

DECLARATION OF COMPLIANCE FCC PARTS 24(E) & 22(H) EMC MEASUREMENTS

Test Lab

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Applicant Information

ITRONIX CORPORATION
801 South Stevens Street
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United States

FCC IDENTIFIER: KBCIX100XAC555
IC IDENTIFIER: 1943A-IX100Xb
Model(s): IX100XAC555

FCC Rule Part(s): 47 CFR §24(E), §22(H), §2
IC Rule Part(s): RSS-133 Issue 2, RSS-132 Issue 1
Test Procedure(s): FCC 47 CFR §24(E), §22(H), §2; ANSI TIA/EIA-603-A-2001
IC RSS-133 Issue 2, RSS-132 Issue 1
FCC Device Classification: PCS Licensed Transmitter worn on body (PCT)
IC Device Classification: 2GHz Personal Communication Services (RSS-133 Issue 2)
800MHz Cellular Telephones Employing New Technologies (RSS-132 Issue 1)

Device Type: Rugged Handheld PC with AirCard 555/550 PCS/Cellular CDMA PCMCIA Modem, with ¼-Wave Helix Antenna, 3 dBi Gain Vehicle-Mount Antenna, & Vehicle Cradle
Tx Frequency Range(s): 1851.25 - 1908.75 MHz (PCS CDMA)
824.70 - 848.31 MHz (Cellular CDMA)
Max. ERP/EIRP Measured: 0.313 Watts (24.96 dBm) EIRP - PCS CDMA (Nearson ¼-Wave Helix Antenna)
0.338 Watts (25.29 dBm) ERP - Cellular CDMA (Nearson ¼-Wave Helix Antenna)
0.078 Watts (18.93 dBm) EIRP - PCS CDMA (MaxRad Vehicle-Mount Antenna)
0.080 Watts (19.05 dBm) ERP - Cellular CDMA (MaxRad Vehicle-Mount Antenna)
Max. Conducted Power Tested: 23.0 dBm (PCS CDMA)
23.0 dBm (Cellular CDMA)
Emission Designator(s): 1M25F9W
Frequency Tolerance(s): 150 Hz (PCS CDMA)
300 Hz (Cellular CDMA)
Antenna Type(s) Tested: Nearson ¼-Wave Helix P/N: P/N: 47-0180-003 (Dual-Band CDMA)
MaxRad 3 dBi Gain Vehicle-Mount P/N: WMLPVDB800/1900 (Dual-Band CDMA)
Power Source(s) Tested: Lithium-ion Battery 7.4 V, 3.0 Ah (P/N: 46-0136-001)
12V AC Adapter (Magic Power Model: MPE-C045-12-R-1)

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 §24(E), §22(H), §2, Industry Canada RSS-133 Issue 2, RSS-132 Issue 1, 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.



Duane Friesen
EMC Manager
Celltech Labs Inc



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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

| | | | | | | | | |
|---|-------------------|---|-------|--------|--|---------------|------------------------|------------------------------|
| APPLICANT | | ITRONIX CORPORATION | | | 801 South Stevens Street Spokane, WA 99210 | | | |
| FCC IDENTIFER | | KBCIX100XAC555 | | | | | | |
| IC IDENTIFIER | | 1943A-IX100Xb | | | | | | |
| Model(s) | | IX100XAC555 | | | | | | |
| Device(s) Under Test | | Itronix IX100X PC | | S/N | 510495001-U5103-0025 | | Identical Prototype | |
| | | Nearson ¼-Wave Helix | | S/N | n/a | | P/N | 47-0180-003 |
| | | Itronix IX100X Vehicle Cradle | | S/N | 05 | | P/N | 50-0107-001 |
| | | MaxRad 3 dBi Gain Vehicle-Mount Antenna | | S/N | n/a | | P/N | WMLPVDB800/1900 |
| Device Description | | Rugged Handheld PC with Sierra Wireless AirCard 555/550 PCS/Cellular CDMA Modem and ¼-Wave Helix Antenna, Itronix Vehicle Cradle and MaxRad Vehicle-Mount Antenna | | | | | | |
| FCC | Rule Part(s) | §24(E) | | §22(H) | | | §2 | |
| | Classification(s) | PCS Licensed Transmitter worn on body (PCT) | | | | | | |
| IC | Rule Part(s) | RSS-133 Issue 2 | | | RSS-132 Issue 1 | | | |
| | Classification(s) | 2GHz Personal Communication Services | | | 800MHz CDMA Cellular Transmitter | | | |
| Tx Frequency Range(s) | | 1851.25 - 1908.75 MHz | | | PCS CDMA | | | |
| | | 824.70 - 848.31 MHz | | | Cellular CDMA | | | |
| Max. ERP/EIRP Levels Measured | | 0.313 | Watts | 24.96 | dBm | EIRP | PCS CDMA | Nearson ¼-Wave Helix Antenna |
| | | 0.338 | Watts | 25.29 | dBm | ERP | Cellular CDMA | |
| | | 0.078 | Watts | 18.93 | dBm | EIRP | PCS CDMA | MaxRad Vehicle-Mount Antenna |
| | | 0.080 | Watts | 19.05 | dBm | ERP | Cellular CDMA | |
| RF Conducted Output Power Level(s) Tested | | 23.0 dBm | | | | PCS CDMA | | |
| | | 23.0 dBm | | | | Cellular CDMA | | |
| Frequency Tolerance(s) | | 150 Hz | | | PCS CDMA | | | |
| | | 300 Hz | | | Cellular CDMA | | | |
| Emission Designator(s) | | 1M25F9W | | | | | | |
| Power Source(s) Tested | | Lithium-ion Battery | | | 7.4 V, 3.0 Ah | | P/N: 46-0136-001 | |
| | | Magic Power AC Adapter | | | 12 V | | Model: MPE-C045-12-R-1 | |

2.1 MEASUREMENT PROCEDURES

2.2 RF OUTPUT POWER MEASUREMENT - §2.1046

The average conducted power levels were measured with a Gigatronics 8652A Universal Power Meter using modulated 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 DUT was placed into test mode via internal software. All subsequent tests were performed using the same tune-up procedures.

| Conducted Power Measurements | | | |
|------------------------------|-----------------------------------|------------|-----------------------------|
| Frequency (MHz) | Measured at the Antenna Connector | | Measured at the PCMCIA Card |
| | Average Power | Cable Loss | Average Power |
| | (dBm) | (dB) | (dBm) |
| 824.70 | 22.2 | 0.8 | 23.0 |
| 835.89 | 22.4 | 0.6 | 23.0 |
| 848.31 | 22.5 | 0.5 | 23.0 |
| 1851.25 | 22.2 | 0.8 | 23.0 |
| 1880.00 | 22.2 | 0.8 | 23.0 |
| 1908.75 | 22.3 | 0.7 | 23.0 |

2.3 SPURIOUS EMISSIONS AT ANTENNA TERMINAL - §2.1051

The DUT was placed in test mode via internal software in the “always up” power control mode. An offset was entered into the power meter to correct for all losses of the attenuator and cable installed before the sensor input. The DUT was placed into test mode via internal software. The level of the carrier and the various conducted spurious frequencies were measured by means of a calibrated spectrum analyzer. The resolution bandwidth and video bandwidth were set to 1MHz. The spectrum was scanned from 10MHz to 20GHz at the low, mid, and high channels. The radio transmitter was operating at maximum output power. The antenna output terminal of the DUT was connected to the input of a 50Ω spectrum analyzer through a matched 30dB attenuator and coaxial cable. The reported emissions were below the specified limit of -13dBm. The test plots are shown in Appendix A.

2.4 FIELD STRENGTH OF SPURIOUS RADIATION - §2.1053

EIRP measurements were performed on a 3-meter open area test site using the Signal Substitution Method in accordance with ANSI TIA/EIA-603-A-2001. The Sierra Wireless AirCard 555 test software was used to set the DUT to transmit in the CDMA “always up” power control mode. For the ¼-wave helix antenna evaluation, the DUT was placed in the center of the turntable, on a Styrofoam support, 1 meter above the ground plane at a distance of 3 meters from the receive antenna. For the vehicle-mount antenna evaluation, The DUT was placed in the vehicle cradle and positioned on the turntable. The vehicle-mount antenna was fixed on a 50 cm x 50 cm ground plane placed on a Styrofoam support at a distance of 3 meters from the receive antenna. The vehicle-mount antenna was connected to the vehicle cradle via a 17-foot LMR-195 cable representing a typical vehicle-mount installation. A frequency band from just above the highest transmitted frequency to just above the 10th harmonic of the highest transmitted frequency was divided into smaller bands corresponding to measurement equipment setups and capabilities. The measurement equipment including carrier blocking filters, was optimized for maximum sensitivity for each band while ensuring no saturation occurred in any gain stages that may be present. It was also necessary to measure the bands above 10 GHz at a distance of 1 meter versus the 3-meter measurement distance used for the lower bands. The applicable bands were chosen from: 800 MHz to 1 GHz, 1 GHz to 5 GHz, 5 GHz to 10 GHz, 10 GHz to 18 GHz and 18 GHz to 20 GHz. The maximum field intensity in each of these bands were determined by rotating the DUT approximately 360 degrees and changing the height of the receive antenna from 1 to 4 meters while maintaining the spectrum analyzer trace in max hold. The stored trace was then evaluated to determine any significant emissions that should be evaluated by substitution. The frequency and uncorrected field strength level for each significant emission was recorded. To describe the noise floor, the maximum level associated with a number of frequencies within the band were also recorded. The DUT was then substituted with a transmit antenna. A signal simulating the DUT emission was generated for each of the signals recorded; it was amplified and fed through a directional coupler to the substitution antenna. The height and direction of the receive antenna as well as the direction of the substitution horn was adjusted for a maximum received signal. The power applied to the transmit antenna was then adjusted to give the same field strength reading as previously recorded for the DUT and the power at the forward coupler port recorded. The substitution antenna was then replaced with a calibrated power sensor, the forward coupler port power level confirmed and the power applied to the horn antenna recorded. The radiated power level was determined by correcting the applied feed point power with the addition of the antenna gain. The radiated spurious emissions test data is shown on pages 9-11.

2.5 EMISSION DESIGNATOR - §2.202

CDMA BW = 1.25 MHz
F = Frequency Modulation
9 = Composite Digital Info
W = Combination Audio/Data Transmission

2.6 OCCUPIED BANDWIDTH - §2.1049, §22.917, §24.238

The DUT was placed in test mode via internal software in the “always up” power control mode. The DUT was connected to the input of a 50Ω spectrum analyzer through a matched 30 dB attenuator. For both PCS CDMA and cellular CDMA modes the resolution bandwidth was set to 30 kHz and the video bandwidth was set to 300 kHz. Spectrum analyzer plots for 99% occupied bandwidth and -26 dBc emission bandwidth are shown in Appendix A.

| Frequency (MHz) | 99% Occupied Bandwidth (MHz) | -26 dBc Emission Bandwidth (MHz) |
|-----------------|------------------------------|----------------------------------|
| 1851.25 | 1.266 | 1.473 |
| 1880.00 | 1.269 | 1.483 |
| 1908.75 | 1.260 | 1.499 |
| 824.70 | 1.254 | 1.424 |
| 835.89 | 1.258 | 1.432 |
| 848.31 | 1.267 | 1.442 |

Specified Limits:

§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.
- (b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
- (c) Alternative out of band emission limit. Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas, in lieu of that set forth in this section, pursuant to a private contractual arrangement of all affected licensees and applicants. In this event, each party to such contract shall maintain a copy of the contract in their station files and disclose it to prospective assignees or transferees and, upon request, to the FCC.
- (d) Interference caused by out of band emissions. If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

§24.238

- (a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB.
- (b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
- (c) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.
- (d) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.
- (e) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

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

EIRP measurements were performed on a 3-meter open area test site using the Signal Substitution Method in accordance with ANSI TIA/EIA-603-A-2001. The Sierra Wireless AirCard 555 test software was used to set the DUT to transmit in the CDMA "always up" power control mode. For the ¼-wave helix antenna evaluation, the DUT was placed in the center of the turntable, on a Styrofoam support, 1 meter above the ground plane at a distance of 3 meters from the receive antenna. For the vehicle-mount antenna evaluation, The DUT was placed in the vehicle cradle and positioned on the turntable. The vehicle-mount antenna was fixed on a 50 cm x 50 cm ground plane placed on a Styrofoam support at a distance of 3 meters from the receive antenna. The vehicle-mount antenna was connected to the vehicle cradle via a 17-foot LMR-195 cable representing a typical vehicle-mount installation. The maximum field intensity was determined by rotating the DUT approximately 360 degrees and changing the height of the receive antenna from 1 to 4 meters. Once the maximum emission was found, the spectrum analyzer was set to peak hold and the uncorrected emission value recorded for each of the low, mid and high channels tested. The DUT was then substituted with a horn antenna. A signal, simulating the DUT emission was generated, amplified, and fed through a directional coupler to the substitution antenna. The height and direction of the receive antenna as well as the direction of the substitution horn was adjusted for a maximum received signal. The power applied to the horn was then adjusted to give the same field strength reading as previously recorded for the DUT and the power at the forward coupler port recorded. The substitution antenna was then replaced with a calibrated power sensor, the forward coupler port power level confirmed and the power applied to the horn antenna recorded. The EIRP level was determined by correcting the applied feed point power with the addition of the horn gain. The EIRP measurement data is shown on page 8.

2.8 EFFECTIVE RADIATED POWER OUTPUT - §22.913

ERP measurements were performed on a 3-meter open area test site using the Signal Substitution Method in accordance with ANSI TIA/EIA-603-A-2001. The Sierra Wireless AirCard 555 test software was used to set the DUT to transmit in the CDMA "always up" power control mode. For the ¼-wave helix antenna evaluation, the DUT was placed in the center of the turntable, on a Styrofoam support, 1 meter above the ground plane at a distance of 3 meters from the receive antenna. For the vehicle-mount antenna evaluation, The DUT was placed in the vehicle cradle and positioned on the turntable. The vehicle-mount antenna was fixed on a 50 cm x 50 cm ground plane placed on a Styrofoam support at a distance of 3 meters from the receive antenna. The vehicle-mount antenna was connected to the vehicle cradle via a 17-foot LMR-195 cable representing a typical vehicle-mount installation. The maximum field intensity was determined by rotating the DUT approximately 360 degrees and changing the height of the receive antenna from 1 to 4 meters. Once the maximum emission was found, the spectrum analyzer was set to peak hold and the uncorrected emission value recorded for each of the low, mid and high channels tested. The DUT was then substituted with a dipole antenna. A signal, simulating the DUT emission was generated, amplified, and fed through a directional coupler to the substitution antenna. The height and direction of the receive antenna as well as the direction of the substitution dipole was adjusted for a maximum received signal. The power applied to the dipole was then adjusted to give the same field strength reading as previously recorded for the DUT and the power at the forward coupler port recorded. The substitution antenna was then replaced with a calibrated power sensor, the forward coupler port power level confirmed and the power applied to the dipole antenna recorded. The ERP level was determined by correcting the applied feed point power with the addition of the dipole gain. The ERP measurement data is shown on page 9.

2.9 RADIATED MEASUREMENT TEST SETUP

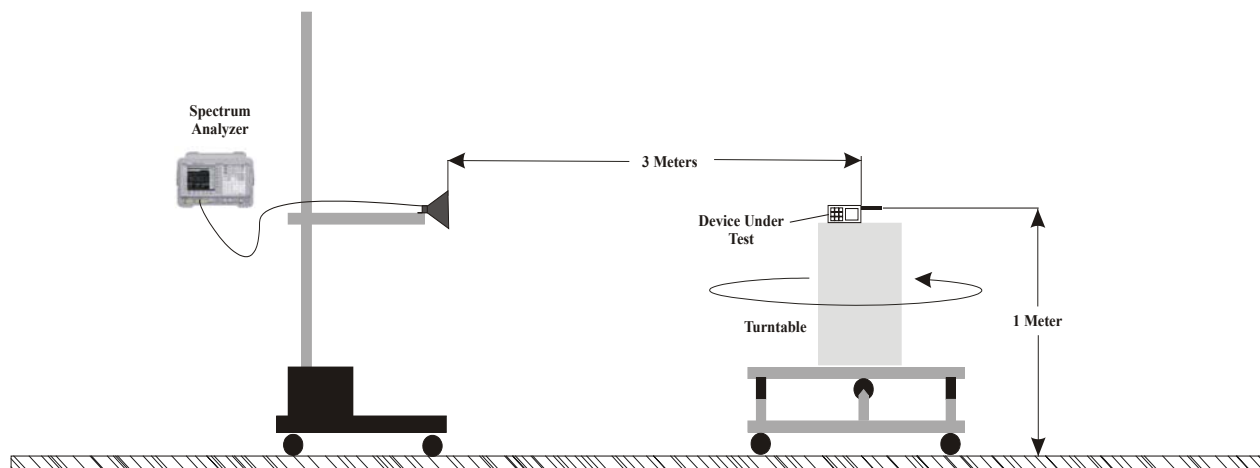


Figure 1. Radiated Measurement Test Setup Diagram - Horn Antenna

3.0 FREQUENCY STABILITY / TEMPERATURE VARIATION - §2.1055, §24.235

The minimum frequency stability shall be $\pm 300\text{Hz}$ (Cellular CDMA) and $\pm 150\text{Hz}$ (PCS CDMA) referenced to a received carrier frequency. This meets the requirement for operational accuracy of 0.00005% for digital mode. An HP 53181A Frequency Counter was used to measure the error in the fundamental frequency. The transmitter was set to maximum power at the center frequency of the band. The DUT was placed inside the temperature chamber. The test data is shown on pages 18-19.

Measurement Method:

The frequency stability of the transmitter was measured by:

1. Temperature:

The temperature was varied from -30°C to $+60^{\circ}\text{C}$ at intervals no more than 10°C throughout the temperature range using an environmental chamber. A period of time sufficient to stabilize all of the components in the equipment was allowed prior to each frequency measurement.

2. Primary Supply Voltage:

The primary supply voltage was set at the specified nominal rating and reduced to the battery operating endpoint specified by the manufacturer. The voltage was measured at the terminals of the power supply or at the input to the cable normally provided with the equipment.


Time Period and Procedure:

1. The carrier frequency of the transmitter was measured at room temperature (25°C to 27°C to provide a reference).
2. The equipment was subjected to an overnight "soak" at -30°C without any power applied.
3. After the overnight "soak" at -30°C , the measurement of the carrier frequency of the transmitter was made within a three-minute interval after applying power to the transmitter.
4. Frequency measurements were made at 10°C intervals up to $+60^{\circ}\text{C}$, then back to room temperature. A minimum period of one hour was provided to allow stabilization of the equipment at each temperature level.

