# RADIATED SPURIOUS EMISSIONS PORTIONS OF FCC CFR47 PART 15 SUBPART C

## CERTIFICATION TEST REPORT FOR

## DUAL-BAND 1xRTT CDMA PHONE WITH BLUETOOTH

**FCC MODEL NUMBER: SCP- 3820**

**FCC ID: V65SCP- 3820**

**REPORT NUMBER: 10U13253-3**

**ISSUE DATE: JUNE 25, 2010**

*Prepared for*
**KYOCERA COMMUNICATIONS, INC.**
**10300 CAMPUS POINT DRIVE**
**SAN DIEGO, CA. 92121**

*Prepared by*
**COMPLIANCE CERTIFICATION SERVICES**
**47173 BENICIA STREET**
**FREMONT, CA 94538, U.S.A.**
**TEL: (510) 771-1000**
**FAX: (510) 661-0888**

NVLAP LAB CODE 200065-0

## Revision History

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| --- | 06/25/10 | Initial Issue | T. Chan |

# TABLE OF CONTENTS

# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** KYOCERA COMMUNICATIONS, INC.
10300 CAMPUS POINT DRIVE
SAN DIEGO, CA. 92121

**EUT DESCRIPTION:** DUAL 1XRTT CDMA PHONE WITH BLUETOOTH

**MODEL:** SCP-3820

**SERIAL NUMBER:** 268435457816708535

**DATE TESTED:** JUNE 15-16, 2010

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULTS** |
| CFR 47 Part 15 Subpart C | PASS (Radiated Portions) |

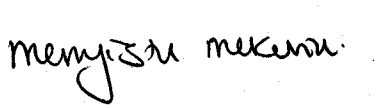
Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

THU CHAN
EMC MANAGER
COMPLIANCE CERTIFICATION SERVICES

Tested By:



MENGISTU MEKURIA
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, and FCC CFR 47 Part 15.

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

## 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

## 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER | UNCERTAINTY |
|---|---|
| Conducted Disturbance, 0.15 to 30 MHz | 3.52 dB |
| Radiated Disturbance, 30 to 1000 MHz | 4.94 dB |

Uncertainty figures are valid to a confidence level of 95%.

# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

The EUT is a Bluetooth featured Dual-band CDMA Phone that manufactured by Kyocera Communications, Inc.

## 5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal antenna, with a maximum gain of –1.0 dBi.

## 5.3. SOFTWARE AND FIRMWARE

N/A

## 5.4. WORST-CASE CONFIGURATION AND MODE

The worst-position was the EUT with highest emissions. To determine the worst-case, the EUT was investigated for X, Y, Z, and Mobile-Positions, and the worst case is Mobile-position with AC/DC adapter.

## 5.5. DESCRIPTION OF TEST SETUP

**SUPPORT EQUIPMENT**

| PERIPHERAL SUPPORT EQUIPMENT LIST | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **FCC ID** |
| AC/DC Adapter | Sanyo | SCP-26ADT | 310 | DoC |
| HEADSET | Kyocera | N/A | N/A | N/A |

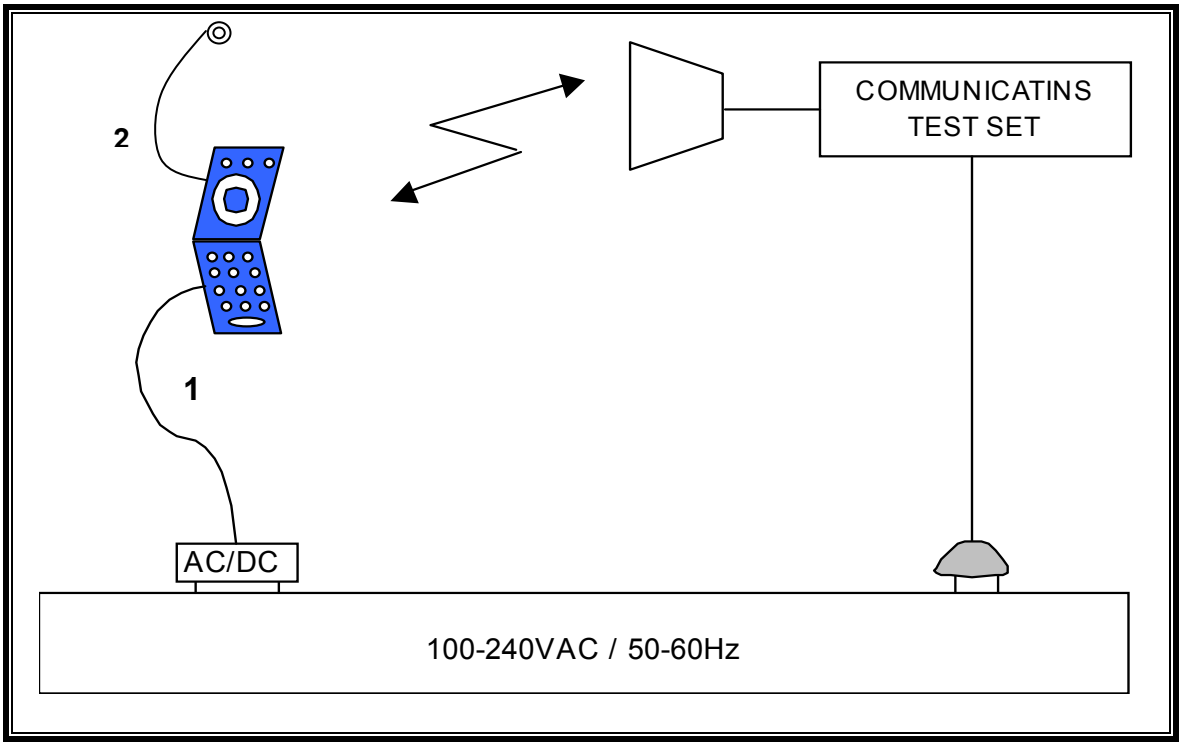
**I/O CABLES**

| I/O CABLE LIST | | | | | | |
|---|---|---|---|---|---|---|
| Cable No. | Port | # of Identical Ports | Connector Type | Cable Type | Cable Length | Remarks |
| 1 | DC Input | 1 | Micro-USB | Un-Shielded | 2.0 m | N/A |
| 2 | AUDIO | 1 | Mini-Jack | Un-Shielded | 1.8 m | Volume Control on the Cable |

