CERTIFICATION TEST REPORT

Report Number. : 4790558569-E4V2

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-A236V
FCC ID	:	A3LSMA236V
EUT Description	:	GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C

Date Of Issue:
2022-11-24

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	2022-11-11	Initial issue	Minju Cha
V2	2022-11-24	Updated to address TCB's question	Minju Cha

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC
MODEL NUMBER:	SM-A236V
SERIAL NUMBER:	664a0edc42347ece, 664a125001347ece (CONDUCTED); 664a1250e6347ece, 664a124c06347ece (RADIATED);
DATE TESTED:	2022-09-06 ~ 2022-11-11;

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:

Minju Cha
Suwon Lab Technician
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
☒ 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. 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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
28.9 dBuV/m = 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB

AC Corrected Reading (dBuV) = Measured Voltage (dBuV) + Extension Cord Loss (dB) + Cable Loss (dB)
44.72 dBuV = 34.72 dBuV + 9.9 dB + 0.1 dB

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	3.02 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.05 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.78 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.58 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 115:2021.

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

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

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	1Mbps (37pkt)	Peak	7.182	5.226
		Average	6.822	4.810
	2Mbps (255pkt)	Peak	7.282	5.348
		Average	6.627	4.599

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 ANT maximum gain of -4.51 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 X 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 1 Mbps(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	Freq. [MHz]	Conducted Burst Avg [dBm]	Symbol Rate [Ms/s]	Mode	Freq. [MHz]	Conducted Burst Avg [dBm]
1	**1Mbps 37pkt**	2402	6.759	2	2Mbps 37pkt	2402	6.544
		2440	**6.822**			2440	6.617
		2480	6.492			2480	6.266
	1Mbps 255pkt	2402	6.759		**2Mbps 255pkt**	2402	6.552
		2440	6.808			**2440**	**6.627**
		2480	6.455			2480	6.268
1 Coded S=8	125kbps 37pkt	2402	6.720	1 Coded S=2	500kbps 37pkt	2402	6.740
		2440	6.790			2440	6.794
		2480	6.428			2480	6.432
	125kbps 255pkt	2402	6.707		500kbps 255pkt	2402	6.709
		2440	6.750			2440	6.749
		2480	6.383			2480	6.386

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA800	R37MANQ1E72SE3	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02115A BWE	N/A
Earphone	SAMSUNG	GH59-15055A	EHS64AVFWE	N/A

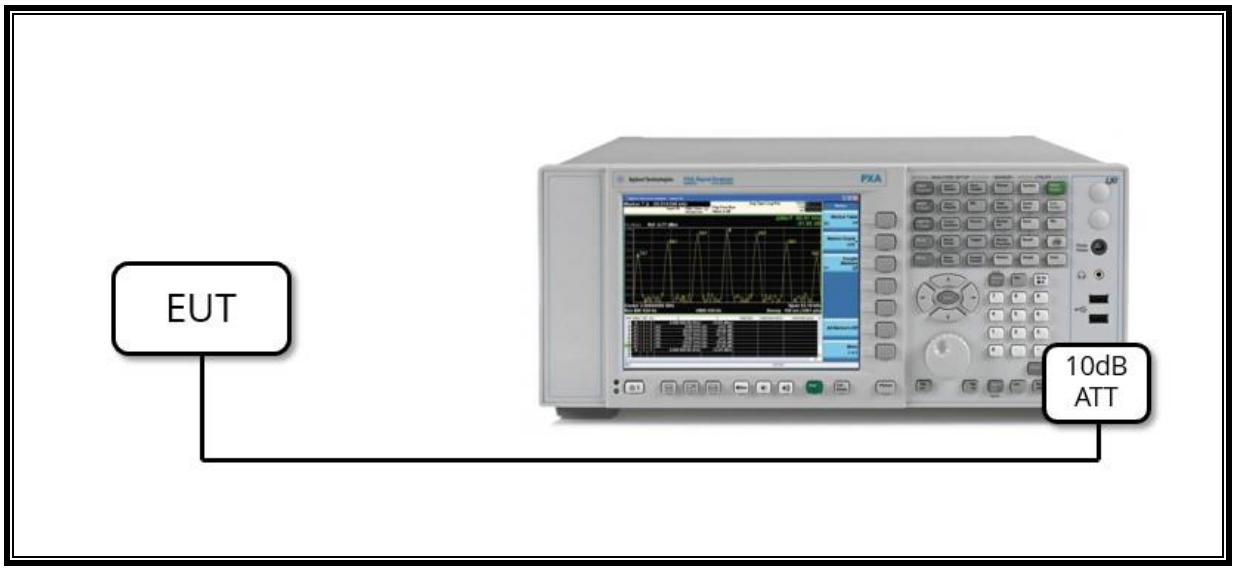
I/O CABLE

I/O Cable List						
Cable No.	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC Power	1	C Type	Shielded	1.0 m	N/A
2	Audio	2	Mini-Jack	Unshielded	0.7 m	N/A

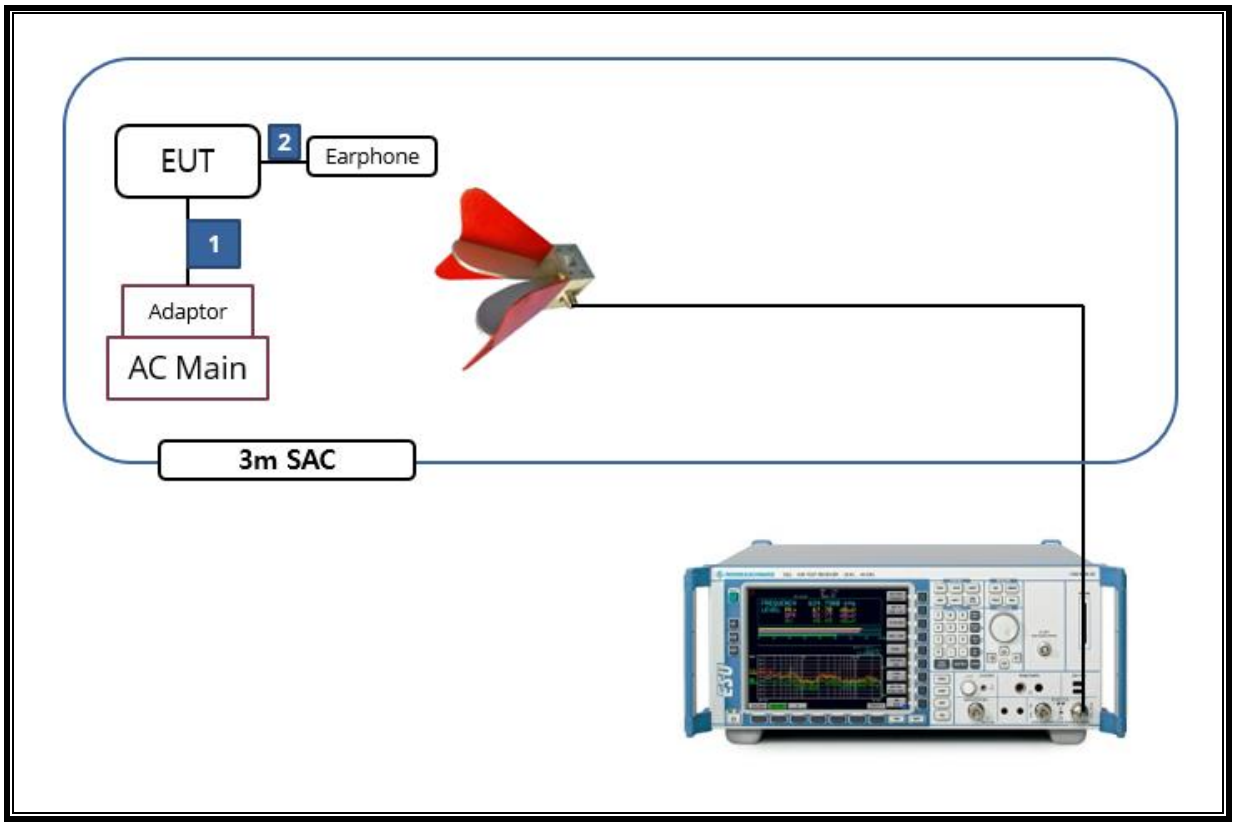
TEST SETUP

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 : ANSI C63.10-2013, Section 11.8.2 Option 2

OUTPUT POWER : ANSI C63.10-2013, Section 11.9.1.1 RBW ≥ DTS bandwidth

POWER SPECTRAL DENSITY : ANSI C63.10-2013, Section 11.10.2 Method PKPSD (peak PSD)

Out-of-band Emissions (Conducted) : ANSI C63.10-2013, Section 11.11 Emissions in nonrestricted frequency bands

Out-of-band Emissions in Non-restricted Bands: ANSI C63.10-2013, Section 11.11 Emissions in nonrestricted frequency bands

Out-of-band Emissions in Restricted Bands : ANSI C63.10-2013, Section 11.12 Emissions in restricted frequency bands

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	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	2024-08-15
Antenna, Horn, 18 GHz	ETS	3115	00167211	2024-08-04
Antenna, Horn, 18 GHz	ETS	3115	00161451	2024-08-21
Antenna, Horn, 18 GHz	ETS	3117	00168724	2024-08-04
Antenna, Horn, 18 GHz	ETS	3117	00168717	2024-08-21
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2024-08-02
Preamplifier	ETS	3116C-PA	00168841	2023-08-04
Preamplifier, 1000 MHz	Sonoma	310N	341282	2023-08-02
Preamplifier, 1000 MHz	Sonoma	310N	351741	2023-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	2023-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2023-08-01
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2023-08-01
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2023-08-03
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2023-08-01
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030B	MY60070693	2023-01-18
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9040B	MY60080268	2023-01-19
Average Power Sensor	Agilent / HP	U2000A	MY54270007	2023-08-03
Average Power Sensor	Agilent / HP	U2000A	MY54260010	2023-08-03
Attenuator	PASTERNACK	PE7087-10	A001	2023-08-03
Attenuator	PASTERNACK	PE7087-10	A008	2023-08-03
Attenuator	PASTERNACK	PE7004-10	2	2023-08-01
Attenuator	PASTERNACK	PE7087-10	A009	2023-08-03
EMI Test Receive, 40 GHz	R&S	ESU40	100439	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
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	2023-08-02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	2023-08-01
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	2023-08-01
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	2023-08-02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	2023-08-01
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	2023-08-02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	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	

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

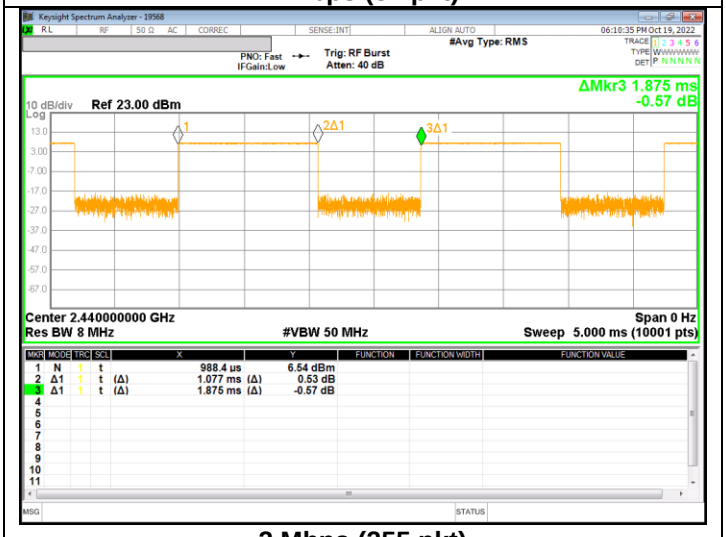
9.1. ON TIME AND DUTY CYCLE

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						
1 Mbps [37pkt]	0.390	0.625	0.624	62.412	2.047	2.563
2 Mbps [255pkt]	1.077	1.875	0.574	57.440	2.408	0.929

1 Mbps (37 pkt)



2 Mbps (255 pkt)

9.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

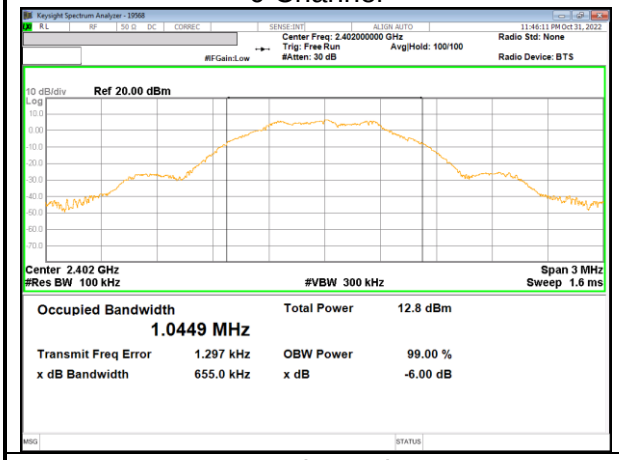
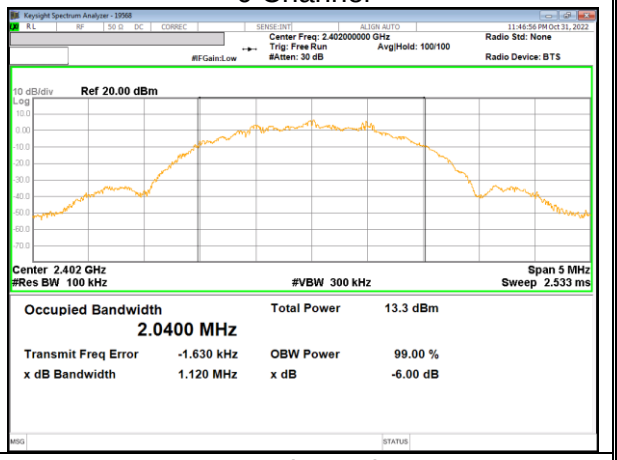
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

