CERTIFICATION TEST REPORT

Report Number. : 4790160839-E4V1

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-A536B/DS
FCC ID	:	A3LSMA536B
EUT Description	:	GSM/WCDMA/LTE 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:
2021-12-29

Prepared by:
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IAS ACCREDITED
TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2021-12-29	Initial issue	Hyunsik Yun

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, and NFC
MODEL NUMBER:	SM-A536B/DS
SERIAL NUMBER:	R3CRA0RNS7M, R3CRA0RNQHP (CONDUCTED, Original); R3CRA0RNRAJ, R3CRA0RNTME (RADIATED, Original); R3CRA0RS3CF (RADIATED, Spot-check);
DATE TESTED:	2021-11-19 ~ 2021-12-29(Original); 2021-12-17 ~ 2021-12-29(Spot-Check);

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Complies

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Korea, Ltd. By:

Seokhwan Hong
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:

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

1.1. INTRODUCTION OF TEST DATA REUSE

This report referenced from the FCC ID: A3LSMA536E DTS BLE(FCC CFR 47 Part 15C).
And the applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID.

1.2. DIFFERENCE

The FCC ID: A3LSMA536B shares the same enclosure and circuit board as FCC ID: A3LSMA536E. The BLE antennas and surrounding circuitry and layout are identical between these two units.

After confirming through preliminary radiated emissions that the performance of the FCC ID: A3LSMA536E remains representative of FCC ID: A3LSMA536B. The test data of FCC ID: A3LSMA536E being submitted for this application to cover BLE features.

1.3. SPOT CHECK VERIFICATION DATA

(Worst case of the radiated band-edge and radiated spurious emissions)

Band	Test Item	Mode	Frequency	Test Limit	Original model	Spot check model	Deviation	Remark
					SM-A536E/DS Results	SM-A536B/DS Results		
					FCC ID : A3LSMA536E	FCC ID : A3LSMA536B		
DTS BLE 1M	Band Edge	1Mbps 2480 MHz	2480 MHz	54 dBuV/m	48.00 dBuV/m	48.70 dBuV/m	0.70 dB	
	RSE	1Mbps 2402 MHz	9608 MHz	74 dBuV/m	49.67 dBuV/m	49.13 dBuV/m	-0.54 dB	
DTS BLE 2M	Band Edge	2Mbps 2480 MHz	2480 MHz	54 dBuV/m	51.79 dBuV/m	51.50 dBuV/m	-0.29 dB	
	RSE	2Mbps 2480 MHz	9920 MHz	74 dBuV/m	39.23 dBuV/m	41.28 dBuV/m	2.05 dB	

Comparison of two models, upper deviation is within 3 dB range and all test results are under FCC Technical Limits.

1.4. REFERENCE DETAIL

Reference application that contains the reused reference data in the individual test reports:

Equipment Class	Reference FCC ID (Parent)	Application Type	Reference Test report number	Exhibit Type	Variant Test Report Number	Data Re-used
PCE	A3LSMA536E	Original Grant	4790160849-E2	Test Report	4790160839-E2	All
DTS	A3LSMA536E	Original Grant	4790160849-E3 (802.11b/g/n)	Test Report	4790160839-E3 (802.11b/g/n)	All
			4790160849-E4 Bluetooth LE	Test Report	4790160839-E4 Bluetooth LE	All
DSS	A3LSMA536E	Original Grant	4790160849-E5 (Bluetooth)	Test Report	4790160839-E5 (Bluetooth)	All
NII	A3LSMA536E	Original Grant	4790160849-E6 (802.11a/n/ac)	Test Report	4790160839-E6 (802.11a/n/ac)	All
DXX	A3LSMA536E	Original Grant	4790160849-E7 (NFC)	Test Report	4790160839-E7 (NFC)	All

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.
5. KDB 484596 D01 Referencing Test Data v01

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
☒ Chamber 2
☐ Chamber 3

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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

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 Tablet + 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	Peak	16.202	41.706
		Average	15.897	38.878
	2Mbps	Peak	16.471	44.371
		Average	15.915	39.039

