAN-CH6	14620.00	38.96	41.29	9.80	-31.68	19.41	58.37	PK	74.0	15.6	PASS
V	3	Horn SN6267	WLAN-CH6	14620.00	28.65	41.29	9.80	-31.68	19.41	48.06	AV	54.0	05.9	PASS
V	3	Horn SN6267	WLAN-CH11	4924.00	39.60	33.26	10.73	-32.29	11.70	51.30	PK*	54.0	02.7	PASS
V	3	Horn SN6267	WLAN-CH11	5772.00	40.60	34.25	12.02	-32.14	14.12	54.72	PK	70.1	15.4	PASS
V	3	Horn SN6267	WLAN-CH11	7386.00	39.55	36.17	6.47	-32.17	10.47	50.02	PK*	54.0	04.0	PASS
V	3	Horn SN6267	WLAN-CH11	9848.00	38.70	38.10	7.60	-31.98	13.73	52.43	PK*	54.0	01.5	PASS
V	3	Horn SN6267	WLAN-CH11	12310.00	37.35	38.54	8.74	-31.76	15.52	52.87	PK*	54.0	01.1	PASS
V	3	Horn SN6267	WLAN-CH11	14772.00	40.67	40.70	9.87	-31.81	18.76	59.43	PK	74.0	14.6	PASS
V	3	Horn SN6267	WLAN-CH11	14772.00	29.37	40.70	9.87	-31.81	18.76	48.13	AV	54.0	05.9	PASS

Notes:
*PK denotes QP or Average limits applied to emissions measured with a peak detector
BOLD signifies the highest signal measured near a carrier harmonic frequency
No EUT emissions levels were measured above those reported
Formulae:
Total CF = Antenna Factor + Cable Factor + Other Factor (Amplifier Gain, filter loss, etc)
Field Strength = SA Reading + Total CF
Margin = Limit - Field Strength

Limit based on highest radiated carrier

C.9.4. Mode g - Out-of-Band Spurious Emission Field Strengths @ Specified Distance

Horizontal Receive Antenna Polarization

Project Number: 750
Company: Itronix
Product: IX100X with USI WLAN
Standard: FCC15.247c, FCC15.209
Test Start Date: 20-Jun-06
Test End Date: 21-Jun-06

Polarity	Distance	Receive Antenna	Carrier Channel	Frequency	Maximized SA Signal Level (uncorrected)	Rx AF	Rx CL	Other Corrections	Total Correction Factors	Corrected Field Strength	Detector	Limit	Margin	Pass/Fail
	m			MHz	dBuV	dB/m	dB	dB	dBm	dBuV/m	(PK/AV/QP)	dBuV/m	dB	
H	3	Horn SN6267	WLAN-CH1	4824.00	39.60	33.03	10.58	-32.34	11.27	50.87	PK*	54.0	03.1	PASS
H	3	Horn SN6267	WLAN-CH1	7235.00	38.62	35.80	6.41	-32.16	10.04	48.66	PK*	61.8	13.1	PASS
H	3	Horn SN6267	WLAN-CH1	9645.00	38.65	37.98	7.51	-31.96	13.52	52.17	PK*	61.8	09.6	PASS
H	3	Horn SN6267	WLAN-CH1	12060.00	38.10	38.78	8.62	-31.76	15.64	53.74	PK*	54.0	00.2	PASS
H	3	Horn SN6267	WLAN-CH1	14470.00	39.65	41.73	9.73	-31.52	19.93	59.58	PK	74.0	14.4	PASS
H	3	Horn SN6267	WLAN-CH1	14470.00	29.10	41.73	9.73	-31.52	19.93	49.03	AV	54.0	04.9	PASS
H	3	Horn SN6267	WLAN-CH6	4874.00	40.10	33.14	10.62	-32.34	11.43	51.53	PK*	54.0	02.5	PASS
H	3	Horn SN6267	WLAN-CH6	7310.00	39.07	35.98	6.44	-32.14	10.28	49.35	PK*	54.0	04.6	PASS
H	3	Horn SN6267	WLAN-CH6	9745.00	38.30	38.04	7.55	-31.99	13.60	51.90	PK*	54.0	02.1	PASS
H	3	Horn SN6267	WLAN-CH6	12185.00	38.34	38.66	8.68	-31.71	15.62	53.96	PK*	54.0	00.0	PASS
H	3	Horn SN6267	WLAN-CH6	14620.00	39.83	41.29	9.80	-31.68	19.41	59.24	PK	74.0	14.7	PASS
H	3	Horn SN6267	WLAN-CH6	14620.00	28.75	41.29	9.80	-31.68	19.41	48.16	AV	54.0	05.8	PASS
H	3	Horn SN6267	WLAN-CH11	4924.00	39.60	33.26	10.73	-32.29	11.70	51.30	PK*	54.0	02.7	PASS
H	3	Horn SN6267	WLAN-CH11	7385.00	39.06	36.17	6.47	-32.17	10.47	49.53	PK*	54.0	04.4	PASS
H	3	Horn SN6267	WLAN-CH11	9845.00	38.32	38.10	7.60	-31.98	13.73	52.05	PK*	54.0	01.9	PASS
H	3	Horn SN6267	WLAN-CH11	12310.00	37.80	38.54	8.74	-31.76	15.52	53.32	PK*	54.0	00.7	PASS
H	3	Horn SN6267	WLAN-CH11	14770.00	39.40	40.71	9.87	-31.81	18.77	58.17	PK	74.0	15.8	PASS
H	3	Horn SN6267	WLAN-CH11	14770.00	29.20	40.71	9.87	-31.81	18.77	47.97	AV	54.0	06.0	PASS

Notes:
*PK denotes QP or Average limits applied to emissions measured with a peak detector
BOLD signifies the highest signal measured near a carrier harmonic frequency
No EUT emissions levels were measured above those reported
Formulae:
Total Correction Factor = Antenna Factor + Cable Factor + Other Factor (Amplifier Gain, filter loss, etc)
Field Strength = SA Reading + Total CF
Margin = Limit - Field Strength

Limit based on highest radiated carrier

Mode g - Vertical Receive Antenna Polarization

Project Number: 750
Company: Itronix
Product: IX100X with USI WLAN

Standard: FCC15.247c, FCC15.209
Test Start Date: 20-Jun-06
Test End Date: 21-Jun-06

Polarity	Distance	Receive Antenna	Carrier Channel	Frequency	Maximized SA Signal Level (uncorrected)	Rx AF	Rx CL	Other Corrections	Total Correction Factors	Corrected Field Strength	Detector	Limit	Margin	Pass/Fail
	m			MHz	dBuV	dB/m	dB	dB	dBm	dBuV/m	(PK/AV/QP)	dBuV/m	dB	
V	3	Horn SN6267	WLAN-CH1	4824.00	39.80	33.03	10.58	-32.34	11.27	51.07	PK*	54.0	02.9	PASS
V	3	Horn SN6267	WLAN-CH1	7235.00	39.25	35.80	6.41	-32.16	10.04	49.29	PK*	54.0	04.7	PASS
V	3	Horn SN6267	WLAN-CH1	9645.00	37.70	37.98	7.51	-31.96	13.52	51.22	PK*	54.0	02.8	PASS
V	3	Horn SN6267	WLAN-CH1	12060.00	37.19	38.78	8.62	-31.76	15.64	52.83	PK*	54.0	01.1	PASS
V	3	Horn SN6267	WLAN-CH1	14470.00	39.83	41.73	9.73	-31.52	19.93	59.76	PK	74.0	14.2	PASS
V	3	Horn SN6267	WLAN-CH1	14470.00	28.95	41.73	9.73	-31.52	19.93	48.88	AV	54.0	05.1	PASS
V	3	Horn SN6267	WLAN-CH6	4874.00	39.50	33.14	10.62	-32.34	11.43	50.93	PK*	54.0	03.1	PASS
V	3	Horn SN6267	WLAN-CH6	7310.00	38.88	35.98	6.44	-32.14	10.28	49.16	PK*	54.0	04.8	PASS
V	3	Horn SN6267	WLAN-CH6	9745.00	38.73	38.04	7.55	-31.99	13.60	52.33	PK*	54.0	01.6	PASS
V	3	Horn SN6267	WLAN-CH6	12185.00	37.94	38.66	8.68	-31.71	15.62	53.56	PK*	54.0	00.4	PASS
V	3	Horn SN6267	WLAN-CH6	14620.00	39.94	41.29	9.80	-31.68	19.41	59.35	PK	74.0	14.6	PASS
V	3	Horn SN6267	WLAN-CH6	14620.00	28.81	41.29	9.80	-31.68	19.41	48.22	AV	54.0	05.8	PASS
V	3	Horn SN6267	WLAN-CH11	4924.00	39.90	33.26	10.73	-32.29	11.70	51.60	PK*	54.0	02.4	PASS
V	3	Horn SN6267	WLAN-CH11	7385.00	39.46	36.17	6.47	-32.17	10.47	49.93	PK*	54.0	04.0	PASS
V	3	Horn SN6267	WLAN-CH11	9845.00	38.92	38.10	7.60	-31.98	13.73	52.65	PK*	54.0	01.3	PASS
V	3	Horn SN6267	WLAN-CH11	12310.00	38.90	38.54	8.74	-31.76	15.52	54.42	PK	74.0	19.6	PASS
V	3	Horn SN6267	WLAN-CH11	12310.00	28.60	38.54	8.74	-31.76	15.52	44.12	AV	54.0	09.9	PASS
V	3	Horn SN6267	WLAN-CH11	14770.00	39.87	40.71	9.87	-31.81	18.77	58.64	PK	74.0	15.3	PASS
V	3	Horn SN6267	WLAN-CH11	14770.00	29.15	40.71	9.87	-31.81	18.77	47.92	AV	54.0	06.1	PASS

