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

CERTIFICATION TEST REPORT

FOR

Wireless Adaptor

MODEL NUMBER: CECHYA-0085

FCC ID: ZL2CECHYA0085
IC: 409P-CECHYA0085

REPORT NUMBER: 12U1488-1, Revision B

ISSUE DATE: July 31, 2012

Prepared for
Sony Computer Entertainment America
919 East Hillsdale Blvd.
Foster City, CA 94404-2175

Prepared by
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333 Pfingsten Rd.
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NVLAP Lab code: 100414-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	07/05/12	Initial Issue	M.Ferrer
A	07/11/12	Adding serial number	M.Ferrer
B	07/31/12	Revised Antenna Description	M.Ferrer

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Sony Computer Entertainment America
919 East Hillsdale Blvd.
Foster City, CA 94404-2175

EUT DESCRIPTION: wireless adaptor

MODEL: CECHYA-0085

SERIAL NUMBER: Conducted tests SN:062, Radiated Tests SN:PVT-000004

DATE TESTED: 06/26/12 – 07/03/12

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

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

MICHAEL ANTOLA
SENIOR PROJECT ENGINEER
UL

Tested By:

MICHAEL FERRER
SENIOR PROJECT ENGINEER
UL

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 333 Pfingsten Road, Northbrook, IL 60193, USA.

UL NBK is accredited by NVLAP, Laboratory Code 100414-0

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

Sample Calculations
Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:

Field Strength (dBuV/m) = Meter Reading (dBuV) + AF (dB/m) - Gain (dB) + Cable Loss (dB)
Conducted Voltage (dBuV) = Meter Reading (dBuV) + Cable Loss (dB) + LISN IL (dB)
Conducted Current (dBuA) = Meter Reading (dBuV) + Cable Loss (dB) - Transducer Factor (dBohms)

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	+/- 0.3 dB (k=2)
Radiated Disturbance, 30 to 1000 MHz	+/- 3.17 dB (k=2)

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an USB wireless adaptor that operates at 2.4GHz.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2405 - 2477	DTS	4.49	2.81

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Diversity antenna installed internally integral, Antenna 0 gain 0.92 and antenna 1 gain 1.55. The both antenna are the same, therefore the higher gain antenna was used during transmission.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was rev. R01.00.00.

The EUT driver used standard windows drivers.

The test utility software used during testing was VMItest, rev. 1.1.6.38.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the single channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Y axis orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y axis orientation. EUT was set to single channel as worst case.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Sony	PCG-6H4L	3000002	DoC
AC/DC adpater	Sony	VGP-AC19V25	1480131	DoC

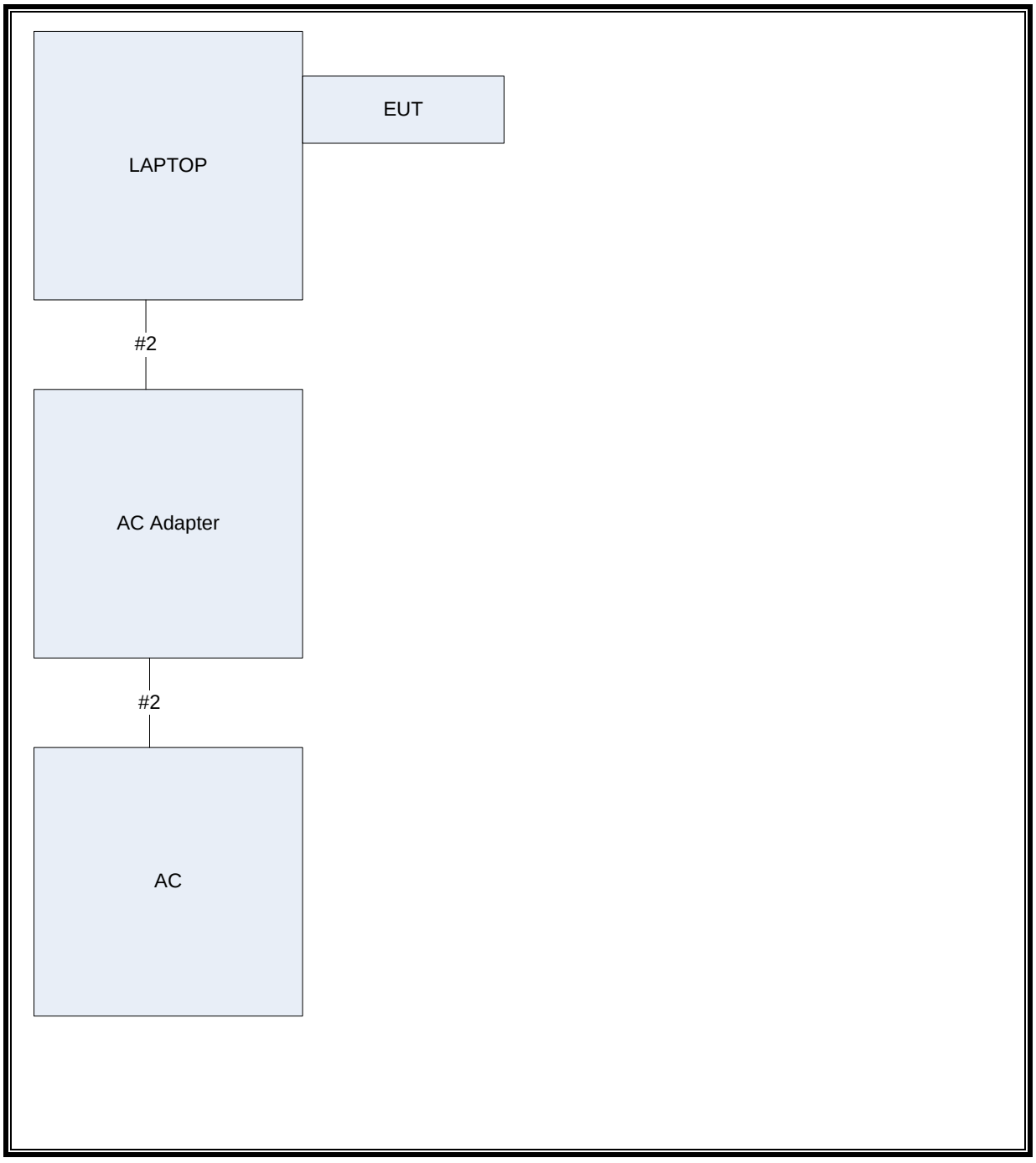
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB	2	USB	N/A	N/A	USB connected direct
2	DC	1	DC	2 wire	8.5 ft	AC adapter

TEST SETUP

The EUT is connected to the host laptop computer via USB 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 Date**	**Cal Due**	**Test**
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	20111228	20121231	RE, CP
Bicon Antenna	Chase	VBA6106A	EMC4078	20120117	20130131	RE, CP
Log-P Antenna	Chase	UPA6109	EMC4258	20110927	20120928	RE
Spectrum Analyzer	Rhode & Schwarz	FSEK	EMC4182	20111227	20121231	RE
Antenna Array	UL	BOMS	EMC4276	20111227	20121231	RE
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC4328	20111228	20121231	CE
LISN	Solar	8602-50-TS-50-N	EMC4052	20120106	20130106	CE
LISN	Solar	8602-50-TS-50-N	EMC4064	20120106	20130106	CE
EMI Test Receiver	Agilent	N9030A	EMC4360	20120515	20130515	OBW, PSD
Power Meter	Rohde & Schwarz	NRVD	EMC4074	20111229	20121231	AP
Power Sensor	Rohde & Schwarz	NRV-Z555	EMC4265	20120529	20130531	AP

RE: Radiated Emissions
CP: Conducted Antenna Peak Power, Spurious Emissions
CE: Conducted Emissions AC Mains
OBW: Occupied BW
PSD: Power Spectral Density
AP: Average Power

7. ANTENNA PORT TEST RESULTS

7.1. DTS MODE IN THE 2.4 GHz BAND

7.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

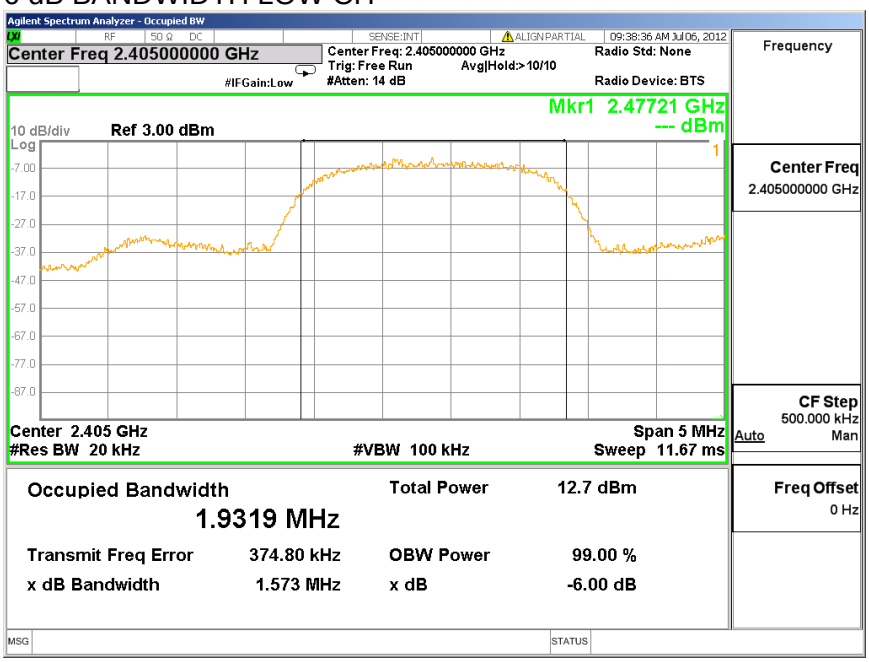
The transmitter output is connected to a spectrum analyzer. The RBW is set to 20 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

RESULTS

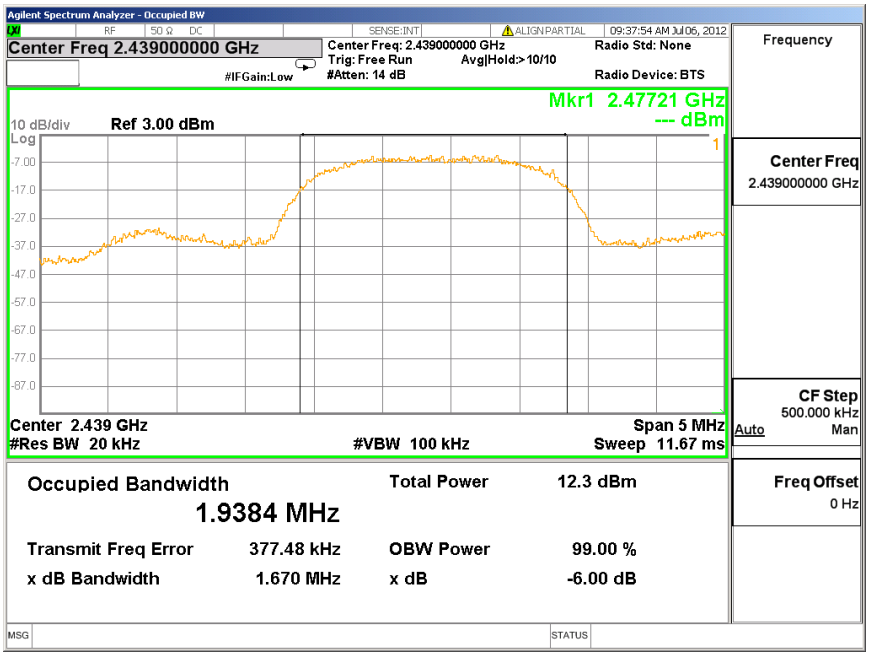
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2.405	1.5730	0.5
Middle	2.439	1.6700	0.5
High	2.477	1.6560	0.5