**TEST SETUP**

EUT with AC Adapter and headset is used for both below and above 1GHz radiated emissions and AC line conduction emission tests

**SETUP DIAGRAM FOR TESTS**



# 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST EQUIPMENT LIST | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Asset** | **Cal Due** |
| Spectrum Analyzer, 26.5 GHz | Agilent / HP | E4440A | C01179 | 08/24/10 |
| Spectrum Analyzer, 26.5 GHz | Agilent / HP | E4440A | C01178 | 08/31/10 |
| Preamplifier, 26.5 GHz | Agilent / HP | 8449B | C01052 | 08/04/10 |
| Preamplifier, 26.5 GHz | Agilent / HP | 8449B | C01063 | 08/04/10 |
| Preamplifier, 1300 MHz | Agilent / HP | 8447D | C00885 | 07/06/10 |
| Antenna, Bilog, 2 GHz | Sunol Sciences | JB1 | C01011 | 07/14/10 |
| Antenna, Horn, 18 GHz | EMCO | 3115 | C00945 | 07/29/10 |
| Antenna, Horn, 18 GHz | EMCO | 3115 | C00783 | 07/29/10 |
| EMI Test Receiver, 30 MHz | R & S | ESHS 20 | N02396 | 05/06/11 |
| LISN, 30 MHz | FCC | LISN-50/250-25-2 | N02625 | 10/29/10 |
| Reject Filter, 2.4-2.5 GHz | Micro-Tronics | BRM50702 | N02685 | CNR |

# 7. RADIATED TEST RESULTS

## 7.1. LIMITS AND PROCEDURE

**LIMITS**

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

| Frequency Range (MHz) | Field Strength Limit (uV/m) at 3 m | Field Strength Limit (dBuV/m) at 3 m |
|---|---|---|
| 30 - 88 | 100 | 40 |
| 88 - 216 | 150 | 43.5 |
| 216 - 960 | 200 | 46 |
| Above 960 | 500 | 54 |

**TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

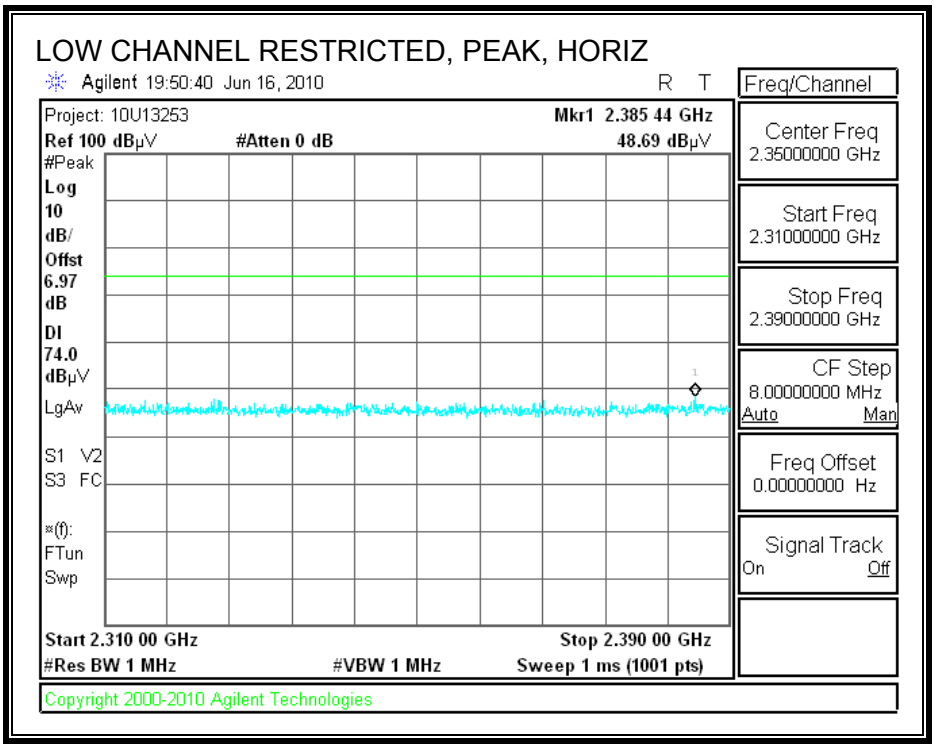
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