Notes:
*PK denotes QP or Average limits applied to emissions measured with a peak detector
No EUT emissions levels were measured above those reported
Formulae:
Total CF = Antenna Factor + Cable Factor + Other Factor (Amplifier Gain, filter loss, etc)
Field Strength = SA Reading + Total CF
Margin = Limit - Field Strength

Limit based on highest radiated carrier

Appendix D - Bandedge Emissions Measurement

D.1. REFERENCES	
Normative Reference Standard	FCC CFR 47 §15.205 (a) (b), FCC CFR 47 §15.209 (a)
Procedure Reference	FCC 97-114

D.2. LIMITS

FCC CFR 47 §15.209

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency	Field Strength		Measurement Distance
MHz	uV/m	dBuv/m	Meters
.009 - 0.490	2400/F(kHz)	48.52 – 13.80	300
0.490 - 1.705	24000/F(kHz)	33.80 – 22.97	30
1.705 - 30.0	30	29.54	30
30 - 88	100	40.00	3
88 - 216	150	43.52	3
216 - 960	200	46.02	3
Above 960	500	53.98	3

(b) In the emission table above, the tighter limit applies at the band edges.

D.3. ENVIRONMENTAL CONDITIONS	
Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

D.4. EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00015	Agilent	E4408B	Spectrum Analyzer	02Feb06	02Feb07
00076	Pasternack	PE7014-30	30dB 2 Watt Attenuator	na*	na

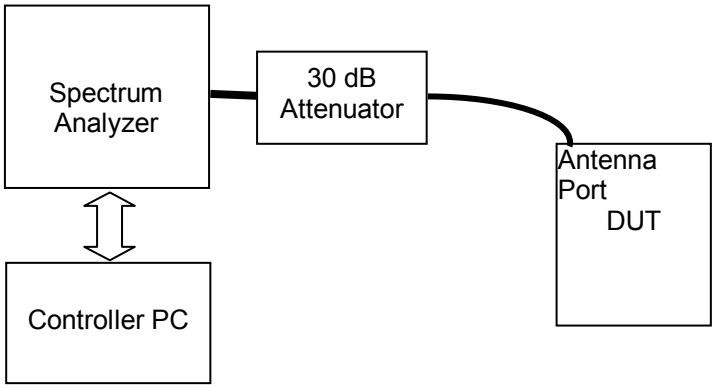
*Attenuator verified with power meter prior to use

D.5. MEASUREMENT EQUIPMENT SETUP

Measurement Equipment Connections	The equipment was connected as shown in the setup drawing in D.6.
Measurement Equipment Settings	To evaluate the radiated bandedge according to the marker-delta method, the following spectrum analyzer settings were used for the conducted measurement: RBW - 1 MHz VBW - 3 MHz Detector - Peak Trace - Max Hold Span -25 MHz
Measurement Procedure	A PC controller was used to record the spectrum analyzer display.

D.6. SETUP DRAWING

Figure D.6-1 - Setup Drawing



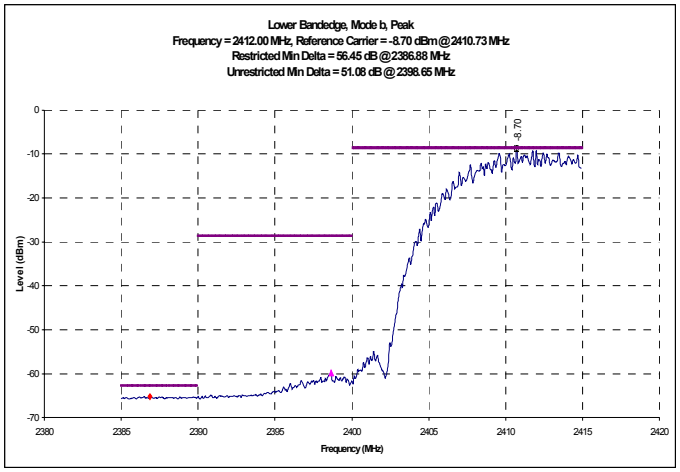
D.7. DUT OPERATING DESCRIPTION

The worst-case data rate was determined from conducted power measurements.

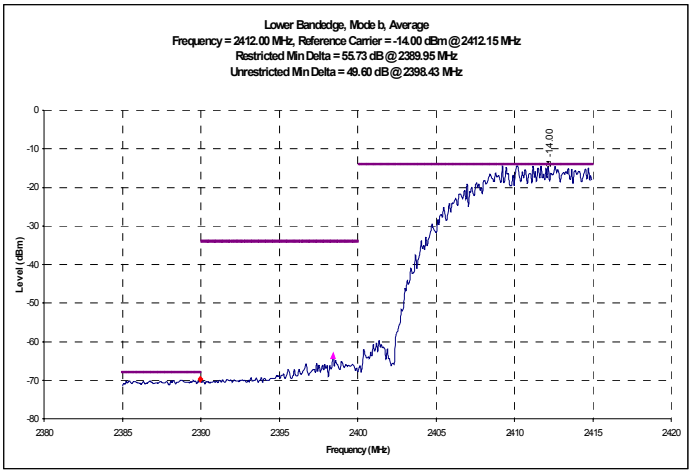
D.8. TEST RESULTS

D.8.1. Mode b - Lower Band-edge Emission Field Strengths @ Specified Distance

Channel 1 Mode b - Conducted Peak Band-edge Plots



Channel 1 Mode b - Conducted Average Band-edge Plots



Channel 1 b - Calculated Band-edge (Restricted) Field Strengths

IX100X with WLAN Mode b, Tx = 11 Mbps

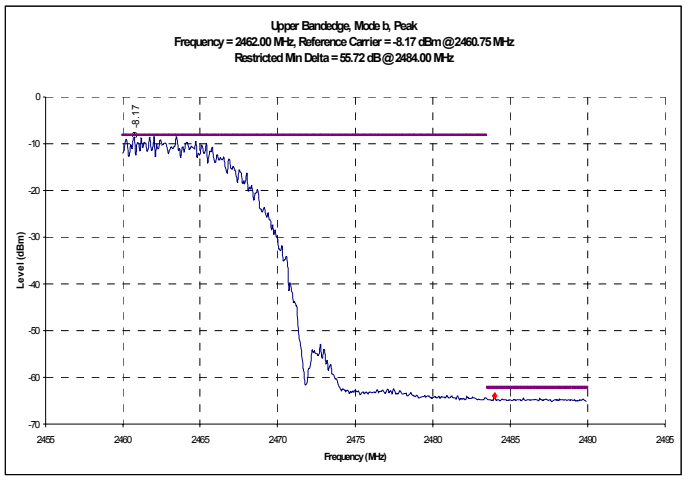
Channel	Polarity	Distance	Frequency	Carrier Radiated Field Strength	Delta Marker	Detector	Calculated Bandedge Field Strength	Duty Cycle Correction	Corrected Bandedge Field Strength	Specified Limit	Specified Limit Distance	Limit Distance Correction	Calculated Limit	Margin	Pass/Fail
		m	MHz	dBuV/m	dB		dBuV/m	dB	dBuV/m	dBuV/m	m	dB	dBuV/m	dB	
WLAN-CH1	H	3	2386.88	99.66	56.45	PK	43.21	0.00	43.21	73.98	3.00	0.00	73.98	30.77	PASS
WLAN-CH1	H	3	2389.95	91.66	55.73	AV	35.93	0.00	35.93	53.98	3.00	0.00	53.98	18.05	PASS
WLAN-CH1	V	3	2386.88	93.66	56.45	PK	37.21	0.00	37.21	73.98	3.00	0.00	73.98	36.77	PASS
WLAN-CH1	V	3	2389.95	85.36	55.73	AV	29.63	0.00	29.63	53.98	3.00	0.00	53.98	24.35	PASS