6 dB BANDWIDTH

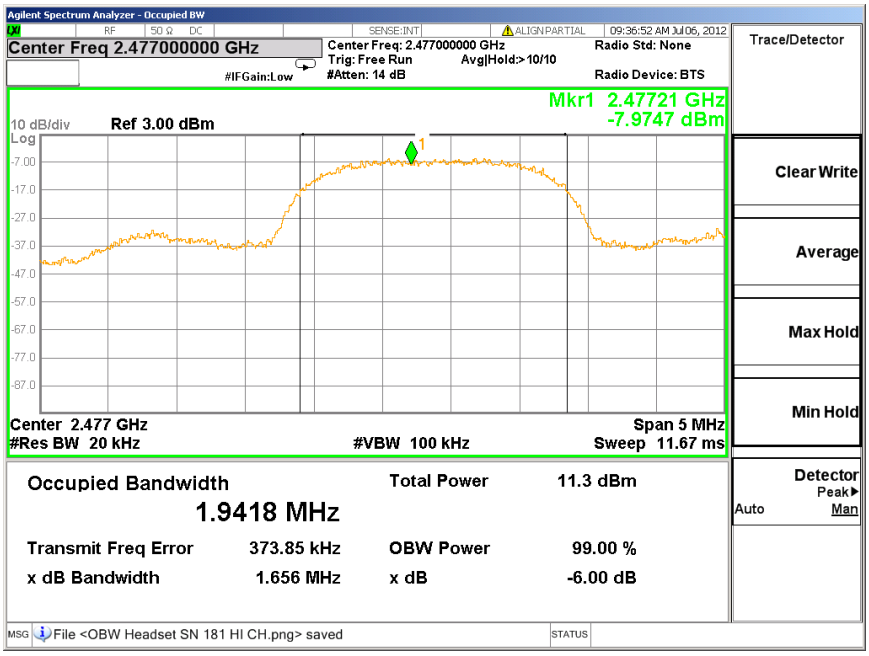
6 dB BANDWIDTH LOW CH



6 dB BANDWIDTH MID CH



6 dB BANDWIDTH HIGH CH



7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

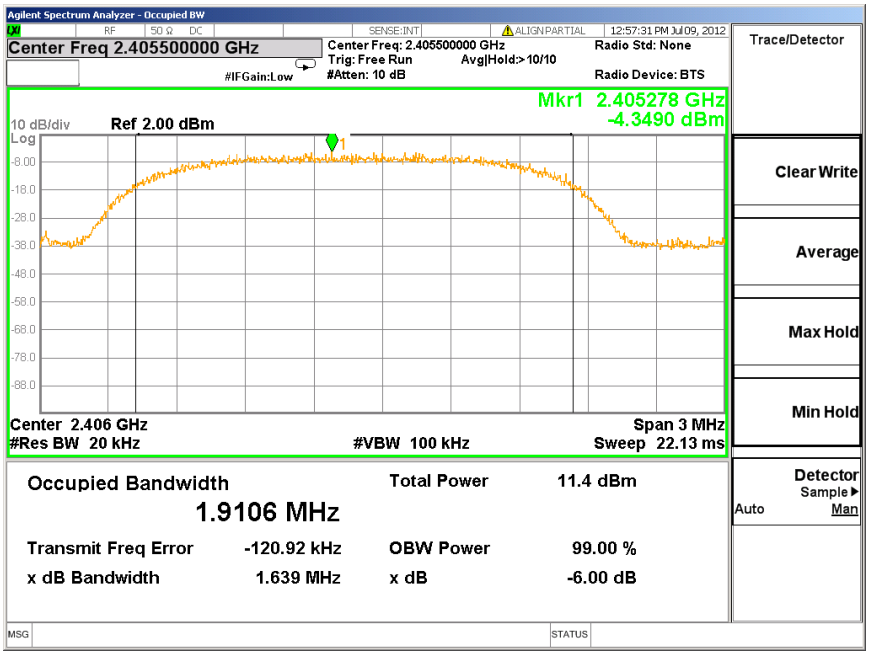
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

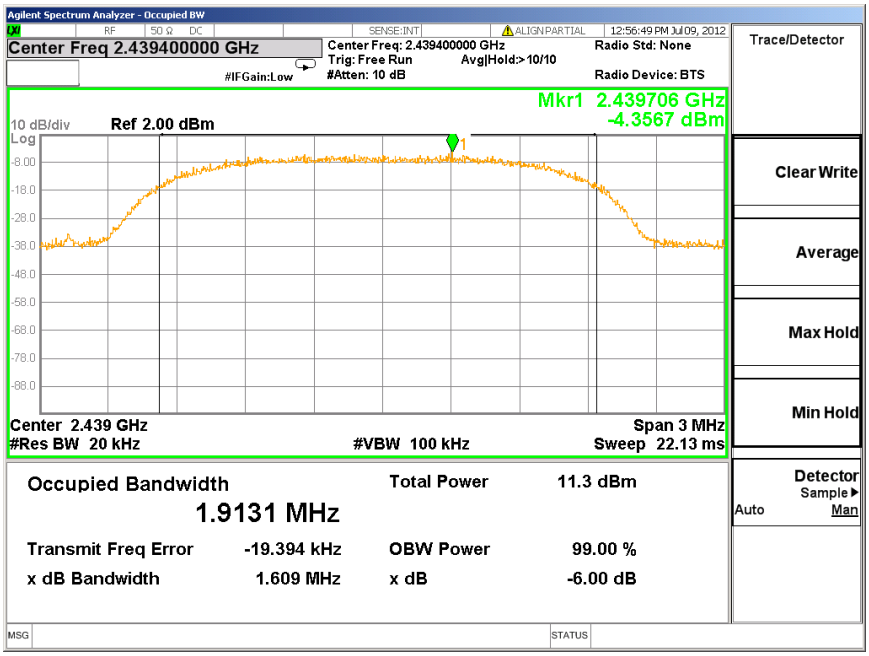
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2405	1.9106
Middle	2439	1.9131
High	2477	1.9098

99% BANDWIDTH

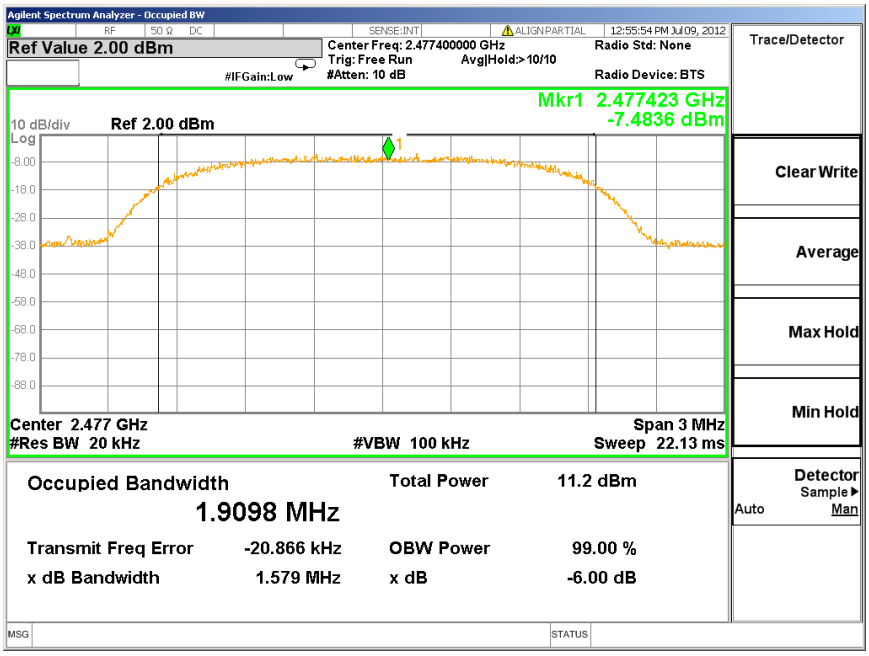
99% BANDWIDTH LOW CH



99% BANDWIDTH MID CH



99% BANDWIDTH HIGH CH



7.1.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

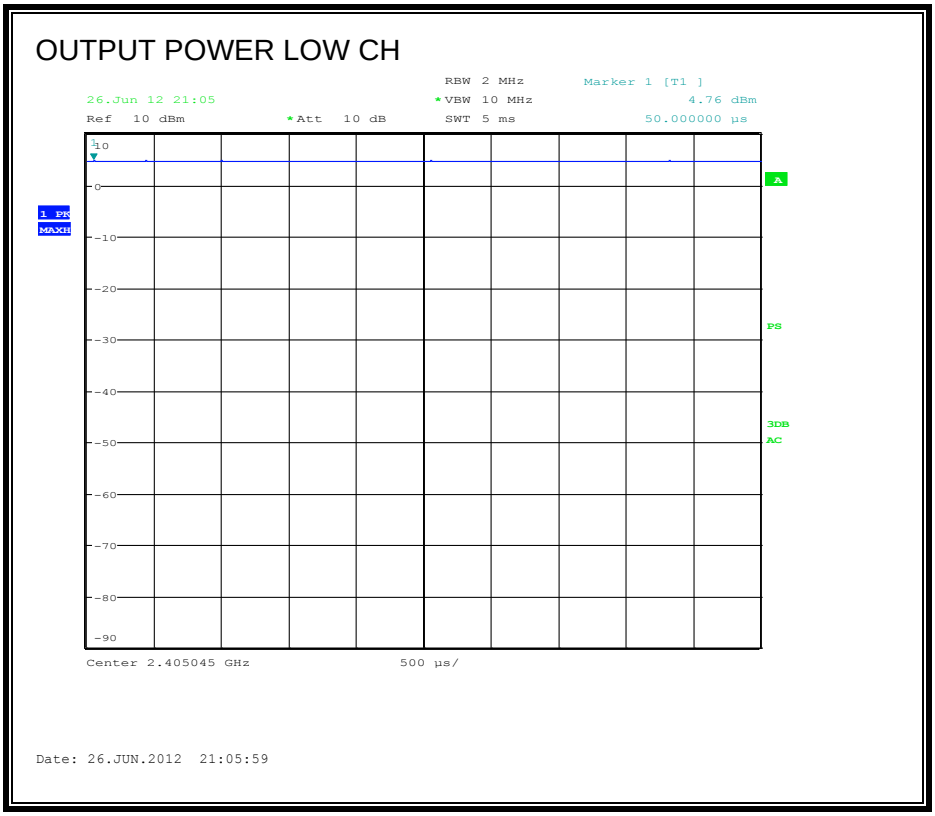
TEST PROCEDURE

Peak Power is measured using procedure from KDB 558074 DTS Meas Guidance v02 Section 7.2.1.1

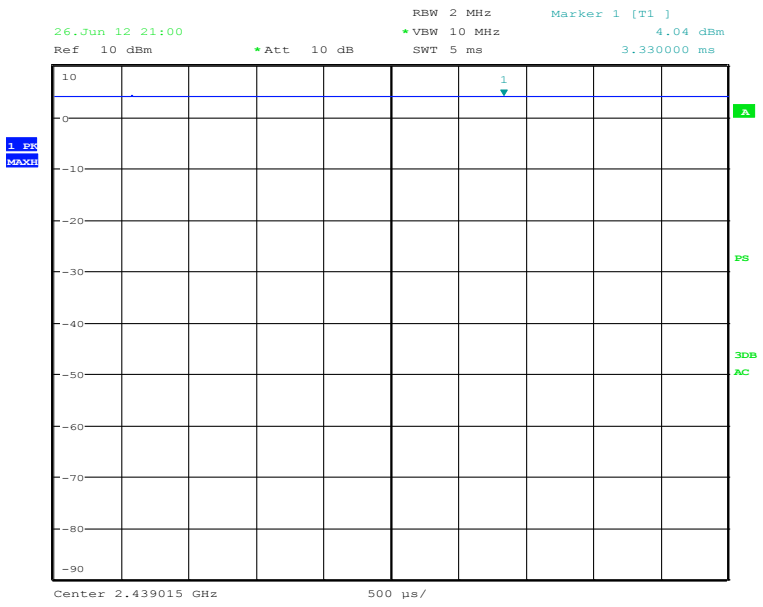
RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2.405	4.760	30	-25.240
Middle	2.439	4.040	30	-25.960
High	2.477	3.140	30	-26.860

OUTPUT POWER

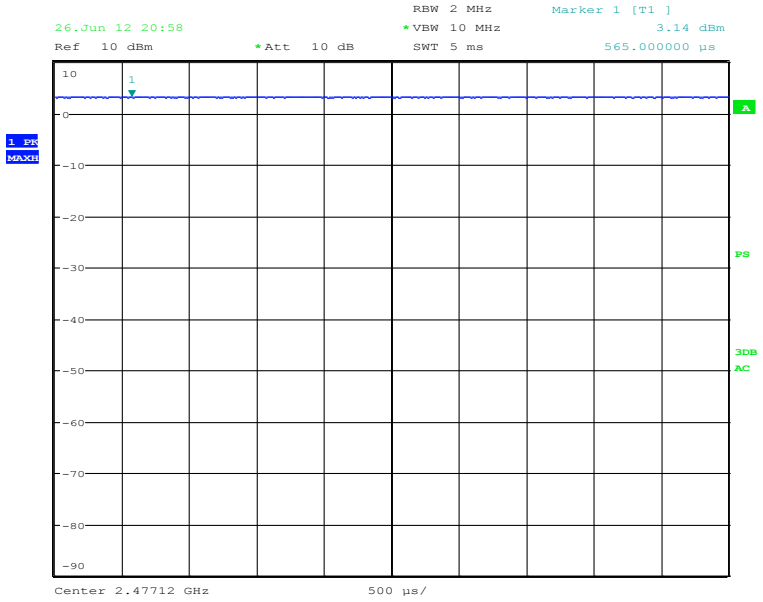


OUTPUT POWER MID CH



Date: 26.JUN.2012 21:00:01

OUTPUT POWER HIGH CH



Date: 26.JUN.2012 20:58:25

7.1.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

From KDB 558074 DTS Meas Guidance DR01
Section 7.2.2.3 Option 3 was used

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 1 dB for the cable was included in the table below.

