



**FCC 47 CFR PART 15 SUBPART C**

**CERTIFICATION TEST REPORT**

**FOR**

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

**FCC ID: PY7-764860**

**REPORT NUMBER: 11589096AP-E2V2**

**ISSUE DATE: 2017-02-24**

*Prepared for*

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NVLAP LAB CODE 200246-0

Revision History

<u>Ver.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
1	2017-02-20	Initial Issue	Richard Jankovics
2	2017-02-24	Removed BLE Reference from EUT Description and revised Section 6.2 to Maximum Fundamental Electric Field Strength.	Jeff Moser

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## 1. DATA REUSE

### 1.1. INTRODUCTION

The 15.215 antenna port conducted and 15.207 Line Conducted Emissions for FCC ID: PY7-76486O are represented by FCC ID: PY7-21831Z, test report 11589096A-E7. This report for FCC ID: PY7-76486O contains radiated field strength and emissions, and Frequency Stability.

SONY MOBILE COMMUNICATIONS, INC takes full responsibility that the data as referenced in FCC ID: PY7-21831Z, test report 11589096A-E7 represent compliance for this model.

### 1.2. DIFFERENCES

According to manufacturer FCC ID: PY7-21831Z and FCC ID: PY7-76486O NFC radios are electrically identical. They share the same chipset and same antenna performance including antenna gain. The FCC ID: PY7-21831Z test data shall remain representative of FCC ID: PY7-76486O, so FCC ID: PY7-76486O leverages test data from FCC ID: PY7-21831Z.

- Difference in Single SIM and Dual SIM (Dual standby) by SW
- eMMC memory difference of 32GB and 64GB
- LTE band7/41 antenna matching circuit difference

### 1.3. TESTING PERFORMED

Testing performed under This report for FCC ID: PY7-76486O contains radiated field strength and emissions, and Frequency Stability. All other data is referenced to FCC ID: PY7-21831Z, test report 11589096A-E1.

### 1.4. REFERENCE DETAIL SECTION

Equipment Class	Reference FCC ID	Type Grant	Grant Date	Report Title
DXX	FCC ID: PY7-21831Z	New	02/24/17	11589096A-E7

## 2. 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:** 00440245-679053-8

**DATE TESTED:** 2017-01-06 – 2017-01-17

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Pass

UL LLC 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 LLC 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 LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC 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, or any agency of the U.S. Government.

Approved & Released  
For UL LLC By:

Prepared By:



Jeff Moser  
EMC Program Manager  
UL – Consumer Technology Division



Richard Jankovics  
WiSE Engineer  
UL – Consumer Technology Division

### 3. TEST METHODOLOGY

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

### 4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA and 2800 Suite B, Perimeter Park Drive, Morrisville, NC 27560.

12 Laboratory Dr., RTP, NC 27709
<input type="checkbox"/> Chamber A
<input type="checkbox"/> Chamber C

2800 Suite B Perimeter Park Dr., Morrisville, NC 27560
<input type="checkbox"/> Chamber NORTH
<input checked="" type="checkbox"/> Chamber SOUTH

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at <http://www.nist.gov/nvlap/>

### 5. CALIBRATION AND UNCERTAINTY

#### 5.1. 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.

#### 5.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

### 5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Total RF power, conducted	$\pm 0.45$
RF power density, conducted	$\pm 1.50$
Spurious emissions, conducted	$\pm 2.94$
All emissions, radiated up to 26 GHz	$\pm 5.36$
Temperature	$\pm 0.07$
Humidity	$\pm 2.26$
DC and low frequency voltages	$\pm 1.27$
Conducted Emissions (0.150-30MHz)	$\pm 3.65$
Frequency Stability	$\pm 141$ Hz

## **6. EQUIPMENT UNDER TEST**

### **6.1. DESCRIPTION OF EUT**

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

### **6.2. MAXIMUM FUNDAMENTAL ELECTRIC FIELD STRENGTH**

The testing was performed at 3 meter. The transmitter maximum E-field at 30 meter distance is 21.87 dBuV/m which is converted from the 3 meter data.

### **6.3. DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes loop antenna.

### **6.4. SOFTWARE AND FIRMWARE**

The firmware installed in the EUT during testing was 1.30

### **6.5. WORST-CASE CONFIGURATION AND MODE**

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

For testing performed with the NFC Tag, the fundamental of the EUT was investigated in three orthogonal orientations X, Y, Z, it was determined that X-Axis orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X-Axis orientation. Modulation and data rate were fixed by the tag.

For testing performed with the NFC Test App, 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. All modulations and data rates were investigated and it was determined that Type A, 106 Kbps was considered worst-case. Therefore, all testing was performed in Type A, 106 Kbps mode.

### **6.6. MODIFICATIONS**

No modifications were made during testing.



## 6.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Desktop	Lenovo	ThinkCentre	MG00ADEN	NA
Headphones	Sony	MH410x	1625A87E00005E2	NA
PowerSupply	Sony	1300-7138.1	4016W34204581	NA

