



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

**CERTIFICATION TEST REPORT
FOR**

DUAL BAND CDMA WITH BLUETOOTH + EDR

FCC MODEL NUMBER: E4100

FCC ID: V65E4100

REPORT NUMBER: 10U13354-2

ISSUE DATE: AUGUST 18, 2010

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

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
---	08/18/10	Initial Issue	T. Chan

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: DUAL BAND CELL PHONE WITH BLUETOOTH

MODEL: E4100

SERIAL NUMBER: 41000051

DATE TESTED: AUGUST 17- 18, 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:

Tested By:



THU CHAN
ENGINEERING MANAGER
COMPLIANCE CERTIFICATION SERVICES

TOM CHEN
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:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

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 Cell Phone that manufactured by Kyocera Communications, Inc.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal antenna, with a maximum gain of 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, and Z-Positions, and the worst case is X position without AC/DC adapter.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Kyocera	SCP-28ADT	N/A	DOC
Headset	N/A	TX-550	N/A	N/A

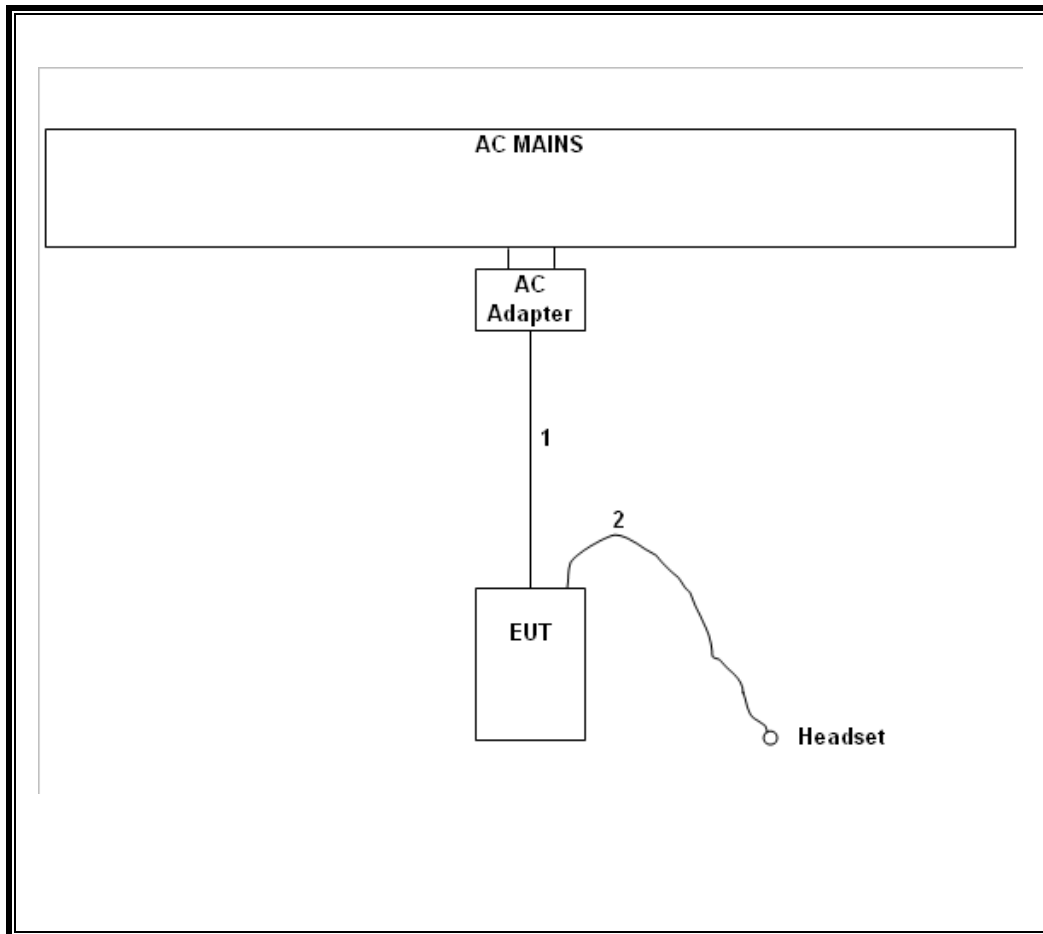
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	DC Input	1	USB	Un-Shielded	1.5 m	N/A
3	AUDIO	1	Jack	Un-Shielded	1 m	NA

TEST SETUP

The EUT is a stand alone for above 1GHz radiated emission, and with AC/DC adapter for below 1GHz radiated emissions, also AC Line Conduction 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, 44 GHz	Agilent / HP	E4446A	C01069	10/08/10
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	07/05/11
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	12/16/10
Antenna, Bilog, 2 GHz	Sund Sciences	JB1	C01011	01/14/11
Antenna, Horn, 18 GHz	EMCO	3115	C00945	01/29/11
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.

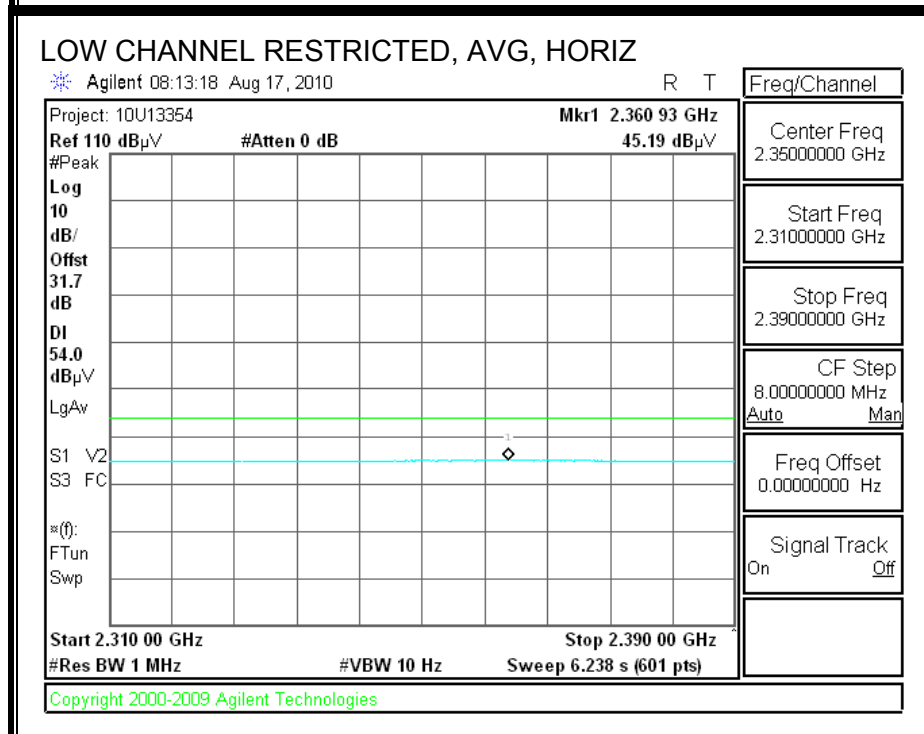
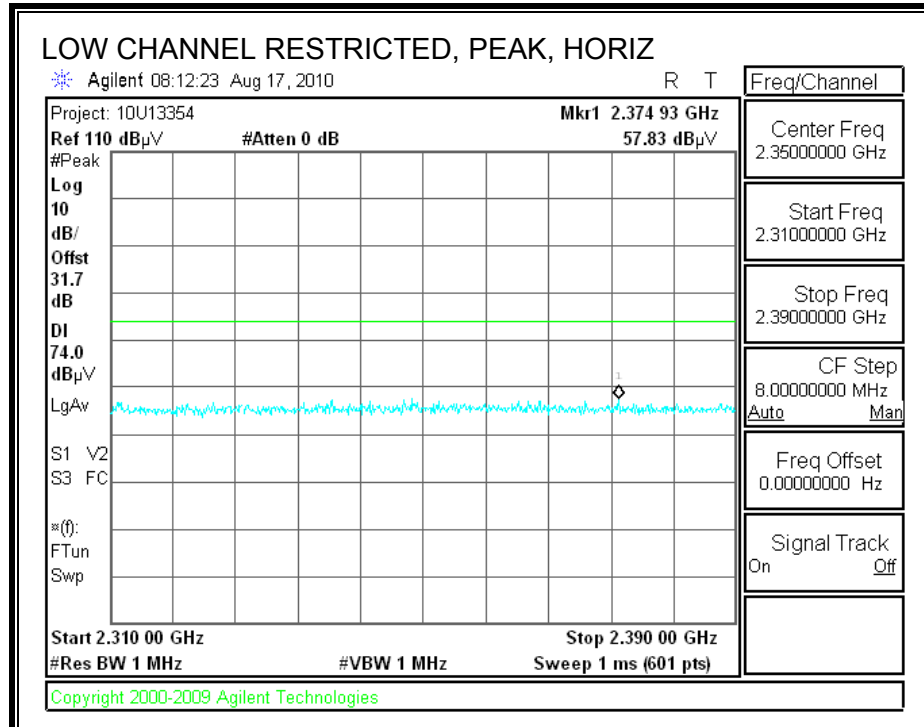
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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.

