



CERTIFICATION TEST REPORT

REPORT NUMBER : 12081839-E7V2

APPLICANT : SONY MOBILE COMMUNICATIONS INC.
4-12-3 HIGASHI-SHINAGAWA,
SHINAGAWA -KU,TOKYO, 140-0002, JAPAN

FCC ID : PY7-24118Q

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

TEST STANDARD(S) : FCC 47 CFR PART 15 SUBPART C

Date Of Issue:

January 23, 2018

Prepared by:

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Revision History

<u>Ver.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	01/17/18	Initial Issue	
V2	01/23/18	Updated Section 5.7 (Radiated setup). Updated Section 9 (AC Main Line: the fundamental markers note).	Dan Corona

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SONY MOBILE COMMUNICATIONS, INC.
4-12-3 HIGASHI-SHINAGAWA,
SHINAGAWA –KU, TOKYO, 140-0002, JAPAN

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

SERIAL NUMBER: BH90002BAW & BH90003UAW

DATE TESTED: DECEMBER 19, 2017

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies

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
UL Verification Services Inc By:



Dan Corona
Operations Leader
UL Verification Services Inc.

Prepared By:



Kiya Kedida
Project Engineer
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, and FCC CFR 47 Part 15.

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
<input type="checkbox"/> Chamber A (IC:2324B-1)	<input checked="" type="checkbox"/> Chamber D (IC:22541-1)
<input type="checkbox"/> Chamber B (IC:2324B-2)	<input type="checkbox"/> Chamber E (IC: 22541-2)
<input type="checkbox"/> Chamber C (IC:2324B-3)	<input type="checkbox"/> Chamber F (IC: 22541-3)
	<input type="checkbox"/> Chamber G (IC: 22541-4)
	<input type="checkbox"/> Chamber H (IC: 22541-5)

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. Chambers A through C are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under Industry Canada company address code 22541 with site numbers 22541 -1 through 22541-5, respectively.

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:

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

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

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

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

5.2. MAXIMUM FIELD STRENGTH

The testing was performed at 3 meters. The transmitter maximum E-field at 30 meter distance was 16.79 dBuV/m, which was converted from the 3 meter data.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes the loop antenna.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was SONY, s_atp_1_00139_B_10_5.

The test utility software used during testing was Tera Term Ver 4.79.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission was performed with the EUT set to transmit at the 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.

5.6. MODIFICATIONS

No modifications were made during testing.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	SONY	1309-8864.1	VB17W46601037	NA
Headphones	SONY	N/A	N/A	N/A

I/O CABLES

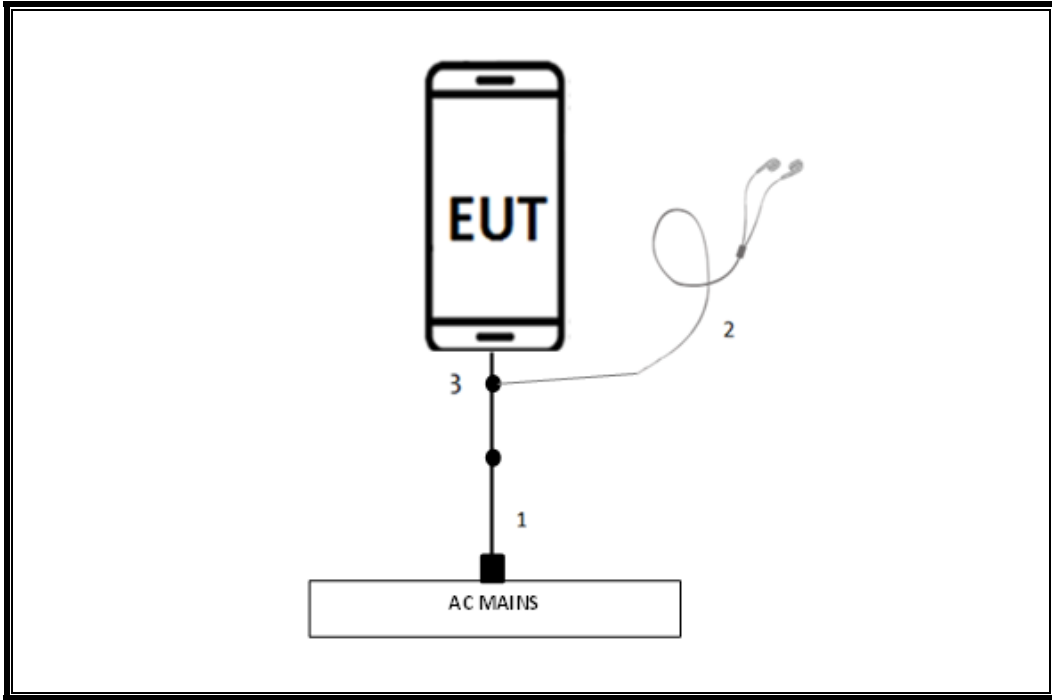
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	USB Type-C	UnShielded	1.2	N/A
2	Jack	1	Headset	UnShielded	1	N/A
3	USB/Head phone Jack	1	USB Type-C/Audio	UnShielded	0.11	Audio & Charger Splitter

TEST SETUP

The EUT is setup as a standalone device. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS

RADIATED AND AC LINE CONDUCTED EMISSIONS SETUP DIAGRAM



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 Due
Antenna, Broadband Hybrid, 30MHz to 2000MHz w/4dB Pad	Sunol Sciences Corp.	JB3	T477	07/07/2018
Antenna, Active Loop 9kHz-30MHz	Com-Power Corp.	AL-130R	T1866	10/11/2018
Antenna, Active Loop 9kHz-30MHz	ETS-Lindgren	6502	T1863	02/17/2018
Amplifier, 10kHz-1GHz	Sonoma Instruments Co.	310N	T286	06/12/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T341	11/12/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1450	01/10/2018
Temperature Chamber	Thermotron Industries	SE-600-10-10	T80	02/18/2018
EMI Test Receiver	Rohde & Schwarz	ESR	T1436	01/18/2018
LISN	Fischer Custom Communications	FCC-LISN-50/250-25-2-01	T1310	06/08/2018
Transient Limiter	COM-POWER	LIT-930	T1457	02/24/18

Test Software List			
Description	Manufacturer	Model	Version
Antenna Port Software	UL	UL EMC	Ver 7.7, Dec 14, 2017
Radiated Emissions Software	UL	UL EMC	Ver 9.5, Dec 01, 2016

NOTE: *testing was completed before equipment calibration expiration date.

