



CERTIFICATION TEST REPORT

Report Number. : 4790047196-E4V1

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

Model : SM-G780G/DSM, SM-G780G/DS, SM-G780G

FCC ID : A3LSMG780G1

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

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

Date Of Issue:

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, WPT and NFC

MODEL: SM-G780G/DSM, SM-G780G/DS, SM-G780G

SERIAL NUMBER: R38R301JNJM, R38R301JPNJ (CONDUCTED);
R38R301JNSD, R38R301JN8P,
R38R301JR3B, R38R301JQQM (RADIATED);

DATE TESTED: 2021-07-26 ~ 2021-08-13

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:



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Suwon Lab Engineer
UL Korea, Ltd.

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Dexter(Hyunsik) Yun
Suwon Lab Engineer
UL Korea, Ltd.

2. TEST METHODOLOGY

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 558074 D01 15.247 Meas Guidance v05r02.
4. ANSI C63.10-2013.

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	
<input checked="" type="checkbox"/>	Chamber 1
<input checked="" type="checkbox"/>	Chamber 2
<input type="checkbox"/>	Chamber 3

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. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

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:

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

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	3.01 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.26 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.90 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.49 dB

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

4.4. DECISION RULES

Decision rule for statement(s) of conformity is based on Procedure 2, Clause 4.4.3 in IEC Guide 115:2007.

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

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

This report covers the Samsung models SM-G780G/DSM, SM-G780G/DS and SM-G780G. These models are identical in hardware except SM-G780G/DSM is supported MST and SMG780G/DS has dual SIM tray and SM-G780G has single SIM tray. All series model was same hardware thus, SM-G780G/DS (Dual SIM tray) was set for final test.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range [MHz]	Mode	Power Mode	Output Power [dBm]	Output Power [mW]
2 402 ~ 2 480	500kbps	Peak	6.525	4.493
		Average	6.147	4.118
	2Mbps	Peak	6.608	4.579
		Average	5.928	3.916

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

**The internal antenna was Permanently attached.
 Therefore this E.U.T Complies with the requirement of §15.203.**

The radio utilizes an internal antennas, with maximum gain of -4.12 dBi.

5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission below 1GHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

Note : All radiated and power line conducted tests were performed attached with travel adapter for the worst case condition mode.

Power verification

The Output Power of all data rate are all investigated, the 500 kbps(37 pkt) and 2 Mbps(255 pkt) power is the worst case for symbol rate. All tests were performed in these two modes.

Symbol Rate [Ms/s]	Mode	Frequency [MHz]	Conducted Burst Avg [dBm]	Symbol Rate [Ms/s]	Mode	Frequency [MHz]	Conducted Burst Avg [dBm]
1	1Mbps (37 pkt)	2402	3.840	2	2Mbps (37 pkt)	2402	3.660
		2440	6.084			2440	5.917
		2480	4.284			2480	4.133
	1Mbps (255 pkt)	2402	3.860		2Mbps (255 pkt)	2402	3.696
		2440	6.082			2440	5.928
		2480	4.266			2480	4.122
1	125 kbps (37 pkt)	2402	3.854				
		2440	6.084				
		2480	4.268				
	125 kbps (255 pkt)	2402	3.847				
		2440	6.074				
		2480	4.256				
	500 kbps (37 pkt)	2402	3.918				
		2440	6.147				
		2480	4.342				
	500 kbps (255 pkt)	2402	3.861				
		2440	6.101				
		2480	4.280				

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA200	R37M194G2J1SE3	N/A
Data Cable	SAMSUNG	EP-DR140AWE	N/A	N/A

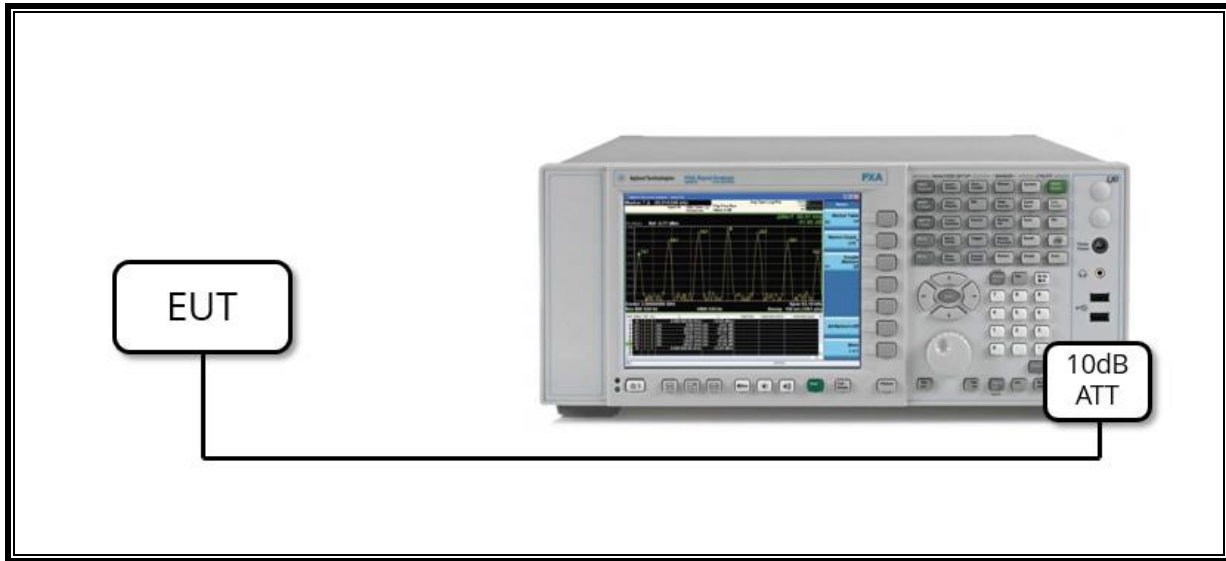
I/O CABLE

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	0.7 m	N/A

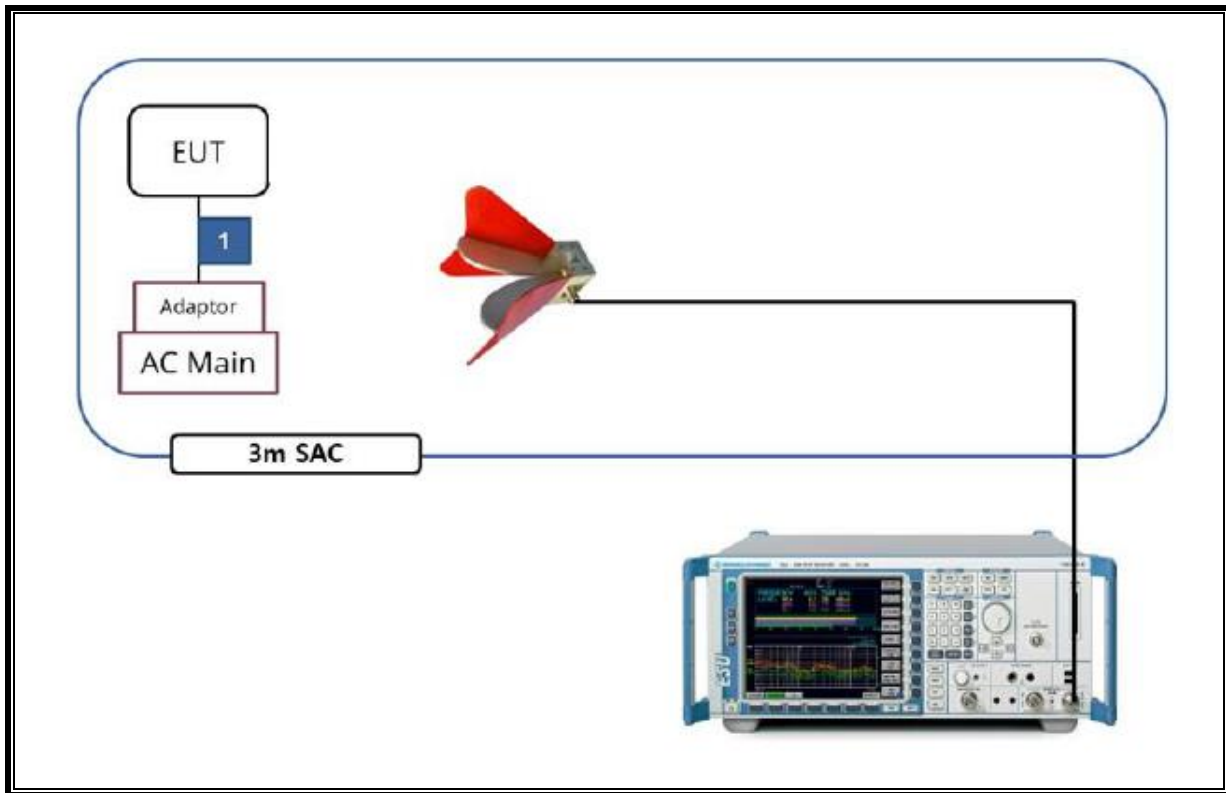
TEST SETUP

The EUT is a stand-alone unit during the tests.
 Test software in hidden menu exercised the EUT to enable BLE mode.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. MEASUREMENT METHOD

6 dB BW : KDB 558074 D01 v05r02, Section 8.2.

OUTPUT POWER : KDB 558074 D01 v05r02, Section 8.3.1.1

POWER SPECTRAL DENSITY : KDB 558074 D01 v05r02, Section 8.4.

Out-of-band Emissions (Conducted) : KDB 558074 D01 v05r02, Section 8.5.

Out-of-band Emissions in Non-restricted Bands: KDB 558074 D01 v05r02, Section 8.5.

Out-of-band Emissions in Restricted Bands : KDB 558074 D01 v05r02, Section 8.6.

AC Power Line Conducted Emission : ANSI C63.10-2013, Section 6.2

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	S/N	Cal Due
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	2022/08/19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2022/08/13
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	2022/08/13
Antenna, Horn, 18 GHz	ETS	3115	00167211	2022/07/27
Antenna, Horn, 18 GHz	ETS	3115	00161451	2022/08/15
Antenna, Horn, 18 GHz	ETS	3117	00168724	2022/07/27
Antenna, Horn, 18 GHz	ETS	3117	00168717	2022/08/15
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2022/08/04
Antenna, Horn, 40 GHz	ETS	3116C	00168645	2021/10/02
Preamplifier	ETS	3116C-PA	00168841	2022/08/04
Preamplifier, 1000 MHz	Sonoma	310N	341282	2022/08/02
Preamplifier, 1000 MHz	Sonoma	310N	351741	2022/08/02
Preamplifier, 1000 MHz	Sonoma	310N	370599	2022/08/02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	2022/08/02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2022/08/02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029168	2022/08/02
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2022/08/04
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2022/08/04
Average Power Sensor	Agilent / HP	U2000	MY54270007	2022/08/04
Average Power Sensor	Agilent / HP	U2000	MY54260010	2022/08/04
Attenuator	PASTERNAK	PE7087-10	A001	2022/08/03
Attenuator	PASTERNAK	PE7087-10	A008	2022/08/03
Attenuator	PASTERNAK	PE7004-10	2	2022/08/02
Attenuator	PASTERNAK	PE7087-10	A009	2022/08/03
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2022/08/02
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2022/08/02
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2022/08/02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	2022/08/02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	2022/08/02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	019	2022/08/02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	2022/08/02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	2022/08/02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	2022/08/02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	2022/08/02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	2022/08/02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	020	2022/08/02
LISN	R&S	ENV-216	101837	2022/08/05
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2021/10/02
UL Software				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

8. TEST RESULTS SUMMARY

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
15.247 (a)(2)	Occupied Bandwidth(6dB)	> 500kHz	Conducted	PASS
2.1051, 15.247(d)	Band Edge / Conducted Spurious Emission	-20 dBc		PASS
15.247 (b)(3)	TX conducted output power	< 30 dBm		PASS
15.247(e)	PSD	< 8 dBm/3kHz		PASS
15.207(a)	AC Power Line conducted emissions	Section 11	Power Line conducted	PASS
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m(Av)	Radiated	PASS

