CERTIFICATION TEST REPORT

Report Number. : 4790976555-E11V2

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-S921B/DS, SM-S921B
FCC ID	:	A3LSMS921B
EUT Description	:	GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC and WPT
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C

Date Of Issue:
2023-10-18

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	2023-10-17	Initial issue	Dexter(Hyunsik) Yun
V2	2023-10-18	Updated to address TCB's question	Dexter(Hyunsik) Yun

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UL KOREA LTD. Suwon Laboratory FORM ID: FCC_15C(05)
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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/ax, NFC and WPT
MODEL NUMBER:	SM-S921B/DS, SM-S921B
SERIAL NUMBER:	R3CW80FLMSJ, R3CW90M7N2J, R3CW90M7MSN (RADIATED);
DATE TESTED:	2023-08-28 ~ 2023-10-18

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 v03r01.

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 Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC and WPT. This test report addresses the wireless low power transmitter(DCD) operational mode.

Representative model	Difference	Derivative model
		SM-S921B
SM-S921B/DS	Hardware	Different Sim Card tray
	Software	Same

The model SM-S921B/DS was used for final testing and is representative of the test results in this report.

5.2. MAXIMUM E-FIELD STRENGTH

Fundamental Frequency (kHz)	Test Case	E-Field (30m distance) FCC (dBuV/m)
110 - 148	**5**	**-2.30**

5.3. PRELIMINARY TEST CONFIGURATIONS

	Power sharing mode
Worst case of antenna axis	Y

5.4. WORST-CASE CONFIGURATION AND MODE

Mode 1	Test Case	Description
Power sharing mode	1	Charging from EUT to Phone
	2	Charging from EUT(Charging from TA) to Phone
	3	Charging from EUT to Phone (Cross position)
	4	Charging from EUT(Charging from TA) to Phone (Cross position)
	5	**Charging from EUT to Wearable device**
	6	Charging from EUT(Charging from TA) to Wearable device

For radiated test, test case 1/3/5, the EUT can operate the power sharing mode when battery level is over 30%. Because test results are not different between fully charged status and battery level 30% status(EUT condition), test were performed fully charged condition.

Also according to current client device's(Phone and Wearable device) battery level, test results are different.Because the test results were worst when the battery level was 1%~20%, tests were performed when the battery level was 1%~20%.(Client device)

During radiated test for test case 1/3/5, 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 power sharing mode, test results of case 5 is worst case so this test report described test case 5.

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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	R37T53J8459SEA	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02111A	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