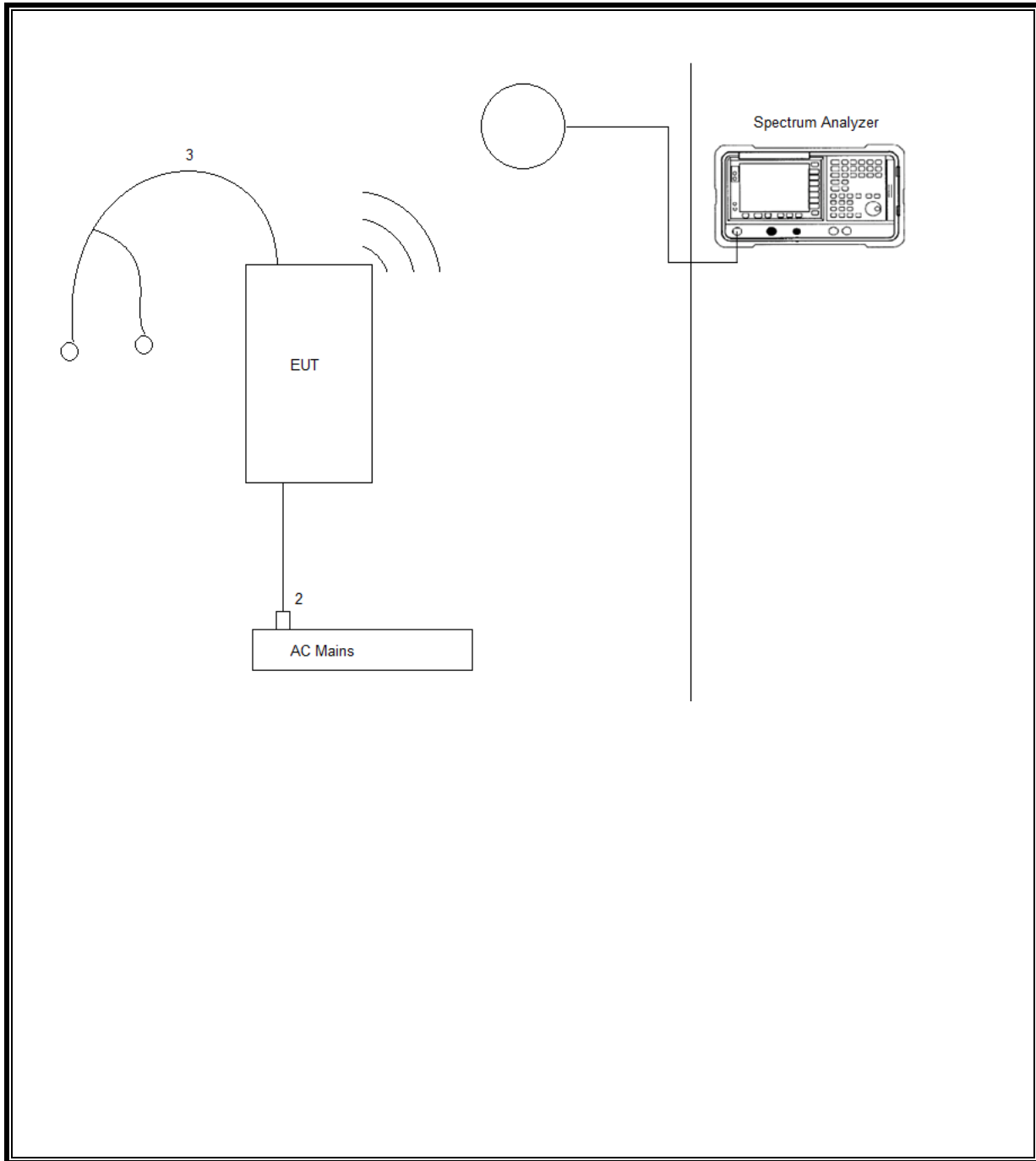
### I/O CABLES

I/O Cable List					
Cable No	Port	# of Identical ports	Connector Type	Cable Length (m)	Remarks
2	DC Mains	1	AC	>1m	NA
3	Audio	1	3.5mm	>1m	Headphone

### TEST SETUP

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

**SETUP DIAGRAM FOR TESTS**



## 7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	<b>0.009-30MHz</b>	<b>(Loop Ant.)</b>			
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2016-12-28	2017-12-31
	<b>30-1000 MHz</b>				
AT0074	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2016-06-07	2017-06-30
	<b>Gain-Loss Chains</b>				
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2016-10-04	2017-10-04
S-SAC02	Gain-loss string: 30-1000MHz	Various	Various	2016-06-26	2017-06-30
	<b>Receiver &amp; Software</b>				
SA0025	Spectrum Analyzer	Agilent	N9030A	2016-03-17	2017-03-31
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	<b>Additional Equipment used</b>				
139843	Temp/Humid/Pressure Meter	Control Co./Fisher	14-650-118	2016-02-19	2017-02-19

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL077	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3476-240	2016-06-15	2017-06-30
139843	Temp/Humid/Pressure Meter	Control Co./Fisher	14-650-118	2016-02-19	2017-02-19
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2016-08-24	2017-08-24
PRE0101521 (75141)	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2016-08-23	2017-08-23
TL001	Transient Limiter, 0.009-30MHz	Com-Power	LIT-930A	2016-06-09	2017-06-30
MM0167	Multi-meter	Fluke	83V	2016-10-07	2017-10-31
CDECABLE001	ANSI C63.4 1m extension cable.	UL	Per Annex B of ANSI C63.4	2016-06-04	2017-06-30
PS215	AC Power Source	Elgar	CW2501M (s/n 1523A02397)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA

Test Equipment Used – Frequency Stability Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	<b>Conducted Room 2</b>				
SA0020	Spectrum Analyzer	Agilent Technologies	E4446A	2016-03-22	2017-03-31
1100502	Temp/Humid Chamber	Cincinnati Sub-Zero	ZPH-8-3.5-SCT/AC	2016-06-06	2017-06-06
139843	Temp/Humid/Pressure Meter	Control Co./Fisher	14-650-118	2016-02-19	2017-02-19
76021	DC Regulated Power Supply	CircuitSpecialists.Com	CSI3005X5	N/A	N/A
	<b>Additional Equipment used</b>				
SA0026	Spectrum Analyzer	Keysight Technologies	N9030A	2016-02-24	2017-02-28
7405	E and B – Field Probes	EMCO	7405	N/A	N/A

## 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:

Limit (dBuV/m) = 20 log limit (uV/m)

In addition:

