



FCC 47 CFR PART 15 SUBPART B

TEST REPORT

FOR

SMART WATCH with BT and BLE

MODEL NUMBER: LG-W100, W100, LGW100

FCC ID: ZNFW100

IC ID: 2703C-W100

REPORT NUMBER: 14U17492-3, Revision C

ISSUE DATE: May 7, 2014

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	4/24/14	Initial issue	P. Kim
A	5/5/14	Updated statement	P. Kim
B	5/6/14	Updated statement	P. Kim
C	5/7/14	Updated block diagram	P. Kim

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC.
EUT DESCRIPTION: Smart watch with BT and BLE
MODEL: LG-W100, W100, LGW100
SERIAL NUMBER: 15D9C
DATE TESTED: April 15 – 23, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART B	Pass

UL Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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
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2. FACILITIES AND ACCREDITATION

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

47173 Benicia Street	47266 Benicia Street
☐ Chamber A	☐ Chamber D
☒ Chamber B	☐ Chamber E
☐ Chamber C	☐ Chamber F

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

3. CALIBRATION AND UNCERTAINTY

3.1. 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.

3.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

3.3. 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%.

4. EQUIPMENT UNDER TEST

4.1. DESCRIPTION OF EUT

The EUT is a smart watch with BT and BLE

GENERAL INFORMATION

Power Requirements	Input :100-240 VAC / 50-60 Hz Output: 5VDC, 0.85 A
List of frequencies generated or used by the EUT	1.2GHz , 26MHz and 19.2MHz

SUBASSEMBLIES

The EUT was constructed using the following subassemblies:

Subassembly Description	Manufacturer	Part Number
Cradle	LG	W0
AC adapter	DongDo	MCS-01WD
AC adapter	Sunlin	MCS-01WR
USB cable	Ningbo BROAD	EAD62289301

4.2. PRELIMINARY TEST CONFIGURATIONS

The following configurations were investigated during preliminary testing:

EUT Configuration	Description
1	EUT with Cradle and adapter
2	EUT with Laptop

The worst-case configuration was determined to be EUT with Laptop.

4.3. MODE(S) OF OPERATION

Mode	Description
1	EUT attached with BT call box and under standby mode; EUT docked in the charger with charging function enabled

4.4. DETAILS OF TESTED SYSTEM

SUPPORT EQUIPMENT & PERIPHERALS

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Cradle	LG	W0	N/A	N/A
AC adapter	DongDo	MCS-01WD	N/A	N/A
AC adapter	Sunlin	MCS-01WR	N/A	N/A
USB cable	Ningbo BROAD	EAD62289301	N/A	N/A
Laptop	Lenovo	T430	N/A	N/A
USB drive	kingstone	N/A	N/A	N/A