9.2.1. Test data

Mode	Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]
1Mbps (37pkt)	0	2 402	655.0	500.0
	19	2 440	660.6	500.0
	39	**2 480**	**652.7**	500.0
2Mbps (255pkt)	0	2 402	1120.0	500.0
	19	2 440	1120.0	500.0
	39	2 480	1124.0	500.0
Worst			**652.7**	500.0

9.2.2. 6 dB BANDWIDTH PLOTS

1 Mbps	2 Mbps
0 Channel	0 Channel
	
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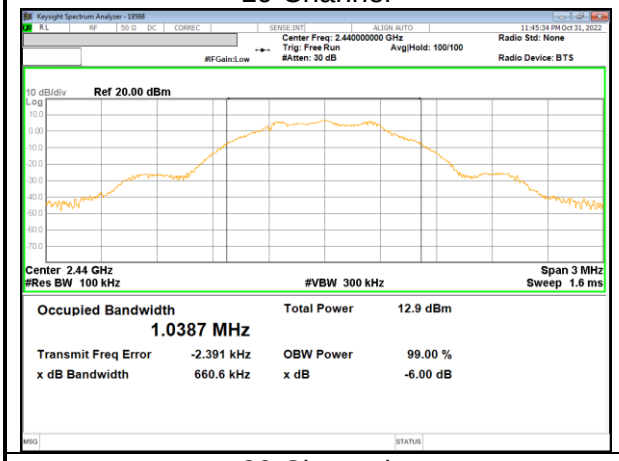
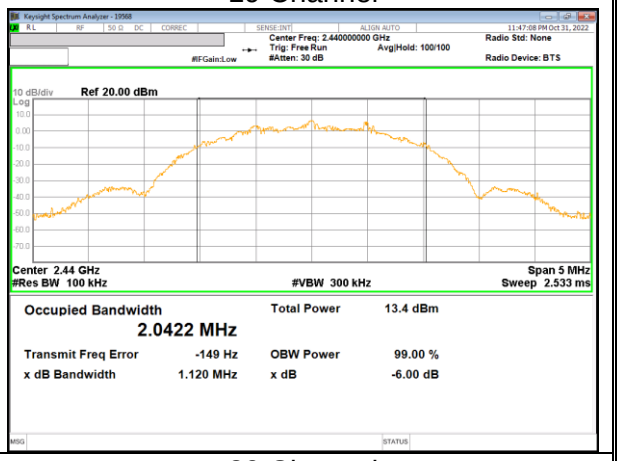
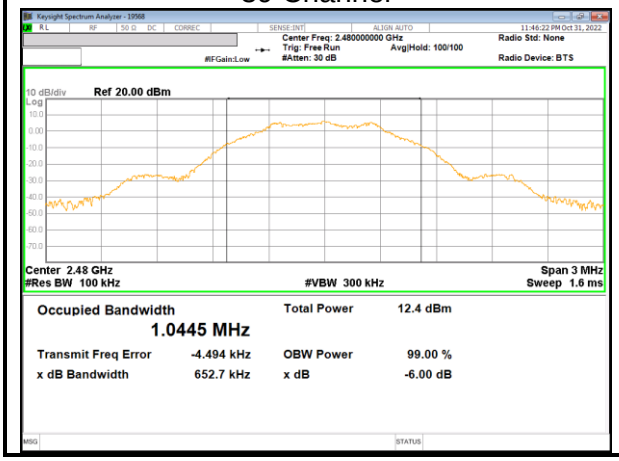
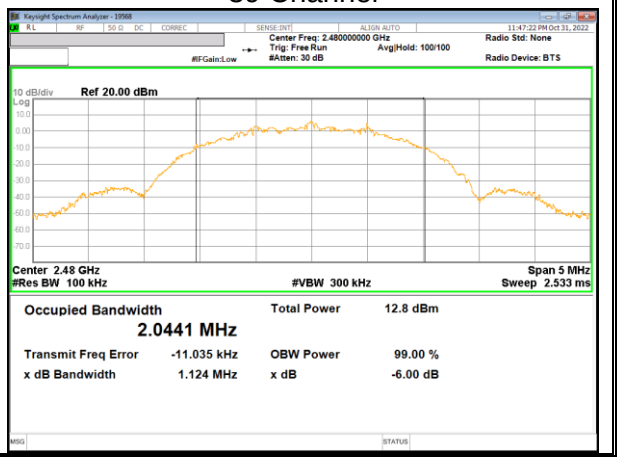
	
39 Channel	39 Channel
	

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(RBW ≧ DTS bandwidth).

RESULTS

9.3.1. Test data

Mode	Channel	Frequency [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]
1Mbps (37 pkt)	0	2 402	7.165	30.000	-22.835
	19	2 440	7.182		-22.818
	39	2 480	6.863		-23.137
2Mbps (255 pkt)	0	2 402	7.196		-22.804
	19	**2 440**	**7.282**		-22.718
	39	2 480	7.025		-22.975
Worst			**7.282**		-21.979

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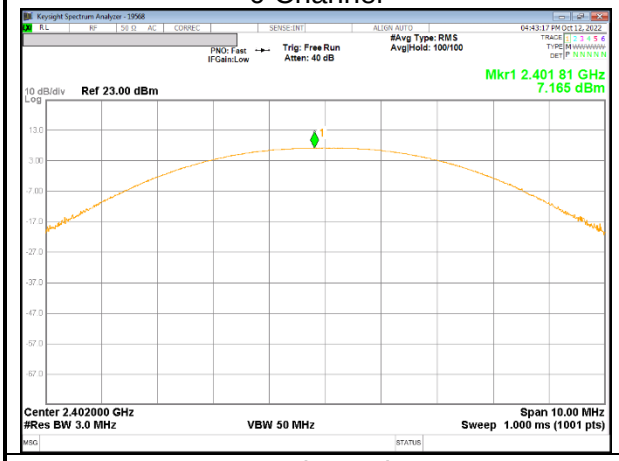
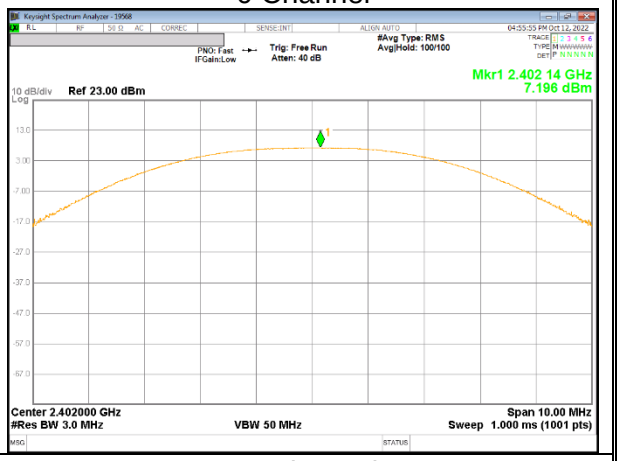
9.3.2. PEAK POWER PLOTS

1 Mbps	2 Mbps
0 Channel	0 Channel
	
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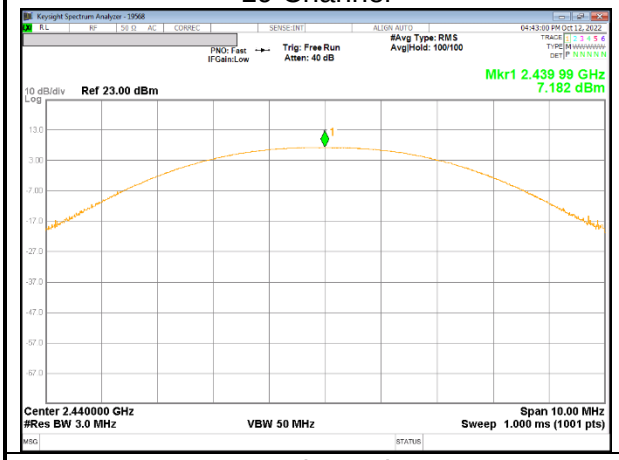
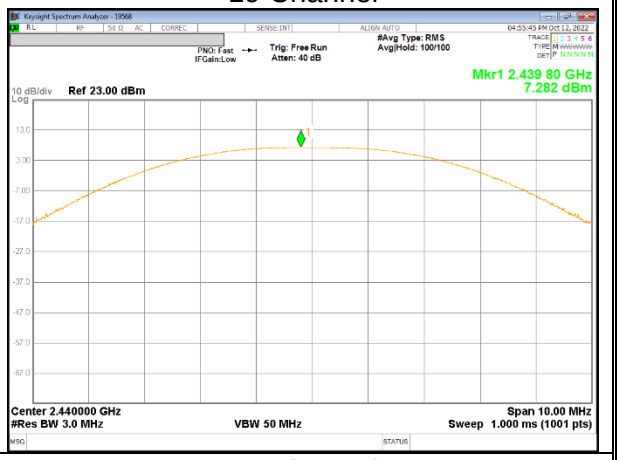
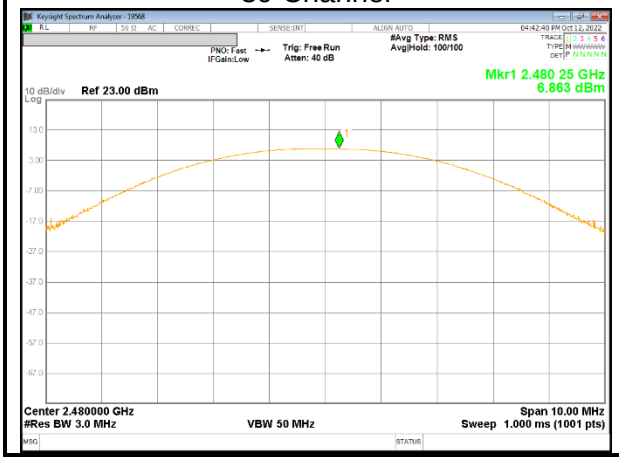
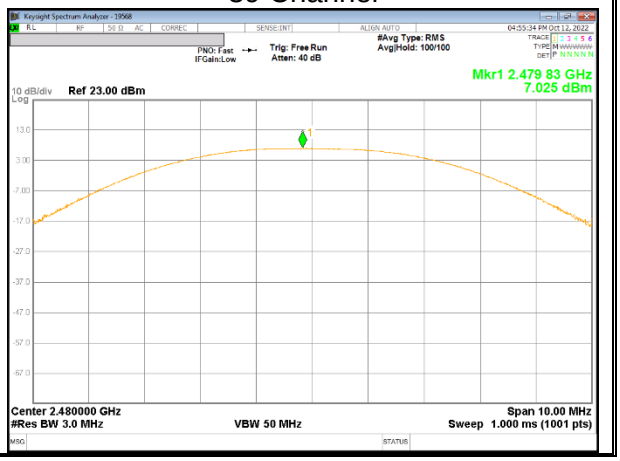
	
39 Channel	39 Channel
	

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. Test data

Mode	Channel	Frequency [MHz]	Average Output Power [dBm]	Average Output Power [mW]
1Mbps (37pkt)	0	2 402	6.759	4.742
	19	**2 440**	**6.822**	**4.810**
	39	2 480	6.492	4.458
2Mbps (255pkt)	0	2 402	6.552	4.521
	19	2 440	6.627	4.599
	39	2 480	6.268	4.235

9.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

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.

TEST PROCEDURE

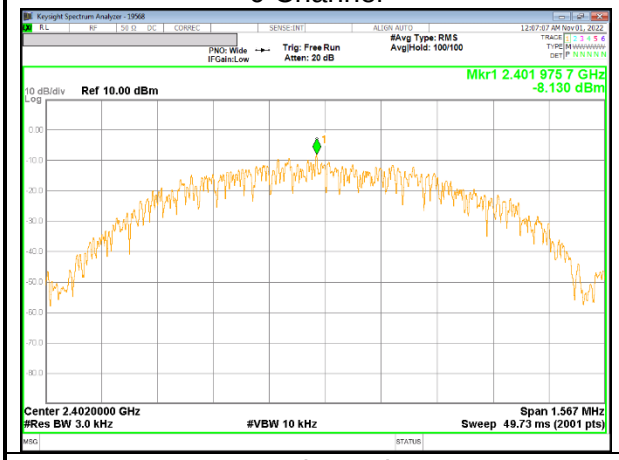
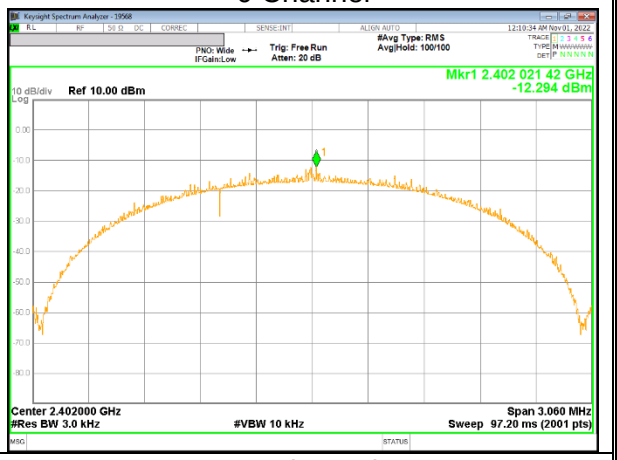
ANSI C63.10-2013, Section 11.10.2 Method PKPSD (peak PSD)

RESULTS

9.5.1. Test data

Mode	Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
1Mbps (37pkt)	0	2 402	-8.130	8.00	-16.130
	19	**2 440**	**-8.042**		-16.042
	39	2 480	-8.512		-16.512
2Mbps (255pkt)	0	2 402	-12.294		-20.294
	19	2 440	-12.170		-20.170
	39	2 480	-12.636		-20.636
Worst			**-8.042**		