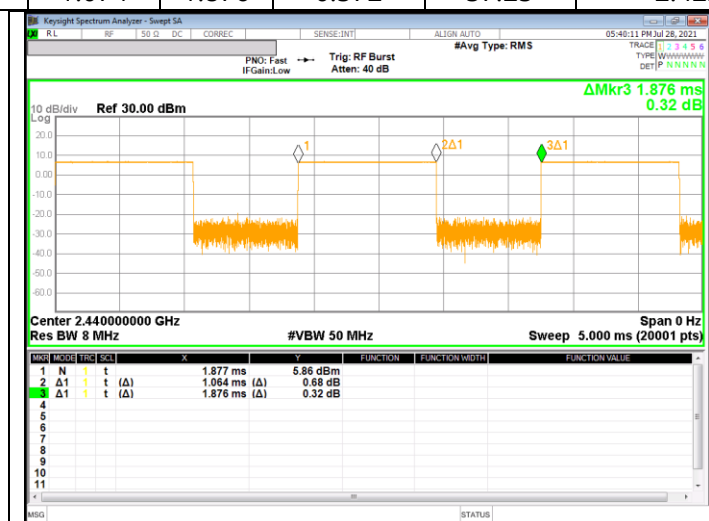
9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

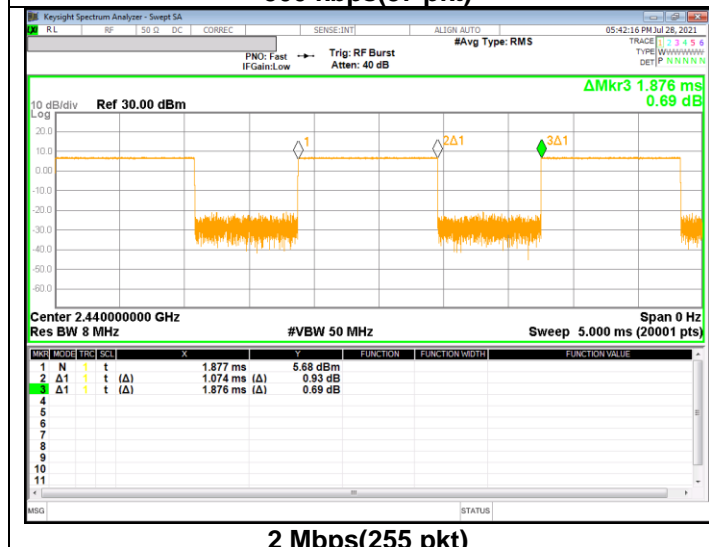
LIMITS

None; for reporting purposes only.

Mode	On time [msec]	Period [msec]	Duty cycle x [Linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Minimum VBW [kHz]
2 400 ~ 2 483.5 MHz Bands						
500 kbps [37pkt]	1.064	1.876	0.567	56.72	2.463	0.940
2 Mbps [255pkt]	1.074	1.876	0.572	57.25	2.422	0.931



500 kbps(37 pkt)



2 Mbps(255 pkt)

9.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

9.2.1. 500 kbps

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minumun Limit [kHz]
Low	2 402	637.0	500.0
Mid	2 440	667.3	500.0
High	2 480	651.2	500.0
Worst		667.3	500.0

9.2.2. 2 Mbps

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minumun Limit [kHz]
Low	2 402	1120.0	500.0
Mid	2 440	1121.0	500.0
High	2 480	1123.0	500.0
Worst		1123.0	500.0

9.2.3. 6 dB BANDWIDTH PLOTS



9.3. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

Peak power is measured using ANSI C63.10(2013) under section 11.9.1.1 utilizing spectrum analyzer.

RESULTS

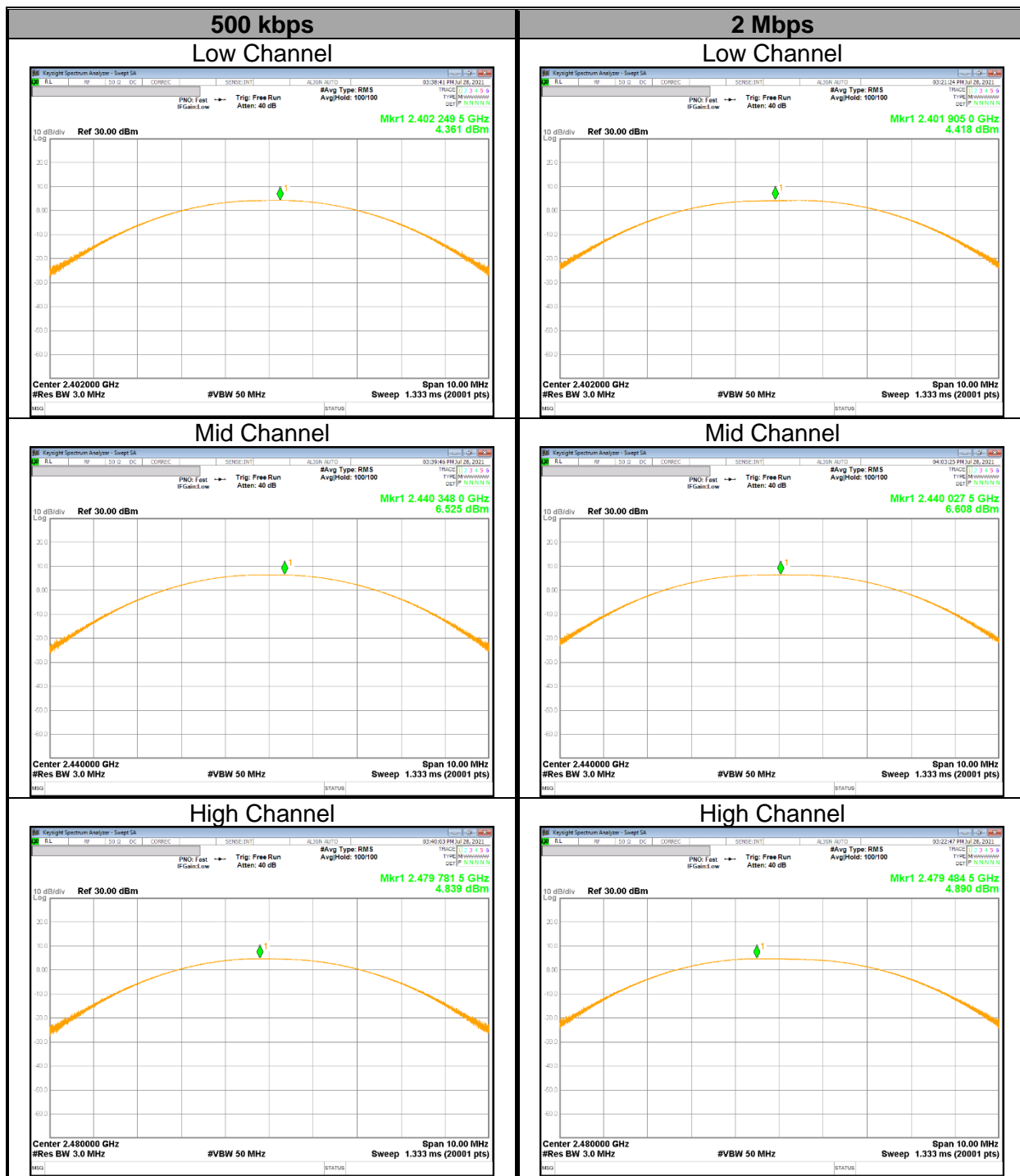
9.3.1. 500 kbps

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2 402	4.361	30.000	-25.639
Mid	2 440	6.525	30.000	-23.475
High	2 480	4.839	30.000	-25.161
Worst		6.525	30.000	-23.475

9.3.2. 2 Mbps

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2 402	4.418	30.000	-25.582
Mid	2 440	6.608	30.000	-23.392
High	2 480	4.890	30.000	-25.110
Worst		6.608	30.000	-23.392

9.3.3. PEAK POWER PLOTS



9.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Measurements perform using a wideband RF frame average power sensor. The cable assembly insertion loss and duty cycle correction factor were entered as an offset in the power meter to allow for direct reading of power.

RESULTS

9.4.1. 500 kbps

Channel	Frequency [MHz]	AV power [dBm]	AV power [mW]
Low	2 402	3.918	-26.082
Middle	2 440	6.147	-23.853
High	2 480	4.342	-25.658

9.4.2. 2 Mbps

Channel	Frequency [MHz]	AV power [dBm]	AV power [mW]
Low	2 402	3.696	-26.304
Middle	2 440	5.928	-24.072
High	2 480	4.122	-25.878

9.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

RSS-247 (5.2) (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

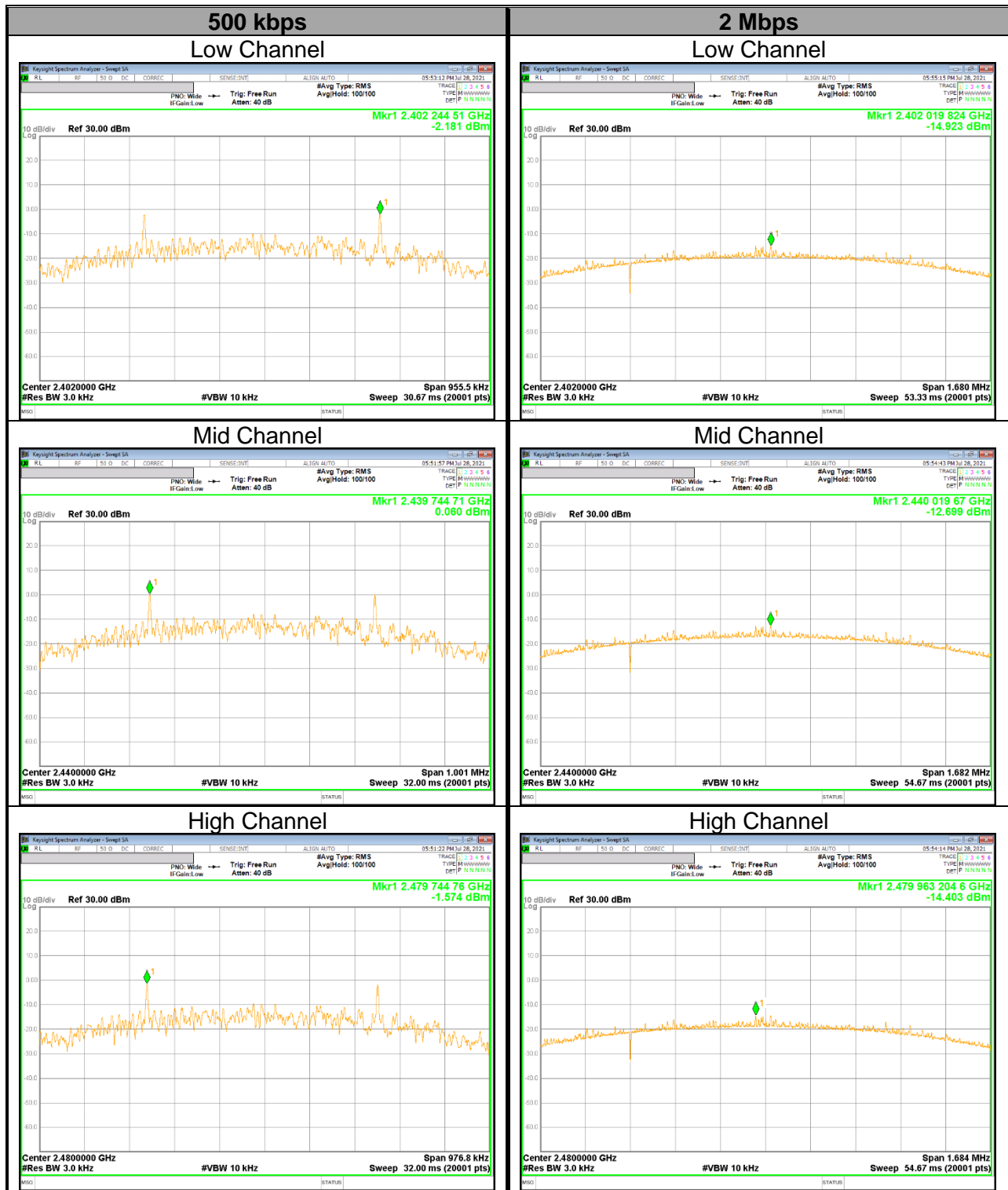
9.5.1. 500 kbps

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2 402	-2.181	8.00	-10.181
Mid	2 440	0.060	8.00	-7.94
High	2 480	-1.574	8.00	-9.574

9.5.2. 2Mbps

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2 402	-14.923	8.00	-22.923
Mid	2 440	-12.699	8.00	-20.699
High	2 480	-14.403	8.00	-22.403

9.5.3. PSD TEST PLOTS



9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

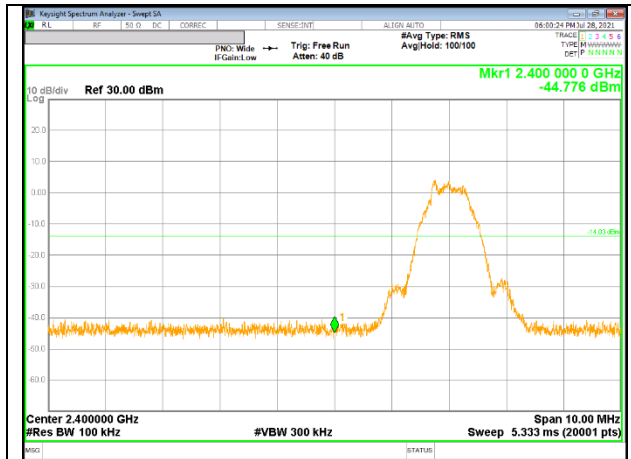
FCC §15.247 (d)

RSS-247 5.5

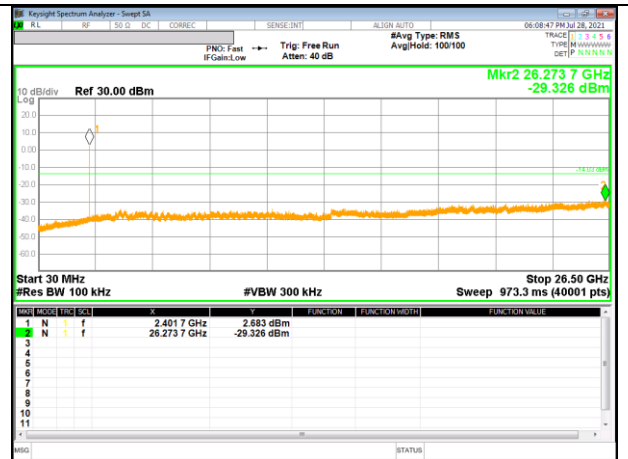
Output power was measured based on the use of a peak measurement.
Therefore, spurious emissions are required to be 20 dBc.

