***Nemko USA, Inc***
11696 Sorrento Valley Rd., Suite F
San Diego, CA 92121-1024

**EMC TEST REPORT**

# Kyocera Wireless Corp.

**K24 Dual Band Tri-Mode Cell Phone with Bluetooth Capability**

Model: **K323**

RADIATED AND CONDUCTED EMISSIONS

FCC, PART 15.247

FCC, PART 15B

CANADA RSS 210

CANADA ICES-003

TEST REPORT # 2006 050299 K323 PART 15.247

26-299-KYO

NEMKO USA, INC.
11696 SORRENTO VALLEY ROAD SUITE F
SAN DIEGO, CA 92121
PHONE: 858-755-5525

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## APPENDICES

EMC Test Report

For

**Kyocera Wireless Corp.**

Test Number : 26-299-KYO

Product Name : K24 Dual Band Tri-Mode Cell Phone with Bluetooth Capability

Regulation : FCC, Part 15.247 and FCC Part 15B
: Canada, RSS 210 and ICES-003
:

Date : MAY 9, 2006

Report Reviewed
Accepted by: _____

Kyocera Wireless Corp.
10300 Campus Point Drive
San Diego, CA 92121
Phone: 858 882-1631
Fax: 619 330-4977

Report Issued By: *F. R. Fleury*

F. R. Fleury

Tested By: _____

Mike Krumweide EMC Test Engineer

# Administrative Data

Regulation : FCC, Part 15.247 and FCC Part 15B
: Canada, RSS 210 and ICES-003
:

Test Method : ANSI C63.4 – 2003
: CSA C108. - M1983
:

Test Type : Certification
Manufacturer : Kyocera Wireless Corp.
EUT : K24 Dual Band Tri-Mode Cell Phone with Bluetooth Capability
Model : K323
Date(s) of Test : April 25 to May 9, 2006
Customer Personnel : Christy, Le

Nemko Personnel : Mike Krumweide, EMC Test Engineer
Test Location : OPEN Area Test Site
Nemko USA, Inc.
11696 Sorrento Valley Road, Suite F
San Diego, CA 92121

# EUT Description

The K323 is a K24 Dual Band Tri-Mode Cell Phone with Bluetooth Capability. Its function is to provide communication for mobile phone users. The EUT was exercised in Bluetooth Transmit mode for Conducted Emissions and Bluetooth Receive mode for Radiated Emissions. For Spurious Emissions the EUT was in Transmit High, Mid, and Low channels.

| DEVICE | MANUFACTURER<br>MODEL #<br>SERIAL # | POWER CABLE |
|---|---|---|
| EUT - K24 Dual Band Tri-Mode Cell Phone with Bluetooth Capability | Kyocera Wireless Corp.<br>Model: K323<br>SN: FM000000002678 | N/A |
| EUT – Battery Charger (Type 1) | Travel Charger<br>TXTVL10079<br>N/A | N/A |
| EUT – Battery Charger (Type 2) | Travel Charger<br>TXTVL10080<br>N/A | N/A |

| CONNECTION | I/O CABLE |
|---|---|
| Battery Charger to Cell Phone | 2m, unshielded, 22AWG, 2wire, DC jack – Wall mount. |

REASON FOR TEST:

The EUT was tested to establish compliance.

CHANGES MADE DURING TEST

The following design modifications were made to the EUT during testing.

No design modifications were made to the EUT during testing.

DEVIATIONS FROM STANDARD TEST METHOD

None.

CERTIFICATION AND TEST SUMMARY

| *Test Type* | *In Accordance with Document* | *Frequency Range Investigated* | *EUT Complies* |
|---|---|---|---|
| Conducted Emissions | FCC 15 B Sec.207 Class "B" | 150 kHz to 30 MHz | Pass |
| Radiated Emissions | FCC 15 B Sec.209 Class "B" | 30 MHz to 1000 MHz | Pass |
| Radiated Emissions | FCC 15 C Sec. 247 | 2.4GHz to 24.0 GHz | Pass |

The K24 Dual Band Tri-Mode Cell Phone with Bluetooth Capability complied with FCC, PART 15B and C, and CANADA, RSS 210 and ICES-003, when tested in the system configuration defined herein.

# 1. DESCRIPTION OF TEST SITE AND EQUIPMENT

## 1.1. Description of Test Site

The test site is located at 11696 Sorrento Valley Road, Suite F, San Diego, CA 92121. The site is physically located 18 miles Northwest of downtown San Diego. The general area is a valley 1.5 miles east of the Pacific Ocean. This particular part of the valley tends to minimize ambient levels, i.e. radio and TV broadcast stations and land mobile communications. The three and ten-meter Open Area Test Site (OATS) is located behind the office/lab building. It conforms to the normalized site attenuation limits and construction specifications as set in the EN 55022 (1998), CISPR 16 (2000) and 22 (1997) and ANSI C63.4-2004 documents. The OATS normalized site attenuation characteristics are verified for compliance every.

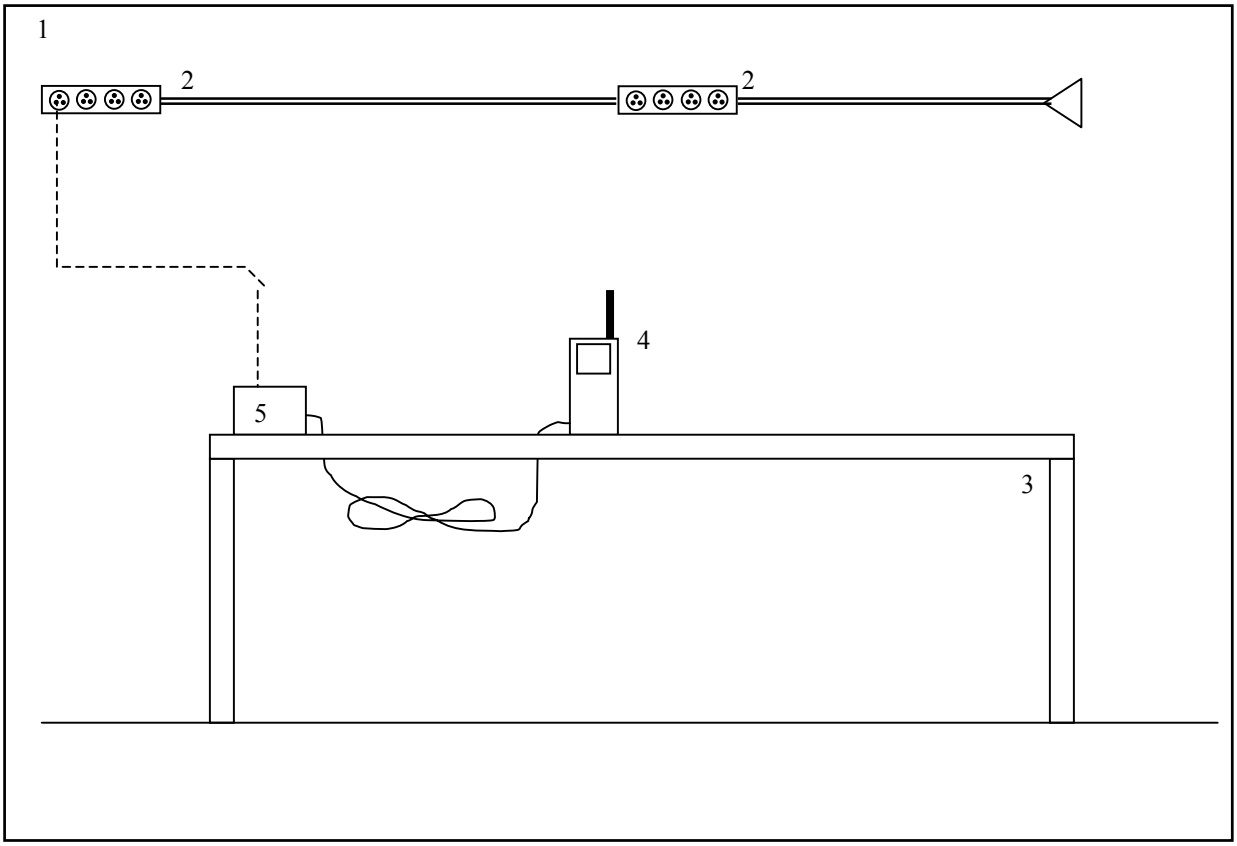
# 2. DESCRIPTION OF TESTING METHODS

## 2.1. Introduction

As required in 47 CFR, Parts 2 and 15, the methods employed to test the radiated and conducted emissions (as applicable) of the EUT are those contained within the American National Standards Institute (ANSI) document C63.4-2004, titled "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz." All applicable FCC Rule Sections that provide further guidance for performance of such testing are also observed. In addition, TIA/EIA 603, "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards," provides the method employed to check the radiated measurements known as Signal Substitution.