7. OCCUPIED BANDWIDTH

LIMITS

For reporting purposes only. Tested per ANSI C63.10 (6.9.3)

RESULTS

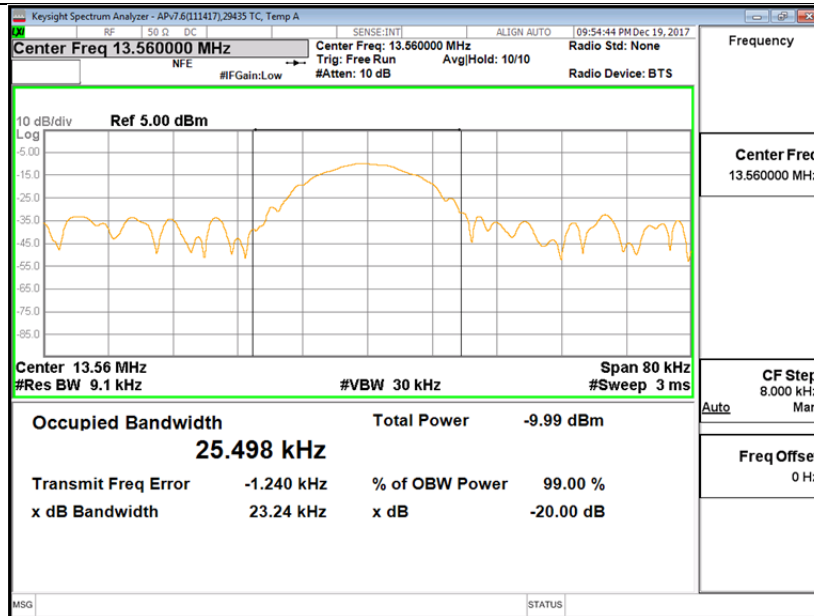
ID:	29435 TC	Date:	12/19/17
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Frequency (MHz)	Modulation	Data Rate (kbps)	99% Bandwidth (kHz)	20dB Bandwidth (kHz)
13.56	Type A	106	25.498	23.240
		212	20.687	23.120
		424	19.927	22.730
		848	19.385	22.610
	Type B	106	21.897	23.580
		212	21.897	23.580
		424	19.639	22.180
		848	19.477	22.820
	Type F	212	19.364	22.760
		424	19.328	22.890

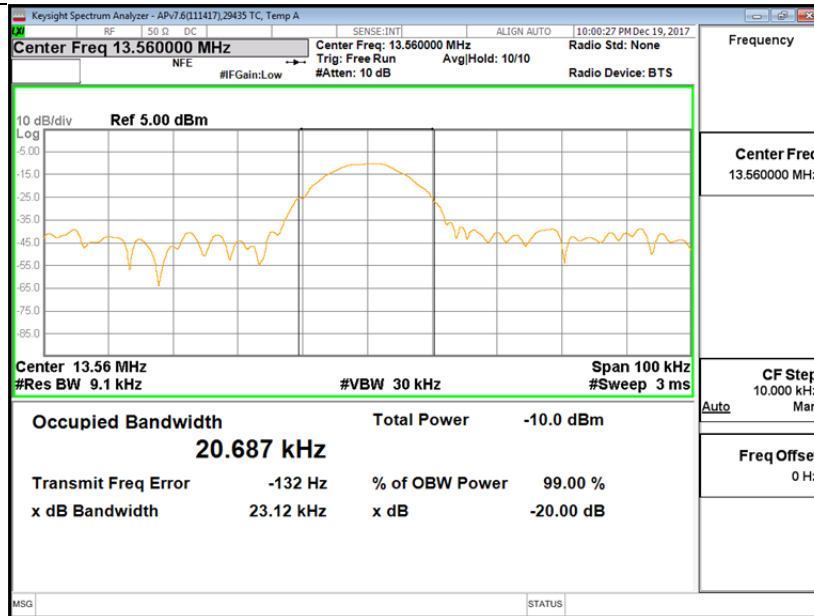
Note: Measured signal is CW adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

