



FCC CFR47 PART 15 SUBPART C

NFC

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n, ANT+ and NFC

MODEL NUMBER : SM-A605GN/DS, SM-A605GN

FCC ID: A3LSMA605GN

REPORT NUMBER: 4788371689-E6V1

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ACCREDITED*

Testing
Laboratory

TL-637

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	03/27/18	Initial issue	Junwhan Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n, ANT+ and NFC

MODEL NUMBER: SM-A605GN/DS, SM-A605GN

SERIAL NUMBER: R38K108QFAK, R38K104R4WF, R38K104R4LJ
(RADIATED, CONDUCTED, Original);
R38K10CXCDR (RADIATED, Spot check)

DATE TESTED: MAR 07, 2018 - MAR 25, 2018 (Original)
MAR 23, 2018 - MAR 25, 2018 (Spot check)

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

UL Korea, Ltd. 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 Korea, Ltd. 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 Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. 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 IAS, any agency of the Federal Government, or any agency of any government.

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UL Korea, Ltd.

1.1. INTRODUCTION OF TEST DATA REUSE

This report referenced from the FCC ID: A3LSMA605FN NFC(FCC CFR 47 Part 15C). And the applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID.

1.2. DIFFERENCE

The FCC ID: A3LSMA605GN shares the same enclosure and circuit board as FCC ID: A3LSMA605FN. The NFC antennas and surrounding circuitry and layout are identical between these two units.

After confirming through preliminary radiated emissions that the performance of the FCC ID: A3LSMA605FN remains representative of FCC ID: A3LSMA605GN. The test data of FCC ID: A3LSMA605FN being submitted for this application to cover NFC features.

1.3. SPOT CHECK VERIFICATION DATA

Mode	Test Item	Frequency	Test Limit	Original model	Spot check model	Deviation	Remark
				SM-A605FN/DS Results	SM-A605GN/DS Results		
				FCC ID : A3LSMA605FN	FCC ID : A3LSMA605GN		
NFC	Fundamental	13.56363 MHz	84.00 dBuV/m	26.00 dBuV/m	26.23 dBuV/m	0.23 dB	Loop antenna Face on
	Emission	5.5881 MHz	29.50 dBuV/m	9.84 dBuV/m	8.26 dBuV/m	-1.58 dB	Loop antenna Face on

Comparison of two models, higher deviation is within 3dB range and all test results are under FCC Technical Limits.

1.4. REFERENCE DETAIL

Reference application that contains the reused reference data.

Equipment Class	Reference FCC ID	Type Grant/Permissive Change	Reference Application	Folder Test/RF Exposure	Report Title / Section
DTS	A3LSMA605FN	Grant	4788372835-E1V2	Test	FCC Report DTS WLAN All sections
			4788372835-E2V2	Test	FCC Report BLE All sections
DSS	A3LSMA605FN	Grant	4788372835-E3V2	Test	FCC Report BT / All sections
NII	A3LSMA605FN	Grant	4788372835-E4V3	Test	FCC Report UNII WLAN / All sections
DXX	A3LSMA605FN	Grant	4788372835-E5V2	Test	FCC Report ANT+ / All sections
			4788372835-E6V3	Test	FCC Report NFC / All sections
PCE	A3LSMA605FN	Grant	4788372835-E7V2	Test	FCC Report WWAN / All sections (Except Conducted Output Power)

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. ANSI C63.10-2013.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 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.

218 Maeyeong-ro	
☒	Chamber 1
☒	Chamber 2
☐	Chamber 3

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <http://www.iasonline.org/PDF/TL/TL-637.pdf>.

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
Conducted Disturbance, 0.15 to 30 MHz	2.32 dB
Radiated Disturbance, Below 1GHz	3.86 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 + BT/BLE, DTS/UNII a/b/g/n, ANT+ and NFC .
This test report addresses the DXX (NFC) operational mode.

5.2. MAXIMUM E-FIELD STRENGTH

The testing was performed at 3 meter. The transmitter maximum E-field at 30m distance is 26.00 dBuV/m which convert from 3 meter data.

5.3. WORST-CASE CONFIGURATION AND MODE

The NFC function was tested at its' fundamental and only operational frequency of 13.56 MHz. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that the Z orientation was the worst-case orientation; therefore all final radiated testing was performed with the EUT in the Z orientation while generating continuous emissions.

The fundamental level of the EUT was investigated each type and bitrate.
All test was performed worst case condition(type A and bit rate 106 kbps).

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA50EWE	DW3J719AS/A- E	N/A
Data Cable	SAMSUNG	ECB-DU68WE	N/A	N/A
Earphone	SAMSUNG	EHS61ASFWE	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	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	2	Mini-Jack	Unshielded	1.2m	N/A