3.1 TEST DATA

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

| Test Date: 03/17/04 - PCS CDMA Mode - Nearson ¼-Wave Helix Antenna | | | | | | |
|--|-------------------------------|----------------------|-----------|------------------------------|---|-------|
| Freq. Tuned | Maximum Field Strength of DUT | Antenna Polarization | Horn Gain | Horn Forward Conducted Power | EIRP of DUT Horn Gain + Horn Forward Conducted Power | |
| MHz | dBm | H/V | dBi | dBm | dBm | Watts |
| 1851.25 | - 13.27 | H | 6.55 | 17.89 | 24.44 | 0.278 |
| 1880.00 | - 14.66 | H | 6.58 | 16.99 | 23.57 | 0.228 |
| 1908.75 | - 13.99 | H | 6.61 | 18.35 | 24.96 | 0.313 |
| 1851.25 | - 16.39 | V | 6.55 | 13.78 | 20.33 | 0.108 |
| 1880.00 | - 17.78 | V | 6.58 | 12.39 | 18.97 | 0.079 |
| 1908.75 | - 17.13 | V | 6.61 | 13.04 | 19.65 | 0.092 |

| | | | | | |
|---|--|-------------------------------|--|----------------------------|--|
|  | | Project Number: 073004-547KBC | | Standard: FCC24.232b | |
| | | Company: Itronix | | Test Start Date: 18-Aug-04 | |
| | | Product: IX100 with AC555 | | Test End Date: 27-Aug-04 | |

| Polarity | Distance | Substitution Antenna Type | Channel | Frequency | Corrected Field Strength | Substituted SA Signal Level (uncorrected) | Power Applied to Antenna | Antenna Gain | Carrier EIRP Level | | EIRP Limit | | Margin | Pass/Fail |
|----------|----------|---------------------------|---------|-----------|--------------------------|---|--------------------------|--------------|--------------------|-------|------------|-------|--------|-----------|
| | | | | MHz | dBiV/m | dBiV | dBm | dBi | dBm | Watts | dBm | Watts | dB | |
| H | 3 | Horn SN6276 | 25 | 1851.25 | 110.69 | 78.69 | 2.77 | 6.67 | 9.44 | 0.009 | 33.01 | 2.00 | 23.57 | PASS |
| H | 3 | Horn SN6276 | 600 | 1880.00 | 108.32 | 76.21 | 2.96 | 6.68 | 9.64 | 0.009 | 33.01 | 2.00 | 23.37 | PASS |
| H | 3 | Horn SN6276 | 1175 | 1908.75 | 107.74 | 75.51 | 3.61 | 6.68 | 10.29 | 0.011 | 33.01 | 2.00 | 22.72 | PASS |
| V | 3 | Horn SN6276 | 25 | 1851.25 | 117.22 | 85.22 | 10.34 | 6.67 | 17.01 | 0.050 | 33.01 | 2.00 | 16.00 | PASS |
| V | 3 | Horn SN6276 | 600 | 1880.00 | 118.19 | 86.08 | 10.94 | 6.68 | 17.62 | 0.058 | 33.01 | 2.00 | 15.39 | PASS |
| V | 3 | Horn SN6276 | 1175 | 1908.75 | 119.33 | 87.10 | 12.25 | 6.68 | 18.93 | 0.078 | 33.01 | 2.00 | 14.08 | PASS |


Note:
Horn Antenna used for substitution

Formulae:
EIRP Level (dBm) = Power applied to Antenna (dBm) + Antenna Gain (dB)
Margin (dB) = Limit (dBm) - Level (dBm)

PCS CDMA Mode - MaxRad 3 dBi Gain Vehicle-Mount Antenna

3.3 EFFECTIVE RADIATED POWER OUTPUT - §22.913

| Test Date: 03/17/04 - Cellular CDMA Mode - Nearson ¼-Wave Helix Antenna | | | | | | |
|---|-------------------------------|----------------------|-------------|--------------------------------|---|-------|
| Freq. Tuned | Maximum Field Strength of DUT | Antenna Polarization | Dipole Gain | Dipole Forward Conducted Power | ERP of DUT Dipole Gain + Dipole Forward Conducted Power | |
| MHz | dBm | H/V | dBd | dBm | dBm | Watts |
| 824.70 | - 12.09 | H | - 0.84 | 23.61 | 22.77 | 0.189 |
| 835.89 | - 10.60 | H | - 0.71 | 26.00 | 25.29 | 0.338 |
| 848.31 | - 11.06 | H | - 0.56 | 25.48 | 24.92 | 0.310 |
| 824.70 | - 14.64 | V | - 0.84 | 21.08 | 20.24 | 0.106 |
| 835.89 | - 13.12 | V | - 0.71 | 23.45 | 22.74 | 0.188 |
| 848.31 | - 13.69 | V | - 0.56 | 22.85 | 22.29 | 0.169 |

| | | | | | | | | | | | | | | |
|--|----------|---------------------------|---------|-------------------------------|--------------------------|---|--------------------------|--------------|-------------------|----------------------------|-----------|-------|--------|-----------|
|  | | | | Project Number: 073004-547KBC | | | | | | Standard: FCC22.913 | | | | |
| | | | | Company: Itronix | | | | | | Test Start Date: 18-Aug-04 | | | | |
| | | | | Product: IX100 with AC555 | | | | | | Test End Date: 27-Aug-04 | | | | |
| | | | | | | | | | | | | | | |
| Polarity | Distance | Substitution Antenna Type | Channel | Frequency | Corrected Field Strength | Substituted SA Signal Level (uncorrected) | Power Applied to Antenna | Antenna Gain | Carrier ERP Level | | ERP Limit | | Margin | Pass/Fail |
| | | | | MHz | dRiV/m | dRiV | dBm | dBi | dRm | Watts | dBm | Watts | dB | |
| H | 3 | B_3121C | 1013 | 824.70 | 106.63 | 81.46 | 9.92 | 1.30 | 9.08 | 0.008 | 38.45 | 7.00 | 29.37 | PASS |
| H | 3 | B_3121C | 363 | 835.89 | 104.72 | 79.26 | 8.39 | 1.43 | 7.68 | 0.006 | 38.45 | 7.00 | 30.77 | PASS |
| H | 3 | B_3121C | 777 | 848.31 | 105.86 | 80.28 | 9.35 | 1.58 | 8.79 | 0.008 | 38.45 | 7.00 | 29.66 | PASS |
| V | 3 | B_3121C | 1013 | 824.70 | 112.95 | 87.78 | 19.89 | 1.30 | 19.05 | 0.080 | 38.45 | 7.00 | 19.40 | PASS |
| V | 3 | B_3121C | 363 | 835.89 | 113.14 | 87.68 | 18.47 | 1.43 | 17.76 | 0.060 | 38.45 | 7.00 | 20.69 | PASS |
| V | 3 | B_3121C | 777 | 848.31 | 112.83 | 87.25 | 18.48 | 1.58 | 17.92 | 0.062 | 38.45 | 7.00 | 20.53 | PASS |
| | | | | | | | | | | | | | | |
| Note: Dipole Antenna used for substitution | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Formulae: ERP Level (dBm) = Power applied to Antenna (dBm) + Antenna Gain (dBi) - 2.14 Margin (dB) = Limit (dBm) - Level (dBm) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

Cellular CDMA Mode - MaxRad 3 dBi Gain Vehicle-Mount Antenna

Cellular CDMA Mode - MaxRad 3 dBi Gain Vehicle-Mount Antenna

3.4 FIELD STRENGTH OF SPURIOUS RADIATION - §2.1053

DUT with Nearson 1/4-Wave Helix Antenna

Test Date: 03/19/04
Operating Frequency (MHz): 1851.25
Channel: 25 (Low)
DUT Conducted Pwr. (dBm): 23.0
Measured EIRP (dBm): 24.44
Mode: PCS CDMA
Distance: 3 Meters
Limit: $43 + 10 \log (W) = 37.44 \text{ dBc}$

| Frequency | Field Strength of Spurious Radiation | Horn Forward Conducted Power | Standard Gain Horn Antenna Gain | POL | EIRP | ERP | dBc |
|-----------|--------------------------------------|------------------------------|---------------------------------|-----|--------|--------|-------|
| MHz | dBm | dBm | dBi | H/V | dBm | dBm | |
| 3702.50 | -74.07 | -41.18 | 6.6 | H | -34.58 | -36.72 | 61.16 |
| 5553.75 | -75.04 | -37.24 | 7.8 | H | -29.44 | -31.58 | 56.02 |
| 7405.00 | -73.44 | -36.86 | 7.8 | H | -29.06 | -31.20 | 55.64 |
| 9256.25 | -74.43 | -36.41 | 7.6 | H | -28.81 | -30.95 | 55.39 |
| 11107.50 | -72.58 | -36.22 | 8.5 | H | -27.72 | -29.86 | 54.30 |
| 12958.75 | -73.82 | -35.94 | 8.8 | H | -27.14 | -29.28 | 53.72 |
| 14810.00 | -69.94 | -32.06 | 9.6 | H | -22.46 | -24.60 | 49.04 |
| 16661.25 | -71.28 | -33.45 | 9.0 | H | -24.45 | -26.59 | 51.03 |
| 18512.50 | -72.22 | -36.01 | 9.3 | H | -26.71 | -28.85 | 53.29 |

Test Date: 03/19/04
Operating Frequency (MHz): 1880.00
Channel: 600 (Mid)
DUT Conducted Pwr. (dBm): 23.0
Measured EIRP (dBm): 23.57
Mode: PCS CDMA
Distance: 3 Meters
Limit: $43 + 10 \log (W) = 36.58 \text{ dBc}$

| Frequency | Field Strength of Spurious Radiation | Horn Forward Conducted Power | Standard Gain Horn Antenna Gain | POL | EIRP | ERP | dBc |
|-----------|--------------------------------------|------------------------------|---------------------------------|-----|--------|--------|-------|
| MHz | dBm | dBm | dBi | H/V | dBm | dBm | |
| 3760.00 | -73.29 | -40.40 | 6.6 | H | -33.80 | -35.94 | 59.51 |
| 5640.00 | -74.91 | -37.11 | 7.8 | H | -29.31 | -31.45 | 55.02 |
| 7520.00 | -74.14 | -37.56 | 7.8 | H | -29.76 | -31.90 | 55.47 |
| 9400.00 | -74.33 | -36.31 | 7.6 | H | -28.71 | -30.85 | 54.42 |
| 11280.00 | -74.14 | -37.78 | 8.5 | H | -29.28 | -31.42 | 54.99 |
| 13160.00 | -73.90 | -36.02 | 8.8 | H | -27.22 | -29.36 | 52.93 |
| 15040.00 | -71.40 | -33.52 | 9.6 | H | -23.92 | -26.06 | 49.63 |
| 16920.00 | -71.04 | -33.21 | 9.0 | H | -24.21 | -26.35 | 49.92 |
| 18800.00 | -72.49 | -36.28 | 9.3 | H | -26.98 | -29.12 | 52.69 |

FIELD STRENGTH OF SPURIOUS RADIATION - §2.1053 (Cont.)

DUT with Nearson ¼-Wave Helix Antenna

Test Date: 03/19/04
Operating Frequency (MHz): 1908.75
Channel: 1175 (High)
DUT Conducted Pwr. (dBm): 23.0
Measured EIRP (dBm): 24.96
Mode: PCS CDMA
Distance: 3 Meters
Limit: $43 + 10 \log (W) = 37.96 \text{ dBc}$

| Frequency | Field Strength of Spurious Radiation | Horn Forward Conducted Power | Standard Gain Horn Antenna Gain | POL | EIRP | ERP | dBc |
|-----------|--------------------------------------|------------------------------|---------------------------------|-----|--------|--------|-------|
| MHz | dBm | dBm | dBi | H/V | dBm | dBm | |
| 3817.50 | -73.10 | -40.21 | 6.6 | H | -33.61 | -35.75 | 60.71 |
| 5726.25 | -76.00 | -38.20 | 7.8 | H | -30.40 | -32.54 | 57.50 |
| 7635.00 | -73.57 | -36.99 | 7.8 | H | -29.19 | -31.33 | 56.29 |
| 9543.75 | -73.86 | -35.84 | 7.6 | H | -28.24 | -30.38 | 55.34 |
| 11452.50 | -73.86 | -37.50 | 8.5 | H | -29.00 | -31.14 | 56.10 |
| 13361.25 | -69.68 | -31.80 | 8.8 | H | -23.00 | -25.14 | 50.10 |
| 15270.00 | -71.17 | -33.29 | 9.6 | H | -23.69 | -25.83 | 50.79 |
| 17178.75 | -71.77 | -33.94 | 9.0 | H | -24.94 | -27.08 | 52.04 |
| 19087.50 | -71.95 | -35.74 | 9.3 | H | -26.44 | -28.58 | 53.54 |

Test Date: 03/18/04
Operating Frequency (MHz): 824.70
Channel: 1013 (Low)
DUT Conducted Pwr. (dBm): 23.0
Measured ERP (dBm): 22.77
Mode: Cellular CDMA
Distance: 3 Meters
Limit: $43 + 10 \log (W) = 35.76 \text{ dBc}$

| Frequency | Field Strength of Spurious Radiation | Horn Forward Conducted Power | Standard Gain Horn Antenna Gain | POL | EIRP | ERP | dBc |
|-----------|--------------------------------------|------------------------------|---------------------------------|-----|--------|--------|-------|
| MHz | dBm | dBm | dBi | H/V | dBm | dBm | |
| 1649.40 | -72.83 | -39.94 | 6.6 | H | -33.34 | -35.48 | 58.25 |
| 2474.10 | -74.20 | -36.40 | 7.8 | H | -28.60 | -30.74 | 53.51 |
| 3298.80 | -76.03 | -39.45 | 7.8 | H | -31.65 | -33.79 | 56.56 |
| 4123.50 | -77.32 | -39.30 | 7.6 | H | -31.70 | -33.84 | 56.61 |
| 4948.20 | -76.03 | -39.67 | 8.5 | H | -31.17 | -33.31 | 56.08 |
| 5772.90 | -76.05 | -38.17 | 8.8 | H | -29.37 | -31.51 | 54.28 |
| 6597.60 | -75.81 | -37.93 | 9.6 | H | -28.33 | -30.47 | 53.24 |
| 7422.30 | -73.95 | -36.12 | 9.0 | H | -27.12 | -29.26 | 52.03 |
| 8247.00 | -74.75 | -38.54 | 9.3 | H | -29.24 | -31.38 | 54.15 |

FIELD STRENGTH OF SPURIOUS RADIATION - §2.1053 (Cont.)

DUT with Nearson ¼-Wave Helix Antenna

Test Date: 03/18/04
Operating Frequency (MHz): 835.89
Channel: 363 (Mid)
DUT Conducted Pwr. (dBm): 23.0
Measured ERP (dBm): 25.29
Mode: Cellular CDMA
Distance: 3 Meters
Limit: $43 + 10 \log (W) = 38.29 \text{ dBc}$


| Frequency | Field Strength of Spurious Radiation | Horn Forward Conducted Power | Standard Gain Horn Antenna Gain | POL | EIRP | ERP | dBc |
|-----------|--------------------------------------|------------------------------|---------------------------------|-----|--------|--------|-------|
| MHz | dBm | dBm | dBi | H/V | dBm | dBm | |
| 1671.78 | -71.28 | -38.39 | 6.6 | H | -31.79 | -33.93 | 59.22 |
| 2507.67 | -74.89 | -37.09 | 7.8 | H | -29.29 | -31.43 | 56.72 |
| 3343.56 | -76.57 | -39.99 | 7.8 | H | -32.19 | -34.33 | 59.62 |
| 4179.45 | -76.57 | -38.55 | 7.6 | H | -30.95 | -33.09 | 58.38 |
| 5015.34 | -76.94 | -40.58 | 8.5 | H | -32.08 | -34.22 | 59.51 |
| 5851.23 | -76.16 | -38.28 | 8.8 | H | -29.48 | -31.62 | 56.91 |
| 6687.12 | -75.17 | -37.29 | 9.6 | H | -27.69 | -29.83 | 55.12 |
| 7523.01 | -73.80 | -35.97 | 9.0 | H | -26.97 | -29.11 | 54.40 |
| 8358.90 | -74.92 | -38.71 | 9.3 | H | -29.41 | -31.55 | 56.84 |

Test Date: 03/18/04
Operating Frequency (MHz): 848.31
Channel: 777 (High)
DUT Conducted Pwr. (dBm): 23.0
Measured ERP (dBm): 24.92
Mode: Cellular CDMA
Distance: 3 Meters
Limit: $43 + 10 \log (W) = 37.91 \text{ dBc}$

| Frequency | Field Strength of Spurious Radiation | Horn Forward Conducted Power | Standard Gain Horn Antenna Gain | POL | EIRP | ERP | dBc |
|-----------|--------------------------------------|------------------------------|---------------------------------|-----|--------|--------|-------|
| MHz | dBm | dBm | dBi | H/V | dBm | dBm | |
| 1696.62 | -71.95 | -39.06 | 6.6 | H | -32.46 | -34.60 | 59.52 |
| 2544.93 | -74.18 | -36.38 | 7.8 | H | -28.58 | -30.72 | 55.64 |
| 3393.24 | -75.40 | -38.82 | 7.8 | H | -31.02 | -33.16 | 58.08 |
| 4241.55 | -76.58 | -38.56 | 7.6 | H | -30.96 | -33.10 | 58.02 |
| 5089.86 | -76.88 | -40.52 | 8.5 | H | -32.02 | -34.16 | 59.08 |
| 5938.17 | -76.58 | -38.70 | 8.8 | H | -29.90 | -32.04 | 56.96 |
| 6786.48 | -72.02 | -34.14 | 9.6 | H | -24.54 | -26.68 | 51.60 |
| 7634.79 | -74.27 | -36.44 | 9.0 | H | -27.44 | -29.58 | 54.50 |
| 8483.10 | -74.72 | -38.51 | 9.3 | H | -29.21 | -31.35 | 56.27 |

FIELD STRENGTH OF SPURIOUS RADIATION - §2.1053 (Cont.)