9.5.2. PSD TEST PLOTS

1 Mbps	2 Mbps
0 Channel	0 Channel
	
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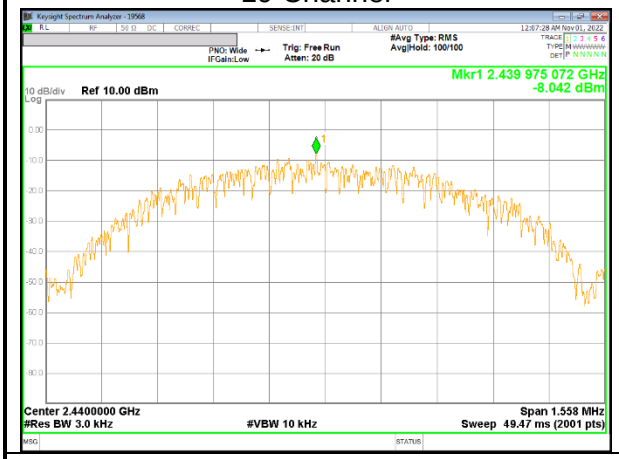
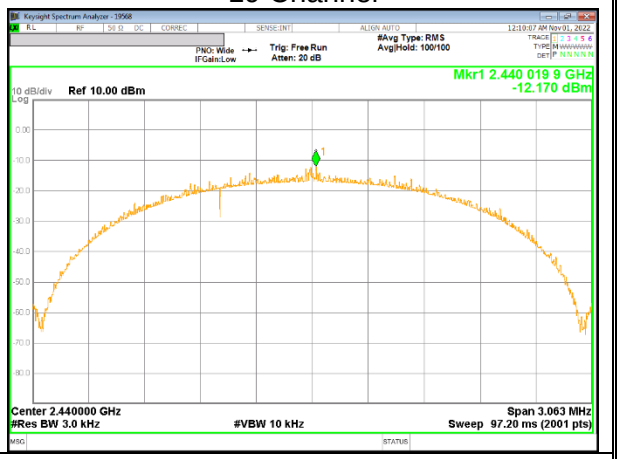
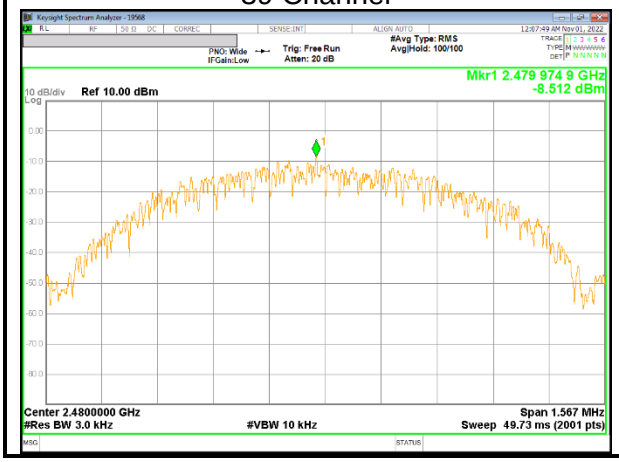
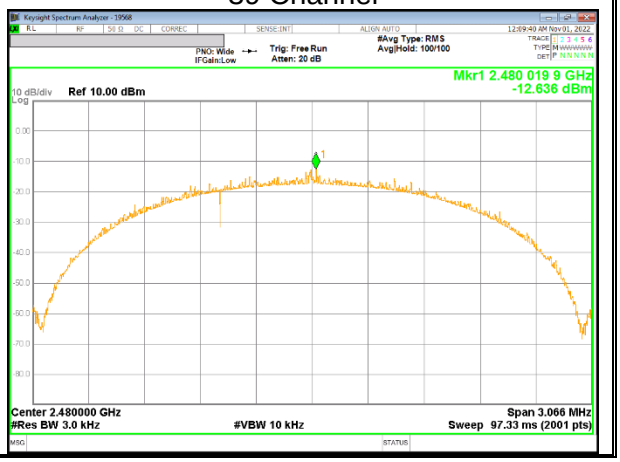
	
39 Channel	39 Channel
	

9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

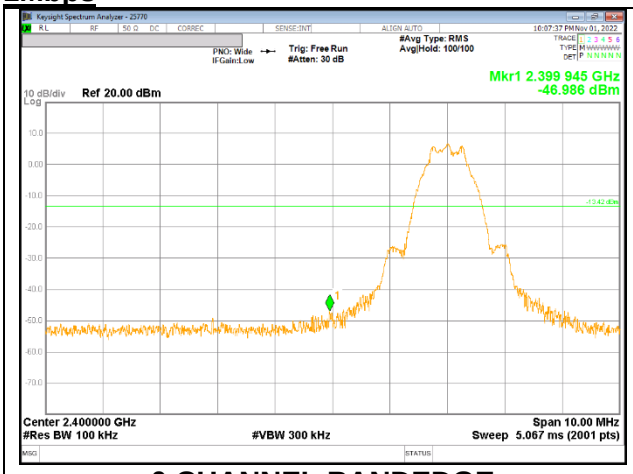
FCC §15.247 (d)

