FCC 47 CFR PART 15 SUBPART B

TEST REPORT

FOR

SMART WATCH + CDMA

MODEL NUMBER: LG-VC100, LGVC100, VC100, LG-VC100P, LGVC100P, VC100P

FCC ID: ZNFVC100

REPORT NUMBER: 14U18513-E2 REVISION A

ISSUE DATE: SEPTEMBER 15, 2014

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	9/3/14	Initial Issue	D. Coronia
A	9/15/14	Update report page 8-9, 28, 30 & 32	D. Coronia

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC

EUT DESCRIPTION: SMART WATCH + CDMA

MODEL: LG-VC100, LGVC100, VC100, LG-VC100P, LGVC100P, VC100P

SERIAL NUMBER: 1-Conducted, 2-Radiated

DATE TESTED: AUGUST 30, 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.

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2. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

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

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:

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

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%.

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4. EQUIPMENT UNDER TEST

4.1. DESCRIPTION OF EUT

The EUT is a SMART WATCH + CDMA.

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 sub-assemblies:

Subassembly Description	Manufacturer	Part Number
AC adapter	Sunlin	MCS-02WR
USB cable	Ningbo BROAD	EAD62377902

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4.2. PRELIMINARY TEST CONFIGURATIONS

The following configurations were investigated during preliminary testing:

EUT Configuration	Description
1	EUT with USB 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 call box and under standby mode; EUT plugged-in, in the USB adaptor charger with charging function enabled

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4.4. DETAILS OF TESTED SYSTEM

SUPPORT EQUIPMENT & PERIPHERALS

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC adapter	Sunlin	MCS-02WR	N/A	N/A
USB cable	Ningbo	EAD62377906	N/A	N/A
	KSD	EAD62377907	N/A	N/A
Laptop	Lenovo	T430	N/A	N/A
USB drive	kingstone	N/A	N/A	N/A
USB Mouse	Dell		N/A	N/A
USB KEYBOARD	Dell	L100	CN0RH65965890746069U	
Switch Switch	Netgear	GS108Tv2	29SA3C5T00E79	N/A
LCD Monitor	Accer	v173 B	ETLE10D0929440C5F785602	N/A
Laptop	Lenovo	T440s	N/A	TP00490A

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	
1	RJ 45 (Laptop)	1	RJ45	RJ45	1.5	
1	VGA (Laptop)	1	VGA	VGA	1	

TEST SETUP

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

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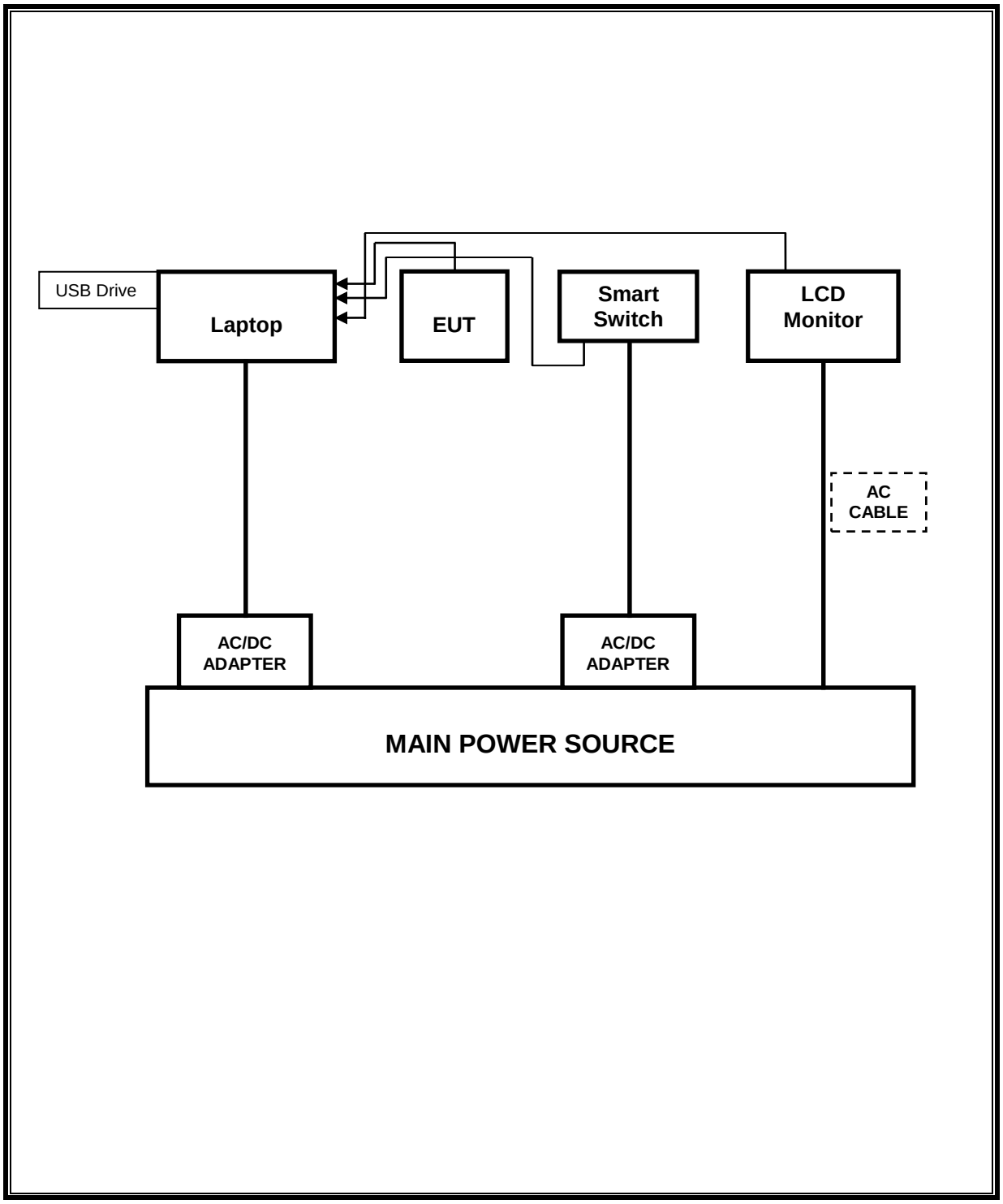
TEST SETUP DIAGRAM



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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	05/05/15
Spectrum Analyzer, 44 GHz	Agilent	N9030A	F00127	02/21/15
Antenna, Horn, 18 GHz	ETS	3117	29301	01/06/15
EMI Test Receiver, 9 kHz-7GHz	R&S	ESCI 7	100935	08/14/15
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/15

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5. APPLICABLE LIMITS AND TEST RESULTS

5.1. RADIATED EMISSIONS

TEST PROCEDURE

ANSI C63.4: 2009

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 (dBµV/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.	