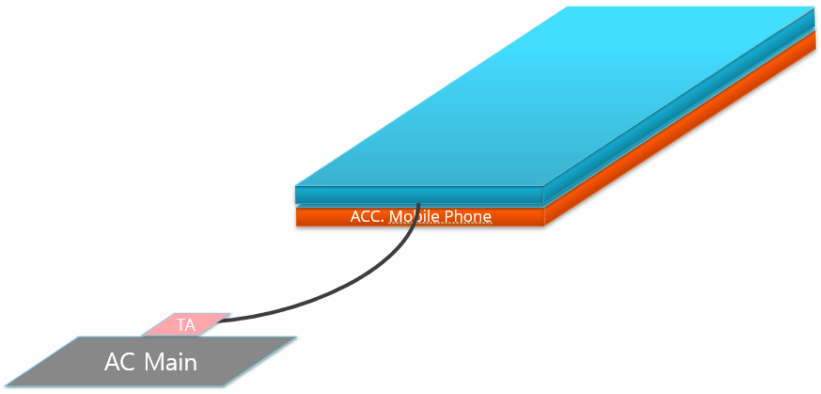
TEST SETUP

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

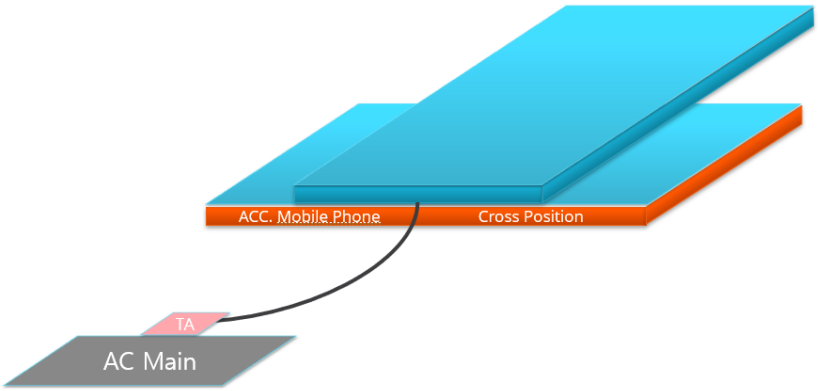
TEST SETUP DIAGRAM

NOTE : Test case 1/3/5, EUT did not connected with Travel adapter(AC Main) in below set-up diagram for radiated test.

- Test Case1 and 2 : Charging Phone



- Test Case 3 and 4 : Charging Phone(Cross position)



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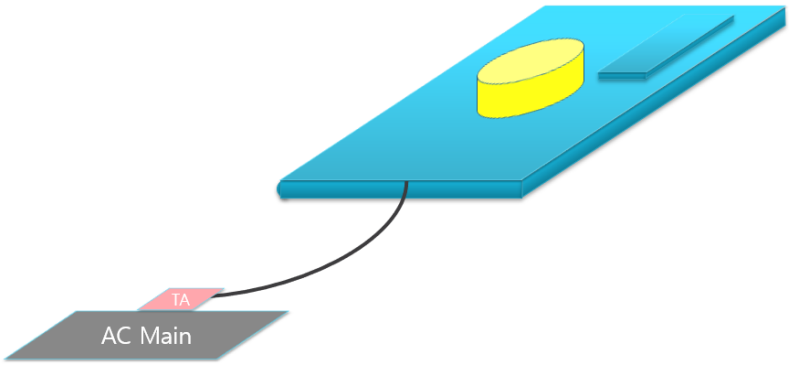
- Test Case 5 and 6 : Charging Wearable device



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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	845	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2024-08-15
Preamplifier, 1000 MHz	Sonoma	310N	341282	2024-07-24
Preamplifier, 1000 MHz	Sonoma	310N	351741	2024-07-24
Spectrum Analyzer, 7 GHz	Agilent / HP	N9010A	MY54200580	2024-07-23
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030A	MY54170614	2024-07-24
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2024-07-23
DC Power Supply	Agilent / HP	E3640A	MY54226395	2024-07-24
Temperature Chamber	ESPEC	SH-642	93001109	2024-07-24
LISN	R&S	ENV-216	101836	2024-07-23
LISN	R&S	ENV-216	101837	2024-07-23
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2025-09-06
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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7. APPLICABLE LIMITS AND TEST RESULTS

7.1. 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.

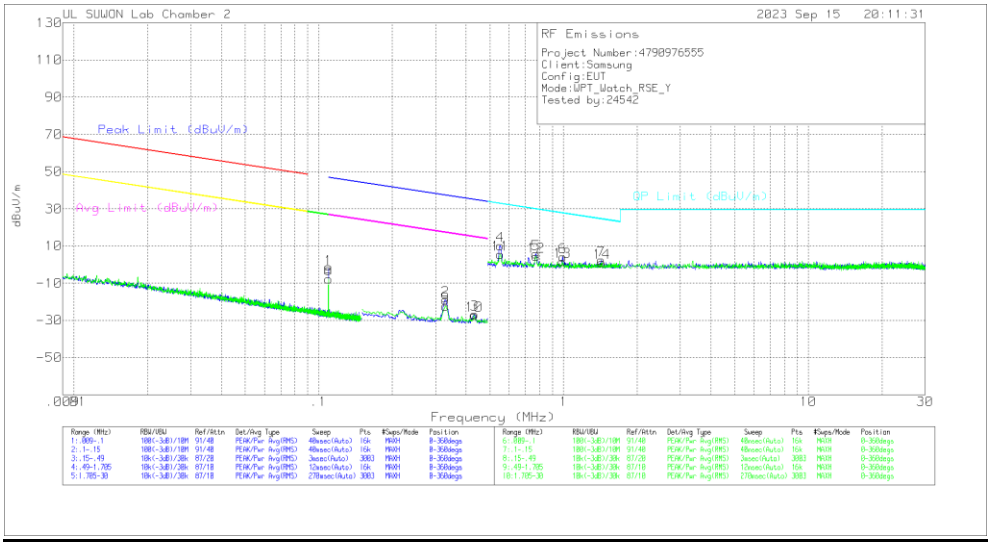
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (m)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100	3
88 to 216	150	3
216 to 960	200	3
Above 960 MHz	500	3
Note: The lower limit shall apply at the transition frequency.		

