

CERTIFICATION TEST REPORT

Report Number. : S-4791440365-E9V2

Applicant : SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,
GYEONGGI-DO, 16677, KOREA

Model : SM-A166U, SM-A166U1, SM-S166V

FCC ID : A3LSMA166U

EUT Description : GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac and
NFC

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C

Date Of Issue:

2024-10-18

Prepared by:

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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2024-10-04	Initial issue	Myeongjun Kwon
V2	2024-10-18	Updated to address TCB's question	Myeongjun Kwon

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC.

MODEL NUMBER: SM-A166U, SM-A166U1, SM-S166V

SERIAL NUMBER: R3CX807W82F, R3CX807W74Y, R3CX807W7RA (CONDUCTED);
R3CX807W3JV, R3CX807W8JT, R3CX807W38R (RADIATED)

DATE TESTED: 2024-08-12 - 2024-10-04

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

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.

Approved & Released For
UL KOREA LTD. By:



Seokhwan Hong
Suwon Lab Engineer
UL KOREA LTD.

Tested By:



Myeongjun Kwon
Suwon Lab Engineer
UL KOREA LTD.

2. TEST METHODOLOGY

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

1. FCC 47 CFR Part 2.
2. FCC 47 CFR Part 15.
3. ANSI C63.10-2020.
4. KDB 414788 D01 Radiated Test Site v01r01

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(3m semi-anechoic chamber)
☒	Chamber 2(3m semi-anechoic chamber)
☒	Chamber 3(3m semi-anechoic chamber)
☐	Chamber 4(3m Full-anechoic chamber)
☐	Chamber 5(3m Full-anechoic chamber)

UL KOREA LTD. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.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:

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

$$\begin{aligned} \text{Corrected Reading (dBuV)} &= \text{Meter Reading (dBuV)} + \text{External Cable (dB)} + \\ &\text{Cableloss (dB)} \\ 46.62 \text{ dBuV} + 9.8 \text{ dB} + 0.1 \text{ dB} &= 56.52 \text{ dBuV} \end{aligned}$$

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	2.80 dB
Radiated Disturbance, 9 kHz to 30 MHz	1.69 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.92 dB

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

4.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Clause 4.4.3 in IEC Guide 115:2023.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC.
This test report addresses the DXX (NFC) operational mode.

Representative model	Difference	Derivative model
		SM-A166U1, SM-S166V
SM-A166U	Hardware	Same
	Software	The UI has changed according to Service Provider

The model SM-A166U was used for final testing and is representative of the test results in this report.

5.2. MAXIMUM E-FIELD STRENGTH

The testing was performed at 3 meter. The transmitter maximum E-field at 30m distance is 12.45 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.

Worst case of antenna axis:

NFC with tag mode	NFC without tag mode
Z	Z

The fundamental level of the EUT was investigated each type and bitrate.
All test was performed worst case condition.

- ISO/IEC 14443-A(Type A) and bit rate 106 kbps

Radiated(fundamental level and spurious emissions) tests were performed both without reading a passive tag condition[test mode] and with reading a passive tag condition.

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37TC7A00JBDKA	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02115A	N/A

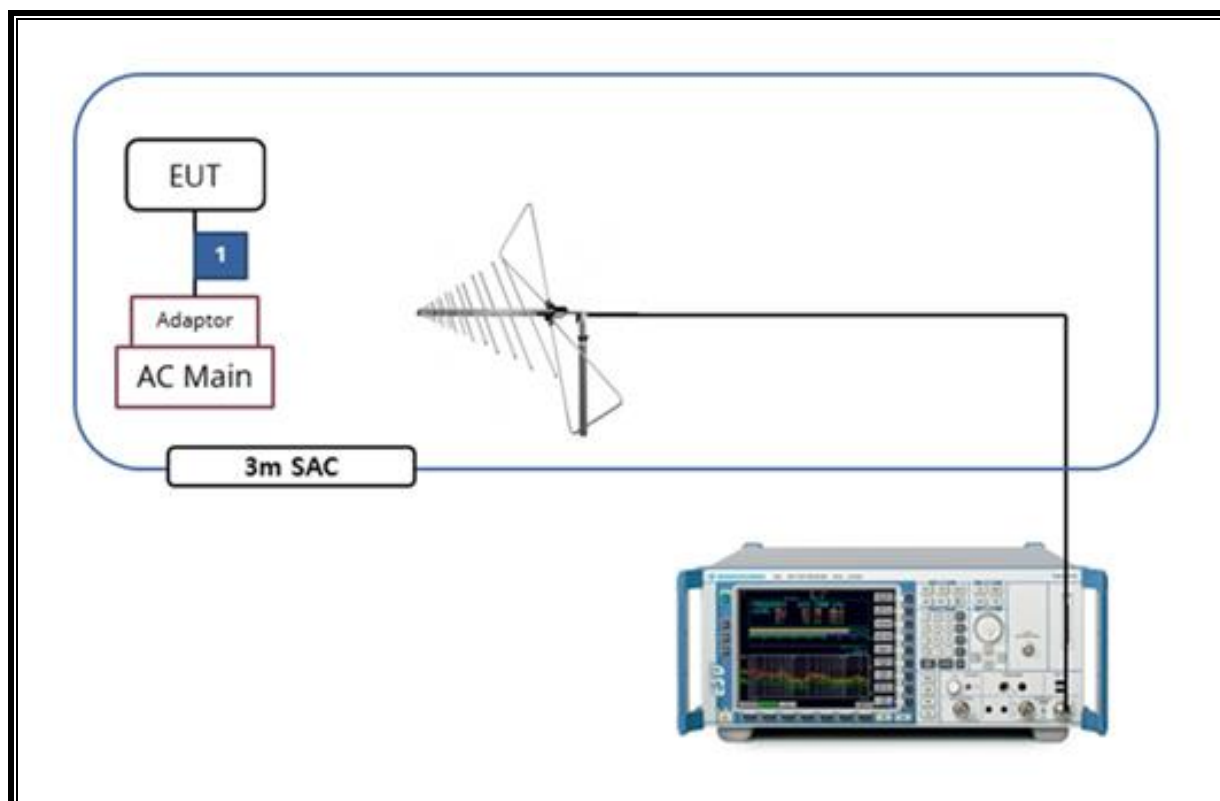
I/O CABLE

I/O Cable List						
Cable No.	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	C Type	Shielded	1.0 m	N/A

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 TEST SETUP)



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	VULB 9163	845	2026-07-30
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB 9163	749	2026-08-12
Preamplifier, 1000 MHz	Sonoma	310N	341282	2025-07-22
Preamplifier, 1000 MHz	Sonoma	310N	351741	2025-07-22
Spectrum Analyzer, 7 GHz	Agilent / HP	N9010A	MY54200580	2025-07-23
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030A	MY54170614	2025-07-24
EMI Test Receive, 3 GHz	R&S	ESR 3	101832	2025-07-22
DC Power Supply	Agilent / HP	E3640A	MY54226395	2025-07-24
Temperature Chamber	ESPEC	SH-642	93001109	2025-07-23
LISN	R&S	ENV216	101836	2025-07-22
LISN	R&S	ENV216	101837	2025-07-22
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2025-09-07
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 1-5% of emission BW. The VBW is set to 3 times the RBW. The sweep time is coupled.