NOTE: Above 1GHz test data is for reference only.

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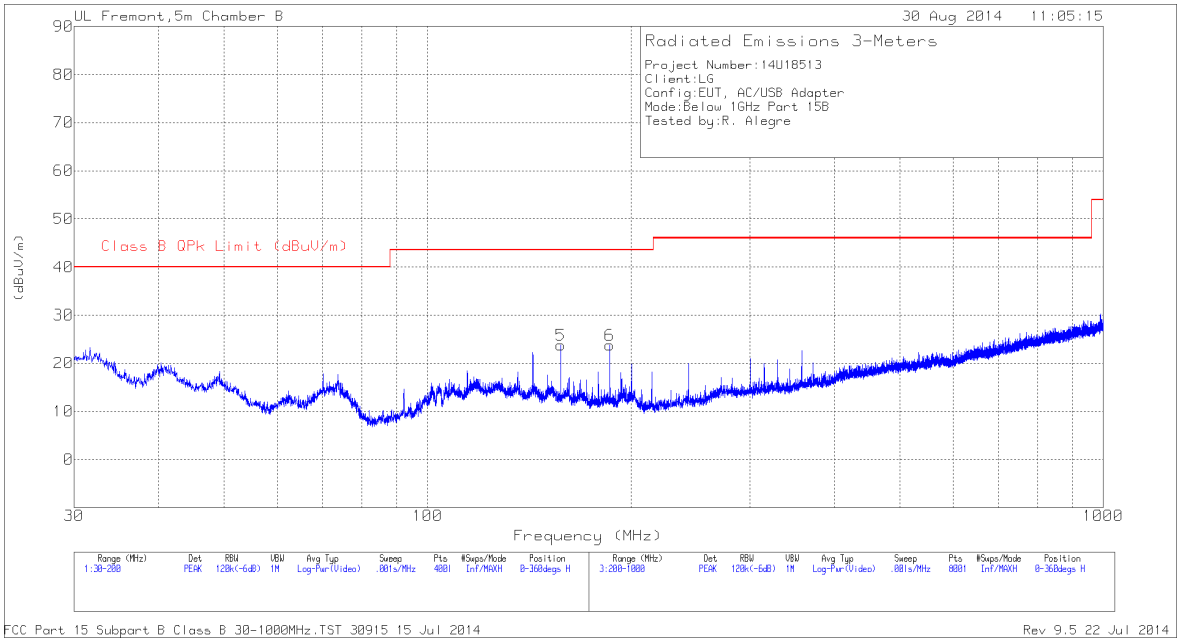
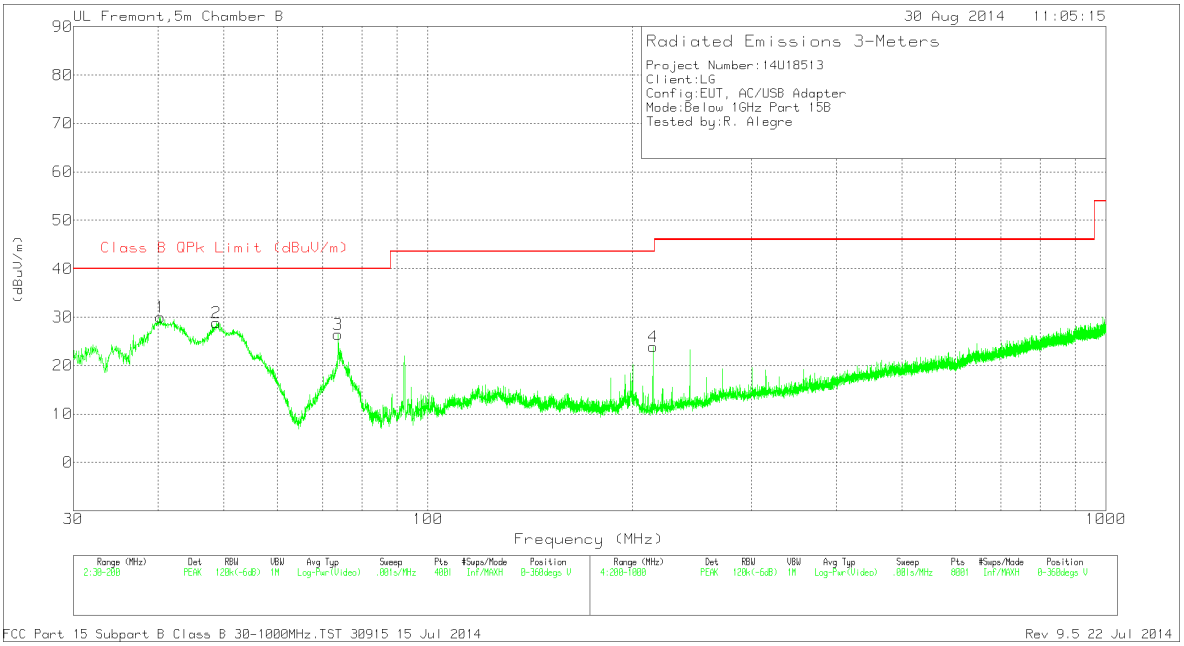
EUT WITH USB ADAPTER BELOW 1GHZ RESULTS

HORIZONTAL PLOT



VERTICAL PLOT



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DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	40.37	45.09	PK	13.6	-28.7	29.99	40	-10.01	0-360	101	V
2	48.7425	48.89	PK	8.5	-28.5	28.89	40	-11.11	0-360	101	V
3	73.7325	46.61	PK	8.1	-28.3	26.41	40	-13.59	0-360	101	V
5	157.5	38.92	PK	12.2	-27.4	23.72	43.52	-19.8	0-360	200	H
6	186.145	39.93	PK	10.9	-27	23.83	43.52	-19.69	0-360	101	H
4	214.8	40.12	PK	10.6	-26.8	23.92	43.52	-19.6	0-360	200	V

