



**FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 7
CLASS II PERMISSIVE CHANGE**

CERTIFICATION TEST REPORT

FOR
BLUETOOTH TRANSCEIVER MODULE

MODEL NUMBER: BCM92046MD_MINI

FCC ID: QDS-BRCM1037

IC: 4324A-BRCM1037

REPORT NUMBER: 08U12210-1

ISSUE DATE: NOVEMBER 11, 2008

Prepared for

**BROADCOM CORPORATION
190 MATHILDA PLACE
SUNNYVALE, CA 94086, U.S.A.**

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

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
<u>---</u>	<u>11/11/08</u>	<u>Initial Issue</u>	<u>T. Chan</u>
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: BROADCOM CORPORATION
190 MATHILDA PLACE
SUNNYVALE, CA 94086, U.S.A

EUT DESCRIPTION: BLUETOOTH TRANSCEIVER MODULE

MODEL: BCM92046MD_MINI

SERIAL NUMBER: 22

DATE TESTED: NOVEMBER 6 – 7, 2008

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
RSS-210 Issue 7 Annex 8 and RSS-GEN Issue 2	Pass

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

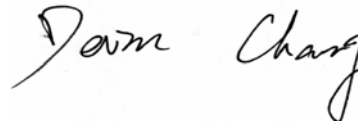
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:



THU CHAN
EMC MANAGER
COMPLIANCE CERTIFICATION SERVICES

Tested By:



DEVIN CHANG
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, FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

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. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 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 transceiver.

The radio module is manufactured by Universal Scientific Industrial (Shanghai) Co., Ltd.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The major change filed under this application is adding a new antenna (Amphenol, 631-0969).

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an antenna, with a maximum gain of -7.46 dBi.

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during testing was Broadcom, rev.5.1.0.1400.

The test utility software used during testing was Broadcom Blue Tool, rev. 1.0.0.6

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case Bluetooth channel is determined as the channel with the highest output power.

The worst-case modulation is determined to be 8PSK modulation, based on original test report 08U11678.

Only the Radiated Emission tests are performed.

During emission tests the antenna orientations as X, Y, and Z were investigated to determine the worst-case. The outcome showed that Y-orientation as the worst-case.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	HP	Pavillion DV6000	CNF6511956	DoC
AC Adapter	HP	PPP009H	1UW0629000813	N/A

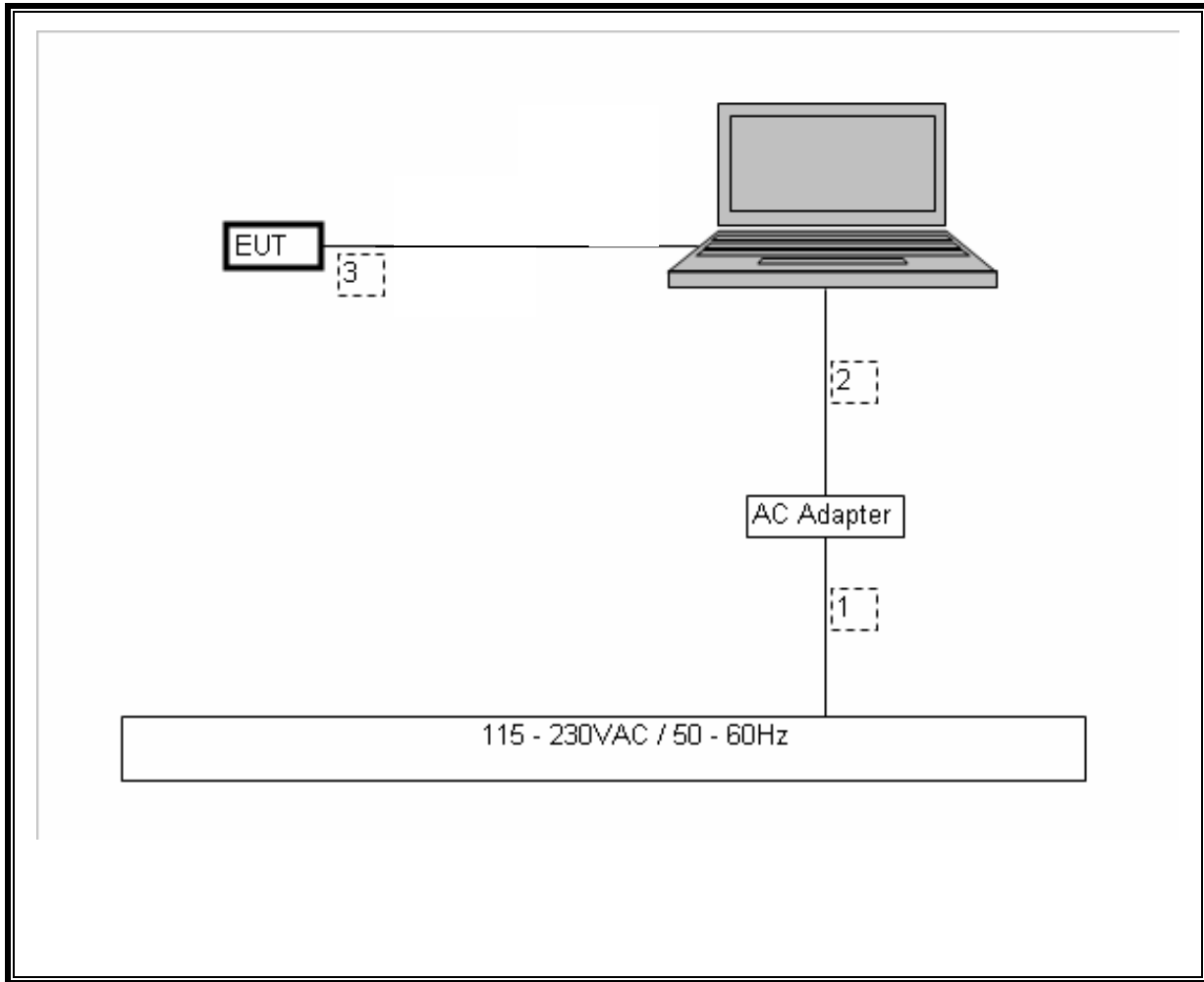
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US115V	Unshielded	1.8m	N/A
2	DC	1	DC	Unshielded	1.8m	N/A
3	USB	1	Ribbon Cable	Unshielded	.15m	EUT / Adapter Board