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

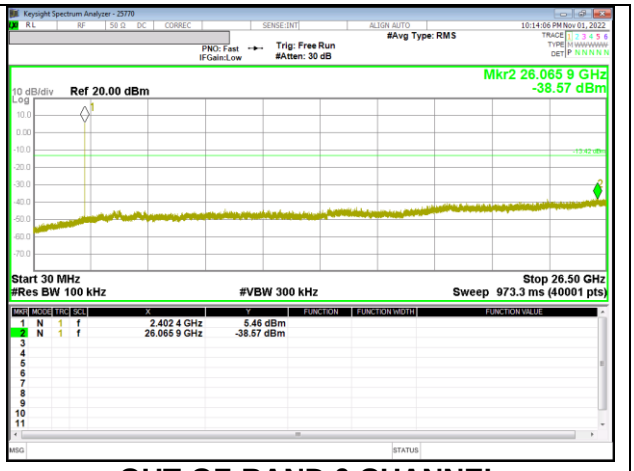
RESULTS

9.6.1. Test plot

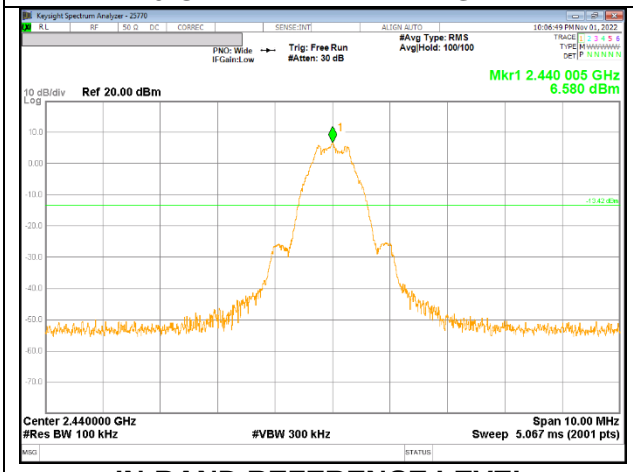
1Mbps



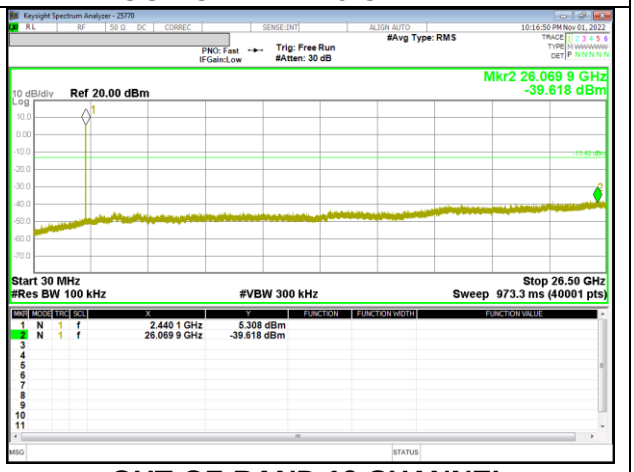
0 CHANNEL BANDEDGE



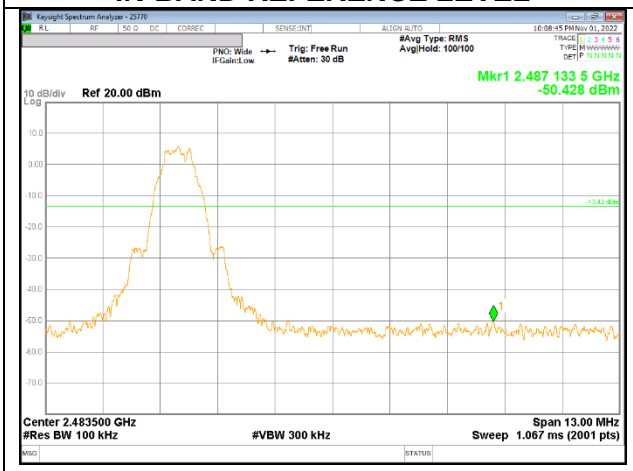
OUT-OF-BAND 0 CHANNEL



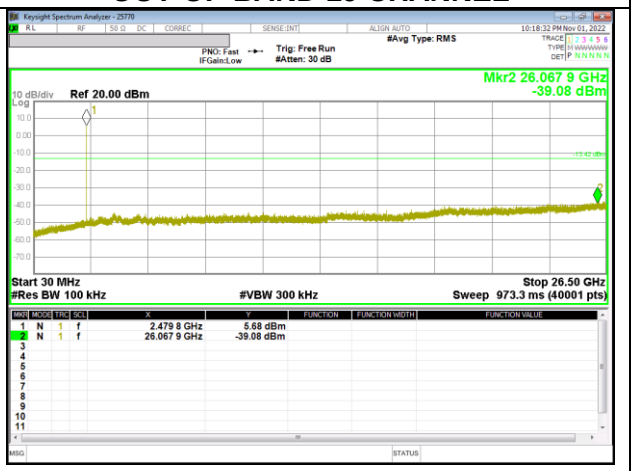
IN-BAND REFERENCE LEVEL



OUT-OF-BAND 19 CHANNEL

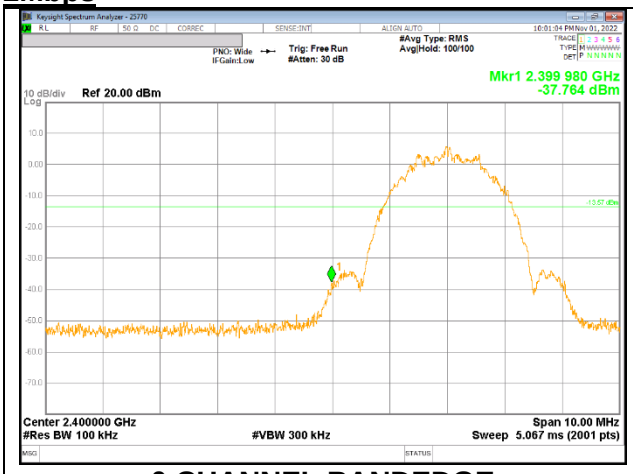


39 CHANNEL BANDEDGE

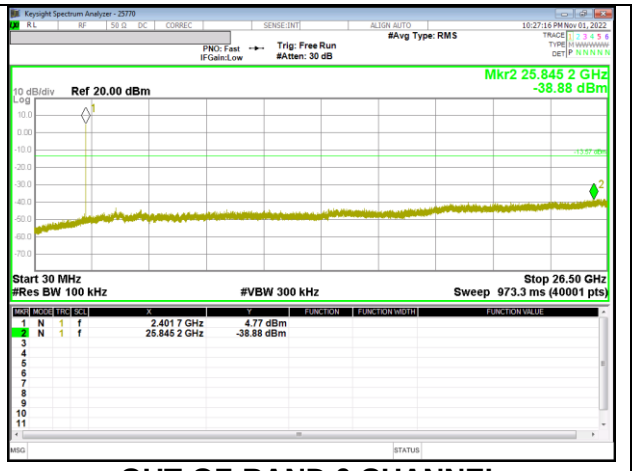


OUT-OF-BAND 39 CHANNEL

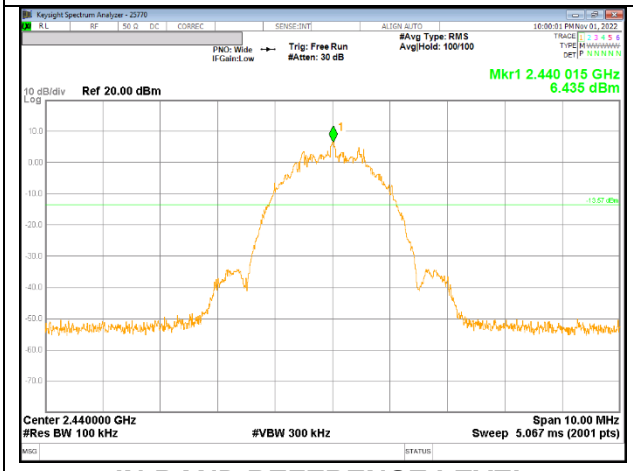
2Mbps



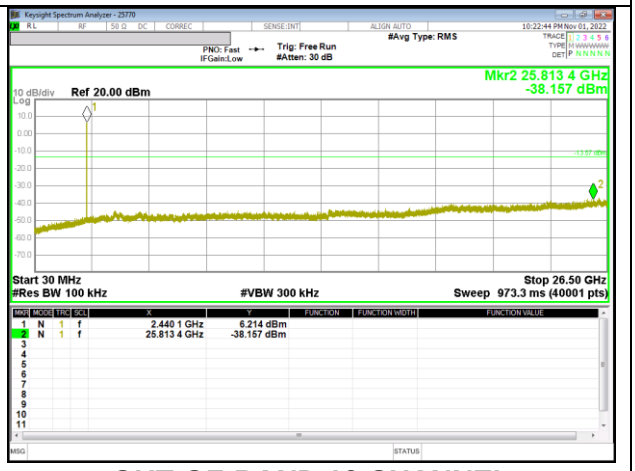
0 CHANNEL BANDEDGE



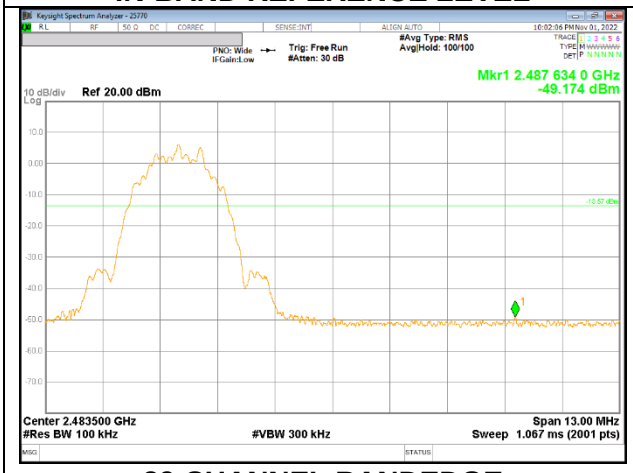
OUT-OF-BAND 0 CHANNEL



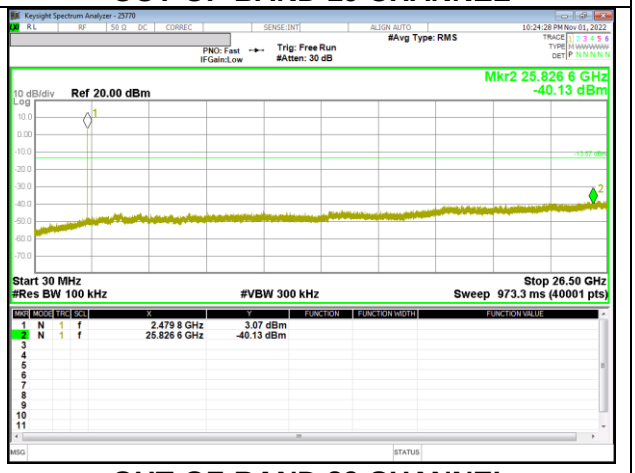
IN-BAND REFERENCE LEVEL



OUT-OF-BAND 19 CHANNEL



39 CHANNEL BANDEDGE



OUT-OF-BAND 39 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 band-edge, Final detection of spurious harmonic emissions)
Duty cycle factor = 10 log (1/x). For this sample: For 1 Mbps, DCF = 10log(1/0.624)=2.047dB (Spectrum Analyzer round it up to 2.05 dB) and for 2 Mbps, DCF = 10log(1/0.574)=2.408 dB (Spectrum Analyzer round it up to 2.41 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.

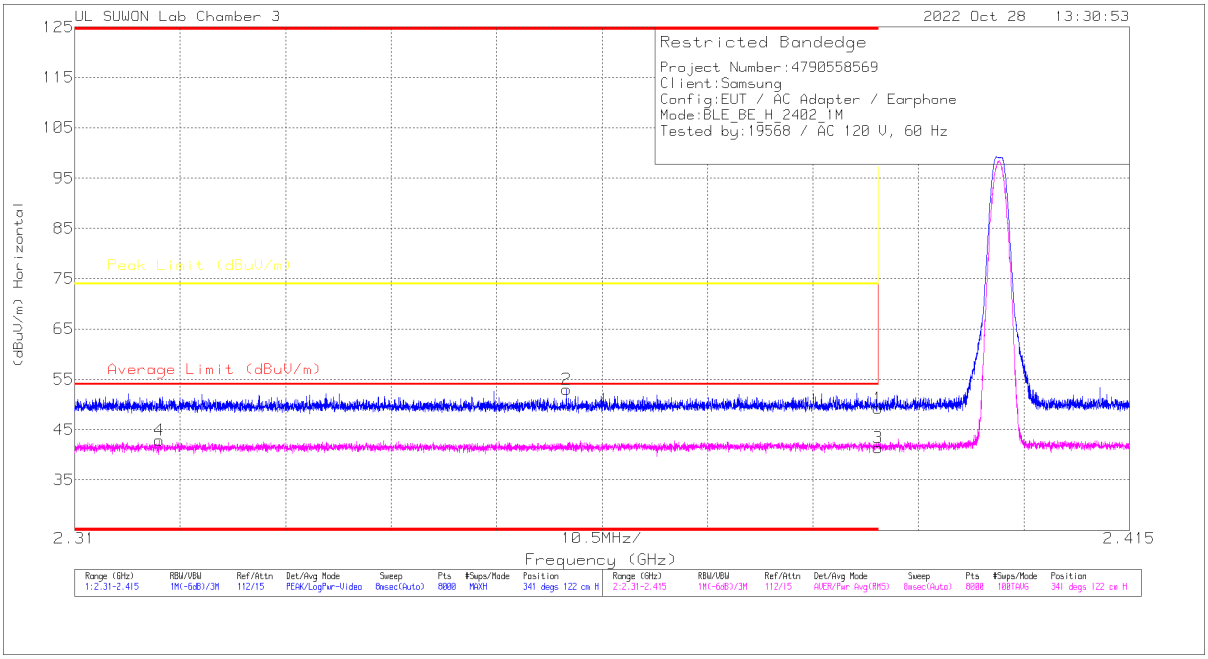
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. 1 Mbps

BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT

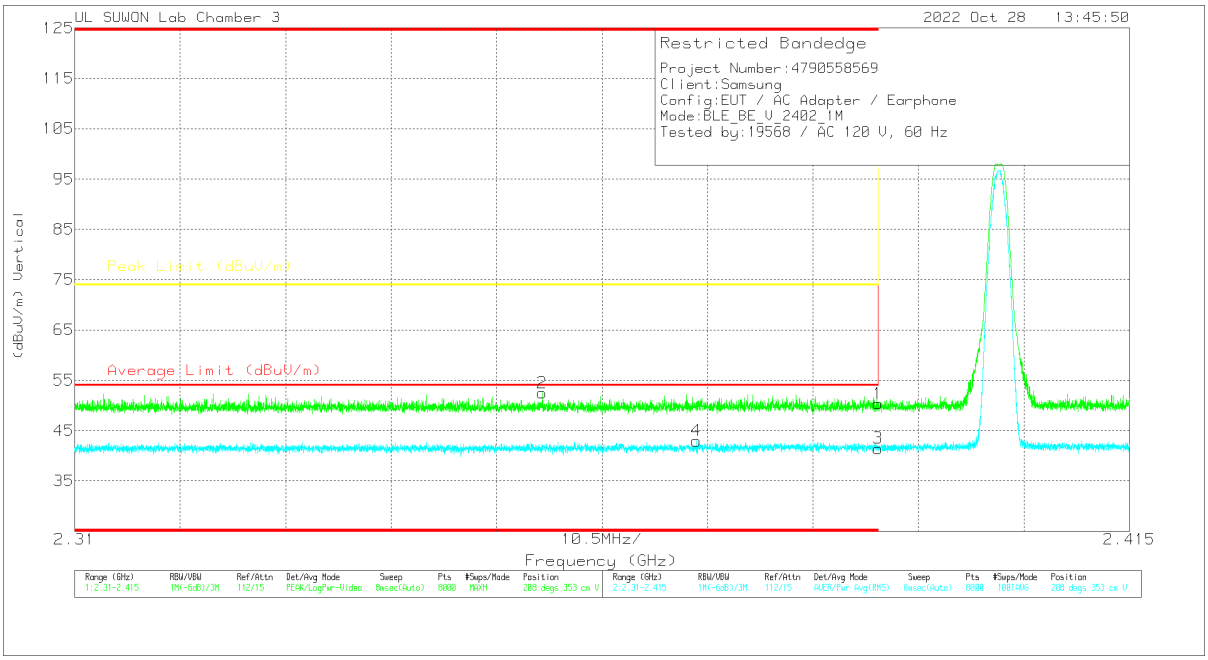


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	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	41.25	Pk	32.8	-24.8	0	49.25	-	-	74	-24.75	341	122	H
2	* 2.35898	45.31	Pk	32.6	-24.9	0	53.01	-	-	74	-20.99	341	122	H
3	* 2.39	31.33	RMS	32.8	-24.8	2.05	41.38	54	-12.62	-	-	341	122	H
4	* 2.31839	33.22	RMS	32.5	-24.9	2.05	42.87	54	-11.13	-	-	341	122	H

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

VERTICAL RESULT



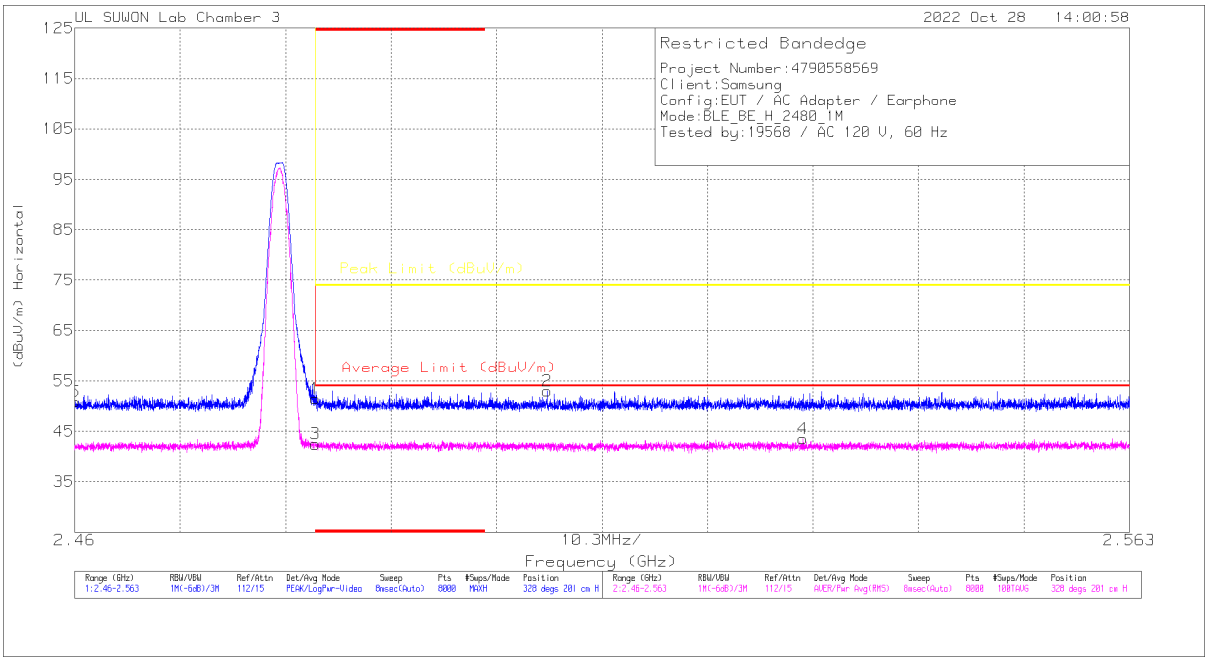
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	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	42.34	Pk	32.8	-24.8	0	50.34	-	-	74	-23.66	208	353	V
2	* 2.35656	44.81	Pk	32.6	-24.9	0	52.51	-	-	74	-21.49	208	353	V
3	* 2.39	31.42	RMS	32.8	-24.8	2.05	41.47	54	-12.53	-	-	208	353	V
4	* 2.37188	33.12	RMS	32.7	-24.9	2.05	42.97	54	-11.03	-	-	208	353	V

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

BANDEDGE (39 CHANNEL)

HORIZONTAL RESULT

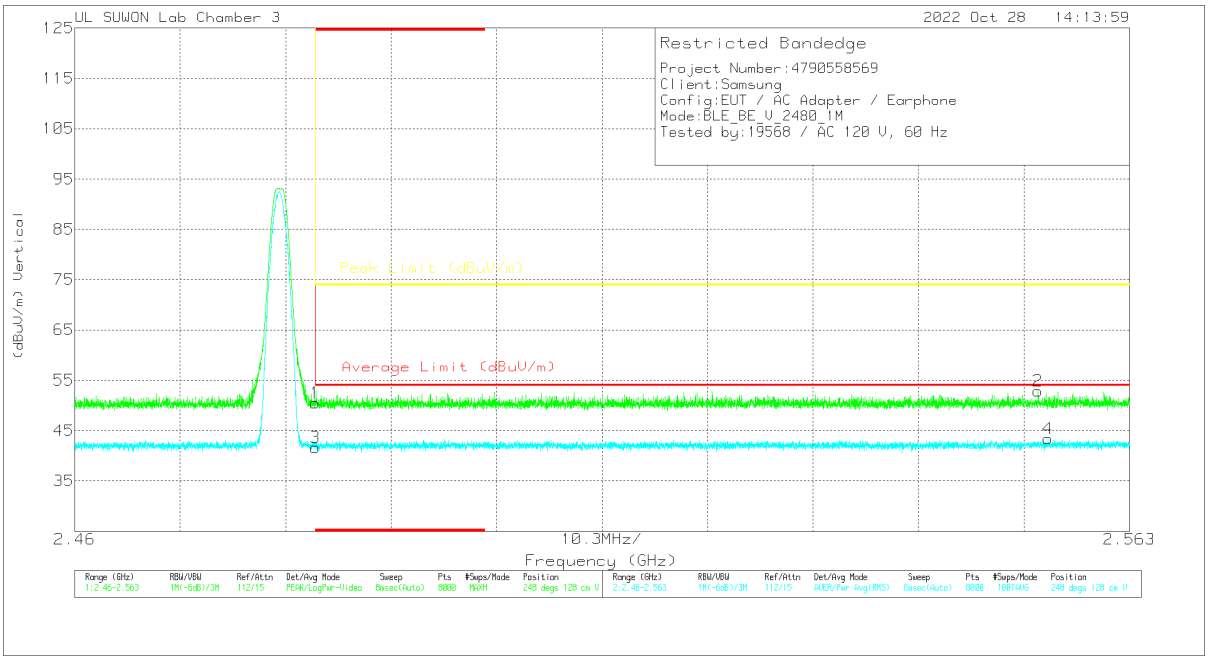


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	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	* 2.4835	43.26	Pk	32.9	-24.7	0	51.46	-	-	74	-22.54	328	201	H
2	2.50614	44.8	Pk	32.9	-24.7	0	53	-	-	74	-21	328	201	H
5	2.46008	42.74	Pk	32.9	-24.8	0	50.84	-	-	-	-	328	201	H
3	* 2.4835	32.22	RMS	32.9	-24.7	2.05	42.47	54	-11.53	-	-	328	201	H
4	2.53109	33.27	RMS	32.9	-24.7	2.05	43.52	54	-10.48	-	-	328	201	H

