

Test Report S/N:	102604KBC-T577-E24G/E15B Issue 1.0		
Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

SUPPLEMENTARY EMC TEST REPORT

FOR THE

ITRONIX RUGGED HANDHELD PC MODEL: IX100XA775WLBT

WITH THE

INTERNAL USI WM-BB-AG-01 802.11B/BLEETOOTH COMBO TRANSMITTER

UTILIZING AN

INTERNAL 802.11 DIPOLE ANTENNA & INTERNAL PRINTED CIRCUIT BLEETOOTH ANTENNA

WITH

THE BLEETOOTH CO-TRANSMITTING WITH THE

INTERNAL SIERRA WIRELESS AIRCARD 775 DUAL-BAND GSM GPRS/EDGE PCMCIA MODEM

UTILIZING AN

EXTERNAL ¼-WAVE HELIX ANTENNA

TRSN 102604KBC-T577-E24G/E15B
Issue 1.0

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

February 2, 2005

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Lab Registration(s):	FCC #714830	IC Lab File #3874	

DECLARATION OF COMPLIANCE

Test Lab CELLTECH LABS INC. Testing and Engineering Services 1955 Moss Court Kelowna, B.C. Canada V1Y 9L3 Phone: 250-448-7047 Fax: 250-448-7048 e-mail: info@celltechlabs.com				Applicant Information ITRONIX CORPORATION 801 South Stevens Street Spokane, WA 99204 United States			
web site: www.celltechlabs.com							
Laboratory Registration No.(s):		FCC:	714830	IC:	IC 3874		
Rule Part(s):	FCC:	Dual Band GSM		§2 ; §22H; §24E			
		Bluetooth - FHSS		§15.247; §2.1091; §1.1310			
		WLAN - DSSS		§15.247; §2.1091; §1.1310			
Device Classification:	FCC:	Dual Band GSM GPRS/EDGE		- PCS Licensed Transmitter (PCB)			
		Bluetooth - FHSS		- Part 15 Spread Spectrum Transmitter (DSS)			
		WLAN - DSSS		- Part 15 Digital Transmission System (DTS)			
Device Identification:	FCC ID:	KBCIX100XA775WLBT		IC:	1943A-IX100Xe		
DUT Description:							
Model:	IX100XA775WLBT						
Device Description:	Rugged Handheld PC with internal USI WM-BB-AG-01 802.11b/Bluetooth Combo Transmitter, internal dipole antenna (WLAN), and printed circuit antenna (Bluetooth) - Bluetooth co-transmitting with Sierra Wireless AirCard 775 Dual-Band GSM GPRS/EDGE PCMCIA Modem and External ¼-Wave Helix Antenna, Vehicle-Mount Antenna, and Vehicle Cradle						
Tx Frequency Range(s):	Dual Band GSM	Cellular	824.2 - 848.8 MHz	PCS	1850.2 - 1909.8 MHz		
	Bluetooth - FHSS	2402 - 2480 MHz					
Max. RF Output Power Measured:	Dual Band GSM	Cellular	+32.1 dBm Peak Conducted	PCS	+28.8 dBm Peak Conducted		
	Bluetooth	+4.26 dBm Peak Conducted					
Max. Time Slots:	Dual-Band GSM	4 (Class 12)					
Max. Duty Cycle:	Dual-Band GSM	50 %					
Max. Source-Based Time-Averaged Power:	Cellular	+29.1 dBm Peak Conducted	PCS	+25.8 dBm Peak Conducted			
Modulation(s):	Dual Band GSM	GMSK, 8-PSK					
	Bluetooth	GFSK 1 Mbps 0.5 BT Gaussian					
Antenna Type(s) Tested:	Dual Band GSM	Nearson ¼-Wave Helix P/N: 47-0180-003					
	Bluetooth	Printed Circuit Antenna P/N: 47-0225-001					
Power Supply:	Model MPE-CO45-12 12 VDC 3.75 A, AC Power Adapter, Lithium-ion Battery 7.4 V, 3.0 Ah (P/N: 46-0136-001)						

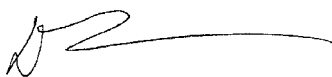
This wireless portable device has demonstrated compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in FCC 47 CFR Parts 2, 15.247, 22H, 24E, Industry Canada RSS 133 Issue 2, RSS-132 Issue 1 (Provisional), RSS-210 Issue 5; and ANSI TIA/EIA-603-C-2004.

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.



Duane M. Friesen
EMC Manager
Celltech Labs Inc.



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TEST SUMMARY

Referenced Standard: FCC CFR Title 47 Parts 2, 22 & 24

Appendix	Test Description	Procedure Reference	Limit Reference	Test Start Date	Test End Date	Result
B	Conducted RF Output Power	FCC 97-114	§2.1046	17Dec04	17Dec04	Pass
C	Effective Radiated Power / Effective Isotropic Radiated Power	ANSI/TIA/EIA-603-C	§22.913 §24.232(b)	17Dec04	02Feb05	Pass
D	Radiated Spurious Emissions	ANSI/TIA/EIA-603-C	§22.917 (a), §24.238 (a)	17Dec04	02Feb05	Pass
E	Maximum Permissible Exposure	FCC CFR 47 § 2.1091 IEEE Std C95.1-1999	§1.1310 Table 1 (b)	na	na	na

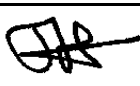
Referenced Standard: IC RSS-210, RSS-132, & RSS-133

B	Conducted RF Output Power	ANSI/TIA/EIA-603-C	RSS-132 §4.4 RSS-133 §6.2	17Dec04	17Dec04	Pass
C	Effective Radiated Power / Effective Isotropic Radiated Power	ANSI/TIA/EIA-603-C	RSS-132 §4.4 RSS-133 §6.2	17Dec04	02Feb05	Pass
D	Radiated Spurious Emissions	ANSI/TIA/EIA-603-C	RSS-132 §4.4 RSS-133 §6.3	17Dec04	02Feb05	Pass
E	Maximum Permissible Exposure	RSS-102 Issue 1	RSS-210 §14 Safety Code 6 2.2.1(a) Table 5	na	na	na

REVISION LOG

Issue	Description	Implemented By	Implementation Date
1.0	Initial Release	Jon Hughes	2Feb05

SIGNATORIES

Prepared By:		Feb. 2, 2005
Name/Title	Duane M. Friesen, C.E.T. / EMC Manager	Date
Approved By:		Feb. 2, 2005
Name/Title	Jon Hughes / General Manager	Date

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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1.0 SCOPE

