FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8

CLASS II PERMISSIVE CHANGE TEST REPORT

FOR

Bluetooth Module (Power Class 2) (Adding higher gain antenna)

MODEL NUMBER: BT11B

FCC ID: ACJ9TGBT11B
IC: 216A-CFBT11B

REPORT NUMBER: 11J13899-1

ISSUE DATE: JULY 12, 2011

Prepared for
PANASONIC CORPORATION OF NORTH AMERICA
ONE PANASONIC WAY, 4B-8
SECAUCUS, NEW JERSEY 07094, U.S.A.

Prepared by
COMPLIANCE CERTIFICATION SERVICES (UL CCS)
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
--	7/12/11	Initial Issue	F. Ibrahim

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: PANASONIC CORPORATION OF NORTH AMERICA
ONE PANASONIC WAY, 4B-8
SECAUCUS, NEW JERSEY 07094, U.S.A.

EUT DESCRIPTION: Bluetooth Module (Power Class 2) Class II Permissive Change (Adding higher gain antenna)

MODEL: BT11B

SERIAL NUMBER: 1CTSA00169

DATE TESTED: JUNE 30, 2011

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

Compliance Certification Services (UL 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 UL 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 UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL 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 UL CCS By:

FRANK IBRAHIM
EMC SUPERVISOR
UL CCS

Tested By:

CHIN PANG
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

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

UL 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 an Bluetooth Module (Power Class 2) Class II Permissive Change (Adding higher gain antenna).

The radio module is manufactured by Alps Electric Co., Ltd.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The major change filed under this application is adding Portable Panasonic Host with Higher antenna gain. (Representative model; CF-D1).

5.3. MAXIMUM OUTPUT POWER

The test measurement passed within ± 0.5dBm of the original output power.

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, a maximum gain of the antenna is as:

Bluetooth (Class 2/UGNZ4)	
Original	1.34
CF-D1	3.42

5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was BC 02, rev. 23e.

The EUT driver software installed in the Laptop during testing was BlueSuite, rev. V7.10.22(P).

The test utility software used during testing was Bluetooth.exe and BCliCtrlt, rev. 1.19.

WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power. Radiated Emissions below 1 GHz was performed with EUT set to transmit at the channel with highest output power.

The EUT (tablet) was investigated in three orthogonal orientations X,Y,Z and it was determined that Y-axis orientation is the worst-case orientation; therefore, all testing in this report was conducted with EUT in worst case orientation.

Worst-case modes were selected for BE and Harmonics based on an investigation of the original reports.

5.6 DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	PANASONIC	CF-D1	1CTSA00169	DoC
AC Adapter	PANASONIC	CF-AA5713AM1	5713AM110Z12951A	DoC

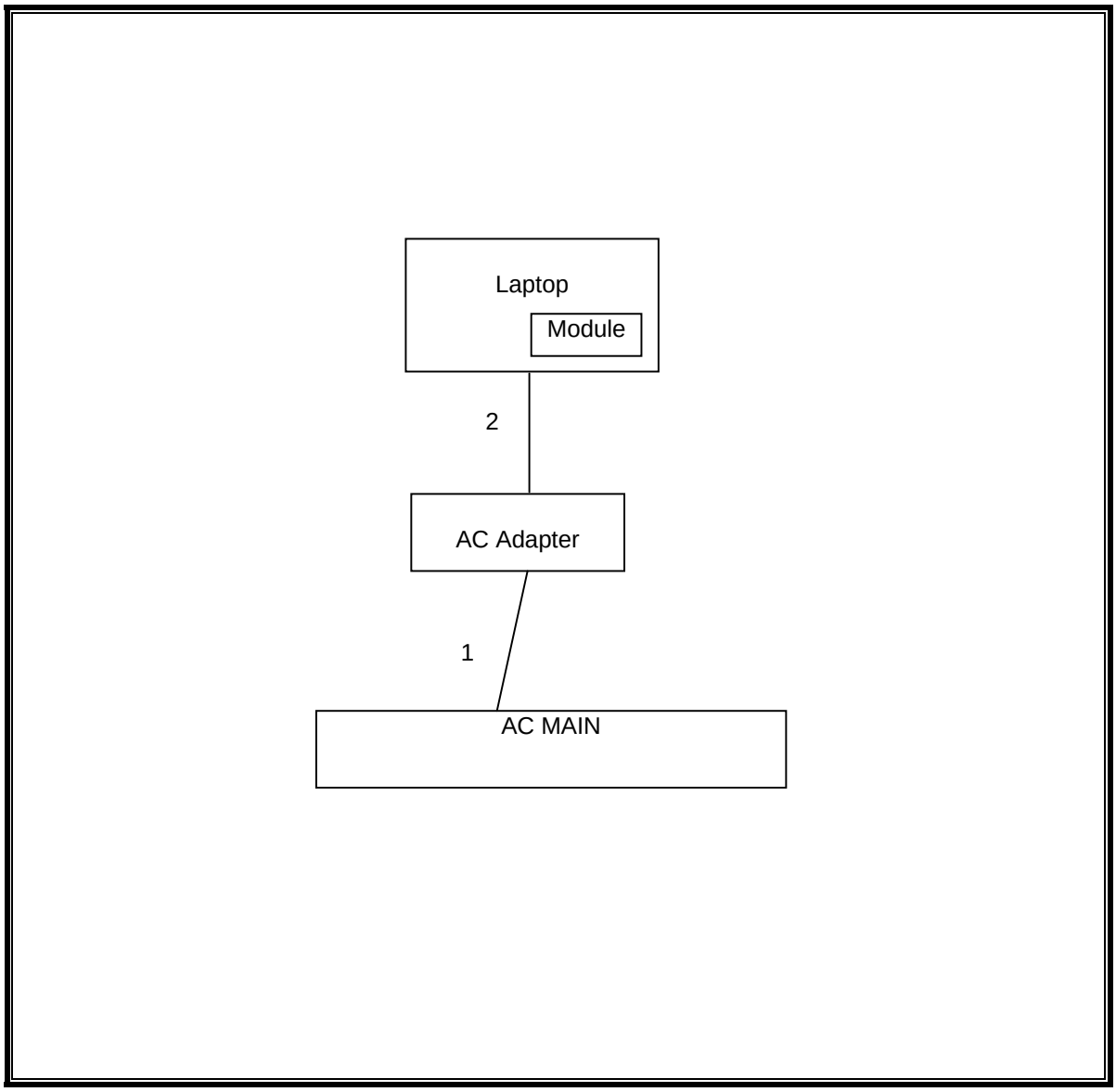
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	AC	Un-Sheilded	180 cm	N/A
2	DC	1	DC	Un-Sheilded	180 cm	N/A

TEST SETUP

The EUT is installed in a host laptop computer during the tests. Test software exercised the radio card. A laptop computer was used to configure the EUT to continuously transmit at a specified output power or continuously receive on the channel specified in the test data. For transmit modes the worst case was evaluated.

