CERTIFICATION TEST REPORT

Report Number. : 4790841155-E9V1

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-X516B
FCC ID	:	A3LSMX516B
EUT Description	:	GSM/WCDMA/LTE 5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac/ax and Digitizer
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C

Date Of Issue:
2023-07-18

Prepared by:
UL KOREA LTD.
26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

Suwon Test Site: UL KOREA LTD. Suwon Laboratory
218 Maeyeong-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16675, Korea
TEL: (031) 337-9902
FAX: (031) 213-5433

IAS ACCREDITED
Testing Laboratory
TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2023-07-18	Initial issue	Dexter(Hyunsik) Yun

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE 5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac/ax and Digitizer
MODEL NUMBER:	SM-X516B
SERIAL NUMBER:	74b2c4c8e3397ece (RADIATED);
DATE TESTED:	2023-07-10 ~ 2023-07-18

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 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:

Dexter(Hyunsik) Yun
Suwon Lab Engineer
UL KOREA LTD.

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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.
4. KDB 680106 D01 RF Exposure Wireless Charging Apps v03.

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:

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

Corrected Reading (dBuV) = Meter Reading (dBuV) + External Cable (dB) + Cableloss (dB)
46.62 dBuV + 9.8 dB + 0.1 dB = 56.52 dBuV

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 Procedure 2, Clause 4.4.3 in IEC Guide 115:2021.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE 5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac/ax and Digitizer. This test report addresses the wireless low power transmitter(DCD) operational mode.

5.2. MAXIMUM E-FIELD STRENGTH

- Mode 1

Fundamental Frequency (kHz)	Test Case	E-Field (30m distance) FCC (dBuV/m)
531 ~ 656	**2**	**6.41**

Test was performed at the worst margin among the fundamental output levels(531, 562, 593, **656** kHz).

5.3. PRELIMINARY TEST CONFIGURATIONS

Worst case of antenna axis: Y

5.4. WORST-CASE CONFIGURATION AND MODE

Mode 1	Test Case	Description
Digitizer	1	Display Scan(without TA)
	2	**Display Scan(with TA)**

During radiated test for test case 1, the EUT didn't connected AC adapter, but for AC line conducted test for all test case was performed with connected with AC adapter.

For Digitizer mode, test results of case 2 is worst, so this test report described test case 2.

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5.5. MODIFICATIONS

No modifications were made during testing.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT & PERIPHERALS

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA800	R37M9KN2LV2DK3	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02115A	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	C Type	Shielded	1.0 m	N/A

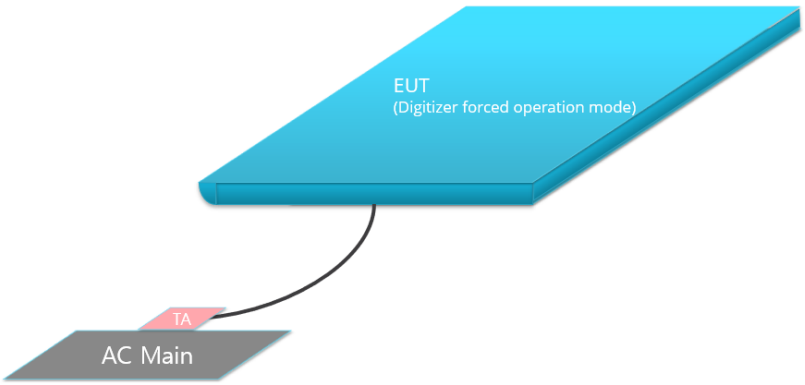
TEST SETUP

The EUT is installed in a typical configuration. Charging from EUT.

TEST SETUP DIAGRAM

NOTE : Test case 1, EUT did not connected with Travel adapter(AC Main) in below set-up diagram for radiated test.