This report outlines the measurements made and results collected during electromagnetic emissions testing of the Itronix Corporation IX100X Rugged Handheld PC with internal USI WM-BB-AG-01 802.11b/Bluetooth Combo Transmitter. The Bluetooth was co-transmitting with the Sierra Wireless AirCard 775 Dual-Band GSM GPRS/EDGE PCMCIA Modem. The 802.11b transmitter does not co-transmit with the Sierra Wireless AirCard 775 Dual-Band GSM GPRS/EDGE PCMCIA Modem. The Bluetooth transmitter was connected to an internal printed circuit antenna located within the PC. The AirCard 775 Dual-Band GSM Modem was connected to an external Nearson ¼-Wave Helix antenna located on the upper right side edge of the PC. The IX100X also has the option of being mounted in a vehicle cradle with the AirCard 775 Dual-Band GSM Modem utilizing a vehicle-mount antenna. The Bluetooth transmitter does not utilize the vehicle-mount antenna option. The vehicle antenna option was not considered to be worst case when investigating the co-transmitting effects, and therefore was not used in obtaining the data presented in this report. This report describes the inter-modulation product investigation and related measurement results obtained with both GSM and Bluetooth transmitters installed in the IX100X Rugged Handheld PC as described, and transmitting simultaneously. The measurement results were applied against the applicable 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 2, 15 Subpart C, 22 Subpart H and 24 Subpart E; and Industry Canada Radio Standards Specification RSS-210 Issue 5, RSS-132 Issue 1 (Provisional), and RSS-133 Issue 2.

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
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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
ANSI/TIA/EIA-603-C:2004	Land Mobile FM or PM Communication Equipment Measurement and Performance Standards
CFR Title 47 Part 2:2003	Code of Federal Regulations Title 47: Telecommunication Part 2: Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
CFR Title 47 Part 15:2003	Code of Federal Regulations Title 47: Telecommunication Part 15: Radio Frequency Devices
CFR Title 47 Part 22:2003	Code of Federal Regulations Title 47: Telecommunication Part 22: Public Mobile Services
CFR Title 47 Part 24:2003	Code of Federal Regulations Title 47: Telecommunication Part 24: Personal Communication Services
IC Spectrum Management & Telecommunications Policy	Radio Standards Specification 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 RSS-132 Issue 1 (Provisional) 800 MHz Cellular Telephones Employing New Technologies RSS-133 Issue 2, Revision 1 Personal Communication Services RSS-210 Issue 5 - Low Power Licence-Exempt Radiocommunication Devices RSS-212 Issue 1 (Provisional) - Test Facilities & Test Methods for Radio Equipment

2.2 Reference Test Reports

TIMCO Engineering	FCC Test Report For the WLAN and Bluetooth FCC ID: KBCIX100XA775WLBT Test Report Number \NITRONIX\423AUT4\423AUT4TestReport.doc Date: April 15, 2004
Celltech Labs Test Report	EMC Test Report For the Itronix Rugged Handheld PC Model: IX100XA775WLBT with the Sierra Wireless AirCard 775 Dual-Band GSM GPRS/EDGE PCMCIA Modem utilizing an External ¼-Wave Helix Antenna and a Vehicle-Mount Dipole Antenna with Cradle FCC ID: KBCIX100XA775WLBT Test Report Serial Number 102604KBC-T577-E24G Issue 1.0 (Single-Transmit) Date: February 1, 2005

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
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3.0 TERMS AND DEFINITIONS

AV	Average
CDMA	Code Division Multiple Access
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
EDGE	Enhanced Data Rates for GSM Evolution
EIRP	Effective Isotropic Radiated Power
EMC	Electromagnetic Compatibility
ERP	Effective Radiated Power
FCC	Federal Communication Commission
FHSS	Frequency Hopping Spread Spectrum
GSM	Global Systems for a Mobility Communication
GPRS	General Packet Radio Service
HP	Hewlett Packard
HPF	High Pass Filter
Hpol	Horizontal Polarization
Hz	Hertz
IC	Industry Canada
kHz	kilohertz
LNA	Low Noise Amplifier
m	meter
MHz	Megahertz
Mbps	megabits per second
na	not applicable
n/a	not available
PK	Peak
PPSD	Peak Power Spectral Density
QP	Quasi-peak
RBW	Resolution Bandwidth
R&S	Rohde & Schwarz
RSS	Radio Standard Specification
SA	Spectrum Analyzer
VBW	Video Bandwidth
Vpol	Vertical Polarization
WLAN	Wireless Local Area Network

4.0 FACILITIES AND ACCREDITATIONS

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

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5.0 GENERAL INFORMATION

5.1 Applicant Information

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

5.2 DUT Description

The DUT consisted of the IX100X Rugged Handheld PC containing a Sierra Wireless AirCard 775 Dual-Band GSM GPRS/EDGE PCMCIA Modem connected to an External Nearson ¼-Wave Helix Antenna located on the upper right side edge of the PC. Co-located within the handheld PC is a USI WM-BB-AG-01 802.11B/Bluetooth Combo Transmitter connected to two internal antennas located at the top (802.11b) and right (Bluetooth) sides of the PC. The IX100X has the option of being mounted in a vehicle cradle, with the AirCard 775 Dual-Band GSM Modem utilizing a MaxRad vehicle-mount antenna with a 17-foot attached cable. The USI WM-BB-AG-01 802.11B/Bluetooth Combo Transmitter does not utilize the vehicle-mount antenna. Photographs of the DUT placement and construction are shown in Appendix A.

Device:	IX100X Rugged Handheld PC			
Model:	IX100XA775WLBT			
Serial Number(s):	MH002			
Identifier(s):	FCC ID:	KBCIX100XA775WLBT	IC:	1943A-IX100Xe
Power Source:	Magic Power Technology MPE-C045-12 R2 (F-875-1008-1) AC-DC power supply Output 12 VDC, 3.75A			

Device:	Dual-Band GSM GPRS/EDGE PCMCIA Modem			
Model:	Sierra Wireless AirCard 775			
Serial Number:	X04072701619010			
Identifier(s):	FCC ID:	N7NAC775	IC:	2417-AC775
Rule Part(s):	FCC:	§2.1091; §22.913, §22.917; §24.232(b), §24.238		
	IC:	RSS-133 Issue 2; RSS-132 Issue 1 (Provisional)		
Classification:	FCC:	PCS Licensed Transmitter (PCB)		
	IC:	800 MHz Cellular Telephones employing New Technologies (RSS-132)		
		2 GHz Personal Communication Services (RSS-133)		
Power Source:	Powered from the internal PC power supply			

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
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Device:	802.11b/Bluetooth Combo Transmitter					
Model:	USI WM-BB-AG-01					
Serial Number:	03UT99470005					
Identifier(s):	FCC ID:	IXMWM-BB-AG-01		IC:	na	
Rule Part(s):	FCC:	§15.247; §2.1091; §1.1310		IC:	RSS-210 Issue 5 - A1. 11/30/02	
Classification:	FCC:	Bluetooth	Spread Spectrum Transmitter (DSS)		IC:	Low Power Licence-Exempt Radiocommunication Device
		WLAN	Digital Transmission System (DTS)			
Power Source:	Powered from the internal PC power supply					

Device:	Internal Printed Circuit Board Antenna (Bluetooth)				
Part No.:	47-00225-001				
Gain:	+2.5 dBi				

Device:	Internal Dipole Antenna (WLAN)				
Part No.:	47-00224-001				
Gain:	-4 dBi				

5.3 Co-Located Equipment

Name:	none
Model:	na

5.4 Cable Descriptions

ROUTING		Length	Model	Terminations		Shield Type	Shield Termination		Suppression
From	To	m		End 1	End 2		End 1	End 2	
none									

5.5 Support Equipment

The following equipment was used in support of the DUT.