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 Date**	**Cal Due**
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	07-12-10	07-12-11
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01-27-11	01-27-12
Antenna, Horn, 18 GHz	EMCO	3115	C00783	06-29-10	06-30-12
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	04-07-11	04-07-12
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	01-07-10	04-11-12
Peak Power Meter	Agilent / HP	E4416A	C00963	12-04-09	04-11-12
Reject Filter, 2.4-2.5 GHz	Micro-Tronics	BRC13192	N02683	CNR	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, 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.

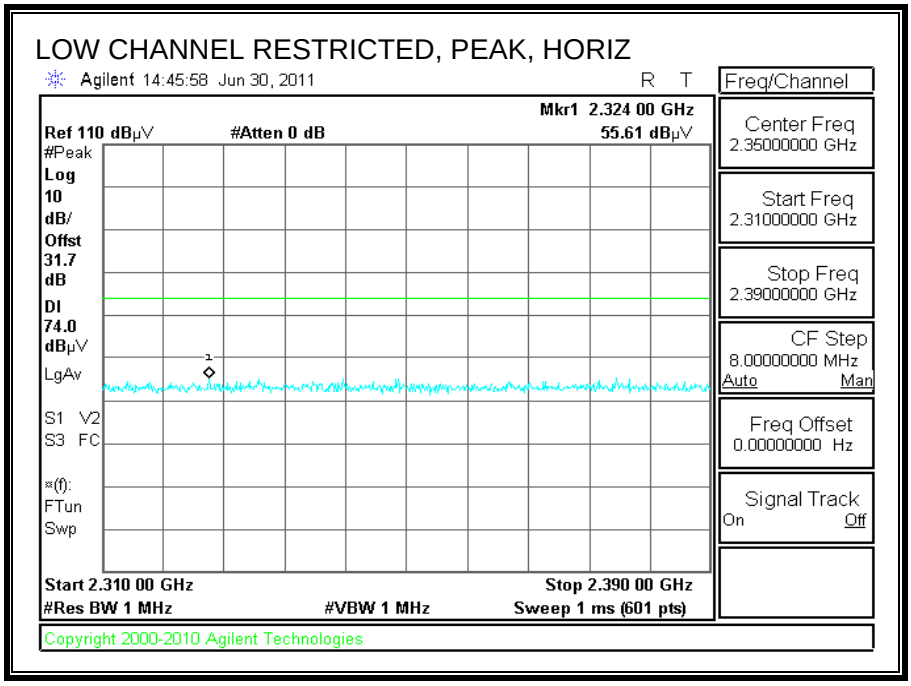
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

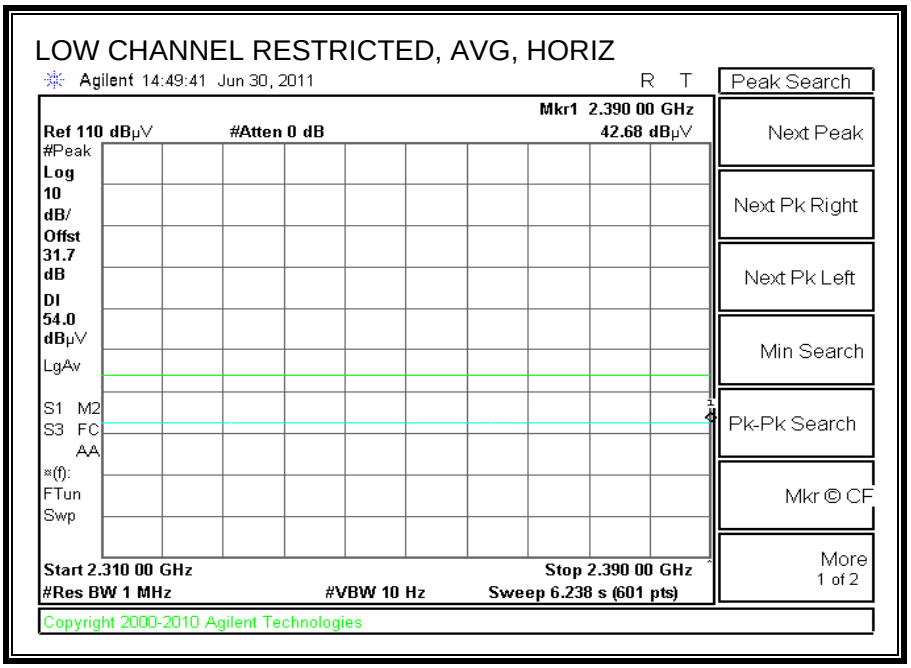
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

