CERTIFICATION TEST REPORT

Report Number. : 12737383-E7V2

Applicant	:	Samsung Electronics Co., Ltd. 129 Samsung-Ro, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, 16677, Korea
Model	:	SM-A7050
FCC ID	:	A3LSMA7050
EUT Description	:	GSM/CDMA/WCDMA/LTE phone with BT, DTS/UNII a/b/g/n/ac, ANT+ and NFC
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C

Date Of Issue:
March 29, 2019

Prepared by:
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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	3/27/2019	Initial Issue	
V2	3/29/2019	Updated Table of Contents	Steven Tran

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TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	Samsung Electronics Co., Ltd. 129 Samsung-Ro, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, 16677, Korea
EUT DESCRIPTION:	GSM/CDMA/WCDMA/LTE phone with BT, DTS/UNII a/b/g/n/ac, ANT+ and NFC
MODEL:	SM-A7050
SERIAL NUMBER:	Radiated (Original):R38M10NPF1Y Radiated (Spot Check): R38M207598Z
DATE TESTED:	February 21 – March 22, 2019 (Original) March 13 – 27, 2019 (Spot Check)

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

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 the U.S. government.

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UL Verification Services Inc.

Reviewed By:

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UL Verification Services Inc.

2. INTRODUCTION OF TEST DATA REUSE

2.1. INTRODUCTION

According to the manufacturer, FCC ID: A3LSMA705FN and FCC ID: A3LSMA7050 non-licensed radios are electrically identical. The FCC ID: A3LSMA705FN test data shall remain representative of FCC ID: A3LSMA7050.

The applicant takes full responsibility that the test data as referenced in this section represents compliance for this FCC ID.

2.2. DIFFERENCES

The FCC ID: A3LSMA705FN, shares the same enclosure and circuit board as FCC ID: A3LSMA7050. The NFC antennas and surrounding circuitry and layout are identical between two models.

After confirming through preliminary radiated emissions that the performance of the FCC ID: A3LSMG705FN remains representative of FCC ID: A3LSMA7050. The test data of FCC ID: A3LSMG705FN being submitted for this application to cover NFC features.

2.3. SPOT CHECK VERIFICATION RESULTS SUMMARY

Spot check verification has been done on device A3LSMA7050 for radiated fundamental. The data from the application has been verified through appropriate spot checks to demonstrate compliance for this device as shown in the summary below.

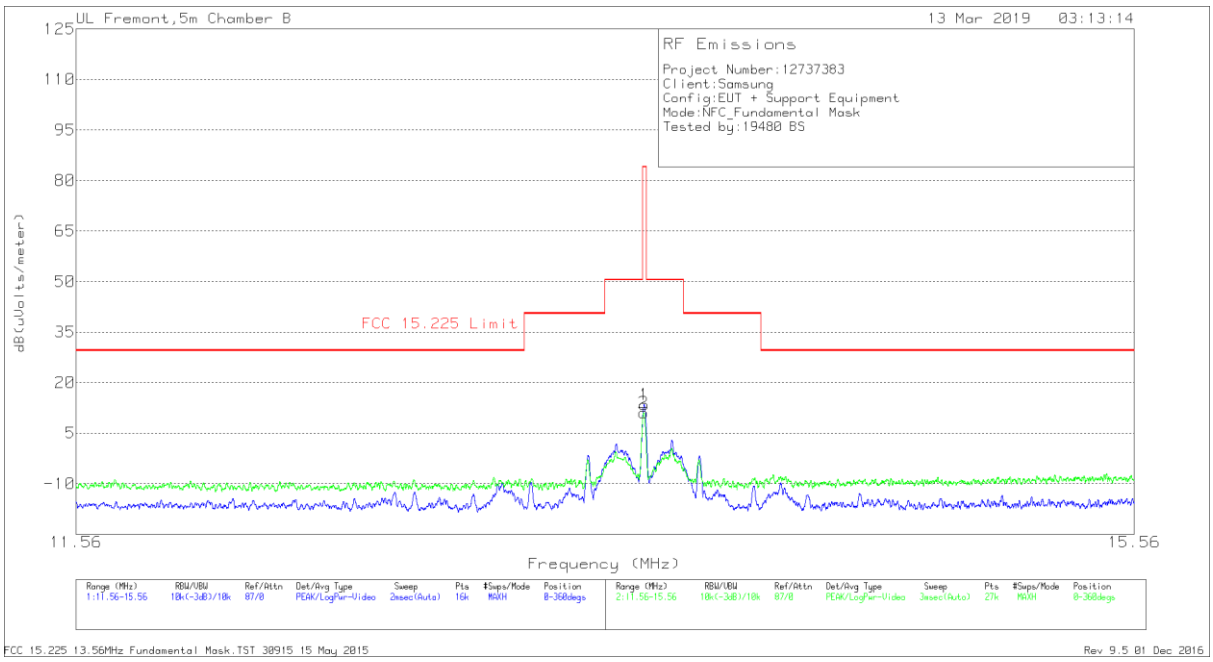
SM-A7050 SPOT CHECK RESULTS						
Technology	Mode	Test Item	Measured Frequency	Original Model	Spot check model	Delta (dB)
				SM-A705FN/DS	SM-A7050	
				A3LSMA705FN	A3LSMA7050	
				Peak	Peak	Peak
NFC	Fundamental		13.56MHz	15.3	13.48	-1.82

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

2.3.1. SPOT CHECK DATA

2.3.2. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.09 - 1000 MHz)

FUNDAMENTAL EMISSION MASK - TYPE A, 106Kbps (11.56 – 15.56 MHz)



FACE ON AND FACE OFF

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.

DATA

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr (dB) 40Log	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)	Polarity
2	13.55763	39.95	Pk	10.6	.5	-40	11.05	84	-72.95	0-360	Face-Off
1	13.55963	42.38	Pk	10.6	.5	-40	13.48	84	-70.52	0-360	Face-On

Pk - Peak detector

2.4. 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
DXX (NFC)	A3LSMA705FN	Grant	12726900-E7	Test	FCC Report NFC / All sections Except Worst Case Below 1GHz and AC Power Line Conducted Emissions

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, and and KDB 484596 D01 Referencing Test Data v01.

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, 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	47658 Kato Rd
☒ Chamber A (ISED:2324B-1)	☐ Chamber D (ISED:22541-1)	☐ Chamber I (ISED:2324A-5)
☐ Chamber B (ISED:2324B-2)	☐ Chamber E (ISED:22541-2)	☐ Chamber J (ISED:2324A-6)
☐ Chamber C (ISED:2324B-3)	☐ Chamber F (ISED:22541-3)	☒ Chamber K (ISED:2324A-1)
	☐ Chamber G (ISED:22541-4)	☐ Chamber L (ISED:2324A-3)
	☐ Chamber H (ISED:22541-5)	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

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

RADIATED EMISSIONS

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

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

5.3. 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%.

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is a GSM/CDMA/WCDMA/LTE phone with BT, DTS/UNII a/b/g/n/ac, ANT+ and NFC. The model SM-A705FN/DS was used for final testing and is representative of the test results in this report. The test report addresses the NFC operational mode.

6.2. MAXIMUM FIELD STRENGTH

The testing was performed at 3 meters. The transmitter maximum E-field at 30 meter distance was 15.3 dBuV/m, which was converted from the 3 meter data.

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes the loop antenna.

6.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was A705FN.001.

6.5. WORST-CASE CONFIGURATION AND MODE

The fundamental of the EUT was investigated under three orthogonal orientations X (Flatbed), Y (Landscape), and Z (Portrait). The Y (Landscape) orientation was determined to be the worst-case orientation.

Although these tests were performed other than open filed site, adequate comparison measurements were confirmed against 30 m open filed 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

NOTE: The EUT pre-scanned in three NFC type A, B & F. The worst type is A, and data rate of 106kbps was recorded to this report.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	Samsung	EP-TA800	R37M2100011SE3	N/A
Earphone	Samsung	N/A	N/A	N/A

I/O CABLES (CONDUCTED TEST)

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Antenna	1	RF	Shielded	0.2	To PSA
2	USB	1	USB	Un-shielded	1	EUT to AC Mains

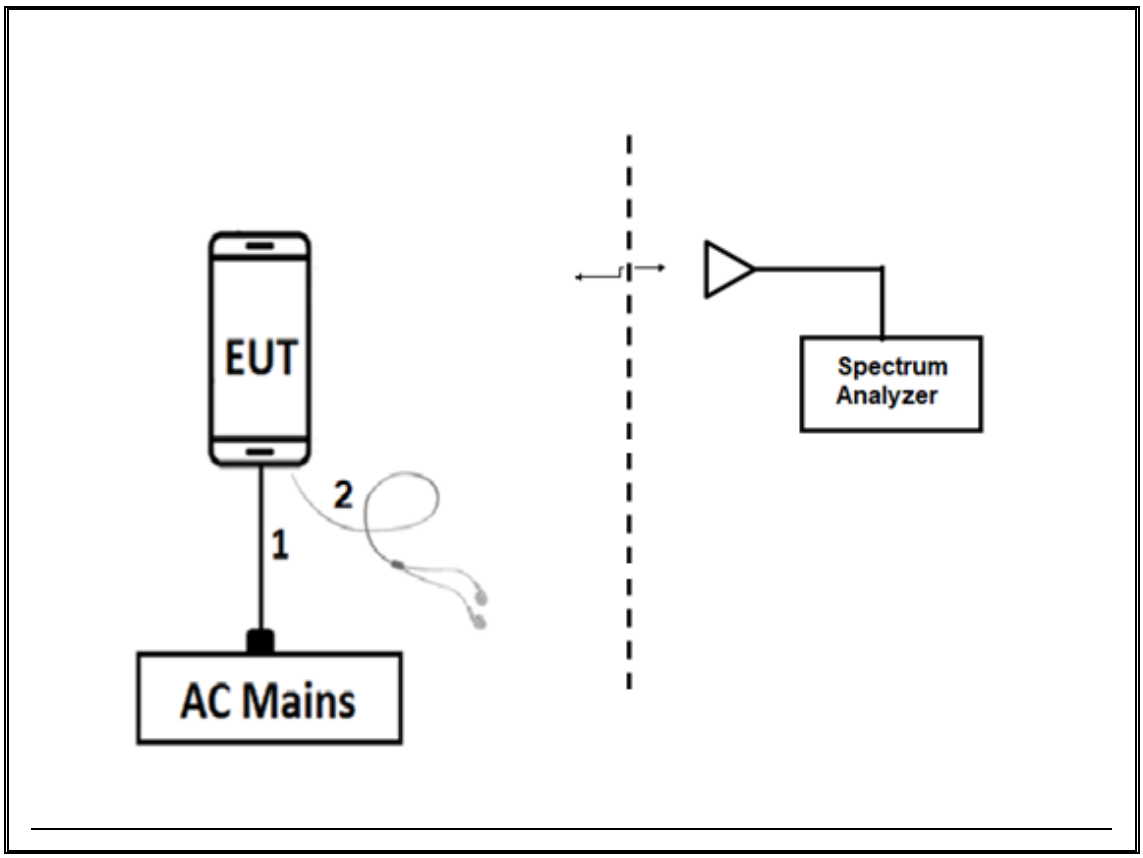
I/O CABLES (RADIATED AND CONDUCTED EMISSIONS)

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB	1	USB	Shielded	1	N/A
2	earphone	1	3.5mm	Un-shielded	1	N/A

TEST SETUP

The EUT is a stand alone. Test software exercised the radio card.