For General Test Configuration please refer to Figure 1 on the following page.

# Figure 1. General EUT Test Setup Diagram




*NOT TO SCALE*

## CONFIGURATION LEGEND

1. Test Laboratory
2. AC Power for Peripheral Devices (120V, 60 cycles, single phase)
3. Non-Conducting tables 80 cm above ground plane
4. EUT: **K24 Dual Band Tri-Mode Cell Phone with Bluetooth Capability**
5. 120VAC Domestic Charger.

## Photograph 1. Front and Open View of EUT


# Photograph 2. EUT Charger

**TXTVL10079 Charger**

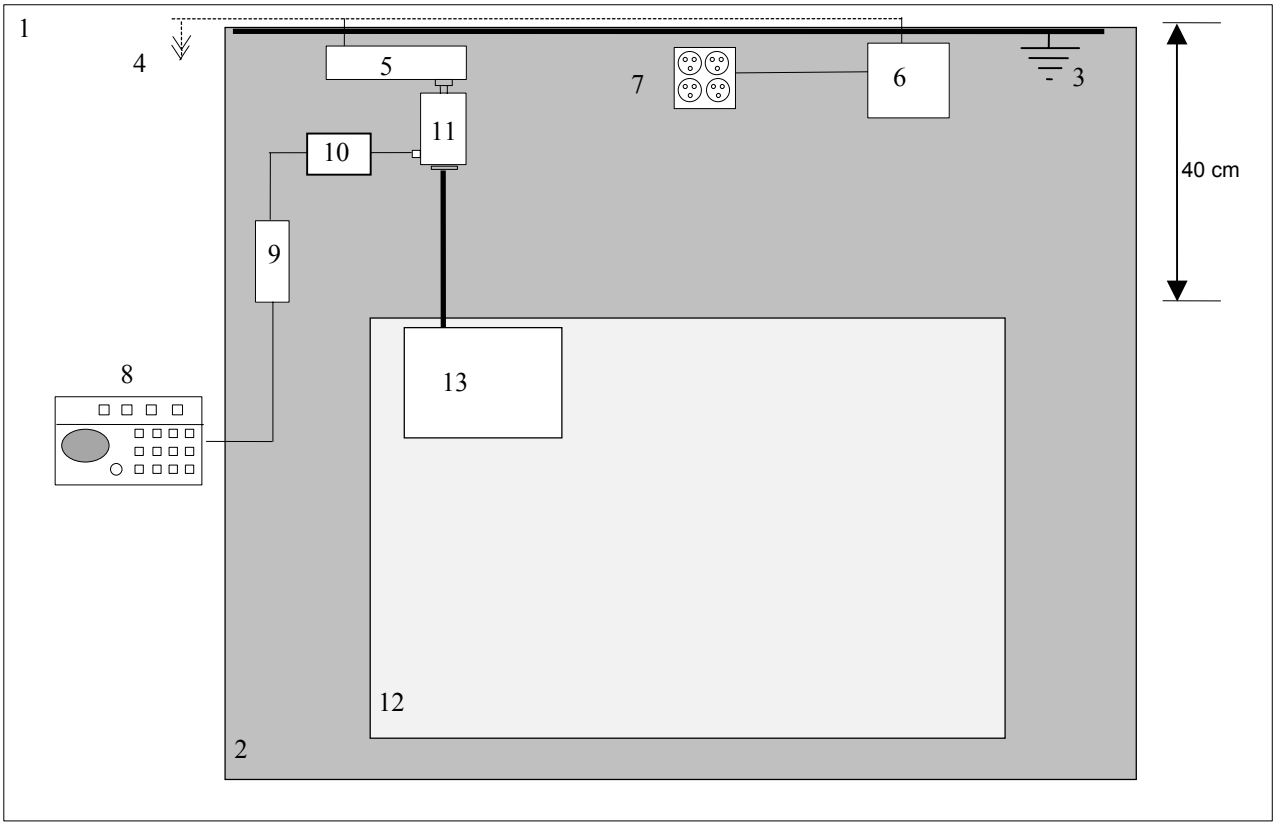

**TXTVL10080 Charger**

## 2.2. Configuration and Methods of Measurements for Conducted Emissions

Section 7 of ANSI C63.4 determines the general configuration of the EUT and associated equipment, as well as the test platform for conducted emissions testing. Tabletop devices are placed on a non-conducting surface 80 centimeters above the ground plane floor and 40 centimeters from the ground plane wall. The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. The EUT is powered via a Line Impedance Stabilization Network (LISN). The emissions are recorded using the required bandwidth of 9 kHz in the quasi-peak mode. The average amplitude is also observed employing a 10 kHz bandwidth to determine the presence of broadband RFI. When such interference is caused by broadband sources (as defined by the FCC and ANSI Rules), the deviation guidelines contained in Section 11.3.1 of ANSI C63.4 are employed, which allows a correction factor of 13 dB to be subtracted from the quasi-peak reading. The emission levels are then compared to the applicable FCC limits to determine compliance.

For Conducted Emissions Test Configuration please refer to Figure 2 on the following page.

# Figure 2. Conducted Emissions Test Setup Diagram




*NOT TO SCALE*

## CONFIGURATION LEGEND

1. Test Laboratory (6 X 6 meters)
2. Ground Plane (15 square meters)
3. Vertical Conducting Wall (Grounded through Ground Plane via 10' ground rod)
4. AC Power for Devices
5. Power Line Filter, Lindgren, 120 dB, 30 amp
6. Line Impedance Stabilization Network (LISN) for peripheral devices
7. Power Distribution Box for peripheral devices
8. Spectrum Analyzer with Quasi-Peak Adapter
9. High Pass Filter
10. Transient Limiter
11. LISN for EUT
12. Non-Conducting table 80 cm above ground plane
13. EUT: **K24 Dual Band Tri-Mode Cell Phone with Bluetooth Capability** and associated system

## 2.3. Configuration and Methods of Measurements for Radiated Emissions

Section 8 of ANSI C63.4 determines the general configuration and procedures for measuring the radiated emissions of equipment under test. Initially, the primary emission frequencies are identified inside the test lab by positioning a broadband receive antenna one meter from the EUT to locate frequencies of significant radiation. Next, the EUT and associated system are placed on a turntable on a ten meter open area test site (registered with the FCC in accord with its Rules and ANSI C63.4) and the receive antenna is located at a distance of three meters from the EUT.

The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. All significant radiated emissions are recorded when maximum radiation on each frequency is observed, in accordance with part 8 of ANSI C63.4 and Section 15.33 of the FCC Rules. To ensure that the maximum emission at each discrete frequency of interest is observed, the receive antenna is varied in height from one to four meters and rotated to horizontal and vertical polarities, and the turntable is also rotated to determine the worst emitting configuration. The numerical results of the test are included herein to demonstrate compliance.