- Test case 1 and 2 : Digitizer



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	845	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2024-08-15
Preamplifier, 1000 MHz	Sonoma	310N	341282	2023-08-02
Preamplifier, 1000 MHz	Sonoma	310N	351741	2023-08-02
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2023-07-29
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2023-08-01
Spectrum Analyzer, 7 GHz	Agilent / HP	N9010A	MY54200580	2023-08-01
LISN	R&S	ENV-216	101837	2023-08-04
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2023-10-06
UL Software				
Description	**Manufacturer**	**Model**	**Version**	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

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6. APPLICABLE LIMITS AND TEST RESULTS

6.1. RADIATED EMISSIONS

TEST PROCEDURE

ANSI C63.10: 2013

The highest clock frequency generated or used in the EUT is 600 kHz therefore the frequency range was investigated from 9 kHz to 30 MHz.

LIMIT

FCC §15.209 (a)
ICES-001 Section 6.2, IC RSS-216 6.2.2, and IC RSS-GEN Sections 8.9 and 8.10.

Frequency (MHz)	Field Strength (microvolts/meter)	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 to 216	150	3
216 to 960	200	3
Above 960 MHz	500	3
Note: The lower limit shall apply at the transition frequency.		

RESULTS

The EUT belongs to Test Case 2.

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 300 m open field 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 D01.

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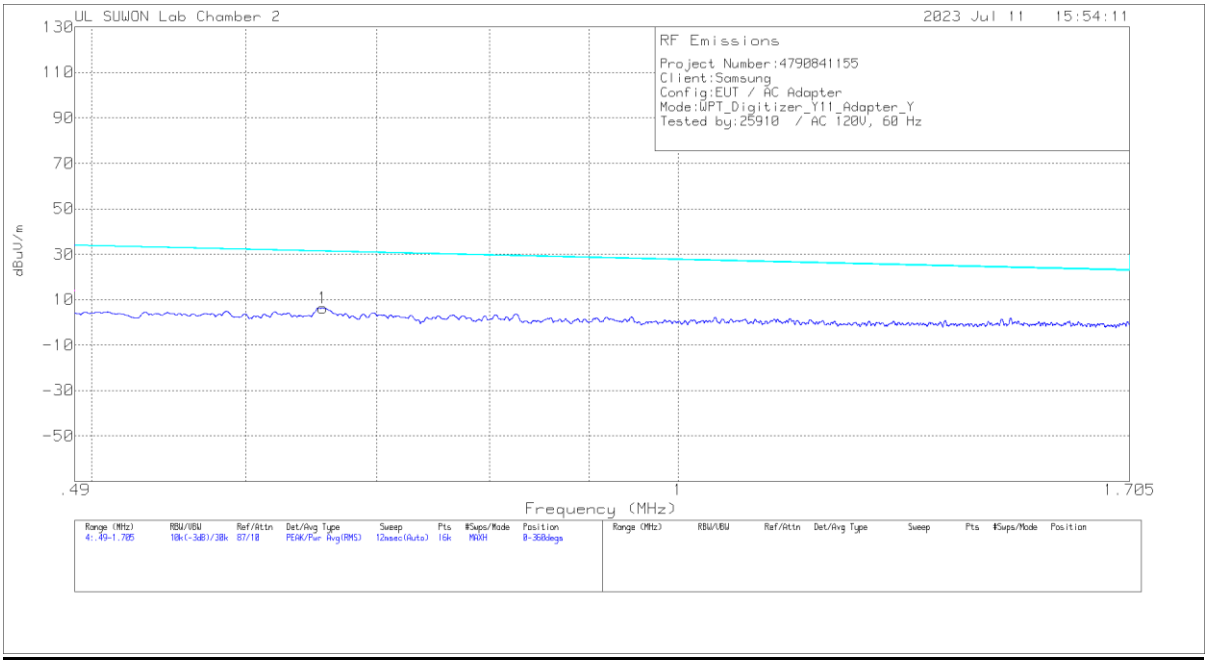
FUNDAMENTAL EMISSIONS 9 KHz to 30 MHz(Digitizer mode Test Case 2)



TEST DATA

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	HFH2-Z2_Loop Antenna	Cable Loss	Dist Corr 30m	Corrected Reading dBuV/m	QP Limit (dBuV/m)	Margin (dB)
1	.65686	26.31	Pk	20	.1	-40	6.41	31.26	-24.85