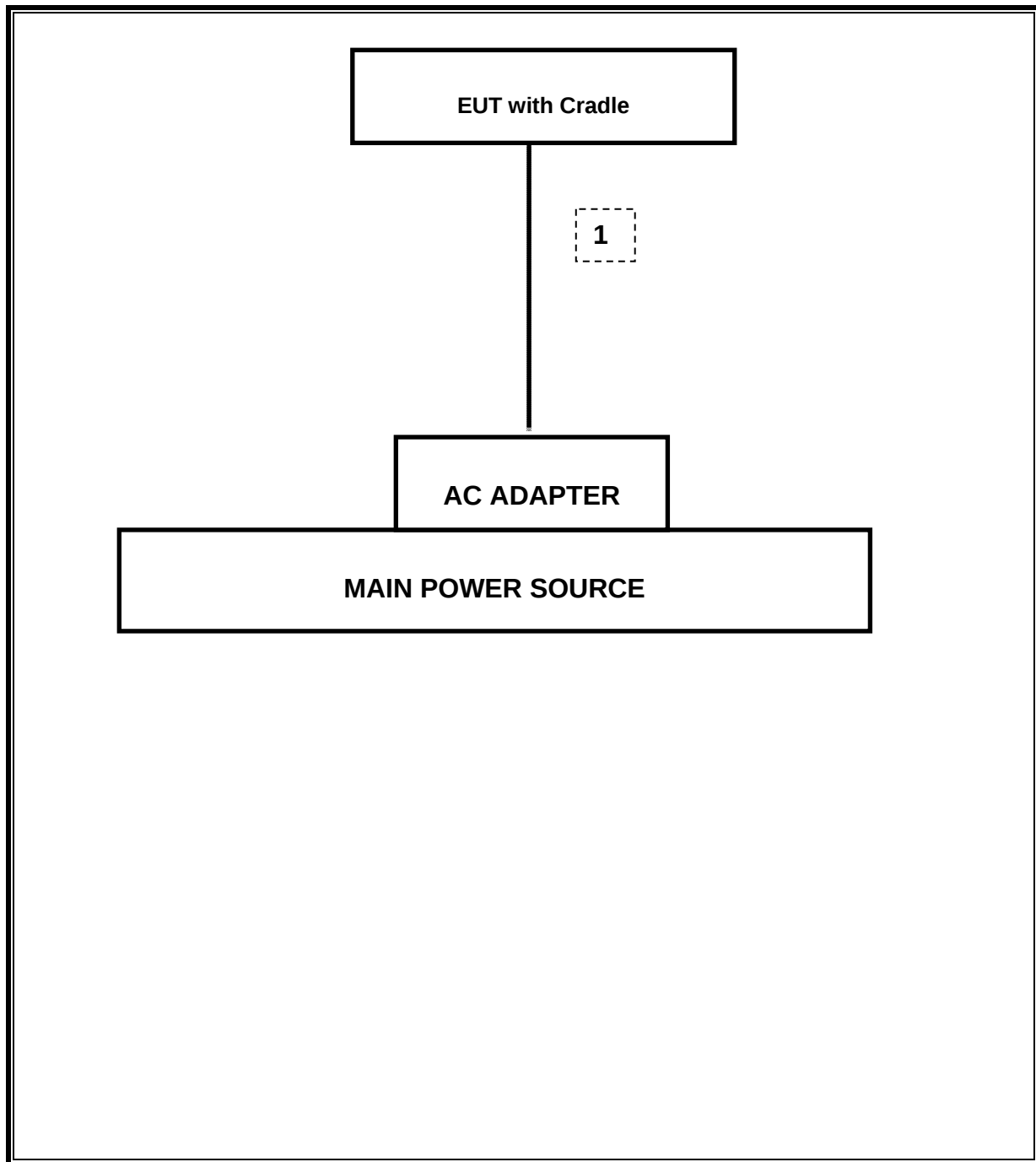
I/O CABLES

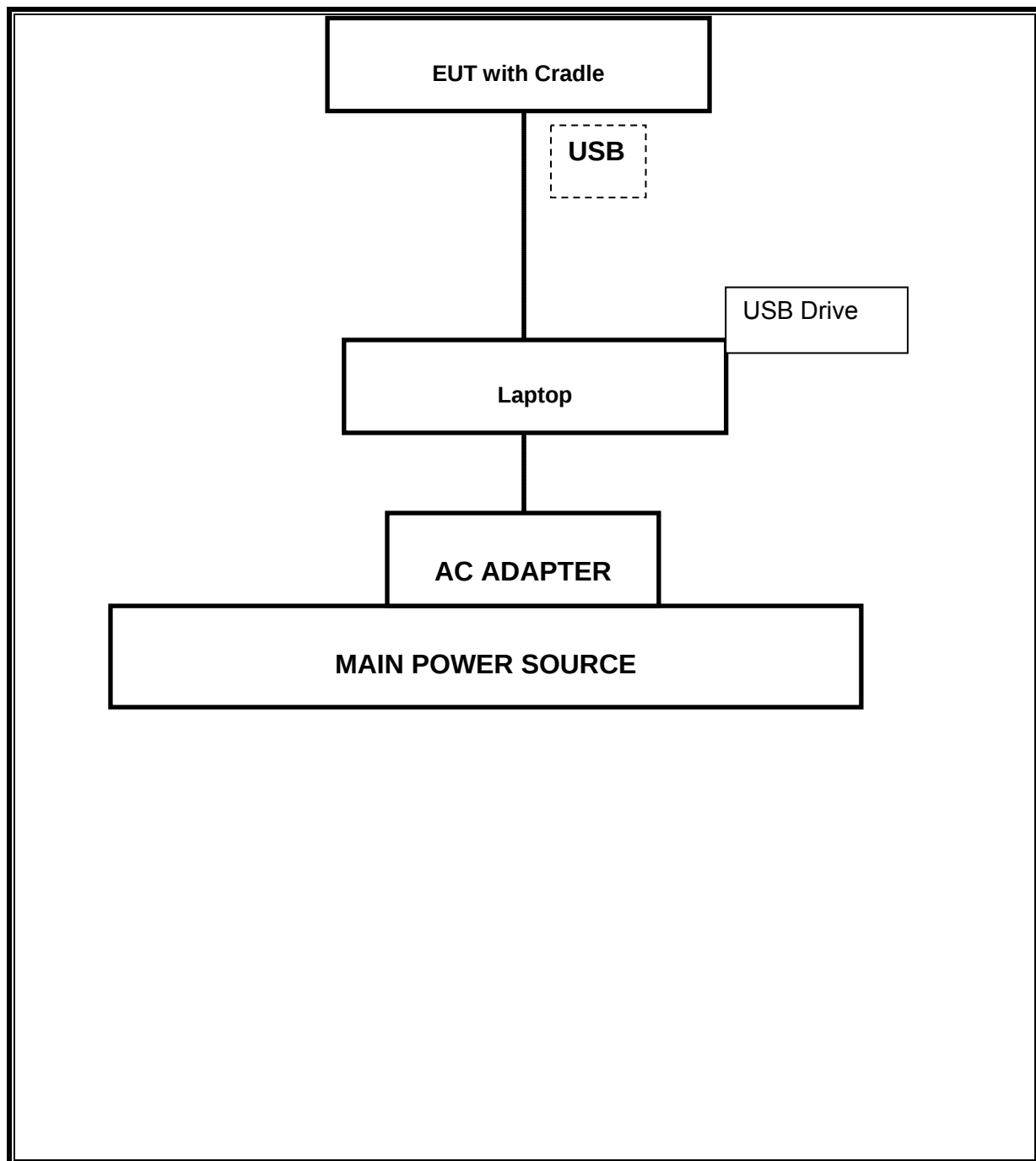
I/O CABLE LIST						
Cable No.	Port	No. of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB(Charger)	1	mini USB	USB	1	
1	USB(Laptop)	1	mini USB	USB	1	

TEST SETUP

The EUT is installed in a typical configuration. Test software exercised the EUT.

TEST SETUP DIAGRAM





5. 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	S/N	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	10/21/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	01/16/15
ESA-E Spectrum Analyzer, 9kHz-26.5 GHz	Agilent / HP	E4407B	C01098	03/26/15
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	02/12/15
OmniBER	HP	37717C	F00109	05/05/14
Spectrum Analyzer, 44 GHz	Agilent	N9030A	F00127	02/21/15
Antenna, Horn, 18 GHz	ETS	3117	F00131	02/19/15
EMI Test Receiver, 9 kHz-7GHz	R&S	ESCI 7	100935	08/21/14
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/15