RESULTS

Frequency [MHz]	20 dB Bandwidth [kHz]
13.56	439

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 dBuV/m is:

Limit (dBuV/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 C63.10-2020

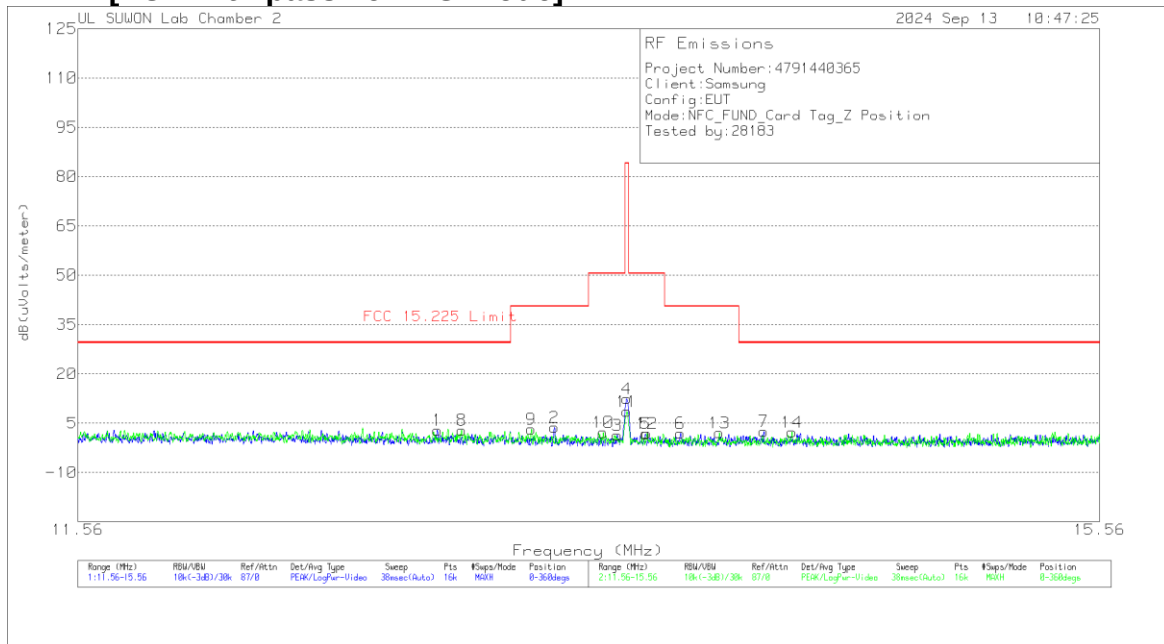
The EUT is an intentional radiator that incorporates a digital device. The highest fundamental frequency generated or used in the device is 13.56 MHz. The frequency range was investigated from 0.15 MHz to the 10th harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater (1000MHz)

RESULTS

No non-compliance noted:

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

[EUT with passive TAG mode]



Trace Markers

Face on

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor(dB/m)	Dist Corr 30m[dB]	Cable Loss[dB]	Corrected Reading (dBuV/m)	FCC 15.225 Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	12.83363	22.29	Pk	20.1	-40	.5	2.89	29.54	-26.65	0-360
2	13.27813	23.14	Pk	20.1	-40	.5	3.74	40.51	-36.77	0-360
3	13.52325	20.71	Pk	20.1	-40	.5	1.31	50.5	-49.19	0-360
**4	13.56	31.85	Pk	20.1	-40	.5	12.45	84	-71.55	0-360
5	13.63463	21.11	Pk	20.1	-40	.6	1.81	50.5	-48.69	0-360
6	13.77413	21.22	Pk	20.1	-40	.6	1.92	40.51	-38.59	0-360
7	14.11188	21.82	Pk	20.1	-40	.6	2.52	29.54	-27.02	0-360

Face off

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor(dB/m)	Dist Corr 30m[dB]	Cable Loss[dB]	Corrected Reading (dBuV/m)	FCC 15.225 Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
8	12.92475	22.26	Pk	20.1	-40	.5	2.86	29.54	-26.68	0-360
9	13.18963	22.55	Pk	20.1	-40	.5	3.15	40.51	-37.36	0-360
10	13.46788	21.58	Pk	20.1	-40	.5	2.18	50.5	-48.32	0-360
**11	13.56063	27.95	Pk	20.1	-40	.5	8.55	84	-75.45	0-360
12	13.64063	21.16	Pk	20.1	-40	.6	1.86	50.5	-48.64	0-360
13	13.93088	21.38	Pk	20.1	-40	.6	2.08	40.51	-38.43	0-360
14	14.22788	21.57	Pk	20.1	-40	.6	2.27	29.54	-27.27	0-360