Channel	Frequency (MHz)	AV power (dBm)
Low	2.405	2.45
Middle	2.439	1.88
High	2.477	0.89

7.1.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

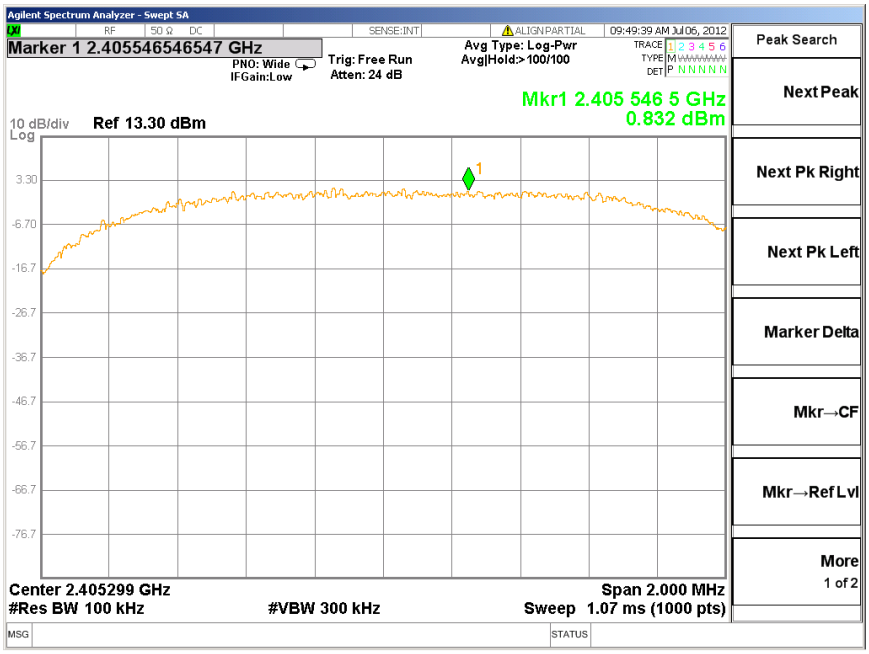
PSD Procedure used from KDB 558074 DTS Meas Guidance DR01 Section 7.3.1, note item 10 (-15.2 dB) used for scaling and included in the table below.

RESULTS

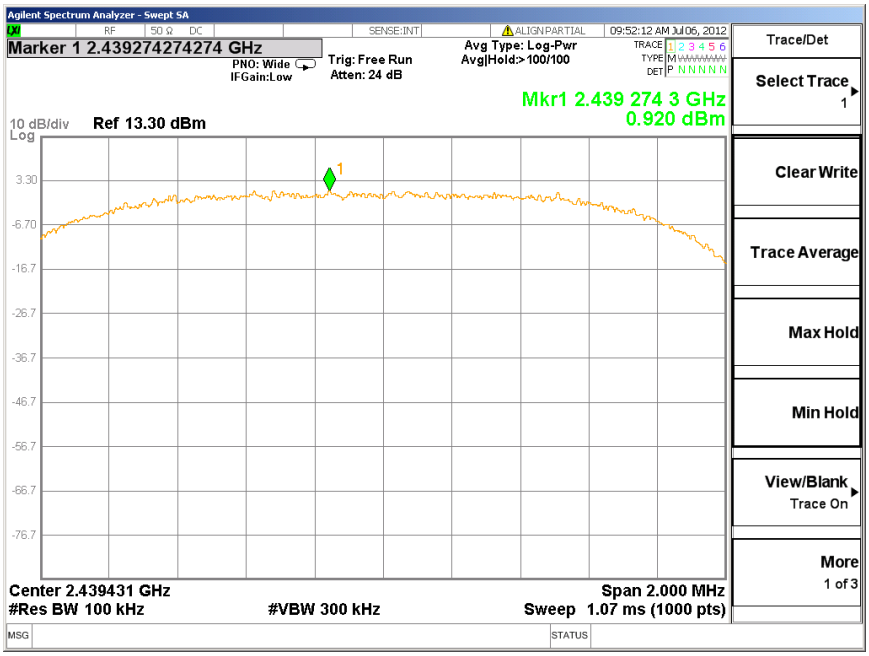
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2.405	-14.37	8	-22.37
Middle	2.439	-14.28	8	-22.28
High	2.477	-15.24	8	-23.24

POWER SPECTRAL DENSITY

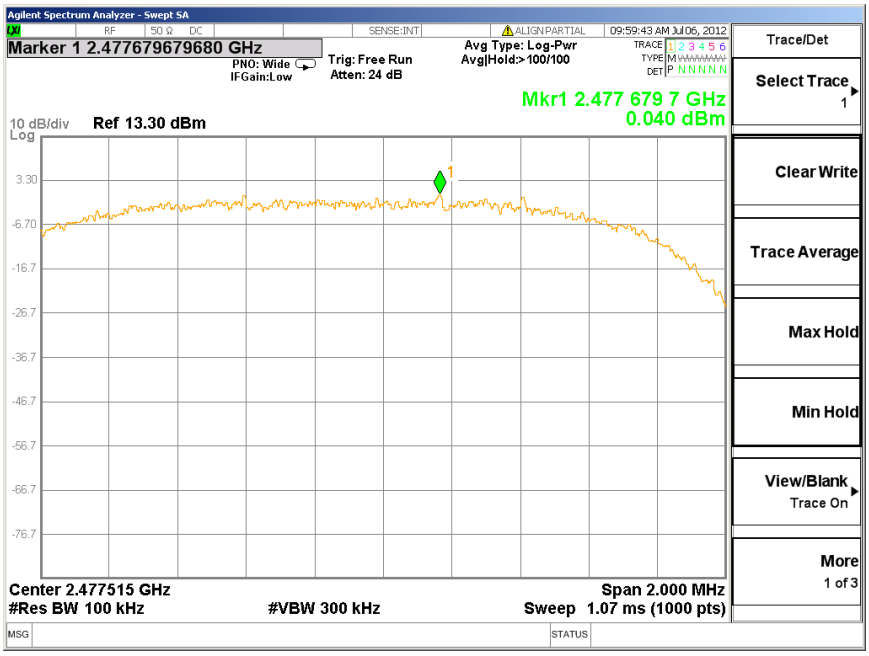
PSD LOW CH



PSD MID CH



PSD HIGH CH



7.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

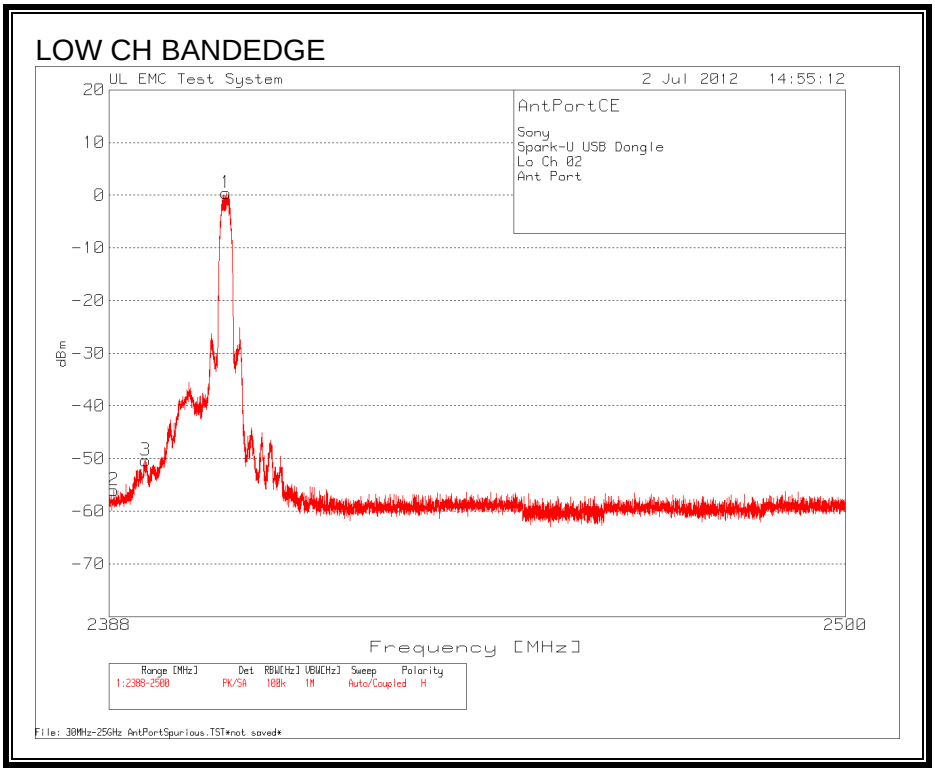
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

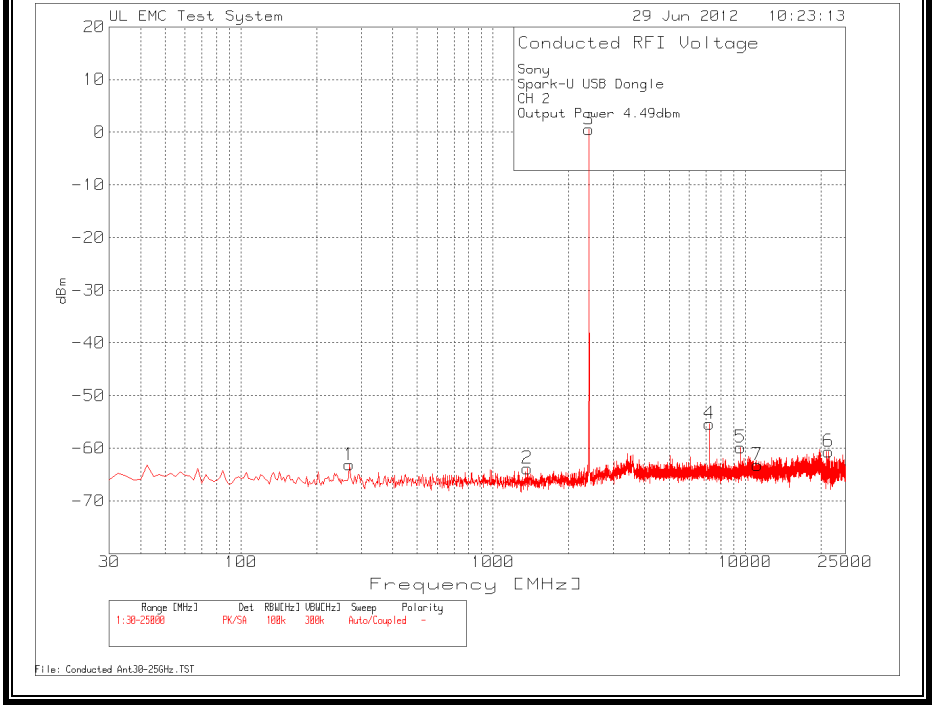


Sony
Spark-U USB Dongle
Lo Ch 02
Ant Port

No.	Test Frequency [MHz]	Meter Reading (dBuV)	Transducer Factor [dB]	Gain/Loss Factor [dB]	Level dBm	Limit:1	2	3	4	5	6
Range 1 2388 - 2500MHz											
1	2405.456	97.44 PK	-107	10	.44	-	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-	-	-	-	-	-
2	2388.709	40.93 PK	-107	10.1	-55.97	-	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-	-	-	-	-	-
3	2393.384	46.52 PK	-107	10.1	-50.38	-	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-	-	-	-	-	-