RADIATED AND AC LINE CONDUCTED EMISSIONS SETUP DIAGRAM



TEST SETUP

For radiated tests: EUT has support equipment. The test software exercises the radio.

7. 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**	**ID Num**	**Cal Due**	**Last Cal**
Antenna, Active Loop 9kHz-30MHz	ETS-Lindgren	6502	T757	09/25/2019	09/25/2018
Antenna, Passive Loop 30Hz – 1MHz	Electro-Metrics	EM-6871	PRE0179465	05/22/2019	05/22/2018
Antenna, Passive Loop 100kHz – 30MHz	Electro_Metrics	EM-6872	PRE0179467	05/23/2019	05/23/2018
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179375	05/08/2019	05/08/2018
Temp Chamber	Thermotron Industries	SE-600-10-10	T80	05/01/2019	11/01/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T908	01/23/2020	01/23/2019
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1450	01/24/2020	01/24/2019
Amplifier, 9kHz to 1GHz, 32 dB	Sonoma Instrument	310	175953	12/13/2019	12/13/2018
Hybrid Antenna, 30MHz to 3GHz	SunAR rf motion	JB3	PRE0184052	10/24/2019	10/24/2018
AC Line Conducted					
EMI Receiver	Rohde & Schwarz	ESR	T1436	02/14/2020	02/14/2019
LISN for Conducted Emissions CISPR-16	FCC INC.	FCC LISN 50/250	T1310	06/15/2019	06/15/2018
Test Software List					
Radiated Software	UL	UL EMC		Ver 9.5, June 22, 2018	
Antenna Port Software	UL	UL RF		Ver 9.3.2, Jan. 07, 2019	
AC Line Conducted Software	UL	UL EMC		Ver 9.5, May 26, 2015	

NOTES:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

8. OCCUPIED BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 10kHz. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

Note: Because the measured signal is CW or CW-like 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

RESULTS

99% and 20dB BW

Type A (CE Mode)

Mode Kbps	Frequency (MHz)	99% Bandwidth (KHz)	20dB Bandwidth (KHz)
424	13.56	21.887	25.21
212	13.56	22.078	25.60
106	13.56	24.921	24.84

TYPE B

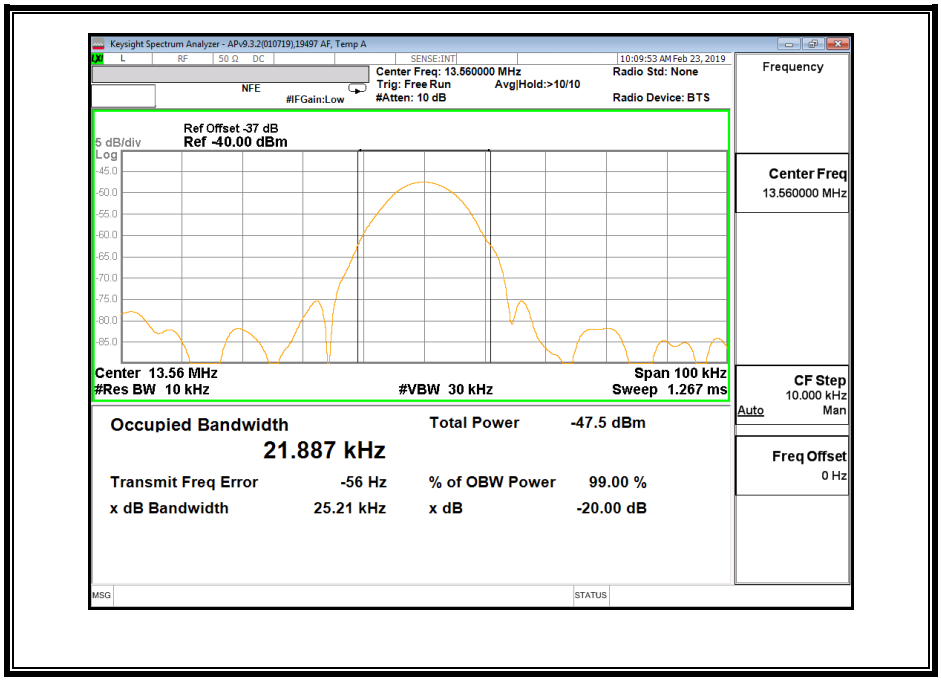
Mode Kbps	Frequency (MHz)	99% Bandwidth (KHz)	20dB Bandwidth (KHz)
424	13.56	22.211	25.68
212	13.56	22.538	24.94
106	13.56	23.220	25.54

TYPE F

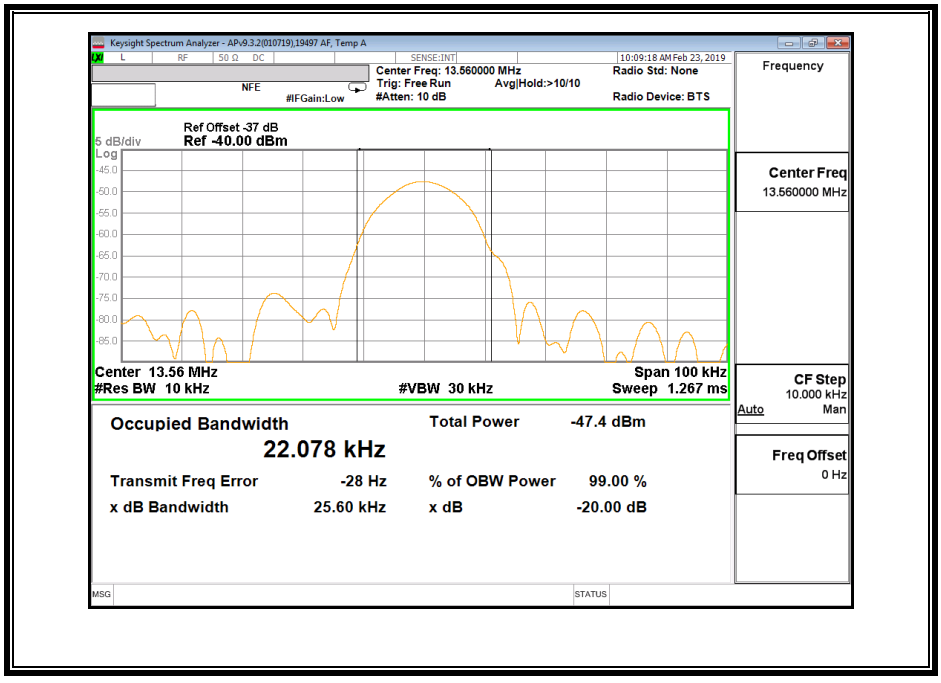
Mode Kbps	Frequency (MHz)	99% Bandwidth (KHz)	20dB Bandwidth (KHz)
424	13.56	21.207	25.00
212	13.56	21.219	24.92