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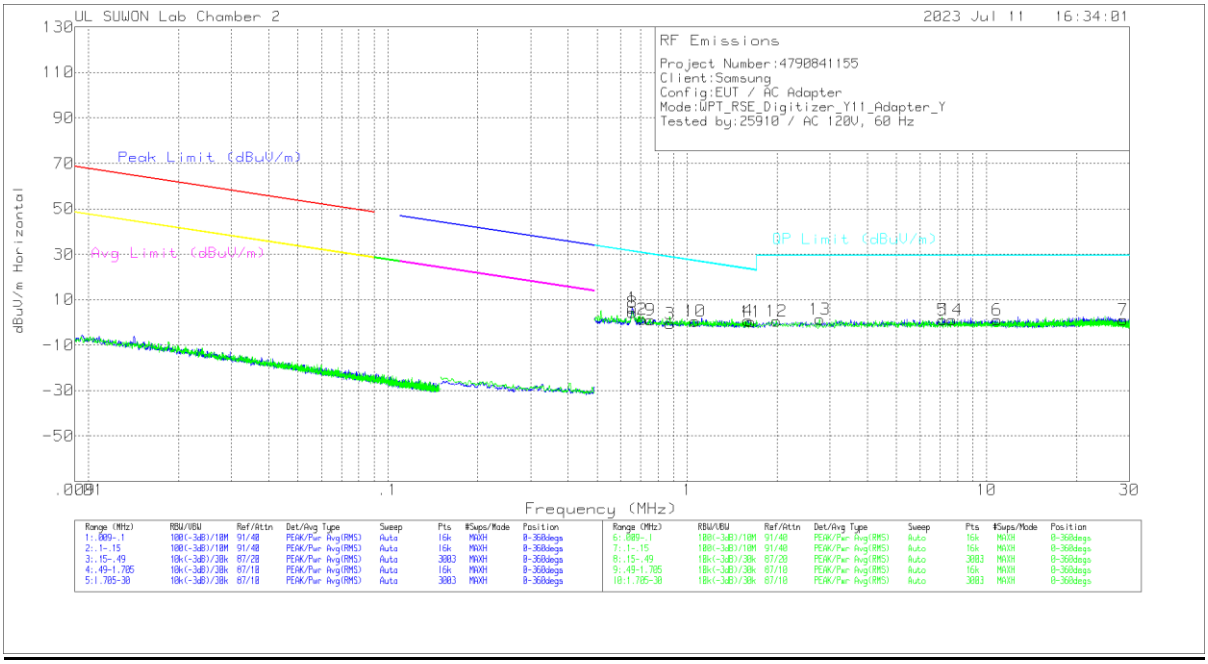
RADIATED EMISSIONS 9 KHz to 30 MHz(Digitizer mode Test Case 2)



TEST DATA

Trace Markers

[Face On]

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	HFH2-Z2_Loop Antenna	Cable Loss	Dist Corr 30m	Corrected Reading dBuV/m	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
**1	.65602	26.29	Pk	20	.1	-40	6.39	31.27	-24.88	0-360
2	.70827	21.18	Pk	20	.1	-40	1.28	30.61	-29.33	0-360
3	.87597	19.25	Pk	20	.2	-40	-.55	28.77	-29.32	0-360
4	1.59698	20.49	Pk	20.1	.2	-40	.79	23.57	-22.78	0-360
5	7.12438	20.59	Pk	20.2	.4	-40	1.19	29.5	-28.31	0-360
6	10.84725	20.46	Pk	20.2	.5	-40	1.16	29.5	-28.34	0-360
7	28.63223	20.59	Pk	19.8	.8	-40	1.19	29.5	-28.31	0-360

[Face Off]

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	HFH2-Z2_Loop Antenna	Cable Loss	Dist Corr 30m	Corrected Reading dBuV/m	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
**8	.65709	24.25	Pk	20	.1	-40	4.35	31.26	-26.91	0-360
9	.75387	20.98	Pk	20	.2	-40	1.18	30.07	-28.89	0-360
10	1.06141	20.39	Pk	20	.2	-40	.59	27.11	-26.52	0-360
11	1.63475	20.02	Pk	20.1	.2	-40	.32	23.36	-23.04	0-360
12	1.98775	20.25	Pk	20.1	.2	-40	.55	29.5	-28.95	0-360
13	2.77003	20.86	Pk	20.2	.3	-40	1.36	29.5	-28.14	0-360
14	7.65689	20.62	Pk	20.2	.4	-40	1.22	29.5	-28.28	0-360

Pk - Peak detector

** Fundamental

Note : 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.

