SUPPLEMENTARY EMC TEST REPORT
FOR THE
ITRONIX RUGGED TABLET PC MODEL: IX325-IWLBT
WITH THE
INTERNAL MSI MS-6837 BLUETOOTH TRANSMITTER
UTILIZING THE
WELL GREEN TECHNOLOGY INTERNAL PIFA WLAN ANTENNA 3
CO-TRANSMITTING WITH THE
INTEL PRO2200BG 802.11B/G 2.4 GHz DSSS WLAN MINI-PCI CARD
UTILIZING THE
WELL GREEN TECHNOLOGY DUAL INTERNAL PIFA WLAN ANTENNAS 1&2

FCC ID: KBCIX325-IWLBT

IC: 1943A-IX325a

TRSN 060605KBC-T644-E15W/B
Issue 1.0

Celltech Compliance Testing & Engineering Lab
(Celltech Labs Inc.)
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V1Y 9L3

Test Report Issue Date
August 15, 2005

DECLARATION OF COMPLIANCE

Test Lab

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Applicant

ITRONIX CORPORATION
801 South Stevens Street
Spokane, WA 99204
United States

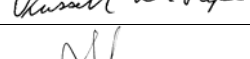
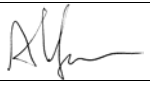
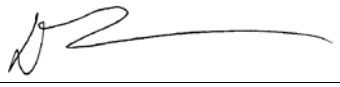
Lab Registration No.(s):	FCC:	714830	IC:	3874
Rule Part(s):	FCC:	§15.247; §2.1091; §1.1310	IC:	RSS-210 Issue 5 - A1. 11/30/02
Device Classification:	FCC:	WLAN - DSSS Digital Transmission System (DTS)	Bluetooth - FHSS Part 15 Spread Spectrum Transmitter (DSS)	
	IC:	Low Power Licence-Exempt Transmitter		
Device Identification:	FCC ID:	KBCIX325-IWLBT	IC:	1943A-IX325a

DUT Description:				
Model:	IX325-IWLBT			
Device Description:	Rugged Tablet PC			
Internal Transmitter(s):	Intel PRO2200BG 802.11b/g 2.4 GHz DSSS WLAN Mini-PCI Card			
	Micro-Star International MS-6837 Bluetooth			
TX Frequency Ranges:	WLAN	2412 - 2462 MHz	Bluetooth	2402 - 2480 MHz
Max. RF Output Power:	WLAN	0.074 Watts - 18.71 dBm - Peak Conducted - 802.11b		
		0.052 Watts - 17.16 dBm - Peak Conducted - 802.11g		
	Bluetooth	0.00261 Watts - 4.17 dBm - Peak Conducted		
Modulation Type(s):	WLAN	OFDM with BPSK, QPSK, 16QAM, 64QAM, DBPSK, DQPSK, CCK		
	Bluetooth	GFSK 1 Mbps 0.5 BT Gaussian		
Antenna Type(s):	WLAN	Well Green Technology PIFA Dual Internal Antennas: Primary Transmit & Receive mounted on the right upper edge of LCD Display (Antenna 2) Auxiliary WLAN Receive only mounted on the left upper edge of LCD Display (Antenna 1)		
	Bluetooth	Well Green Technology PIFA Internal Antenna - left mid side edge of LCD Display (Antenna 3)		
Power Source(s):	Stationary: 75 Watt AC Power Adapter			
	11.1 V Internal Lithium-ion Battery, 3600 mAh (Model: T8M-E)			
	11.1 V External Second Lithium-ion Battery, 3600 mAh (Model: T8S-E)			

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 5.

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.

	**Russell Pipe** **Senior Compliance Technologist** **Celltech Labs Inc.**
	**Alex Yuan** **EMC Technologist** **Celltech Labs Inc.**
	**Duane M. Friesen, C.E.T.** **EMC Manager** **Celltech Labs Inc.**

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PHOTOGRAPHS

TEST SUMMARY

Appendix	Test Description	Procedure Reference	Limit Reference	Test Start Date	Test End Date	Result
Referenced Standard: FCC CFR Title 47 Part 15						
B	Bluetooth Peak Conducted Output Power	FCC 97-114	§15.247 (b) (3)	12Jul05	3Aug05	Pass
C	Bluetooth 6 dB Bandwidth	FCC 97-114	§15.247(2)	12Jul05	3Aug05	Pass
D	WLAN 6 dB Bandwidth	FCC 97-114	§15.247(2)	12Jul05	3Aug05	Pass
E	WLAN Peak Conducted Output Power	FCC 97-114	§15.247 (b) (3)	12Jul05	3Aug05	Pass
F	Radiated Spurious Emissions	FCC 97-114	§15.247(c)	22Jul05	10Aug05	Pass
G	Restricted Band Emissions	FCC 97-114	§15.205 (a), (b) §15.209 (a)	22Jul05	10Aug05	Pass
H	Powerline Conducted Emissions	ANSI C63.4	§15.207	3Aug05	3Aug05	Pass
Referenced Standard: IC RSS-210 Issue 5						
B	Bluetooth Peak Conducted Output Power	FCC 97-114	§15.247 (b) (3)	12Jul05	3Aug05	Pass
C	Bluetooth 6 dB Bandwidth	FCC 97-114	§15.247(2)	12Jul05	3Aug05	Pass
D	WLAN 6 dB Bandwidth	FCC 97-114	§15.247(2)	12Jul05	3Aug05	Pass
E	WLAN Peak Conducted Output Power	FCC 97-114	§15.247 (b) (3)	12Jul05	3Aug05	Pass
F	Radiated Spurious Emissions	FCC 97-114	§15.247(c)	22Jul05	10Aug05	Pass
G	Restricted Band Emissions	FCC 97-114	§15.205 (a), (b) §15.209 (a)	22Jul05	10Aug05	Pass
H	Powerline Conducted Emissions	ANSI C63.4	§15.207	3Aug05	3Aug05	Pass

REVISION LOG

Issue	Description	Implemented By	Implementation Date
1.0	Initial Release	Jon Hughes	15Aug05

SIGNATORIES

Prepared By		August 15, 2005
Name/Title	Duane M. Friesen, C.E.T. / EMC Manager	Date
Reviewed By		August 15, 2005
Name/Title	Jon Hughes / General Manager	Date

1.0 SCOPE

This supplementary report outlines the measurements made and results collected during the electromagnetic emissions testing of the Itronix Corporation Model: IX325-IWLBT Rugged Tablet PC with internal MSI MS-6837 Bluetooth co-transmitting with the Intel PRO2200BG 802.11b/g 2.4 GHz DSSS WLAN Mini-PCI Card. Each radio transmitter is attached to internal Well Green Technology PIFA antennas. This report describes the effects on key parameters when both transmitters installed in the IX325 Rugged Tablet PC as described, are transmitting simultaneously. Measurements made for each transmitter operating singularly are described in separate test reports. The measurement 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 5.

2.0 REFERENCES

2.1 Normative References

ANSI/ISO 17025:1999	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
FCC CFR Title 47:2004	Code of Federal Regulations Title 47: Telecommunication Part 2: Frequency Allocations and Radio Treaty Matters; General Rules and Regulations 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 (May 10, 2005)
IC Spectrum Management & Telecommunications Policy	Radio Standards Specification RSS-212 Issue 1 (Provisional) - Test Facilities & Test Methods for Radio Equipment RSS-210 Issue 5 - Low Power Licence-Exempt Radiocommunication Devices: Amendment November 30, 2002 RSS-102 Issue 1 (Provisional) - Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields
Celltech Labs Test Reports	FCC Part 15C EMC Test Report for the ITRONIX Rugged Tablet PC Model: IX325-IWLBT Including the Intel Pro2200BG 802.11b/g 2.4 GHz DSSS WLAN Mini-PCI Card with dual Well Green Technology Internal PIFA Antennas 1&2 Test Report Serial Number 060605KBC-T644-E15W Issue 1 Date: August 12, 2005 FCC Part 15C EMC Test Report for the ITRONIX Rugged Tablet PC Model: IX325-IWLBT including the MSI Model MS-6837 Bluetooth Transmitter with Well Green Technology Internal PIFA Antenna 3 Test Report Serial Number 060605KBC-T644-E15B Issue 1 Date: August 12, 2005

TERMS AND DEFINITIONS

AV	Average
CFR	Code of Federal Regulations
dB	decibel
dBm	dB referenced to 1 mW
dBuV	dB referenced to 1 uV
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
Hz	Hertz
IC	Industry Canada
kHz	kilohertz
LNA	Low Noise Amplifier
m	meter
MAP	Mean Average Power
MHz	Megahertz
Mbps	megabits per second
na	not applicable
n/a	not available
PIFA	Planar inverted folded antenna
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

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 are listed with the FCC under Registration Number 714830 and Industry Canada under File Number IC 3874.

4.0 GENERAL INFORMATION

4.1 Applicant Information

Company Name:	Itronix Corporation
Address:	801 South Stevens Street
	Spokane, WA 99204
	United States

4.2 DUT Description

The DUT consisted of the Itronix Rugged Tablet PC Model: IX325-IWLBT with internal Intel PRO2200BG 802.11b/g 2.4 GHz DSSS WLAN Mini-PCI Card and co-located MSI MS-6837 Bluetooth. The WLAN utilizes two internal PIFA antennas installed on the top side front edge of the DUT (LCD side) and the Bluetooth utilizes a PIFA antenna installed on the left side middle edge of the DUT (LCD side). Photographs of the DUT placement and construction are shown in Appendix A.

Device:	Rugged Tablet PC			
Model:	IX325-IWLBT			
Serial Number:	ZZGEG5073ZZ9782			
Identifier(s):	FCC ID:	KBCIX325-IWLBT	IC:	1943A-IX325a
Power Source(s):	Delta Electronics 75 Watt AC-DC Power Supply Model: ADP-75 FB B Rev 00 (S/N: UCT030200307)			
	Internal Lithium-ion 11.1 V 3600 mAh Battery Model: T8M-E			
	External Second Lithium-ion 11.1 V 3600 mAh Battery Model: T8S-E			

Device:	2.4GHz DSSS WLAN Mini-PCI Card (802.11b/g)			
Model:	Intel PRO2200BG			
Serial Number:	060189074ADC54906006			
Rule Part(s):	FCC:	§15.247; §2.1091; §1.1310	IC:	RSS-210 Issue 5 - A1. 11/30/02
Classification:	FCC:	Digital Transmission System (DTS)	IC:	Low Power Licence-Exempt Transmitter
Power Source:	Powered from the internal PC power supply			

Device:	2.4GHz FHSS Bluetooth Transmitter			
Model:	Micro-Star International Co. Ltd. MS-6837		**Serial Number:**	BH5070000079
Rule Part(s):	FCC:	§15.247; §2.1091; §1.1310	IC:	RSS-210 Issue 5 - A1. 11/30/02
Classification:	FCC:	Spread Spectrum Transmitter (DSS)	IC:	Low Power Licence-Exempt Transmitter
Power Source:	Powered from the internal PC power supply			

Device:	Internal PIFA WLAN Antenna 1 (diversity antenna for Receive only) - upper left side of LCD
Model:	Well Green Technology WLAN Antenna
Gain:	2.41 dBi

Device:	Internal PIFA WLAN Antenna 2 (diversity antenna for Transmit and Receive) - upper right side of LCD
Model:	Well Green Technology WLAN Antenna
Gain:	1.65 dBi

Device:	Internal PIFA Bluetooth Antenna 3 - mid left side of LCD
Model:	Well Green Technology Bluetooth Antenna
Gain:	-0.81 dBi

Note: In compliance with the requirements of *§15.247 (b) (4),* the gain of the antenna used in this DUT is less than 6 dBi, therefore no reduction in the conducted power limit is required.

4.3 Co-Located Equipment

Device:	GPS Receiver Module
Model:	Leadtek Model LR9805

Device:	GPS Antenna (Receive only)
Model:	Sarantel 101401040/2004UK

4.4 Cable Descriptions

ROUTING		Length	Model	Terminations		Shield Type	Shield Termination		Suppression
From	To	m		End 1	End 2		End 1	End 2	
PC modem port	Unterminated	1.0	n/a	RJ-11	RJ-11	None	na	na	None
PC network port	Network hub	1.0	n/a	RJ-45	RJ-45	None	na	na	None

4.5 Support Equipment

The following equipment was used in support of the DUT.

CO-LOCATED SUPPORT EQUIPMENT LIST		
MANUFACTURER	**MODEL**	**DESCRIPTION**
D-Link	DE-809TC/	Ethernet hub
YNG YUH	YP-040	Hub power supply
MLi	699	Speakers
Polk Audio	n/a	Speaker-microphone
	K8255	Keyboard
Sanwa Supply	MA-MBUSB	Mouse

4.6 Clock Frequencies

4.6.1 DUT Clock Frequencies

Device:	Rugged Tablet PC
Clocks:	n/a
Name:	2.4GHz DSSS WLAN Mini-PCI Card
Clocks:	n/a
Name:	Internal Dual PIFA Antennas (WLAN)
Clocks:	None
Name:	2.4GHz FHSS Bluetooth
Clocks:	n/a
Name:	Internal PIFA Antenna (Bluetooth)
Clocks:	None

4.6.2 Co-Located Clock Frequencies

Device:	Peripherals
Clocks:	n/a

4.7 Mode(s) of Operation Tested

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

4.7.1 Bluetooth Transceiver

TX Frequency Range	2402 - 2480 MHz Ch. 0 (2402 MHz), Ch. 39 (2441 MHz) & Ch. 78 (2480 MHz) measured unless otherwise noted)	
Software Power Gain Settings	Ch. 0 - 255 / 61, Ch. 39 - 255 / 63, Ch. 78 - 255 / 63	
RF Peak Conducted Output Power Tested	Single Transmit	Co-Tx with Highest Power WLAN Channel
	Ch. 0 - +3.96 dBm Ch. 39 - +3.57 dBm Ch. 78 - +3.44 dBm	Ch. 0 - +4.17 dBm Ch. 39 - +3.94 dBm Ch. 78 - +3.08 dBm
Modulation Type	GFSK 0.5 BT Gaussian	
Modulation Frequency	0 for carrier power, TXDATA1 default (PRBS9 payload, packet type DM5) for other measurements	
Power Source(s) Tested	All tests were performed with the AC Power Adapter powering the DUT.	

4.7.2 Bluetooth Exercising Software Description

The DUT was configured and exercised using customer supplied test software that allowed an operator to set the operating parameters of the Bluetooth transmitter. Depending on the measurement being made, the power, channel and modulation were set appropriately. The settings used are described in each appendix.

4.7.3 WLAN Mini-PCI Card

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:	802.11b set to power setting of 27 802.11g set to power setting of 20					
RF Peak Conducted Output Power Tested:[1]	**802.11b**	Single	Co-TX with highest BT hopping	**802.11g**	Single	Co-TX with highest BT hopping
	2412 MHz 2437 MHz 2462 MHz	18.42 dBm 18.29 dBm 18.98 dBm	17.65 dBm 18.20 dBm 18.71 dBm	2412 MHz 2437 MHz 2462 MHz	16.81 dBm 17.25 dBm 17.48 dBm	17.16 dBm 17.02 dBm 17.12 dBm
Modes / Data Rates Tested:[2]	802.11b - (1, 5.5, 11 Mbps checked in single, 1 Mbps short determined to be worst-case spurious and used unless otherwise noted)					
	802.11g - (6, 36, 54 Mbps checked in prescan, 6 Mbps determined to be worst-case spurious and used unless otherwise noted)					
Modulation Type(s):	OFDM with BPSK, QPSK, 16QAM, 64QAM, DBPSK, DQPSK, CCK					
Power Source(s) Tested:	All tests were performed with the AC Power Adapter powering the DUT.					

Note 1: Peak power measured and corrected per FCC Document KDB Pub. No. 558074 Power Output Option 2 Method 1.
Note 2: Turbo mode available at module level but not enabled when installed in DUT.

4.7.4 WLAN Exercising Software Description

The WLAN was configured and exercised using customer supplied test software that allows an operator to set the parameters of the WLAN operation. With the exception of the output power and frequency settings, all other WLAN settings were left on their default settings. The settings used are described in each appendix. Unless otherwise noted the power gain settings were set as described in section 5.6 with the worst-case data rate as described in the same section. Software power settings were set as defined by the manufacturer for typical operation.