DUT with Itronix IX100X Vehicle Cradle & MaxRad 3 dBi Gain Vehicle-Mount Antenna - PCS CDMA


| | | | | | | | | | |
|---|--|-----------------|--|------------------|--|------------------|--|-----------|--|
|  | | Project Number: | | 073004-547KBC | | Standard: | | FCC24.238 | |
| | | Company: | | Itronix | | Test Start Date: | | 18-Aug-04 | |
| | | Product: | | IX100 with AC555 | | Test End Date: | | 27-Aug-04 | |

| Polarity | Distance | Substitution Antenna Type | Channel | Frequency | Corrected Field Strength | Substituted SA Signal Level (uncorrected) | Power Applied to Antenna | Antenna Gain | Emission EIRP Level | EIRP Limit | Margin | Pass/Fail |
|----------|----------|---------------------------|---------|-----------|--------------------------|---|--------------------------|--------------|---------------------|------------|--------|-----------|
| | m | | | MHz | dBuV/m | dBuV | dBm | dBi | dBm | dBm* | dB | |
| H | 3 | Horn SN6267 | 25 | 2000.00 | 67.38 | 34.70 | -41.84 | 6.70 | -35.14 | -13.00 | 22.14 | PASS |
| H | 3 | Horn SN6267 | 25 | 3701.88 | 49.71 | 47.57 | -52.69 | 8.06 | -44.63 | -13.00 | 31.63 | PASS |
| H | 3 | Horn SN6267 | 25 | 4952.50 | 49.25 | 44.10 | -52.10 | 8.61 | -43.49 | -13.00 | 30.49 | PASS |
| H | 3 | Horn SN6267 | 25 | 7129.37 | 54.08 | 45.30 | -48.00 | 9.20 | -38.80 | -13.00 | 25.80 | PASS |
| H | 1 | Horn SN6267 | 25 | 14740.00 | 60.53 | 44.90 | -52.80 | 11.05 | -41.76 | -13.00 | 28.76 | PASS |
| H | 1 | Horn SN6267 | 25 | 17960.00 | 67.29 | 45.50 | -43.41 | 8.08 | -35.33 | -13.00 | 22.33 | PASS |
| H | 1 | 3160-09 | 25 | 19800.00 | 61.16 | 45.70 | -42.12 | 15.92 | -26.20 | -13.00 | 13.20 | PASS |
| V | 3 | Horn SN6267 | 25 | 1871.00 | 67.18 | 35.10 | -41.39 | 6.57 | -34.82 | -13.00 | 21.82 | PASS |
| V | 3 | Horn SN6267 | 25 | 2116.00 | 42.63 | 46.90 | -49.67 | 6.96 | -42.71 | -13.00 | 29.71 | PASS |
| V | 3 | Horn SN6267 | 25 | 3703.75 | 56.14 | 54.00 | -42.26 | 8.06 | -34.20 | -13.00 | 21.20 | PASS |
| V | 3 | Horn SN6267 | 25 | 4840.38 | 48.30 | 43.50 | -53.19 | 8.63 | -44.56 | -13.00 | 31.56 | PASS |
| V | 3 | Horn SN6267 | 25 | 8372.50 | 55.35 | 44.70 | -50.16 | 9.30 | -40.86 | -13.00 | 27.86 | PASS |
| V | 1 | Horn SN6267 | 25 | 11108.00 | 64.43 | 52.10 | -54.38 | 10.45 | -43.93 | -13.00 | 30.93 | PASS |
| V | 1 | Horn SN6267 | 25 | 17994.00 | 67.01 | 44.90 | -40.52 | 7.93 | -32.59 | -13.00 | 19.59 | PASS |
| V | 1 | 3160-09 | 25 | 19902.00 | 60.41 | 44.70 | -40.28 | 15.96 | -24.32 | -13.00 | 11.32 | PASS |
| H | 3 | Horn SN6267 | 600 | 1998.00 | 67.17 | 34.50 | -41.93 | 6.70 | -35.24 | -13.00 | 22.24 | PASS |
| H | 3 | Horn SN6267 | 600 | 5616.25 | 53.48 | 47.10 | -46.63 | 8.74 | -37.89 | -13.00 | 24.89 | PASS |
| H | 1 | Horn SN6267 | 600 | 17930.00 | 66.90 | 45.30 | -42.08 | 8.21 | -33.87 | -13.00 | 20.87 | PASS |
| H | 1 | 3160-09 | 600 | 19892.00 | 60.97 | 45.30 | -39.34 | 15.96 | -23.38 | -13.00 | 10.38 | PASS |
| V | 3 | Horn SN6267 | 600 | 1999.00 | 67.38 | 34.70 | -41.39 | 6.70 | -34.69 | -13.00 | 21.69 | PASS |
| V | 3 | Horn SN6267 | 600 | 3761.88 | 57.19 | 54.90 | -41.14 | 8.05 | -33.09 | -13.00 | 20.09 | PASS |
| V | 1 | Horn SN6267 | 600 | 17976.00 | 67.04 | 45.10 | -39.75 | 8.01 | -31.74 | -13.00 | 18.74 | PASS |
| V | 1 | 3160-09 | 600 | 19706.00 | 60.68 | 45.30 | -38.94 | 15.88 | -23.06 | -13.00 | 10.06 | PASS |
| H | 3 | Horn SN6267 | 1175 | 1984.00 | 66.90 | 34.30 | -41.80 | 6.68 | -35.11 | -13.00 | 22.11 | PASS |
| H | 3 | Horn SN6267 | 1175 | 5618.13 | 51.88 | 45.50 | -48.69 | 8.74 | -39.95 | -13.00 | 26.95 | PASS |
| H | 3 | Horn SN6267 | 1175 | 9295.00 | 55.84 | 43.70 | -51.35 | 9.10 | -42.26 | -13.00 | 29.26 | PASS |
| H | 1 | Horn SN6267 | 1175 | 17990.00 | 67.17 | 45.10 | -43.20 | 7.94 | -35.26 | -13.00 | 22.26 | PASS |
| H | 1 | 3160-09 | 1175 | 19882.00 | 61.52 | 45.90 | -38.54 | 15.95 | -22.59 | -13.00 | 9.59 | PASS |
| V | 3 | Horn SN6267 | 1175 | 1891.00 | 66.46 | 34.30 | -42.36 | 6.59 | -35.77 | -13.00 | 22.77 | PASS |
| V | 3 | Horn SN6267 | 1175 | 8113.75 | 53.79 | 43.50 | -52.53 | 9.30 | -43.23 | -13.00 | 30.23 | PASS |
| V | 1 | Horn SN6267 | 1175 | 17978.00 | 66.86 | 44.90 | -39.39 | 8.00 | -31.40 | -13.00 | 18.40 | PASS |
| V | 1 | 3160-09 | 1175 | 19974.00 | 60.68 | 44.90 | -40.95 | 15.99 | -24.96 | -13.00 | 11.96 | PASS |

| | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <p>Note:</p> <p>Horn Antenna used for substitution</p> <p>All applicable frequency ranges were investigated up to the carrier tenth harmonic and any significant emissions or noise floor level reported for each range.</p> <p>Formulae:</p> <p>Limit = $43 + 10 \log(\text{Fundamental Power Level, in watts})$ below the Fundamental peak power gives -13 dBm</p> <p>EIRP Level (dBm) = Power applied to Antenna (dBm) + Antenna Gain (dBi)</p> <p>Margin (dB) = Limit (dBm) - Level (dBm)</p> | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|

FIELD STRENGTH OF SPURIOUS RADIATION - §2.1053 (Cont.)

DUT with Itronix IX100X Vehicle Cradle & MaxRad 3 dBi Gain Vehicle-Mount Antenna - Cellular CDMA

| | | | | | | | | | |
|---|--|-----------------|--|------------------|--|------------------|--|-----------|--|
|  | | Project Number: | | 073004-547KBC | | Standard: | | FCC22.917 | |
| | | Company: | | Itronix | | Test Start Date: | | 18-Aug-04 | |
| | | Product: | | IX100 with AC555 | | Test End Date: | | 27-Aug-04 | |

| Polarity | Distance | Substitution Antenna Type | Channel | Frequency | Corrected Field Strength | Substituted SA Signal Level (uncorrected) | Power Applied to Antenna | Antenna Gain | Emission ERP Level | ERP Limit | Margin | Pass/Fail |
|----------|----------|---------------------------|---------|-----------|--------------------------|---|--------------------------|--------------|--------------------|-----------|--------|-----------|
| | m | | | MHz | dBuV/m | dBuV | dBm | dBi | dBm | dBm* | dB | |
| H | 3 | B_3121C | 1013 | 854.00 | 68.35 | 42.80 | -27.94 | 1.66 | -26.27 | -13.00 | 13.27 | PASS |
| H | 3 | Horn SN6267 | 1013 | 1078.00 | 67.15 | 56.90 | -46.68 | 4.09 | -42.59 | -13.00 | 29.59 | PASS |
| H | 3 | Horn SN6267 | 1013 | 5792.50 | 55.34 | 48.80 | -45.62 | 8.95 | -36.67 | -13.00 | 23.67 | PASS |
| V | 3 | B_3121C | 1013 | 839.00 | 68.35 | 42.80 | -25.09 | 1.47 | -23.62 | -13.00 | 10.62 | PASS |
| V | 3 | Horn SN6267 | 1013 | 1001.50 | 62.40 | 44.50 | -45.51 | 3.71 | -41.80 | -13.00 | 28.80 | PASS |
| V | 3 | Horn SN6267 | 1013 | 8421.25 | 54.60 | 43.90 | -51.31 | 9.30 | -42.01 | -13.00 | 29.01 | PASS |
| H | 3 | B_3121C | 363 | 810.40 | 66.84 | 42.00 | -27.74 | 1.07 | -26.67 | -13.00 | 13.67 | PASS |
| H | 3 | Horn SN6267 | 363 | 1127.50 | 60.60 | 55.30 | -54.26 | 4.34 | -49.92 | -13.00 | 36.92 | PASS |
| H | 3 | Horn SN6267 | 363 | 8100.00 | 55.15 | 44.90 | -51.60 | 9.30 | -42.30 | -13.00 | 29.30 | PASS |
| V | 3 | B_3121C | 363 | 859.00 | 67.91 | 42.40 | -24.56 | 1.74 | -22.82 | -13.00 | 9.82 | PASS |
| V | 3 | Horn SN6267 | 363 | 1073.50 | 60.40 | 49.70 | -52.15 | 4.07 | -48.08 | -13.00 | 35.08 | PASS |
| V | 3 | Horn SN6267 | 363 | 7570.00 | 54.11 | 44.30 | -50.38 | 8.96 | -41.42 | -13.00 | 28.42 | PASS |
| H | 3 | B_3121C | 777 | 854.20 | 67.25 | 41.70 | -26.95 | 1.67 | -25.28 | -13.00 | 12.28 | PASS |
| H | 3 | Horn SN6267 | 777 | 1000.00 | 60.55 | 42.50 | -48.34 | 3.70 | -44.64 | -13.00 | 31.64 | PASS |
| H | 3 | Horn SN6267 | 777 | 5783.13 | 55.37 | 48.80 | -51.35 | 8.94 | -42.41 | -13.00 | 29.41 | PASS |
| H | 3 | Horn SN6267 | 777 | 8698.75 | 55.76 | 44.70 | -57.07 | 9.10 | -47.97 | -13.00 | 34.97 | PASS |
| V | 3 | B_3121C | 777 | 920.80 | 64.22 | 37.60 | -29.52 | 2.05 | -27.47 | -13.00 | 14.47 | PASS |
| V | 3 | Horn SN6267 | 777 | 1129.00 | 64.85 | 59.70 | -51.56 | 4.35 | -47.22 | -13.00 | 34.22 | PASS |
| V | 3 | Horn SN6267 | 777 | 8785.00 | 55.17 | 43.90 | -56.73 | 9.01 | -47.72 | -13.00 | 34.72 | PASS |

| | | | | | | | | | | | | |
|---|--|--|--|--|--|--|--|--|--|--|--|--|
| <p>Note:</p> <p>Dipole Antenna used for substitution for 1000 MHz and below. Horn Antenna used above 1000 MHz</p> <p>All applicable frequency ranges were investigated up to the carrier tenth harmonic and any significant emissions or noise floor level reported for each range.</p> <p>Formulae:</p> <p>Limit = $43 + 10 \log(\text{Fundamental Power Level, in watts})$ below the Fundamental peak power gives -13 dBm</p> <p>ERP Level (dBm) = Power applied to Antenna (dBm) + Antenna Gain (dBi) - 2.14</p> <p>Margin (dB) = Limit (dBm) - Level (dBm)</p> | | | | | | | | | | | | |
|---|--|--|--|--|--|--|--|--|--|--|--|--|

3.5 FREQUENCY STABILITY / TEMPERATURE VARIATION - §24.235

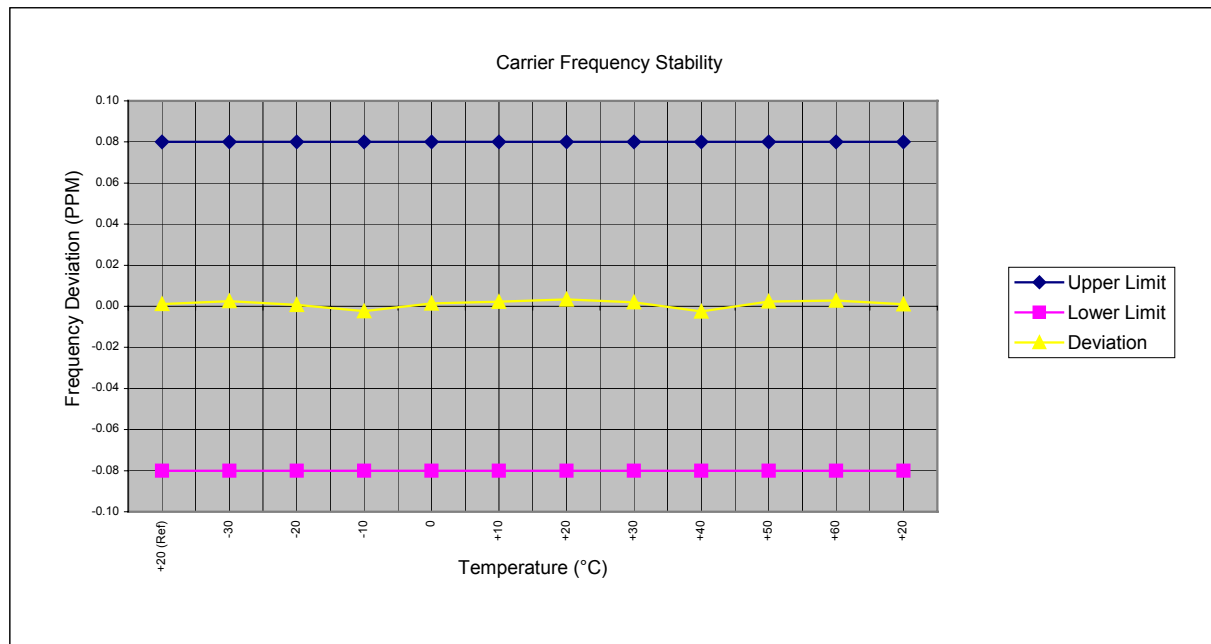
Carrier Frequency (GHz): 1.88

Channel: 600

Mode: PCS CDMA

Deviation Limit (PPM): 0.08

| Temperature | Voltage | Power | Carrier Frequency Deviation | | Specification | |
|-------------|------------------|-------|-----------------------------|--------|-------------------|-------------------|
| (°C) | (%) | (VDC) | (Hz) | (PPM) | Lower Limit (PPM) | Upper Limit (PPM) |
| +20 (Ref) | 100 | 7.4 | 2.17 | 0.001 | 0.08 | -0.08 |
| -30 | 100 | 7.4 | 4.60 | 0.002 | 0.08 | -0.08 |
| -20 | 100 | 7.4 | 1.36 | 0.001 | 0.08 | -0.08 |
| -10 | 100 | 7.4 | -4.55 | -0.002 | 0.08 | -0.08 |
| 0 | 100 | 7.4 | 2.68 | 0.001 | 0.08 | -0.08 |
| +10 | 100 | 7.4 | 4.14 | 0.002 | 0.08 | -0.08 |
| +20 | 100 | 7.4 | 6.30 | 0.003 | 0.08 | -0.08 |
| +30 | 100 | 7.4 | 3.78 | 0.002 | 0.08 | -0.08 |
| +40 | 100 | 7.4 | -4.71 | -0.003 | 0.08 | -0.08 |
| +50 | 100 | 7.4 | 4.43 | 0.002 | 0.08 | -0.08 |
| +60 | 100 | 7.4 | 5.26 | 0.003 | 0.08 | -0.08 |
| +20 | Battery Endpoint | 6.1 | 1.80 | 0.001 | 0.08 | -0.08 |



3.6 FREQUENCY STABILITY / TEMPERATURE VARIATION - §2.1055

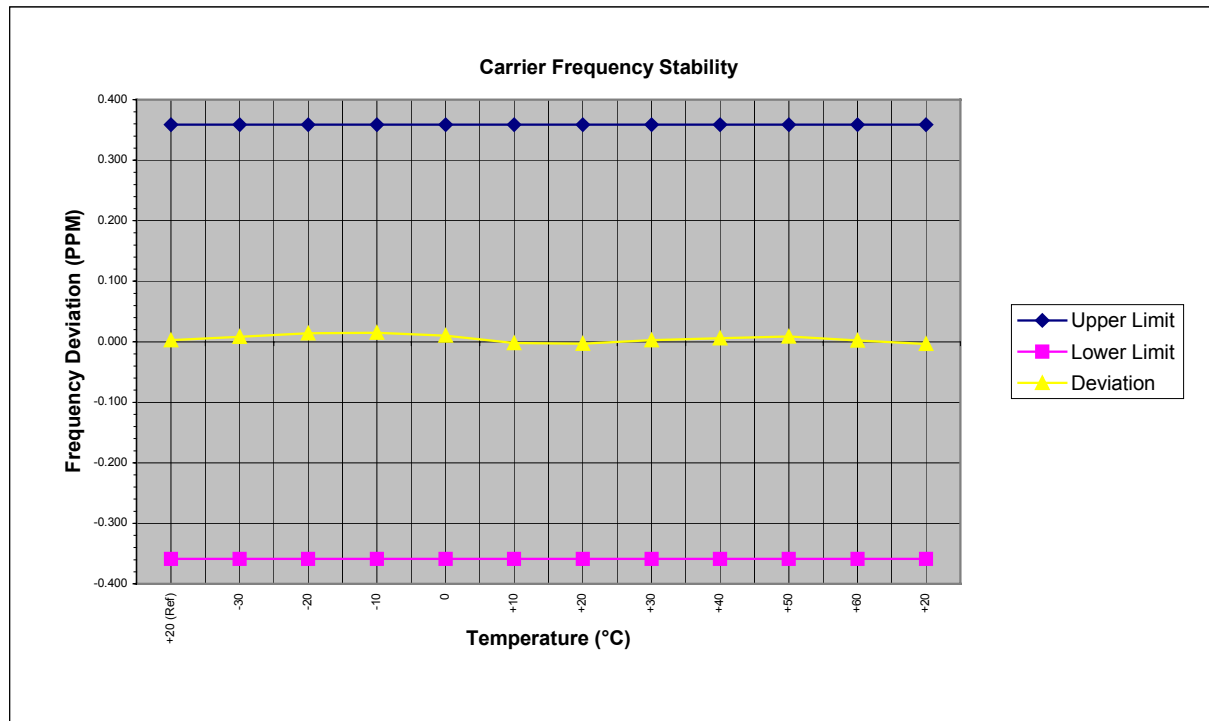
Carrier Frequency (MHz): 835.89

Channel: 363

Mode: Cellular CDMA

Deviation Limit (PPM): 0.359

| Temperature (°C) | Voltage (%) | Power (VDC) | Carrier Frequency Deviation | | Specification | |
|---------------------|------------------|----------------|-----------------------------|--------|-------------------|-------------------|
| | | | (Hz) | (PPM) | Lower Limit (PPM) | Upper Limit (PPM) |
| +20 (Ref) | 100 | 7.4 | 2.15 | 0.003 | 0.359 | -0.359 |
| -30 | 100 | 7.4 | 6.93 | 0.008 | 0.359 | -0.359 |
| -20 | 100 | 7.4 | 11.52 | 0.014 | 0.359 | -0.359 |
| -10 | 100 | 7.4 | 12.33 | 0.015 | 0.359 | -0.359 |
| 0 | 100 | 7.4 | 8.60 | 0.010 | 0.359 | -0.359 |
| +10 | 100 | 7.4 | -1.81 | -0.002 | 0.359 | -0.359 |
| +20 | 100 | 7.4 | -2.43 | -0.003 | 0.359 | -0.359 |
| +30 | 100 | 7.4 | 2.11 | 0.003 | 0.359 | -0.359 |
| +40 | 100 | 7.4 | 5.08 | 0.006 | 0.359 | -0.359 |
| +50 | 100 | 7.4 | 7.47 | 0.009 | 0.359 | -0.359 |
| +60 | 100 | 7.4 | 1.97 | 0.002 | 0.359 | -0.359 |
| +20 | Battery Endpoint | 6.1 | -2.80 | -0.003 | 0.359 | -0.359 |