Co-located Support Equipment List		
Manufacturer	Model	Description
none		

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5.6 Clock Frequencies

5.6.1 DUT Clock Frequencies

Device:	Rugged Handheld PC
Clocks:	n/a
Device:	Dual-Band GSM Modem
Clocks:	n/a
Device:	801.11B/Bluetooth Combo Transmitter
Clocks:	n/a
Clocks:	None
Device:	Internal Printed Circuit Antenna (Bluetooth)
Clocks:	None
Device:	Internal Dipole Antenna (WLAN)
Clocks:	None

5.6.2 Co-Located Clock Frequencies

Device:	None
Clocks:	

5.7 Mode(s) of Operation Tested

Customer supplied software was used to set the GSM Modem and Bluetooth to the appropriate channels and power level for the specific measurement. The following settings were used.

5.7.1 Sierra Wireless AirCard 775 Dual-Band GSM GPRS/EDGE PCMCIA Modem

5.7.1.1 Cellular GSM

TX Frequency Range:	824.2 - 848.8 MHz Ch. 128 (824.200 MHz), Ch. 190 (836.600 MHz) & Ch. 251 (848.800 MHz) measured unless otherwise noted
Software Power Gain Settings:	The supplied software set the power for maximum rated output power.
RF Peak Conducted Output Power Tested:	Ch. 128 - +32.13 dBm Ch. 190 - +32.03 dBm Ch. 251 - +32.02 dBm *conducted power measured at card port while powered with AC adapter
Battery Type(s):	7.4V Lithium-ion, 3.0Ah (Model: 46-0136-001)
Modulation Tested:	GMSK

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5.7.1.2 PCS GSM

TX Frequency Range:	1850.2 - 1909.8 MHz Ch. 512 (1850.2 MHz), Ch. 661 (1880.0) & Ch. 810 (1909.8 MHz) measured unless otherwise noted
Software Power Gain Settings:	The supplied software set the power for maximum rated output power.
RF Peak Conducted Output Power Tested:	Ch. 512 - +28.47 dBm Ch. 661 - +28.53 dBm Ch. 810 - +28.79 dBm *conducted power measured at card port while powered with AC adapter
Battery Type(s):	7.4V Lithium-ion, 3.0Ah (Model: 46-0136-001)
Modulation Tested:	GMSK

5.7.2 USI WM-BB-AG-01 802.11b/Bluetooth Combo SIP Transmitter

5.7.2.1 Bluetooth

TX Frequency Range:	2402 MHz - 2480 MHz Ch. 0 (2402 MHz), Ch. 39 (2441) & Ch. 78 (2480 MHz) measured unless otherwise noted
Software Power Gain Settings:	The supplied software set the power for nominal rated output power with the channels hopping.
RF Peak Conducted Output Power Tested:	Ch. 0 - +4.26 dBm Ch. 39 - +4.26 dBm Ch. 78 - +4.26 dBm *conducted power measured at card port while powered with AC adapter
Battery Type(s):	7.4V Lithium-ion, 3.0Ah (Model: 46-0136-001)
Modulation Type:	GFSK

5.7.2.2 WLAN (Rx Only - Transmitter Idle)

TX Frequency Range:	2412 - 2462 MHz
Software Power Gain Settings:	na
RF Peak Conducted Output Power Tested:	na
Battery Type(s):	7.4V Lithium-ion, 3.0Ah (Model: 46-0136-001)
Modulation Type:	na

5.7.3 DUT Exercising Software Description

The DUT was configured and exercised using customer supplied test software that allowed an operator to set the parameters of the Dual-Band GSM modem and Bluetooth operation. The settings used are described in each appendix.

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Report S/N:	102604KBC-T577-E24G/E15B Issue 1.0		
Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

5.8 Configuration Description

The DUT was configured, as described by the client as being representative of what would be delivered to a final customer. Using prescan testing as a reference, the PC was positioned with its face pointing up for the spurious emissions testing described herein. For ERP/EIRP measurements, the PC was oriented to match the orientation of the receive antenna. More specific details may be included in each appendix.

5.8.1 Configuration Justification

The DUT was tested in a configuration described by the client as being worst-case but typical of normal use. The system is available for use while handheld or installed in a mobile cradle utilizing a vehicle-mount dipole antenna (for GSM transmitter only). The test results are described in the referenced test reports. The portable configuration with attached Nearson 1/4-wave helix antenna was considered to be a worst-case representation of the co-transmitting effects and was used for the results described herein.

6.0 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 no greater than the specified limits as defined. The pass/fail statements made in this report only apply to the unit tested.

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Report S/N:	102604KBC-T577-E24G/E15B Issue 1.0		
Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

APPENDIX

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Report S/N:	102604KBC-T577-E24G/E15B Issue 1.0	
Test Date(s):	17Dec04 - 02Feb05	
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133
Lab Registration(s):	FCC #714830	IC Lab File #3874

Appendix A - Photographs

A.1 DUT PHOTOGRAPHS

Photograph A.1-1 - Front of IX100X Handheld PC with Nearson ¼-wave helix antenna



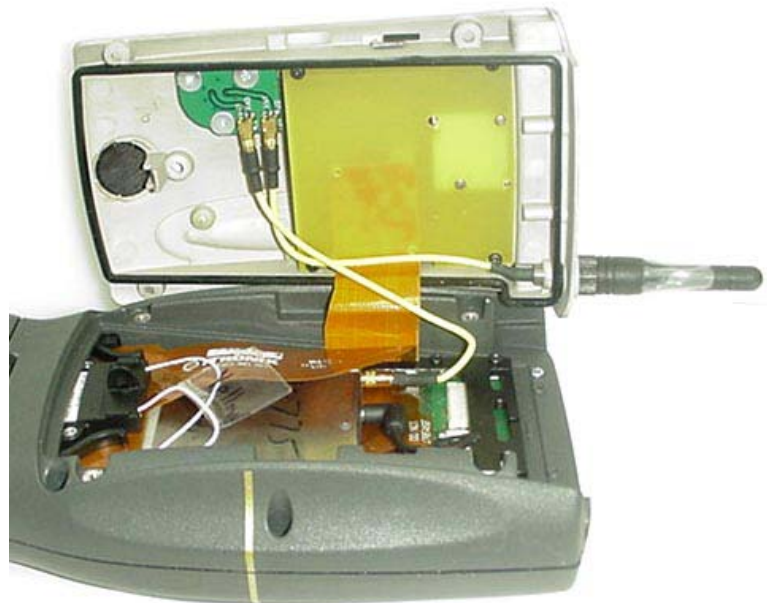
Photograph A.1-2 - IX100X Handheld PC in vehicle cradle with MaxRad vehicle-mount antenna