§15.209 (d) The emission limits shown 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 937606 OATS and Chamber Correlation Justification**

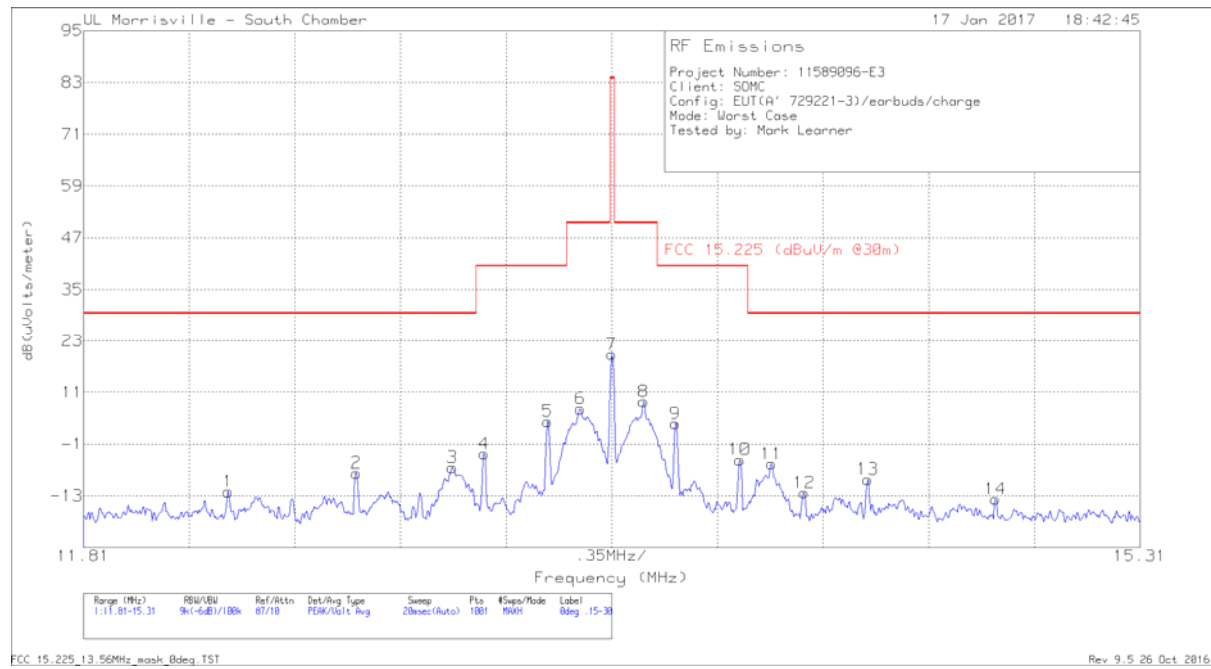
Device is a Smart Phone.

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 AND SPURIOUS EMISSIONS (0.15 – 30 MHz)