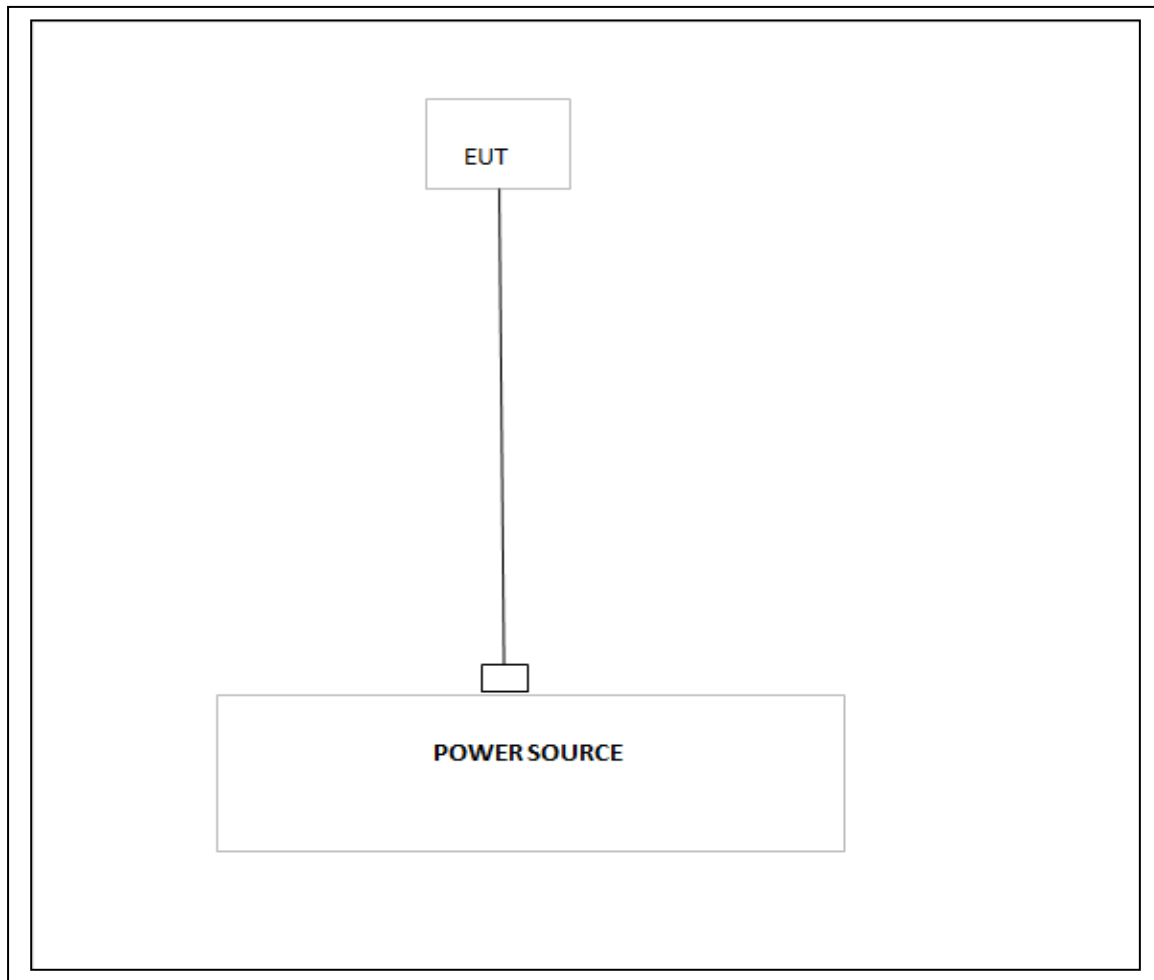
TEST SETUP

The EUT is a stand-alone device configured and tested in a worst-case setup.

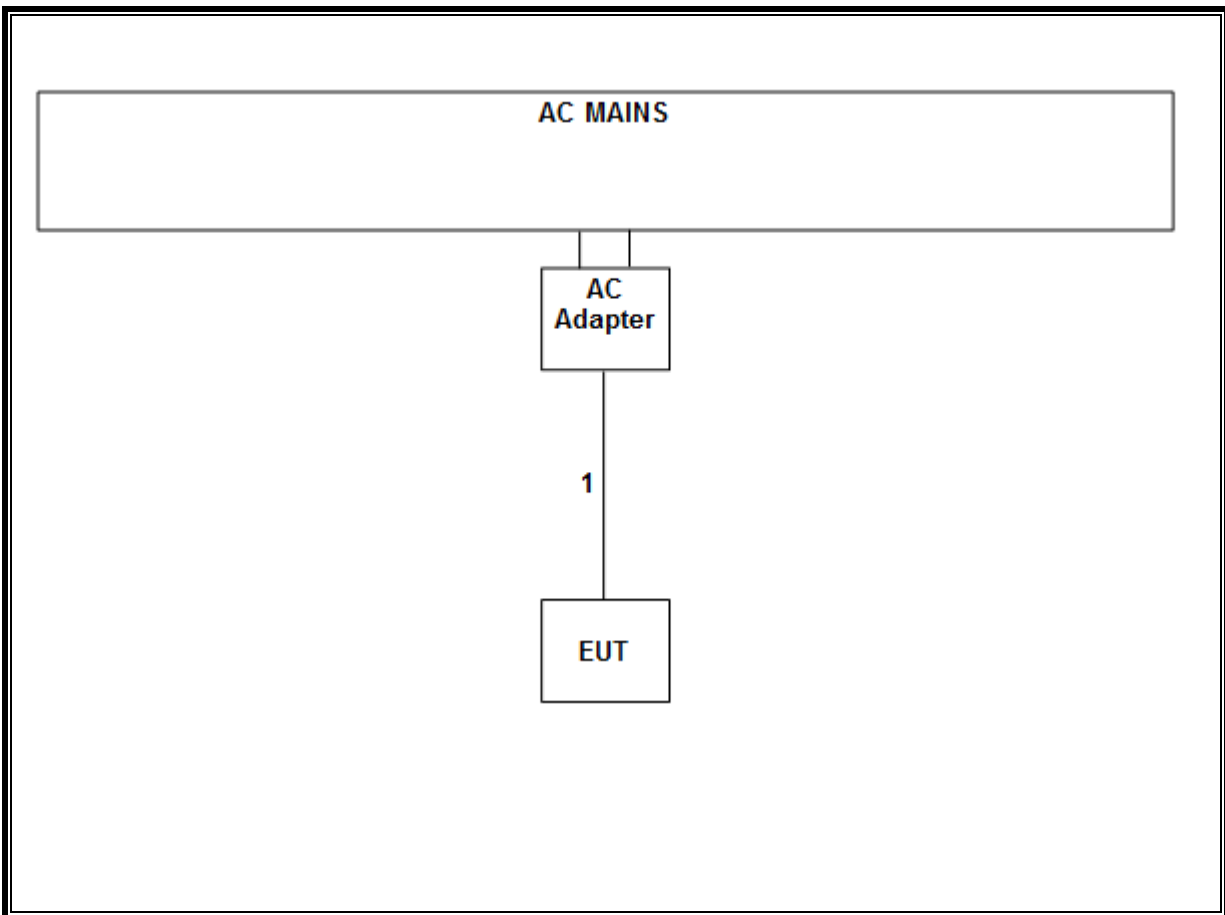
Note: Worst case is using worst case orientation with AC charger attached to the EUT with NFC signal continuously transmitting.