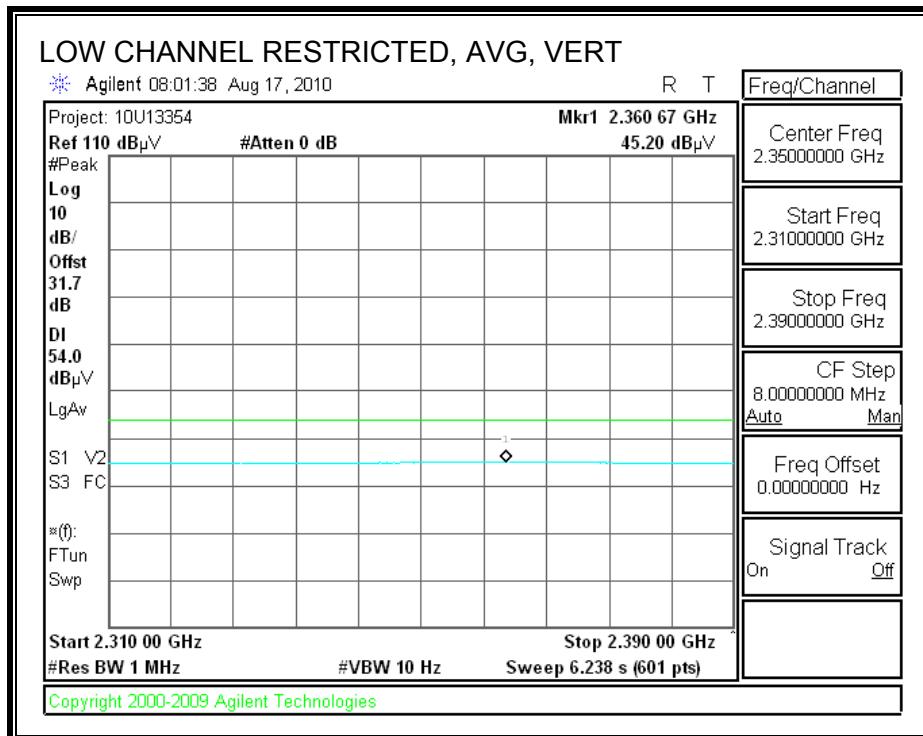
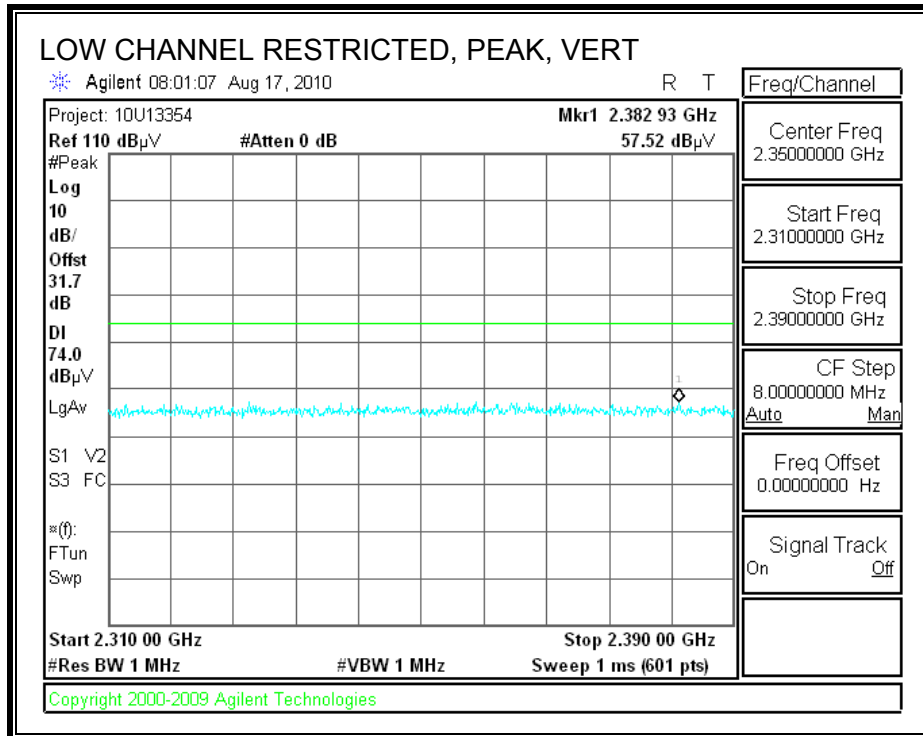
7.2. TRANSMITTER ABOVE 1 GHz