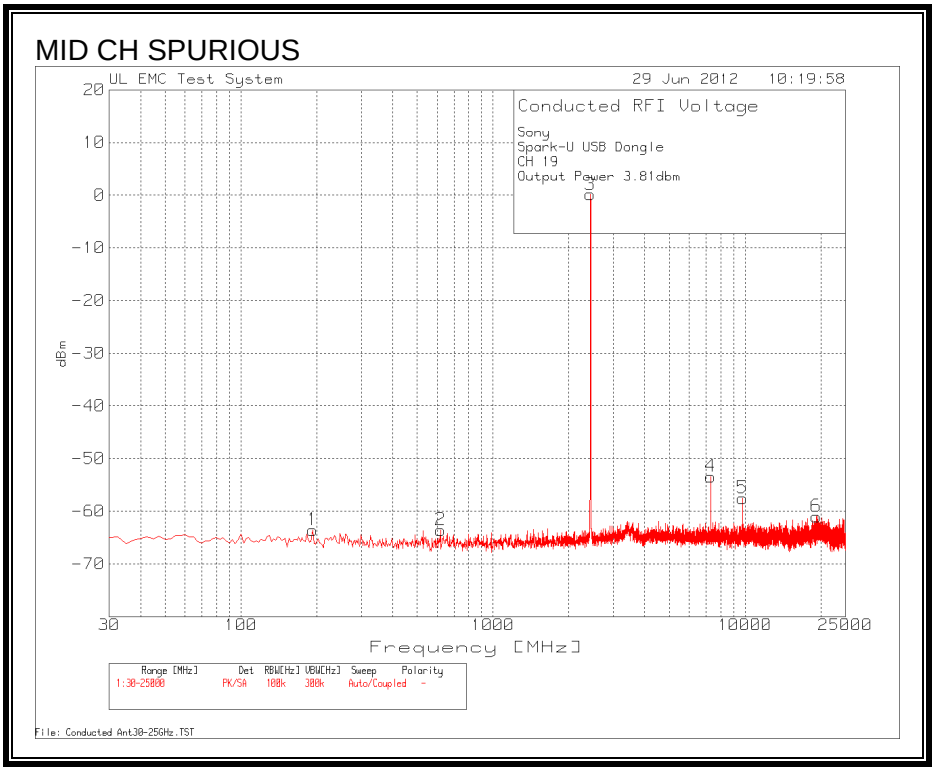
PK - Peak detector

LOW CH SPURIOUS



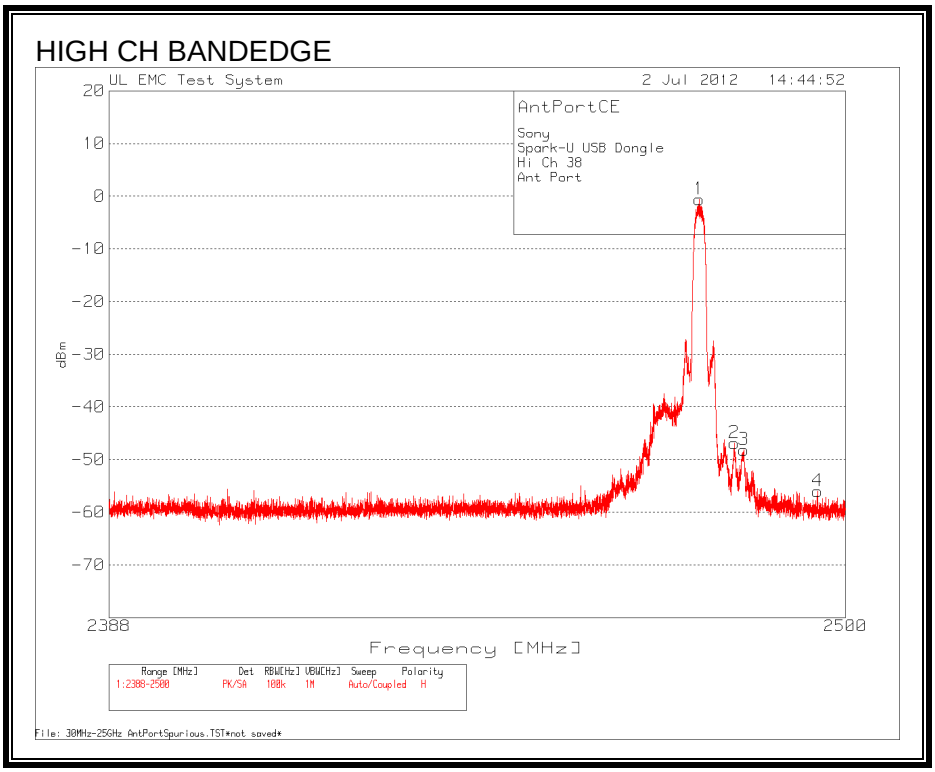
All Emissions 20dB below fundamental as seen in plot

SPURIOUS EMISSIONS, MID CHANNEL



All Emissions 20dB below fundamental as seen in plot

SPURIOUS EMISSIONS, HIGH CHANNEL

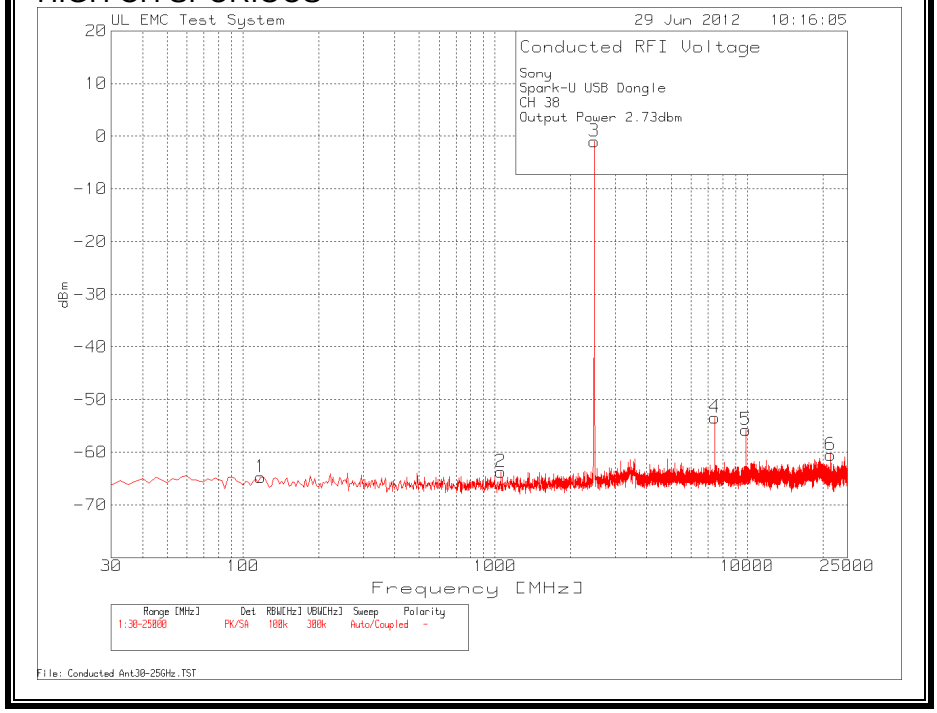


Sony
Spark-U USB Dongle
Hi Ch 38
Ant Port

No.	Test Frequency [MHz]	Meter Reading (dBuV)	Transducer Factor [dB]	Gain/Loss Factor [dB]	Level dBm	Limit:1	2	3	4	5	6
Range 1 2388 - 2500MHz											
1	2477.334	96.31 PK	-107	10.1	-.59	-	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-	-	-	-	-	-
2	2482.792	50.09 PK	-107	10	-46.91	-	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-	-	-	-	-	-
3	2484.234	48.81 PK	-107	10	-48.19	-	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-	-	-	-	-	-
4	2495.698	40.96 PK	-107	10	-56.04	-	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-	-	-	-	-	-

PK - Peak detector

HIGH CH SPURIOUS



All Emissions 20dB below fundamental as seen in plot

8. RADIATED TEST RESULTS

8.1. 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 25 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

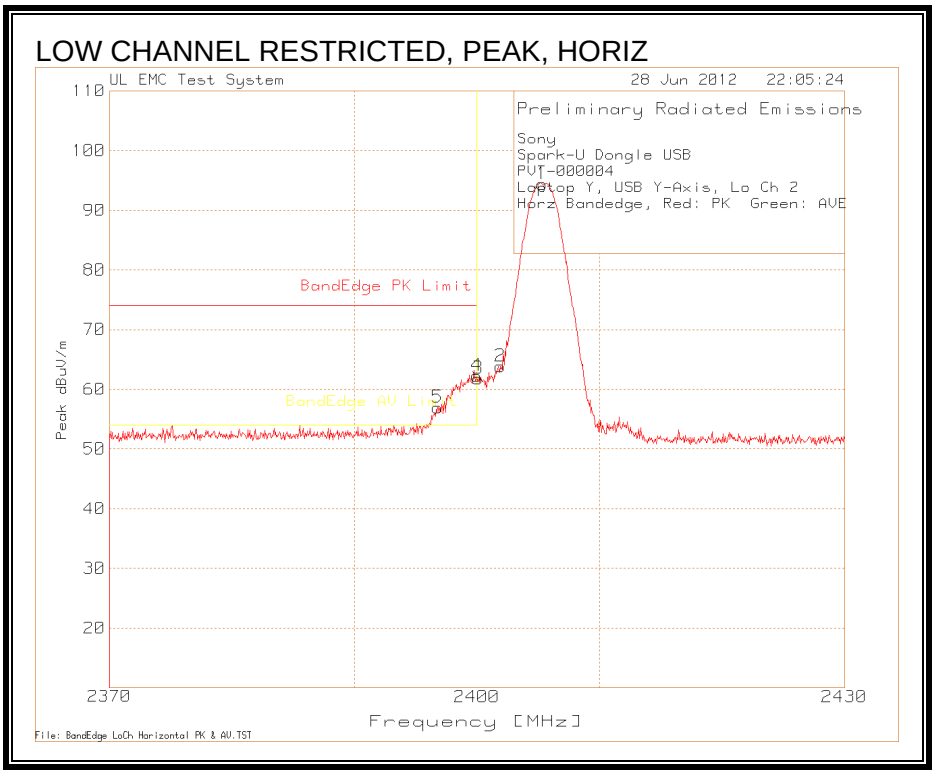
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2. TRANSMITTER ABOVE 1 GHz

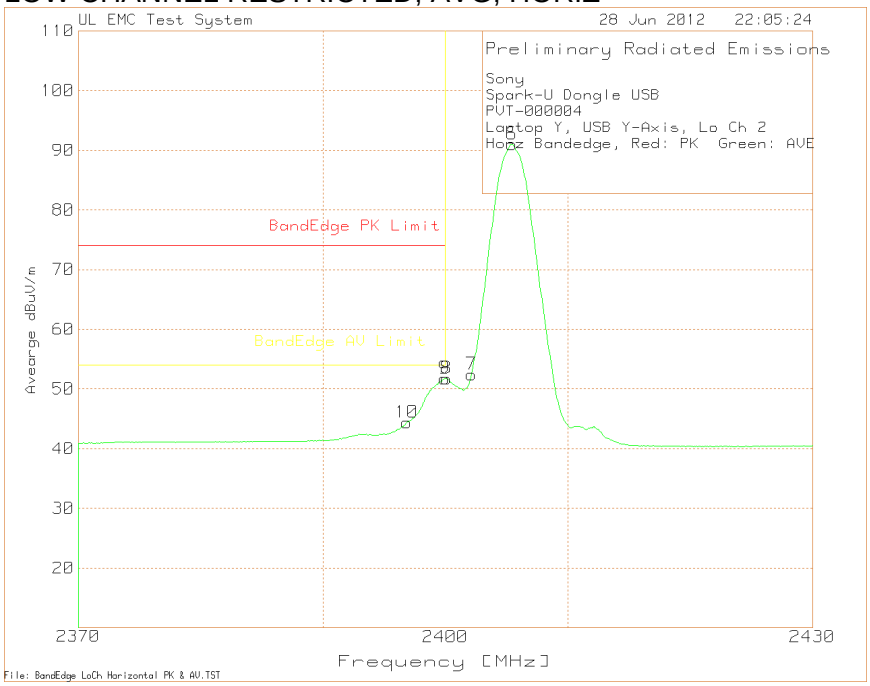
8.2.1. TX ABOVE 1 GHz FOR DTS TX MODE IN THE 2.4 GHz BAND