TEST SETUP

The EUT is connected to a host laptop computer via an USB cable during the tests. Test software exercised the radio card.

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
Horn Antenna	ETS	3117	C01005	04/22/09
Bilog Antenna	Sunol Sciences	JB1	C01016	02/11/09
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	11/27/08
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	03/31/09
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	09/19/09
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	03/03/09

7. RADIATED TEST RESULTS

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.

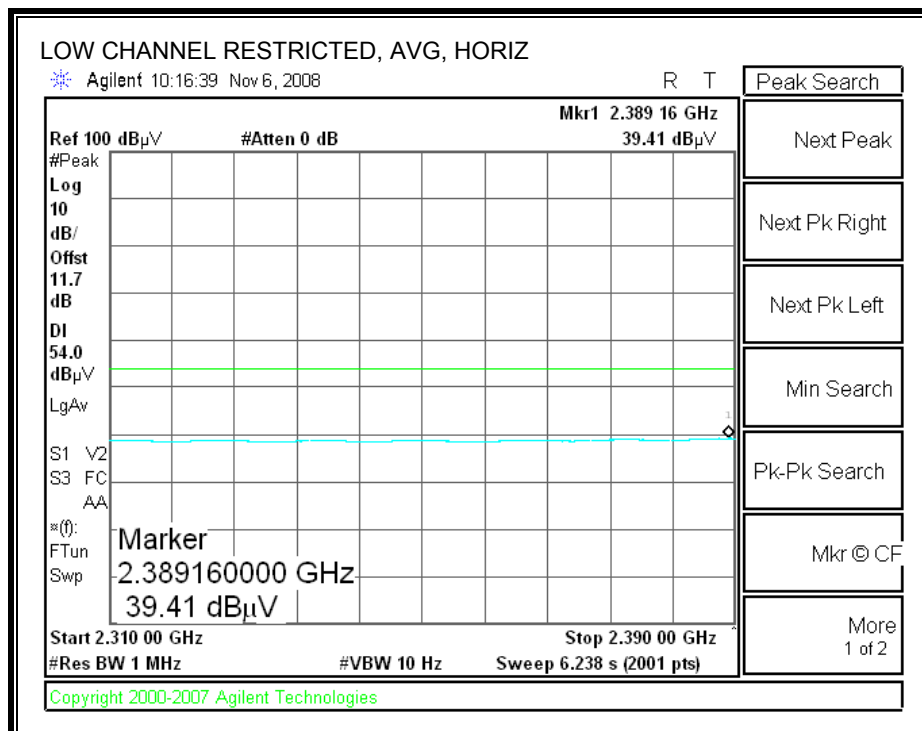
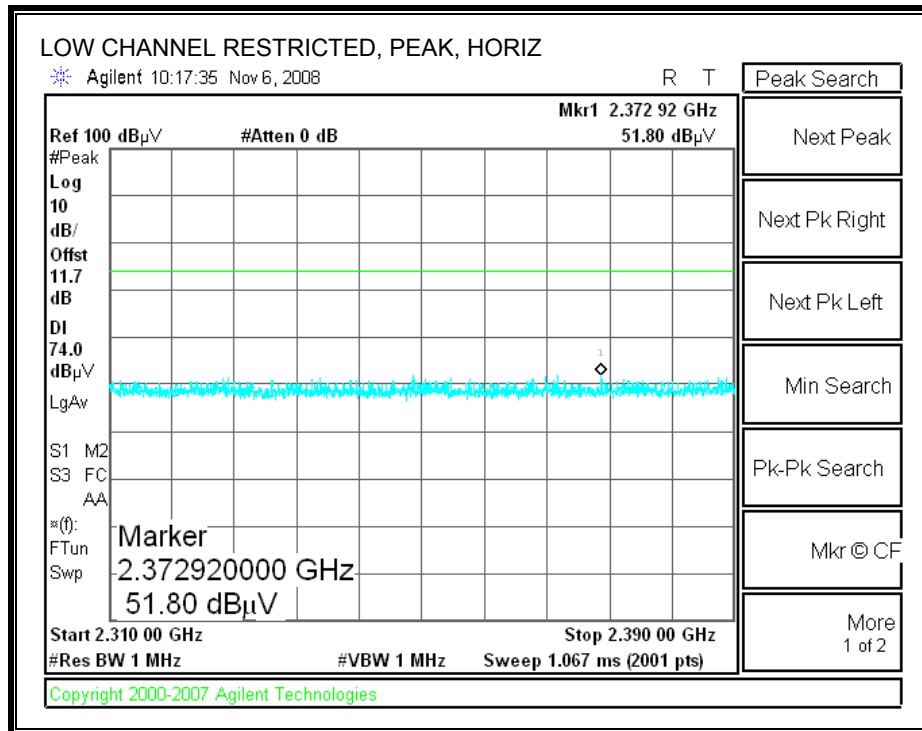
For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