SETUP DIAGRAM FOR TESTS

Radiated Emissions Below 30 MHz:



Radiated Emissions Above 30 MHz, AC Line Conducted Emissions:



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	S/N	Cal Due
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	08-31-19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-31-19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	09-14-19
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-26-19
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-09-18
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-10-18
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-07-18
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-08-18
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-08-18
Spectrum Analyzer, 7 GHz	Agilent / HP	N9010A	MY54200580	08-07-18
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-08-18
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-08-18
EMI Test Receive, 44 GHz	R&S	ESW44	101590	08-09-18
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-07-18
DC Power Supply	Agilent / HP	E3640A	MY54226395	08-07-18
Temperature Chamber	ESPEC	SH-642	93001109	08-08-18
LISN	R&S	ENV216	101837	08-09-18
UL Software				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

7. 20dB BANDWIDTH

LIMITS

§15.215

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated

§15.225

Operation within the band 13.110 – 14.010MHz

TEST PROCEDURE

The spectrum analyzer connected receive antenna and the EUT placed on near the receive antenna. The RBW is set to 10KHz. The VBW is set to 3 times the RBW. The sweep time is coupled.

RESULTS

Frequency [MHz]	20dB Bandwidth [KHz]
13.56	435.00

Note : Because the intentional signal is very narrowband (almost CW) adjusting the RBW per RSS-GEN/ANSI C63.10:2013 to be a value between 1-5% of the OBW is impractical. Measurements were made to show the emissions were fully contained within the frequency band designated in the rule section under which the equipment is operated.

20dB Bandwidth Plot



8. RADIATED EMISSION TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMIT

§15.225

(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 field strength from µV/m to dBµV/m is:

Limit (dBµV/m) = 20 log limit (µV/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

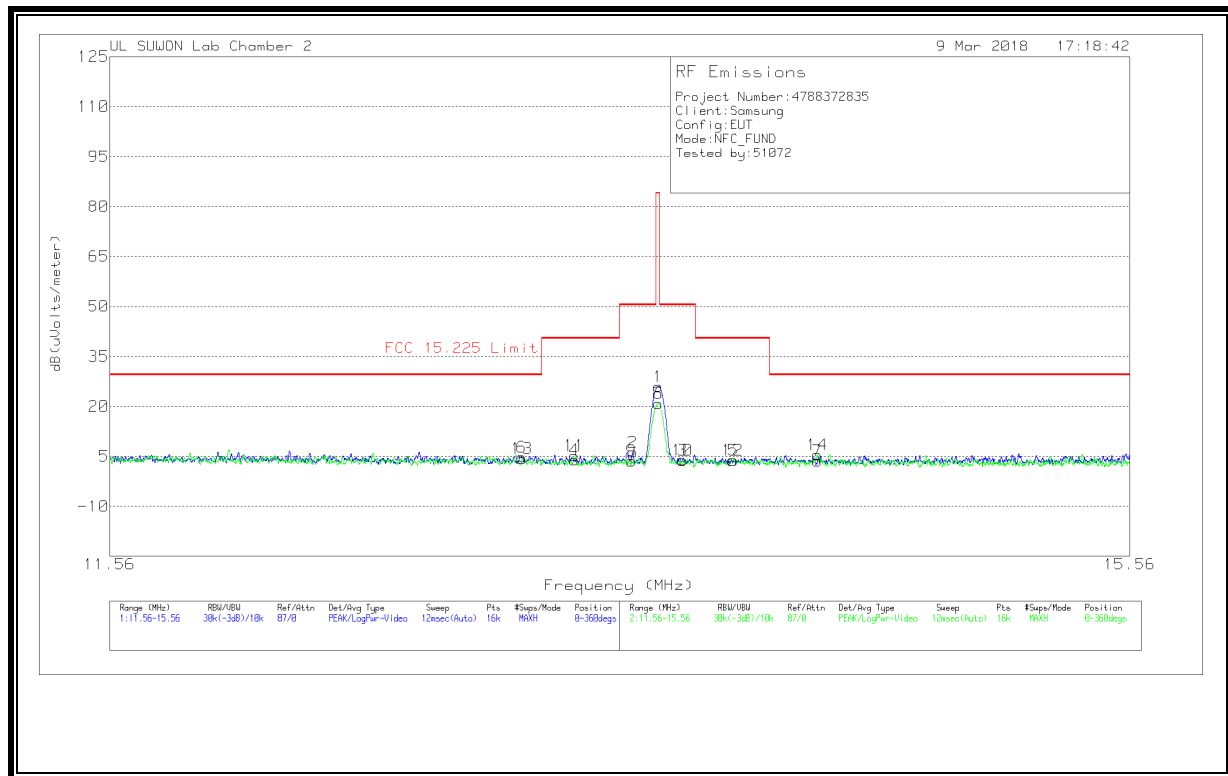
ANSI C63.10-2013

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:

8.1.1. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz)



Trace Markers

[Face-on]

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna	Dist Corr 30m	Cable Loss	Corrected Reading dB(uVolts/ meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)
1	13.56363	45.6	PK	19.9	-40	.5	26	84	-58	0-360
2	13.46263	25.86	PK	19.9	-40	.5	6.26	50.5	-44.24	0-360
3	13.66	23.38	PK	19.9	-40	.6	3.88	50.5	-46.62	0-360
4	13.23563	23.55	PK	19.9	-40	.5	3.95	40.51	-36.56	0-360
5	13.86325	23.45	PK	19.8	-40	.6	3.85	40.51	-36.66	0-360
6	13.03325	24.44	PK	19.9	-40	.5	4.84	29.54	-24.7	0-360
7	14.2075	23.27	PK	19.8	-40	.6	3.67	29.54	-25.87	0-360

