



CERTIFICATION TEST REPORT

Report Number. : 4790577225-FR2V1

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

Model : EP-P9500

FCC ID : A3LEPP9500

EUT Description : SmartThings Station with BLE, DTS/UNII a/b/g/n/ac, Zigbee and WPT

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

Date Of Issue:

2022-11-10

Prepared by:

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2022-11-10	Initial issue	Hyunsik(Dexter) Yun

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: SmartThings Station with BLE, DTS/UNII a/b/g/n/ac, Zigbee and WPT
MODEL NUMBER: EP-P9500
SERIAL NUMBER: R37T9001P1AX3S, 00000000000000 (CONDUCTED);
R37TA0004VFX3S (RADIATED);
DATE TESTED: 2022-10-16 ~ 2022-11-10;

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
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UL Korea, Ltd.

Tested By:



Hyunsik(Dexter) 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(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 115:2021.

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is a SmartThings Station with BLE, DTS/UNII a/b/g/n/ac, Zigbee and WPT. 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	1 Mbps (255pkt)	Peak	9.262	8.437
		Average	8.951	7.855
	2 Mbps (37pkt)	Peak	9.681	9.292
		Average	9.147	8.216

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 3.5 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.

Worst case of antenna axis: X

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

Power verification

The Output Power of all data rate are all investigated, the 1 Mbps(255 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	6.482	2	2Mbps 37pkt	2402	6.195
		2440	8.950			2440	9.147
		2480	6.717			2480	6.517
	1Mbps 255pkt	2402	6.366		2Mbps 255pkt	2402	6.179
		2440	8.951			2440	8.730
		2480	6.668			2480	6.471

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	-	N/A
Data Cable	SAMSUNG	EP-DN980	-	N/A
Test Zig	-	DJT150701	-	N/A

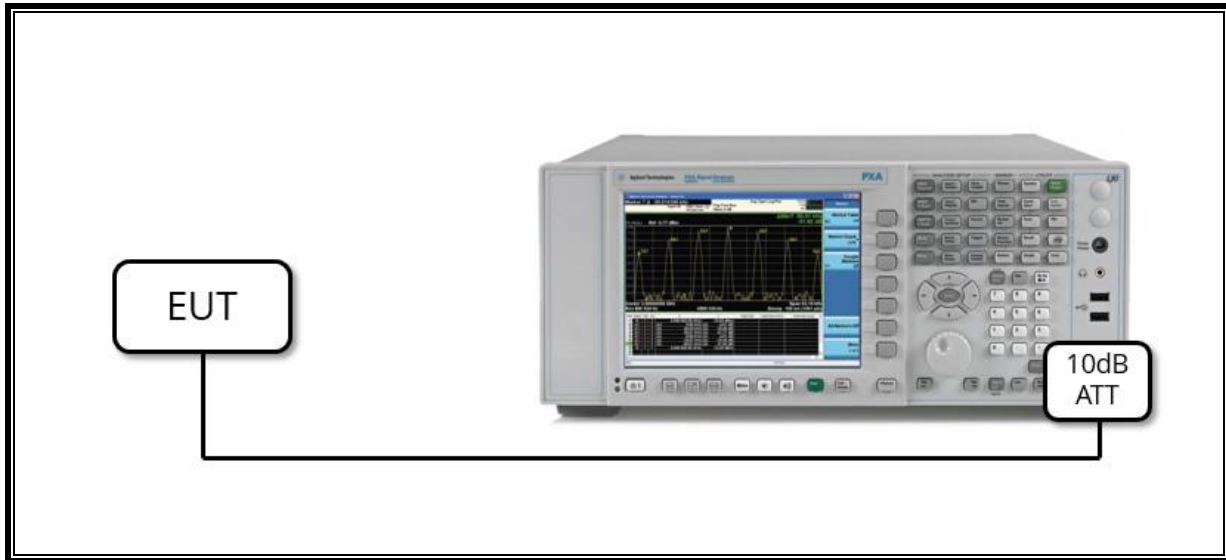
I/O CABLE

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

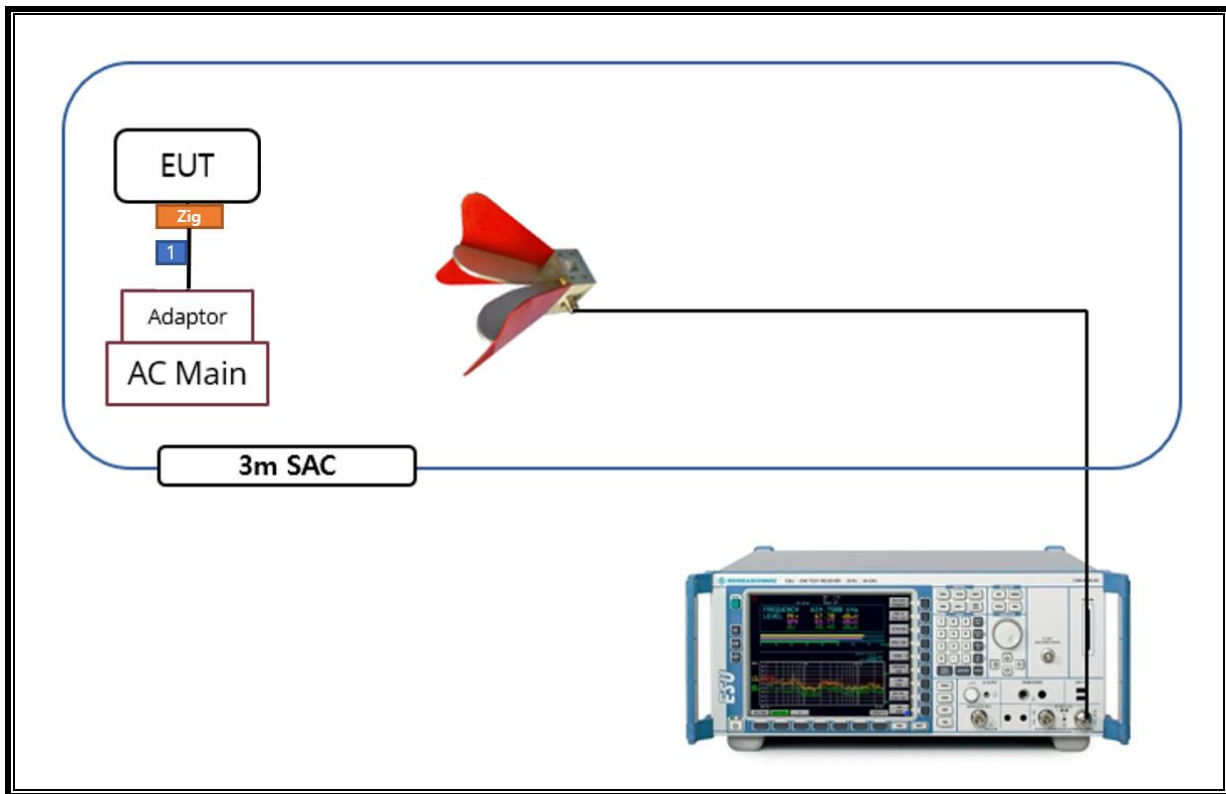
TEST SETUP

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	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	PASTERNAK	PE7087-10	A001	2023-08-03
Attenuator	PASTERNAK	PE7087-10	A008	2023-08-03
Attenuator	PASTERNAK	PE7004-10	2	2023-08-01
Attenuator	PASTERNAK	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

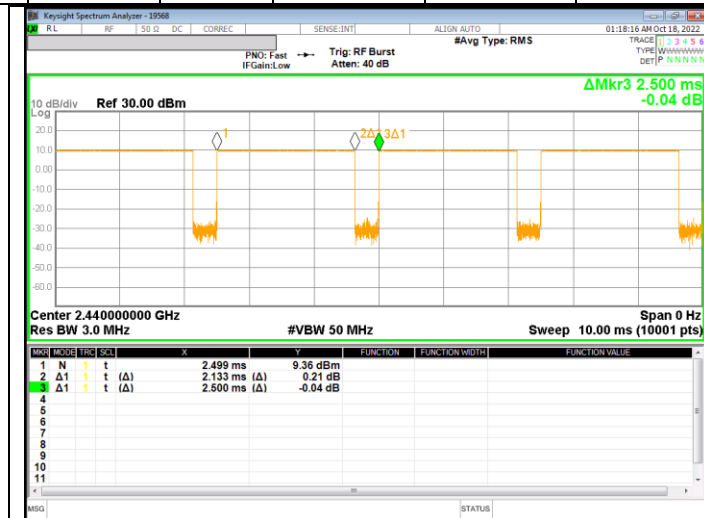
9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

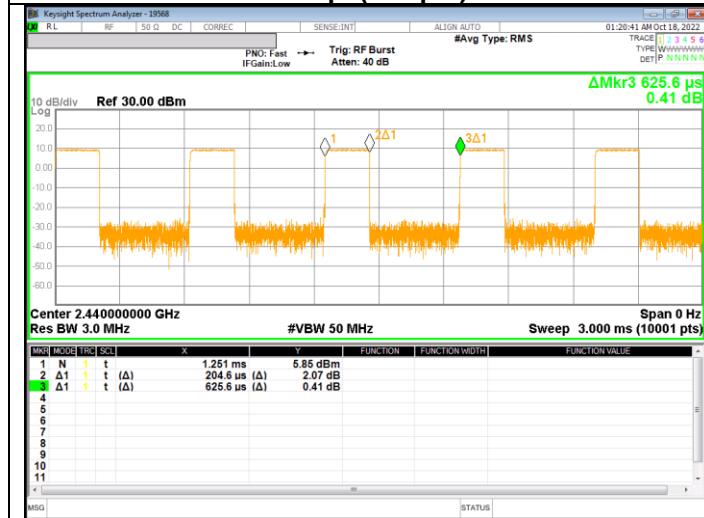
LIMITS

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 [255pkt]	2.133	2.500	0.853	85.320	0.69	0.47
2 Mbps [37pkt]	0.205	0.626	0.327	32.705	4.85	4.89



1 Mbps(255 pkt)



2 Mbps(37 pkt)

9.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

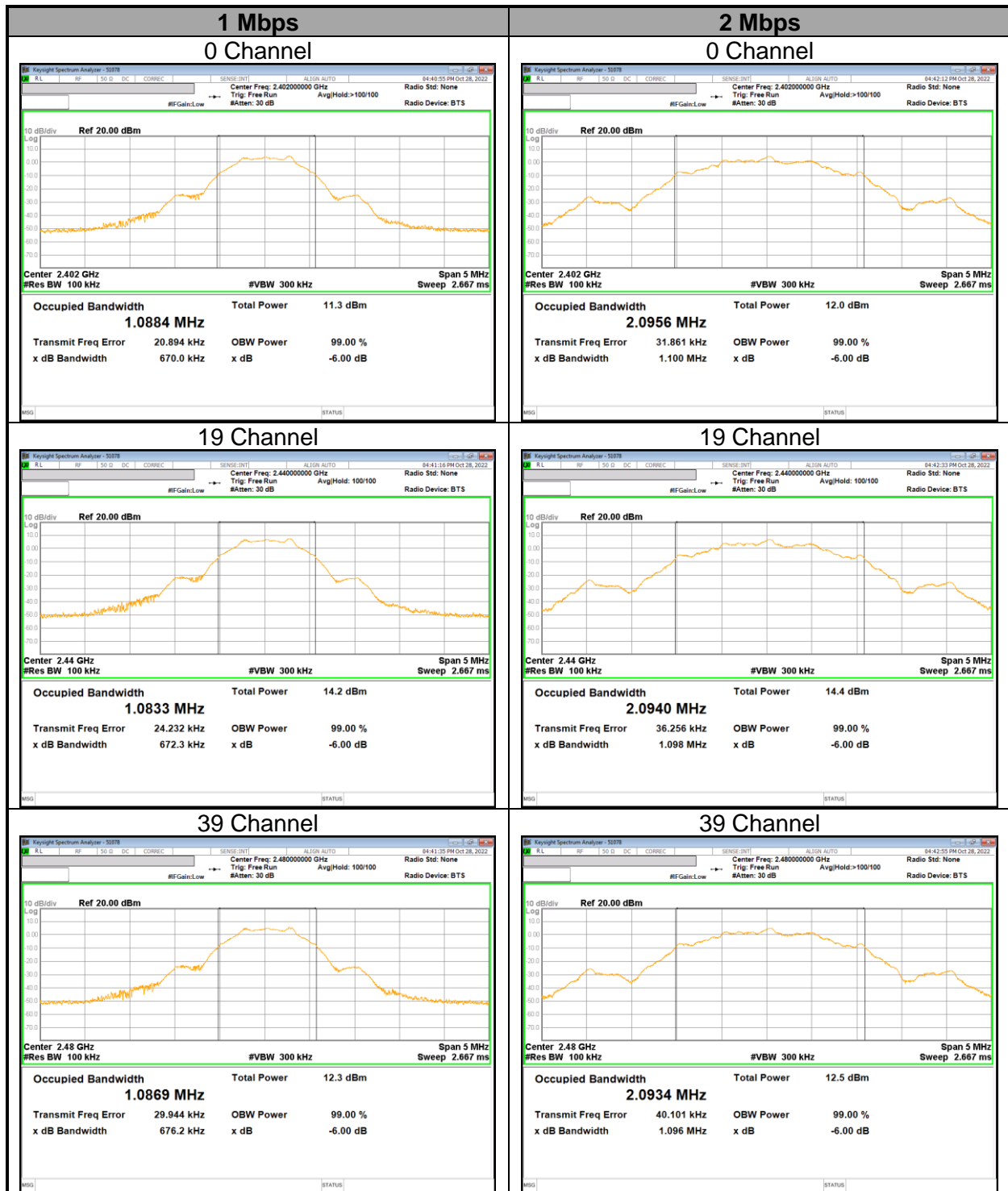
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