6. RADIATED EMISSIONS

TEST PROCEDURE

ANSI C63.4

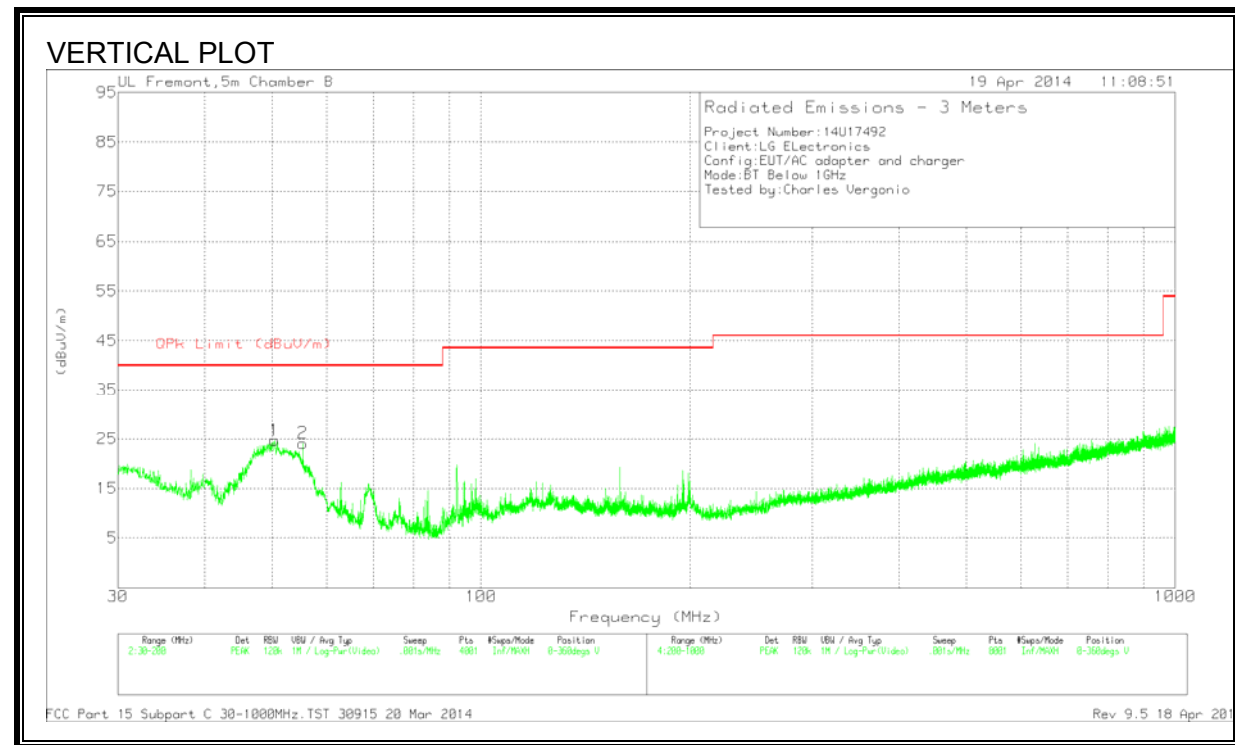
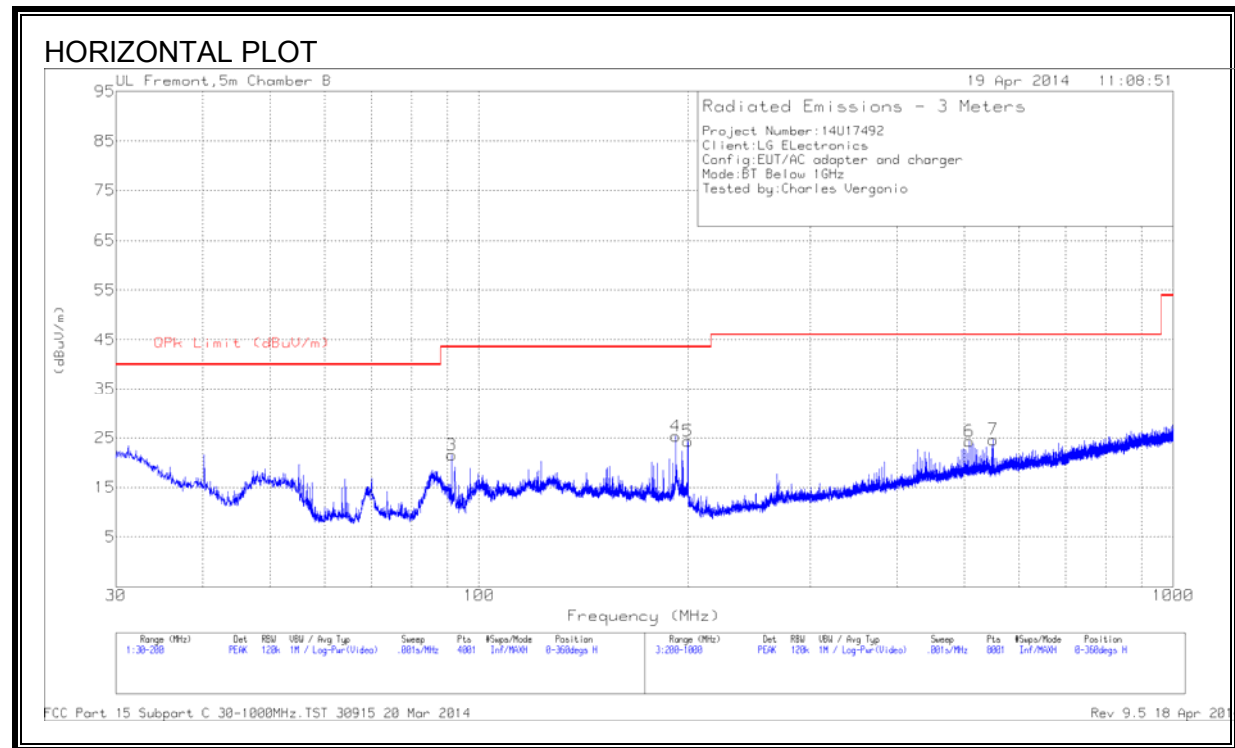
The highest clock frequency generated or used in the EUT is 26 MHz, therefore the frequency range was investigated from 30 MHz to 5000 MHz.

LIMIT

§15.109 (a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Limits for radiated disturbance of Class B ITE at measuring distance of 3 m	
Frequency range (MHz)	Quasi-peak limits (dB μ V/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960 MHz	54
Note: The lower limit shall apply at the transition frequency.	

