

# **Report Number.** : 4791196575-E13V2

- Applicant : SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
  - Model : SM-F956U, SM-F956U1
  - FCC ID : A3LSMF956U
- **EUT Description** : GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB
- Test Standard(s) : FCC 47 CFR PART 15 SUBPART C

# Date Of Issue: 2024-05-04

### Prepared by:

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### Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2024-04-22	Initial issue	Dexter(Hyunsik) Yun
V2	2024-05-04	Updated to address TCB's question	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 Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB

MODEL NUMBER: SM-F956U, SM-F956U1

SERIAL NUMBER: R3CX10W66CR, R3CX309QRBH (RADIATED);

**DATE TESTED:** 2024-02-20 ~ 2024-04-22

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 <u>https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf</u>.

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# 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	2.79 dB
Radiated Disturbance, 9 kHz to 30 MHz	1.69 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.07 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.

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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, WPT and UWB. This test report addresses the wireless low power transmitter(DCD) operational mode.

Representative	Difference	Derivative model		
model	Difference	SM-F956U1		
SM-F956U	Hardware	Same		
	Software	The UI has changed according to Service Provider		

The model SM-F956U was used for final testing and is representative of the test results in this report.

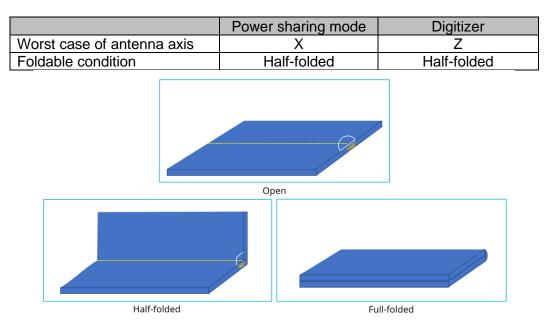
# 5.2. MAXIMUM E-FIELD STRENGTH

- Mode 1		
Fundamental Frequency (kHz)	Test Case	E-Field (30m distance) FCC (dBuV/m)
110 - 148	3	8.79

### - Mode 2

Fundamental Frequency (kHz)	Test Case	E-Field (30m distance) FCC (dBuV/m)	
531 - 593	8	11.68	

### 5.3. PRELIMINARY TEST CONFIGURATIONS





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### 5.4. WORST-CASE CONFIGURATION AND MODE

Mode 1	Test Case	Description			
	1	Charging from EUT to Phone			
	2	Charging from EUT(Charging from TA) to Phone			
Dower charing mode	3	Charging from EUT to Phone (Cross position)			
Power sharing mode	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			

Mode 2 Test Case Description			
Disitizer	7	Scan the S-Pen on the display fo the EUT	
Digitizer	8	Scan the S-Pen on the display fo the EUT(with TA)	

For radiated test, test case 1/3/5/7, 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)

For S-pen, both fully charged and non-fully charged condition were investigated, test case 7/8/9 were performed non-fully charged condition as worst case.

During radiated test for test case 1/3/5/7, the EUT didn't connected AC adapter, but for AC line conducted test for all test case was performed with connected with AC adapter.

Test results of case 3 is worst case and Digitizer mode, test results of case 8 is worst, so this test report described test case 3 and test case 8.

In test case 8, hover mode[F1: Pen tip](593 kHz) is worse than button press mode[F2: Button](531 kHz); therefore, only hover mode was reported.

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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	R37N9QP6H39DK3	N/A		
Data Cable	SAMSUNG	EP-DN980	GH39-02111A	N/A		

### I/O CABLES

	I/O Cable List							
Cable No.	Port I Identical I Gaple IVne I Port Remarks							
1	DC Power	1	С Туре	Shielded	1.0 m	N/A		

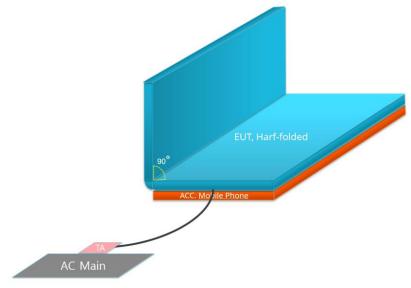
### TEST SETUP

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

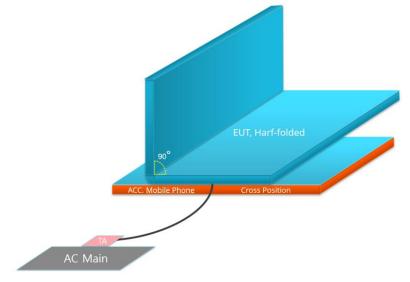
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### TEST SETUP DIAGRAM