RESULTS

The EUT belongs to Test Case 5.

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.

FUNDAMENTAL AND RADIATED EMISSIONS 9 KHz to 30 MHz(Power sharing mode Test Case 5)



TEST DATA

Trace Markers

[Face On]

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor [dB(1/m)]	Cable Loss (dB)	Dist Corr 300m(dB)	Corrected Reading dBuV/m	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
**1	.10984	57.6	Pk	20	.1	-80	-2.3	26.81	-29.11	0-360

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor [dB(1/m)]	Cable Loss(dB)	Dist Corr 300m(dB)	Corrected Reading dBuV/m	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
2	.32882	41.04	Pk	19.9	.1	-80	-18.96	37.27	-56.23	17.27	-36.23	0-360
3	.43278	33.29	Pk	20	.1	-80	-26.61	34.88	-61.49	14.88	-41.49	0-360

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor [dB(1/m)]	Cable Loss (dB)	Dist Corr 30m(dB)	Corrected Reading dBuV/m	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
4	.55122	30.13	Pk	20	.1	-40	10.23	32.78	-22.55	0-360
5	.77116	25.71	Pk	20	.2	-40	5.91	29.87	-23.96	0-360
6	.99225	23.85	Pk	20	.2	-40	4.05	27.69	-23.64	0-360
7	1.4278	22.2	Pk	20	.2	-40	2.4	24.54	-22.14	0-360

[Face Off]

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor [dB(1/m)]	Cable Loss (dB)	Dist Corr 300m(dB)	Corrected Reading dBuV/m	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
**8	.10959	52.21	Pk	20	.1	-80	-7.69	26.83	-34.52	0-360

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor [dB(1/m)]	Cable Loss(dB)	Dist Corr 300m(dB)	Corrected Reading dBuV/m	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
9	.3295	37.74	Pk	19.9	.1	-80	-22.26	37.25	-59.51	17.25	-39.51	0-360
10	.43064	32.58	Pk	20	.1	-80	-27.32	34.92	-62.24	14.92	-42.24	0-360

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor [dB(1/m)]	Cable Loss (dB)	Dist Corr 30m(dB)	Corrected Reading dBuV/m	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
11	.55175	25.53	Pk	20	.1	-40	5.63	32.77	-27.14	0-360
12	.772	24.31	Pk	20	.2	-40	4.51	29.86	-25.35	0-360
13	.98845	21.41	Pk	20	.2	-40	1.61	27.72	-26.11	0-360
14	1.43555	20.81	Pk	20	.2	-40	1.01	24.49	-23.48	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.

7.1. 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 6.