EUT WITH DOCK CHARGER BELOW 1GHZ RESULTS



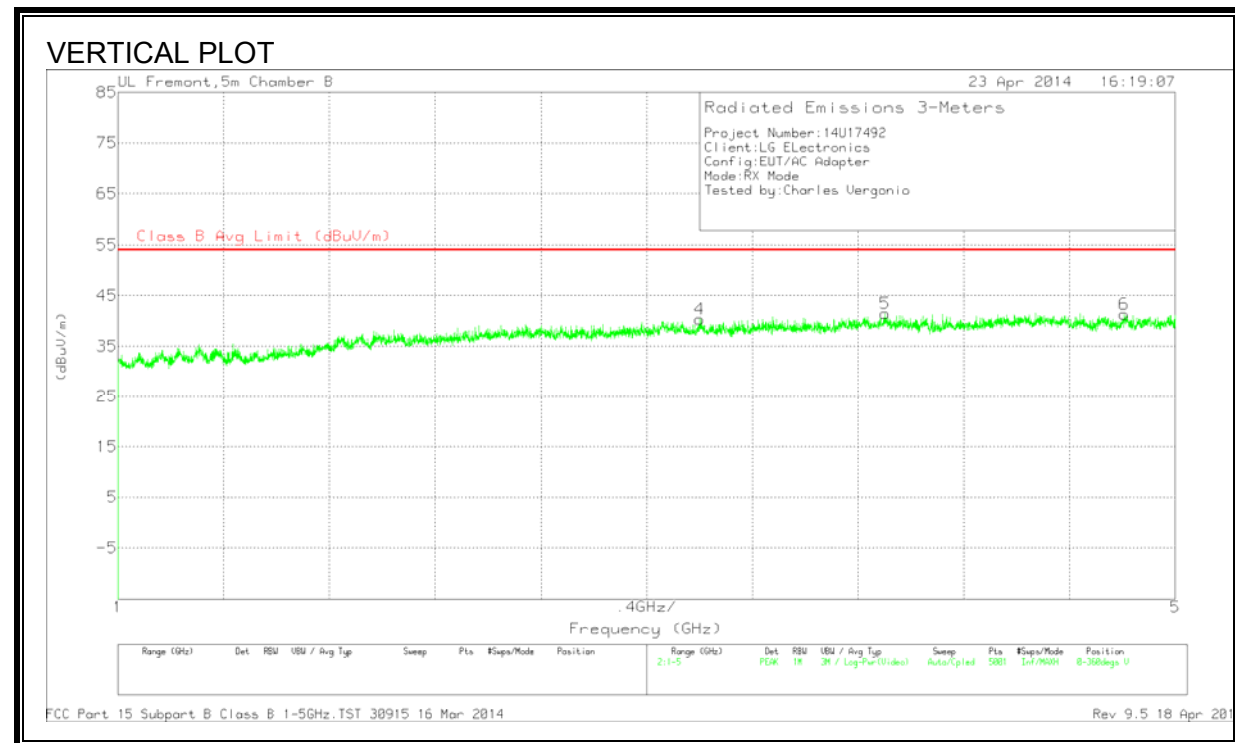
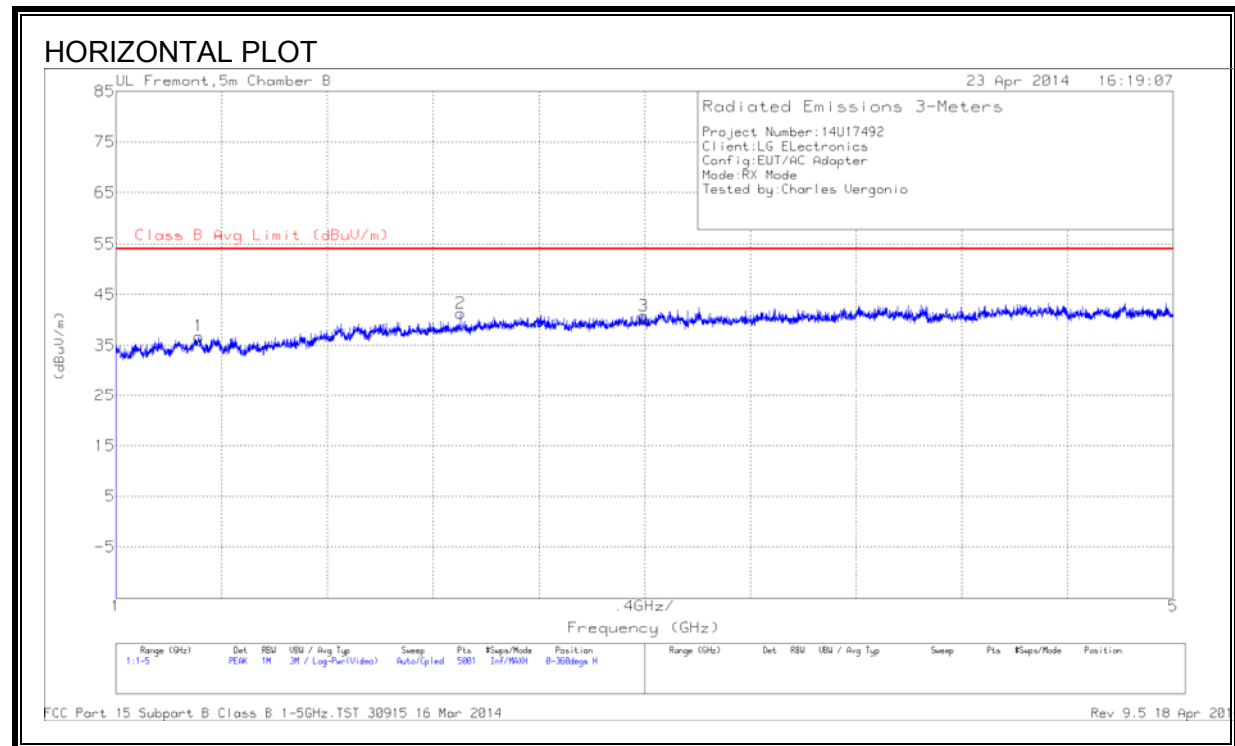
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T477 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	50.4	45.63	PK	7.7	-28.6	24.73	40	-15.27	0-360	101	V
2	55.3725	45.74	PK	7	-28.6	24.14	40	-15.86	0-360	101	V
3	91.3275	41.61	PK	8	-28.1	21.51	43.52	-22.01	0-360	300	H
4	192.01	40.93	PK	11.5	-27.1	25.33	43.52	-18.19	0-360	200	H
5	199.9575	39.03	PK	12.3	-27	24.33	43.52	-19.19	0-360	200	H
6	508.8	32.28	PK	17.8	-25.7	24.38	46.02	-21.64	0-360	200	H
7	550	32.55	PK	17.7	-25.6	24.65	46.02	-21.37	0-360	200	H