7.2. TRANSMITTER ABOVE 1 GHz

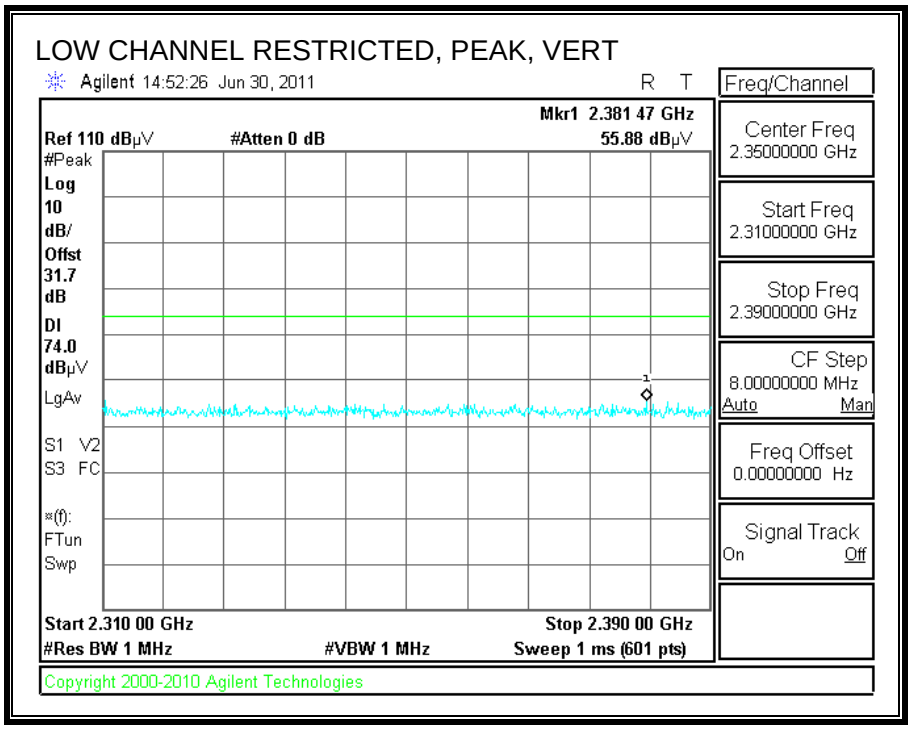
7.2.1. GFSK MODULATION

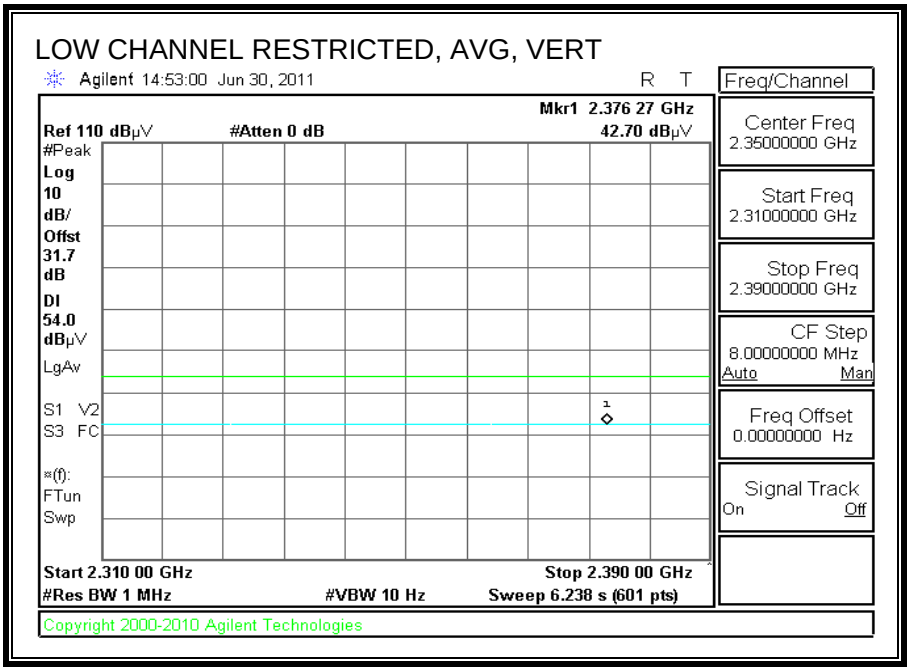
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



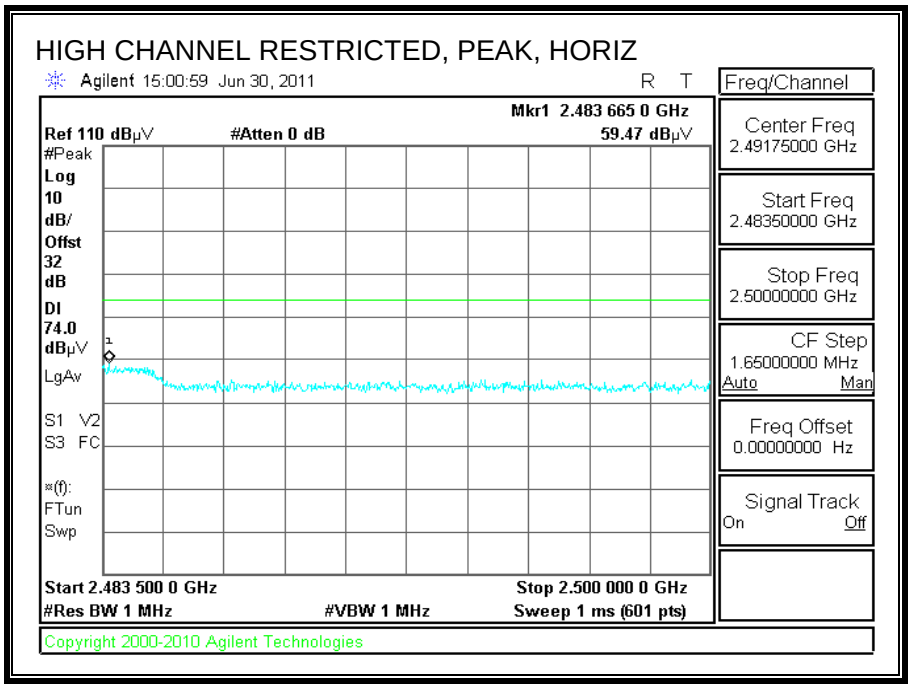


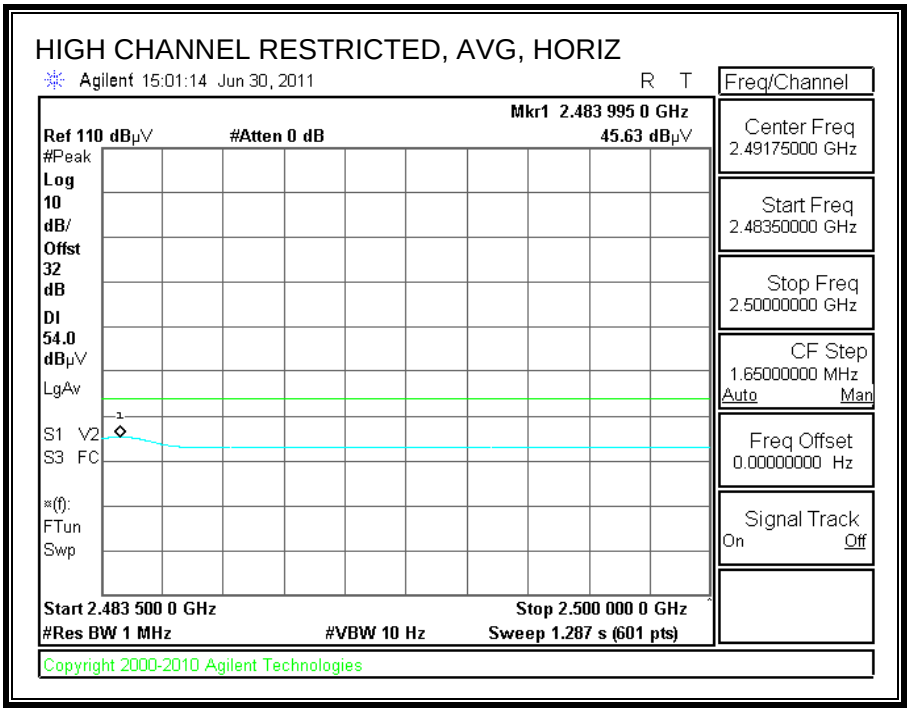
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