Photograph A.1-3 - IX100X Rugged Handheld PC with GSM Modem & 802.11b/Bluetooth



Photograph A.1-4 - IX100X Rugged Handheld PC with GSM Modem & 802.11b/Bluetooth



Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Report S/N:	102604KBC-T577-E24G/E15B Issue 1.0		
Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

Appendix B - GSM Conducted RF Output Power Measurement

B.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §2.1046 (a)
Procedure Reference	FCC 97-114

B.2 LIMITS

B.2.1 FCC CFR 47

FCC CFR 47 §2.1046 (a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedures to give the values of current and voltage on the circuit elements specified in §2.1033(c) (8).

*ERP and EIRP limits are specified in Appendix C.

B.3 ENVIRONMENTAL CONDITIONS

Temperature	25.2 +/- 2 °C
Humidity	35 +/- 2 %
Barometric Pressure	96.34 kPa

B.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00008	Gigatronics	8652A	Power Meter	30Apr04	30Apr05
00010	Gigatronics	80701A	Power Sensor	30Apr04	30Apr05
00012	Gigatronics	80701A	Power Sensor	30Apr04	30Apr05
00107	HP	8491C	Attenuator	n/a	n/a

*Cable and attenuator verified with power meter prior to use

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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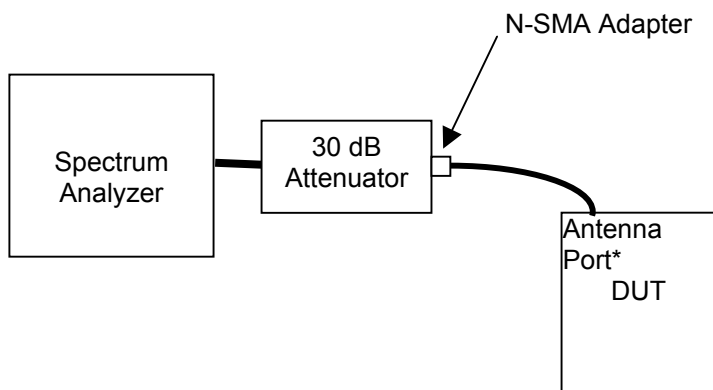
Test Report S/N:	102604KBC-T577-E24G/E15B Issue 1.0		
Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

B.5 MEASUREMENT EQUIPMENT SETUP

Measurement Equipment Connections	The equipment was connected as shown in the setup drawing in B.6.
Measurement Equipment Settings	Power Meter Settings: Mode – BAP Frequency compensation set for carrier frequency Offset set appropriately for carrier frequency and attenuator characteristics
Measurement Procedure	The RF conducted power levels for both PCS and cellular bands were measured at the DUT antenna connector port (at the card level) using a Gigatronics 8652A Universal Power Meter in burst average power mode. An offset was entered into the power meter to correct for the losses of the attenuator and cable installed between the transmitter output port and the power sensor input. The DUT test software was used to set it to transmit in the GSM mode. All subsequent tests were performed using the same power measurement procedures.

B.6 SETUP DRAWING

Figure B.6-1 - Setup Drawing



*measurement made/referenced at PCMCIA card port.

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Report S/N:	102604KBC-T577-E24G/E15B Issue 1.0		
Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

B.7 DUT OPERATING DESCRIPTION

Power measurements were made of each channel in both the cellular and PCS bands, with the GSM modem set appropriately as described in section 5.7.1. As a reference, the GSM powers were first measured while transmitting alone and then while the Bluetooth was transmitting in hopping mode.

B.8 TEST RESULTS

B.8.1 Single Transmit Reference

Mode	Channel	Frequency	Conducted Power
Cellular GSM	128	824.2 MHz	+32.06 dBm
	190	836.6 MHz	+31.92 dBm
	251	848.8 MHz	+31.87 dBm
PCS GSM	512	1850.2 MHz	+28.58 dBm
	661	1880.0 MHz	+28.58 dBm
	810	1909.8 MHz	+28.82 dBm

B.8.2 Co-Transmit with the Bluetooth Hopping

Mode	Channel	Frequency	Conducted Power
Cellular GSM	128	824.2 MHz	+32.13 dBm
	190	836.6 MHz	+32.03 dBm
	251	848.8 MHz	+32.02 dBm
PCS GSM	512	1850.2 MHz	+28.47 dBm
	661	1880.0 MHz	+28.53 dBm
	810	1909.8 MHz	+28.79 dBm

B.9 PASS/FAIL

There is no pass/fail criterion for this measurement.

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.



Russell Pipe
Senior Compliance Technologist
Celltech Labs Inc.

17Dec04

Date

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Report S/N:	102604KBC-T577-E24G/E15B Issue 1.0		
Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

Appendix C - Effective Radiated Power / Effective Isotropic Radiated Power Measurement

C.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §22.913 (a), FCC CFR 47 §24.232 (b)
Procedure Reference	ANSI/TIA/EIA-603-C

C.2 LIMITS

C.2.1 FCC CFR 47

FCC CFR 47 §22.913 (a)	(a) Maximum ERP. The ERP of mobile transmitters and auxiliary transmitters must not exceed 7 Watts.
FCC CFR 47 §24.232 (b)	(b) Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

C.3 ENVIRONMENTAL CONDITIONS

Temperature	27.4 +/- 2 °C
Humidity	33 +/- 2 %
Barometric Pressure	96.24 +/- 0.2 kPa

C.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00072	EMCO	2075	Mini-mast	n/a	n/a
00073	EMCO	2080	Turn Table	n/a	n/a
00071	EMCO	2090	Multi-Device Controller	n/a	n/a
00055	EMCO	3121C	Dipole Antenna	4Dec03	4Dec05
00034	ETS	3115	Double Ridged Guide Horn	24Mar04	24Mar05
00036	ETS	3115	Double Ridged Guide Horn	24Mar04	24Mar05
00202	ETS	3160-09	Small Horn Antenna	27May04	27Jun05
00049	HP	8566B	Spectrum Analyzer RF Section	18May04	18May05
00049	HP	85650A	Quasi-peak Adapter	18May04	18May05
00047	HP	85685A	RF Preselector	18May04	18May05
00048	Gore	65474	Microwave Cable	20May04	20May05
00030	HP	83017A	LNA	20May04	20May05
00006	R & S	SMR 20	Signal Generator (10MHz-40GHz)	30Apr04	30Apr05
00114	Amplifier Research	DC7154	Directional Coupler (0.8-4.2 GHz)	n/a	n/a
00078	Pasternack	PE2214-20	Directional Coupler (1-18 GHz)	n/a	n/a
00106	Amplifier Research	5S1G4	Power Amplifier (5W, 800MHz-4.2GHz)	n/a	n/a
00041	Amplifier Research	10W1000C	Power Amplifier (0.5 – 1 GHz)	n/a	n/a
00008	Gigatronics	8652A	Power Meter	30Apr04	30Apr05
00010	Gigatronics	80701A	Power Sensor	30Apr04	30Apr05