7.2.1. BASIC DATA RATE GFSK MODULATION

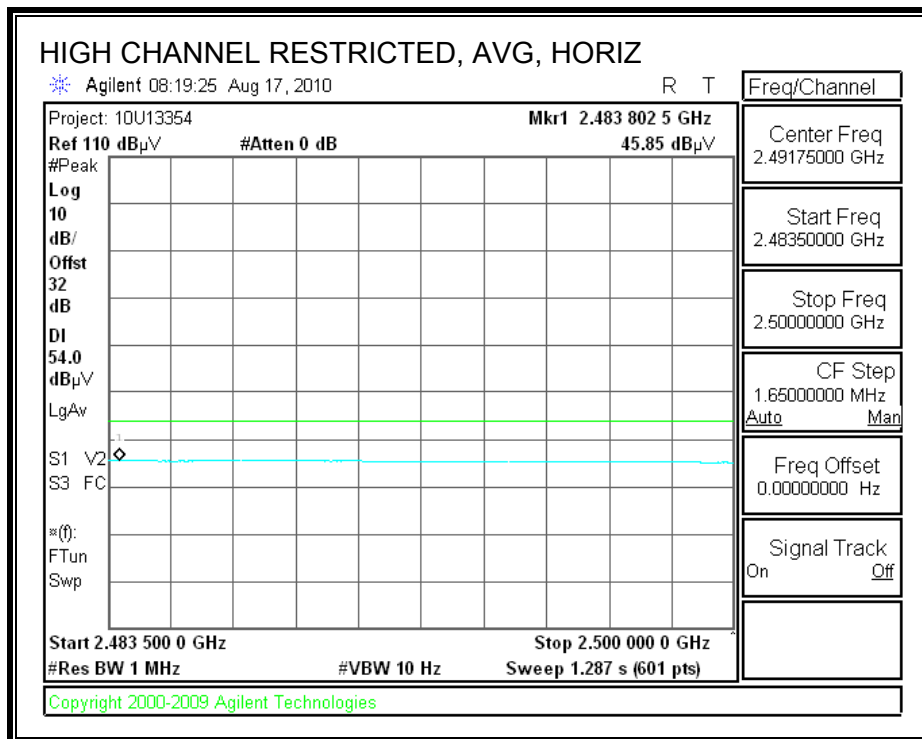
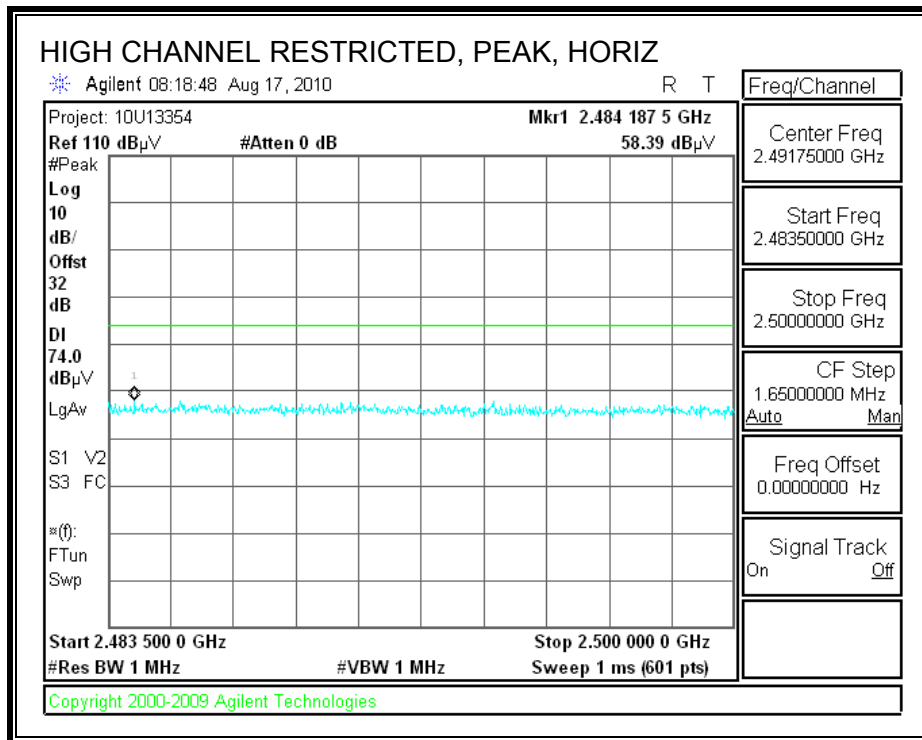
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



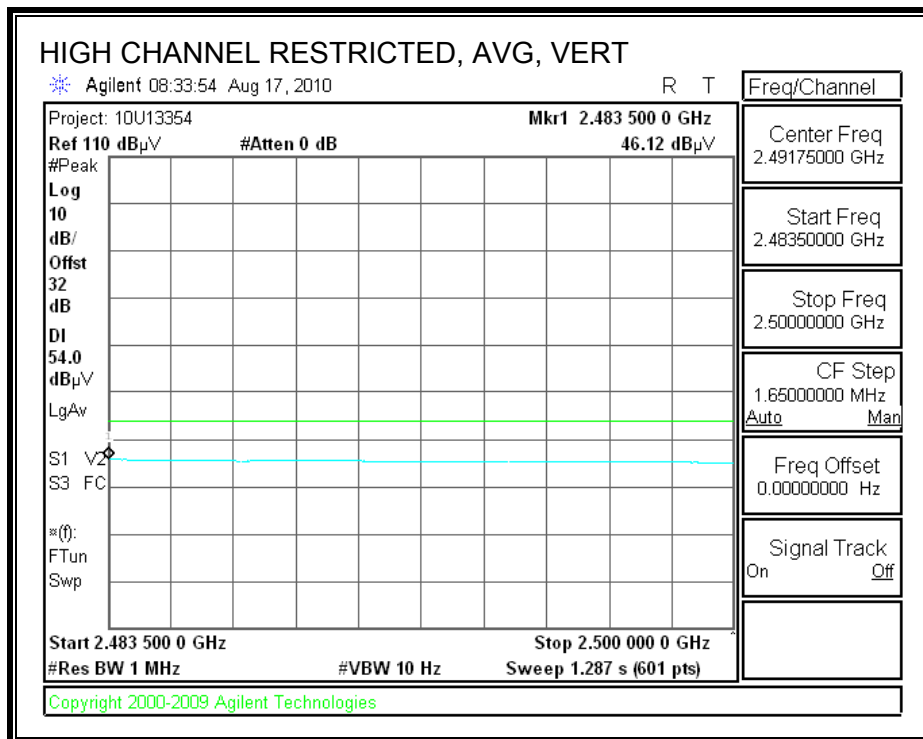
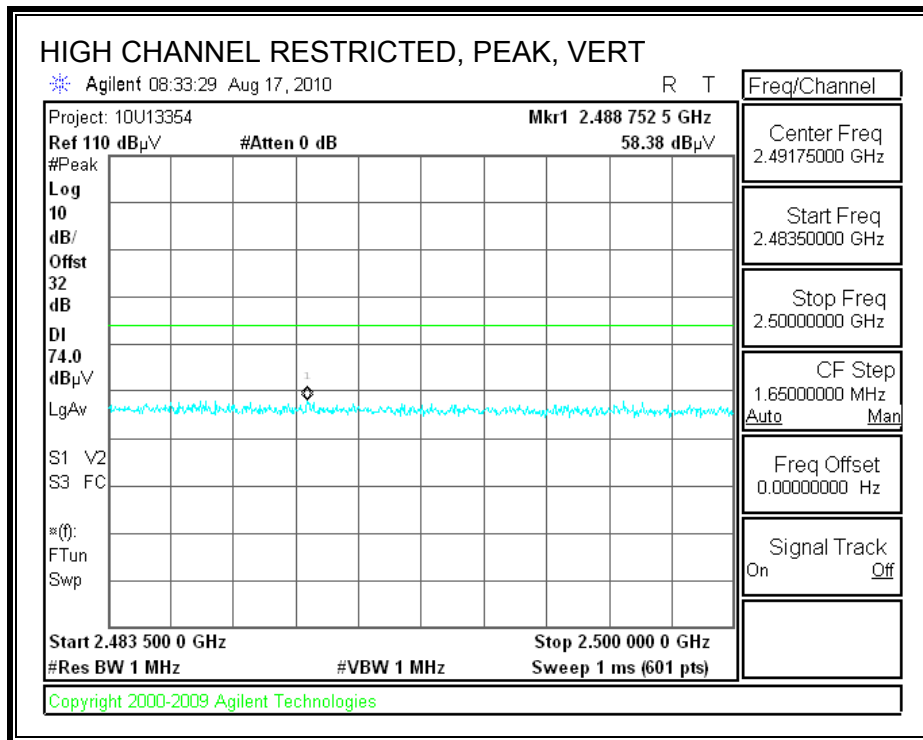
RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANEDGE (HIGH CHANNEL, VERTICAL)