PK - Peak detector

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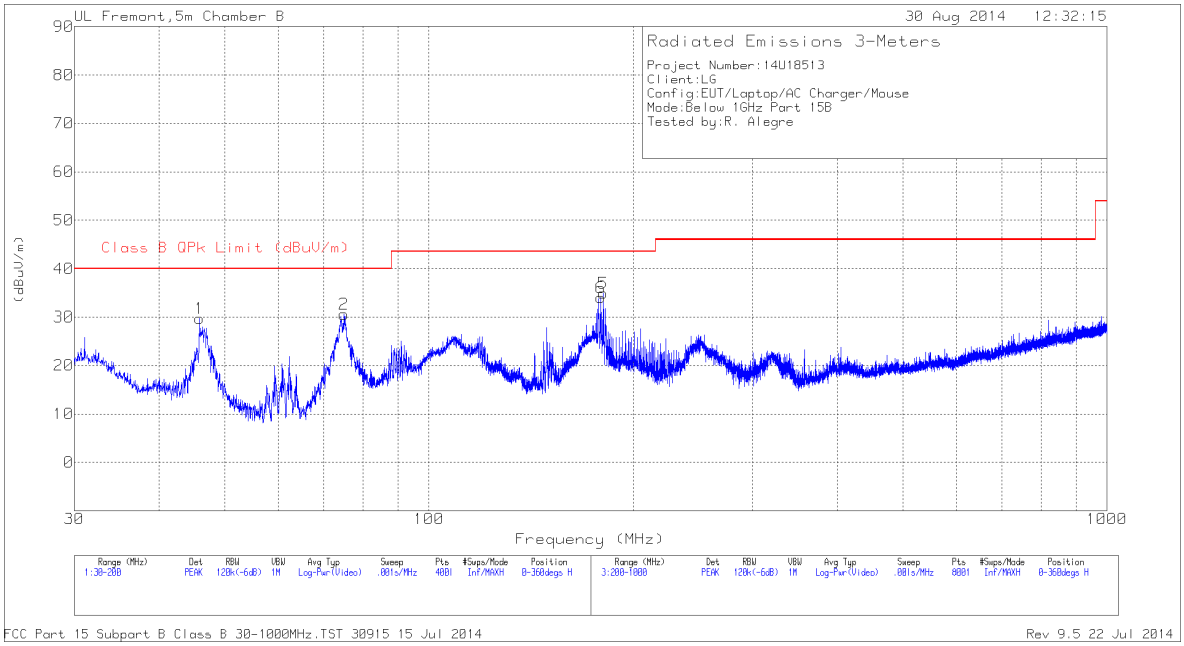
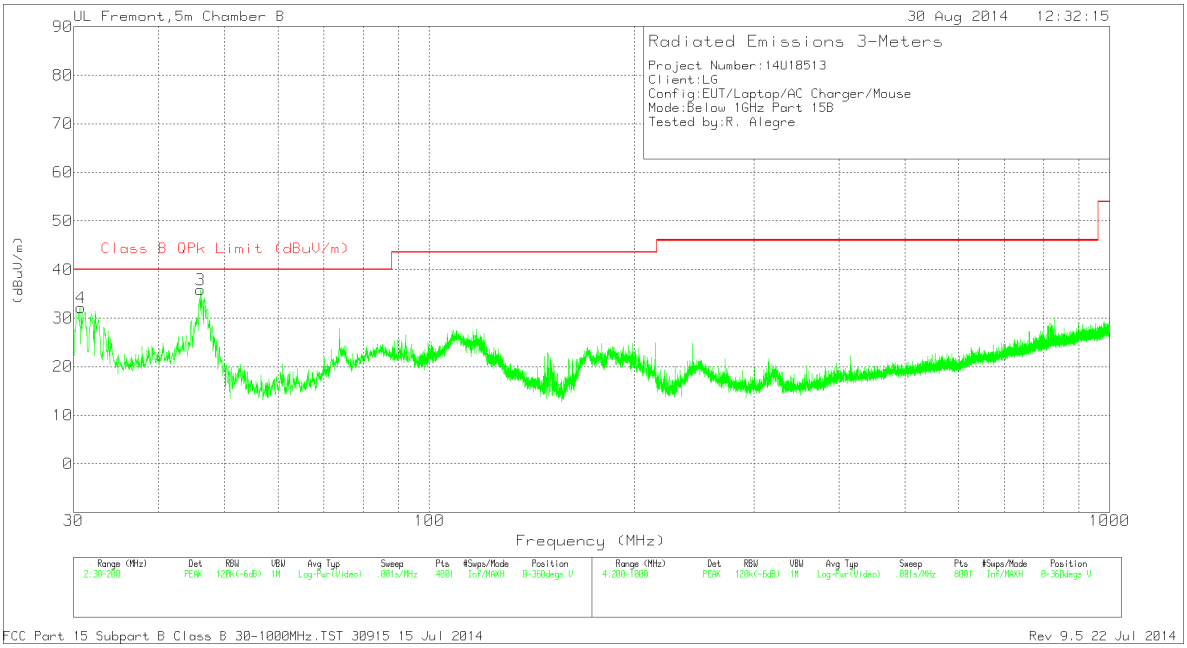
EUT WITH LAPTOP BELOW 1GHZ RESULTS

HORIZONTAL PLOT



VERTICAL PLOT



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DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	30.765	40.05	PK	20.9	-28.8	32.15	40	-7.85	0-360	101	V
1	45.9375	48.39	PK	9.8	-28.5	29.69	40	-10.31	0-360	300	H
3	46.1075	54.62	PK	9.7	-28.5	35.82	40	-4.18	0-360	101	V
2	75.0075	50.87	PK	8	-28.3	30.57	40	-9.43	0-360	300	H
6	179.1325	50.18	PK	11	-27.1	34.08	43.52	-9.44	0-360	200	H
5	180.705	51.18	PK	10.9	-27.1	34.98	43.52	-8.54	0-360	200	H