4.8 Configuration Description

The DUT was configured, as described by the client as being representative of what would be delivered to a final customer. This configuration included the WLAN, Bluetooth, and internal antennas as described in section 5.2 installed in a typical manner. The DUT orientation was set with its long edge up (power supply port down). More specific details may be included in each appendix.

4.8.1 Configuration Justification

The DUT was tested in a configuration described by the client as being worst-case but typical of normal use.

Using the worst-case data rates determined in the WLAN single testing (Mode b - 1 Mbps & Mode g - 6 Mbps), prescan measurements were made for each of the three orthogonal axis configurations with the each WLAN channel, in each of the two available modes (b & g) while the Bluetooth was set to hop through its channels with a worst-case power setting. The configuration with the highest inter-modulation emissions (or highest carrier when no emission difference was apparent) was determined and used for all radiated testing. Of all three DUT orientations, the one with the DUT's long edge up (power supply port down) was determined to produce the highest radiated carrier power. Unless otherwise specified in the applicable appendices, these settings were used for the measurements described in this report.

5.0 PASS/FAIL CRITERIA

Unless otherwise noted in the Appendices, the pass/fail criteria is the limit set forth in the reference standards. A 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 - DUT Photographs

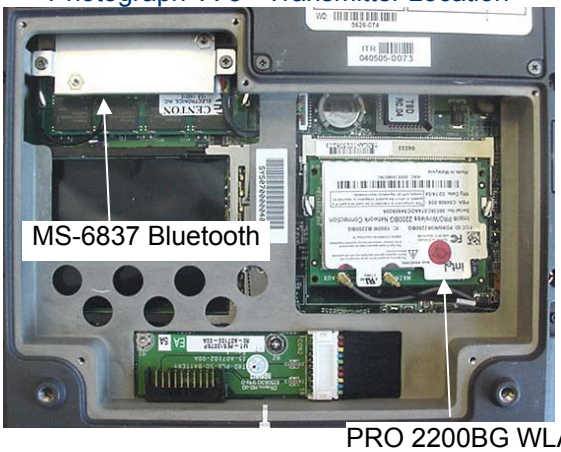
Photograph A-1 - Front of IX325 Tablet PC

Photograph A-2 - Back of IX325 Tablet PC

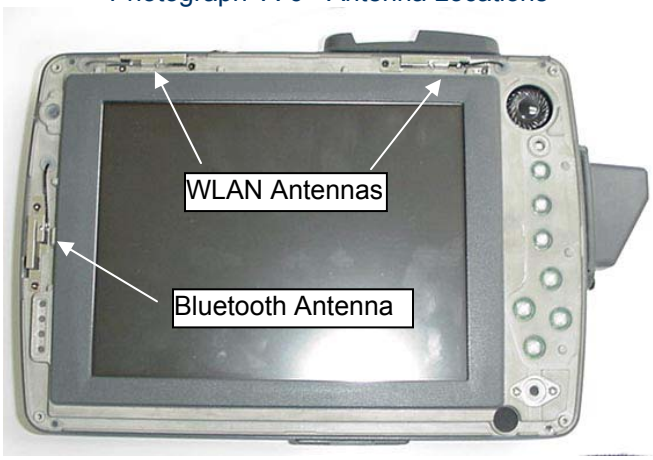
Photograph A-3 - Edge of IX325 Tablet PC

Photograph A-4 - Side of IX325 Tablet PC

Photograph A-5 - Transmitter Location



Photograph A-6 - Antenna Locations



Appendix B - Bluetooth Peak Conducted 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) (1) For frequency hopping systems operating in the 2400 – 2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725 – 5850 MHz bands: 1 Watt.**

*Single Transmitter report results confirm the number of hopping channels to be at least 75.

B.3. ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 2 ºC
Humidity	35 +/- 2 %
Barometric Pressure	96 kPa

B.4. EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00015	Agilent	E4408B	Spectrum Analyzer	24Jan05	24Jan06
00075	Alpha Wire-J	9223	1ft. RG223/U RF Cable	na*	na
00076	Pasternack	PE7014-30	30dB 2 Watt Attenuator	na*	na

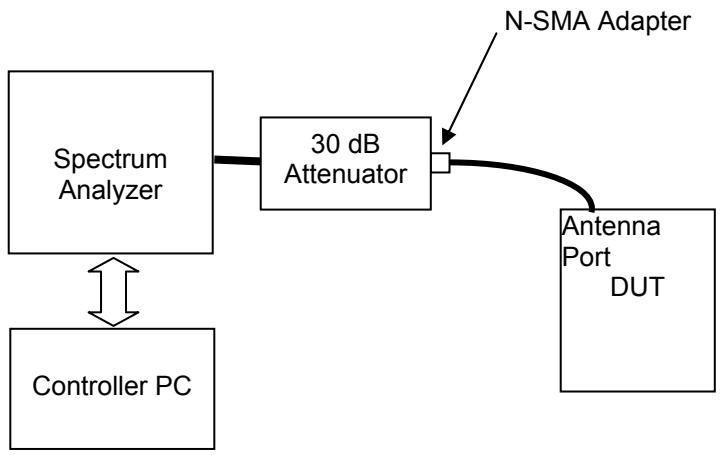
*Cable and attenuator verified with power meter prior to use

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 – 1 MHz VBW – 1 MHz Detector – Peak Trace – Max Hold Span -12 MHz
Measurement Procedure	A PC controller was used to record the spectrum analyzer display and pick the maximum level.

B.6. SETUP DRAWING

Figure B.6-1 - Setup Drawing



B.7. DUT OPERATING DESCRIPTION

The maximum peak power is measurement with the DUT set at max power for each of the three low, mid and high channels with no modulation applied for the single transmitter test. In addition, the WLAN transmitting in the highest power mode and channel (CH1 Mode b) was enabled for the co-transmitting measurement.

B.8. TEST RESULTS

Channel	Frequency	Single Bluetooth Transmitter			Bluetooth Co-transmitting with WLAN Channel 1 Mode b		
		Bluetooth Peak Conducted Power		Limit	Bluetooth Peak Conducted Power		Limit
	MHz	dBm	Watts	Watts	dBm	Watts	Watts
Low	2402	3.96	.00249	1	4.17	.00261	1
Mid	2441	3.57	.00228	1	3.94	.00248	1
High	2480	3.44	.00221	1	3.08	.00203	1

B.9. PASS/FAIL

In reference to the results outlined in B.8, the DUT passes the requirements as stated in the reference standards as follows:

§15.247(b): The maximum peak output power of the intentional radiator shall not exceed the following:
§15.247(b) (1) For frequency hopping systems operating in the 2400 - 2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725 - 5850 MHz bands: 1 Watt

The number of hopping channels is greater than 75 and the maximum co-transmitting power recorded was measured for Channel 0 at 0.00261 watt (+4.17 dBm) when the DUT was set as defined. A maximum change of approximately +/- 0.37 dB was realized when the WLAN transmitter was enabled.

B.10. SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Alex Yuan
EMC Technologist
Celltech Labs Inc.

14Jul05
Date

Russell Pipe
Senior Compliance Technologist
Celltech Labs Inc.

14Jul05
Date

Appendix C - Bluetooth 20 dB Bandwidth Measurement

C.1. REFERENCES

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

C.2. LIMITS

C.2.1. FCC CFR 47

§15.247 (a) (1) (iii): Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

Note: The channel width as referenced in the results outlined in Appendix D and E of the single report is 1 MHz, therefore to be non-overlapping, the 20 dB bandwidth must be no greater than 1 MHz for the system to comply.

C.3. ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 2 ºC
Humidity	35 +/- 2 %
Barometric Pressure	96 kPa

C.4. EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00015	Agilent	E4408B	Spectrum Analyzer	24Jan05	24Jan06
00075	Alpha Wire-J	9223	1ft. RG223/U RF Cable	na*	na
00076	Pasternack	PE7014-30	30dB 2 Watt Attenuator	na*	na

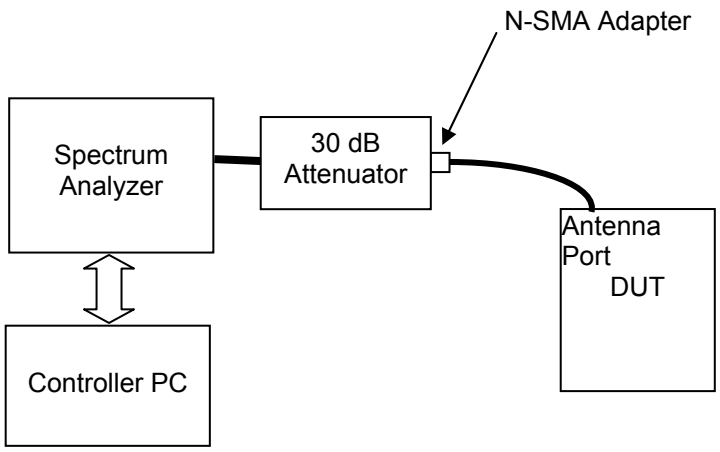
*Cable and attenuator verified with power meter prior to use

C.5. MEASUREMENT EQUIPMENT SETUP

Measurement Equipment Connections	The equipment was connected as shown in the setup drawing in C.6.
Measurement Equipment Settings	The occupied bandwidth was measured for each channel using the spectrum analyzer with settings of: Frequency – each of three low, mid and high channels (2402, 2441 & 2480 MHz) Span – 5 MHz RBW – 30 kHz VBW – 30 kHz Sweep – 5 mS Detector – Peak Trace - Max Hold Offset – appropriate for external attenuation (-31.4 dB)

C.6. SETUP DRAWING

Figure C.6-1 - Setup Drawing



C.7. DUT OPERATING DESCRIPTION

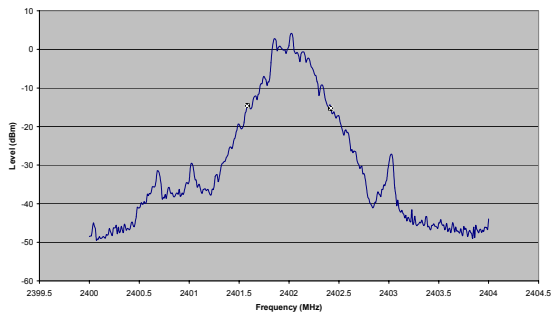
The 20 dB occupied bandwidth is measurement with the DUT set at max power for each of the three low, mid and high channels with pseudo-random modulation applied for the single transmitter test. In addition, the WLAN transmitting in the highest power mode and channel (CH1g) was enabled for the co-transmitting measurement.

C.8. TEST RESULTS

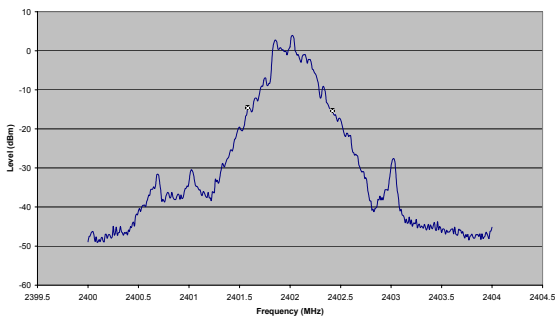
C.8.1. Occupied Bandwidth

Single Bluetooth Transmitter	Bluetooth co-transmitting with WLAN CH1 Mode g

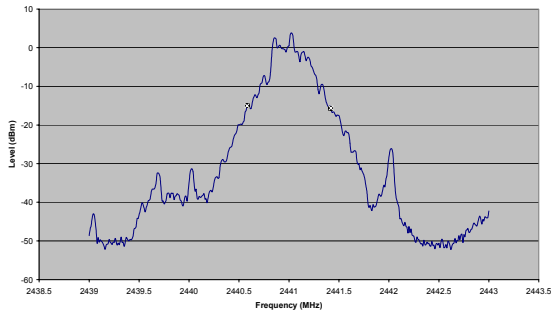
MSI Bluetooth: Occupied Bandwidth
Frequency = 2402 MHz, -20 dB OBW = 839.8 kHz with RBW = 30 kHz
Setting: Power Ext = 255, Int = 61



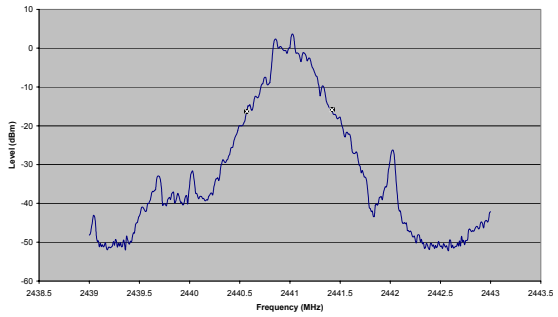
MSI Bluetooth CoTx with Intel WLAN: Occupied Bandwidth
Frequency = 2402 MHz, -20 dB OBW = 839.8 kHz with RBW = 30 kHz
Setting: Power Ext = 255, Int = 61



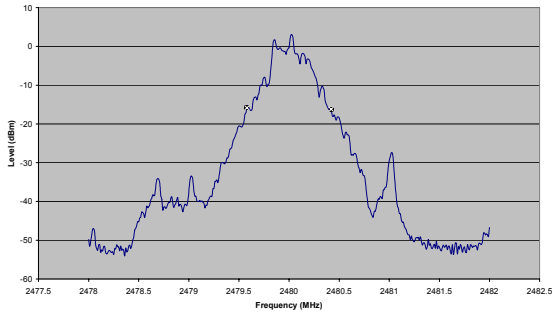
MSI Bluetooth: Occupied Bandwidth
Frequency = 2441 MHz, -20 dB OBW = 839.8 kHz with RBW = 30 kHz
Setting: Power Ext = 255, Int = 63



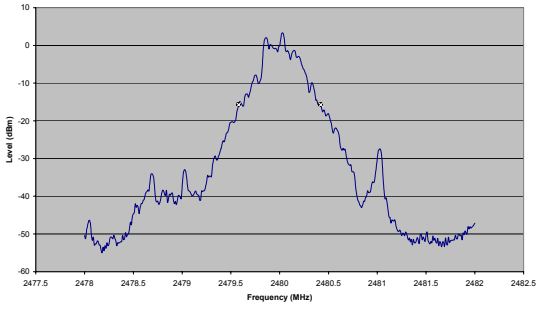
MSI Bluetooth CoTx with Intel WLAN: Occupied Bandwidth
Frequency = 2441 MHz, -20 dB OBW = 849.8 kHz with RBW = 30 kHz
Setting: Power Ext = 255, Int = 63



MSI Bluetooth: Occupied Bandwidth
Frequency = 2480 MHz, -20 dB OBW = 840.4 kHz with RBW = 30 kHz
Setting: Power Ext = 255, Int = 63



MSI Bluetooth CoTx with Intel WLAN: Occupied Bandwidth
Frequency = 2480 MHz, -20 dB OBW = 840.4 kHz with RBW = 30 kHz
Setting: Power Ext = 255, Int = 63



Channel	Power Settings	Frequency	Single 20 dB Bandwidth	Co-transmit 20 dB Bandwidth	Limit
	Power (ext/int)	MHz	kHz	kHz	kHz
1	255/61	2402	839.8	839.8	1000
6	255/63	2441	839.8	849.8	1000
11	255/63	2480	840.4	840.4	1000

C.9. PASS/FAIL

In reference to the results outlined in C.8, the DUT passes the requirements as stated in the reference standards as follows:

§15.247 (a) (1) (iii): Frequency hopping systems in the 2400 - 2483.5 MHz band shall use at least 15 non-overlapping channels. Note: The channel width as referenced in the results outlined in Appendix D and E is 1 MHz, therefore to be non-overlapping, the 20 dB bandwidth must be no greater than 1 MHz for the system to comply.

The maximum 20 dB co-transmitting bandwidth measured was 849.8 kHz. The largest difference between single and co-transmitting configurations was 10 kHz.

C.10. SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Alex Yuan
EMC Technologist
Celltech Labs Inc.

14Jul05
Date

Russell Pipe
Senior Compliance Technologist
Celltech Labs Inc.

14Jul05
Date

Appendix D - WLAN Peak Conducted Power Measurement

D.1. REFERENCES

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

D.2. LIMITS

D.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.