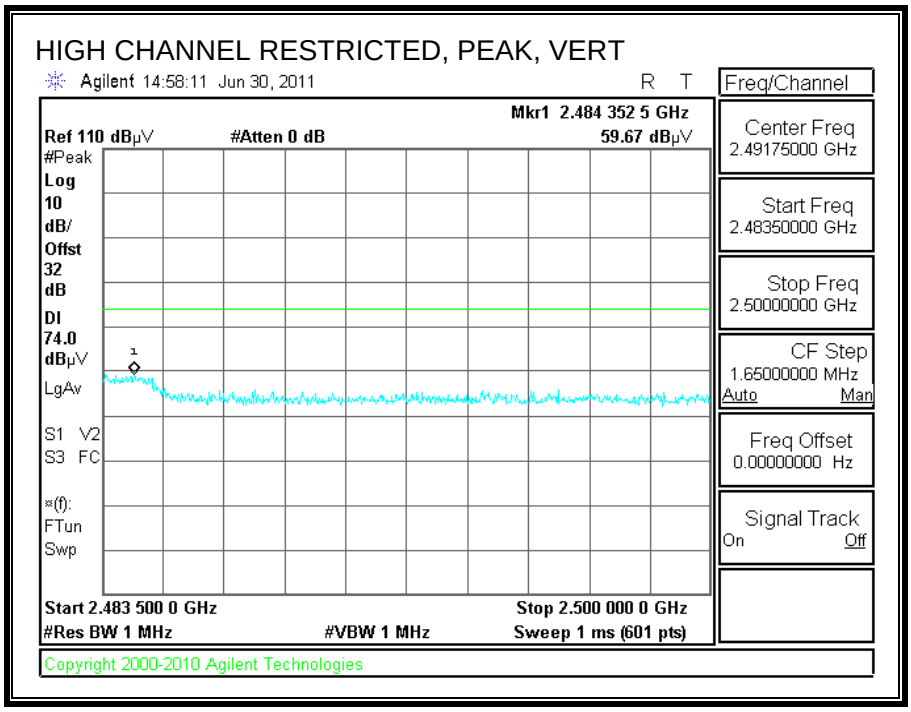


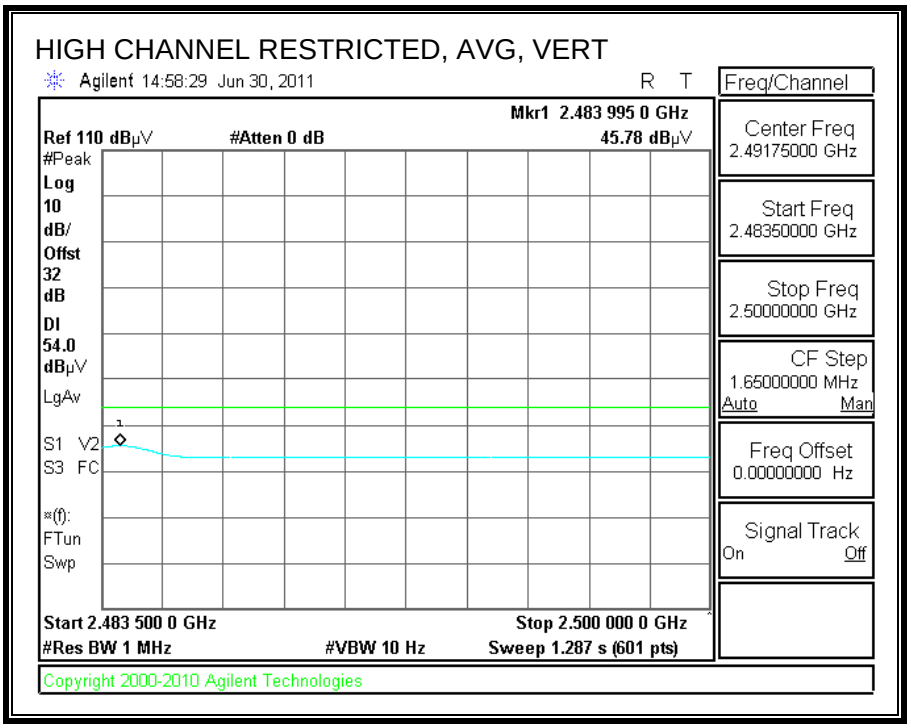
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 06-30-11
Project #: TBD
Company: Panasonic
Test Target: FCC 15.247
Mode Oper: TX, BT, GFSK (Worst Case)
CF-D1

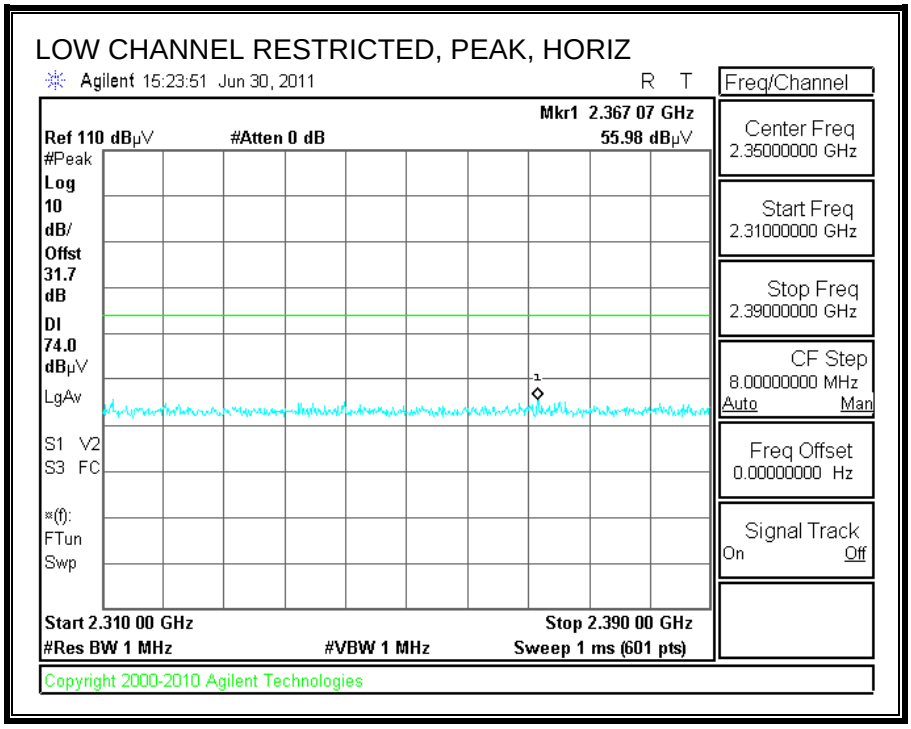
f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs.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

