FCC 47 CFR PART 15 SUBPART B

TEST REPORT

FOR

GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac & NFC

FCC ID: PY7-PM0941

REPORT NUMBER: 16J22997-E8V4

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Prepared for
SONY MOBILE COMMUNICATIONS, INC.
4-12-3 Higashi-Shinagawa, Shinagawa-Ku
TOKYO, 140-0002 JAPAN

Prepared by
UL VERIFICATION SERVICES INC.
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
V1	3/22/2016	Initial Issue	C. OOI
V2	3/30/2016	Updated Information on Page 4	C. OOI
V3	3/31/2016	Updated Below 1GHz data/plots	C. OOI
V4	4/6/2016	Updated Section 6.2.2, 6.2.3, 6.2.4 and 6.3.2	C. OOI

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SONY MOBILE COMMUNICATIONS, INC.

EUT DESCRIPTION: GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac & NFC.

SERIAL NUMBER: CB5129YWF6

DATE TESTED: March 18 - 31, 2016

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC 47 CFR 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 and released for
UL Verification Services Inc. by:

CHOON OOI
PROJECT LEAD
UL Verification Services Inc.

Prepared by:

JUDE SEMANA
EMC TEST ENGINEER
UL Verification Services Inc.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2014.

3. 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

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.
UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

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

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

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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
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 dB

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac & NFC.

GENERAL INFORMATION

List of frequencies generated or used by the EUT	37.4MHz, 2.2GHz

5.2. MODE(S) OF OPERATION

Mode	Description
Sync mode	Data transfer; Sync video file from laptop to EUT and continued playing video during testing.
Charging Mode	_Charging with supplied USB charger. EUT and its charger shall be on back edge of table, with charger connected to extension cord. _Charging with NFC transmitting On

5.3. MODIFICATIONS

No modifications were made during testing.

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5.4. DETAILS OF TESTED SYSTEM

SUPPORT EQUIPMENT & PERIPHERALS

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Lenovo	2349CW5	PB05HPL	DoC
Earphone	Samsung	GH59	N/A	DoC
AC Adapter	Lenovo	ADLX90NLT2A	11S45N0307ZLZ436RDM2	N/A
Mouse	Logitech	M-U0026	1304HS02AX68	N/A
Keyboard	Lenovo	KU-0225	54Y9400	N/A
Switch	Netgear	GS108T	29SA3C5T00E79	DoC
AC Adapter	Netgear	DSA-12R-12 AUS	332-10006-01	N/A

I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC Power	2	Power	Shielded	1.2m	N/A
2	Audio	1	Mini-Jack	Unshielded	1m	N/A
3	USB	1	Mini-USB	Shielded	0.9 m	UCB16 cable from EUT to Laptop
3	USB	2	USB	Shielded	2m	From laptop to keyboard & mouse
4	AC Power	2	IEC	Unshielded	1m	N/A
5	Ethernet	1	RJ45	Unshielded	2m	N/A

TEST SETUP

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

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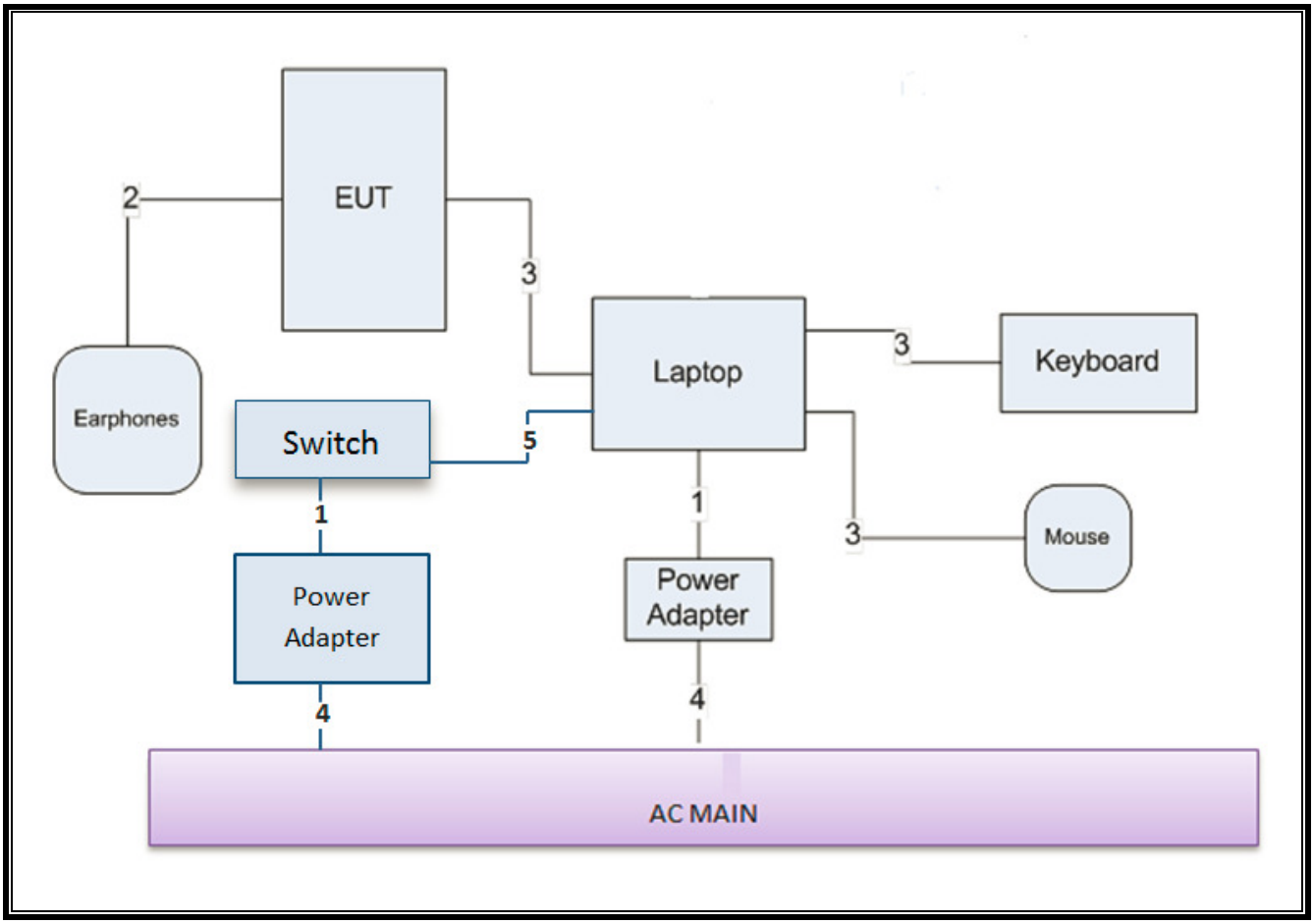
SETUP DIAGRAM