PK - Peak detector

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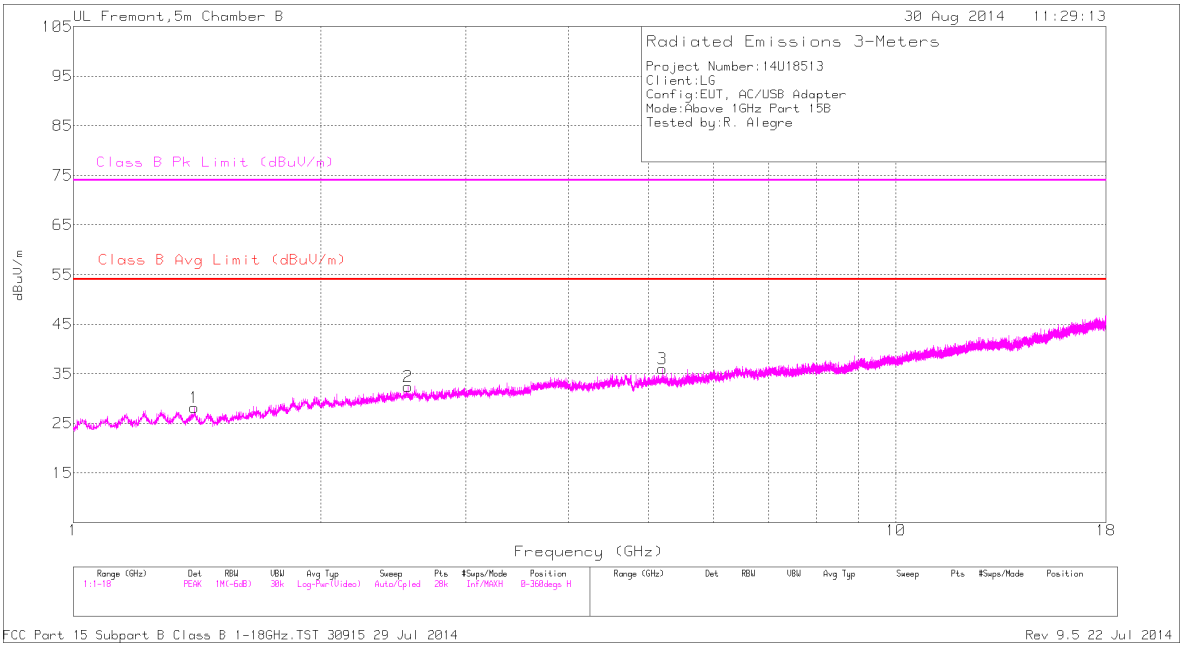
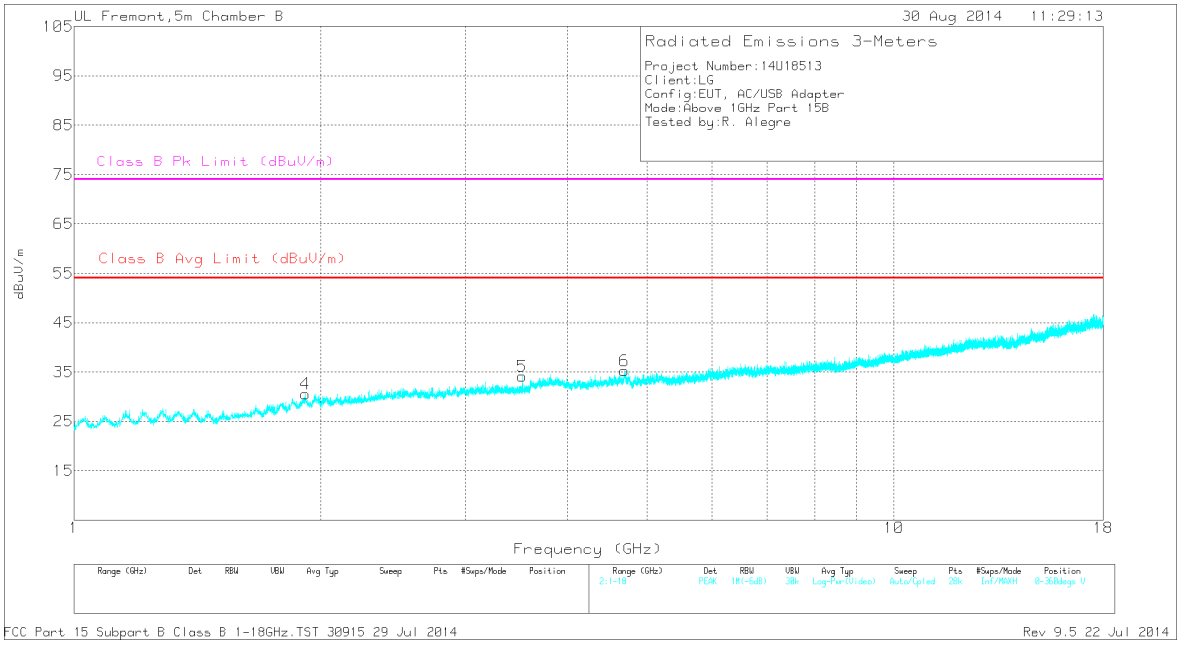
EUT WITH USB ADAPTER ABOVE 1GHZ RESULTS

HORIZONTAL PLOT



VERTICAL PLOT



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DATA

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)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.404	33.98	PK	28.5	-34.3	28.18	-	-	74	-45.82	0-360	200	H
4	1.915	33	PK	31.1	-33.5	30.6	-	-	74	-43.4	0-360	101	V
2	2.552	32.49	PK	32.5	-32.6	32.39	-	-	74	-41.61	0-360	101	H
5	3.522	32.8	PK	32.9	-31.6	34.1	-	-	74	-39.9	0-360	200	V
6	4.691	32	PK	34.2	-30.9	35.3	-	-	74	-38.7	0-360	200	V
3	5.201	32.07	PK	34.4	-30.5	35.97	-	-	74	-38.03	0-360	101	H