99% & 20dB Bandwidth

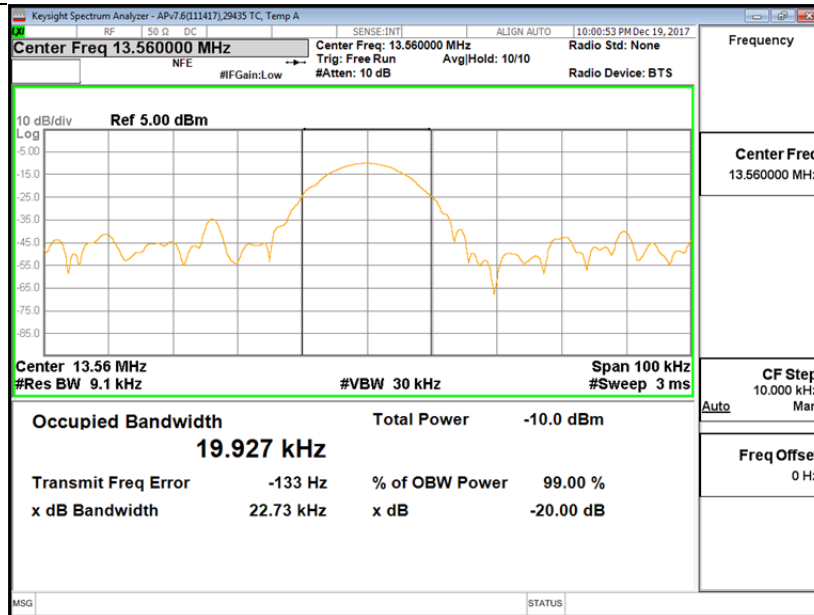
99% & 20dB BANDWIDTH TYPE A 106k



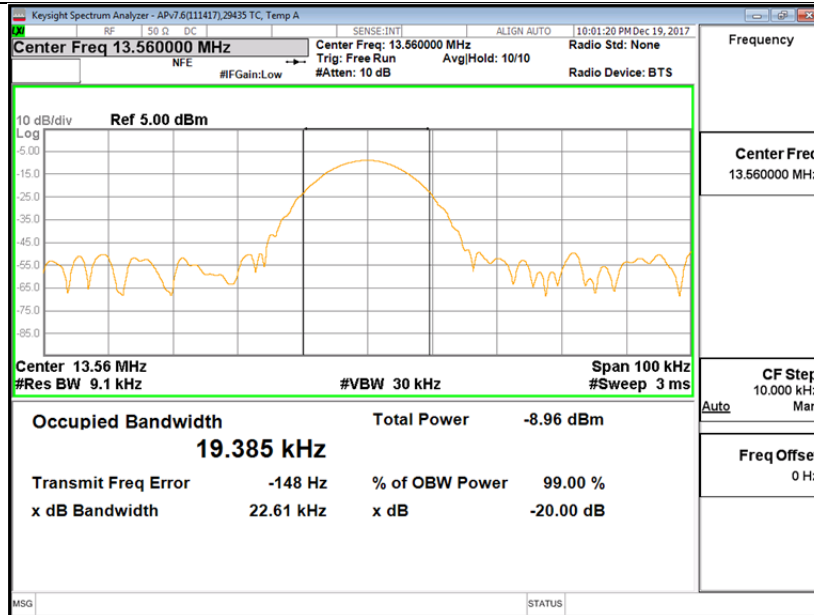
99% & 20dB BANDWIDTH TYPE A 212k



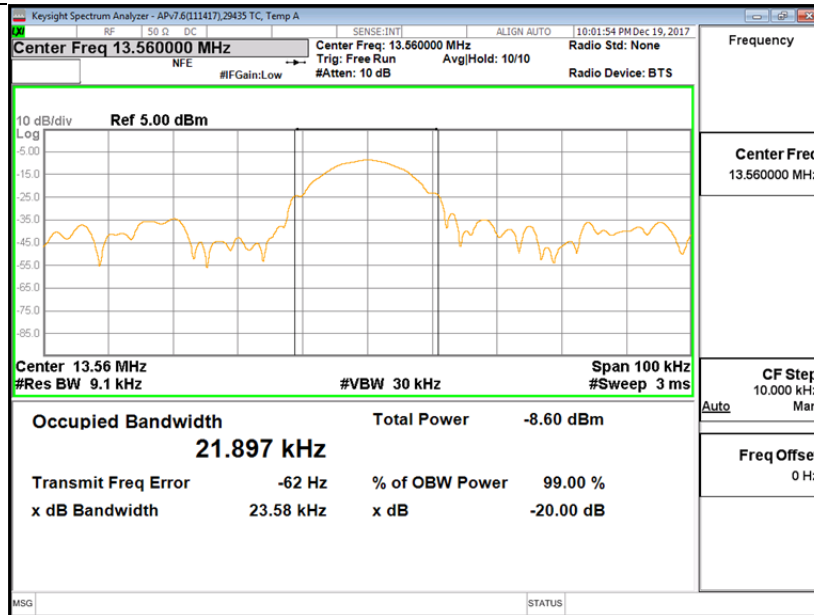
99% & 20dB BANDWIDTH TYPE A 424k



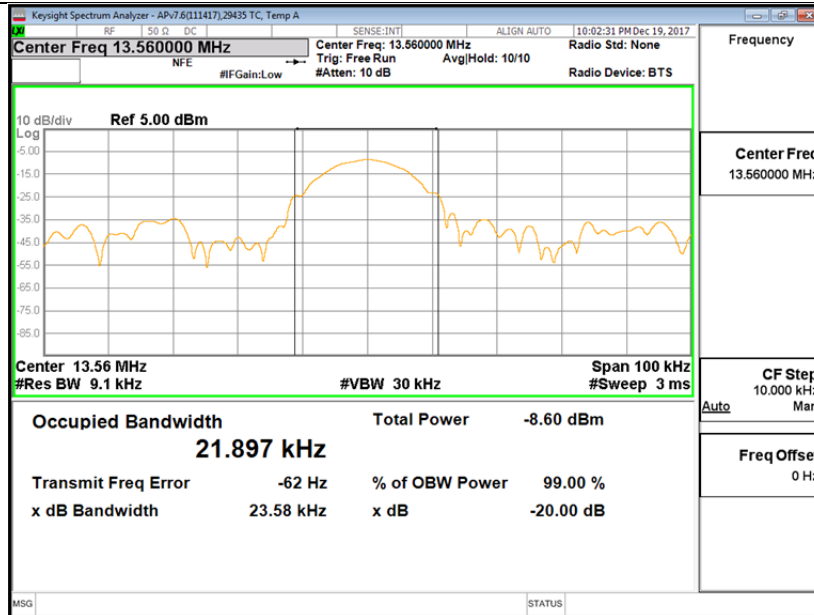
99% & 20dB BANDWIDTH TYPE A 848k



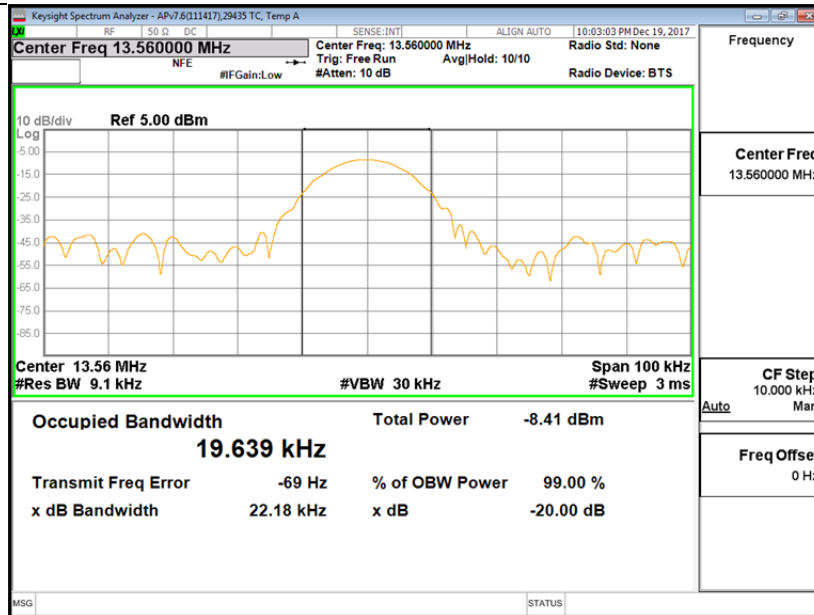
99% & 20dB BANDWIDTH TYPE B 106k



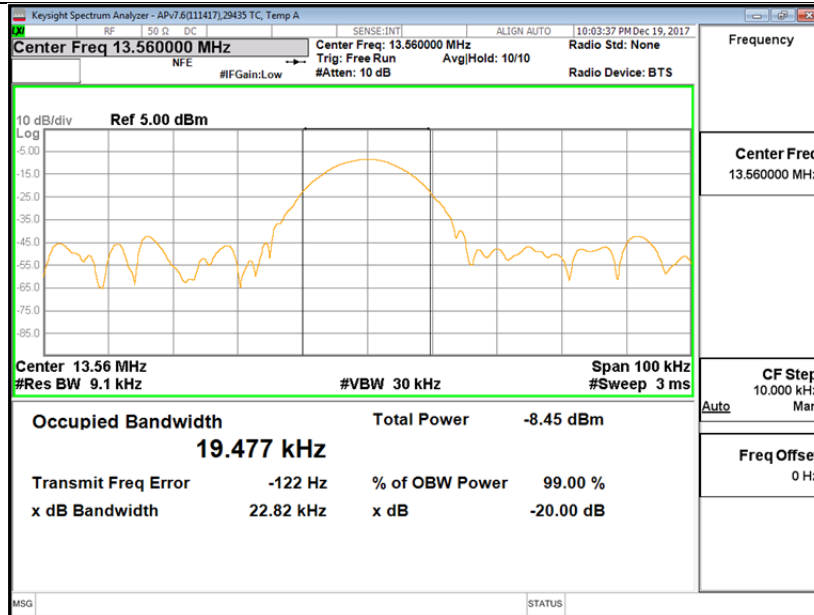
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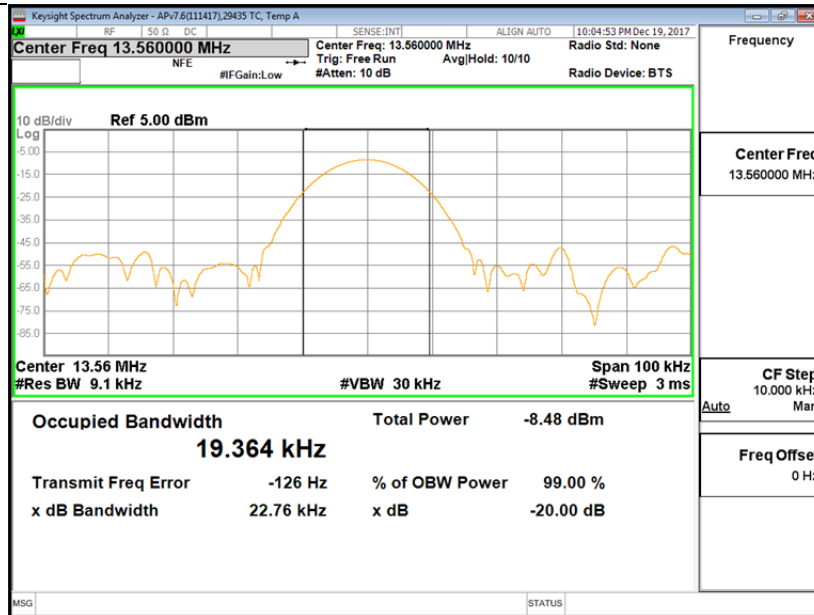
99% & 20dB BANDWIDTH TYPE B 424k



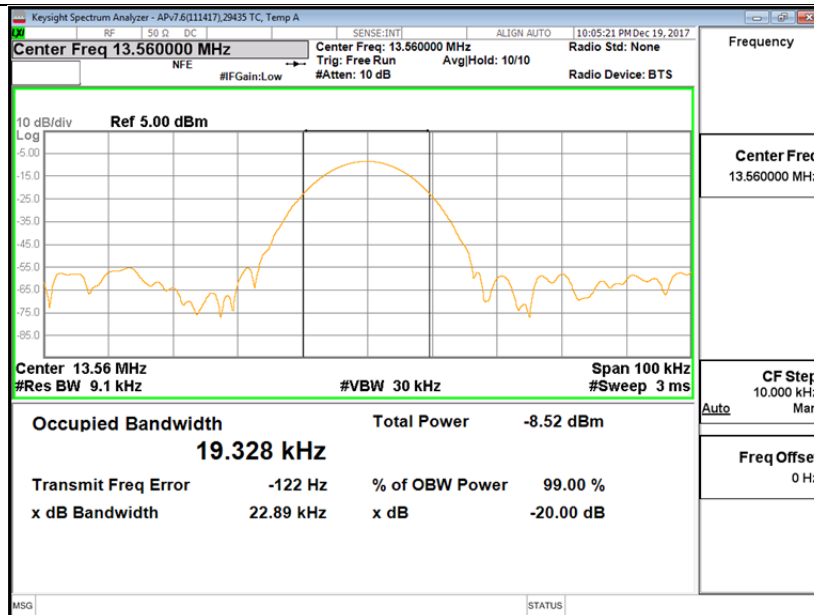
99% & 20dB BANDWIDTH TYPE B 848k



99% & 20dB BANDWIDTH TYPE F 212k



99% & 20dB BANDWIDTH TYPE F 424k



8. RADIATED EMISSION TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMIT

§15.225, 15.209

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110– 14.010 MHz and shall not exceed the general radiated emission limits in § 15.209 as follows:

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Formula for converting the filed strength from uV/m to dBuV/m is:

$$\text{Limit (dBuV/m)} = 20 \log \text{limit (uV/m)}$$

In addition:

§15.209 (d) The emission limits shown at the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§15.209 (d) The provisions in §§ 15.225, measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

TEST PROCEDURE

ANSI C63.10-2013

The EUT is an intentional radiator that incorporates a digital device. The highest fundamental frequency generated or used in the device is 13.56 MHz. The frequency range was investigated from 0.15 MHz to the 10th harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater (1000MHz)

RESULTS

No non-compliance noted:

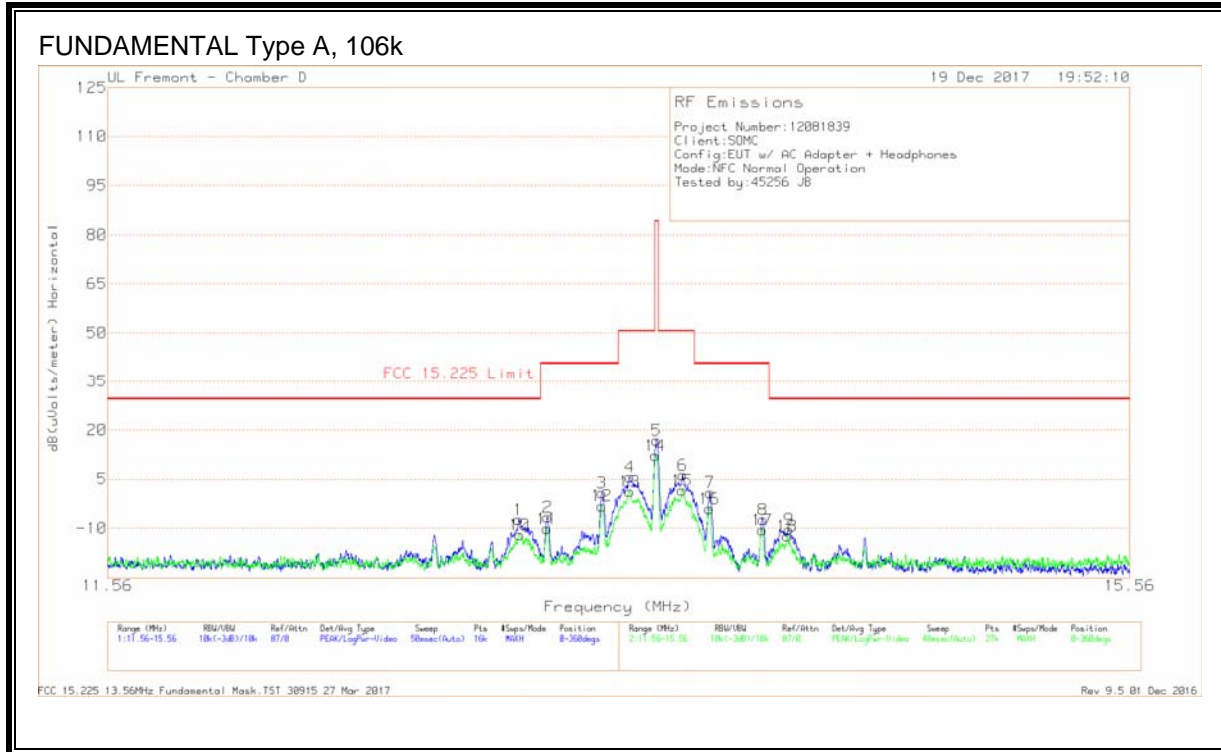
KDB 414788 OATS and Chamber Correlation Justification

Device is a Smart Phone.

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OATs and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

8.1.1. FUNDAMENTAL EMISSION MASK (11.56 – 15.56MHz)



Note: All data rate Field Strength was investigated and Type A, 106k found to have the highest Field Strength results and represents as the worst case data rate.

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 30m	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)	Polarity
1	13.028	22.07	Pk	10.1	.4	-40	-7.43	29.54	-36.97	0-360	Face-On
10	13.03238	17.53	Pk	10.1	.4	-40	-11.97	29.54	-41.51	0-360	Face-Off
11	13.13502	19.42	Pk	10.1	.4	-40	-10.08	40.51	-50.59	0-360	Face-Off
2	13.13688	22.89	Pk	10.1	.4	-40	-6.61	40.51	-47.12	0-360	Face-On
12	13.34555	26.33	Pk	10.1	.4	-40	-3.17	40.51	-43.68	0-360	Face-Off
3	13.34738	30.39	Pk	10.1	.4	-40	.89	40.51	-39.62	0-360	Face-On
13	13.45455	30.65	Pk	10.1	.4	-40	1.15	50.5	-49.35	0-360	Face-Off
4	13.45538	35.17	Pk	10.1	.4	-40	5.67	50.5	-44.83	0-360	Face-On
14	*13.55637	41.75	Pk	10.1	.4	-40	12.25	84	-71.75	0-360	Face-Off
5	*13.5615	46.29	Pk	10.1	.4	-40	16.79	84	-67.21	0-360	Face-On
15	13.66219	31.11	Pk	10.1	.4	-40	1.61	50.5	-48.89	0-360	Face-Off
6	13.66363	35.73	Pk	10.1	.4	-40	6.23	50.5	-44.27	0-360	Face-On
16	13.76979	25.67	Pk	10	.4	-40	-3.93	40.51	-44.44	0-360	Face-Off
7	13.77213	30.52	Pk	10	.4	-40	.92	40.51	-39.59	0-360	Face-On
17	13.9832	19.05	Pk	10	.4	-40	-10.55	40.51	-51.06	0-360	Face-Off
8	13.98525	22.22	Pk	10	.4	-40	-7.38	40.51	-47.89	0-360	Face-On
18	14.08629	17.29	Pk	10	.4	-40	-12.31	29.54	-41.85	0-360	Face-Off
9	14.092	19.29	Pk	10	.4	-40	-10.31	29.54	-39.85	0-360	Face-On

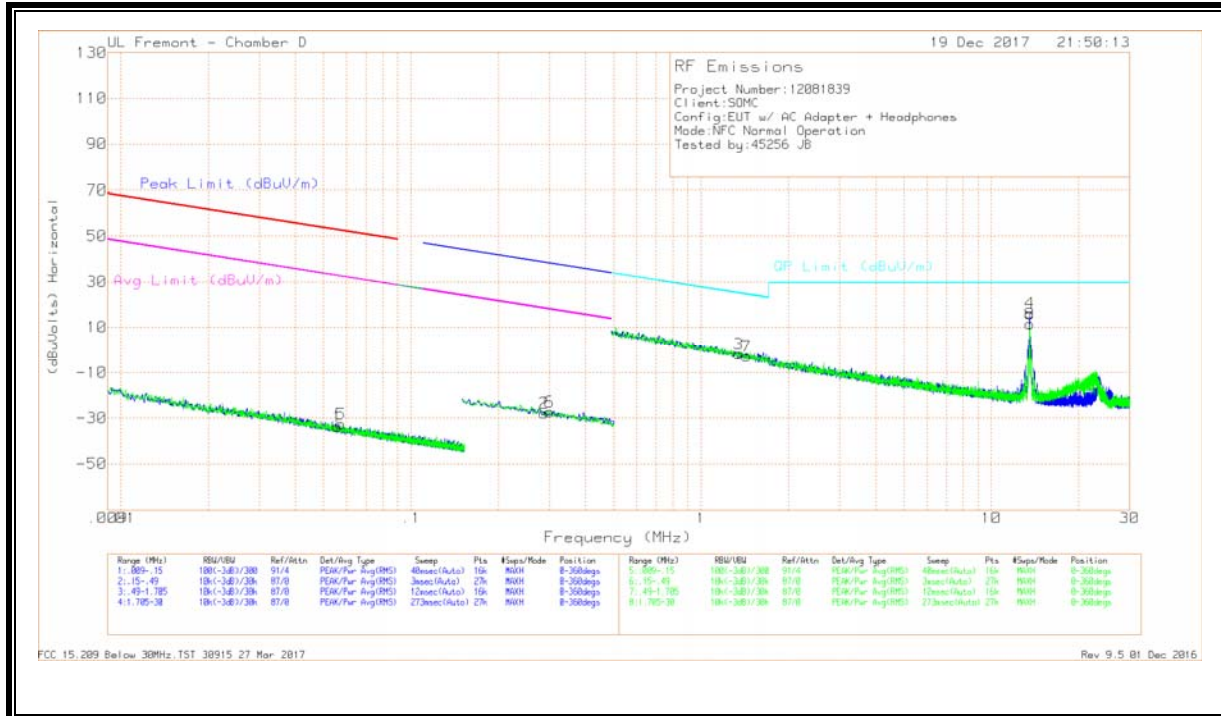
* - Indicates fundamental frequency
 Pk - Peak detector