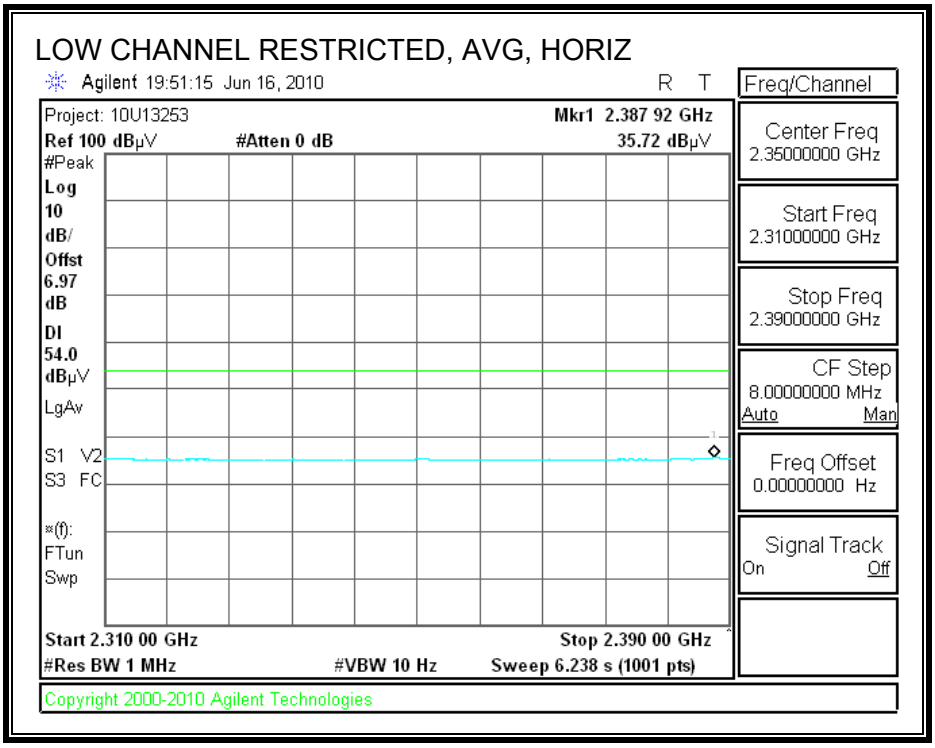
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

# 7.2. TRANSMITTER ABOVE 1 GHz

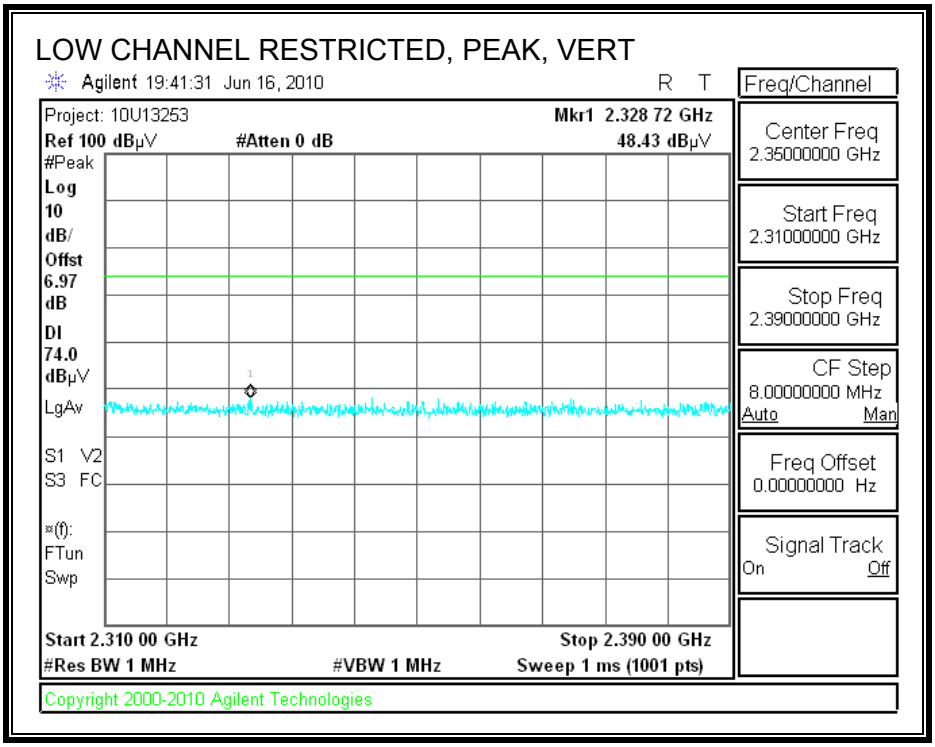
## 7.2.1. BASIC DATA RATE GFSK MODULATION

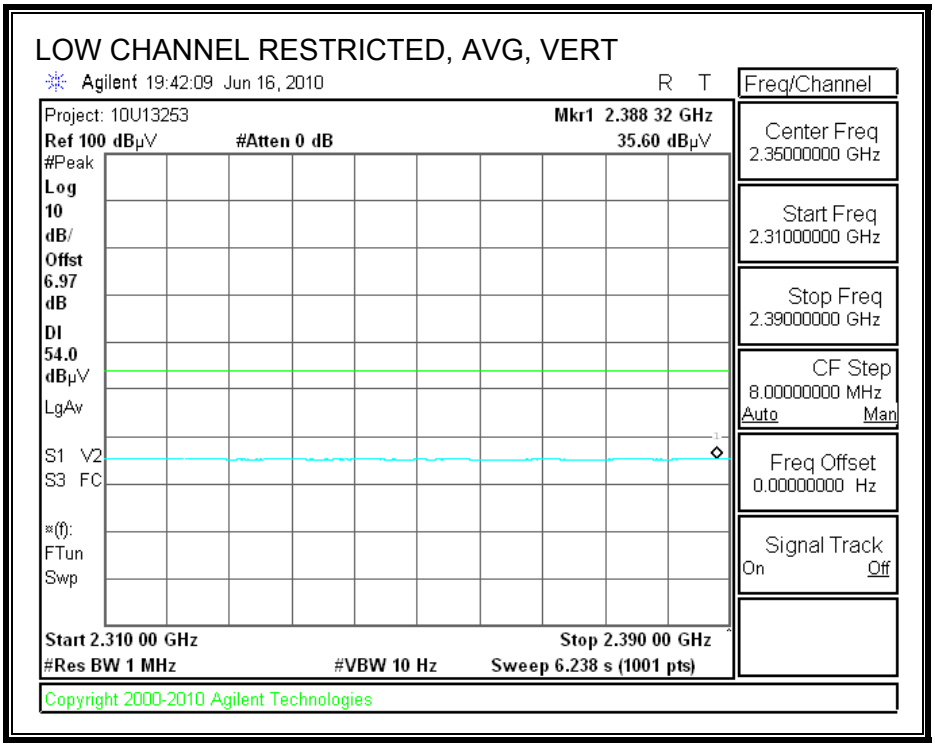
**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