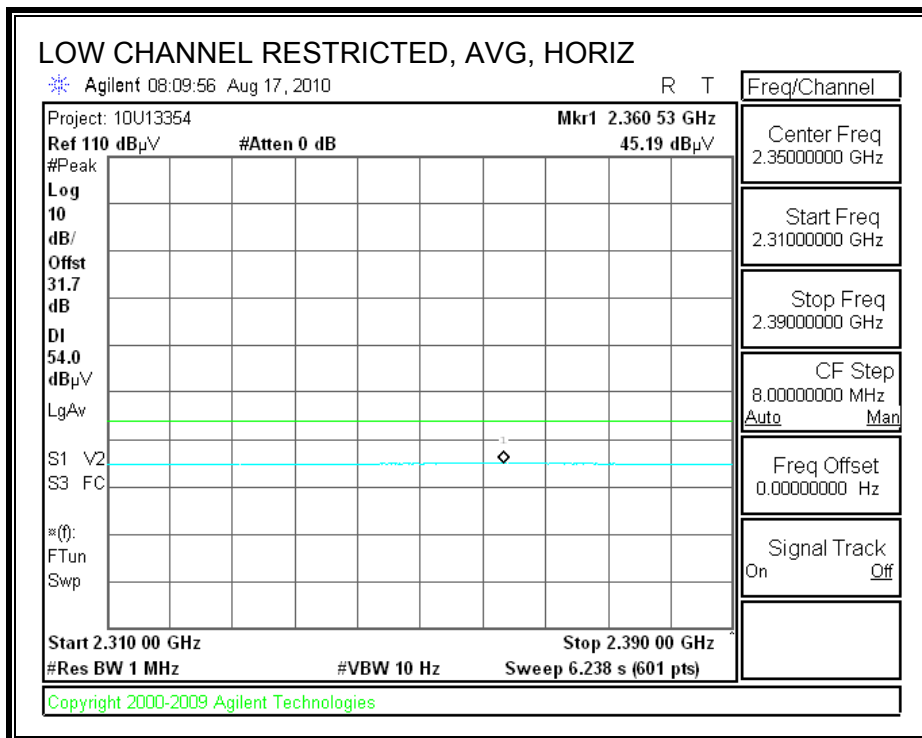
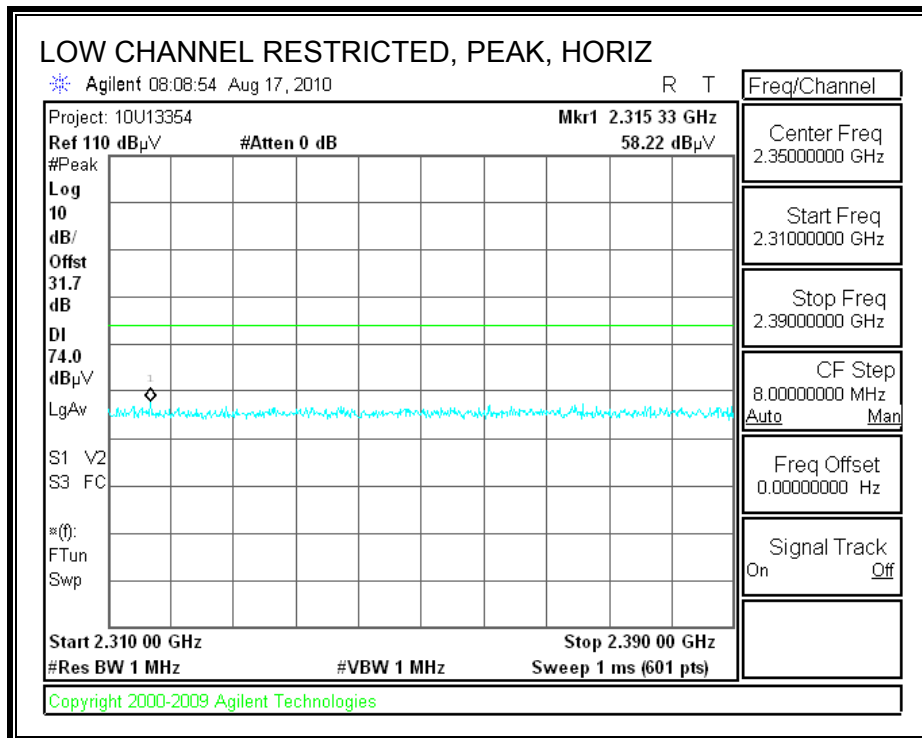