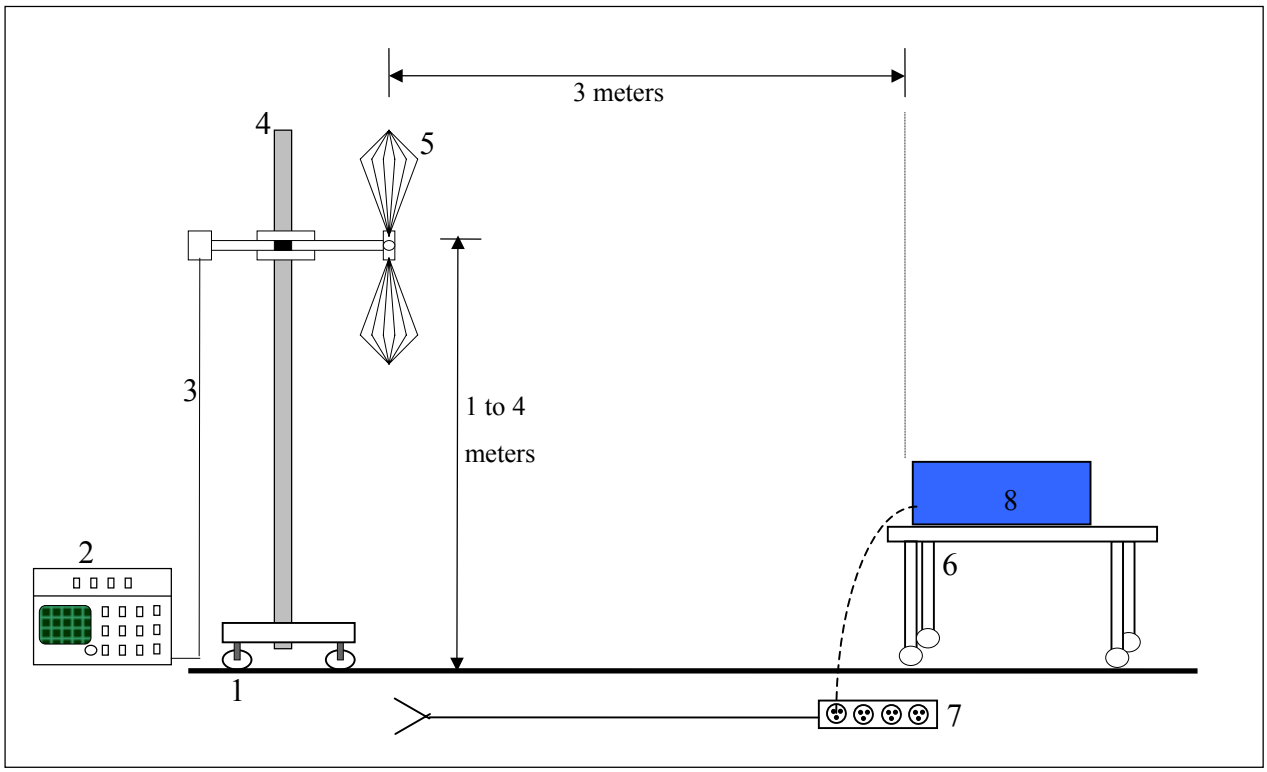
The numerical results that are applied to the emissions limits are arrived at by the following method:
Example: A=RR+CL+AF
A = Amplitude dBuV/M
RR = Receiver Reading dBuV
CL = cable loss dB
AF = antenna factor dBm-1

Example Frequency = 110MHz
18.5 dBuV (spectrum analyzer reading)
+3.0 dB (cable loss @ frequency)
21.5 dBuV
+15.4 dBm-1 (antenna factor @ frequency)
36.9 dBuV/M Final adjusted value

The final adjusted value is then compared to the appropriate emission limit to determine compliance.

For Radiated Emissions Test Configuration please refer to Figure 4 on the following page.

## Figure 3. Radiated Emissions Test Setup Diagram




*NOT TO SCALE*

### CONFIGURATION LEGEND

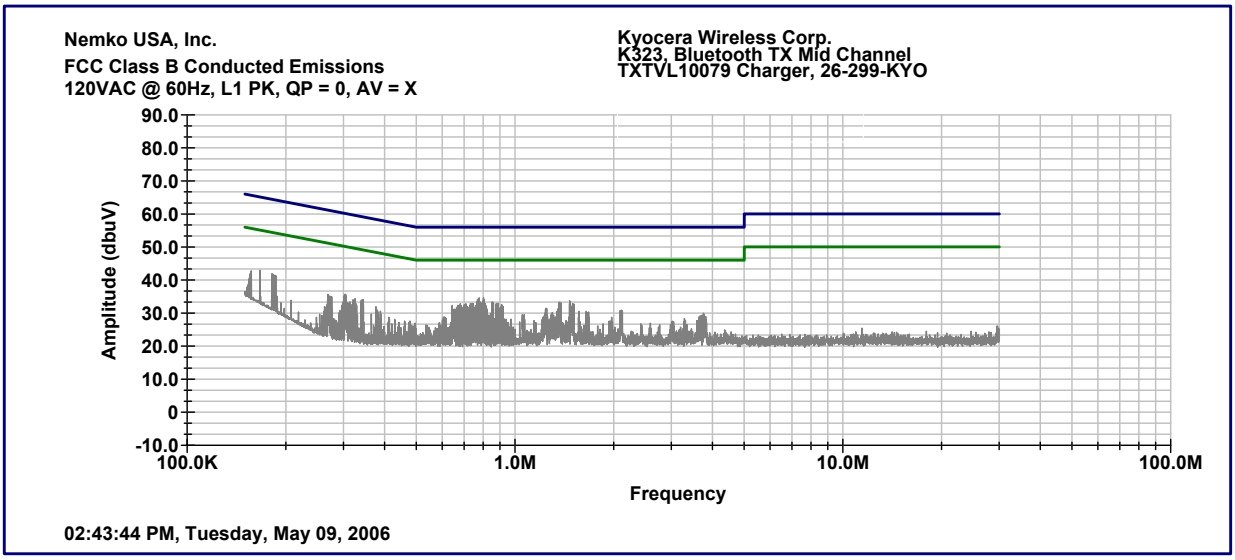
1. Ground plane (11 X 17 meters)
2. Spectrum Analyzer with Quasi-Peak Adapter
3. Coax interconnect from Receive Antenna to Spectrum Analyzer
4. Antenna Mast with motorized mounting assembly
5. Receive Antenna (basic relative position)
6. Non-Conducting table 80 cm above ground plane
7. AC power for devices
8. EUT: **K24 Dual Band Tri-Mode Cell Phone with Bluetooth Capability** and associated system.

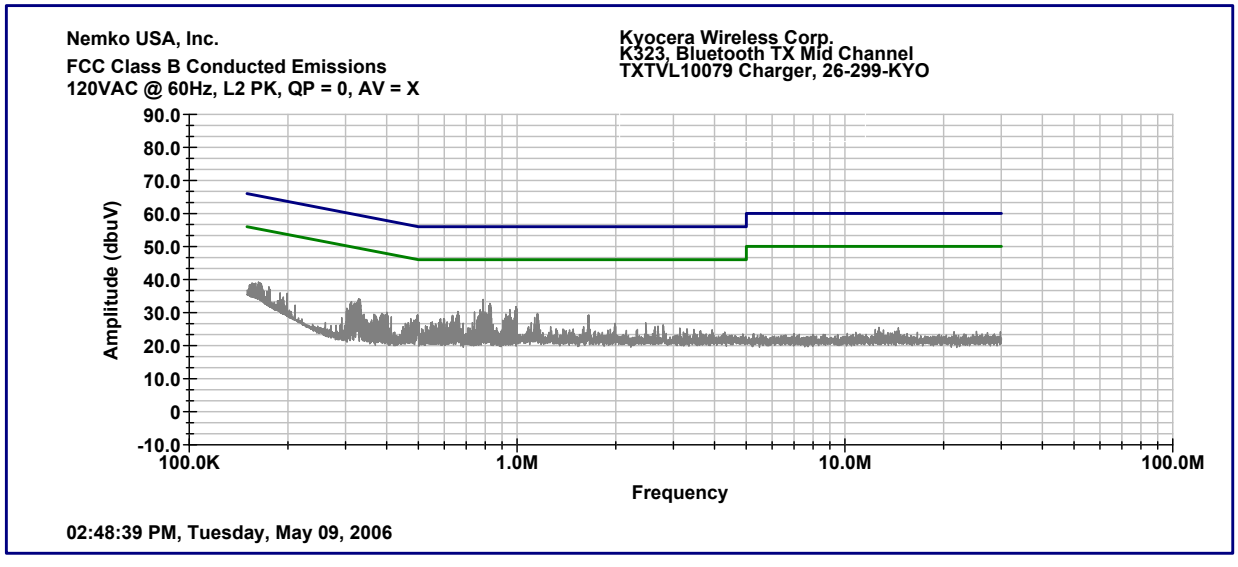
Bluetooth fundamental frequencies and radiated emissions were measured on three orthogonal axes. Only the maximum emissions of the three axes are stated in this report.

