



CERTIFICATION TEST REPORT

Report Number. : 4790302419-E4V3

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

Model : SM-A136B/DSN, SM-A136B/N

FCC ID : A3LSMA136B

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:

2022-05-04

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2022-04-01	Initial issue	Sungeun Lee
V2	2022-04-21	Updated to address TCB's question	Sungeun Lee
V3	2022-05-04	Add model name	Sungeun Lee

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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-A136B/DSN, SM-A136B/N

SERIAL NUMBER: R3CT2062ZZH, R3CT2062HAY (CONDUCTED);
R3CT20636MK (RADIATED);

DATE TESTED: 2022-02-16 ~ 2022-03-31

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:



Sungeun Lee
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(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 2(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 3(3m semi-anechoic chamber)
<input type="checkbox"/>	Chamber 4(3m Full-anechoic chamber)
<input type="checkbox"/>	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:

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

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	3.02 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 115:2007.

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..

This report covers the Samsung models SM-A136B/DSN and SM-A136B/N. These models are identical in hardware except SM-A136B/N has single SIM tray. With some pre-scan, model SM-A136B/DSN 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	1Mbps (37pkt)	Peak	6.422	4.387
		Average	6.097	4.071
	2Mbps (37pkt)	Peak	6.464	4.430
		Average	5.800	3.802

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 -4.15 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(37 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	5.305	2	2Mbps 37pkt	2402	5.005
		2440	6.096			2440	5.800
		2480	6.097			2480	5.800
	1Mbps 255pkt	2402	5.310		2Mbps 255pkt	2402	5.012
		2440	6.078			2440	5.795
		2480	6.089			2480	5.793
1 Coded S=8	125kbps 37pkt	2402	5.192	1 Coded S=2	500kbps 37pkt	2402	5.197
		2440	5.981			2440	5.984
		2480	5.974			2480	5.982
	125kbps 255pkt	2402	5.162		500kbps 255pkt	2402	5.176
		2440	5.944			2440	5.959
		2480	5.943			2480	5.953

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
Charger	SAMSUNG	EP-TA200	R37KC6F39T1SE3	N/A
Data Cable	SAMSUNG	EP-DR140AWE	GH39-01999A	N/A
Earphone	SAMSUNG	GH59-15055A	EHS64AVFWE	N/A

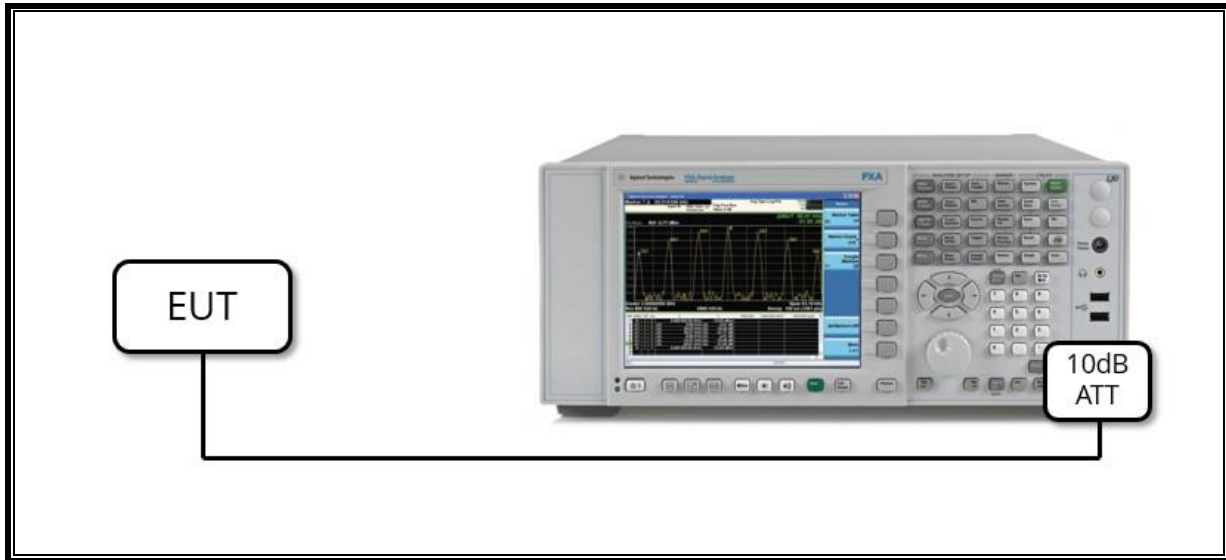
I/O CABLE

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

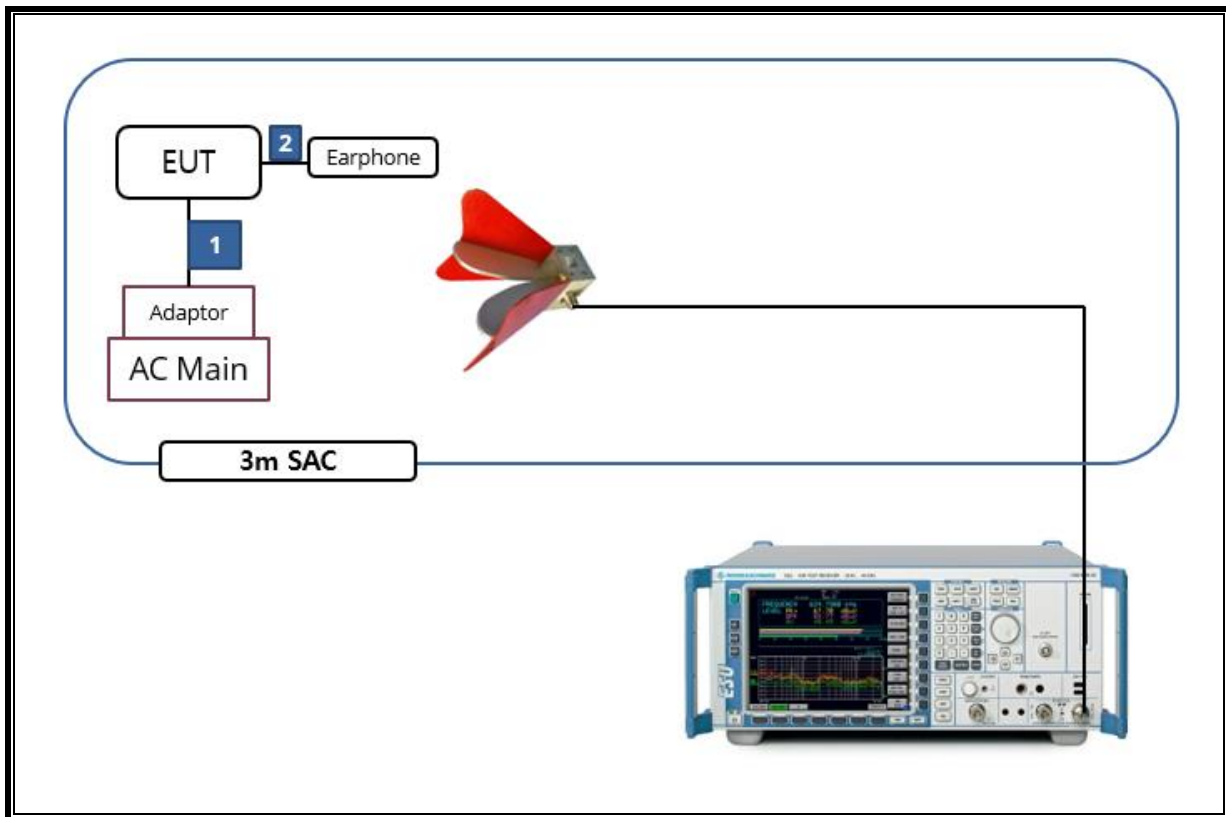
TEST SETUP

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 \geq 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	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
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	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

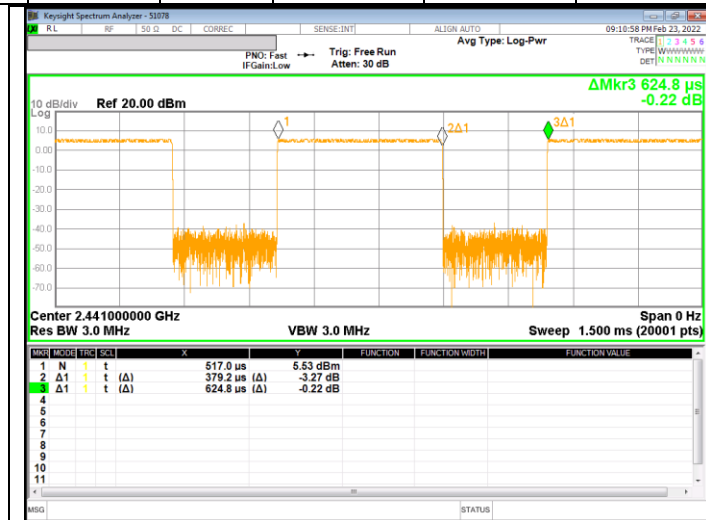
9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

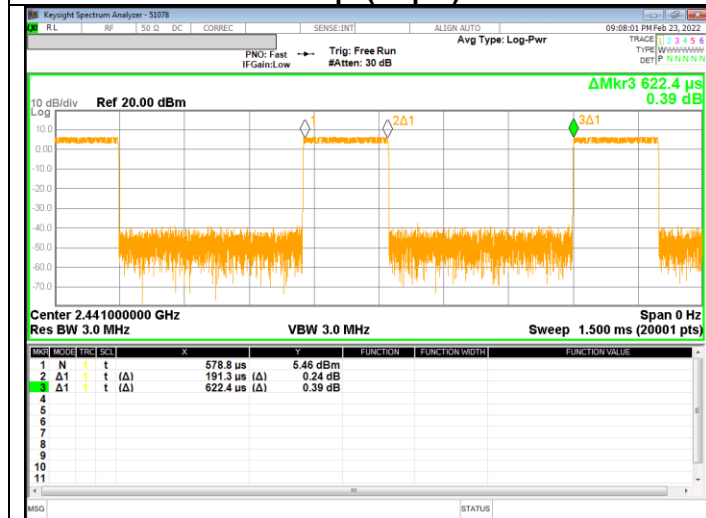
LIMITS

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]	0.379	0.625	0.607	60.691	2.17	2.64
2 Mbps [37pkt]	0.191	0.622	0.307	30.736	5.12	5.24



1 Mbps(37 pkt)



2 Mbps(37 pkt)

9.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

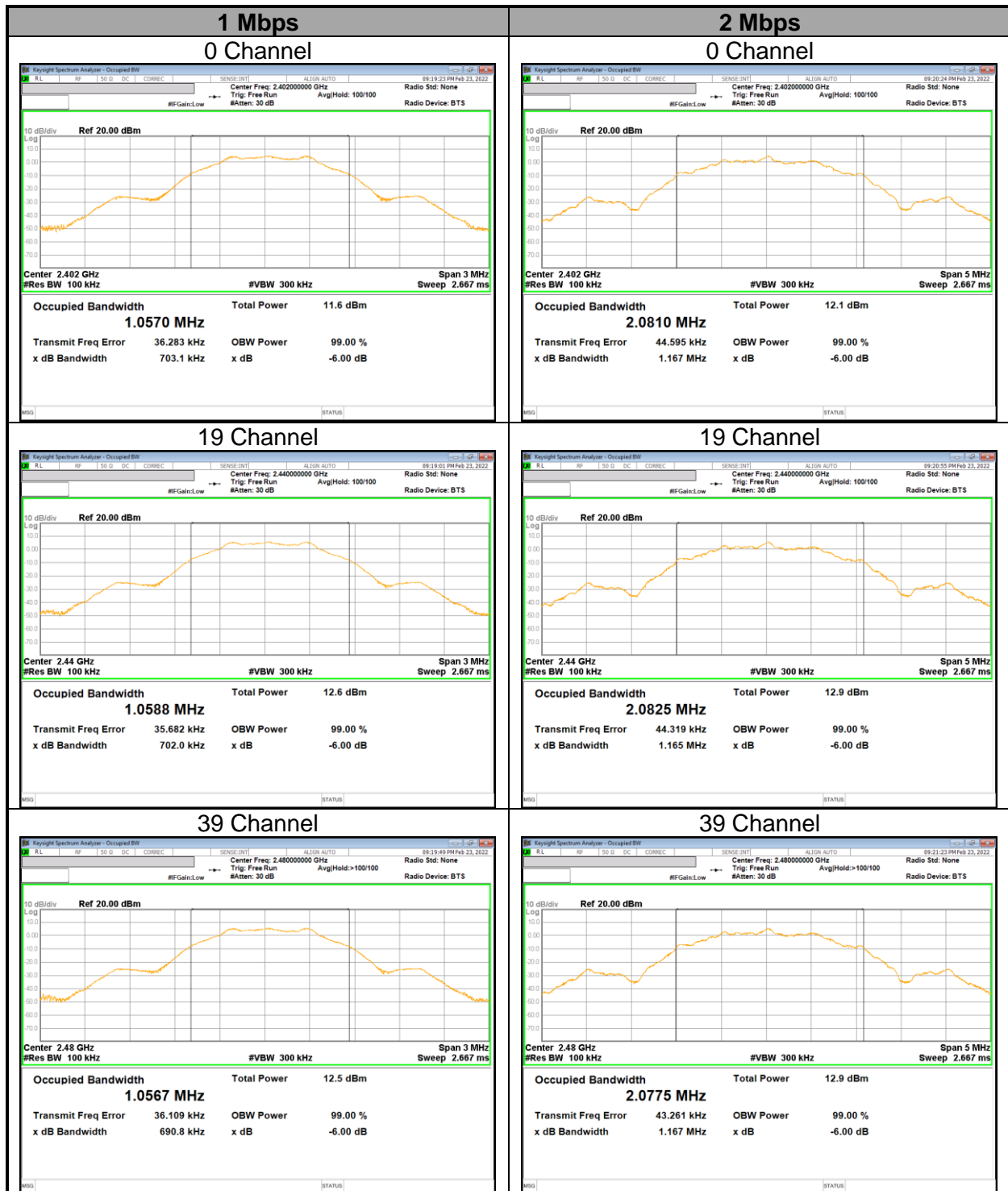
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