- NOTE : Test case 1/3/5/7, EUT did not connected with Travel adapter(AC Main) in below set-up diagram for radiated test.
  - Test Case1 and 2 : Charging Phone



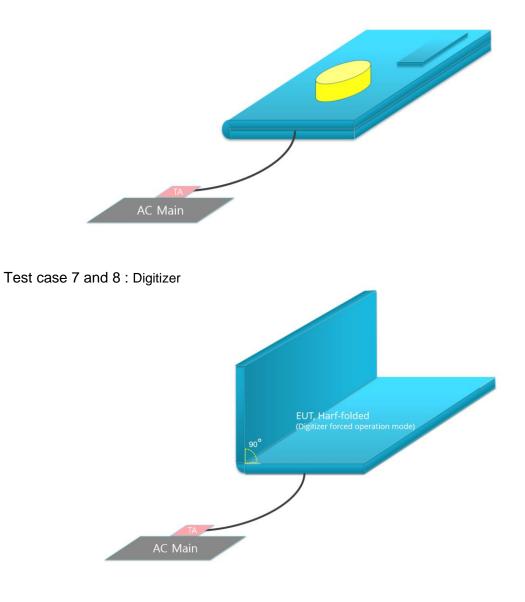
- Test Case 3 and 4 : Charging Phone(Cross position)



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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	Vers	sion						
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.

#### <u>LIMIT</u>

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.							

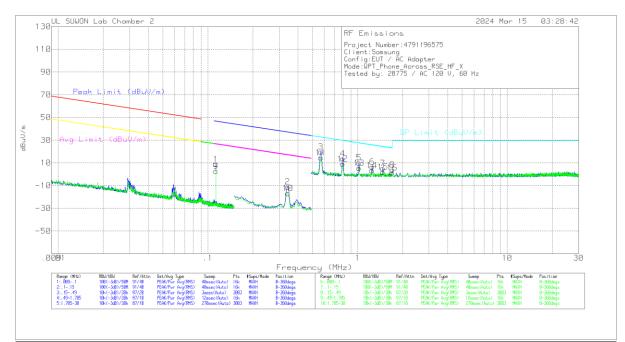
### <u>RESULTS</u>

The EUT belongs to Test Case 4 and 7 and 10 and 12.

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.

#### RADIATED EMISSIONS 9 KHz to 30 MHz(Power sharing mode Test Case 3)



#### TEST DATA

### Trace Markers

[Face on]																	
Marker	Frequen cy (MHz)	Me Rea (dB	ding	Det	Antenn Correcti Factor (dB/m	on r	Cable Loss (dB)	Dist Corr 300m (dB)	Correcte d Reading dBuV/m		eak Limit IBuV/m)	Marg (dB		Avg Lim (dBuV/n		Margin (dB)	Azimuth (Degs)
**1	.11295	68.	69	Pk	20		.1	-80	8.79		46.57	-37.7	78	26.57		-17.78	0-360
2	.34142	4	9	Pk	19.8		.1	-80	-11.1		36.94	-48.0	)4	16.94		-28.04	0-360
Marker	Freque (MHz		Met Read (dBu	ding	Det	C	Antenna orrection ctor (dB/m)	Cable Los (dB)	s Dist C 30m (dB)	i.	Correcte Reading (dBuV/n	g		P Limit suV/m)		argin dB)	Azimuth (Degs)
3	.5669	19	39.	72	Pk		19.9	.1	-40		19.72		3	2.54	-12	2.82	0-360
4	.7972	7	33.	66	Pk		19.9	.2	-40		13.76		2	9.58	-15	5.82	0-360
5	1.0219	96	30.	04	Pk		19.9	.2	-40		10.14		2	7.43	-17	7.29	0-360
6	1.250	68	26.	46	Pk		19.9	.2	-40		6.56		2	5.68	-19	9.12	0-360
7	1.4730	06	25.	08	Pk		19.9	.2	-40		5.18		2	4.27	-19	9.09	0-360
8	1.70	5	23.	74	Pk		20	.2	-40		3.94			23	-19	9.06	0-360