4.1 TEST EQUIPMENT LIST

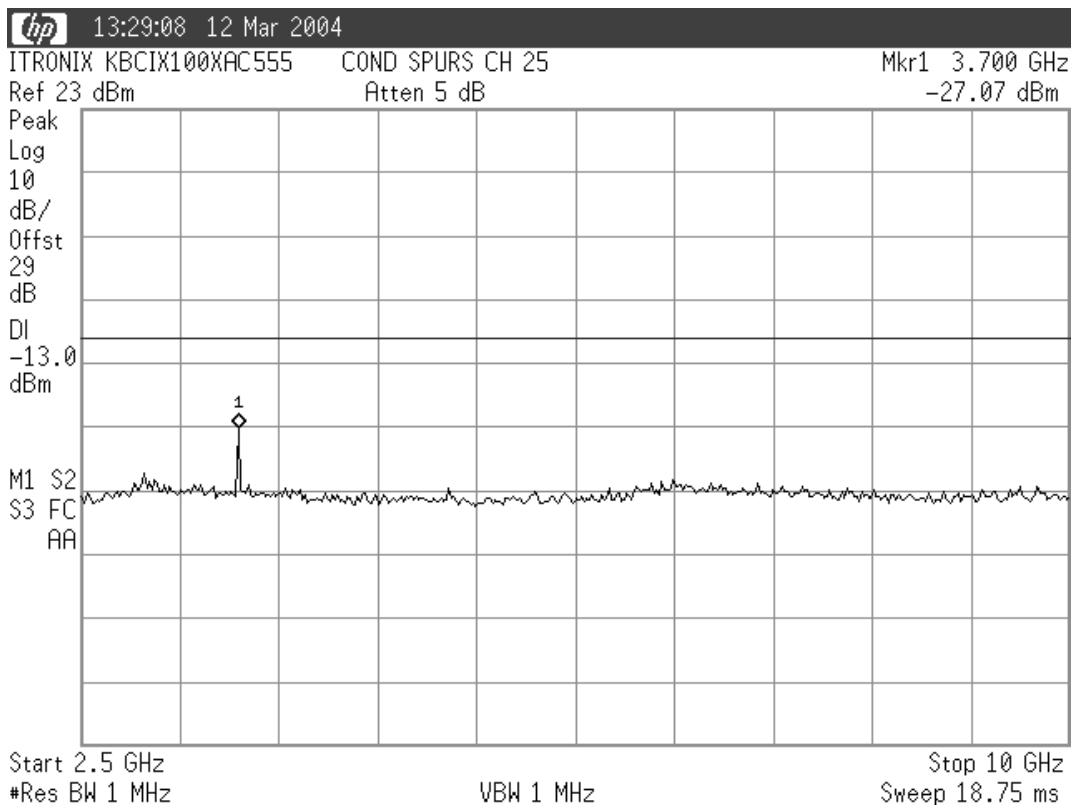
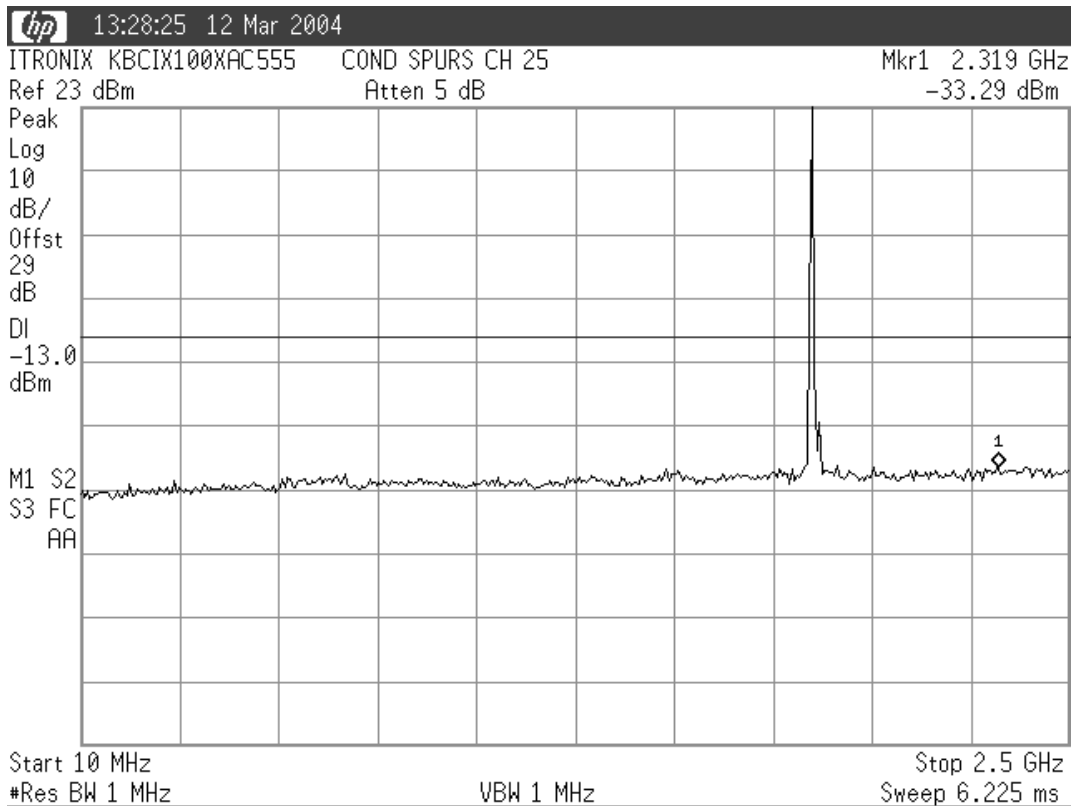
| Equipment Type | Model | Serial No. | Calibration Due Date |
|----------------------------------|---|-----------------|----------------------|
| HP Signal Generator | 8648D (9kHz-4.0GHz) | 3847A00611 | April 2005 |
| Rohde & Schwarz Signal Generator | SMR 20 (10MHz-40GHz) | 100104 | April 2005 |
| Gigatronics Power Meter | 8651A | 8650137 | April 2005 |
| Gigatronics Power Meter | 8652A | 1835267 | April 2005 |
| Gigatronics Power Sensor | 80701A (0.05-18GHz) | 1833535 | April 2005 |
| Gigatronics Power Sensor | 80701A (0.05-18GHz) | 1833542 | April 2005 |
| Gigatronics Power Sensor | 80701A (0.05-18GHz) | 1834350 | April 2005 |
| Amplifier Research Power Amp. | 5S1G4 (5W, 800MHz-4.2GHz) | 26235 | N/A |
| Amplifier Research Power Amp. | 10W1000C (0.5 – 1 GHz) | 27887 | N/A |
| Microwave System Amplifier | HP 83017A (0.5-26.5GHz) | 3123A00587 | N/A |
| Network Analyzer | HP 8753E (30kHz-3GHz) | US38433013 | April 2005 |
| Frequency Counter | HP 53181A (3GHz) | 3736A05175 | April 2005 |
| 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) TX Substitution Antenna (Horn SN6267) | 6267 | Oct 2004 |
| Double Ridged Horn Antenna | ETS 3115 (1-18GHz) | 6276 | Oct 2004 |
| Standard Gain Horn Antenna | ETS 3160-09 TX Substitution Antenna (3160-09) | 9810-1123 | N/A |
| Standard Gain Horn Antenna | ETS 3160-09 | 1263 | N/A |
| Bilog Antenna | Schaffner CBL6111A | 1607 | Jan 2005 |
| Roberts Dipole Antenna | 3121C-DB4 TX Substitution Antenna (B_3121C) | 0003-1494 | Dec 2004 |
| Roberts Dipole Antenna | 3121C-DB4 | 0003-1498 | Dec 2004 |
| Spectrum Analyzer | HP 8594E | 3543A02721 | April 2005 |
| Spectrum Analyzer | HP E4408B | US39240170 | Dec 2004 |
| Shielded Screen Room | Lindgren R.F. 18W-2/2-0 | 16297 | N/A |
| Environmental Chamber | ESPEC ECT-2 (Temperature/Humidity) | 0510154-B | Feb 2005 |
| Directional Coupler | Amplifier Research DC7154 (0.8-4.2 GHz) | 26197 | N/A |
| Directional Coupler | Pasternack PE2214-20 | 00078 | N/A |
| High Pass Filter | Microwave Circuits HIG318G1 | 0001DC0020 | N/A |
| High Pass Filter | Microwave Circuits H02G18G1 | 0001DC0020 | N/A |
| 30 dB Attenuator | Pasternack PE7019-30 | 00065 | N/A |
| Itronix Laptop PC | IX260+ | ZZGEG4112ZZ9777 | N/A |

5.1 CONCLUSION

The data in this measurement report demonstrates that the ITRONIX CORPORATION Model: IX100XAC555 FCC ID: KBCIX100XAC555 Rugged Handheld PC with Sierra Wireless AirCard 555/550 Dual-Band PCS/Cellular CDMA PCMCIA Modem and Nearson $\frac{1}{4}$ -wave Helix Antenna, Itronix IX100X Vehicle Cradle and MaxRad 3 dBi Gain Vehicle-Mount Antenna, complies with the requirements of FCC Rule Parts §24(E), §22(H), and §2.

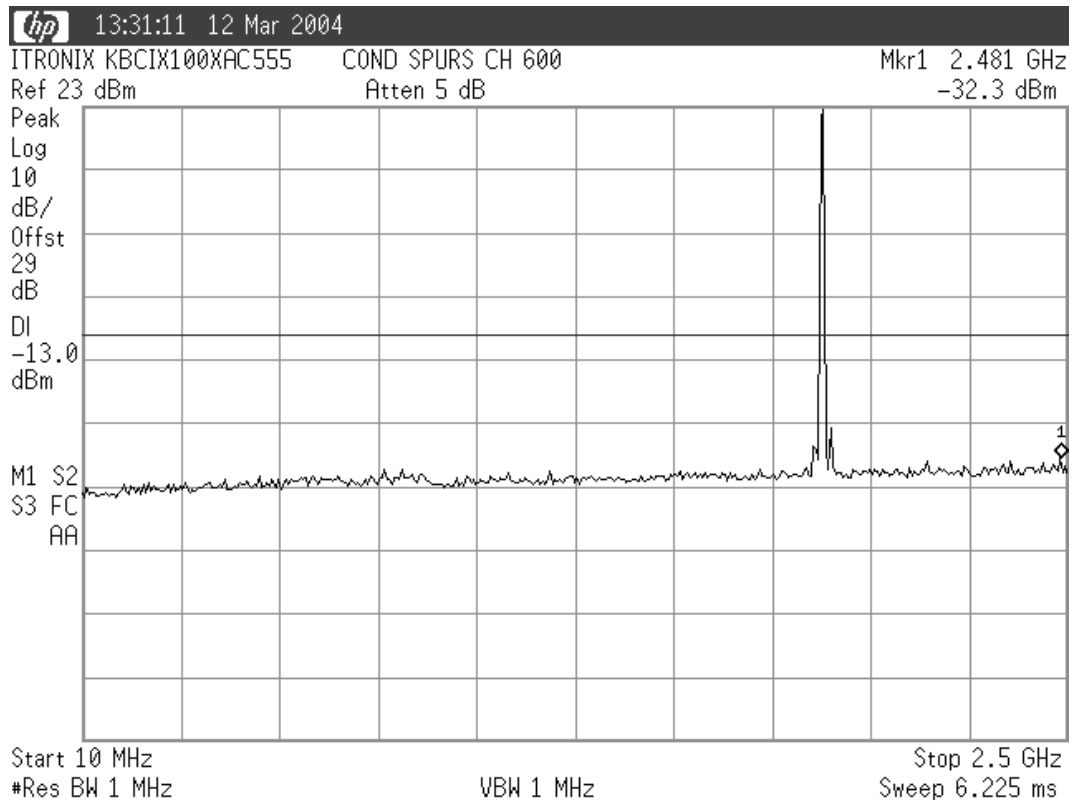
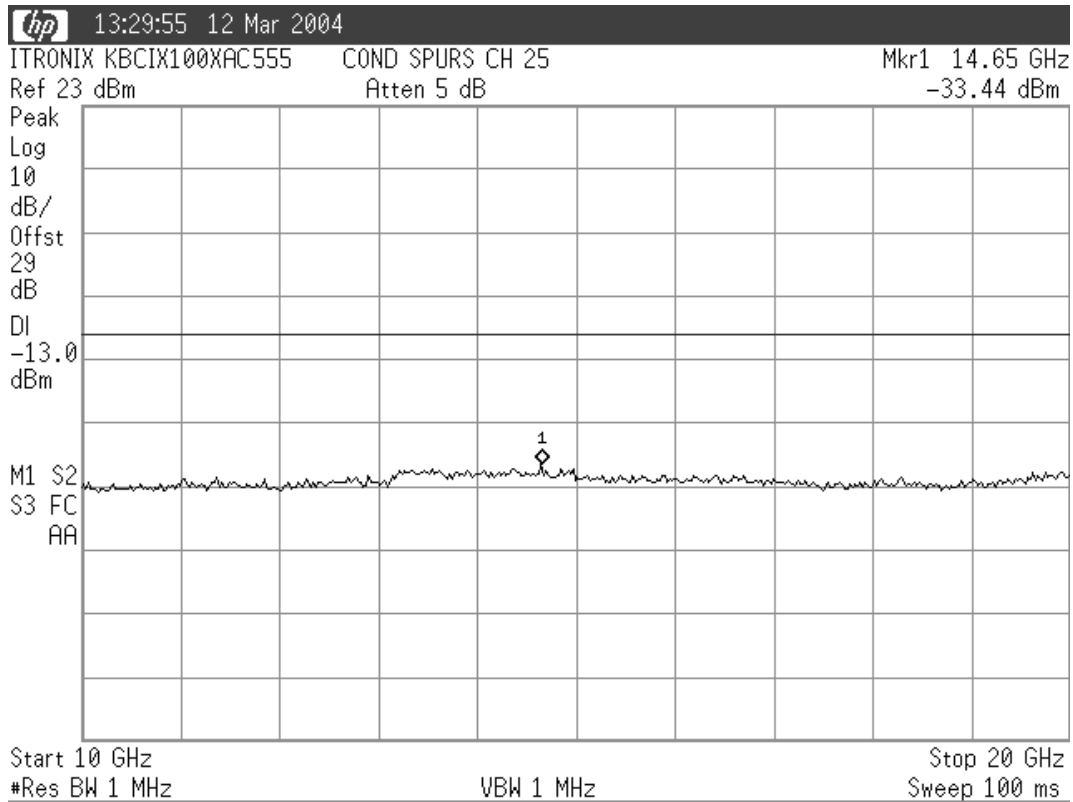
APPENDIX A - TEST PLOTS

PCS Band



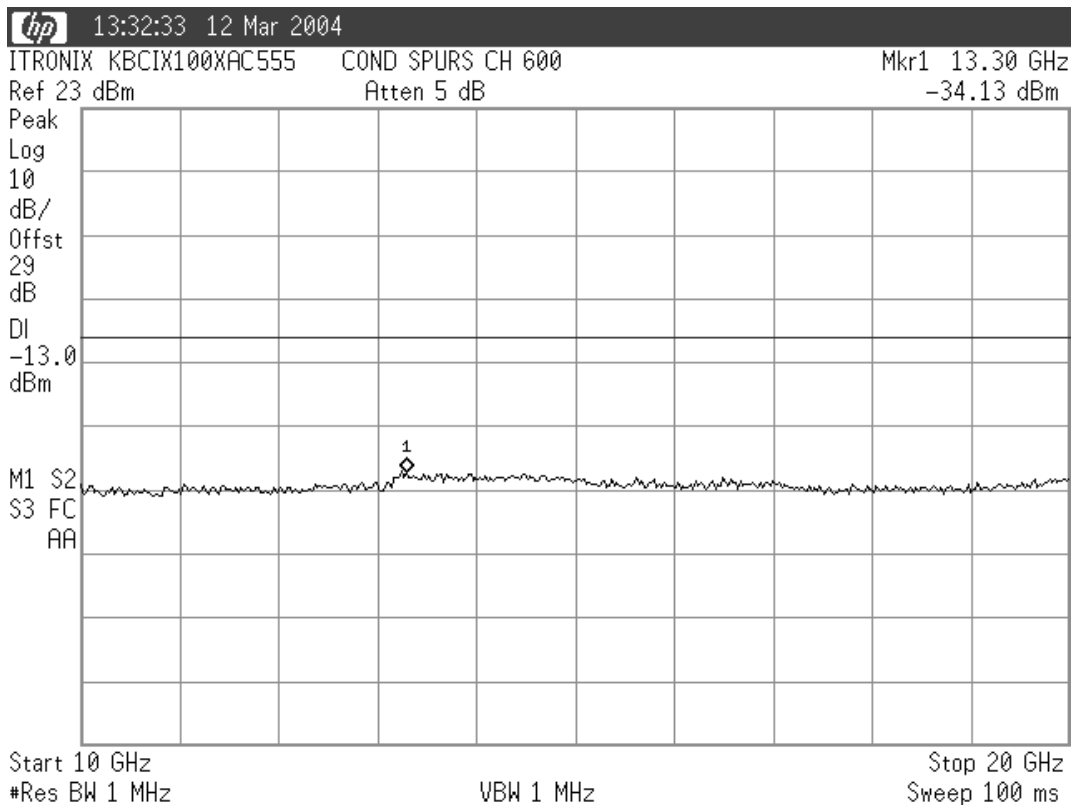
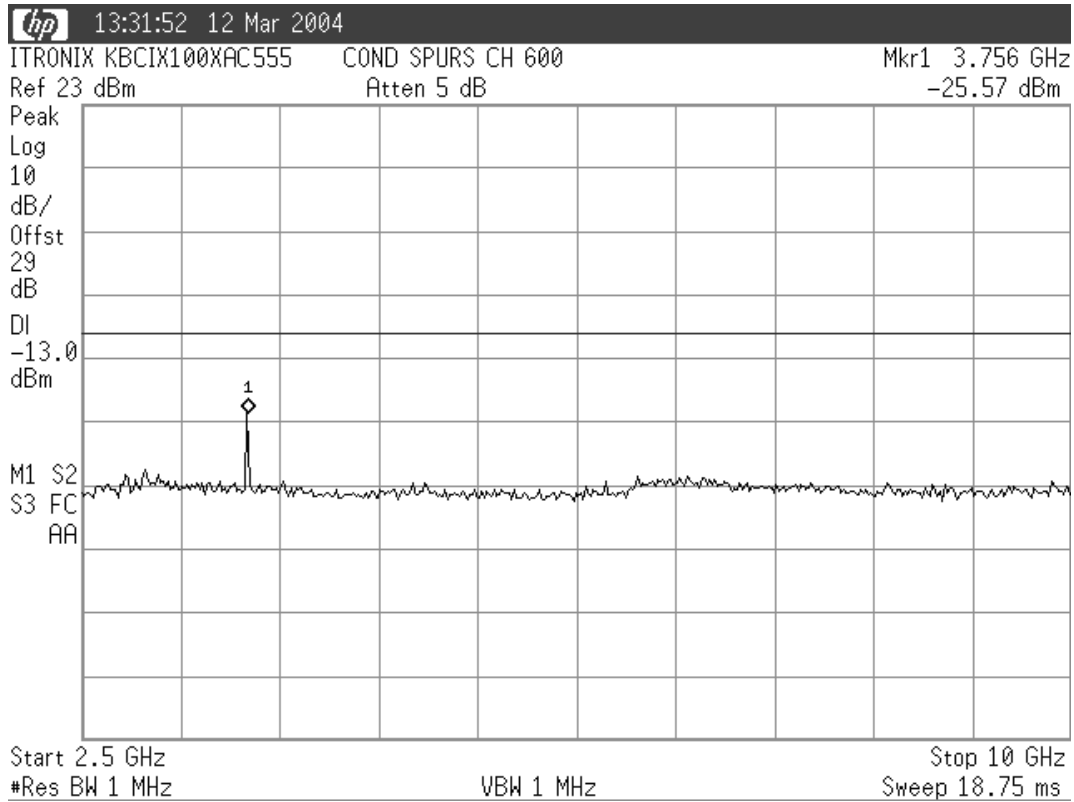
TEST PLOTS (Cont.)