Fundamental Frequency

Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 30m	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)	Antenna Position
*13.55637	41.75	Pk	10.1	.4	-40	12.25	84	-71.75	0-360	Face-Off
*13.5615	46.29	Pk	10.1	.4	-40	16.79	84	-67.21	0-360	Face-On

Pk - Peak detector

8.1.2. SPURIOUS EMISSIONS (0.09 – 30MHz)



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.05579	34.64	Pk	11.8	0	-80	-33.56	52.65	-86.21	32.65	-66.21	-	-	-	-	0-360
5	.05742	35.83	Pk	11.7	0	-80	-32.47	52.4	-84.87	32.4	-64.87	-	-	-	-	0-360
2	.28749	41.49	Pk	10.7	.1	-80	-27.71	-	-	-	-	38.44	-66.15	18.44	-46.15	0-360
6	.30038	41.84	Pk	10.7	.1	-80	-27.36	-	-	-	-	38.06	-65.42	18.06	-45.42	0-360

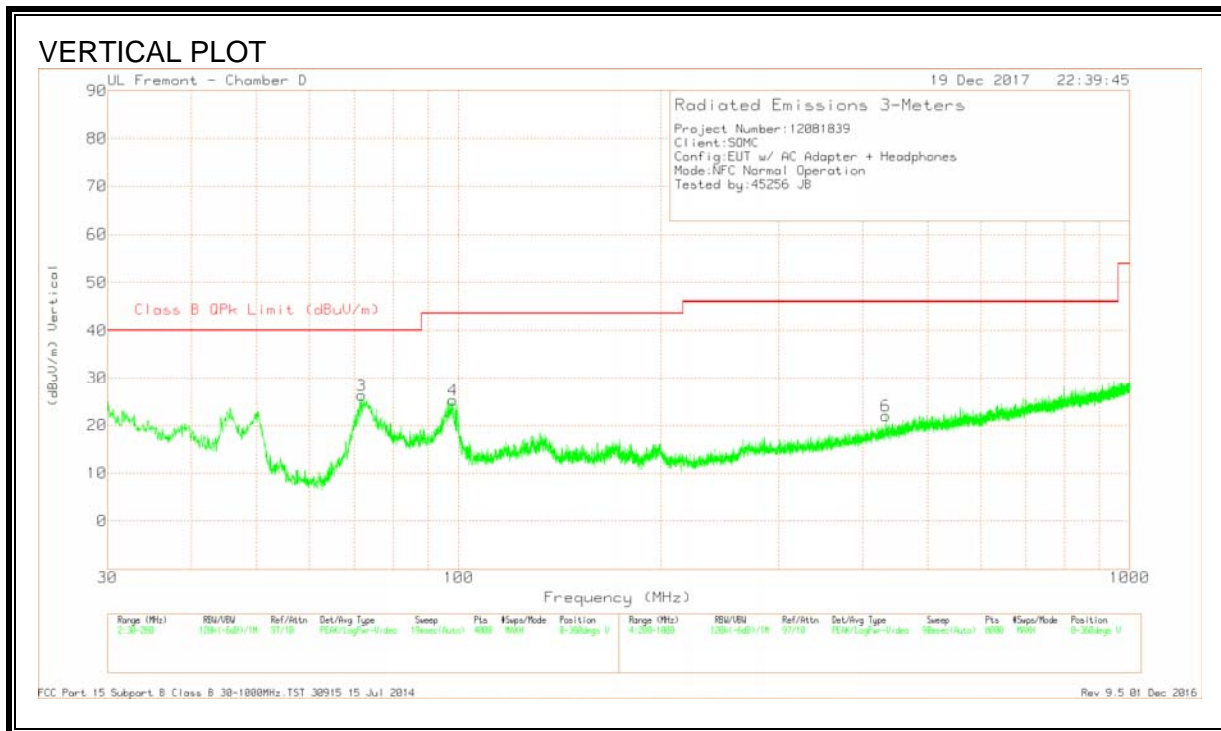
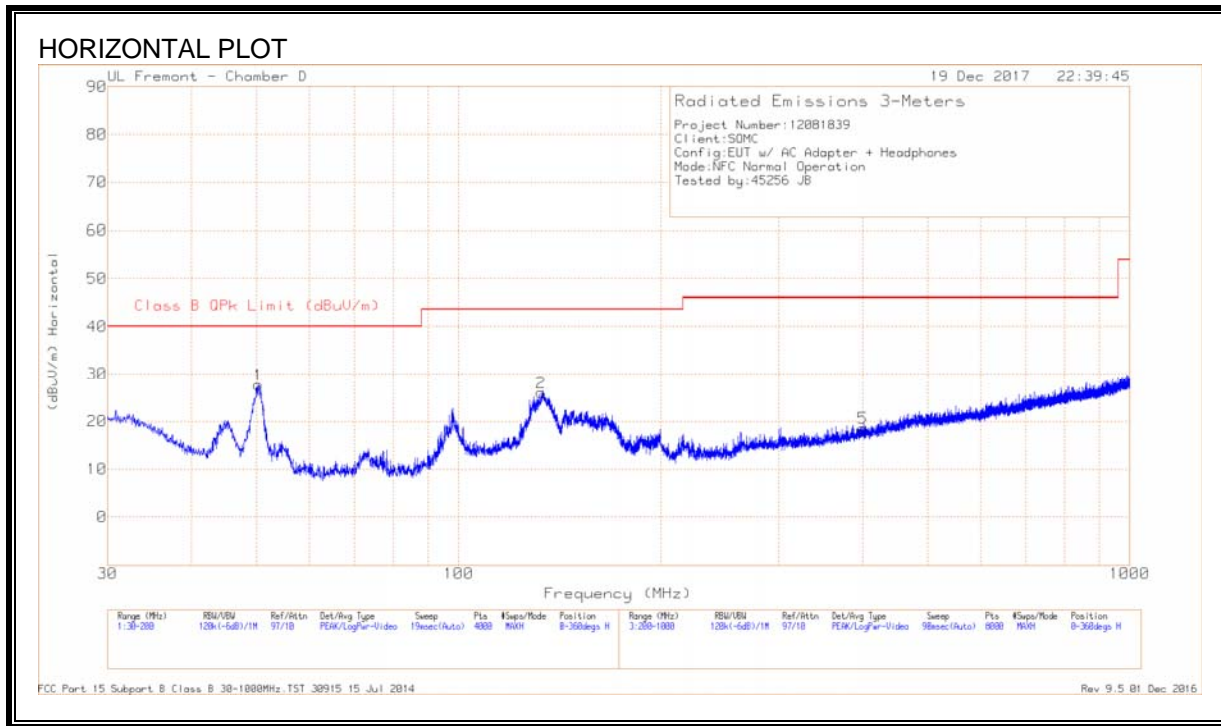
Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 30m	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	1.34758	27.59	Pk	10.6	.1	-40	-1.71	25.04	-26.75	-	-	-	-	0-360
7	1.43381	26.31	Pk	10.6	.2	-40	-2.89	24.5	-27.39	-	-	-	-	0-360
4	*13.55893	45.8	Pk	10.1	.4	-40	16.3	29.5	-13.2	-	-	-	-	0-360
8	*13.55945	41.04	Pk	10.1	.4	-40	11.54	29.5	-17.96	-	-	-	-	0-360