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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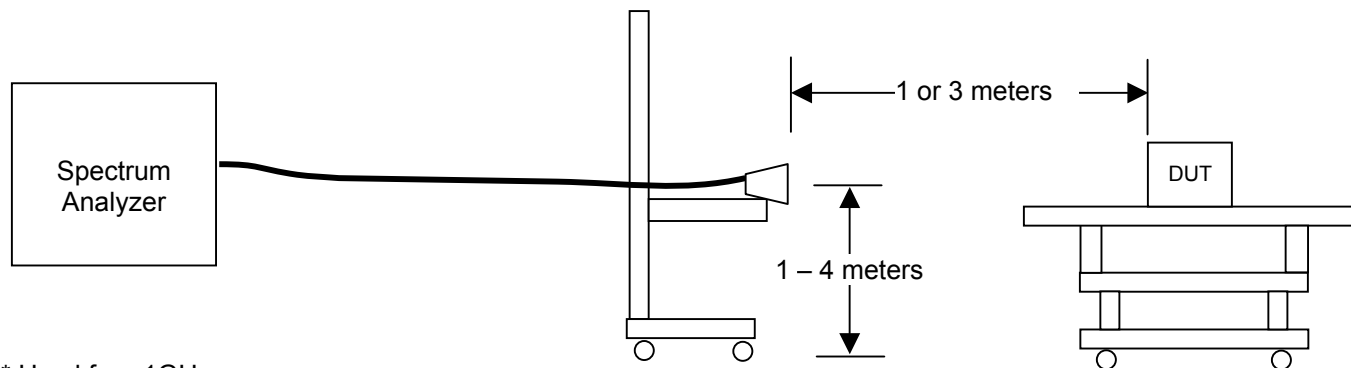
Test Report S/N:	102604KBC-T577-E24G/E15B Issue 1.0		
Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

C.5 MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS	For the field strength measurements, the measurement equipment was connected as shown in C.6. A number of antennas were used to cover the applicable frequency range tested ¹ . The ranges in which each antenna was used are as follows. For the final substitutions, the DUT was replaced with the appropriate antenna and fed from a CW signal source sufficient to replicate the received field strength of the emission being investigated.		
	Frequency Range	RX Antenna	TX Antenna
	30 MHz – 1GHz	Dipole	Dipole
	1 GHz – 18 GHz	ETS 3115 Horn	ETS 3115 Horn
MEASUREMENT EQUIPMENT SETTINGS	For the spurious out-of-band emissions, the spectrum analyzer was set to the following settings:		
	Mode	RBW	VBW
		kHz	kHz
	Cellular	100	300
	PCS	1000	1000
			Detector
			Peak
			Peak

C.6 SETUP DRAWING

Figure C.6-1 - Setup Drawing



* Used for >1GHz

Applicant:	Itronix Corporation	Model:	IX100XA775WLB	FCC ID:	KBCIX100XA775WLB	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Report S/N:	102604KBC-T577-E24G/E15B Issue 1.0	
Test Date(s):	17Dec04 - 02Feb05	
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133
Lab Registration(s):	FCC #714830	IC Lab File #3874

C.7 SETUP PHOTOGRAPHS

Photograph C.7-1 - Dipole Receive Antenna with DUT Helix Antenna Configuration



Photograph C.7-2 - Horn Receive Antenna with DUT Helix Antenna Configuration



Photograph C.7-3 - Dipole Substitution Antenna Setup



C.8 DUT OPERATING DESCRIPTION

Measurements were made for the low, mid and high GSM channels transmitting in each of the cellular and PCS bands at maximum power levels as described in Appendix B while the Bluetooth was transmitting simultaneously in hopping mode at its nominal power level.

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Report S/N:	102604KBC-T577-E24G/E15B Issue 1.0		
Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

C.9 TEST RESULTS

C.9.1 Carrier Levels

C.9.1.1 Cellular GSM Carrier Levels



Project Number: 102604KBC-T577
Company: Itronix
Product: IX100X+ with AC775 & BT

Standard: FCC22.913
Test Start Date: 17-Dec-04
Test End Date: 2-Feb-05

Attached Helix Antenna (co-transmitting with BT hopping) Carrier Power Levels

Polarity	Distance m	Rx Antenna	Tx Antenna	Channel	Frequency	Corrected Field Strength	Substituted SA Signal Level	Power Applied to Antenna	Antenna Gain	Carrier ERP Level		ERP Limit		Margin	Pass/Fail
					MHz	dBuV/m	dBuV	dBm	dBd	dBm	Watts	dBm*	Watts	dB	
H	3	A_3121C	B_3121C	128	824.20	129.41	100.16	30.65	-0.86	27.65	0.582	38.45	7.00	10.80	PASS
H	3	A_3121C	B_3121C	190	836.60	128.14	98.92	30.83	-0.71	27.98	0.628	38.45	7.00	10.47	PASS
H	3	A_3121C	B_3121C	251	848.80	128.15	98.96	30.95	-0.56	28.25	0.668	38.45	7.00	10.20	PASS
V	3	A_3121C	B_3121C	128	824.20	127.95	98.70	27.84	-0.86	24.84	0.305	38.45	7.00	13.61	PASS
V	3	A_3121C	B_3121C	190	836.60	127.72	98.50	30.11	-0.71	27.26	0.532	38.45	7.00	11.19	PASS
V	3	A_3121C	B_3121C	251	848.80	127.45	98.26	29.56	-0.56	26.86	0.485	38.45	7.00	11.59	PASS

Note:

All bands were investigated and the significant emissions or noise floor reported.