D.3. ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 2 ºC
Humidity	35 +/- 2 %
Barometric Pressure	96 kPa

D.4. EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00015	Agilent	E4408B	Spectrum Analyzer	24Jan05	24Jan06
00075	Alpha Wire-J	9223	1ft. RG223/U RF Cable	na*	na
00076	Pasternack	PE7014-30	30dB 2 Watt Attenuator	na*	na

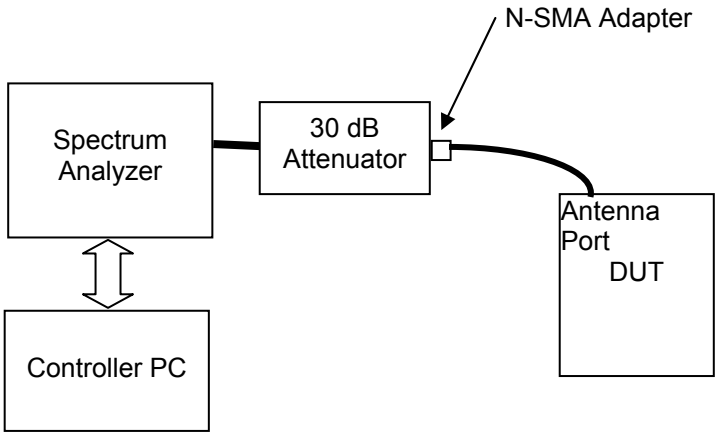
*Cable and attenuator verified with power meter prior to use

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 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 pick the maximum level and to determine the emission bandwidth (EBW). It then corrected the peak level recorded with a bandwidth correction factor of 10 * log (EBW/RBW). The corrected peak value was recorded and reported herein.

D.6. SETUP DRAWING

Figure D.6-1 - Setup Drawing



D.7. DUT OPERATING DESCRIPTION

The worst-case data rate was determined from prescan investigations. For the single transmitter comparison, 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. For the co-transmitting measurement, the Bluetooth transmitter was also enabled in its hopping mode with the power set to the maximum setting.

D.8. TEST RESULTS

Channel	Frequency	Data Rate	Maximum Corrected Peak Conducted Power*		-26 dB EBW	Maximum Corrected Peak Conducted Power*		-26 dB EBW	Limit
	MHz	Mb/s	dBm	Watts	MHz	dBm	Watts	MHz	Watts
802.11b			Single WLAN			Co-transmitting with Bluetooth Hopping			
Low	2412	1	18.42	0.069	19.25	17.65	0.058	19.38	1
Mid	2437	1	18.29	0.067	19.50	18.20	0.066	19.38	1
High	2462	1	18.98	0.079	19.38	18.71	0.074	19.38	1
802.11g			Single WLAN			Co-transmitting with Bluetooth Hopping			
Low	2412	6	16.81	0.048	20.88	17.16	0.052	20.63	1
Mid	2437	6	17.25	0.053	20.62	17.02	0.050	20.75	1
High	2462	6	17.48	0.056	20.63	17.12	0.051	20.75	1

*Corrected Peak Power (corrected for BW),
Peak Conducted Power (dBm) = Measured Conducted Power (dBm) + 10 * log (EBW / 3 MHz)

D.9. PASS/FAIL

In reference to the results outlined in D.8 the DUT passes the requirements as stated in the reference standards as follows:

FCC 15.247 (b) (3): The peak power did not exceed 1 Watt.

The maximum corrected peak co-transmitting power measured for Mode b was 0.074 watts, and for Mode g was 0.052 watts. A maximum of 0.77 dB change was realized when the unit was co-transmitting.

D.10. SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Alex Yuan
EMC Technologist
Celltech Labs Inc.

14Jul05
Date

Russell Pipe
Senior Compliance Technologist
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14Jul05
Date

Appendix E - WLAN 6 dB Bandwidth Measurement

E.1. REFERENCES

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

E.2. LIMITS

E.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*

E.3. ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 2 ºC
Humidity	35 +/- 2 %
Barometric Pressure	96 kPa

E.4. EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00015	Agilent	E4408B	Spectrum Analyzer	24Jan05	24Jan06
00075	Alpha Wire-J	9223	1ft. RG223/U RF Cable	na*	na
00076	Pasternack	PE7014-30	30dB 2 Watt Attenuator	na*	na

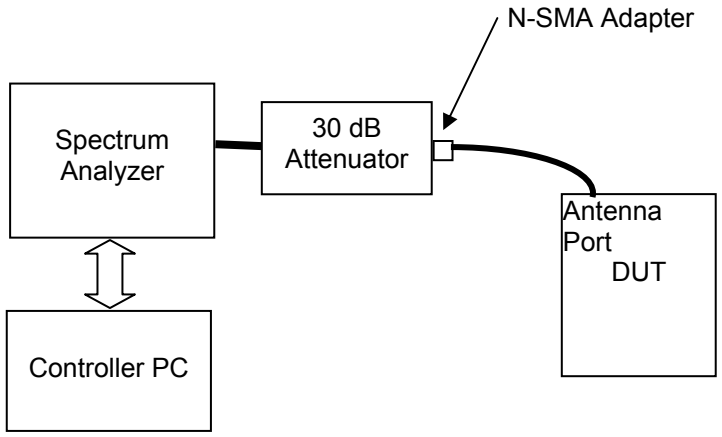
*Cable and attenuator verified with power meter prior to use

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 occupied bandwidth, software and a PC controller were used to set the spectrum analyzer using the following setting: RBW – 100 kHz VBW – 100 kHz Span – 25 MHz Detector – Sample Average – Power Average Count – 100 Offset – appropriate for external attenuation (-31.4 dB)

E.6. SETUP

Figure E.6-1 - Setup Drawing



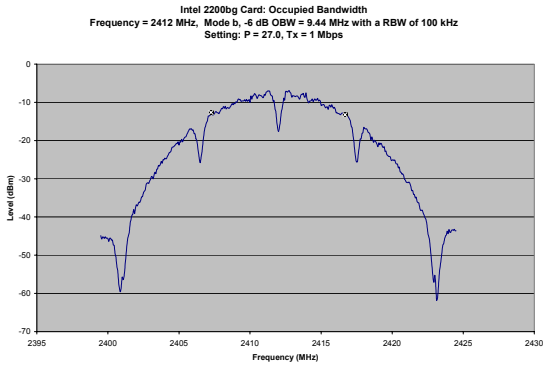
E.7. DUT OPERATING DESCRIPTION

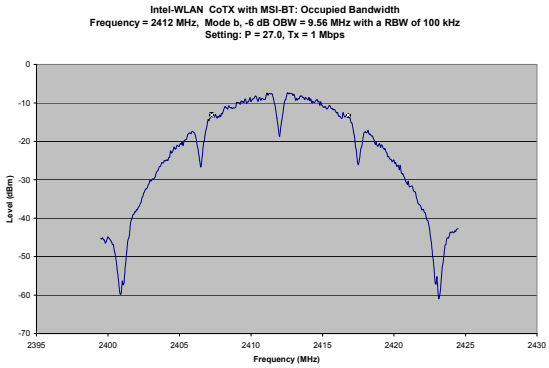
The worst-case data rate was determined from prescan investigations. For the single transmitter comparison, measurements were made at three channels throughout the band, Low Channel (2412 MHz), Mid Channel (2437 MHz), High Channel (2462 MHz) for both Modes b and g. For the co-transmitting measurement, the Bluetooth transmitter was also enabled in its hopping mode with the power set to the maximum setting.

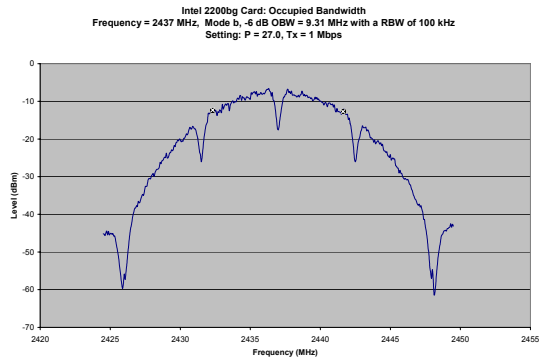
E.8. TEST RESULTS

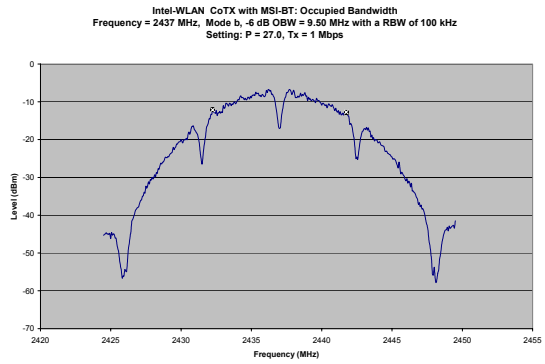
E.8.1. Mode b Occupied Bandwidth

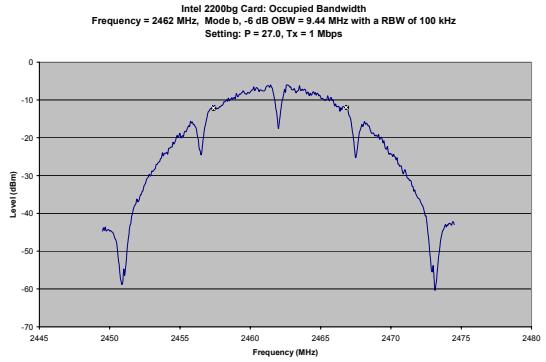
Single WLAN Mode b	WLAN Mode b co-transmitting with Bluetooth Hopping

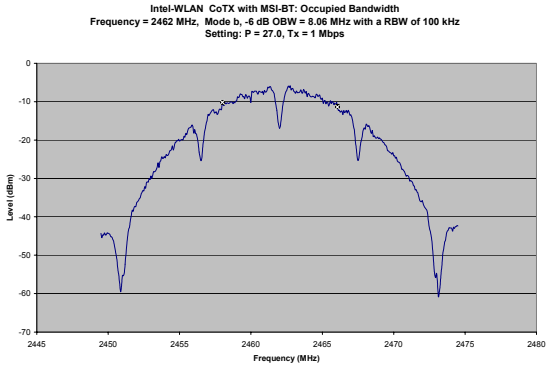










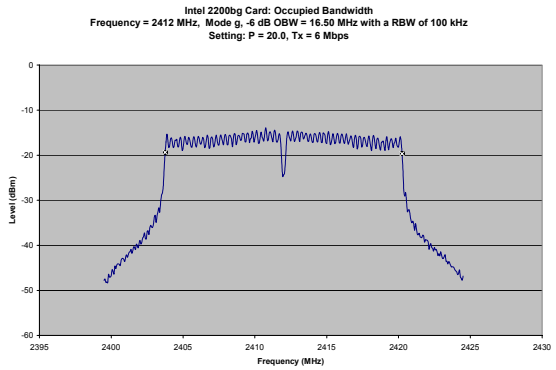


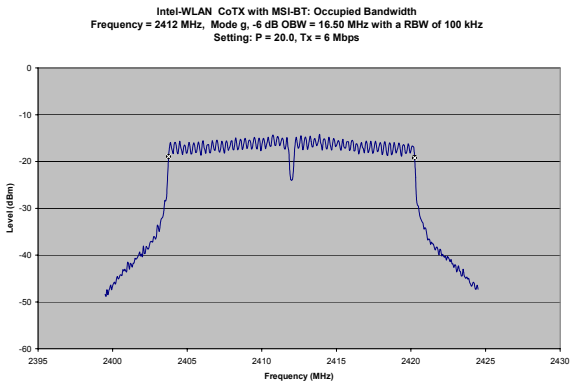
Channel	Power Settings	Frequency	Single 6 dB Bandwidth	Co-transmit 6 dB Bandwidth	Minimum Limit
	Power	(MHz)	(MHz)	(MHz)	(MHz)
1	27.0	2412	9.44	9.56	0.5
6	27.0	2437	9.31	9.50	0.5
11	27.0	2462	9.44	8.06	0.5

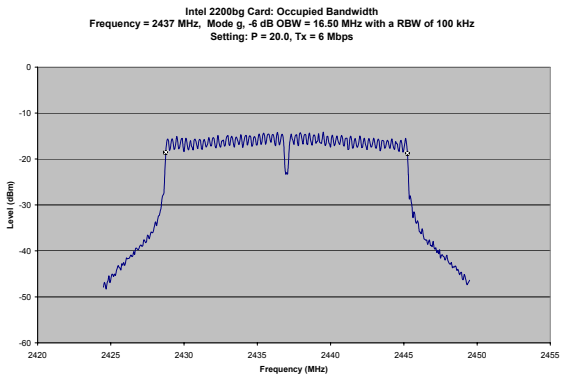
* Bluetooth power setting of 255/63 & hopping for co-transmit

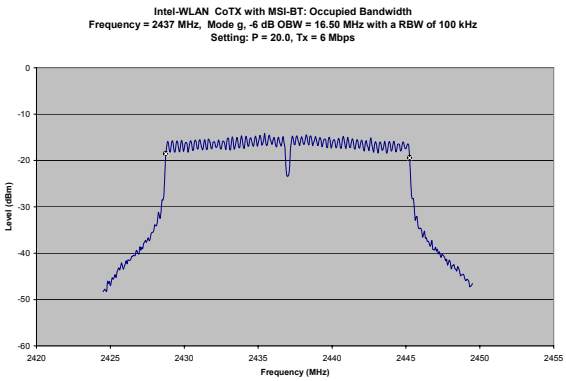
E.8.2. Mode g Occupied Bandwidth

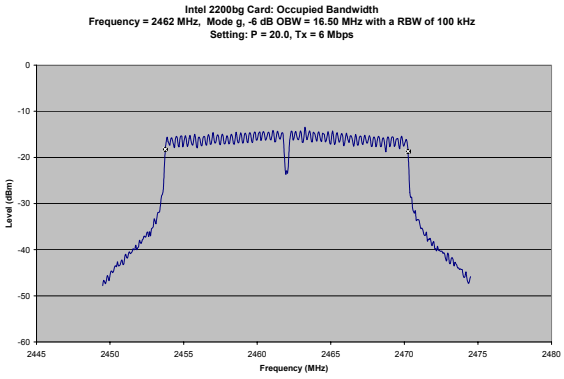
Single WLAN Mode g	WLAN Mode g co-transmitting with Bluetooth Hopping

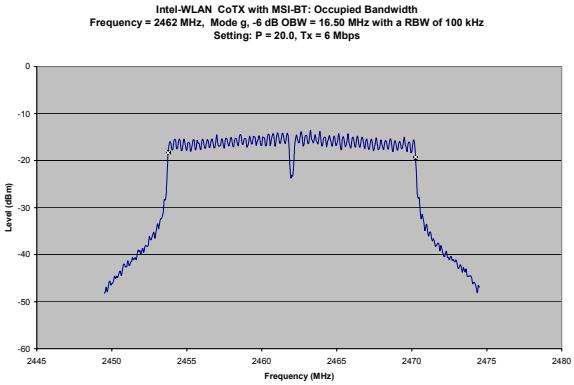












Channel	Power Settings	Frequency	Single 6 dB Bandwidth	Co-transmit 6 dB Bandwidth	Minimum Limit
	Power	(MHz)	(MHz)	(MHz)	(MHz)
1	20.0	2412	16.50	16.50	0.5
6	20.0	2437	16.50	16.50	0.5
11	20.0	2462	16.50	16.50	0.5

* Bluetooth power setting of 255/63 & hopping for co-transmit

E.9. PASS/FAIL

In reference to the results outlined in E.8, the DUT passes the requirements as stated in the reference standards as follows:

FCC 15.247 (2): The 6 dB bandwidth as measured meets the minimum 500 kHz bandwidth requirement.

The minimum 6 dB co-transmitting bandwidth measured for Mode b was 8.06 MHz and for Mode g was 16.50 MHz. Having the additional transmitter transmitting resulted in a maximum change in bandwidth of 1.38 MHz for Mode b and no change for Mode g.

E.10. SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Alex Yuan
EMC Technologist
Celltech Labs Inc.

3Aug05
Date

Russell Pipe
Senior Compliance Technologist
Celltech Labs Inc.

3Aug05
Date

Appendix F - Radiated Spurious Emission Measurement

F.1. REFERENCES

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

F.2. LIMITS

F.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.

Note: Spurious emissions within the restricted bands are reported in Appendix G.