#### FUNDAMENTAL Type A, 106k, 0 deg (Test App Mode)

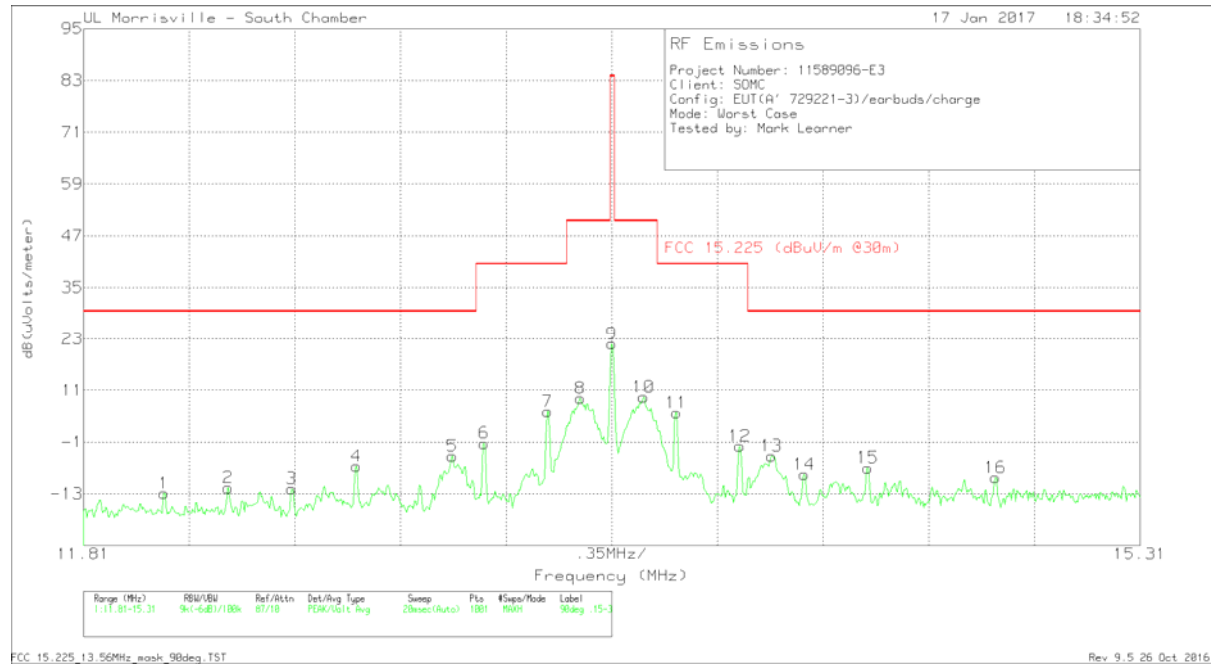


#### Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.225 (dBuV/m @30m)	Margin (dB)	Azimuth (Degs)
1	12.2895	16.84	Pk	10.5	.6	-40	-12.06	29.5	-41.56	69
2	12.713	21.29	Pk	10.4	.6	-40	-7.71	29.5	-37.21	69
3	13.0315	22.59	Pk	10.4	.6	-40	-6.41	29.5	-35.91	69
4	13.1365	25.73	Pk	10.4	.6	-40	-3.27	40.5	-43.77	69
5	13.3465	33.26	Pk	10.4	.6	-40	4.26	40.5	-36.24	69
6	13.455	36.19	Pk	10.4	.6	-40	7.19	50.5	-43.31	69
7	13.56	48.79	Pk	10.4	.6	-40	19.79	84	-64.21	69
8	13.665	37.83	Pk	10.4	.6	-40	8.83	50.5	-41.67	69
9	13.77	32.78	Pk	10.4	.6	-40	3.78	40.5	-36.72	69
10	13.9835	24.37	Pk	10.4	.6	-40	-4.63	40.5	-45.13	69
11	14.0885	23.4	Pk	10.4	.6	-40	-5.6	29.5	-35.1	69
12	14.197	16.67	Pk	10.4	.6	-40	-12.33	29.5	-41.83	69
13	14.407	19.83	Pk	10.4	.6	-40	-9.17	29.5	-38.67	69
14	14.8305	15.32	Pk	10.3	.6	-40	-13.78	29.5	-43.28	69

Pk - Peak detector

**FUNDAMENTAL Type A, 106k, 90 deg (Test App Mode)**



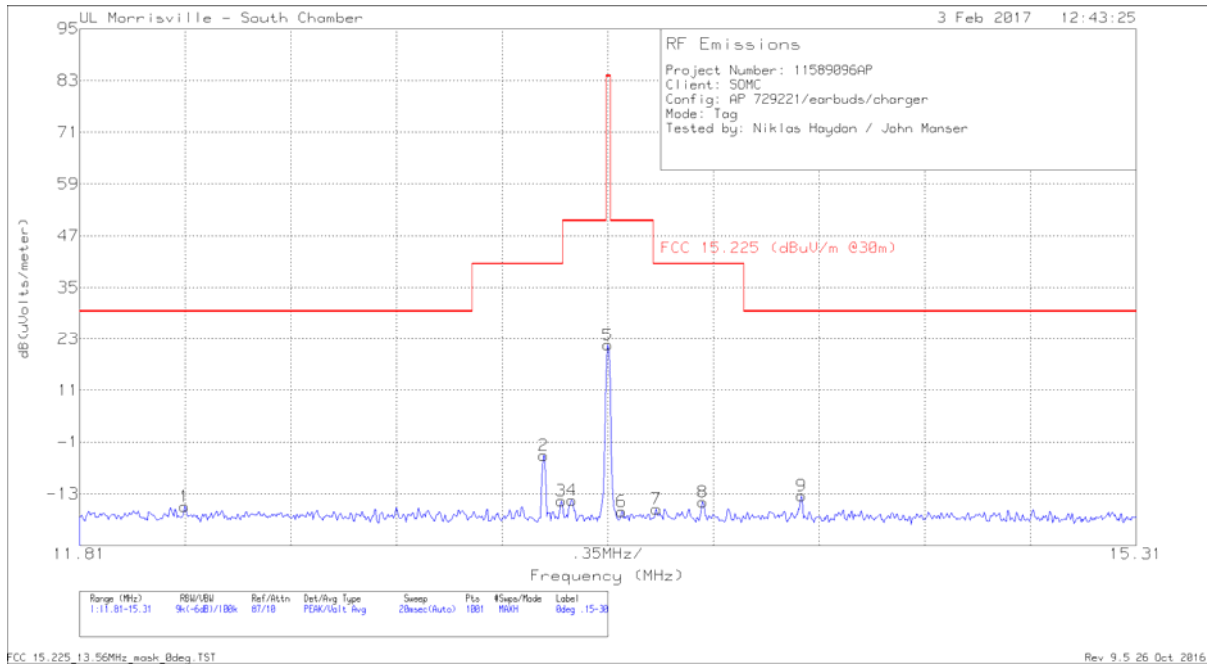
ce Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.225 (dBuV/m @30m)	Margin (dB)	Azimuth (Degs)
1	12.076	16.01	Pk	10.5	.6	-40	-12.89	29.5	-42.39	179
2	12.2895	17.28	Pk	10.5	.6	-40	-11.62	29.5	-41.12	179
3	12.4995	17.09	Pk	10.5	.6	-40	-11.81	29.5	-41.31	179
4	12.713	22.37	Pk	10.4	.6	-40	-6.63	29.5	-36.13	179
5	13.0315	24.75	Pk	10.4	.6	-40	-4.25	29.5	-33.75	179
6	13.1365	27.72	Pk	10.4	.6	-40	-1.28	40.5	-41.78	179
7	13.3465	35.11	Pk	10.4	.6	-40	6.11	40.5	-34.39	179
8	13.455	38.16	Pk	10.4	.6	-40	9.16	50.5	-41.34	179
9	13.56	50.87	Pk	10.4	.6	-40	21.87	84	-62.13	179
10	13.665	38.44	Pk	10.4	.6	-40	9.44	50.5	-41.06	179
11	13.7735	34.76	Pk	10.4	.6	-40	5.76	40.5	-34.74	179
12	13.9835	27.06	Pk	10.4	.6	-40	-1.94	40.5	-42.44	179
13	14.0885	24.77	Pk	10.4	.6	-40	-4.23	29.5	-33.73	179
14	14.197	20.46	Pk	10.4	.6	-40	-8.54	29.5	-38.04	179
15	14.407	22.01	Pk	10.4	.6	-40	-6.99	29.5	-36.49	179
16	14.8305	19.84	Pk	10.3	.6	-40	-9.26	29.5	-38.76	179