8.1. Type A

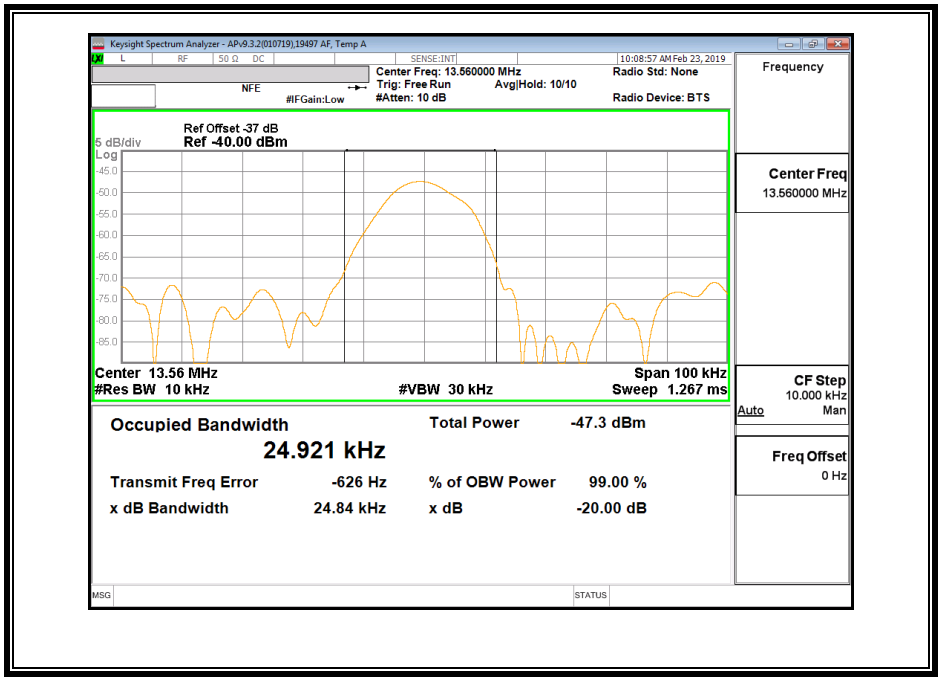
424Kbps



212Kbps

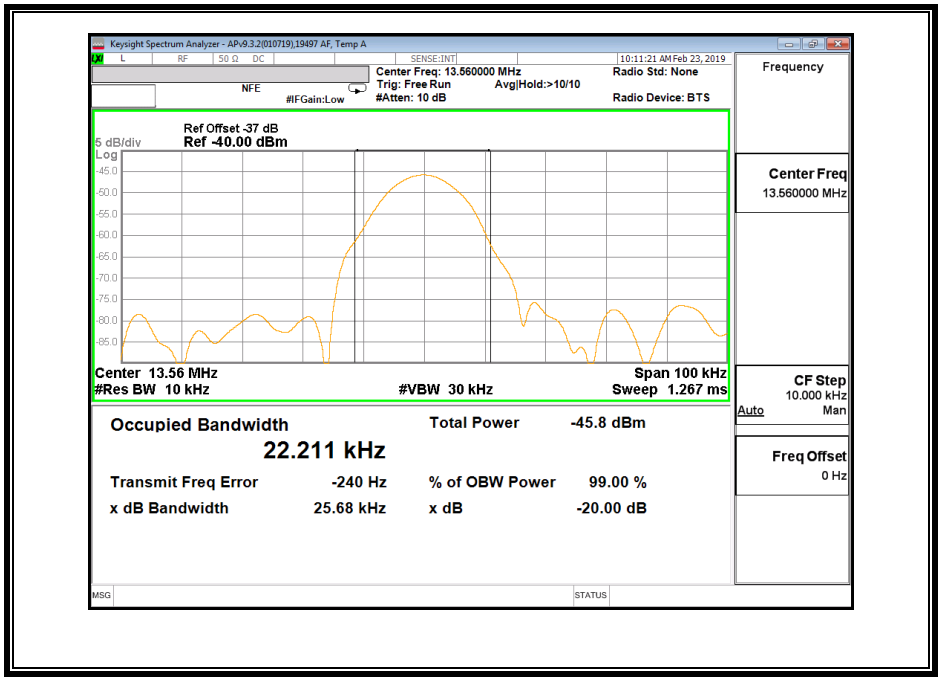


106Kbps

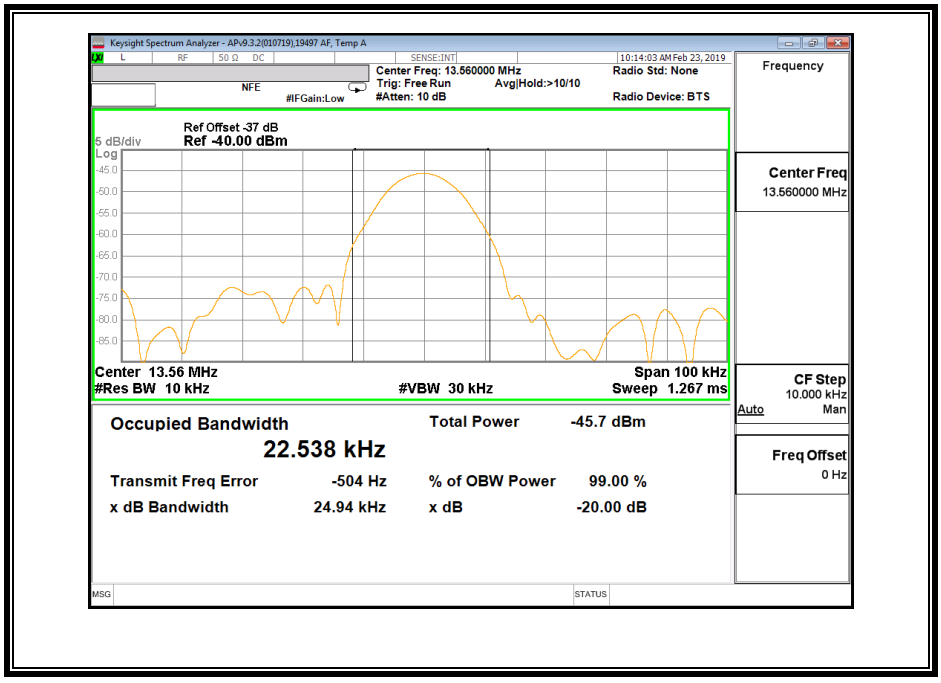


8.2. Type B

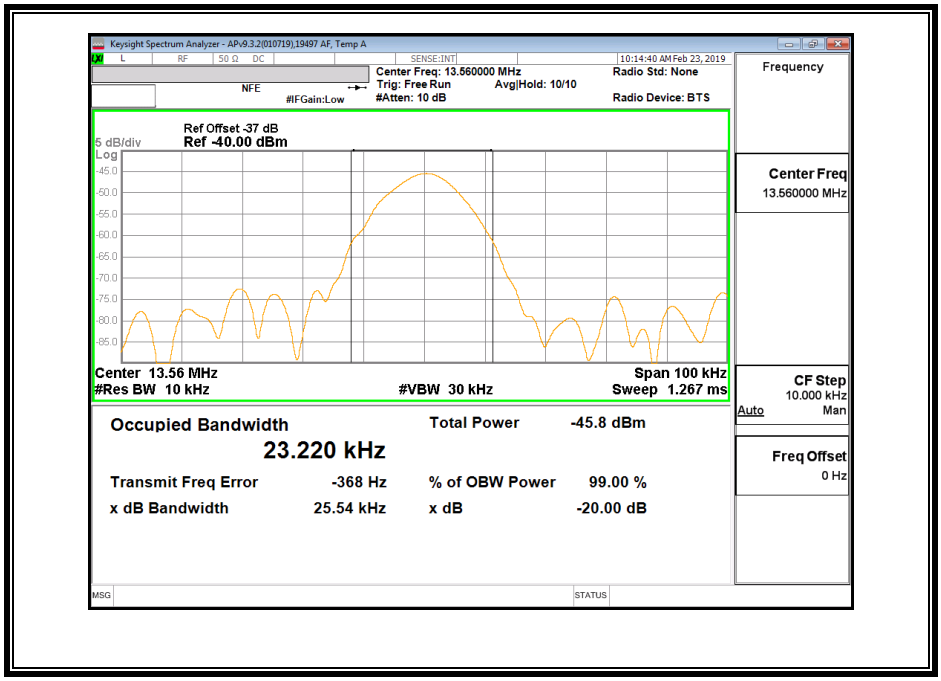
424Kbps



212Kbps

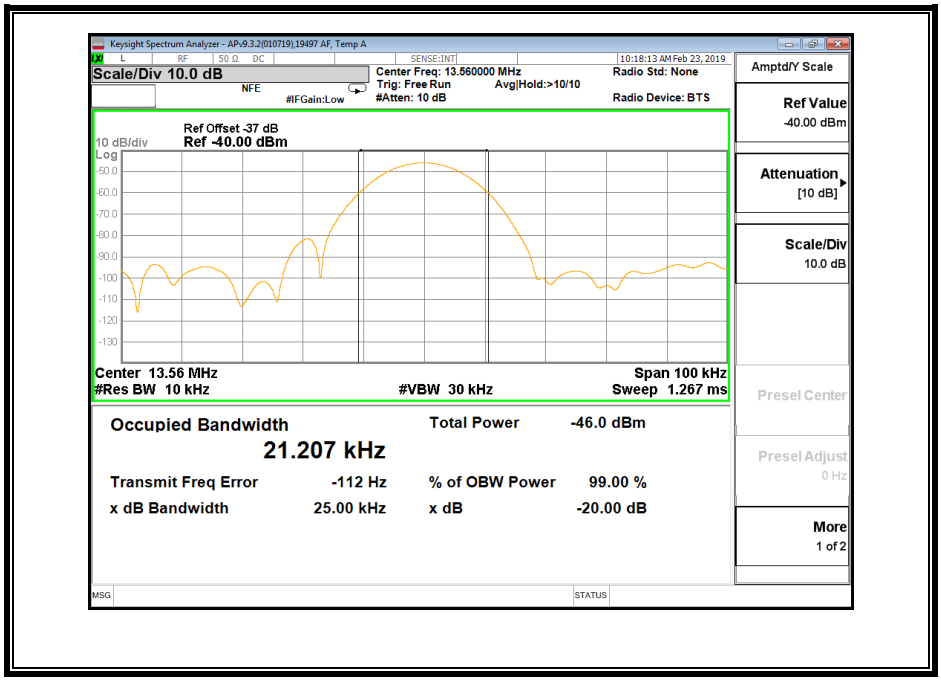


106Kbps

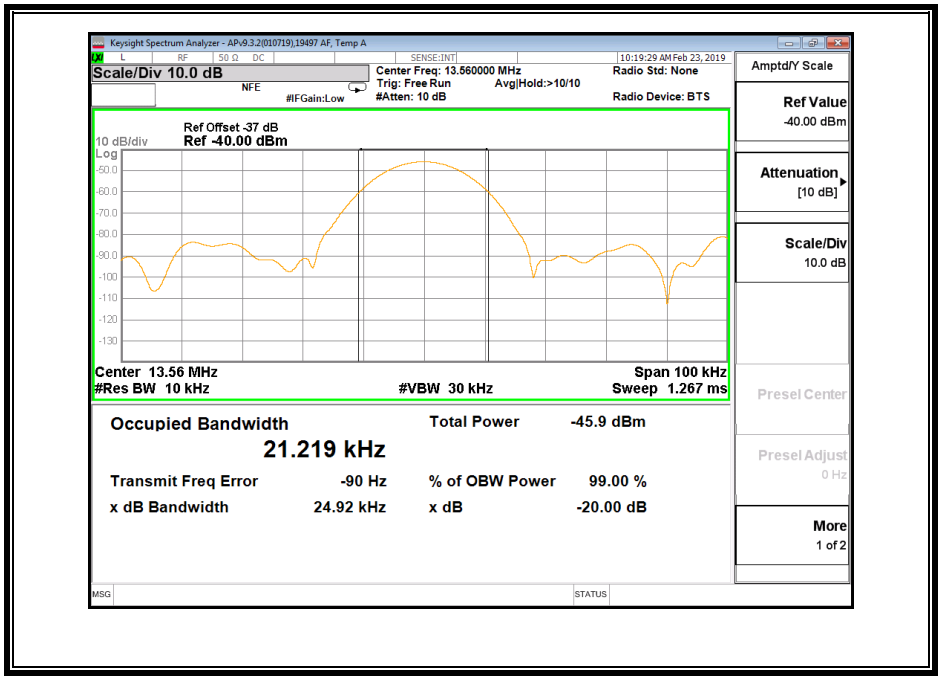


8.3. Type F

424Kbps



212Kbps



9. RADIATED EMISSION TEST RESULTS

9.1. 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 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; therefore, the frequency range was investigated from 0.15 MHz to the 10th harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater.

2D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.

KDB 414788 OFS and Chamber Correlation Justification

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.