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6. APPLICABLE EMISSIONS LIMITS AND TEST RESULTS

6.1. EMISSIONS 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**	**T Number**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	99	06/10/16
Amplifier, 1-18GHz	Miteq	AFS42-00101800-25-S-	1165	07/20/16
Amplifier, 1-8GHz, 35 dB	Miteq	AMF-4D-01000800-30-	1172	07/20/16
RF Preamplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	88	04/07/16
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	122	01/29/17
Antenna, Horn, 18GHz	ETS Lindgren	3117	346	02/22/17
ESR7 EMI Test Receiver 7GHz	Rohde & Schwarz	ESR	1436	12/19/16
LISN, 30 MHz	FCC	FCC-LISN-50/250-25-2	24	2/9/2017

Test Software List			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	UL	UL EMC	Ver 9.5, June 24, 2015
Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015

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6.2. RADIATED EMISSIONS LIMITS AND RESULTS

TEST PROCEDURE

ANSI C63.4: 2014

The highest clock frequency generated or used in the EUT is 1.0 GHz therefore the frequency range was investigated from 30 MHz to 18 GHz.

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.	

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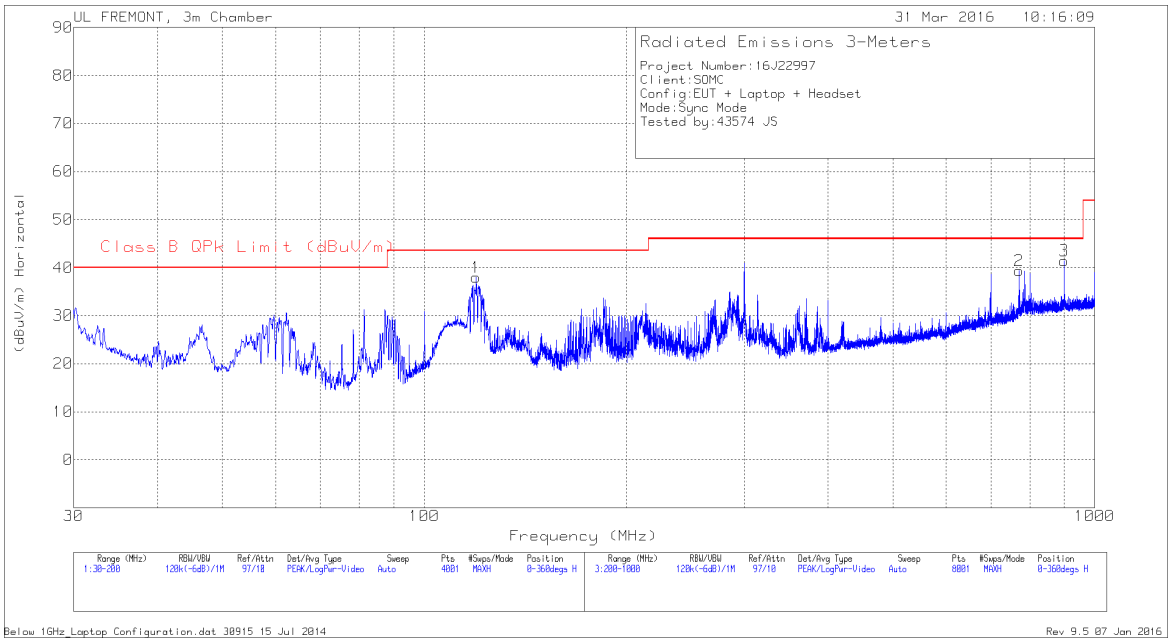
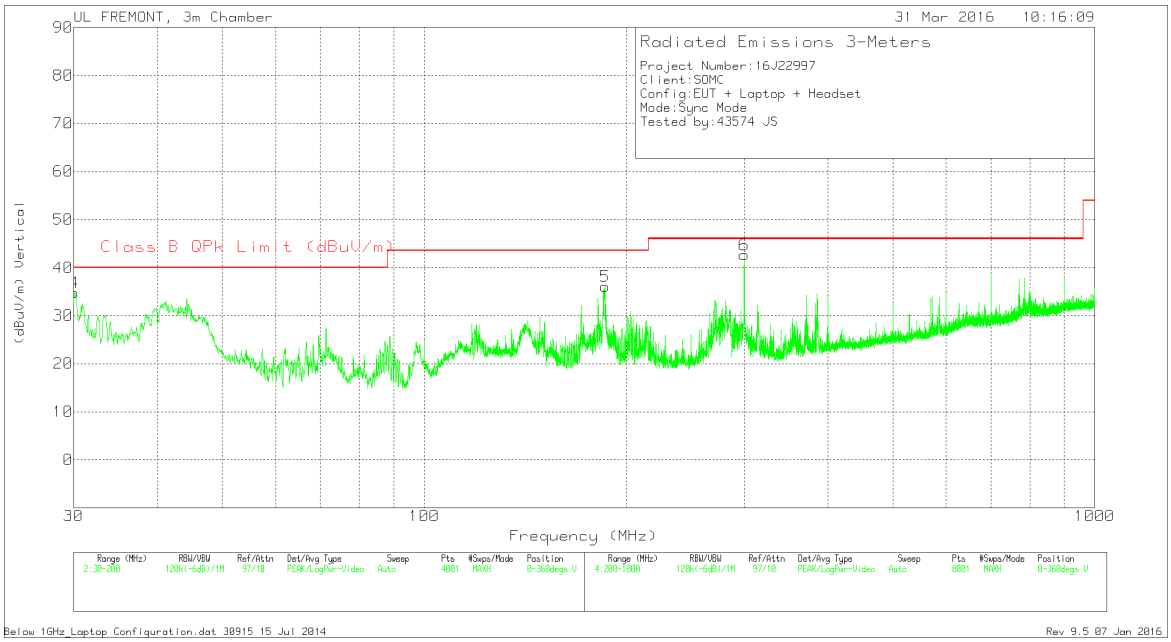
RESULTS