RESULTS

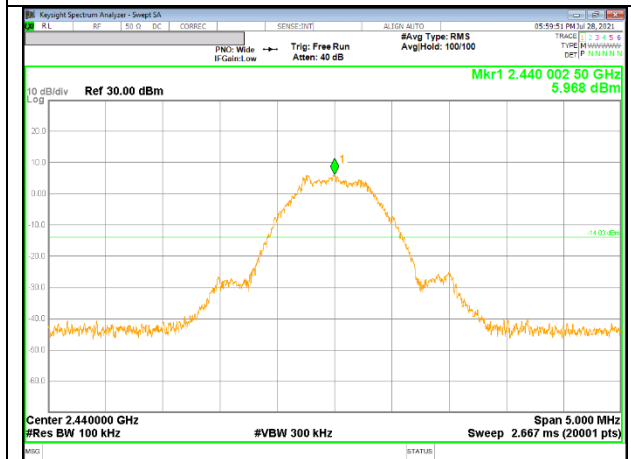
9.6.1. 500 kbps



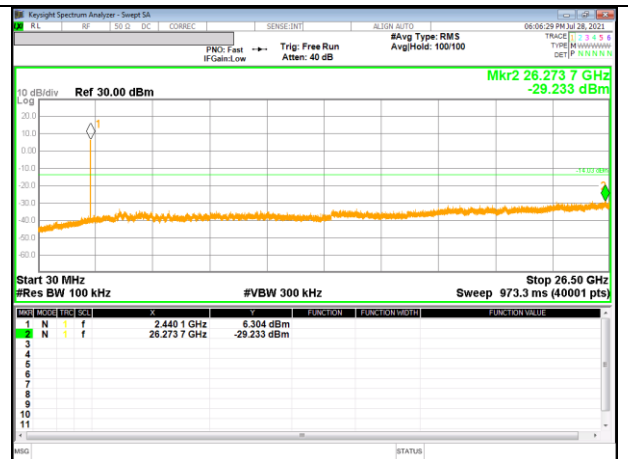
LOW CHANNEL BANDEDGE



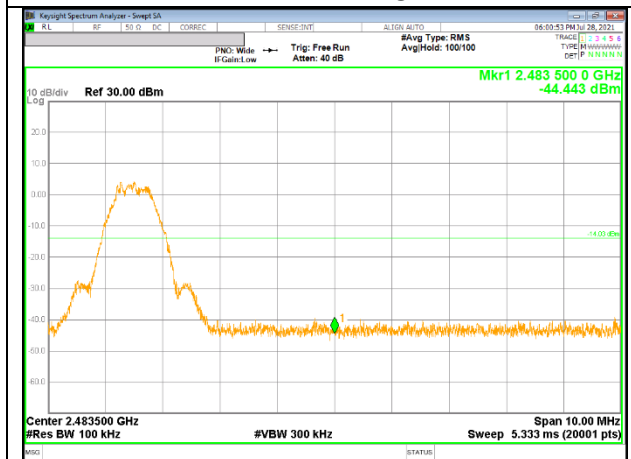
OUT-OF-BAND LOW CHANNEL



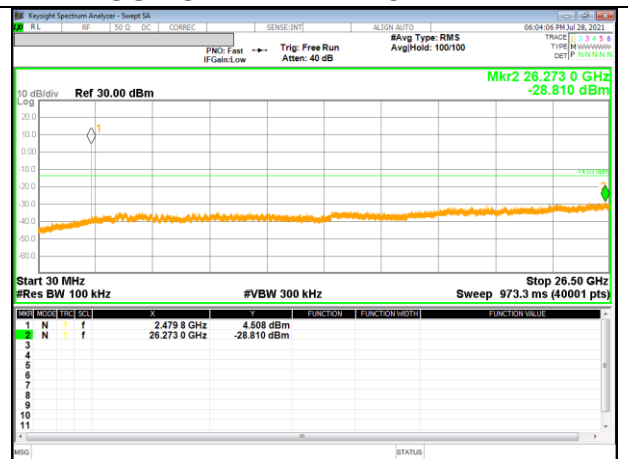
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE

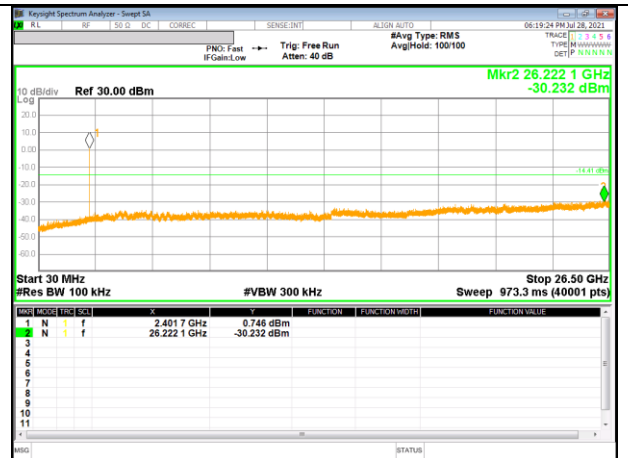


OUT-OF-BAND HIGH CHANNEL

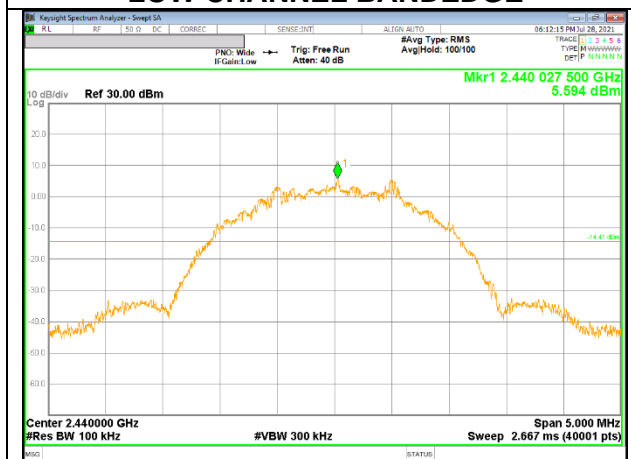
9.6.2. 2Mbps



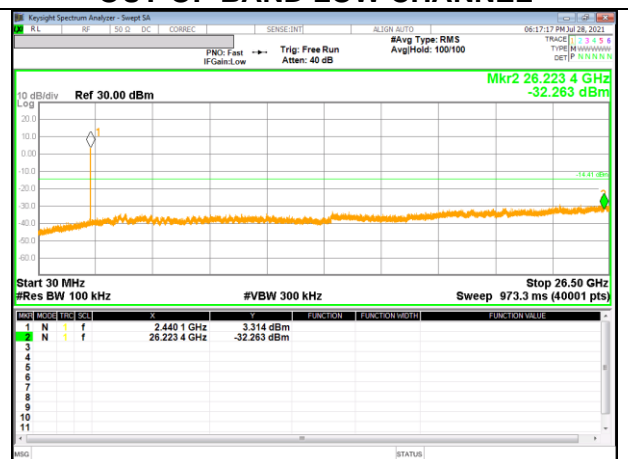
LOW CHANNEL BANDEDGE



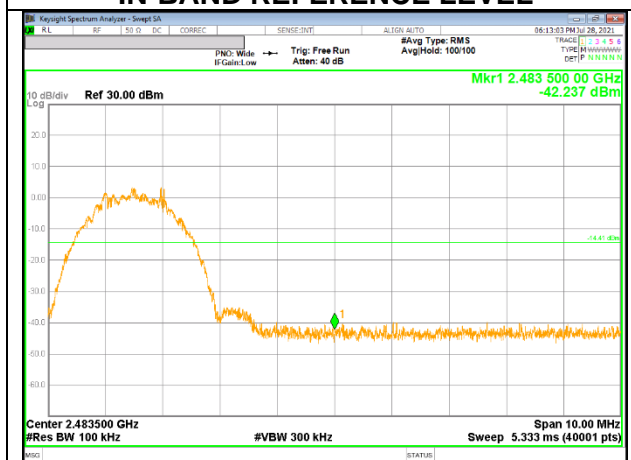
OUT-OF-BAND LOW CHANNEL



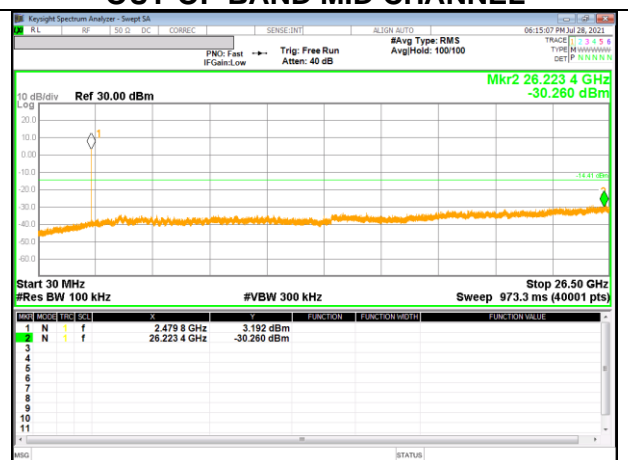
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. (Restricted bandedge, Final detection of spurious harmonic emissions) Duty cycle factor = $10 \log(1/x)$. For this sample: For 500 kbps, DCF = $10\log(1/0.567)=2.463$ dB (Spectrum Analyzer round it up to 2.46 dB) and for 2 Mbps, DCF = $10\log(1/0.572)=2.422$ dB (Spectrum Analyzer round it up to 2.42 dB).

Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.

The spectrum from 1 GHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

Note : Emission was pre-scanned from 9kHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).
Per FCC part 15.31(o), test results were not reported.