F.3. ENVIRONMENTAL CONDITIONS

Temperature	27 +/- 2 ºC
Humidity	33 +/- 2 %
Barometric Pressure	96 +/- 0.2 kPa

F.4. EQUIPMENT LIST

RECEIVING EQUIPMENT

ID	ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
1	00072	EMCO	2075	Mini-mast	na	na
2	00073	EMCO	2080	Turn Table	na	na
3	00071	EMCO	2090	Multi-Device Controller	na	na
4	00035	ETS	3115	Double Ridged Guide Horn	24Mar04	24Mar06
5	00161/00166	Waveline	899/801-KF	Standard Gain Horn	na	na
6	00051	HP	8566B	Spectrum Analyzer RF Section	12Apr05	12Apr06
7	00049	HP	85650A	Quasi-Peak Adapter	13Apr05	13Apr06
8	00047	HP	85685A	RF Preselector	13Apr05	13Apr06
9	00015	Agilent	4408B	Spectrum Analyzer	24Jan05	24Jan06
10	00115	Miteq	J54-00102600-35-5A	LNA	08Jun04	08Jun06
11	00093	Microtronics	HPM50111	High Pass Filter	8Jun04	8Dec05
12	00119	INMAT	18AH-10	10dB attenuator	8Jun04	8Dec05
13	00120	Celltech	n/a	Microwave Cable (RX)	25Mar05	25Mar06
14	00121	Andrew	FSJ4-50B	Microwave Cable (RX)	25Mar05	25Mar06
15	00130	Andrew	FSJ1-50A	Microwave Cable (RX)	25Mar05	25Mar06

F.5. MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS

The measurement equipment was connected as shown in the F.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 – 3 GHz	00051	00119/00115	00035
3 GHz – 10 GHz	00051	00093/00115	00035
10 GHz – 18 GHz	00015	00093/00115	00035

MEASUREMENT EQUIPMENT SETTINGS

The spectrum analyzer was set to the following settings:

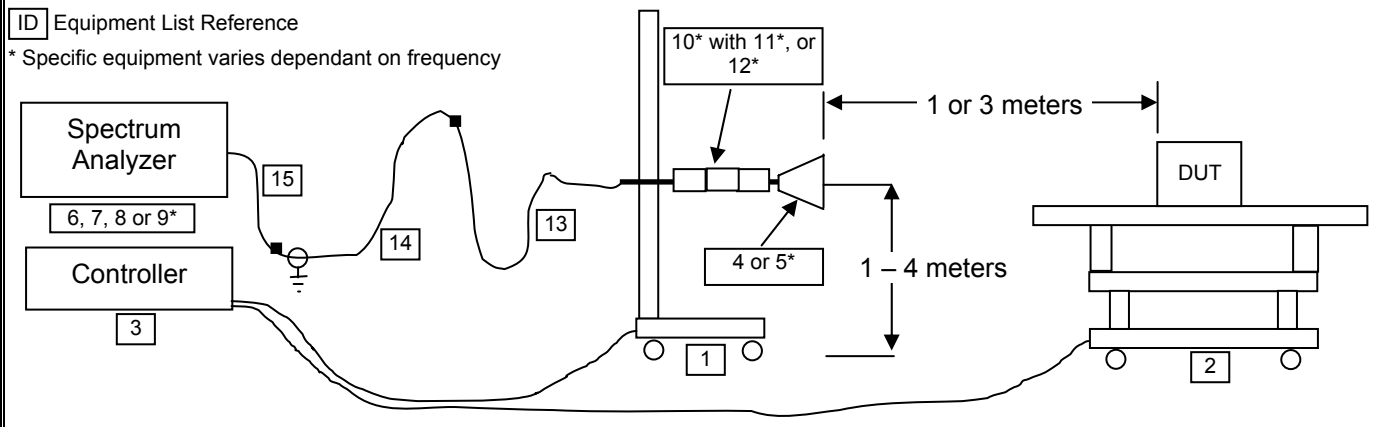
Frequency Range	RBW	VBW	Detector
MHz	kHz	kHz	
> 1000	1000*	1000	Peak*

*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.

Band edge Measurement:
The delta marker measurement was made by measuring the radiated signal band edge inside a GTEM with both transmitters operating. The RBW used to determine the delta marker was 30 kHz. The delta marker signal was referenced to the applicable WLAN carrier peak. For the radiated band edge measurement, the optimum EUT azimuth and receive antenna polarization was determined and used.

F.6. SETUP DRAWING

Figure F.6-1 - Setup Drawing



F.7. SETUP PHOTOGRAPHS

Photograph F-1 - 3115 Horn with LNA/filter @ 3 m

Photograph F-2 - 3115 Horn with LNA/Filter @ 1m

F.8. DUT OPERATING DESCRIPTION

The worst-case data rate was determined from prescan investigations. Prescan measurements were made of each of the three WLAN channels with the Bluetooth transmitter hopping. From these prescan measurements, the worst-case configuration was chosen for the final radiated spurious emission measurements. For the radiated spurious emissions measurements, the Bluetooth transmitter was set to its highest power setting and allowed to hop within its operating band, as would be typical in normal use. For the radiated carrier and radiated band edge measurements, the Bluetooth transmitter was set to a worst-case channel (lowest channel for lower band edge, highest for high band edge) while the WLAN was set to transmit on the applicable channel.

F.9. TEST RESULTS

F.9.1. Bluetooth - Fundamental Field Strengths @ Specified Distance (100 kHz RBW)

Channel	Polarity	Measurement Distance	Antenna	Frequency	SA Level	Noise Floor	AF	CL	Other	Total CF	Field Strength	Detector	RBW
		m		MHz	dBuV		dB/m	dB	dB	dB/m	dBuV/m		kHz
BT-CH0	H	3	Horn SN6276	2402.00	84.00		30.24	5.08	-23.13	12.19	96.19	PK	100
BT-CH0	H	3	Horn SN6276	2402.00	83.80		30.24	5.08	-23.13	12.19	95.99	AV	100
BT-CH0	V	3	Horn SN6276	2402.00	79.60		30.24	5.08	-23.13	12.19	91.79	PK	100
BT-CH0	V	3	Horn SN6276	2402.00	79.60		30.24	5.08	-23.13	12.19	91.79	AV	100
BT-CH39	H	3	Horn SN6276	2441.00	86.10		30.31	5.14	-23.12	12.33	98.43	PK	100
BT-CH39	H	3	Horn SN6276	2441.00	85.60		30.31	5.14	-23.12	12.33	97.93	AV	100
BT-CH39	V	3	Horn SN6276	2441.00	81.20		30.31	5.14	-23.12	12.33	93.53	PK	100
BT-CH39	V	3	Horn SN6276	2441.00	79.80		30.31	5.14	-23.12	12.33	92.13	AV	100
BT-CH78	H	3	Horn SN6276	2480.00	84.00		30.37	5.17	-23.12	12.41	96.41	PK	100
BT-CH78	H	3	Horn SN6276	2480.00	84.10		30.37	5.17	-23.12	12.41	96.51	AV	100
BT-CH78	V	3	Horn SN6276	2480.00	79.10		30.37	5.17	-23.12	12.41	91.51	PK	100
BT-CH78	V	3	Horn SN6276	2480.00	79.20		30.37	5.17	-23.12	12.41	91.61	AV	100

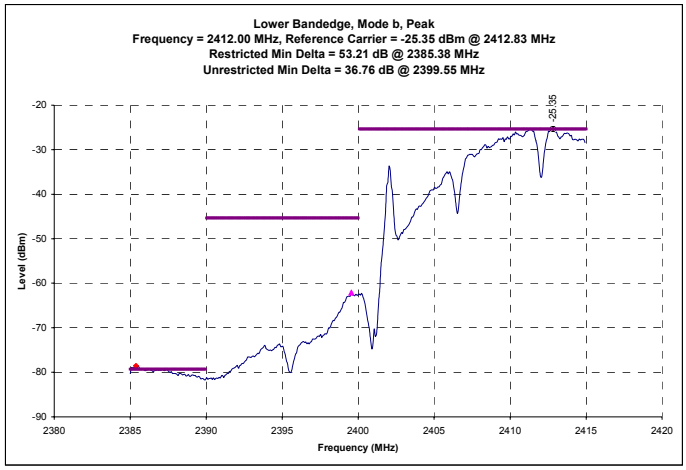
F.9.2. WLAN Mode b Co-transmitting with Bluetooth Hopping - Fundamental Field Strengths @ Specified Distance (100 kHz RBW)

Channel	Polarity	Measurement Distance	Antenna	Frequency	SA Level	Noise Floor	AF	CL	Other	Total CF	Field Strength	Detector	RBW
		m		MHz	dBuV		dB/m	dB	dB	dB/m	dBuV/m		kHz
WLAN-CH1	H	3	Horn SN6276	2412.00	84.10		30.26	5.10	-23.13	12.23	96.33	PK	100
WLAN-CH1	H	3	Horn SN6276	2412.00	73.30		30.26	5.10	-23.13	12.23	85.53	AV	100
WLAN-CH1	V	3	Horn SN6276	2412.00	79.10		30.26	5.10	-23.13	12.23	91.33	PK	100
WLAN-CH1	V	3	Horn SN6276	2412.00	69.10		30.26	5.10	-23.13	12.23	81.33	AV	100
WLAN-CH6	H	3	Horn SN6276	2437.00	84.80		30.30	5.14	-23.12	12.31	97.11	PK	100
WLAN-CH6	H	3	Horn SN6276	2437.00	73.90		30.30	5.14	-23.12	12.31	86.21	AV	100
WLAN-CH6	V	3	Horn SN6276	2437.00	81.10		30.30	5.14	-23.12	12.31	93.41	PK	100
WLAN-CH6	V	3	Horn SN6276	2437.00	70.10		30.30	5.14	-23.12	12.31	82.41	AV	100
WLAN-CH11	H	3	Horn SN6276	2462.00	84.00		30.34	5.16	-23.12	12.38	96.38	PK	100
WLAN-CH11	H	3	Horn SN6276	2462.00	73.20		30.34	5.16	-23.12	12.38	85.58	AV	100
WLAN-CH11	V	3	Horn SN6276	2462.00	79.70		30.34	5.16	-23.12	12.38	92.08	PK	100
WLAN-CH11	V	3	Horn SN6276	2462.00	69.20		30.34	5.16	-23.12	12.38	81.58	AV	100

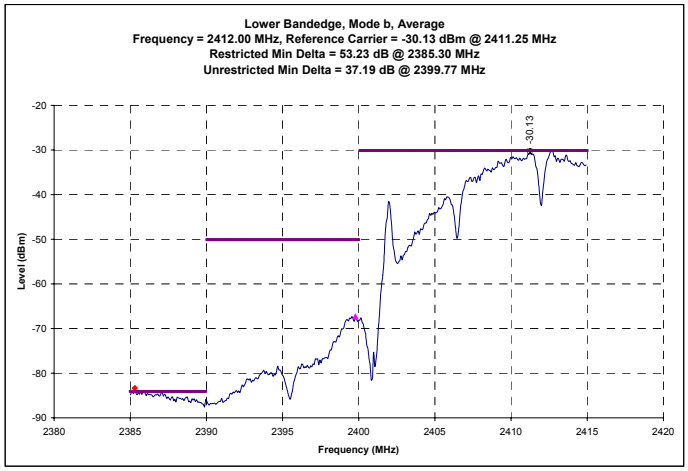
Formulae:
Total CF = AF + CL + Other
Field Strength = SA Level + Total CF

F.9.3. WLAN Mode b Co-transmitting with Bluetooth Channel 0 - Lower Band-edge Emission Field Strengths

Channel 1 Mode b - Conducted Peak Band-edge Plots



Channel 1 Mode b - Conducted Average Band-edge Plots



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

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	2399.55	96.33	36.76	PK	59.57	0.00	59.57	77.11	3.00	0.00	77.11	17.54	PASS
WLAN-CH1	H	3	2399.77	85.53	37.19	AV	48.34	0.00	48.34	66.21	3.00	0.00	66.21	17.87	PASS
WLAN-CH1	V	3	2399.55	91.33	36.76	PK	54.57	0.00	54.57	73.41	3.00	0.00	73.41	18.84	PASS
WLAN-CH1	V	3	2399.77	81.33	37.19	AV	44.14	0.00	44.14	62.41	3.00	0.00	62.41	18.27	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
Limit based on highest radiated carrier

F.9.4. WLAN Mode b Co-transmitting with Bluetooth Hopping - Out-of-Band Spurious Emission Field Strengths @ Specified Distance (not within restricted bands)

Project Number: 060605KBC-T644-E15W
Company: Itronix
Product: IX325 with Intel WLAN & MSI BT
Standard: FCC15.247c
Test Start Date: 27-Jul-05
Test End Date: 3-Aug-05

Channel	Polarity	Distance	Rx Antenna	Frequency	SA Level	Noise Floor	Rx AF	Rx CL	Other Rx	Total Rx CF	Field Strength	Detector	Limit Distance	Limit Distance Correction	Calculated Limit	Margin	Pass/Fail
		m		MHz	dBuV		dB/m	dB	dB	dB/m	dBuV/m	(PK/QP/AV)	m	dB	dBuV/m	dB	
CH 1	H	3	Bilog SN1607	58.81	38.10		6.28	0.76	0.00	7.04	45.14	PK	3.00	0.00	77.11	31.97	PASS
CH 1	H	3	Bilog SN1607	58.86	19.60		6.27	0.76	0.00	7.03	26.63	AV	3.00	0.00	66.21	39.58	PASS
CH 1	H	3	Horn SN6276	2399.55	49.60		30.24	5.07	-23.13	12.18	61.78	PK	3.00	0.00	77.11	15.33	PASS
CH 1	H	3	Horn SN6276	2399.55	38.60		30.24	5.07	-23.13	12.18	50.78	AV	3.00	0.00	66.21	15.43	PASS
CH 1	H	3	Horn SN6276	2399.98	54.10		30.24	5.07	-23.13	12.18	66.28	PK	3.00	0.00	77.11	10.83	PASS
CH 1	H	3	Horn SN6276	2399.73	41.00		30.24	5.07	-23.13	12.18	53.18	AV	3.00	0.00	66.21	13.03	PASS
CH 1	V	3	Bilog SN1607	56.14	40.20		6.93	0.73	0.00	7.66	47.86	PK	3.00	0.00	73.41	25.55	PASS
CH 1	V	3	Bilog SN1607	55.69	16.40		7.03	0.73	0.00	7.76	24.16	AV	3.00	0.00	62.41	38.25	PASS
CH 1	V	3	Horn SN6276	2400.00	50.70		30.24	5.07	-23.13	12.19	62.89	PK	3.00	0.00	73.41	10.53	PASS
CH 1	V	3	Horn SN6276	2399.61	40.00		30.24	5.07	-23.13	12.18	52.18	AV	3.00	0.00	62.41	10.23	PASS
CH 1	V	3	Horn SN6276	2400.00	49.20		30.24	5.07	-23.13	12.19	61.39	PK	3.00	0.00	73.41	12.03	PASS
CH 1	V	3	Horn SN6276	2399.67	40.30		30.24	5.07	-23.13	12.18	52.48	AV	3.00	0.00	62.41	9.93	PASS
CH 6	H	3	Bilog SN1607	39.61	21.80		14.50	0.62	0.00	15.11	36.91	PK	3.00	0.00	77.11	40.20	PASS
CH 6	H	3	Bilog SN1607	43.00	5.40		12.74	0.64	0.00	13.38	18.78	AV	3.00	0.00	66.21	47.44	PASS
CH 6	H	3	Horn SN6276	2397.63	33.40	X	30.24	5.07	-23.13	12.18	45.58	PK	3.00	0.00	77.11	31.54	PASS
CH 6	H	3	Horn SN6276	2399.92	23.70	X	30.24	5.07	-23.13	12.18	35.88	AV	3.00	0.00	66.21	30.33	PASS
CH 6	H	3	Horn SN6276	2398.22	36.40		30.24	5.07	-23.13	12.18	48.58	PK	3.00	0.00	77.11	28.53	PASS
CH 6	H	3	Horn SN6276	2399.80	23.10		30.24	5.07	-23.13	12.18	35.28	AV	3.00	0.00	66.21	30.93	PASS
CH 6	V	3	Bilog SN1607	39.62	32.50		14.49	0.62	0.00	15.11	47.61	PK	3.00	0.00	73.41	25.81	PASS
CH 6	V	3	Bilog SN1607	38.91	10.60		14.85	0.60	0.00	15.45	26.05	AV	3.00	0.00	62.41	36.37	PASS
CH 6	V	3	Horn SN6276	2396.23	44.90		30.23	5.07	-23.13	12.17	57.07	PK	3.00	0.00	73.41	16.34	PASS
CH 6	V	3	Horn SN6276	2397.26	28.90		30.24	5.07	-23.13	12.18	41.08	AV	3.00	0.00	62.41	21.34	PASS
CH 11	H	3	Bilog SN1607	58.98	45.20		6.24	0.76	0.00	7.00	52.20	PK	3.00	0.00	77.11	24.91	PASS
CH 11	H	3	Bilog SN1607	58.98	23.60		6.24	0.76	0.00	7.00	30.60	AV	3.00	0.00	66.21	35.61	PASS
CH 11	V	3	Bilog SN1607	56.13	40.10		6.93	0.73	0.00	7.66	47.76	PK	3.00	0.00	73.41	25.65	PASS
CH 11	V	3	Bilog SN1607	56.85	19.00		6.76	0.74	0.00	7.50	26.50	AV	3.00	0.00	62.41	35.92	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
Limit Distance Correction = 40*log(d1/d2) for F<30 MHz, 20*log(d1/d2) for F> 30 MHz:
where d1 is the measurement distance, d2 is the published limit distance
Limit = Specified Limit + Limit Distance Correction
Margin = Limit - Field Strength