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

VERTICAL RESULT



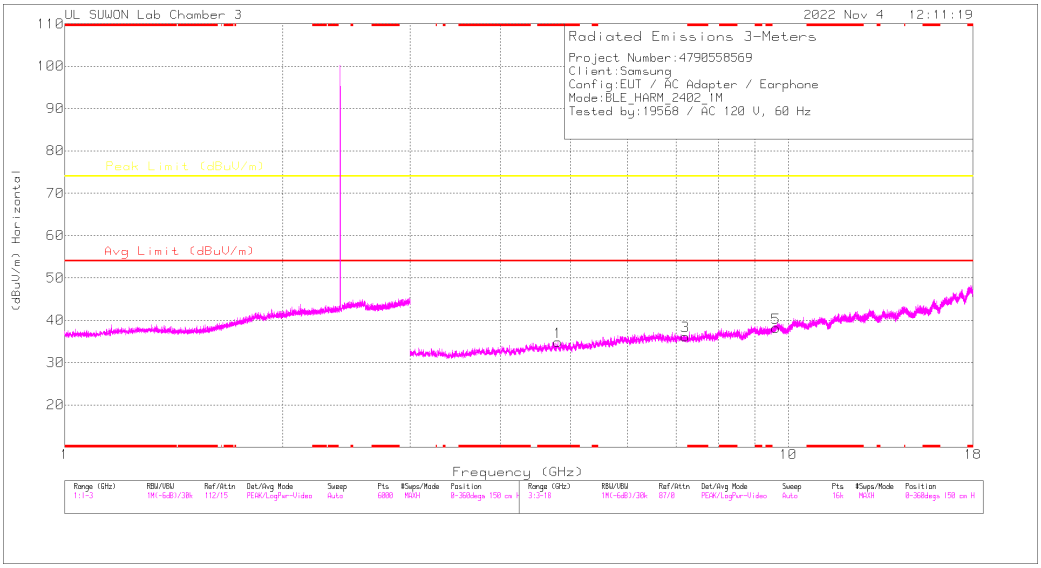
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	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	* 2.4835	42.26	Pk	32.9	-24.7	0	50.46	-	-	74	-23.54	248	128	V
2	2.55408	44.6	Pk	32.9	-24.6	0	52.9	-	-	74	-21.1	248	128	V
3	* 2.4835	31.46	RMS	32.9	-24.7	2.05	41.71	54	-12.29	-	-	248	128	V
4	2.55503	33.06	RMS	32.9	-24.6	2.05	43.41	54	-10.59	-	-	248	128	V

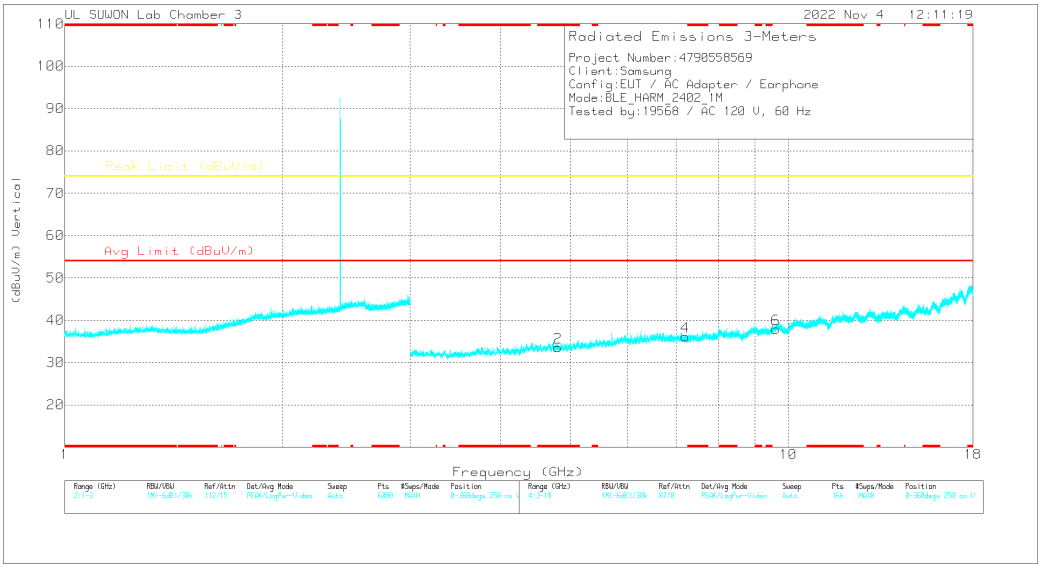
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

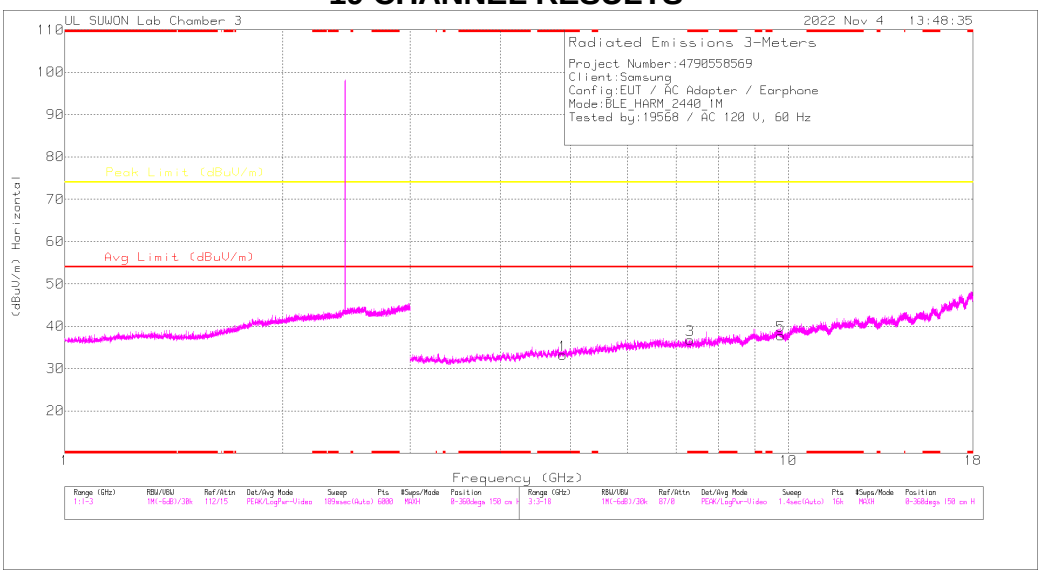
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

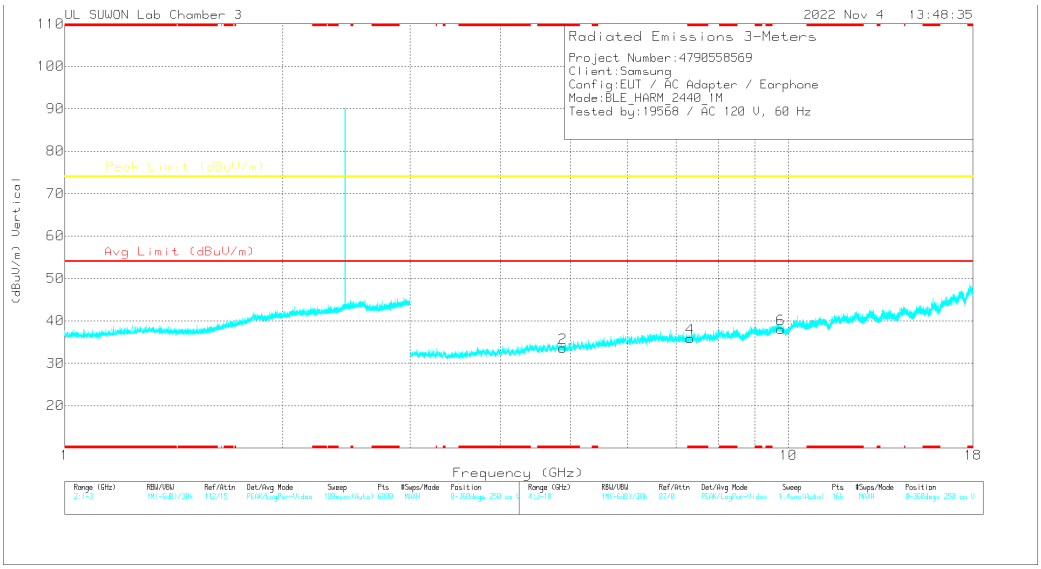
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80475	39.76	PK2	34.6	-29.9	0	44.46	-	-	74	-29.54	0	100	H
* 4.81094	39.54	PK2	34.6	-30	0	44.14	-	-	74	-29.86	0	100	V
7.20601	35.43	PK2	36.1	-25.6	0	45.93	-	-	74	-28.07	0	100	H
7.20664	36.15	PK2	36.1	-25.6	0	46.65	-	-	74	-27.35	0	100	V
9.6164	32.76	PK2	37.3	-21.7	0	48.36	-	-	74	-25.64	0	100	H
9.61057	33.14	PK2	37.3	-21.8	0	48.64	-	-	74	-25.36	0	100	V

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

19 CHANNEL RESULTS



HORIZONTAL



VERTICAL

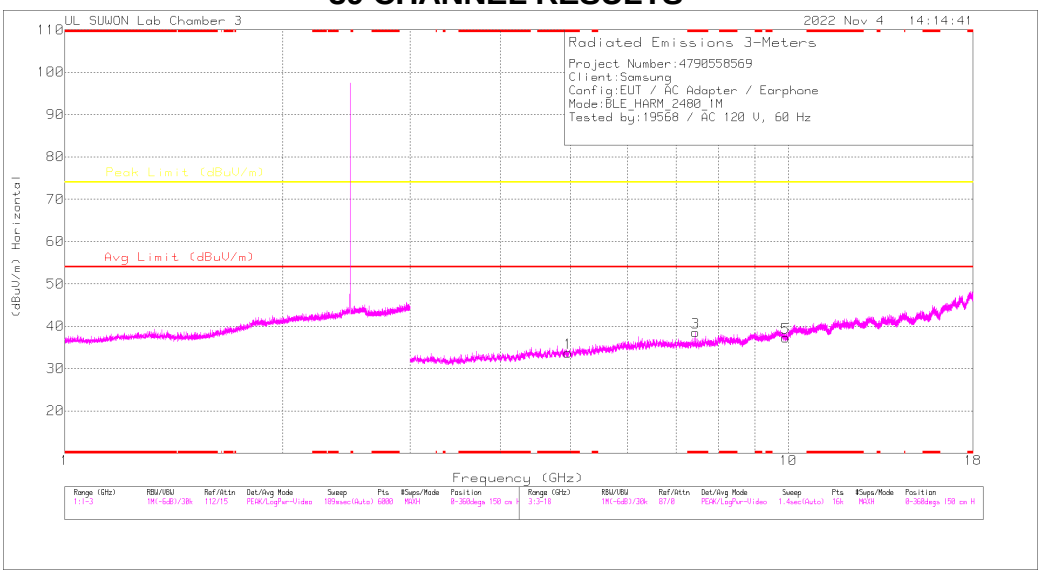
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

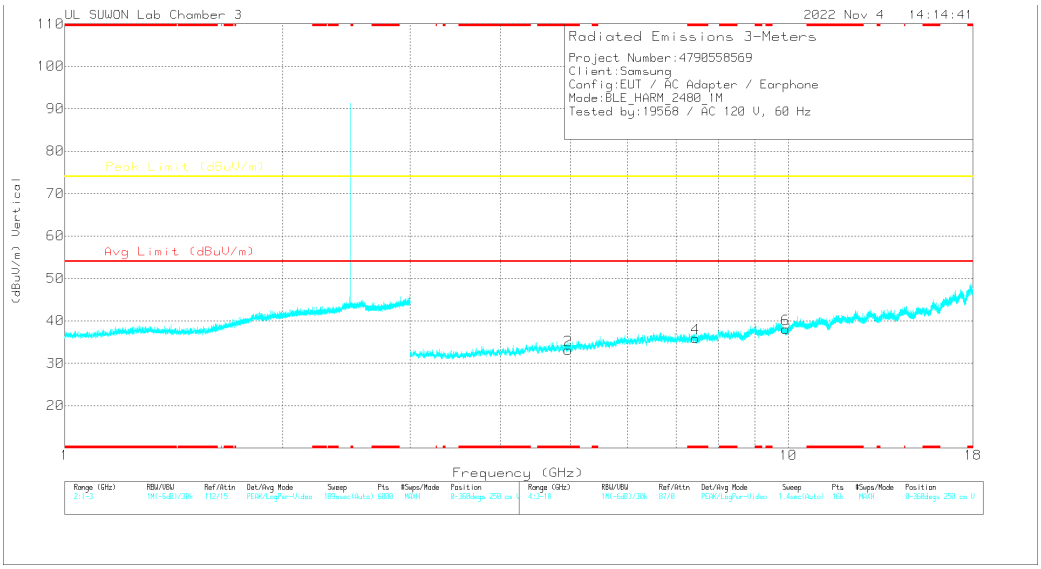
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88094	40.07	PK2	34.7	-30.6	0	44.17	-	-	74	-29.83	0	100	H
* 4.88168	39.81	PK2	34.7	-30.7	0	43.81	-	-	74	-30.19	0	100	V
* 7.32454	35.35	PK2	36	-25.1	0	46.25	-	-	74	-27.75	0	100	H
* 7.32761	34.83	PK2	36	-25	0	45.83	-	-	74	-28.17	0	100	V
9.75198	33.32	PK2	37.5	-21.4	0	49.42	-	-	74	-24.58	0	100	H
9.76015	31.67	PK2	37.5	-21.3	0	47.87	-	-	74	-26.13	0	100	V