Formulae:
Calculated Bandedge Field Strength (dBuV/m) = Carrier Radiated Field Strength (dBuV/m) + Delta Marker (dB)
Corrected Bandedge Field Strength (dBuV/m) = Calculated Bandedge Field Strength (dBuV/m) + Duty Cycle Correction (dB)
Limit Distance Correction = 20 * log (measurement distance / limit distance)
Calculated Limit (dBuV/m) = Specified Limit (dBuV/m) + Limit Distance Correction (dB)
Margin (dB) = Corrected Limit (dBuV/m) – Corrected Bandedge Field Strength (dBuV/m)

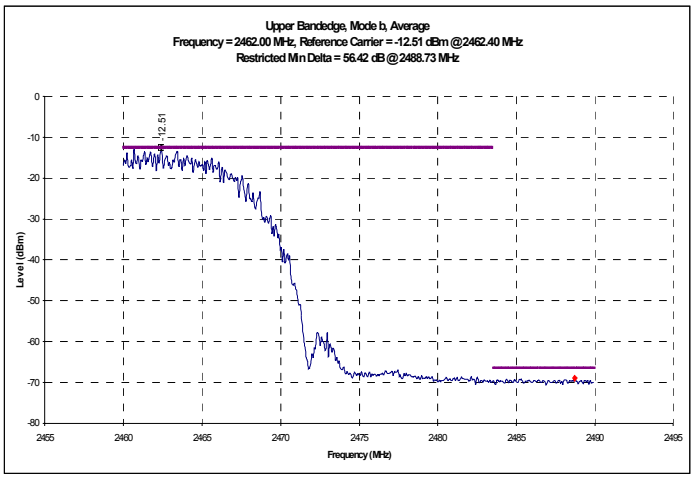
Note: Measurements and calculation reference the Marker-Delta Method described in FCC Public Notice DA 00-705

D.8.2. Mode b - Upper Band-edge Emission Field Strengths @ Specified Distance

Channel 11 Mode b - Conducted Peak Band-edge Plots



Channel 11 Mode b - Conducted Average Band-edge Plots



Channel 11 b - Calculated Band-edge (Restricted) Field Strengths

IX100X with WLAN Mode b, Tx = 11 Mbps

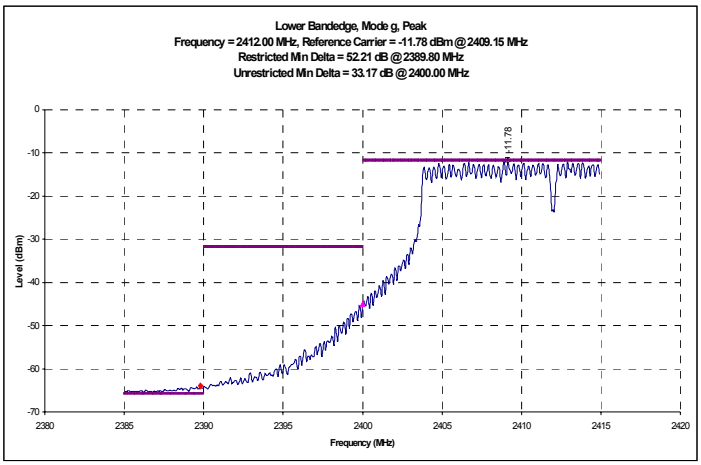
Channel	Polarity	Distance	Frequency	Carrier Radiated Field Strength	Delta Marker	Detector	Calculated Bandedge Field Strength	Duty Cycle Correction	Corrected Bandedge Field Strength	Specified Limit	Specified Limit Distance	Limit Distance Correction	Calculated Limit	Margin	Pass/Fail
		m	MHz	dBuV/m	dB		dBuV/m	dB	dBuV/m	dBuV/m	m	dB	dBuV/m	dB	
WLAN-CH11	H	3	2484.00	102.10	55.72	PK	46.38	0.00	46.38	73.98	3.00	0.00	73.98	27.60	PASS
WLAN-CH11	H	3	2488.73	94.10	56.42	AV	37.68	0.00	37.68	53.98	3.00	0.00	53.98	16.30	PASS
WLAN-CH11	V	3	2484.00	97.90	55.72	PK	42.18	0.00	42.18	73.98	3.00	0.00	73.98	31.80	PASS
WLAN-CH11	V	3	2488.73	89.80	56.42	AV	33.38	0.00	33.38	53.98	3.00	0.00	53.98	20.60	PASS

Formulae:
Calculated Bandedge Field Strength (dBuV/m) = Carrier Radiated Field Strength (dBuV/m) + Delta Marker (dB)
Duty Cycle Correction (dB) = 20 * log (time on / total time)
Corrected Bandedge Field Strength (dBuV/m) = Calculated Bandedge Field Strength (dBuV/m) + Duty Cycle Correction (dB)
Limit Distance Correction = 20 * log (measurement distance / limit distance)
Calculated Limit (dBuV/m) = Specified Limit (dBuV/m) + Limit Distance Correction (dB)
Margin (dB) = Corrected Limit (dBuV/m) – Corrected Bandedge Field Strength (dBuV/m)

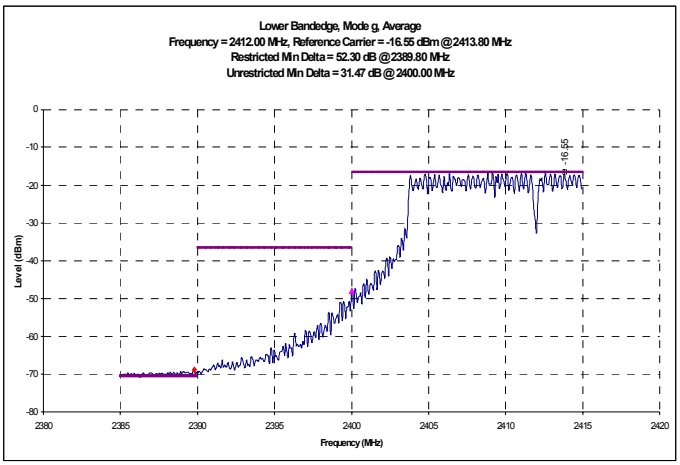
Note: Measurements and calculation reference the Marker-Delta Method described in FCC Public Notice DA 00-705