# 3.Test Results

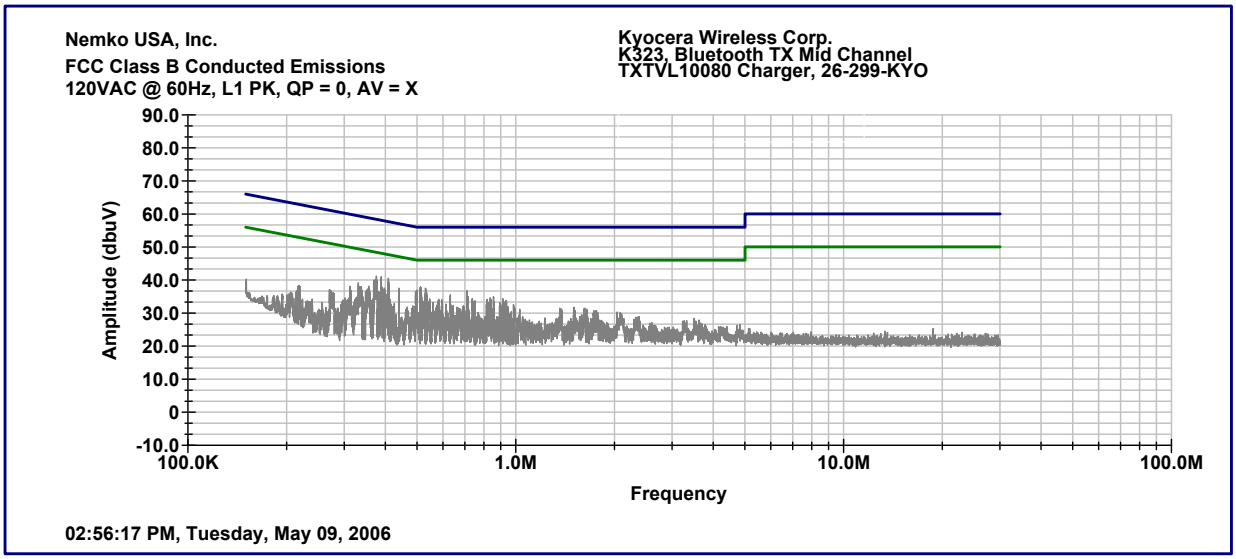
## 3.1. Conducted Emissions Test Data

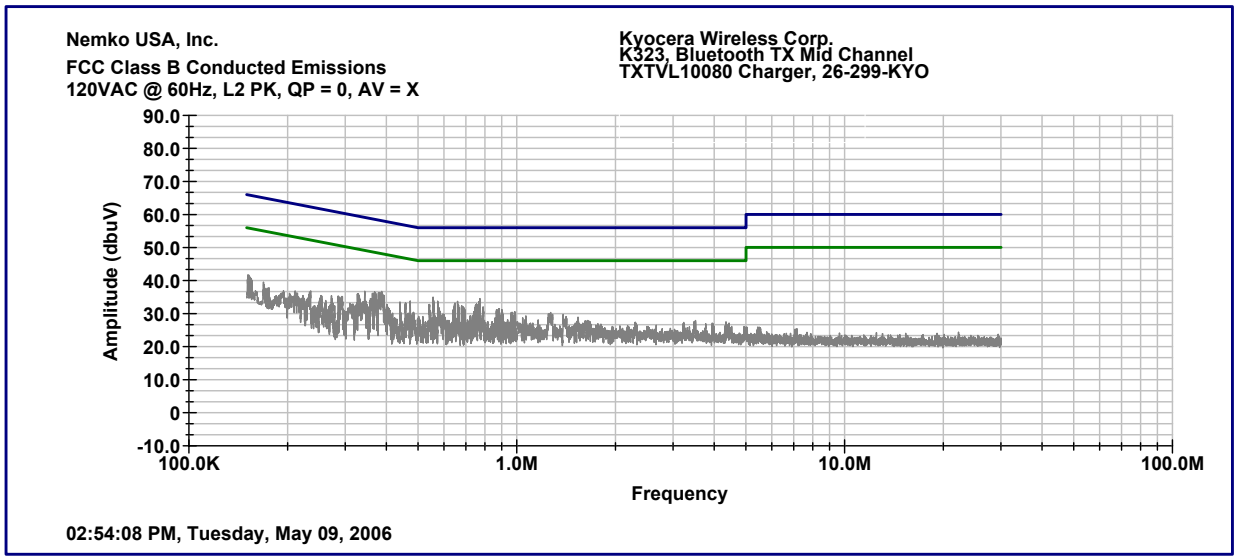
| | | | | |
|---|---|---|---|---|
| Client | Kyocera Wireless Corp. | Temperature | 71 | deg F |
| PAN # | 26-299-KYO | Relative Humidity | 61 | % |
| EUT Name | K24 Dual Band Tri-Mode Cell Phone with Bluetooth Capability | Barometric Pressure | 30.2 | Hg |
| EUT Model | K323 with TXTVL10079 Charger | Test Location | Enclosure 1 | |
| Governing Doc | CFR 47 Part 15C | Test Engineer | Mike Krumweide | |
| Basic Standard | Sec. 15.207 | Date | 5/9/06 | |



| | | | | |
|---|---|---|---|---|
| Client | Kyocera Wireless Corp. | Temperature | 71 | deg F |
| PAN # | 26-299-KYO | Relative Humidity | 61 | % |
| EUT Name | K24 Dual Band Tri-Mode Cell Phone with Bluetooth Capability | Barometric Pressure | 30.2 | Hg |
| EUT Model | K323 with TXTVL10080 Charger | Test Location | Enclosure 1 | |
| Governing Doc | CFR 47 Part 15C | Test Engineer | Mike Krumweide | |
| Basic Standard | Sec. 15.207 | Date | 5/9/06 | |



# Conducted Emissions Test Equipment

| | | | |
|---|---|---|---|
| Client | Kyocera Wireless Corp. | EUT Name | K24 Dual Band Tri-Mode Cell Phone with Bluetooth Capability |
| PAN # | 26-299-KYO | EUT Model | K323 |

| Asset Number | Description | Model Number | Serial Number | Last Cal | Cal Due |
|---|---|---|---|---|---|
| | | | | | |
| 542 | High Pass Filter, Solar | 7801-5.0 | 838132 | 3/1/06 | 3/1/07 |
| 395 | LISN, Solar | 9348-50-R-24-BNC | 941718 | 1/18/06 | 1/18/07 |
| 533 | Quasi-Peak Adapter, HP | 85650A | 2043A00211 | 4/12/06 | 4/12/07 |
| 422 | Spectrum Analyzer Display, HP | 85662A | 2403A07080 | 4/12/06 | 4/12/07 |
| 535 | Spectrum Analyzer, HP | 85680A | 2517A01757 | 4/12/06 | 4/12/07 |
| 682 | Transient Limiter, HP | 11974A | 3107A02633 | 11/16/05 | 11/16/06 |
| | | | | | |
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## 3.2. Radiated Emissions Test Data