PCS Band



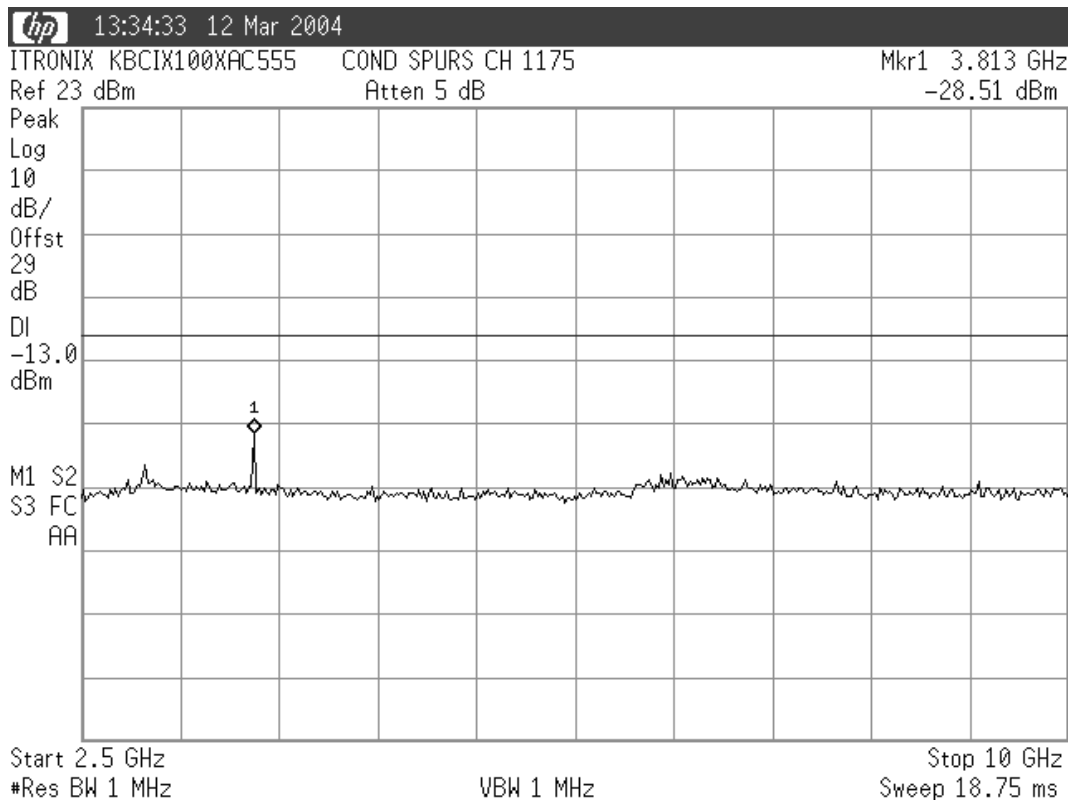
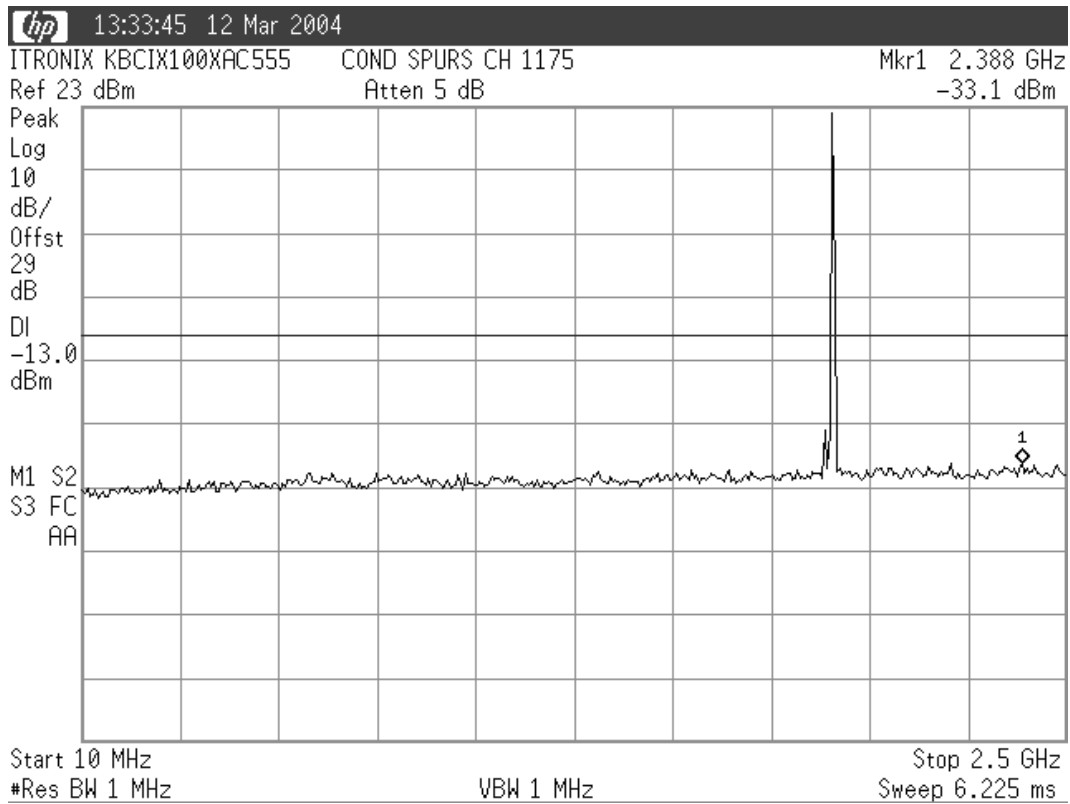
TEST PLOTS (Cont.)

PCS Band



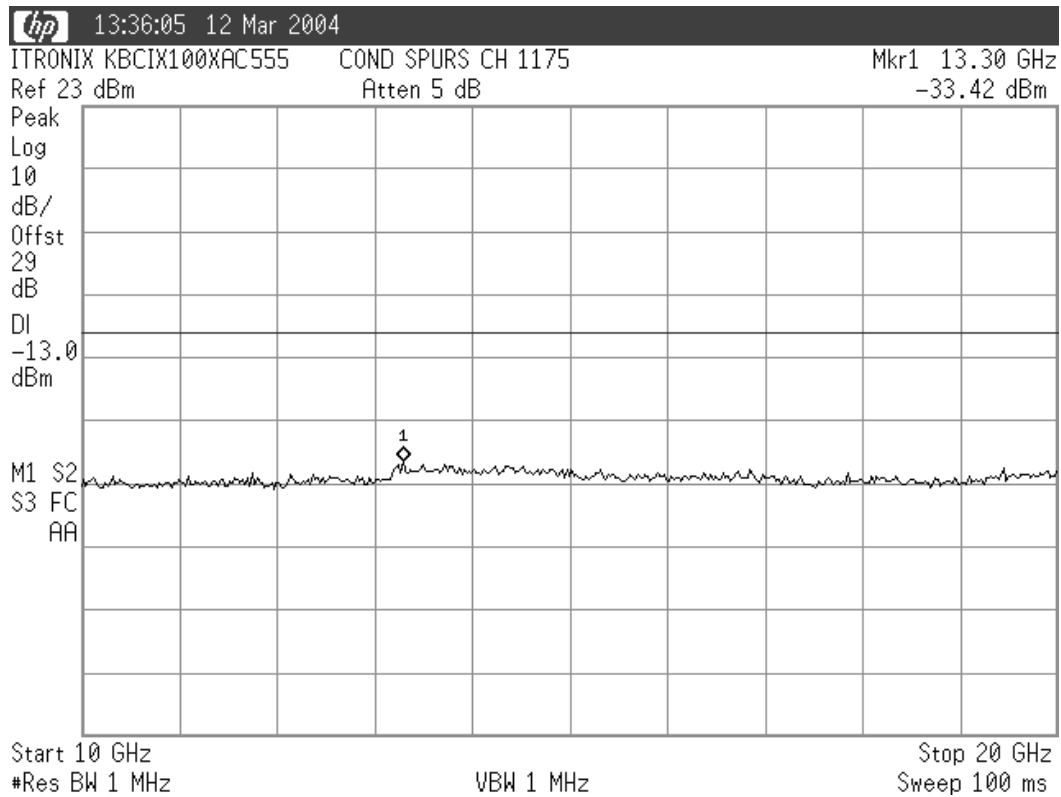
TEST PLOTS (Cont.)

PCS Band



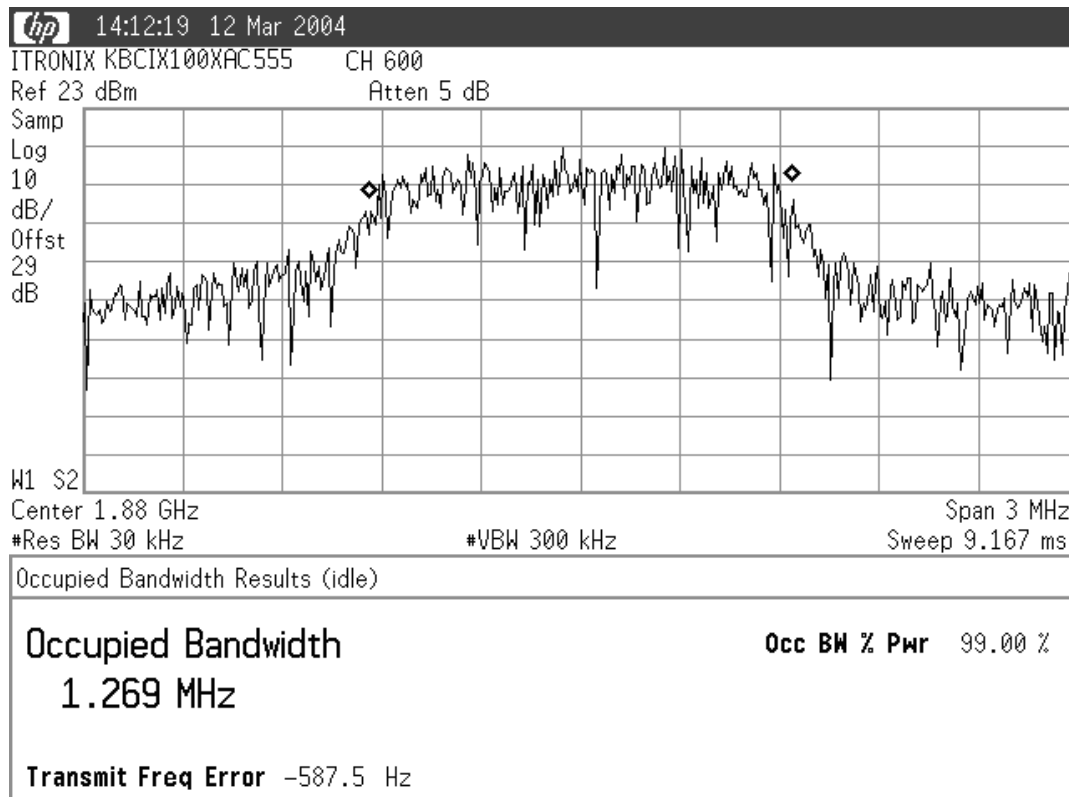
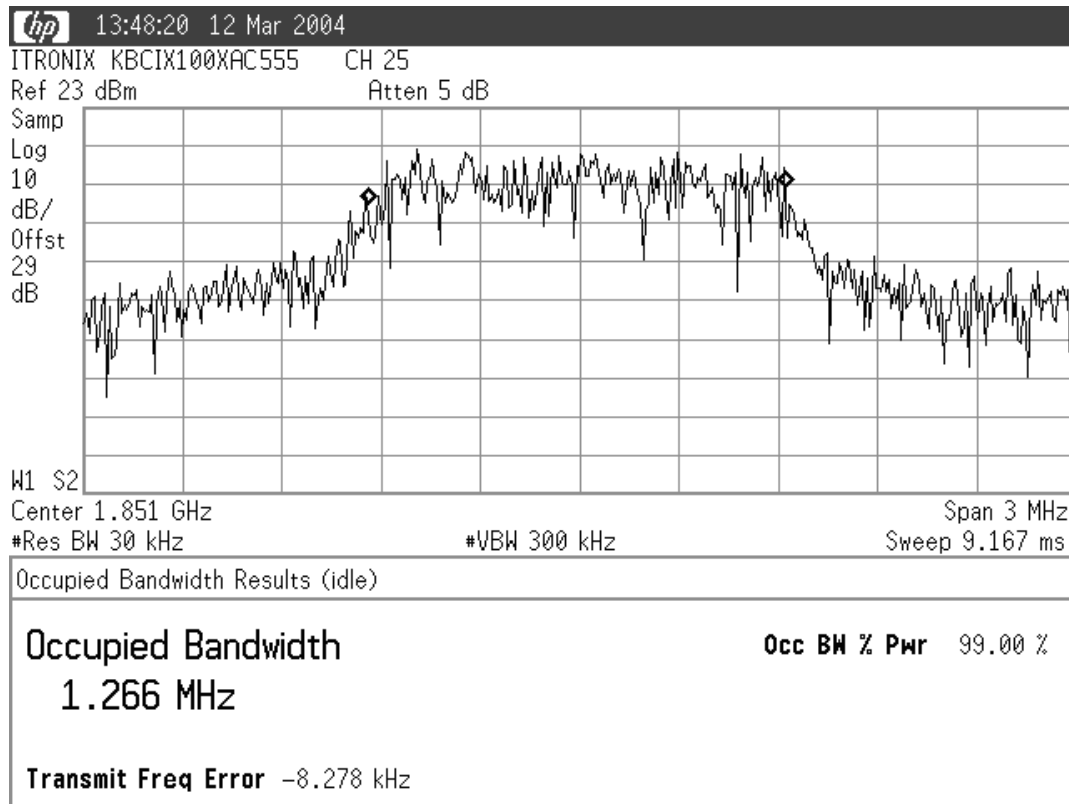
TEST PLOTS (Cont.)