Pk - Peak detector

**Fundamental

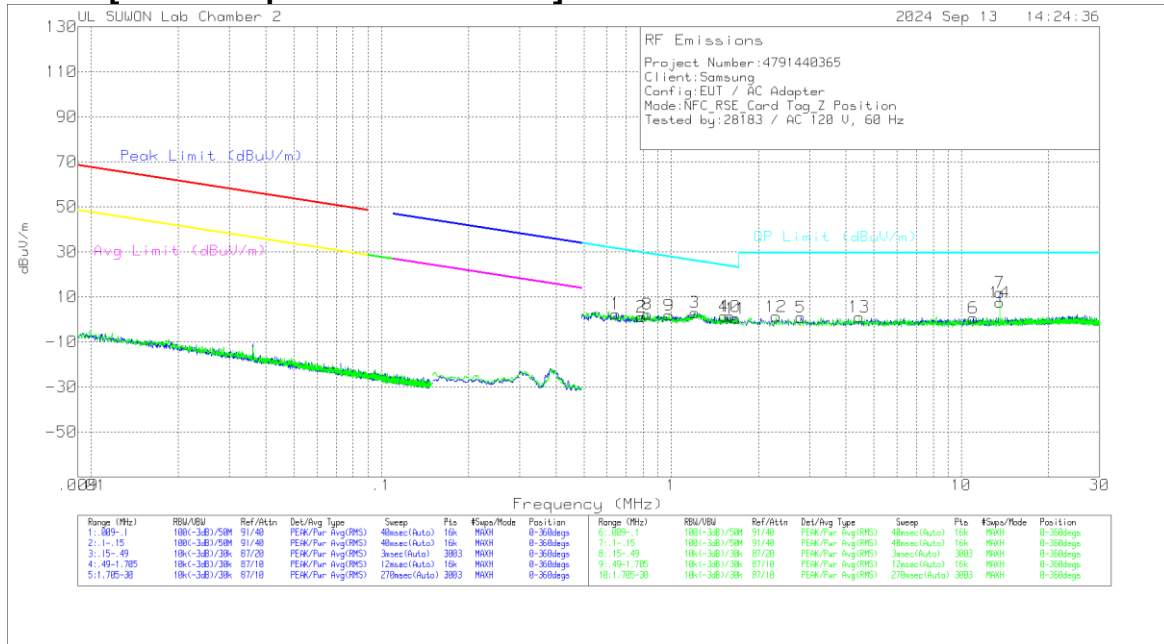
Note 1 : Although these tests were performed other than open filed test site, adequate comparison measurements were confirmed against 30 m open are test site.

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.

Note 2: Radiated test were investigated with three receiving antenna axes: Face-on, Face-off and horizontal (parallel to the ground plane) and the worse orientations of Face-on and Face-off were set for final test.

8.1.2. SPURIOUS EMISSION 0.009 TO 30 MHz

[EUT with passive TAG mode]



Trace Markers

[Face on]

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor(dB/m)	Cable Loss [dB]	Dist Corr 30m[dB]	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.64493	22.48	Pk	19.9	.1	-40	2.48	31.42	-28.94	0-360
2	.79047	21.01	Pk	19.9	.2	-40	1.11	29.66	-28.55	0-360
3	1.20763	22.96	Pk	19.9	.2	-40	3.06	25.99	-22.93	0-360
4	1.52242	21.15	Pk	20	.2	-40	1.35	23.98	-22.63	0-360
5	2.7983	20.56	Pk	20.1	.3	-40	.96	29.5	-28.54	0-360
6	11.00276	20.12	Pk	20	.5	-40	.62	29.5	-28.88	0-360
**7	13.56165	31.39	Pk	20	.5	-40	11.89	29.5	-17.61	0-360

[Face off]

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor(dB/m)	Cable Loss [dB]	Dist Corr 30m[dB]	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
8	.82736	22.16	Pk	19.9	.2	-40	2.26	29.26	-27	0-360
9	.98252	21.74	Pk	19.9	.2	-40	1.84	27.77	-25.93	0-360
10	1.59462	21.08	Pk	20	.2	-40	1.28	23.58	-22.3	0-360
11	1.66937	20.27	Pk	20	.2	-40	.47	23.18	-22.71	0-360
12	2.29878	21.11	Pk	20	.2	-40	1.31	29.5	-28.19	0-360
13	4.44768	20.71	Pk	20.1	.3	-40	1.11	29.5	-28.39	0-360
**14	13.56165	27	Pk	20	.5	-40	7.5	29.5	-22	0-360

Pk - Peak detector

**Fundamental

Note 1: The data for marker number 7 and 14 are the fundamental signal.

Please refer to section 8.1.1 about the fundamental level.

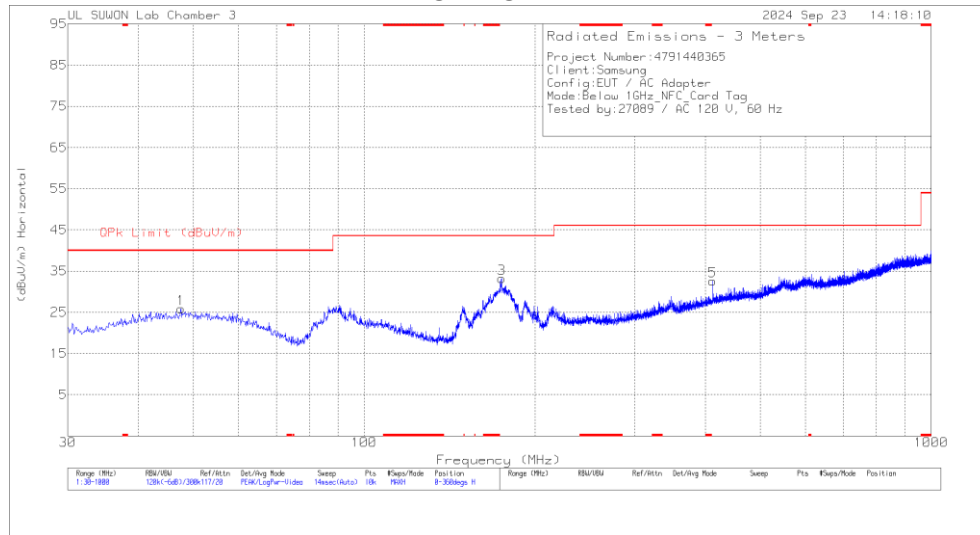
Frequency range 0.009MHz ~ 0.490MHz, only noise floor level and more than 20dB margin.

Note 2: Radiated test were investigated with three receiving antenna axes: Face-on, Face-off and horizontal (parallel to the ground plane) and the worse orientations of Face-on and Face-off were set for final test.