6.2.1. RADIATED EMISSIONS 30 TO 1000 MHz (SYNC MODE)

HORIZONTAL PLOT



VERTICAL PLOT



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HORIZONTAL AND VERTICAL DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T122 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	30.085	36.87	Pk	25.2	-27.3	34.77	40	-5.23	0-360	100	V
		27.5	Qp	25.2	-27.3	25.4	40	-14.6	43	118	V
1	119.505	46.2	Pk	17.9	-26.1	38	43.52	-5.52	0-360	200	H
		37.85	Qp	17.8	-26.1	29.55	43.52	-13.97	345	238	H
5	185.89	46.47	Pk	14.9	-25.3	36.07	43.52	-7.45	0-360	100	V
6	300	49.8	Pk	17.3	-24.4	42.7	46.02	-3.32	0-360	200	V
		43.66	Qp	17.3	-24.4	36.56	46.02	-9.46	142	145	V
2	771.4	38.04	Pk	24.9	-23.6	39.34	46.02	-6.68	0-360	100	H
3	900	37.68	Pk	26.5	-22.7	41.48	46.02	-4.54	0-360	300	H
		32.48	Qp	26.5	-22.7	36.28	46.02	-9.74	219	316	H

Pk - Peak detector
Qp - Quasi-Peak detector

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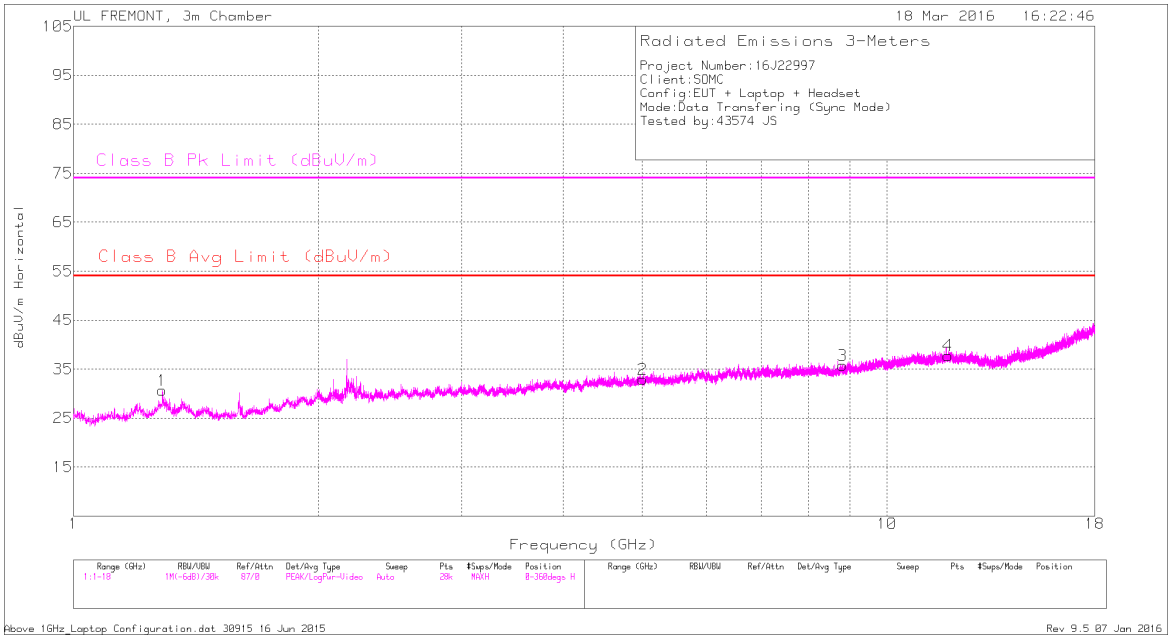
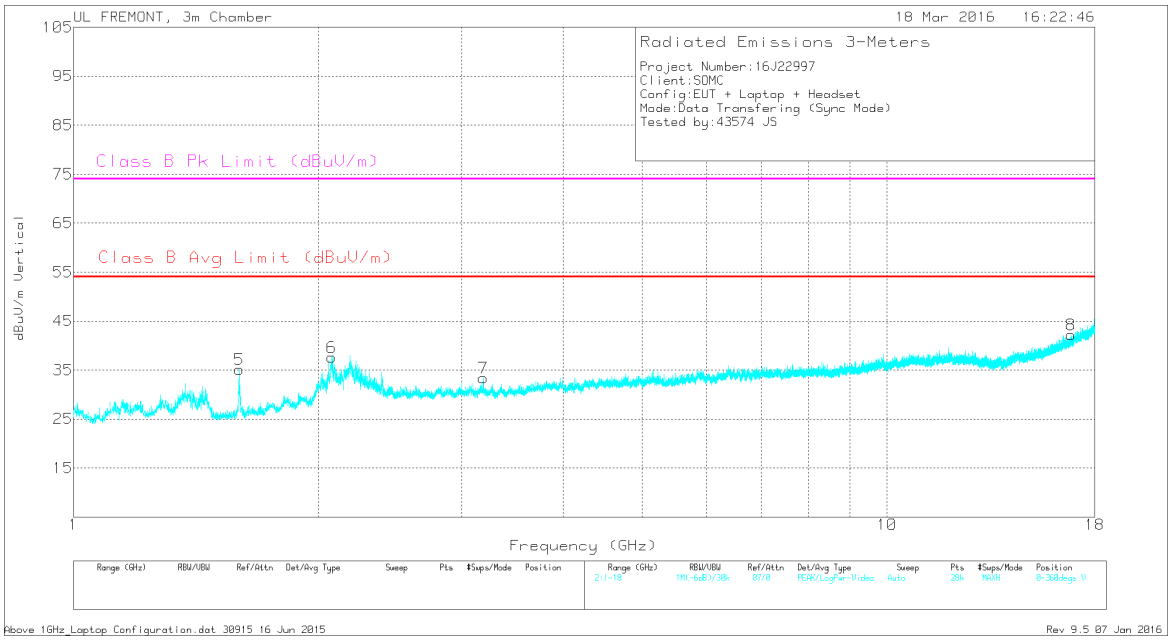
6.2.2. RADIATED EMISSIONS 1GHz to 18GHz (SYNC MODE)

HORIZONTAL PLOT



VERTICAL PLOT



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HORIZONTAL AND VERTICAL DATA