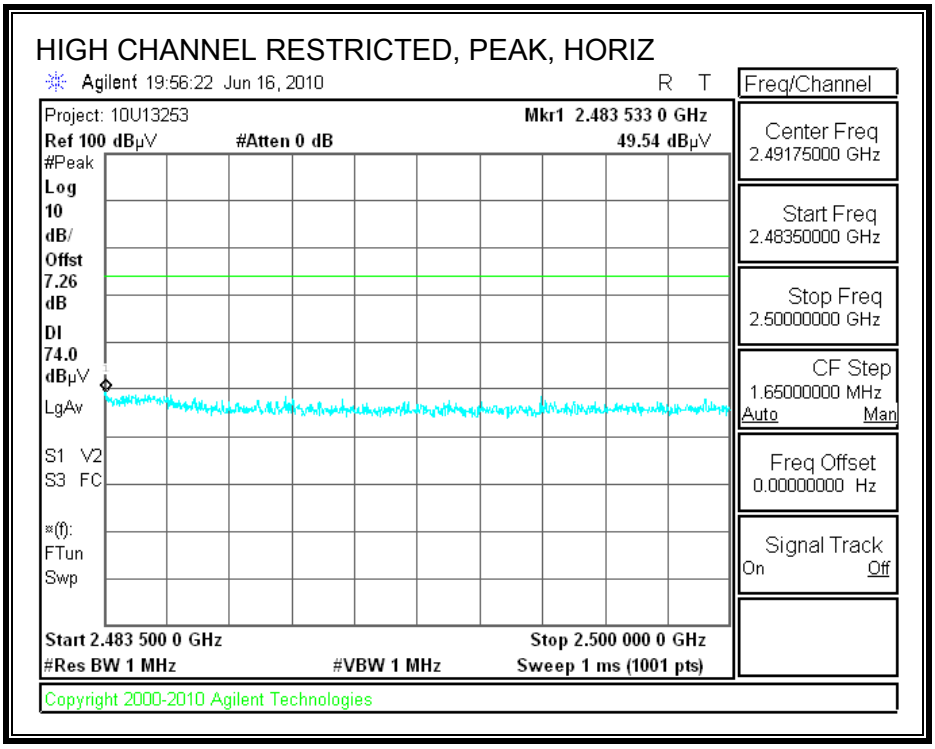



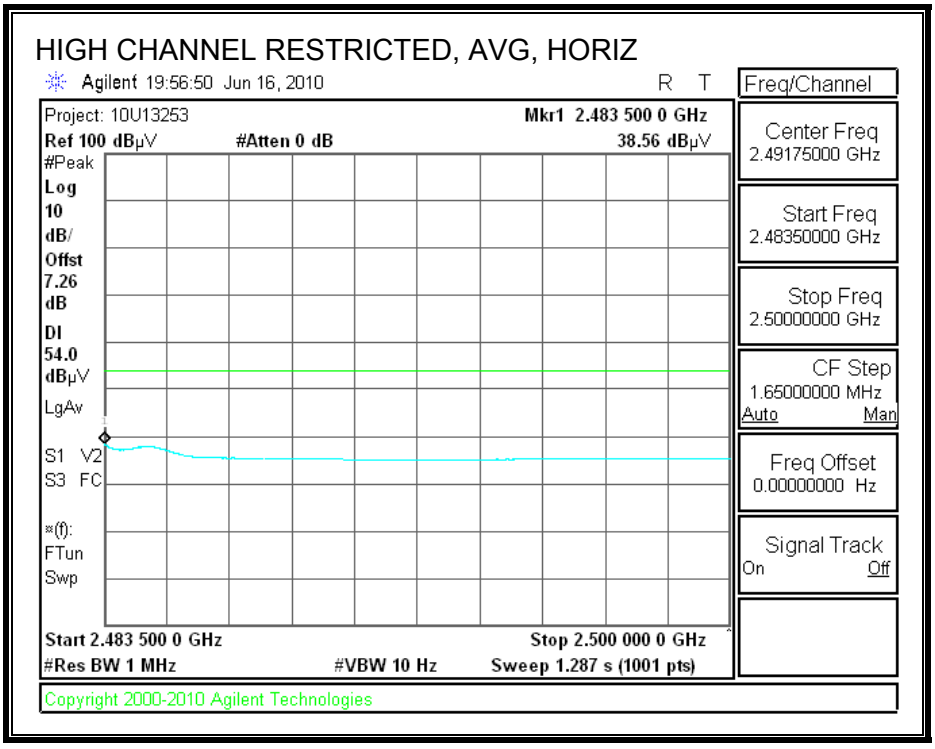
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