PK - Peak detector

FCC Part 15 Subpart C 30-1000MHz.TST 30915 20 Mar 2014

EUT WITH DOCK CHARGER ABOVE 1GHZ RESULTS



DATA

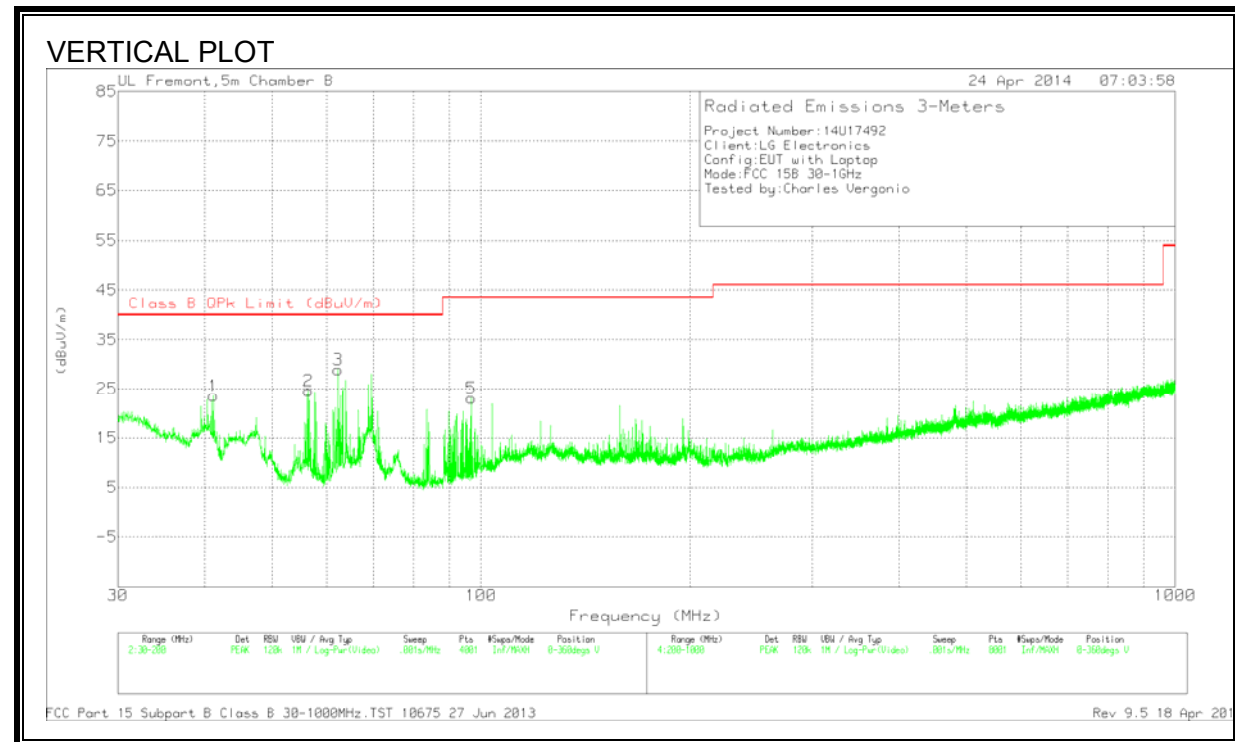
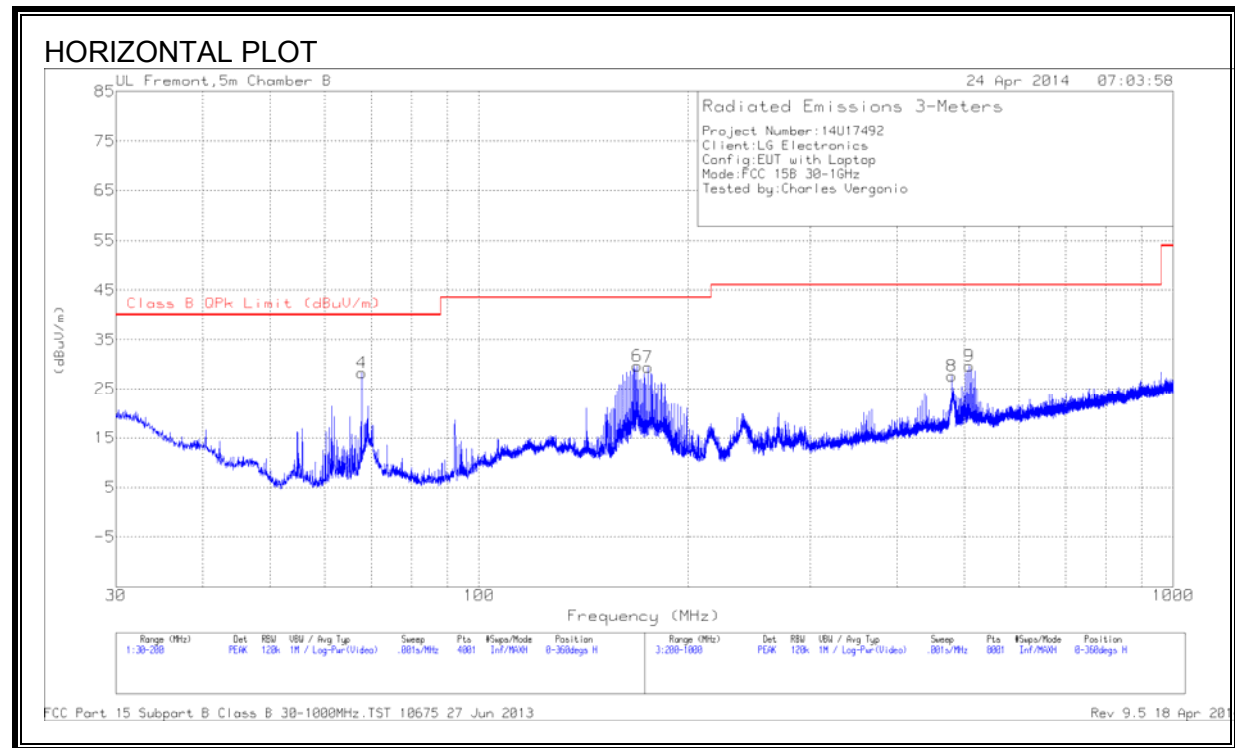
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B Avg Limit (dBuV/m)	Av(CISPR)Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.314	42.5	PK	28.8	-34.5	36.8	54	-17.2	0-360	99	H
2	2.304	42.53	PK	31.7	-32.9	41.33	54	-12.67	0-360	99	H
3	2.996	40.28	PK	32.8	-32.2	40.88	54	-13.12	0-360	199	H
4	3.201	39.5	PK	32.8	-32	40.3	54	-13.7	0-360	202	V
5	3.903	39.11	PK	33.8	-31.5	41.41	54	-12.59	0-360	202	V
6	4.808	37.57	PK	34.2	-30.4	41.37	54	-12.63	0-360	202	V

PK - Peak detector

Note: additional above 1GHz testing performed to ensure the unit's performance purpose only.