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

39 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

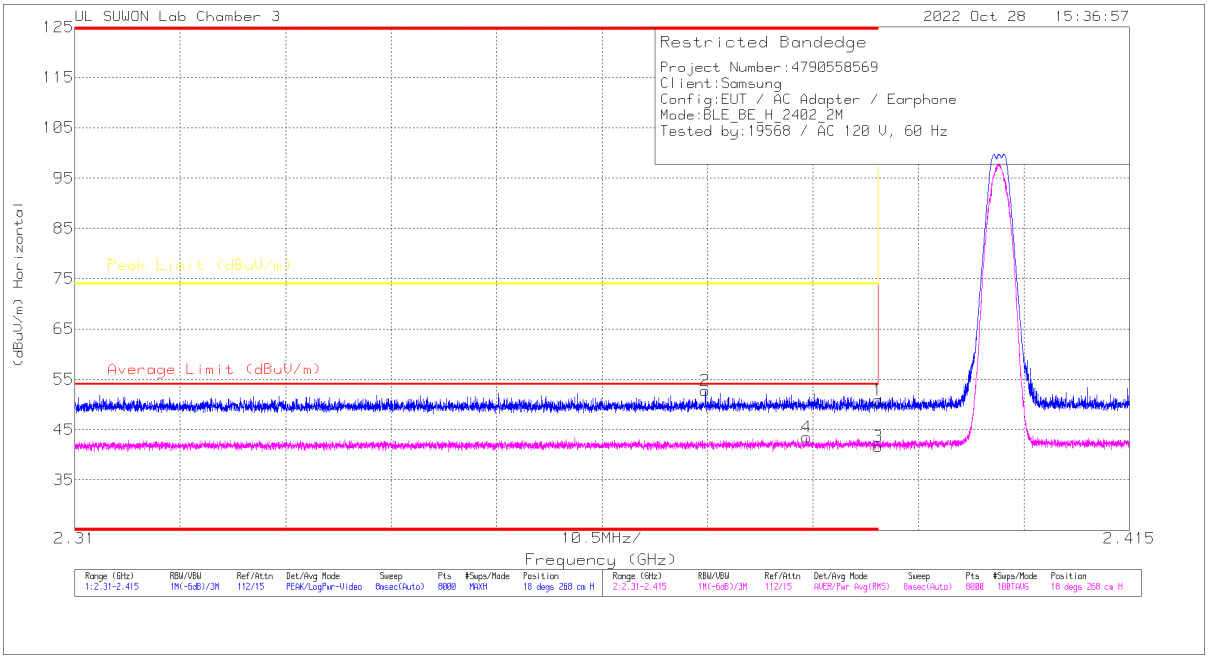
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.43975	35.83	PK2	36	-24.8	0	47.03	-	-	74	-26.97	357	101	H
* 7.43937	24.94	MAv1	36	-24.8	2.05	38.19	54	-15.81	-	-	357	101	H
* 7.43293	34.92	PK2	36	-24.7	0	46.22	-	-	74	-27.78	360	100	V
9.9102	31.62	PK2	37.7	-21.5	0	47.82	-	-	74	-26.18	360	100	H
9.92497	30.95	PK2	37.7	-21.5	0	47.15	-	-	74	-26.85	360	117	V
* 4.96012	39.08	PK2	34.7	-30.4	0	43.38	-	-	74	-30.62	360	100	H
* 4.95262	39.07	PK2	34.7	-30.5	0	43.27	-	-	74	-30.73	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

10.2.2. 2 Mbps

BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT

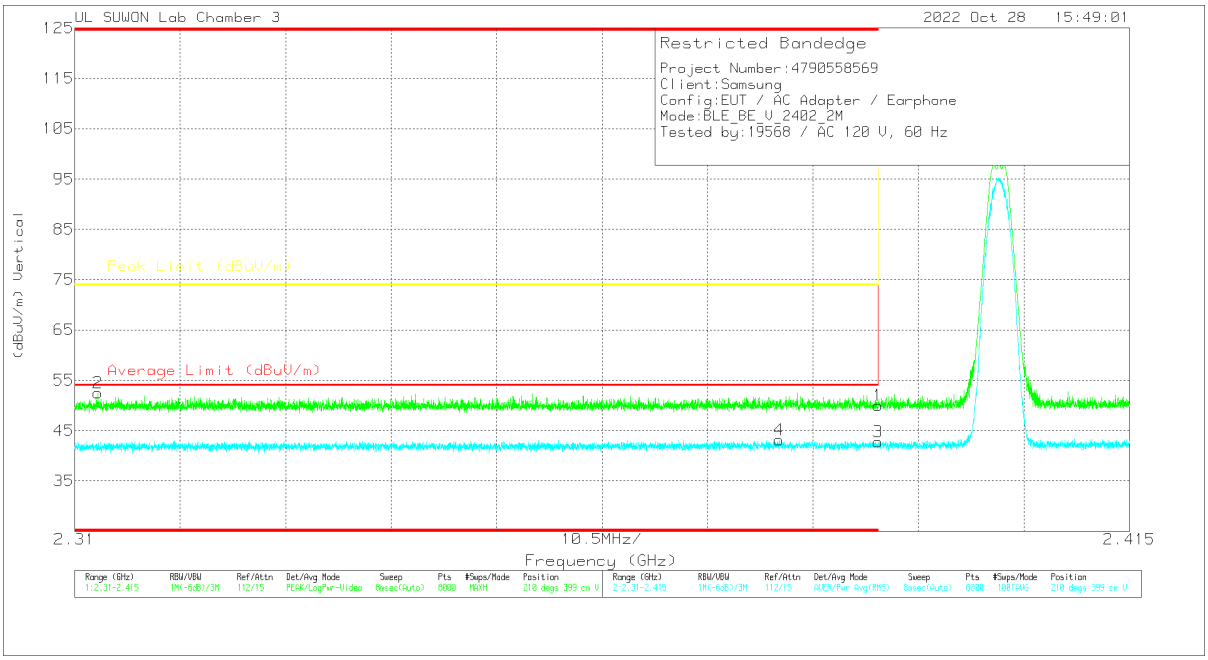


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	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	42.85	Pk	32.8	-24.8	0	50.85	-	-	74	-23.15	18	268	H
2	* 2.37279	44.96	Pk	32.7	-24.9	0	52.76	-	-	74	-21.24	18	268	H
3	* 2.39	31.19	RMS	32.8	-24.8	2.41	41.6	54	-12.4	-	-	18	268	H
4	* 2.38284	33.26	RMS	32.7	-24.9	2.41	43.47	54	-10.53	-	-	18	268	H

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

VERTICAL RESULT



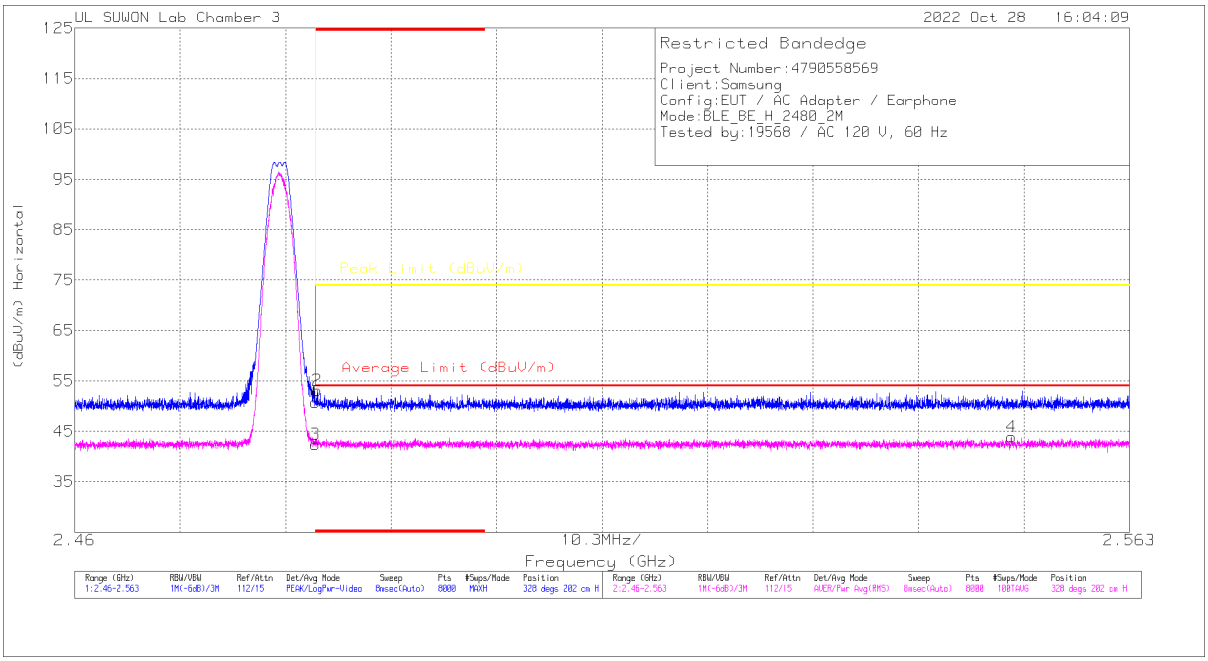
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	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	41.98	Pk	32.8	-24.8	0	49.98	-	-	74	-24.02	210	399	V
2	* 2.31231	45.03	Pk	32.4	-24.9	0	52.53	-	-	74	-21.47	210	399	V
3	* 2.39	32.39	RMS	32.8	-24.8	2.41	42.8	54	-11.2	-	-	210	399	V
4	* 2.38015	32.94	RMS	32.7	-24.9	2.41	43.15	54	-10.85	-	-	210	399	V

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

BANDEDGE (39 CHANNEL)

HORIZONTAL RESULT

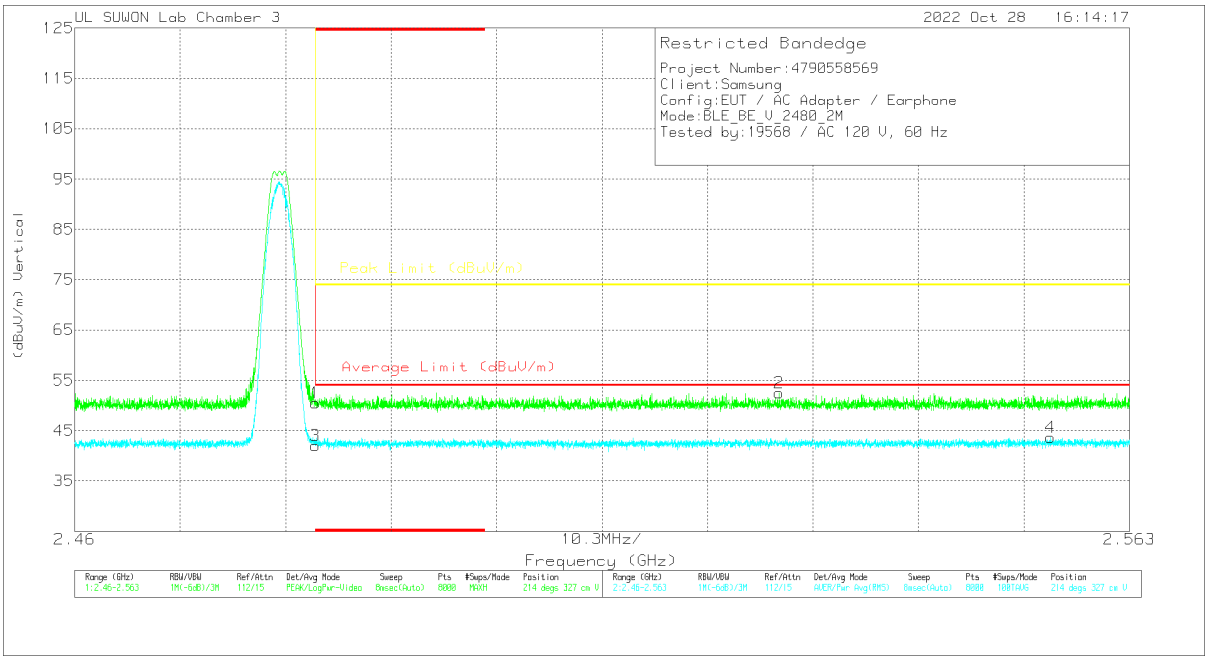


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	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	* 2.4835	42.55	Pk	32.9	-24.7	0	50.75	-	-	74	-23.25	328	202	H
2	* 2.48367	44.91	Pk	32.9	-24.7	0	53.11	-	-	74	-20.89	328	202	H
3	* 2.4835	31.78	RMS	32.9	-24.7	2.41	42.39	54	-11.61	-	-	328	202	H
4	2.55147	33.15	RMS	32.9	-24.6	2.41	43.86	54	-10.14	-	-	328	202	H