PCS Band



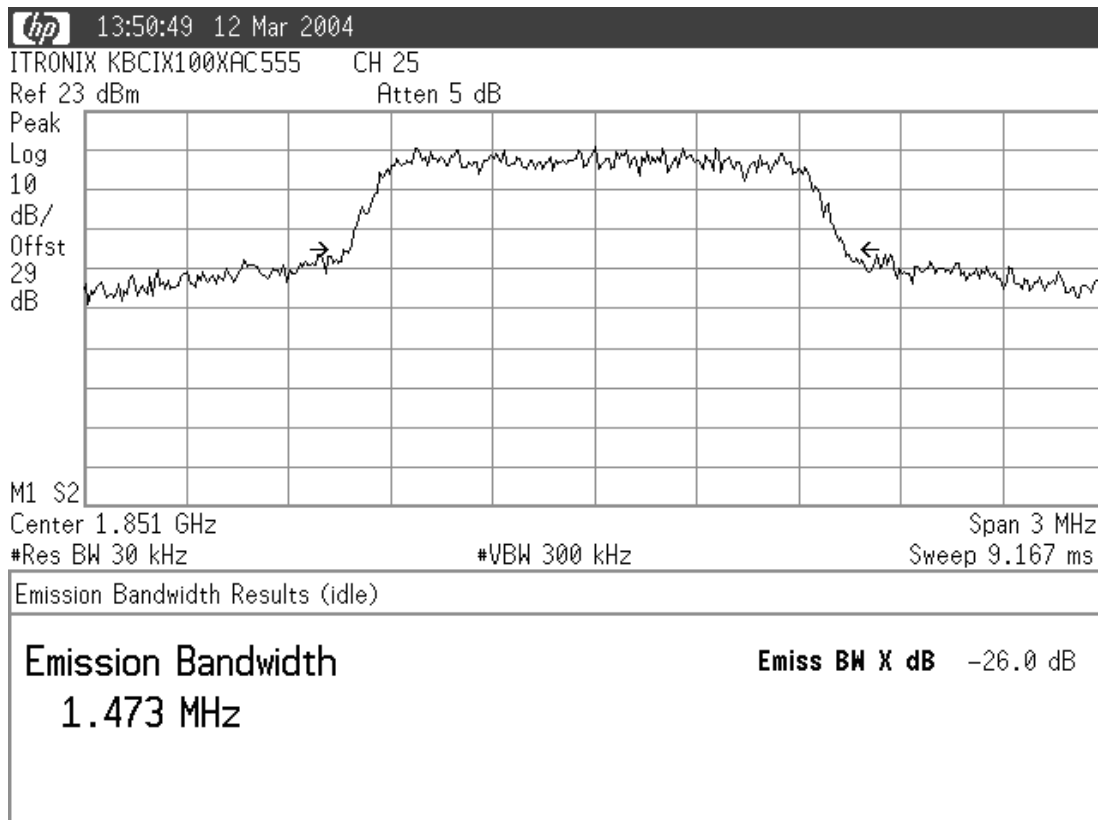
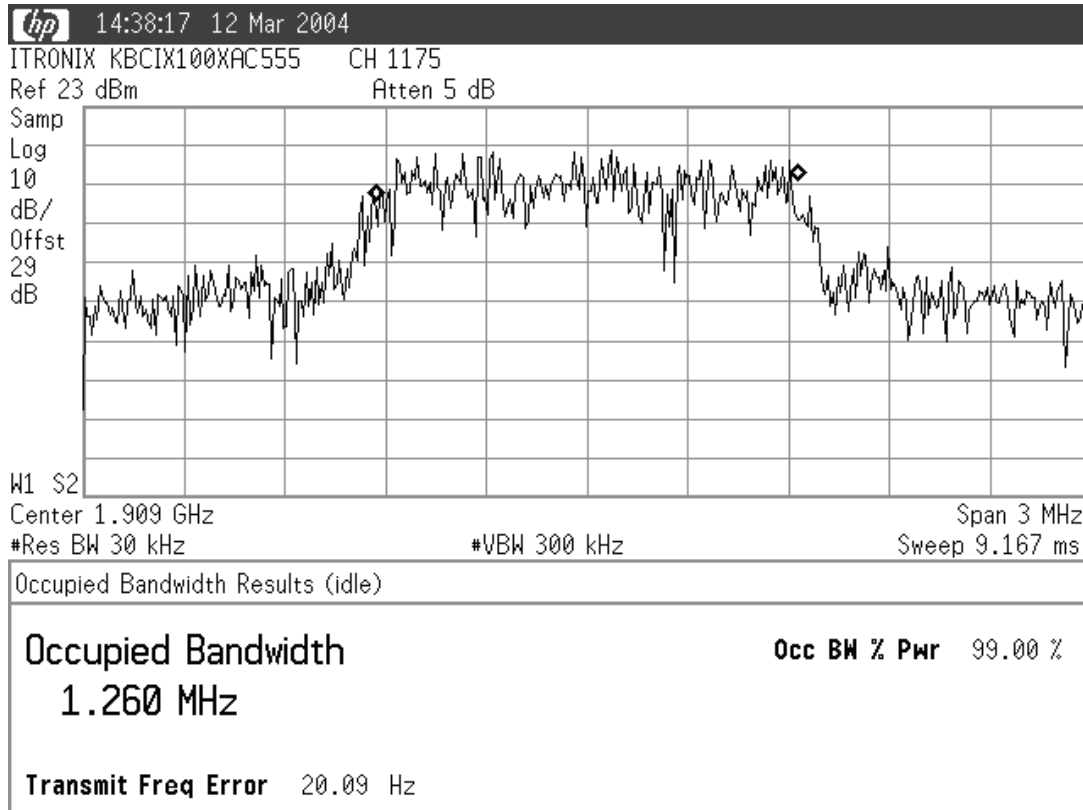
TEST PLOTS (Cont.)

PCS Band



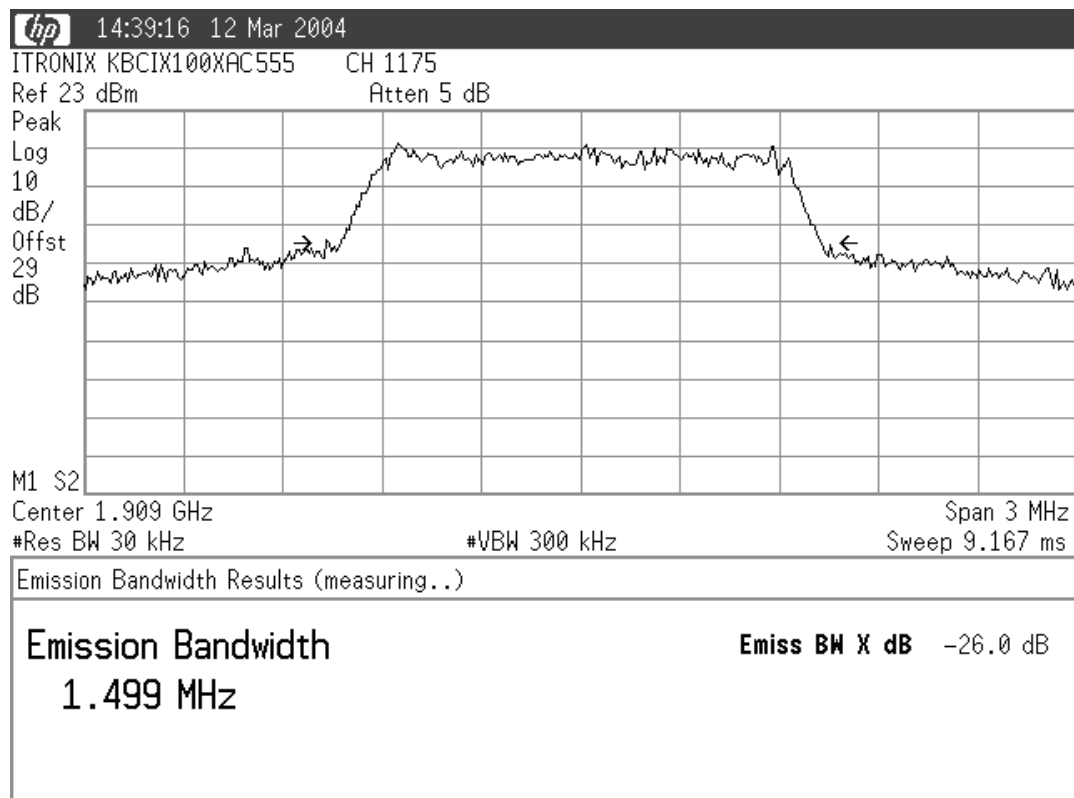
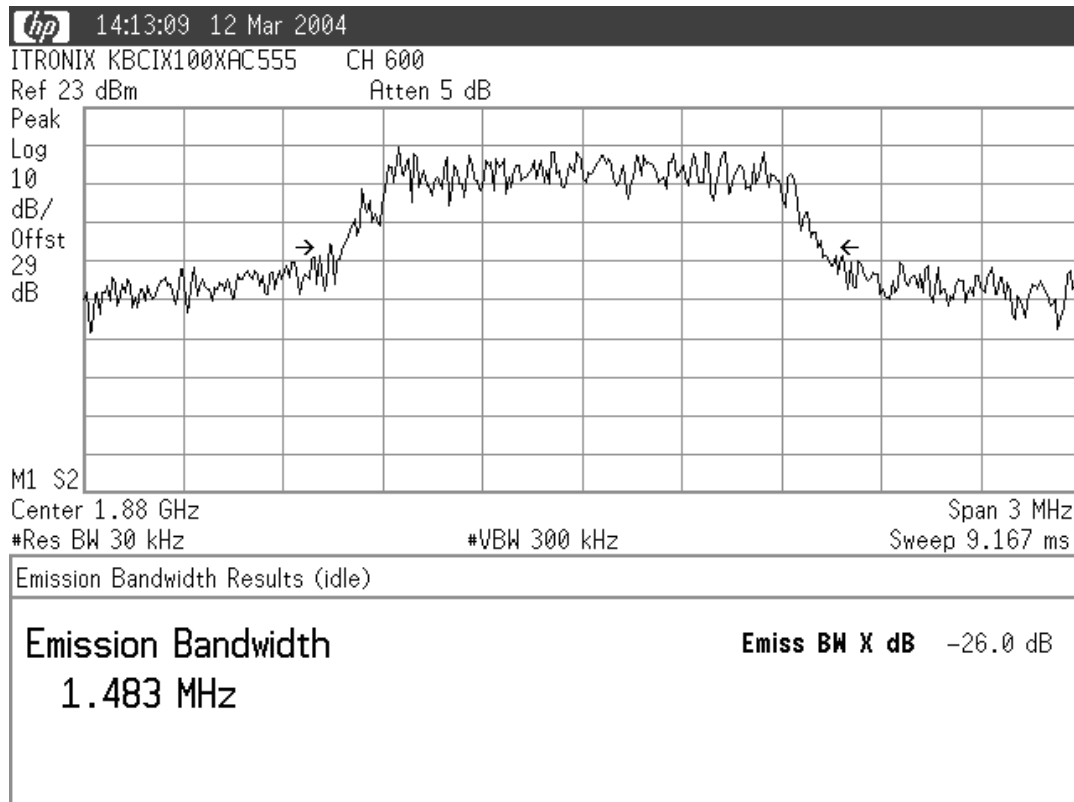
TEST PLOTS (Cont.)

PCS Band



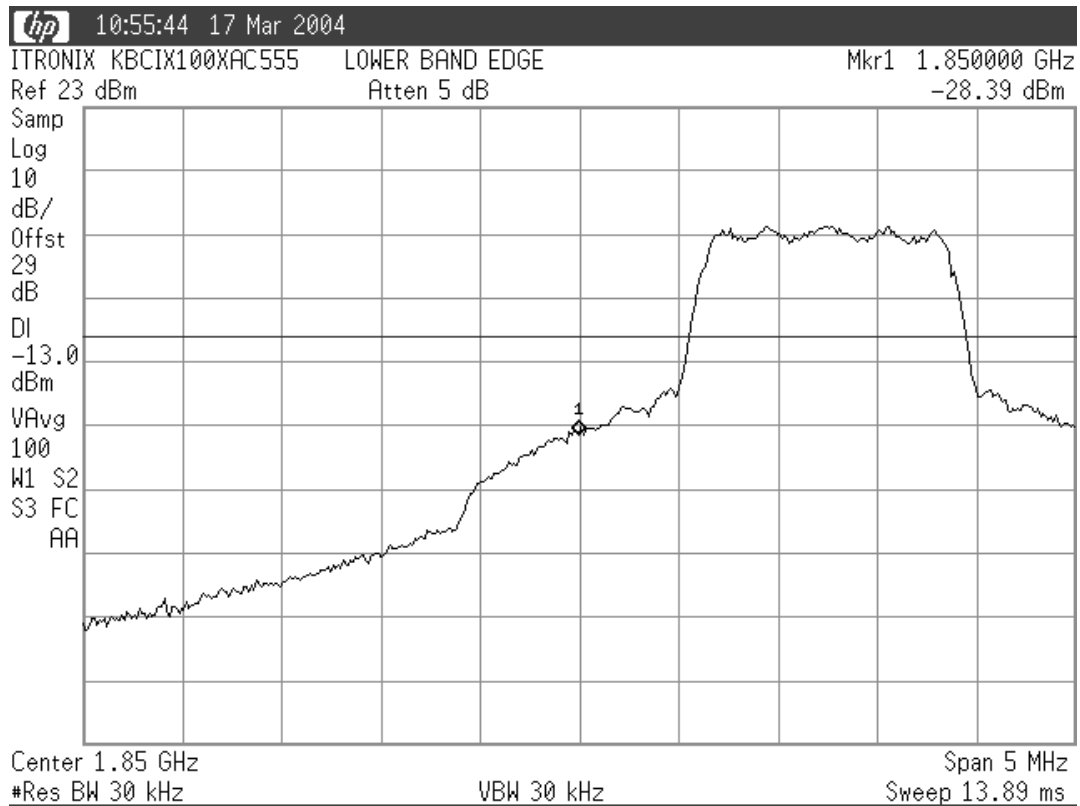
TEST PLOTS (Cont.)

PCS Band



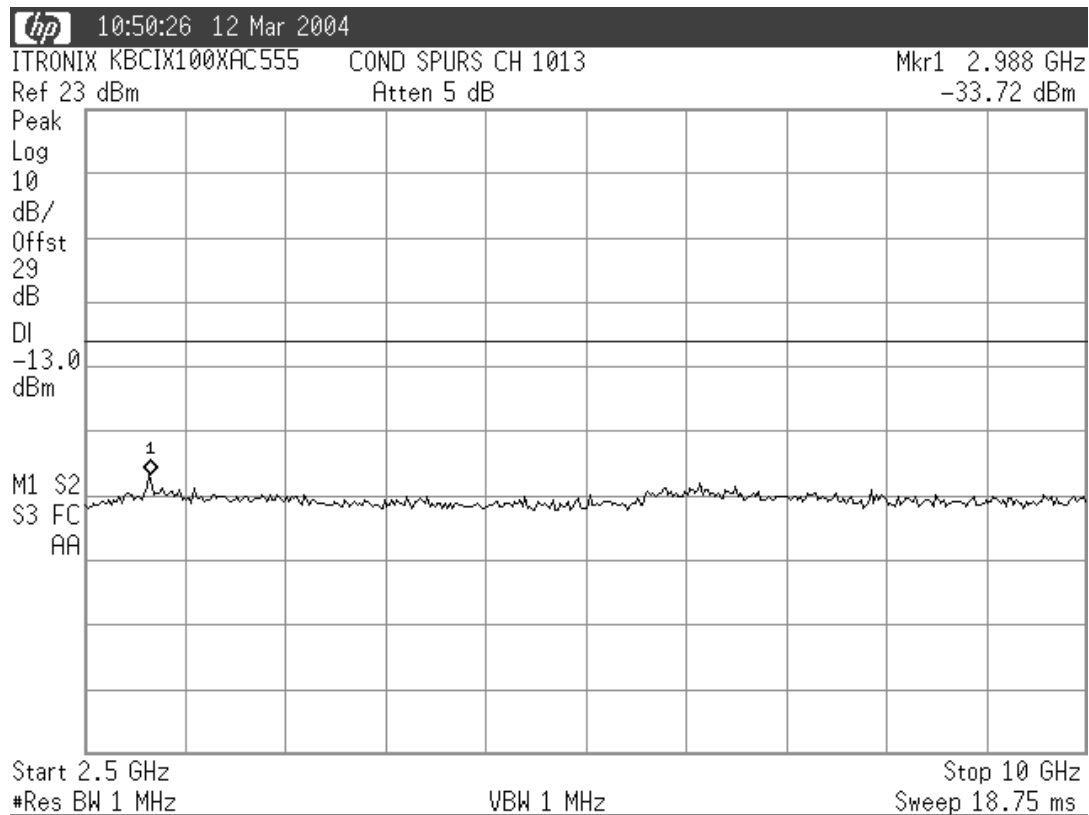
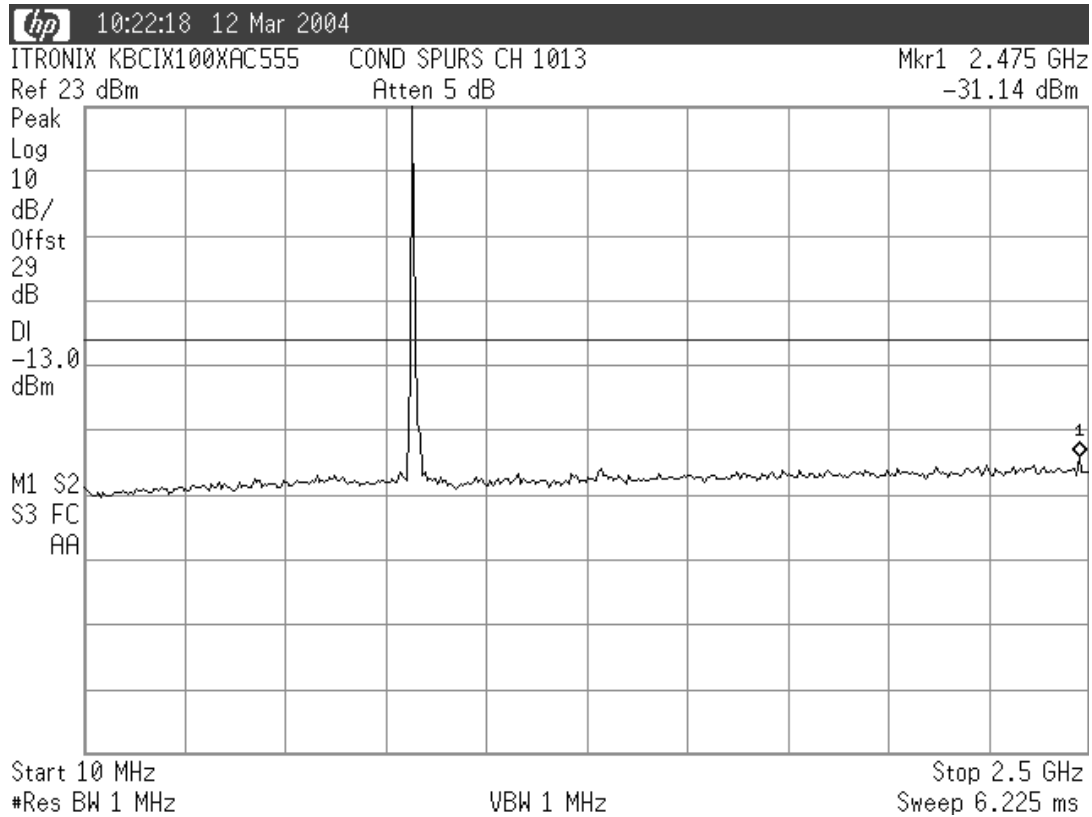
TEST PLOTS (Cont.)