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 -5.00 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 Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z 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**	**15.897**	2	2Mbps 37pkt	**2402**	**15.915**
		2440	15.651			2440	15.824
		2480	14.544			2480	14.780
	1Mbps 255pkt	2402	15.581		2Mbps 255pkt	2402	15.895
		2440	15.234			2440	15.577
		2480	14.090			2480	14.452
1 Coded S=8	125kbps 37pkt	2402	15.645	1 Coded S=2	500kbps 37pkt	2402	15.810
		2440	15.247			2440	15.613
		2480	14.127			2480	14.514
	125kbps 255pkt	2402	15.218		500kbps 255pkt	2402	15.412
		2440	14.881			2440	15.057
		2480	13.710			2480	13.852

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA800	R37N3MAH988DK3	N/A
Data Cable	SAMSUNG	EP-DN980	N/A	N/A

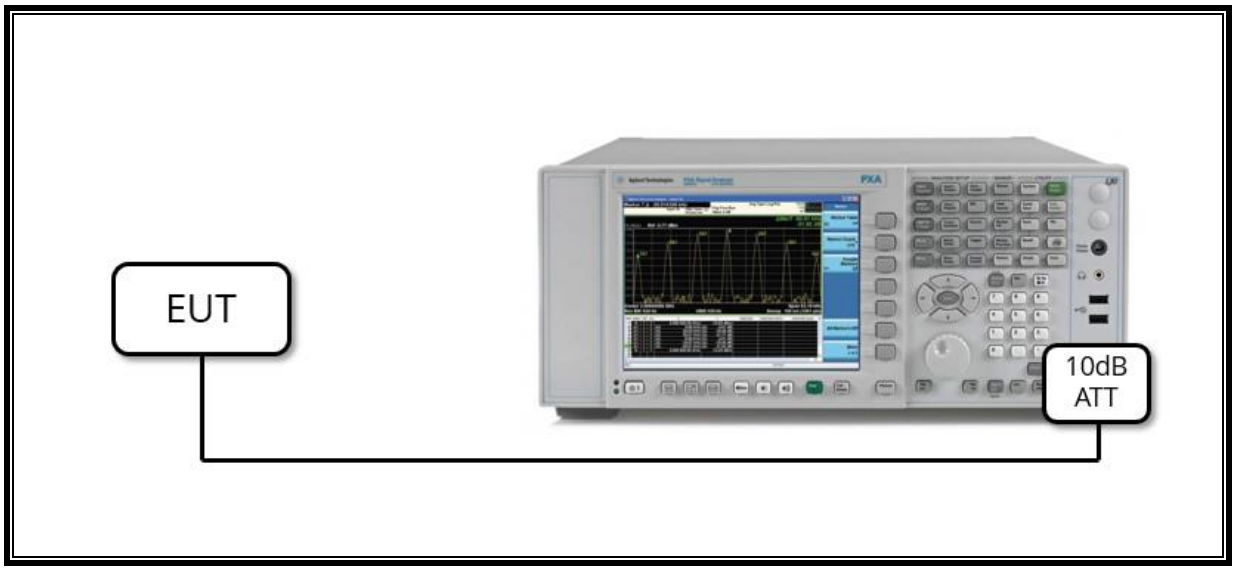
I/O CABLE