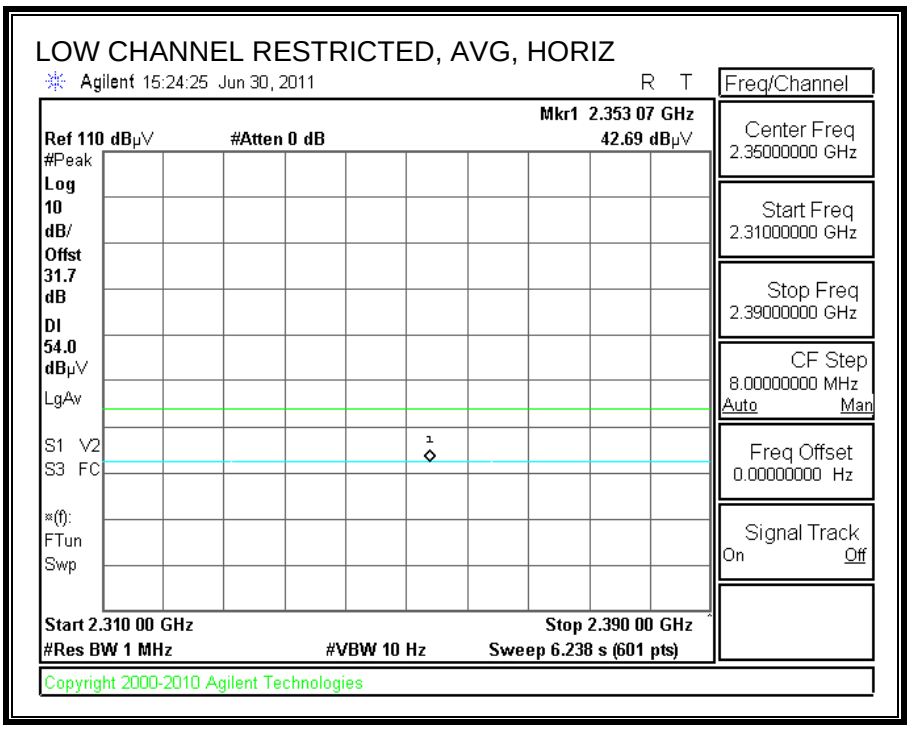
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Mid Ch, 2441MHz													
4.882	3.0	45.8	32.8	5.8	-34.9	0.0	0.0	49.6	74.0	-24.4	H	P	
4.882	3.0	38.9	32.8	5.8	-34.9	0.0	0.0	42.7	54.0	-11.3	H	A	
7.323	3.0	36.3	35.2	7.3	-34.7	0.0	0.0	44.1	74.0	-29.9	H	P	
7.323	3.0	24.4	35.2	7.3	-34.7	0.0	0.0	32.3	54.0	-21.7	H	A	
4.882	3.0	49.6	32.8	5.8	-34.9	0.0	0.0	53.4	74.0	-20.6	V	P	
4.882	3.0	41.8	32.8	5.8	-34.9	0.0	0.0	45.6	54.0	-8.4	V	A	
7.323	3.0	36.0	35.2	7.3	-34.7	0.0	0.0	43.9	74.0	-30.1	V	P	
7.323	3.0	24.3	35.2	7.3	-34.7	0.0	0.0	32.1	54.0	-21.9	V	A	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