9.2.1. 1 Test data

Mode	Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]
1Mbps	0	2 402	703.1	500.0
	19	2 440	702.0	500.0
	39	2 480	690.8	500.0
2Mbps	0	2 402	1167.0	500.0
	19	2 440	1165.0	500.0
	39	2 480	1167.0	500.0
Worst			690.8	500.0

9.2.2. 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

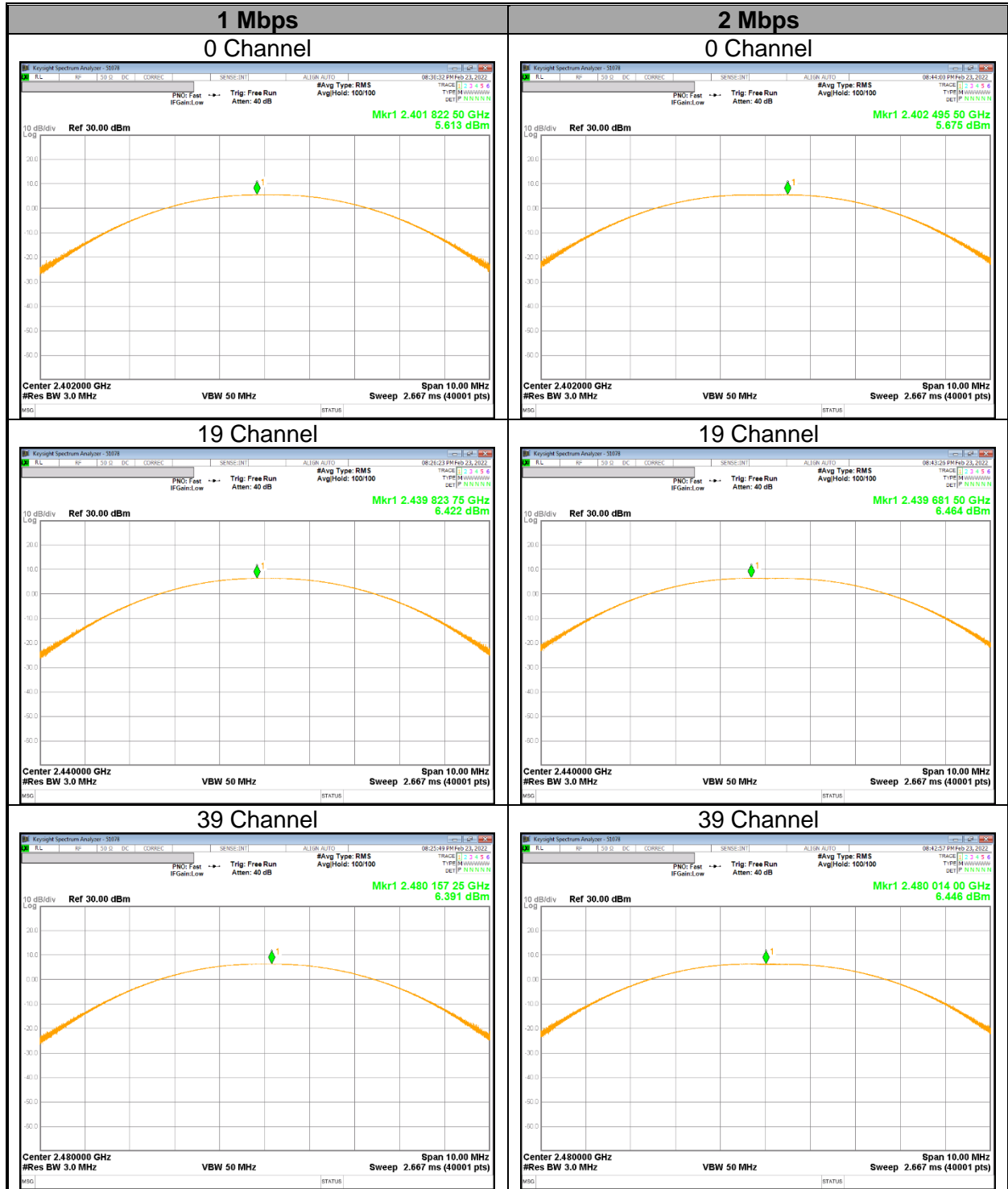
Peak power is measured using ANSI C63.10(2013) under section 11.9.1.1 utilizing spectrum analyzer(RBW \cong DTS bandwidth).

RESULTS

9.3.1. 1 Test data

Mode	Channel	Frequency [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]	
1Mbps (37 pkt)	0	2 402	5.613	30.000	-24.387	
	19	2 440	6.422		-23.578	
	39	2 480	6.391		-23.609	
2Mbps (37 pkt)	0	2 402	5.675		-24.325	
	19	2 440	6.464		-23.536	
	39	2 480	6.446		-23.554	
Worst			6.464			-23.536

9.3.2. 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. Test data

Mode	Channel	Frequency [MHz]	Average Output Power [dBm]	Average Output Power [mW]
1Mbps	0	2 402	5.305	3.392
	19	2 440	6.096	4.070
	39	2 480	6.097	4.071
2Mbps	0	2 402	5.005	3.166
	19	2 440	5.800	3.802
	39	2 480	5.800	3.802

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.

TEST PROCEDURE

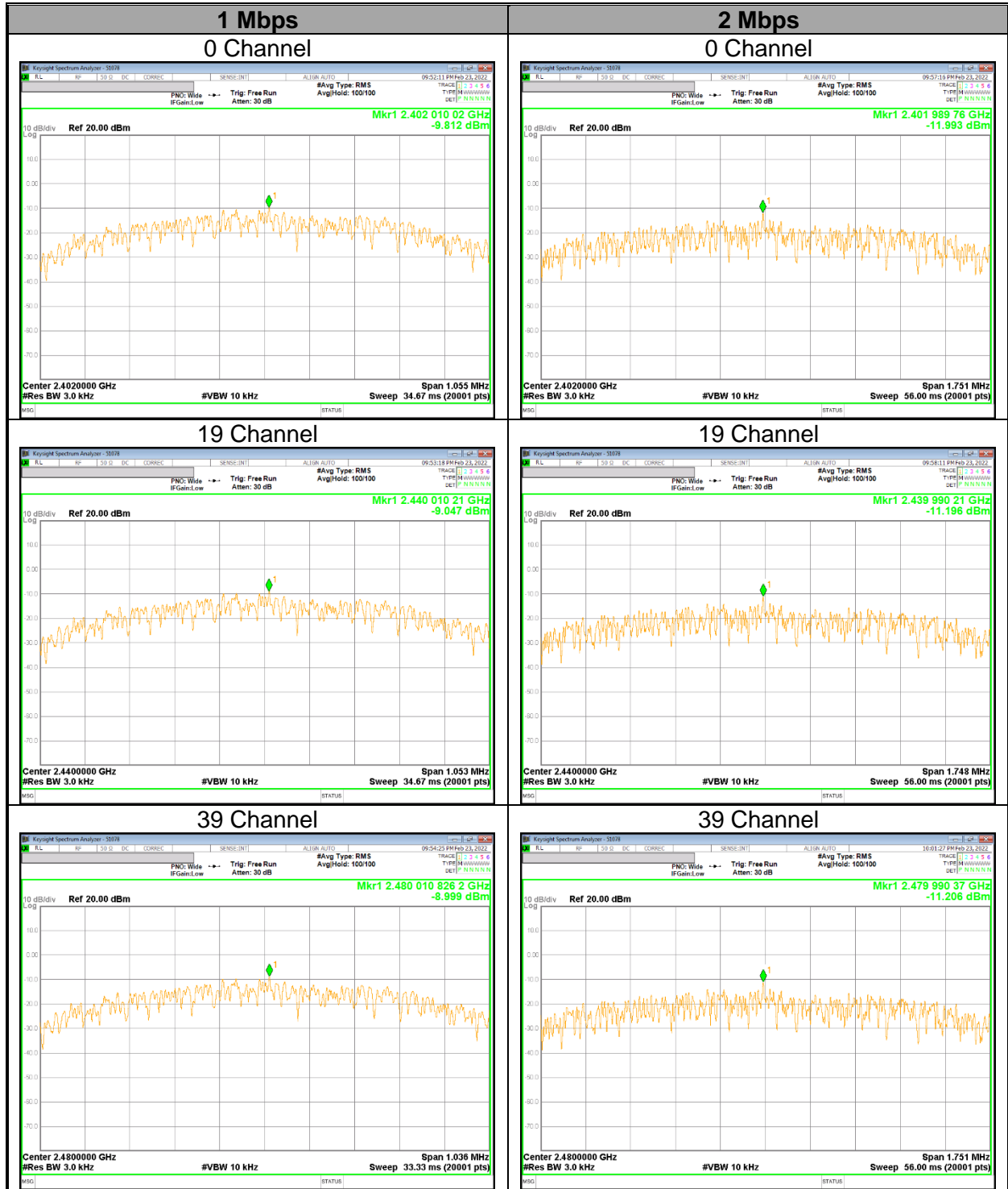
ANSI C63.10-2013, Section 11.10.2 Method PKPSD (peak PSD)

RESULTS

9.5.1. Test data

Mode	Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
1Mbps (37pkt)	0	2 402	-9.812	8.00	-17.812
	19	2 440	-9.047		-17.047
	39	2 480	-8.999		-16.999
2Mbps (37pkt)	0	2 402	-11.993		-19.993
	19	2 440	-11.196		-19.196
	39	2 480	-11.206		-19.206
Worst			-8.999		-16.999