PK - Peak detector

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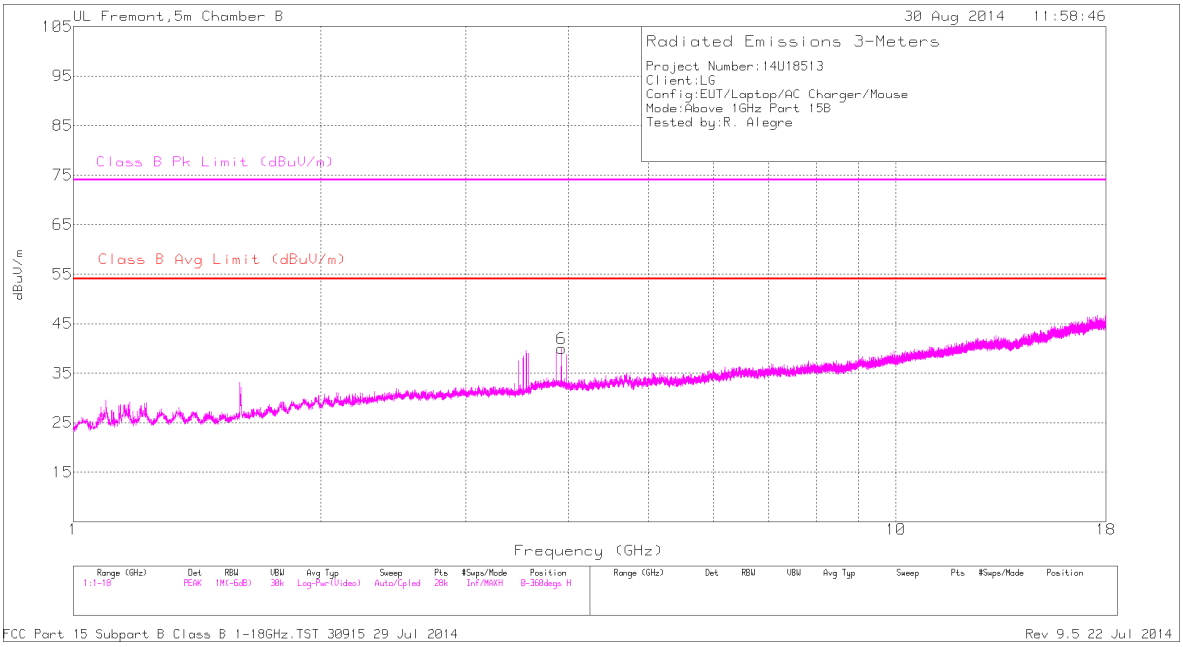
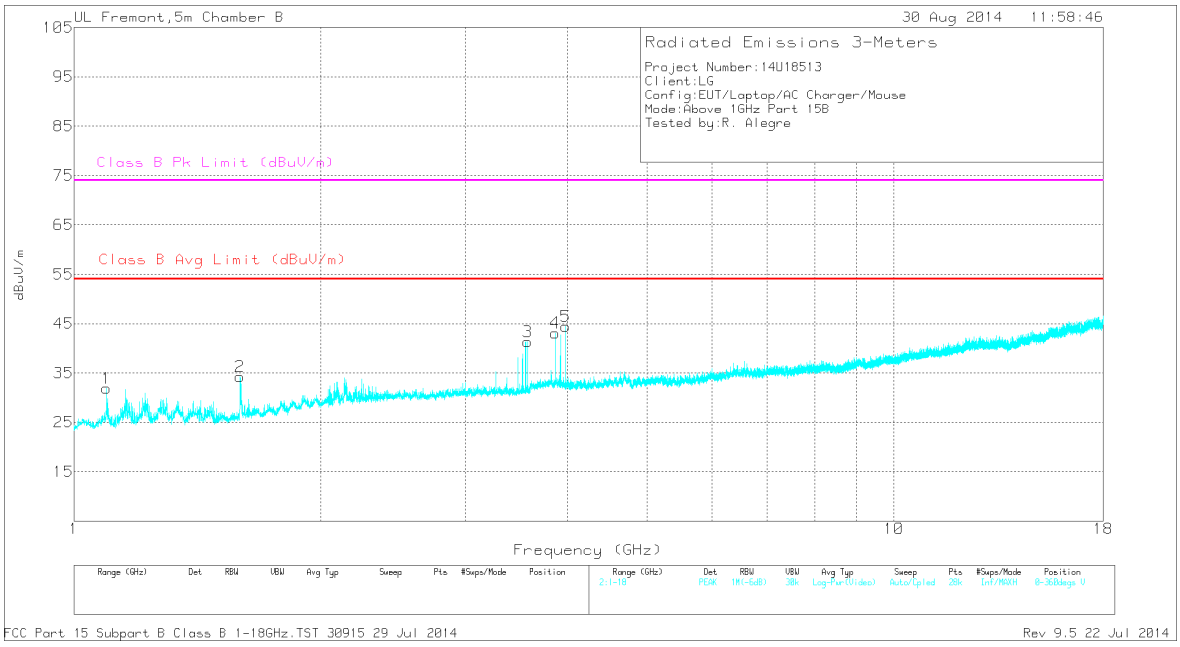
EUT WITH LAPTOP ABOVE 1GHZ RESULTS

HORIZONTAL PLOT



VERTICAL PLOT



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DATA

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)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.095	39.14	PK	27.4	-34.6	31.94	-	-	74	-42.06	0-360	200	V
2	1.594	39.68	PK	28.5	-33.9	34.28	-	-	74	-39.72	0-360	101	V
3	3.573	39.91	PK	33	-31.6	41.31	-	-	74	-32.69	0-360	101	V
4	3.862	41.04	PK	33.7	-31.6	43.14	-	-	74	-30.86	0-360	200	V
6	3.919	37.56	PK	33.8	-31.4	39.96	-	-	74	-34.04	0-360	101	H
5	3.977	42.02	PK	33.6	-31.2	44.42	-	-	74	-29.58	0-360	101	V

PK - Peak detector

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5.2. AC MAINS LINE CONDUCTED EMISSIONS

TEST PROCEDURE

ANSI C63.4: 2009

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 μH/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 (dBμV)	
	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.		