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

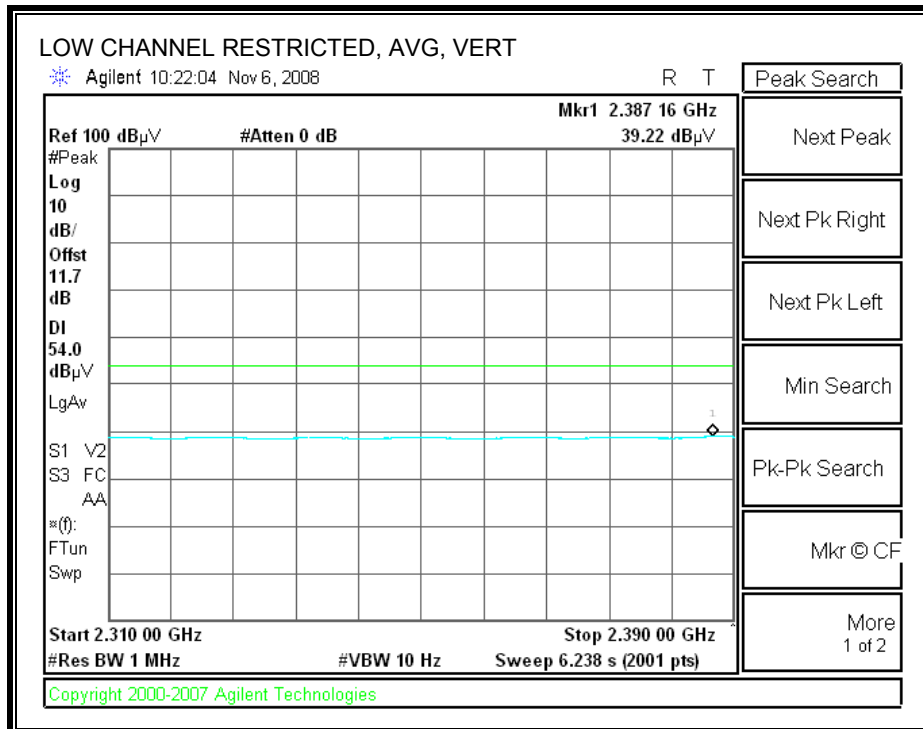
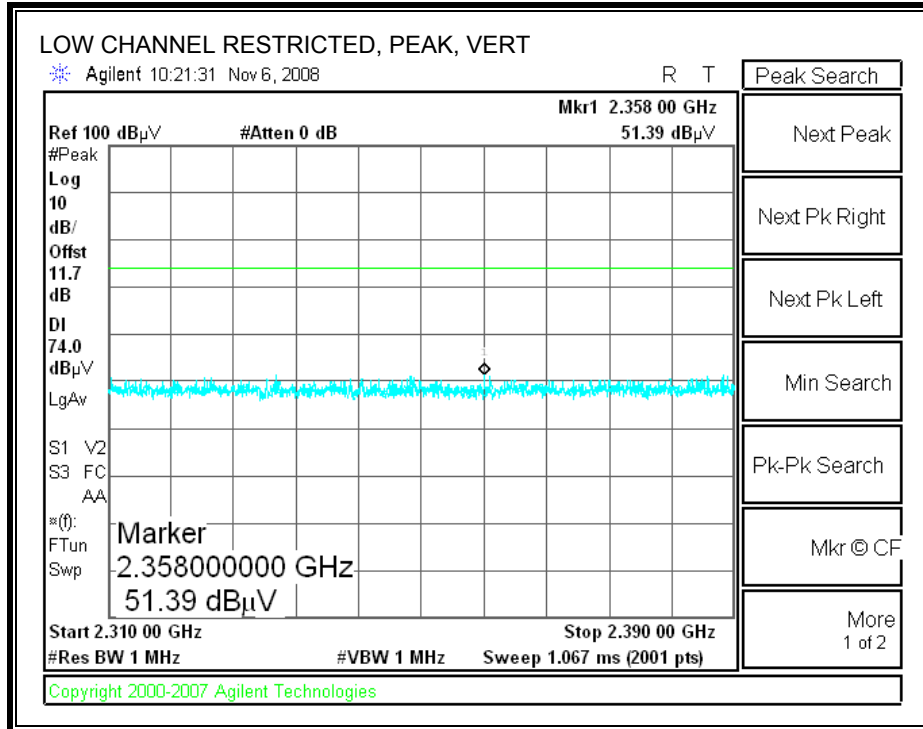
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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.