9.5.2. PSD TEST PLOTS



9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

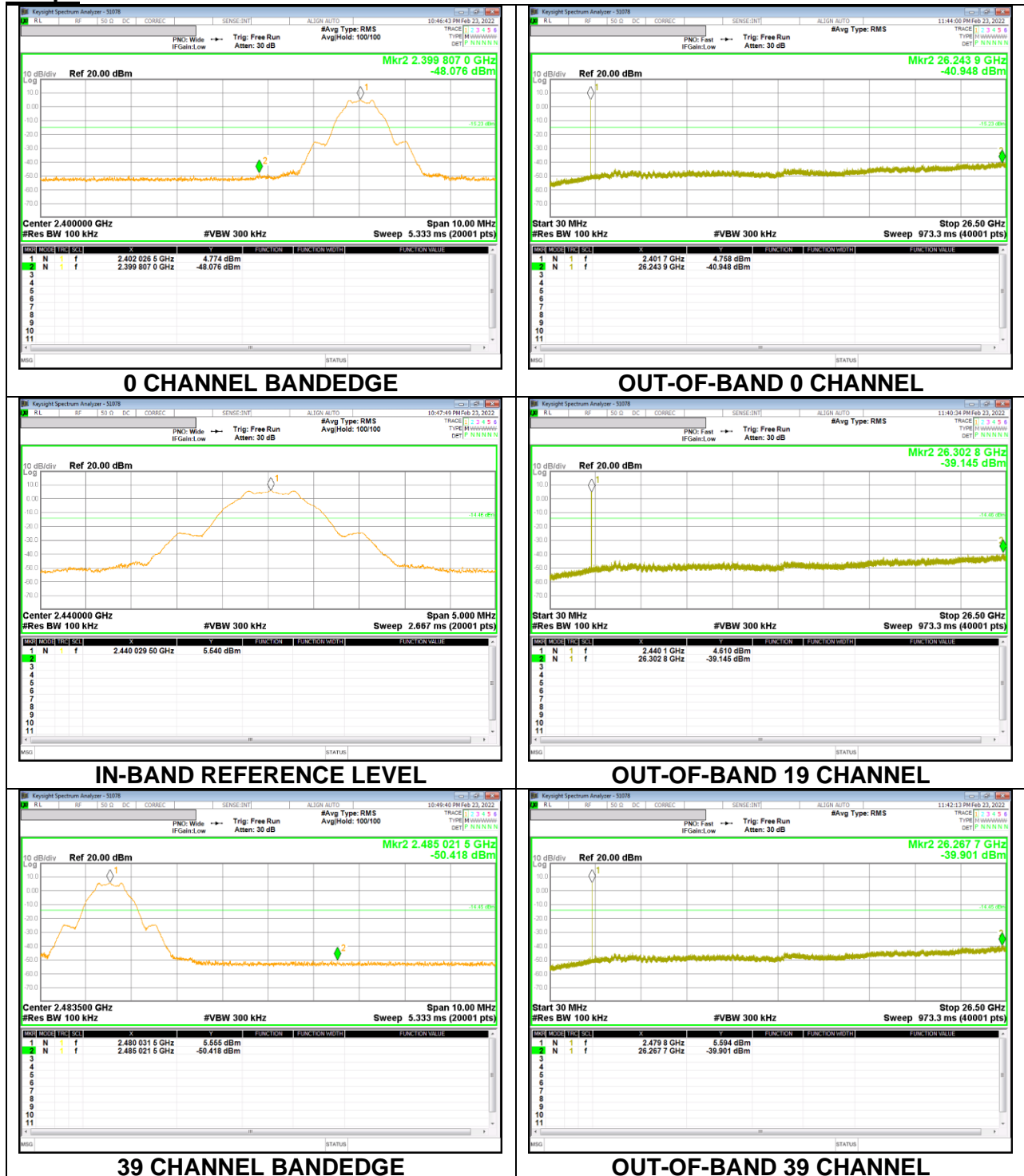
RSS-247 5.5

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

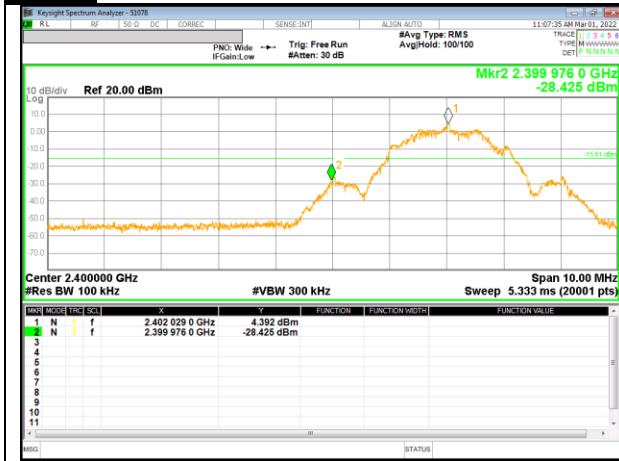
RESULTS

9.6.1. Test plot

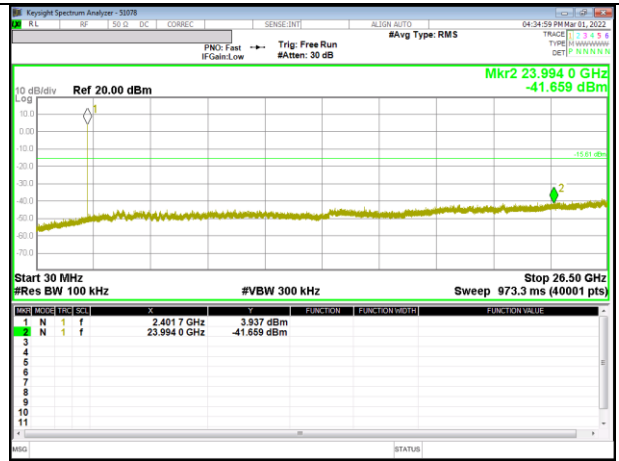
1Mbps



2Mbps



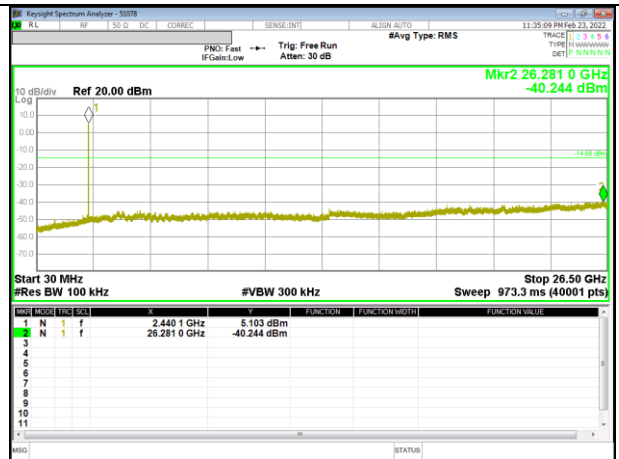
0 CHANNEL BANDEDGE



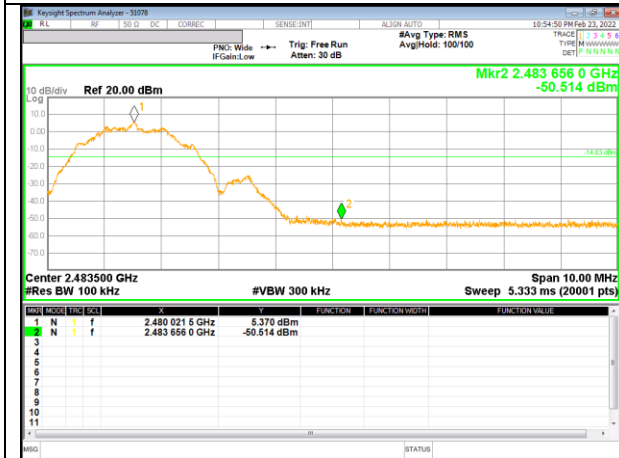
OUT-OF-BAND 0 CHANNEL



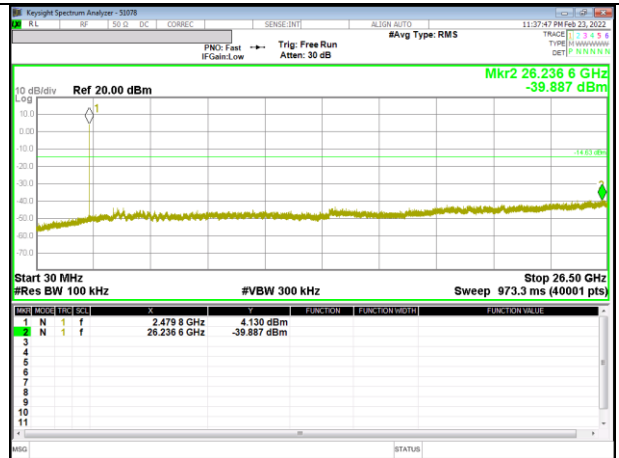
IN-BAND REFERENCE LEVEL



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 ($\mu\text{V}/\text{m}$)	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 = $10\log(1/0.607)=2.169$ dB (Spectrum Analyzer round it up to 2.17 dB) and for 2 Mbps, DCF = $10\log(1/0.307)=5.124$ dB (Spectrum Analyzer round it up to 5.12 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.

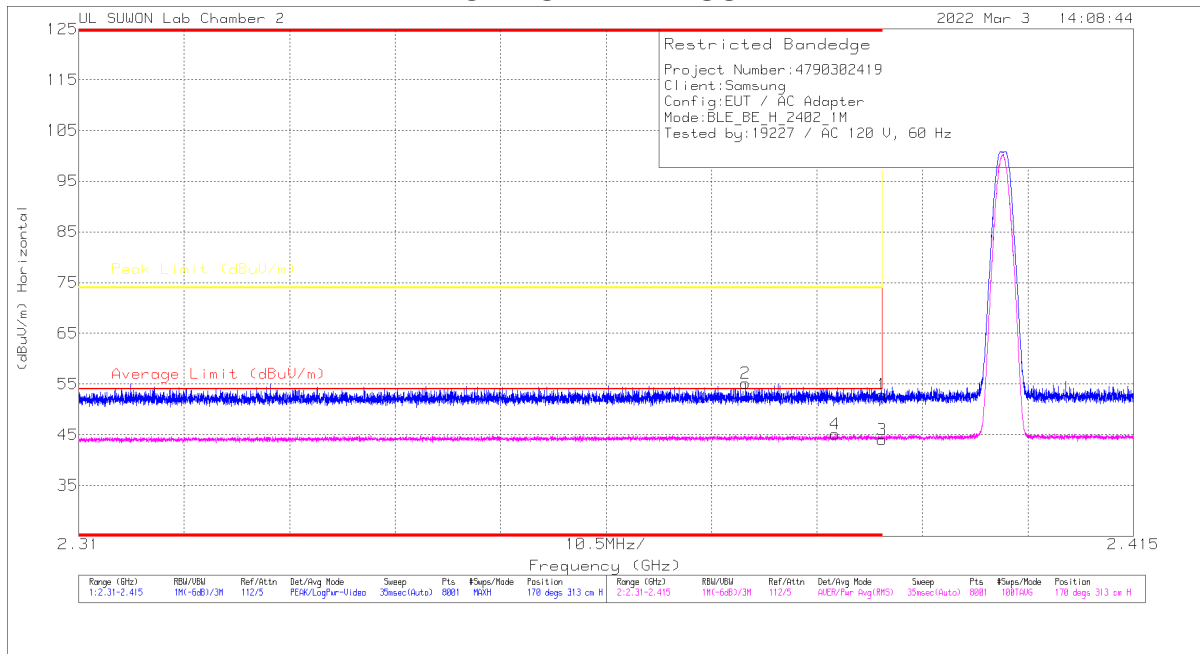
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. 1 Mbps

BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT

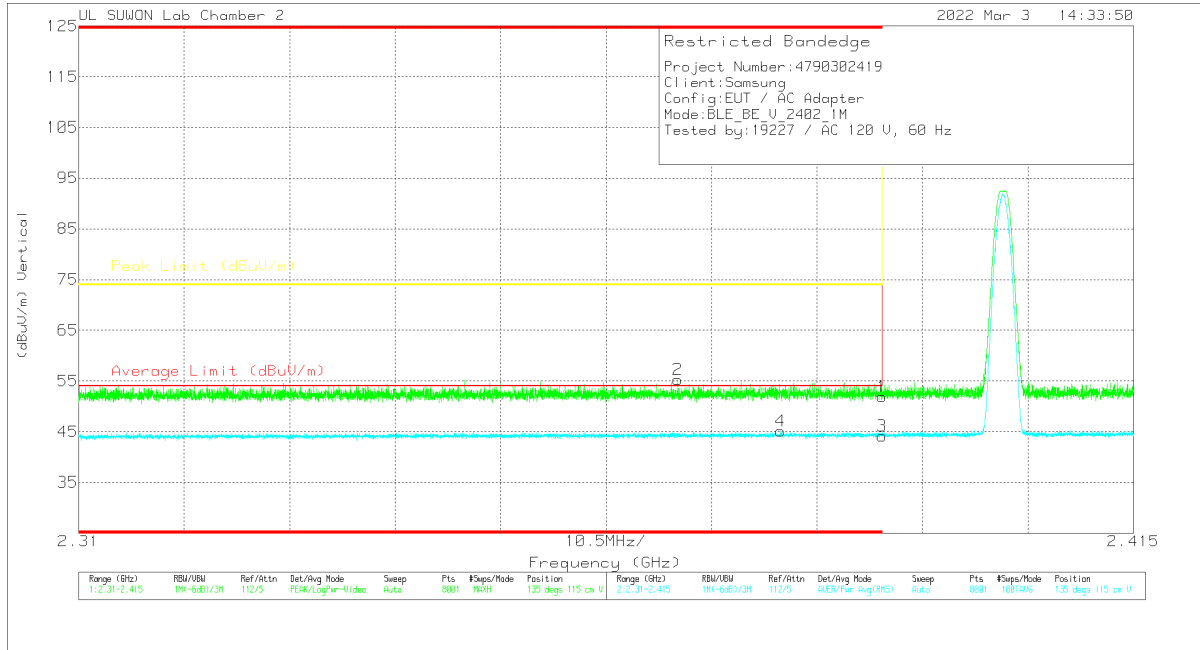


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_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	41.68	PK	31.9	-20.6	0	52.98	-	-	74	-21.02	170	313	H
2	* 2.3784	43.8	PK	31.9	-20.6	0	55.1	-	-	74	-18.9	170	313	H
3	* 2.39	30.52	RMS	31.9	-20.6	2.17	43.99	54	-10.01	-	-	170	313	H
4	* 2.38529	31.61	RMS	31.9	-20.6	2.17	45.08	54	-8.92	-	-	170	313	H

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

VERTICAL RESULT



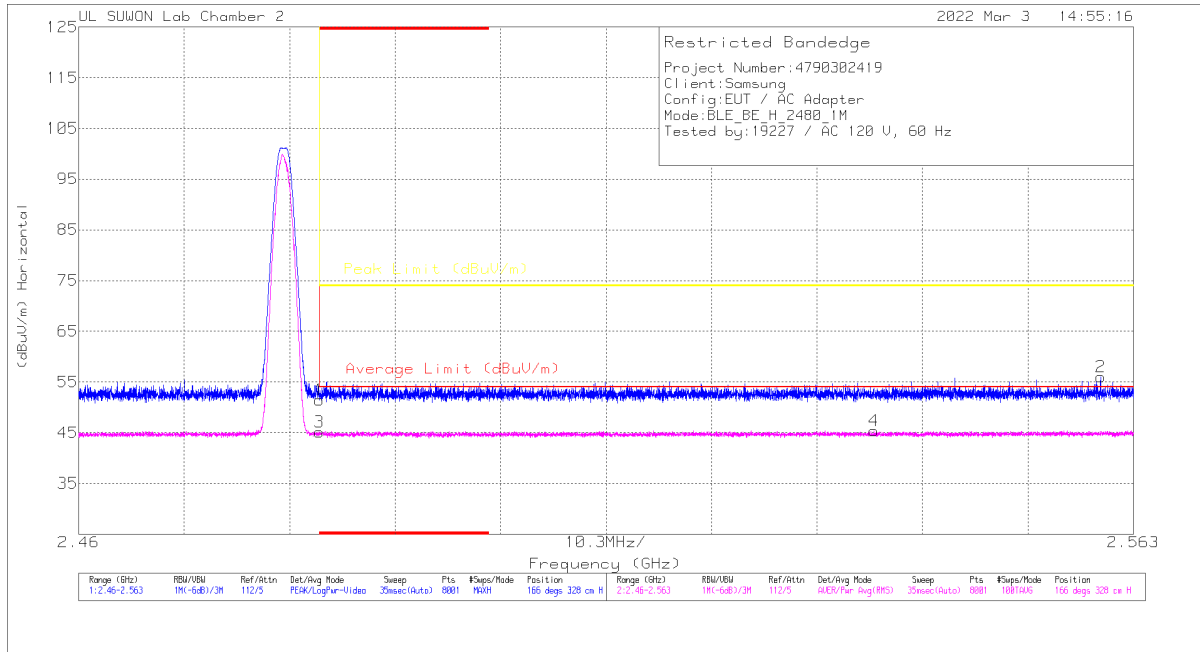
Trace Markers

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	40.67	Pk	31.9	-20.6	0	51.97	-	-	74	-22.03	135	115	V
2	* 2.36967	44.05	Pk	31.8	-20.6	0	55.25	-	-	74	-18.75	135	115	V
3	* 2.39	30.67	RMS	31.9	-20.6	2.17	44.14	54	-9.86	-	-	135	115	V
4	* 2.37985	31.67	RMS	31.9	-20.6	2.17	45.14	54	-8.86	-	-	135	115	V

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

BANDEDGE (39 CHANNEL)