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EUT WITH USB ADAPTER 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	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.15	39.87	PK	1.4	0	41.27	66	-24.73	-	-
2	.15	16.13	Av	1.4	0	17.53	-	-	56	-38.47
3	.3705	37.63	PK	.4	0	38.03	58.5	-20.47	-	-
4	.3705	27.3	Av	.4	0	27.7	-	-	48.5	-20.8
5	1.2345	26.48	PK	.2	.1	26.78	56	-29.22	-	-
6	1.2345	13.74	Av	.2	.1	14.04	-	-	46	-31.96
7	7.2915	27.37	PK	.2	.1	27.67	60	-32.33	-	-
8	7.2915	15.81	Av	.2	.1	16.11	-	-	50	-33.89
9	28.5	24.43	PK	.3	.3	25.03	60	-34.97	-	-
10	28.5	7.59	Av	.3	.3	8.19	-	-	50	-41.81

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)
11	.15	39.23	PK	1.5	0	40.73	66	-25.27	-	-
12	.15	13.67	Av	1.5	0	15.17	-	-	56	-40.83
13	.3705	33.99	PK	.5	0	34.49	58.5	-24.01	-	-
14	.3705	23.98	Av	.5	0	24.48	-	-	48.5	-24.02
15	.69	21.56	PK	.3	0	21.86	56	-34.14	-	-
16	.69	2.53	Av	.3	0	2.83	-	-	46	-43.17
17	6.8325	23.79	PK	.2	.1	24.09	60	-35.91	-	-
18	6.8325	11.72	Av	.2	.1	12.02	-	-	50	-37.98
19	28.707	22.11	PK	.3	.3	22.71	60	-37.29	-	-
20	28.707	1.1	Av	.3	.3	1.7	-	-	50	-48.3

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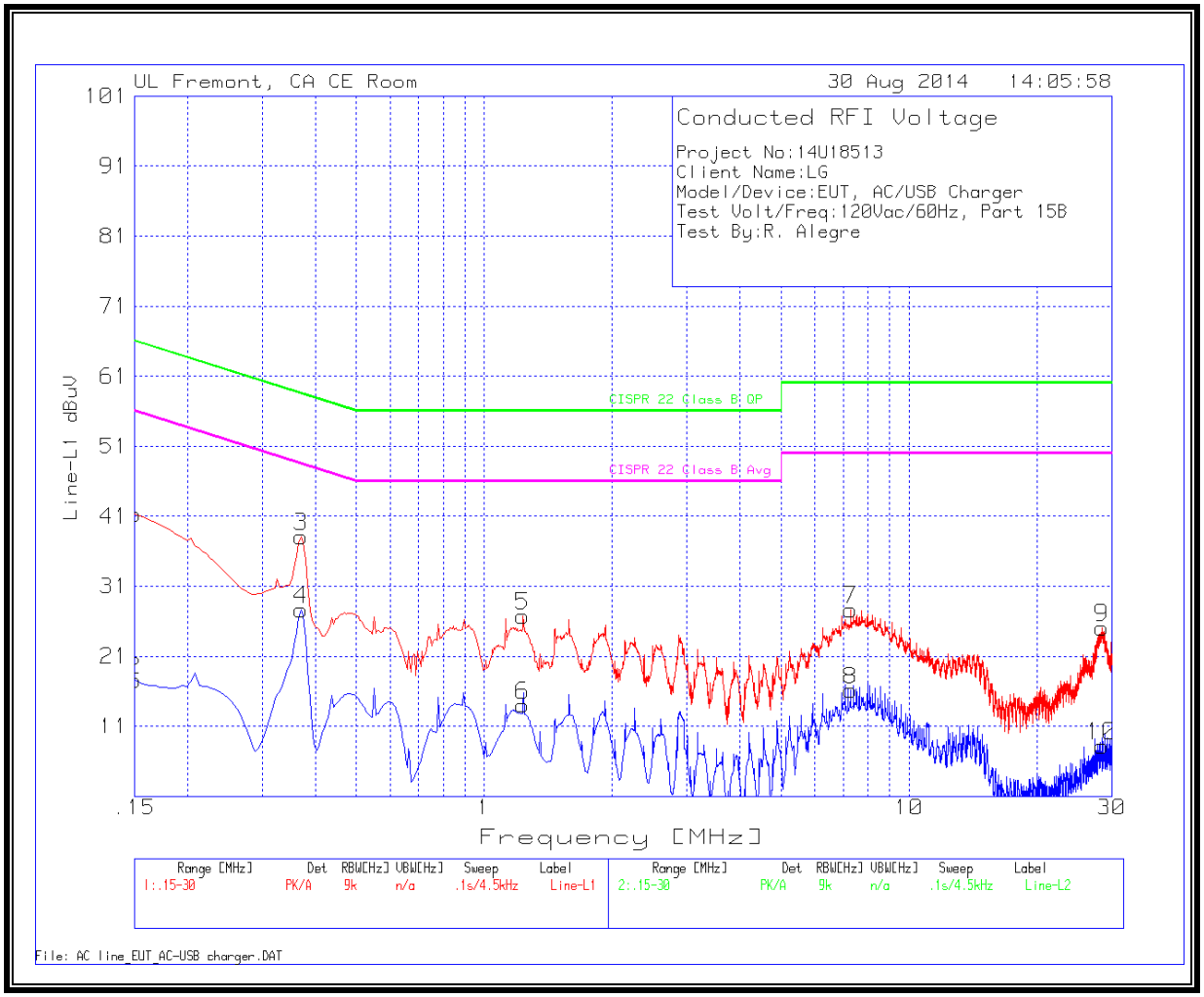
LINE 1 RESULTS