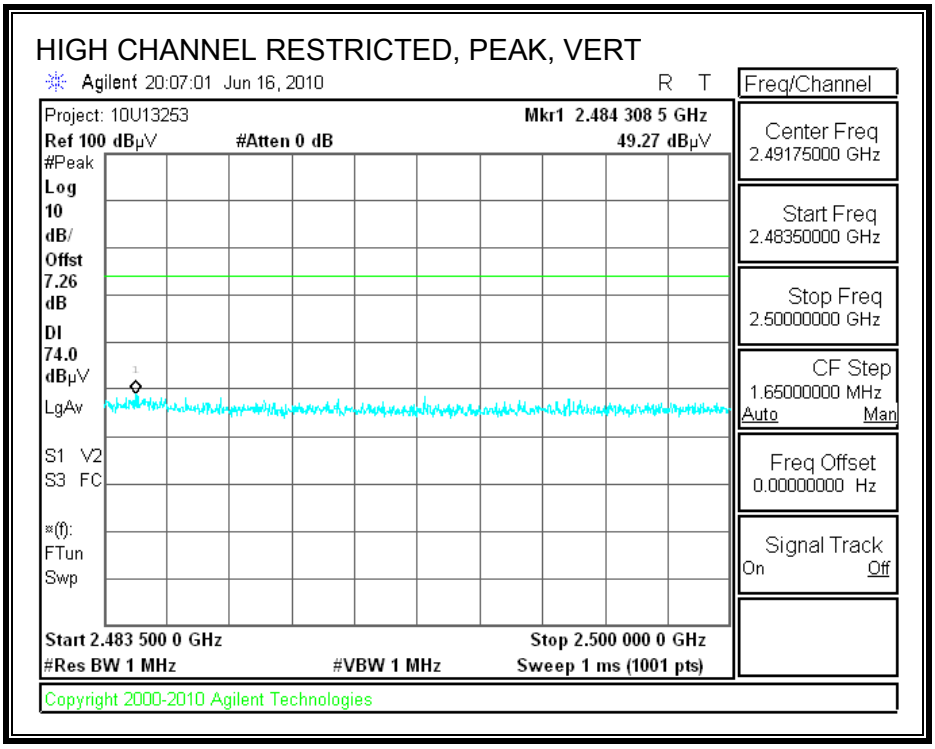



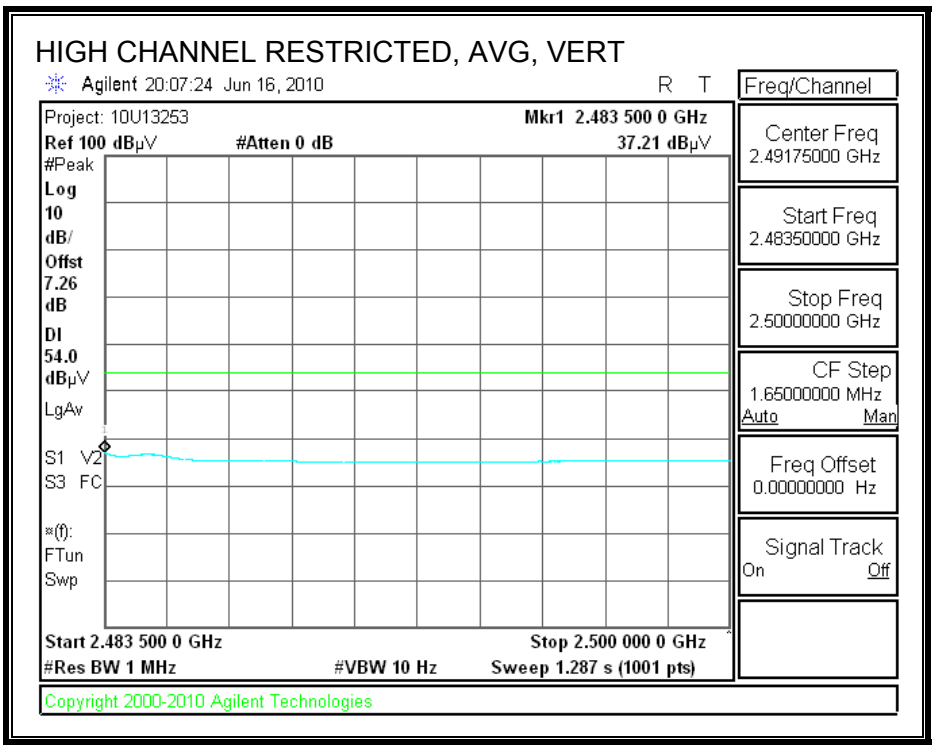
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



## HARMONICS AND SPURIOUS EMISSIONS

**High Frequency Measurement**
**Compliance Certification Services, Fremont 5m Chamber**

| | |
|---|---|
| **Company:** | KYOCERA COMMUNICATIONS, INC. |
| **Project #:** | 10U13253 |
| **Date:** | 6/15/2010 |
| **Test Engineer:** | MENGISTU MEKURIA |
| **Configuration:** | EUT, HEADSET, AND AC ADAPTER |
| **Mode:** | TX, GFSK MODE |

**Test Equipment:**

| Horn 1-18GHz | Pre-amplifer 1-26GHz | Pre-amplifer 26-40GHz | Horn > 18GHz | Limit |
|---|---|---|---|---|
| T59; S/N: 3245 @3m | T145 Agilent 3008A0056 | | | FCC 15.205 |

Hi Frequency Cables

| 3' cable 22807700 | 12' cable 22807600 | 20' cable 22807500 | HPF | Reject Filter |
|---|---|---|---|---|
| 3' cable 22807700 | 12' cable 22807600 | 20' cable 22807500 | | R_001 |