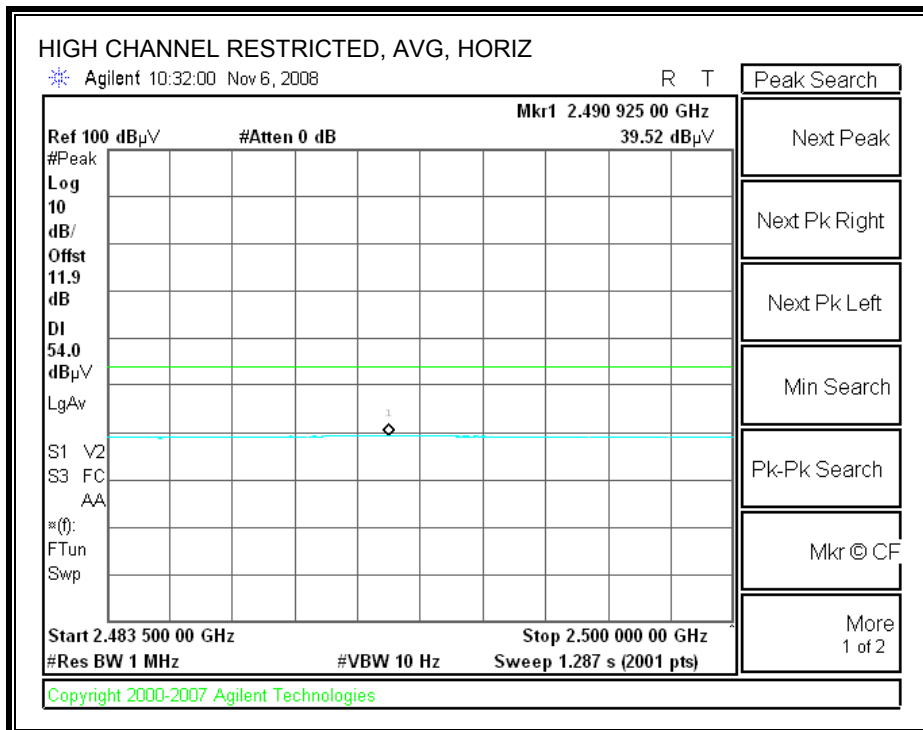
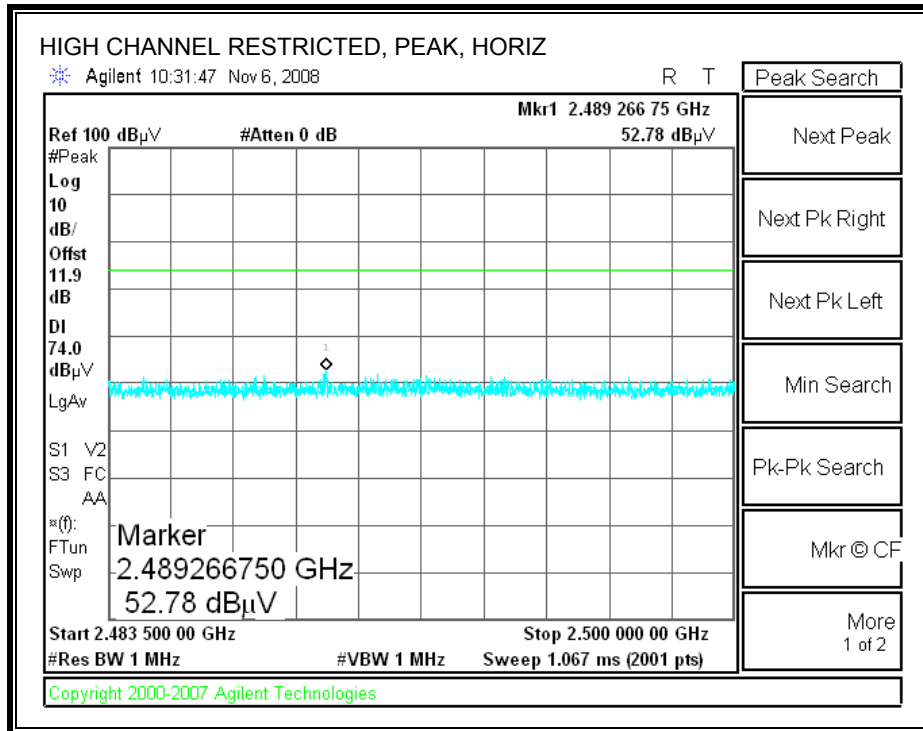
7.1. TRANSMITTER ABOVE 1 GHz (WORST CASE)
7.1.1. 8PSK MODULATION
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