[Face off]

	Marker	Frequen cy (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor (dB/m)	Cable Loss (dB)	Dist Corr 300m (dB)	Correcte d Reading dBuV/m	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	**9	.11295	62.66	Pk	20	.1	-80	2.76	46.57	-43.81	26.57	-23.81	0-360
[	10	.34176	43.29	Pk	19.8	.1	-80	-16.81	36.94	-53.75	16.94	-33.75	0-360
		•					•	•					

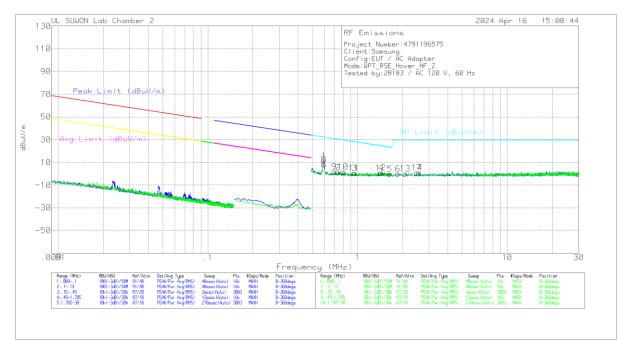
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor (dB/m)	Cable Loss (dB)	Dist Corr 30m (dB)	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
11	.56824	34.66	Pk	19.9	.1	-40	14.66	32.52	-17.86	0-360
12	.79396	29.05	Pk	19.9	.2	-40	9.15	29.62	-20.47	0-360
13	1.02025	25.44	Pk	19.9	.2	-40	5.54	27.45	-21.91	0-360
14	1.24875	23.2	Pk	19.9	.2	-40	3.3	25.7	-22.4	0-360
15	1.47591	21.86	Pk	19.9	.2	-40	1.96	24.25	-22.29	0-360
16	1.705	21.24	Pk	20	.2	-40	1.44	23	-21.56	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.

### RADIATED EMISSIONS 9 KHz to 30 MHz(Digitizer mode\_Test case 8)



TEST DATA

### **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	.5948	31.68	Pk	19.9	.1	-40	11.68	32.12	-20.44	0-360
2	.7454	21.11	Pk	19.9	.2	-40	1.21	30.17	-28.96	0-360
3	.95729	20.41	Pk	19.9	.2	-40	.51	28	-27.49	0-360
4	1.43973	20.85	Pk	19.9	.2	-40	.95	24.46	-23.51	0-360
5	1.64144	19.65	Pk	20	.2	-40	15	23.33	-23.48	0-360
6	1.86051	19.71	Pk	20	.2	-40	09	29.5	-29.59	0-360
7	2.58153	20.79	Pk	20.1	.3	-40	1.19	29.5	-28.31	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	.59541	28.18	Pk	19.9	.1	-40	8.18	32.11	-23.93	0-360
9	.69759	21.86	Pk	19.9	.1	-40	1.86	30.74	-28.88	0-360
10	.80065	21.63	Pk	19.9	.2	-40	1.73	29.55	-27.82	0-360
11	.94771	20.58	Pk	19.9	.2	-40	.68	28.09	-27.41	0-360
12	1.42567	20.85	Pk	19.9	.2	-40	.95	24.55	-23.6	0-360
13	2.07258	19.93	Pk	20	.2	-40	.13	29.5	-29.37	0-360
14	2.4967	20.66	Pk	20	.3	-40	.96	29.5	-28.54	0-360

Pk - Peak detector

\*\*Fundamental

Note 1: 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.

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### 7.2. 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.

### <u>LIMIT</u>

FCC §15.207 (a)

Frequency range	Limits (dBµV)					
(MHz)	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**

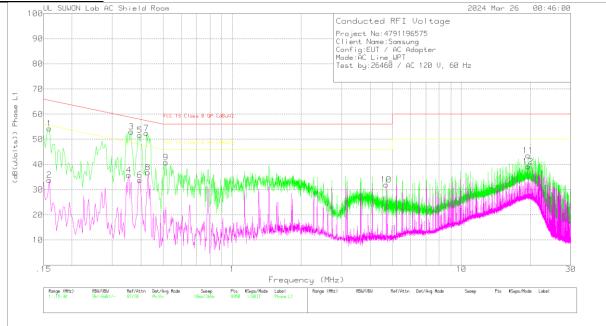
The EUT belongs to Test Case 4(worst).