### Radiated Emissions Data

| | | | | | |
|---|---|---|---|---|---|
| Complete | X | | | Job # : 26-299-KYO | Test # : 1 |
| Preliminary | | | | Page 1 | of 1 |
| Client Name : | Kyoceral Wireless Corp. | | | | |
| EUT Name : | K24 Dual Band Tri-Mode Cellular Phone with Bluetooth | | | | |
| EUT Model # : | K323 | | | | |
| EUT Part # : | | | | | |
| EUT Serial # : | FM000000002678 | | | | |
| EUT Config. : | Bluetooth Receive mode | | | | |
| | Charger M/N: TXTVL10079 | | | | |
| Specification : | CFR47 Part 15, Subpart B, Class B | | | Reference : | |
| Rod. Ant. #: | NA | Temp. (deg. C) : | 16 | Date : | 5/8/2006 |
| Bicon Ant.#: | 128 | Humidity (%) : | 67 | Time : | |
| Log Ant.#: | 110 | EUT Voltage : | 120 Vac | Staff : | MK |
| DRG Ant. # | NA | EUT Frequency : | 60 Hz | Photo ID: | |
| Dipole Ant.#: | NA | Phase: | 1 | Quasi-Peak Bandwidth: | 120 kHz |
| Cable#: | NOATS | Location: | RN # 329550-01 | Video Bandwidth | 120 kHz |
| Preamp#: | 901 | Distance: | 3m | | |
| Spec An.#: | 674 | | | | |
| QP #: | 676 | | | | |
| PreSelect#: | NA | | | | |

| Meas. Freq. (MHz) | Ant. Pol. (H/V) | Atten. (dB) | Meter Reading (dBuV) | Antenna Factor (dB) | Path Loss (dB) | RF Gain (dB) | Corrected Reading (dBuV/m) | Spec. limit (dBuV/m) | CR/SL Diff. (dB) | Pass Fail Unc. | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | ***Maximum of 3 Axes*** |
| 37.64 | V | | 48 | 11.7 | 1.1 | 31.9 | 28.9 | 40.0 | -11.1 | Pass | |
| 45.14 | V | | 37.8 | 11.1 | 1.1 | 31.9 | 18.1 | 40.0 | -21.9 | Pass | |
| 73.4 | H | | 44 | 8.4 | 1.5 | 32.0 | 21.9 | 40.0 | -18.1 | Pass | |
| 77.9 | H | | 42.0 | 7.1 | 1.5 | 32.0 | 18.6 | 40.0 | -21.4 | Pass | Ambient noise floor |
| 124.48 | V | | 33.0 | 14.3 | 1.8 | 31.9 | 17.2 | 43.5 | -26.3 | Pass | Ambient noise floor |
| 142.8 | V | | 29 | 11.8 | 1.8 | 31.9 | 10.7 | 43.5 | -32.8 | Pass | Ambient noise floor |
| 159.6 | V | | 27 | 14.3 | 2.2 | 32.0 | 11.5 | 43.5 | -32.0 | Pass | Ambient noise floor |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

## Radiated Emissions Data

Complete X
Preliminary

Job # : 26-299-KYO
Page 1

Test # : 1
of 1

Client Name : Kyoceral Wireless Corp.
EUT Name : K24 Dual Band Tri-Mode Cellular Phone with Bluetooth
EUT Model # : K323
EUT Part # :
EUT Serial # : FM000000002678
EUT Config. : Bluetooth Receive mode
Charger M/N: TXTVL10080
Specification : CFR47 Part 15, Subpart B, Class B
Reference :

| | | | | | |
|---|---|---|---|---|---|
| Rod. Ant. #: | NA | Temp. (deg. C) : | 16 | Date : | 5/8/2006 |
| Bicon Ant.#: | 128 | Humidity (%) : | 67 | Time : | |
| Log Ant.#: | 110 | EUT Voltage : | 120 Vac | Staff : | MK |
| DRG Ant. # | NA | EUT Frequency : | 60 Hz | Photo ID: | |
| Dipole Ant.#: | NA | Phase: | 1 | Quasi-Peak Bandwidth: | 120 kHz |
| Cable#: | NOATS | Location: | RN # 329550-01 | Video Bandwidth | 120 kHz |
| Preamp#: | 901 | Distance: | 3m | | |
| Spec An.#: | 674 | | | | |
| QP #: | 676 | | | | |
| PreSelect#: | NA | | | | |

| Meas. Freq. (MHz) | Ant. Pol. (H/V) | Atten. (dB) | Meter Reading (dBuV) | Antenna Factor (dB) | Path Loss (dB) | RF Gain (dB) | Corrected Reading (dBuV/m) | Spec. limit (dBuV/m) | CR/SL Diff. (dB) | Pass Fail Unc. | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | ***Maximum of 3 Axes*** |
| 35 | V | | 41 | 11.7 | 1.0 | 31.8 | 21.8 | 40.0 | -18.2 | Pass | Ambient noise floor |
| 45.28 | V | | 42.6 | 11.1 | 1.1 | 31.9 | 22.9 | 40.0 | -17.1 | Pass | |
| 48 | V | | 48 | 11.1 | 1.2 | 31.9 | 28.4 | 40.0 | -11.6 | Pass | |
| 125 | V | | 36.7 | 14.3 | 1.8 | 31.9 | 20.9 | 43.5 | -22.6 | Pass | Ambient noise floor |
| 140 | V | | 31.0 | 11.4 | 1.8 | 31.9 | 12.3 | 43.5 | -31.2 | Pass | Ambient noise floor |
| 150.2 | V | | 34 | 12.5 | 2.2 | 32.0 | 16.7 | 43.5 | -26.8 | Pass | |
| | | | | | | | | | | | |
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## Radiated Emissions Data

Job # : 26-299-KYO Test # : 3
Page 1 of 1

Client Name : Kyocera Wireless Corp.
EUT Name : K24 Tri-Mode Cellular Phone with Bluetooth
EUT Model # : K323
EUT Part # :
EUT Serial # : FM000000002678
EUT Config. : Bluetooth Transmit Mode
Open
Specification : FCC Part 15.247 (c), 15.209(a) Reference :

| | | | | | |
|---|---|---|---|---|---|
| Rod. Ant. #: | NA | Temp. (°C) : | 18 | Date : | 05/09/06 |
| Bicon Ant.#: | NA | Humidity (%) : | 75 | Time : | |
| Log Ant.#: | NA | EUT Voltage : | | Staff : | M. Krumweide |
| DRG Ant. # | 877 | EUT Frequency : | NA | Photo ID: | |
| Dipole Ant.#: | NA | Phase: | NA | Peak Measurment Bandwidth: | 1 MHz/ 1 MHz |
| Cable#: | 40ft | Location: | RN # 329550-01 | Average Measurment Bandwidth: | 1 MHz/ 10 Hz |
| Preamp#: | 842 | Distance: | 3m | | |
| Spec An.#: | 835 | | | | |
| QP #: | NA | | | | |
| PreSelect#: | NA | | | | |