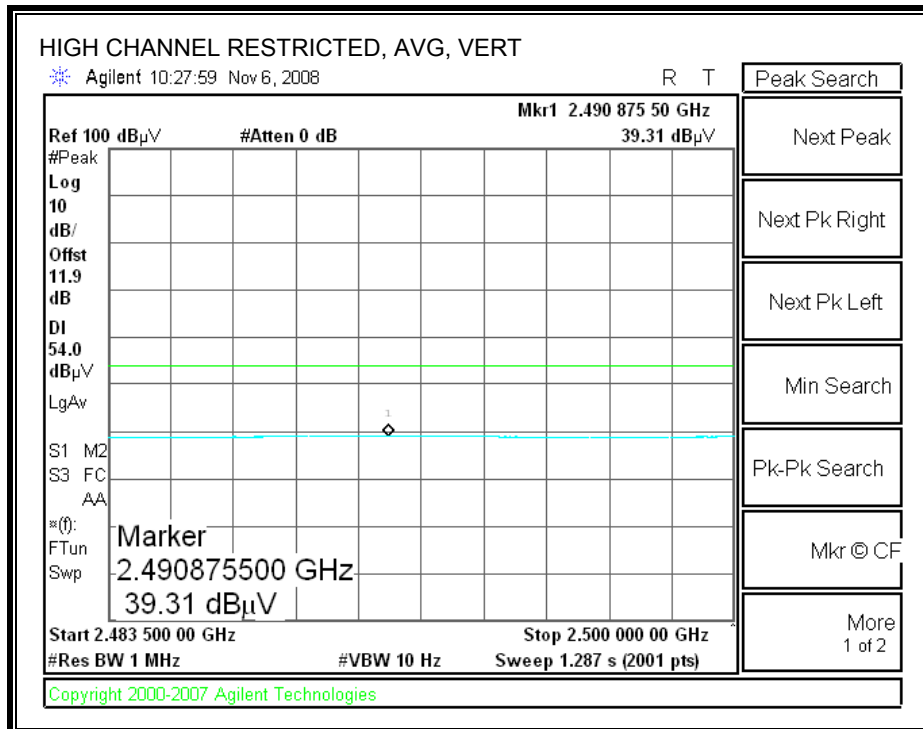
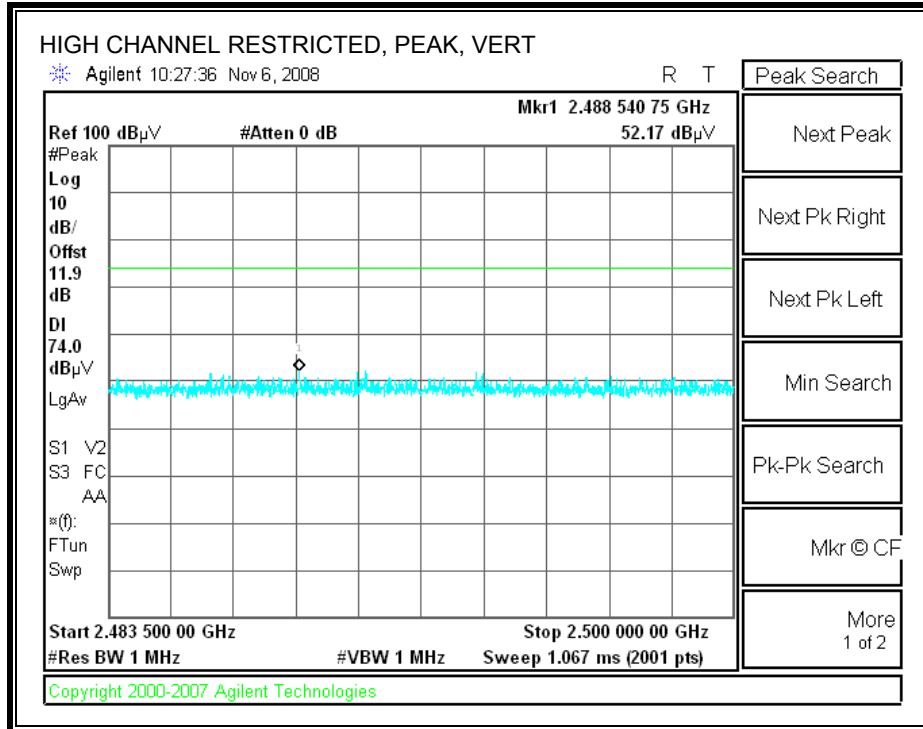
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS – 8PSK MODE