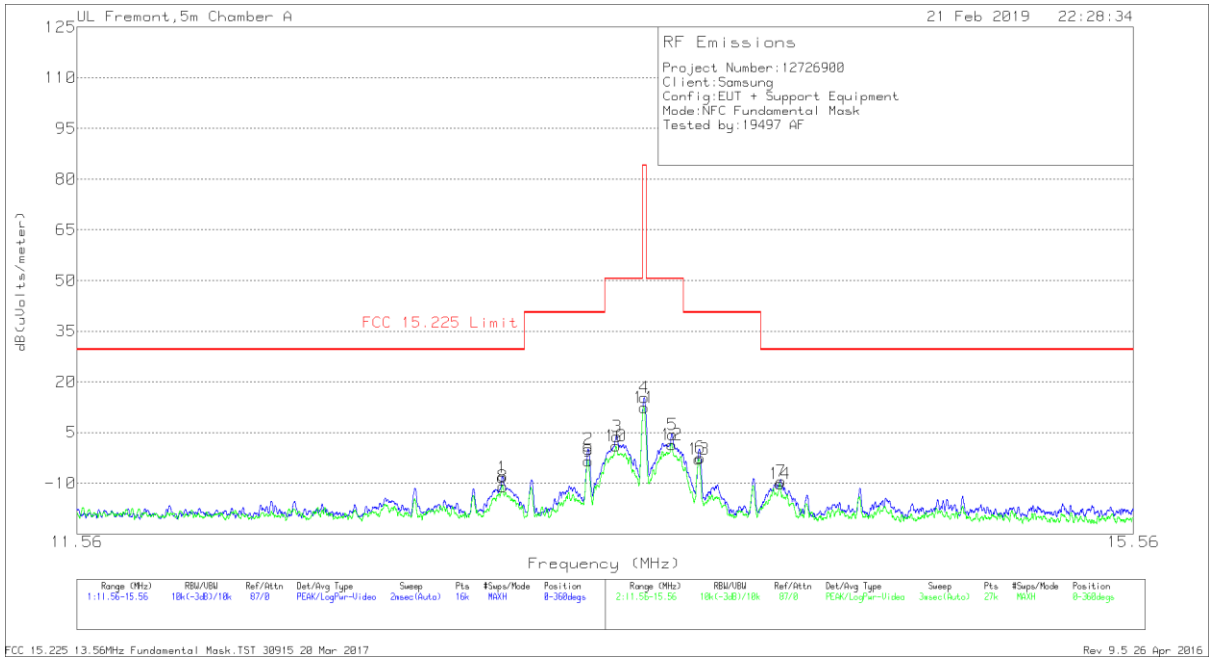
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

RESULTS

9.2. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 - 30 MHz)

TYPE A - 106Kbps (CE Mode)

FUNDAMENTAL EMISSION MASK - (11.56 – 15.56 MHz)



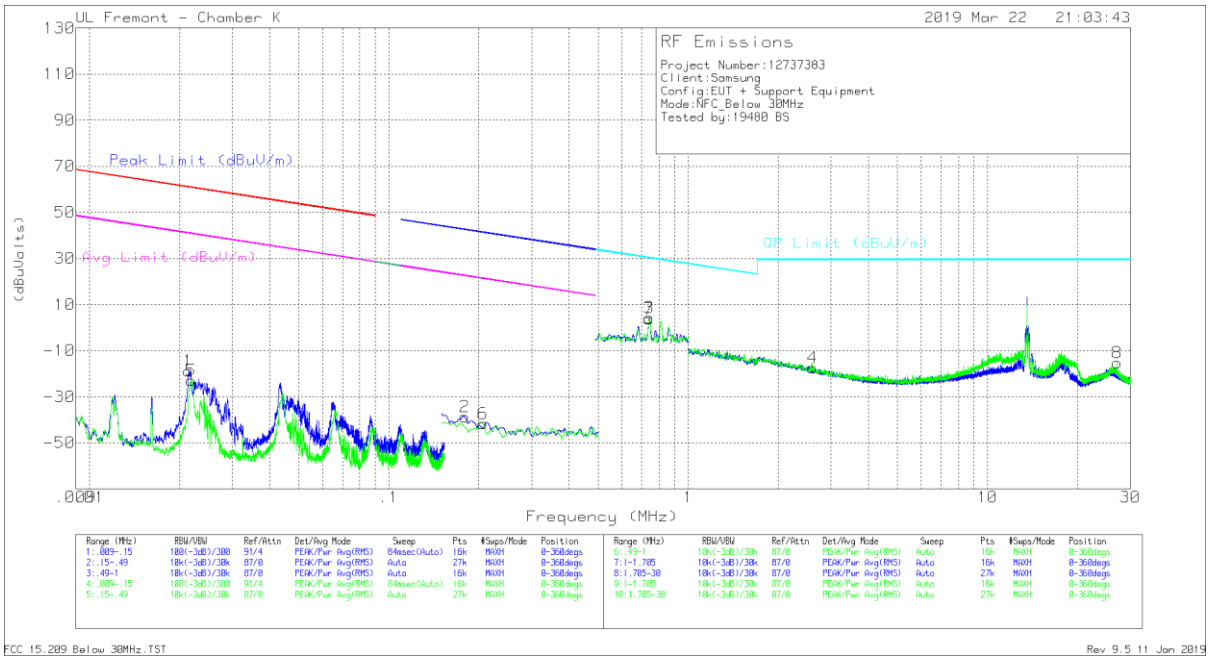
NOTE: All data rate Field Strength was investigated and Type A, 106k found to have the highest Field Strength results and represents as the worst case data rate.

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dBm)	Cables (dB)	Dist Corr 30m	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)	Polarity
1	13.02825	20.47	Pk	10.8	.5	-40	-8.23	29.54	-37.77	0-360	Face-On
8	13.03097	17.71	Pk	10.8	.5	-40	-10.99	29.54	-40.53	0-360	Face-Off
2	13.34788	28.83	Pk	10.8	.5	-40	.13	40.51	-40.38	0-360	Face-On
9	13.34799	25.19	Pk	10.8	.5	-40	-3.51	40.51	-44.02	0-360	Face-Off
10	13.45255	29.65	Pk	10.8	.5	-40	.95	50.5	-49.55	0-360	Face-Off
3	13.4565	32.44	Pk	10.8	.5	-40	3.74	50.5	-46.76	0-360	Face-On
11	*13.55963	41.12	Pk	10.7	.5	-40	12.32	84	-71.68	0-360	Face-Off
4	*13.56025	44.1	Pk	10.7	.5	-40	15.3	84	-68.7	0-360	Face-On
12	13.6656	30.2	Pk	10.7	.5	-40	1.4	50.5	-49.1	0-360	Face-Off
5	13.6675	33.1	Pk	10.7	.5	-40	4.3	50.5	-46.2	0-360	Face-On
13	13.76971	25.97	Pk	10.7	.5	-40	-2.83	40.51	-43.34	0-360	Face-Off
6	13.7765	26.37	Pk	10.7	.5	-40	-2.43	40.51	-42.94	0-360	Face-On
14	14.0874	18.56	Pk	10.7	.5	-40	-10.24	29.54	-39.78	0-360	Face-Off
7	14.092	19.47	Pk	10.7	.5	-40	-9.33	29.54	-38.87	0-360	Face-On

* - Indicates fundamental frequency
Pk - Peak detector

SPURIOUS EMISSIONS (0.09 – 30MHz) – China Adapter



Trace Markers

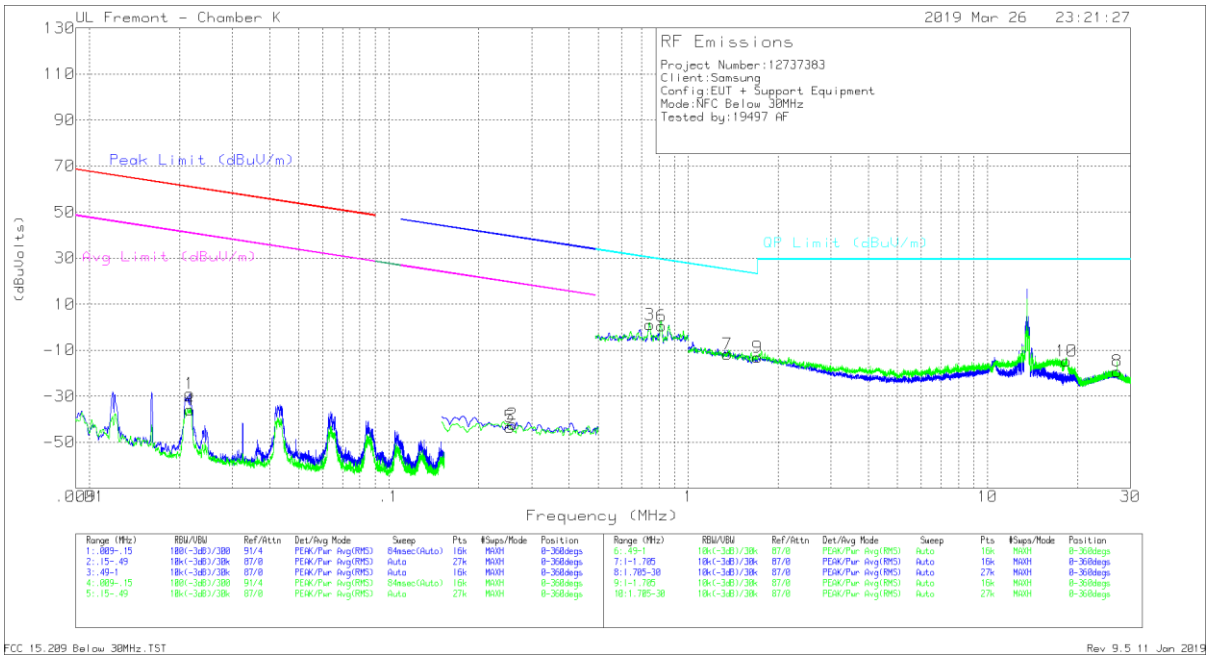
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Cables w/ PRE0186650	Dist Corr 300 m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.02144	34.53	Pk	58.8	-32.1	-80	-18.77	60.96	-79.73	40.96	-59.73	-	-	-	-	0-360
2	.1793	17.2	Pk	56.2	-32.1	-80	-38.7	-	-	-	-	42.55	-81.25	22.55	-61.25	0-360
5	.02184	30.37	Pk	58.8	-32.1	-80	-22.93	60.8	-83.73	40.8	-63.73	-	-	-	-	0-360
6	.20621	14.11	Pk	56.3	-32.1	-80	-41.69	-	-	-	-	41.33	-83.02	21.33	-63.02	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Cables w/ PRE0186650	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.73966	20.02	Pk	56.3	-32.1	-40	4.22	30.23	-26.01	0-360
7	.74002	19.65	Pk	56.3	-32.1	-40	3.85	30.23	-26.38	0-360
4	2.60418	15.08	Pk	39.5	-32	-40	-17.42	29.5	-46.92	0-360
8	27.1169	22.96	Pk	33.3	-31.6	-40	-15.34	29.5	-44.84	0-360