PK – Peak Detector

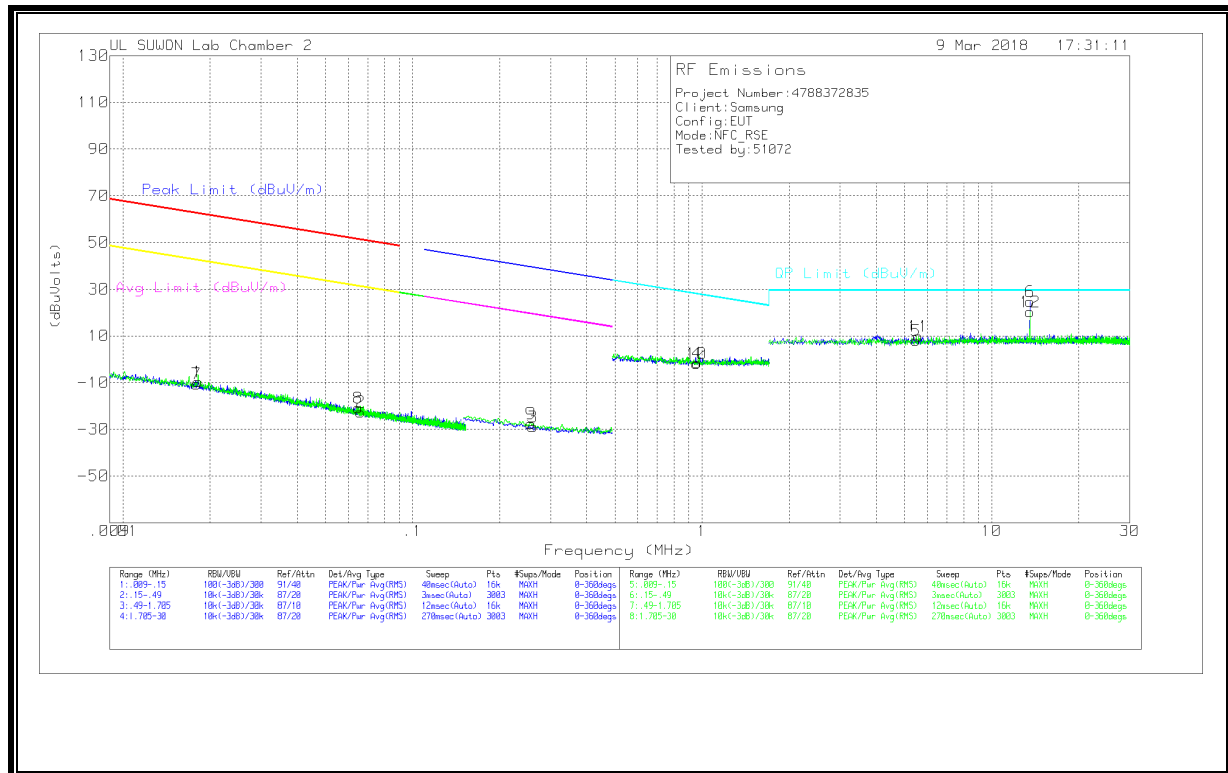
[Face-Off]

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna	Dist Corr 30m	Cable Loss	Corrected Reading dB(uVolts/ meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)
8	13.56238	40.56	PK	19.9	-40	.5	20.96	84	-63.04	0-360
9	13.45863	23.26	PK	19.9	-40	.5	3.66	50.5	-46.84	0-360
10	13.65925	23.33	PK	19.9	-40	.6	3.83	50.5	-46.67	0-360
11	13.23663	24.86	PK	19.9	-40	.5	5.26	40.51	-35.25	0-360
12	13.86038	23.43	PK	19.8	-40	.6	3.83	40.51	-36.68	0-360
13	13.03525	23.96	PK	19.9	-40	.5	4.36	29.54	-25.18	0-360
14	14.20713	25.1	PK	19.8	-40	.6	5.5	29.54	-24.04	0-360

PK – Peak Detector

Note : Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

8.1.2. SPURIOUS EMISSION 0.09 TO 30 MHz



Trace Markers

[Face-ON]

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna	Cable Loss	Dist Corr 300m	Corrected Reading (dBuV/dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.01819	50.22	Pk	20	.1	-80	-9.68	62.39	-72.07	42.39	-52.07	-	-	-	-	-	-	0-360
2	.06627	37.49	Pk	19.8	.1	-80	-22.61	51.16	-73.77	31.16	-53.77	-	-	-	-	-	-	0-360
3	.26046	31.39	Pk	19.5	.1	-80	-29.01	-	-	-	-	-	-	39.3	-68.31	19.3	-48.31	0-360
4	.96166	18.46	Pk	19.7	.2	-40	-1.64	-	-	-	-	27.96	-29.6	-	-	-	-	0-360
5	5.48443	27.77	Pk	19.9	.4	-40	8.07	-	-	-	-	29.5	-21.43	-	-	-	-	0-360
6	13.56165	44.31	Pk	19.9	.5	-40	24.71	-	-	-	-	29.5	-4.79	-	-	-	-	0-360