Dipole Antenna used for substitution

Antenna factors are stated in dBd

ERP = Power applied to Antenna + Antenna Gain

Margin = Limit - Level

C.9.1.2 PCS GSM Carrier Levels



Project Number: 102604KBC-T577
Company: Itronix
Product: IX100X+ with AC775 & BT

Standard: FCC24.232b
Test Start Date: 17-Dec-04
Test End Date: 2-Feb-05

Attached Helix Antenna (co-transmitting with BT hopping) Carrier Power Levels

Polarity	Distance m	Rx Antenna	Tx Antenna	Channel	Frequency	Corrected Field Strength	Substituted SA Signal Level	Power Applied to Antenna	Antenna Gain	Carrier EIRP Level		EIRP Limit		Margin	Pass/Fail
					MHz	dBuV/m	dBuV	dBm	dBd	dBm	Watts	dBm*	Watts	dB	
H	3	Horn SN6276	Horn SN6267	512	1850.20	125.97	94.02	22.29	6.55	28.84	0.766	33.01	2.00	4.17	PASS
H	3	Horn SN6276	Horn SN6267	661	1880.00	123.69	91.60	22.85	6.58	29.43	0.877	33.01	2.00	3.58	PASS
H	3	Horn SN6276	Horn SN6267	810	1909.80	121.77	89.52	23.03	6.61	29.64	0.920	33.01	2.00	3.37	PASS
V	3	Horn SN6276	Horn SN6267	512	1850.20	123.83	91.88	21.56	6.55	28.11	0.647	33.01	2.00	4.90	PASS
V	3	Horn SN6276	Horn SN6267	661	1880.00	123.29	91.20	21.35	6.58	27.93	0.621	33.01	2.00	5.08	PASS
V	3	Horn SN6276	Horn SN6267	810	1909.80	121.01	88.76	21.08	6.61	27.69	0.587	33.01	2.00	5.32	PASS

Note:

All bands were investigated and the significant emissions or noise floor reported.

Horn Antenna used for substitution

Antenna factors are stated in dBd

EIRP = Power applied to Antenna + Antenna Gain

Margin = Limit - Level

Applicant: Itronix Corporation Model: IX100XA775WLBT FCC ID: KBCIX100XA775WLBT IC ID: 1943A-IX100Xe

Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth



Test Report S/N:	102604KBC-T577-E24G/E15B Issue 1.0		
Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

C.10 PASS/FAIL

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

FCC 22.913 (a) Maximum ERP. The ERP of mobile transmitters and auxiliary transmitters must not exceed 7 Watts. A maximum ERP of 28.25 dBm (0.668 Watts) was measured when Channel 251 was transmitting through the attached Helix antenna.

FCC 24.232 (b): Mobile/portable stations are limited to 2 watts e.i.r.p. peak power.... A maximum EIRP of 29.64 dBm (0.920 Watts) was measured when Channel 810 was transmitting through the attached Helix antenna.

C.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.



Russell Pipe
Senior Compliance Technologist
Celltech Labs Inc.

02Feb05

Date

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

Appendix D - Radiated Spurious Emissions Measurement

D.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §22.917(a), FCC CFR 47 §24.238(a)
Procedure Reference	ANSI/TIA/EIA-603-C

D.2 LIMITS

D.2.1 FCC CFR 47

FCC CFR 47 §22.917	(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB
FCC CFR 47 §24.238	(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

D.3 ENVIRONMENTAL CONDITIONS

Temperature	27.4 +/- 2 °C
Humidity	33 +/- 2 %
Barometric Pressure	96.24 +/- 0.2 kPa

D.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00072	EMCO	2075	Mini-mast	n/a	n/a
00073	EMCO	2080	Turn Table	n/a	n/a
00071	EMCO	2090	Multi-Device Controller	n/a	n/a
00050	Chase	CBL-6111A	Bilog Antenna	30Apr04	30Apr05
00055	EMCO	3121C	Dipole Antenna	4Dec03	4Dec05
00034	ETS	3115	Double Ridged Guide Horn	24Mar04	24Mar05
00036	ETS	3115	Double Ridged Guide Horn	24Mar04	24Mar05
00202	ETS	3160-09	Small Horn Antenna	27May04	27Jun05
00049	HP	8566B	Spectrum Analyzer RF Section	18May04	18May05
00049	HP	85650A	Quasi-peak Adapter	18May04	18May05
00047	HP	85685A	RF Preselector	18May04	18May05
00048	Gore	65474	Microwave Cable	20May04	20May05
00030	HP	83017A	LNA	20May04	20May05
00006	R & S	SMR 20	Signal Generator (10MHz-40GHz)	30Apr04	30Apr05
00114	Amplifier Research	DC7154	Directional Coupler (0.8-4.2 GHz)	n/a	n/a
00078	Pasternack	PE2214-20	Directional Coupler (1-18 GHz)	n/a	n/a
00106	Amplifier Research	5S1G4	Power Amplifier (5W, 800MHz-4.2GHz)	n/a	n/a
00041	Amplifier Research	10W1000C	Power Amplifier (0.5 – 1 GHz)	n/a	n/a
00008	Gigatronics	8652A	Power Meter	30Apr04	30Apr05
00010	Gigatronics	80701A	Power Sensor	30Apr04	30Apr05

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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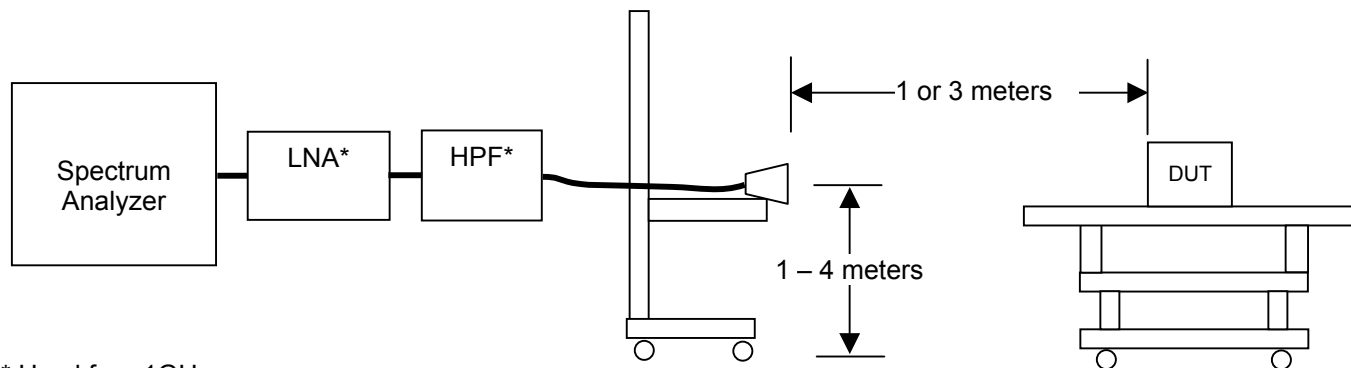
Test Report S/N:	102604KBC-T577-E24G/E15B Issue 1.0		
Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

D.5 MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS	For the field strength measurements, the measurement equipment was connected as shown in D.6. A number of antennas were used to cover the applicable frequency range tested ¹ . The ranges in which each antenna was used are as follows. For the final substitutions, the DUT was replaced with the appropriate antenna and fed from a CW signal source sufficient to replicate the received field strength of the emission being investigated.		
	Frequency Range	RX Antenna	TX Antenna
	30 MHz – 1GHz	Bilog	Dipole
	1 GHz – 18 GHz	ETS 3115 Horn	ETS 3115 Horn
	18 GHz – 20 GHz	ETS 3160-09 Horn	ETS 3160-09 Horn
MEASUREMENT EQUIPMENT SETTINGS	For the spurious out-of-band emissions, the spectrum analyzer was set to the following settings:		
	Mode	RBW	VBW
		kHz	kHz
	Cellular	100	300
	PCS	1000	1000
	Detector		
	Peak*		
	Peak*		
	*Where the peak emission exceeded the average limit, an average measurement was made using video averaging		

D.6 SETUP DRAWING

Figure D.6-1 - Setup Drawing



* Used for >1GHz

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Lab Registration(s):	FCC #714830	IC Lab File #3874	

D.7 SETUP PHOTOGRAPHS

Photograph D.7-1 - Horn Receive Antenna with DUT Helix Antenna Configuration



D.8 DUT OPERATING DESCRIPTION

Measurements were made for the low and high GSM channels transmitting in each of the cellular and PCS bands at maximum power levels as described in Appendix B while the Bluetooth was transmitting simultaneously in hopping mode at its nominal power level.