9.2.1. Test data

Mode	Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]
1 Mbps	0	2 402	670.0	500.0
	19	2 440	672.3	500.0
	39	2 480	676.2	500.0
2 Mbps	0	2 402	1100.0	500.0
	19	2 440	1098.0	500.0
	39	2 480	1096.0	500.0
Worst			670.0	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

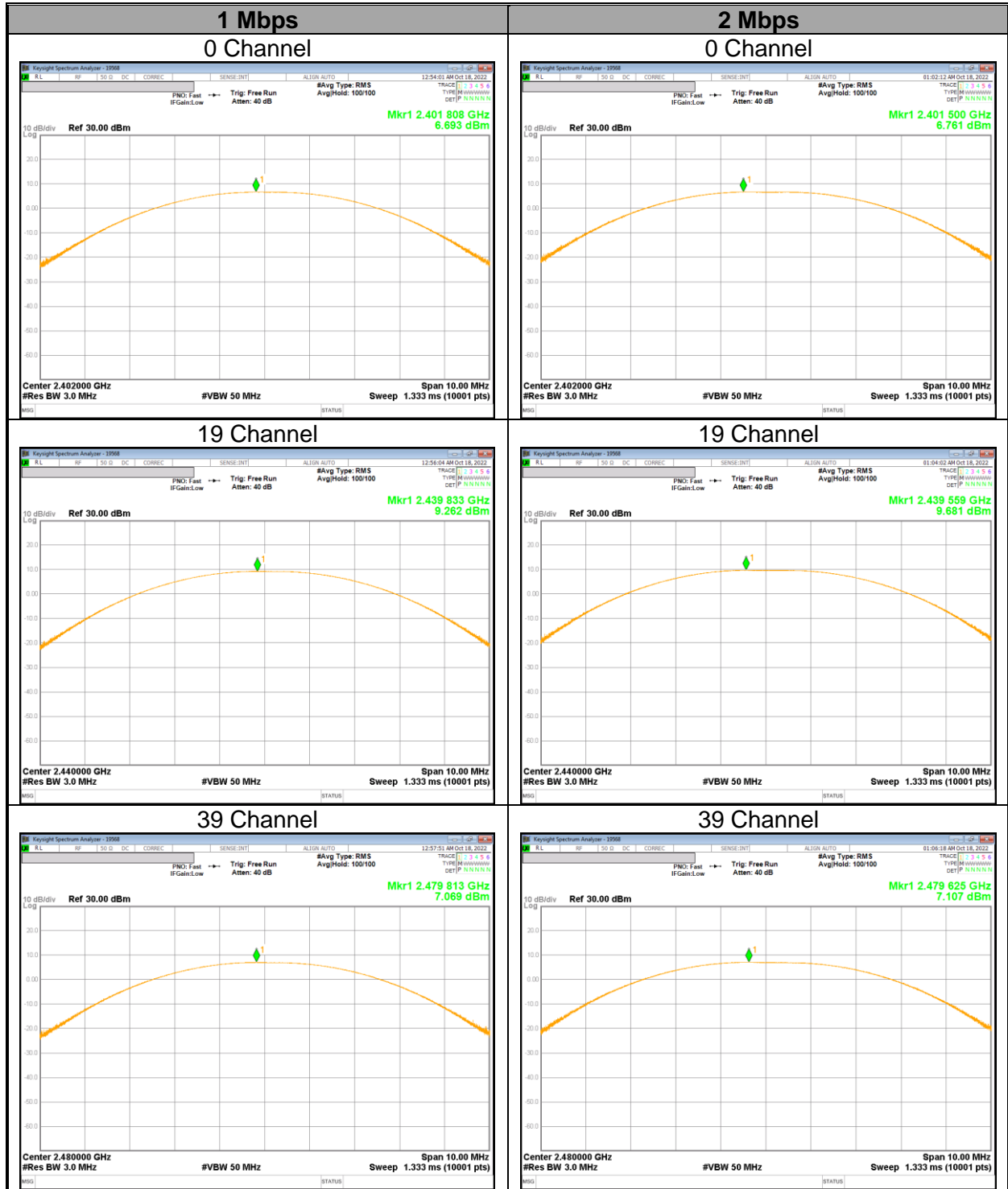
Peak power is measured using ANSI C63.10(2013) under section 11.9.1.1 utilizing spectrum analyzer(RBW \cong DTS bandwidth).

RESULTS

9.3.1. Test data

Mode	Channel	Frequency [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]
1 Mbps (255 pkt)	0	2 402	6.693	30.000	-23.307
	19	2 440	9.262		-20.738
	39	2 480	7.069		-22.931
2 Mbps (37 pkt)	0	2 402	6.761		-23.239
	19	2 440	9.681		-20.319
	39	2 480	7.107		-22.893
Worst			9.681		-20.319

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]
1 Mbps	0	2 402	6.366	4.331
	19	2 440	8.951	7.855
	39	2 480	6.668	4.643
2 Mbps	0	2 402	6.195	4.164
	19	2 440	9.147	8.216
	39	2 480	6.517	4.484

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

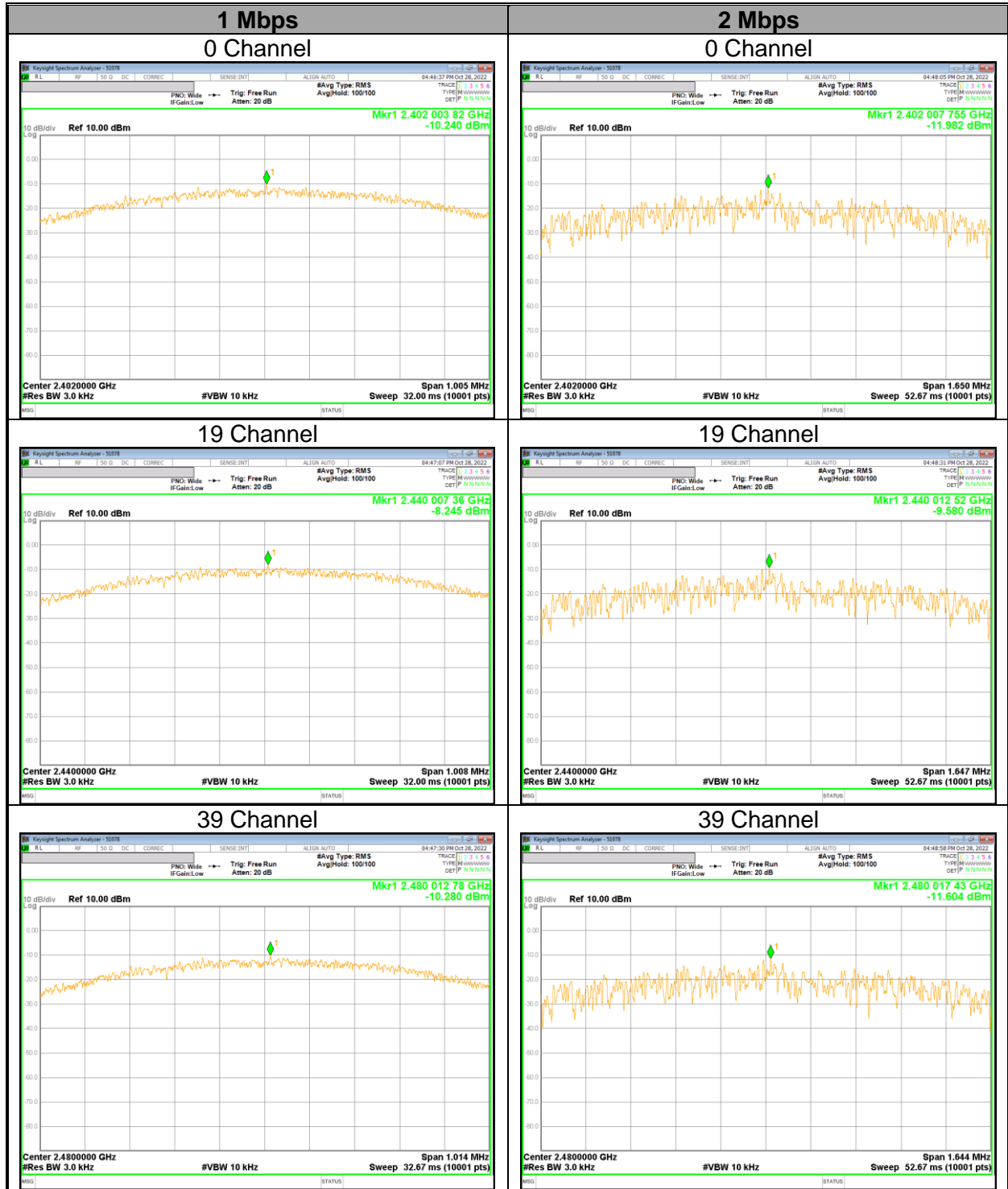
ANSI C63.10-2013, Section 11.10.2 Method PKPSD (peak PSD)

RESULTS

9.5.1. Test data

Mode	Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
1 Mbps (255pkt)	0	2 402	-10.240	8.00	-18.240
	19	2 440	-8.245		-16.245
	39	2 480	-10.280		-18.280
2 Mbps (37pkt)	0	2 402	-11.982		-19.982
	19	2 440	-9.580		-17.580
	39	2 480	-11.604		-19.604
Worst			-8.245		-16.245