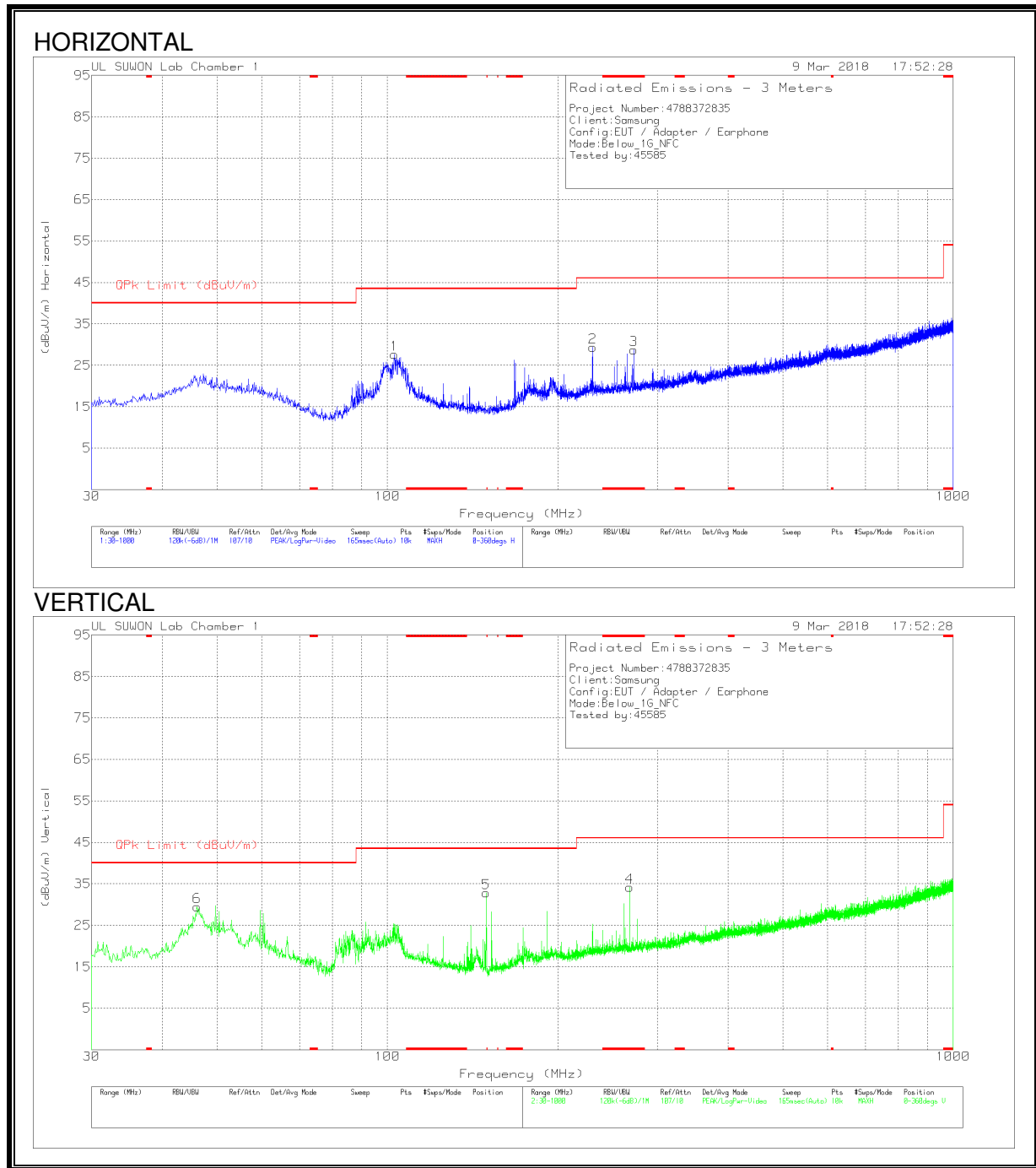
Pk - Peak detector

[Face-Off]

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna	Cable Loss	Dist Corr 30m	Corrected Reading (dBuV/dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
7	.01796	49.37	Pk	20	.1	-80	-10.53	62.5	-73.03	42.5	-53.03	-	-	-	-	-	-	0-360
8	.06496	39.18	Pk	19.8	.1	-80	-20.92	51.33	-72.25	31.33	-52.25	-	-	-	-	-	-	0-360
9	.25679	32.84	Pk	19.5	.1	-80	-27.56	-	-	-	-	-	-	39.42	-66.98	19.42	-46.98	0-360
10	.95702	18.26	Pk	19.7	.2	-40	-1.84	-	-	-	-	28	-29.84	-	-	-	-	0-360
11	5.5881	29.54	Pk	19.9	.4	-40	9.84	-	-	-	-	29.5	-19.66	-	-	-	-	0-360
12	13.56165	39.87	Pk	19.9	.5	-40	20.27	-	-	-	-	29.5	-9.23	-	-	-	-	0-360

Pk - Peak detector

8.1.3. TX SPURIOUS EMISSION 30 TO 1000 MHz



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	750_20170831	30-1000MHz[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	102.944	38.53	Pk	17.5	-28.4	27.63	43.52	-15.89	0-360	300	H
2	230.499	39.18	Pk	17.7	-27.5	29.38	46.02	-16.64	0-360	100	H
3	* 272.306	37.32	Pk	18.5	-27.1	28.72	46.02	-17.3	0-360	200	H
4	* 268.232	42.9	Pk	18.4	-27.1	34.2	46.02	-11.82	0-360	100	V
5	149.601	46.89	Pk	13.8	-27.9	32.79	43.52	-10.73	0-360	100	V
6	46.102	39.06	Pk	19.7	-29.3	29.46	40	-10.54	0-360	200	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

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

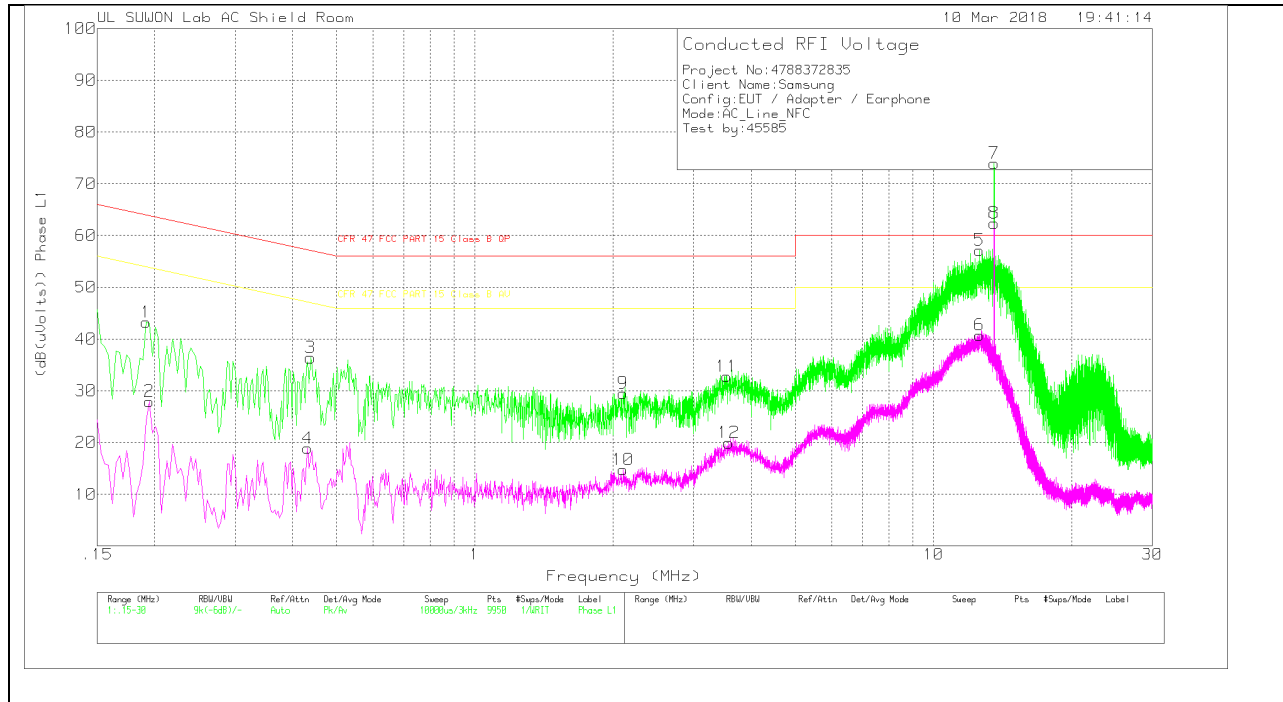
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