D.8.3. Mode g - Lower Band-edge Emission Field Strengths @ Specified Distance

Channel 1 Mode g - Conducted Peak Band-edge Plots



Channel 1 Mode g - Conducted Average Band-edge Plots



Channel 1 g - Calculated Band-edge (Restricted) Field Strengths

IX100X with WLAN Mode g, Tx = 11 Mbps

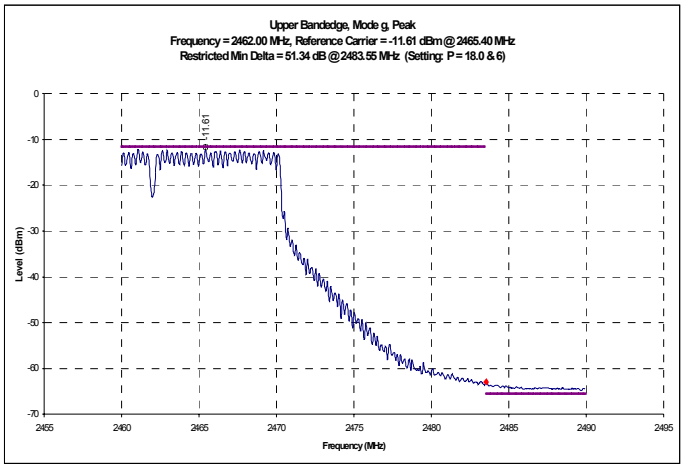
Channel	Polarity	Distance	Frequency	Carrier Radiated Field Strength	Delta Marker	Detector	Calculated Bandedge Field Strength	Duty Cycle Correction	Corrected Bandedge Field Strength	Specified Limit	Specified Limit Distance	Limit Distance Correction	Calculated Limit	Margin	Pass/Fail
		m	MHz	dBuV/m	dB		dBuV/m	dB	dBuV/m	dBuV/m	m	dB	dBuV/m	dB	
WLAN-CH1	H	3	2389.80	99.26	52.21	PK	47.05	0.00	47.05	73.98	3.00	0.00	73.98	26.93	PASS
WLAN-CH1	H	3	2389.80	88.66	52.30	AV	36.36	0.00	36.36	53.98	3.00	0.00	53.98	17.62	PASS
WLAN-CH1	V	3	2389.80	93.16	52.21	PK	40.95	0.00	40.95	73.98	3.00	0.00	73.98	33.03	PASS
WLAN-CH1	V	3	2389.80	82.06	52.30	AV	29.76	0.00	29.76	53.98	3.00	0.00	53.98	24.22	PASS

Formulae:
Calculated Bandedge Field Strength (dBuV/m) = Carrier Radiated Field Strength (dBuV/m) + Delta Marker (dB)
Duty Cycle Correction (dB) = 20 * log (time on / total time)
Corrected Bandedge Field Strength (dBuV/m) = Calculated Bandedge Field Strength (dBuV/m) + Duty Cycle Correction (dB)
Limit Distance Correction = 20 * log (measurement distance / limit distance)
Calculated Limit (dBuV/m) = Specified Limit (dBuV/m) + Limit Distance Correction (dB)
Margin (dB) = Corrected Limit (dBuV/m) – Corrected Bandedge Field Strength (dBuV/m)

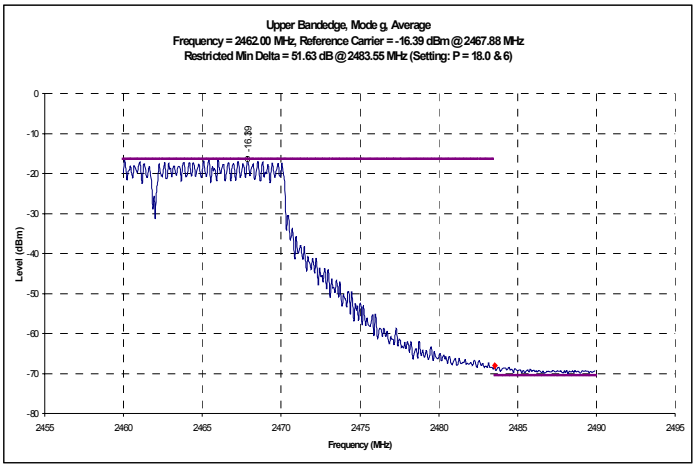
Note: Measurements and calculation reference the Marker-Delta Method described in FCC Public Notice DA 00-705

D.8.4. Mode g - Upper Band-edge Emission Field Strengths @ Specified Distance

Channel 11 Mode g - Conducted Peak Band-edge Plots



Channel 11 Mode g - Conducted Average Band-edge Plots



Channel 11 g - Calculated Band-edge (Restricted) Field Strengths

IX100X with WLAN Mode g, Tx = 11 Mbps

Channel	Polarity	Distance	Frequency	Carrier Radiated Field Strength	Delta Marker	Detector	Calculated Bandedge Field Strength	Duty Cycle Correction	Corrected Bandedge Field Strength	Specified Limit	Specified Limit Distance	Limit Distance Correction	Calculated Limit	Margin	Pass/Fail
		m	MHz	dBuV/m	dB		dBuV/m	dB	dBuV/m	dBuV/m	m	dB	dBuV/m	dB	
WLAN-CH11	H	3	2483.55	100.80	51.34	PK	49.46	0.00	49.46	73.98	3.00	0.00	73.98	24.52	PASS
WLAN-CH11	H	3	2483.55	89.70	51.63	AV	38.07	0.00	38.07	53.98	3.00	0.00	53.98	15.91	PASS
WLAN-CH11	V	3	2483.55	97.50	51.34	PK	46.16	0.00	46.16	73.98	3.00	0.00	73.98	27.82	PASS
WLAN-CH11	V	3	2483.55	85.40	51.63	AV	33.77	0.00	33.77	53.98	3.00	0.00	53.98	20.21	PASS

Formulae:
Calculated Bandedge Field Strength (dBuV/m) = Carrier Radiated Field Strength (dBuV/m) + Delta Marker (dB)
Duty Cycle Correction (dB) = 20 * log (time on / total time)
Corrected Bandedge Field Strength (dBuV/m) = Calculated Bandedge Field Strength (dBuV/m) + Duty Cycle Correction (dB)
Limit Distance Correction = 20 * log (measurement distance / limit distance)
Calculated Limit (dBuV/m) = Specified Limit (dBuV/m) + Limit Distance Correction (dB)
Margin (dB) = Corrected Limit (dBuV/m) – Corrected Bandedge Field Strength (dBuV/m)

Note: Measurements and calculation reference the Marker-Delta Method described in FCC Public Notice DA 00-705

Appendix E - Peak Power Spectral Density Measurement

E.1. REFERENCES

Normative Reference Standard	FCC CFR 47 §15.247(d)
Procedure Reference	FCC Bulletin KDB Publication No 558074

E.2. LIMITS

E.2.1. FCC CFR

§15.247(d): For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than +8 dBm in any 3 kHz band during any time interval of continuous transmission.

E.3. ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

E.4. EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00015	Agilent	E4408B	Spectrum Analyzer	02Feb06	02Feb07
00076	Pasternack	PE7014-30	30dB 2 Watt Attenuator	na*	na

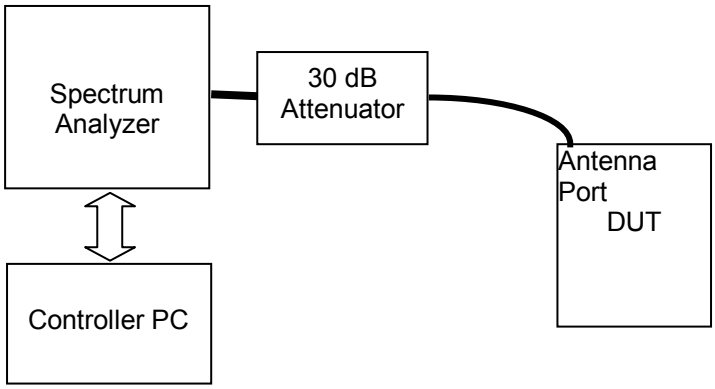
*Attenuator verified with power meter prior to use

E.5. MEASUREMENT EQUIPMENT SETUP

Measurement Equipment Connections	The equipment was connected as shown in the setup drawing in E.6.
Measurement Equipment Settings	To evaluate the peak power spectral density, software and a PC controller were used to set the spectrum analyzer using the following setting: RBW – 3 kHz VBW – 30 kHz Detector – Sample Average – Power Trace Average – 100 Offset – appropriate for external attenuation (-31.4 dB)
Measurement Procedure	The power spectral density measurement was performed using the PSD Option 2 method described in the FCC document KDB Publication No. 558074.