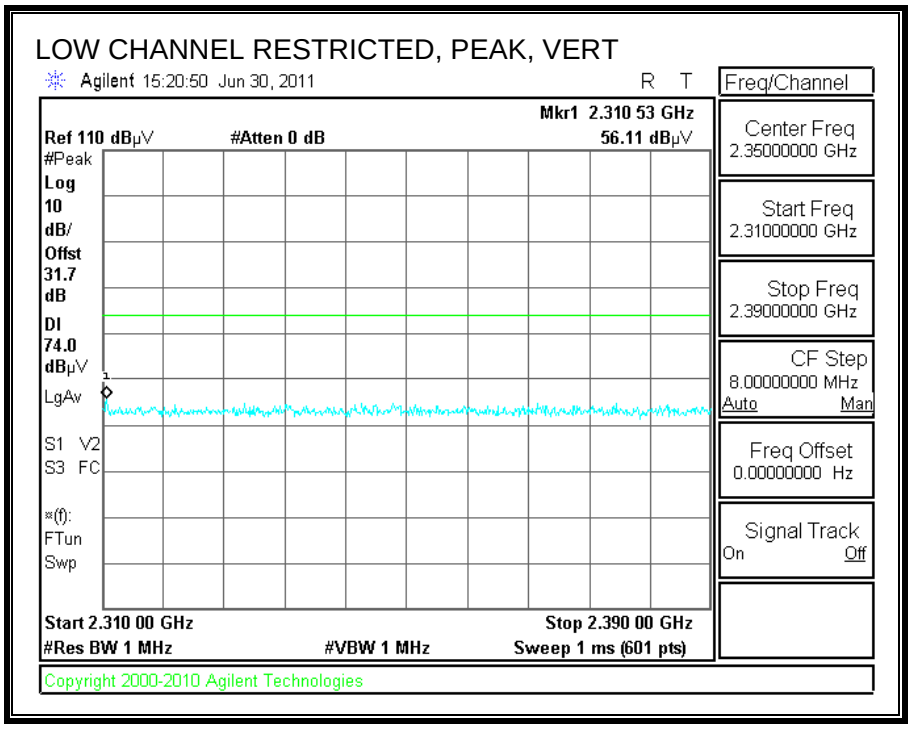
7.2.2. 8PSK MODULATION

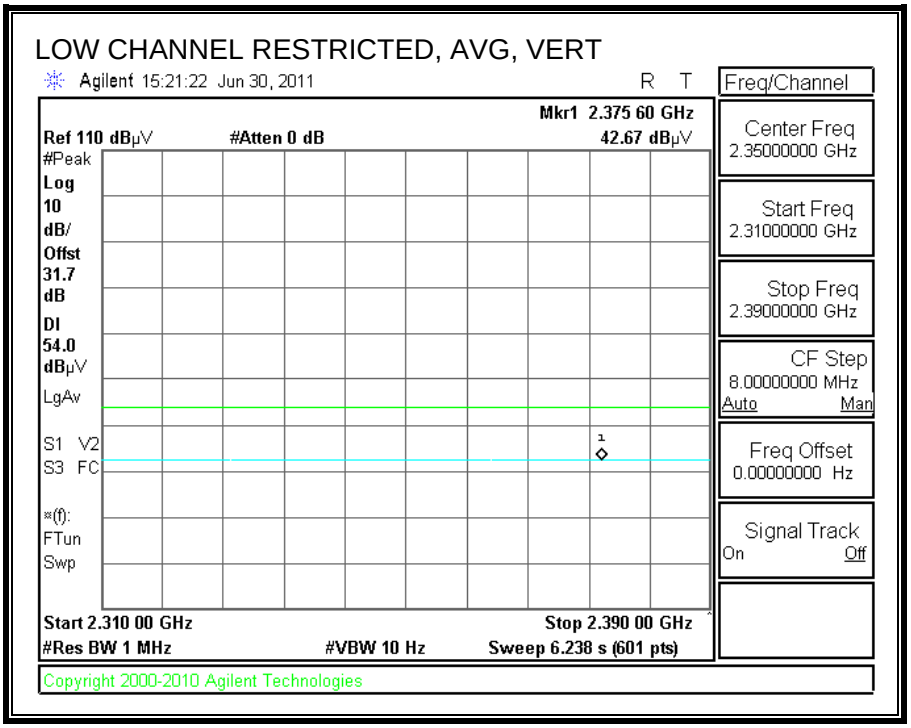
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



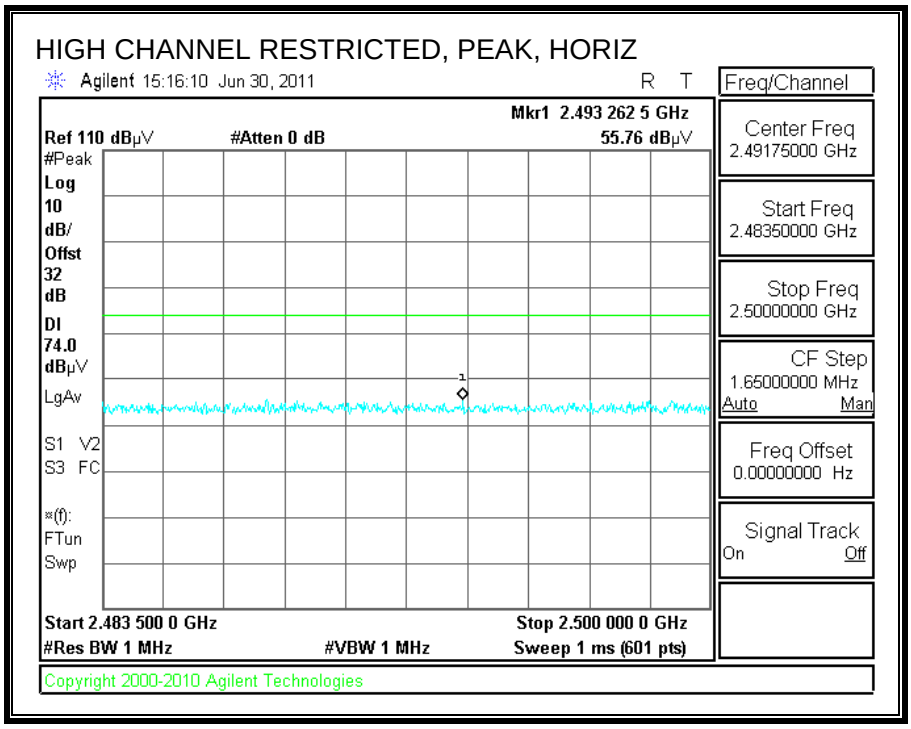


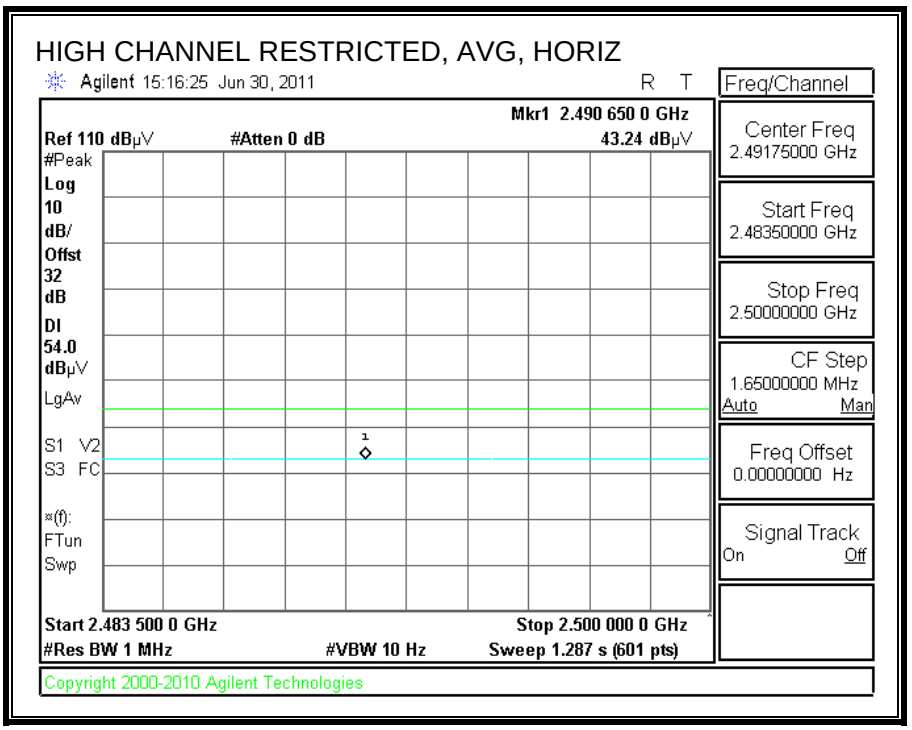
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