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Lab Registration(s):	FCC #714830	IC Lab File #3874	

D.9 TEST RESULTS

The spurious measurements detailed in this section are referenced to the carrier levels set forth in Appendix C of this report:

D.9.1 Spurious Emissions (Attached Helix Antenna)

D.9.1.1 Cellular GSM Spurious Emissions



Project Number: 102604KBC-T577
 Company: Itronix
 Product: IX100X+ with AC775 & BT

Standard: FCC22.917
 Test Start Date: 17-Dec-04
 Test End Date: 2-Feb-05

Attached Helix Antenna (co-transmitting with BT hopping)

Polarity	Distance m	Rx Antenna	Tx Antenna	Channel	Frequency	Corrected Field Strength	Substituted SA Signal Level	Power Applied to Antenna	Antenna Gain	ERP Emission Level	ERP Limit	Margin	Pass/Fail
					MHz	dBuV/m	dBuV	dBm	dBd	dBm	dBm*	dB	
H	3	Horn SN6276	Horn SN6267	128	1648.00	63.06	32.30	-42.05	4.20	-37.85	-13.00	24.85	PASS
H	3	Horn SN6276	Horn SN6267	128	2792.00	47.05	48.35	-50.12	5.65	-44.47	-13.00	31.47	PASS
V	3	Horn SN6276	Horn SN6267	128	1648.00	65.26	34.50	-40.15	4.20	-35.95	-13.00	22.95	PASS
V	3	Horn SN6276	Horn SN6267	128	2366.00	41.07	44.30	-50.51	5.36	-45.15	-13.00	32.15	PASS
V	3	Horn SN6276	Horn SN6267	128	2523.00	43.04	45.65	-50.98	5.65	-45.33	-13.00	32.33	PASS
V	3	Horn SN6276	Horn SN6267	128	2581.00	43.82	46.10	-50.30	5.65	-44.65	-13.00	31.65	PASS
H	3	Horn SN6276	Horn SN6267	251	1697.00	47.09	16.05	-55.20	4.25	-50.95	-13.00	37.95	PASS
H	3	Horn SN6276	Horn SN6267	251	2546.00	45.83	48.30	-48.91	5.65	-43.26	-13.00	30.26	PASS
H	3	Horn SN6276	Horn SN6267	251	2816.00	46.36	47.55	-50.50	5.65	-44.85	-13.00	31.85	PASS
V	3	Horn SN6276	Horn SN6267	251	1697.00	47.64	16.60	-54.94	4.25	-50.69	-13.00	37.69	PASS
V	3	Horn SN6276	Horn SN6267	251	2546.00	48.33	50.80	-46.18	5.65	-40.53	-13.00	27.53	PASS
V	3	Horn SN6276	Horn SN6267	251	2819.00	45.98	47.15	-50.29	5.65	-44.64	-13.00	31.64	PASS

Note:
 EUT orientation same as RX antenna polarity
 Antenna factors are stated in dBd
 ERP = Power applied to Antenna + Antenna Gain
 Margin = Limit - Level
 Limit = $43 + 10 \log(\text{Fundamental Power Level, in watts})$ below the Fundamental peak power => -13 dBm

*The emissions reported above represent the highest emissions or noise floor measured within the frequency band of 30MHz and the 10th harmonic of the carrier with field strengths within 20 dB of the theoretical limit. All other emissions attributed to the DUT had field strengths greater than 20 dB below the theoretical limit and substitutions were not made.

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

D.9.1.2 PCS GSM Spurious Emissions



Project Number: 102604KBC-T577
Company: Itronix
Product: IX100X+ with AC775 & BT

Standard: FCC24.238
Test Start Date: 17-Dec-04
Test End Date: 2-Feb-05

Attached Helix Antenna (co-transmitting with BT hopping)

Polarity	Distance	Rx Antenna	Tx Antenna	Channel	Frequency	Corrected Field Strength	Substituted SA Signal Level	Power Applied to Antenna	Antenna Gain	EIRP Emission Level	EIRP Limit	Margin	Pass/Fail
	m				MHz	dBuV/m	dBuV	dBm	dBi	dBm	dBm*	dB	
H	3	Horn SN6276	Horn SN6267	512	2721.00	48.69	50.30	-50.86	7.80	-43.06	-13.00	30.06	PASS
H	3	Horn SN6276	Horn SN6267	512	3700.00	52.80	50.35	-45.73	8.06	-37.67	-13.00	24.67	PASS
H	3	Horn SN6276	Horn SN6267	512	5550.60	46.00	39.60	-57.70	8.66	-49.04	-13.00	36.04	PASS
V	3	Horn SN6276	Horn SN6267	512	3700.00	52.95	50.50	-45.07	8.06	-37.01	-13.00	24.01	PASS
V	3	Horn SN6276	Horn SN6267	512	5550.60	47.65	41.25	-49.41	8.66	-40.75	-13.00	27.75	PASS
H	3	Horn SN6276	Horn SN6267	810	3819.00	57.88	53.25	-41.00	8.04	-32.96	-13.00	19.96	PASS
H	3	Horn SN6276	Horn SN6267	810	5729.40	48.27	40.60	-49.10	8.88	-40.22	-13.00	27.22	PASS
H	3	Horn SN6276	Horn SN6267	810	7637.50	54.79	45.05	-47.65	9.01	-38.64	-13.00	25.64	PASS
V	3	Horn SN6276	Horn SN6267	810	3819.00	56.42	53.60	-40.08	8.04	-32.04	-13.00	19.04	PASS
V	3	Horn SN6276	Horn SN6267	810	5728.25	47.19	40.65	-55.85	8.87	-46.98	-13.00	33.98	PASS

Note:
 EUT orientation same as RX antenna polarity
 Antenna factors are stated in dBi
 EIRP = Power applied to Antenna + Antenna Gain
 Margin = Limit - Level
 Limit = $43 + 10 \log(\text{Fundamental Power Level, in watts})$ below the Fundamental peak power $\Rightarrow$ -13 dBm

*The emissions reported above represent the highest emissions or noise floor measured within the frequency band of 30MHz and the 10th harmonic of the carrier with field strengths within 20 dB of the theoretical limit. All other emissions attributed to the EUT had field strengths greater than 20 dB below the theoretical limit and substitutions were not made.