High Frequency Measurement															
Compliance Certification Services, Fremont 5m Chamber															
Test Engr:		Devin Chang													
Date:		10/17/08													
Project #:		08U12210													
Company:		BROADCOM													
EUT Description:		EUT with Laptop													
EUT M/N:		BCM92046MD_MINI													
Test Target:		FCC Part 15.205													
Mode Oper:		8PSK_Tx Mode_Y axis													
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	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
2402MHz															
1.607	3.0	59.5	30.0	4.0	-35.7	0.0	0.0	57.8	74.0	-16.2	V	P	100.0	19.6	
1.607	3.0	40.2	30.0	4.0	-35.7	0.0	0.0	38.6	54.0	-15.4	V	A	100.0	19.6	
4.501	3.0	41.2	33.5	6.8	-34.8	0.0	0.0	46.8	74.0	-27.2	V	P	100.6	157.6	
4.501	3.0	35.1	33.5	6.8	-34.8	0.0	0.0	40.7	54.0	-13.4	V	A	100.6	157.6	
4.804	3.0	38.1	33.7	7.1	-34.8	0.0	0.0	44.0	74.0	-30.0	V	P	196.3	47.1	
4.804	3.0	25.0	33.7	7.1	-34.8	0.0	0.0	30.9	54.0	-23.1	V	A	196.3	47.1	
1.607	3.0	55.2	30.0	4.0	-35.7	0.0	0.0	53.6	74.0	-20.4	H	P	130.1	93.0	
1.607	3.0	36.7	30.0	4.0	-35.7	0.0	0.0	35.1	54.0	-18.9	H	A	130.1	93.0	
4.501	3.0	40.0	33.5	6.8	-34.8	0.0	0.0	45.6	74.0	-28.4	H	P	114.3	76.6	
4.501	3.0	33.2	33.5	6.8	-34.8	0.0	0.0	38.8	54.0	-15.2	H	A	114.3	76.6	
4.804	3.0	37.7	33.7	7.1	-34.8	0.0	0.0	43.7	74.0	-30.3	H	P	144.4	104.7	
4.804	3.0	25.1	33.7	7.1	-34.8	0.0	0.0	31.0	54.0	-23.0	H	A	144.4	104.7	
2441MHz															
1.607	3.0	59.0	30.0	4.0	-35.7	0.0	0.0	57.3	74.0	-16.7	V	P	102.5	25.5	
1.607	3.0	39.3	30.0	4.0	-35.7	0.0	0.0	37.7	54.0	-16.3	V	A	102.5	25.5	
4.500	3.0	41.6	33.5	6.8	-34.8	0.0	0.0	47.2	74.0	-26.8	V	P	100.0	152.6	
4.500	3.0	34.9	33.5	6.8	-34.8	0.0	0.0	40.5	54.0	-13.5	V	A	100.0	152.6	
4.882	3.0	37.6	33.7	7.2	-34.9	0.0	0.0	43.7	74.0	-30.3	V	P	101.5	352.3	
4.882	3.0	24.8	33.7	7.2	-34.9	0.0	0.0	30.9	54.0	-23.1	V	A	101.5	352.3	
7.323	3.0	35.6	35.2	8.7	-34.7	0.0	0.0	44.7	74.0	-29.3	V	P	165.8	54.0	
7.323	3.0	23.7	35.2	8.7	-34.7	0.0	0.0	32.8	54.0	-21.2	V	A	165.8	54.0	
1.607	3.0	54.5	30.0	4.0	-35.7	0.0	0.0	52.9	74.0	-21.1	H	P	100.6	96.0	
1.607	3.0	36.0	30.0	4.0	-35.7	0.0	0.0	34.3	54.0	-19.7	H	A	100.6	96.0	
4.500	3.0	41.0	33.5	6.8	-34.8	0.0	0.0	46.5	74.0	-27.5	H	P	113.4	76.3	
4.500	3.0	33.4	33.5	6.8	-34.8	0.0	0.0	39.0	54.0	-15.0	H	A	113.4	76.3	
4.882	3.0	36.9	33.7	7.2	-34.9	0.0	0.0	42.9	74.0	-31.1	H	P	101.2	359.7	
4.882	3.0	25.0	33.7	7.2	-34.9	0.0	0.0	31.1	54.0	-22.9	H	A	101.2	359.7	
7.323	3.0	36.7	35.2	8.7	-34.7	0.0	0.0	45.9	74.0	-28.1	H	P	100.3	353.1	
7.323	3.0	23.7	35.2	8.7	-34.7	0.0	0.0	32.8	54.0	-21.2	H	A	100.3	353.1	
2480MHz															
1.607	3.0	60.3	30.0	4.0	-35.7	0.0	0.0	58.6	74.0	-15.4	V	P	100.0	17.5	
1.607	3.0	40.5	30.0	4.0	-35.7	0.0	0.0	38.9	54.0	-15.1	V	A	100.0	17.5	
4.500	3.0	42.0	33.5	6.8	-34.8	0.0	0.0	47.5	74.0	-26.5	V	P	100.0	85.3	
4.500	3.0	36.6	33.5	6.8	-34.8	0.0	0.0	42.1	54.0	-11.9	V	A	100.0	85.3	
4.960	3.0	37.4	33.8	7.2	-34.9	0.0	0.0	43.5	74.0	-30.5	V	P	101.8	1.5	
4.960	3.0	25.0	33.8	7.2	-34.9	0.0	0.0	31.1	54.0	-22.9	V	A	101.8	1.5	
7.440	3.0	36.1	35.2	8.7	-34.6	0.0	0.0	45.4	74.0	-28.6	V	P	137.3	194.4	
7.440	3.0	24.5	35.2	8.7	-34.6	0.0	0.0	33.7	54.0	-20.3	V	A	137.3	194.4	
1.607	3.0	59.3	30.0	4.0	-35.7	0.0	0.0	57.7	74.0	-16.4	H	P	132.3	62.9	
1.607	3.0	39.2	30.0	4.0	-35.7	0.0	0.0	37.6	54.0	-16.4	H	A	132.3	62.9	
4.500	3.0	40.1	33.5	6.8	-34.8	0.0	0.0	45.7	74.0	-28.3	H	P	100.0	3.1	
4.500	3.0	32.6	33.5	6.8	-34.8	0.0	0.0	38.2	54.0	-15.8	H	A	100.0	3.1	
4.960	3.0	37.1	33.8	7.2	-34.9	0.0	0.0	43.2	74.0	-30.8	H	P	132.0	136.5	
4.960	3.0	25.2	33.8	7.2	-34.9	0.0	0.0	31.3	54.0	-22.7	H	A	132.0	136.5	
7.440	3.0	36.5	35.2	8.7	-34.6	0.0	0.0	45.8	74.0	-28.2	H	P	120.3	281.8	
7.440	3.0	24.5	35.2	8.7	-34.6	0.0	0.0	33.7	54.0	-20.3	H	A	120.3	281.8	