PCS Band



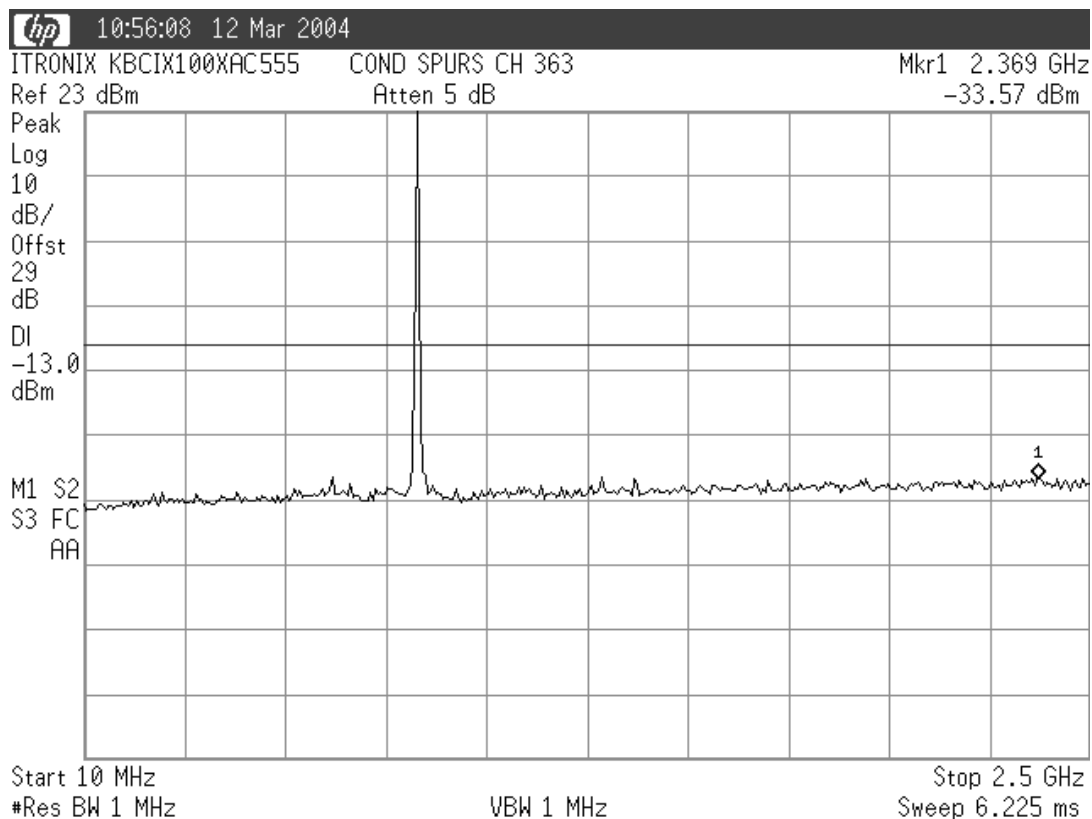
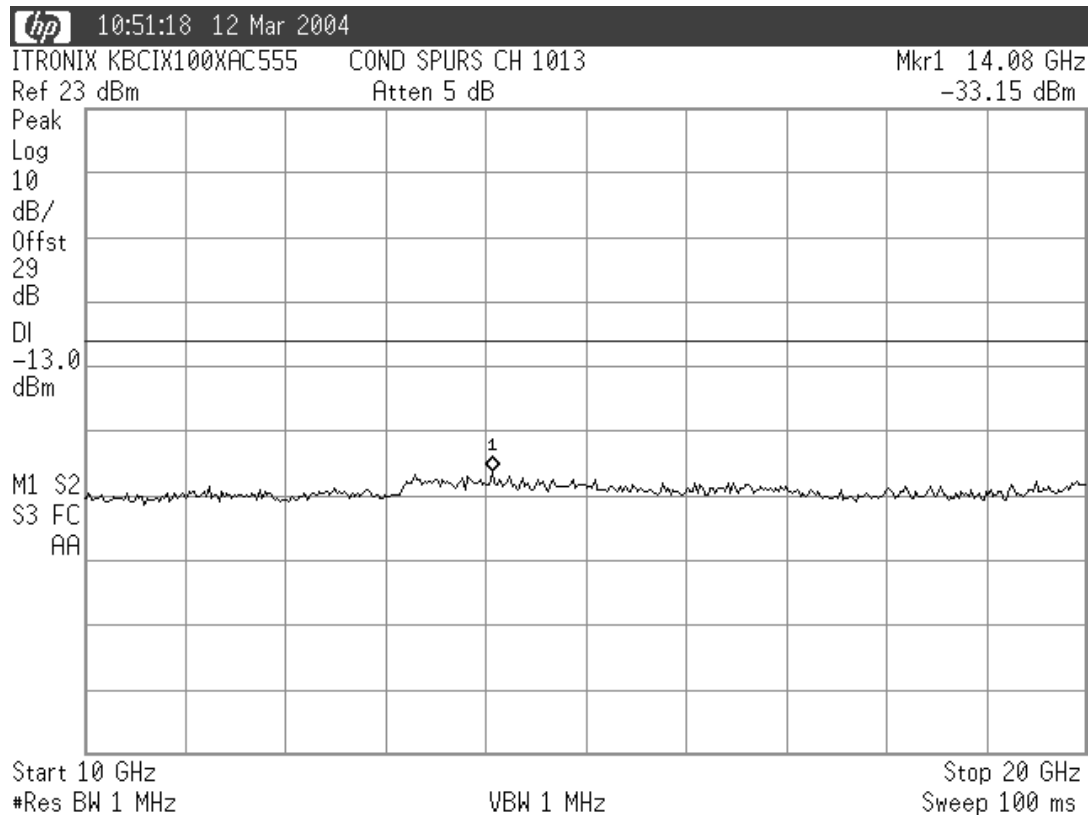
TEST PLOTS (Cont.)

Cellular Band



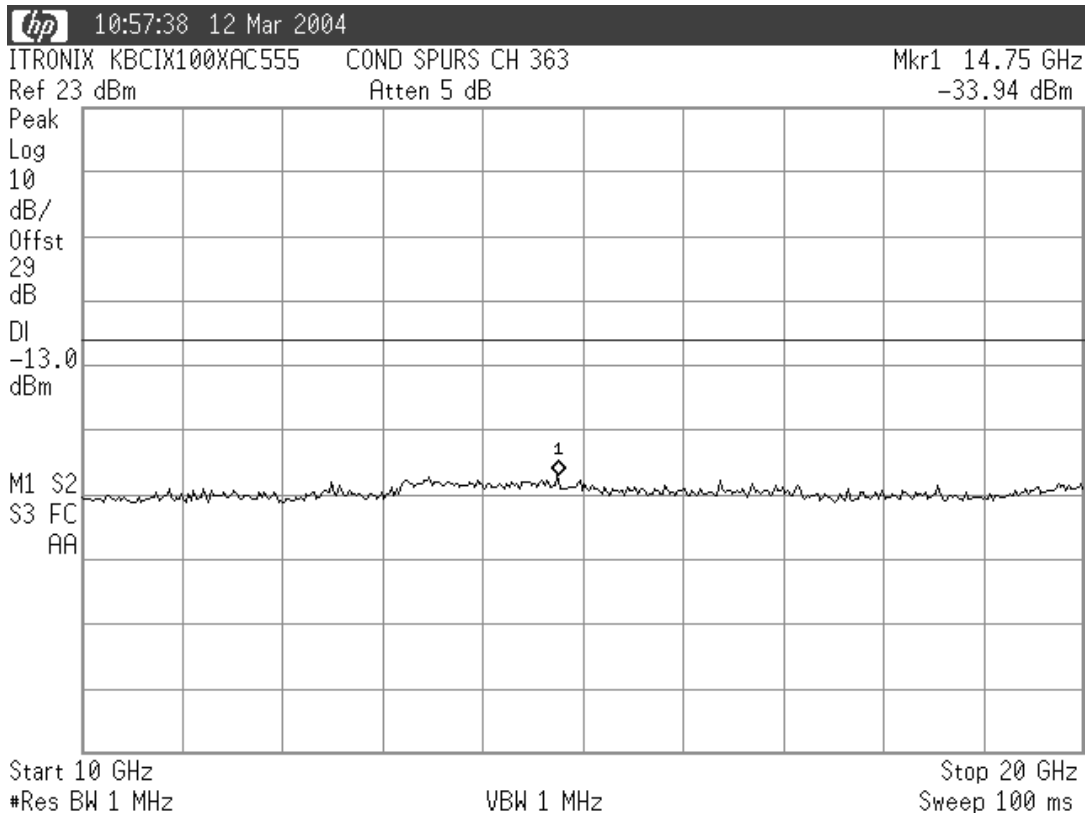
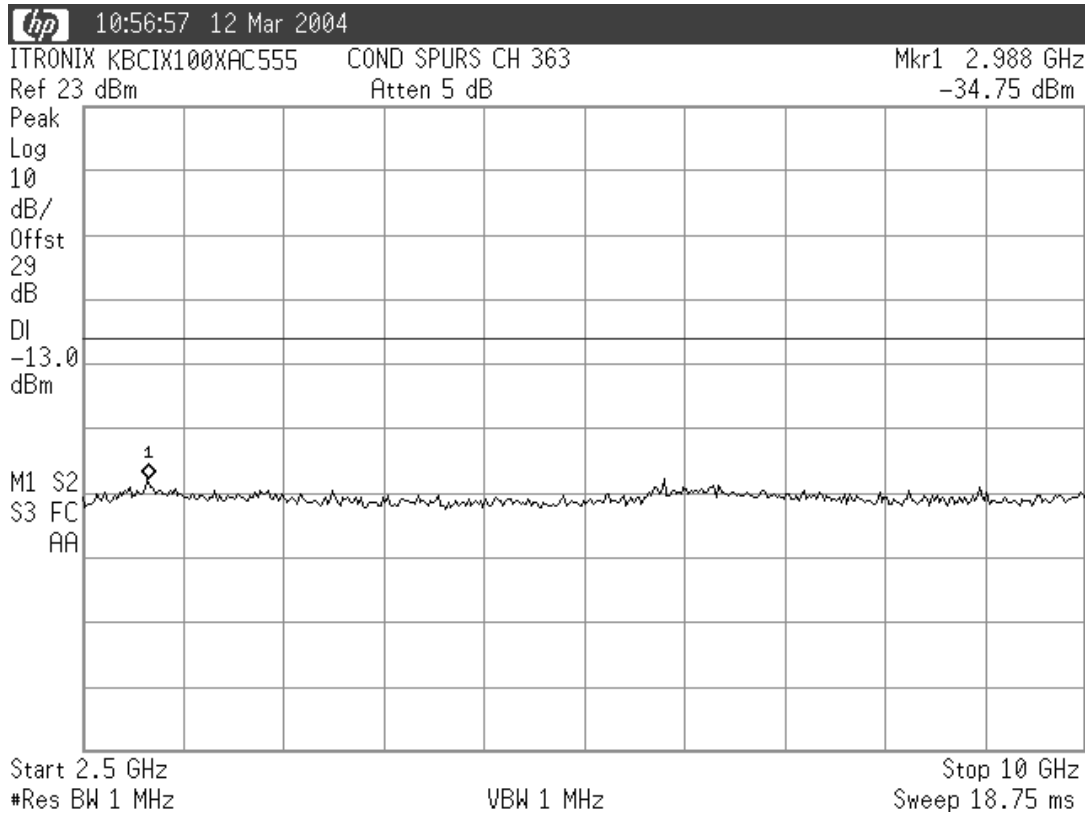
TEST PLOTS (Cont.)

Cellular Band



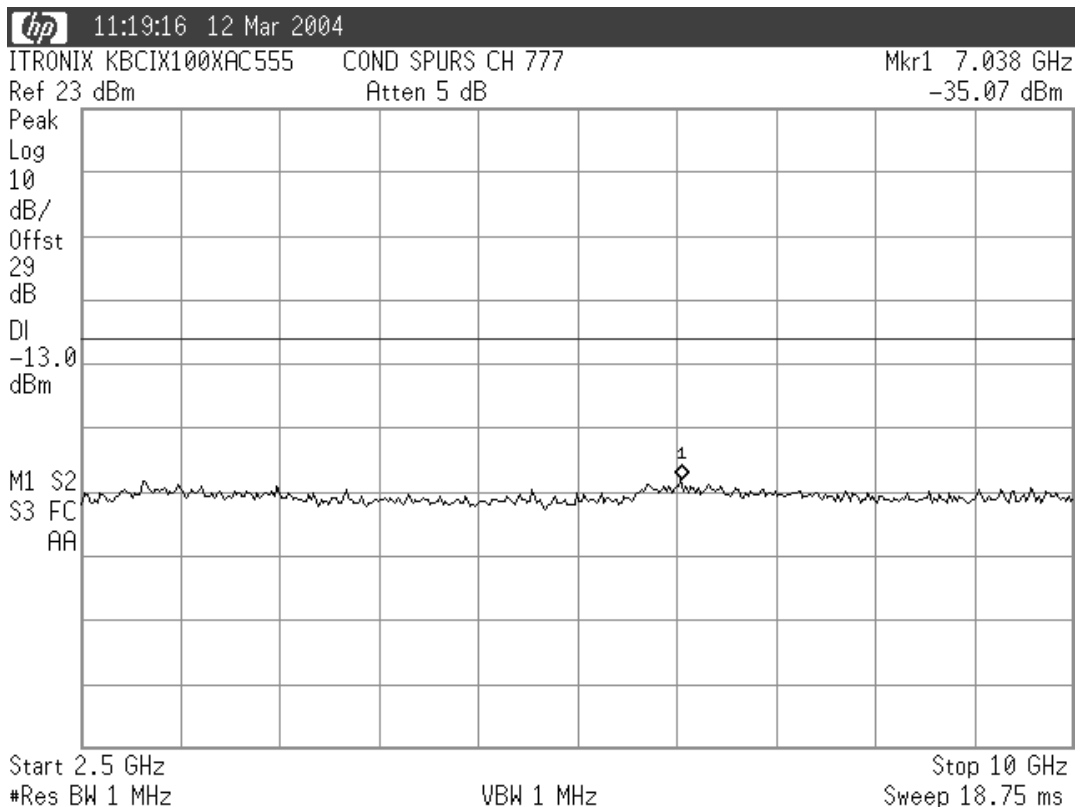
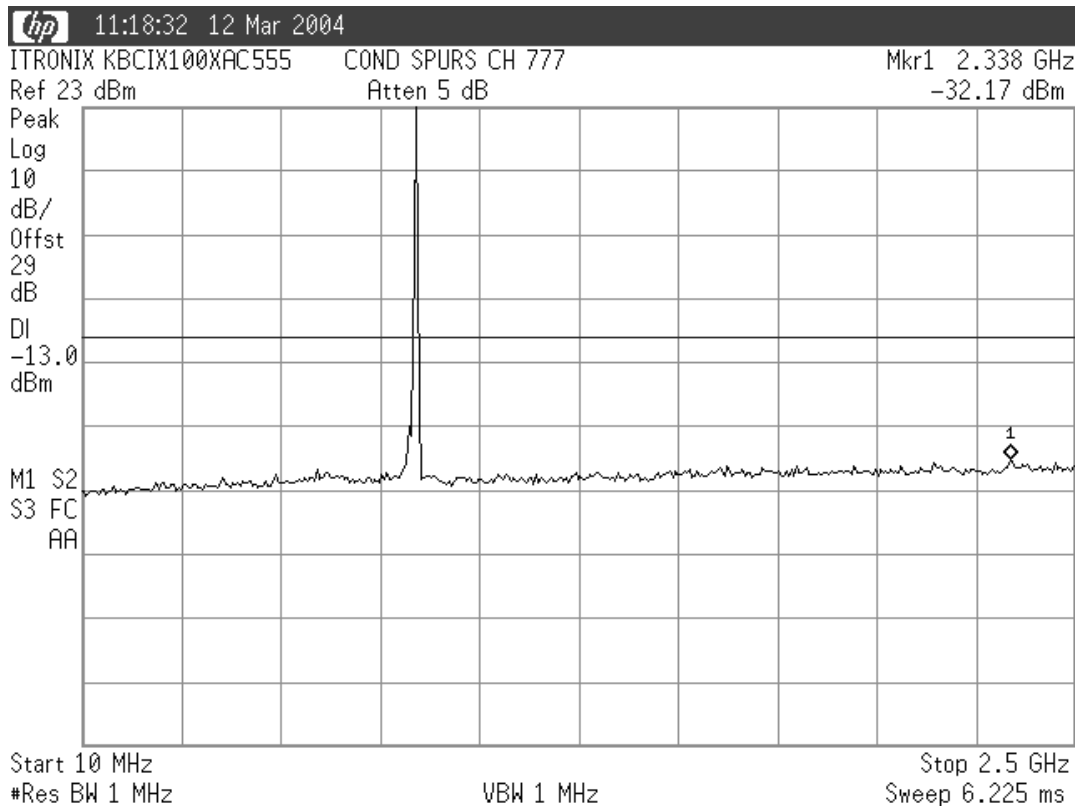
TEST PLOTS (Cont.)

Cellular Band



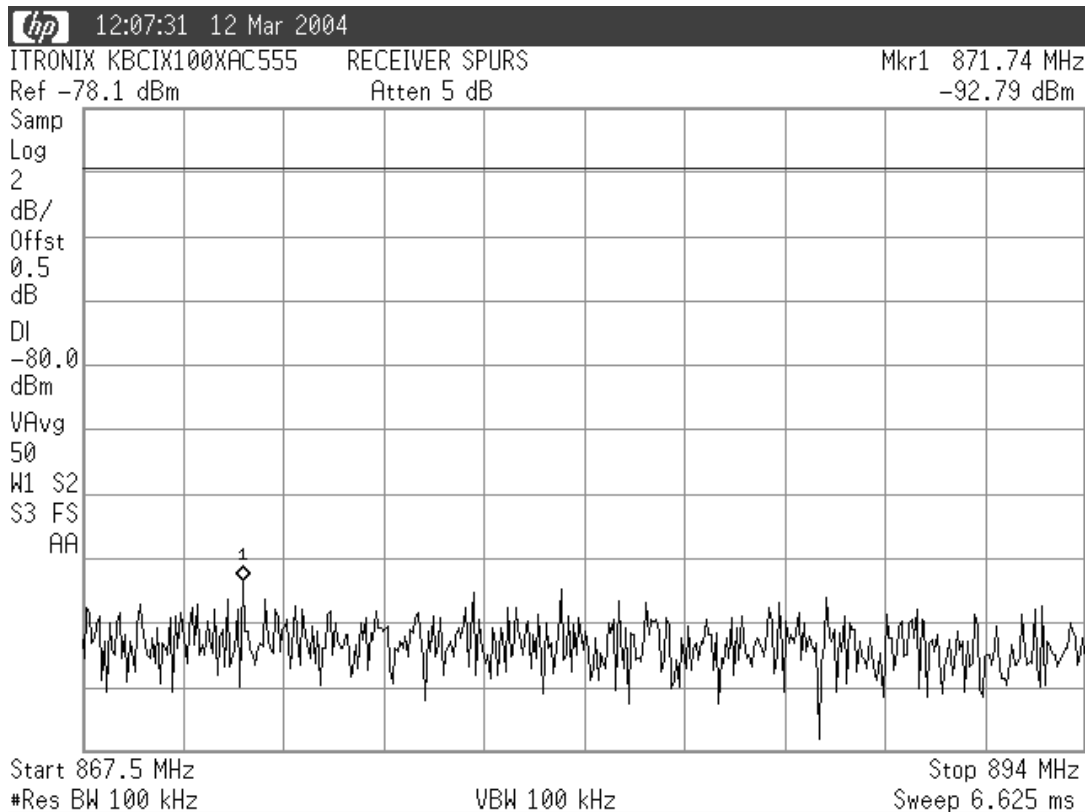
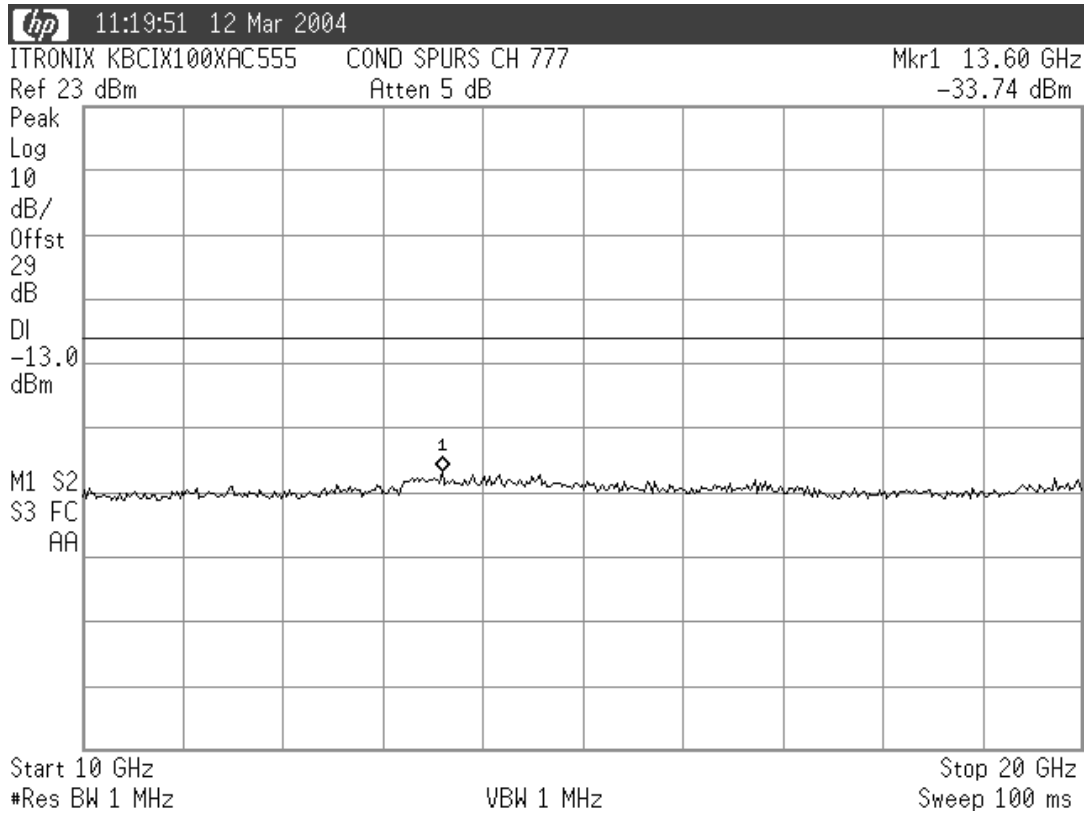
TEST PLOTS (Cont.)