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

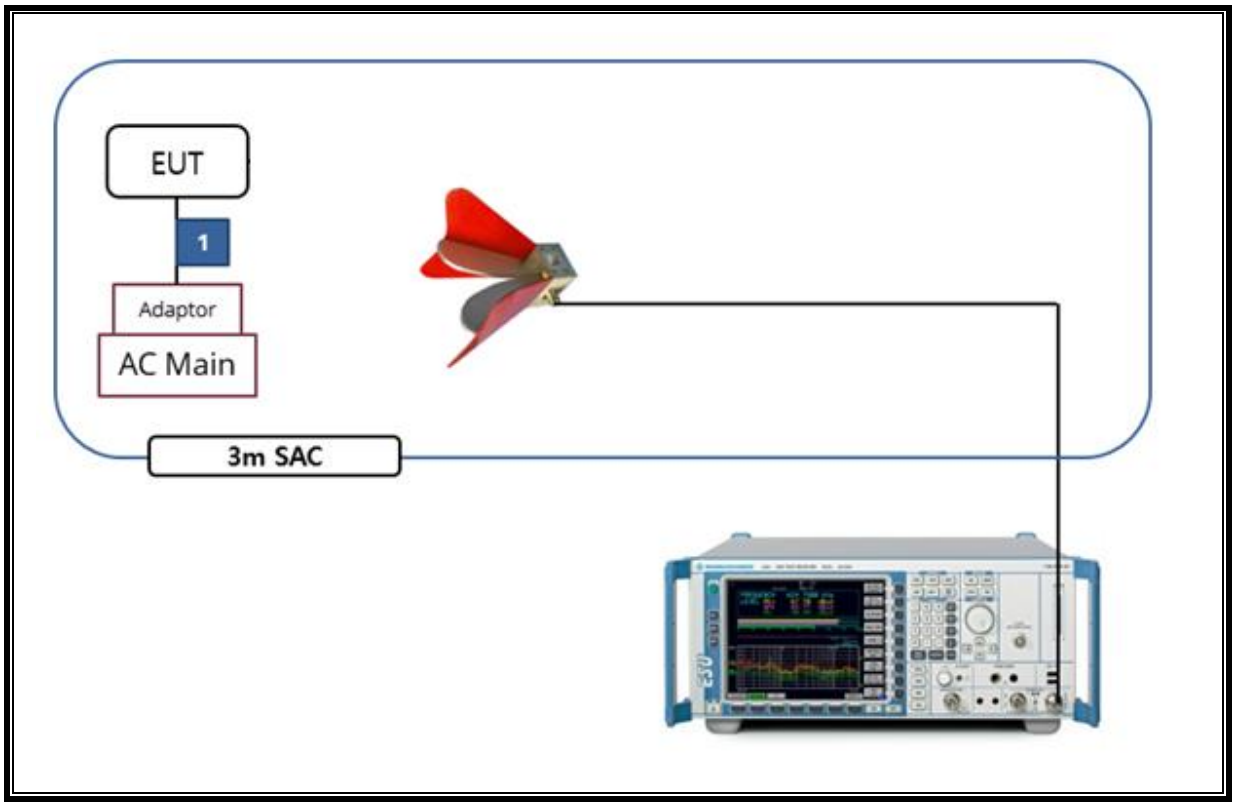
TEST SETUP

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 ≥ 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
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030B	MY60070693	2022-01-03
Average Power Sensor	Agilent / HP	U2000	MY54270007	2022-08-04
Average Power Sensor	Agilent / HP	U2000	MY54260010	2022-08-04
Attenuator	PASTERNACK	PE7087-10	A001	2022-08-03
Attenuator	PASTERNACK	PE7087-10	A008	2022-08-03
Attenuator	PASTERNACK	PE7004-10	2	2022-08-02
Attenuator	PASTERNACK	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

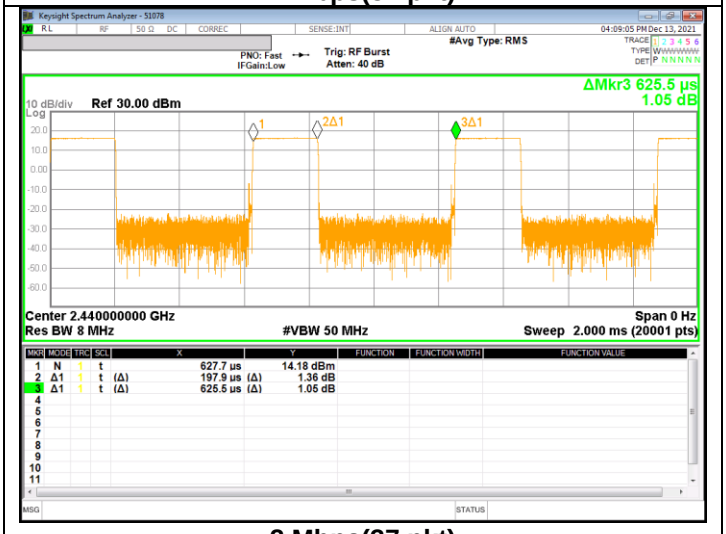
9.1. ON TIME AND DUTY CYCLE

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]	0.383	0.626	0.61	61.29	2.13	2.61
2 Mbps [37pkt]	0.198	0.626	0.32	31.64	5.00	5.05