No non-compliance noted:

WORST EMISSIONS(With Antenna)

LINE 1 PLOT



LINE 1 RESULTS

Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_L1_with extension	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.192	33.23	Pk	9.8	.2	43.23	63.95	-20.72	-	-
2	.195	17.95	Av	9.8	.2	27.95	-	-	53.82	-25.87
3	.438	26.49	Pk	9.7	.2	36.39	57.1	-20.71	-	-
4	.432	9	Av	9.7	.2	18.9	-	-	47.21	-28.31
5	12.597	47.06	Pk	9.8	.3	57.16	60	-2.84	-	-
6	12.609	30.65	Av	9.8	.3	40.75	-	-	50	-9.25
7	13.56	63.75	Pk	9.8	.4	73.95	60	13.95	-	-
8	13.56	52.2	Av	9.8	.4	62.4	-	-	50	12.4
9	2.106	19.33	Pk	9.9	.3	29.53	56	-26.47	-	-
10	2.106	4.58	Av	9.9	.3	14.78	-	-	46	-31.22
11	3.546	22.66	Pk	9.8	.3	32.76	56	-23.24	-	-
12	3.579	9.86	Av	9.8	.3	19.96	-	-	46	-26.04

Pk - Peak detector

Av - Average detection

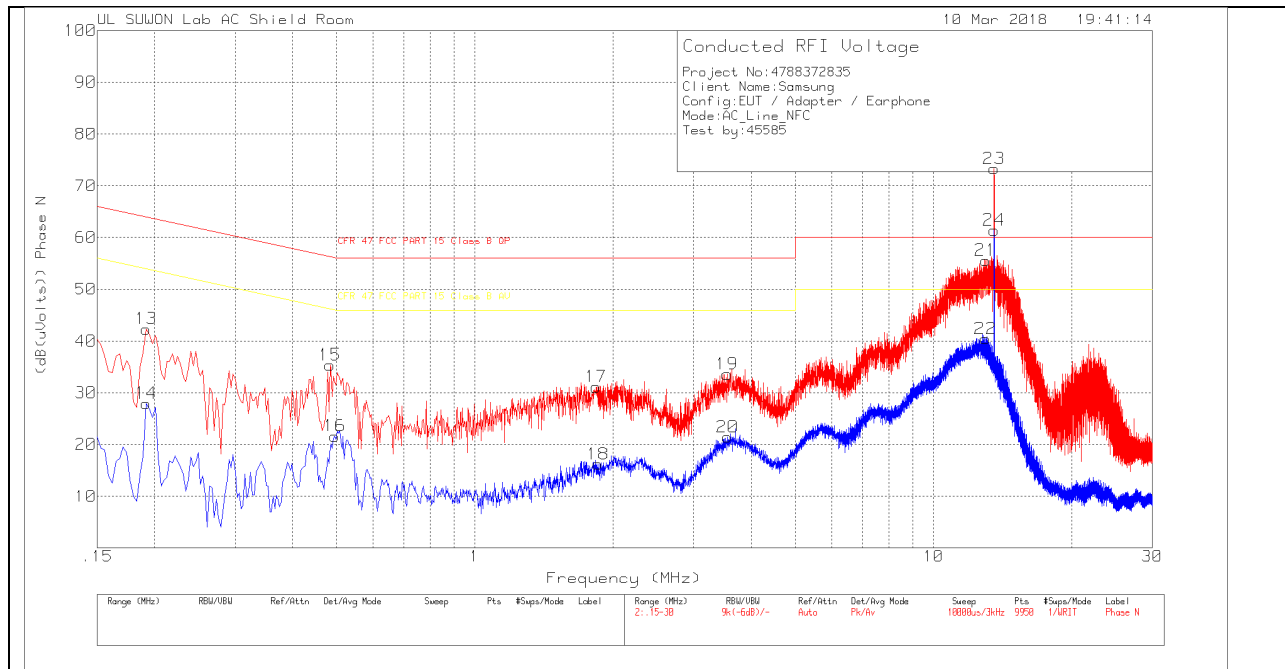
Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101837_L1_with extension	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
.19275	30.68	Qp	9.8	.2	40.68	63.92	-23.24	-	-
.19425	30.67	Qp	9.8	.2	40.67	63.85	-23.18	-	-
.43725	21.97	Qp	9.7	.2	31.87	57.11	-25.24	-	-
.43215	21.5	Qp	9.7	.2	31.4	57.21	-25.81	-	-
12.5963	39.32	Qp	9.8	.3	49.42	60	-10.58	-	-
12.6098	38.74	Qp	9.8	.3	48.84	60	-11.16	-	-
13.5602	62.5	Qp	9.8	.4	72.7	60	12.7	-	-

Qp - Quasi-Peak detector

LINE 2 PLOT



LINE 2 RESULTS

Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_N_with extension	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
13	.192	32.24	Pk	9.9	.2	42.34	63.95	-21.61	-	-
14	.192	17.85	Av	9.9	.2	27.95	-	-	53.95	-26
15	.483	25.36	Pk	9.8	.2	35.36	56.29	-20.93	-	-
16	.495	11.65	Av	9.8	.2	21.65	-	-	46.08	-24.43
17	1.839	20.95	Pk	9.9	.3	31.15	56	-24.85	-	-
18	1.857	6.03	Av	9.9	.3	16.23	-	-	46	-29.77
19	3.549	23.49	Pk	9.8	.3	33.59	56	-22.41	-	-
20	3.558	11.35	Av	9.8	.3	21.45	-	-	46	-24.55
21	12.99	45.39	Pk	9.8	.4	55.59	60	-4.41	-	-
22	12.981	30.23	Av	9.8	.4	40.43	-	-	50	-9.57
23	13.56	63.13	Pk	9.8	.4	73.33	60	13.33	-	-
24	13.56	51.22	Av	9.8	.4	61.42	-	-	50	11.42