HORIZONTAL RESULT

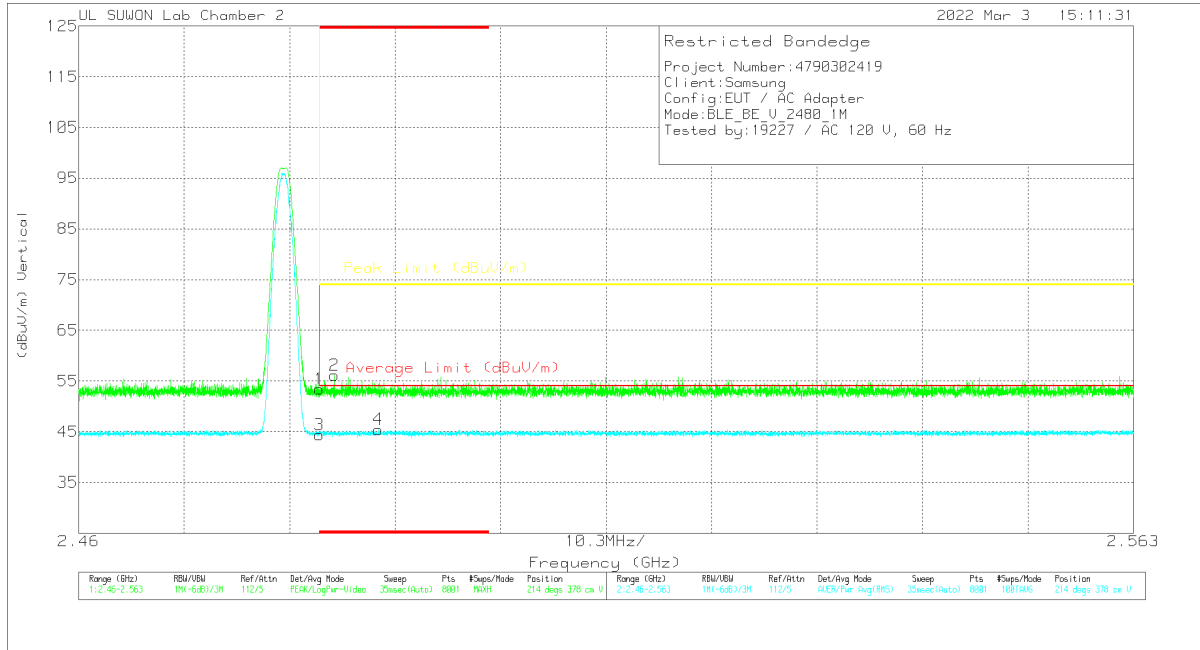


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_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	39.84	Pk	32	-20.4	0	51.44	-	-	74	-22.56	166	328	H
2	2.55979	44.06	Pk	32.2	-20.2	0	56.06	-	-	74	-17.94	166	328	H
3	* 2.48351	31.34	RMS	32	-20.4	2.17	45.11	54	-8.89	-	-	166	328	H
4	2.53766	31.56	RMS	32.1	-20.4	2.17	45.43	54	-8.57	-	-	166	328	H

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

VERTICAL RESULT



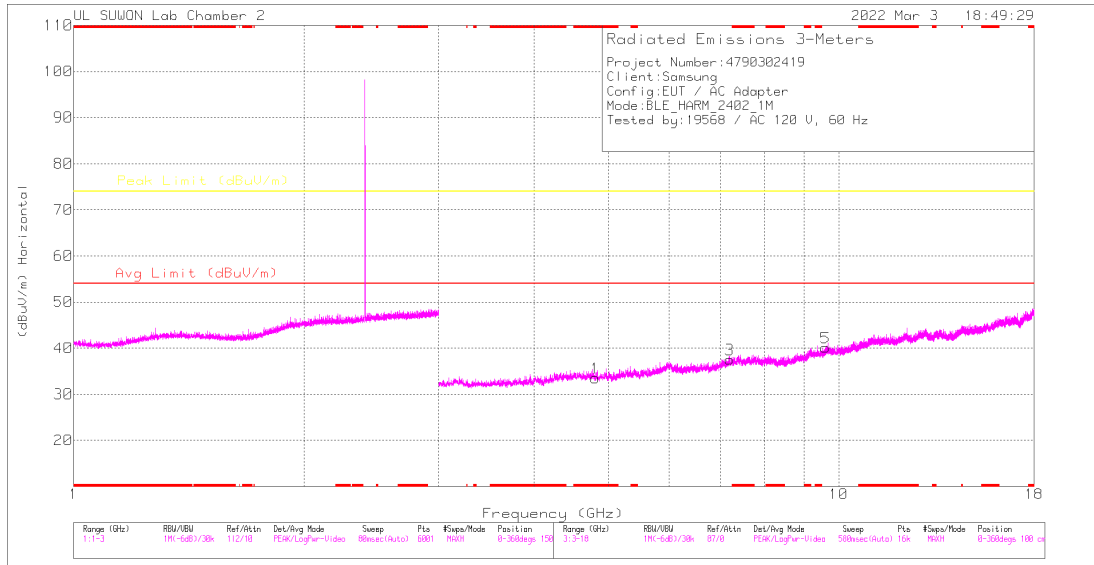
Trace Markers

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	* 2.48351	41.81	Pk	32	-20.4	0	53.41	-	-	74	-20.59	214	378	V
2	* 2.48494	44.68	Pk	32	-20.5	0	56.18	-	-	74	-17.82	214	378	V
3	* 2.48351	30.86	RMS	32	-20.4	2.17	44.43	54	-9.57	-	-	214	378	V
4	* 2.48924	31.57	RMS	32.1	-20.4	2.17	45.44	54	-8.56	-	-	214	378	V

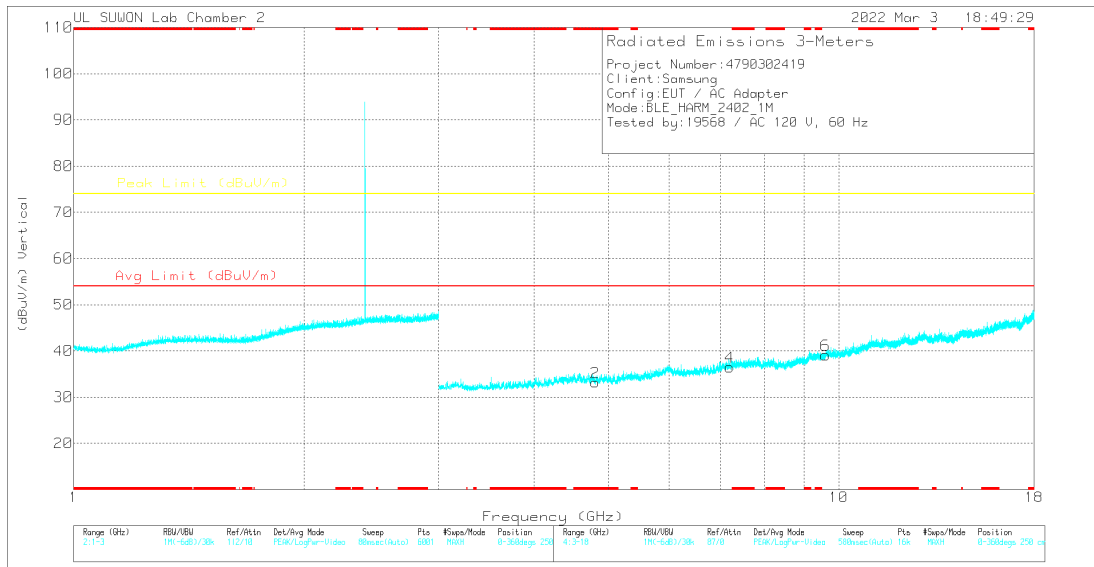
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK - Peak detector
 RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

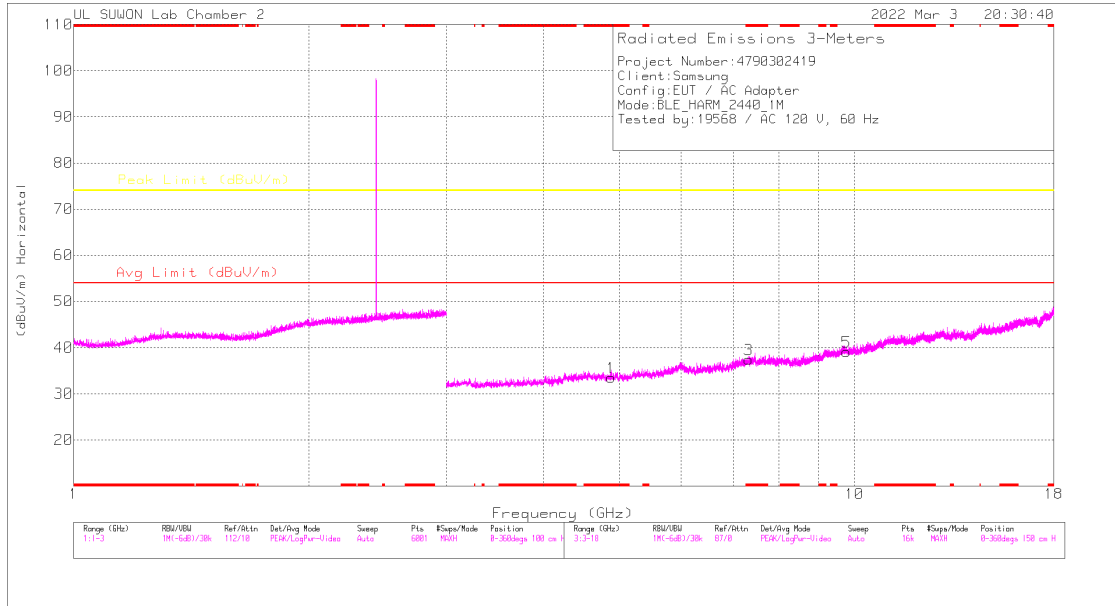
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

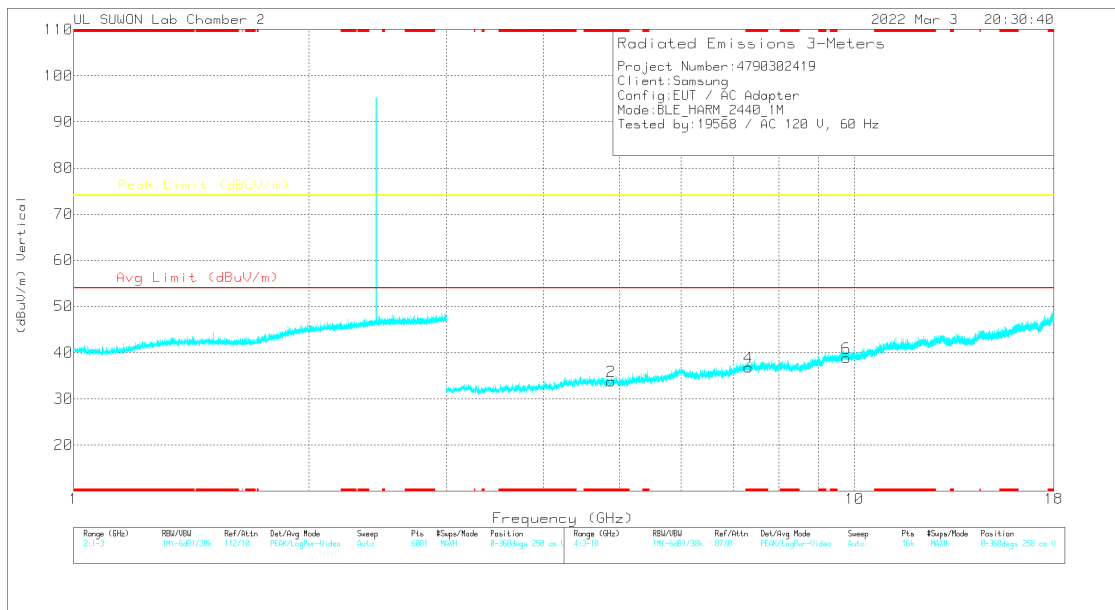
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HPI(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80361	37.26	PK2	34.1	-28	0	43.36	-	-	74	-30.64	0	100	H
* 4.80337	36.7	PK2	34.1	-28	0	42.8	-	-	74	-31.2	0	100	V
7.20584	35.39	PK2	36.2	-25.3	0	46.29	-	-	74	-27.71	0	100	H
7.20423	35.42	PK2	36.2	-25.3	0	46.32	-	-	74	-27.68	0	100	V
9.60729	32.67	PK2	37	-21.7	0	47.97	-	-	74	-26.03	0	100	H
9.60971	32.79	PK2	37	-21.7	0	48.09	-	-	74	-25.91	0	100	V

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

19 CHANNEL RESULTS



HORIZONTAL



VERTICAL

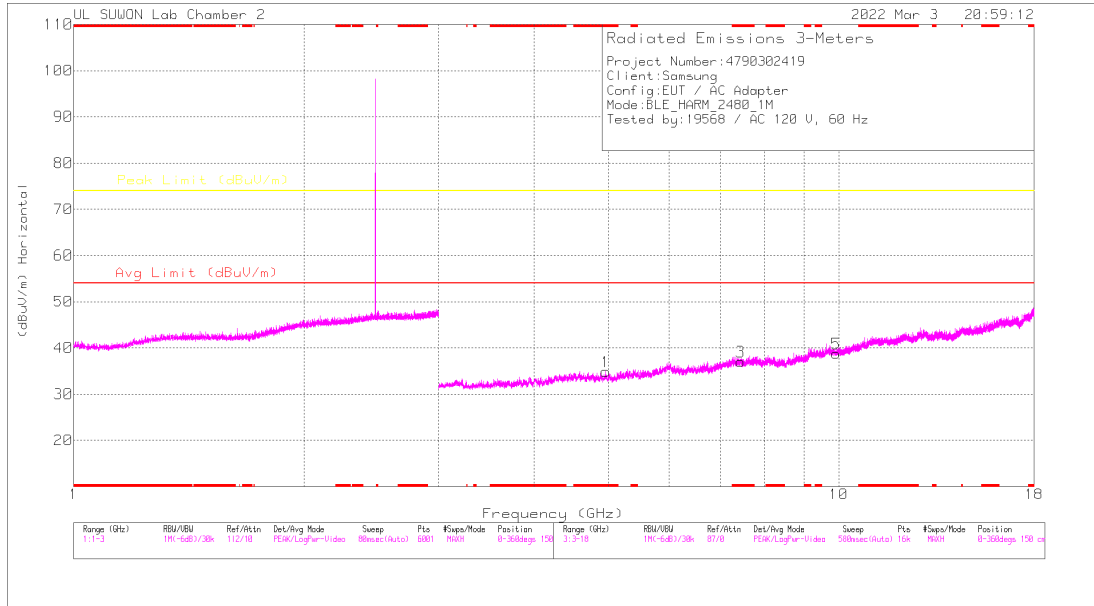
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