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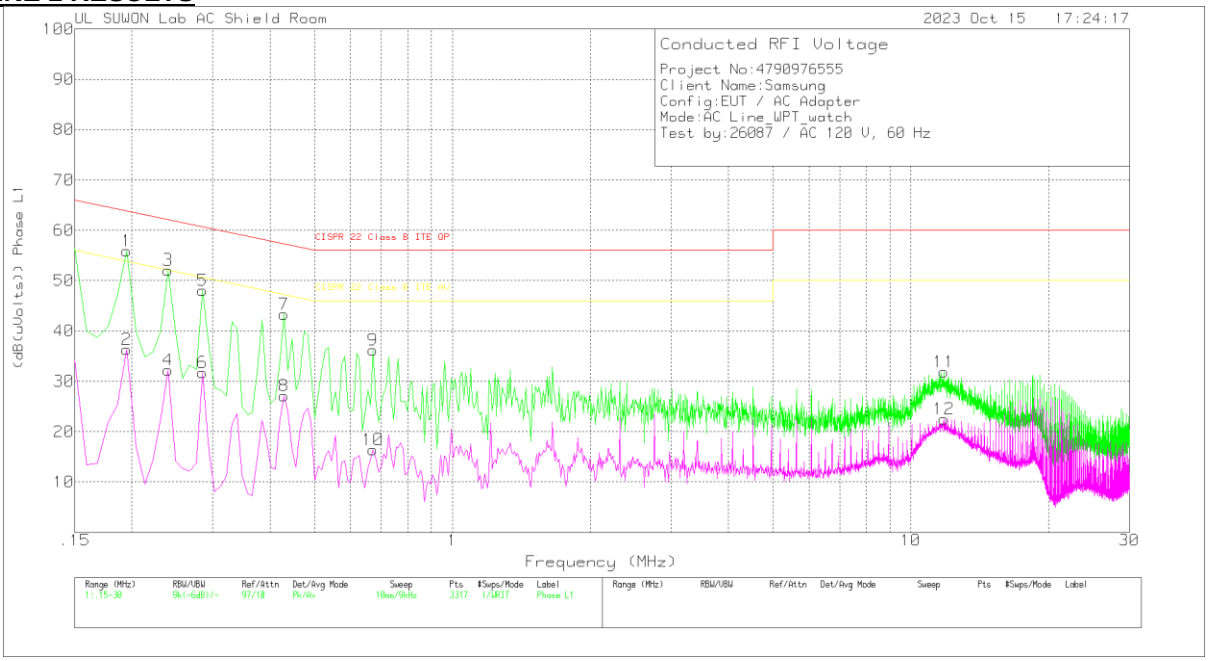
WORST EMISSIONS (Power sharing mode Test Case 6)

Line-L1 .15 - 30MHz

LINE 1 RESULTS



Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	01836_AUTO_With EX_L1[dB]	CABLELOSS[dB]	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP (dB(uVolts))	Margin (dB)	CISPR 22 Class B ITE AV (dB(uVolts))	Margin (dB)
1	.195	46.21	Pk	9.5	.2	55.91	63.82	-7.91	-	-
2	.195	26.61	Av	9.5	.2	36.31	-	-	53.82	-17.51
3	.24	42.41	Pk	9.5	.2	52.11	62.1	-9.99	-	-
4	.24	22.56	Av	9.5	.2	32.26	-	-	52.1	-19.84
5	.285	38.38	Pk	9.5	.2	48.08	60.67	-12.59	-	-
6	.285	22.09	Av	9.5	.2	31.79	-	-	50.67	-18.88
7	.429	33.66	Pk	9.5	.2	43.36	57.27	-13.91	-	-
8	.429	17.38	Av	9.5	.2	27.08	-	-	47.27	-20.19
9	.672	26.37	Pk	9.6	.2	36.17	56	-19.83	-	-
10	.672	6.64	Av	9.6	.2	16.44	-	-	46	-29.56
11	11.814	21.99	Pk	9.6	.3	31.89	60	-28.11	-	-
12	11.814	12.65	Av	9.6	.3	22.55	-	-	50	-27.45

Pk - Peak detector
Av - Average detection

Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	01836_AUTO_With EX_L1[dB]	CABLELOSS[dB]	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP (dB(uVolts))	Margin (dB)	CISPR 22 Class B ITE AV (dB(uVolts))	Margin (dB)
.19275	34.28	Qp	9.5	.2	43.98	63.92	-19.94	-	-
.23775	37.79	Qp	9.5	.2	47.49	62.17	-14.68	-	-