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

VERTICAL RESULT



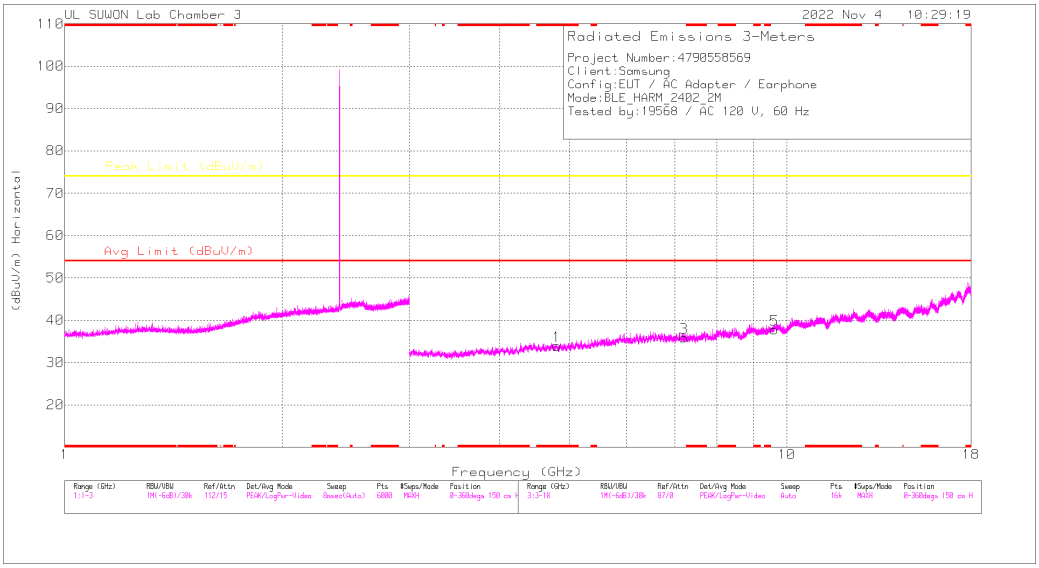
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	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	* 2.4835	42.27	Pk	32.9	-24.7	0	50.47	-	-	74	-23.53	214	327	V
2	2.52878	44.23	Pk	32.9	-24.6	0	52.53	-	-	74	-21.47	214	327	V
3	* 2.4835	31.43	RMS	32.9	-24.7	2.41	42.04	54	-11.96	-	-	214	327	V
4	2.55532	32.92	RMS	32.9	-24.6	2.41	43.63	54	-10.37	-	-	214	327	V

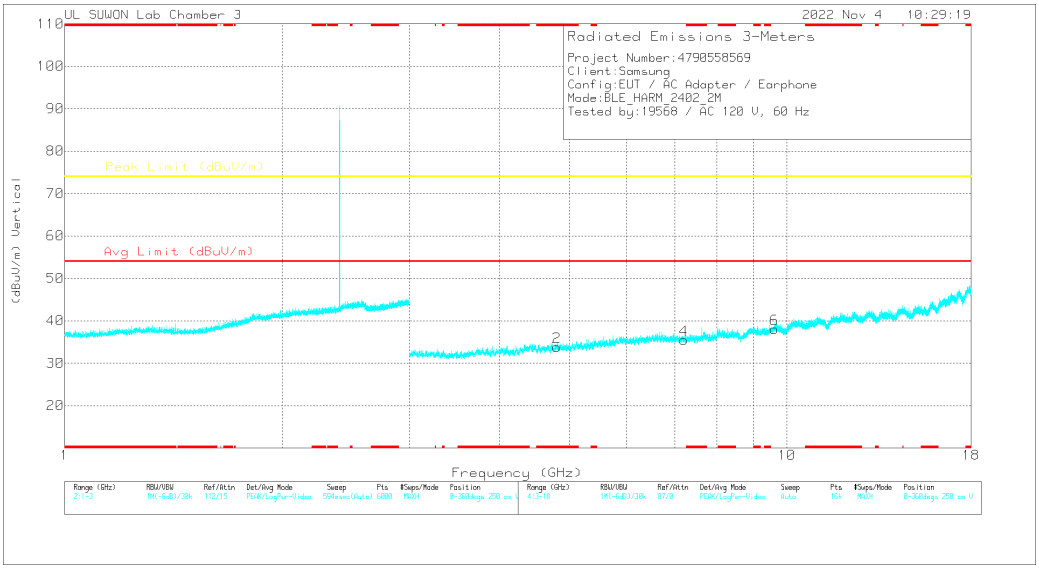
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

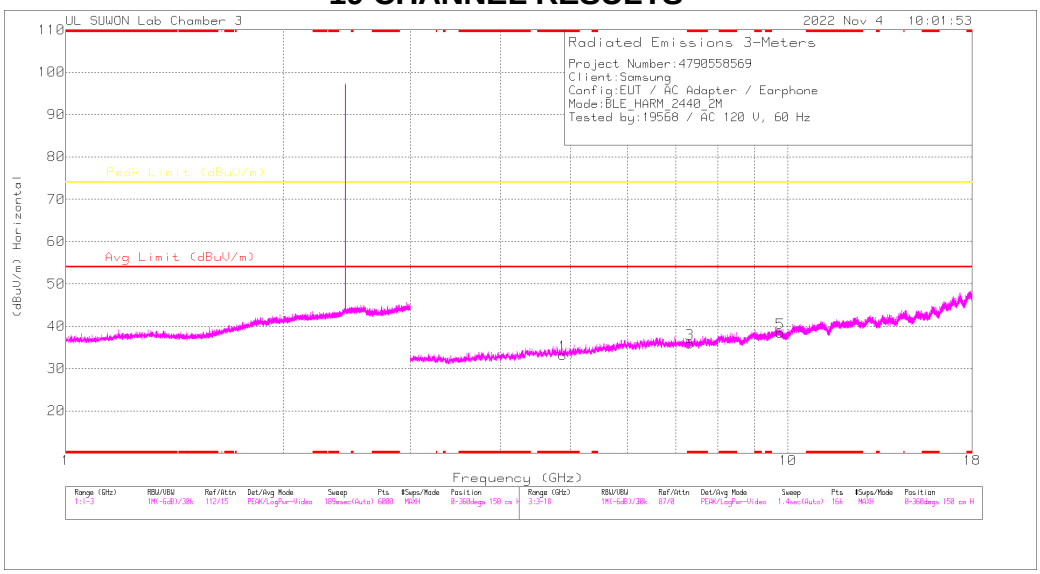
ote: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

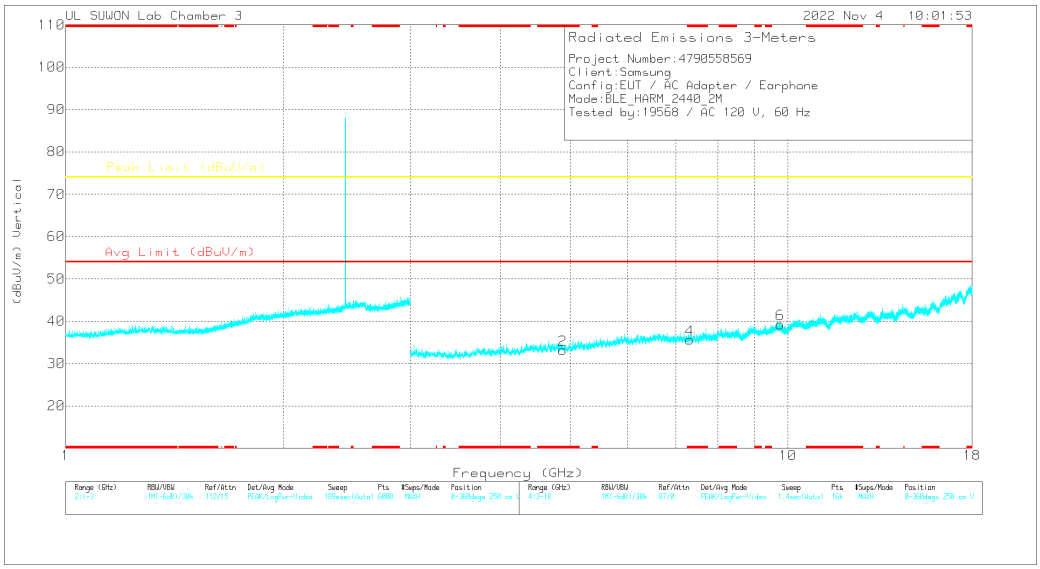
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80568	26.8	PK2	34.6	-29.9	0	31.5	-	-	74	-42.5	0	100	H
* 4.80187	28.05	PK2	34.6	-29.9	0	32.75	-	-	74	-41.25	0	100	V
7.19964	25.79	PK2	36.1	-25.7	0	36.19	-	-	74	-37.81	0	100	H
7.20273	25.1	PK2	36.1	-25.6	0	35.6	-	-	74	-38.4	0	100	V
9.61329	23.45	PK2	37.3	-21.7	0	39.05	-	-	74	-34.95	0	100	H
9.61096	15.99	PK2	37.3	-21.8	0	31.49	-	-	74	-42.51	0	100	V

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

19 CHANNEL RESULTS



HORIZONTAL



VERTICAL

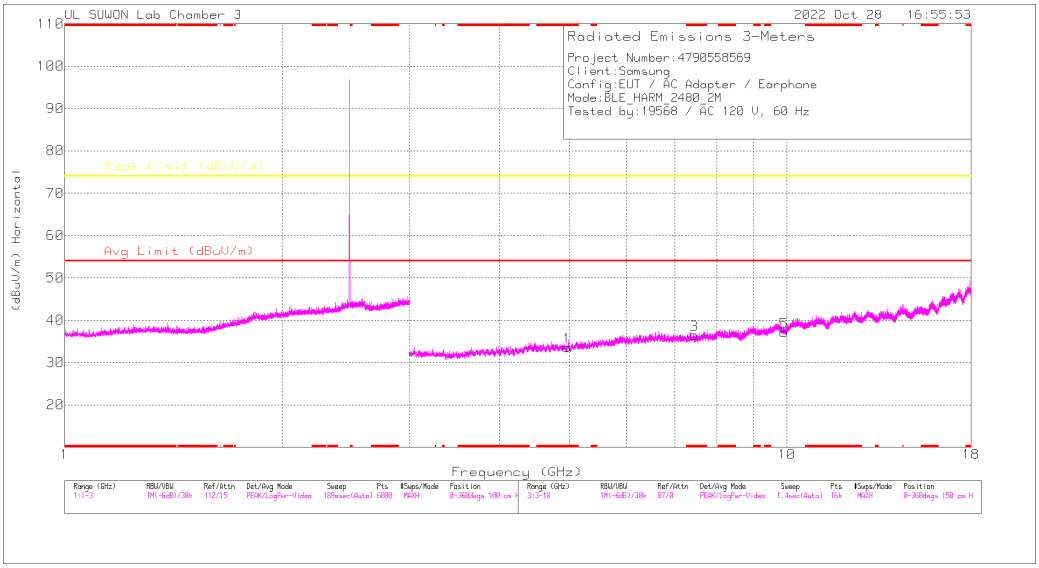
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

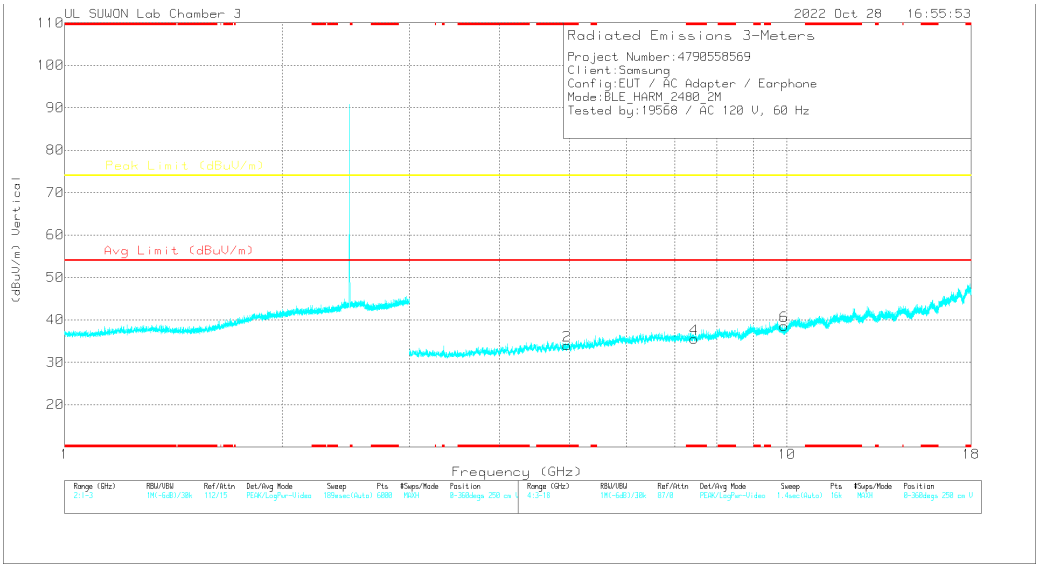
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.872	39.97	PK2	34.6	-30.6	0	43.97	-	-	74	-30.03	0	100	H
* 4.88853	39.68	PK2	34.7	-30.7	0	43.68	-	-	74	-30.32	0	100	V
* 7.32117	34.87	PK2	36	-25.1	0	45.77	-	-	74	-28.23	0	100	H
* 7.32791	35.37	PK2	36	-25	0	46.37	-	-	74	-27.63	0	100	V
9.75253	31.83	PK2	37.5	-21.4	0	47.93	-	-	74	-26.07	0	100	H
9.75309	32.19	PK2	37.5	-21.4	0	48.29	-	-	74	-25.71	0	100	V

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

39 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.