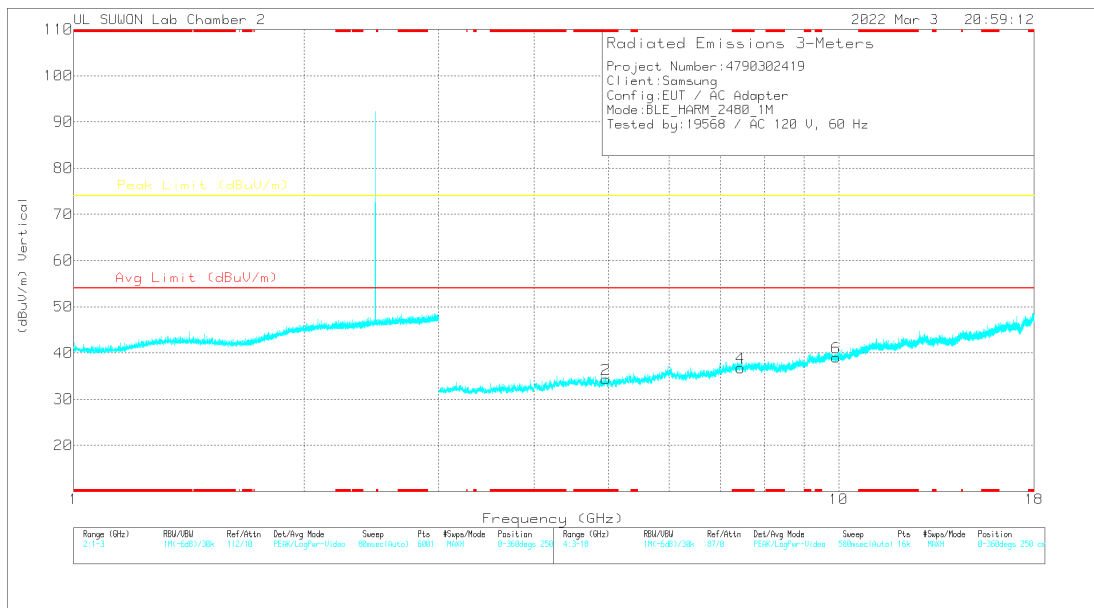
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HPI(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.87959	37.19	PK2	34.1	-27.8	0	43.49	-	-	74	-30.51	0	100	H
* 4.88055	36.31	PK2	34.1	-27.8	0	42.61	-	-	74	-31.39	0	100	V
* 7.31895	35.3	PK2	36.1	-24.9	0	46.5	-	-	74	-27.5	0	100	H
* 7.32334	35.09	PK2	36.1	-24.9	0	46.29	-	-	74	-27.71	0	100	V
9.76378	32.49	PK2	37.2	-21.5	0	48.19	-	-	74	-25.81	0	100	H
9.76364	32.9	PK2	37.2	-21.5	0	48.6	-	-	74	-25.4	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

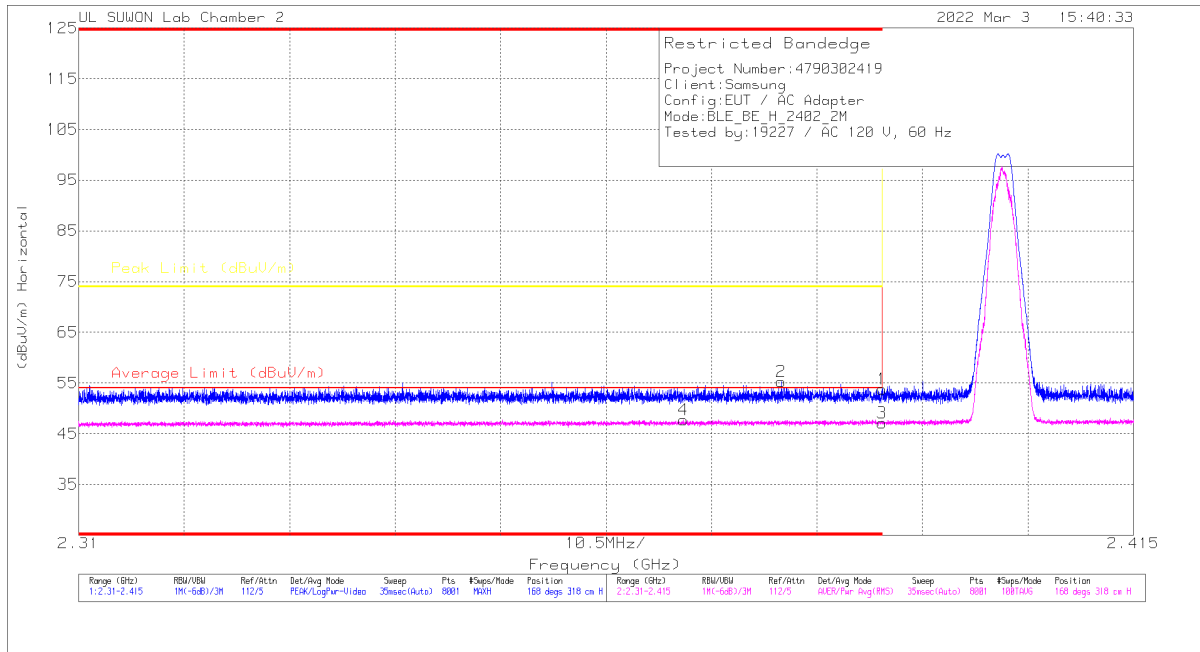
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.96041	36.6	PK2	34.1	-27.2	0	43.5	-	-	74	-30.5	0	100	H
* 4.95995	35.97	PK2	34.1	-27.2	0	42.87	-	-	74	-31.13	0	100	V
* 7.43977	34.82	PK2	36	-24.1	0	46.72	-	-	74	-27.28	0	100	H
* 7.43943	35.42	PK2	36	-24.1	0	47.32	-	-	74	-26.68	0	100	V
9.92048	32.59	PK2	37.4	-21.2	0	48.79	-	-	74	-25.21	0	100	H
9.92191	31.96	PK2	37.4	-21.2	0	48.16	-	-	74	-25.84	0	100	V

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

10.2.2. 2 Mbps

BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT

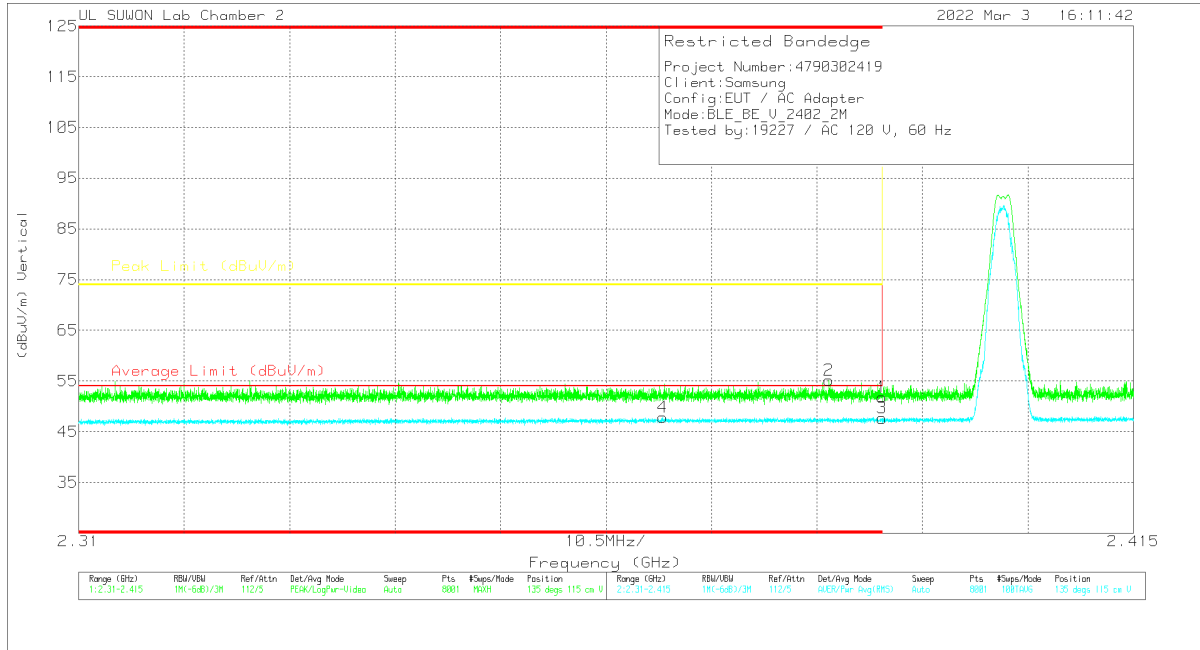


Trace Markers

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	42.53	Pk	31.9	-20.6	0	53.83	-	-	74	-20.17	168	318	H
2	* 2.3799	43.93	Pk	31.9	-20.6	0	55.23	-	-	74	-18.77	168	318	H
3	* 2.39	30.72	RMS	31.9	-20.6	5.12	47.14	54	-6.86	-	-	168	318	H
4	* 2.37019	31.45	RMS	31.8	-20.6	5.12	47.77	54	-6.23	-	-	168	318	H

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

VERTICAL RESULT



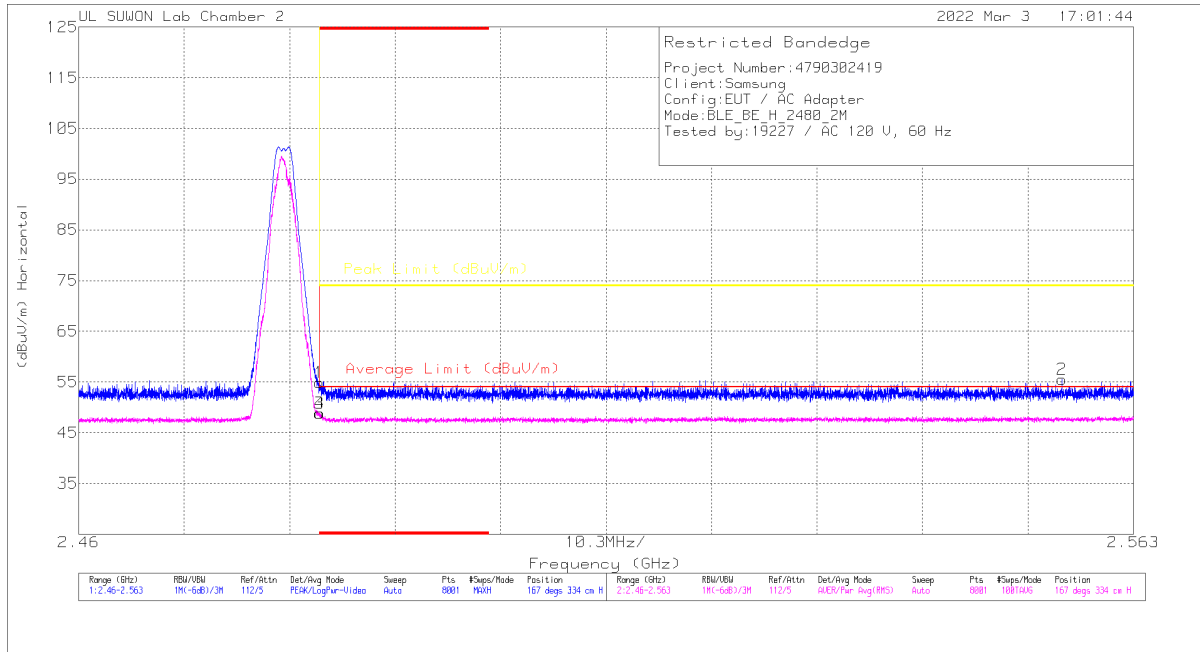
Trace Markers

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	40.51	Pk	31.9	-20.6	0	51.81	-	-	74	-22.19	135	115	V
2	* 2.38467	43.87	Pk	31.9	-20.6	0	55.17	-	-	74	-18.83	135	115	V
3	* 2.39	31.25	RMS	31.9	-20.6	5.12	47.67	54	-6.33	-	-	135	115	V
4	* 2.36817	31.51	RMS	31.8	-20.6	5.12	47.83	54	-6.17	-	-	135	115	V

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

BANDEDGE (39 CHANNEL)