E.6. SETUP DRAWING

Figure E.6-1 - Setup Drawing



E.7. TEST RESULTS

Channel	802.11b			802.11g		
	Frequency (GHz)	PPSD (dBm)	Data Rate Mb/s	Frequency (GHz)	PPSD (dBm)	Data Rate Mb/s
Low	2.412	-15.66	11	2.412	-22.32	48
Mid	2.437	-15.36	11	2.437	-24.46	48
High	2.462	-14.84	11	2.462	-23.10	48

Appendix F - Conducted Powerline Emissions Measurement

F.1. REFERENCES

Normative Reference Standard	CFR 47 FCC §15.207
Procedure Reference	ANSI C63.4

F.2. LIMITS

§15.207: Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each powerline and ground at the power terminal.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.50 – 5.0	56	46
5.0 – 30.0	60	50

*Decreases logarithmically with frequency.

F.3. ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

F.4. EQUIPMENT LIST

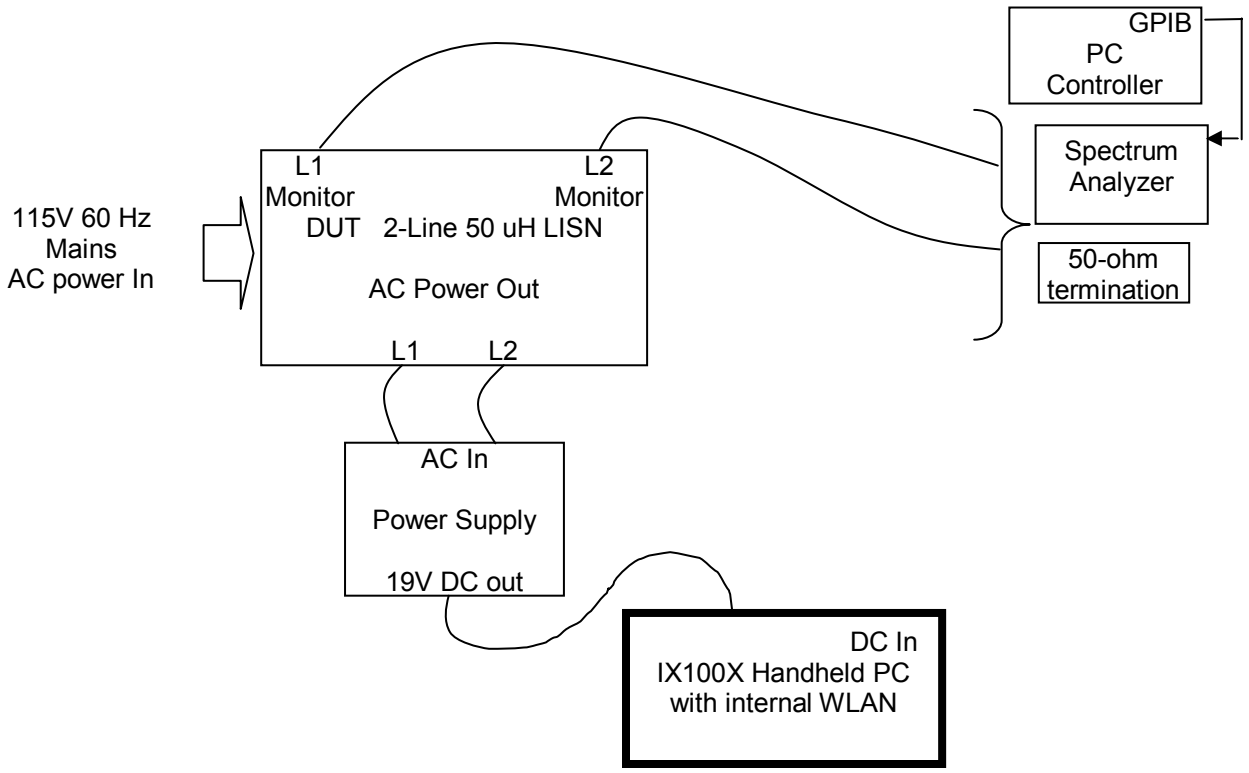
ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00049	HP	85650A	Quasi-Peak Adapter	04Apr06	04Apr07
00047	HP	85685A	RF Preselector	05Apr06	05Apr07
00051	HP	8566B	Spectrum Analyzer RF Section	04Apr06	04Apr07
00083	EMCO	3825/2	Line Impedance Stabilization Network	20Apr06	20Apr07
00084	EMCO	3825/2	Line Impedance Stabilization Network	20Apr06	20Apr07

F.5. MEASUREMENT EQUIPMENT SETUP

MEASUREMENT SETUP	The measurement setup and test was performed according to ANSI/TIA-603-C-2004 section 2.1.3 Power Line Conducted Spurious Output Voltage

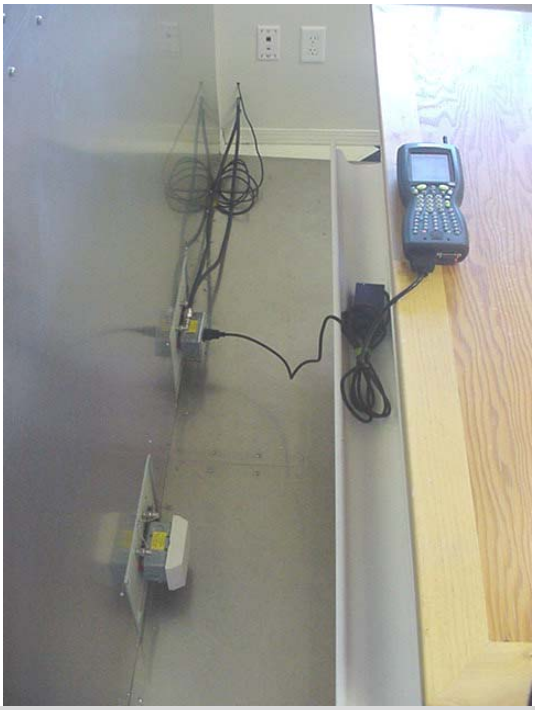
F.6. SETUP DRAWING

Figure F.6-1 - Setup Drawing



F.7. SETUP PHOTOS

Photograph F-1 - AC Powerline Conducted Emission Cable Placement



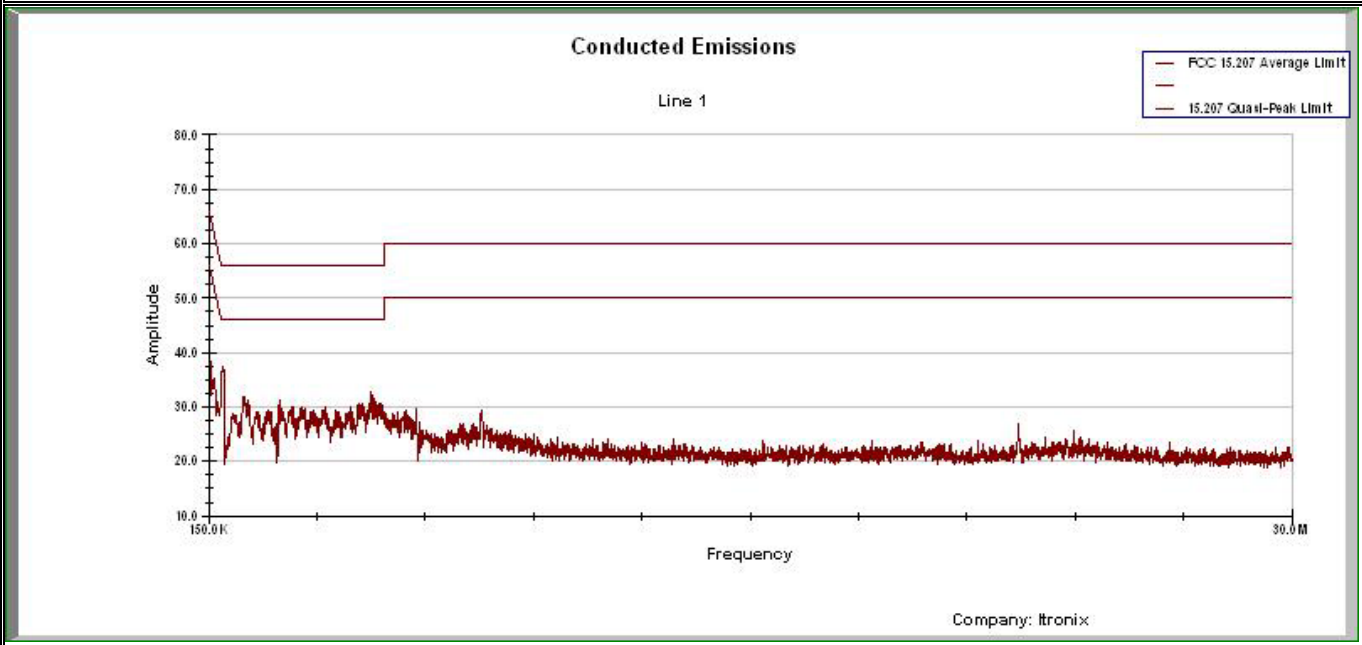
Photograph F-2 - AC Powerline Conducted Emission Configuration

F.8. DUT OPERATING DESCRIPTION

WLAN:	The WLAN was set to transmit at full power on Channel 11, Mode b, 11 Mbps
PC:	Other than operating the WLAN software and running MS windows, no PC exercising was performed.