Pk - Peak detector



**FUNDAMENTAL 0 deg (Tag)**



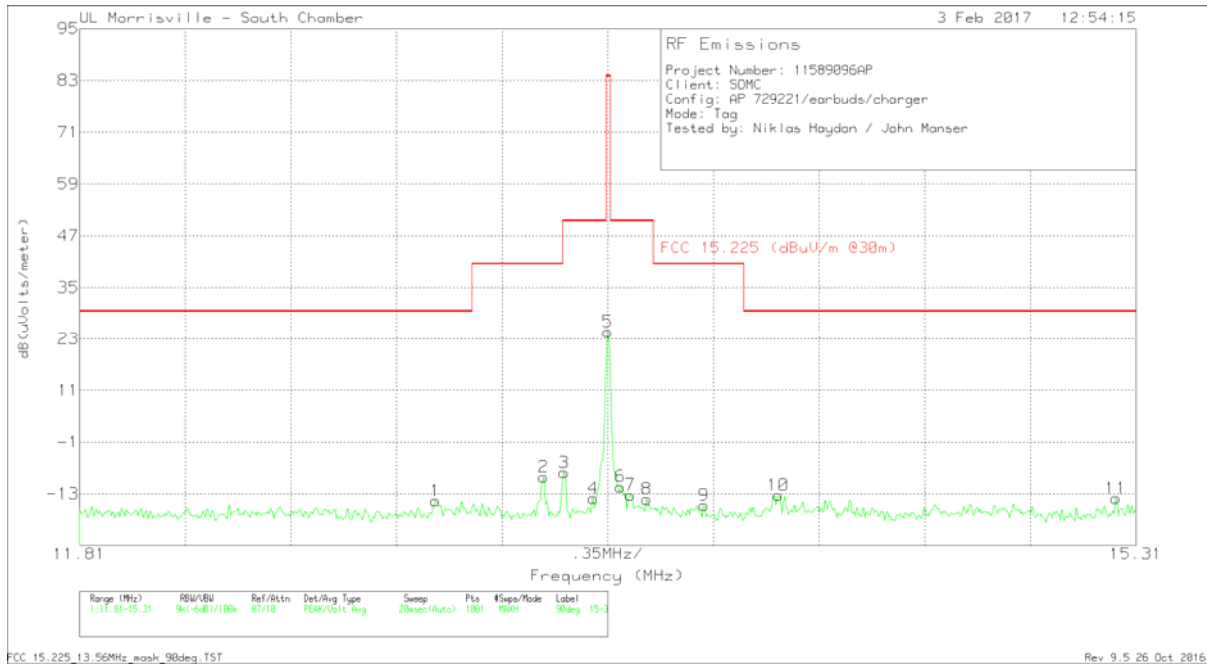
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uV/m)	FCC 15.225 (dBuV/m @30m)	Margin (dB)	Azimuth (Degs)
1	12.15825	12.92	Pk	10.5	.6	-40	-15.98	29.5	-45.48	74
2	13.3465	24.91	Pk	10.4	.6	-40	-4.09	40.5	-44.59	74
3	13.406	14.4	Pk	10.4	.6	-40	-14.6	40.5	-55.1	74
4	13.441	14.5	Pk	10.4	.6	-40	-14.5	50.5	-65	74
5	13.56	50.56	Pk	10.4	.6	-40	21.56	84	-62.44	74
6	13.6055	11.86	Pk	10.4	.6	-40	-17.14	50.5	-67.64	74
7	13.721	12.51	Pk	10.4	.6	-40	-16.49	40.5	-56.99	74
8	13.875	14.09	Pk	10.4	.6	-40	-14.91	40.5	-55.41	74
9	14.2005	15.53	Pk	10.4	.6	-40	-13.47	29.5	-42.97	74

Pk - Peak detector

FCC 15.225\_13.56MHz\_mask\_0deg.TST

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**FUNDAMENTAL 90 deg (Tag)**



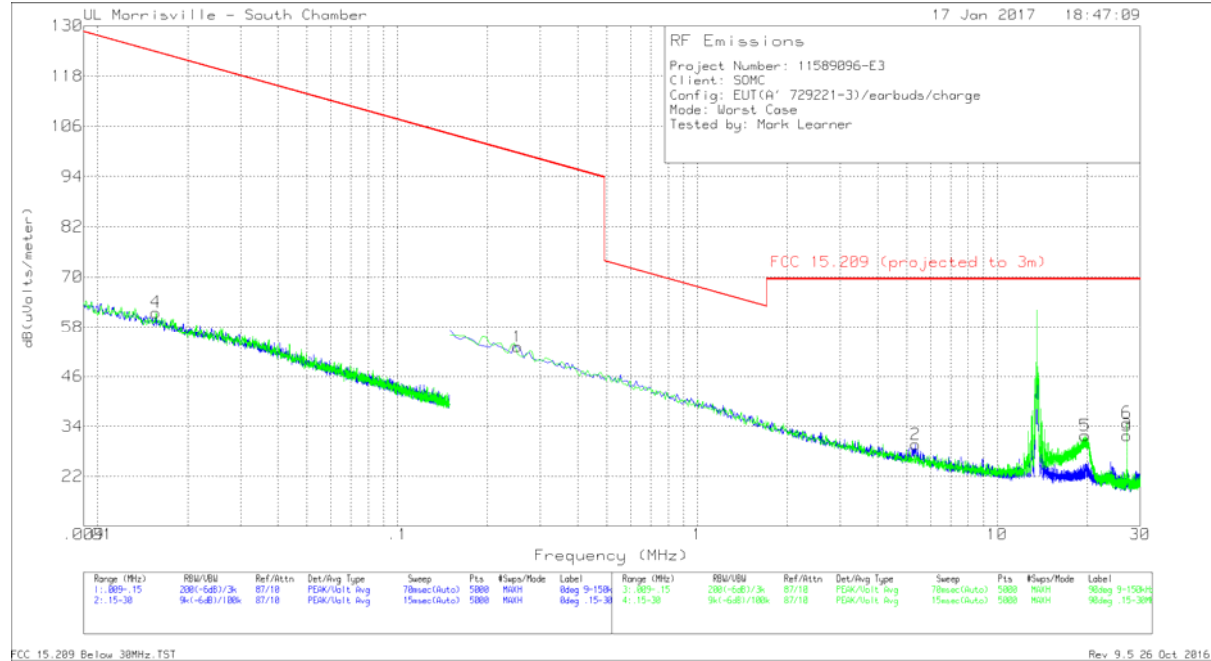
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uV/m)	FCC 15.225 (dBuV/m @30m)	Margin (dB)	Azimuth (Degs)
1	12.9895	14.39	Pk	10.4	.6	-40	-14.61	29.5	-44.11	175
2	13.3465	19.95	Pk	10.4	.6	-40	-9.05	40.5	-49.55	175
3	13.41475	20.94	Pk	10.4	.6	-40	-8.06	50.5	-58.56	175
4	13.511	14.91	Pk	10.4	.6	-40	-14.09	50.5	-64.59	175
5	13.56	53.67	Pk	10.4	.6	-40	24.67	84	-59.33	175
6	13.602	17.66	Pk	10.4	.6	-40	-11.34	50.5	-61.84	175
7	13.63525	15.73	Pk	10.4	.6	-40	-13.27	50.5	-63.77	175
8	13.6895	14.76	Pk	10.4	.6	-40	-14.24	50.5	-64.74	175
9	13.8785	13.38	Pk	10.4	.6	-40	-15.62	40.5	-56.12	175
10	14.1235	15.69	Pk	10.4	.6	-40	-13.31	29.5	-42.81	175
11	15.2435	15.05	Pk	10.3	.6	-40	-14.05	29.5	-43.55	175