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.286	40.94	Pk	29.8	-33.1	37.64	-	-	74	-36.36	317	176	H
1.286	27.29	Av	29.8	-33.1	23.99	54	-30.01	-	-	317	176	H
1.6	53.41	Pk	28	-32.7	48.71	-	-	74	-25.29	160	195	V
1.6	38.74	Av	28	-32.7	34.04	54	-19.96	-	-	160	195	V
2.075	39.85	Pk	31.5	-32.3	39.05	-	-	74	-34.95	89	287	V
2.075	26.26	Av	31.5	-32.3	25.46	54	-28.54	-	-	89	287	V
3.188	38.76	Pk	32.6	-31.2	40.16	-	-	74	-33.84	37	105	V
3.188	25.51	Av	32.6	-31.2	26.91	54	-27.09	-	-	37	105	V
5.003	37.93	Pk	34	-30	41.93	-	-	74	-32.07	263	250	H
5.003	25.02	Av	34	-30	29.02	54	-24.98	-	-	263	250	H
8.815	34.82	Pk	35.9	-25.8	44.92	-	-	74	-29.08	156	169	H
8.815	21.79	Av	35.9	-25.8	31.89	54	-22.11	-	-	156	169	H
11.881	34.35	Pk	39.1	-24.7	48.75	-	-	74	-25.25	92	132	H
11.881	20.54	Av	39.1	-24.7	34.94	54	-19.06	-	-	92	132	H
16.821	31.38	Pk	41.2	-21.2	51.38	-	-	74	-22.62	27	159	V
16.821	18.33	Av	41.2	-21.2	38.33	54	-15.67	-	-	27	159	V

Pk - Peak detector
Av - Average detection

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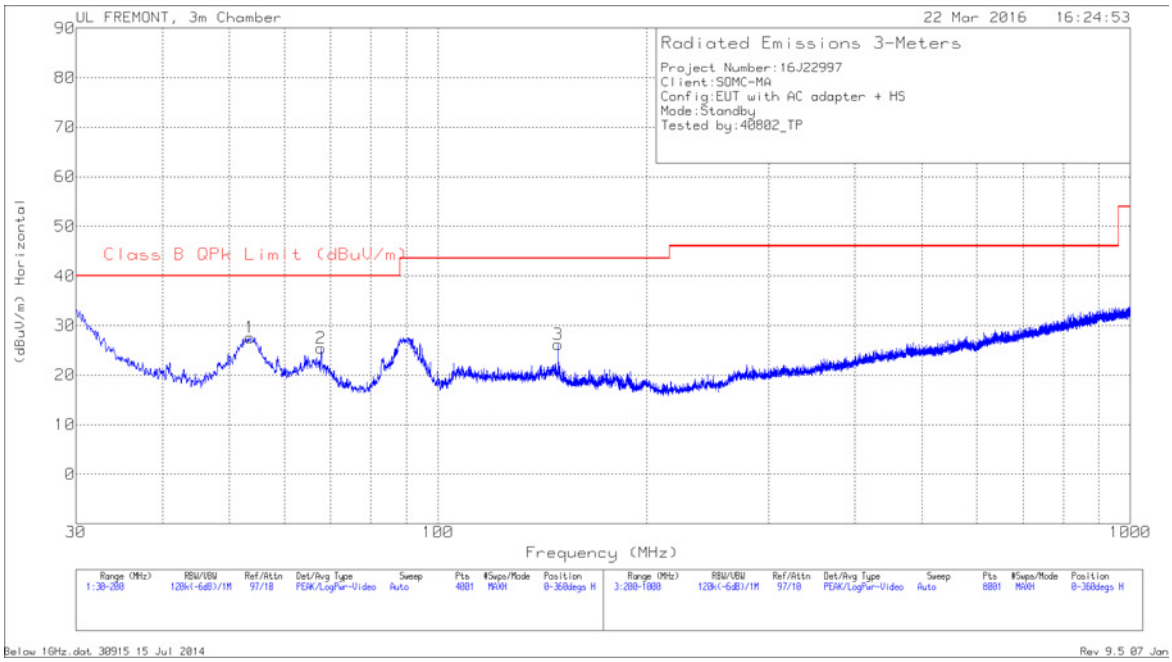
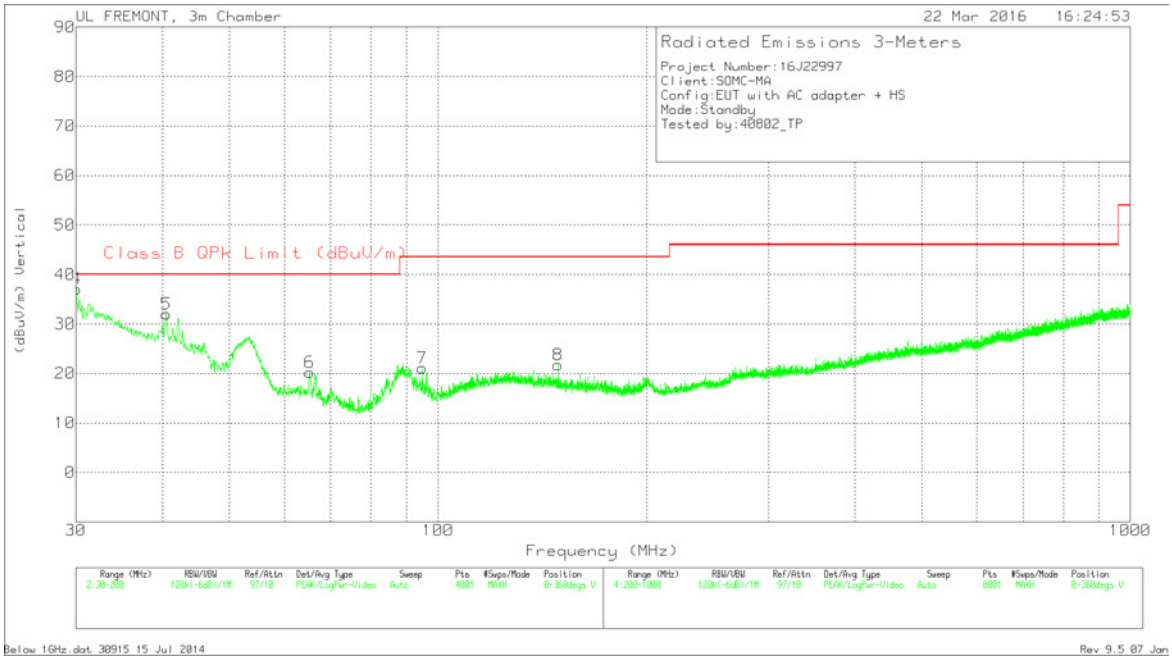
RESULTS