HORIZONTAL RESULT

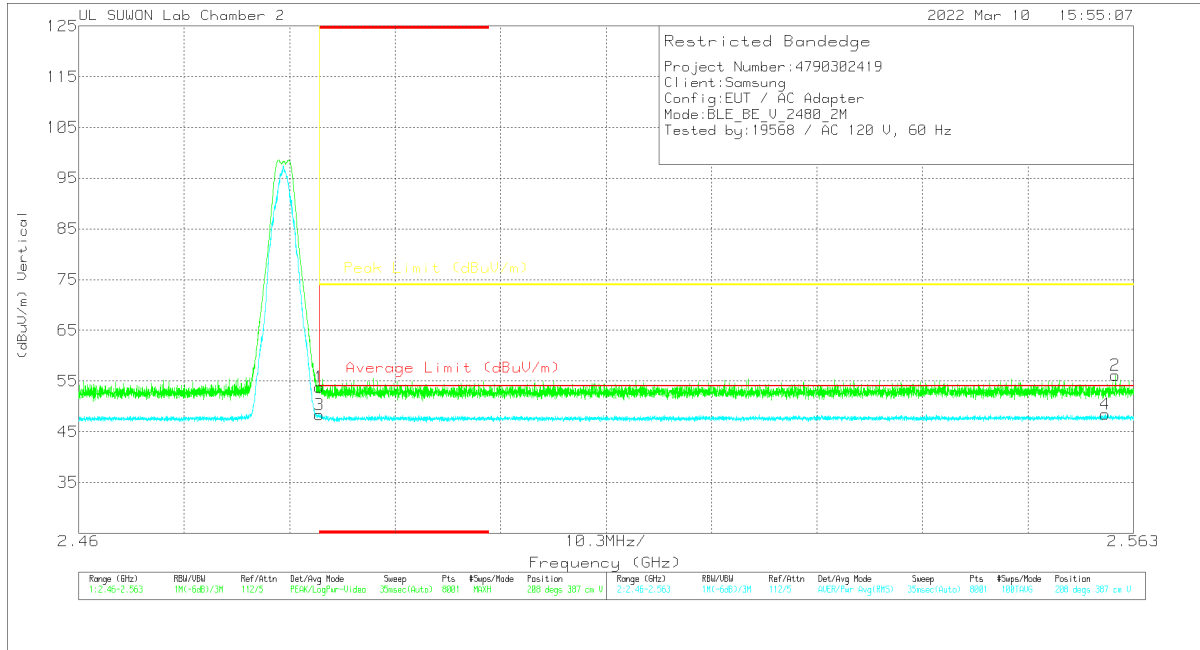


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_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	43.26	Pk	32	-20.4	0	54.86	-	-	74	-19.14	167	334	H
2	2.55603	43.63	Pk	32	-20.3	0	55.53	-	-	74	-18.47	167	334	H
3	* 2.48351	32.14	RMS	32	-20.4	5.12	48.86	54	-5.14	-	-	167	334	H
4	* 2.48355	32.1	RMS	32	-20.4	5.12	48.82	54	-5.18	-	-	167	334	H

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

VERTICAL RESULT



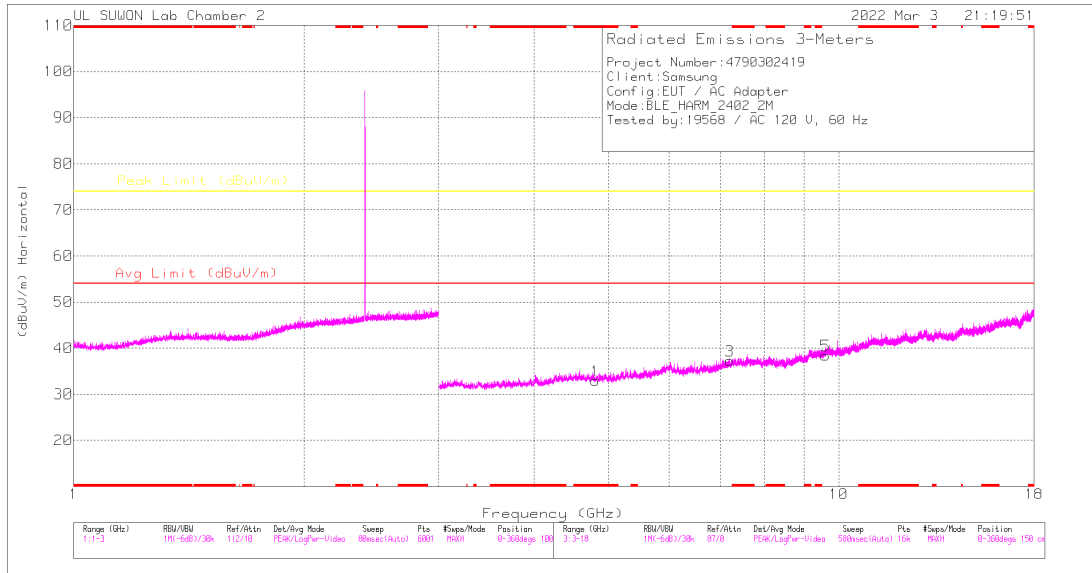
Trace Markers

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	42.23	Pk	32	-20.4	0	53.83	-	-	74	-20.17	208	387	V
2	2.56124	44.26	Pk	32.2	-20.3	0	56.16	-	-	74	-17.84	208	387	V
3	* 2.48351	31.61	RMS	32	-20.4	5.12	48.33	54	-5.67	-	-	208	387	V
4	2.56027	31.38	RMS	32.2	-20.2	5.12	48.5	54	-5.5	-	-	208	387	V

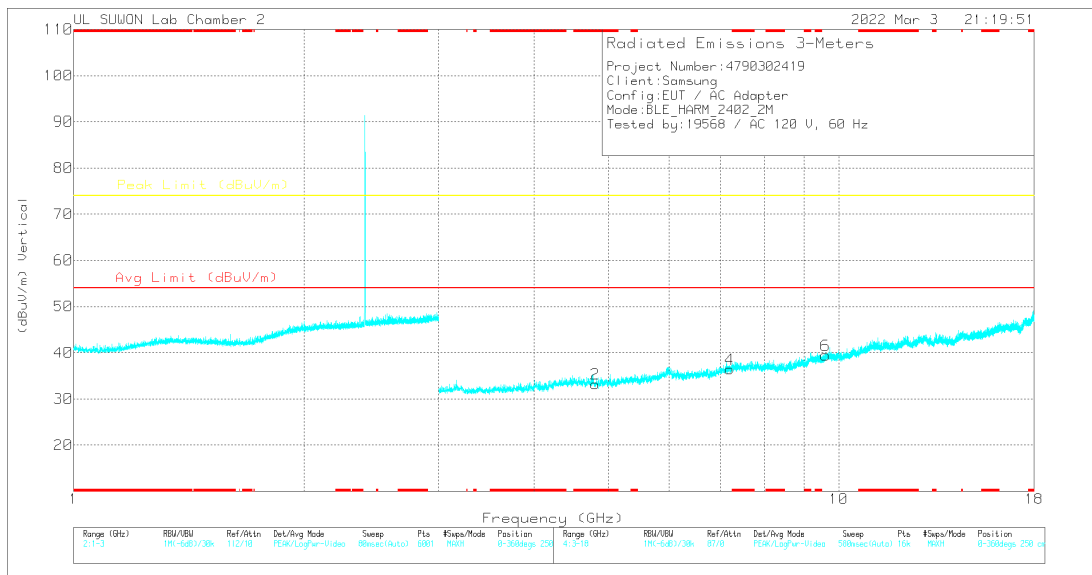
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK - Peak detector
 RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

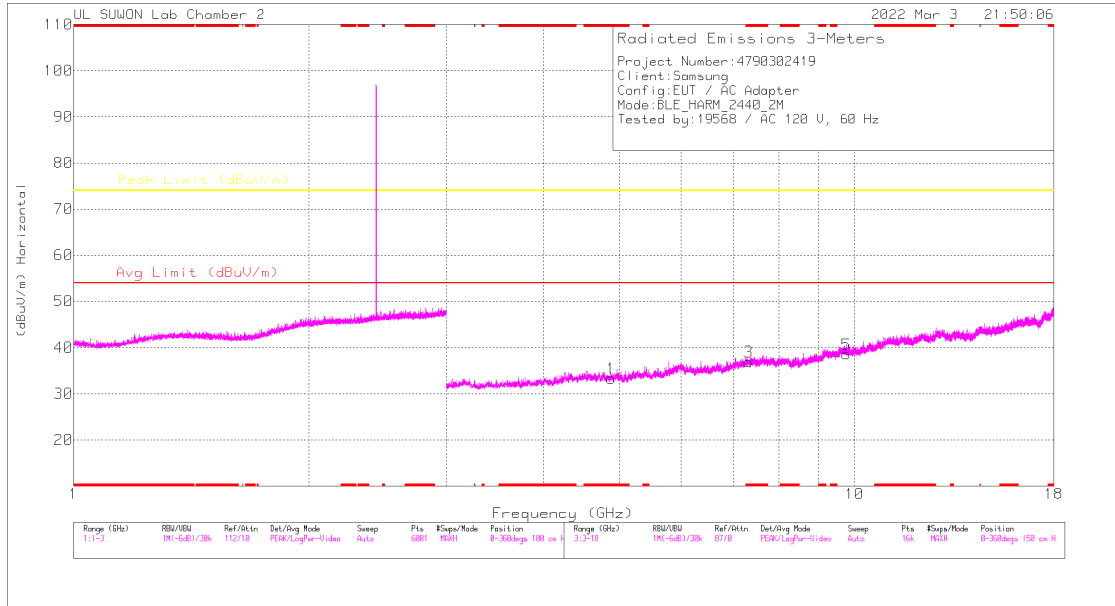
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

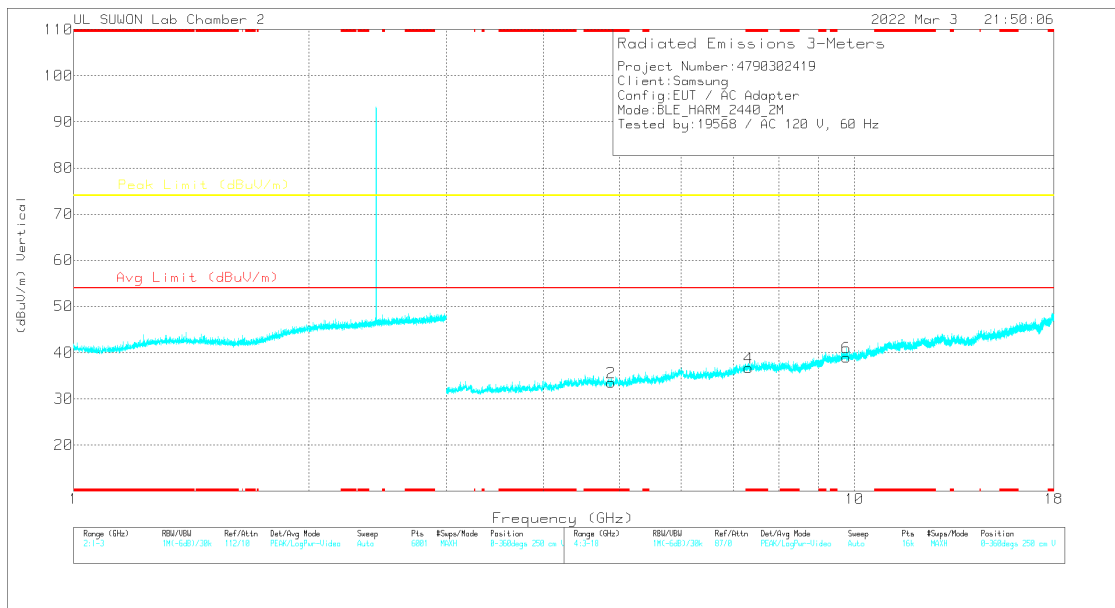
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80388	37.49	PK2	34.1	-28	0	43.59	-	-	74	-30.41	0	100	H
* 4.80312	36.22	PK2	34.1	-28	0	42.32	-	-	74	-31.68	0	100	V
7.20554	35.3	PK2	36.2	-25.3	0	46.2	-	-	74	-27.8	0	100	H
7.20706	35.16	PK2	36.2	-25.3	0	46.06	-	-	74	-27.94	0	100	V
9.60695	34.15	PK2	37	-21.7	0	49.45	-	-	74	-24.55	0	100	H
9.6098	33.17	PK2	37	-21.7	0	48.47	-	-	74	-25.53	0	100	V

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

19 CHANNEL RESULTS



HORIZONTAL



VERTICAL

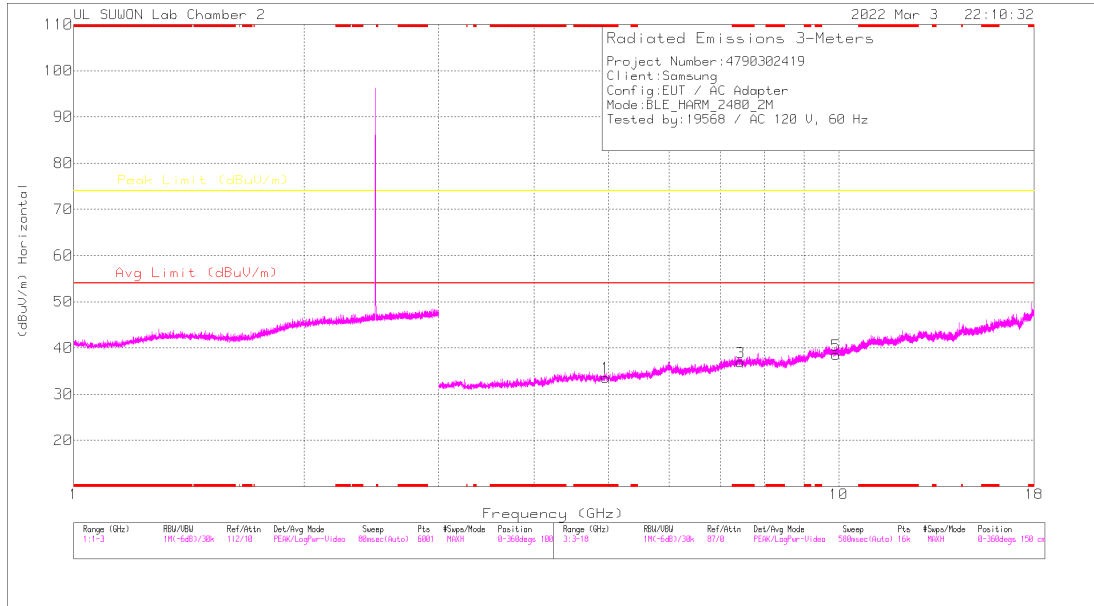
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