Qp - Quasi-Peak detector

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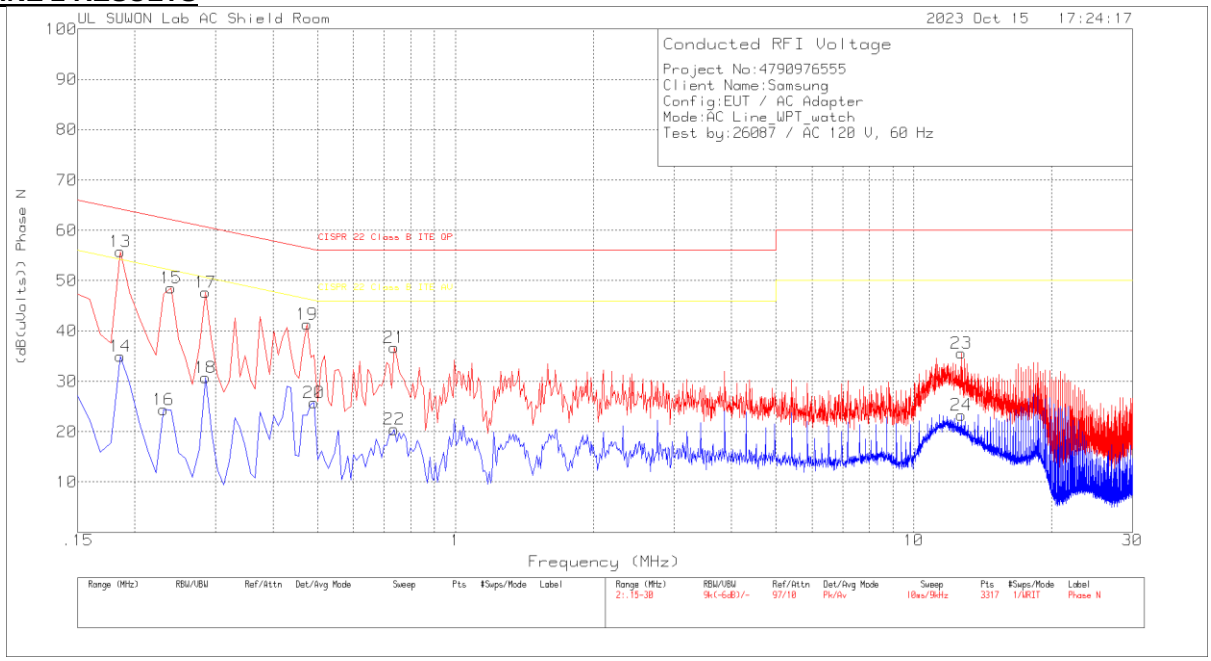
Line-L2 .15 - 30MHz

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))	CISPR 22 Class B ITE QP (dB(uVolts))	Margin (dB)	CISPR 22 Class B ITE AV (dB(uVolts))	Margin (dB)
13	.186	46.09	Pk	9.5	.2	55.79	64.21	-8.42	-	-
14	.186	25.31	Av	9.5	.2	35.01	-	-	54.21	-19.2
15	.24	38.91	Pk	9.5	.2	48.61	62.1	-13.49	-	-
16	.231	14.67	Av	9.5	.2	24.37	-	-	52.41	-28.04
17	.285	37.99	Pk	9.5	.2	47.69	60.67	-12.98	-	-
18	.285	21.09	Av	9.5	.2	30.79	-	-	50.67	-19.88
19	.474	31.63	Pk	9.5	.2	41.33	56.44	-15.11	-	-
20	.492	16.06	Av	9.5	.2	25.76	-	-	46.13	-20.37
21	.735	26.88	Pk	9.6	.2	36.68	56	-19.32	-	-
22	.735	10.66	Av	9.6	.2	20.46	-	-	46	-25.54
23	12.705	25.72	Pk	9.6	.3	35.62	60	-24.38	-	-
24	12.705	13.42	Av	9.6	.3	23.32	-	-	50	-26.68

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))	CISPR 22 Class B ITE QP (dB(uVolts))	Margin (dB)	CISPR 22 Class B ITE AV (dB(uVolts))	Margin (dB)
.18825	41.91	Qp	9.5	.2	51.61	64.11	-12.5	-	-

Qp - Quasi-Peak detector

END OF TEST REPORT

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