HARMONICS AND SPURIOUS EMISSIONS

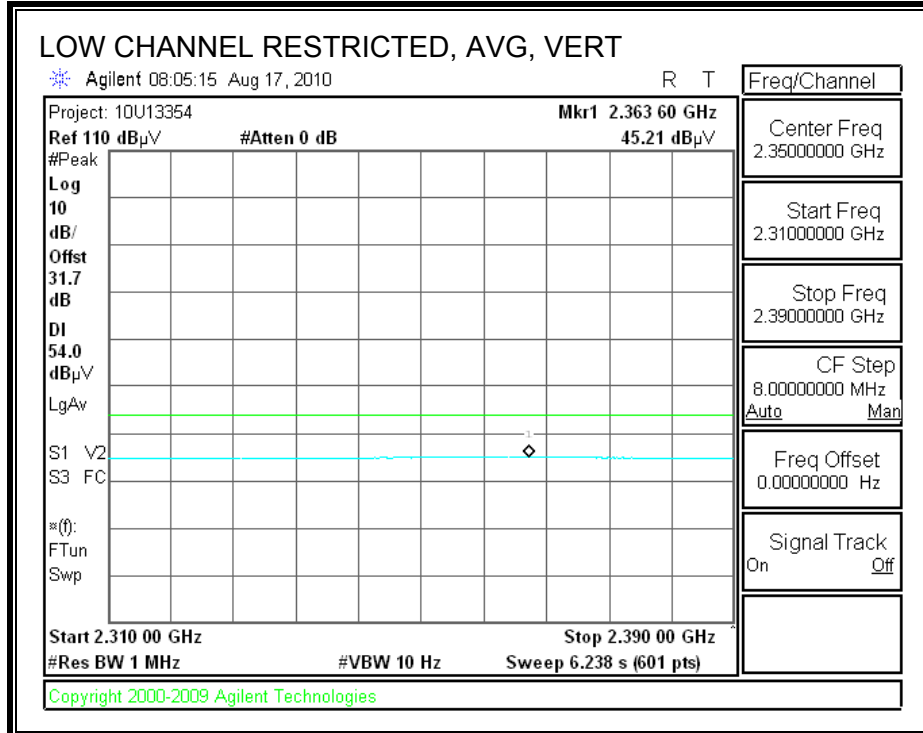
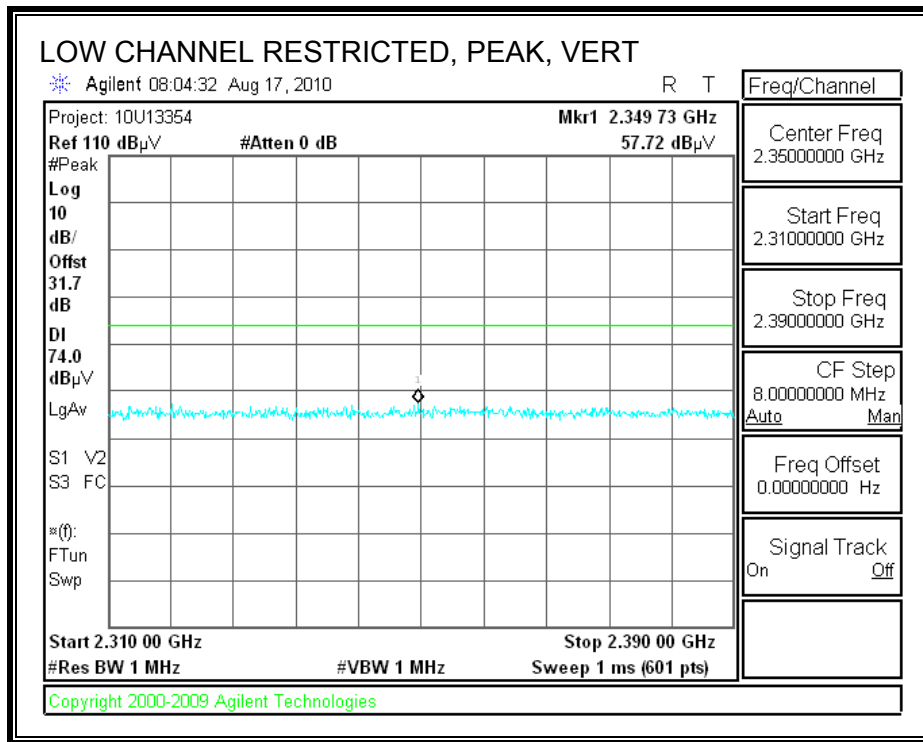
High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Tom Chen											
Date:		08/17/10											
Project #:		10U13354											
Company:		Kyocera Wireless											
EUT Description:		Dual Band Cell Phone with BT + EDR											
EUT M/N:		EUT with Headset											
Test Target:		FCC Class B											
Mode Oper:		Bluetooth TX mode											
f	Measurement Frequency			Amp	Preamp Gain			Average Field Strength Limit					
Dist	Distance to Antenna			D Corr	Distance Correct to 3 meters			Peak Field Strength Limit					
Read	Analyzer Reading			Avg	Average Field Strength @ 3 m			Margin vs. Average Limit					
AF	Antenna Factor			Peak	Calculated Peak Field Strength			Margin vs. Peak Limit					
CL	Cable Loss			HPF	High Pass Filter								
f	Dist	Read	AF	CL	Amp	D Corr	Ftr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
2402 MHz Low CH GFSK													
4.804	3.0	64.6	33.0	5.8	-36.5	0.0	0.0	66.9	74.0	-7.1	H	P	Hori
4.804	3.0	35.9	33.0	5.8	-36.5	0.0	0.0	46.9	54.0	-7.1	H	A	Hori
7.206	3.0	37.2	35.1	7.2	-36.2	0.0	0.0	43.3	74.0	-30.7	H	P	Hori
7.206	3.0	25.3	35.1	7.2	-36.2	0.0	0.0	31.4	54.0	-22.6	H	A	Hori
4.804	3.0	58.2	33.0	5.8	-36.5	0.0	0.0	60.5	74.0	-13.5	V	P	Vert
4.804	3.0	38.2	33.0	5.8	-36.5	0.0	0.0	40.5	54.0	-13.5	V	A	Vert
7.206	3.0	38.2	35.1	7.2	-36.2	0.0	0.0	44.4	74.0	-29.6	V	P	Vert
7.206	3.0	24.9	35.1	7.2	-36.2	0.0	0.0	31.0	54.0	-23.0	V	A	Vert
2441 MHz Mid CH GFSK													
4.882	3.0	61.7	33.1	5.8	-36.5	0.0	0.0	64.2	74.0	-9.8	H	P	Hori
4.882	3.0	32.9	33.1	5.8	-36.5	0.0	0.0	44.2	54.0	-9.8	H	A	Hori
7.323	3.0	37.4	35.3	7.3	-36.2	0.0	0.0	43.7	74.0	-30.3	H	P	Hori
7.323	3.0	25.9	35.3	7.3	-36.2	0.0	0.0	32.3	54.0	-21.7	H	A	Hori
4.882	3.0	56.5	33.1	5.8	-36.5	0.0	0.0	59.0	74.0	-15.0	V	P	Vert
4.882	3.0	28.3	33.1	5.8	-36.5	0.0	0.0	39.0	54.0	-15.0	V	A	Vert
7.323	3.0	36.8	35.3	7.3	-36.2	0.0	0.0	43.1	74.0	-30.9	V	P	Vert
7.323	3.0	24.9	35.3	7.3	-36.2	0.0	0.0	31.2	54.0	-22.8	V	A	Vert
2480 MHz High CH GFSK													
4.960	3.0	63.1	33.2	5.9	-36.5	0.0	0.0	65.7	74.0	-8.3	H	P	Hori
4.960	3.0	34.4	33.2	5.9	-36.5	0.0	0.0	45.7	54.0	-8.3	H	A	Hori
7.440	3.0	37.3	35.5	7.3	-36.2	0.0	0.0	43.9	74.0	-30.1	H	P	Hori
7.440	3.0	24.6	35.5	7.3	-36.2	0.0	0.0	31.2	54.0	-22.8	H	A	Hori
4.960	3.0	62.6	33.2	5.9	-36.5	0.0	0.0	65.2	74.0	-8.8	V	P	Vert
4.960	3.0	42.6	33.2	5.9	-36.5	0.0	0.0	45.2	54.0	-8.8	V	A	Vert
7.440	3.0	37.0	35.5	7.3	-36.2	0.0	0.0	43.6	74.0	-30.4	V	P	Vert
7.440	3.0	24.6	35.5	7.3	-36.2	0.0	0.0	31.2	54.0	-22.8	V	A	Vert
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

7.2.2. ENHANCED DATA RATE 8PSK MODULATION

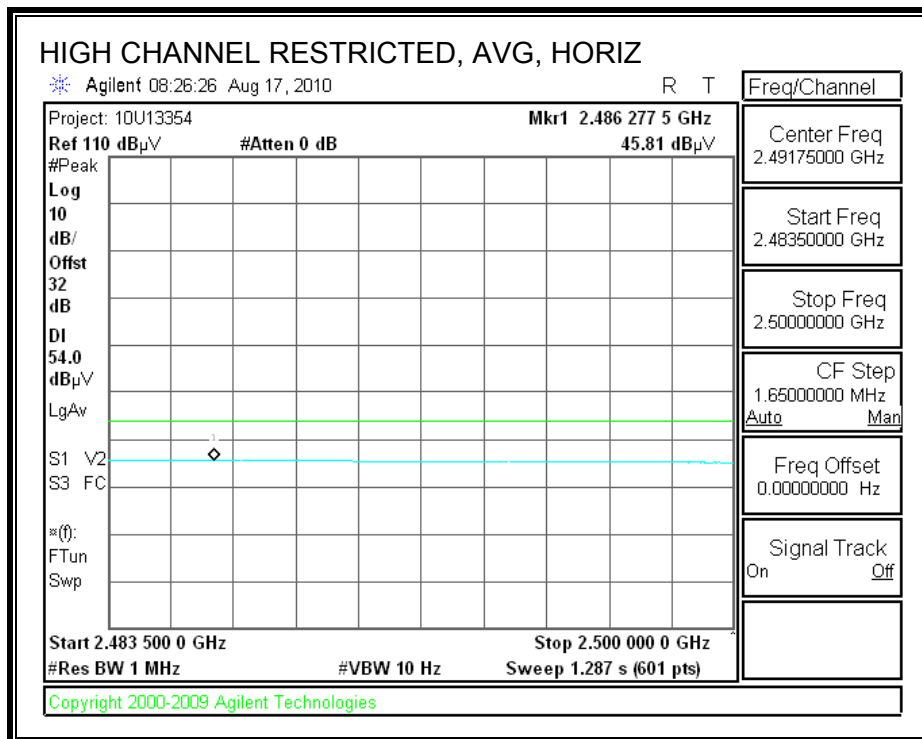
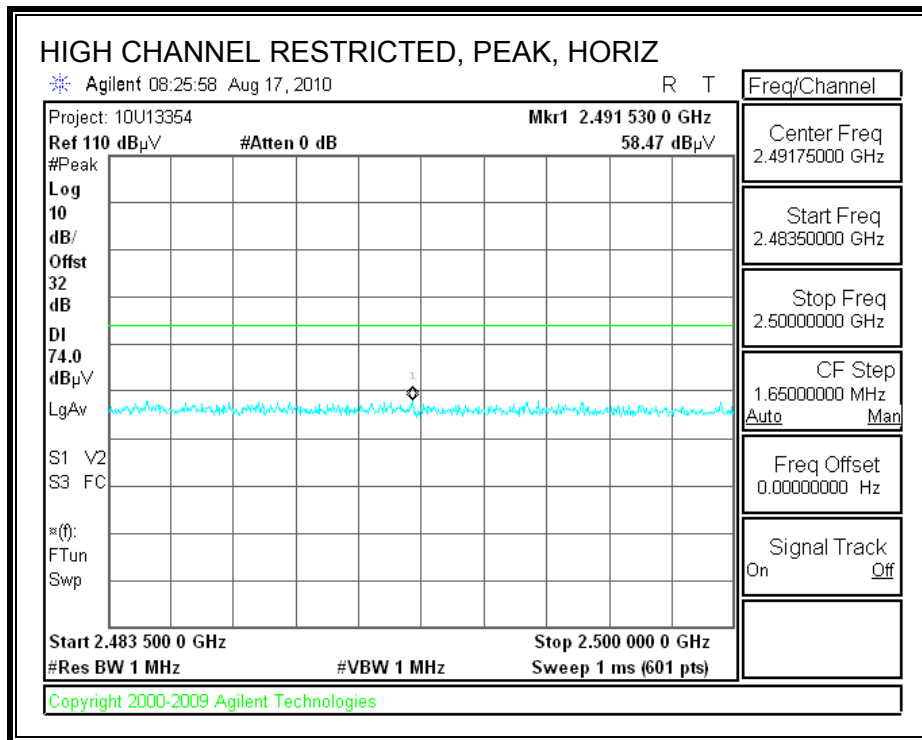
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