6.2.3. RADIATED EMISSIONS 30 TO 1000 MHz (CHARGING MODE)

HORIZONTAL PLOT



VERTICAL PLOT



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HORIZONTAL AND VERTICAL DATA

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T122 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	30.0425	39.05	Pk	25.3	-27.3	37.05	40	-2.95	0-360	100	V
		26.74	Qp	25.3	-27.3	24.74	40	-15.26	110	121	V
5	40.4975	41.58	Pk	17.4	-27	31.98	40	-8.02	0-360	100	V
1	53.545	43.34	Pk	11.2	-26.9	27.64	40	-12.36	0-360	400	H
6	65.2325	35.3	Pk	11.7	-26.8	20.2	40	-19.8	0-360	100	V
2	67.825	40.23	Pk	11.9	-26.7	25.43	40	-14.57	0-360	300	H
7	94.94	34.83	Pk	12.7	-26.4	21.13	43.52	-22.39	0-360	100	V
3	149.17	35.54	Pk	16.4	-25.7	26.24	43.52	-17.28	0-360	300	H
8	149.17	31.02	Pk	16.4	-25.7	21.72	43.52	-21.8	0-360	100	V

Pk - Peak detector
Qp - Quasi-Peak detector

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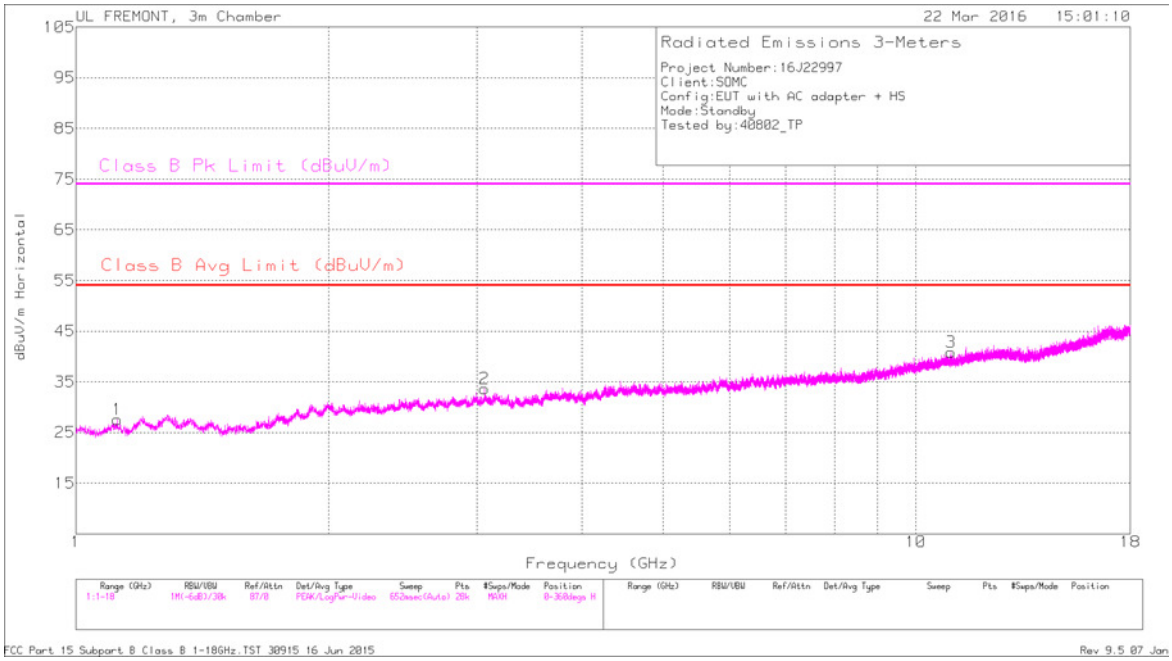
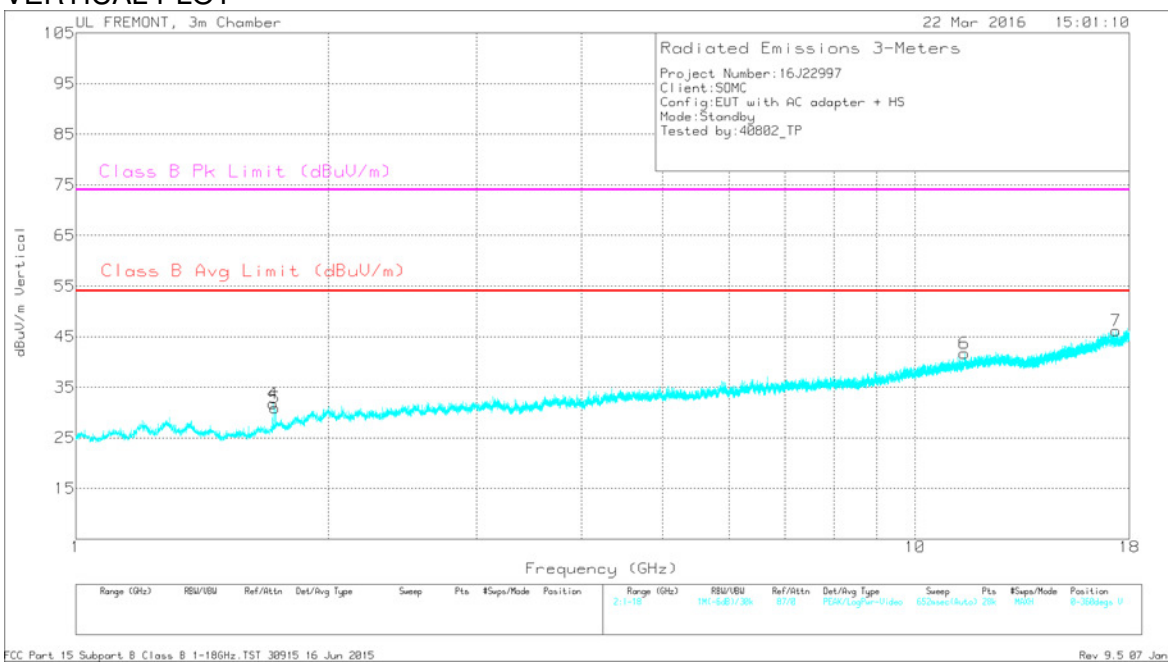
6.2.4. RADIATED EMISSIONS 1GHz to 18GHz (CHARGING MODE)

HORIZONTAL PLOT



VERTICAL PLOT



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HORIZONTAL AND VERTICAL DATA