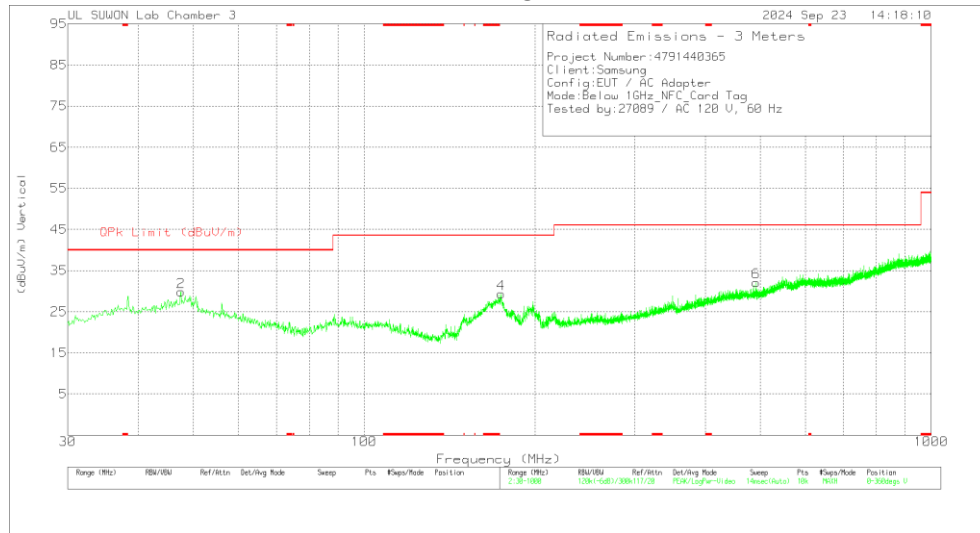
8.1.3. TX SPURIOUS EMISSION 30 TO 1000 MHz

[EUT with passive TAG mode]

HORIZONTAL



VERTICAL

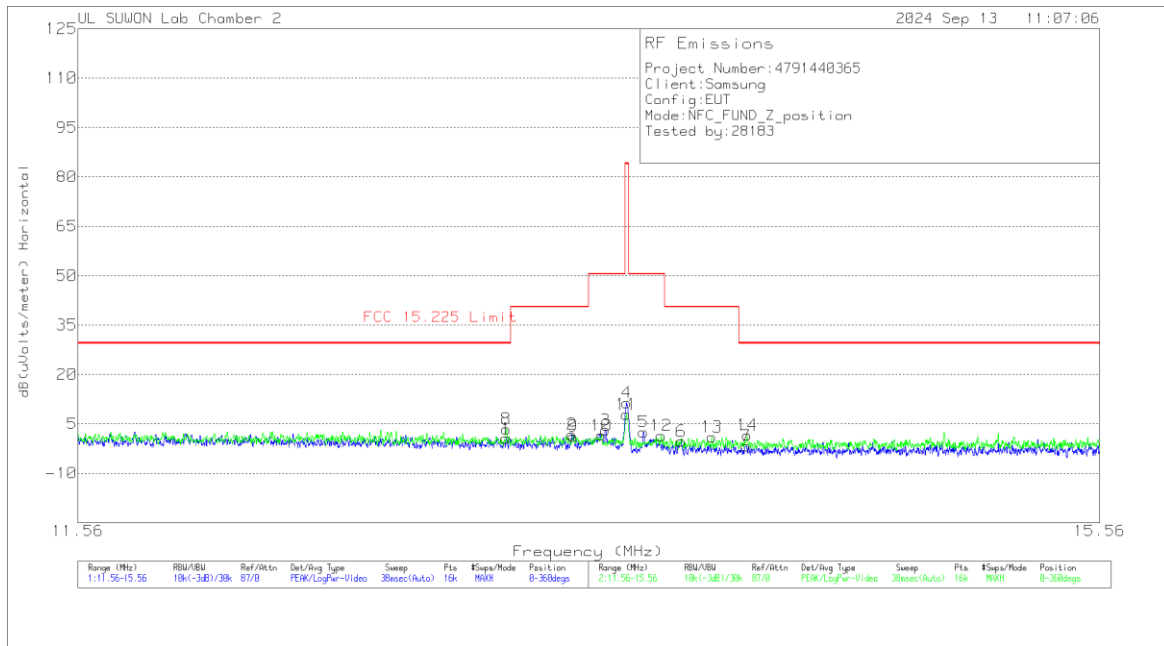


Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna_845_Fact or(dB/m)	Below_1G_Path Loss(dB)	Corrected Reading (dBuV/m)	OPK Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	47.5588	37.92	Pk	19.8	-31.8	25.92	40	-14.08	0-360	200	H
3	174.6419	49.62	Pk	14.6	-31	33.22	43.52	-10.3	0-360	100	H
5	411.5403	41.44	Pk	21.3	-30.1	32.64	46.02	-13.38	0-360	100	H
2	47.5588	41.83	Pk	19.8	-31.8	29.83	40	-10.17	0-360	100	V
4	174.4479	45.64	Pk	14.6	-30.9	29.34	43.52	-14.18	0-360	100	V
6	491.5736	39.66	Pk	22.3	-29.8	32.16	46.02	-13.86	0-360	100	V

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

8.1.4. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz) [EUT without passive TAG mode]



Trace Markers Face on

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor(dB/m)	Dist Corr 30m[dB]	Cable Loss[dB]	Corrected Reading (dBuV/m)	FCC 15.225 Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	13.09263	19.98	Pk	20.1	-40	.5	.58	29.54	-28.96	0-360
2	13.34563	21.23	Pk	20.1	-40	.5	1.83	40.51	-38.68	0-360
3	13.47688	22.56	Pk	20.1	-40	.5	3.16	50.5	-47.34	0-360
**4	13.56	30.82	Pk	20.1	-40	.5	11.42	84	-72.58	0-360
5	13.62663	21.87	Pk	20.1	-40	.6	2.57	50.5	-47.93	0-360
6	13.77738	19.01	Pk	20.1	-40	.6	-.29	40.51	-40.8	0-360
7	14.04013	17.58	Pk	20.1	-40	.6	-1.72	29.54	-31.26	0-360

Face off

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor(dB/m)	Dist Corr 30m[dB]	Cable Loss[dB]	Corrected Reading (dBuV/m)	FCC 15.225 Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
8	13.09438	22.87	Pk	20.1	-40	.5	3.47	29.54	-26.07	0-360
9	13.35175	20.65	Pk	20.1	-40	.5	1.25	40.51	-39.26	0-360
10	13.46063	20.94	Pk	20.1	-40	.5	1.54	50.5	-48.96	0-360
**11	13.559	27.28	Pk	20.1	-40	.5	7.88	84	-76.12	0-360
12	13.697	20.76	Pk	20.1	-40	.6	1.46	50.5	-49.04	0-360
13	13.90088	20.36	Pk	20.1	-40	.6	1.06	40.51	-39.45	0-360
14	14.044	20.89	Pk	20.1	-40	.6	1.59	29.54	-27.95	0-360