9.5.2. PSD TEST PLOTS



9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

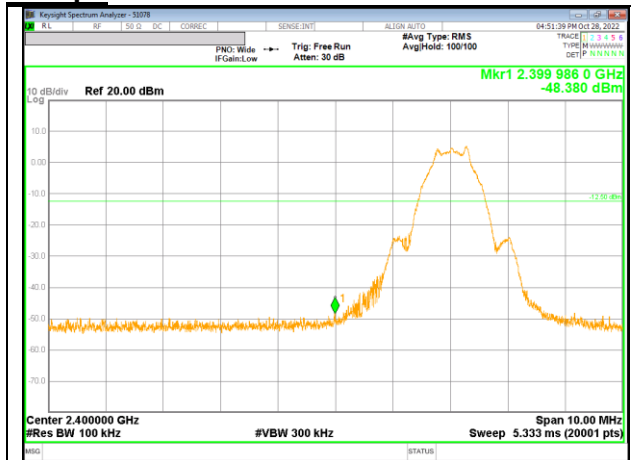
RSS-247 5.5

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

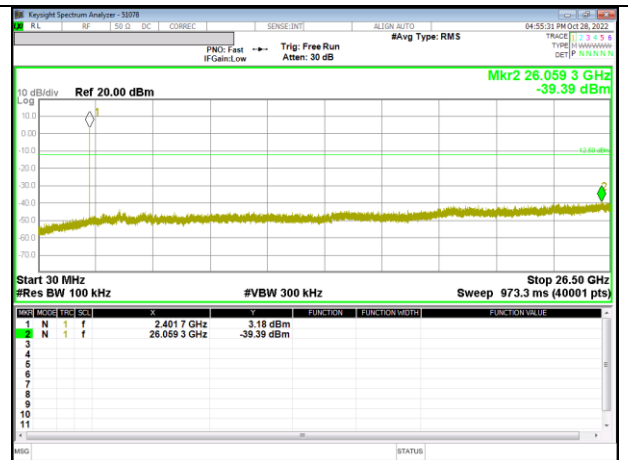
RESULTS

9.6.1. Test plot

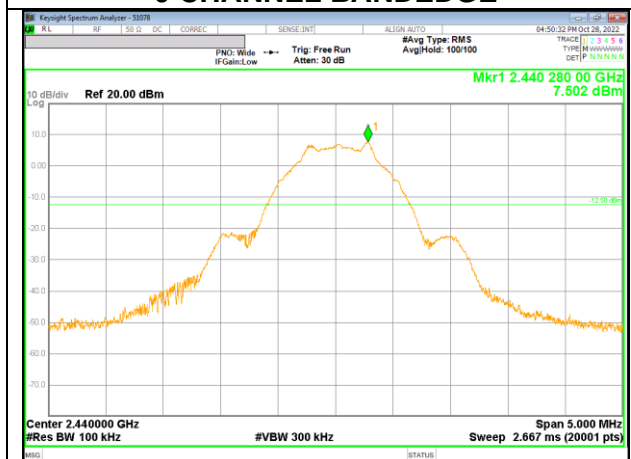
1 Mbps



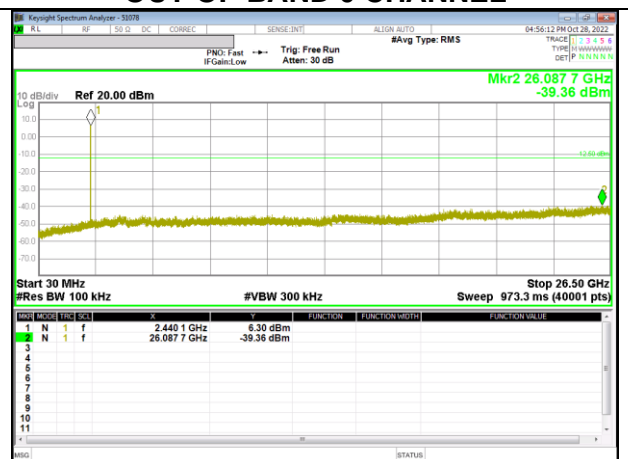
0 CHANNEL BANDEGE



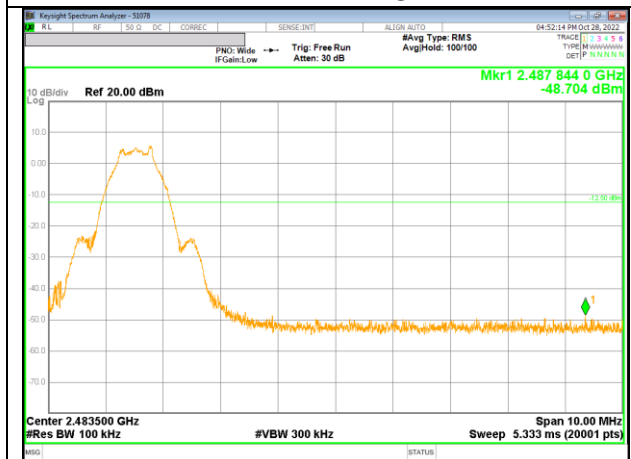
OUT-OF-BAND 0 CHANNEL



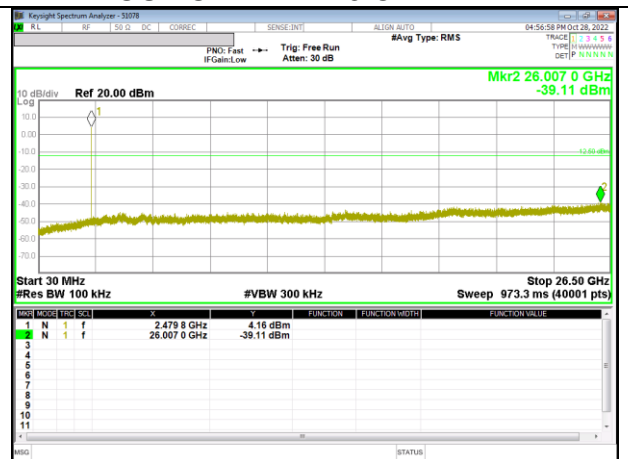
IN-BAND REFERENCE LEVEL



OUT-OF-BAND 19 CHANNEL

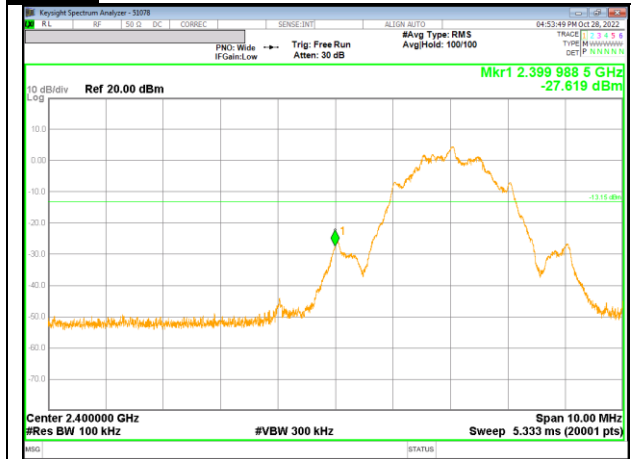


39 CHANNEL BANDEGE

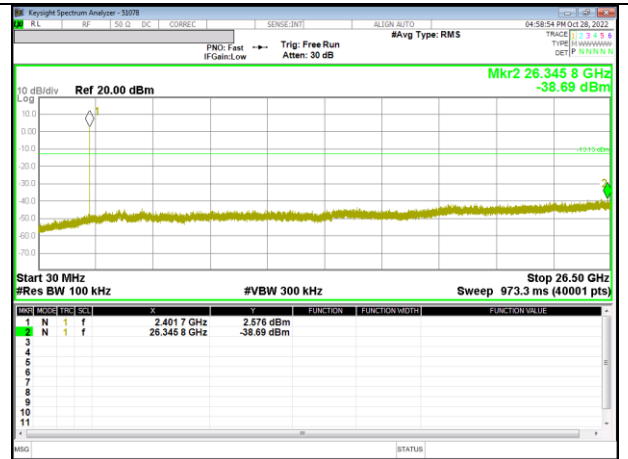


OUT-OF-BAND 39 CHANNEL

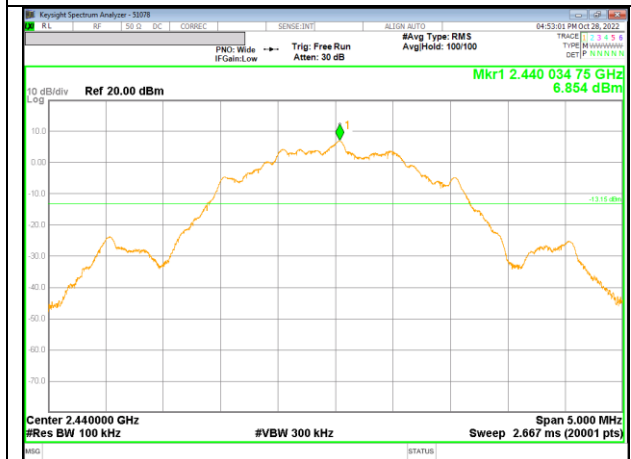
2Mbps



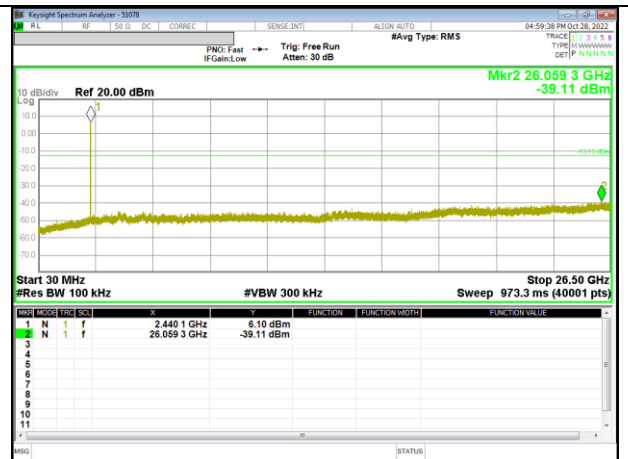
0 CHANNEL BANDEDGE



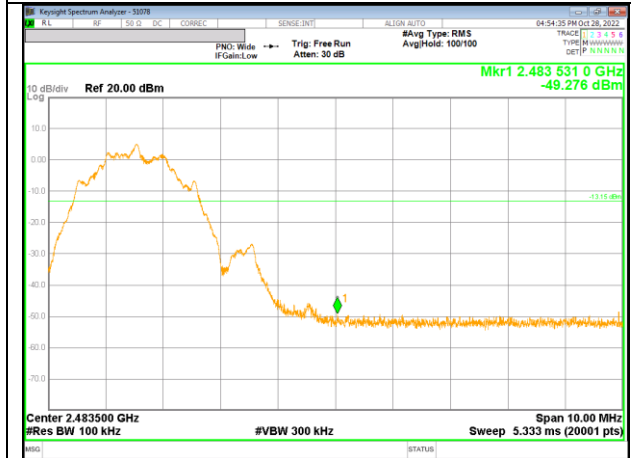
OUT-OF-BAND 0 CHANNEL



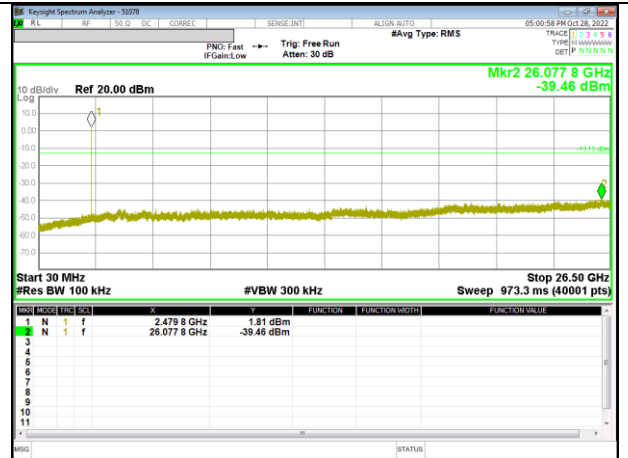
IN-BAND REFERENCE LEVEL



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 ($\mu\text{V/m}$)	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 500 kbps, DCF = $10 \log(1/0.853)=0.689$ dB (Spectrum Analyzer round it up to 0.69 dB) and for 2 Mbps, DCF = $10 \log(1/0.327)=4.854$ dB (Spectrum Analyzer round it up to 4.85 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.

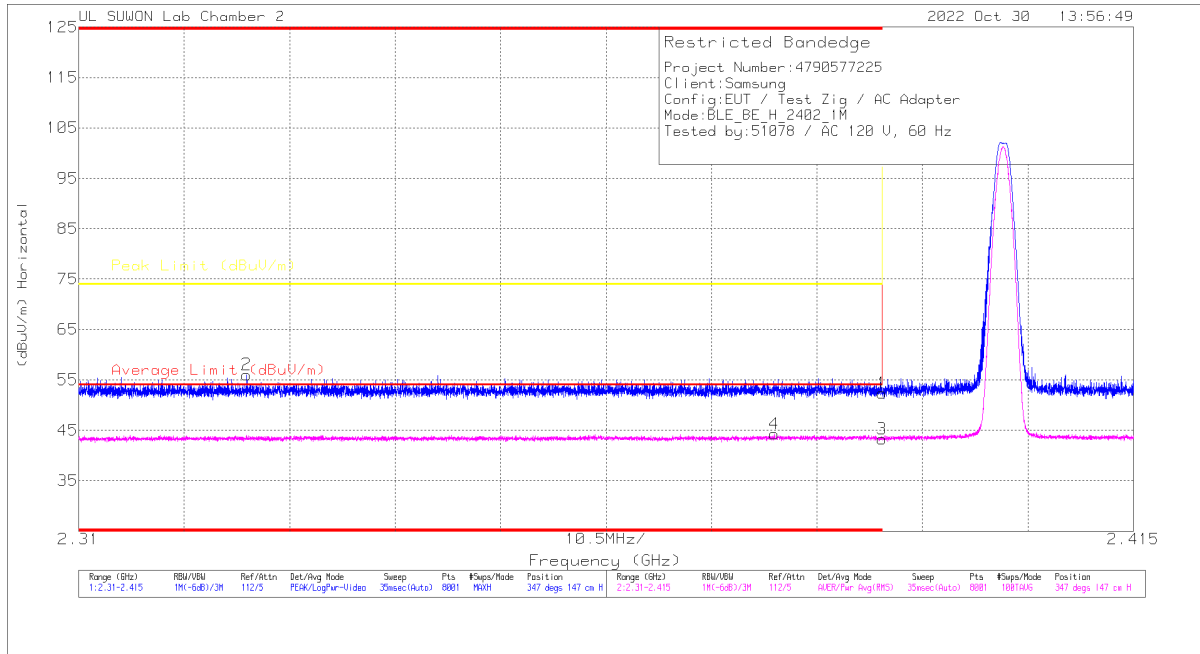
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. 1 Mbps

BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT

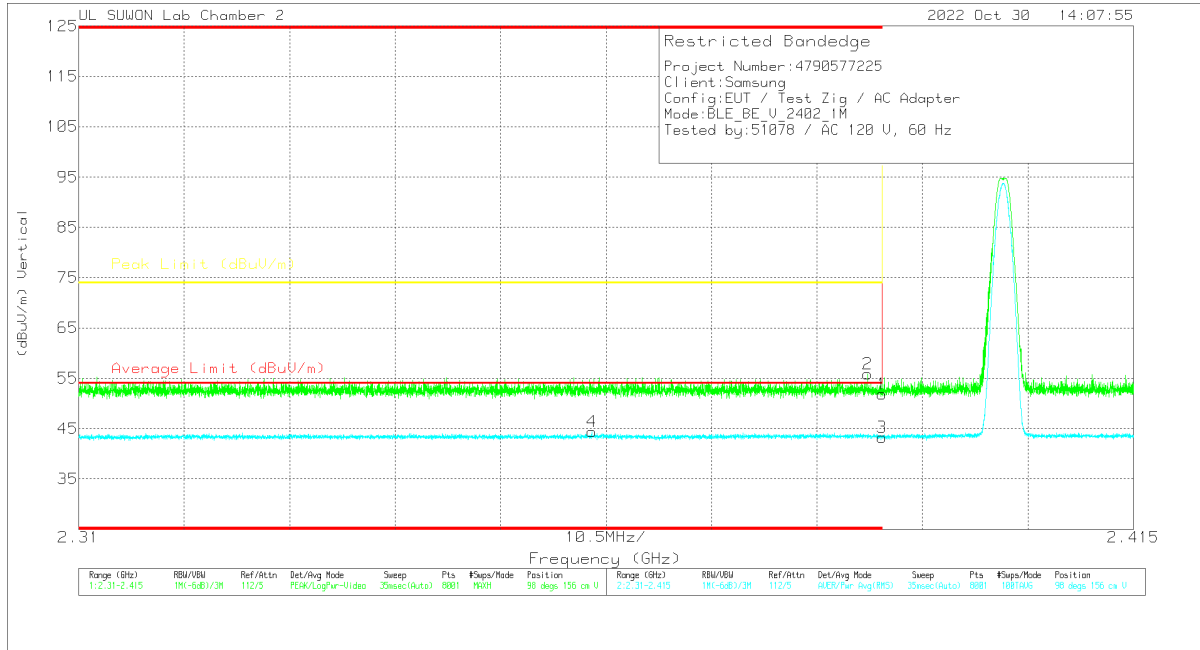


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC 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	40.39	PK	31.7	-19.7	0	52.39	-	-	74	-21.61	347	147	H
2	* 2.32673	44.05	PK	31.6	-19.6	0	56.05	-	-	74	-17.95	347	147	H
3	* 2.39	30.54	RMS	31.7	-19.7	.69	43.23	54	-10.77	-	-	347	147	H
4	* 2.37527	31.51	RMS	31.7	-19.6	.69	44.3	54	-9.7	-	-	347	147	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	39.9	Pk	31.7	-19.7	0	51.9	-	-	74	-22.1	98	156	V
2	* 2.38853	43.8	Pk	31.7	-19.6	0	55.9	-	-	74	-18.1	98	156	V
3	* 2.39	30.61	RMS	31.7	-19.7	69	43.3	54	-10.7	-	-	98	156	V
4	* 2.36111	31.64	RMS	31.6	-19.5	69	44.43	54	-9.57	-	-	98	156	V

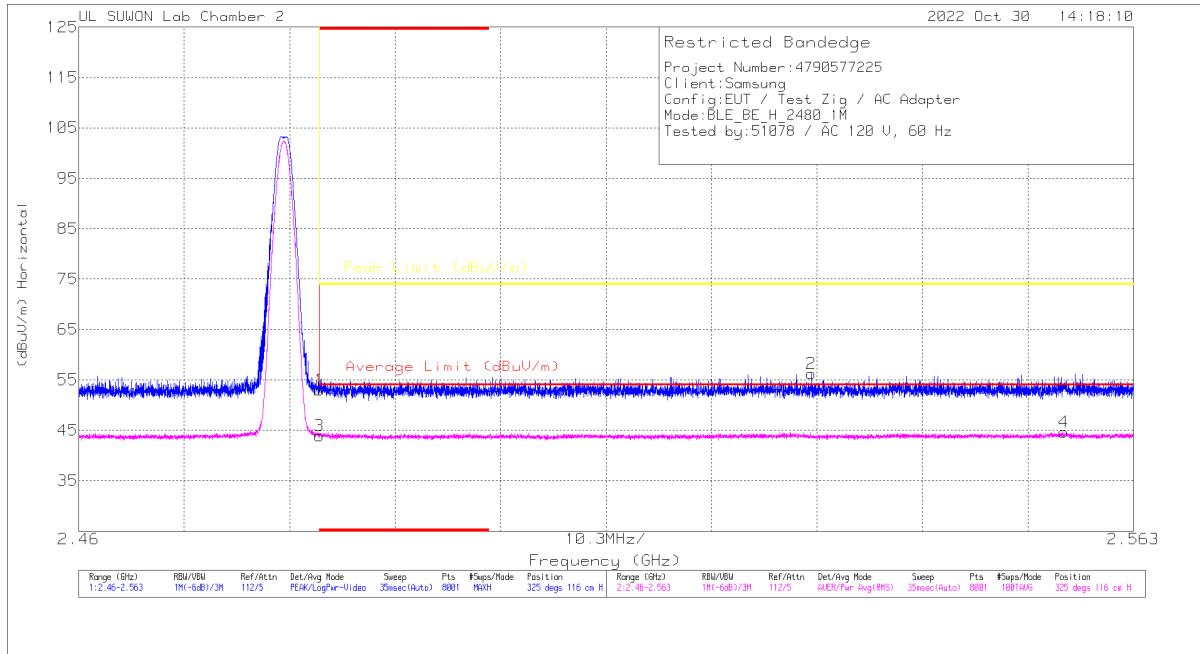
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (39 CHANNEL)

HORIZONTAL RESULT

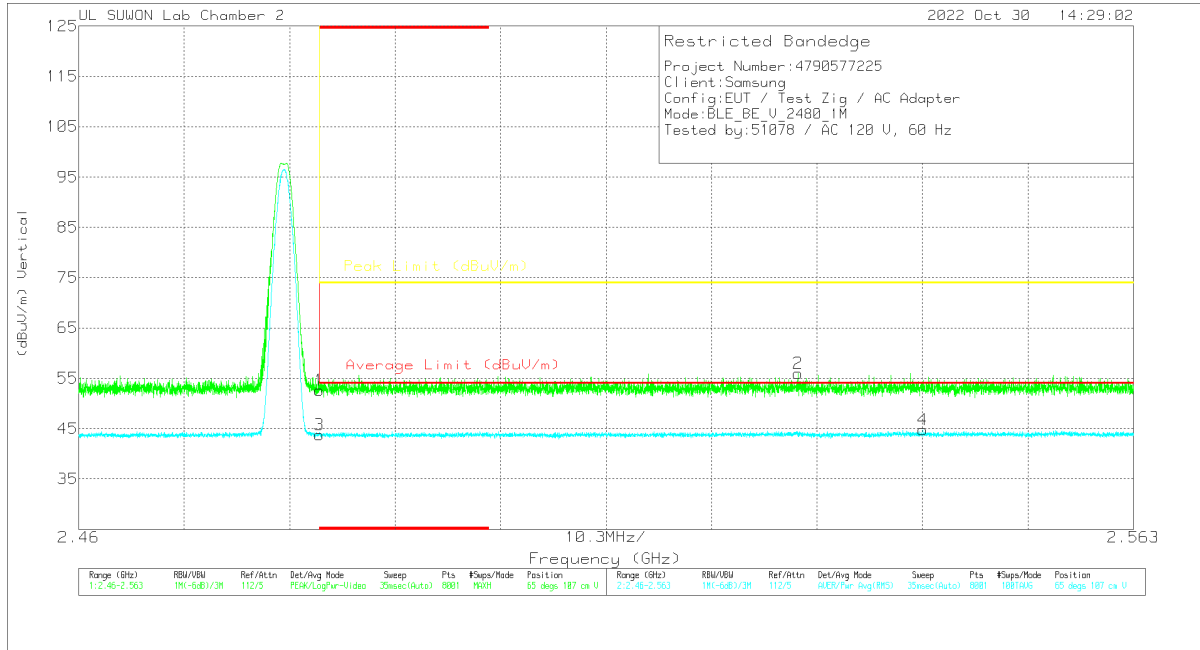


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBu)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBu/m)	Average Limit (dBu/m)	Margin (dB)	Peak Limit (dBu/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	40.74	Pk	31.9	-19.6	0	53.04	-	-	74	-20.96	325	116	H
2	2.53153	43.79	Pk	31.9	-19.5	0	56.19	-	-	74	-17.81	325	116	H
3	* 2.48351	30.89	RMS	31.9	-19.6	69	43.88	54	-10.12	-	-	325	116	H
4	2.55621	31.25	RMS	32	-19.3	69	44.64	54	-9.36	-	-	325	116	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	40.29	Pk	31.9	-19.6	0	52.59	-	-	74	-21.41	65	107	V
2	2.53026	43.53	Pk	31.9	-19.4	0	56.03	-	-	74	-17.97	65	107	V
3	* 2.48351	30.84	RMS	31.9	-19.6	69	43.83	54	-10.17	-	-	65	107	V
4	2.54243	31.43	RMS	32	-19.4	69	44.72	54	-9.28	-	-	65	107	V

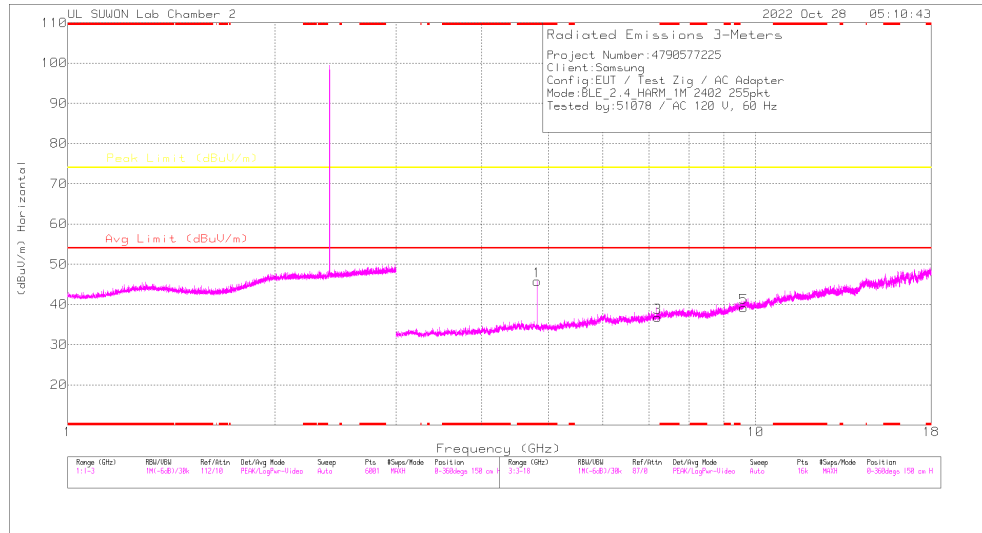
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