Please note different limits shown in plots.
Red: Peak limit
Yellow: Avg Limit
Peak Scan: RBW=VBW=1MHz Shown in Red trace
Average Scan: RBW=1MHz VBW =1Hz Shown in Green trace
The plot for low channel is segmented into 3 sections with a dotted line separating each section vertically
The 1st dotted line is at 2390MHz which signifies the end of the restricted band.
The plot for high channel shows the limit line starts at 2.4835GHz for the start of the restricted band

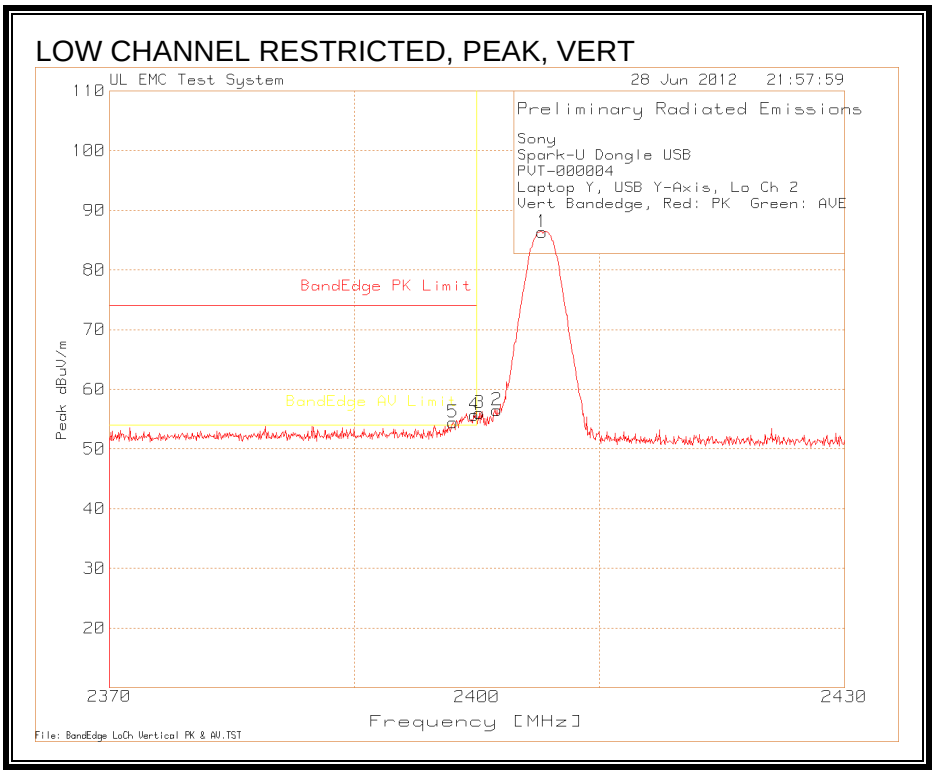
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



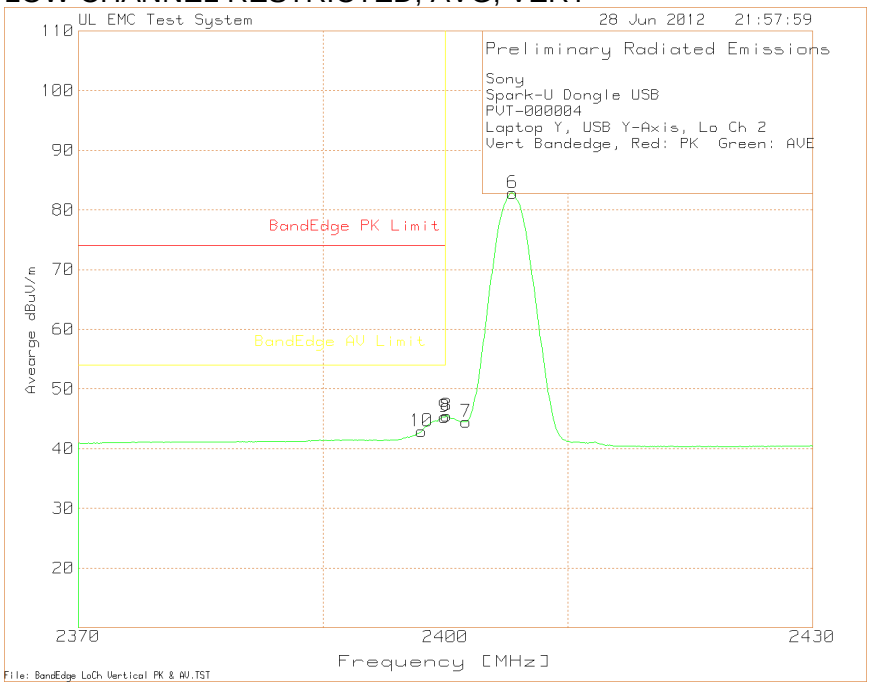
LOW CHANNEL RESTRICTED, AVG, HORIZ



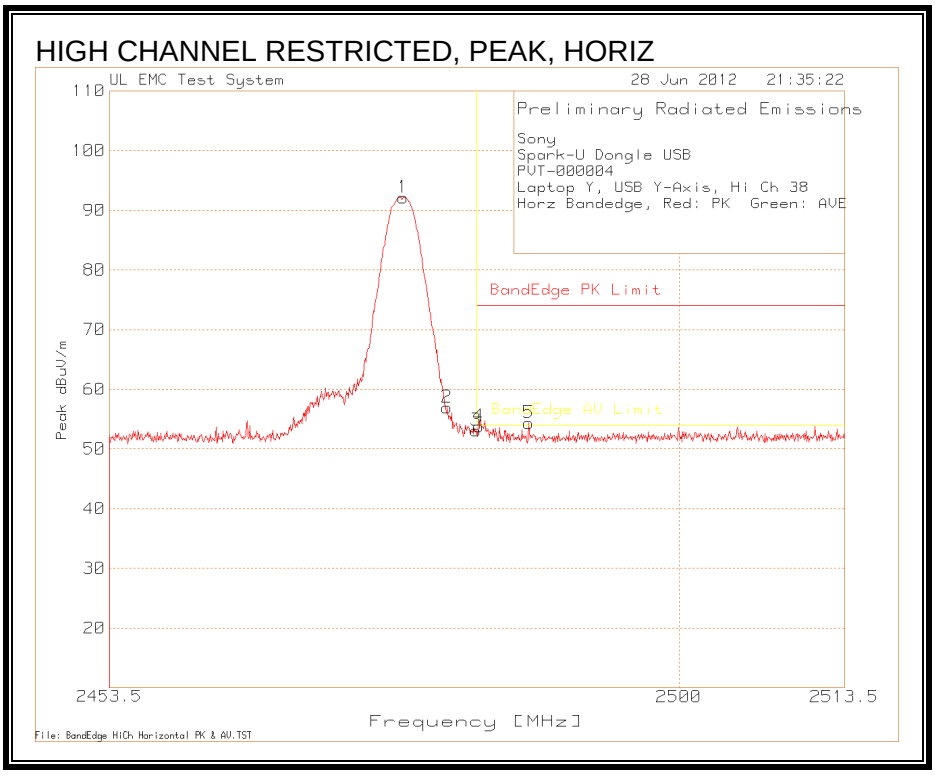
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



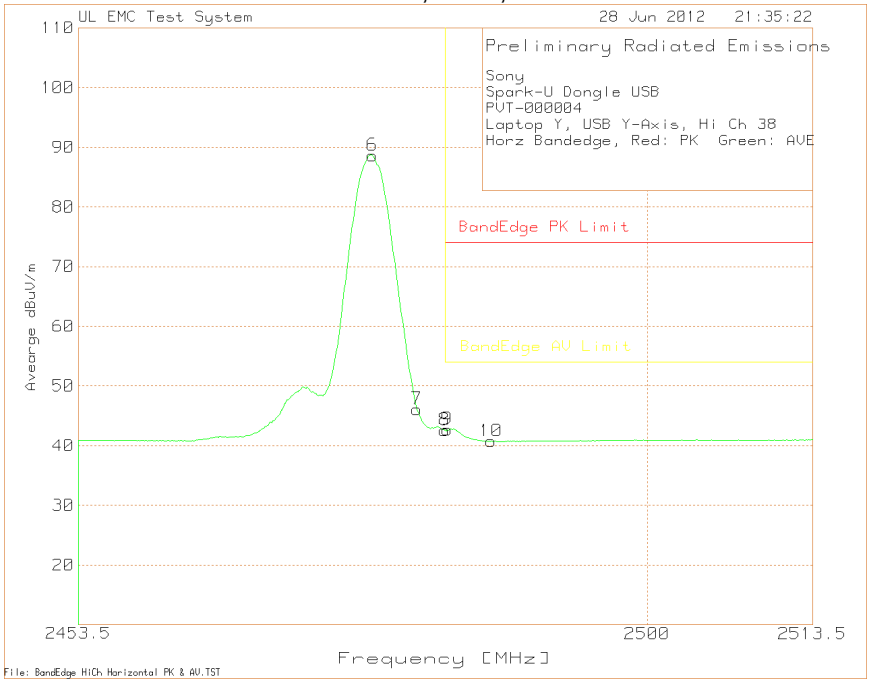
LOW CHANNEL RESTRICTED, AVG, VERT



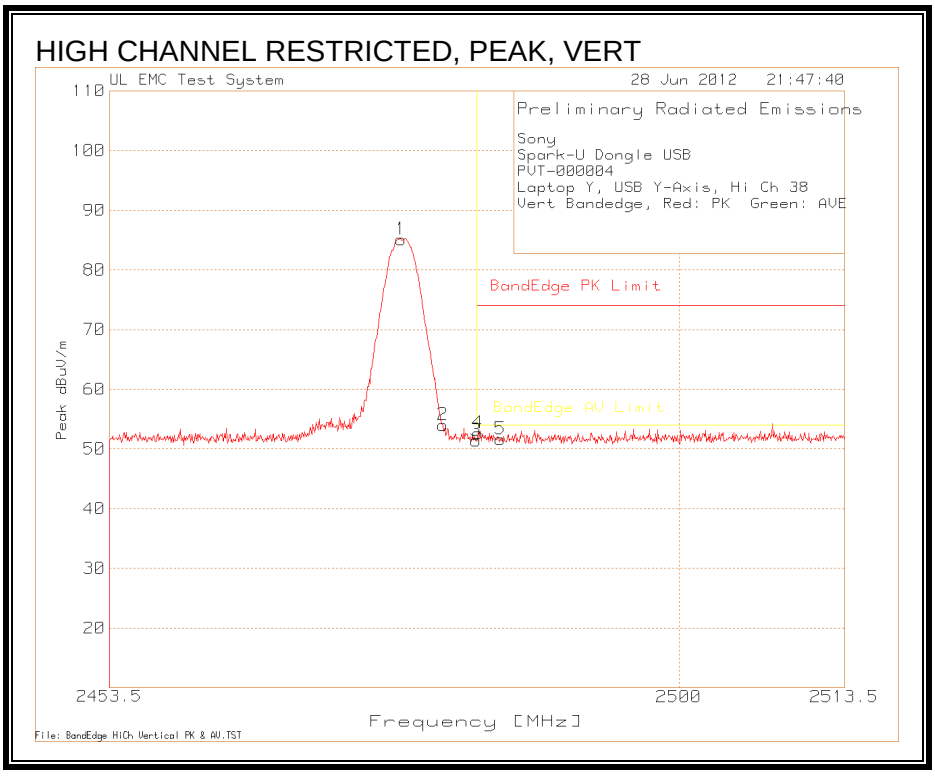
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