F.9. TEST RESULTS

F.9.1. Line 1 Conducted Emissions



Project Number: 750
Company: Itronix
Product: IX100X with USI WLAN

Standard: FCC 15.207
Test Start Date: 19-Jul-05
Test End Date: 19-Jul-05

Line 1 Conducted Emissions

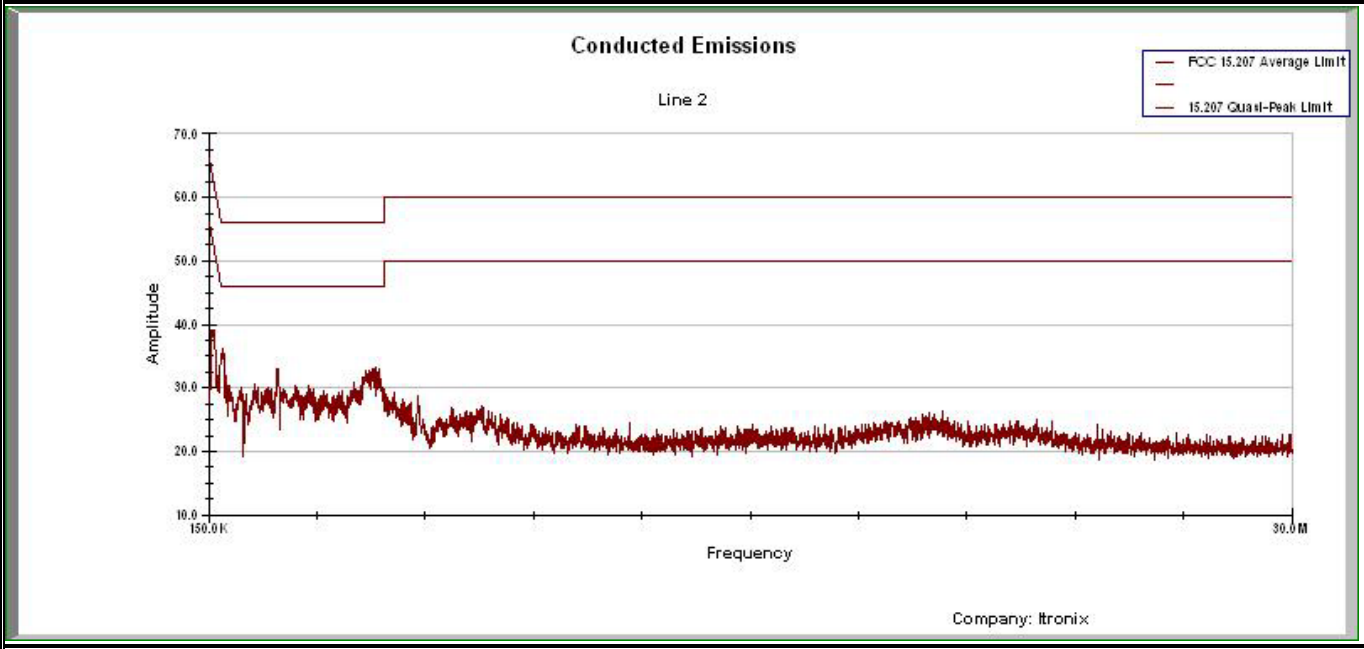
Frequency	Uncorrected Reading			Correction Factor	Corrected Emission Level			Quasi-Peak Limit	Quasi-Peak Margin	Average Limit	Average Margin	Pass/Fail
	Peak	Quasi-Peak	Average		Peak	Quasi-Peak	Average					
MHz	dBuV	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dBuV	dB	
0.150	36.60	28.52	26.51	-2.13	34.47	26.39	24.38	65.97	39.58	55.97	31.59	Pass
0.158	46.30	45.11	41.70	-2.00	44.30	43.11	39.69	65.57	22.47	55.57	15.88	Pass
0.158	46.50	45.10	41.53	-2.00	44.50	43.10	39.53	65.57	22.47	55.57	16.04	Pass
0.163	45.60	43.24	39.42	-1.91	43.69	41.33	37.51	65.29	23.96	55.29	17.78	Pass
0.171	36.90	26.47	23.45	-1.79	35.11	24.68	21.66	64.92	40.24	54.92	33.26	Pass
0.172	35.20	26.11	23.35	-1.78	33.42	24.33	21.57	64.88	40.55	54.88	33.31	Pass
0.181	34.30	22.70	22.18	-1.65	32.65	21.05	20.53	64.44	43.39	54.44	33.91	Pass
0.188	31.90	21.89	21.38	-1.55	30.35	20.34	19.82	64.12	43.78	54.12	34.29	Pass
0.189	32.90	21.79	21.18	-1.54	31.36	20.25	19.64	64.08	43.83	54.08	34.44	Pass
0.537	38.20	36.26	35.79	-0.45	37.75	35.81	35.35	56.00	20.19	46.00	10.66	Pass
0.540	30.70	28.59	27.01	-0.45	30.25	28.14	26.56	56.00	27.86	46.00	19.44	Pass
0.542	27.30	22.02	16.64	-0.45	26.86	21.58	16.19	56.00	34.43	46.00	29.81	Pass

Corrected Emission Level (dBuV) = Uncorrected Reading (dBuV) + Correction Factor (dB)
Margin (dB) = Limit (dBuV) - Corrected Emission Level (dBuV)

Calculations

CF = Correction Factor
Emission Level = Measured Level + correction factor
Margin = Limit – Emission Level

F.9.2. Line 2 Conducted Emissions



Celltech Testing and Engineering Services Lab

Project Number: 750
Company: Itronix
Product: IX100X with USI WLAN

Standard: FCC 15.207
Test Start Date: 19-Jul-05
Test End Date: 19-Jul-05

Line 2 Conducted Emissions

Frequency	Uncorrected Reading			Correction Factor	Corrected Emission Level			Quasi-Peak Limit	Quasi-Peak Margin	Average Limit	Average Margin	Pass/Fail
	Peak	Quasi-Peak	Average		Peak	Quasi-Peak	Average					
MHz	dBuV	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dBuV	dB	
0.216	41.90	40.61	38.38	-1.29	40.61	39.32	37.09	62.98	23.67	52.98	15.90	Pass
0.216	42.10	40.85	38.68	-1.29	40.81	39.56	37.39	62.97	23.41	52.97	15.57	Pass
0.225	31.20	20.20	17.14	-1.22	29.99	18.99	15.93	62.63	43.65	52.63	36.71	Pass
0.233	32.40	19.01	16.81	-1.16	31.24	17.85	15.65	62.34	44.50	52.34	36.70	Pass
0.234	31.40	18.79	16.99	-1.16	30.24	17.63	15.83	62.31	44.68	52.31	36.48	Pass
0.242	30.30	18.58	15.85	-1.11	29.19	17.47	14.74	62.04	44.57	52.04	37.30	Pass
0.245	29.50	18.50	15.95	-1.09	28.41	17.41	14.87	61.91	44.50	51.91	37.04	Pass
0.245	29.80	18.65	15.86	-1.09	28.72	17.57	14.77	61.91	44.34	51.91	37.14	Pass
0.290	27.20	17.36	13.70	-0.87	26.33	16.49	12.83	60.53	44.04	50.53	37.69	Pass
0.291	28.50	17.15	13.61	-0.87	27.63	16.28	12.75	60.49	44.21	50.49	37.75	Pass
0.297	27.40	17.18	13.64	-0.84	26.56	16.34	12.80	60.34	44.00	50.34	37.54	Pass
30.000	25.80	15.93	11.50	-0.45	25.35	15.48	11.04	60.00	44.52	50.00	38.96	Pass