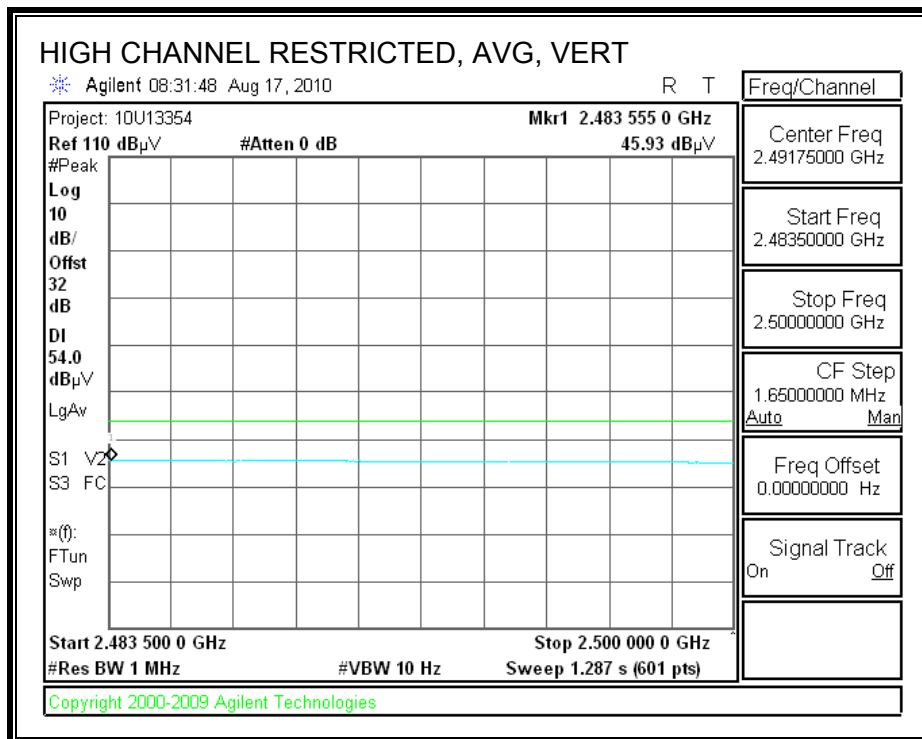
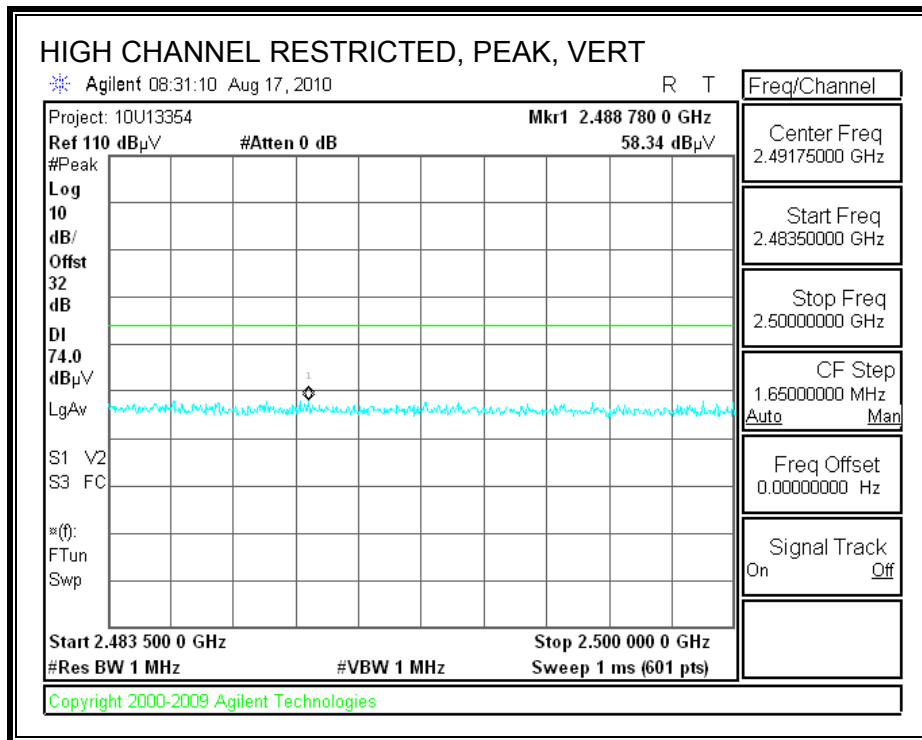
RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANEDGE (HIGH CHANNEL, VERTICAL)