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.119	40.53	Pk	28.1	-33.1	35.53	-	-	74	-38.47	345	133	H
1.119	27.07	Av	28.1	-33.1	22.07	54	-31.93	-	-	345	133	H
1.716	39.12	Pk	29.2	-32.6	35.72	-	-	74	-38.28	148	100	V
1.716	26.23	Av	29.2	-32.6	22.83	54	-31.17	-	-	148	100	V
1.73	39.72	Pk	29.4	-32.5	36.62	-	-	74	-37.38	192	171	V
1.73	26.56	Av	29.4	-32.5	23.46	54	-30.54	-	-	192	171	V
3.069	39.03	Pk	33	-31.3	40.73	-	-	74	-33.27	284	222	H
3.069	25.96	Av	33	-31.3	27.66	54	-26.34	-	-	284	222	H
11.004	34.13	Pk	38	-24.2	47.93	-	-	74	-26.07	229	173	H
11.004	21.12	Av	38	-24.2	34.92	54	-19.08	-	-	229	173	H
11.443	33.96	Pk	38.5	-23.8	48.66	-	-	74	-25.34	156	247	V
11.443	20.9	Av	38.5	-23.8	35.6	54	-18.4	-	-	156	247	V
17.357	31.25	Pk	41.2	-20.3	52.15	-	-	74	-21.85	196	200	V
17.357	18.58	Av	41.2	-20.3	39.48	54	-14.52	-	-	196	200	V

Pk - Peak detector
Av - Average detection

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6.3. AC MAINS LINE CONDUCTED EMISSIONS

TEST PROCEDURE

ANSI C63.4: 2014

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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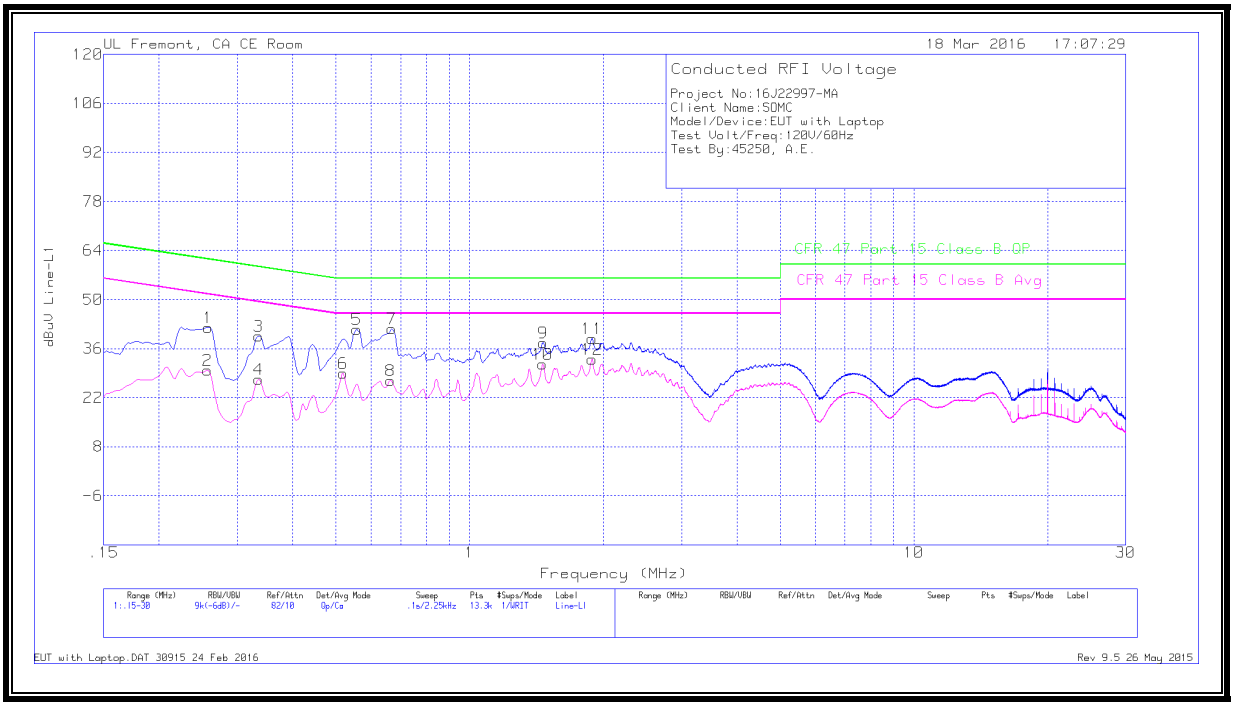
6.3.1. RESULTS- SYNC MODE

6 WORST EMISSIONS

Line-L1 .15 - 30MHz

PLOT



DATA

Trace Markers

Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
1	.258	31.28	Qp	.7	0	10.1	42.08	61.5	-19.42	-	-
2	.25688	19.02	Ca	.7	0	10.1	29.82	-	-	51.53	-21.71
3	.3345	28.96	Qp	.5	0	10.1	39.56	59.34	-19.78	-	-
4	.3345	16.65	Ca	.5	0	10.1	27.25	-	-	49.34	-22.09
5	.55725	31.02	Qp	.3	0	10.1	41.42	56	-14.58	-	-
6	.519	18.59	Ca	.3	0	10.1	28.99	-	-	46	-17.01
7	.6675	31.2	Qp	.3	0	10.1	41.6	56	-14.4	-	-
8	.663	16.49	Ca	.3	0	10.1	26.89	-	-	46	-19.11
9	1.46625	27.3	Qp	.2	.1	10.1	37.7	56	-18.3	-	-
10	1.4595	21.13	Ca	.2	.1	10.1	31.53	-	-	46	-14.47
11	1.887	28.47	Qp	.2	.1	10.1	38.87	56	-17.13	-	-
12	1.887	22.57	Ca	.2	.1	10.1	32.97	-	-	46	-13.03