Pk - Peak detector

SPURIOUS EMISSIONS (0.09 – 30MHz) – Hong Kong Adapter



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Cables w/ PRE0186650	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	.02162	24.42	Pk	58.8	-32.1	-80	-28.88	60.89	-89.77	40.89	-69.77	-	-	-	-	0-360
2	.2588	13.59	Pk	56.3	-32.1	-80	-42.21	-	-	-	-	39.35	-81.56	19.35	-61.56	0-360
4	.02162	17.42	Pk	58.8	-32.1	-80	-35.88	60.89	-96.77	40.89	-76.77	-	-	-	-	0-360
5	.25386	12.39	Pk	56.3	-32.1	-80	-43.41	-	-	-	-	39.52	-82.93	19.52	-62.93	0-360

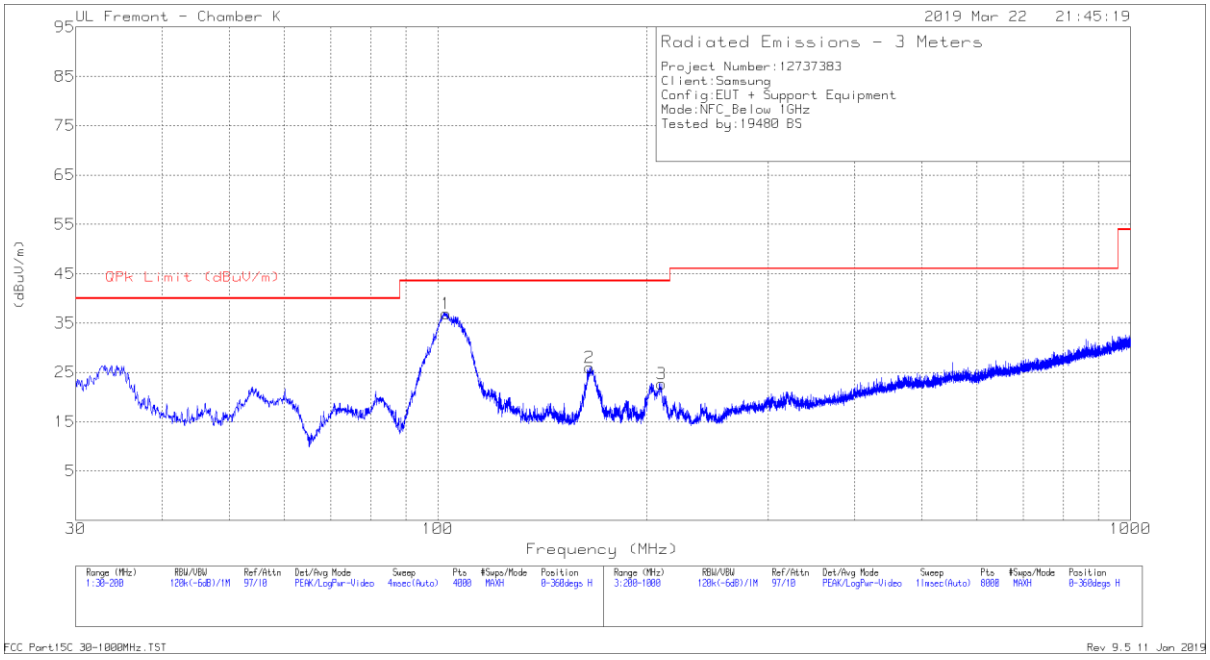
Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Cables w/ PRE0186650	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.74373	16.97	Pk	56.3	-32.1	-40	1.17	30.19	-29.02	0-360
6	.81509	16.41	Pk	56.3	-32.1	-40	.61	29.39	-28.78	0-360
7	1.34971	15.82	Pk	44.6	-32.1	-40	-11.68	25.02	-36.7	0-360
8	27.119	19.11	Pk	33.3	-31.6	-40	-19.19	29.5	-48.69	0-360
9	1.70446	16.22	Pk	42.7	-32	-40	-13.08	23	-36.08	0-360
10	18.34619	23.13	Pk	33.8	-31.7	-40	-14.77	29.5	-44.27	0-360

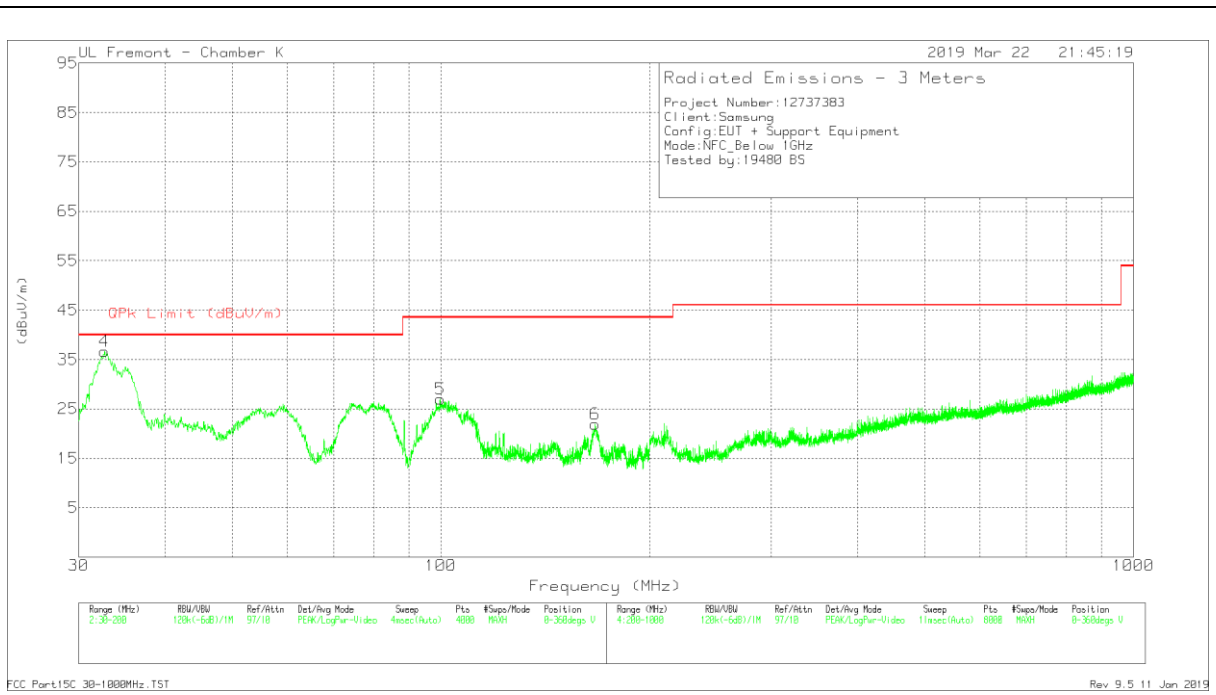
Pk - Peak detector

9.3. TX SPURIOUS EMISSION 30 TO 1000 MHz (China Adapter)

TYPE A - 106Kbps (CE Mode)



HORIZONTAL



VERTICAL

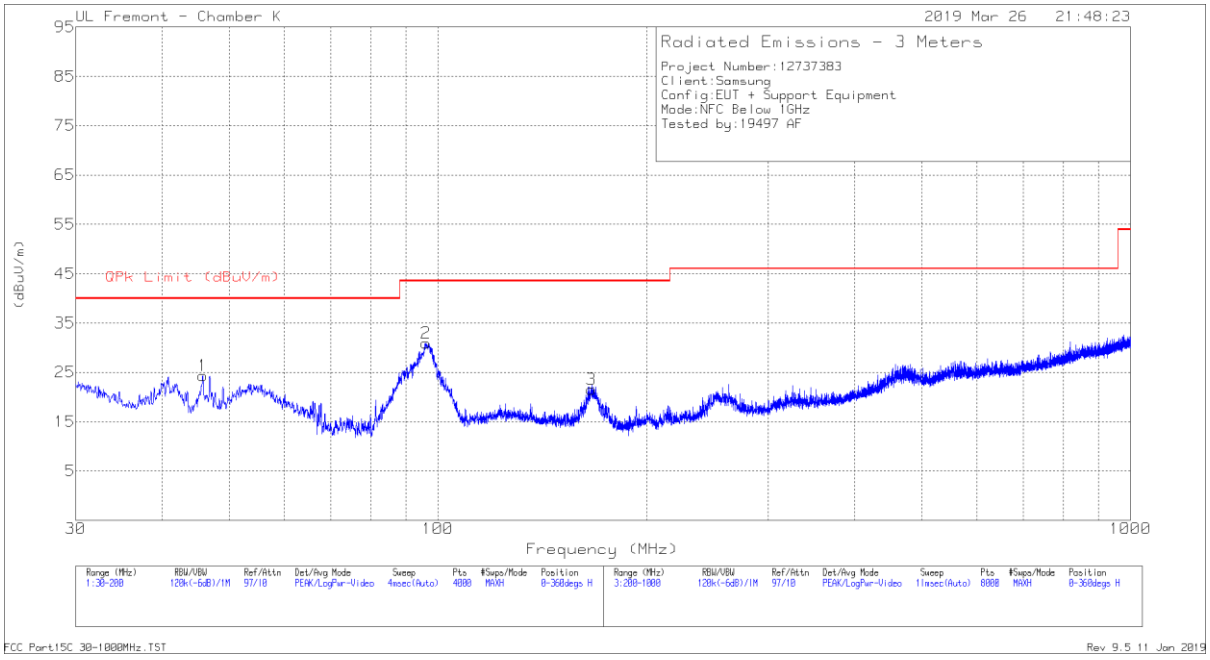
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0184052 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	102.7788	50.87	Pk	16.9	-30.9	36.87	43.52	-6.65	0-360	299	H
2	* 165.6951	38.54	Pk	17.8	-30.4	25.94	43.52	-17.58	0-360	199	H
4	32.823	42.48	Pk	24.8	-31.5	35.78	40	-4.22	139	108	V
	32.823	36.61	Qp	24.8	-31.5	29.91	40	-10.09	139	108	V
5	99.718	41.89	Pk	16	-30.9	26.99	43.52	-16.53	0-360	100	V
6	* 166.9279	34.53	Pk	17.8	-30.4	21.93	43.52	-21.59	0-360	100	V
3	210.3013	36.69	Pk	16.3	-30.3	22.69	43.52	-20.83	0-360	100	H