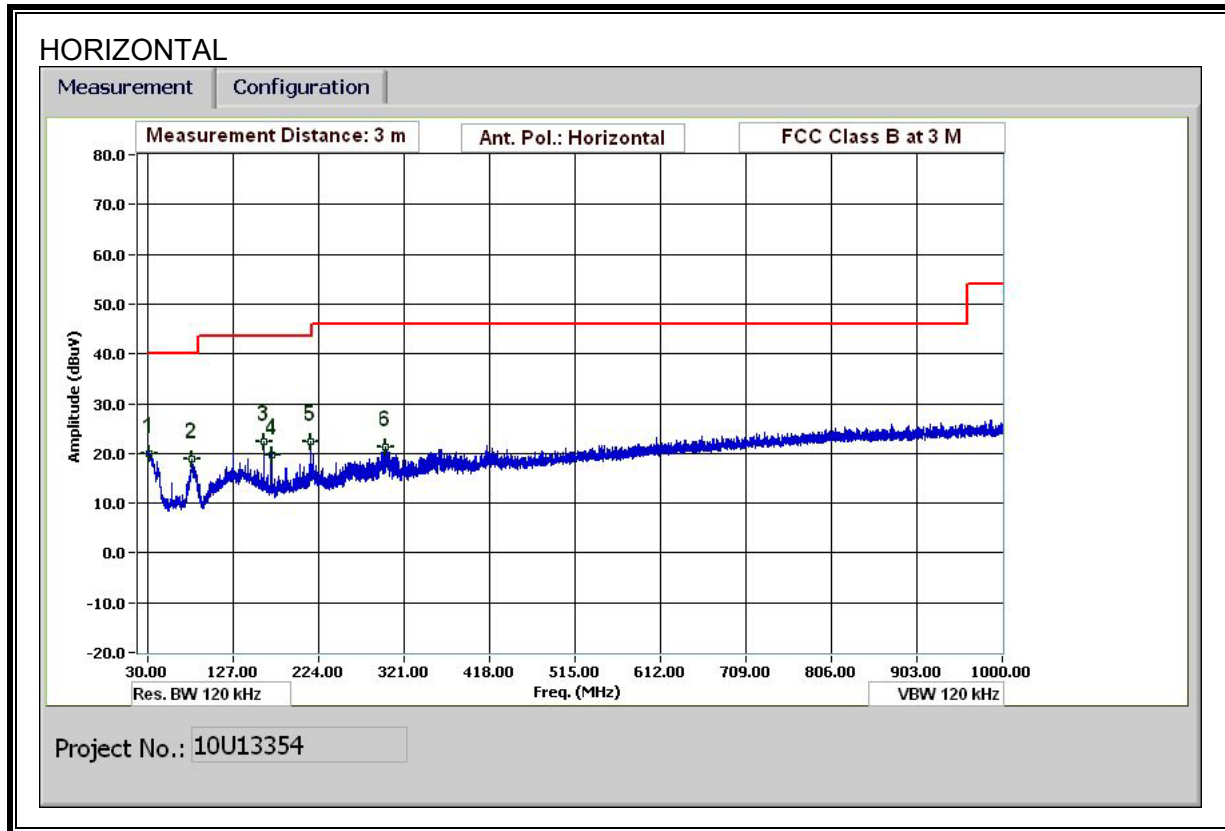
HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
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EUT Description:		Dual Band Cell Phone with BT + EDR											
EUT M/N:		EUT with Headset											
Test Target:		FCC Class B											
Mode Oper:		Bluetooth TX mode											
f	Measurement Frequency			Amp	Preamp Gain			Average Field Strength Limit					
Dist	Distance to Antenna			D Corr	Distance Correct to 3 meters			Peak Field Strength Limit					
Read	Analyzer Reading			Avg	Average Field Strength @ 3 m			Margin vs. Average Limit					
AF	Antenna Factor			Peak	Calculated Peak Field Strength			Margin vs. Peak Limit					
CL	Cable Loss			HPF	High Pass Filter								
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Corr. dB	Limit dB	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
2402 MHz Low CH 8PSK													
4.804	3.0	56.8	33.0	5.8	-36.5	0.0	0.0	59.1	74.0	-14.9	H	P	Hori
4.804	3.0	38.5	33.0	5.8	-36.5	0.0	0.0	40.8	54.0	-13.2	H	A	Hori
7.206	3.0	36.8	35.1	7.2	-36.2	0.0	0.0	43.0	74.0	-31.0	H	P	Hori
7.206	3.0	24.9	35.1	7.2	-36.2	0.0	0.0	31.0	54.0	-23.0	H	A	Hori
4.804	3.0	49.0	33.0	5.8	-36.5	0.0	0.0	51.3	74.0	-22.7	V	P	Vert
4.804	3.0	32.9	33.0	5.8	-36.5	0.0	0.0	35.2	54.0	-18.8	V	A	Vert
7.206	3.0	37.2	35.1	7.2	-36.2	0.0	0.0	43.3	74.0	-30.7	V	P	Vert
7.206	3.0	24.7	35.1	7.2	-36.2	0.0	0.0	30.8	54.0	-23.2	V	A	Vert
2441 MHz Mid CH 8PSK													
4.882	3.0	53.9	33.1	5.8	-36.5	0.0	0.0	56.4	74.0	-17.6	H	P	Hori
4.882	3.0	31.2	33.1	5.8	-36.5	0.0	0.0	33.7	54.0	-20.3	H	A	Hori
7.323	3.0	36.7	35.3	7.3	-36.2	0.0	0.0	43.1	74.0	-30.9	H	P	Hori
7.323	3.0	24.7	35.3	7.3	-36.2	0.0	0.0	31.0	54.0	-23.0	H	A	Hori
4.882	3.0	49.6	33.1	5.8	-36.5	0.0	0.0	52.1	74.0	-21.9	V	P	Vert
4.882	3.0	28.3	33.1	5.8	-36.5	0.0	0.0	30.8	54.0	-23.2	V	A	Vert
7.323	3.0	37.6	35.3	7.3	-36.2	0.0	0.0	44.0	74.0	-30.1	V	P	Vert
7.323	3.0	24.6	35.3	7.3	-36.2	0.0	0.0	30.9	54.0	-23.1	V	A	Vert
2480 MHz High CH 8PSK													
4.960	3.0	53.4	33.2	5.9	-36.5	0.0	0.0	56.1	74.0	-17.9	H	P	Hori
4.960	3.0	36.2	33.2	5.9	-36.5	0.0	0.0	38.8	54.0	-15.2	H	A	Hori
7.440	3.0	37.7	35.5	7.3	-36.2	0.0	0.0	44.3	74.0	-29.7	H	P	Hori
7.440	3.0	24.6	35.5	7.3	-36.2	0.0	0.0	31.2	54.0	-22.8	H	A	Hori
4.960	3.0	54.5	33.2	5.9	-36.5	0.0	0.0	57.1	74.0	-16.9	V	P	Vert
4.960	3.0	37.1	33.2	5.9	-36.5	0.0	0.0	39.8	54.0	-14.2	V	A	Vert
7.440	3.0	36.5	35.5	7.3	-36.2	0.0	0.0	43.2	74.0	-30.8	V	P	Vert
7.440	3.0	24.6	35.5	7.3	-36.2	0.0	0.0	31.2	54.0	-22.8	V	A	Vert
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