Pk - Peak detector

Av - Average detection

Quasi-Peak Emissions

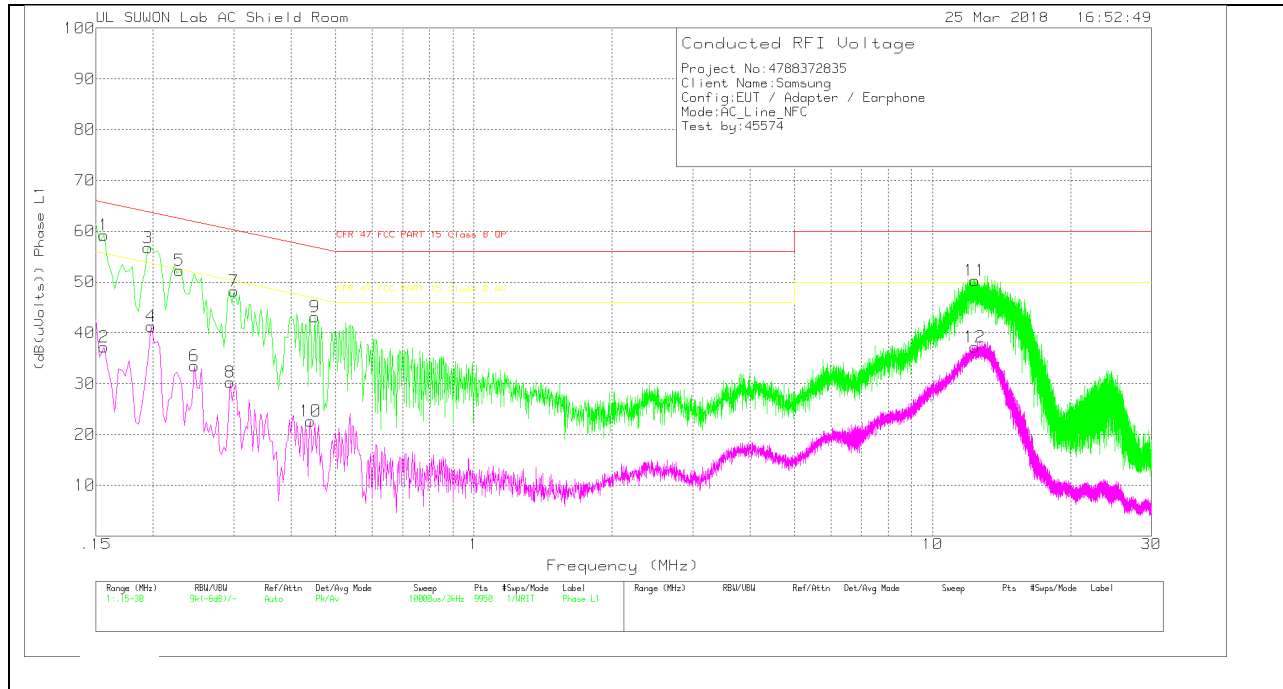
Range 2: Phase N .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101837_N_with extension	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
.19275	29.24	Qp	9.9	.2	39.34	63.92	-24.58	-	-
.48375	20.63	Qp	9.8	.2	30.63	56.27	-25.64	-	-
.49425	21.37	Qp	9.8	.2	31.37	56.1	-24.73	-	-
1.83825	16	Qp	9.9	.3	26.2	56	-29.8	-	-
1.85715	14.77	Qp	9.9	.3	24.97	56	-31.03	-	-
12.9908	38.76	Qp	9.8	.4	48.96	60	-11.04	-	-
12.9803	38.58	Qp	9.8	.4	48.78	60	-11.22	-	-
13.5602	61.23	Qp	9.8	.4	71.43	60	11.43	-	-

Qp - Quasi-Peak detector

WORST EMISSIONS(Antenna Port Terminated)

LINE 1 PLOT



LINE 1 RESULTS

Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_L1_with extension	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.156	49.08	Pk	10	.1	59.18	65.67	-6.49	-	-
2	.156	27.08	Av	10	.1	37.18	-	-	55.67	-18.49
3	.195	46.8	Pk	9.8	.2	56.8	63.82	-7.02	-	-
4	.198	31.32	Av	9.8	.2	41.32	-	-	53.69	-12.37
5	.228	42.46	Pk	9.6	.2	52.26	62.52	-10.26	-	-
6	.246	23.8	Av	9.5	.2	33.5	-	-	51.89	-18.39
7	.3	38.4	Pk	9.6	.2	48.2	60.24	-12.04	-	-
8	.294	20.51	Av	9.6	.2	30.31	-	-	50.41	-20.1
9	.45	33.2	Pk	9.7	.2	43.1	56.88	-13.78	-	-
10	.441	12.65	Av	9.7	.2	22.55	-	-	47.04	-24.49
11	12.372	40.24	Pk	9.8	.3	50.34	60	-9.66	-	-
12	12.351	27.05	Av	9.8	.3	37.15	-	-	50	-12.85