Corrected Emission Level (dBuV) = Uncorrected Reading (dBuV) + Correction Factor (dB)
Margin (dB) = Limit (dBuV) - Corrected Emission Level (dBuV)

Calculations

CF = Correction Factor
Emission Level = Measured Level + correction factor
Margin = Limit – Emission Level

Appendix G - Conducted RX Spurious Emissions Measurement

G.1. REFERENCES

Normative Reference Standard	IC RSS-GEN §6
Procedure Reference	IC RSS-GEN §4.8

G.2. LIMITS

IC RSS-GEN §6	*(b) If a conducted measurement is made, no spurious output signals appearing at the antenna terminals shall exceed 2 nanowatts per 4 kHz spurious frequency in the band 30 – 1000 MHz or 5 nanowatts above 1 GHz.*

G.3. ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 2 kPa

G.4. EQUIPMENT LIST

RECEIVING EQUIPMENT

ID	ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
1	00015	Agilent	E4408B	Spectrum Analyzer	02Feb06	02Feb07
2	na	Itronix	na	Cable & SMA adapter	na	na*

*Verified with VNA

G.5. MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS	The measurement equipment was connected as shown in D.6.

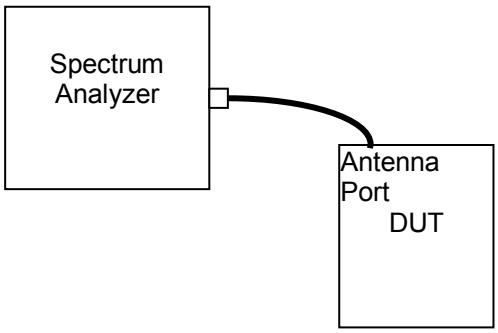
MEASUREMENT EQUIPMENT SETTINGS

The spectrum analyzer was set to the following settings:

Frequency Range	RBW (kHz)	VBW (kHz)	Detector
30 MHz – 1 GHz	10	10	Peak
1 GHz – 9 GHz	100	100	Peak

G.6. SETUP DRAWING

Figure G.6-1 - Setup Drawing

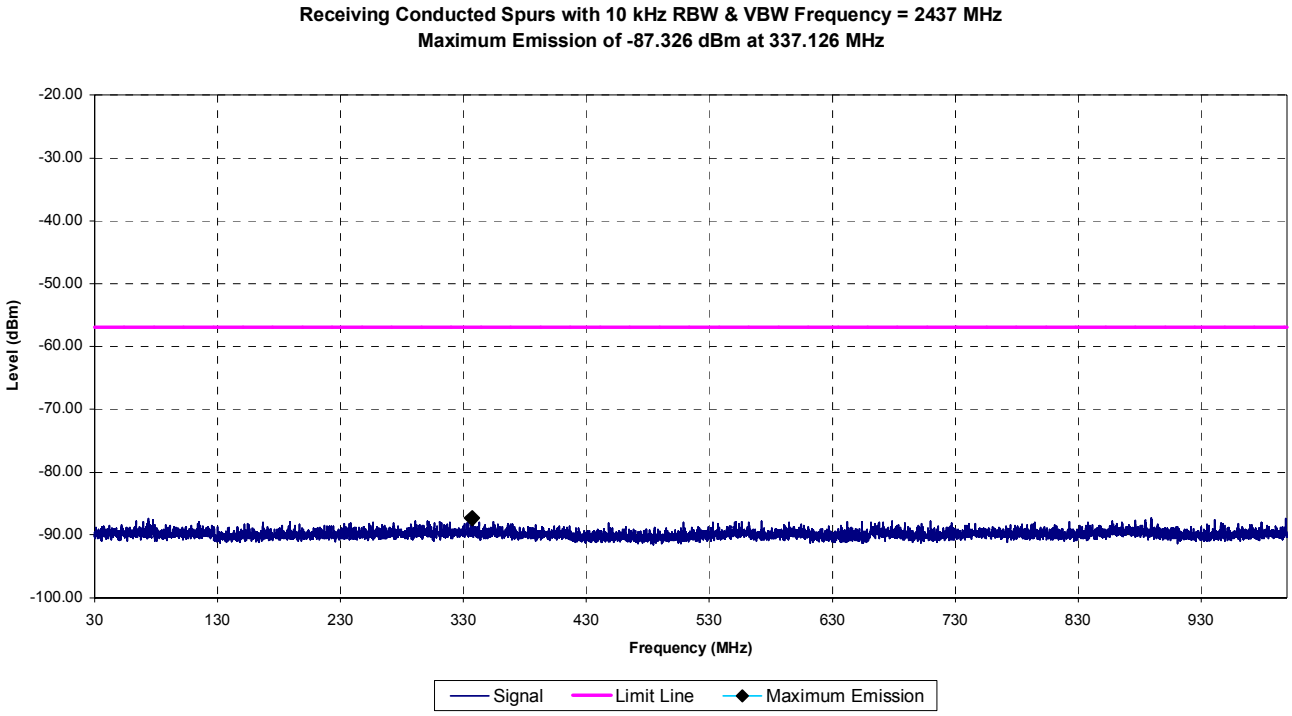


G.7. DUT OPERATING DESCRIPTION

Measurements were made with the DUT in receive mode for the mid channel (2437 MHz) in both b and g data modes.

G.8. RECEIVER SPURIOUS EMISSIONS TEST RESULTS

G.8.1. Mid Channel - Mode b - 30 MHz to 1 GHz



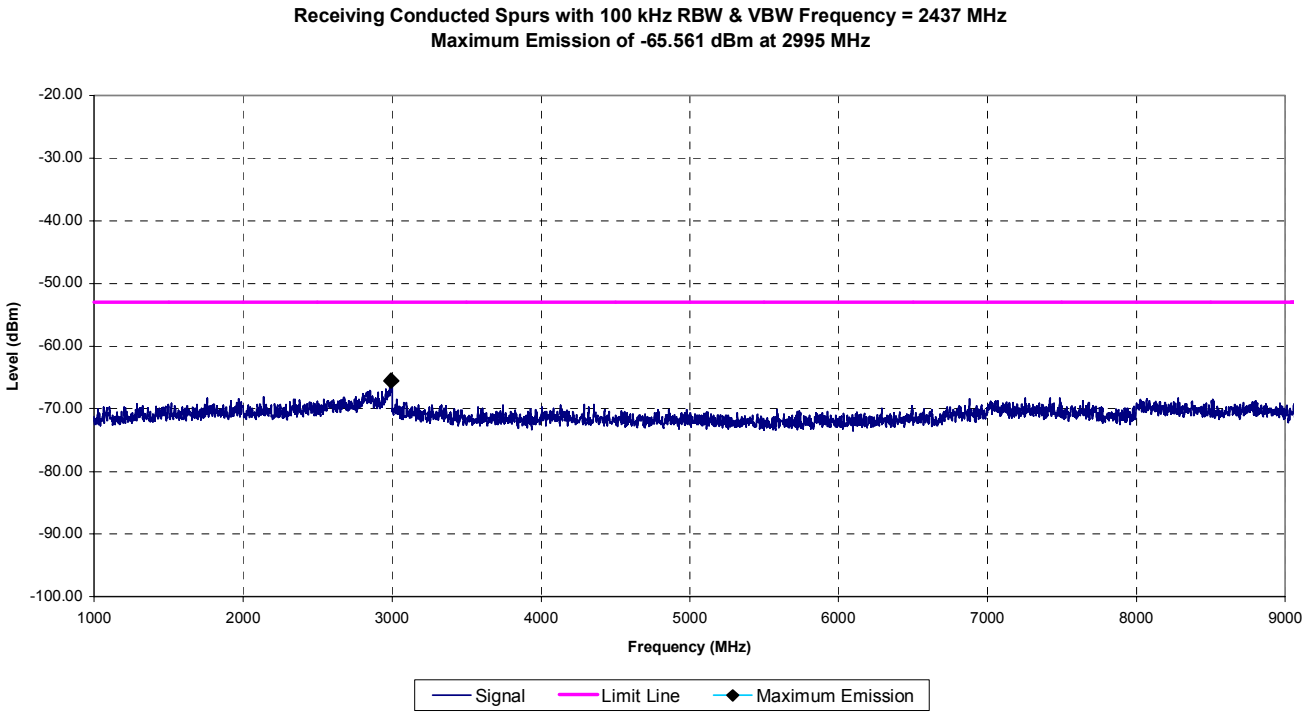
Calculations

Because the RBW of the measurement is greater than 4 kHz, no bandwidth correction is required.