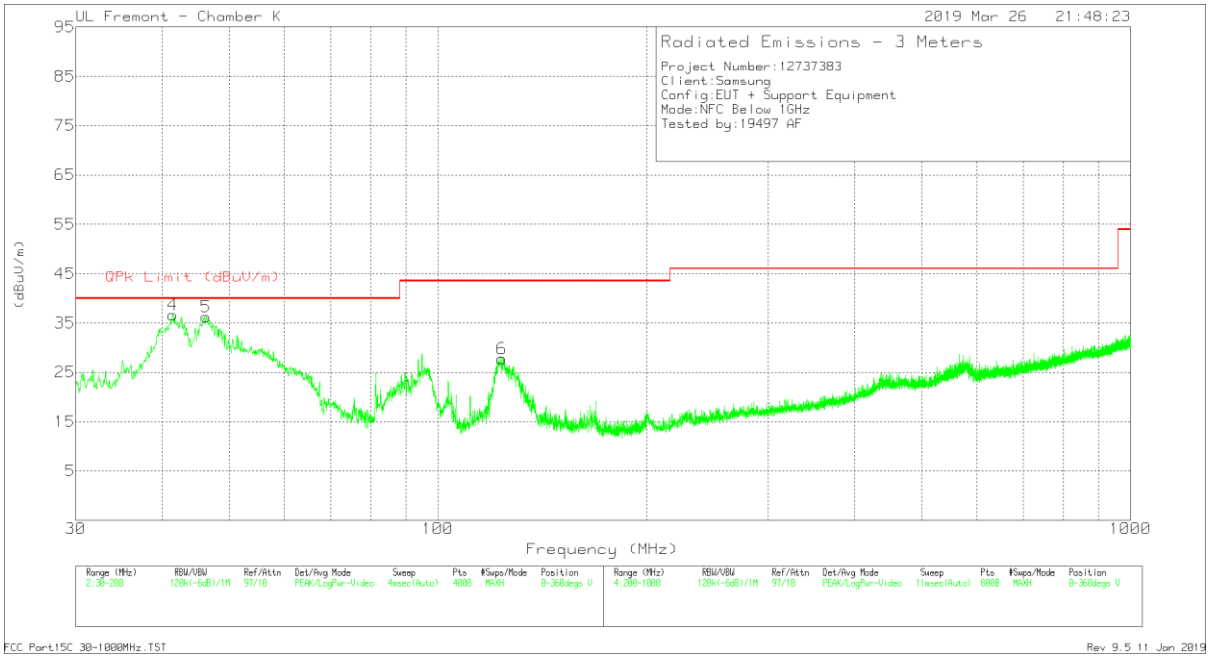
* - indicates frequency in CFR47 Pt 15 Restricted Band
Pk - Peak detector
Qp - Quasi-Peak detector

9.4. TX SPURIOUS EMISSION 30 TO 1000 MHz (Hong Kong Adapter)

TYPE A - 106Kbps (CE Mode)



HORIZONTAL



VERTICAL

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0184052 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	45.7716	40	Pk	15.6	-31.3	24.3	40	-15.7	0-360	399	H
2	96.1471	46.8	Pk	15	-30.9	30.9	43.52	-12.62	0-360	299	H
3	* 166.6729	34.14	Pk	17.8	-30.4	21.54	43.52	-21.98	0-360	199	H
4	41.6604	50.48	Pk	18.4	-31.4	37.48	40	-2.52	188	113	V
	41.6604	47.09	Qp	18.4	-31.4	34.09	40	-5.91	188	113	V
5	46.4112	52.03	Pk	15.3	-31.4	35.93	40	-4.07	310	117	V
	46.4112	42.52	Qp	15.3	-31.4	26.42	40	-13.58	310	117	V
6	* 123.7368	38.76	Pk	19.7	-30.7	27.76	43.52	-15.76	0-360	100	V

* - indicates frequency in CFR47 Pt 15 Restricted Band
Pk - Peak detector
Qp - Quasi-Peak detector

10. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within ±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 Clause 6.8

RESULTS

ID:	19497 AF	Date:	2/23/2019

No non-compliance noted.

TYPE A - 106Kbps (CE Mode)

106Kbps

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measureed with Time Elapse								
(Vdc)	(ºC)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	13.5597720	-4.362	13.5597039	0.662	13.5597055	0.548	13.5596463	4.911	± 100
3.80	40	13.5596460	4.936	13.5596605	3.862	13.5597061	0.500	13.5597059	0.518	± 100
3.80	30	13.5596671	3.379	13.5597065	0.469	13.5597065	0.469	13.5597066	0.467	± 100
3.80	***20***	***13.5597129***	***0.000***	***13.5597146***	***-0.124***	***13.5597145***	***-0.116***	***13.5597136***	***-0.054***	***± 100***
3.80	10	13.5597897	-5.666	13.5597872	-5.477	13.5597858	-5.375	13.5597862	-5.406	± 100
3.80	0	13.5598169	-7.673	13.5598128	-7.368	13.5598101	-7.171	13.5598075	-6.979	± 100
3.80	-10	13.5598255	-8.305	13.5597238	-0.806	13.5598216	-8.018	13.5598152	-7.544	± 100
3.23	20	13.5597117	0.089	13.5597142	-0.099	13.5597146	-0.129	13.5597138	-0.067	± 100
4.37	20	13.5597138	-0.064	13.5597142	-0.093	13.5597148	-0.140	13.5597138	-0.066	± 100

11. 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 50µH/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.		

TEST PROCEDURE

ANSI C63.10:2013

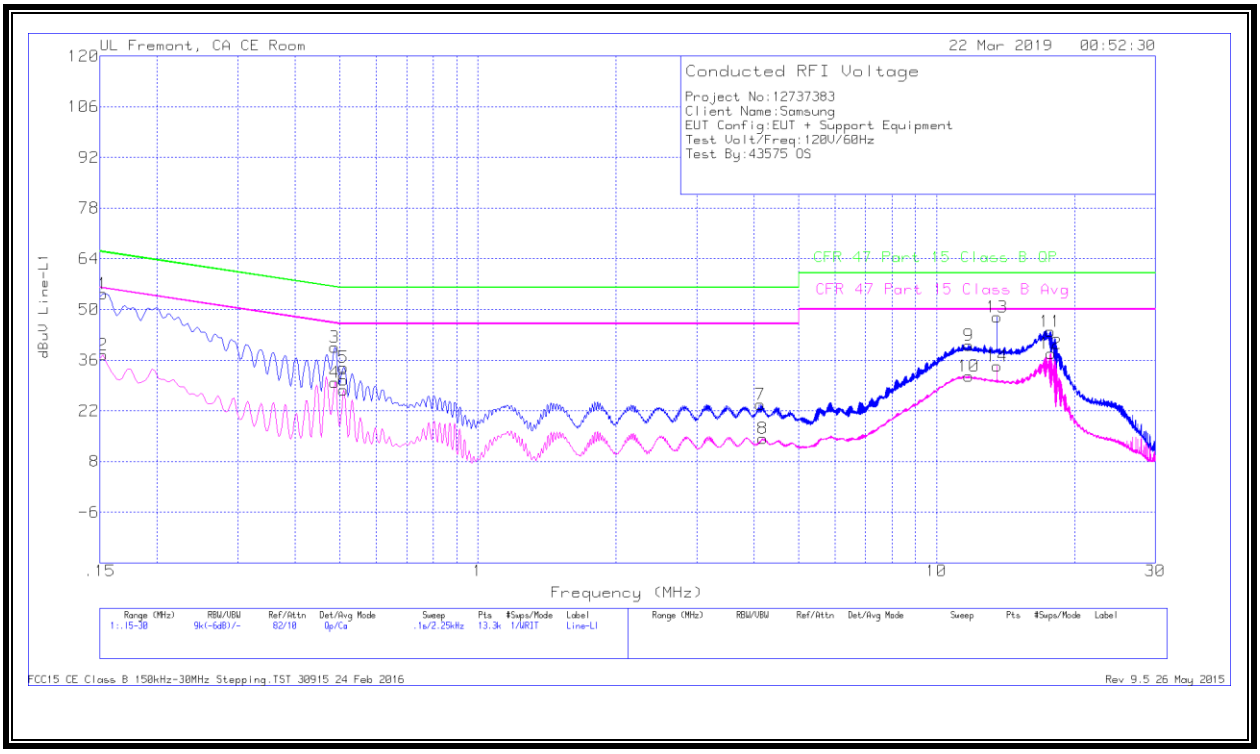
RESULTS

No non-compliance noted:

TYPE A - 106Kbps (CE Mode)