Pk - Peak detector

FCC 15.225\_13.56MHz\_mask\_90deg.TST

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**SPURIOUS EMISSION (0.009-30 MHz) Type A, 106k**

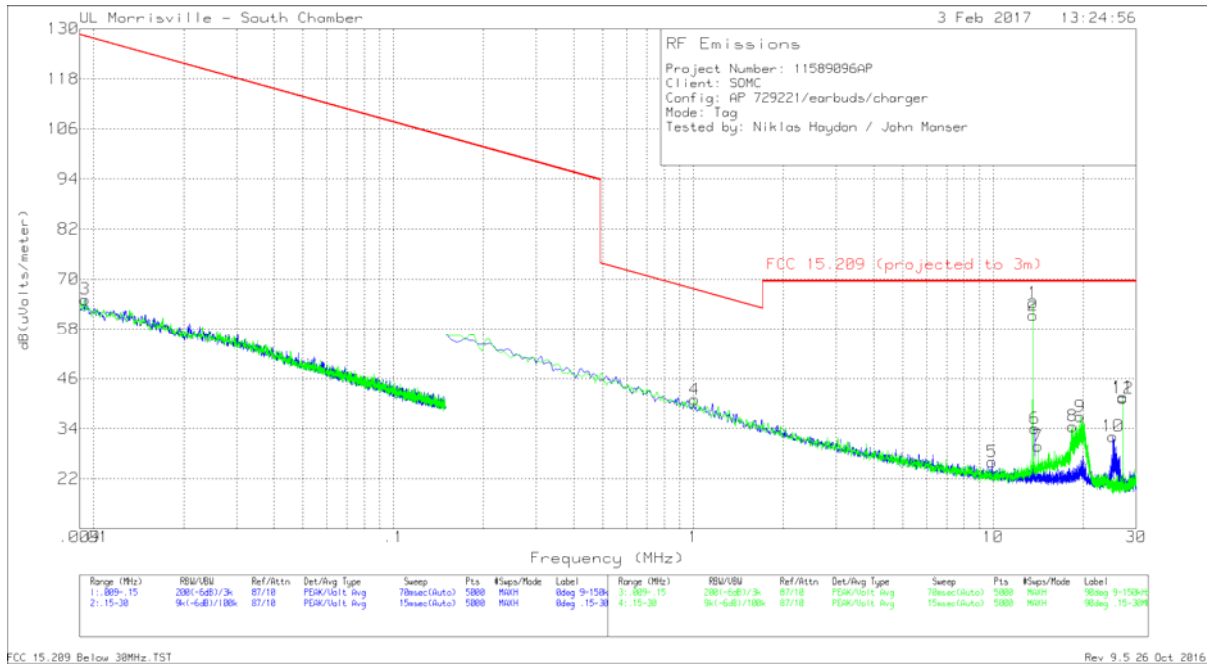


Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (dB/m)	Cbl (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.209 (projected to 3m)	Margin (dB)	Azimuth (Degs)	Loop Antenna Face
1	.25151	42.45	Pk	10.6	.1	53.15	99.59	-46.44	0-360	On EUT
2	5.34477	18.28	Pk	11	.4	29.68	69.54	-39.86	0-360	On EUT
3	27.12101	22.33	Pk	8.6	.9	31.83	69.54	-37.71	0-360	On EUT
4	.01569	45.54	Pk	15.9	.1	61.54	123.69	-62.15	0-360	Off EUT
5	19.65129	21.16	Pk	9.9	.7	31.76	69.54	-37.78	0-360	Off EUT
6	27.12101	25.33	Pk	8.6	.9	34.83	69.54	-34.71	0-360	Off EUT