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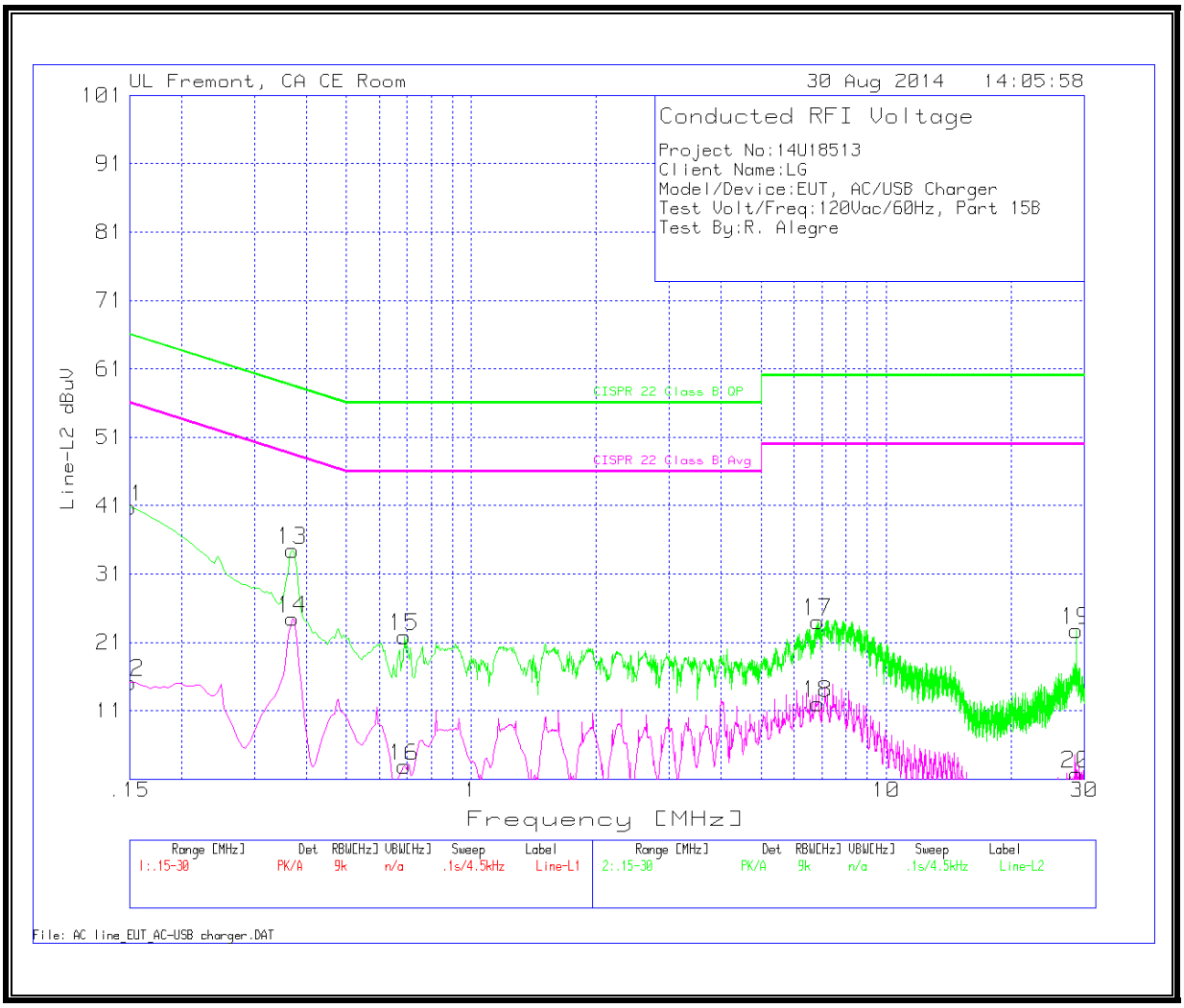
LINE 2 RESULTS



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EUT WITH LAPTOP 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	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.159	60.1	PK	1.3	0	61.4	65.5	-4.1	-	-
2	.159	32.44	Av	1.3	0	33.74	-	-	55.5	-21.76
3	.537	34.94	PK	.3	0	35.24	56	-20.76	-	-
4	.537	15.46	Av	.3	0	15.76	-	-	46	-30.24
5	4.7175	35.51	PK	.2	.1	35.81	56	-20.19	-	-
6	4.7175	22.63	Av	.2	.1	22.93	-	-	46	-23.07
7	18.078	38.25	PK	.3	.2	38.75	60	-21.25	-	-
8	18.078	23.97	Av	.3	.2	24.47	-	-	50	-25.53

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)
9	.15	58.24	PK	1.5	0	59.74	66	-6.26	-	-
10	.15	38.28	Av	1.5	0	39.78	-	-	56	-16.22
11	.168	56.59	PK	1.3	0	57.89	65.1	-7.21	-	-
12	.168	30.4	Av	1.3	0	31.7	-	-	55.1	-23.4
13	.5415	31.82	PK	.3	0	32.12	56	-23.88	-	-
14	.5415	16.05	Av	.3	0	16.35	-	-	46	-29.65
15	4.5105	32.21	PK	.2	.1	32.51	56	-23.49	-	-
16	4.5105	18.29	Av	.2	.1	18.59	-	-	46	-27.41
17	17.898	38.12	PK	.3	.2	38.62	60	-21.38	-	-
18	17.898	22.97	Av	.3	.2	23.47	-	-	50	-26.53