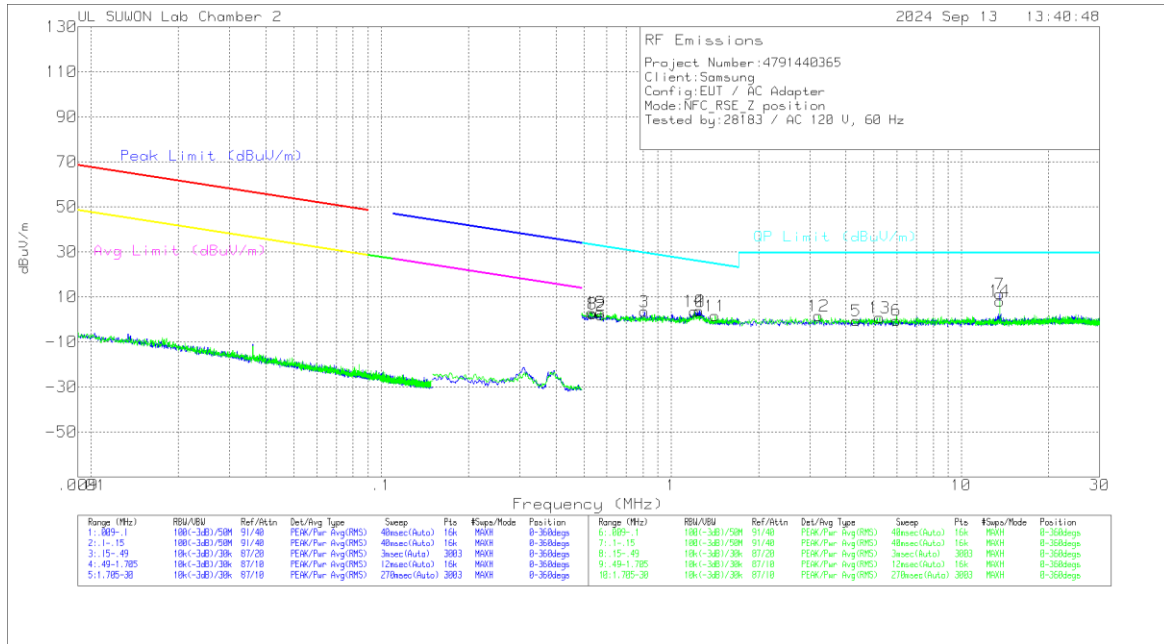
Pk - Peak detector

**Fundamental

Note 1: Although these tests were performed other than open filed test site, adequate comparison measurements were confirmed against 30 m open are 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.

Note 2: Radiated test were investigated with three receiving antenna axes: Face-on, Face-off and horizontal (parallel to the ground plane) and the worse orientations of Face-on and Face-off were set for final test.

8.1.5. SPURIOUS EMISSION 0.09 TO 30 MHz [EUT without passive TAG mode]



Trace Markers

[Face on]

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor(dB/m)	Cable Loss [dB]	Dist Corr 30m[dB]	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.53176	22.97	Pk	19.9	.1	-40	2.97	33.09	-30.12	0-360
2	.5728	21.84	Pk	19.9	.1	-40	1.84	32.45	-30.61	0-360
3	.80848	23.34	Pk	19.9	.2	-40	3.44	29.46	-26.02	0-360
4	1.25027	23.73	Pk	19.9	.2	-40	3.83	25.69	-21.86	0-360
5	4.344	19	Pk	20.1	.3	-40	-.6	29.5	-30.1	0-360
6	5.97453	19.06	Pk	20.1	.4	-40	-.44	29.5	-29.94	0-360
**7	13.56165	30.79	Pk	20	.5	-40	11.29	29.5	-18.21	0-360

[Face off]

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor(dB/m)	Cable Loss [dB]	Dist Corr 30m[dB]	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
8	.53579	22.43	Pk	19.9	.1	-40	2.43	33.03	-30.6	0-360
9	.57083	23.14	Pk	19.9	.1	-40	3.14	32.48	-29.34	0-360
10	1.20345	23.44	Pk	19.9	.2	-40	3.54	26.02	-22.48	0-360
11	1.41747	21.43	Pk	19.9	.2	-40	1.53	24.6	-23.07	0-360
12	3.22243	21.18	Pk	20.1	.3	-40	1.58	29.5	-27.92	0-360
13	5.22995	20.37	Pk	20.1	.3	-40	.77	29.5	-28.73	0-360
**14	13.56165	27.65	Pk	20	.5	-40	8.15	29.5	-21.35	0-360

Pk - Peak detector

**Fundamental

Note 1: The data for marker number 7 and 14 are the fundamental signal.

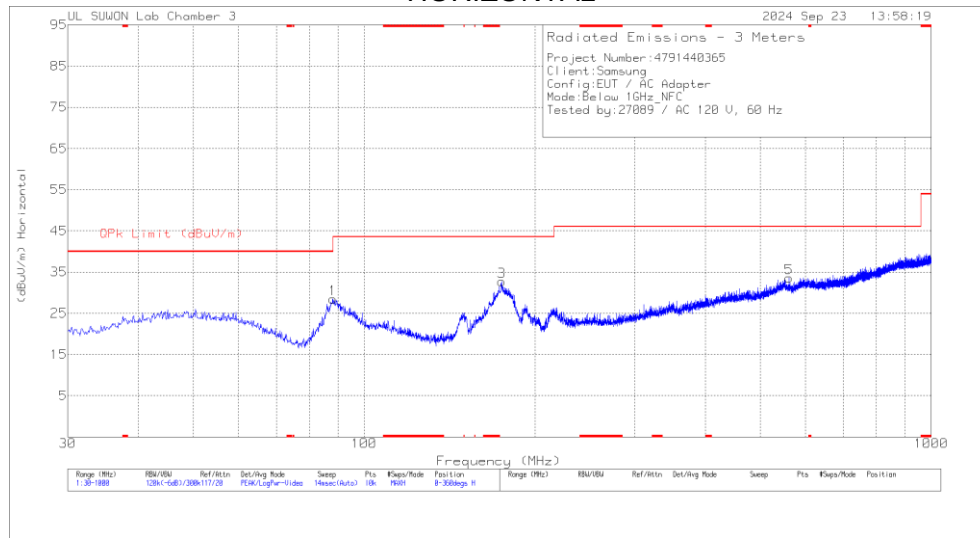
Please refer to section 8.1.4 about the fundamental level.

Frequency range 0.009MHz ~ 0.490MHz, only noise floor level and more than 20dB margin.