Pk - Peak detector

Av - Average detection

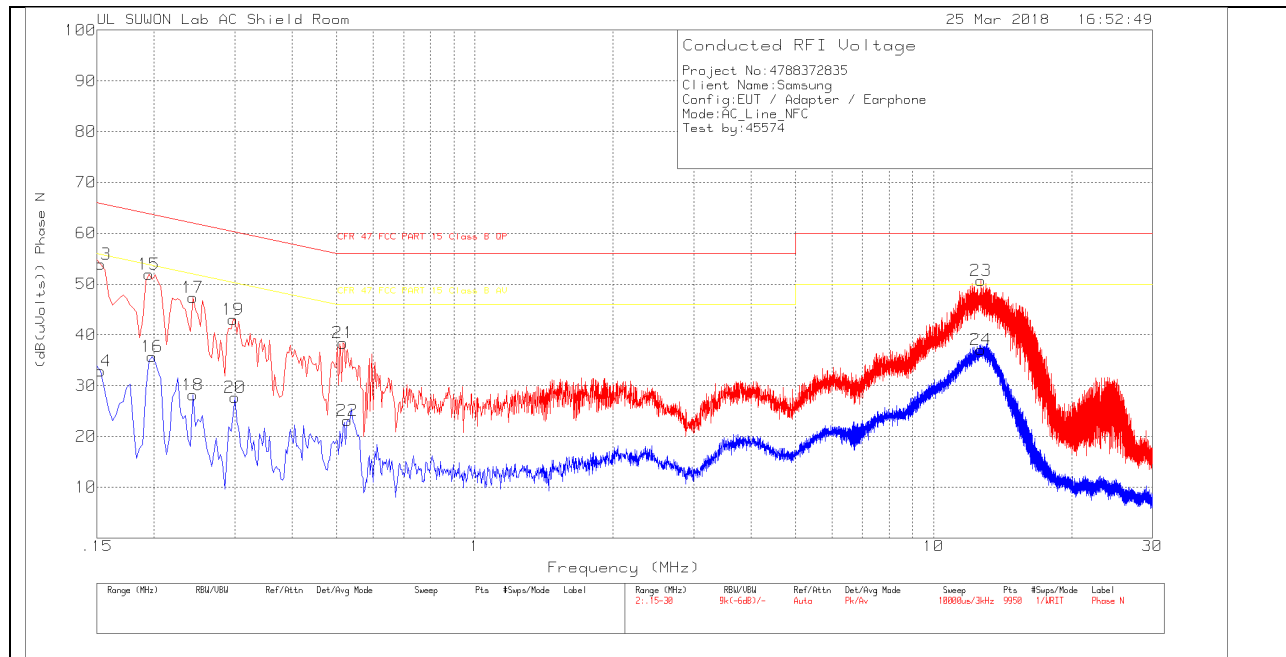
Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101837_L1_with extension	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
.15525	35.39	Qp	10	.1	45.49	65.71	-20.22	-	-
.19725	35.85	Qp	9.8	.2	45.85	63.73	-17.88	-	-
12.3722	34.02	Qp	9.8	.3	44.12	60	-15.88	-	-

Qp – Quasi-Peak detector

LINE 2 PLOT



LINE 2 RESULTS

Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_N_with extension	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
13	.153	43.84	Pk	10	.1	53.94	65.84	-11.9	-	-
14	.153	22.78	Av	10	.1	32.88	-	-	55.84	-22.96
15	.195	41.86	Pk	9.9	.2	51.96	63.82	-11.86	-	-
16	.198	25.59	Av	9.9	.2	35.69	-	-	53.69	-18
17	.243	37.54	Pk	9.6	.2	47.34	61.99	-14.65	-	-
18	.243	18.41	Av	9.6	.2	28.21	-	-	51.99	-23.78
19	.297	33.1	Pk	9.7	.2	43	60.33	-17.33	-	-
20	.3	17.73	Av	9.7	.2	27.63	-	-	50.24	-22.61
21	.516	28.38	Pk	9.8	.2	38.38	56	-17.62	-	-
22	.528	13.14	Av	9.8	.2	23.14	-	-	46	-22.86
23	12.687	40.63	Pk	9.8	.3	50.73	60	-9.27	-	-
24	12.681	26.98	Av	9.8	.3	37.08	-	-	50	-12.92

Pk - Peak detector

Av - Average detection

Quasi-Peak Emissions

Range 2: Phase N .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101837_N_with extension	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
12.6878	33.32	Qp	9.8	.3	43.42	60	-16.58	-	-

Qp – Quasi-Peak detector

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 -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 §6.8

RESULTS

Reference Frequency: EUT Channel 13.56 MHz @ 20°C Limit: ± 100 ppm = 1.356 kHz										
Power Supply (Vdc)	Envir. Temp (°C)	Frequency Deviation Measured with Time Elapse								
		Start up (MHz)	Delta (ppm)	@ 2mins (MHz)	Delta (ppm)	@ 5mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
3.85	50	13.559837254	0.103	13.559837048	0.118	13.559836840	0.133	13.559836526	0.157	100
3.85	40	13.559835421	0.238	13.559835367	0.242	13.559835125	0.260	13.559835072	0.264	100
3.85	30	13.559836872	0.131	13.559836625	0.149	13.559836104	0.188	13.559835806	0.210	100
3.85	20	13.559838650	0	13.559838755	-0.008	13.559839785	-0.084	13.559839651	-0.074	100
3.85	10	13.559839054	-0.030	13.559840226	-0.116	13.559840919	-0.167	13.559838458	0.014	100
3.85	0	13.559837251	0.103	13.559836157	0.184	13.559836319	0.172	13.559836143	0.185	100
3.85	-10	13.559841399	-0.203	13.559841449	-0.206	13.559842201	-0.262	13.559843670	-0.370	100
3.85	-20	13.559843616	-0.366	13.559843685	-0.371	13.559842984	-0.320	13.559843216	-0.337	100
3.85	-30	13.559841925	-0.242	13.559841711	-0.226	13.559840875	-0.164	13.559840548	-0.140	100

Reference Frequency: EUT Channel 13.56 MHz @ 20°C Limit: ± 100 ppm = 1.356 kHz										
Power Supply (Vdc)	Envir. Temp (°C)	Frequency Deviation Measured with Time Elapse								
		Start up (MHz)	Delta (ppm)	@ 2mins (MHz)	Delta (ppm)	@ 5mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
3.85	20	13.559838650	0	13.559838755	-0.008	13.559839785	-0.084	13.559839651	-0.074	100
4.40	20	13.559838854	-0.015	13.559838284	0.027	13.559838664	0.083	13.559838166	0.036	100
3.60	20	13.559837292	0.100	13.559837476	0.087	13.559837988	0.133	13.559838350	0.022	100

No non-compliance noted.