Highest emission in the region from 30 MHz to 1 GHz:
-87.326 dBm or 1.85 pW

Margin (nW) = 2 nW – 0.00185 nW
= 1.998 nW

G.8.2. Mid Channel - Mode b - 1 GHz to 9 GHz



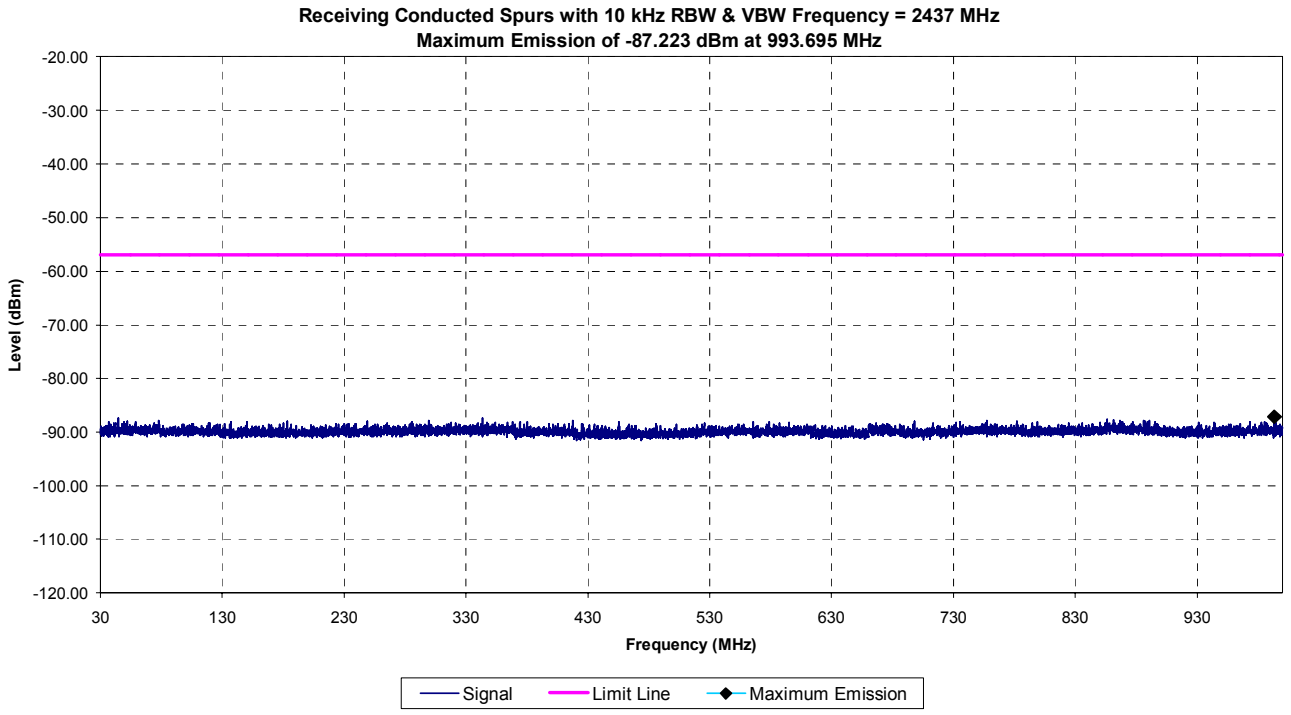
Calculations

Because the RBW of the measurement is greater than 4 kHz, no bandwidth correction is required.

Highest emission in the region from 1 GHz to 9 GHz:
-65.561 dBm or 0.2779 nW

Margin (nW) = 5 nW – 0.2779 nW
= 4.722 nW

G.8.3. Mid Channel - Mode g - 30 MHz to 1 GHz



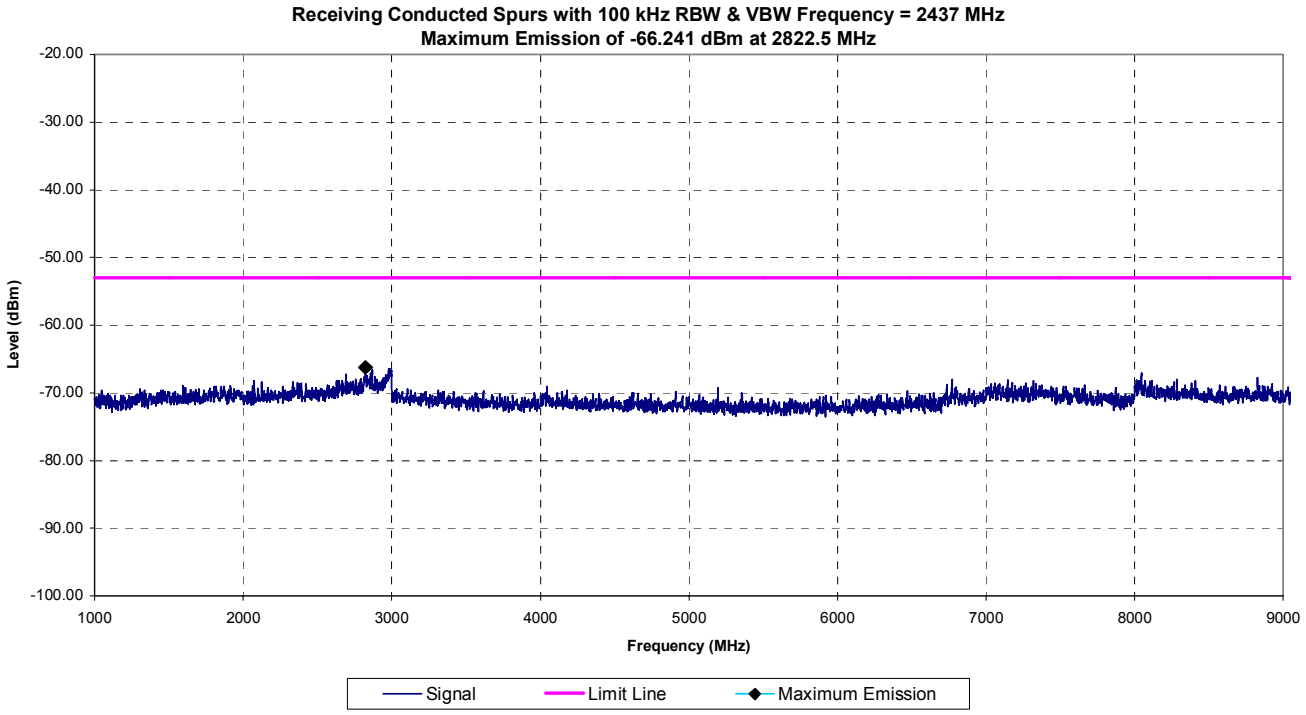
Calculations

Because the RBW of the measurement is greater than 4 kHz, no bandwidth correction is required.

Highest emission in the region from 30 MHz to 1 GHz:
-87.223 dBm or 1.895 pW

Margin (nW) = 2 nW – 0.001895 nW
= 1.998 nW

G.8.4. Mid Channel - Mode g - 1 GHz to 9 GHz



Calculations

Because the RBW of the measurement is greater than 4 kHz, no bandwidth correction is required.

Highest emission in the region from 1 GHz to 9 GHz:
-66.241 dBm or 0.2376 nW

Margin (nW) = 5 nW – 0.2376 nW
= 4.762 nW

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