11.1.1. NORMAL OPERATION (China Adapter)

LINE 1 RESULTS

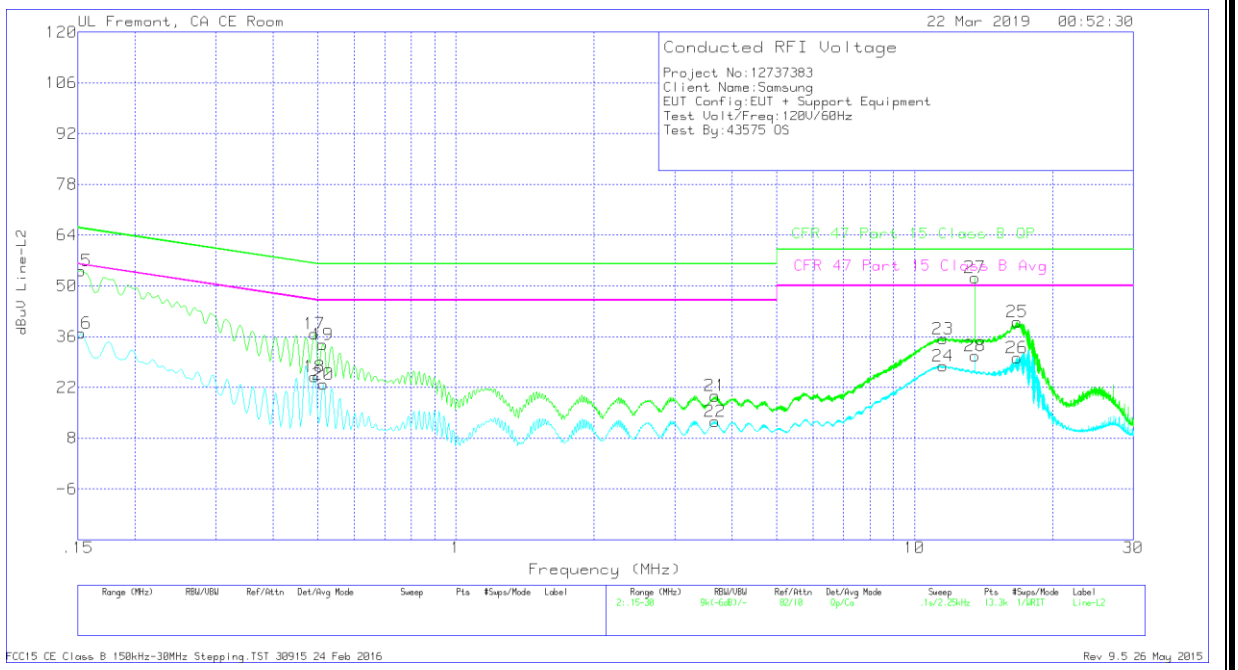


Worst Emission

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	.15225	44.18	Qp	.1	0	10.1	54.38	65.88	-11.5	-	-
2	.15225	27.22	Ca	.1	0	10.1	37.42	-	-	55.88	-18.46
3	.4875	29.43	Qp	0	0	10.1	39.53	56.21	-16.68	-	-
4	.4875	19.81	Ca	0	0	10.1	29.91	-	-	46.21	-16.3
5	.51	23.87	Qp	0	0	10.1	33.97	56	-22.03	-	-
6	.51	17.59	Ca	0	0	10.1	27.69	-	-	46	-18.31
7	4.13025	13.56	Qp	0	.1	10.1	23.76	56	-32.24	-	-
8	4.18425	4.15	Ca	0	.1	10.1	14.35	-	-	46	-31.65
9	11.77125	29.62	Qp	.1	.2	10.2	40.12	60	-19.88	-	-
10	11.77125	21.15	Ca	.1	.2	10.2	31.65	-	-	50	-18.35
11	17.7225	33.19	Qp	.1	.3	10.3	43.89	60	-16.11	-	-
12	17.74275	27.09	Ca	.1	.3	10.3	37.79	-	-	50	-12.21
13	13.56	37.47	Qp	.1	.2	10.2	47.97	60	-12.03	-	-
14	13.56	23.79	Ca	.1	.2	10.2	34.29	-	-	50	-15.71

Qp - Quasi-Peak detector
Ca - CISPR average detection
Note: Markers 13 and 14 are the 13.56MHz NFC Fundamental

LINE 2 RESULTS



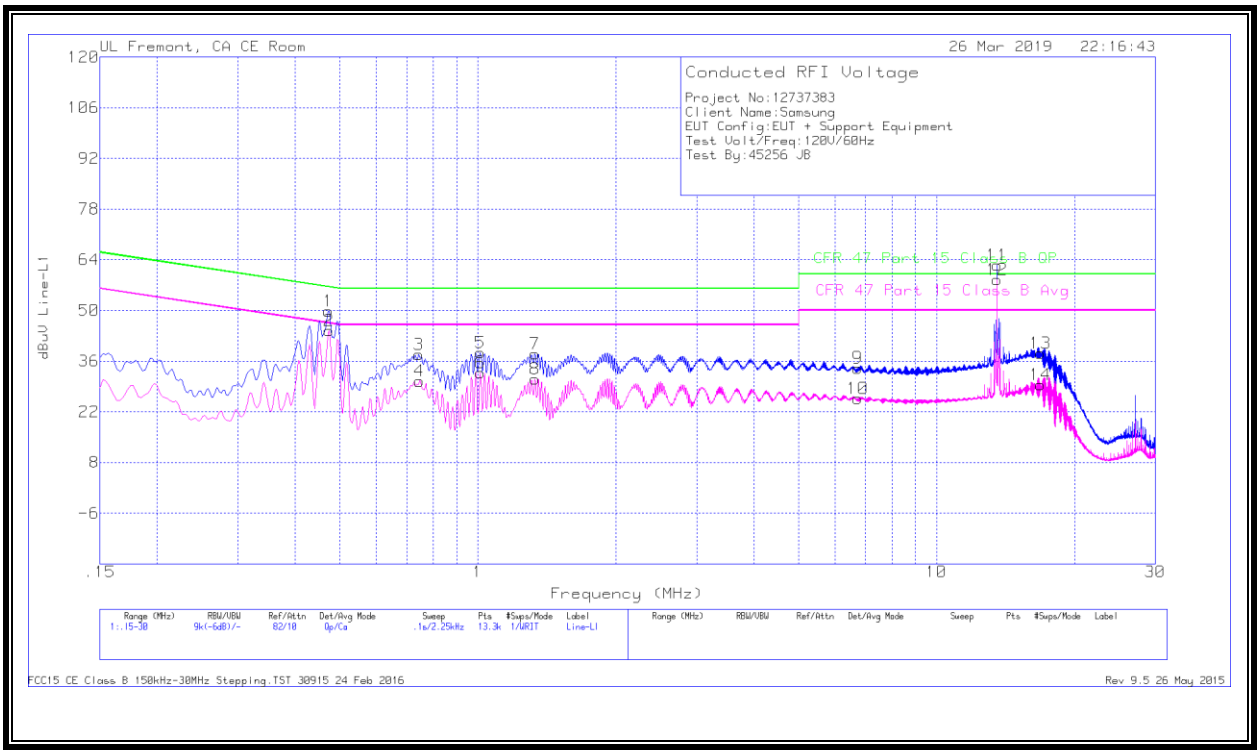
Worst Emission

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)
15	.15225	44.01	Qp	.1	0	10.1	54.21	65.88	-11.67	-	-
16	.15225	26.81	Ca	.1	0	10.1	37.01	-	-	55.88	-18.87
17	.492	26.61	Qp	0	0	10.1	36.71	56.13	-19.42	-	-
18	.492	14.8	Ca	0	0	10.1	24.9	-	-	46.13	-21.23
19	.51225	23.8	Qp	0	0	10.1	33.9	56	-22.1	-	-
20	.5145	12.73	Ca	0	0	10.1	22.83	-	-	46	-23.17
21	3.678	9.47	Qp	0	.1	10.1	19.67	56	-36.33	-	-
22	3.678	2.44	Ca	0	.1	10.1	12.64	-	-	46	-33.36
23	11.5395	24.96	Qp	.1	.2	10.2	35.46	60	-24.54	-	-
24	11.53725	17.35	Ca	.1	.2	10.2	27.85	-	-	50	-22.15
25	16.73475	29.42	Qp	.1	.3	10.3	40.12	60	-19.88	-	-
26	16.71225	19.46	Ca	.1	.3	10.3	30.16	-	-	50	-19.84
27	13.56	41.84	Qp	.1	.2	10.2	52.34	60	-7.66	-	-
28	13.56	20.21	Ca	.1	.2	10.2	30.71	-	-	50	-19.29

Qp - Quasi-Peak detector
Ca - CISPR average detection
Note: Markers 27 and 28 are the 13.56MHz NFC Fundamental

11.1.2. NORMAL OPERATION with ANTENNA (Hong Kong Adapter)

LINE 1 RESULTS

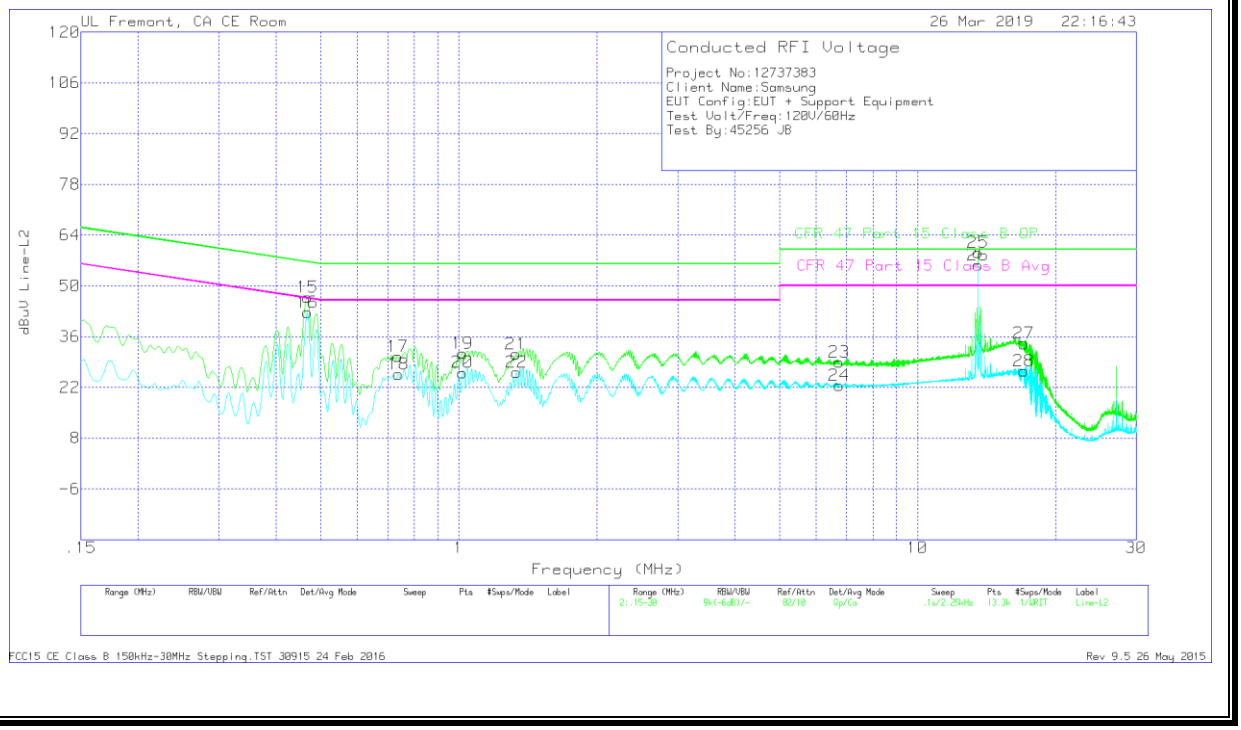


Worst Emission

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	.47175	39.72	Qp	0	0	10.1	49.82	56.48	-6.66	-	-
2	.474	34.38	Ca	0	0	10.1	44.48	-	-	46.44	-1.96
3	.744	27.79	Qp	0	0	10.1	37.89	56	-18.11	-	-
4	.74625	20.35	Ca	0	0	10.1	30.45	-	-	46	-15.55
5	1.014	28.1	Qp	0	.1	10.1	38.3	56	-17.7	-	-
6	1.01175	22.67	Ca	0	.1	10.1	32.87	-	-	46	-13.13
7	1.3335	27.81	Qp	0	.1	10.1	38.01	56	-17.99	-	-
8	1.33125	20.93	Ca	0	.1	10.1	31.13	-	-	46	-14.87
9	6.73125	23.69	Qp	0	.2	10.2	34.09	60	-25.91	-	-
10	6.73125	15.22	Ca	0	.2	10.2	25.62	-	-	50	-24.38
11	13.56	52.03	Qp	.1	.2	10.2	62.53	**60**	**2.53**	-	-
12	13.56	48.08	Ca	.1	.2	10.2	58.58	-	-	**50**	**8.58**
13	16.8495	27.51	Qp	.1	.3	10.3	38.21	60	-21.79	-	-
14	16.845	18.72	Ca	.1	.3	10.3	29.42	-	-	50	-20.58