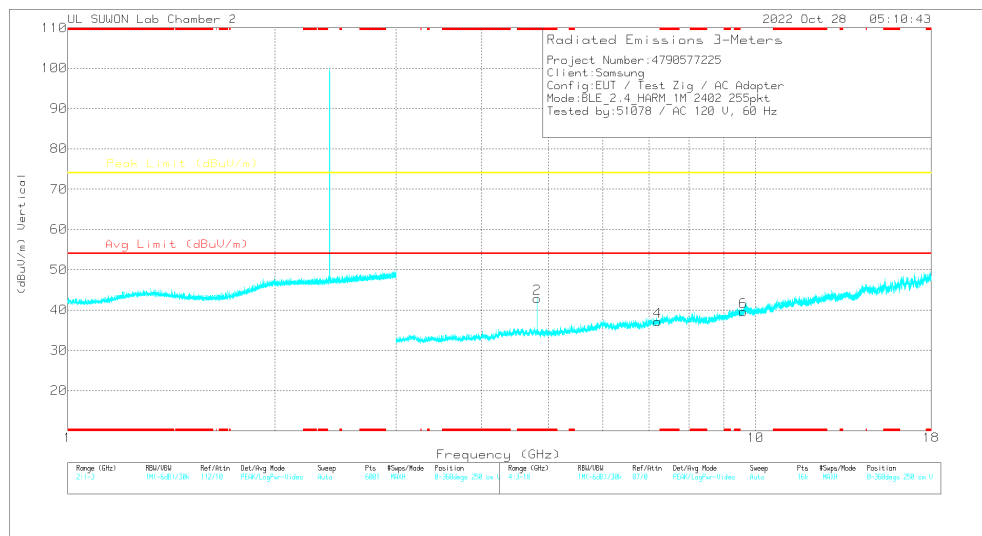
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

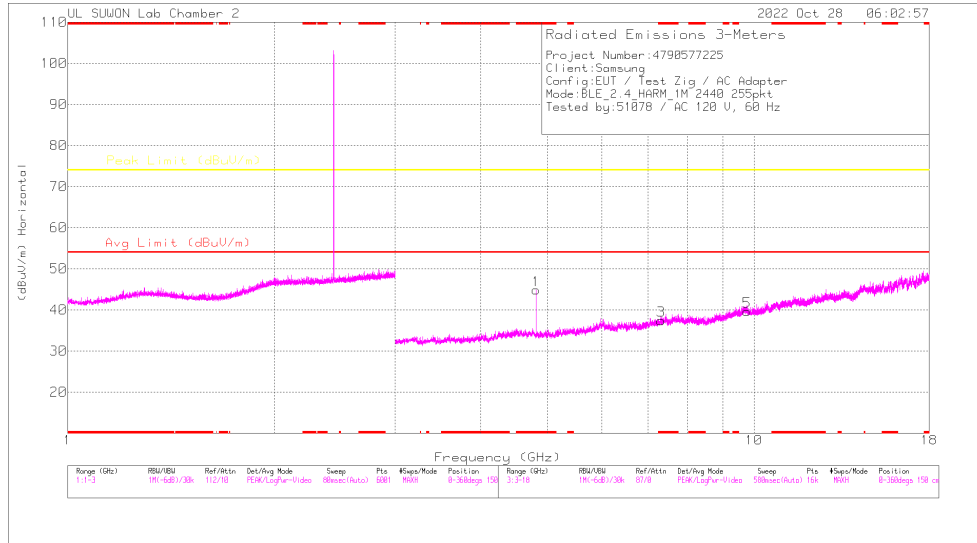
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

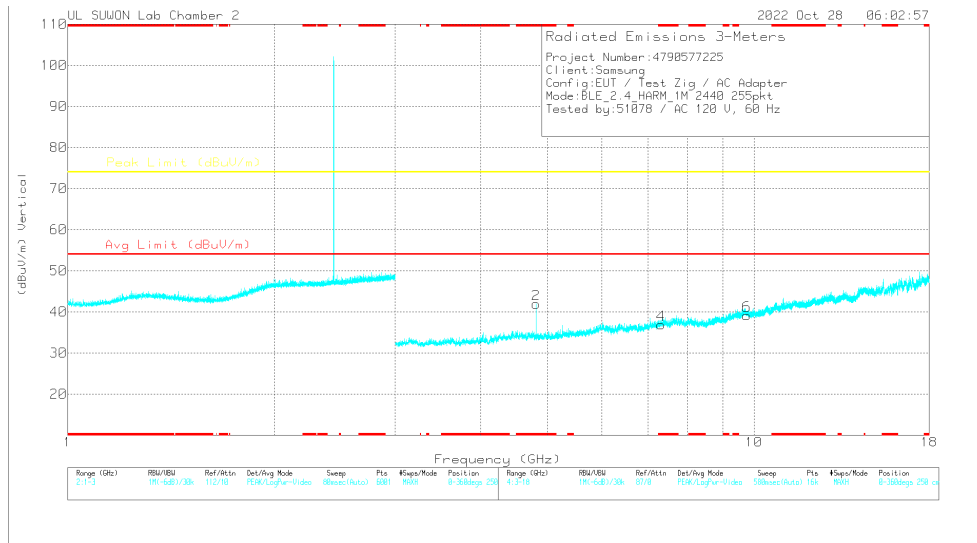
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016872 4	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.81275	44.04	PK2	34	-27.7	0	50.34	-	-	74	-23.66	39	139	H
* 4.81269	39.97	MAV1	34	-27.7	.69	46.96	54	-7.04	-	-	39	139	H
7.2052	35.64	PK2	35.7	-25	0	46.34	-	-	74	-27.66	0	100	H
9.60758	33.04	PK2	36.9	-21.3	0	48.64	-	-	74	-25.36	0	100	H
* 4.8127	41.64	PK2	34	-27.7	0	47.94	-	-	74	-26.06	123	243	V
* 4.81266	36.48	MAV1	34	-27.7	.69	43.47	54	-10.53	-	-	123	243	V
7.20579	35.6	PK2	35.7	-25	0	46.3	-	-	74	-27.7	0	100	V
9.59807	32.85	PK2	36.9	-21.4	0	48.35	-	-	74	-25.65	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 MAV1 - KDB558074 Option 1 Maximum RMS Average

19 CHANNEL RESULTS



HORIZONTAL



VERTICAL

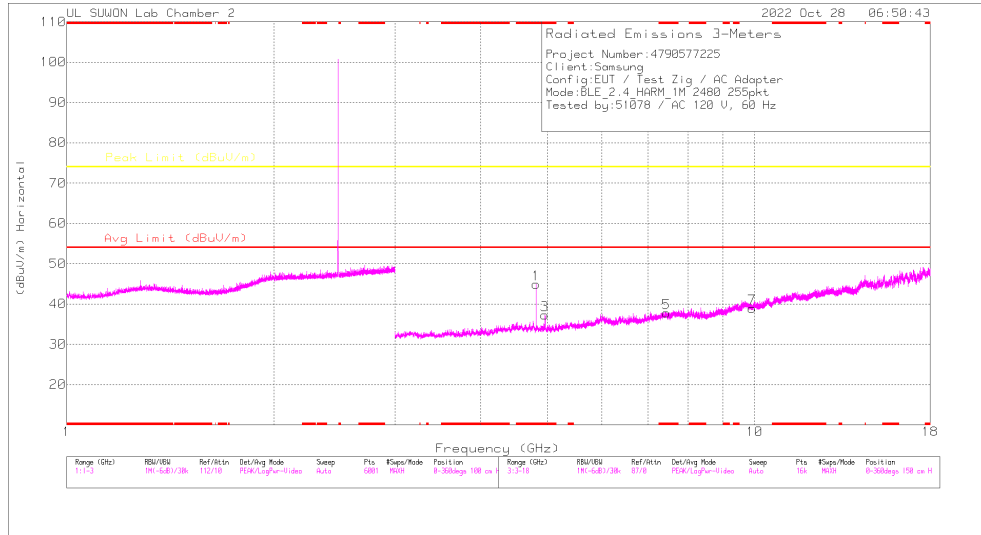
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

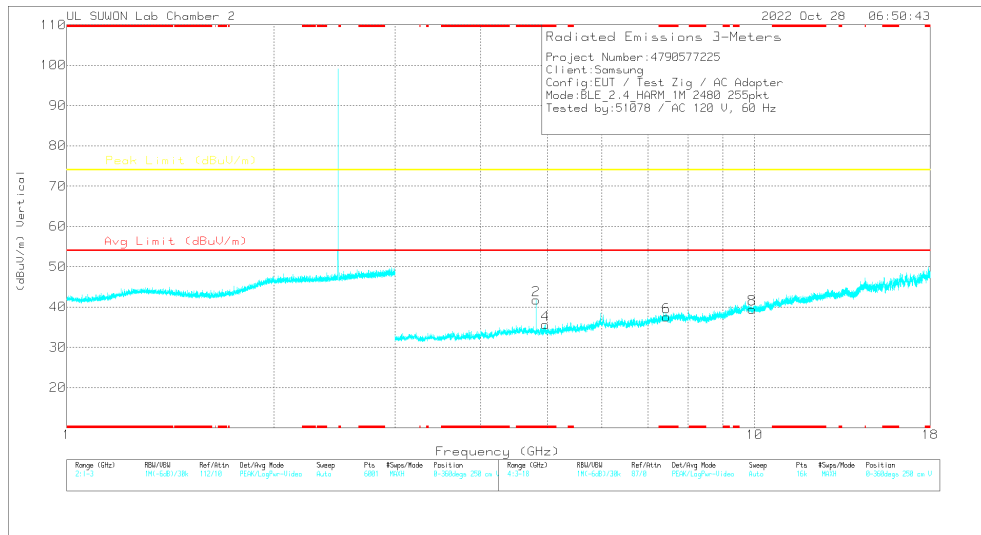
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016872 4	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.8127	43.87	PK2	34	-27.7	0	50.17	-	-	74	-23.83	38	139	H
* 4.81268	39.54	MAV1	34	-27.7	.69	46.53	54	-7.47	-	-	38	139	H
* 7.32142	35.77	PK2	35.7	-24.5	0	46.97	-	-	74	-27.03	0	100	H
* 7.3207	24.11	MAV1	35.7	-24.5	.69	36	54	-18	-	-	0	100	H
9.76045	33.11	PK2	37.1	-21	0	49.21	-	-	74	-24.79	0	100	H
* 4.81281	41.62	PK2	34	-27.7	0	47.92	-	-	74	-26.08	113	256	V
* 4.8127	35.72	MAV1	34	-27.7	.69	42.71	54	-11.29	-	-	113	256	V
* 7.32232	35.76	PK2	35.7	-24.5	0	46.96	-	-	74	-27.04	0	100	V
* 7.32207	23.91	MAV1	35.7	-24.5	.69	35.8	54	-18.2	-	-	0	100	V
9.76048	32.67	PK2	37.1	-21	0	48.77	-	-	74	-25.23	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 MAV1 - KDB558074 Option 1 Maximum RMS Average