| Meas. Freq. (MHz) | Vertical (dBuV) pk | Vertical (dBuV) av | Horizontal (dBuV) pk | Horizontal (dBuV) av | CF (db) | Max Level (dBuV/m) pk | Max Level (dBuV/m) av | Spec. Limit (dBuV/m) pk | Spec. Limit (dBuV/m) av | Margin dB pk | Margin dB av | EUT Rotation | Ant. Height | Pass Fail Unc. | Comment Max. of 3 Axes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2402.00 | | | | | -15.8 | | | 97.3 | N/A | | N/A | | | | Fundemental |
| 4804.00 | 52.8 | 40.5 | 54.0 | 45.6 | -4.3 | 49.7 | 41.3 | 74.0 | 54.0 | -24.3 | -12.7 | | | Pass | * |
| 7206.00 | 52.1 | 43.0 | 51.6 | 42.3 | 3.9 | 56.0 | 46.9 | 77.3 | 57.3 | -21.3 | -10.4 | | | Pass | * |
| 9608.00 | | | | | 9.4 | | | | 54.0 | | | | | | noise floor |
| 12010.00 | | | | | 17.8 | | | 74.0 | 54.0 | | | | | | noise floor |
| 14412.00 | | | | | 20.1 | | | | 54.0 | | | | | | noise floor |
| 16814.00 | | | | | 25.4 | | | | 54.0 | | | | | | noise floor |
| 19216.00 | | | | | 37.5 | | | 74.0 | 54.0 | | | | | | noise floor |
| 21618.00 | | | | | 37.5 | | | | 54.0 | | | | | | noise floor |
| 24020.00 | | | | | 37.5 | | | | 54.0 | | | | | | |
| 2441.00 | | | | | -15.8 | | | | N/A | | N/A | | | | Fundemental |
| 4882.00 | 53.6 | 41.2 | 54.4 | 43.1 | -4.3 | 50.1 | 38.8 | 74.0 | 54.0 | -23.9 | -15.2 | | | Pass | * |
| 7323.00 | 53.0 | 41.0 | 52.2 | 40.1 | 3.9 | 56.9 | 44.9 | 74.0 | 54.0 | -17.1 | -9.1 | | | Pass | * |
| 9764.00 | | | | | 9.4 | | | | 54.0 | | | | | | noise floor |
| 12205.00 | | | | | 17.8 | | | 74.0 | 54.0 | | | | | | noise floor |
| 14646.00 | | | | | 20.7 | | | | 54.0 | | | | | | noise floor |
| 17087.00 | | | | | 30.8 | | | | 54.0 | | | | | | noise floor |
| 19528.00 | | | | | 37.5 | | | 74.0 | 54.0 | | | | | | noise floor |
| 21969.00 | | | | | 37.5 | | | | 54.0 | | | | | | noise floor |
| 24410.00 | | | | | 37.5 | | | | 54.0 | | | | | | |
| 2480.00 | | | | | -15.8 | | | | N/A | | N/A | | | | Fundemental |
| 4960.00 | 53.0 | 41.0 | 53.9 | 42.3 | -4.3 | 49.6 | 38.0 | 74.0 | 54.0 | -24.4 | -16.0 | | | Pass | * |
| 7440.00 | 52.5 | 40.0 | 51.6 | 40.6 | 3.9 | 56.4 | 44.5 | 74.0 | 54.0 | -17.6 | -9.5 | | | Pass | * |
| 9920.00 | | | | | 9.4 | | | | 54.0 | | | | | | noise floor |
| 12400.00 | | | | | 17.8 | | | 74.0 | 54.0 | | | | | | noise floor |
| 14880.00 | | | | | 20.7 | | | | 54.0 | | | | | | noise floor |
| 17360.00 | | | | | 30.8 | | | | 54.0 | | | | | | noise floor |
| 19840.00 | | | | | 37.5 | | | 74.0 | 54.0 | | | | | | noise floor |
| 22320.00 | | | | | 37.5 | | | 74.0 | 54.0 | | | | | | noise floor |
| 24800.00 | | | | | 37.5 | | | | 54.0 | | | | | | noise floor |

* The radiated emissions comply with -20dBc requirements of 15.247(c)
Frequencies which fall in the restricted bands of 15.205(a) comply with 15.209(a) limits.

## Radiated Emissions Data

Job # : 26-299-KYO Test # : 4
Page 1 of 1

Client Name : Kyocera Wireless Corp.
EUT Name : K24 Tri-Mode Cellular Phone with Bluetooth
EUT Model # : K323
EUT Part # :
EUT Serial # : FM000000002678
EUT Config. : Bluetooth Transmit Mode
Closed
Specification : FCC Part 15.247 (c), 15.209(a) Reference :

| | | | | | |
|---|---|---|---|---|---|
| Rod. Ant. #: | NA | Temp. (°C) : | 18 | Date : | 05/09/06 |
| Bicon Ant.#: | NA | Humidity (%) : | 75 | Time : | |
| Log Ant.#: | NA | EUT Voltage : | NA | Staff : | M. Krumweide |
| DRG Ant. # | 877 | EUT Frequency : | NA | Photo ID: | |
| Dipole Ant.#: | NA | Phase: | NA | Peak Measurment Bandwidth: | 1 MHz/ 1 MHz |
| Cable#: | 40ft | Location: | RN # 329550-01 | Average Measurment Bandwidth: | 1 MHz/ 10 Hz |
| Preamp#: | 842 | Distance: | 3m | | |
| Spec An.#: | 835 | | | | |
| QP #: | NA | | | | |
| PreSelect#: | NA | | | | |

| Meas. Freq. (MHz) | Vertical (dBuV) pk | Vertical (dBuV) av | Horizontal (dBuV) pk | Horizontal (dBuV) av | CF (db) | Max Level (dBuV/m) pk | Max Level (dBuV/m) av | Spec. Limit (dBuV/m) pk | Spec. Limit (dBuV/m) av | Margin dB pk | Margin dB av | EUT Rotation | Ant. Height | Pass Fail Unc. | Comment Max. of 3 Axes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2402.00 | | | | | | | | 93.9 | N/A | | N/A | | | | Fundemental |
| 4804.00 | 52.6 | 41.5 | 52.2 | 41.1 | -4.3 | 48.3 | 37.2 | 74.0 | 54.0 | -25.7 | -16.8 | | | Pass | * |
| 7206.00 | 52.3 | 43.6 | 50.9 | 39.8 | 3.9 | 56.2 | 47.5 | 73.9 | 53.9 | -17.7 | -6.4 | | | Pass | * |
| 9608.00 | | | | | 9.4 | | | | 54.0 | | | | | | noise floor |
| 12010.00 | | | | | 17.8 | | | 74.0 | 54.0 | | | | | | noise floor |
| 14412.00 | | | | | 20.1 | | | | 54.0 | | | | | | noise floor |
| 16814.00 | | | | | 25.4 | | | | 54.0 | | | | | | noise floor |
| 19216.00 | | | | | 37.5 | | | 74.0 | 54.0 | | | | | | noise floor |
| 21618.00 | | | | | 37.5 | | | | 54.0 | | | | | | noise floor |
| 24020.00 | | | | | 37.5 | | | | 54.0 | | | | | | |
| 2441.00 | | | | | 32.6 | | | | N/A | | N/A | | | | Fundemental |
| 4882.00 | 52.9 | 41.0 | 53.3 | 41.5 | -4.3 | 49.0 | 37.2 | 74.0 | 54.0 | -25.0 | -16.8 | | | Pass | * |
| 7323.00 | 51.9 | 39.9 | 51.6 | 39.9 | 3.9 | 55.8 | 43.8 | 74.0 | 54.0 | -18.2 | -10.2 | | | Pass | * |
| 9764.00 | | | | | 9.4 | | | | 54.0 | | | | | | noise floor |
| 12205.00 | | | | | 17.8 | | | 74.0 | 54.0 | | | | | | noise floor |
| 14646.00 | | | | | 20.7 | | | | 54.0 | | | | | | noise floor |
| 17087.00 | | | | | 30.8 | | | | 54.0 | | | | | | noise floor |
| 19528.00 | | | | | 37.5 | | | 74.0 | 54.0 | | | | | | noise floor |
| 21969.00 | | | | | 37.5 | | | | 54.0 | | | | | | noise floor |
| 24410.00 | | | | | 37.5 | | | | 54.0 | | | | | | |
| 2480.00 | | | | | 32.6 | | | | N/A | | N/A | | | | Fundemental |
| 4960.00 | 54.0 | 42.6 | 53.5 | 41.5 | -4.3 | 49.7 | 38.3 | 74.0 | 54.0 | -24.3 | -15.7 | | | Pass | * |
| 7440.00 | 52.4 | 40.6 | 51.1 | 41.4 | 3.9 | 56.3 | 45.3 | 74.0 | 54.0 | -17.7 | -8.7 | | | Pass | * |
| 9920.00 | | | | | 9.4 | | | | 54.0 | | | | | | noise floor |
| 12400.00 | | | | | 17.8 | | | 74.0 | 54.0 | | | | | | noise floor |
| 14880.00 | | | | | 20.7 | | | | 54.0 | | | | | | noise floor |
| 17360.00 | | | | | 30.8 | | | | 54.0 | | | | | | noise floor |
| 19840.00 | | | | | 37.5 | | | 74.0 | 54.0 | | | | | | noise floor |
| 22320.00 | | | | | 37.5 | | | 74.0 | 54.0 | | | | | | noise floor |
| 24800.00 | | | | | 37.5 | | | | 54.0 | | | | | | noise floor |