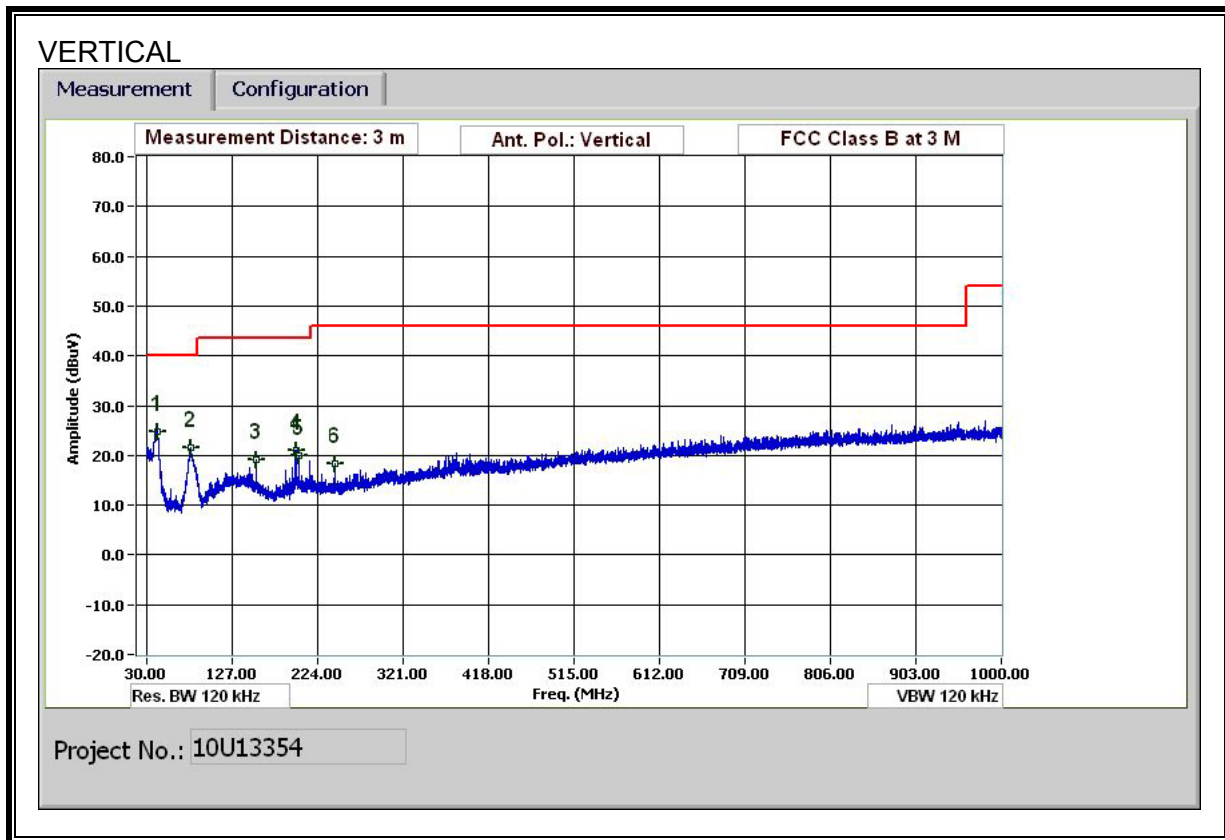
7.3. WORST-CASE BELOW 1 GHz

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

PLOTS



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



DATA

30-1000MHz Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Tom Chen											
Date:		08/17/10											
Project #:		10U13354											
Company:		Kyocera Wireless											
EUT Description:		Dual Band Cell Phone with BT + EDR											
EUT M/N:		EUT with Headset											
Test Target:		FCC Class B											
Mode Oper:		Bluetooth TX mode											
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	Dist	Read	AF	CL	Amp	D Corr	Filter	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
MHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
Horizontal													
31.560	3.0	28.4	19.4	0.5	28.4	0.0	0.0	20.0	40.0	-20.0	H	P	
80.402	3.0	39.1	7.3	0.8	28.3	0.0	0.0	18.9	40.0	-21.1	H	P	
161.525	3.0	38.0	11.5	1.1	28.2	0.0	0.0	22.4	43.5	-21.1	H	P	
170.406	3.0	36.1	10.8	1.2	28.2	0.0	0.0	19.8	43.5	-23.7	H	P	
214.808	3.0	37.5	11.9	1.3	28.2	0.0	0.0	22.5	43.5	-21.0	H	P	
299.771	3.0	34.5	13.4	1.5	28.1	0.0	0.0	21.3	46.0	-24.7	H	P	
Vertical													
42.120	3.0	40.1	12.6	0.6	28.4	0.0	0.0	24.8	40.0	-15.2	V	P	
80.042	3.0	41.8	7.3	0.8	28.3	0.0	0.0	21.6	40.0	-18.4	V	P	
154.805	3.0	34.1	12.2	1.1	28.3	0.0	0.0	19.2	43.5	-24.3	V	P	
199.087	3.0	36.2	11.9	1.2	28.2	0.0	0.0	21.1	43.5	-22.4	V	P	
202.687	3.0	35.0	12.0	1.3	28.2	0.0	0.0	20.0	43.5	-23.5	V	P	
243.369	3.0	33.5	11.8	1.3	28.2	0.0	0.0	18.5	46.0	-27.5	V	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.

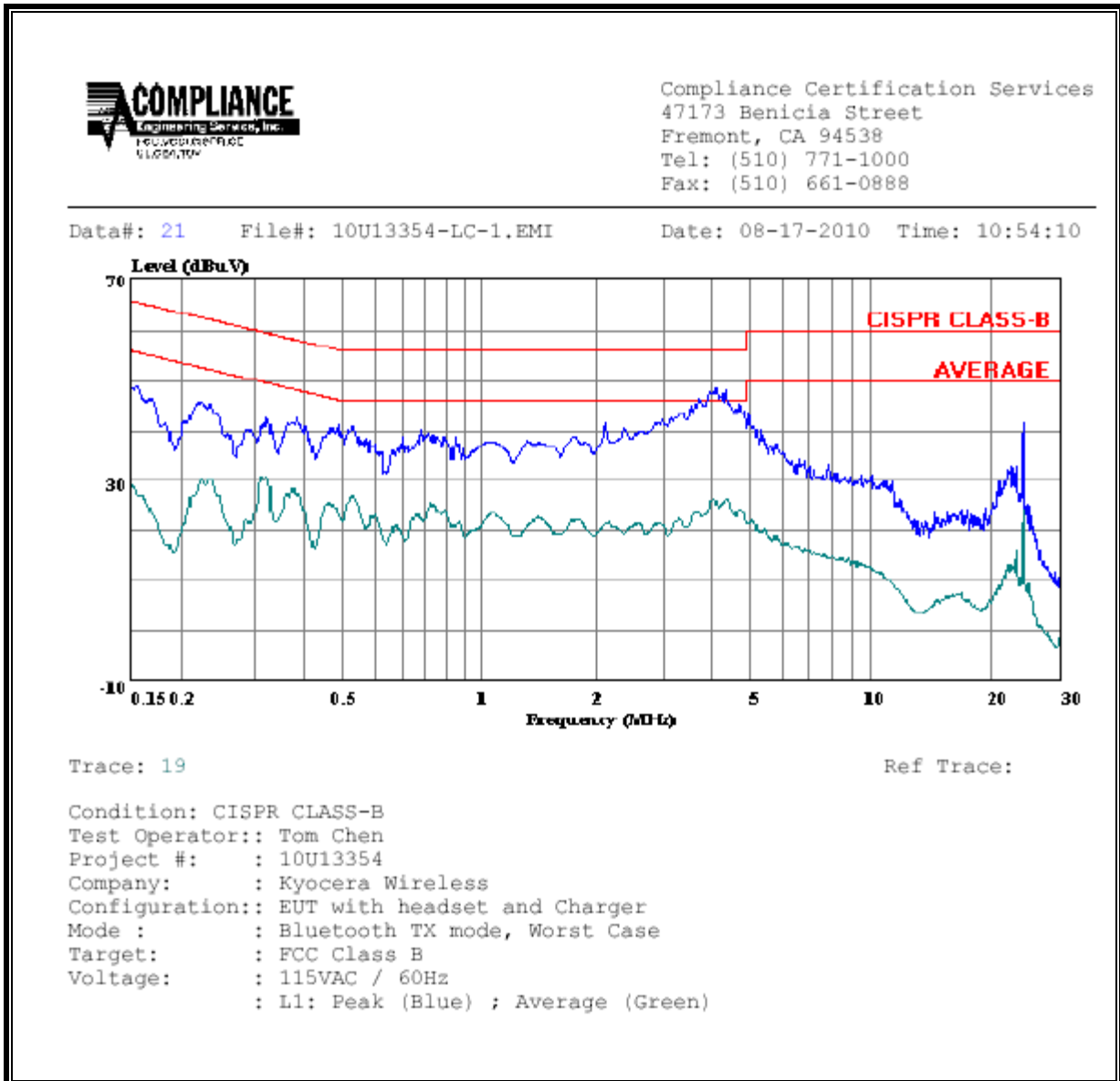
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

6 WORST EMISSIONS (EUT WITH AC ADAPTER)

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Class	Limit	EN_B	Margin		Remark
(MHz)	PK (dBUV)	QP (dBUV)	AV (dBUV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.16	48.94	--	27.18	0.00	65.73	55.73	-16.79	-28.55	L1
0.49	41.26	--	23.40	0.00	56.24	46.24	-14.98	-22.84	L1
4.20	48.66	--	25.88	0.00	56.00	46.00	-7.34	-20.12	L1
0.22	49.90	--	33.74	0.00	62.74	52.74	-12.84	-19.00	L2
0.32	47.48	--	35.65	0.00	59.84	49.84	-12.36	-14.19	L2
4.38	44.24	--	27.06	0.00	56.00	46.00	-11.76	-18.94	L2
6 Worst Data									

LINE 1 RESULTS



LINE 2 RESULTS