Limit based on highest radiated carrier

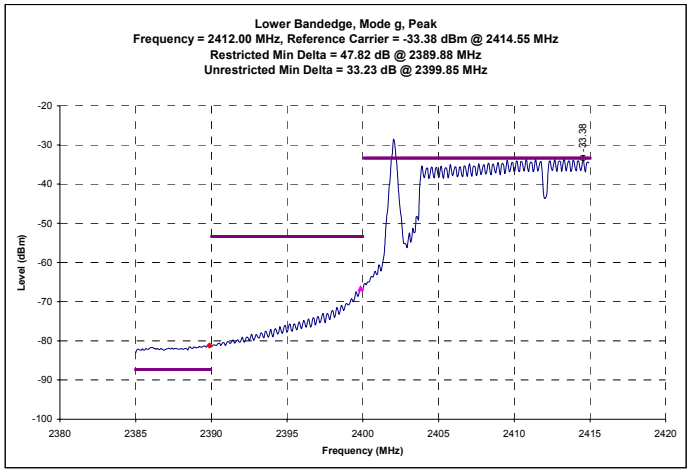
F.9.5. WLAN Mode g Co-transmitting with Bluetooth Hopping - Fundamental Field Strengths @ Specified Distance (100 kHz RBW)

Channel	Polarity	Measurement Distance	Antenna	Frequency	SA Level	Noise Floor	AF	CL	Other	Total CF	Field Strength	Detector	RBW
		m		MHz	dBuV		dB/m	dB	dB	dB/m	dBuV/m		kHz
WLAN-CH1	H	3	Horn SN6276	2412.00	75.10		30.26	5.10	-23.13	12.23	87.33	PK	100
WLAN-CH1	H	3	Horn SN6276	2412.00	65.30		30.26	5.10	-23.13	12.23	77.53	AV	100
WLAN-CH1	V	3	Horn SN6276	2412.00	70.90		30.26	5.10	-23.13	12.23	83.13	PK	100
WLAN-CH1	V	3	Horn SN6276	2412.00	61.00		30.26	5.10	-23.13	12.23	73.23	AV	100
WLAN-CH6	H	3	Horn SN6276	2437.00	76.10		30.30	5.14	-23.12	12.31	88.41	PK	100
WLAN-CH6	H	3	Horn SN6276	2437.00	66.40		30.30	5.14	-23.12	12.31	78.71	AV	100
WLAN-CH6	V	3	Horn SN6276	2437.00	72.10		30.30	5.14	-23.12	12.31	84.41	PK	100
WLAN-CH6	V	3	Horn SN6276	2437.00	62.20		30.30	5.14	-23.12	12.31	74.51	AV	100
WLAN-CH11	H	3	Horn SN6276	2462.00	75.90		30.34	5.16	-23.12	12.38	88.28	PK	100
WLAN-CH11	H	3	Horn SN6276	2462.00	65.20		30.34	5.16	-23.12	12.38	77.58	AV	100
WLAN-CH11	V	3	Horn SN6276	2462.00	70.80		30.34	5.16	-23.12	12.38	83.18	PK	100
WLAN-CH11	V	3	Horn SN6276	2462.00	60.60		30.34	5.16	-23.12	12.38	72.98	AV	100

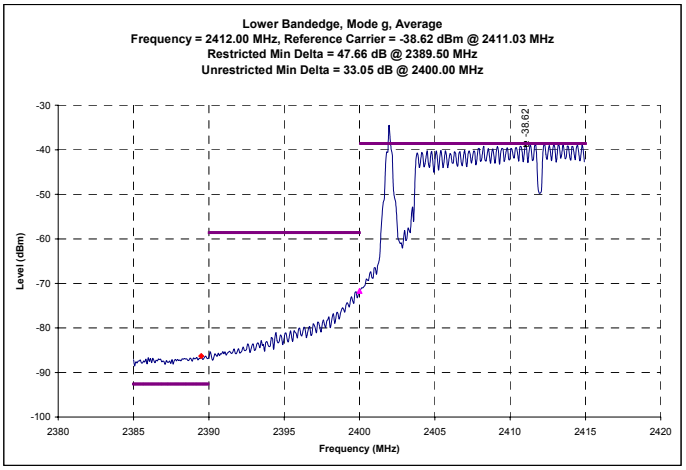
Formulae:
Total CF = AF + CL + Other
Field Strength = SA Level + Total CF

F.9.6. WLAN Mode g Co-transmitting with Bluetooth Channel 0 - Lower Band-edge Emission Field Strengths

Channel 1 Mode g - Conducted Peak Band-edge Plots



Channel 1 Mode g - Conducted Average Band-edge Plots



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

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	2399.85	87.33	33.23	PK	54.10	0.00	54.10	68.41	3.00	0.00	68.41	14.31	PASS
WLAN-CH1	H	3	2400.00	77.53	33.05	AV	44.48	0.00	44.48	58.71	3.00	0.00	58.71	14.23	PASS
WLAN-CH1	V	3	2399.85	83.13	33.23	PK	49.90	0.00	49.90	64.41	3.00	0.00	64.41	14.51	PASS
WLAN-CH1	V	3	2400.00	73.23	33.05	AV	40.18	0.00	40.18	54.51	3.00	0.00	54.51	14.33	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
Limit based on highest radiated carrier

F.9.7. WLAN Mode g Co-transmitting with Bluetooth Hopping - Out-of-Band Spurious Emission Field Strengths @ Specified Distance (not within restricted bands)

Project Number: 060605KBC-T644-E15W
Company: Itronix
Product: IX325 with Intel WLAN & MSI BT
Standard: FCC15.247c
Test Start Date: 27-Jul-05
Test End Date: 3-Aug-05

Channel	Polarity	Distance	Rx Antenna	Frequency	SA Level	Noise Floor	Rx AF	Rx CL	Other Rx	Total Rx CF	Field Strength	Detector	Limit Distance	Limit Distance Correction	Calculated Limit	Margin	Pass/Fail
		m		MHz	dBuV		dB/m	dB	dB	dB/m	dBuV/m	(PK/QP/AV)	m	dB	dBuV/m	dB	
CH 1	H	3	Bilog SN1607	58.96	40.20		6.25	0.76	0.00	7.01	47.21	PK	3.00	0.00	68.41	21.21	PASS
CH 1	H	3	Bilog SN1607	58.96	15.50		6.25	0.76	0.00	7.01	22.51	AV	3.00	0.00	58.71	36.21	PASS
CH 1	V	3	Bilog SN1607	56.26	40.20		6.90	0.74	0.00	7.63	47.83	PK	3.00	0.00	64.41	16.58	PASS
CH 1	V	3	Bilog SN1607	55.61	18.30		7.05	0.73	0.00	7.78	26.08	AV	3.00	0.00	54.51	28.43	PASS
CH 1	V	3	Horn SN6276	2521.96	34.90		30.47	5.23	-23.12	12.58	47.48	PK	3.00	0.00	64.41	16.93	PASS
CH 1	V	3	Horn SN6276	2521.96	21.90		30.47	5.23	-23.12	12.58	34.48	AV	3.00	0.00	54.51	20.03	PASS
CH 6	H	3	Bilog SN1607	39.74	23.00		14.43	0.62	0.00	15.05	38.05	PK	3.00	0.00	68.41	30.36	PASS
CH 6	H	3	Bilog SN1607	39.74	5.00		14.43	0.62	0.00	15.05	20.05	AV	3.00	0.00	58.71	38.66	PASS
CH 6	V	3	Bilog SN1607	39.66	33.10		14.47	0.62	0.00	15.09	48.19	PK	3.00	0.00	64.41	16.23	PASS
CH 6	V	3	Bilog SN1607	38.91	9.30		14.85	0.60	0.00	15.45	24.75	AV	3.00	0.00	54.51	29.77	PASS
CH 11	H	3	Bilog SN1607	58.98	40.10		6.24	0.76	0.00	7.00	47.10	PK	3.00	0.00	68.41	21.31	PASS
CH 11	H	3	Bilog SN1607	58.98	20.90		6.24	0.76	0.00	7.00	27.90	AV	3.00	0.00	58.71	30.81	PASS
CH 11	V	3	Bilog SN1607	56.64	43.20		6.81	0.74	0.00	7.55	50.75	PK	3.00	0.00	64.41	13.67	PASS
CH 11	V	3	Bilog SN1607	56.49	19.20		6.84	0.74	0.00	7.58	26.78	AV	3.00	0.00	54.51	27.73	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
Limit Distance Correction = 40*log(d1/d2) for F<30 MHz, 20*log(d1/d2) for F> 30 MHz:
where d1 is the measurement distance, d2 is the published limit distance
Limit = Specified Limit + Limit Distance Correction
Margin = Limit - Field Strength

Limit based on highest radiated carrier

F.10. PASS/FAIL

In reference to the results outlined in F.9, the DUT passes the requirements as stated in the reference standards as follows:

FCC 15.247 (c): All emissions within any 100 kHz bandwidth outside the operating frequency band are greater than 20 dB below the maximum 100 kHz bandwidth signal within the operating band.

F.11. SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Alex Yuan
EMC Technologist
Celltech Labs Inc.

10Aug05
Date

Appendix G - Restricted Band Emission Measurement

G.1. REFERENCES

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

G.2. LIMITS

FCC CFR 47 §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.

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.

G.3. ENVIRONMENTAL CONDITIONS

Temperature	274 +/- 2 ºC
Humidity	33 +/- 2 %
Barometric Pressure	96 +/- 0.2 kPa

G.4. EQUIPMENT LIST

RECEIVING EQUIPMENT

ID	ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
1	00072	EMCO	2075	Mini-mast	na	na
2	00073	EMCO	2080	Turn Table	na	na
3	00071	EMCO	2090	Multi-Device Controller	na	na
4	00085	EMCO	6502	Loop Antenna	10Aug04	10Aug05
5	00050	Chase	CBL-6111A	Bilog Antenna	08Feb05	08Feb06
6	00035	ETS	3115	Double Ridged Guide Horn	24Mar04	24Mar06
7	00161/00166	Waveline	899/801-KF	Standard Gain Horn	na	na
8	00051	HP	8566B	Spectrum Analyzer RF Section	12Apr05	12Apr06
9	00049	HP	85650A	Quasi-Peak Adapter	13Apr05	13Apr06
10	00047	HP	85685A	RF Preselector	13Apr05	13Apr06
11	00015	Agilent	4408B	Spectrum Analyzer	24Jan05	24Jan06
12	00115	Miteq	J54-00102600-35-5A	LNA	08Jun04	08Jun06
13	00093	Microtronics	HPM50111	High Pass Filter	8Jun04	8Dec05
14	00119	INMAT	18AH-10	10dB attenuator	8Jun04	8Dec05
15	00120	Celltech	n/a	Microwave Cable (RX)	25Mar05	25Mar06
16	00121	Andrew	FSJ4-50B	Microwave Cable (RX)	25Mar05	25Mar06
17	00130	Andrew	FSJ1-50A	Microwave Cable (RX)	25Mar05	25Mar06

G.5. MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS

The measurement equipment was connected as shown in the G.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 #
10kHz - 30 MHz	00051/00049/00047	none	00085
30 MHz – 1 GHz	00051/00049/00047	none	00050
1 GHz – 2 GHz	00051/00047	none	00035
2 GHz – 3 GHz	00051	00119/00115	00035
3 GHz – 10 GHz	00051	00093/00115	00035
10 GHz – 18 GHz	00015	00093/00115	00035

MEASUREMENT EQUIPMENT SETTINGS

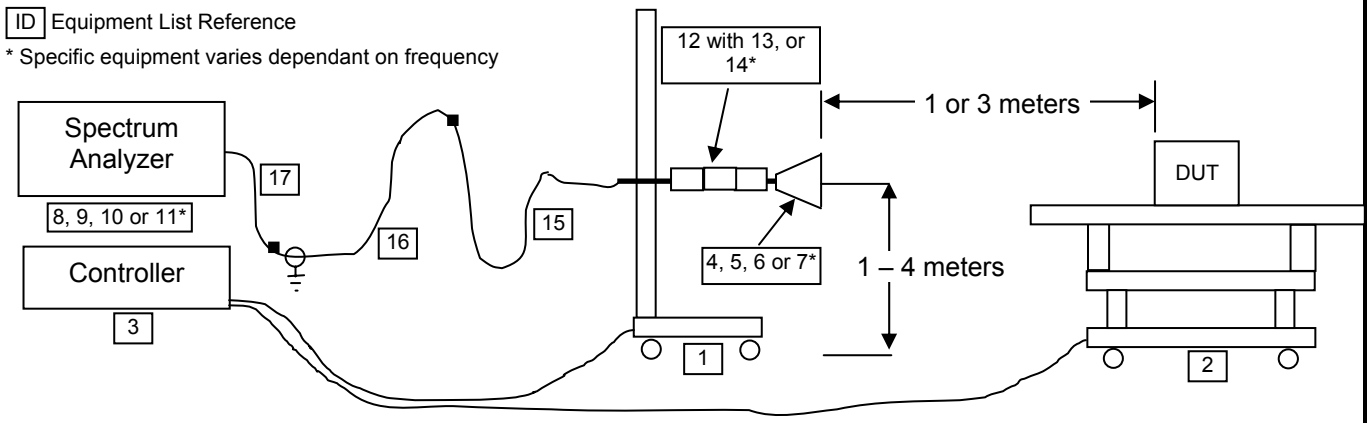
The spectrum analyzer was set to the following settings:

Frequency Range	RBW	VBW	Detector
MHz	kHz	kHz	
0.009 – 0.150	0.200	10	Peak*
0.150 – 30	9	30	Peak*
30 – 1000	100	300	Peak*
> 1000	1000*	1000	Peak*

*As a worst-case measurement, the average/QP limit was applied to measurements made with a peak detector, unless otherwise noted.

G.6. SETUP DRAWING

Figure G.6-1 - Setup Drawing



G.7. SETUP PHOTOGRAPHS

Photograph G-1 - Loop Antenna @ 3m

Photograph G-2 - Bilog Antenna @ 3m

Photograph G-3 - 3115 Horn @ 3 m

Photograph G-4 - 3115 Horn with LNA/Filter @ 1m

G.8. DUT OPERATING DESCRIPTION

The worst-case data rate was determined from prescan investigations. Prescan measurements were made of each of the three WLAN channels with the Bluetooth transmitter hopping. From these prescan measurements, the worst-case configuration was chosen for the final radiated spurious emission measurements. For the radiated spurious emissions measurements, the Bluetooth transmitter was set to its highest power setting and allowed to hop within its operating band, as would be typical in normal use. For the radiated carrier and radiated band edge measurements, the Bluetooth transmitter was set to a worst-case channel (lowest channel for lower band edge, highest for high band edge) while the WLAN was set to transmit on the applicable channel.