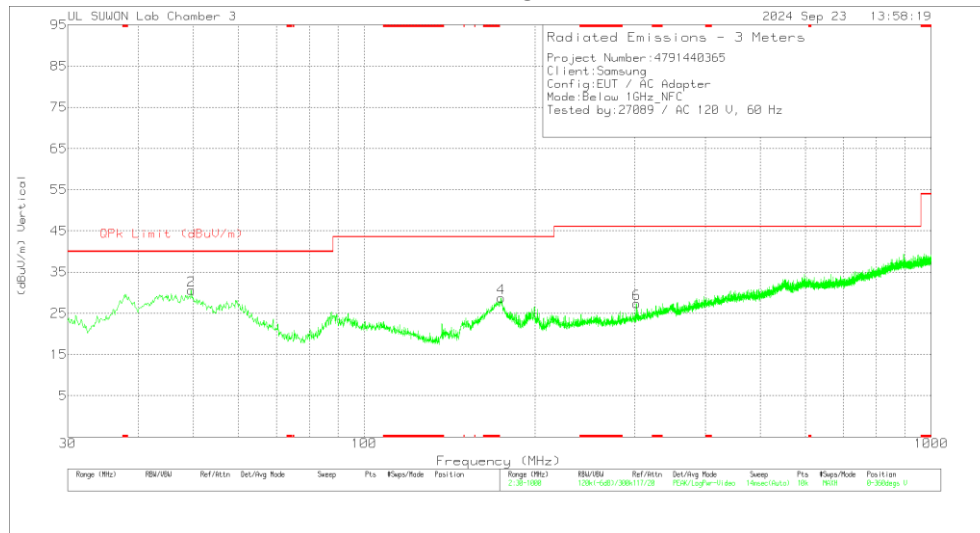
Note 2: Radiated test were investigated with three receiving antenna axes: Face-on, Face-off and horizontal (parallel to the ground plane) and the worse orientations of Face-on and Face-off were set for final test.

8.1.6. TX SPURIOUS EMISSION 30 TO 1000 MHz [EUT without passive TAG mode]

HORIZONTAL



VERTICAL



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna_845 Fact or(dB/m)	Below_1G_Path Loss(dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	88.012	44.81	PK	15.2	-31.5	28.51	43.52	-15.01	0-360	200	H
3	174.7389	49.14	PK	14.6	-31	32.74	43.52	-10.78	0-360	100	H
5	561.7118	40	PK	23.2	-29.6	33.6	46.02	-12.42	0-360	100	H
2	49.596	42.72	PK	19.8	-31.9	30.62	40	-9.38	0-360	100	V
4	174.3509	45.06	PK	14.6	-30.9	28.76	43.52	-14.76	0-360	100	V
6	302.1131	38.81	PK	18.8	-30.3	27.31	46.02	-18.71	0-360	100	V

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 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

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.

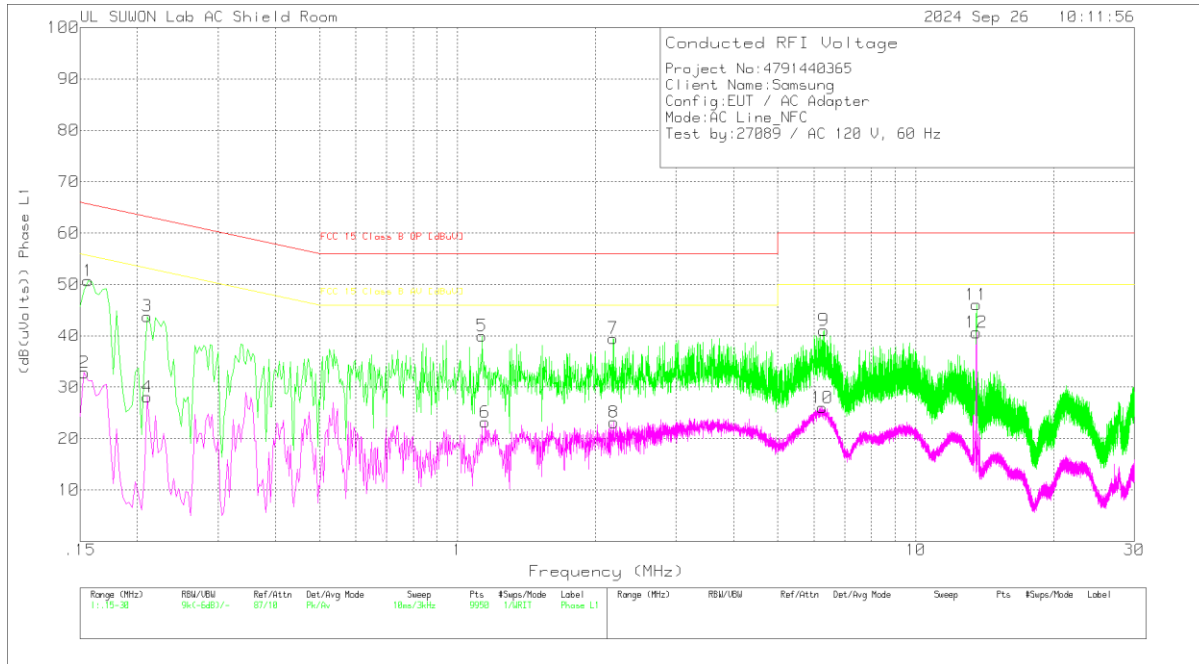
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

No non-compliance noted:

WORST EMISSIONS(non-Terminated)

