

DECLARATION OF COMPLIANCE FCC PART 24(E) EMC MEASUREMENTS

| <u>Test Lab</u> | <u>Applicant Information</u> |
|--|---|
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| | |
|-----------------------------------|---|
| FCC Rule Part(s): | 47 CFR §24(E), §2 |
| IC Rule Part(s): | RSS-133 Issue 2 |
| Test Procedure(s): | FCC 47 CFR §24(E), §2; ANSI TIA/EIA-603-A-2001 |
| FCC Device Classification: | Licensed Base Station for Part 24 (PCB) |
| IC Device Classification: | 2GHz Personal Communication Services |
| Device Type: | Rugged Laptop PC with Sierra Wireless AirCard 750 PCS GSM/GPRS PCMCIA Modem (co-located with Cisco Systems MPI-350 Mini-PCI DSSS WLAN Card), Vehicle Cradle, & Mobile Vehicle-Mount Antenna |
| FCC ID: | KBCIX260AC750-MPI |
| Model(s): | IX260 |
| Tx Frequency Range: | 1850.25 - 1909.875 MHz |
| Max. RF Output Power: | 0.385 Watts EIRP (25.85 dBm) |
| Conducted Power Tested: | 27.9 dBm Peak (1850.25 MHz) 27.9 dBm Peak (1880.00 MHz) 27.8 dBm Peak (1909.875 MHz) |
| Modulation: | GMSK |
| Emission Designator: | 271KGXW |
| Antenna Type: | Mobile Vehicle Antenna (MaxRad P/N: WMLPVDB800/1900 - 3 dBi Gain) |
| Power Supply: | 12V Vehicle Battery |

This equipment 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 §24(E), §2, and ANSI TIA/EIA-603-A-2001.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made 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.



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FCC PART 24(E) EMC MEASUREMENT REPORT

1.1 SCOPE

Measurement and determination of electromagnetic emissions (EME) from radio frequency devices for compliance with the technical rules and regulations of the Federal Communications Commission and Industry Canada.

1.2 GENERAL INFORMATION - §2.1033(a)

| | |
|---|--|
| <u>APPLICANT</u> | |
| ITRONIX CORPORATION 801 South Stevens Street Spokane, WA 99204 | |
| FCC ID | KBCIX260AC750-MPI |
| Model(s) | IX260 |
| Serial No. | Pre-production |
| EUT Type | Rugged Laptop PC with Sierra Wireless AirCard 750 PCS GSM/GPRS PCMCIA Modem Card (co-located with Cisco MPI-350 Mini-PCI DSSS WLAN Card) Vehicle Cradle, & Mobile Vehicle-Mount Antenna |
| Rule Part(s) | FCC 47 CFR §24(E), §2 IC RSS-133 Issue 2 |
| FCC Classification | Licensed Base Station for Part 24 (PCB) |
| IC Classification | 2GHz Personal Communication Services |
| Tx Frequency Range | 1850.25 - 1909.875 MHz |
| Max. RF Output Power | 0.385 Watts EIRP (25.85 dBm) |
| RF Conducted Output Power Tested | 27.9 dBm Peak (1850.25 MHz) 27.9 dBm Peak (1880.00 MHz) 27.8 dBm Peak (1909.875 MHz) |
| Emission Designator | 271KGXW |
| Frequency Tolerance | 0.1 PPM |
| Power Supply | 12V Vehicle Battery |
| Antenna Type | Mobile Vehicle-Mount Antenna (MaxRad P/N: WMLPVDB800/1900 - 3 dBi Gain) |

2.1 MEASUREMENT PROCEDURES

2.2 RF OUTPUT POWER MEASUREMENT - §2.1046

The peak conducted power was measured with a Gigatronics 8650A 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 before the sensor input. The transmitter terminal was coupled to the power meter and the EUT was placed into test mode via internal software. All subsequent tests were performed using the same tune-up procedures.

2.3 EFFECTIVE ISOTROPIC RADIATED POWER OUTPUT - §24.232(b)

EIRP measurements were performed using the Signal Substitution Method in accordance with ANSI TIA/EIA-603-A-2001 on a 3-meter open area test site. The EUT was placed on a turntable 3-meters from the receive antenna and placed into test mode via internal software at a full rated power. The field of maximum intensity was found by rotating the EUT 360 degrees and changing the height of the receive antenna from 1 to 4 meters. Once a peak was found the spectrum analyzer was set to peak hold and the value of the emission was extracted. The field strength was recorded for each channel being tested, and for both EUT antenna polarizations and modes. A standard gain horn antenna was substituted in place of the EUT. The antenna was fed through a directional coupler and the power at the coupler port was monitored. A signal generator and power amplifier controlled the signal to the antenna, and the input level of the antenna was adjusted to the same field strength level as the EUT. The feed point for the antenna was then connected to a calibrated power meter and the power adjusted to read the same as the coupler port previously recorded, this is to account for any mismatch in impedance, which may occur at the horn antenna. The conducted power at the antenna feed point was recorded. The forward conducted power for the horn antenna was then determined and the EIRP level was determined by adding the horn forward conducted power and the antenna gain in dB.