Qp - Quasi-Peak detector
Ca - CISPR average detection
Note: Markers 11 and 12 are the 13.56MHz NFC Fundamental

LINE 2 RESULTS



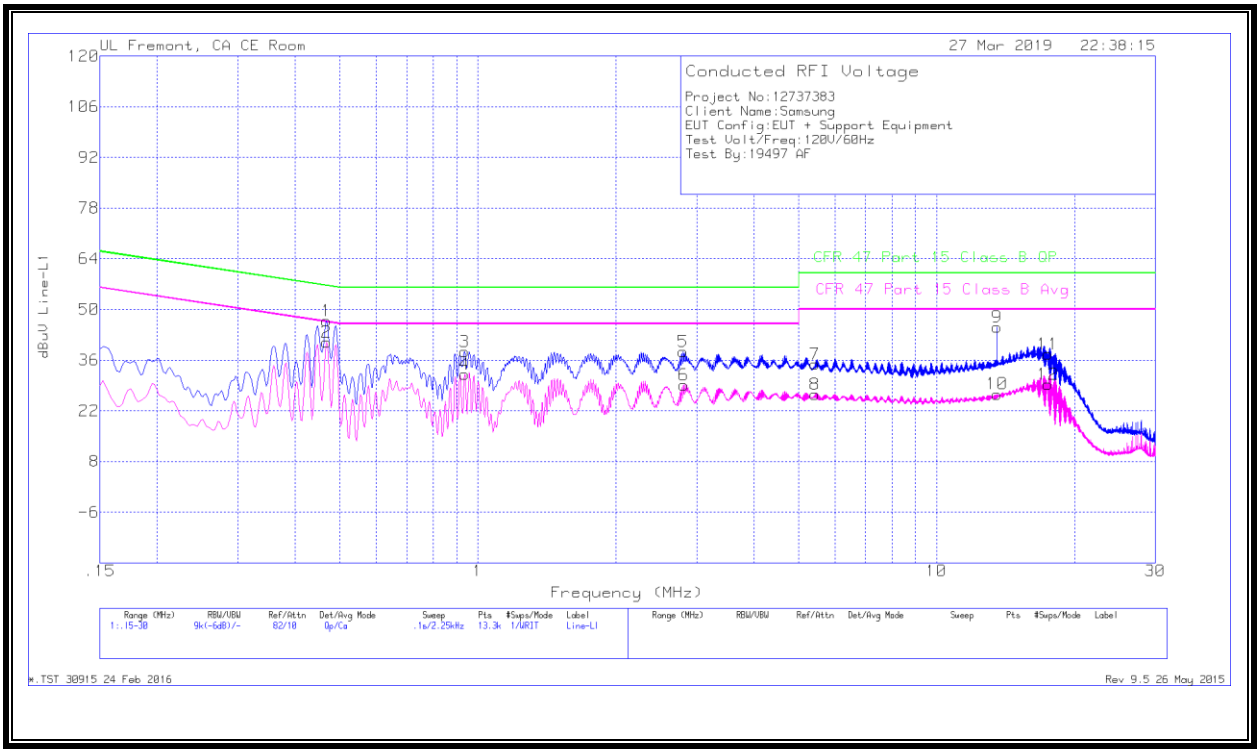
Worst Emission

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)
15	.46725	36.78	Qp	0	0	10.1	46.88	56.56	-9.68	-	-
16	.46725	32.54	Ca	0	0	10.1	42.64	-	-	46.56	-3.92
17	.73725	20.39	Qp	0	0	10.1	30.49	56	-25.51	-	-
18	.7395	15.51	Ca	0	0	10.1	25.61	-	-	46	-20.39
19	1.0185	21.22	Qp	0	.1	10.1	31.42	56	-24.58	-	-
20	1.0185	15.9	Ca	0	.1	10.1	26.1	-	-	46	-19.9
21	1.3335	20.96	Qp	0	.1	10.1	31.16	56	-24.84	-	-
22	1.338	16.05	Ca	0	.1	10.1	26.25	-	-	46	-19.75
23	6.747	18.59	Qp	0	.2	10.2	28.99	60	-31.01	-	-
24	6.74588	12.15	Ca	0	.2	10.2	22.55	-	-	50	-27.45
25	13.56	48.67	Qp	.1	.2	10.2	59.17	60	-.83	-	-
26	13.56	45.19	Ca	.1	.2	10.2	55.69	-	-	**50**	**5.69**
27	17.04975	23.4	Qp	.1	.3	10.3	34.1	60	-25.9	-	-
28	17.06775	15.89	Ca	.1	.3	10.3	26.59	-	-	50	-23.41

Qp - Quasi-Peak detector
Ca - CISPR average detection
Note: Markers 25 and 26 are the 13.56MHz NFC Fundamental

11.1.3. NORMAL OPERATION with ANTENNA TERMINATED (Hong Kong Adapter)

LINE 1 RESULTS

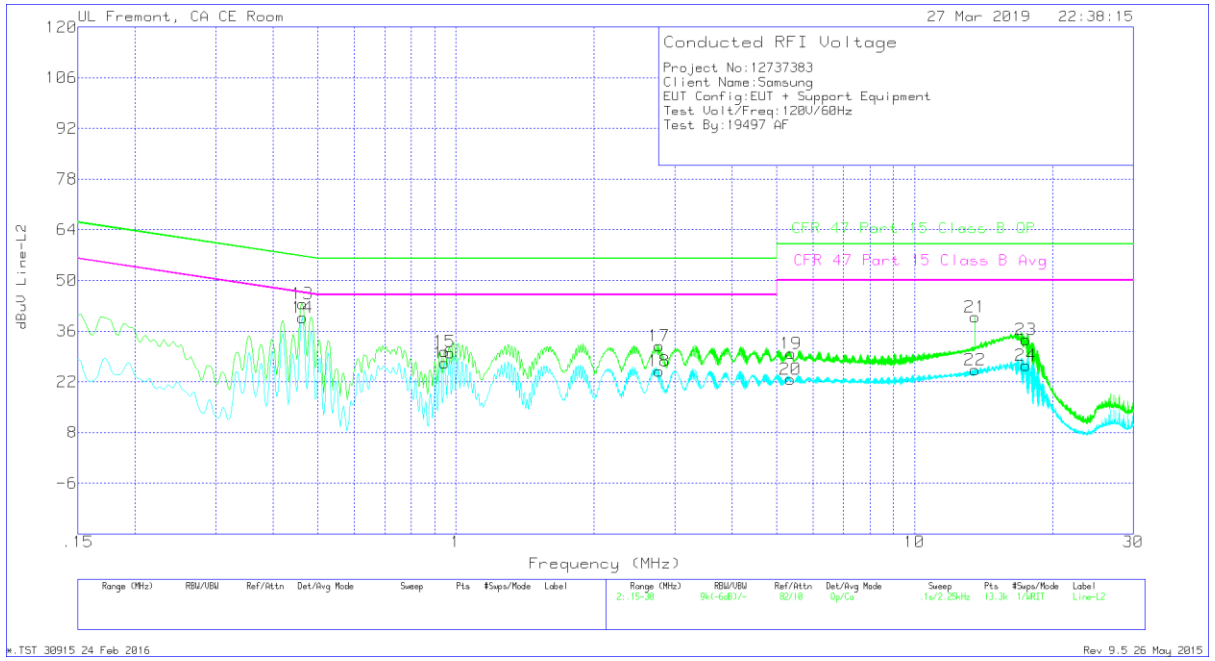


Worst Emission

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	.46725	36.7	Qp	0	0	10.1	46.8	56.56	-9.76	-	-
2	.46725	30.81	Ca	0	0	10.1	40.91	-	-	46.56	-5.65
3	.93525	28.18	Qp	0	.1	10.1	38.38	56	-17.62	-	-
4	.93525	21.86	Ca	0	.1	10.1	32.06	-	-	46	-13.94
5	2.805	28.08	Qp	0	.1	10.1	38.28	56	-17.72	-	-
6	2.80725	18.96	Ca	0	.1	10.1	29.16	-	-	46	-16.84
7	5.43975	24.74	Qp	0	.1	10.1	34.94	60	-25.06	-	-
8	5.43075	16.26	Ca	0	.1	10.1	26.46	-	-	50	-23.54
9	13.56	34.64	Qp	.1	.2	10.2	45.14	60	-14.86	-	-
10	13.56225	16.12	Ca	.1	.2	10.2	26.62	-	-	50	-23.38
11	17.48175	26.93	Qp	.1	.3	10.3	37.63	60	-22.37	-	-
12	17.484	18.62	Ca	.1	.3	10.3	29.32	-	-	50	-20.68

Qp - Quasi-Peak detector
Ca - CISPR average detection
Note: Markers 9 and 10 are the 13.56MHz NFC Fundamental

LINE 2 RESULTS



Worst Emission

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	.46275	33.53	Qp	0	0	10.1	43.63	56.64	-13.01	-	-
14	.46275	29.58	Ca	0	0	10.1	39.68	-	-	46.64	-6.96
15	.94425	20.1	Qp	0	.1	10.1	30.3	56	-25.7	-	-
16	.94537	17.05	Ca	0	.1	10.1	27.25	-	-	46	-18.75
17	2.77575	21.67	Qp	0	.1	10.1	31.87	56	-24.13	-	-
18	2.7735	14.81	Ca	0	.1	10.1	25.01	-	-	46	-20.99
19	5.3745	19.69	Qp	0	.1	10.1	29.89	60	-30.11	-	-
20	5.37	12.43	Ca	0	.1	10.1	22.63	-	-	50	-27.37
21	13.56	29.36	Qp	.1	.2	10.2	39.86	60	-20.14	-	-
22	13.56225	14.81	Ca	.1	.2	10.2	25.31	-	-	50	-24.69
23	17.49525	22.92	Qp	.1	.3	10.3	33.62	60	-26.38	-	-
24	17.493	15.78	Ca	.1	.3	10.3	26.48	-	-	50	-23.52

Qp - Quasi-Peak detector
Ca - CISPR average detection
Note: Markers 21 and 22 are the 13.56MHz NFC Fundamental