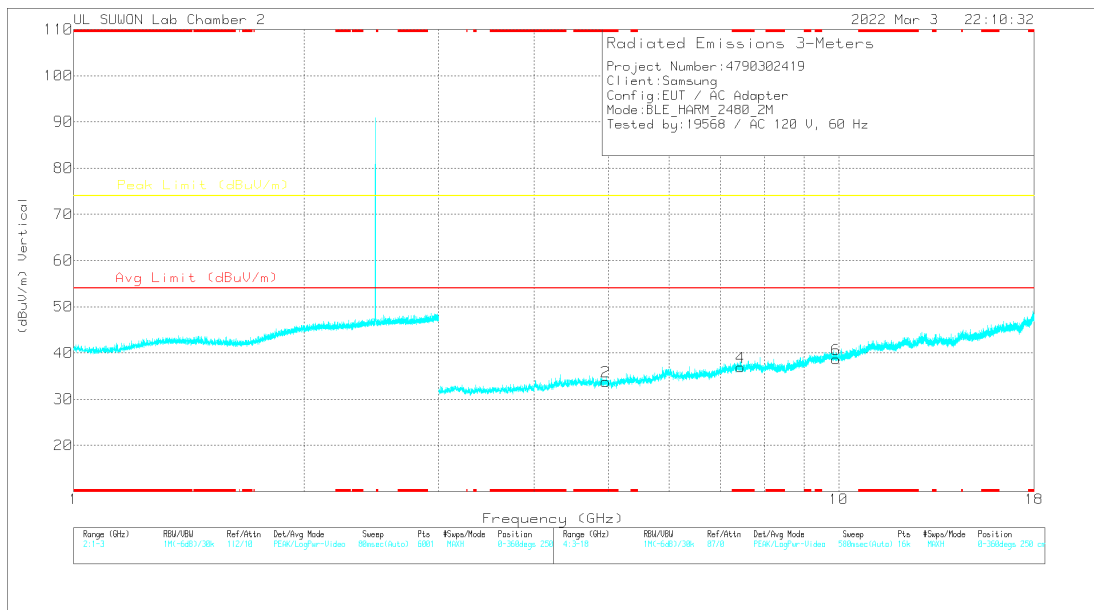
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HPI(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88152	36.94	PK2	34.1	-27.8	0	43.24	-	-	74	-30.76	0	100	H
* 4.88092	36.37	PK2	34.1	-27.8	0	42.67	-	-	74	-31.33	0	100	V
* 7.32127	34.87	PK2	36.1	-24.9	0	46.07	-	-	74	-27.93	0	100	H
* 7.32318	35.38	PK2	36.1	-24.9	0	46.58	-	-	74	-27.42	0	100	V
9.76529	32.31	PK2	37.2	-21.5	0	48.01	-	-	74	-25.99	0	100	H
9.7634	32.39	PK2	37.2	-21.5	0	48.09	-	-	74	-25.91	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.

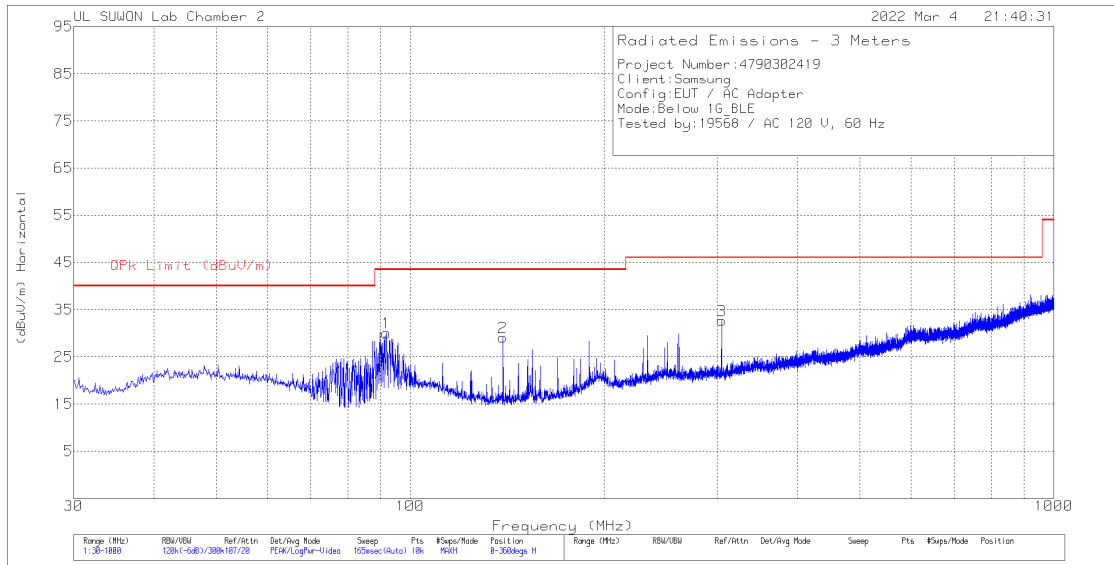
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_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
* 4.96107	36.02	PK2	34.1	-27.2	0	42.92	-	-	74	-31.08	0	100	H
* 4.96213	36.05	PK2	34.1	-27.2	0	42.95	-	-	74	-31.05	0	100	V
* 7.44003	34.49	PK2	36	-24.1	0	46.39	-	-	74	-27.61	0	100	H
* 7.43909	34.49	PK2	36	-24.1	0	46.39	-	-	74	-27.61	0	100	V
9.92029	32.21	PK2	37.4	-21.2	0	48.41	-	-	74	-25.59	0	100	H
9.91992	31.82	PK2	37.4	-21.2	0	48.02	-	-	74	-25.98	0	100	V

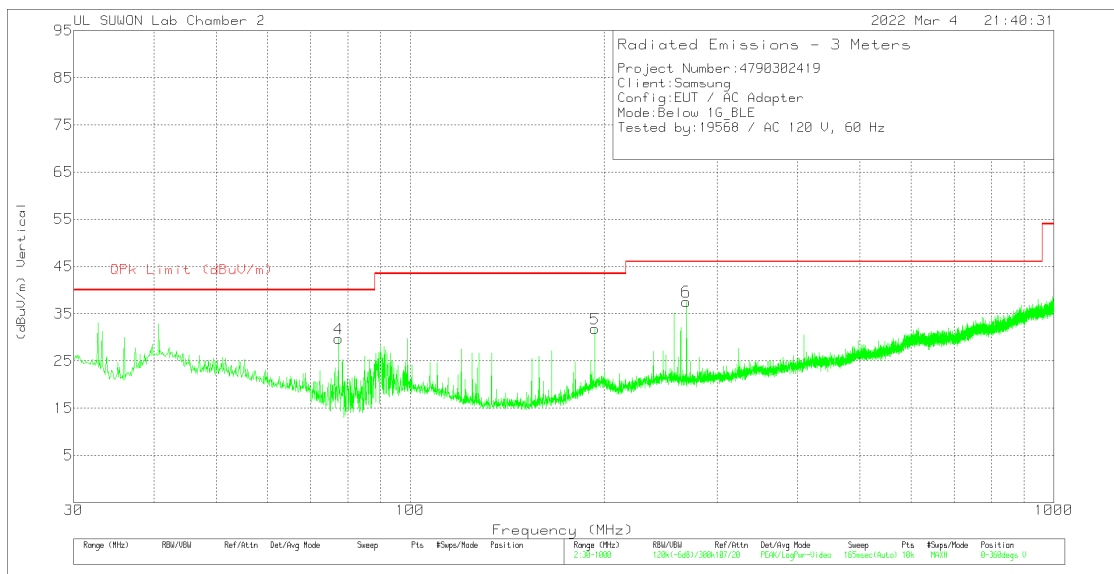
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak

10.3. WORST CASE BELOW 1 GHz (USB C to C Cable)

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



HORIZONTAL



VERTICAL

Below 1GHz Data

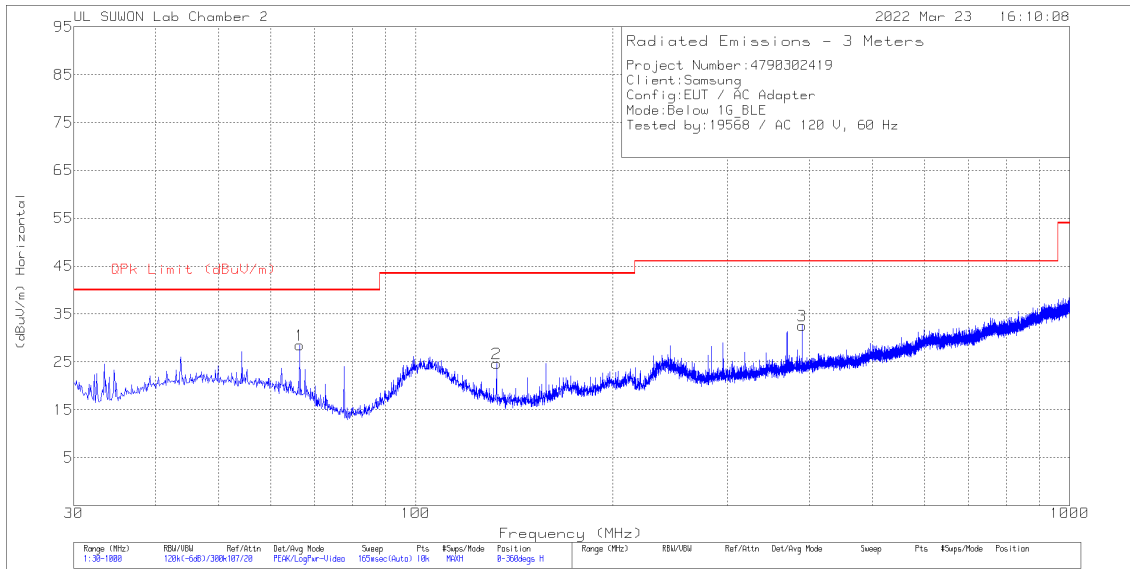
Trace Markers

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	91.886	44.94	Pk	16.4	-31.3	30.04	43.52	-13.48	0-360	200	H
2	139.416	46.14	Pk	14.1	-31.1	29.14	43.52	-14.38	0-360	100	H
3	304.607	43.74	Pk	19.4	-30.4	32.74	46.02	-13.28	0-360	100	H
4	77.336	48.25	Pk	12.9	-31.4	29.75	40	-10.25	0-360	100	V
5	193.542	44.9	Pk	17.7	-30.8	31.8	43.52	-11.72	0-360	100	V
6	268.717	49.48	Pk	18.6	-30.5	37.58	46.02	-8.44	0-360	100	V

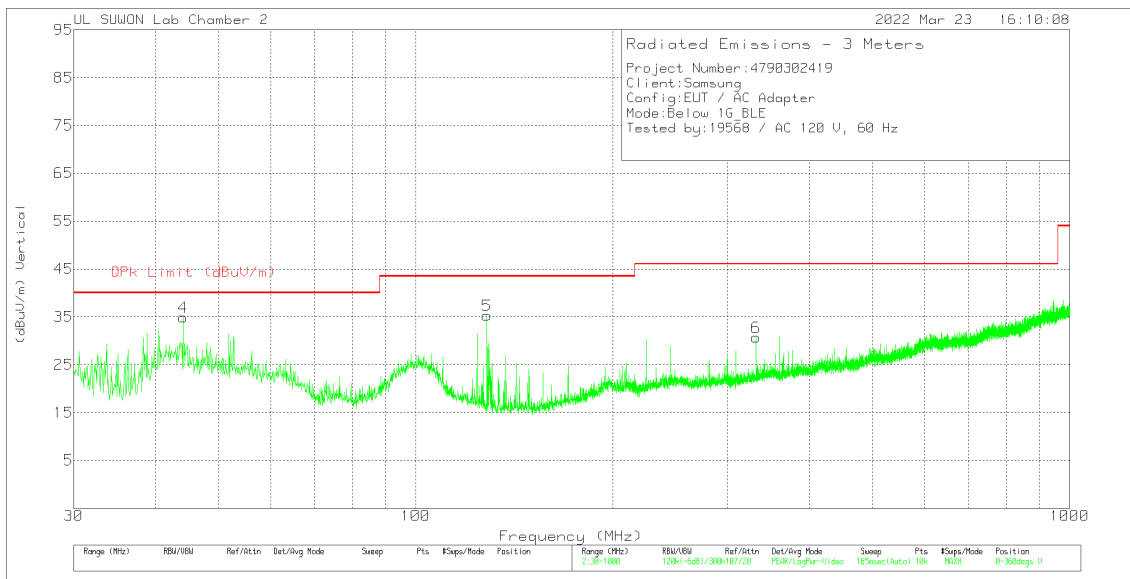
Pk - Peak detector

10.4. WORST CASE BELOW 1 GHz (USB A to C Cable)

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	66.472	43.23	Pk	16.8	-31.5	28.53	40	-11.47	0-360	200	H
2	132.917	41.66	Pk	14.1	-31.1	24.66	43.52	-18.86	0-360	400	H
3	389.773	41.37	Pk	21.2	-30	32.57	46.02	-13.45	0-360	400	H
4	44.065	46.92	Pk	19.7	-31.7	34.92	40	-5.08	0-360	100	V
5	128.552	52	Pk	14.4	-31.1	35.3	43.52	-8.22	0-360	100	V
6	331.476	40.81	Pk	20.1	-30.2	30.71	46.02	-15.31	0-360	100	V

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.