Qp - Quasi-Peak detector
Ca - CISPR average detection

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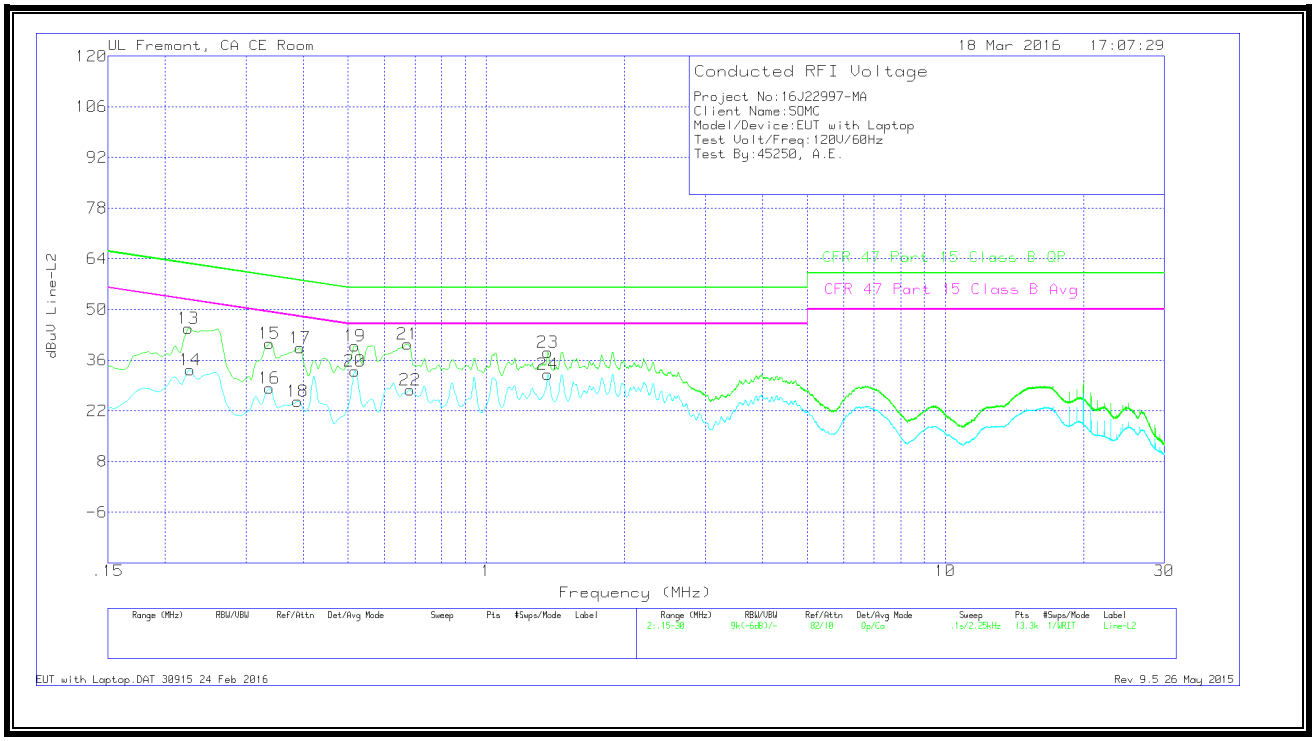
Line-L2 .15 - 30MHz

PLOT



DATA

Trace Markers

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
13	.22425	33.81	Qp	.9	0	10.1	44.81	62.66	-17.85	-	-
14	.2265	22.35	Ca	.9	0	10.1	33.35	-	-	52.58	-19.23
15	.33675	30	Qp	.5	0	10.1	40.6	59.28	-18.68	-	-
16	.33675	17.71	Ca	.5	0	10.1	28.31	-	-	49.28	-20.97
17	.393	28.87	Qp	.4	0	10.1	39.37	58	-18.63	-	-
18	.3885	14.12	Ca	.4	0	10.1	24.62	-	-	48.1	-23.48
19	.51675	29.39	Qp	.4	0	10.1	39.89	56	-16.11	-	-
20	.51675	22.54	Ca	.4	0	10.1	33.04	-	-	46	-12.96
21	.67425	30.08	Qp	.3	0	10.1	40.48	56	-15.52	-	-
22	.68325	17.4	Ca	.3	0	10.1	27.8	-	-	46	-18.2
23	1.36275	27.72	Qp	.2	.1	10.1	38.12	56	-17.88	-	-
24	1.36275	21.67	Ca	.2	.1	10.1	32.07	-	-	46	-13.93

Qp - Quasi-Peak detector
Ca - CISPR average detection

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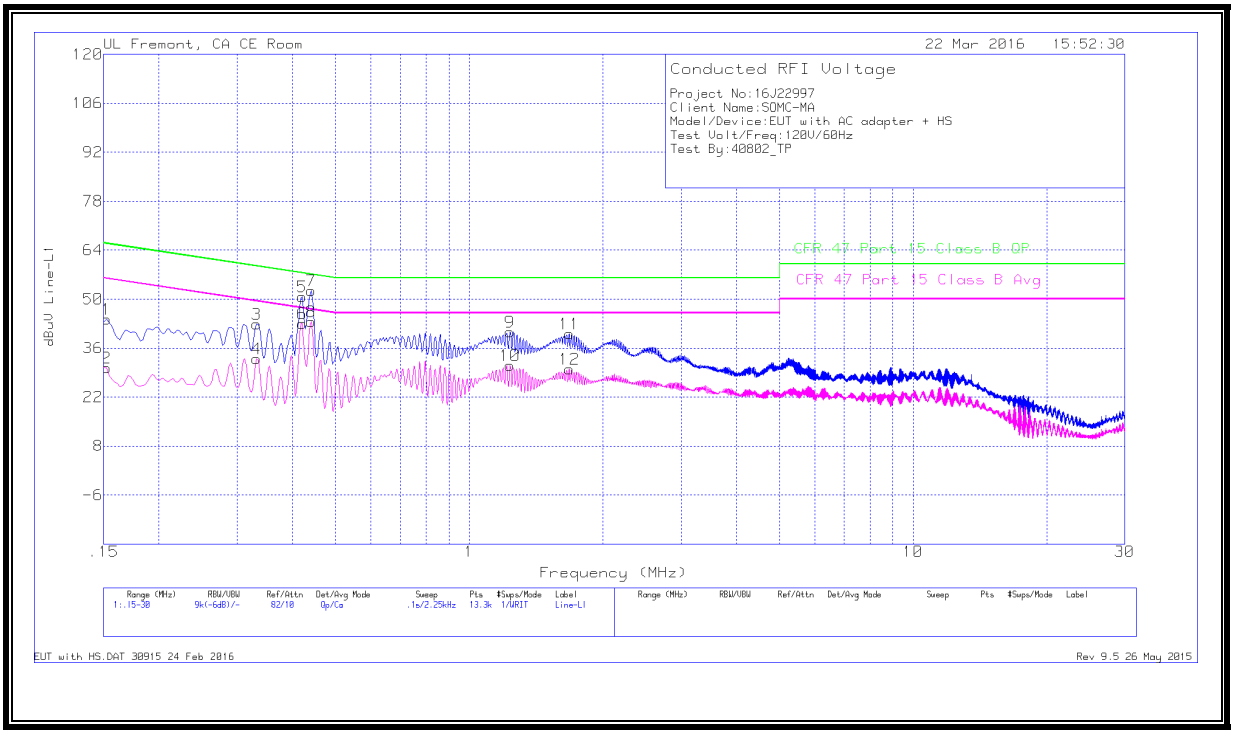
6.3.2. RESULTS- CHARGING MODE