6.1. AC MAINS LINE CONDUCTED EMISSIONS

TEST PROCEDURE

ANSI C63.10: 2013

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.

LIMIT

FCC §15.207 (a)

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
*Decreases with the logarithm of the frequency.		

RESULTS

The EUT belongs to Test Case 2.

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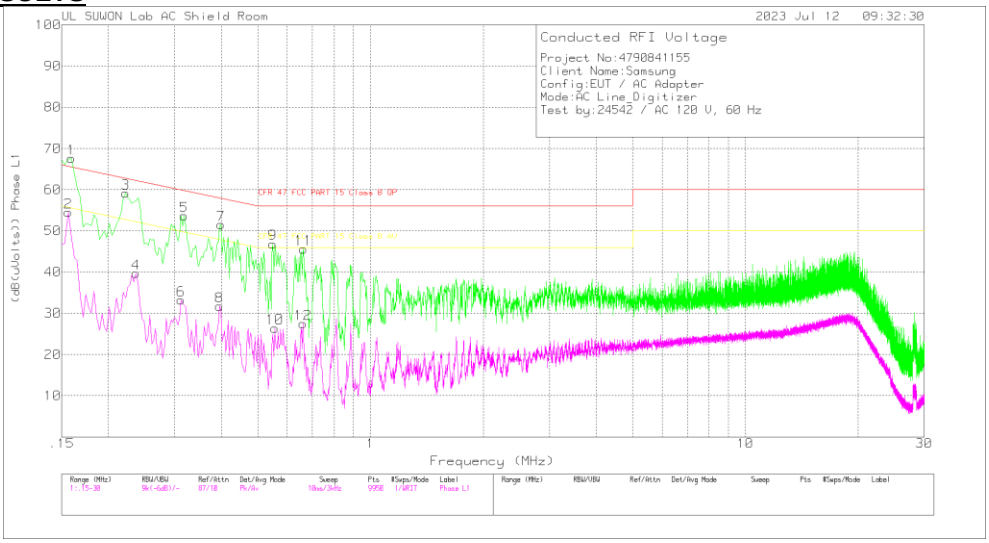
WORST EMISSIONS (Digitizer mode Test Case 2)

Line-L1 .15 - 30MHz

LINE 1 RESULTS



Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_AUTO_With EX_L1[dB]	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	.159	58.06	Pk	9.5	.1	67.66	**65.52**	**2.14**	-	-
2	.156	44.96	Av	9.5	.1	54.56	-	-	55.67	-1.11
3	.222	49.43	Pk	9.5	.2	59.13	62.74	-3.61	-	-
4	.237	30	Av	9.5	.2	39.7	-	-	52.2	-12.5
5	.318	44.01	Pk	9.5	.2	53.71	59.76	-6.05	-	-
6	.312	23.58	Av	9.5	.2	33.28	-	-	49.92	-16.64
7	.399	41.9	Pk	9.5	.2	51.6	57.87	-6.27	-	-
8	.396	22.05	Av	9.5	.2	31.75	-	-	47.94	-16.19
9	.549	37.08	Pk	9.6	.2	46.88	56	-9.12	-	-
10	.555	16.64	Av	9.6	.2	26.44	-	-	46	-19.56
11	.663	35.83	Pk	9.6	.2	45.63	56	-10.37	-	-
12	.66	17.74	Av	9.6	.2	27.54	-	-	46	-18.46