Rev. 4.1.2.7

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

7.2. RECEIVER ABOVE 1 GHz

High Frequency Measurement															
Compliance Certification Services, Fremont 5m Chamber															
Test Engr:		Devin Chang													
Date:		10/17/08													
Project #:		08U12210													
Company:		BROADCOM													
EUT Description:		EUT with Laptop													
EUT M/N:		BCM92046MD_MINI													
Test Target:		FCC Part 15.205													
Mode Oper:		8PSK_Rx Mode_Y axis													
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	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
1.205	3.0	44.3	28.5	3.5	-36.0	0.0	0.0	40.2	74.0	-33.8	V	P	174.2	126.2	
1.205	3.0	31.7	28.5	3.5	-36.0	0.0	0.0	27.7	54.0	-26.3	V	A	174.2	126.2	
1.607	3.0	60.1	30.0	4.0	-35.7	0.0	0.0	58.5	74.0	-15.5	V	P	100.1	17.0	
1.607	3.0	40.6	30.0	4.0	-35.7	0.0	0.0	39.0	54.0	-15.0	V	A	100.1	17.0	
3.000	3.0	46.9	32.5	5.6	-35.2	0.0	0.0	49.7	74.0	-24.3	V	P	102.0	59.8	
3.000	3.0	43.5	32.5	5.6	-35.2	0.0	0.0	46.3	54.0	-7.7	V	A	102.0	59.8	
4.500	3.0	41.6	33.5	6.8	-34.8	0.0	0.0	47.1	74.0	-26.9	V	P	100.0	85.2	
4.500	3.0	36.8	33.5	6.8	-34.8	0.0	0.0	42.3	54.0	-11.7	V	A	100.0	85.2	
1.205	3.0	47.1	28.5	3.5	-36.0	0.0	0.0	43.0	74.0	-31.0	H	P	103.7	213.8	
1.205	3.0	33.9	28.5	3.5	-36.0	0.0	0.0	29.9	54.0	-24.1	H	A	103.7	213.8	
1.607	3.0	58.5	30.0	4.0	-35.7	0.0	0.0	56.8	74.0	-17.2	H	P	136.2	63.9	
1.607	3.0	38.9	30.0	4.0	-35.7	0.0	0.0	37.3	54.0	-16.7	H	A	136.2	63.9	
3.000	3.0	43.4	32.5	5.6	-35.2	0.0	0.0	46.2	74.0	-27.8	H	P	100.0	123.5	
3.000	3.0	37.5	32.5	5.6	-35.2	0.0	0.0	40.3	54.0	-13.7	H	A	100.0	123.5	
4.500	3.0	39.0	33.5	6.8	-34.8	0.0	0.0	44.6	74.0	-29.4	H	P	100.3	3.7	
4.500	3.0	32.0	33.5	6.8	-34.8	0.0	0.0	37.6	54.0	-16.4	H	A	100.3	3.7	

Rev. 4.1.2.7

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

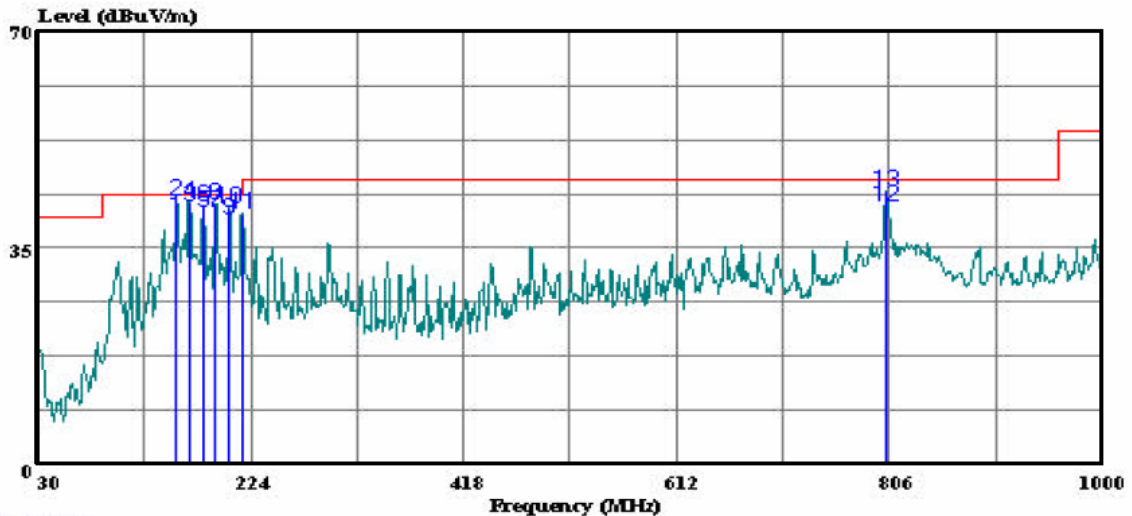
7.3. WORST-CASE BELOW 1 GHz

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



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

Data#: 6 File#: 08U12210.EMI Date: 11-06-2008 Time: 16:19:47



(Fremont)
 Trace: 3

Ref Trace:

Condition: HORIZONTAL
 Test Operator:: Devin Chang
 Project #: : 08U12210
 Company: : Broadcom
 Configuration:: EUT with Laptop
 Mode : : BCM92046MD_MINI
 Target: : FCC Class B