Cellular Band



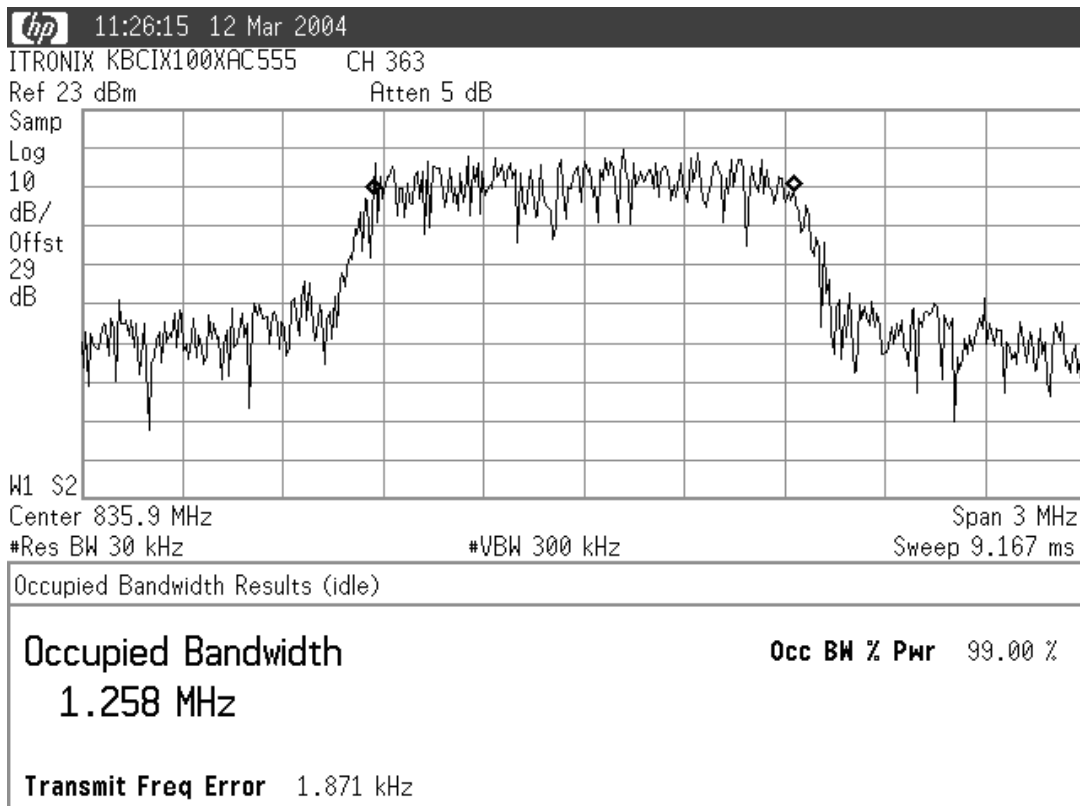
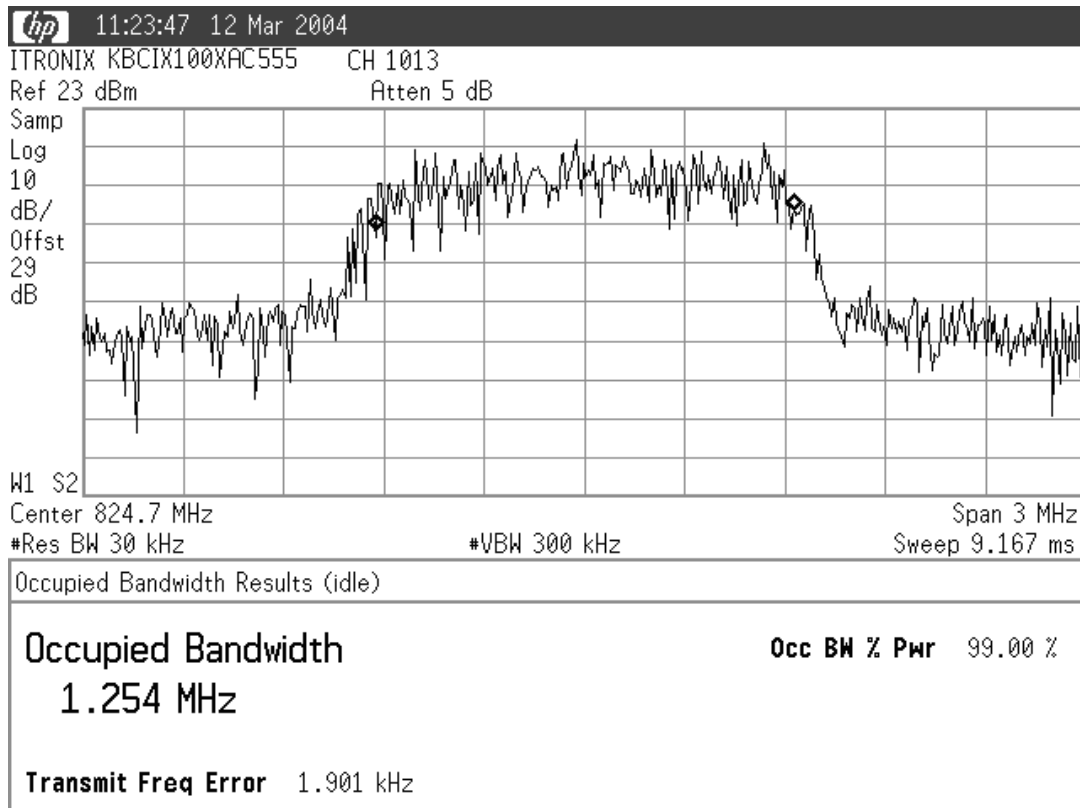
TEST PLOTS (Cont.)

Cellular Band



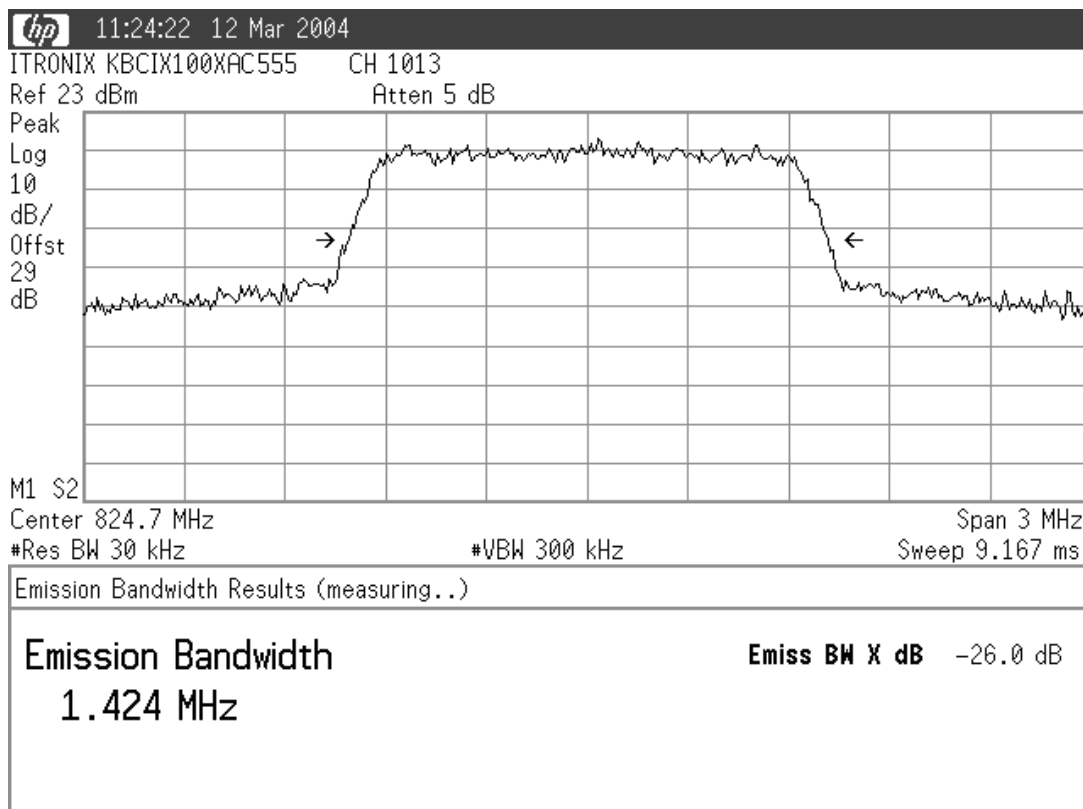
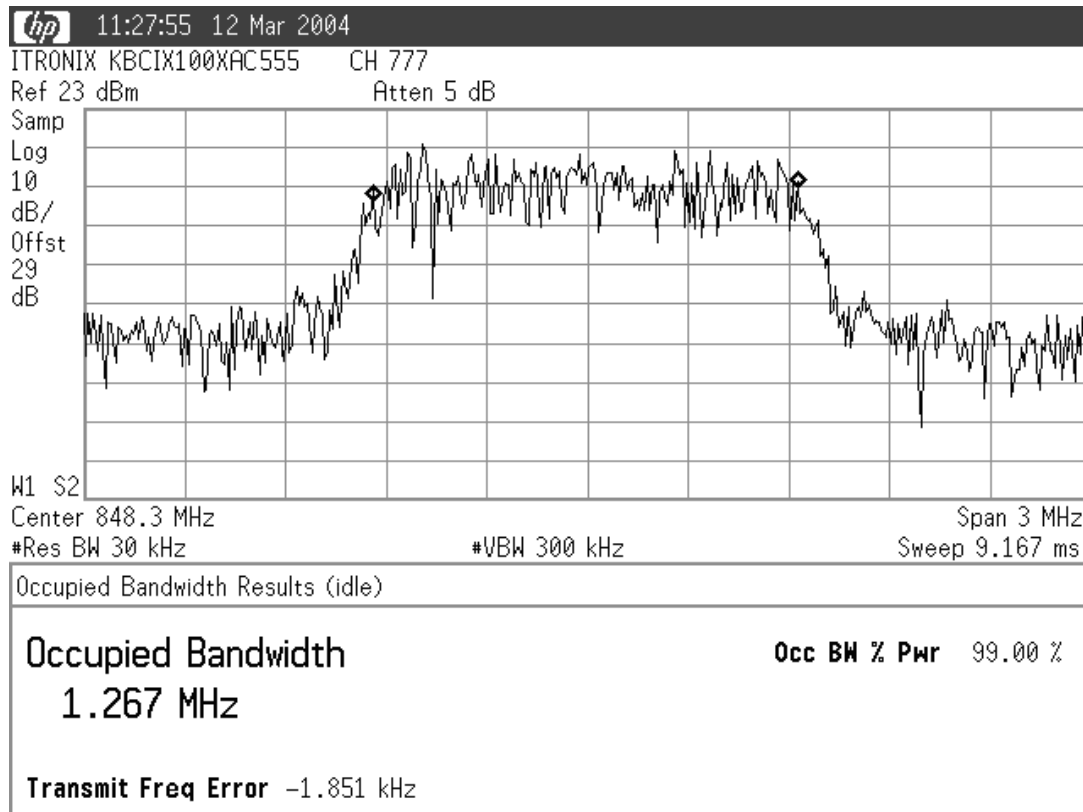
TEST PLOTS (Cont.)

Cellular Band



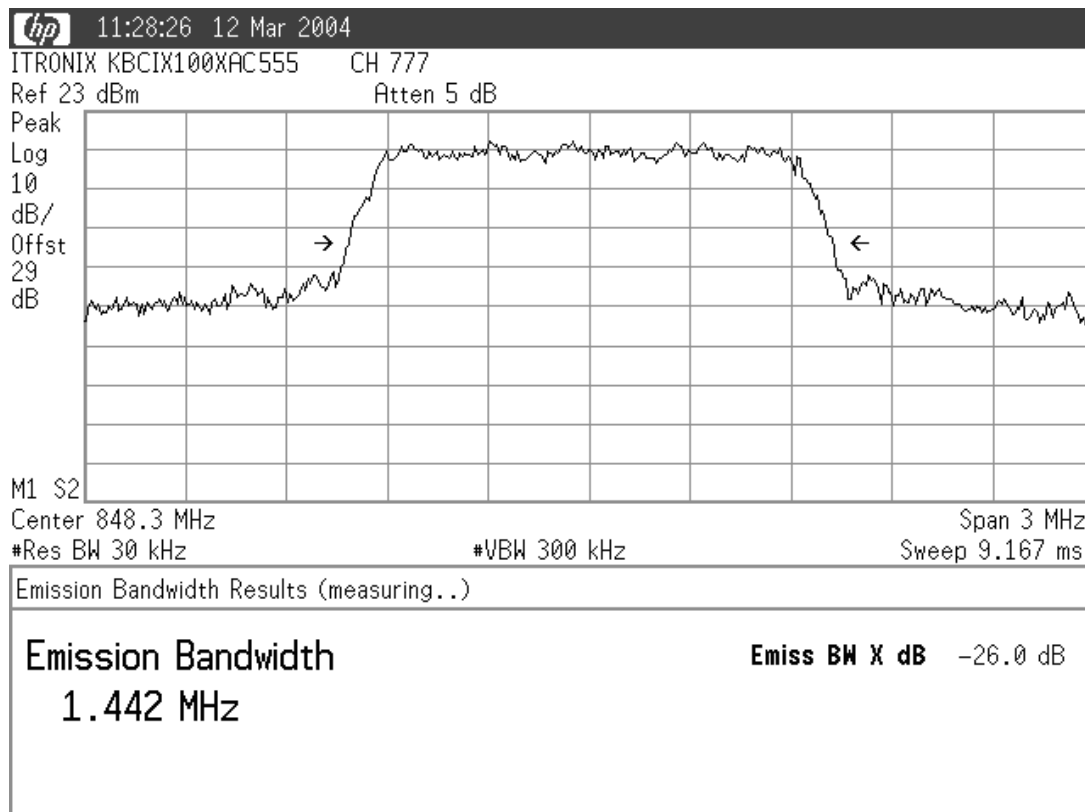
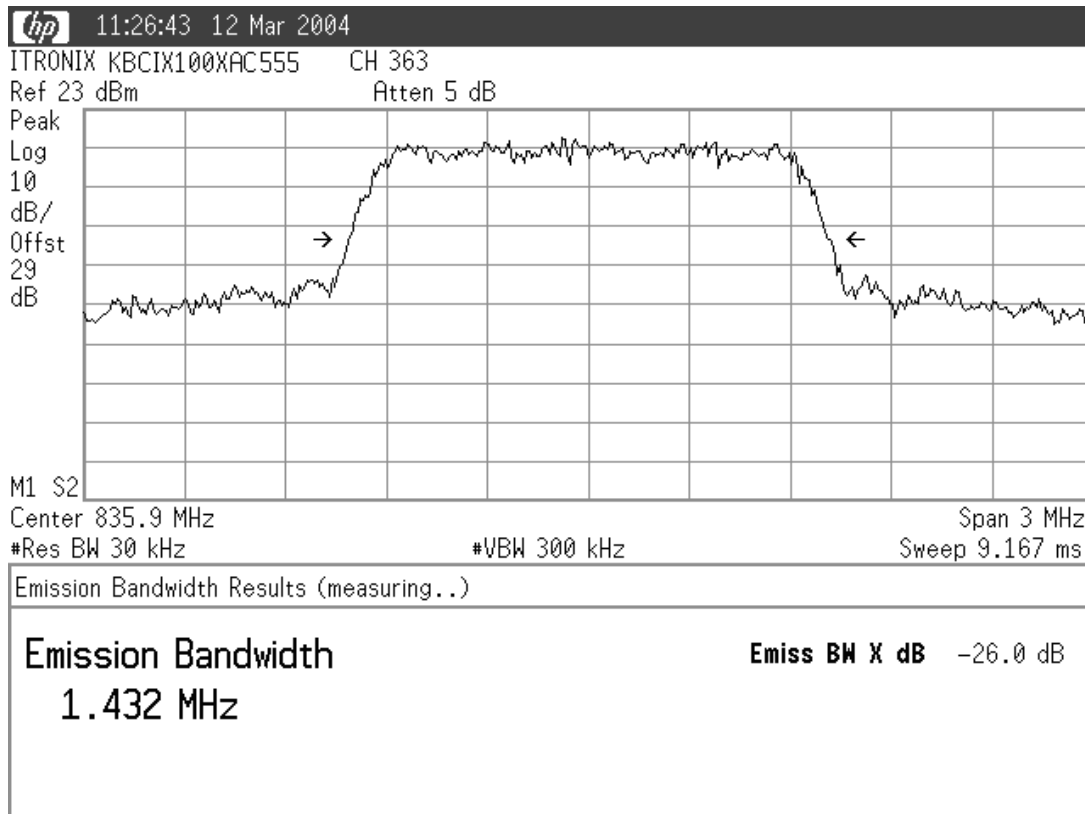
TEST PLOTS (Cont.)

Cellular Band



TEST PLOTS (Cont.)

Cellular Band



TEST PLOTS (Cont.)

Cellular Band