* The radiated emissions comply with -20dBc requirements of 15.247(c)
Frequencies which fall in the restricted bands of 15.205(a) comply with 15.209(a) limits.

## 3.3. Fundamental Emissions Test Data

**Radiated Emissions Data**

Job # : 26-299-KYO Test # : 1
Page 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| Client Name : | Kyocera Wireless Corp. | | | | |
| EUT Name : | K24 Tri-Mode Cellular Phone with Bluetooth | | | | |
| EUT Model # : | K323 | | | | |
| EUT Part # : | | | | | |
| EUT Serial # : | FM000000002678 | | | | |
| EUT Config. : | Bluetooth Transmit Mode | | | | |
| | Open | | | | |
| Specification : | FCC Part 15.247 | | | Reference : | |
| Rod. Ant. #: | NA | Temp. (°C) : | 18 | Date : | 05/09/06 |
| Bicon Ant.#: | NA | Humidity (%) : | 75 | Time : | |
| Log Ant.#: | 112 | EUT Voltage : | NA | Staff : | M. Krumweide |
| DRG Ant. # | 877 | EUT Frequency : | NA | | |
| Dipole Ant.#: | NA | Phase: | NA | Peak Bandwidth: | 1 MHz /100 kHz |
| Cable#: | 40ft | Location: | RN # 329550-01 | Video Bandwidth | 1 MHz |
| Preamp#: | 842 | Distance: | 3m | | |
| Spec An.#: | 835 | ERP conversion factor | 7 | | |
| QP #: | NA | | | | |
| PreSelect#: | NA | | | | |

| Meas. Freq. (MHz) | Vertical (dBuV) pk | Horizontal (dBuV) pk | CF (db) | Max Level (dBm) pk | Spec. Limit (ERP) (dBm) pk | Margin dB pk | EUT Rotation | Ant. Height | Pass Fail Unc. | Comment Maximum of 3 Axes |
|---|---|---|---|---|---|---|---|---|---|---|
| 2402.00 | 64.3 | 64.7 | 32.5 | -0.1 | 30.0 | -30.1 | 0.0 | 2.5 | Pass | Fundemental |
| 2441.00 | 56.6 | 58.4 | 32.5 | -6.4 | 30.0 | -36.4 | 0.0 | 1.0 | Pass | Fundemental |
| 2480.00 | 54.8 | 56.6 | 32.5 | -8.2 | 30.0 | -38.2 | 0.0 | 2.0 | Pass | Fundemental |

## Radiated Emissions Data

Job # : 26-299-KYO Test # : 2
Page 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| Client Name : | Kyocera Wireless Corp. | | | | |
| EUT Name : | K24 Tri-Mode Cellular Phone with Bluetooth | | | | |
| EUT Model # : | K323 | | | | |
| EUT Part # : | | | | | |
| EUT Serial # : | FM000000002678 | | | | |
| EUT Config. : | Bluetooth Transmit Mode | | | | |
| | Closed | | | | |
| Specification : | FCC Part 15.247 | | | Reference : | |
| Rod. Ant. #: | NA | Temp. (°C) : | 18 | Date : | 05/09/06 |
| Bicon Ant.#: | NA | Humidity (%) : | 75 | Time : | |
| Log Ant.#: | 112 | EUT Voltage : | NA | Staff : | M. Krumweide |
| DRG Ant. # | 877 | EUT Frequency : | NA | | |
| Dipole Ant.#: | NA | Phase: | NA | Peak Bandwidth: | 1 MHz / 1 kHz |
| Cable#: | 40ft | Location: | RN # 329550-01 | Video Bandwidth | 1 MHz |
| Preamp#: | 842 | Distance: | 3m | | |
| Spec An.#: | 835 | ERP conversion factor | 7 | | |
| QP #: | NA | | | | |
| PreSelect#: | NA | | | | |

| Meas. Freq. (MHz) | Vertical (dBuV) pk | Horizontal (dBuV) pk | CF (db) | Max Level (dBm) pk | Spec. Limit (ERP) (dBm) pk | Margin dB pk | EUT Rotation | Ant. Height | Pass Fail Unc. | Comment Maximum of 3 Axes |
|---|---|---|---|---|---|---|---|---|---|---|
| 2402.00 | 61.2 | 61.3 | 32.5 | -3.5 | 30.0 | -33.5 | 0.0 | 2.3 | Pass | Fundemental |
| 2441.00 | 54.9 | 53.9 | 32.5 | -9.9 | 30.0 | -39.9 | 0.0 | 1.0 | Pass | Fundemental |
| 2480.00 | 53.2 | 52.7 | 32.5 | -11.6 | 30.0 | -41.6 | 0.0 | 1.0 | Pass | Fundemental |

## Radiated Emissions Test Equipment

| | | | |
|---|---|---|---|
| Client | Kyocera Wireless Corp. | EUT Name | K24 Dual Band Tri-Mode Cell Phone with Bluetooth Capability |
| PAN # | 26-299-KYO | EUT Model | K323 |

| Asset Number | Description | Model Number | Serial Number | Last Cal | Cal Due |
|---|---|---|---|---|---|
| | | | | | |
| 128 | Antenna, Bicon, EMCO | 3104 | 2882 | 10/6/05 | 10/6/06 |
| 110 | Antenna, LPA, Electrometrics | LPA-25 | 1217 | 11/29/05 | 11/29/06 |
| 901 | Preamp, Sonoma Instrument 310 | 310N | 130607 | 12/19/05 | 12/19/06 |
| 898 | EMI Receiver, HP | 8546A | 3625A00348 | 5/16/06 | 5/16/07 |
| 899 | RF Filter Section HP | 85460A | 3448A00288 | 5/16/06 | 5/16/07 |
| 842 | Preamp | Nemko | na | 5/19/05 | 5/19/06 |
| | | | | | |
| 877 | Antenna, DRG Horn, .7-18GHz, A.H. Systems | SAS-571 | 688 | 4/19/05 | 6/19/06 Verified |
| 835 | Spectrum Analyzer, Rhode & Schwartz | RHDFSEK | 829058/005 | 1/18/06 | 1/18/07 |
| | | | | | |
| | | | | | |
| | | | | | |

# Photograph 3. Conducted Emissions Test Configuration

TXTVL10079 Charger


TXTVL10080 Charger

# Photograph 4. Radiated Emissions Test Configuration

TXTVL10079 Charger


TXTVL10080 Charger

# Photograph 5. Fundamental and Spurious Emissions Test Configuration

# APPENDIX A

# A. Radiated Emissions Measurement Uncertainties

## 1. Introduction

ISO/IEC 17025:1999 and ANSI/NCSL Z540-1-1994 require that all measurements contained in a test report be "traceable". "Traceability" is defined in the *International Vocabulary of Basic and General Terms in Metrology* (ISO: 1993) as: "the property of the result of a measurement... whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons, *all having stated uncertainties*".