**Peak Measurements**
RBW=VBW=1MHz
**Average Measurements**
RBW=1MHz ; VBW=10Hz

| f GHz | Dist (m) | Read Pk dBuV | Read Avg. dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Fltr dB | Peak dBuV/m | Avg dBuV/m | Pk Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB | Avg Mar dB | Notes (V/H) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Low Channel(2402.00MHz)** | | | | | | | | | | | | | | | |
| 4.804 | 3.0 | 51.5 | 44.2 | 32.8 | 5.8 | -34.8 | 0.0 | 0.0 | 55.2 | 47.9 | 74 | 54 | -18.8 | -6.1 | V |
| 4.804 | 3.0 | 50.0 | 42.6 | 32.8 | 5.8 | -34.8 | 0.0 | 0.0 | 53.6 | 46.3 | 74 | 54 | -20.4 | -7.7 | H |
| **Mid Channel (2441.00MHz0** | | | | | | | | | | | | | | | |
| 4.882 | 3.0 | 51.5 | 44.3 | 32.8 | 5.8 | -34.9 | 0.0 | 0.0 | 55.3 | 48.1 | 74 | 54 | -18.7 | -5.9 | V |
| 7.323 | 3.0 | 42.7 | 27.2 | 35.2 | 7.3 | -34.7 | 0.0 | 0.0 | 50.5 | 35.0 | 74 | 54 | -23.5 | -19.0 | V |
| 4.882 | 3.0 | 50.1 | 42.8 | 32.8 | 5.8 | -34.9 | 0.0 | 0.0 | 53.9 | 46.6 | 74 | 54 | -20.1 | -7.4 | H |
| 7.323 | 3.0 | 42.9 | 27.4 | 35.2 | 7.3 | -34.7 | 0.0 | 0.0 | 50.7 | 35.2 | 74 | 54 | -23.3 | -18.8 | H |
| **Hi Channel (2480.00 MHz)** | | | | | | | | | | | | | | | |
| 4.960 | 3.0 | 52.2 | 44.9 | 32.9 | 5.9 | -34.9 | 0.0 | 0.0 | 56.1 | 48.8 | 74 | 54 | -17.9 | -5.2 | V |
| 7.440 | 3.0 | 46.3 | 29.8 | 35.4 | 7.3 | -34.6 | 0.0 | 0.0 | 54.4 | 37.9 | 74 | 54 | -19.6 | -16.1 | V |
| 4.960 | 3.0 | 48.9 | 41.9 | 32.9 | 5.9 | -34.9 | 0.0 | 0.0 | 52.8 | 45.8 | 74 | 54 | -21.2 | -8.2 | H |
| 7.440 | 3.0 | 47.5 | 30.4 | 35.4 | 7.3 | -34.6 | 0.0 | 0.0 | 55.6 | 38.5 | 74 | 54 | -18.4 | -15.5 | H |

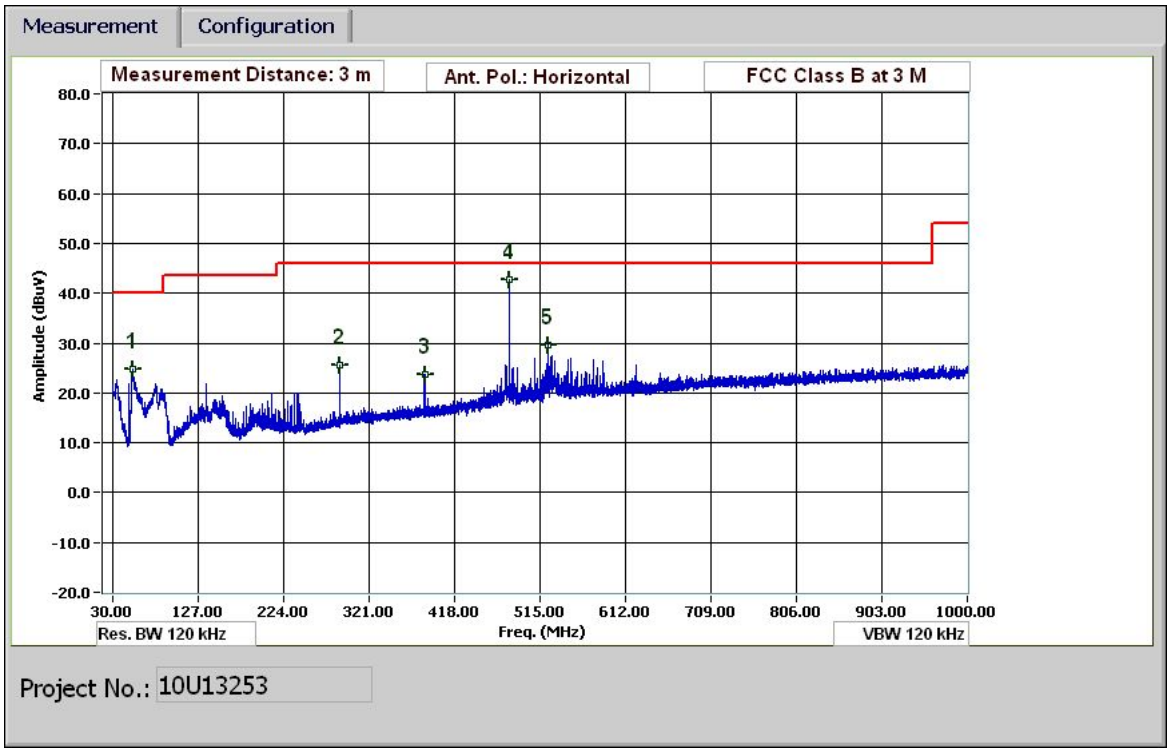
Rev. 07.22.09

| | | | | | |
|---|---|---|---|---|---|
| f | Measurement Frequency | Amp | Preamp Gain | Avg Lim | Average Field Strength Limit |
| Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Pk Lim | Peak Field Strength Limit |
| Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Avg Mar | Margin vs. Average Limit |
| AF | Antenna Factor | Peak | Calculated Peak Field Strength | Pk Mar | Margin vs. Peak Limit |
| CL | Cable Loss | HPF | High Pass Filter | | |