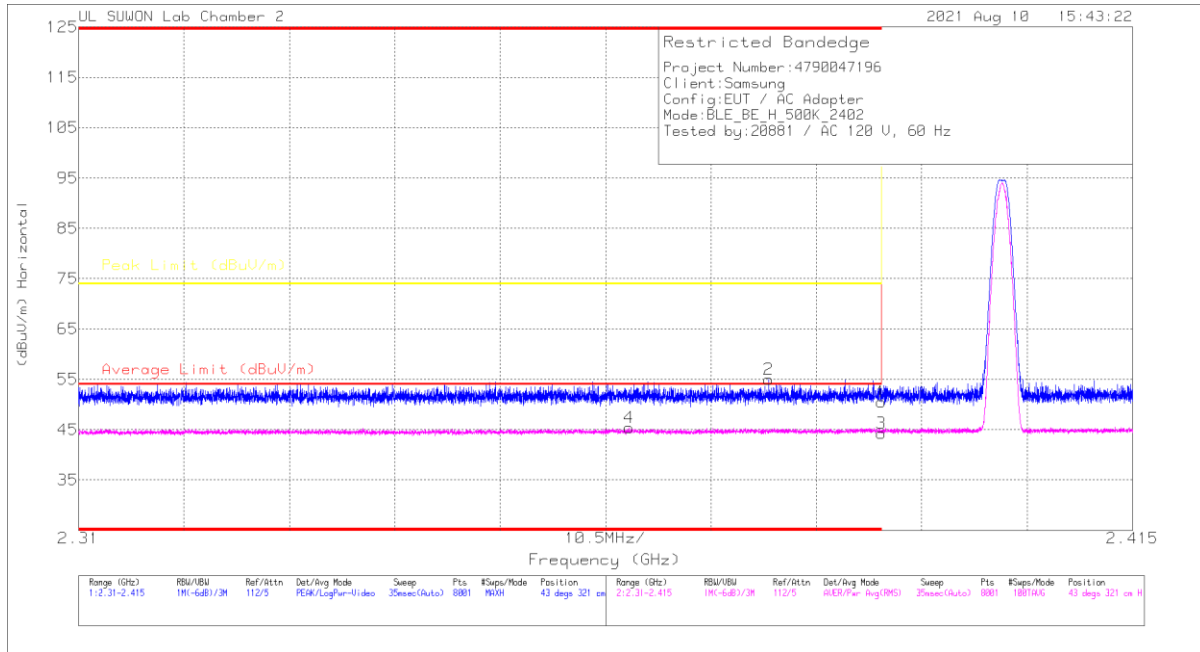
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. 500 kbps

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT

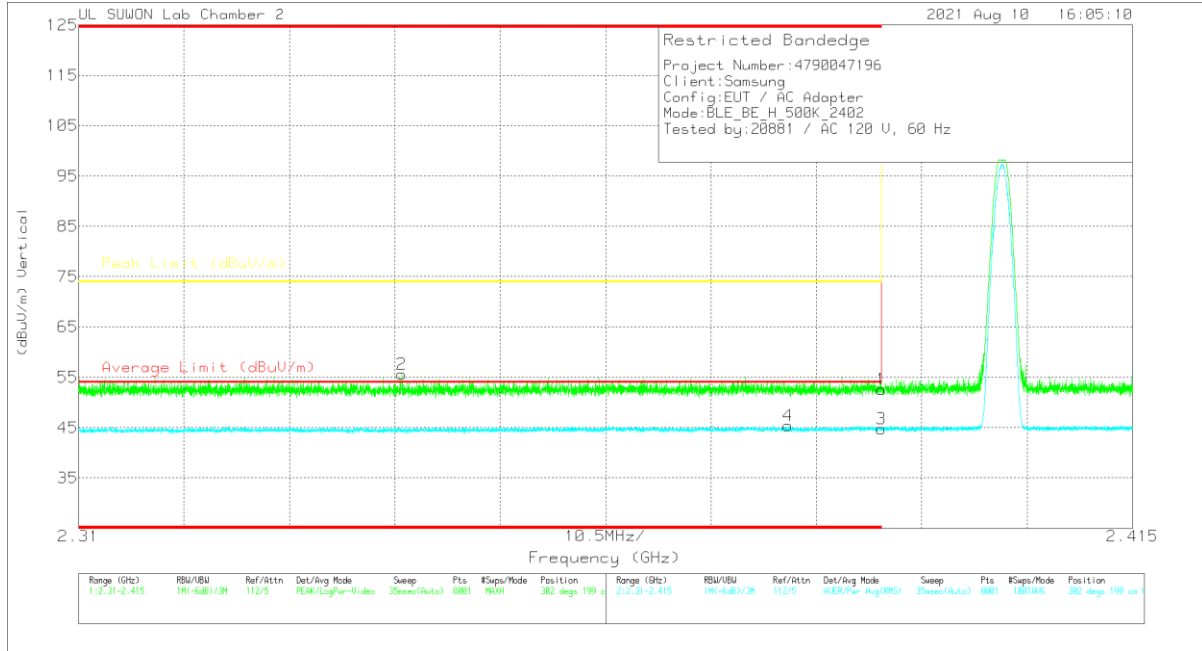


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	39.96	Pk	31.9	-20.3	0	59.56	-	-	74	-23.44	43	321	H
2	* 2.37875	43.51	Pk	31.9	-20.4	0	55.01	-	-	74	-18.99	43	321	H
3	* 2.39	30.26	RMS	31.9	-20.3	2.46	44.32	54	-9.68	-	-	43	321	H
4	* 2.36484	31.44	RMS	31.8	-20.3	2.46	45.4	54	-8.6	-	-	43	321	H

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

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Cor (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.04	Pk	31.9	-20.3	0	52.64	-	-	74	-21.36	302	199	V
2	* 2.34221	44.3	Pk	31.8	-20.5	0	55.6	-	-	74	-18.4	302	199	V
3	* 2.39	30.73	RMS	31.9	-20.3	2.46	44.79	54	-9.21	-	-	302	199	V
4	* 2.3807	31.41	RMS	31.9	-20.4	2.46	45.37	54	-8.63	-	-	302	199	V

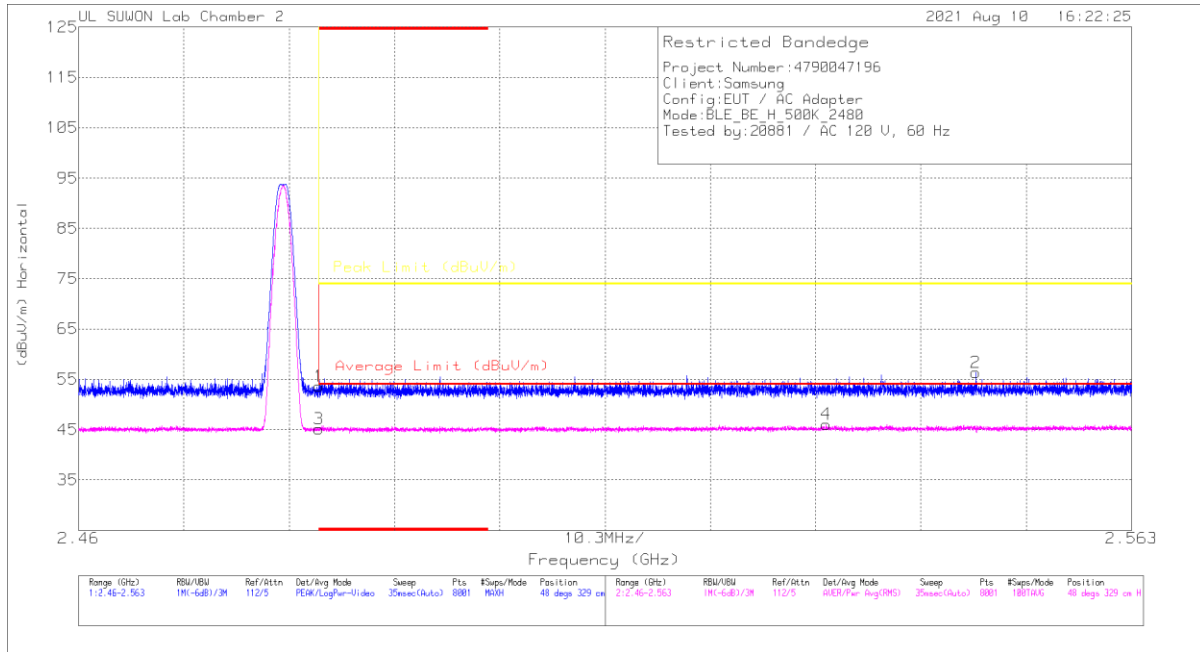
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

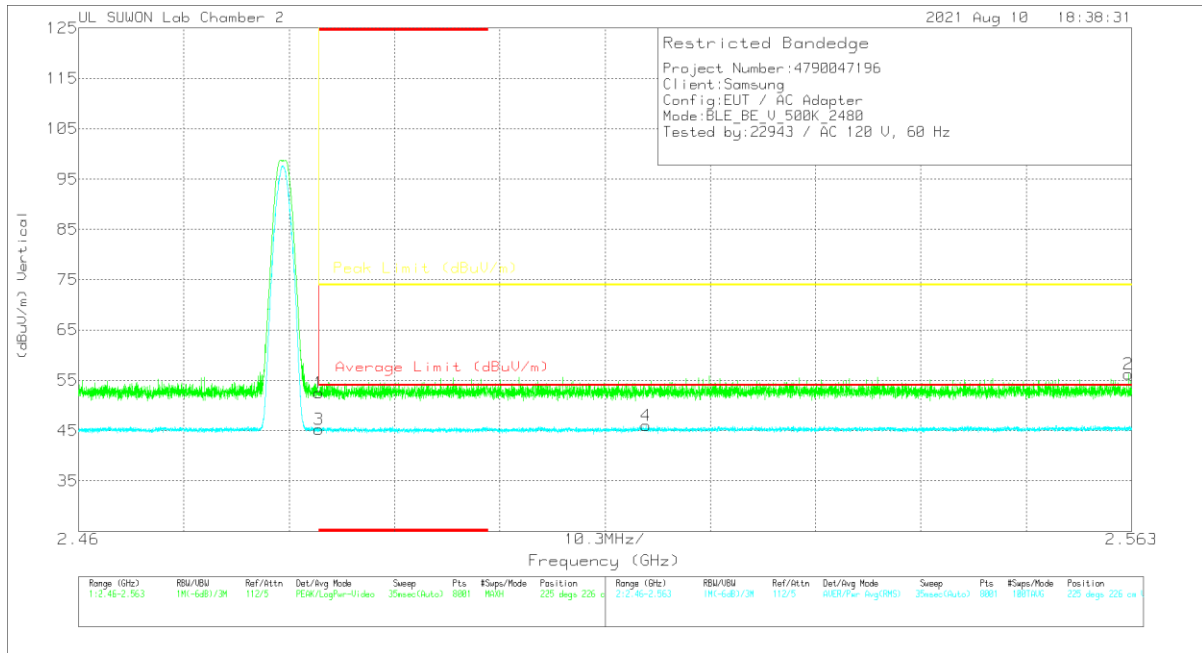


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117.00168724	10dB_ATT[dB]	DC Cor (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	41.83	PK	32	-20.2	0	53.63	-	-	74	-20.37	48	329	H
2	2.54778	44.35	PK	32.1	-20.1	0	56.35	-	-	74	-17.65	48	329	H
3	* 2.48351	30.92	RMS	32	-20.2	2.46	45.18	54	-8.82	-	-	48	329	H
4	2.5331	31.52	RMS	32.1	-20	2.46	46.08	54	-7.92	-	-	48	329	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK - Peak detector
 RMS - RMS detection

VERTICAL RESULT



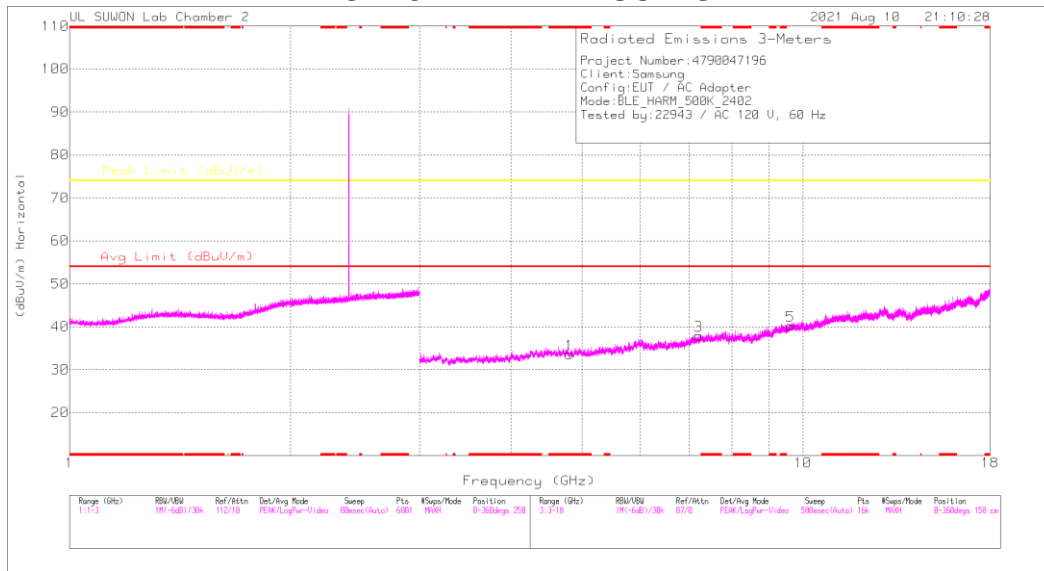
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	40.65	Pk	32	-20.2	0	52.45	-	-	74	-21.55	225	226	V
2	2.56268	44.19	Pk	32.2	-20.1	0	56.29	-	-	74	-17.71	225	226	V
3	* 2.48351	30.96	RMS	32	-20.2	2.46	45.22	54	-8.78	-	-	225	226	V
4	2.51549	31.57	RMS	32.1	-20.1	2.46	46.03	54	-7.97	-	-	225	226	V