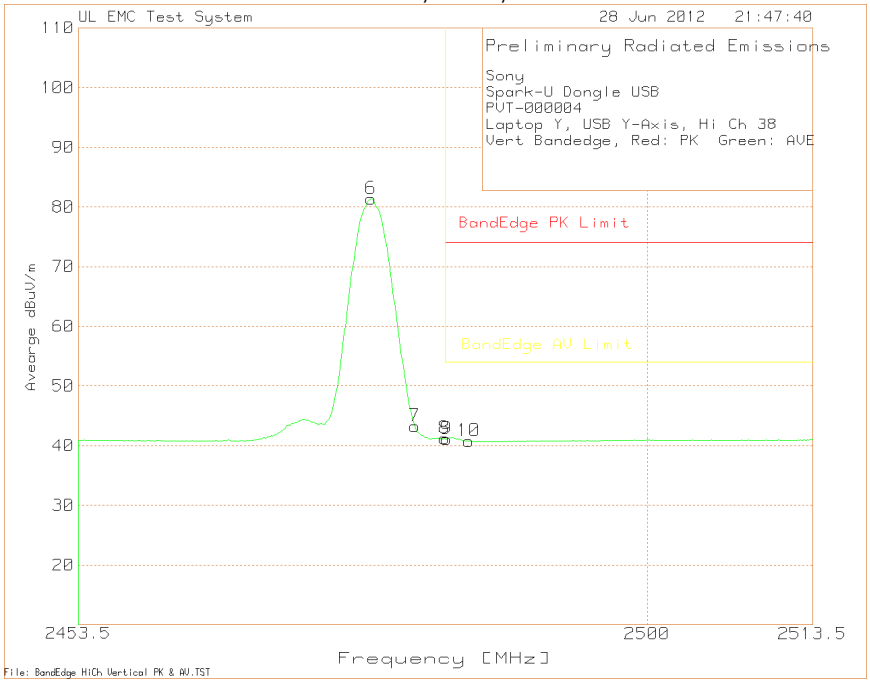
HIGH CHANNEL RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



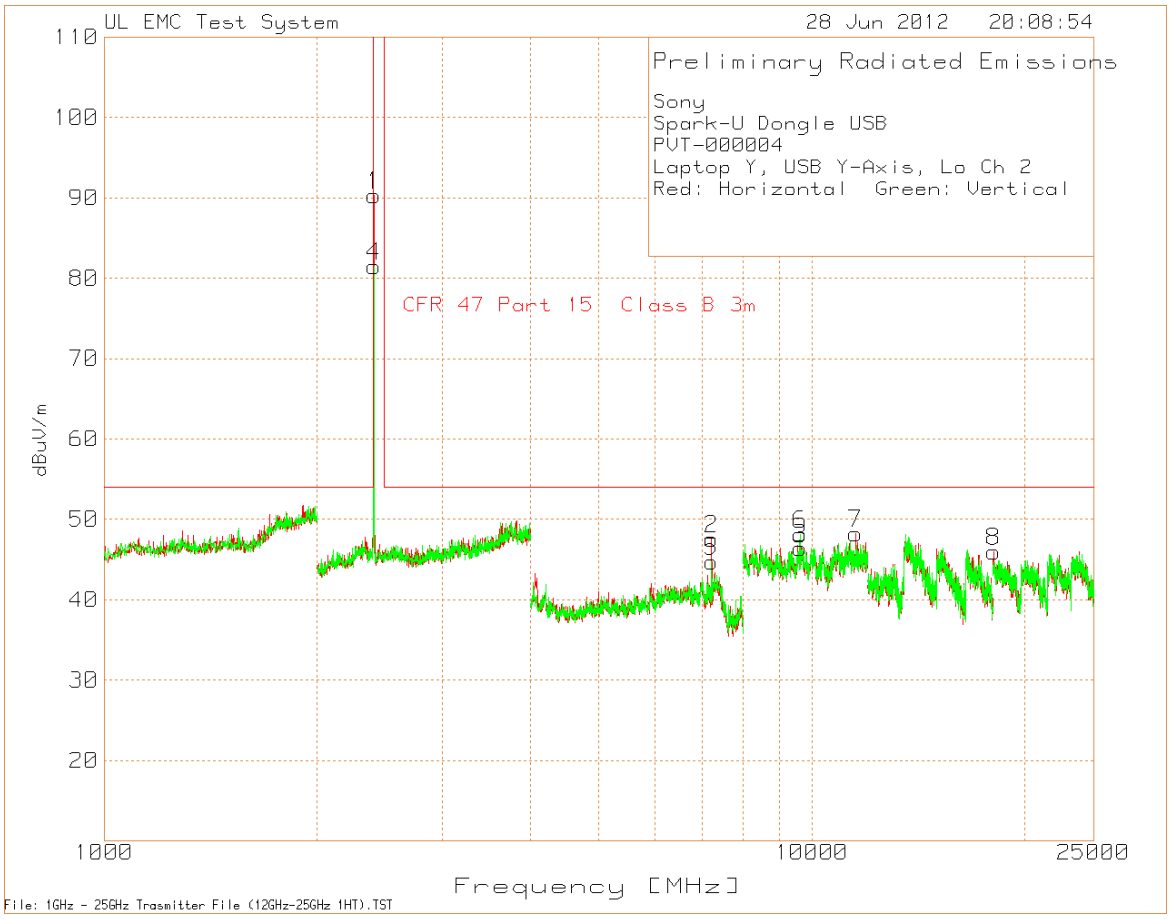
HIGH CHANNEL RESTRICTED, AVG, VERT



8.3. WORST-CASE Above 1 GHz

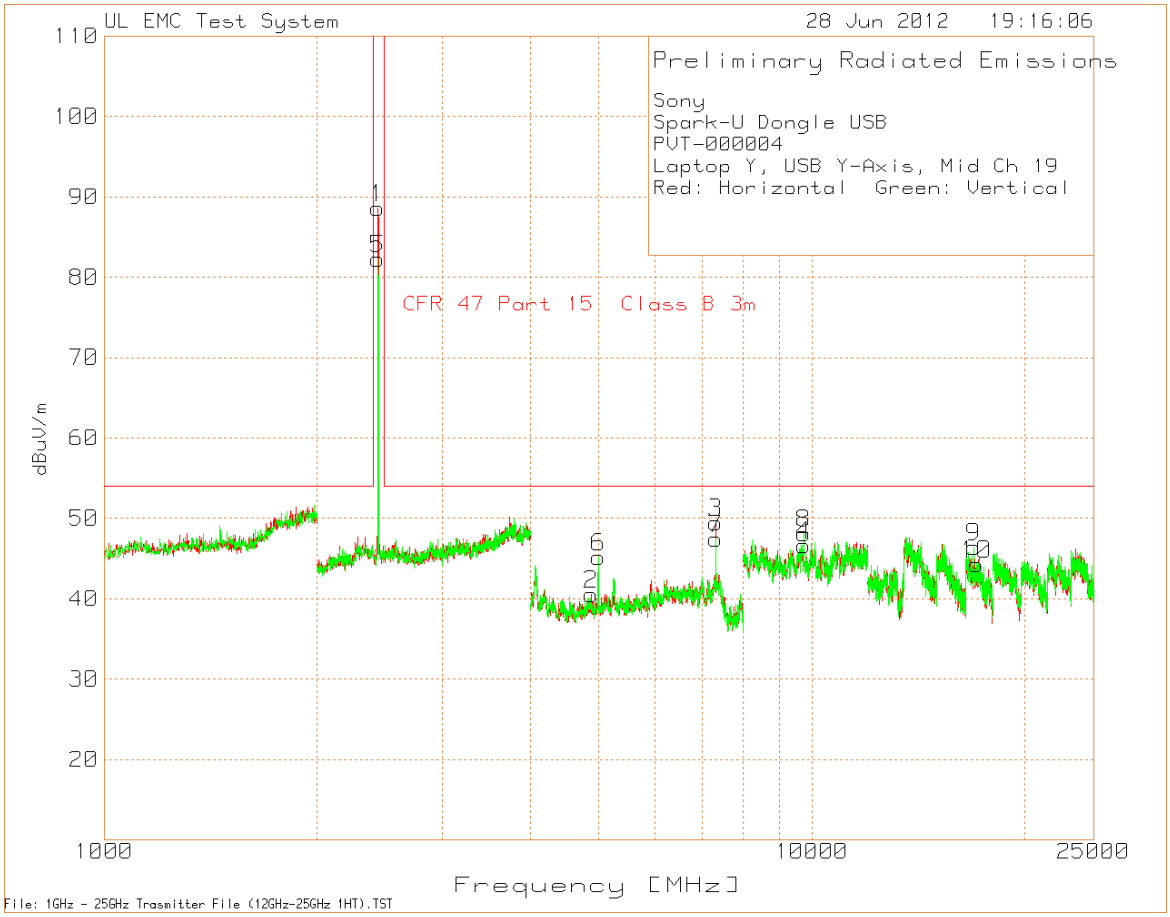
SPURIOUS EMISSIONS 1 TO 25 GHz (WORST-CASE CONFIGURATION, HORIZONTAL)

Low Channel



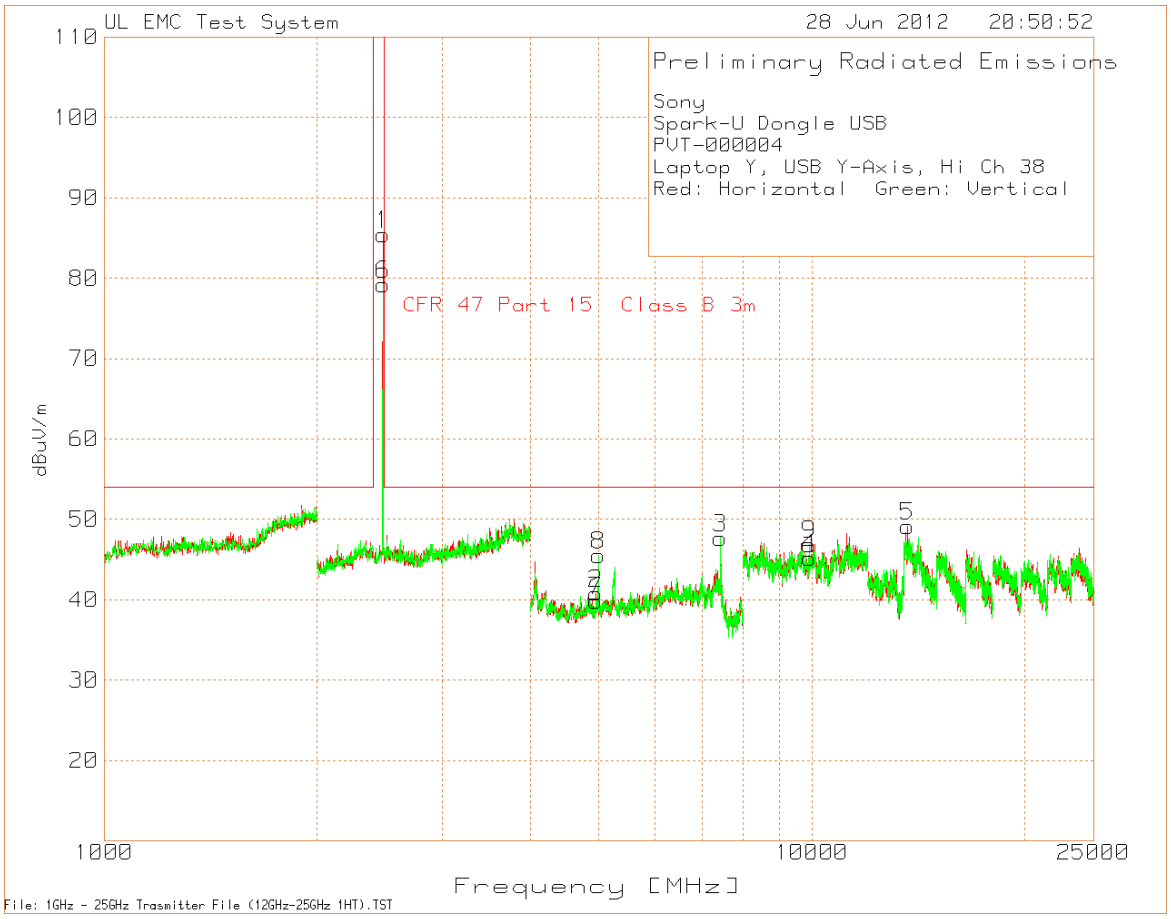
Sony									
Spark-U Dongle USB									
PVT-000004									
Laptop Y, USB Y-Axis, Lo Ch 2									
Red: Horizontal Green: Vertical									
Test Frequency	Meter Reading	Detector	Antenna Factor	BOMS Factor [dB]	dBuV/m	Class B 3m	Margin	Height [cm]	Polarity
2404.404	64.33	PK	21.8	4.18	90.31	-	-	100	Horz
7218.145	65.42	PK	29.8	-47.68	47.54	54	-6.46	100	Horz
9617.078	59.9	PK	36.4	-49.91	46.39	54	-7.61	100	Horz
11519.68	58.56	PK	37.2	-47.52	48.24	54	-5.76	150	Horz
18073.537	66.93	PK	40	-61	45.93	54	-8.07	99	Horz
2404.404	55.48	PK	21.8	4.18	81.46	-	-	150	Vert
7218.145	62.61	PK	29.8	-47.68	44.73	54	-9.27	100	Vert
9617.078	61.66	PK	36.4	-49.91	48.15	54	-5.85	150	Vert
PK - Peak detector									