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

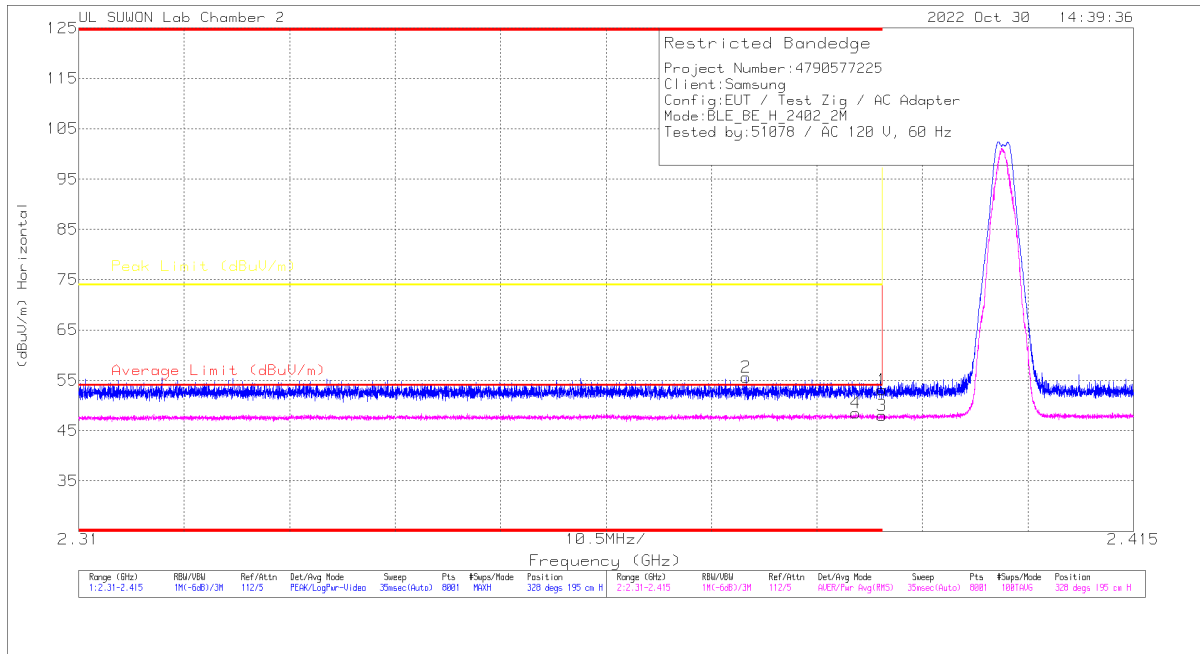
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016872 4	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.81264	43.63	PK2	34	-27.7	0	49.93	-	-	74	-24.07	39	140	H
* 4.81265	39.55	MAv1	34	-27.7	.69	46.54	54	-7.46	-	-	39	140	H
* 4.96058	39.1	PK2	34	-27	0	46.1	-	-	74	-27.9	39	281	H
* 4.95988	28.74	MAv1	34	-27	.69	36.43	54	-17.57	-	-	39	281	H
* 7.4398	34.9	PK2	35.7	-23.7	0	46.9	-	-	74	-27.1	0	100	H
* 7.44069	23.12	MAv1	35.7	-23.7	.69	35.81	54	-18.19	-	-	0	100	H
9.92204	32.49	PK2	37.3	-21.1	0	48.69	-	-	74	-25.31	0	100	H
* 4.81261	41.41	PK2	34	-27.7	0	47.71	-	-	74	-26.29	126	255	V
* 4.8127	35.84	MAv1	34	-27.7	.69	42.83	54	-11.17	-	-	126	255	V
* 4.96045	38.07	PK2	34	-27	0	45.07	-	-	74	-28.93	48	100	V
* 4.95978	27.02	MAv1	34	-27	.69	34.71	54	-19.29	-	-	48	100	V
* 7.43964	34.91	PK2	35.7	-23.7	0	46.91	-	-	74	-27.09	0	100	V
* 7.43951	23.07	MAv1	35.7	-23.7	.69	35.76	54	-18.24	-	-	0	100	V
9.9179	32.03	PK2	37.3	-21	0	48.33	-	-	74	-25.67	0	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

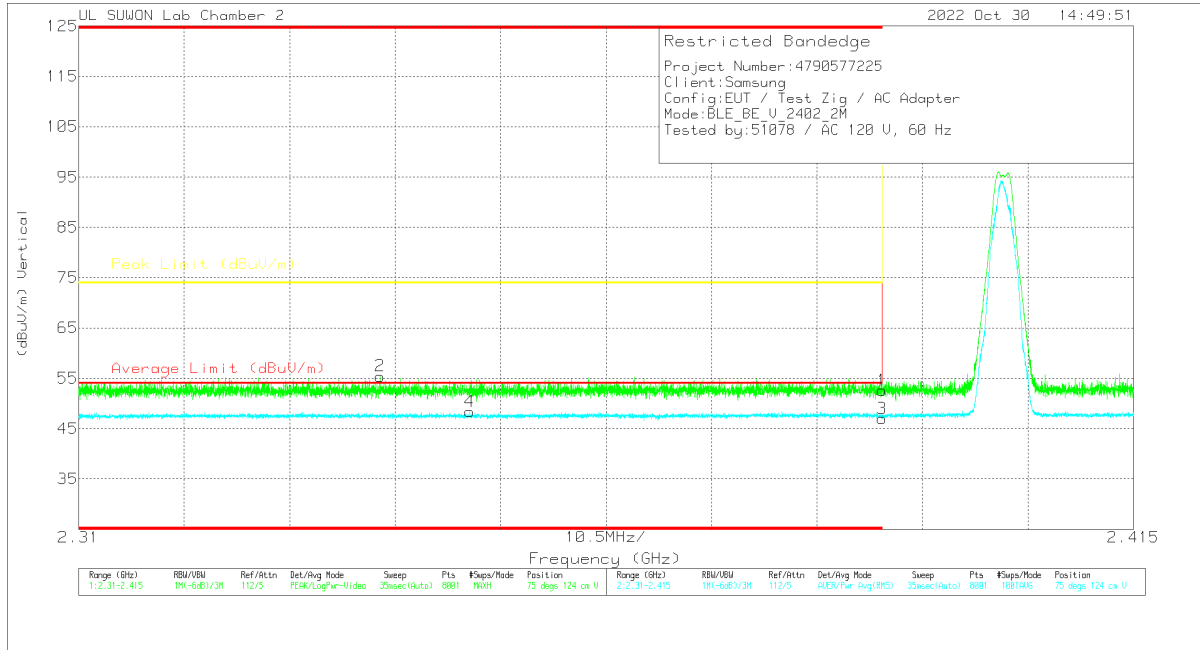


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBu)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBu/m)	Average Limit (dBu/m)	Margin (dB)	Peak Limit (dBu/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.13	Pk	31.7	-19.7	0	53.13	-	-	74	-20.87	328	195	H
2	* 2.37645	43.46	Pk	31.7	-19.6	0	55.56	-	-	74	-18.44	328	195	H
3	* 2.39	31.12	RMS	31.7	-19.7	4.85	47.97	54	-6.03	-	-	328	195	H
4	* 2.38739	31.52	RMS	31.7	-19.6	4.85	48.47	54	-5.53	-	-	328	195	H

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

VERTICAL RESULT



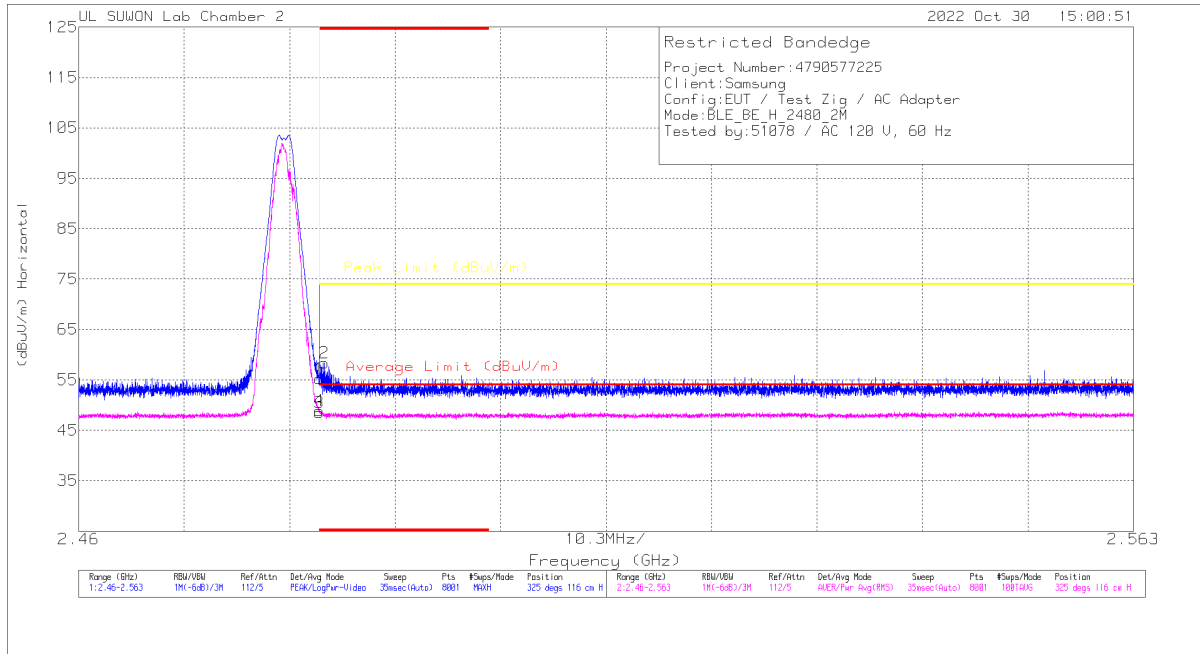
Trace Markers

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	40.59	Pk	31.7	-19.7	0	52.59	-	-	74	-21.41	75	124	V
2	* 2.33998	43.43	Pk	31.6	-19.6	0	55.43	-	-	74	-18.57	75	124	V
3	* 2.39	30.11	RMS	31.7	-19.7	4.85	46.96	54	-7.04	-	-	75	124	V
4	* 2.34894	31.49	RMS	31.6	-19.6	4.85	48.34	54	-5.66	-	-	75	124	V

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

BANDEDGE (39 CHANNEL)

HORIZONTAL RESULT

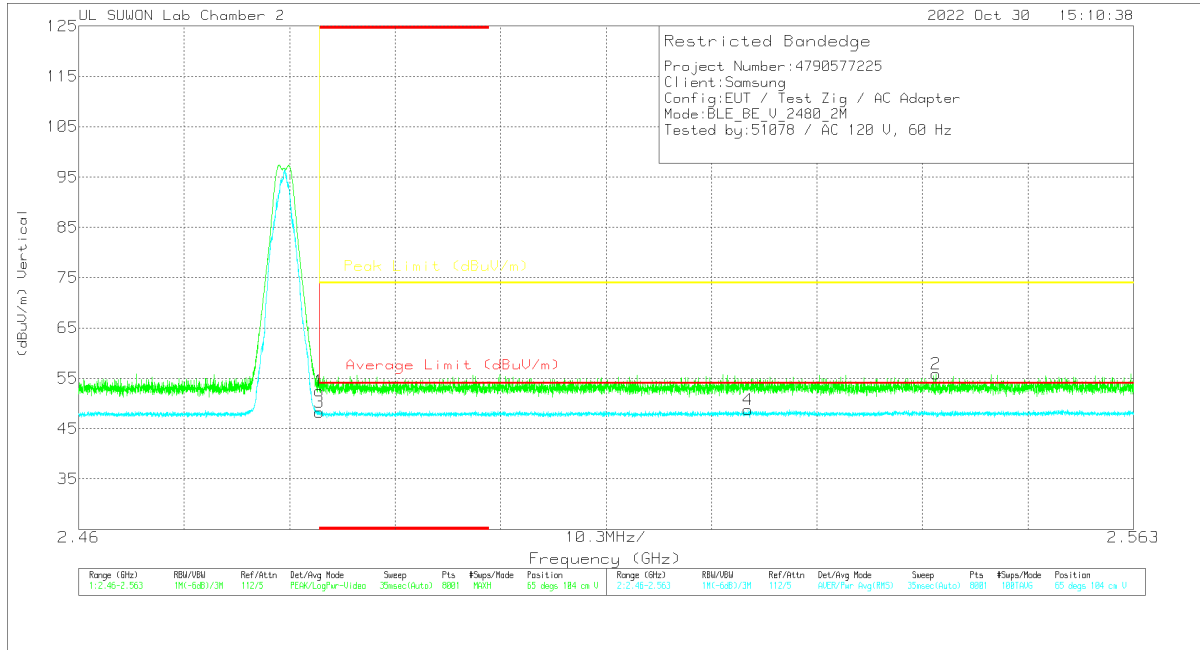


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBu)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBu/m)	Average Limit (dBu/m)	Margin (dB)	Peak Limit (dBu/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	42.95	Pk	31.9	-19.6	0	55.25	-	-	74	-18.75	325	116	H
2	* 2.48396	46.1	Pk	31.9	-19.6	0	58.4	-	-	74	-15.6	325	116	H
3	* 2.48351	31.34	RMS	31.9	-19.6	4.85	48.49	54	-5.1	-	-	325	116	H
4	* 2.48352	31.75	RMS	31.9	-19.6	4.85	48.9	54	-5.1	-	-	325	116	H