Pk - Peak detector
Av - Average detection

Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_AUTO_With EX_L1[dB]	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)
.15825	46.53	Qp	9.5	.1	56.13	65.56	-9.43	-	-
.15525	46.38	Qp	9.5	.1	55.98	65.71	-9.73	-	-
.22215	32.21	Qp	9.5	.2	41.91	62.74	-20.83	-	-
.31875	33.99	Qp	9.5	.2	43.69	59.74	-16.05	-	-
.39825	30.68	Qp	9.5	.2	40.38	57.89	-17.51	-	-
.54915	26.16	Qp	9.6	.2	35.96	56	-20.04	-	-

Qp - Quasi-Peak detector

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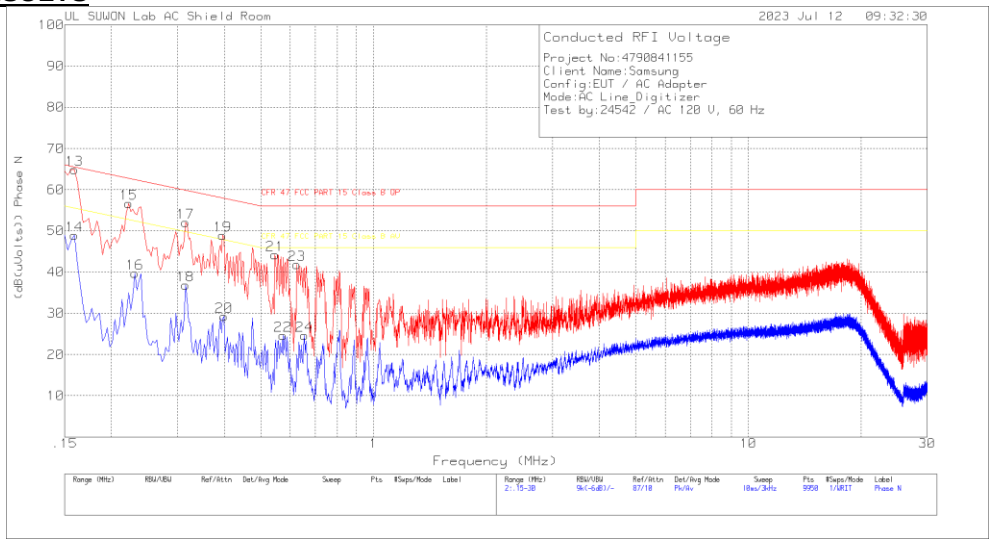
Line-L2 .15 - 30MHz

LINE 2 RESULTS



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_AUTO_With EX_N[dB]	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	.159	55.33	Pk	9.5	.1	64.93	65.52	-.59	-	-
14	.159	39.3	Av	9.5	.1	48.9	-	-	55.52	-6.62
15	.222	46.98	Pk	9.5	.2	56.68	62.74	-6.06	-	-
16	.231	29.96	Av	9.5	.2	39.66	-	-	52.41	-12.75
17	.315	42.33	Pk	9.5	.2	52.03	59.84	-7.81	-	-
18	.315	27.18	Av	9.5	.2	36.88	-	-	49.84	-12.96
19	.396	39.21	Pk	9.5	.2	48.91	57.94	-9.03	-	-
20	.399	19.53	Av	9.5	.2	29.23	-	-	47.87	-18.64
21	.546	34.38	Pk	9.6	.2	44.18	56	-11.82	-	-
22	.573	14.79	Av	9.6	.2	24.59	-	-	46	-21.41
23	.624	31.98	Pk	9.6	.2	41.78	56	-14.22	-	-
24	.654	14.87	Av	9.6	.2	24.67	-	-	46	-21.33

Pk - Peak detector
Av - Average detection

Quasi-Peak Emissions

Range 2: Phase N .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_AUTO_With EX_N[dB]	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)
.15915	45.63	Qp	9.5	.1	55.23	65.51	-10.28	-	-
.15915	45.49	Qp	9.5	.1	55.09	65.51	-10.42	-	-
.22125	32	Qp	9.5	.2	41.7	62.77	-21.07	-	-
.31575	31.89	Qp	9.5	.2	41.59	59.82	-18.23	-	-
.36975	25.48	Qp	9.5	.2	35.18	58.51	-23.33	-	-

Qp - Quasi-Peak detector

END OF TEST REPORT