1 Mbps(37 pkt)



2 Mbps(37 pkt)

9.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

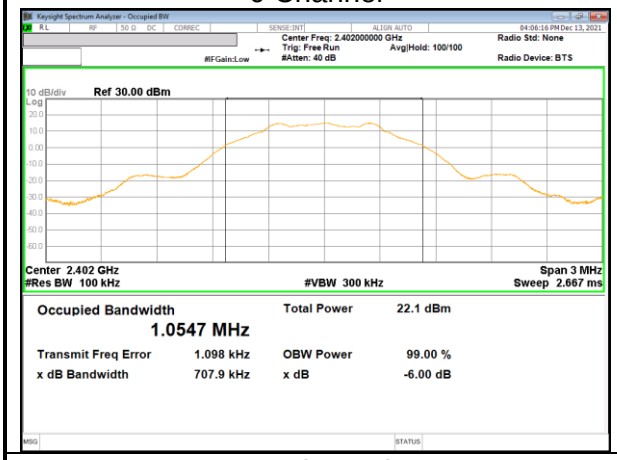
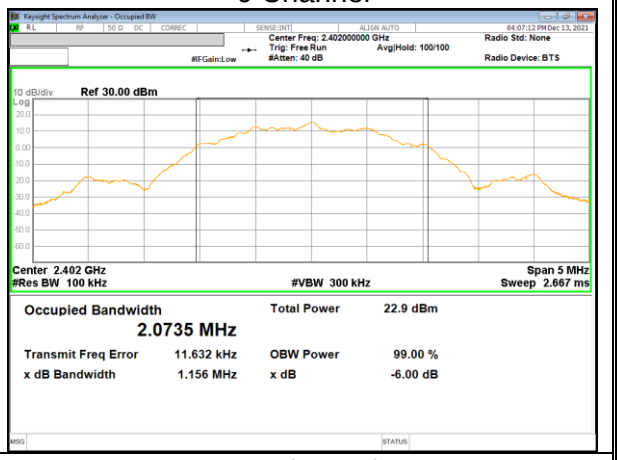
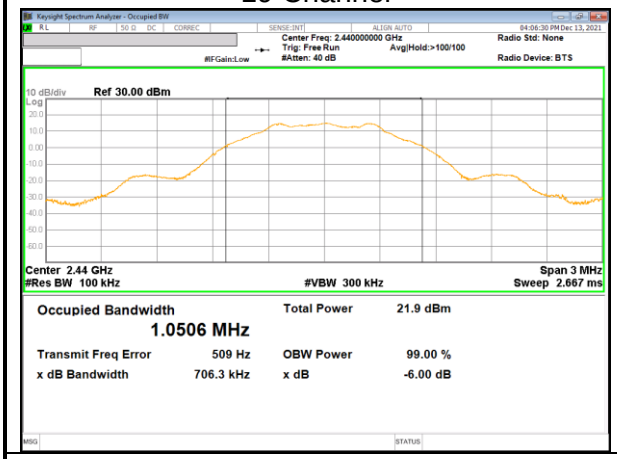
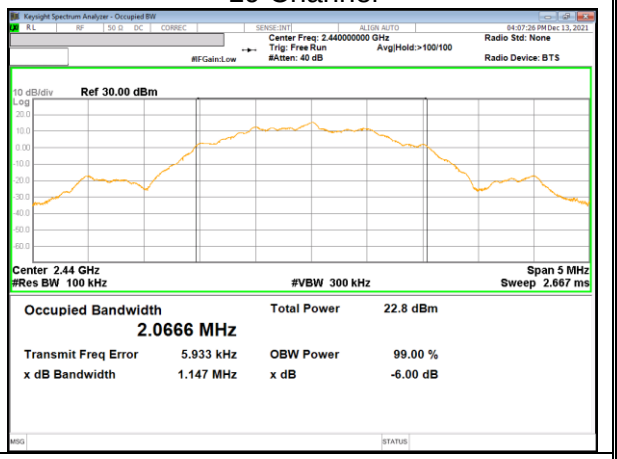
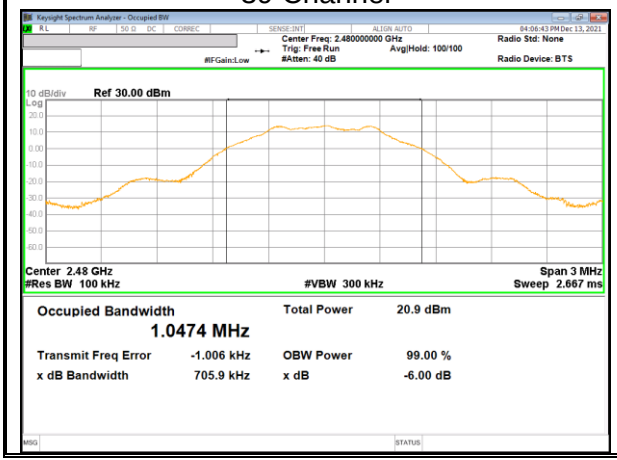
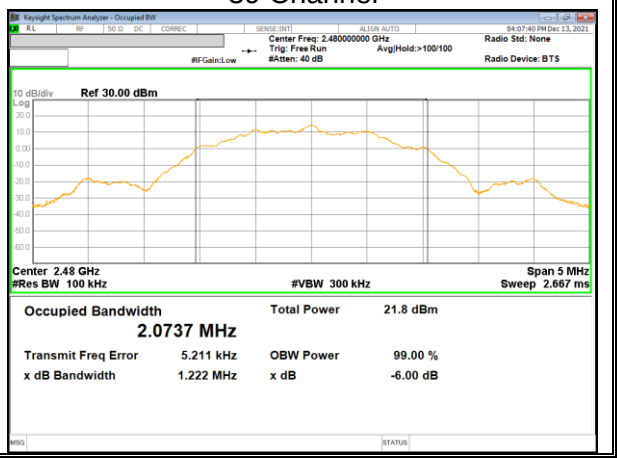
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