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

D.10 PASS/FAIL

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

FCC 22.917 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

FCC 24.238 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

D.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.



Russell Pipe
Senior Compliance Technologist
Celltech Labs Inc.

02Feb05
Date

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

Appendix E - Bluetooth Conducted RF Output Power Measurement

E.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §2.1046 (a)
Procedure Reference	FCC 97-114

E.2 LIMITS

FCC CFR 47 §15.247(b): The maximum peak output power of the intentional radiator shall not exceed the following:
 §15.247 (b) §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.*

*modular report confirmed at least 75 hopping channels

E.3 ENVIRONMENTAL CONDITIONS

Temperature	25.2 +/- 2 °C
Humidity	35 +/- 2 %
Barometric Pressure	96.34 kPa

E.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
00008	Gigatronics	8652A	Power Meter	30Apr04	30Apr05
00010	Gigatronics	80701A	Power Sensor	30Apr04	30Apr05
00012	Gigatronics	80701A	Power Sensor	30Apr04	30Apr05
00107	HP	8491C	Attenuator	n/a	n/a

*Cable and attenuator verified with power meter prior to use

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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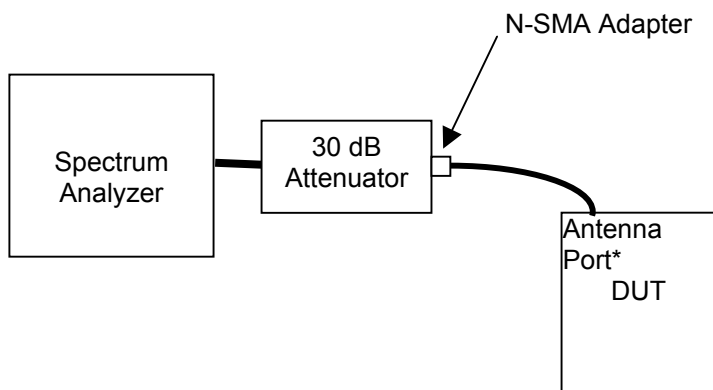
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Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

E.5 MEASUREMENT EQUIPMENT SETUP

Measurement Equipment Connections	The equipment was connected as shown in the setup drawing in E.6.
Measurement Equipment Settings	Power Meter Settings: Mode - MAP Frequency compensation set for carrier frequency Offset set appropriately for carrier frequency and attenuator characteristics
Measurement Procedure	The RF conducted power levels for each low, mid and high channel were measured at the DUT antenna connector port (at the card level) using a Gigatronics 8652A Universal Power Meter in mean average power mode. An offset was entered into the power meter to correct for the losses of the attenuator and cable installed between the transmitter output port and the power sensor input. The DUT test software was used to set it to transmit in its nominal mode and power level. All subsequent tests were performed using the same power measurement procedures.

E.6 SETUP DRAWING

Figure E.6-1 - Setup Drawing



*measurement made/referenced at transmitter port.

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Date(s):	17Dec04 - 02Feb05		
Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133	
Lab Registration(s):	FCC #714830	IC Lab File #3874	

E.7 DUT OPERATING DESCRIPTION

Power measurements were made of each channel, with the Bluetooth set appropriately as described in section 5.7.1. As a reference, the Bluetooth power levels were measured during single transmit, then subsequently measured while the GSM modem was transmitting at maximum power on Channel 128.

E.8 TEST RESULTS

E.8.1 Single Transmit Reference

Channel	Frequency	Conducted Power
0	2402 MHz	+4.26 dBm
41	2441 MHz	+4.26 dBm
78	2480 MHz	+4.23 dBm

E.8.2 Co-transmitting with the GSM modem on Channel 128

0	2402 MHz	+4.26 dBm
41	2441 MHz	+4.26 dBm
78	2480 MHz	+4.26 dBm

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

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.



Russell Pipe
Senior Compliance Technologist
Celltech Labs Inc.

17Dec04
Date

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Lab Registration(s):	FCC #714830	IC Lab File #3874	

Appendix F - Maximum Permissible Exposure Calculation

F.1 REFERENCES

Normative Reference Standard	FCC CFR 47§1.1310 IEEE Std C95.1-1999
Procedure Reference	FCC CFR 47§2.1091

F.2 LIMITS

FCC CFR 47§1.1310 Table 1(b)	Frequency	Power Density
	300 – 1500 MHz	f/1500 mW/cm ²
	1500 – 100,000 MHz	1.0 mW/cm ²

F.3 ENVIRONMENTAL CONDITIONS

Temperature	na
Humidity	na
Barometric Pressure	na

F.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	LAST CAL	CAL DUE
na					

F.5 MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS	na
MEASUREMENT EQUIPMENT SETTINGS	na

F.6 SETUP PHOTOS

na

F.7 SETUP DRAWINGS

na

F.8 DUT OPERATING DESCRIPTION

Dual-Band GSM	na
Bluetooth	na

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Lab Registration(s):	FCC #714830	IC Lab File #3874	

F.9 TEST RESULTS

During normal operation and antenna configuration, the vehicle-mounted GSM antenna and the co-transmitting Bluetooth antenna in the handheld PC would have a greater than 20 cm separation distance apart, therefore no simultaneous transmitting MPE calculation was made. Single transmit MPE calculations for the vehicle-mounted GSM antenna are shown in the single transmitter test report. Please note that the co-located Bluetooth transmitter does not utilize vehicle-mount antenna operation.

F.10 PASS/FAIL

In reference to the results outlined in the referenced GSM single transmitter test report the DUT passes the requirements as stated in the reference standards as follows:

1) The DUT must comply with the minimum spacing requirement of 20 cm to ensure an exposure of not more than $f/1500$ (0.57) mW/cm^2 for frequencies between 300 and 1500 MHz and $1 \text{ mW}/\text{cm}^2$ for frequencies between 1500 and 100,000 MHz.

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.



Duane M. Friesen, C.E.T.
EMC Manager
Celltech Labs Inc.

02Feb05
Date

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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Test Type(s):	FCC §2, §15.247, §22H, §24E	IC RSS-210/132/133
Lab Registration(s):	FCC #714830	IC Lab File #3874

END OF DOCUMENT

Applicant:	Itronix Corporation	Model:	IX100XA775WLBT	FCC ID:	KBCIX100XA775WLBT	IC ID:	1943A-IX100Xe
Rugged Handheld PC w/ Sierra Wireless AirCard 775 GSM GPRS/EDGE Modem & Co-Transmitting Bluetooth							
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