LINE 1 PLOT



LINE 1 RESULTS

Trace Markers

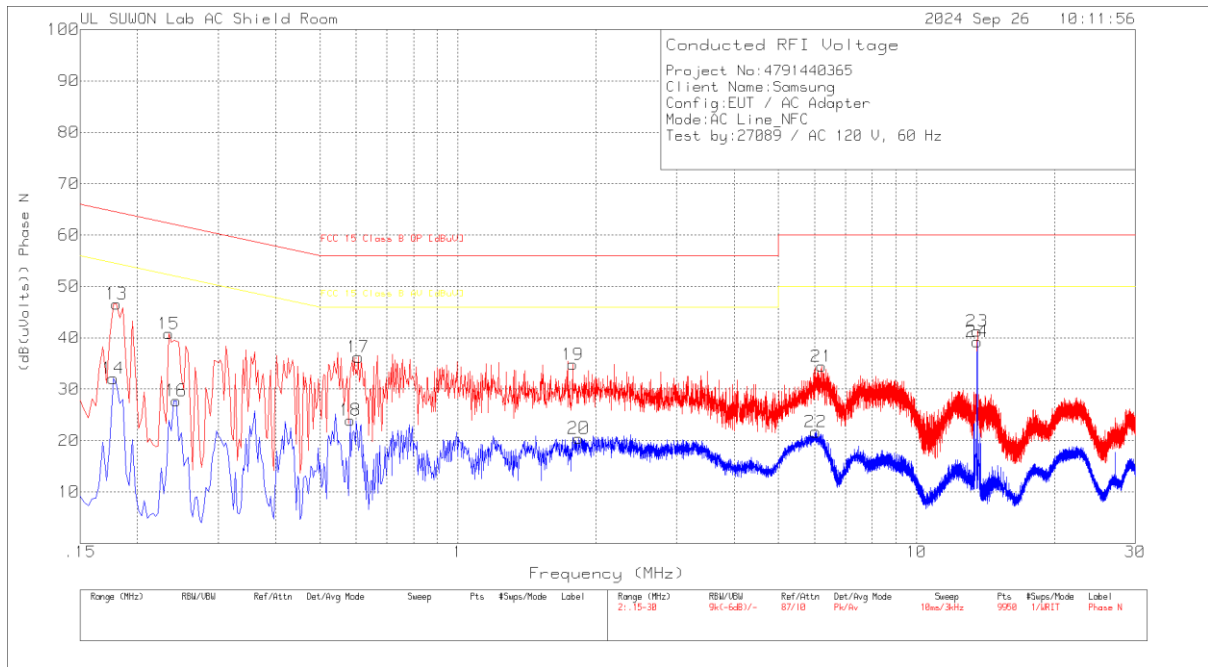
Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_L1 [dB]	Cable Loss [dB]	Corrected Reading [dBuV]	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
1	.156	40.8	Pk	9.8	.1	50.7	65.67	-14.97	-	-
2	.153	22.92	Av	9.8	.1	32.82	-	-	55.84	-23.02
3	.21	33.9	Pk	9.8	.1	43.8	63.21	-19.41	-	-
4	.21	18.19	Av	9.8	.1	28.09	-	-	53.21	-25.12
5	1.131	30.19	Pk	9.7	.1	39.99	56	-16.01	-	-
6	1.149	13.4	Av	9.7	.1	23.2	-	-	46	-22.8
7	2.184	29.71	Pk	9.7	.1	39.51	56	-16.49	-	-
8	2.19	13.37	Av	9.7	.1	23.17	-	-	46	-22.83
9	6.3	31.08	Pk	9.8	.2	41.08	60	-18.92	-	-
10	6.246	16.01	Av	9.8	.2	26.01	-	-	50	-23.99
11	13.56	35.75	Pk	10	.3	46.05	60	-13.95	-	-
12	13.56	30.34	Av	10	.3	40.64	-	-	50	-9.36

Pk - Peak detector

Av - Average detection

LINE 2 PLOT



LINE 2 RESULTS

Trace Markers

Range 2: Phase N .15 - 30MHz

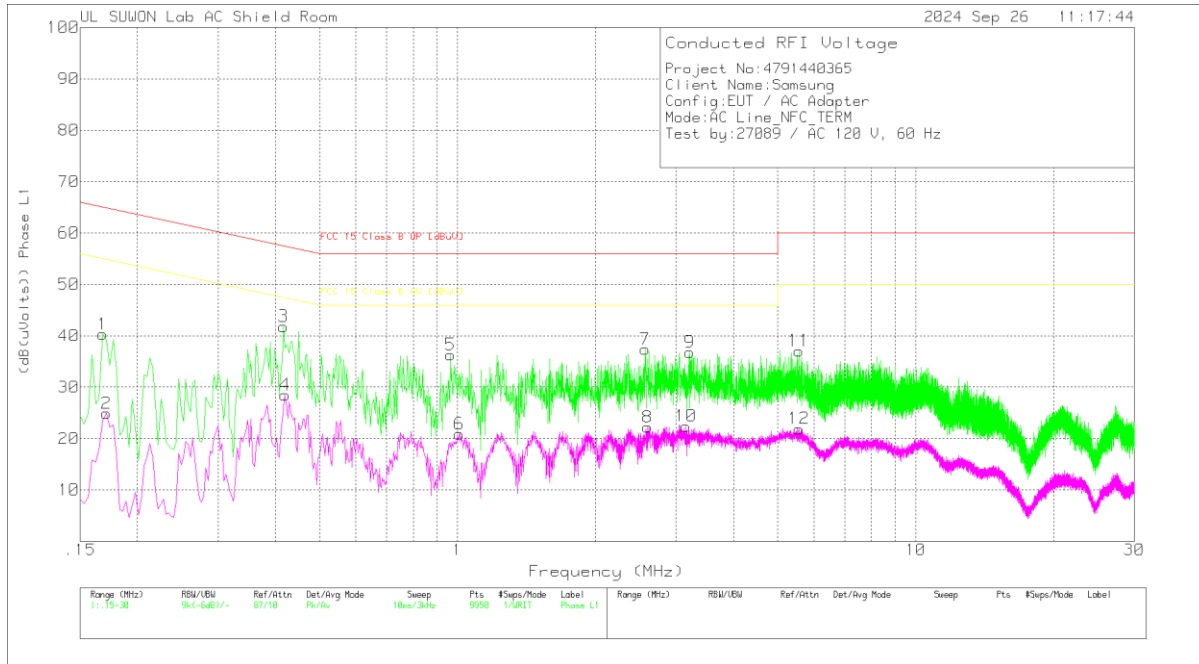
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836 With EX_N [dB]	Cable Loss [dB]	Corrected Reading [dBuV]	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
13	.18	36.59	Pk	9.9	.1	46.59	64.49	-17.9	-	-
14	.177	21.98	Av	10	.1	32.08	-	-	54.63	-22.55
15	.234	31.01	Pk	9.7	.1	40.81	62.31	-21.5	-	-
16	.243	17.95	Av	9.7	.1	27.75	-	-	51.99	-24.24
17	.606	26.34	Pk	9.8	.1	36.24	56	-19.76	-	-
18	.582	14.05	Av	9.8	.1	23.95	-	-	46	-22.05
19	1.779	24.99	Pk	9.7	.1	34.79	56	-21.21	-	-
20	1.833	10.6	Av	9.7	.1	20.4	-	-	46	-25.6
21	6.216	24.44	Pk	9.8	.2	34.44	60	-25.56	-	-
22	6.027	11.7	Av	9.8	.2	21.7	-	-	50	-28.3
23	13.56	31	Pk	10	.3	41.3	60	-18.7	-	-
24	13.56	28.93	Av	10	.3	39.23	-	-	50	-10.77

Pk - Peak detector

Av - Average detection

WORST EMISSIONS(Terminated)