9.2.1. 1 Test data

Mode	Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]
1Mbps	**0**	**2 402**	**707.9**	500.0
	19	2 440	706.3	500.0
	39	2 480	705.9	500.0
2Mbps	0	2 402	1156.0	500.0
	19	2 440	1147.0	500.0
	39	2 480	1222.0	500.0
Worst			**705.9**	500.0

9.2.2. 6 dB BANDWIDTH PLOTS

1 Mbps	1 Mbps
0 Channel	0 Channel
	
19 Channel	19 Channel
	
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

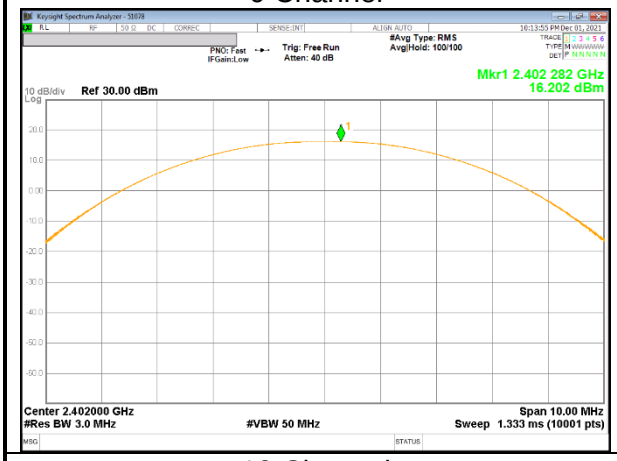
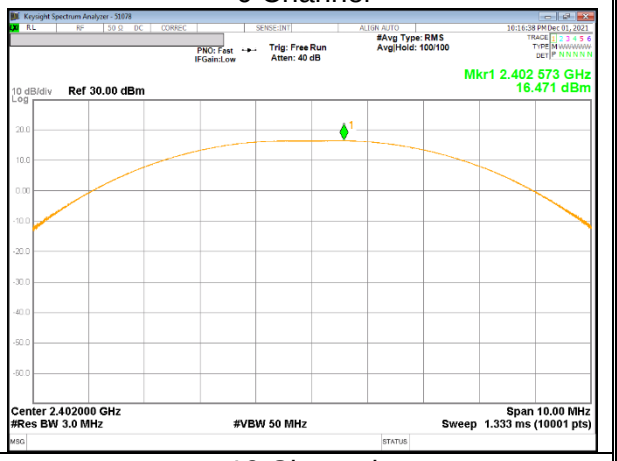
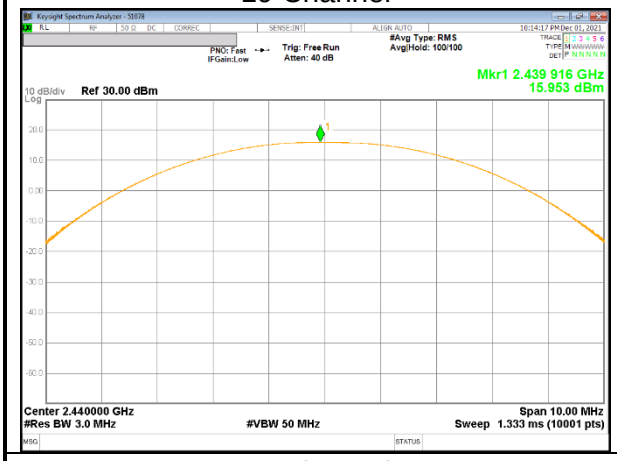
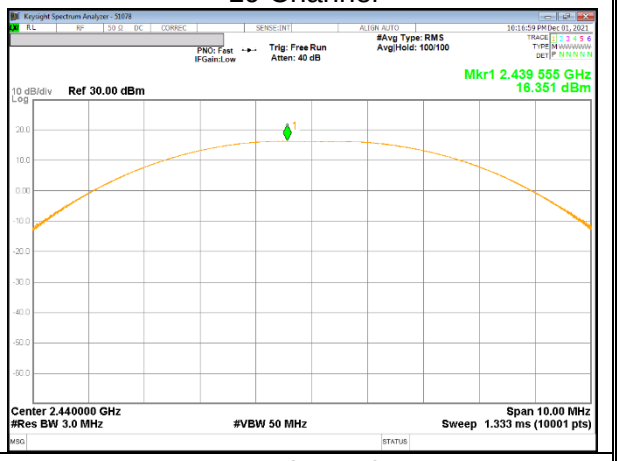
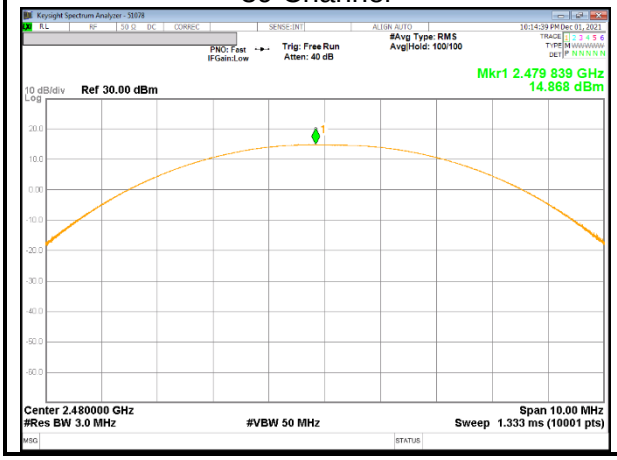
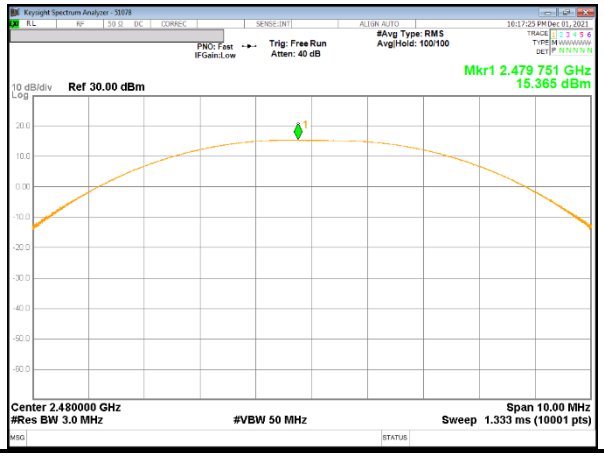
Peak power is measured using ANSI C63.10(2013) under section 11.9.1.1 utilizing spectrum analyzer(RBW ≧ DTS bandwidth).