G.9. TEST RESULTS

G.9.1. WLAN Mode b Co-transmitting with Bluetooth Hopping - Fundamental Field Strengths @ Specified Distance (1000 kHz RBW)

Channel	Polarity	Measurement Distance	Antenna	Frequency	SA Level	Noise Floor	AF	CL	Other	Total CF	Field Strength	Detector	RBW
		m		MHz	dBuV		dB/m	dB	dB	dB/m	dBuV/m		kHz
WLAN-CH1	H	3	Horn SN6276	2412.00	88.00		30.26	5.10	-23.13	12.23	100.23	PK	1000
WLAN-CH1	H	3	Horn SN6276	2412.00	83.70		30.26	5.10	-23.13	12.23	95.93	AV	1000
WLAN-CH1	V	3	Horn SN6276	2412.00	83.30		30.26	5.10	-23.13	12.23	95.53	PK	1000
WLAN-CH1	V	3	Horn SN6276	2412.00	79.30		30.26	5.10	-23.13	12.23	91.53	AV	1000
WLAN-CH6	H	3	Horn SN6276	2437.00	88.30		30.30	5.14	-23.12	12.31	100.61	PK	1000
WLAN-CH6	H	3	Horn SN6276	2437.00	84.20		30.30	5.14	-23.12	12.31	96.51	AV	1000
WLAN-CH6	V	3	Horn SN6276	2437.00	84.50		30.30	5.14	-23.12	12.31	96.81	PK	1000
WLAN-CH6	V	3	Horn SN6276	2437.00	80.30		30.30	5.14	-23.12	12.31	92.61	AV	1000
WLAN-CH11	H	3	Horn SN6276	2462.00	87.70		30.34	5.16	-23.12	12.38	100.08	PK	1000
WLAN-CH11	H	3	Horn SN6276	2462.00	83.20		30.34	5.16	-23.12	12.38	95.58	AV	1000
WLAN-CH11	V	3	Horn SN6276	2462.00	83.40		30.34	5.16	-23.12	12.38	95.78	PK	1000
WLAN-CH11	V	3	Horn SN6276	2462.00	79.30		30.34	5.16	-23.12	12.38	91.68	AV	1000

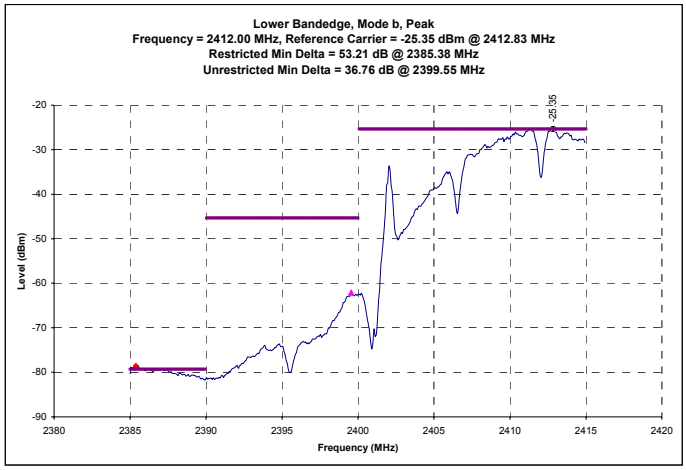
G.9.2. Bluetooth - Fundamental Field Strengths @ Specified Distance (100 kHz RBW)

Channel	Polarity	Measurement Distance	Antenna	Frequency	SA Level	Noise Floor	AF	CL	Other	Total CF	Field Strength	Detector	RBW
		m		MHz	dBuV		dB/m	dB	dB	dB/m	dBuV/m		kHz
BT-CH0	H	3	Horn SN6276	2402.00	84.20		30.24	5.08	-23.13	12.19	96.39	PK	1000
BT-CH0	H	3	Horn SN6276	2402.00	84.00		30.24	5.08	-23.13	12.19	96.19	AV	1000
BT-CH0	V	3	Horn SN6276	2402.00	79.80		30.24	5.08	-23.13	12.19	91.99	PK	1000
BT-CH0	V	3	Horn SN6276	2402.00	79.60		30.24	5.08	-23.13	12.19	91.79	AV	1000
BT-CH39	H	3	Horn SN6276	2441.00	87.20		30.31	5.14	-23.12	12.33	99.53	PK	1000
BT-CH39	H	3	Horn SN6276	2441.00	85.50		30.31	5.14	-23.12	12.33	97.83	AV	1000
BT-CH39	V	3	Horn SN6276	2441.00	83.10		30.31	5.14	-23.12	12.33	95.43	PK	1000
BT-CH39	V	3	Horn SN6276	2441.00	79.70		30.31	5.14	-23.12	12.33	92.03	AV	1000
BT-CH78	H	3	Horn SN6276	2480.00	84.10		30.37	5.17	-23.12	12.41	96.51	PK	1000
BT-CH78	H	3	Horn SN6276	2480.00	84.10		30.37	5.17	-23.12	12.41	96.51	AV	1000
BT-CH78	V	3	Horn SN6276	2480.00	79.20		30.37	5.17	-23.12	12.41	91.61	PK	1000
BT-CH78	V	3	Horn SN6276	2480.00	79.20		30.37	5.17	-23.12	12.41	91.61	AV	1000

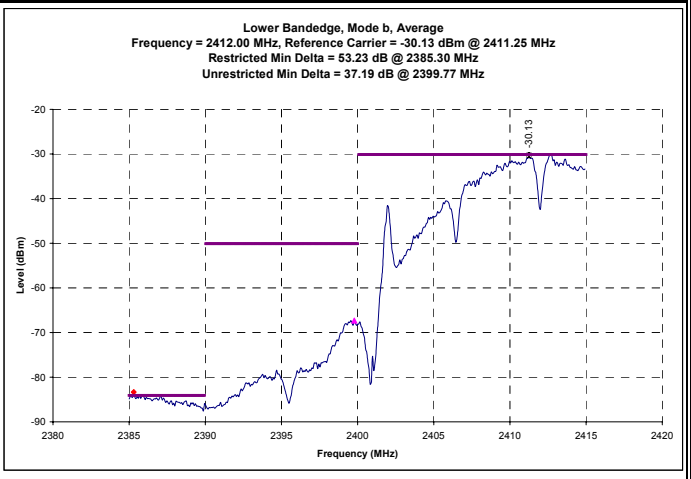
Formulae:
Total CF = AF + CL + Other
Field Strength = SA Level + Total CF

G.9.3. WLAN Mode b Co-transmitting with Bluetooth Channel 0 - Lower Band-edge Emission Field Strengths

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

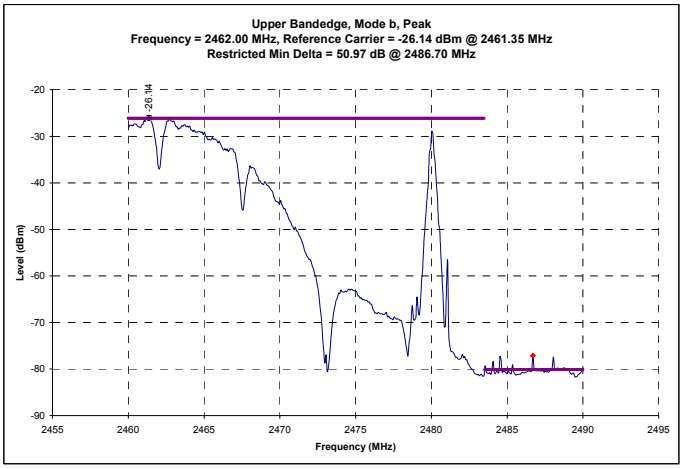
Channel	Polarity	Distance	Frequency	Carrier Radiated Field Strength	Delta Marker	Detector	Calculated Bandedge Field Strength	Duty Cycle Correction	Corrected Bandedge Field Strength	Specified Limit	Specified Limit Distance	Limit Distance Correction	Calculated Limit	Margin	Pass/Fail
		m	MHz	dBuV/m	dB		dBuV/m	dB	dBuV/m	dBuV/m	m	dB	dBuV/m	dB	
WLAN-CH1	H	3	2385.38	100.23	53.21	PK	47.02	0.00	47.02	73.98	3.00	0.00	73.98	26.96	PASS
WLAN-CH1	H	3	2385.30	95.93	53.23	AV	42.70	0.00	42.70	53.98	3.00	0.00	53.98	11.28	PASS
WLAN-CH1	V	3	2385.38	95.53	53.21	PK	42.32	0.00	42.32	73.98	3.00	0.00	73.98	31.66	PASS
WLAN-CH1	V	3	2385.30	91.53	53.23	AV	38.30	0.00	38.30	53.98	3.00	0.00	53.98	15.68	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)

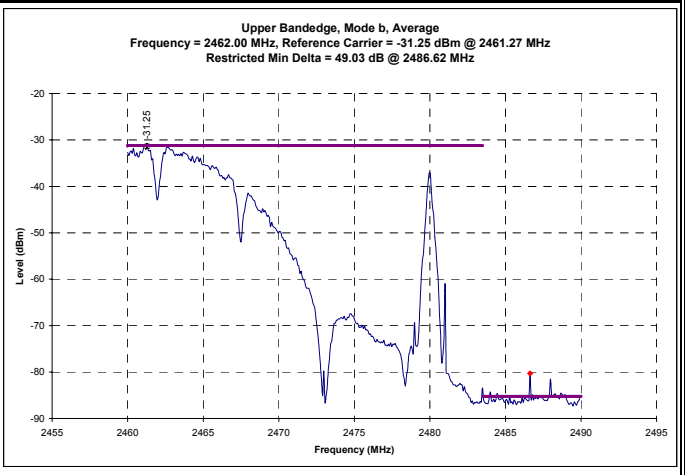
Note: Measurements and calculation reference the Marker-Delta Method described in FCC Public Notice DA 00-705

G.9.4. WLAN Mode b Co-transmitting with Bluetooth Channel 78 - Lower Band-edge Emission Field Strengths

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

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	2486.70	100.08	50.97	PK	49.11	0.00	49.11	73.98	3.00	0.00	73.98	24.87	PASS
WLAN-CH11	H	3	2486.62	95.58	49.03	AV	46.55	0.00	46.55	53.98	3.00	0.00	53.98	7.43	PASS
WLAN-CH11	V	3	2486.70	95.78	50.97	PK	44.81	0.00	44.81	73.98	3.00	0.00	73.98	29.17	PASS
WLAN-CH11	V	3	2486.62	91.68	49.03	AV	42.65	0.00	42.65	53.98	3.00	0.00	53.98	11.33	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

G.9.5. WLAN Mode b Co-transmitting with Bluetooth Hopping - Out-of-Band Spurious Emission Field Strengths @ Specified Distance (within restricted bands)

Project Number:
Company: Itronix
Product: IX325 with Intel WLAN & MSI BT
Standard: FCC15.247c
Test Start Date: 12-Jul-05
Test End Date: 12-Jul-05

Channel	Polarity	Distance	Rx Antenna	Frequency	SA Level	Noise Floor	Rx AF	Rx CL	Other Rx	Total Rx CF	Field Strength	Detector	Limit Distance	Limit Distance Correction	Calculated Limit	Margin	Pass/Fail
CH 1	H	3	Horn SN6276	2483.56	45.90		30.37	5.18	-23.12	12.43	58.33	PK	3.00	0.00	73.98	15.64	PASS
CH 1	H	3	Horn SN6276	2483.56	23.80		30.37	5.18	-23.12	12.43	36.23	AV	3.00	0.00	53.98	17.74	PASS
CH 1	H	3	Horn SN6276	4845.56	31.40	X	35.39	7.44	-31.04	11.80	43.20	PK	3.00	0.00	73.98	30.78	PASS
CH 1	H	3	Horn SN6276	4823.88	19.40		35.35	7.40	-31.04	11.71	31.11	AV	3.00	0.00	53.98	22.87	PASS
CH 1	V	3	Horn SN6276	2483.89	37.50		30.37	5.18	-23.12	12.44	49.94	PK	3.00	0.00	73.98	24.04	PASS
CH 1	V	3	Horn SN6276	2483.63	22.30		30.37	5.18	-23.12	12.43	34.73	AV	3.00	0.00	53.98	19.24	PASS
CH 1	V	3	Horn SN6276	4824.12	31.70		35.35	7.40	-31.04	11.71	43.41	PK	3.00	0.00	73.98	30.57	PASS
CH 1	V	3	Horn SN6276	4823.93	21.40		35.35	7.40	-31.04	11.71	33.11	AV	3.00	0.00	53.98	20.87	PASS
CH 6	H	3	Horn SN6276	2483.62	39.60		30.37	5.18	-23.12	12.43	52.03	PK	3.00	0.00	73.98	21.94	PASS
CH 6	H	3	Horn SN6276	2483.58	23.00	X	30.37	5.18	-23.12	12.43	35.43	AV	3.00	0.00	53.98	18.54	PASS
CH 6	H	3	Horn SN6276	4873.20	31.00	X	35.45	7.59	-31.04	12.00	43.00	PK	3.00	0.00	73.98	30.98	PASS
CH 6	H	3	Horn SN6276	4873.68	18.60		35.45	7.60	-31.04	12.01	30.61	AV	3.00	0.00	53.98	23.37	PASS
CH 6	V	3	Horn SN6276	2380.30	45.50		30.21	5.05	-23.13	12.13	57.63	PK	3.00	0.00	73.98	16.35	PASS
CH 6	V	3	Horn SN6276	2381.52	31.60		30.21	5.05	-23.13	12.14	43.74	AV	3.00	0.00	53.98	10.24	PASS
CH 6	V	3	Horn SN6276	2492.15	43.10		30.39	5.22	-23.12	12.49	55.59	PK	3.00	0.00	73.98	18.39	PASS
CH 6	V	3	Horn SN6276	2491.20	30.30		30.39	5.21	-23.12	12.48	42.78	AV	3.00	0.00	53.98	11.20	PASS
CH 6	V	3	Horn SN6276	4870.16	31.00	X	35.44	7.55	-31.04	11.96	42.96	PK	3.00	0.00	73.98	31.02	PASS
CH 6	V	3	Horn SN6276	4873.92	19.20		35.45	7.60	-31.04	12.01	31.21	AV	3.00	0.00	53.98	22.77	PASS
CH 11	H	3	Horn SN6276	2483.54	42.50		30.37	5.18	-23.12	12.43	54.93	PK	3.00	0.00	73.98	19.04	PASS
CH 11	H	3	Horn SN6276	2483.50	22.90		30.37	5.18	-23.12	12.43	35.33	AV	3.00	0.00	53.98	18.65	PASS
CH 11	H	3	Horn SN6276	2389.27	33.50	X	30.22	5.06	-23.13	12.16	45.66	PK	3.00	0.00	73.98	28.32	PASS
CH 11	H	3	Horn SN6276	2389.27	23.10	X	30.22	5.06	-23.13	12.16	35.26	AV	3.00	0.00	53.98	18.72	PASS
CH 11	H	3	Horn SN6276	2483.65	38.80		30.37	5.18	-23.12	12.44	51.24	PK	3.00	0.00	73.98	22.74	PASS
CH 11	H	3	Horn SN6276	2483.50	22.90		30.37	5.18	-23.12	12.43	35.33	AV	3.00	0.00	53.98	18.65	PASS
CH 11	H	3	Horn SN6276	4872.92	31.70		35.45	7.59	-31.04	12.00	43.70	PK	3.00	0.00	73.98	30.28	PASS
CH 11	H	3	Horn SN6276	4923.88	18.70	X	35.55	7.53	-31.03	12.05	30.75	AV	3.00	0.00	53.98	23.23	PASS
CH 11	V	3	Horn SN6276	2491.84	40.30		30.39	5.22	-23.12	12.48	52.78	PK	3.00	0.00	73.98	21.20	PASS
CH 11	V	3	Horn SN6276	2490.95	28.80		30.39	5.21	-23.12	12.48	41.28	AV	3.00	0.00	53.98	12.70	PASS
CH 11	V	3	Horn SN6276	2493.74	42.90		30.39	5.23	-23.12	12.50	55.40	PK	3.00	0.00	73.98	18.58	PASS
CH 11	V	3	Horn SN6276	2497.60	30.00		30.40	5.24	-23.12	12.52	42.52	AV	3.00	0.00	53.98	11.46	PASS
CH 11	V	3	Horn SN6276	4935.24	31.00	X	35.57	7.58	-31.03	12.12	43.12	PK	3.00	0.00	73.98	30.86	PASS
CH 11	V	3	Horn SN6276	4923.88	19.70		35.55	7.53	-31.03	12.05	31.75	AV	3.00	0.00	53.98	22.23	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
Limit Distance Correction = 40*log(d1/d2) for F<30 MHz, 20*log(d1/d2) for F> 30 MHz:
where d1 is the measurement distance, d2 is the published limit distance

Limit = Specified Limit + Limit Distance The frequency points reported describe the highest emission measured in each of the ranges tested and are used to describe the measured spectrum as a whole. It is shown that the highest emissions measured within the spectrum pass the appropriate restricted limits; therefore all emissions within the restricted bands would also meet the requirements. No out-of-band emissions were measured above the levels noted.