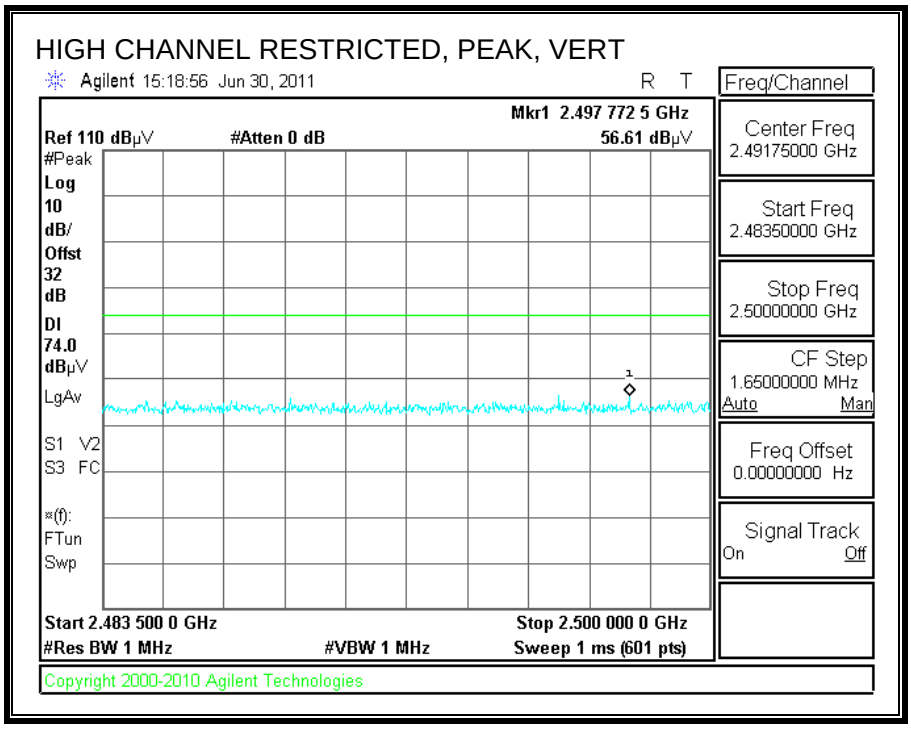


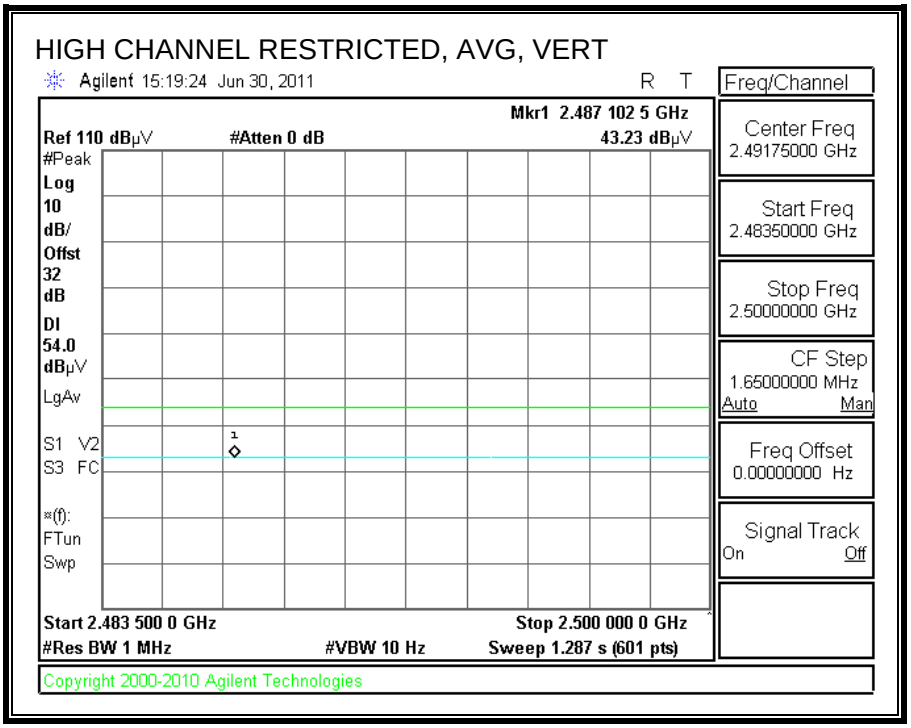
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