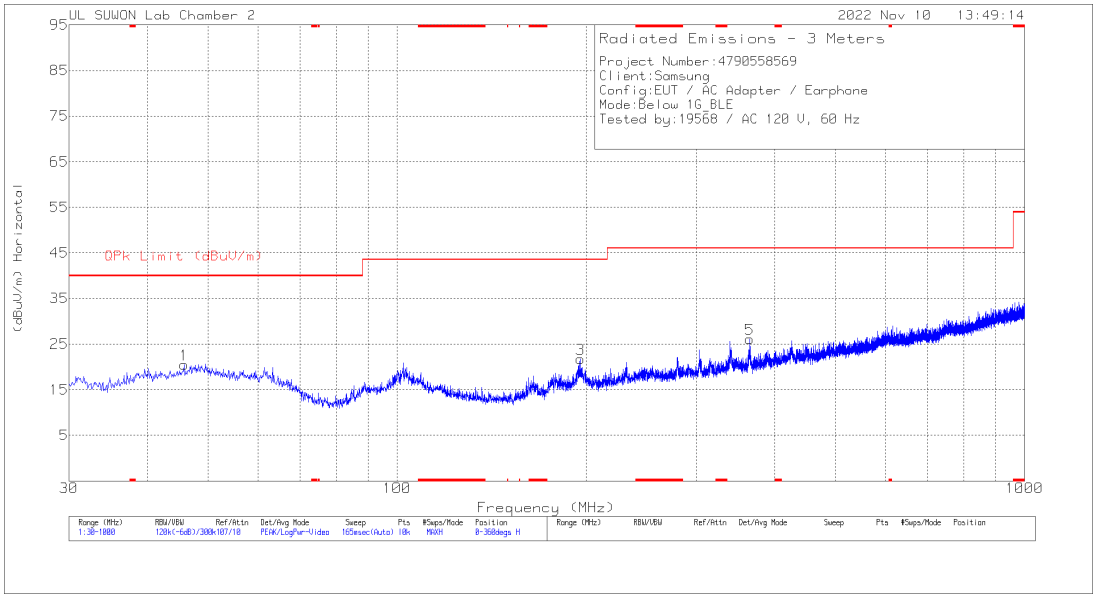
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	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
* 4.97221	39.79	PK2	34.7	-30.2	0	44.29	-	-	74	-29.71	0	100	H
* 4.98518	39.32	PK2	34.7	-30	0	44.02	-	-	74	-29.98	0	100	V
* 7.43859	35.56	PK2	36	-24.8	0	46.76	-	-	74	-27.24	0	100	H
* 7.42693	34.88	PK2	36	-24.7	0	46.18	-	-	74	-27.82	0	100	V
9.90639	31.08	PK2	37.7	-21.5	0	47.28	-	-	74	-26.72	0	100	H
9.91847	31.64	PK2	37.7	-21.5	0	47.84	-	-	74	-26.16	0	100	V

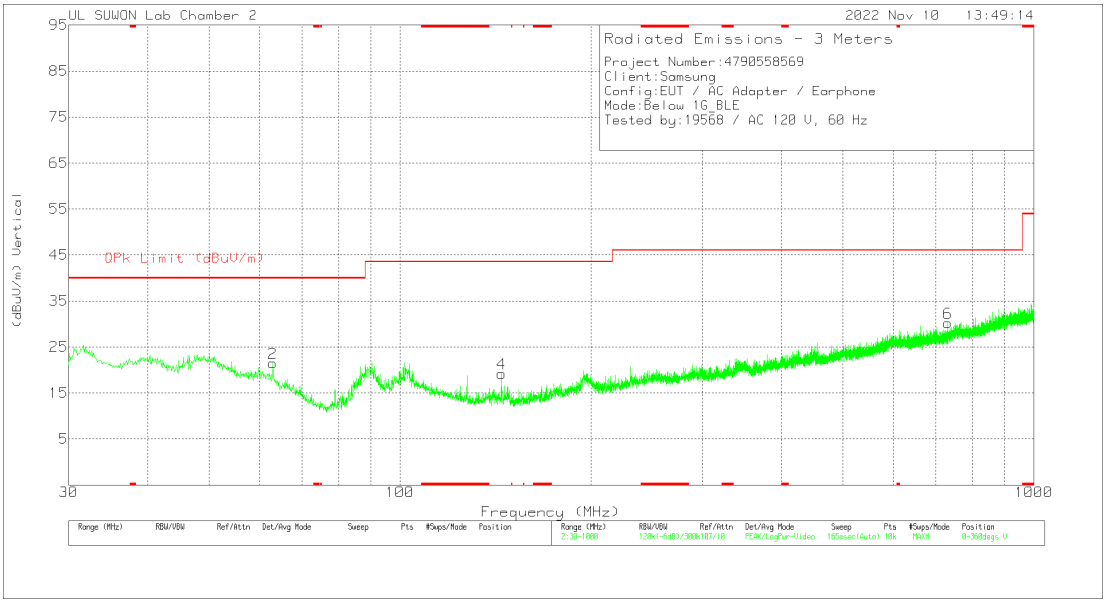
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak

10.3. WORST CASE BELOW 1 GHz

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



HORIZONTAL



VERTICAL

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_749	Below 1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	45.811	31.85	Pk	19.9	-31.3	20.45	40	-19.55	0-360	200	H
3	196.064	33.8	Pk	17.8	-29.8	21.8	43.52	-21.72	0-360	100	H
5	364.941	34.57	Pk	20.2	-28.6	26.17	46.02	-19.85	0-360	100	H
2	62.98	34.74	Pk	17.9	-31.1	21.54	40	-18.46	0-360	100	V
4	144.654	35.5	Pk	13.9	-30.2	19.2	43.52	-24.32	0-360	100	V
6	731.213	31.64	Pk	25.7	-27.1	30.24	46.02	-15.78	0-360	100	V

Pk - Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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.

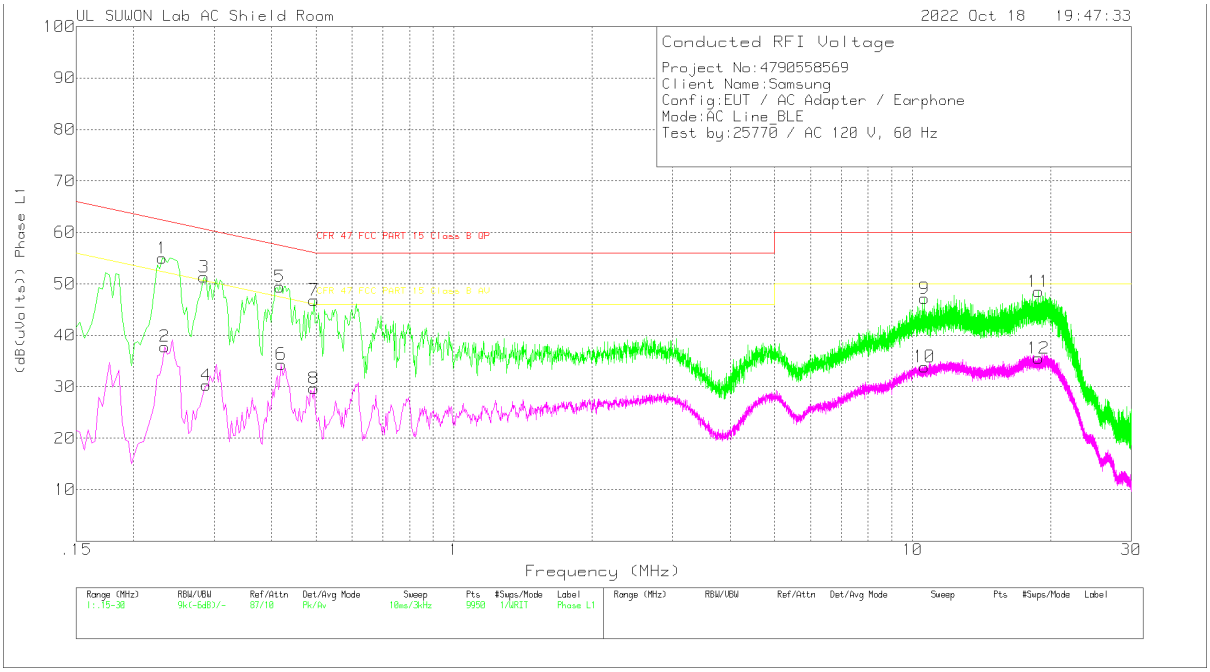
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

11.1. AC Power Line

LINE 1 RESULTS



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	.231	45.07	Pk	9.7	.2	54.97	62.41	-7.44	-	-
2	.234	27.91	Av	9.7	.2	37.81	-	-	52.31	-14.5
3	.285	41.42	Pk	9.7	.2	51.32	60.67	-9.35	-	-
4	.288	20.38	Av	9.7	.2	30.28	-	-	50.58	-20.3
5	.417	39.45	Pk	9.8	.2	49.45	57.51	-8.06	-	-
6	.42	24.38	Av	9.8	.2	34.38	-	-	47.45	-13.07
7	.495	36.74	Pk	9.9	.2	46.84	56.08	-9.24	-	-
8	.495	19.58	Av	9.9	.2	29.68	-	-	46.08	-16.4
9	10.617	36.85	Pk	9.9	.4	47.15	60	-12.85	-	-
10	10.623	23.56	Av	9.9	.4	33.86	-	-	50	-16.14
11	18.825	38.01	Pk	10.1	.4	48.51	60	-11.49	-	-
12	18.825	25.03	Av	10.1	.4	35.53	-	-	50	-14.47

Pk - Peak detector
Av - Average detection

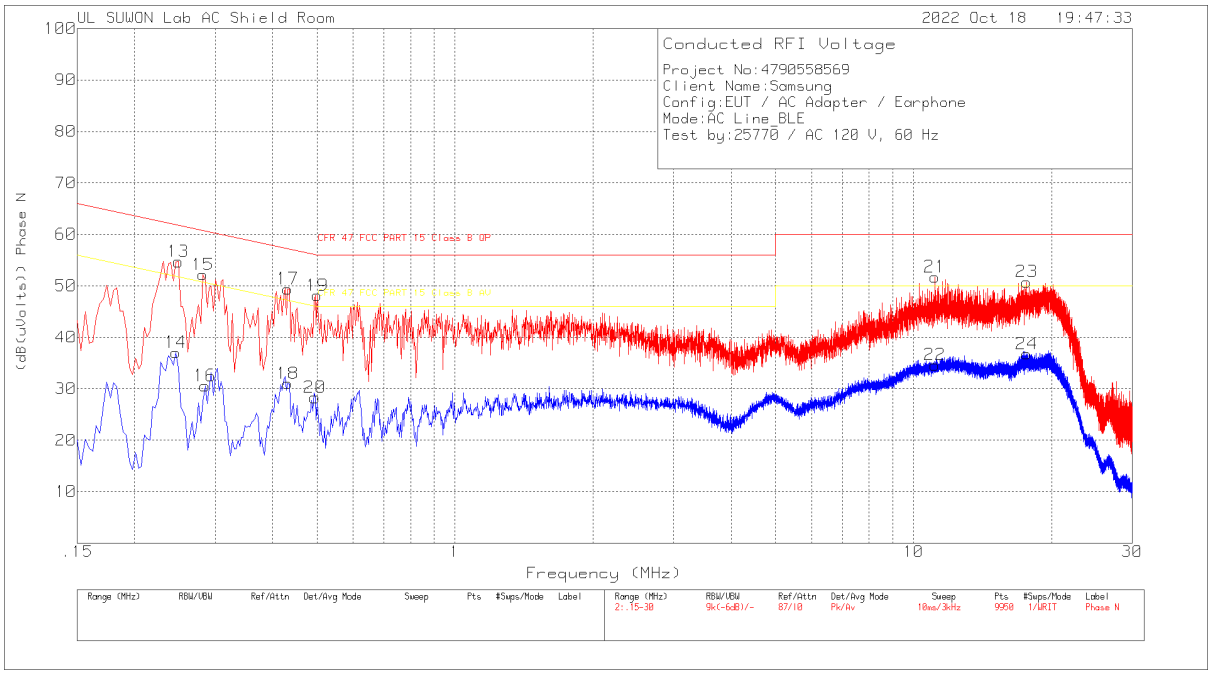
Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_L1[dB]	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)
.23025	33.23	Qp	9.7	.2	43.13	62.44	-19.31	-	-
.28515	31.43	Qp	9.7	.2	41.33	60.66	-19.33	-	-
.41625	37.99	Qp	9.8	.2	47.99	57.52	-9.53	-	-
.49575	29.08	Qp	9.9	.2	39.18	56.07	-16.89	-	-

Qp - Quasi-Peak detector

LINE 2 RESULTS



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_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	.249	44.9	Pk	9.6	.2	54.7	61.79	-7.09	-	-
14	.246	27.25	Av	9.6	.2	37.05	-	-	51.89	-14.84
15	.282	42.27	Pk	9.7	.2	52.17	60.76	-8.59	-	-
16	.285	20.66	Av	9.7	.2	30.56	-	-	50.67	-20.11
17	.432	39.4	Pk	9.8	.2	49.4	57.21	-7.81	-	-
18	.432	21.02	Av	9.8	.2	31.02	-	-	47.21	-16.19
19	.501	38.03	Pk	9.9	.2	48.13	56	-7.87	-	-
20	.495	18.2	Av	9.9	.2	28.3	-	-	46.08	-17.78
21	11.133	41.53	Pk	9.9	.3	51.73	60	-8.27	-	-
22	11.136	24.44	Av	9.9	.3	34.64	-	-	50	-15.36
23	17.664	40.17	Pk	10.2	.4	50.77	60	-9.23	-	-
24	17.664	26.16	Av	10.2	.4	36.76	-	-	50	-13.24

Pk - Peak detector
Av - Average detection

Quasi-Peak Emissions

Range 2: Phase N .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_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)
.24975	39.9	Qp	9.6	.2	49.7	61.77	-12.07	-	-
.28275	34.2	Qp	9.7	.2	44.1	60.73	-16.63	-	-
.43275	22.14	Qp	9.8	.2	32.14	57.2	-25.06	-	-
.50025	27.41	Qp	9.9	.2	37.51	56	-18.49	-	-
11.1332	28.36	Qp	9.9	.3	38.56	60	-21.44	-	-
17.6633	32.15	Qp	10.2	.4	42.75	60	-17.25	-	-

Qp - Quasi-Peak detector

END OF TEST REPORT