* - Indicates fundamental frequency

Pk - Peak detector

8.1.3. TX SPURIOUS EMISSIONS (30 – 1000MHz)



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	50.3628	46.78	Pk	12.6	-31.7	27.68	40	-12.32	0-360	399	H
3	71.7458	44.86	Pk	12.9	-31.5	26.26	40	-13.74	0-360	100	V
4	98.0601	42.48	Pk	14.2	-31.4	25.28	43.52	-18.24	0-360	100	V
2	132.7916	39.27	Pk	18	-31.2	26.07	43.52	-17.45	0-360	199	H
5	399.926	28.59	Pk	19.9	-29.9	18.59	46.02	-27.43	0-360	199	H
6	433.3303	30.89	Pk	20.9	-29.8	21.99	46.02	-24.03	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector

9. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator 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.

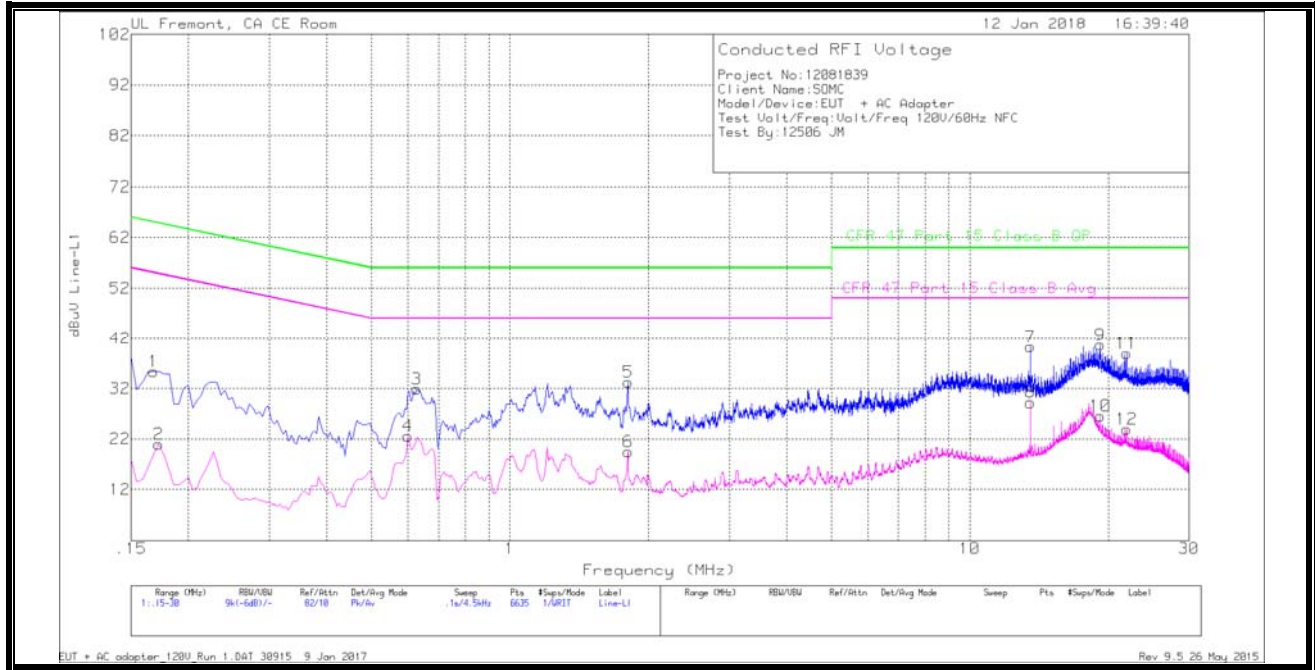
TEST PROCEDURE

ANSI C63.10

RESULTS

No non-compliance noted.