Mid Channel



Sony									
Spark-U Dongle USB									
PVT-000004									
Laptop Y, USB Y-Axis, Mid Ch 19									
Red: Horizontal Green: Vertical									
Test Frequency	Meter Reading	Detector	Antenna Factor	BOMS Factor [dB]	dBuV/m	Class B 3m	Margin	Height [cm]	Polarity
2438.438	62.54	PK	21.9	4.18	88.62	-	-	100	Horz
4877.919	64.05	PK	27.7	-51.16	40.59	54	-13.41	100	Horz
7319.546	65.1	PK	30.6	-46.25	49.45	54	-4.55	100	Horz
9753.169	60.44	PK	36.4	-50.13	46.71	54	-7.29	100	Horz
2438.438	56.23	PK	21.9	4.18	82.31	-	-	150	Vert
4992.662	68.96	PK	27.8	-51.56	45.2	54	-8.8	100	Vert
7319.546	63.06	PK	30.6	-46.25	47.41	54	-6.59	100	Vert
9753.169	61.89	PK	36.4	-50.13	48.16	54	-5.84	100	Vert
16919.46	47.38	PK	40.3	-41.22	46.46	54	-7.54	100	Vert
17075.538	44.84	PK	40.3	-40.91	44.23	54	-9.77	100	Vert
PK - Peak detector									

Hi Channel



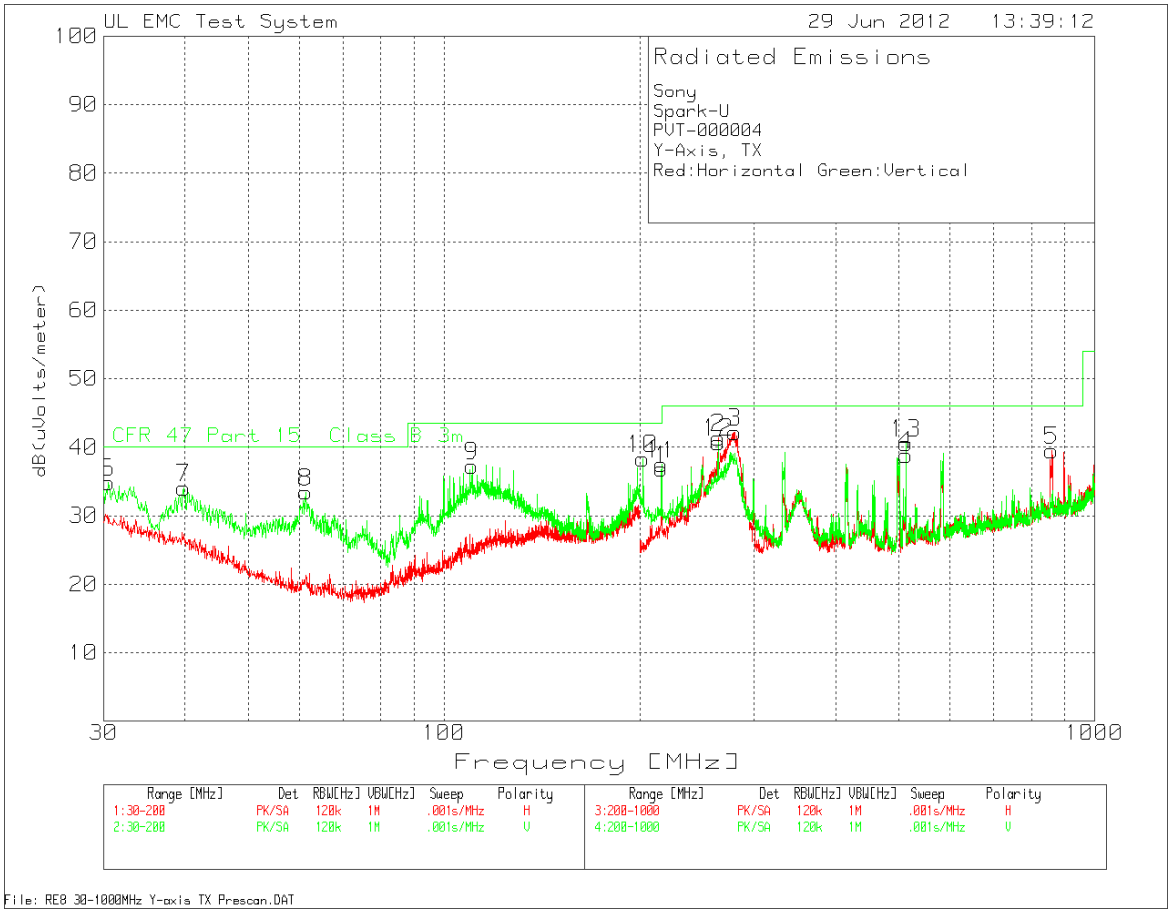
;;

Sony									
Spark-U Dongle USB									
PVT-000004									
Laptop Y, USB Y-Axis, Hi Ch 38									
Red: Horizontal Green: Vertical									
Test Frequency	Meter Reading	Detector	Antenna Factor	BOMS Factor [dB]	dBuV/m	Class B 3m	Margin	Height [cm]	Polarity
2476.476	59.63	PK	22	3.78	85.41	-	-	100	Horz
4955.304	64.6	PK	27.8	-51.57	40.83	54	-13.17	100	Horz
7434.29	64.14	PK	30.7	-47.13	47.71	54	-6.29	100	Horz
9905.27	60.01	PK	36.4	-51.17	45.24	54	-8.76	100	Horz
13656.828	50.28	PK	39.8	-40.97	49.11	54	-4.89	100	Horz
2476.476	53.46	PK	22	3.78	79.24	-	-	150	Vert
4949.967	63.61	PK	27.8	-51.59	39.82	54	-14.18	150	Vert
4995.33	69.4	PK	27.8	-51.65	45.55	54	-8.45	101	Vert
9905.27	61.69	PK	36.4	-51.17	46.92	54	-7.08	150	Vert
PK - Peak detector									

8.4. WORST-CASE BELOW 1 GHz

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

PLOT



DATA

Sony
Spark-U
PVT-000004
Y-Axis, TX
Red:Horizontal Green:Vertical

Test Frequency	Meter Reading	Detector	Antenna Factor	Gain Loss Factor	10m to 3m (dB)	dB(uVolts/meter)	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
30.4248	36	PK	17.7	-29.3	10.5	34.9	40	-5.1	99	Vert
39.7701	38.64	PK	14.2	-29.3	10.5	34.04	40	-5.96	99	Vert
61.2644	45.76	PK	6.6	-29.4	10.5	33.46	40	-6.54	300	Vert
110.4548	44.1	PK	12.1	-29.4	10.5	37.3	43.5	-6.2	99	Vert
215.9893	48.8	PK	10.8	-33.3	10.5	36.8	43.5	-6.7	399	Horz
263.9574	51.46	PK	12.5	-33.1	10.5	41.36	46	-4.64	399	Horz
279.9467	51.71	PK	12.9	-32.9	10.5	42.21	46	-3.79	299	Horz
513.1246	42.33	PK	17.8	-31.8	10.5	38.83	46	-7.17	199	Horz
859.2938	37.78	PK	22.8	-31.6	10.5	39.48	46	-6.52	99	Horz
202.3984	50.05	PK	11.2	-33.4	10.5	38.35	43.5	-5.15	99	Vert
215.9893	49.47	PK	10.8	-33.3	10.5	37.47	43.5	-6.03	99	Vert
263.9574	50.85	PK	12.5	-33.1	10.5	40.75	46	-5.25	99	Vert
513.1246	44.08	PK	17.8	-31.8	10.5	40.58	46	-5.42	299	Vert

Test Frequency	Meter Reading	Detector	Antenna Factor	Gain Loss Factor	10m to 3m [dB]	dB(uVolts/meter)	CFR 47 Part 15 Class B 3m	Margin	Azimuth [Degs]	Height [cm]	Polarity
279.5746	49	QP	12.9	-32.9	10.5	39.5	46	-6.5	269	321	Horz

PK - Peak detector
QP - Quasi-Peak detector

9. 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

ANSI C63.4

RESULTS

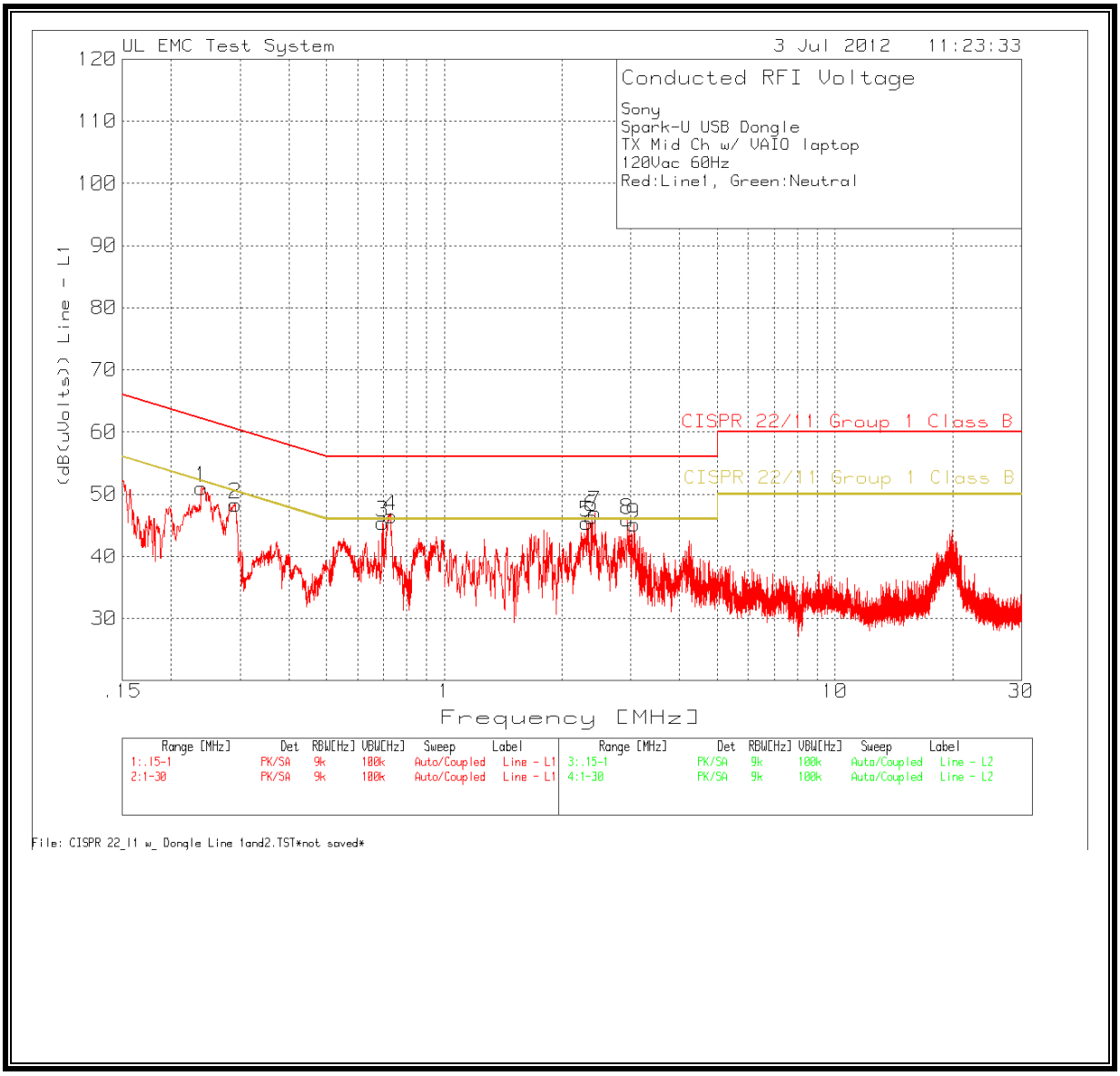
In Plots
Red Limit line is QP limit
Yellow Limit Line is AV Limit