2.4 FIELD STRENGTH OF SPURIOUS RADIATION - §2.1053

Radiated and harmonic emissions were measured on a 3-meter open area test site. The EUT was put into test mode via internal software at a full rated power. The EUT was placed on the turntable with the transmitter transmitting into a non-radiating load. A receiving antenna located 3 meters from the turntable received any signal radiated from the transmitter and its operating accessories. The receiving antenna was varied in height from 1 to 4 meters and the polarization was varied (horizontal and vertical) to determine the worst-case emission level. All spurious emissions made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier were investigated.

2.5 RADIATED MEASUREMENT TEST SETUP

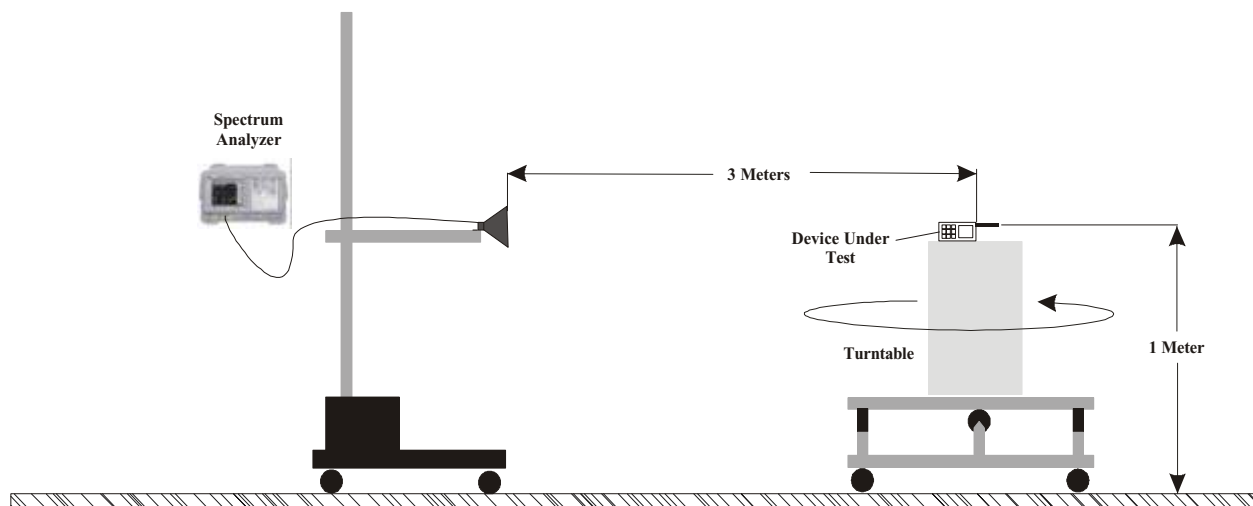


Figure 1. Radiated Measurement Test Setup Diagram

3.1 TEST DATA

3.2 EFFECTIVE ISOTROPIC RADIATED POWER OUTPUT - §24.232(b)

| Freq. Tuned | EUT Peak Conducted Power | Maximum Field Strength of EUT | EUT & Horn Antenna Polariz. | Horn Gain | Horn Forward Conducted Power | EIRP of EUT Horn Gain + Horn Forward Conducted Power | |
|-------------|--------------------------|-------------------------------|-----------------------------|-----------|------------------------------|--|-------|
| MHz | dBm | dBm | H / V | dBi | dBm | dBm | Watts |
| 1850.25 | 27.9 | -13.82 | V | 6.55 | 17.99 | 24.54 | 0.284 |
| 1880.00 | 27.9 | -13.20 | V | 6.58 | 19.27 | 25.85 | 0.385 |
| 1909.875 | 27.8 | -14.44 | V | 6.61 | 18.40 | 25.01 | 0.317 |