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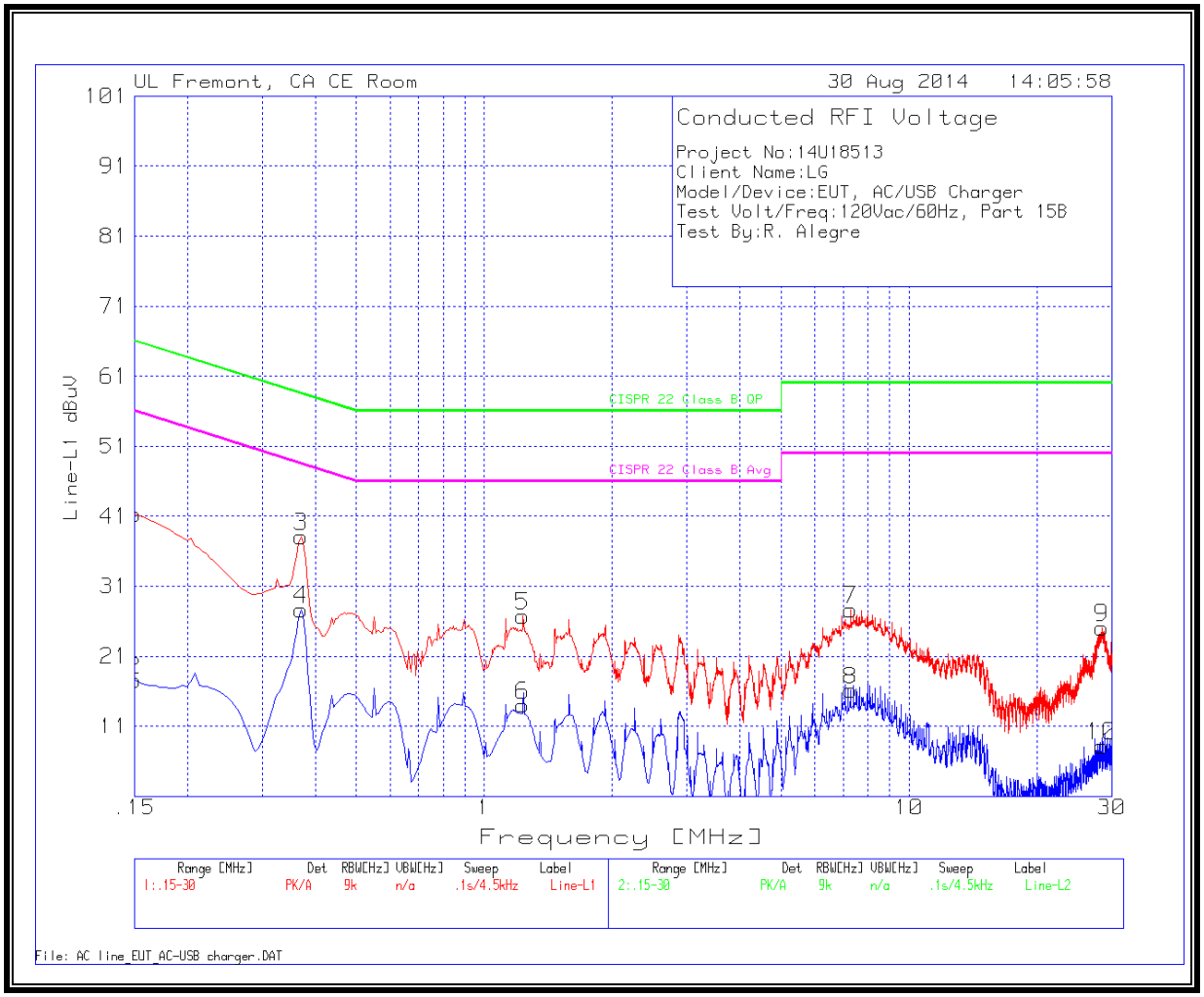
LINE 1 RESULTS



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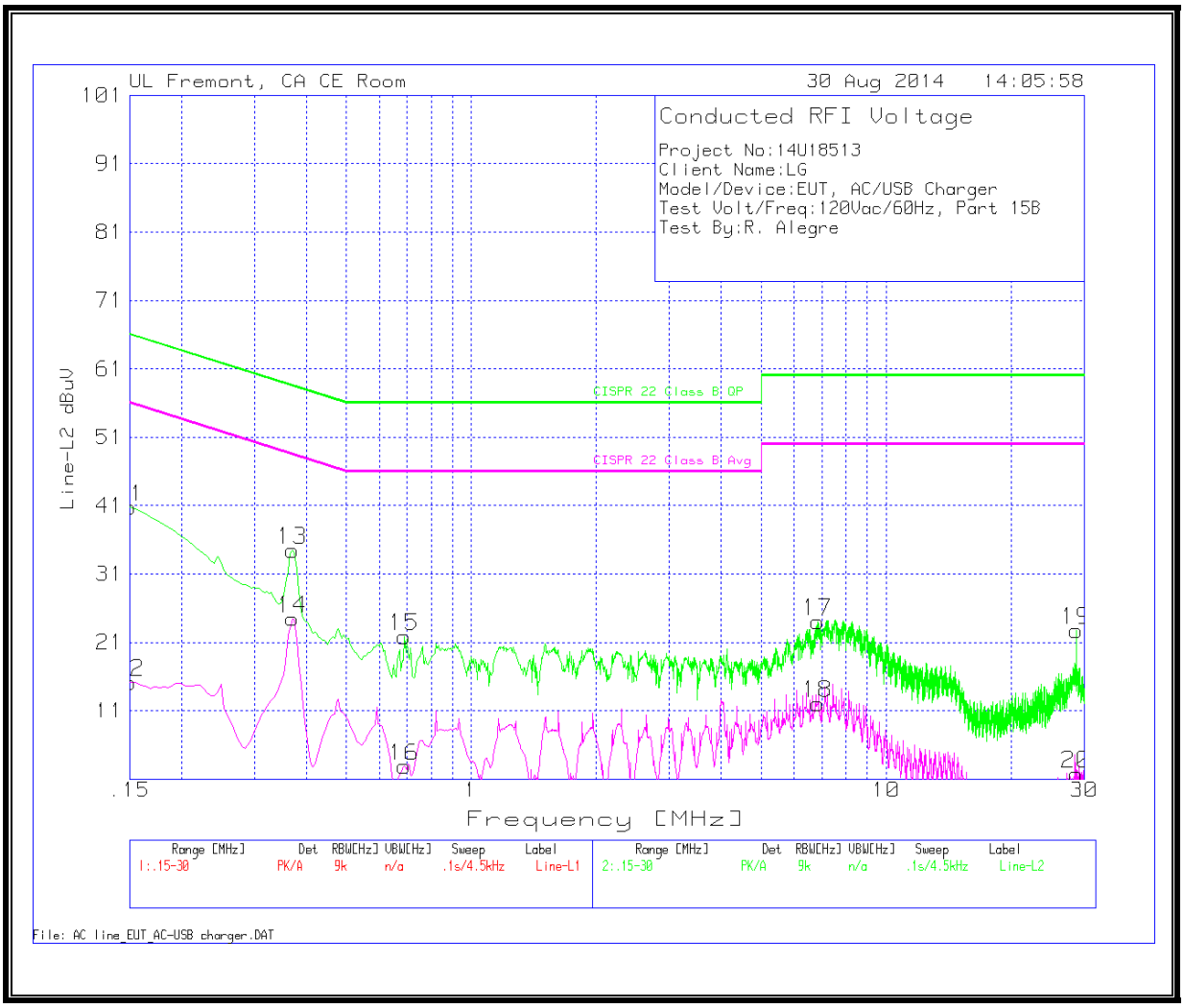
LINE 2 RESULTS



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