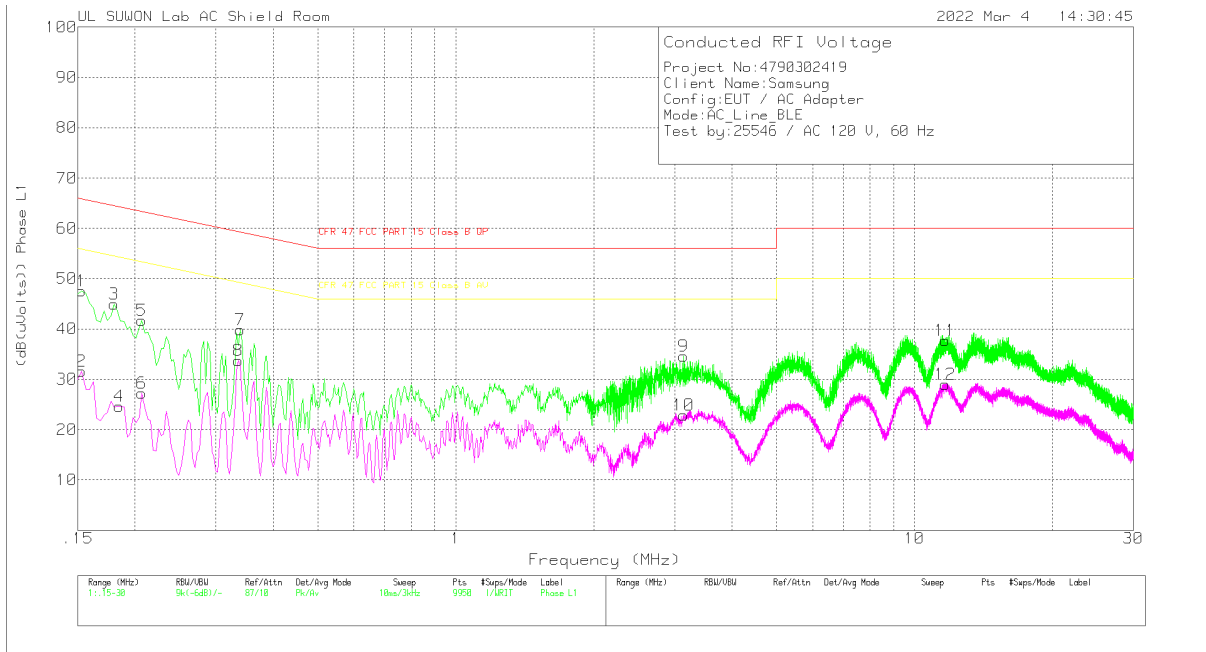
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

11.1. AC Power Line (USB C to C Cable)

LINE 1 RESULTS



Trace Markers

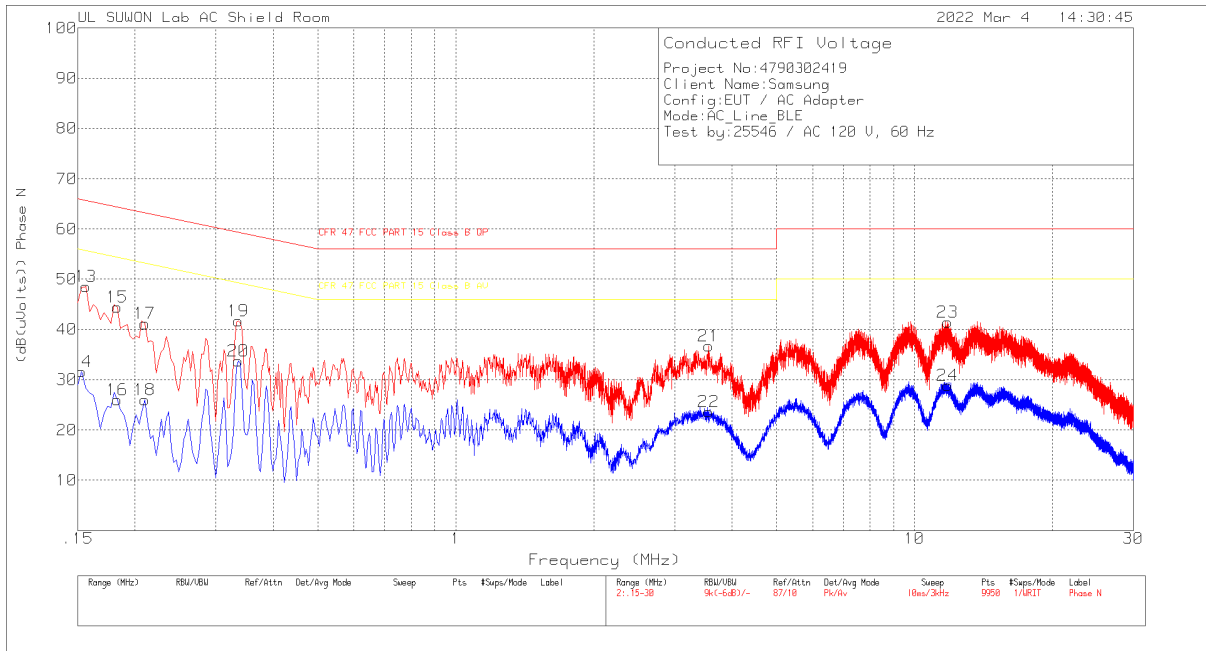
Range 1: Phase L1 .15 - 30MHz

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	.153	37.72	Pk	9.8	.1	47.62	65.84	-18.22	-	-
2	.153	21.69	Av	9.8	.1	31.59	-	-	55.84	-24.25
3	.18	34.81	Pk	9.9	.2	44.91	64.49	-19.58	-	-
4	.1845	14.58	Av	9.9	.2	24.68	-	-	54.28	-29.6
5	.207	31.68	Pk	9.8	.2	41.68	63.32	-21.64	-	-
6	.207	17.21	Av	9.8	.2	27.21	-	-	53.32	-26.11
7	.339	29.79	Pk	9.8	.2	39.79	59.23	-19.44	-	-
8	.336	23.71	Av	9.8	.2	33.71	-	-	49.3	-15.59
9	3.141	24.66	Pk	9.7	.3	34.66	56	-21.34	-	-
10	3.135	12.9	Av	9.7	.3	22.9	-	-	46	-23.1
11	11.661	27.48	Pk	9.9	.3	37.68	60	-22.32	-	-
12	11.664	18.8	Av	9.9	.3	29	-	-	50	-21

Pk - Peak detector

Av - Average detection

LINE 2 RESULTS



Trace Markers

Range 2: Phase N .15 - 30MHz

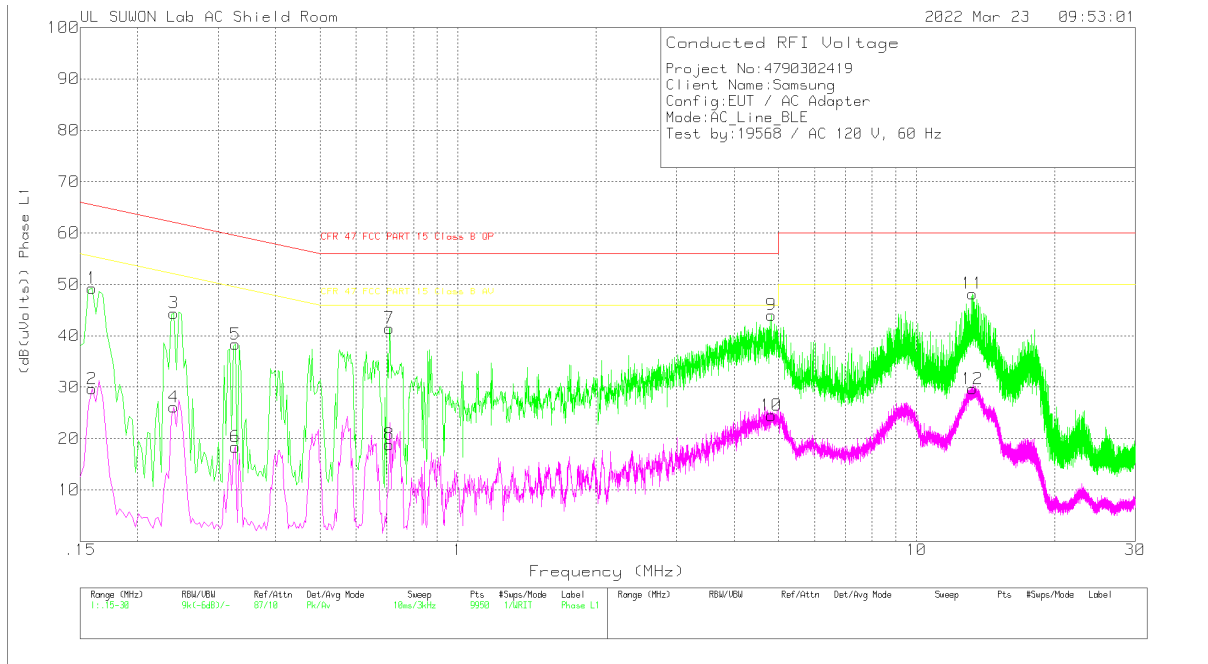
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_N[dB]	CABLELOS S(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
13	.156	38.61	Pk	9.8	.1	48.51	65.67	-17.16	-	-
14	.153	21.67	Av	9.8	.1	31.57	-	-	55.84	-24.27
15	.183	34.35	Pk	9.9	.2	44.45	64.35	-19.9	-	-
16	.183	15.9	Av	9.9	.2	26	-	-	54.35	-28.35
17	.21	31.15	Pk	9.8	.2	41.15	63.21	-22.06	-	-
18	.21	16.06	Av	9.8	.2	26.06	-	-	53.21	-27.15
19	.336	31.72	Pk	9.8	.2	41.72	59.3	-17.58	-	-
20	.336	23.68	Av	9.8	.2	33.68	-	-	49.3	-15.62
21	3.561	26.76	Pk	9.7	.3	36.76	56	-19.24	-	-
22	3.561	13.61	Av	9.7	.3	23.61	-	-	46	-22.39
23	11.814	31.24	Pk	9.9	.3	41.44	60	-18.56	-	-
24	11.814	18.64	Av	9.9	.3	28.84	-	-	50	-21.16

Pk - Peak detector

Av - Average detection

11.1. AC Power Line (USB A to C Cable)

LINE 1 RESULTS



Trace Markers

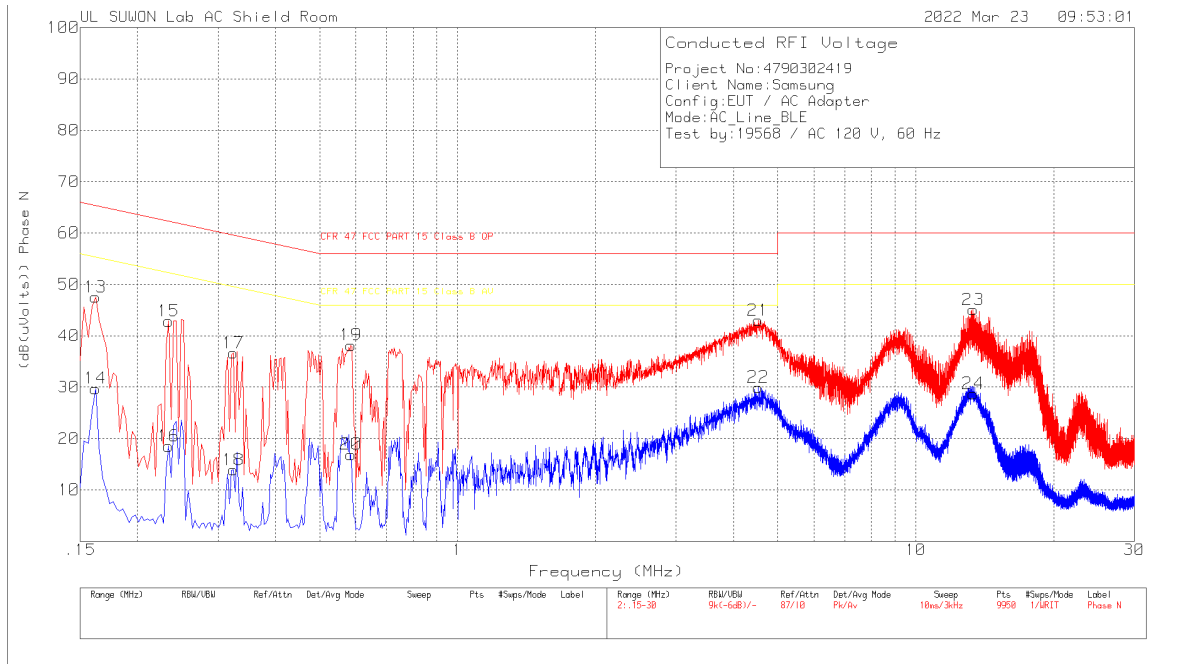
Range 1: Phase L1 .15 - 30MHz

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	39.36	Pk	9.8	.1	49.26	65.52	-16.26	-	-
2	.159	19.78	Av	9.8	.1	29.68	-	-	55.52	-25.84
3	.24	34.52	Pk	9.7	.2	44.42	62.1	-17.68	-	-
4	.24	16.21	Av	9.7	.2	26.11	-	-	52.1	-25.99
5	.327	28.45	Pk	9.7	.2	38.35	59.53	-21.18	-	-
6	.327	8.49	Av	9.7	.2	18.39	-	-	49.53	-31.14
7	.708	31.44	Pk	9.8	.2	41.44	56	-14.56	-	-
8	.708	8.85	Av	9.8	.2	18.85	-	-	46	-27.15
9	4.821	34.04	Pk	9.7	.3	44.04	56	-11.96	-	-
10	4.821	14.51	Av	9.7	.3	24.51	-	-	46	-21.49
11	13.245	37.91	Pk	9.9	.4	48.21	60	-11.79	-	-
12	13.245	19.36	Av	9.9	.4	29.66	-	-	50	-20.34

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	.162	37.53	Pk	9.9	.1	47.53	65.36	-17.83	-	-
14	.162	19.75	Av	9.9	.1	29.75	-	-	55.36	-25.61
15	.234	32.95	Pk	9.7	.2	42.85	62.31	-19.46	-	-
16	.234	8.61	Av	9.7	.2	18.51	-	-	52.31	-33.8
17	.324	26.73	Pk	9.7	.2	36.63	59.6	-22.97	-	-
18	.324	3.99	Av	9.7	.2	13.89	-	-	49.6	-35.71
19	.585	28.08	Pk	9.9	.2	38.18	56	-17.82	-	-
20	.585	6.8	Av	9.9	.2	16.9	-	-	46	-29.1
21	4.53	33.01	Pk	9.7	.3	43.01	56	-12.99	-	-
22	4.53	19.94	Av	9.7	.3	29.94	-	-	46	-16.06
23	13.347	34.66	Pk	10	.4	45.06	60	-14.94	-	-
24	13.347	18.32	Av	10	.4	28.72	-	-	50	-21.28

Pk - Peak detector

Av - Average detection

END OF TEST REPORT