3.3 FIELD STRENGTH OF SPURIOUS RADIATION - §2.1053

Operating Frequency (MHz): 1850.25
 Channel: 512 (Low)
 EUT Conducted Pwr. (dBm): 27.90
 Measured EIRP (dBm): 24.54
 Modulation: GMSK
 Distance: 3 Meters
 Limit: $43 + 10 \log (W) = 37.53 \text{ dBc}$

| Frequency | Field Strength of Spurious Radiation | Horn Forward Cond. Pwr. | Standard Gain Horn Antenna Gain | POL | EIRP | ERP | dBc |
|-----------|--------------------------------------|-------------------------|---------------------------------|-----|--------|--------|-------|
| MHz | dBm | dBm | dBi | H/V | dBm | dBm | |
| 3700.50 | -87.89 | -55.00 | 6.6 | V | -48.40 | -50.54 | 75.08 |
| 5550.75 | -87.31 | -49.51 | 7.8 | V | -41.71 | -43.85 | 68.39 |
| 7401.00 | -85.16 | -48.58 | 7.8 | V | -40.78 | -42.92 | 67.46 |
| 9251.25 | -85.77 | -47.75 | 7.6 | V | -40.15 | -42.29 | 66.83 |
| 11101.50 | -84.06 | -47.70 | 8.5 | V | -39.20 | -41.34 | 65.88 |
| 12951.75 | -80.20 | -42.32 | 8.8 | V | -33.52 | -35.66 | 60.20 |
| 14802.00 | -82.59 | -44.71 | 9.6 | V | -35.11 | -37.25 | 61.79 |
| 16652.25 | -82.89 | -45.06 | 9.0 | V | -36.06 | -38.20 | 62.74 |
| 18502.50 | -83.43 | -47.22 | 9.3 | V | -37.92 | -40.06 | 64.60 |

Notes:

1. Radiated spurious measurements were performed using the Signal Substitution Method per ANSI/TIA/EIA-603-A-2001.
2. All other spurious emissions generated from the lowest frequency of the EUT to the tenth harmonic were investigated and found to be below the magnitude of each harmonic level.
3. Spurious emissions more than 20 dB below the limit are reported, though not required per §2.1051.

FIELD STRENGTH OF SPURIOUS RADIATION - §2.1053

Operating Frequency (MHz): 1880.00
 Channel: 661 (Mid)
 EUT Conducted Pwr. (dBm): 27.90
 Measured EIRP (dBm): 25.85
 Modulation: GMSK
 Distance: 3 Meters
 Limit: $43 + 10 \log (W) = 38.85 \text{ dBc}$

| Frequency | Field Strength of Spurious Radiation | Horn Forward Cond. Pwr. | Standard Gain Horn Antenna Gain | POL | EIRP | ERP | dBc |
|-----------|--------------------------------------|-------------------------|---------------------------------|-----|--------|--------|-------|
| MHz | dBm | dBm | dBi | H/V | dBm | dBm | |
| 3760.00 | -86.97 | -54.08 | 6.6 | V | -47.48 | -49.62 | 75.47 |
| 5640.00 | -85.22 | -47.42 | 7.8 | V | -39.62 | -41.76 | 67.61 |
| 7520.00 | -82.94 | -46.36 | 7.8 | V | -38.56 | -40.70 | 66.55 |
| 9400.00 | -84.92 | -46.90 | 7.6 | V | -39.30 | -41.44 | 67.29 |
| 11280.00 | -84.85 | -48.49 | 8.5 | V | -39.99 | -42.13 | 67.98 |
| 13160.00 | -84.46 | -46.58 | 8.8 | V | -37.78 | -39.92 | 65.77 |
| 15040.00 | -81.73 | -43.85 | 9.6 | V | -34.25 | -36.39 | 62.24 |
| 16920.00 | -82.74 | -44.91 | 9.0 | V | -35.91 | -38.05 | 63.90 |
| 18800.00 | -82.02 | -45.81 | 9.3 | V | -36.51 | -38.65 | 64.50 |

Notes:

1. Radiated spurious measurements were performed using the Signal Substitution Method per ANSI/TIA/EIA-603-A-2001.
2. All other spurious emissions generated from the lowest frequency of the EUT to the tenth harmonic were investigated and found to be below the magnitude of each harmonic level.
3. Spurious emissions more than 20 dB below the limit are reported, though not required per §2.1051.

FIELD STRENGTH OF SPURIOUS RADIATION - §2.1053

Operating Frequency (MHz): 1909.875
 Channel: 810 (High)
 EUT Conducted Pwr. (dBm): 27.80
 Measured EIRP (dBm): 25.01
 Modulation: GMSK
 Distance: 3 Meters
 Limit: $43 + 10 \log (W) = 38.01 \text{ dBc}$