EUT WITH LAPTOP BELOW 1GHZ RESULTS



DATA

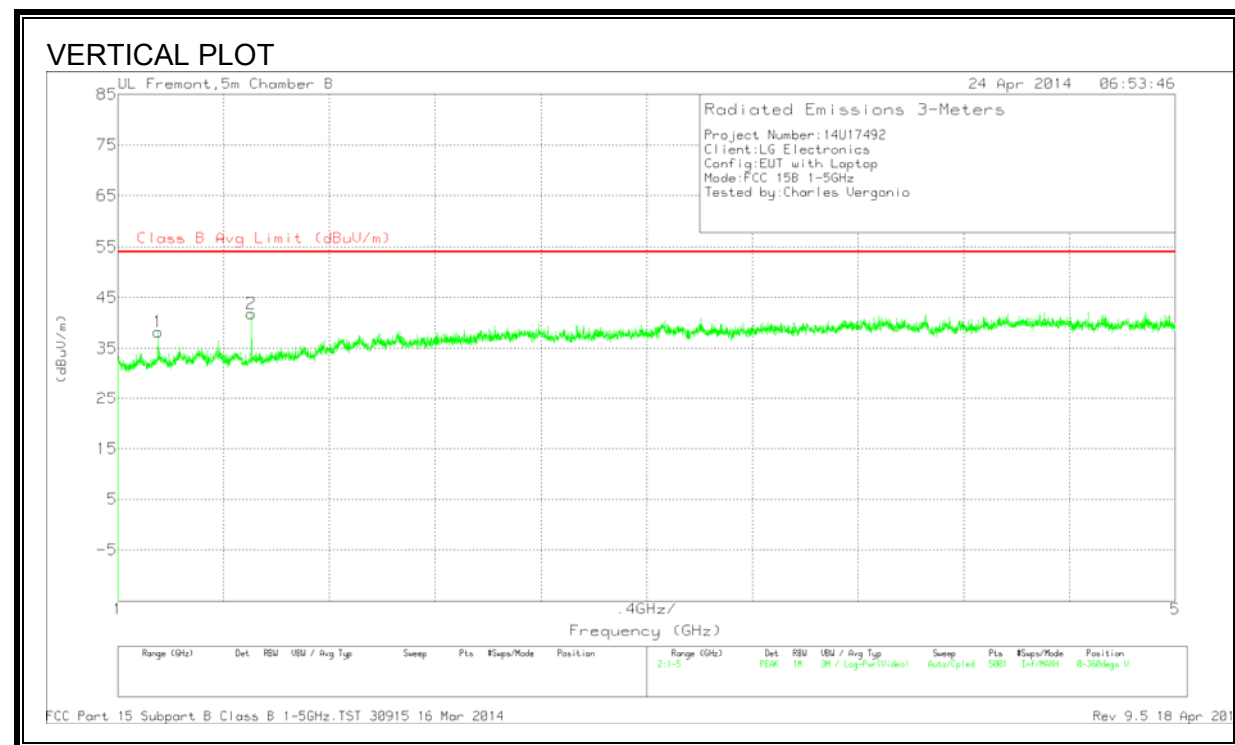
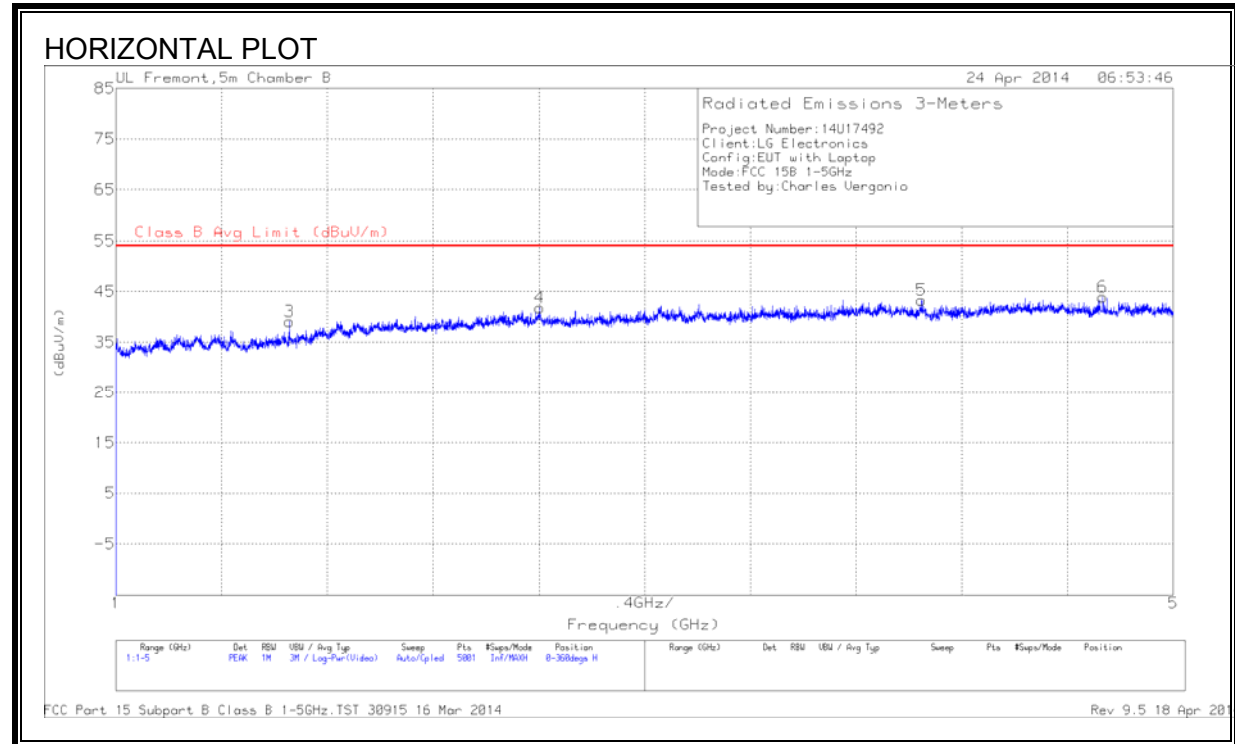
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T477 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	41.1775	39.56	PK	12.7	-28.7	23.56	40	-16.44	0-360	101	V
2	56.4775	46.06	PK	7	-28.5	24.56	40	-15.44	0-360	101	V
3	62.2575	49.96	PK	7.5	-28.5	28.96	40	-11.04	0-360	101	V
4	67.7825	48.63	PK	8.1	-28.4	28.33	40	-11.67	0-360	200	H
5	96.895	41.78	PK	9.4	-28.1	23.08	43.52	-20.44	0-360	101	V
6	169.145	45.23	PK	11.8	-27.3	29.73	43.52	-13.79	0-360	200	H
7	175.1375	45.08	PK	11.5	-27.2	29.38	43.52	-14.14	0-360	200	H
8	480	36.26	PK	17.4	-26	27.66	46.02	-18.36	0-360	200	H
9	508.8	37.56	PK	17.8	-25.7	29.66	46.02	-16.36	0-360	200	H

PK - Peak detector

Note: additional above 1GHz testing performed to ensure the unit's performance purpose only.

EUT WITH LAPTOP ABOVE 1GHZ RESULTS



DATA

Trace Markers

Marker	Frequen cy (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl (dB)	Correcte d Reading (dBuV/m)	Class B Avg Limit (dBuV/m)	Av(CISP R)Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.151	45.02	PK	27.8	-34.6	38.22	54	-15.78	0-360	99	V
2	1.504	48.27	PK	27.9	-34.3	41.87	54	-12.13	0-360	99	V
3	1.656	43.87	PK	28.8	-33.6	39.07	54	-14.93	0-360	202	H
4	2.602	41.69	PK	32.5	-32.4	41.79	54	-12.21	0-360	202	H
5	4.049	40.52	PK	33.6	-30.8	43.32	54	-10.68	0-360	99	H
6	4.734	40.48	PK	34.2	-30.7	43.98	54	-10.02	0-360	99	H

PK - Peak detector

6.1. AC MAINS LINE CONDUCTED EMISSIONS

TEST PROCEDURE

ANSI C63.4

LIMIT

§15.107 (a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Notes: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

RESULTS

6 WORST EMISSIONS

Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	Margin to Limit (dB)	CFR 47 Part 15 Class B Avg	Margin to Limit (dB)
1	.168	45.86	PK	1.2	0	47.06	65.1	-18.04	55.1	-8.04
2	.168	19.65	Av	1.2	0	20.85	65.1	-44.25	55.1	-34.25
3	1.3965	35.99	PK	.2	.1	36.29	56	-19.71	46	-9.71
4	1.3965	18.8	Av	.2	.1	19.1	56	-36.9	46	-26.9
5	13.2405	34.79	PK	.2	.2	35.19	60	-24.81	50	-14.81
6	13.2405	17.96	Av	.2	.2	18.36	60	-41.64	50	-31.64