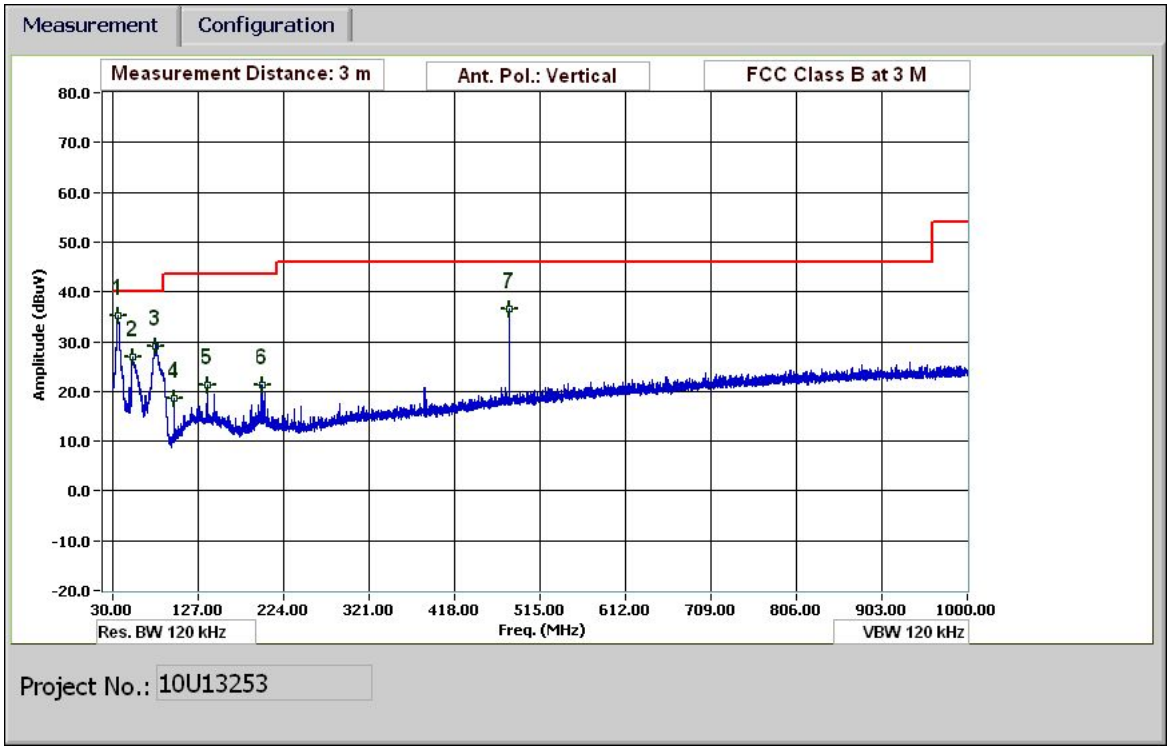
## 7.3. WORST-CASE BELOW 1 GHz

**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)**

HORIZONTAL PLOT



VERTICAL PLOT



## HORIZONTAL AND VERTICAL DATA

**30-1000MHz Frequency Measurement**
**Compliance Certification Services, Fremont 5m Chamber**

**Test Engr:** Mengistu Mekuria
**Date:** 06/15/09
**Project #:** 10U13253
**Company:** Kyocera Communications, Inc.
**EUT Description:** Dual Band 1xRTT Cell Phone With BT
**EUT M/N:**
**Test Target:**
**Mode Oper:**

| | | | | | |
|---|---|---|---|---|---|
| f | Measurement Frequency | Amp | Preamp Gain | Margin | Margin vs. Limit |
| Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | | |
| Read | Analyzer Reading | Filter | Filter Insert Loss | | |
| AF | Antenna Factor | Corr. | Calculated Field Strength | | |
| CL | Cable Loss | Limit | Field Strength Limit | | |

| f MHz | Dist (m) | Read dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Filter dB | Corr. dBuV/m | Limit dBuV/m | Margin dB | Ant. Pol. V/H | Det. P/A/QP | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36.067 | 3.0 | 45.7 | 17.4 | 0.6 | 28.4 | 0.0 | 0.0 | 35.2 | 40.0 | -4.8 | V | P | |
| 36.067 | 3.0 | 42.8 | 17.1 | 0.6 | 28.4 | 0.0 | 0.0 | 32.1 | 40.0 | -7.9 | V | QP | |
| 52.561 | 3.0 | 46.4 | 8.3 | 0.6 | 28.4 | 0.0 | 0.0 | 27.0 | 40.0 | -13.0 | V | P | |
| 79.202 | 3.0 | 49.3 | 7.4 | 0.8 | 28.3 | 0.0 | 0.0 | 29.1 | 40.0 | -10.9 | V | P | |
| 99.243 | 3.0 | 36.2 | 9.8 | 0.9 | 28.3 | 0.0 | 0.0 | 18.5 | 43.5 | -25.0 | V | P | |
| 137.764 | 3.0 | 35.3 | 13.3 | 1.1 | 28.3 | 0.0 | 0.0 | 21.4 | 43.5 | -22.1 | V | P | |
| 199.087 | 3.0 | 36.2 | 11.9 | 1.2 | 28.2 | 0.0 | 0.0 | 21.2 | 43.5 | -22.3 | V | P | |
| 480.019 | 3.0 | 46.0 | 16.4 | 2.0 | 27.9 | 0.0 | 0.0 | 36.4 | 46.0 | -9.6 | V | P | |
| 52.321 | 3.0 | 44.3 | 8.3 | 0.6 | 28.4 | 0.0 | 0.0 | 24.8 | 40.0 | -15.2 | H | P | |
| 288.011 | 3.0 | 39.3 | 13.0 | 1.5 | 28.1 | 0.0 | 0.0 | 25.7 | 46.0 | -20.3 | H | P | |
| 384.015 | 3.0 | 35.4 | 14.7 | 1.8 | 28.1 | 0.0 | 0.0 | 23.7 | 46.0 | -22.3 | H | P | |
| 480.001 | 3.0 | 52.3 | 16.4 | 2.0 | 27.9 | 0.0 | 0.0 | 42.8 | 46.0 | -3.2 | H | P | |
| 480.001 | 3.0 | 51.1 | 16.4 | 2.0 | 27.9 | 0.0 | 0.0 | 41.5 | 46.0 | -4.5 | H | QP | |
| 524.300 | 3.0 | 38.2 | 17.1 | 2.1 | 27.7 | 0.0 | 0.0 | 29.6 | 46.0 | -16.4 | H | P | |

**Rev. 1.27.09**
**Note: No other emissions were detected above the system noise floor.**

# 8. AC POWER LINE CONDUCTED EMISSIONS

**LIMITS**

FCC §15.207 (a)

RSS-Gen 7.2.2

| Frequency of Emission (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 * | 56 to 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