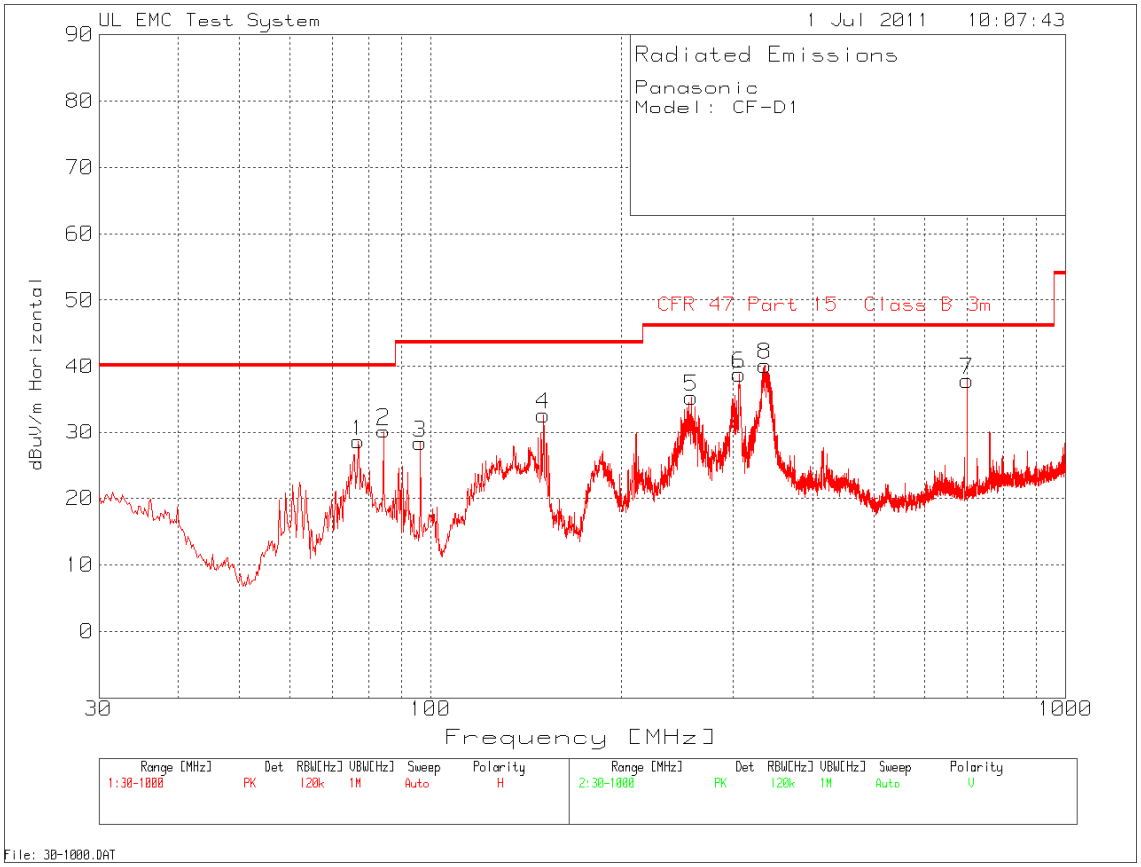




7.3. WORST-CASE BELOW 1 GHz

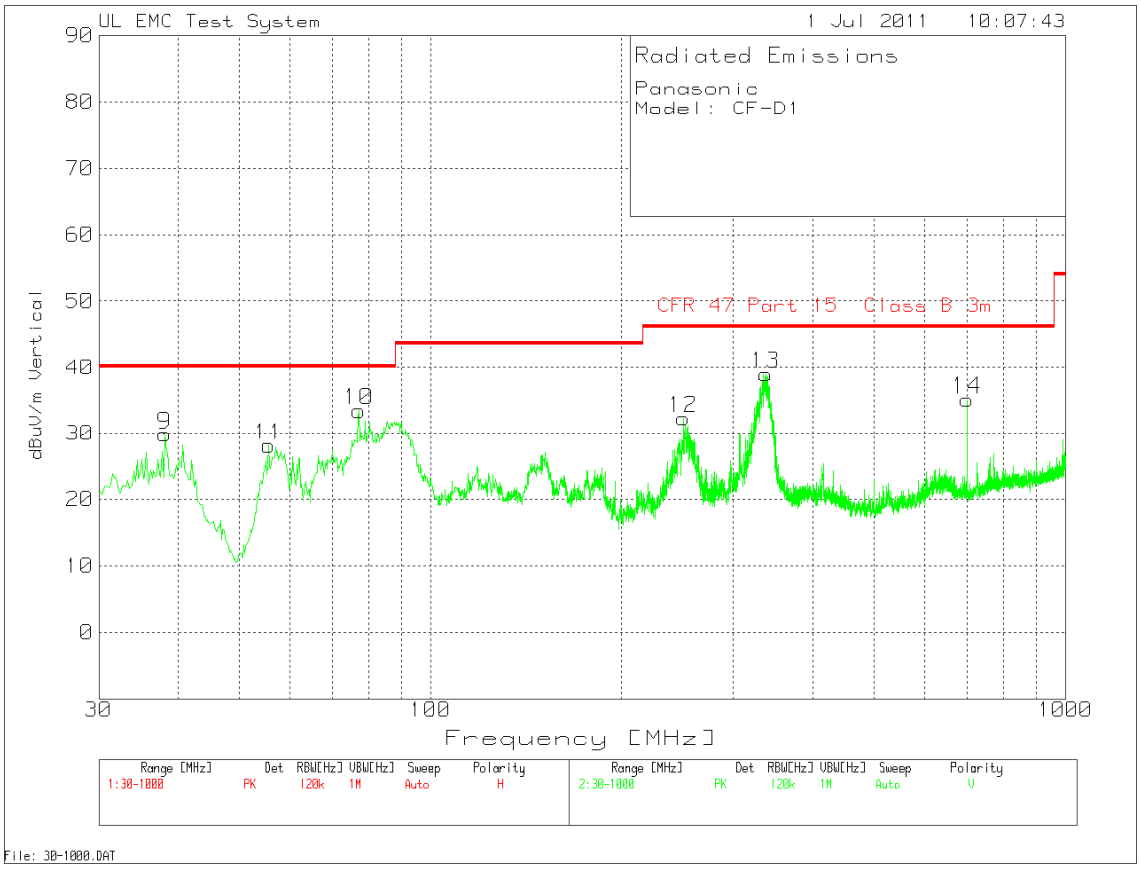
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



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

VERTICAL PLOT



DATA

Panasonic									
Model: CF-D1									
Range 1 30 - 1000MHz									
Test Frec	Meter Rea	Detector	Chamber 5	T10 Below	T130 Bild	dBuV/m	CFR 47 Pa	Margin	Polarity
76.9105	49.01	PK	1.2	-29.4	7.8	28.61	40	-11.39	Horz
84.2766	50.82	PK	1.3	-29.4	7.5	30.22	40	-9.78	Horz
96.295	47.17	PK	1.4	-29.3	9.1	28.37	43.5	-15.13	Horz
150.5715	47.63	PK	1.7	-29.1	12.5	32.73	43.5	-10.77	Horz
257.3801	49.86	PK	2.2	-28.7	12	35.36	46	-10.64	Horz
306.229	51.65	PK	2.4	-28.6	13.4	38.85	46	-7.15	Horz
700.1219	44.32	PK	3.7	-29.3	19.2	37.92	46	-8.08	Horz
336.0811	52.51	PK	2.5	-28.7	13.9	40.21	46	-5.79	Horz
2 30 - 1000MHz									
st Frequer	ter Readi	Detector	low 1GHz	GHz PreAg		Factors	dBuV/m	art 15 C	Margin	Polarity
38.1415	42.96	PK	0.9	-29.5	15.5	29.86	40	-10.14	Vert
77.1043	53.9	PK	1.2	-29.4	7.8	33.5	40	-6.5	Vert
55.5875	48.55	PK	1.1	-29.4	7.9	28.15	40	-11.85	Vert
250.014	47.05	PK	2.2	-28.7	11.8	32.35	46	-13.65	Vert
337.0504	51.22	PK	2.6	-28.7	13.9	39.02	46	-6.98	Vert
700.1219	41.56	PK	3.7	-29.3	19.2	35.16	46	-10.84	Vert