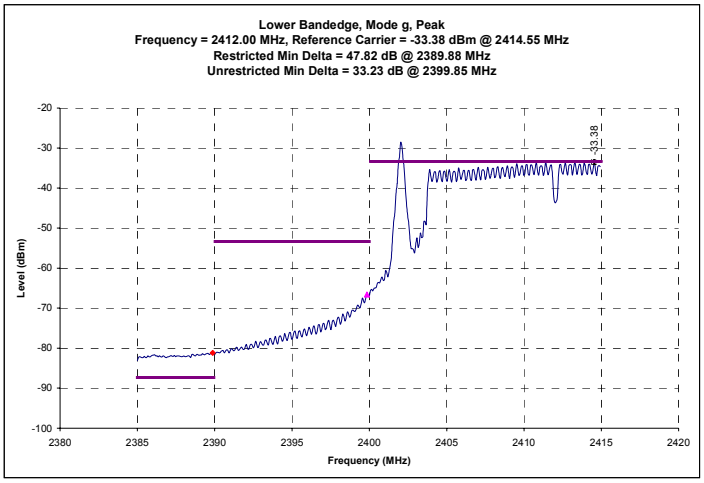
G.9.6. WLAN Mode g Co-transmitting with Bluetooth Hopping - Fundamental Field Strengths @ Specified Distance (1000 kHz RBW)

Channel	Polarity	Measurement Distance	Antenna	Frequency	SA Level	Noise Floor	AF	CL	Other	Total CF	Field Strength	Detector	RBW
		m		MHz	dBuV		dB/m	dB	dB	dB/m	dBuV/m		kHz
WLAN-CH1	H	3	Horn SN6276	2412.00	84.80		30.26	5.10	-23.13	12.23	97.03	PK	1000
WLAN-CH1	H	3	Horn SN6276	2412.00	73.00		30.26	5.10	-23.13	12.23	85.23	AV	1000
WLAN-CH1	V	3	Horn SN6276	2412.00	80.80		30.26	5.10	-23.13	12.23	93.03	PK	1000
WLAN-CH1	V	3	Horn SN6276	2412.00	68.60		30.26	5.10	-23.13	12.23	80.83	AV	1000
WLAN-CH6	H	3	Horn SN6276	2437.00	85.80		30.30	5.14	-23.12	12.31	98.11	PK	1000
WLAN-CH6	H	3	Horn SN6276	2437.00	74.50		30.30	5.14	-23.12	12.31	86.81	AV	1000
WLAN-CH6	V	3	Horn SN6276	2437.00	81.40		30.30	5.14	-23.12	12.31	93.71	PK	1000
WLAN-CH6	V	3	Horn SN6276	2437.00	70.00		30.30	5.14	-23.12	12.31	82.31	AV	1000
WLAN-CH11	H	3	Horn SN6276	2462.00	84.80		30.34	5.16	-23.12	12.38	97.18	PK	1000
WLAN-CH11	H	3	Horn SN6276	2462.00	72.10		30.34	5.16	-23.12	12.38	84.48	AV	1000
WLAN-CH11	V	3	Horn SN6276	2462.00	80.20		30.34	5.16	-23.12	12.38	92.58	PK	1000
WLAN-CH11	V	3	Horn SN6276	2462.00	67.70		30.34	5.16	-23.12	12.38	80.08	AV	1000

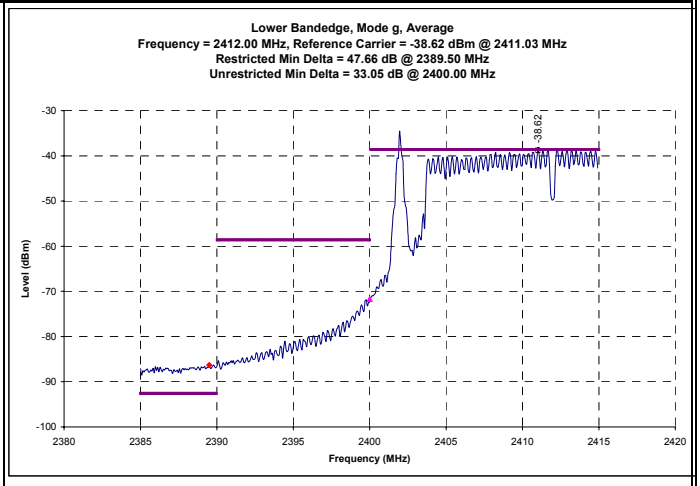
Formulae:
Total CF = AF + CL + Other
Field Strength = SA Level + Total CF

G.9.7. WLAN Mode g Co-transmitting with Bluetooth Channel 0 - Lower Band-edge Emission Field Strengths

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

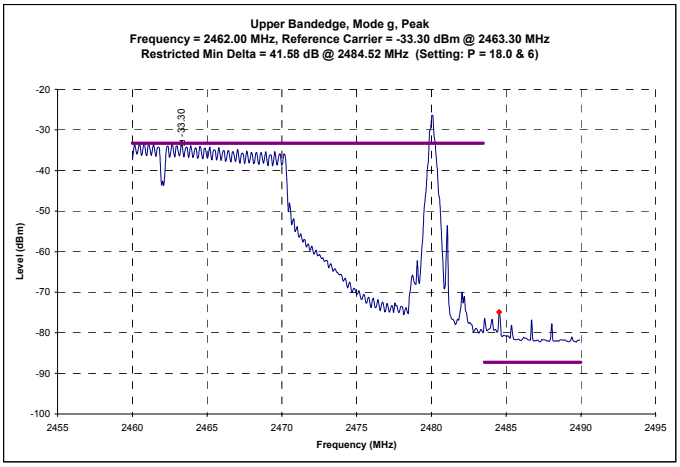
Channel	Polarity	Distance	Frequency	Carrier Radiated Field Strength	Delta Marker	Detector	Calculated Bandedge Field Strength	Duty Cycle Correction	Corrected Bandedge Field Strength	Specified Limit	Specified Limit Distance	Limit Distance Correction	Calculated Limit	Margin	Pass/Fail
		m	MHz	dBuV/m	dB		dBuV/m	dB	dBuV/m	dBuV/m	m	dB	dBuV/m	dB	
WLAN-CH1	H	3	2389.88	97.03	47.82	PK	49.21	0.00	49.21	73.98	3.00	0.00	73.98	24.77	PASS
WLAN-CH1	H	3	2389.50	85.23	47.66	AV	37.57	0.00	37.57	53.98	3.00	0.00	53.98	16.41	PASS
WLAN-CH1	V	3	2389.88	93.03	47.82	PK	45.21	0.00	45.21	73.98	3.00	0.00	73.98	28.77	PASS
WLAN-CH1	V	3	2389.50	80.83	47.66	AV	33.17	0.00	33.17	53.98	3.00	0.00	53.98	20.81	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)

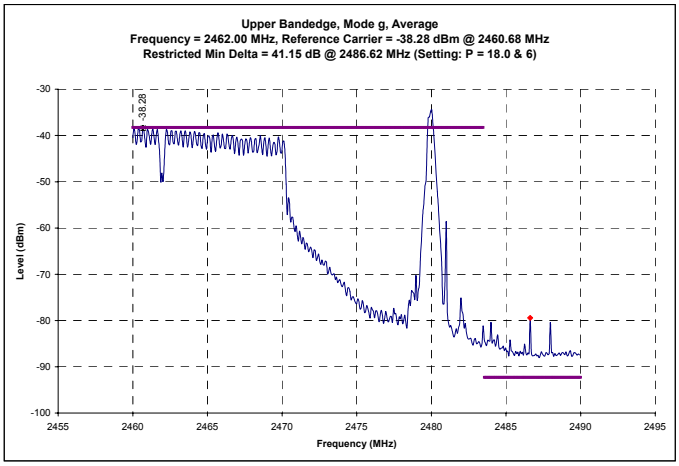
Note: Measurements and calculation reference the Marker-Delta Method described in FCC Public Notice DA 00-705

G.9.8. WLAN Mode g Co-transmitting with Bluetooth Channel 78 - Upper Band-edge Emission Field Strengths

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

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	2484.52	97.18	41.58	PK	55.60	0.00	55.60	73.98	3.00	0.00	73.98	18.38	PASS
WLAN-CH11	H	3	2486.62	84.48	41.15	AV	43.33	0.00	43.33	53.98	3.00	0.00	53.98	10.65	PASS
WLAN-CH11	V	3	2484.52	92.58	41.58	PK	51.00	0.00	51.00	73.98	3.00	0.00	73.98	22.98	PASS
WLAN-CH11	V	3	2486.62	80.08	41.15	AV	38.93	0.00	38.93	53.98	3.00	0.00	53.98	15.05	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

G.9.9. WLAN Mode g Co-transmitting with Bluetooth Hopping - Out-of-Band Spurious Emission Field Strengths @ Specified Distance (within restricted bands)

Project Number: 060605KBC-T644-E15W
Company: Itronix
Product: IX325 with Intel WLAN & MSI BT
Standard: FCC15.247c
Test Start Date: 27-Jul-05
Test End Date: 3-Aug-05

Channel	Polarity	Distance	Rx Antenna	Frequency	SA Level	Noise Floor	Rx AF	Rx CL	Other Rx	Total Rx CF	Field Strength	Detector	Limit Distance	Limit Distance Correction	Calculated Limit	Margin	Pass/Fail
		m		MHz	dBuV		dB/m	dB	dB	dB/m	dBuV/m	(PK/QP/AV)	m	dB	dBuV/m	dB	
CH 1	H	3	Horn SN6276	2367.70	33.00	X	30.19	5.06	-23.13	12.12	45.12	PK	3.00	0.00	73.98	28.86	PASS
CH 1	H	3	Horn SN6276	2344.00	20.90	X	30.15	5.03	-23.13	12.05	32.95	AV	3.00	0.00	53.98	21.03	PASS
CH 1	H	3	Horn SN6276	2493.07	36.40		30.39	5.22	-23.12	12.49	48.89	PK	3.00	0.00	73.98	25.09	PASS
CH 1	H	3	Horn SN6276	2493.07	23.70		30.39	5.22	-23.12	12.49	36.19	AV	3.00	0.00	53.98	17.79	PASS
CH 1	H	3	Horn SN6276	4867.24	31.20	X	35.43	7.52	-31.04	11.92	43.12	PK	3.00	0.00	73.98	30.86	PASS
CH 1	H	3	Horn SN6276	4870.12	18.40	X	35.44	7.55	-31.04	11.96	30.36	AV	3.00	0.00	53.98	23.62	PASS
CH 1	V	3	Horn SN6276	2362.70	38.60		30.18	5.06	-23.13	12.11	50.71	PK	3.00	0.00	73.98	23.27	PASS
CH 1	V	3	Horn SN6276	2355.85	28.00		30.17	5.06	-23.13	12.10	40.10	AV	3.00	0.00	53.98	13.88	PASS
CH 1	V	3	Horn SN6276	4861.40	31.20	X	35.42	7.45	-31.04	11.83	43.03	PK	3.00	0.00	73.98	30.95	PASS
CH 1	V	3	Horn SN6276	4871.80	18.40	X	35.44	7.57	-31.04	11.98	30.38	AV	3.00	0.00	53.98	23.60	PASS
CH 6	H	3	Horn SN6276	2371.34	33.40	X	30.19	5.06	-23.13	12.12	45.52	PK	3.00	0.00	73.98	28.46	PASS
CH 6	H	3	Horn SN6276	2372.89	20.60	X	30.20	5.06	-23.13	12.12	32.72	AV	3.00	0.00	53.98	21.26	PASS
CH 6	H	3	Horn SN6276	2491.95	37.70		30.39	5.22	-23.12	12.48	50.18	PK	3.00	0.00	73.98	23.79	PASS
CH 6	H	3	Horn SN6276	2490.86	21.70		30.39	5.21	-23.12	12.48	34.18	AV	3.00	0.00	53.98	19.80	PASS
CH 6	H	3	Horn SN6276	4863.84	31.20	X	35.43	7.48	-31.04	11.87	43.07	PK	3.00	0.00	73.98	30.91	PASS
CH 6	H	3	Horn SN6276	4871.36	18.30	X	35.44	7.57	-31.04	11.97	30.27	AV	3.00	0.00	53.98	23.70	PASS
CH 6	V	3	Horn SN6276	2376.79	32.60	X	30.20	5.05	-23.13	12.13	44.73	PK	3.00	0.00	73.98	29.25	PASS
CH 6	V	3	Horn SN6276	2376.20	27.20		30.20	5.05	-23.13	12.13	39.33	AV	3.00	0.00	53.98	14.65	PASS
CH 6	V	3	Horn SN6276	2492.15	32.90		30.39	5.22	-23.12	12.49	45.39	PK	3.00	0.00	73.98	28.59	PASS
CH 6	V	3	Horn SN6276	2492.31	27.10		30.39	5.22	-23.12	12.49	39.59	AV	3.00	0.00	53.98	14.39	PASS
CH 6	V	3	Horn SN6276	4865.12	30.40		35.43	7.49	-31.04	11.89	42.29	PK	3.00	0.00	73.98	31.69	PASS
CH 6	V	3	Horn SN6276	4864.48	18.40		35.43	7.48	-31.04	11.88	30.28	AV	3.00	0.00	53.98	23.70	PASS
CH 11	H	3	Horn SN6276	2492.02	39.20		30.39	5.22	-23.12	12.49	51.69	PK	3.00	0.00	73.98	22.29	PASS
CH 11	H	3	Horn SN6276	2491.63	22.20	X	30.39	5.22	-23.12	12.48	34.68	AV	3.00	0.00	53.98	19.30	PASS
CH 11	H	3	Horn SN6276	2342.73	33.60	X	30.15	5.03	-23.13	12.04	45.64	PK	3.00	0.00	73.98	28.33	PASS
CH 11	H	3	Horn SN6276	2342.09	21.20	X	30.15	5.03	-23.13	12.04	33.24	AV	3.00	0.00	53.98	20.74	PASS
CH 11	H	3	Horn SN6276	4941.08	30.90	X	35.58	7.60	-31.03	12.15	43.05	PK	3.00	0.00	73.98	30.93	PASS
CH 11	H	3	Horn SN6276	4923.24	18.50	X	35.55	7.53	-31.03	12.05	30.55	AV	3.00	0.00	53.98	23.43	PASS
CH 11	V	3	Horn SN6276	2491.73	40.10		30.39	5.22	-23.12	12.48	52.58	PK	3.00	0.00	73.98	21.40	PASS
CH 11	V	3	Horn SN6276	2493.58	23.80		30.39	5.22	-23.12	12.49	36.29	AV	3.00	0.00	53.98	17.68	PASS
CH 11	V	3	Horn SN6276	2361.57	33.40	X	30.18	5.07	-23.13	12.11	45.51	PK	3.00	0.00	73.98	28.47	PASS
CH 11	V	3	Horn SN6276	2356.19	21.99		30.17	5.06	-23.13	12.10	34.09	AV	3.00	0.00	53.98	19.89	PASS
CH 11	V	3	Horn SN6276	4906.84	30.80	X	35.51	7.50	-31.03	11.98	42.78	PK	3.00	0.00	73.98	31.20	PASS
CH 11	V	3	Horn SN6276	4865.48	18.40	X	35.43	7.50	-31.04	11.89	30.29	AV	3.00	0.00	53.98	23.69	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
Limit Distance Correction = 40*log(d1/d2) for F<30 MHz, 20*log(d1/d2) for F> 30 MHz:
where d1 is the measurement distance, d2 is the published limit distance

Limit = Specified Limit + Limit Distance The frequency points reported describe the highest emission measured in each of the ranges tested and are used to describe the measured spectrum as a whole. It is shown that the highest emissions measured within the spectrum pass the appropriate restricted limits; therefore all emissions within the restricted bands would also meet the requirements. No out-of-band emissions were measured above the levels noted.

G.10. PASS/FAIL

In reference to the results outlined in G.9, the DUT passes the requirements as stated in the reference standards as follows:

FCC 15.205 (a) (b) and 15.209 (a): No emissions were measured within the restricted bands as outlined in 15.205 that exceeded the limits stated in 15.209.

G.11. SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Alex Yuan
EMC Technologist
Celltech Labs Inc.