Line-L2 .15 - 30MHz

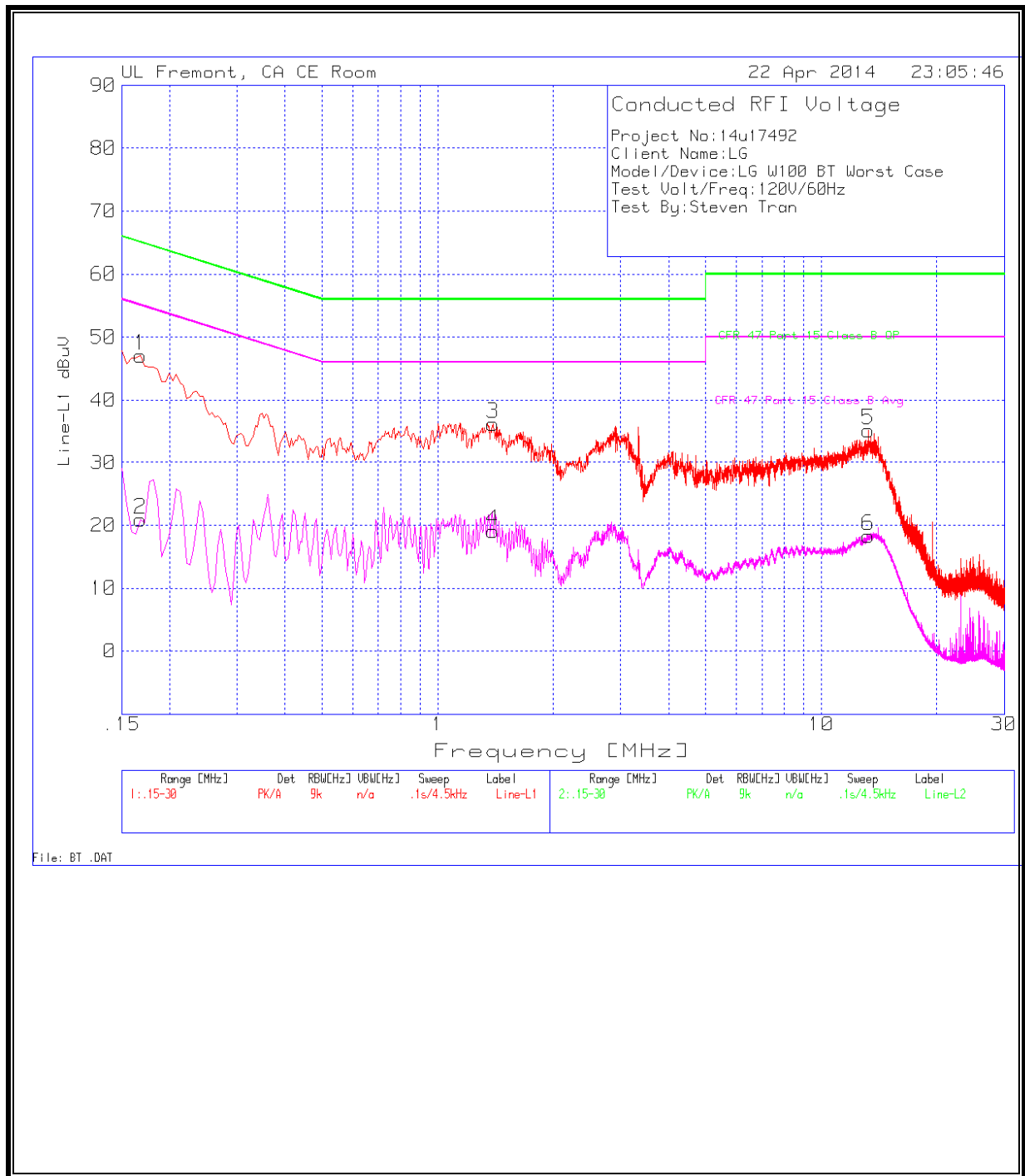
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	Margin to Limit (dB)	CFR 47 Part 15 Class B Avg	Margin to Limit (dB)
7	.1635	38.68	PK	1.3	0	39.98	65.3	-25.32	55.3	-15.32
8	.1635	20.23	Av	1.3	0	21.53	65.3	-43.77	55.3	-33.77
9	1.086	33.86	PK	.3	0	34.16	56	-21.84	46	-11.84
10	1.086	16.6	Av	.3	0	16.9	56	-39.1	46	-29.1
11	13.623	31.91	PK	.3	.2	32.41	60	-27.59	50	-17.59
12	13.623	14.79	Av	.3	.2	15.29	60	-44.71	50	-34.71