Pk - Peak detector

**SPURIOUS EMISSION (0.009-30 MHz) Tag Mode**



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (dB/m)	Cbl (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.209 (projected to 3m)	Margin (dB)	Azimuth (Degs)
3	.00939	46.07	Pk	19	.1	65.17	128.15	-62.98	0-360
4	1.00982	29.77	Pk	11	.2	40.97	67.52	-26.55	0-360
5	9.91259	15.02	Pk	10.5	.5	26.02	69.54	-43.52	0-360
6	13.76985	23.06	Pk	10.4	.6	34.06	69.54	-35.48	0-360
7	14.1102	18.8	Pk	10.4	.6	29.8	69.54	-39.74	0-360
8	18.37946	23.76	Pk	10.1	.7	34.56	69.54	-34.98	0-360
9	19.51992	26.33	Pk	9.9	.7	36.93	69.54	-32.61	0-360
10	25.11475	22.25	Pk	9.1	.8	32.15	69.54	-37.39	0-360
11	27.12101	32.05	Pk	8.6	.9	41.55	69.54	-27.99	0-360
12	27.12101	31.73	Pk	8.6	.9	41.23	69.54	-28.31	0-360

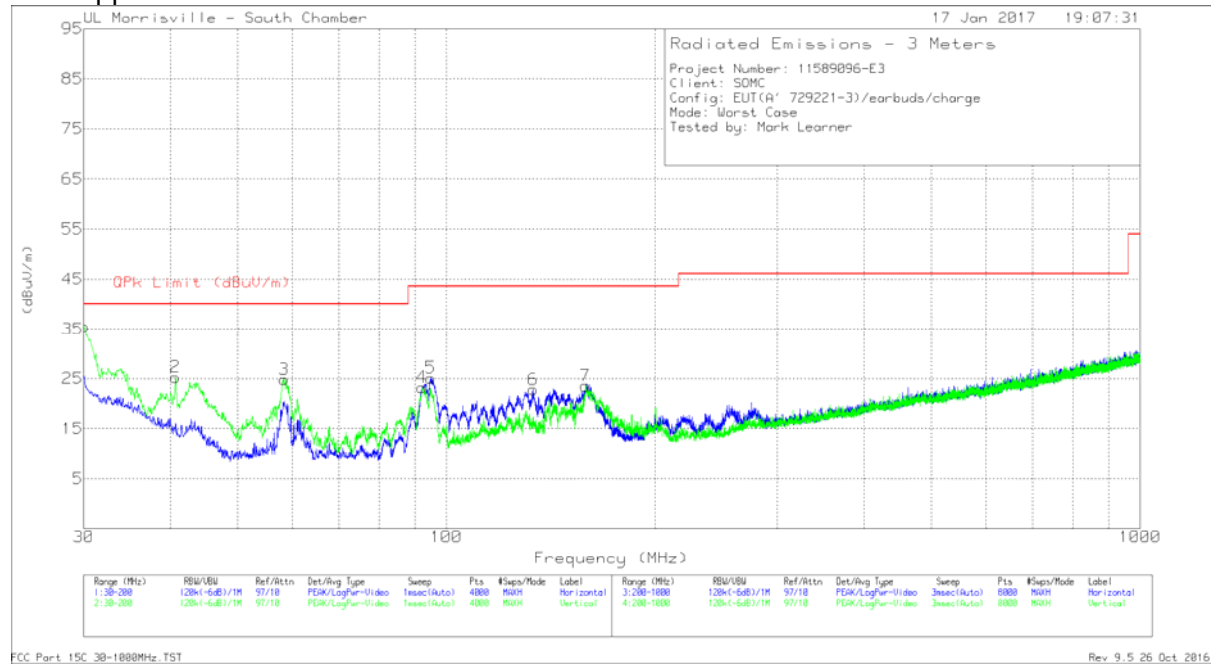
Pk - Peak detector

FCC 15.209 Below 30MHz.TST

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### 8.1.2. TX SPURIOUS EMISSION 30 TO 1000 MHz (HORIZONTAL)

Test App Mode



Trace Markers

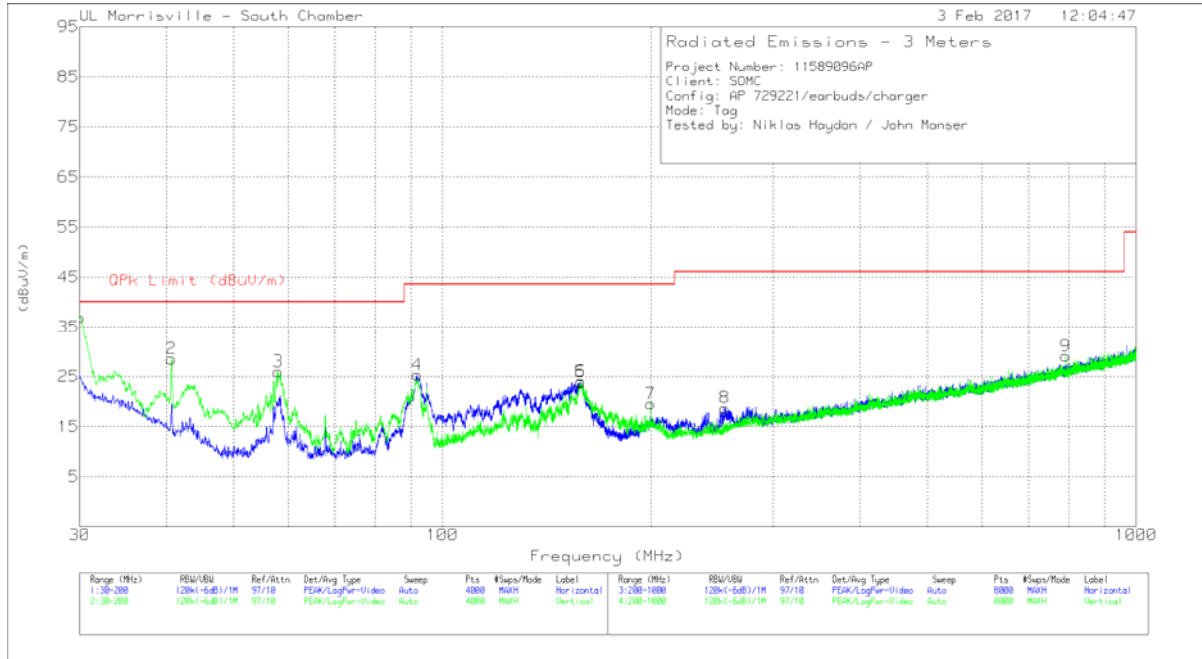
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0074 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 133.4718	35.54	Pk	18	-30.7	22.84	43.52	-20.68	0-360	199	H
1	30.0034	37.09	Qp	26	-31.8	31.29	40	-8.71	289	111	V
2	40.6703	38.97	Pk	17.9	-31.6	25.27	40	-14.73	0-360	102	V
3	58.3123	44.45	Pk	11.8	-31.4	24.85	40	-15.15	0-360	102	V
4	92.2574	42.23	Pk	12.1	-31.1	23.23	43.52	-20.29	0-360	102	V
5	94.9993	43.43	Pk	12.7	-31	25.13	43.52	-18.39	0-360	299	H
7	158.7233	37.23	Pk	16.8	-30.5	23.53	43.52	-19.99	0-360	102	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