**TEST PROCEDURE**

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

**RESULTS**

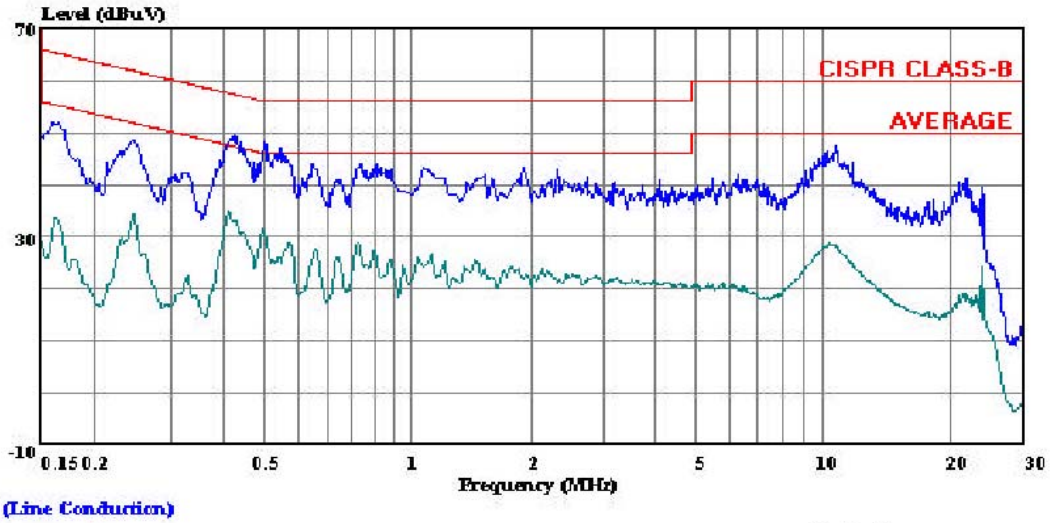
## 6 WORST EMISSIONS (EUT WITH AC ADAPTER)

| CONDUCTED EMISSIONS DATA (115VAC 60Hz) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Freq. | Reading | | | Closs | Limit | EN_B | Margin | | Remark |
| (MHz) | PK (dBuV) | QP (dBuV) | AV (dBuV) | (dB) | QP | AV | QP (dB) | AV (dB) | L1 / L2 |
| 0.44 | 49.86 | -- | 34.04 | 0.00 | 57.16 | 47.16 | -7.30 | -13.12 | L1 |
| 0.54 | 46.82 | -- | 31.13 | 0.00 | 56.00 | 46.00 | -9.18 | -14.87 | L1 |
| 0.69 | 44.20 | -- | 27.97 | 0.00 | 56.00 | 46.00 | -11.80 | -18.03 | L1 |
| 0.43 | 51.39 | -- | 38.02 | 0.00 | 57.19 | 47.19 | -5.80 | -9.17 | L2 |
| 0.56 | 48.50 | -- | 36.74 | 0.00 | 56.00 | 46.00 | -7.50 | -9.26 | L2 |
| 0.88 | 44.82 | -- | 31.45 | 0.00 | 56.00 | 46.00 | -11.18 | -14.55 | L2 |
| 6 Worst Data | | | | | | | | | |

**LINE 1 RESULTS**

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 7 File#: 10U13253 LC.EMI Date: 06-15-2010 Time: 23:31:58




(Line Conduction)

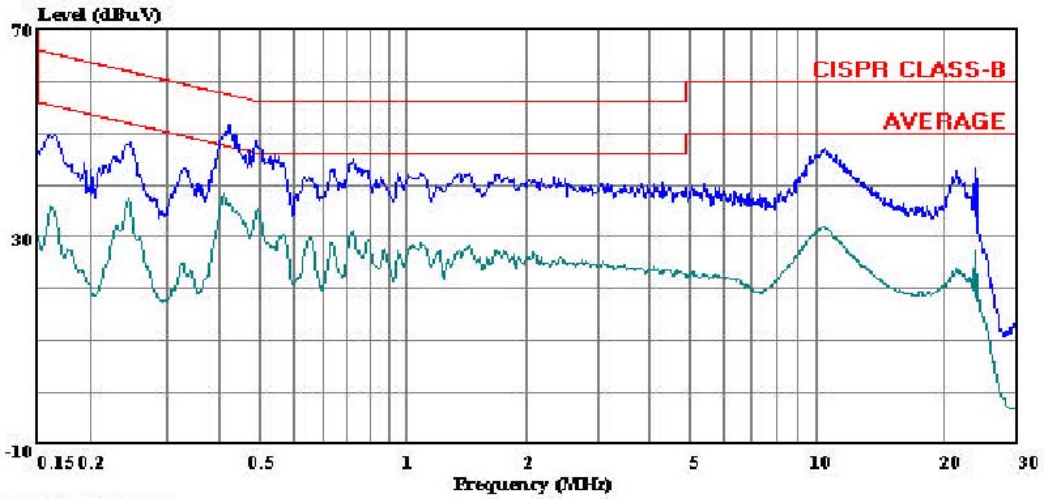
Trace: 5 Ref Trace:

Condition: CISPR CLASS-B
Test Operator: : Mengistu Mekuria
Project #: : 10U13253
Company: : Kyocera Communications, Inc.
EUT Description:: Dual Band CDMA Phone With BT
Model: : SCP-3820
Configuration: : EUT, Headset, and AC Adapter
Mode: : TX Mode
Target: : FCC Class B
Voltage: : 115V 60Hz
: Line 1: Peak (Blue), Average (Green)

**LINE 2 RESULTS**

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 14 File#: 10U13253 LC.EMI Date: 06-15-2010 Time: 23:41:11




(Line Conduction)

Trace: 12 Ref Trace:

Condition: CISPR CLASS-B
Test Operator: : Mengistu Mekuria
Project #: : 10U13253
Company: : Kyocera Communications, Inc.
EUT Description:: Dual Band CDMA Phone With BT
Model: : SCP-3820
Configuration: : EUT, Headset, and AC Adapter
Mode: : TX Mode
Target: : FCC Class B
Voltage: : 115V 60Hz
: Line 2: Peak (Blue), Average (Green)