LINE 1 PLOT



LINE 1 RESULTS

Trace Markers

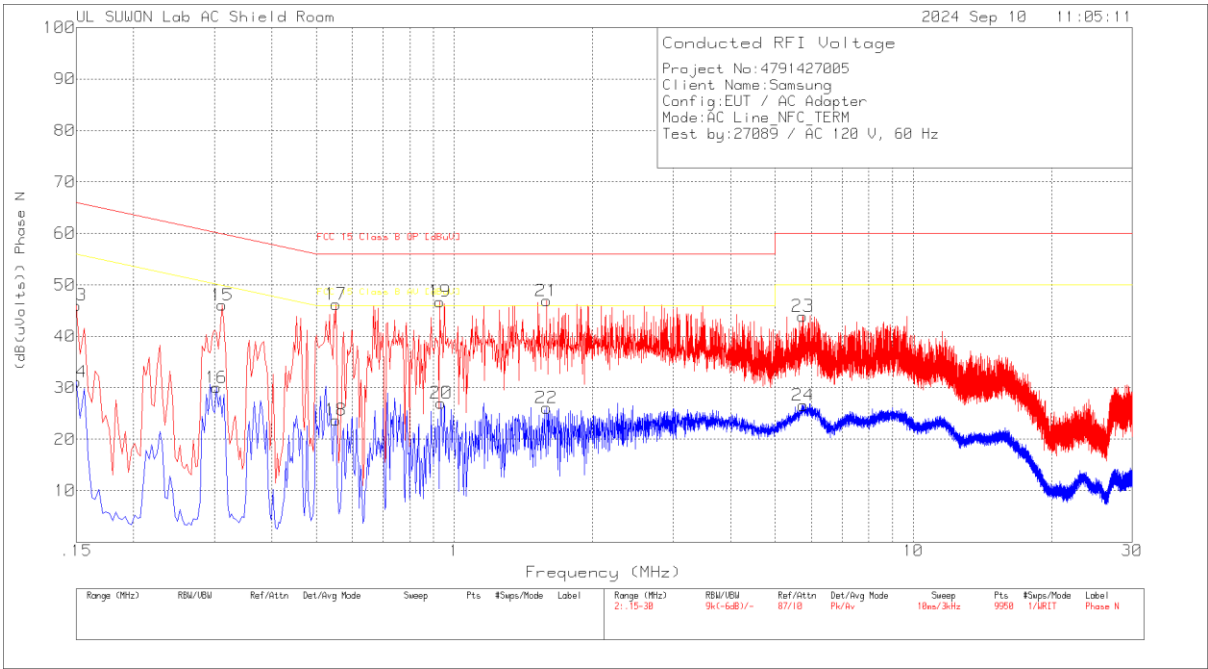
Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_L1 [dB]	Cable Loss [dB]	Corrected Reading [dBuV]	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
1	.168	30.2	Pk	10	.1	40.3	65.06	-24.76	-	-
2	.171	14.8	Av	10	.1	24.9	-	-	54.91	-30.01
3	.417	31.92	Pk	9.8	.1	41.82	57.51	-15.69	-	-
4	.42	18.57	Av	9.8	.1	28.47	-	-	47.45	-18.98
5	.966	26.4	Pk	9.8	.1	36.3	56	-19.7	-	-
6	1.008	11.09	Av	9.7	.1	20.89	-	-	46	-25.11
7	2.568	27.59	Pk	9.7	.1	37.39	56	-18.61	-	-
8	2.601	12.41	Av	9.7	.1	22.21	-	-	46	-23.79
9	3.213	26.99	Pk	9.7	.1	36.79	56	-19.21	-	-
10	3.15	12.61	Av	9.7	.1	22.41	-	-	46	-23.59
11	5.562	27.04	Pk	9.8	.2	37.04	60	-22.96	-	-
12	5.562	11.92	Av	9.8	.2	21.92	-	-	50	-28.08

Pk - Peak detector

Av - Average detection

LINE 2 PLOT



LINE 2 RESULTS

Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836 With EX_N [dB]	Cable Loss [dB]	Corrected Reading [dBuV]	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
13	.165	31.64	Pk	9.9	.1	41.64	65.21	-23.57	-	-
14	.171	17.52	Av	10	.1	27.62	-	-	54.91	-27.29
15	.429	29.24	Pk	9.8	.1	39.14	57.27	-18.13	-	-
16	.429	19.66	Av	9.8	.1	29.56	-	-	47.27	-17.71
17	.963	23.17	Pk	9.8	.1	33.07	56	-22.93	-	-
18	1.038	9.96	Av	9.7	.1	19.76	-	-	46	-26.24
19	1.644	21.55	Pk	9.7	.1	31.35	56	-24.65	-	-
20	1.737	10.55	Av	9.7	.1	20.35	-	-	46	-25.65
21	2.331	21.21	Pk	9.7	.1	31.01	56	-24.99	-	-
22	2.445	9.44	Av	9.7	.1	19.24	-	-	46	-26.76
23	5.805	19.16	Pk	9.8	.2	29.16	60	-30.84	-	-
24	5.064	7.19	Av	9.8	.2	17.19	-	-	50	-32.81

Pk - Peak detector

Av - Average detection

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

Test Date	2024-9-26
Test Engineer	25910

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)
3.88	50	13.560582793	-5.505	13.560581916	-5.569	13.560581061	-5.632	13.560580839	-5.649	100
3.88	40	13.560600710	-4.183	13.560599518	-4.271	13.560599881	-4.244	13.560590772	-4.916	100
3.88	30	13.560608294	-3.624	13.560607686	-3.669	13.560607053	-3.716	13.560608369	-3.618	100
3.88	20	13.560657438	0.000	13.560650901	-0.482	13.560639064	-1.355	13.560633147	-1.791	100
3.88	10	13.560669004	0.853	13.560665446	0.591	13.560683172	1.898	13.560662526	0.375	100
3.88	0	13.560684995	2.032	13.560681736	1.792	13.560681451	1.771	13.560681403	1.767	100
3.88	-10	13.560677976	1.515	13.560681830	1.799	13.560684475	1.994	13.560685355	2.059	100
3.88	-20	13.560659572	0.157	13.560662951	0.407	13.560665953	0.628	13.560667326	0.729	100
3.88	-30	13.560688895	2.320	13.560647380	-0.742	13.560662944	0.406	13.560635171	-1.642	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)
3.70	20	13.560657411	-0.002	13.560657489	0.004	13.560657325	-0.006	13.560657573	0.012	100
3.88	20	13.560657438	0.000	13.560650901	-0.482	13.560639064	-1.353	13.560633147	-1.789	100
4.45	20	13.560657984	0.040	13.560657454	0.001	13.560657987	0.042	13.560657158	-0.019	100

No non-compliance noted.

END OF TEST REPORT