Tag Mode



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0074 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
8	* 255.1072	32.34	Pk	16.3	-29.9	18.74	46.02	-27.28	0-360	102	H
1	30.0333	37.68	Qp	26	-31.8	31.88	40	-8.12	282	102	V
2	40.6703	42.25	Pk	17.9	-31.6	28.55	40	-11.45	0-360	102	V
3	57.9722	45.6	Pk	11.8	-31.4	26	40	-14	0-360	102	V
4	91.981	44.44	Pk	12	-31.1	25.34	43.52	-18.18	0-360	199	H
5	158.2982	37.6	Pk	16.8	-30.5	23.9	43.52	-19.62	0-360	102	V
6	158.3832	37.72	Pk	16.8	-30.5	24.02	43.52	-19.5	0-360	199	H
7	199.4914	32.38	Pk	17.4	-30.2	19.58	43.52	-23.94	0-360	102	V
9	791.8769	31.2	Pk	25.8	-27.9	29.1	46.02	-16.92	0-360	102	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

## 9. 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 -20 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 C63.10-2013

### RESULTS

No non-compliance noted.

Startup

Reference Frequency: EUT Channel 13.56 MHz @ 20°C				
Limit: $\pm 100$ ppm = 1.356 kHz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
			Delta (ppm)	Limit (ppm)
5.00	50	13.5596779	4.323	$\pm 100$
5.00	40	13.5596830	3.946	$\pm 100$
5.00	30	13.5597069	2.185	$\pm 100$
5.00	<b>20</b>	<b>13.5597365</b>	<b>0.000</b>	<b><math>\pm 100</math></b>
5.00	10	13.5597739	-2.756	$\pm 100$
5.00	0	13.5598018	-4.812	$\pm 100$
5.00	-10	13.5598103	-5.439	$\pm 100$
5.00	-20	13.5597950	-4.314	$\pm 100$
4.25	20	13.5597396	-0.230	$\pm 100$
5.75	20	13.5597375	-0.074	$\pm 100$

2 minutes

Reference Frequency: EUT Channel 13.56 MHz @ 20°C				
Limit: ± 100 ppm = 1.356 kHz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
			Delta (ppm)	Limit (ppm)
5.00	50	13.5596824	5.623	± 100
5.00	40	13.5596975	4.508	± 100
5.00	30	13.5597289	2.194	± 100
5.00	<b>20</b>	<b>13.5597586</b>	<b>0.000</b>	<b>± 100</b>
5.00	10	13.5597924	-2.489	± 100
5.00	0	13.5598091	-3.724	± 100
5.00	-10	13.5598055	-3.457	± 100
5.00	-20	13.5597796	-1.549	± 100
4.25	20	13.5597628	-0.304	± 100
5.75	20	13.5597601	-0.111	± 100

5 minutes

Reference Frequency: EUT Channel 13.56 MHz @ 20°C				
Limit: ± 100 ppm = 1.356 kHz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
			Delta (ppm)	Limit (ppm)
5.00	50	13.5596820	5.974	± 100
5.00	40	13.5596991	4.711	± 100
5.00	30	13.5597303	2.415	± 100
5.00	<b>20</b>	<b>13.5597630</b>	<b>0.000</b>	<b>± 100</b>
5.00	10	13.5597926	-2.185	± 100
5.00	0	13.5598096	-3.438	± 100
5.00	-10	13.5598045	-3.061	± 100
5.00	-20	13.5597759	-0.950	± 100
4.25	20	13.5597654	-0.175	± 100
5.75	20	13.5597628	0.018	± 100



10 minutes

Reference Frequency: EUT Channel 13.56 MHz @ 20°C				
Limit: ± 100 ppm = 1.356 kHz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
			Delta (ppm)	Limit (ppm)
5.00	50	13.5596816	6.057	± 100
5.00	40	13.5596995	4.738	± 100
5.00	30	13.5597300	2.489	± 100
5.00	<b>20</b>	<b>13.5597638</b>	<b>0.000</b>	<b>± 100</b>
5.00	10	13.5597926	-2.129	± 100
5.00	0	13.5598098	-3.392	± 100
5.00	-10	13.5598041	-2.978	± 100
5.00	-20	13.5597736	-0.728	± 100
4.25	20	13.5597651	-0.101	± 100
5.75	20	13.5597623	0.111	± 100

**TEST INFORMATION**

**Date 1/6/17**  
**Project No: 11589096**  
**Tester: John Manser**