| Frequency | Field Strength of Spurious Radiation | Horn Forward Cond. Pwr. | Standard Gain Horn Antenna Gain | POL | EIRP | ERP | dBc |
|-----------|--------------------------------------|-------------------------|---------------------------------|-----|--------|--------|-------|
| MHz | dBm | dBm | dBi | H/V | dBm | dBm | |
| 3819.75 | -87.01 | -54.12 | 6.6 | V | -47.52 | -49.66 | 74.67 |
| 5729.63 | -86.31 | -48.51 | 7.8 | V | -40.71 | -42.85 | 67.86 |
| 7639.50 | -84.29 | -47.71 | 7.8 | V | -39.91 | -42.05 | 67.06 |
| 9549.38 | -85.76 | -47.74 | 7.6 | V | -40.14 | -42.28 | 67.29 |
| 11459.25 | -84.09 | -47.73 | 8.5 | V | -39.23 | -41.37 | 66.38 |
| 13369.13 | -84.96 | -47.08 | 8.8 | V | -38.28 | -40.42 | 65.43 |
| 15279.00 | -81.41 | -43.53 | 9.6 | V | -33.93 | -36.07 | 61.08 |
| 17188.88 | -81.82 | -43.99 | 9.0 | V | -34.99 | -37.13 | 62.14 |
| 19098.75 | -82.74 | -46.53 | 9.3 | V | -37.23 | -39.37 | 64.38 |

Notes:

1. Radiated spurious measurements were performed using the Signal Substitution Method per ANSI/TIA/EIA-603-A-2001.
2. All other spurious emissions generated from the lowest frequency of the EUT to the tenth harmonic were investigated and found to be below the magnitude of each harmonic level.
3. Spurious emissions more than 20 dB below the limit are reported, though not required per §2.1051.

4.1 TEST EQUIPMENT LIST

| TEST EQUIPMENT LIST | | | |
|----------------------------------|------------------------------------|------------|----------------------|
| Equipment Type | Model | Serial No. | Calibration Due Date |
| HP Signal Generator | 8648D (9kHz-4.0GHz) | 3847A00611 | Feb 2004 |
| Rohde & Schwarz Signal Generator | SMR40 (10MHz-40GHz) | 835537/022 | Nov 2003 |
| Gigatronics Power Meter | 8652A | 1835272 | Feb 2004 |
| Gigatronics Power Sensor | 80701A (0.05-18GHz) | 1833535 | Feb 2004 |
| Gigatronics Power Sensor | 80701A (0.05-18GHz) | 1833542 | Feb 2004 |
| Amplifier Research Power Amp. | 5S1G4 (5W, 800MHz-4.2GHz) | 26235 | N/A |
| Microwave System Amplifier | HP 83017A (0.5-26.5GHz) | 3123A00587 | N/A |
| Network Analyzer | HP 8753E (30kHz-3GHz) | US38433013 | Feb 2004 |
| Audio Analyzer | HP 8903B | 3729A18691 | Nov 2003 |
| Modulation Analyzer | HP 8901A | 3749A07154 | July 2003 |
| Frequency Counter | HP 53181A (3GHz) | 3736A05175 | May 2003 |
| DC Power Supply | HP E3611A | KR83015294 | N/A |
| Multi-Device Controller | EMCO 2090 | 9912-1484 | N/A |
| Mini Mast | EMCO 2075 | 0001-2277 | N/A |
| Turntable | EMCO 2080-1.2/1.5 | 0002-1002 | N/A |
| Double Ridged Horn Antenna | ETS 3115 (1-18GHz) | 6267 | Oct. 2003 |
| Double Ridged Horn Antenna | ETS 3115 (1-18GHz) | 6276 | Oct. 2003 |
| Horn Antenna | Chase BBHA 9120-A (0.7-4.8GHz) | 9120A-239 | Sept 2003 |
| Horn Antenna | Chase BBHA 9120-A (0.7-4.8GHz) | 9120A-240 | Sept 2003 |
| Roberts Dipoles | Compliance Design (2 sets) 3121C | | June 2003 |
| Spectrum Analyzer | HP 8594E | 3543A02721 | Feb 2004 |
| Spectrum Analyzer | HP E4408B | US39240170 | Nov 2003 |
| Shielded Screen Room | Lindgren R.F. 18W-2/2-0 | 16297 | N/A |
| Environmental Chamber | ESPEC ECT-2 (Temperature/Humidity) | 0510154-B | Feb 2004 |

5.1 CONCLUSION

The data in this measurement report shows that the ITRONIX CORPORATION Model: IX260 FCC ID: KBCIX260AC750-MPI Rugged Laptop PC with Sierra Wireless AirCard 750 PCS GSM/GPRS PCMCIA Modem Card (co-located with Cisco Systems MPI-350 Mini-PCI DSSS WLAN Card), Vehicle Cradle, and MaxRad Mobile Vehicle-Mount Antenna (P/N: WMLPVDB800/1900) complies with the requirements of FCC Rule Parts §24(E) and §2.

APPENDIX A - RADIATED TEST SETUP PHOTOGRAPHS

RADIATED TEST SETUP PHOTOGRAPHS



Radiated Measurement Test Setup



Signal Substitution Test Setup