Page: 1

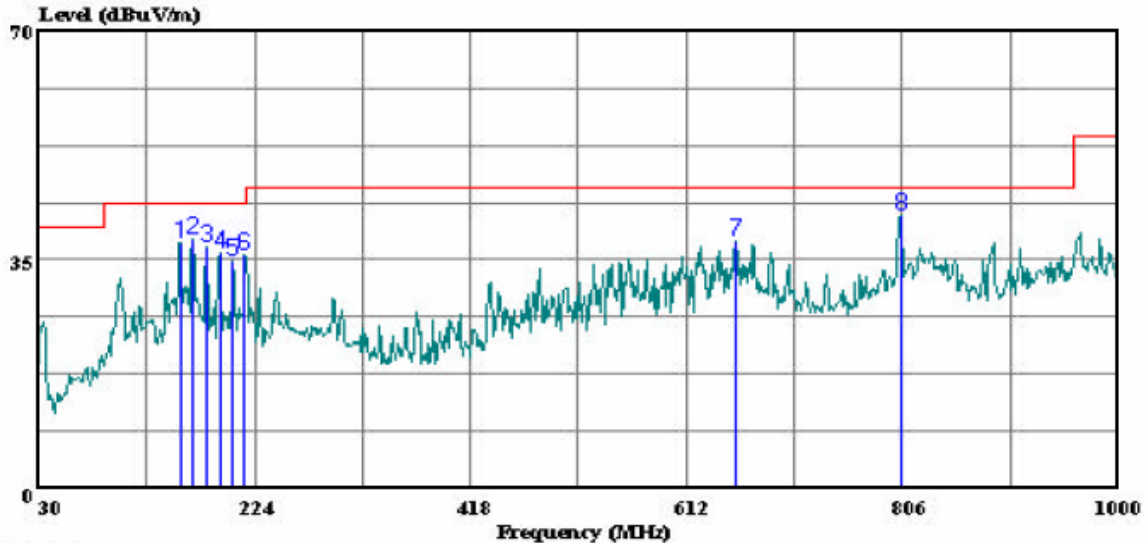
	Read Freq	Read Level	Factor	Level	Limit	Over	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	156.100	57.66	-17.66	40.00	43.50	-3.50	QP
2	156.100	60.33	-17.66	42.67	43.50	-0.83	Peak
3	167.740	59.62	-17.92	41.70	43.50	-1.80	QP
4	167.740	60.33	-17.92	42.42	43.50	-1.08	Peak
5	180.350	58.56	-17.76	40.80	43.50	-2.70	QP
6	180.350	59.67	-17.76	41.91	43.50	-1.59	Peak
7	191.020	57.23	-16.18	41.05	43.50	-2.45	QP
8	191.020	58.33	-16.18	42.15	43.50	-1.35	Peak
9	204.600	56.00	-16.40	39.60	43.50	-3.90	QP
10	204.600	57.83	-16.40	41.44	43.50	-2.06	Peak

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



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

Data#: 2 File#: 08U12210.EMI Date: 11-06-2008 Time: 15:47:35



(Fremont)

Trace: 1

Ref Trace:

Condition: VERTICAL
 Test Operator:: Devin Chang
 Project #: : 08U12210
 Company: : Broadcom
 Configuration:: EUT with Laptop
 Mode : : BCM92046MD_MINI
 Target: : FCC Class B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	157.070	55.33	-17.70	37.63	43.50	-5.87	Peak
2	168.710	56.00	-17.94	38.06	43.50	-5.44	Peak
3	180.350	54.83	-17.76	37.07	43.50	-6.43	Peak
4	192.960	52.17	-16.24	35.93	43.50	-7.57	Peak
5	204.600	51.17	-16.40	34.77	43.50	-8.73	Peak
6	215.270	52.00	-16.38	35.62	43.50	-7.88	Peak
7	655.650	44.17	-6.17	37.99	46.00	-8.01	Peak
8	805.030	45.25	-3.57	41.68	46.00	-4.32	Peak

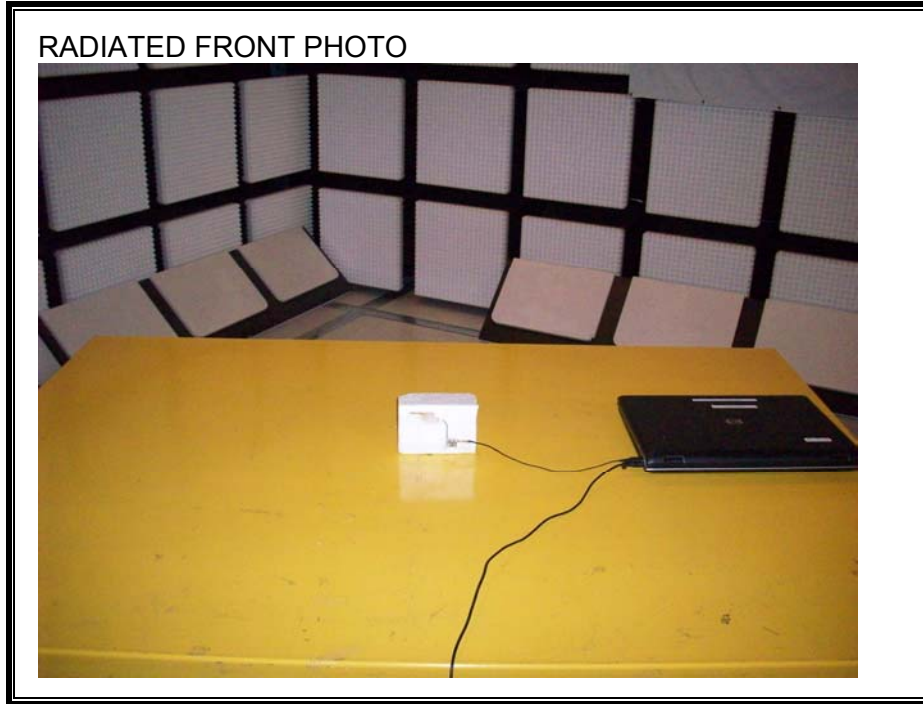
8. SETUP PHOTOS
RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION
WORST-CASE: Y-AXIS



Z-PHOTO



WORST-CASE - RADIATED RF MEASUREMENT SETUP



END OF REPORT