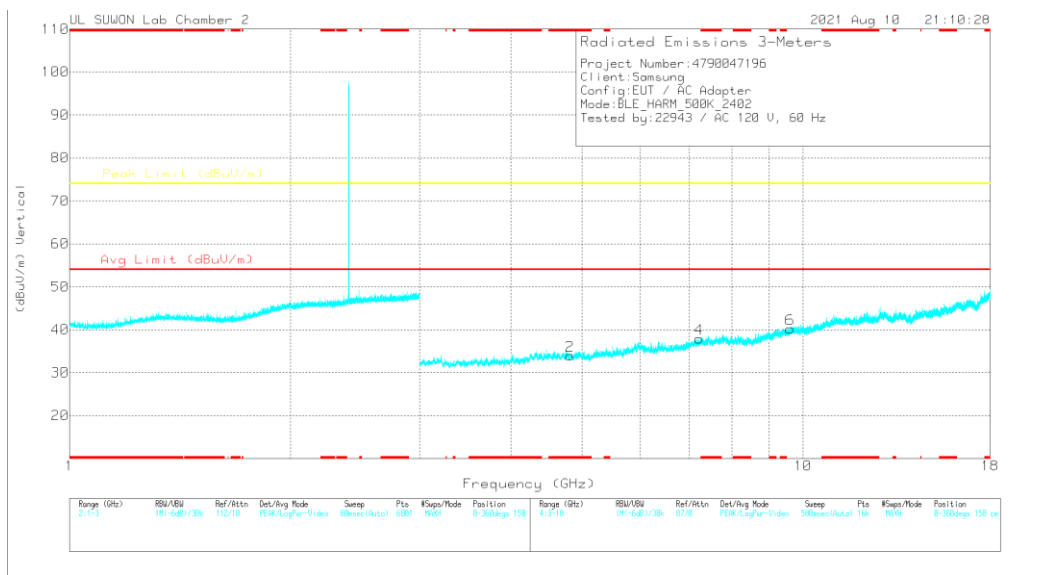
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK - Peak detector
 RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

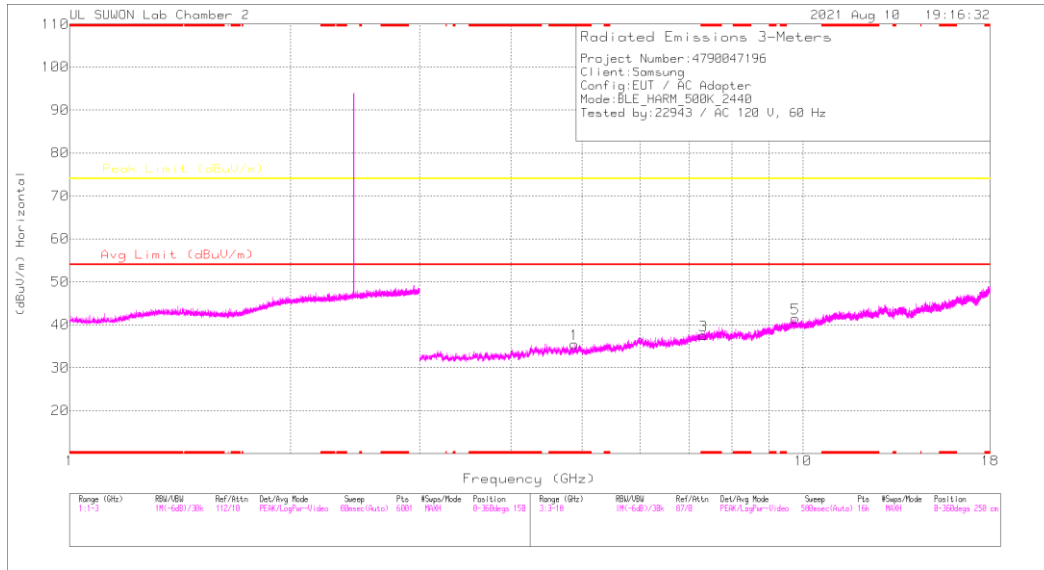
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

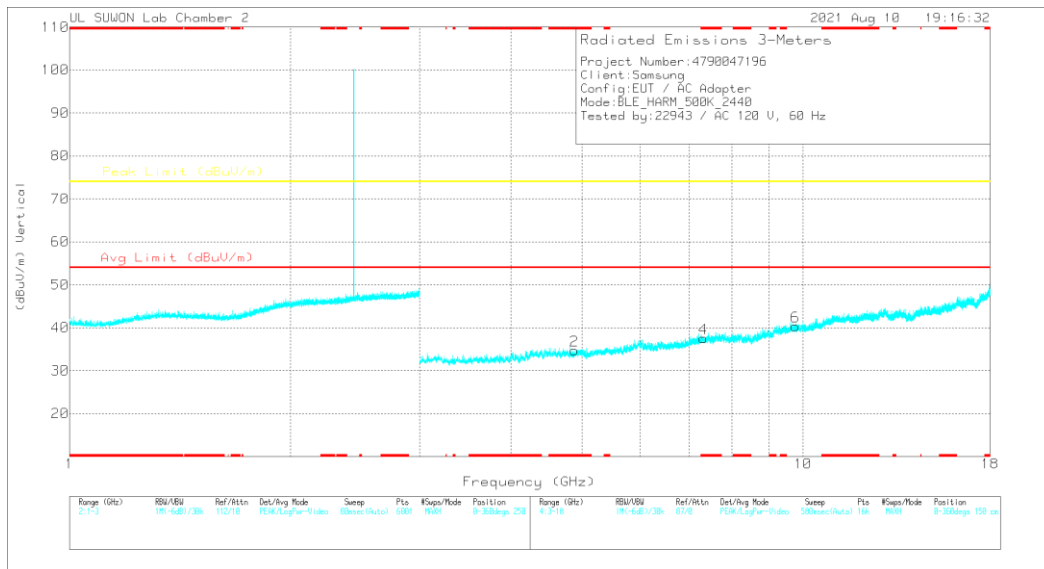
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HPI(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80696	36.39	PK2	34.1	-27.8	0	42.66	-	-	74	-31.32	360	100	H
* 4.80538	36.73	PK2	34.1	-27.7	0	43.13	-	-	74	-30.87	360	100	V
7.20757	35.37	PK2	36.2	-24.9	0	46.67	-	-	74	-27.33	360	100	H
7.20581	34.78	PK2	36.2	-25	0	45.98	-	-	74	-28.02	360	100	V
9.60799	32.8	PK2	37	-20.9	0	48.9	-	-	74	-25.1	360	100	H
9.60345	32.58	PK2	37	-20.9	0	48.68	-	-	74	-25.32	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

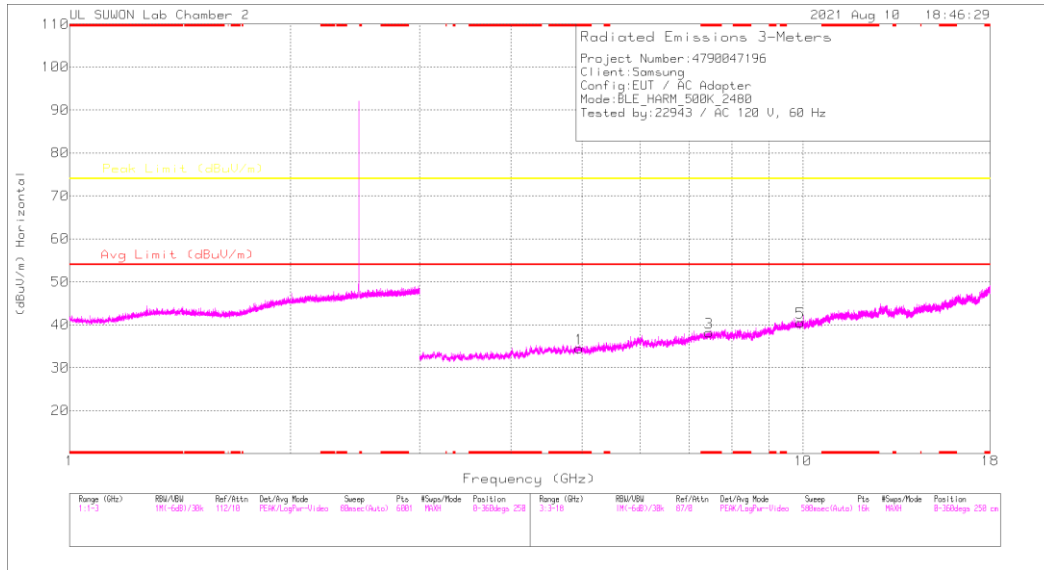
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

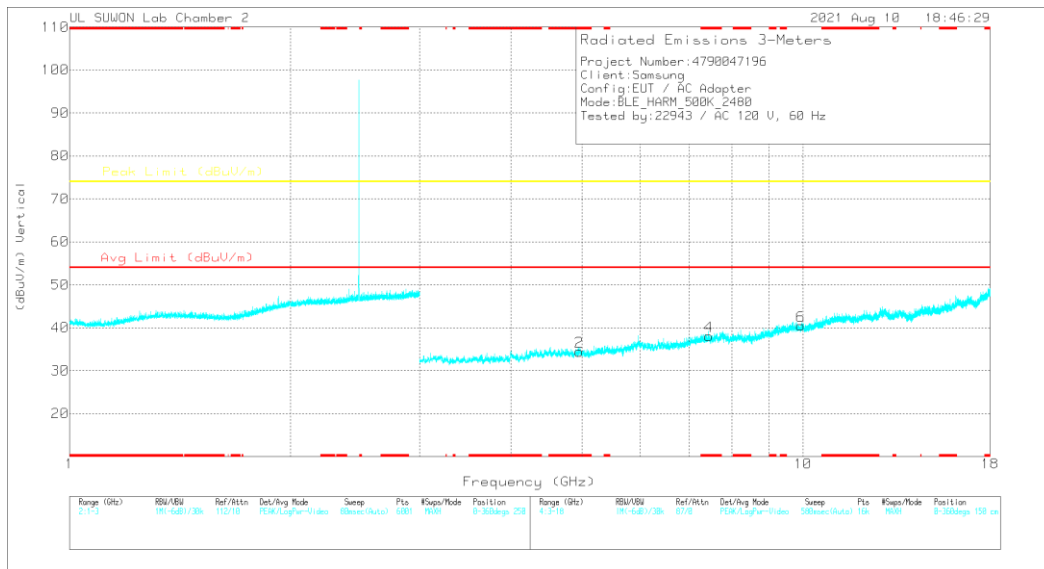
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88181	37.39	PK2	34.1	-27.5	0	43.99	-	-	74	-30.01	360	100	H
* 4.8783	36.68	PK2	34.1	-27.6	0	43.18	-	-	74	-30.82	360	100	V
* 7.32135	35.13	PK2	36.1	-24.6	0	46.63	-	-	74	-27.37	360	100	H
* 7.32005	35.42	PK2	36.1	-24.6	0	46.92	-	-	74	-27.08	360	100	V
9.76027	33.18	PK2	37.2	-20.5	0	49.88	-	-	74	-24.12	360	100	H
9.76158	32.3	PK2	37.2	-20.5	0	49	-	-	74	-25	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