6 WORST EMISSIONS

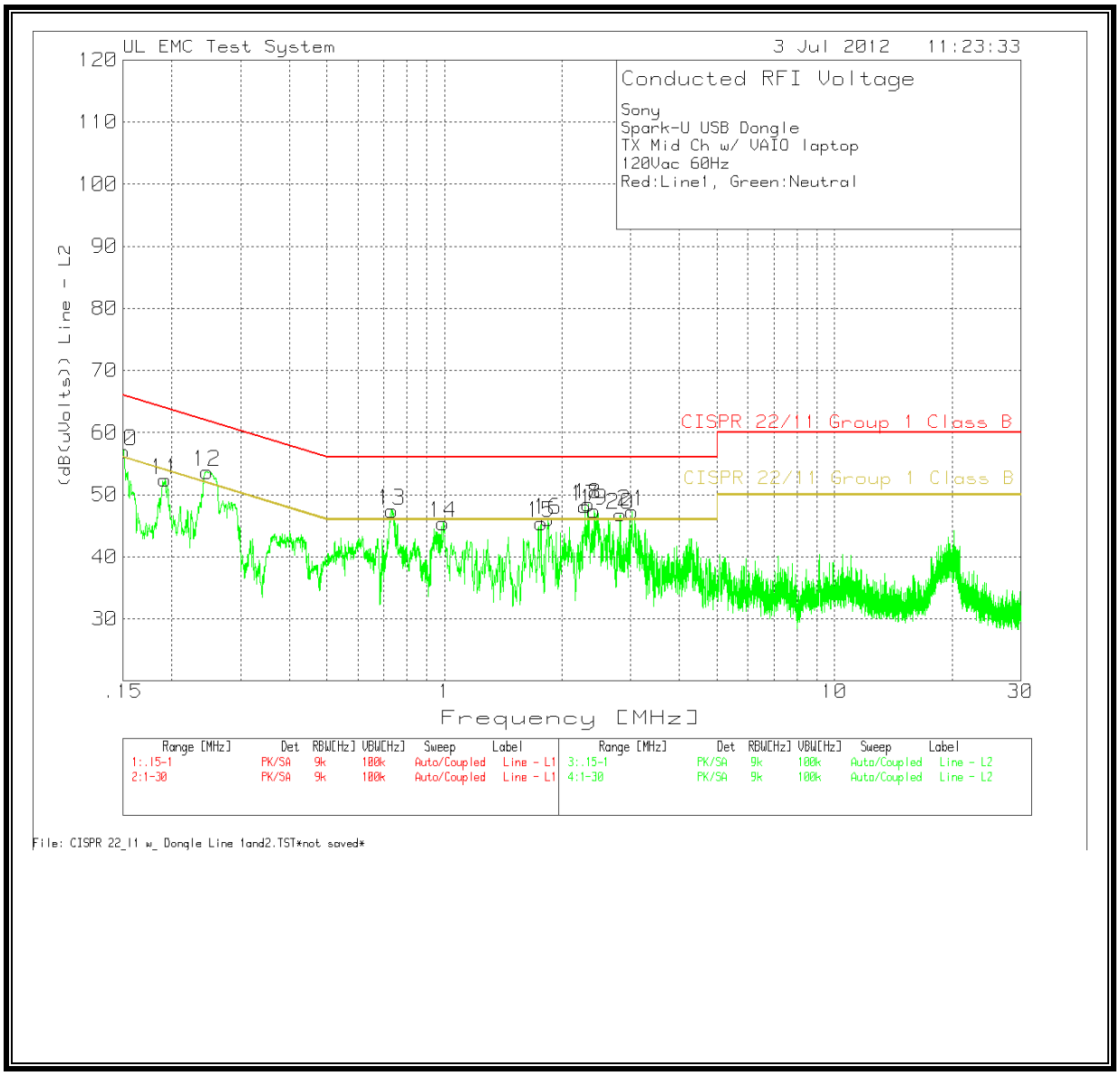
Sony									
Spark-U USB Dongle									
TX Mid Ch w/ VAIO laptop									
120Vac 60Hz									
Red:Line1, Green:Neutral									
Line - L1 .15 - 1MHz									
Test Frequency	Meter Reading	Detector	LISN Factor	Cable Factor	(dB(uVolts))	Class B QP	Margin	Class B AV	Margin
0.23961	39.64	PK	0.1	11.3	51.04	62.1	-11.06	52.1	-1.06
0.29142	37.42	PK	0	10.9	48.32	60.5	-12.18	50.5	-2.18
0.69614	34.87	PK	0	10.6	45.47	56	-10.53	46	-0.53
0.72948	35.83	PK	0	10.6	46.43	56	-9.57	46	0.43
2.3111	34.88	PK	0	10.6	45.48	56	-10.52	46	-0.52
2.38354	35.79	PK	0	10.6	46.39	56	-9.61	46	0.39
2.43062	36.41	PK	0	10.6	47.01	56	-8.99	46	1.01
2.9413	35.29	PK	0	10.6	45.89	56	-10.11	46	-0.11
3.05358	34.5	PK	0	10.6	45.1	56	-10.9	46	-0.9
Line - L2 .15 - 1MHz									
0.15043	43.99	PK	0.1	12.9	56.99	66	-9.01	56	0.99
0.19226	40.7	PK	0.1	11.6	52.4	63.9	-11.5	53.9	-1.5
0.24587	42.31	PK	0.1	11.3	53.71	61.9	-8.19	51.9	1.81
0.73309	36.84	PK	0	10.6	47.44	56	-8.56	46	1.44
0.99384	34.86	PK	0	10.6	45.46	56	-10.54	46	-0.54
1.76783	34.87	PK	0	10.6	45.47	56	-10.53	46	-0.53
1.84389	35.42	PK	0	10.6	46.02	56	-9.98	46	0.02
2.29662	37.44	PK	0.1	10.6	48.14	56	-7.86	46	2.14
2.33283	37.72	PK	0.1	10.6	48.42	56	-7.58	46	2.42
2.41976	36.72	PK	0.1	10.6	47.42	56	-8.58	46	1.42
2.82178	36.11	PK	0.1	10.6	46.81	56	-9.19	46	0.81
3.0246	36.63	PK	0	10.7	47.33	56	-8.67	46	1.33
PK - Peak detector									

Sony									
Spark-U USB Dongle									
TX Mid Ch w/ VAIO laptop									
120Vac 60Hz									
Red:Line1, Green:Neutral									
Line - L1									
Test Frequency	Meter Reading	Detector	LISN Factor	Cable Factor	(dB(uVolts))	Class B QP	Margin	Class B AV	Margin
0.24118	21.82	Av	0	11.3	33.12	62.06	-28.94	52.06	-18.94
0.28995	6.48	Av	0	11	17.48	60.53	-43.05	50.53	-33.05
0.69748	4.88	Av	0	10.6	15.48	56	-40.52	46	-30.52
0.72953	16.69	Av	0	10.6	27.29	56	-28.71	46	-18.71
2.31319	11.78	Av	0	10.6	22.38	56	-33.62	46	-23.62
2.37367	12.8	Av	0	10.6	23.4	56	-32.6	46	-22.6
2.42811	14.95	Av	0	10.6	25.55	56	-30.45	46	-20.45
2.9546	13.29	Av	0	10.6	23.89	56	-32.11	46	-22.11
3.06929	13.59	Av	0	10.6	24.19	56	-31.81	46	-21.81
Line - L2									
Test Frequency	Meter Reading	Detector	LISN Factor	Cable Factor	(dB(uVolts))	Class B QP	Margin	Class B AV	Margin
0.15056	14.14	Av	0.1	12.9	27.14	65.97	-38.83	55.97	-28.83
0.1928	8.86	Av	0.1	11.6	20.56	63.92	-43.36	53.92	-33.36
0.24741	22.41	Av	0.1	11.3	33.81	61.84	-28.03	51.84	-18.03
0.73401	13.77	Av	0	10.6	24.37	56	-31.63	46	-21.63
0.99398	11.59	Av	0	10.6	22.19	56	-33.81	46	-23.81
1.78482	14.12	Av	0	10.6	24.72	56	-31.28	46	-21.28
1.8488	13.7	Av	0	10.6	24.3	56	-31.7	46	-21.7
2.29124	10.76	Av	0.1	10.6	21.46	56	-34.54	46	-24.54
2.32684	11.32	Av	0.1	10.6	22.02	56	-33.98	46	-23.98
2.41302	13.42	Av	0.1	10.6	24.12	56	-31.88	46	-21.88
2.83792	14.09	Av	0.1	10.6	24.79	56	-31.21	46	-21.21
3.00918	11.15	Av	0	10.7	21.85	56	-34.15	46	-24.15
PK - Peak detector									
QP - Quasi-Peak detector									
Av - Average detector									

LINE 1 RESULTS



LINE 2 RESULTS



10. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequenoe of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

Table 5
Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m^2)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	$280/f$	$2.19/f$		6
10–30	28	$2.19/f$		6
30–300	28	0.073	2*	6
300–1 500	$1.585f^{0.5}$	$0.0042f^{0.5}$	$f/150$	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	$616\,000/f^{1.2}$
150 000–300 000	$0.158f^{0.5}$	$4.21 \times 10^{-4}f^{0.5}$	$6.67 \times 10^{-5}f$	$616\,000/f^{1.2}$

* Power density limit is applicable at frequencies greater than 100 MHz.

Notes: 1. Frequency, f, is in MHz.
2. A power density of 10 W/m^2 is equivalent to 1 mW/cm^2.
3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

EQUATIONS

Power density is given by:

S = EIRP / (4 * Pi * D^2)
where
S = Power density in W/m^2
EIRP = Equivalent Isotropic Radiated Power in W
D = Separation distance in m

Power density in units of W/m^2 is converted to units of mWc/m^2 by dividing by 10.

Distance is given by:

D = SQRT (EIRP / (4 * Pi * S))
where
D = Separation distance in m
EIRP = Equivalent Isotropic Radiated Power in W
S = Power density in W/m^2

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm^2

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m^2

RSS-102 Clause 2.5.2 RF exposure evaluation is required if the separation distance between the user and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- •below 1.5 GHz and the maximum e.i.r.p. of the device is equal to or less than 2.5 W;
- •at or above 1.5 GHz and the maximum e.i.r.p. of the device is equal to or less than 5 W.

RESULTS

(No simultaneous co-located transmitters, MPE distance equals 20 cm)

Band	Mode	Separation Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Duty Cycle (%)	Source Based EIRP (mW)	FCC Power Density (mW/cm^2)	IC Power Density (W/m^2)
2.4 GHz	DTS	20	4.76	1.55	100	4.276	0.0009	0.0085

The device operates above 1.5 GHz with a maximum EIRP less than or equal to 5 Watts as a mobile device with a minimum separation distance of 20 cm, therefore it is exempt from routine RF Exposure Evaluation under RSS-102.