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

VERTICAL RESULT



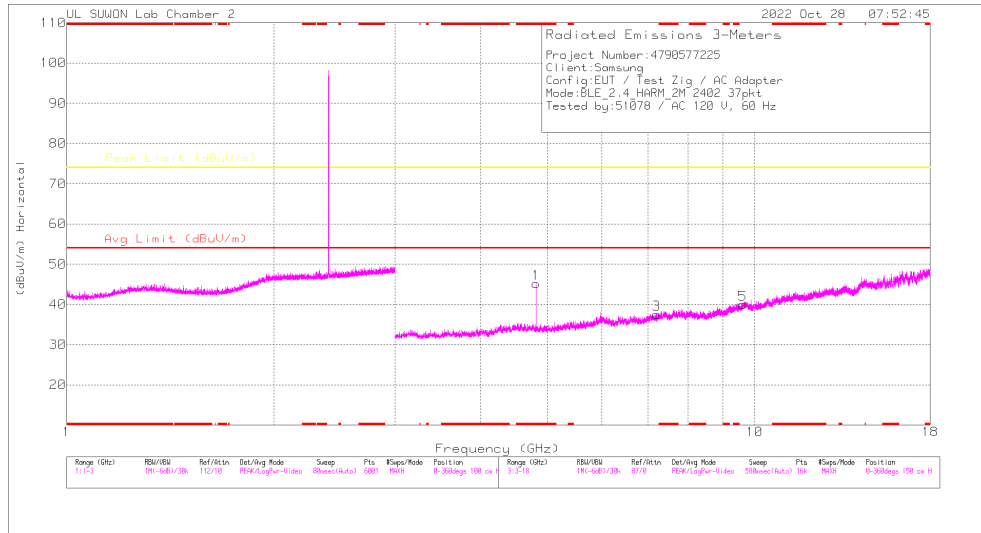
Trace Markers

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	40.16	Pk	31.9	-19.6	0	52.46	-	-	74	-21.54	65	104	V
2	2.5437	43.33	Pk	32	-19.5	0	55.83	-	-	74	-18.17	65	104	V
3	* 2.48351	31.07	RMS	31.9	-19.6	4.85	48.22	54	-5.78	-	-	65	104	V
4	2.52535	31.42	RMS	31.9	-19.4	4.85	48.77	54	-5.23	-	-	65	104	V

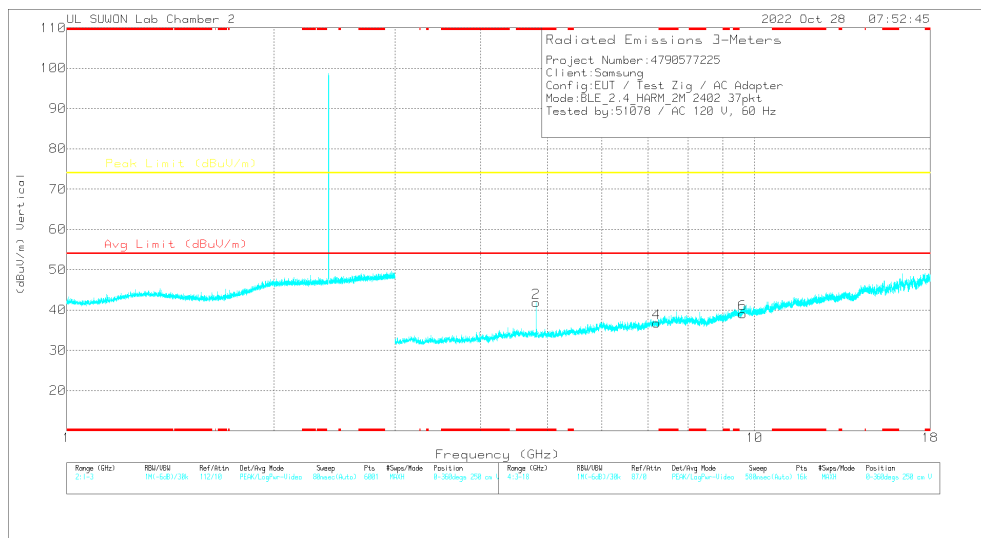
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK - Peak detector
 RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

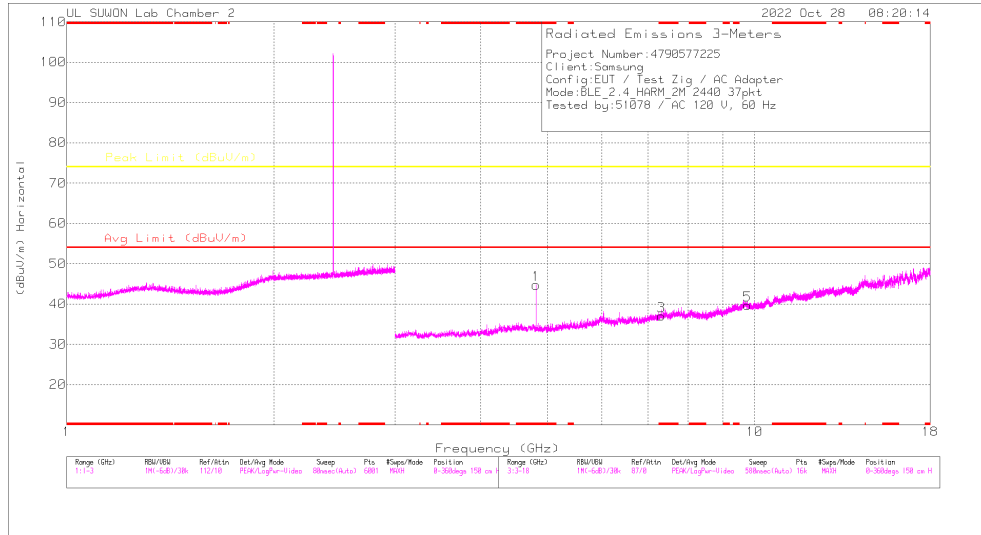
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

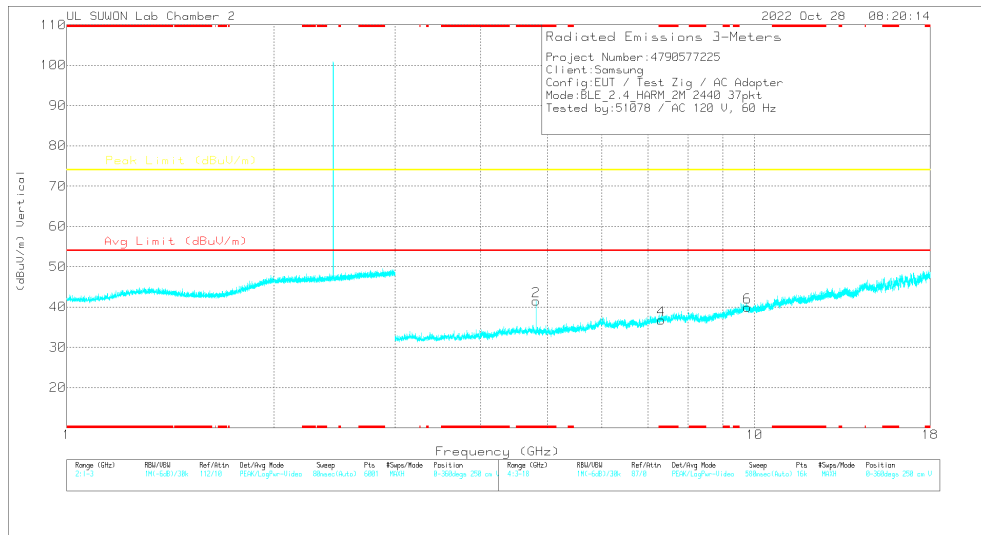
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016872 4	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.81272	43.51	PK2	34	-27.7	0	49.81	-	-	74	-24.19	39	141	H
* 4.81271	39.45	MAV1	34	-27.7	4.85	50.6	54	-3.4	-	-	39	141	H
7.20684	34.95	PK2	35.7	-25	0	45.65	-	-	74	-28.35	0	100	H
9.6079	33.15	PK2	36.9	-21.3	0	48.75	-	-	74	-25.25	0	100	H
* 4.81254	41.7	PK2	34	-27.7	0	48	-	-	74	-26	122	243	V
* 4.81267	36.29	MAV1	34	-27.7	4.85	47.44	54	-6.56	-	-	122	243	V
7.20411	35.48	PK2	35.7	-25	0	46.18	-	-	74	-27.82	0	100	V
9.60706	33.09	PK2	36.9	-21.3	0	48.69	-	-	74	-25.31	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 MAV1 - KDB558074 Option 1 Maximum RMS Average

19 CHANNEL RESULTS



HORIZONTAL



VERTICAL

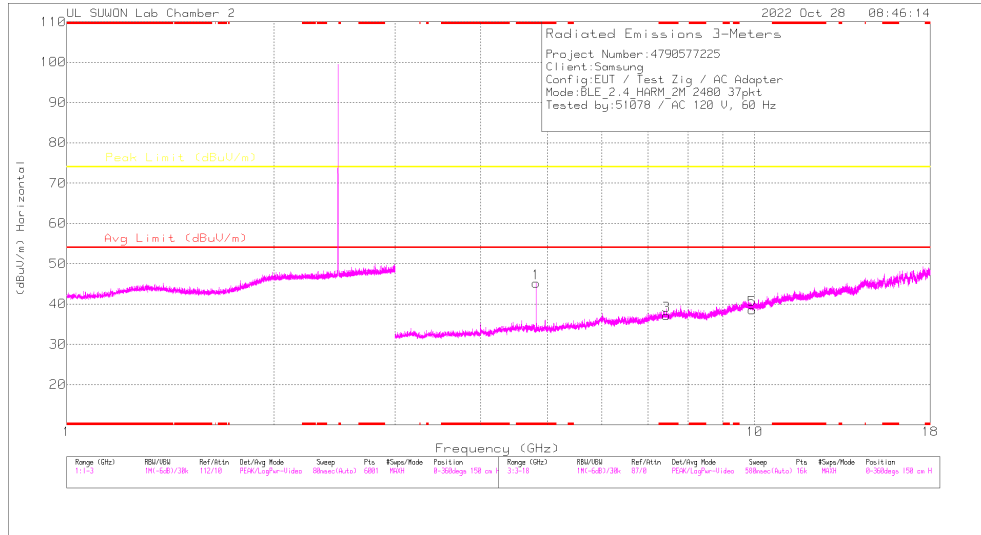
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

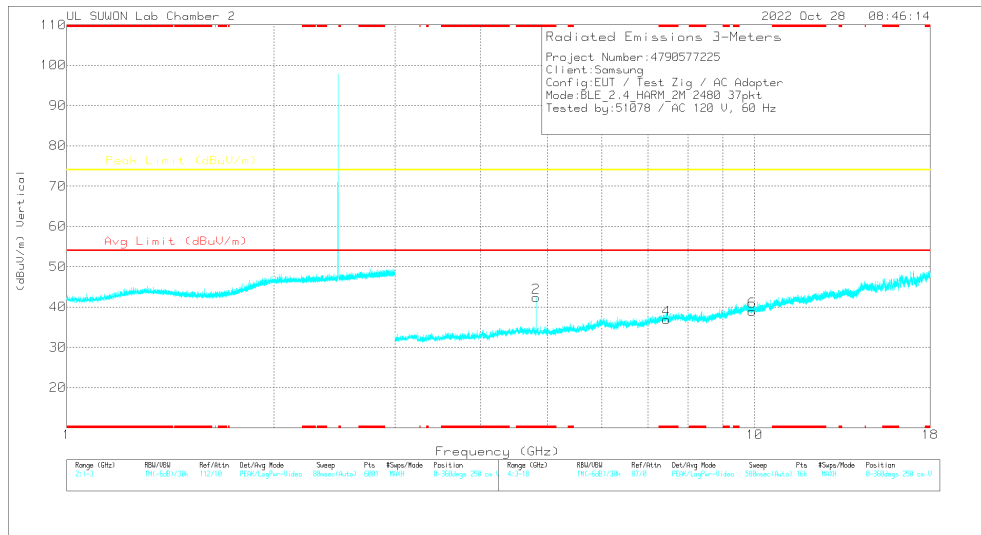
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016872_4	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.81273	43.15	PK2	34	-27.7	0	49.45	-	-	74	-24.55	39	139	H
* 4.8127	39.22	MAv1	34	-27.7	4.85	50.37	54	-3.63	-	-	39	139	H
* 7.32137	35.54	PK2	35.7	-24.5	0	46.74	-	-	74	-27.26	0	100	H
* 7.32097	23.68	MAv1	35.7	-24.5	4.85	39.73	54	-14.27	-	-	0	100	H
9.75874	32.52	PK2	37.1	-20.9	0	46.72	-	-	74	-25.28	0	100	H
* 4.81272	41.31	PK2	34	-27.7	0	47.61	-	-	74	-26.39	112	256	V
* 4.81271	35.86	MAv1	34	-27.7	4.85	47.01	54	-6.99	-	-	112	256	V
* 7.31732	35.18	PK2	35.7	-24.6	0	46.28	-	-	74	-27.72	0	100	V
* 7.31745	23.65	MAv1	35.7	-24.6	4.85	39.6	54	-14.4	-	-	0	100	V
9.75622	32.37	PK2	37.1	-20.9	0	48.57	-	-	74	-25.43	0	100	V

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

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.