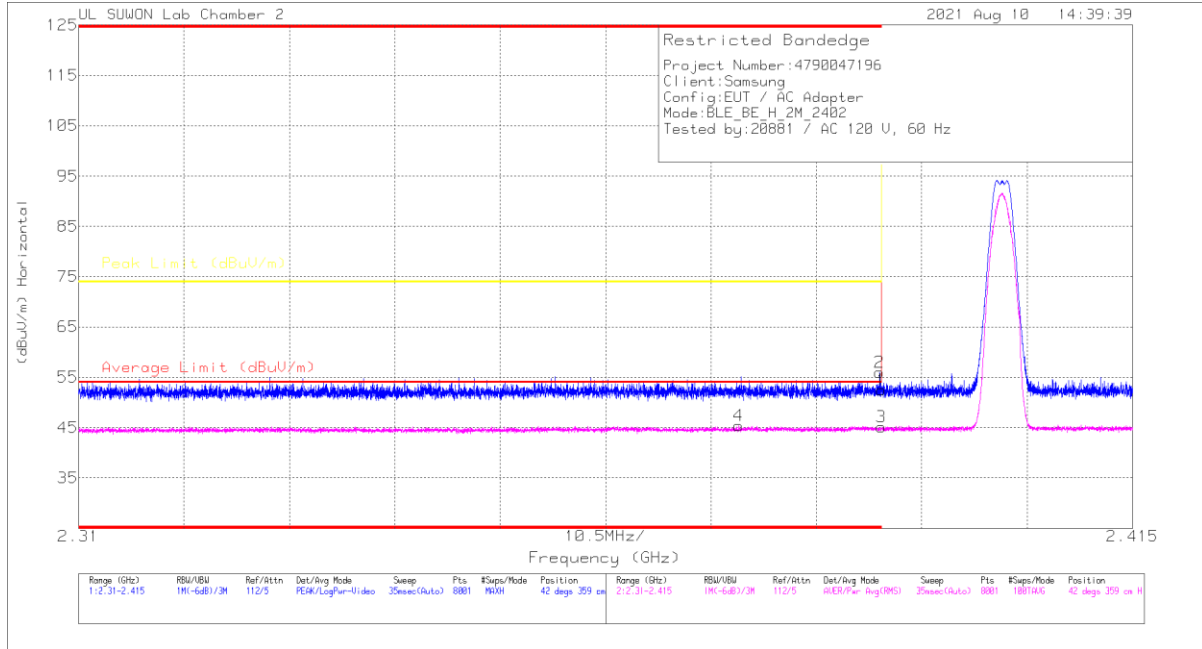
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.96179	36.6	PK2	34.1	-26.8	0	43.9	-	-	74	-30.1	360	100	H
* 4.95937	36.2	PK2	34.1	-26.8	0	43.5	-	-	74	-30.5	360	100	V
* 7.44001	34.7	PK2	36	-23.7	0	47	-	-	74	-27	360	100	H
* 7.43987	34.22	PK2	36	-23.7	0	46.52	-	-	74	-27.48	360	100	V
9.92014	32.1	PK2	37.4	-20.3	0	49.2	-	-	74	-24.8	360	100	H
9.92118	31.76	PK2	37.4	-20.3	0	48.86	-	-	74	-25.14	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak

10.2.2. 2Mbps

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT

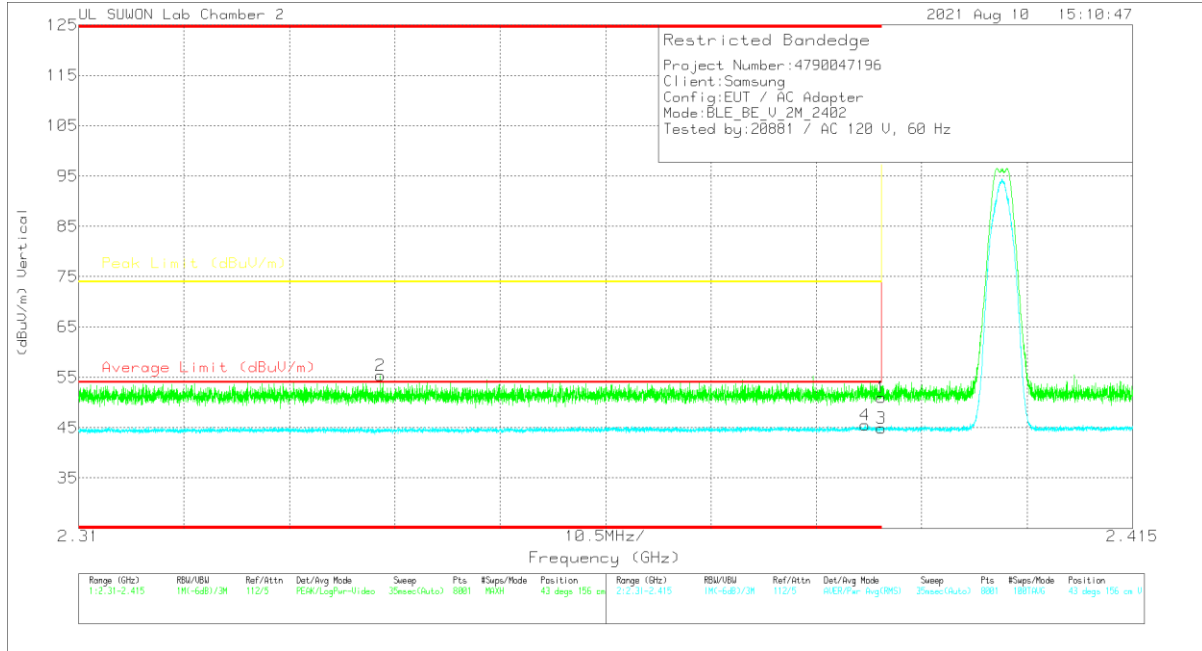


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00158724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.85	PK	31.9	-20.3	0	52.45	-	-	74	-21.55	42	359	H
2	* 2.38979	44.4	PK	31.9	-20.3	0	56	-	-	74	-18	42	359	H
3	* 2.39	31.12	RMS	31.9	-20.3	2.42	45.14	54	-8.86	-	-	42	359	H
4	* 2.37574	31.43	RMS	31.9	-20.4	2.42	45.35	54	-8.65	-	-	42	359	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK - Peak detector
 RMS - RMS detection

VERTICAL RESULT



Trace Markers

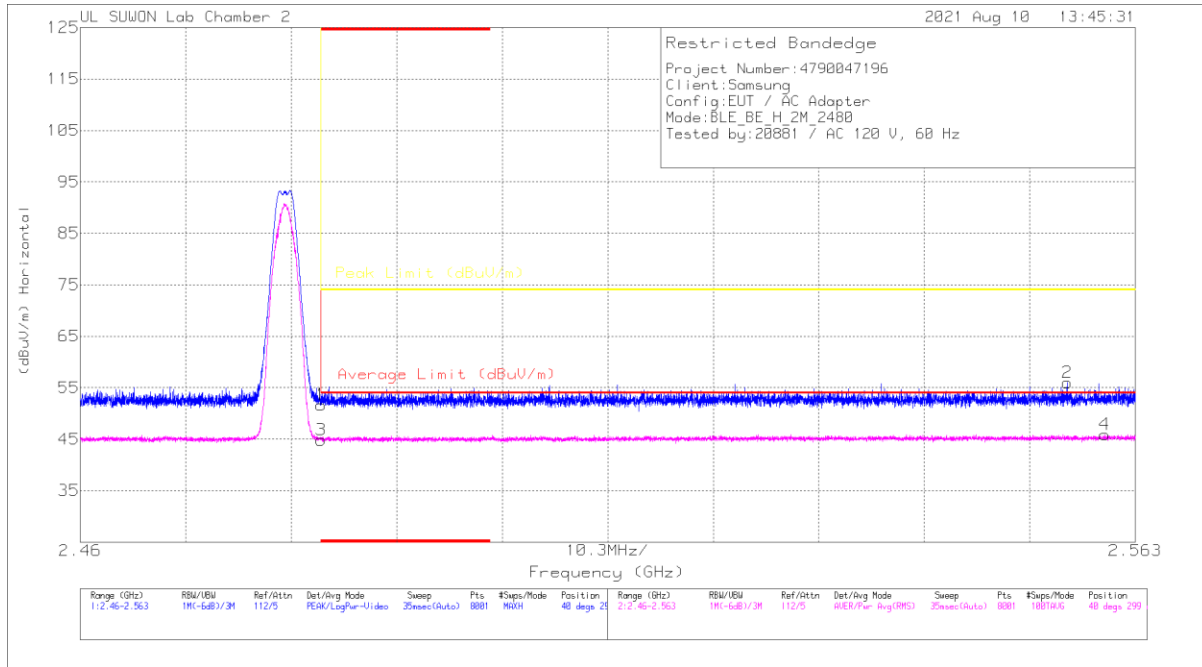
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	39.38	Pk	31.9	-20.3	0	50.98	-	-	74	-23.02	43	156	V
2	* 2.34007	44.09	Pk	31.8	-20.5	0	55.39	-	-	74	-18.61	43	156	V
3	* 2.39	30.9	RMS	31.9	-20.3	2.42	44.92	54	-9.09	-	-	43	156	V
4	* 2.38838	31.48	RMS	31.9	-20.3	2.42	45.5	54	-8.5	-	-	43	156	V

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

Pk - Peak detector
 RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

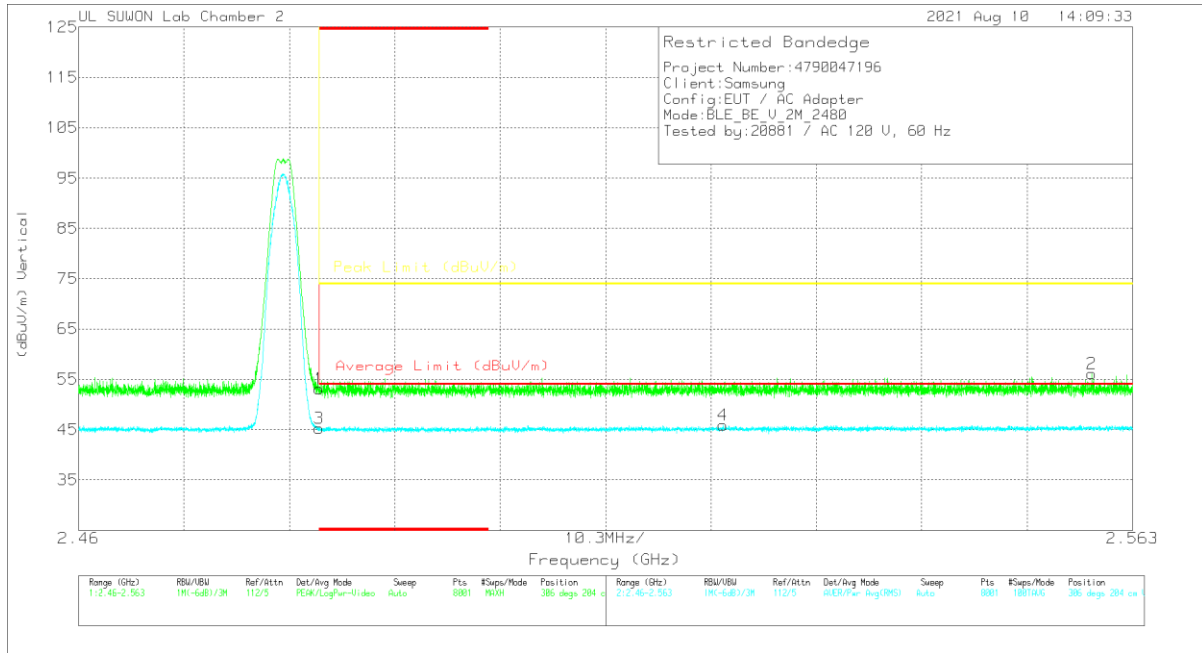


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117.00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	39.87	Pk	32	-20.2	0	51.67	-	-	74	-22.33	40	299	H
2	2.55637	43.88	Pk	32.2	-20.1	0	55.98	-	-	74	-18.02	40	299	H
3	* 2.48351	30.65	RMS	32	-20.2	2.42	44.87	54	-9.13	-	-	40	299	H
4	2.58003	31.4	RMS	32.2	-20.1	2.42	45.92	54	-8.08	-	-	40	299	H

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

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	41.27	Pk	32	-20.2	0	53.07	-	-	74	-20.93	306	204	V
2	2.55901	43.96	Pk	32.2	-20	0	56.16	-	-	74	-17.84	306	204	V
3	2.48351	31.1	RMS	32	-20.2	2.42	45.32	54	-8.68	-	-	306	204	V
4	2.52298	31.53	RMS	32.1	-20.1	2.42	45.95	54	-8.05	-	-	306	204	V