10Aug05
Date

Appendix H - Conducted Powerline Emissions Measurement

H.1. REFERENCES

Normative Reference Standard	CFR 47 FCC Part 15 §15.207
Procedure Reference	ANSI C63.4

H.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.

H.3. ENVIRONMENTAL CONDITIONS

Temperature	+26 ± 5 °C
Humidity	31 % ± 10% RH
Barometric Pressure	101.4 kpa

H.4. EQUIPMENT LIST

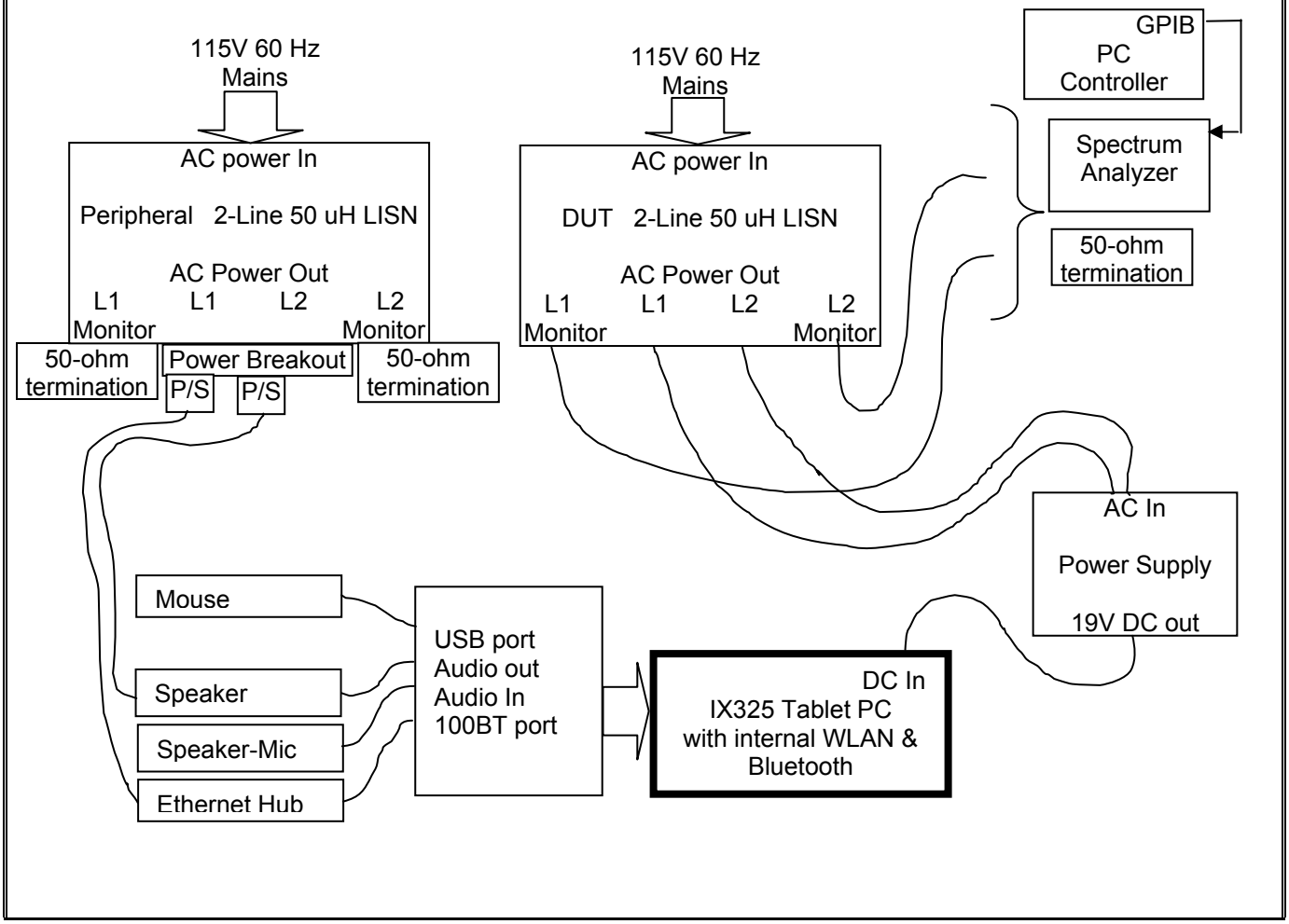
ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00049	HP	85650A	Quasi-Peak Adapter	13Apr05	13Apr06
00047	HP	85685A	RF Preselector	13Apr05	13Apr06
00051	HP	8566B	Spectrum Analyzer RF Section	12Apr05	12Apr06
00083	EMCO	3825/2	Line Impedance Stabilization Network	26Apr05	26Apr06
00084	EMCO	3825/2	Line Impedance Stabilization Network	26Apr05	26Apr06

H.5. MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS	The conducted emissions were measured on each of the two AC powerline leads connected to the DUT's power supply brick. A two line LISN was used to make this measurement. A drawing of the equipment setup is shown in I.7
MEASUREMENT EQUIPMENT SETTINGS	Each of the monitor ports from the 2-line LISN was connected in turn to the spectrum analyzer. The port not connected to the analyzer was terminated in a 50-ohm load. A prescan of the peak emission levels was made of the 150 kHz – 30 MHz range split into 4 equal frequency bands. The following were the spectrum analyzer settings: Start Frequency and Stop Frequency set by software for each of the four bands RBW: 100 kHz VBW: 300 kHz Sweep: 500 mS The resulting data from each band was corrected and collected by software and presented in the graphical representations shown in H.9 for the two leads. The frequency points with the highest 10 levels on each lead were used by software to optimize a set of 20 readings for each type of detector (peak, quasi-peak and average). This data was corrected by the software is presented in the tables shown in section H.9.

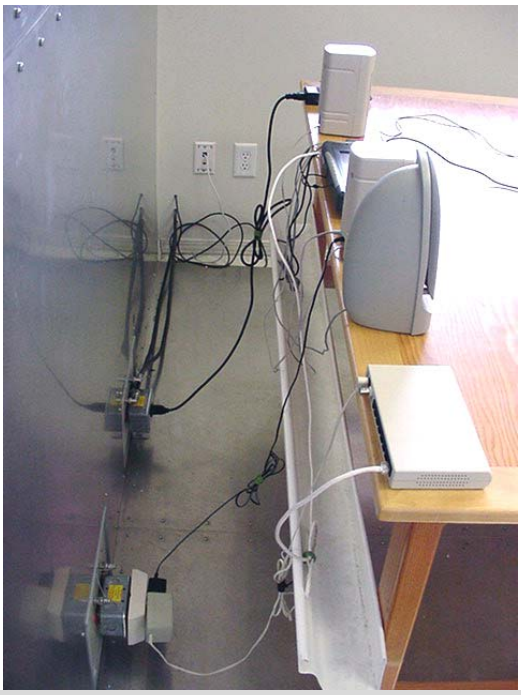
H.6. SETUP DRAWING

Figure H.6-1 - Setup Drawing



H.7. SETUP PHOTOS

Photograph H-1 - AC Powerline Conducted Emission Cable Placement



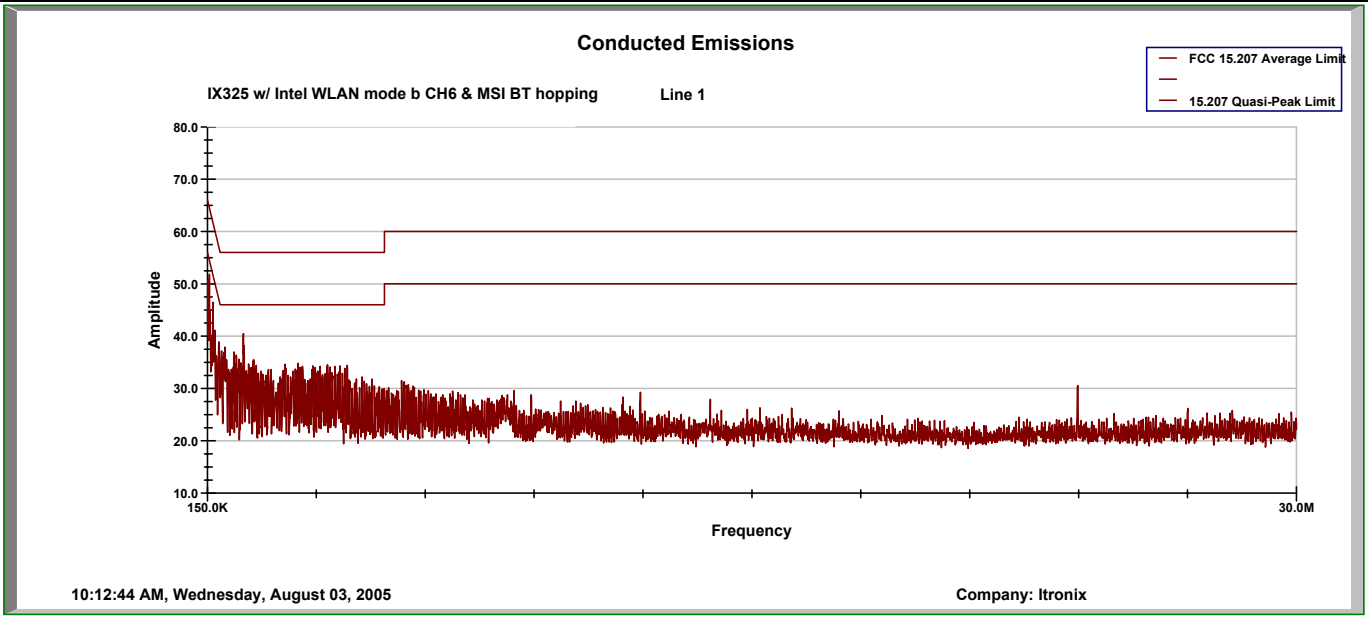
Photograph H-2 - AC Powerline Conducted Emission Configuration

H.8. DUT OPERATING DESCRIPTION

WLAN:	The WLAN was set to transmit at full power on Channel 1, Mode b 1 Mb/s with Bluetooth Hopping
PC:	Other than operating the WLAN software and running MS windows, no PC exercising was performed.
Peripherals:	All peripherals were active, but no specific traffic was initiated.

H.9. TEST RESULTS

H.9.1. Line 1 Conducted Emissions



Project Number:	060605KBC-T644-E15W	**Standard:**	FCC 15.207
Company:	Itronix	**Test Start Date:**	3-Aug-05
Product:	IX325 with Intel WLAN & MSI Bluetooth	**Test End Date:**	3-Aug-05

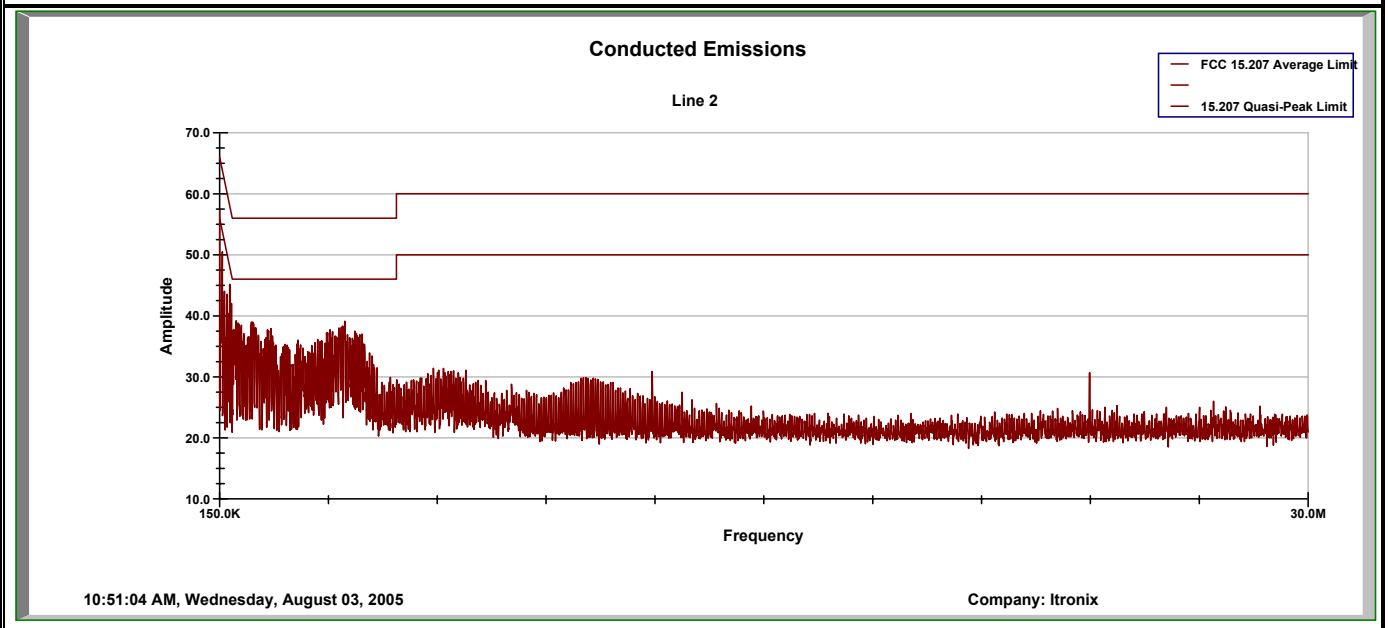
Line 1 Conducted Emissions

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	66.80	56.72	31.74	-2.13	64.67	54.59	29.61	65.98	11.39	55.98	26.37	Pass
0.173	63.90	53.79	26.60	-1.76	62.15	52.04	24.85	64.80	12.76	54.80	29.95	Pass
0.179	63.70	52.23	25.06	-1.68	62.02	50.55	23.38	64.55	14.00	54.55	31.17	Pass
0.203	61.00	50.71	37.73	-1.41	59.59	49.30	36.32	63.51	14.20	53.51	17.18	Pass
0.208	59.40	49.32	21.14	-1.36	58.04	47.96	19.78	63.30	15.33	53.30	33.51	Pass
0.223	59.00	49.03	20.21	-1.23	57.78	47.81	18.99	62.72	14.91	52.72	33.73	Pass
0.300	53.00	42.68	15.70	-0.83	52.17	41.85	14.87	60.24	18.39	50.24	35.37	Pass
0.351	49.70	39.55	15.51	-0.67	49.03	38.88	14.83	58.93	20.05	48.93	34.10	Pass
1.146	41.20	39.39	34.91	-0.31	40.89	39.08	34.59	56.00	16.92	46.00	11.41	Pass

Calculations

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

H.9.2. Line 2 Conducted Emissions



Project Number:	060605KBC-T644-E15W	**Standard:**	FCC 15.207
Company:	Itronix	**Test Start Date:**	3-Aug-05
Product:	IX325 with Intel WLAN & MSI Bluetooth	**Test End Date:**	3-Aug-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	
0.150	66.60	55.40	32.62	-2.15	64.45	53.25	30.47	65.98	12.73	55.98	25.51	Pass
0.211	57.60	46.64	19.13	-1.34	56.26	45.30	17.79	63.18	17.88	53.18	35.40	Pass
0.217	59.00	47.87	19.67	-1.28	57.72	46.59	18.38	62.93	16.34	52.93	34.55	Pass
0.225	57.90	47.95	19.13	-1.22	56.69	46.74	17.91	62.63	15.90	52.63	34.72	Pass
0.277	53.90	43.25	13.78	-0.93	52.97	42.32	12.85	60.91	18.59	50.91	38.06	Pass
0.284	53.30	42.49	11.40	-0.90	52.40	41.59	10.50	60.70	19.11	50.70	40.20	Pass
3.578	39.70	38.56	36.85	-0.30	39.40	38.26	36.55	56.00	17.74	46.00	9.45	Pass

Calculations

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

H.10. PASS/FAIL

In reference to the results outlined in I.9 the DUT passes the requirements as stated in the reference standards as follows:

The RF voltage measured in reference to ground on each of the power line conductors does not exceed the limits as outline in FCC 15.207.

The emission measured on Line 1 with the least margin to the limit measured with an QP detector at 150 kHz and a margin of 11.39 dB. The emission measured on Line 2 with the least margin to the limit was measured with a AV detector at 3.578 MHz with a margin of 9.45 dB.

H.11. SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Alex Yuan
EMC Technologist
Celltech Labs Inc.

3Aug05
Date

END OF DOCUMENT