6 WORST EMISSIONS

Line-L1 .15 - 30MHz

PLOT



DATA

Trace Markers

Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
1	.15225	32.77	Qp	1.4	0	10.1	44.27	65.88	-21.61	-	-
2	.15225	18.93	Ca	1.4	0	10.1	30.43	-	-	55.88	-25.45
3	.33225	32.32	Qp	.5	0	10.1	42.92	59.39	-16.47	-	-
4	.33225	22.32	Ca	.5	0	10.1	32.92	-	-	49.39	-16.47
5	.42	40.25	Qp	.4	0	10.1	50.75	57.45	-6.7	-	-
6	.42	32.51	Ca	.4	0	10.1	43.01	-	-	47.45	-4.44
7	.44025	41.88	Qp	.4	0	10.1	52.38	57.06	-4.68	-	-
8	.44025	33.13	Ca	.4	0	10.1	43.63	-	-	47.06	-3.43
9	1.23675	30.37	Qp	.2	0	10.1	40.67	56	-15.33	-	-
10	1.23675	20.75	Ca	.2	0	10.1	31.05	-	-	46	-14.95
11	1.68	29.63	Qp	.2	.1	10.1	40.03	56	-15.97	-	-
12	1.68	19.63	Ca	.2	.1	10.1	30.03	-	-	46	-15.97

Qp - Quasi-Peak detector
Ca - CISPR average detection

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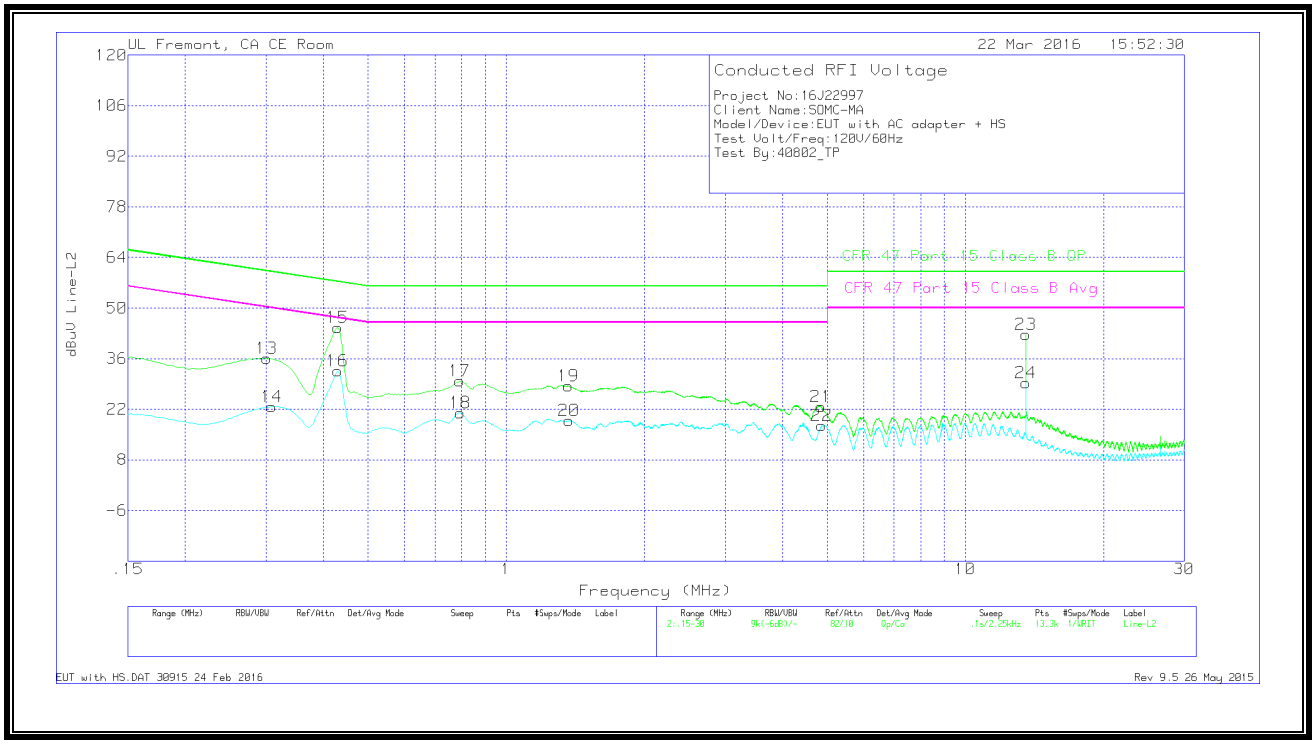
Line-L2 .15 - 30MHz

PLOT



DATA

Trace Markers

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
13	.30075	25.36	Qp	.6	0	10.1	36.06	60.22	-24.16	-	-
14	.30862	12	Ca	.6	0	10.1	22.7	-	-	50.01	-27.31
15	.429	34.15	Qp	.4	0	10.1	44.65	57.27	-12.62	-	-
16	.429	22.04	Ca	.4	0	10.1	32.54	-	-	47.27	-14.73
17	.79125	19.45	Qp	.3	0	10.1	29.85	56	-26.15	-	-
18	.7935	10.65	Ca	.3	0	10.1	21.05	-	-	46	-24.95
19	1.365	18.09	Qp	.2	.1	10.1	28.49	56	-27.51	-	-
20	1.37175	8.42	Ca	.2	.1	10.1	18.82	-	-	46	-27.18
21	4.85025	12.33	Qp	.2	.1	10.1	22.73	56	-33.27	-	-
22	4.86825	7.03	Ca	.2	.1	10.1	17.43	-	-	46	-28.57
23	13.56	32.12	Qp	.2	.2	10.2	42.72	60	-17.28	-	-
24	13.56	18.66	Ca	.2	.2	10.2	29.26	-	-	50	-20.74

Qp - Quasi-Peak detector
Ca - CISPR average detection

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