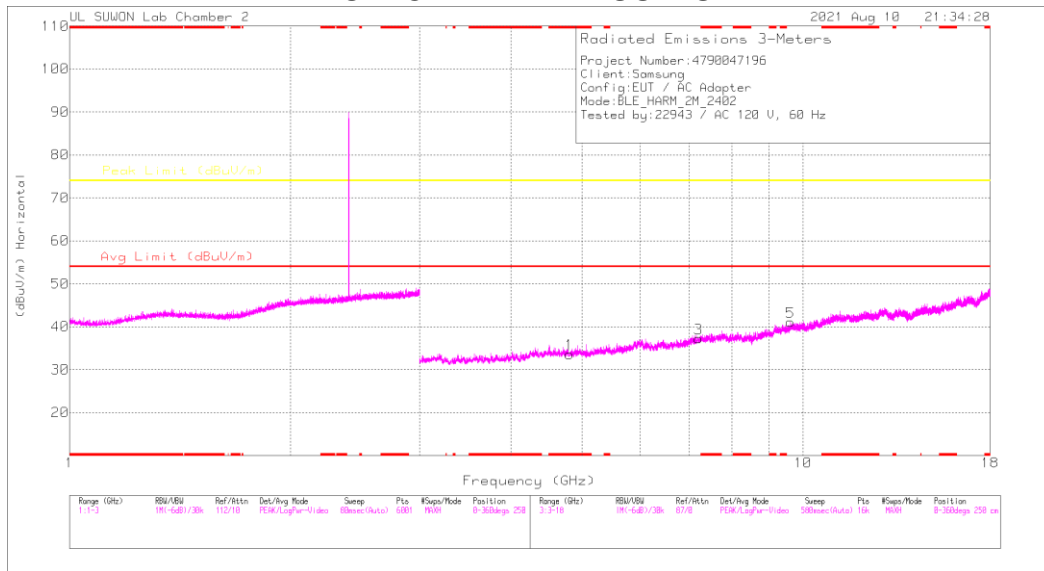
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

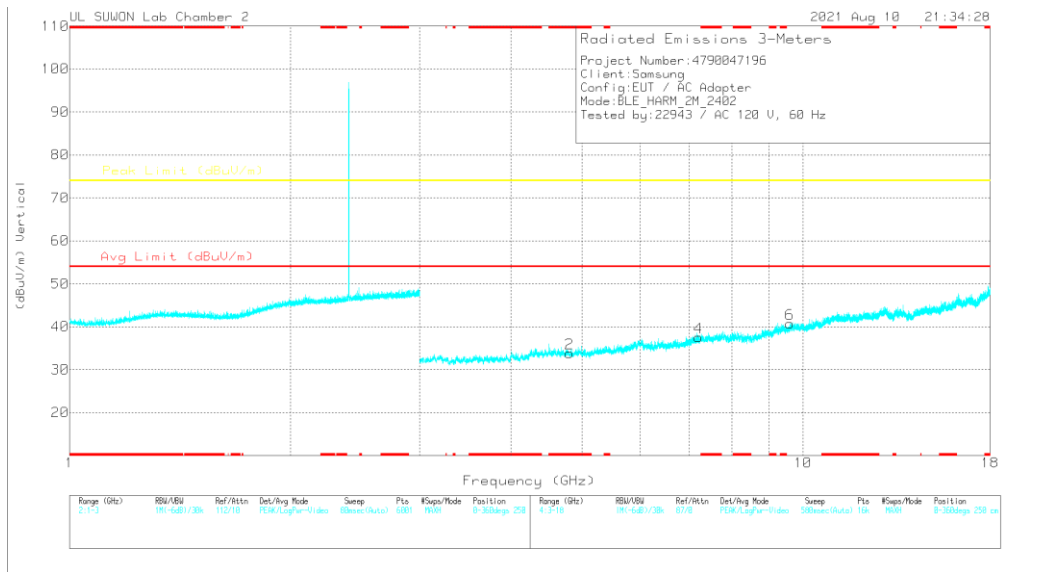
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

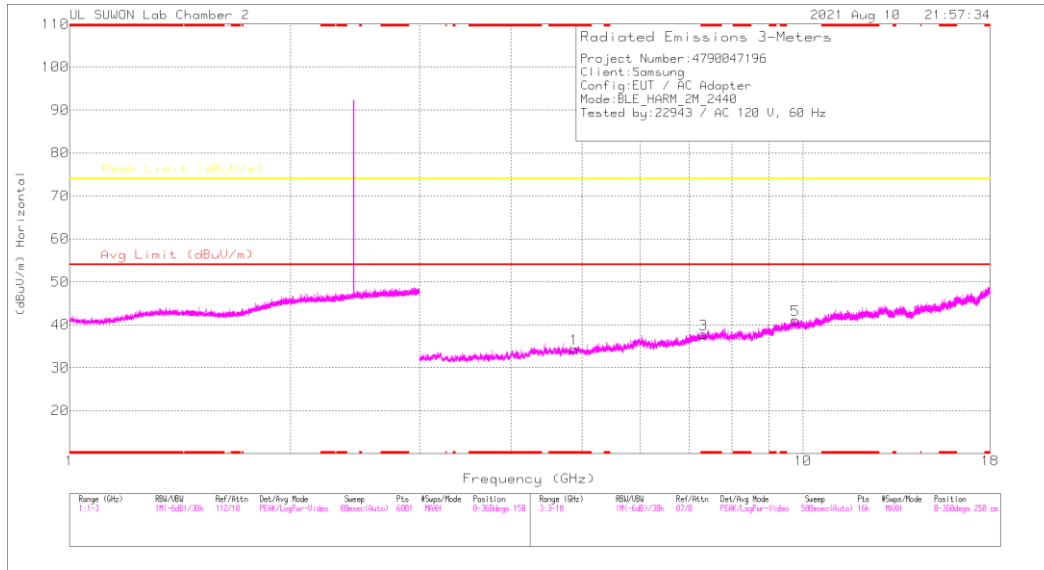
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

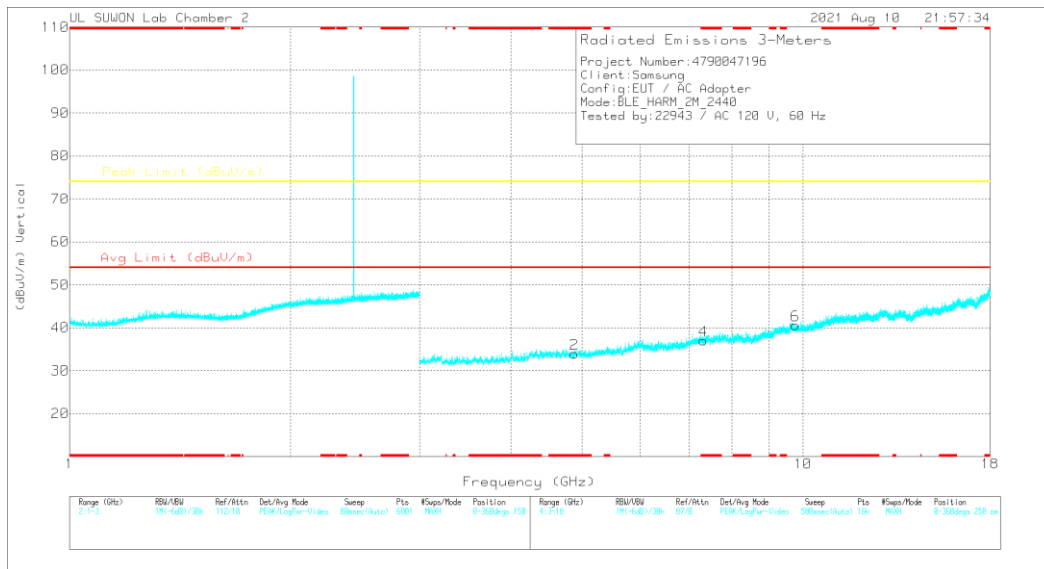
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HPI(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.8042	36.5	PK2	34.1	-27.7	0	42.9	-	-	74	-31.1	360	100	H
* 4.80268	36.23	PK2	34.1	-27.7	0	42.63	-	-	74	-31.37	360	100	V
7.20628	34.91	PK2	36.2	-24.9	0	46.21	-	-	74	-27.79	360	100	H
7.20602	34.86	PK2	36.2	-24.9	0	46.16	-	-	74	-27.84	360	100	V
9.61003	32.81	PK2	37	-20.8	0	49.01	-	-	74	-24.99	360	100	H
9.60348	32.33	PK2	37	-20.9	0	48.43	-	-	74	-25.57	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

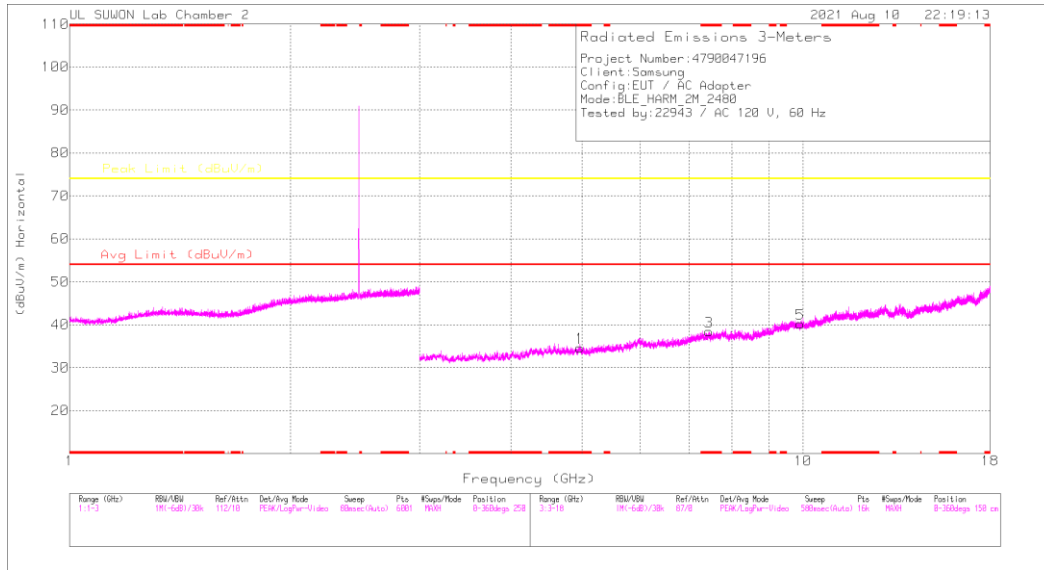
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

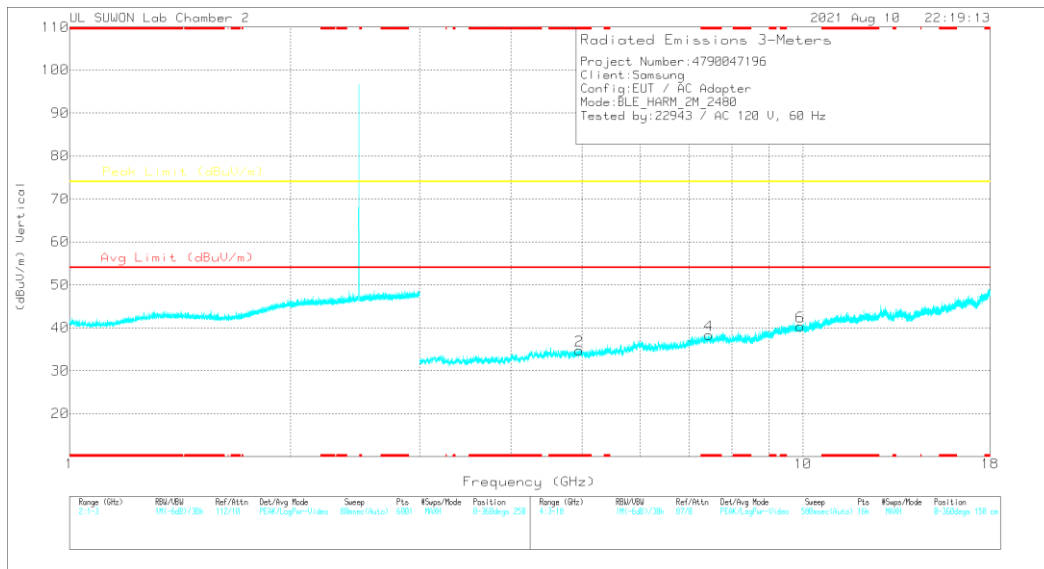
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88161	36.54	PK2	34.1	-27.5	0	43.14	-	-	74	-30.86	360	100	H
* 4.87829	36.66	PK2	34.1	-27.6	0	43.16	-	-	74	-30.84	360	100	V
* 7.32071	35.27	PK2	36.1	-24.6	0	46.77	-	-	74	-27.23	360	100	H
* 7.31955	34.91	PK2	36.1	-24.6	0	46.41	-	-	74	-27.59	360	100	V
9.76189	32.4	PK2	37.2	-20.5	0	49.1	-	-	74	-24.9	360	100	H
9.75806	32.53	PK2	37.2	-20.5	0	49.23	-	-	74	-24.77	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