EUT WITH ANTENNA - LINE 1 RESULTS



WORST EMISSIONS

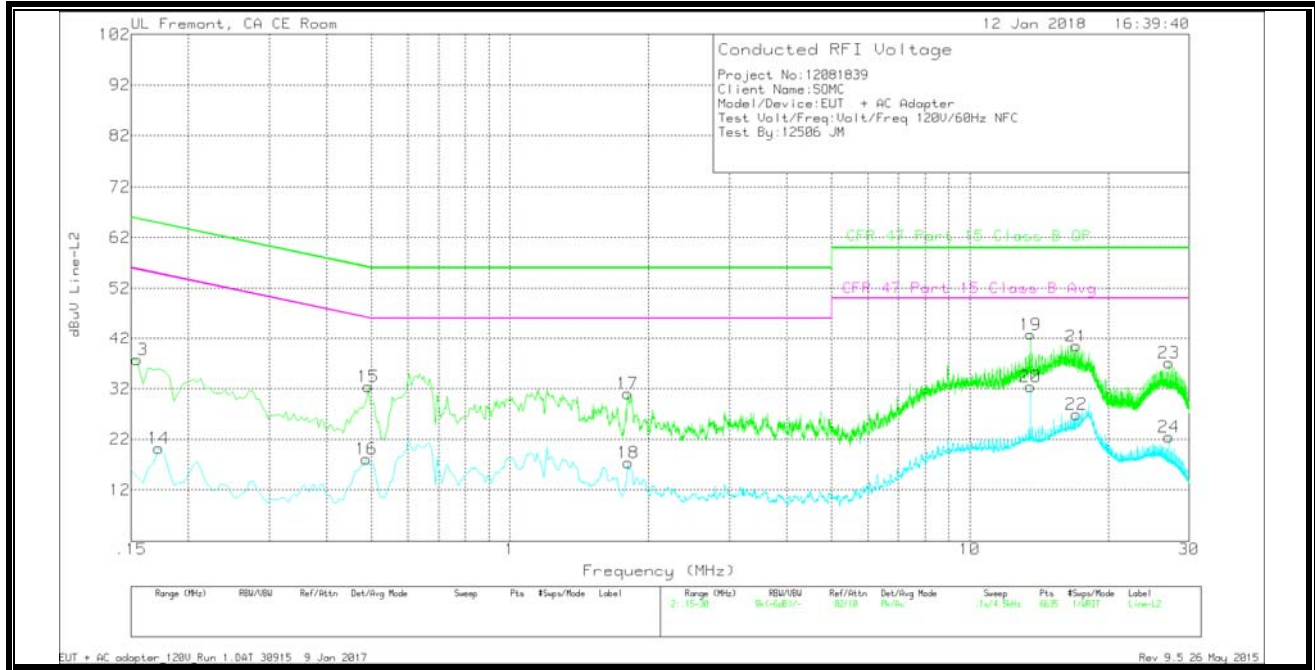
Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.168	25.2	Qp	.1	0	10.1	35.4	65.06	-29.66	-	-
2	.1725	10.89	Ca	0	0	10.1	20.99	-	-	54.84	-33.85
3	.6045	21.32	Qp	0	0	10.1	31.42	56	-24.58	-	-
4	.6	12.44	Ca	0	0	10.1	22.54	-	-	46	-23.46
5	1.806	23.1	Qp	0	.1	10.1	33.3	56	-22.7	-	-
6	1.806	9.22	Ca	0	.1	10.1	19.42	-	-	46	-26.58
7	13.56	29.84	Qp	.1	.2	10.2	40.34	60	-19.66	-	-
8	13.56	18.72	Ca	.1	.2	10.2	29.22	-	-	50	-20.78
9	17.682	29.68	Qp	0	.3	10.3	40.28	60	-19.72	-	-
10	17.6775	16.8	Ca	0	.3	10.3	27.4	-	-	50	-22.6
11	21.9345	28.21	Qp	.1	.3	10.4	39.01	60	-20.99	-	-
12	21.9345	13.14	Ca	.1	.3	10.4	23.94	-	-	50	-26.06

Pk - Peak detector

Av - Average detection

Note: Markers 7 and 8 are the 13.56MHz NFC Fundamental

EUT WITH ANTENNA-LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	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	.1545	27.61	Qp	0	0	10.1	37.71	65.75	-28.04	-	-
14	.1725	10.16	Ca	0	0	10.1	20.26	-	-	54.84	-34.58
15	.636	24.79	Qp	0	0	10.1	34.89	56	-21.11	-	-
16	.627	10.78	Ca	0	0	10.1	20.88	-	-	46	-25.12
17	1.8015	20.77	Qp	0	.1	10.1	30.97	56	-25.03	-	-
18	1.806	7.17	Ca	0	.1	10.1	17.37	-	-	46	-28.63
19	13.56	32.3	Qp	.1	.2	10.2	42.8	60	-17.2	-	-
20	13.56	21.93	Ca	.1	.2	10.2	32.43	-	-	50	-17.57
21	17.0385	29.81	Qp	0	.3	10.3	40.41	60	-19.59	-	-
22	17.043	16.36	Ca	0	.3	10.3	26.96	-	-	50	-23.04
23	27.1095	26.13	Qp	.1	.4	10.5	37.13	60	-22.87	-	-
24	27.1185	11.47	Ca	.1	.4	10.5	22.47	-	-	50	-27.53

Pk - Peak detector

Av - Average detection

Note: Markers 19 and 20 are the 13.56MHz NFC Fundamental

10. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency, over a temperature variation of -10 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

TEST PROCEDURE

ANSI C63.10

RESULTS

ID:	29435 TC	Date:	12/19/17
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No non-compliance noted.

Reference Frequency: EUT Channel 13.56 MHz @ 20°C Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measured with Time Elapse								
(Vdc)	(°C)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	13.5596835	4.818	13.5596813	4.977	13.5596799	5.086	13.5596787	5.173	± 100
3.80	40	13.5597199	2.135	13.5597098	2.879	13.5597065	3.119	13.5597040	3.307	± 100
3.80	30	13.5597488	0.000	13.5597488	0.000	13.5597488	0.000	13.5597488	0.000	± 100
3.80	20	13.5597488	0.000	13.5597450	0.284	13.5597427	0.451	13.5597417	0.528	± 100
3.80	10	13.5597953	-3.431	13.5598120	-4.662	13.5598144	-4.834	13.5598151	-4.890	± 100
3.80	0	13.5598290	-5.910	13.5598351	-6.359	13.5598392	-6.668	13.5598419	-6.863	± 100
3.80	-10	13.5598487	-7.366	13.5598493	-7.407	13.5598489	-7.381	13.5598492	-7.400	± 100
3.23	20	13.5597404	0.620	13.5597409	0.583	13.5597380	0.799	13.5597376	0.828	± 100
4.37	20	13.5597448	0.299	13.5597443	0.335	13.5597447	0.304	13.5597423	0.480	± 100