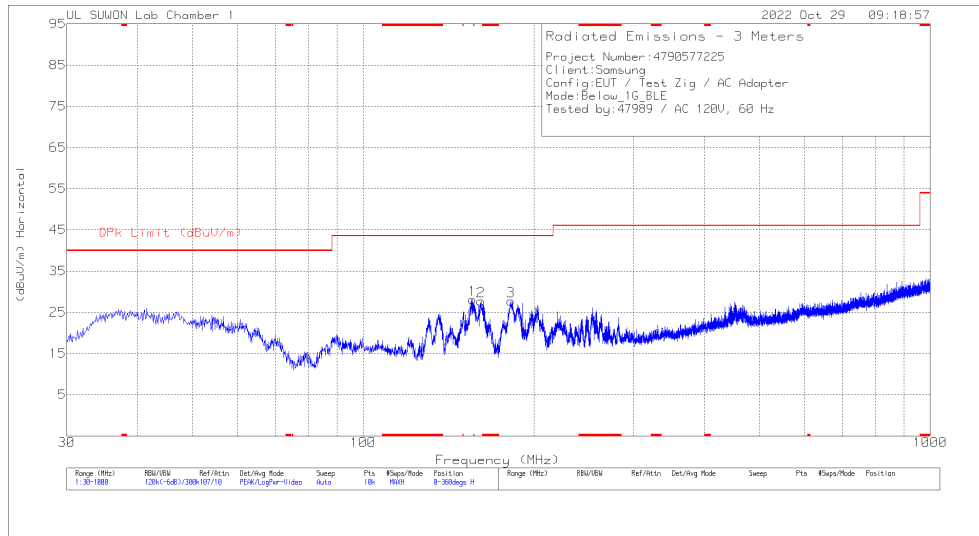
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016872 4	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
* 4.81262	43.16	PK2	34	-27.7	0	49.46	-	-	74	-24.54	39	139	H
* 4.81268	39.27	MAV1	34	-27.7	4.85	50.42	54	-3.58	-	-	39	139	H
* 7.44085	34.75	PK2	35.7	-23.7	0	46.75	-	-	74	-27.25	0	100	H
* 7.44143	23.03	MAV1	35.7	-23.7	4.85	39.88	54	-14.12	-	-	0	100	H
9.91983	32.04	PK2	37.3	-21.1	0	48.24	-	-	74	-25.76	0	100	H
* 4.81271	41.32	PK2	34	-27.7	0	47.62	-	-	74	-26.38	125	254	V
* 4.81267	35.96	MAV1	34	-27.7	4.85	47.11	54	-6.89	-	-	125	254	V
* 7.44193	35.2	PK2	35.7	-23.7	0	47.2	-	-	74	-26.8	0	100	V
* 7.44164	22.93	MAV1	35.7	-23.7	4.85	39.78	54	-14.22	-	-	0	100	V
9.91862	32.03	PK2	37.3	-21.1	0	48.23	-	-	74	-25.77	0	100	V

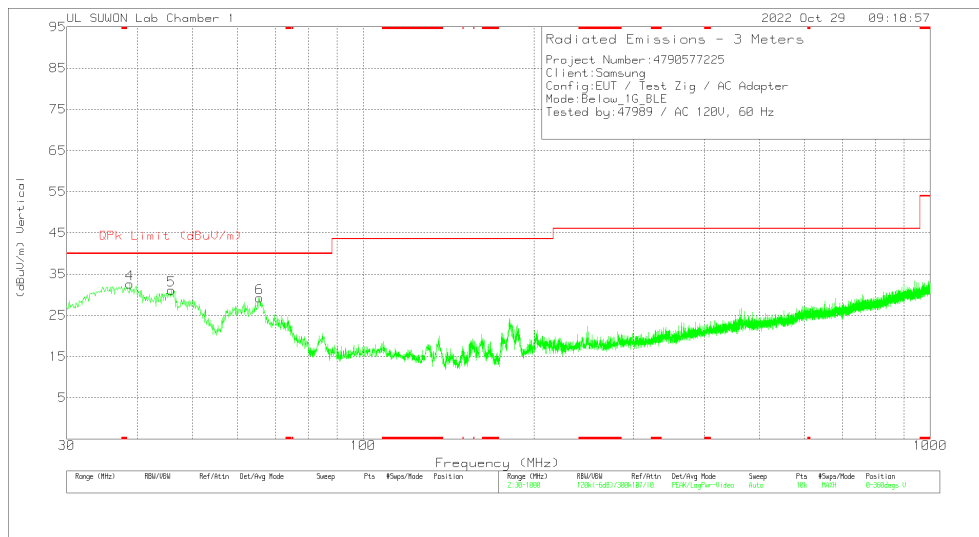
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 MAV1 - KDB558074 Option 1 Maximum RMS Average

10.3. 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	156.003	43.76	Pk	14.1	-29.7	28.16	43.52	-15.36	0-360	100	H
2	161.338	43.1	Pk	14.3	-29.7	27.7	43.52	-15.82	0-360	100	H
3	182.193	41.86	Pk	15.4	-29.5	27.76	43.52	-15.76	0-360	100	H
4	38.73	45.58	Pk	18.1	-31.1	32.58	40	-7.42	0-360	200	V
5	45.908	42.54	Pk	19.6	-31	31.14	40	-8.86	0-360	200	V
6	65.696	43.29	Pk	16.6	-30.7	29.19	40	-10.81	0-360	300	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.

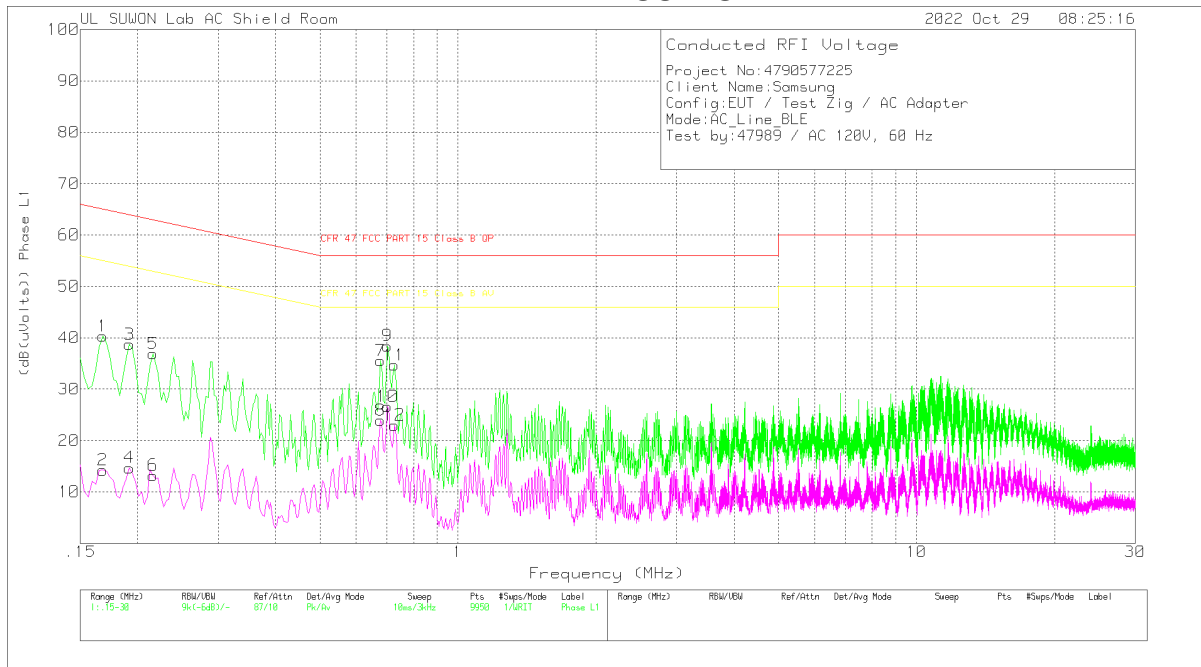
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

11.1. AC Power Line

LINE 1 RESULTS



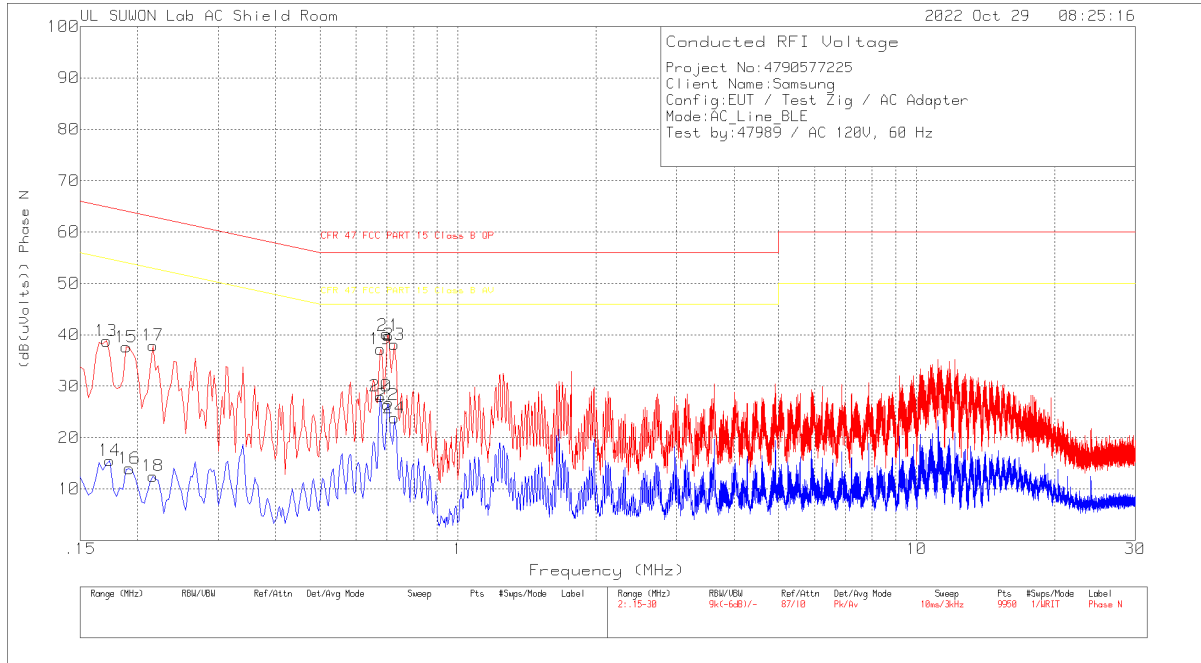
Trace Markers

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	.168	30.22	Pk	10	.1	40.32	65.06	-24.74	-	-
2	.168	4.14	Av	10	.1	14.24	-	-	55.06	-40.82
3	.192	28.61	Pk	9.9	.2	38.71	63.95	-25.24	-	-
4	.192	4.61	Av	9.9	.2	14.71	-	-	53.95	-39.24
5	.216	26.9	Pk	9.8	.2	36.9	62.97	-26.07	-	-
6	.216	3.21	Av	9.8	.2	13.21	-	-	52.97	-39.76
7	.678	25.54	Pk	9.8	.2	35.54	56	-20.46	-	-
8	.678	13.93	Av	9.8	.2	23.93	-	-	46	-22.07
9	.702	28.43	Pk	9.8	.2	38.43	56	-17.57	-	-
10	.702	16.6	Av	9.8	.2	26.6	-	-	46	-19.4
11	.726	24.69	Pk	9.8	.2	34.69	56	-21.31	-	-
12	.726	12.99	Av	9.8	.2	22.99	-	-	46	-23.01

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	.171	28.62	Pk	10	.2	38.82	64.91	-26.09	-	-
14	.174	5.32	Av	10	.2	15.52	-	-	54.77	-39.25
15	.189	27.53	Pk	9.9	.2	37.63	64.08	-26.45	-	-
16	.192	3.88	Av	9.9	.2	13.98	-	-	53.95	-39.97
17	.216	27.93	Pk	9.8	.2	37.93	62.97	-25.04	-	-
18	.216	2.51	Av	9.8	.2	12.51	-	-	52.97	-40.46
19	.678	27.21	Pk	9.8	.2	37.21	56	-18.79	-	-
20	.678	18.03	Av	9.8	.2	28.03	-	-	46	-17.97
21	.705	29.84	Pk	9.8	.2	39.84	56	-16.16	-	-
22	.702	16.38	Av	9.8	.2	26.38	-	-	46	-19.62
23	.726	28.1	Pk	9.8	.2	38.1	56	-17.9	-	-
24	.726	13.82	Av	9.8	.2	23.82	-	-	46	-22.18

Pk - Peak detector
 Av - Average detection

END OF TEST REPORT