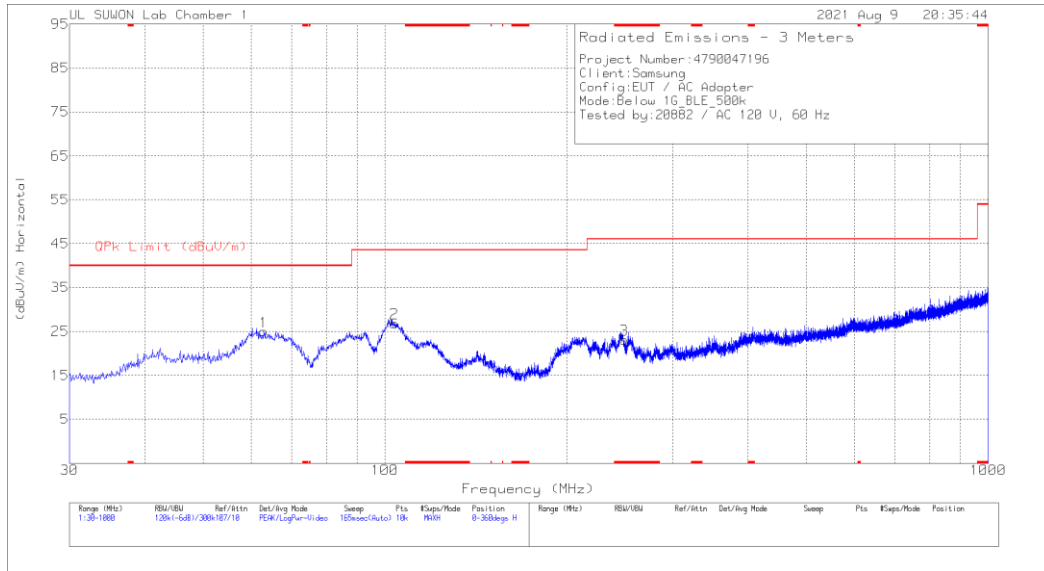
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.96172	35.82	PK2	34.1	-26.8	0	43.12	-	-	74	-30.88	360	100	H
* 4.95977	36.08	PK2	34.1	-26.8	0	43.38	-	-	74	-30.62	360	100	V
* 7.44105	34.35	PK2	36	-23.6	0	46.75	-	-	74	-27.25	360	100	H
* 7.43855	34	PK2	36	-23.6	0	46.4	-	-	74	-27.6	360	100	V
9.92062	32.12	PK2	37.4	-20.2	0	49.32	-	-	74	-24.68	360	100	H
9.91821	31.78	PK2	37.4	-20.4	0	48.78	-	-	74	-25.22	360	100	V

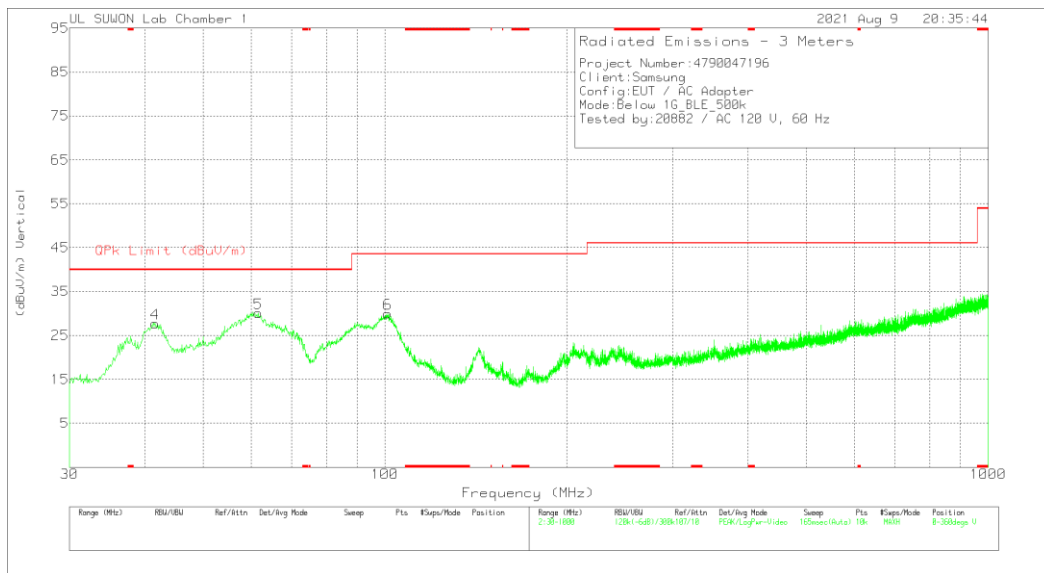
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak

10.3. WORST CASE BELOW 1 GHZ

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)



HORIZONTAL



VERTICAL

Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	62.98	37.93	Pk	17.8	-30.7	25.03	40	-14.97	0-360	400	H
2	103.72	39.42	Pk	17.7	-30.2	26.92	43.52	-16.6	0-360	300	H
3	* 249.026	33.68	Pk	18.5	-29	23.18	46.02	-22.84	0-360	100	H
4	41.64	39.72	Pk	19	-31	27.72	40	-12.28	0-360	100	V
5	61.622	42.56	Pk	18.2	-30.7	30.06	40	-9.94	0-360	100	V
6	101.004	42.42	Pk	17.7	-30.1	30.02	43.52	-13.5	0-360	100	V

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

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

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.

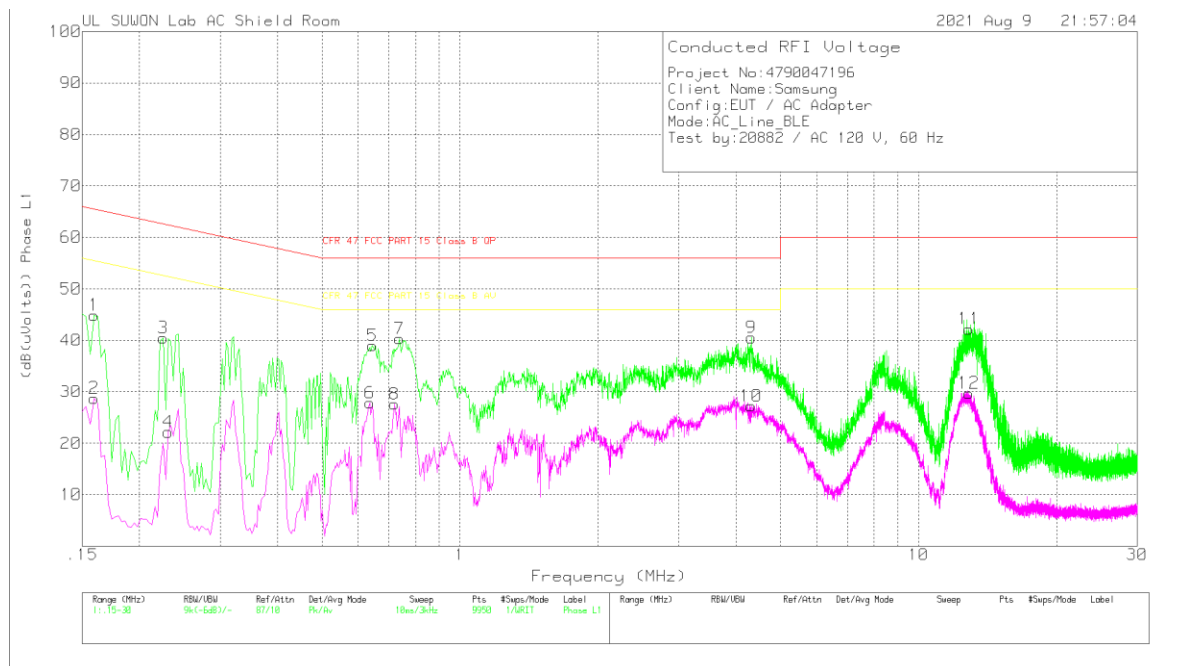
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

11.1.1. AC Power Line

LINE 1 RESULTS



Trace Markers

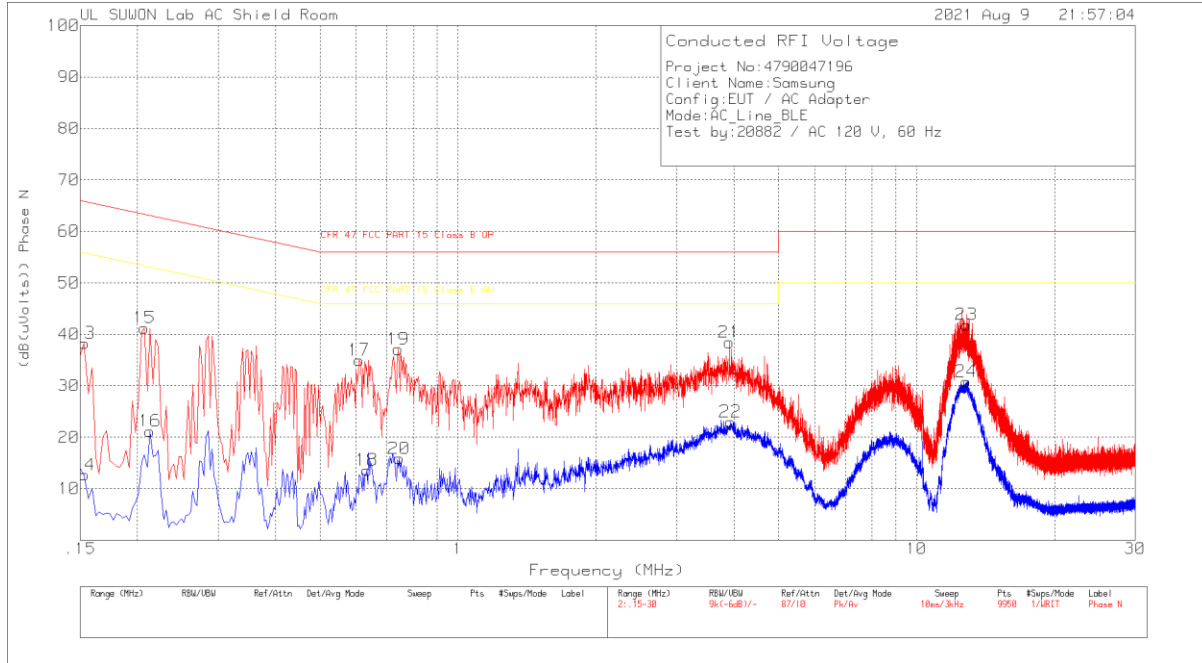
Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_L1[dB]	CABLELOS S(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	34.88	Pk	9.9	.1	44.88	65.52	-20.64	-	-
2	.159	18.73	Av	9.9	.1	28.73	-	-	55.52	-26.79
3	.225	30.46	Pk	9.8	.2	40.46	62.63	-22.17	-	-
4	.231	12.18	Av	9.8	.2	22.18	-	-	52.41	-30.23
5	.645	28.86	Pk	9.9	.2	38.96	56	-17.04	-	-
6	.636	17.72	Av	9.9	.2	27.82	-	-	46	-18.18
7	.738	30.21	Pk	9.9	.2	40.31	56	-15.69	-	-
8	.72	17.5	Av	9.9	.2	27.6	-	-	46	-18.4
9	4.32	30.43	Pk	9.8	.3	40.53	56	-15.47	-	-
10	4.314	17.13	Av	9.8	.3	27.23	-	-	46	-18.77
11	12.888	31.82	Pk	10	.4	42.22	60	-17.78	-	-
12	12.87	19.33	Av	10	.4	29.73	-	-	50	-20.27

Pk - Peak detector

Av - Average detection

LINE 2 RESULTS



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_N[dB]	CABLELOS S(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	.153	28.38	Pk	9.8	.1	38.28	65.84	-27.56	-	-
14	.153	2.77	Av	9.8	.1	12.67	-	-	55.84	-43.17
15	.207	31.14	Pk	9.9	.2	41.24	63.32	-22.08	-	-
16	.213	11.19	Av	9.8	.2	21.19	-	-	53.09	-31.9
17	.609	24.85	Pk	9.9	.2	34.95	56	-21.05	-	-
18	.633	3.48	Av	9.9	.2	13.58	-	-	46	-32.42
19	.741	27.01	Pk	9.9	.2	37.11	56	-18.89	-	-
20	.744	5.75	Av	9.9	.2	15.85	-	-	46	-30.15
21	3.906	28.34	Pk	9.8	.3	38.44	56	-17.56	-	-
22	3.927	12.88	Av	9.8	.3	22.98	-	-	46	-23.02
23	12.843	31.45	Pk	10	.4	41.85	60	-18.15	-	-
24	12.84	20.4	Av	10	.4	30.8	-	-	50	-19.2

PK - Peak detector
 Av - Average detection

END OF TEST REPORT