The purposes of this Appendix are to "state the *Measurement Uncertainties*" of the conducted emissions and radiated emissions measurements contained in Section 5 of this Test Report, and to provide a practical explanation of the meaning of these measurement uncertainties.

## 2. Statement of the Worst-Case Measurement Uncertainties for the Conducted and Radiated Emissions Measurements Contained in This Test Report

**Table 1: Worst-Case Expanded Uncertainty "U" of Measurement for a k=2 Coverage Factor**

| Radiated Emissions Measurement Detection Systems | Applicable Frequency Range | "U" for a k=2 Coverage Factor |
|---|---|---|
| HP8568B Spectrum Analyzer with QPA & HP8447F Preamplifier | 30 MHz - 200 MHz | +4.0 dB, -4.1 dB |
| HP8568B Spectrum Analyzer with QPA & HP8447F Preamplifier | 200 MHz-1000 MHz | +/- 3.5 dB |
| HP8566B Spectrum Analyzer with QPA & Preselector | 30 MHz - 200 MHz | +3.9 dB, -4.0 dB |
| HP8566B Spectrum Analyzer with QPA & Preselector | 200 MHz-1000 MHz | +/- 3.4 dB |
| HP8566B Spectrum Analyzer with QPA & HP 8449A Preamplifier | 1 GHz - 18 GHz | +2.5 dB, -2.6 dB |
| HP8566B Spectrum Analyzer with QPA & HP8449A Preamplifier | 18 GHz - 40 GHz | +/- 3.4 dB |

NOTES:

1. Applies to 3 and 10 meter measurement distances
2. Applies to all valid combinations of Transducers (i.e. LISNs, Line Voltage Probes, and Antennas, as appropriate)
3. Excludes the Repeatability of the EUT

### 3. Practical Explanation of the Meaning of Radiated Emissions Measurement Uncertainties

In general, a "Statement of Measurement Uncertainty" means that with a certain (specified) confidence level, the "true" value of a measurand will be between a (stated) upper bound and a (stated) lower bound.

In the specific case of EMC Measurements in this test report, the measurement uncertainties of the conducted emissions measurements and the radiated emissions measurements have been calculated in accordance with the method detailed in the following documents:

- *ANSI Z540.2 (2002) Guide to the Expression of Uncertainty in Measurement*
- NIS 81:1994, *The Treatment of Uncertainty in EMC Measurements* (NAMAS, 1994)
- NIST Technical Note 1297(1994), *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results* (NIST, 1994)

The calculation method used in these documents requires that the stated uncertainty of the measurements be expressed as *an "expanded uncertainty", U, with a k=2 coverage factor*. The practical interpretation of this method of expressing measurement uncertainty is shown in the following example:

EXAMPLE: Assume that at 39.51 MHz, the (measured) radiated emissions level was equal to +26.5 dBuV/m, and that the +/- 2 standard deviations (i.e. 95% confidence level) measurement uncertainty was +/- 3.4 dB.

In the example above, the phrase "k = 2 Coverage Factor" simply means that the measurement uncertainty is stated to cover +/-2 standard deviations (i.e. a 95% confidence interval) about the measurand. The measurand is the radiated emissions measurement of +26.5 dBuV/m at 39.51 MHz, and the 95% bounds for the uncertainty are –3.4 dB to + 3.4 dB. One can thus be 95% confident that the "true" value of the radiated emissions measurement is between +23.1 dBuV/m and +29.5 dBuV/m. *In effect, this means that in the above example there is only a 2.5% chance that the "true" radiated emissions value exceeds +29.5 dBuV/m.*

# APPENDIX B

## B. Nemko USA, Inc.'s Test Equipment & Facilities Calibration Program

Nemko USA, Inc. operates a comprehensive Periodic Calibration Program in order to ensure the validity of all test data. Nemko USA's Periodic Calibration Program is fully compliant to the requirements of NVLAP Policy Guide PG-1-1988, ANSI/NCSL Z540-1-1994, ISO 10012:2003 , ISO/IEC 17025:1999, and ISO-9000:2000. Nemko USA, Inc.'s calibrations program therefore meets or exceed the US national commercial and military requirements [N.B. ANSI/NCSL Z540-1-1994 replaces MIL-STD-45662A].

Specifically, all of Nemko USA's *primary reference standard devices* (e.g. vector voltmeters, multimeters, attenuators and terminations, RF power meters and their detector heads, oscilloscope mainframes and plug-ins, spectrum analyzers, RF preselectors, quasi-peak adapters, interference analyzers, impulse generators, signal generators and pulse/function generators, field-strength meters and their detector heads, etc.) and certain *secondary standard devices* (e.g. RF Preamplifiers used in CISPR 11/22 and FCC Part 15/18 tests) are periodically recalibrated by:

- A Nemko USA-approved independent (third party) metrology laboratory that uses NIST-traceable standards and that is ISO Guide 25-accredited as a calibration laboratories by NIST; or,
- A Nemko USA-approved independent (third party) metrology laboratory that uses NIST-traceable standards and that is ISO Guide 25-accredited as a calibration laboratory by another accreditation body (such as A2LA) that is mutually recognized by NIST; or,
- A manufacturer of Measurement and Test Equipment (M&TE), if the manufacturer uses NIST-traceable standards and is ISO Guide 25-accredited as calibration laboratory either by NIST or by another accreditation body (such as A2LA) that is mutually recognized by NIST; or
- A manufacturer of M&TE (or by a Nemko USA-approved independent third party metrology laboratory) that is not ISO Guide 25-accredited. (In these cases, Nemko USA conducts an annual audit of the manufacturer or metrology laboratory for the purposes of proving traceabilty to NIST, ensuring that adequate and repeatable calibration procedures are being applied, and verifying conformity with the other requirements of ISO Guide 25).

In all cases, the entity performing the Calibration is required to furnish Nemko USA with a calibration test report and/or certificate of calibration, and a "calibration sticker" on each item of M&TE that is successfully calibrated.

Calibration intervals are normally one year, except when the manufacture advises a shorter interval (e.g. the HP 8568B Spectrum Analyzer is recalibrated every six months) or if US Government directives or client requirements demand a shorter interval. Items of instrumentation/related equipment which fail during routine use, or which suffer visible mechanical damage (during use or while in transit), are sidelined pending repair and recalibration. (Repairs are carried out either in-house [if minor] or by a Nemko USA-approved independent [third party] metrology laboratory, or by the manufacturer of the item of M&TE).

Each antenna used for CISPR 11 and CISPR 22 and FCC Part 15 and Part 18 radiated emissions testing (and for testing to the equivalent European Norms) is calibrated annually by either a NIST (or A2LA) ISO Standard 17025-Accredited third-party Antenna Calibration Laboratory or by the antenna's OEM if the OEM is NIST or A2LA ISO Standard 17025-accredited as an antenna calibration laboratory. The antenna calibrations are performed using the methods specified in Annex G.5 of CISPR 16-1(2003) or ANSI C63.5-2004, including the "Three-Antenna Method". Certain other kinds of antennas (e.g. magnetic-shielded loop antennas) are calibrated annually by either a NIST (or A2LA) ISO Standard 17025-accredited third-party antenna calibration laboratory, or by the antenna's OEM if the OEM is NIST or A2LA ISO Standard 17025-accredited as an antenna calibration laboratory using the procedures specified in the latest version of SAE ARP-958.

In accordance with FCC and other regulations, Nemko USA recalibrates its suite of antennas used for radiated emissions tests on an annual basis. These calibrations are performed as a precursor to the FCC-required annual revalidation of the Normalized Site Attenuation properties of Nemko USA's Open Area Test Site. Nemko USA, Inc. uses the procedures given in both Subclause 16.6 and Annex G.2 of CISPR 16-1 (2003), and, ANSI C63.4-2004 when performing the normalized site attenuation measurements.