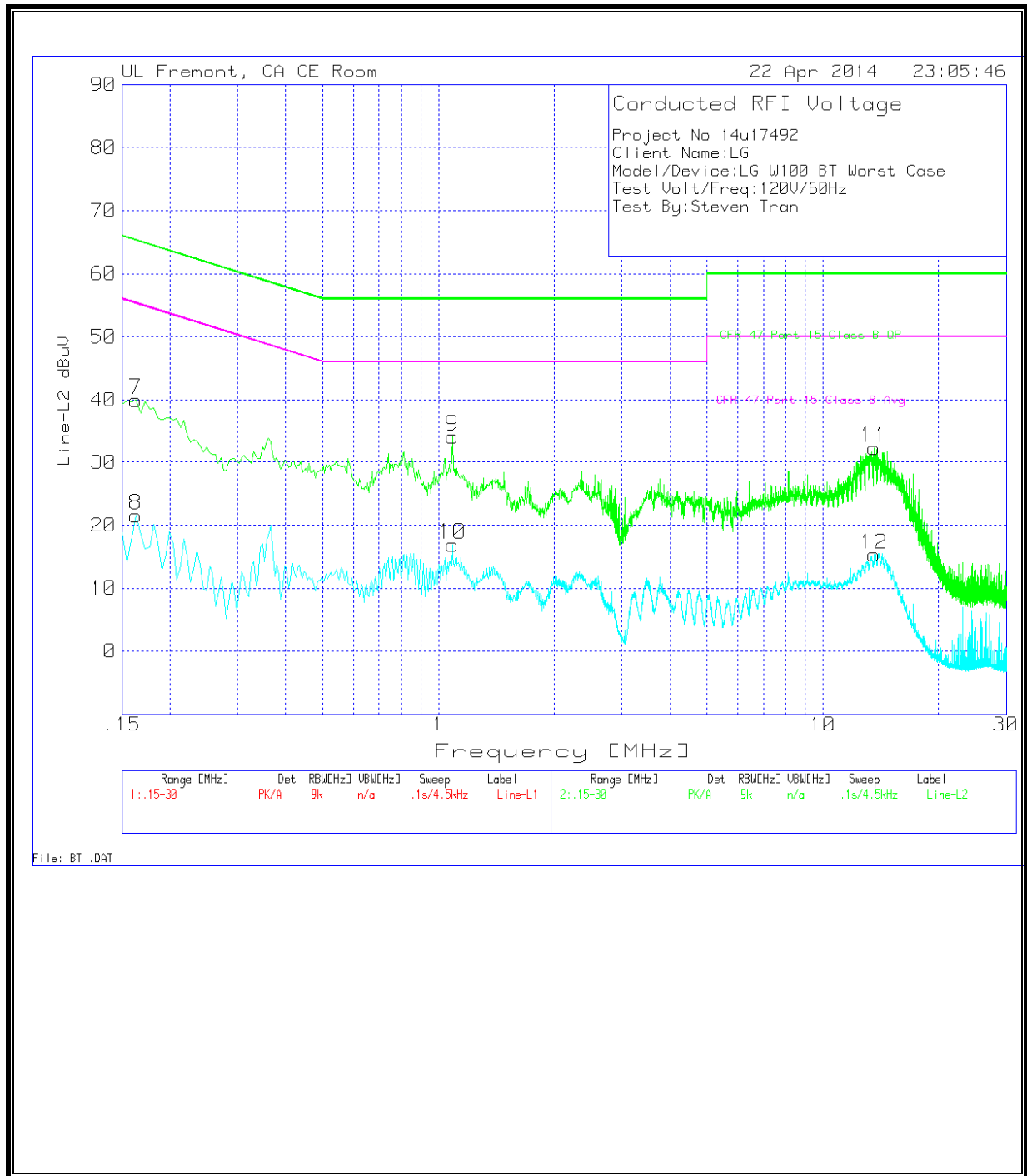
PK - Peak detector

Av - average detection

LINE 1 RESULTS



LINE 2 RESULTS



RESULTS with Laptop

6 WORST EMISSIONS

Line-L1 .15 - 30MHz

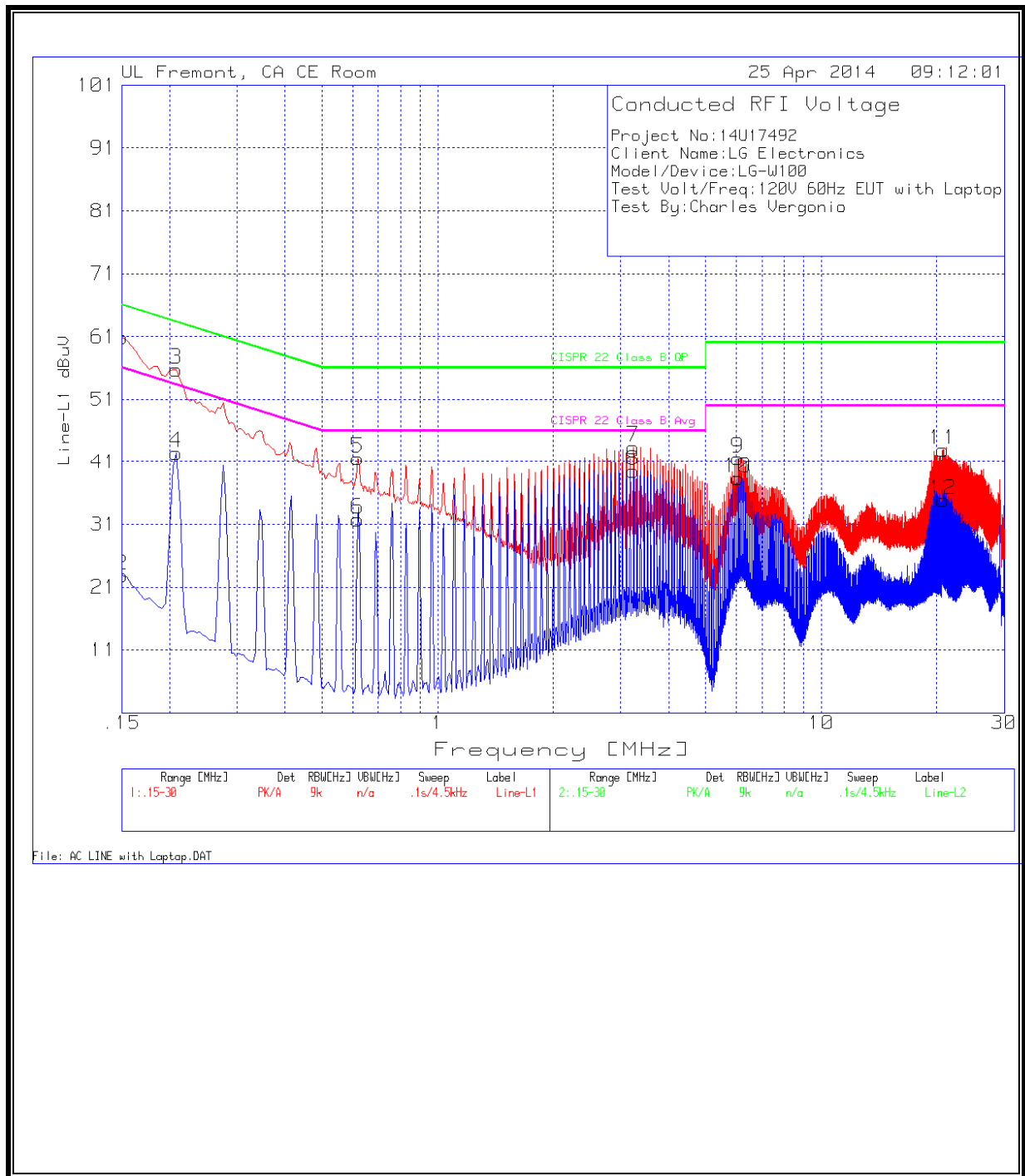
Trace Markers										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.15	59.55	PK	1.4	0	60.95	66	-5.05	-	-
2	.15	21.41	Av	1.4	0	22.81	-	-	56	-33.19
3	.2085	54.79	PK	.9	0	55.69	63.3	-7.61	-	-
4	.2085	41.55	Av	.9	0	42.45	-	-	53.3	-10.85
5	.618	41.22	PK	.3	0	41.52	56	-14.48	-	-
6	.618	31.52	Av	.3	0	31.82	-	-	46	-14.18
7	3.2415	43.03	PK	.2	.1	43.33	56	-12.67	-	-
8	3.2415	39.2	Av	.2	.1	39.5	-	-	46	-6.5
9	6.072	41.24	PK	.2	.1	41.54	60	-18.46	-	-
10	6.072	38	Av	.2	.1	38.3	-	-	50	-11.7
11	20.7285	42.42	PK	.3	.2	42.92	60	-17.08	-	-
12	20.7285	34.3	Av	.3	.2	34.8	-	-	50	-15.2

Line-L2 .15 - 30MHz

Trace Markers										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
13	.15	59.41	PK	1.5	0	60.91	66	-5.09	-	-
14	.15	21.96	Av	1.5	0	23.46	-	-	56	-32.54
15	.2085	54.67	PK	1	0	55.67	63.3	-7.63	-	-
16	.2085	38.67	Av	1	0	39.67	-	-	53.3	-13.63
17	.6225	39.38	PK	.3	0	39.68	56	-16.32	-	-
18	.6225	32.34	Av	.3	0	32.64	-	-	46	-13.36
19	3.732	44.29	PK	.2	.1	44.59	56	-11.41	-	-
20	3.732	36.35	Av	.2	.1	36.65	-	-	46	-9.35
21	6.0855	41.37	PK	.2	.1	41.67	60	-18.33	-	-
22	6.0855	37.21	Av	.2	.1	37.51	-	-	50	-12.49
23	21.156	38.34	PK	.3	.2	38.84	60	-21.16	-	-
24	21.156	29.34	Av	.3	.2	29.84	-	-	50	-20.16

PK - Peak detector
Av - average detection

LINE 1 RESULTS



LINE 2 RESULTS