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### Line-L1 .15 - 30MHz





### 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 (dBuVolts)	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
1	.159	44.45	Pk	9.8	.1	54.35	65.52	-11.17	-	-
2	.159	23.97	Av	9.8	.1	33.87	-	-	55.52	-21.65
3	.363	43.12	Pk	9.8	.1	53.02	58.66	-5.64	-	-
4	.354	25.99	Av	9.8	.1	35.89	-	-	48.87	-12.98
5	.396	41.75	Pk	9.8	.1	51.65	57.94	-6.29	-	-
6	.396	23.95	Av	9.8	.1	33.85	-	-	47.94	-14.09
7	.423	42.53	Pk	9.8	.1	52.43	57.39	-4.96	-	-
8	.429	26.96	Av	9.8	.1	36.86	-	-	47.27	-10.41
9	.513	30.8	Pk	9.9	.1	40.8	56	-15.2	-	-
10	4.698	22.08	Av	9.7	.2	31.98	-	-	46	-14.02
11	19.572	33.1	Pk	10.2	.3	43.6	60	-16.4	-	-
12	19.572	28.74	Av	10.2	.3	39.24	-	-	50	-10.76

Pk - Peak detector

Av - Average detection

### **Quasi-Peak Emissions**

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_L1 [dB]	Cable Loss [dB]	Corrected Reading (dBuVolts)	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
.36315	40.33	Qp	9.8	.1	50.23	58.66	-8.43	-	-
.39525	39.35	Qp	9.8	.1	49.25	57.95	-8.7	-	-
.42375	38.24	Qp	9.8	.1	48.14	57.37	-9.23	-	-

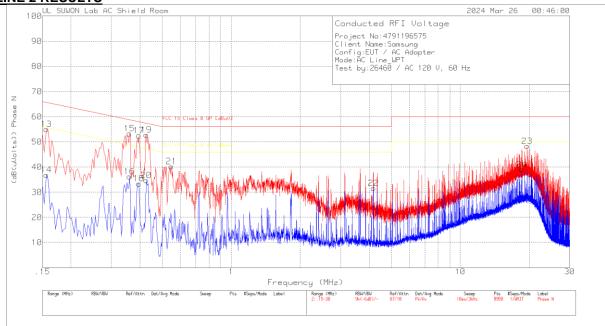
**Qp** - Quasi-Peak detector

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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_Wit h EX_N [dB]	Cable Loss [dB]	Corrected Reading (dBuVolts)	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
13	.156	45.09	Pk	9.8	.1	54.99	65.67	-10.68	-	-
14	.156	27.01	Av	9.8	.1	36.91	-	-	55.67	-18.76
15	.36	43.39	Pk	9.8	.1	53.29	58.73	-5.44	-	-
16	.36	26.27	Av	9.8	.1	36.17	-	-	48.73	-12.56
17	.396	42.59	Pk	9.8	.1	52.49	57.94	-5.45	-	-
18	.396	23.52	Av	9.8	.1	33.42	-	-	47.94	-14.52
19	.426	42.87	Pk	9.8	.1	52.77	57.33	-4.56	-	-
20	.426	24.81	Av	9.8	.1	34.71	-	-	47.33	-12.62
21	.549	30.27	Pk	9.9	.1	40.27	56	-15.73	-	-
22	4.176	21.81	Av	9.7	.1	31.61	-	-	46	-14.39
23	19.572	37.82	Pk	10.2	.3	48.32	60	-11.68	-	-
24	18.528	28.57	Av	10.2	.3	39.07	-	-	50	-10.93

Pk - Peak detector

Av - Average detection

### **Quasi-Peak Emissions**

Range 2: Phase N .1	5 - 30MHz
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Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_N [dB]	Cable Loss [dB]	Corrected Reading (dBuVolts)	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
.36075	40.74	Qp	9.8	.1	50.64	58.71	-8.07	-	-
.39525	40.12	Qp	9.8	.1	50.02	57.95	-7.93	-	-
.42675	40.02	Qp	9.8	.1	49.92	57.32	-7.4	-	-

**Qp** - Quasi-Peak detector

### **END OF TEST REPORT**

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