RESULTS

9.3.1. 1 Test data

Mode	Channel	Frequency [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]
1Mbps (37 pkt)	0	2 402	16.202	30.000	-13.798
	19	2 440	15.953		-14.047
	39	2 480	14.868		-15.132
2Mbps (37 pkt)	0	2 402	16.471		-13.529
	19	2 440	16.351		-13.649
	39	2 480	15.365		-14.635
Worst			**16.471**		**-13.529**

9.3.2. PEAK POWER PLOTS

1 Mbps	2 Mbps
0 Channel	0 Channel
	
19 Channel	19 Channel
	
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	0	2 402	15.897	38.878
	19	2 440	15.651	36.737
	39	2 480	14.544	28.471
2Mbps	0	2 402	15.915	39.039
	19	2 440	15.824	38.230
	39	2 480	14.780	30.061

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

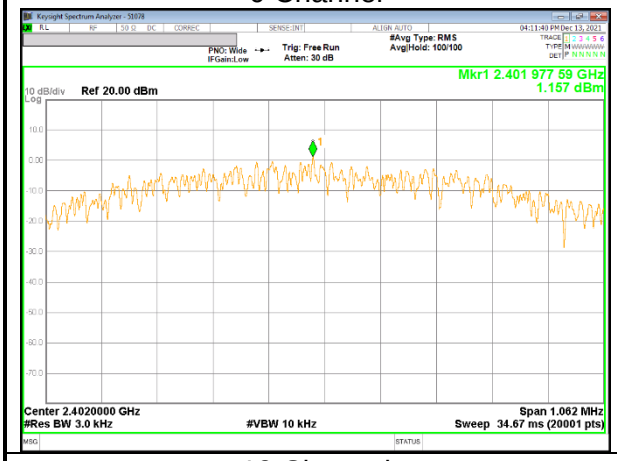
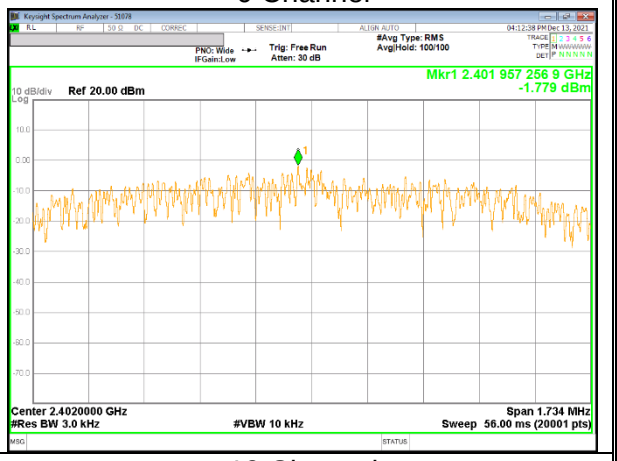
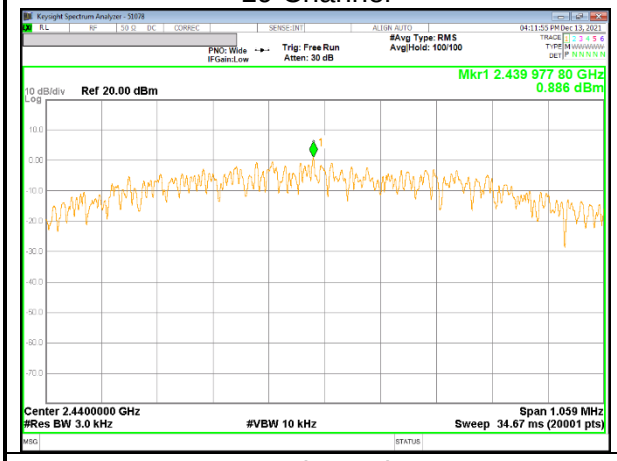
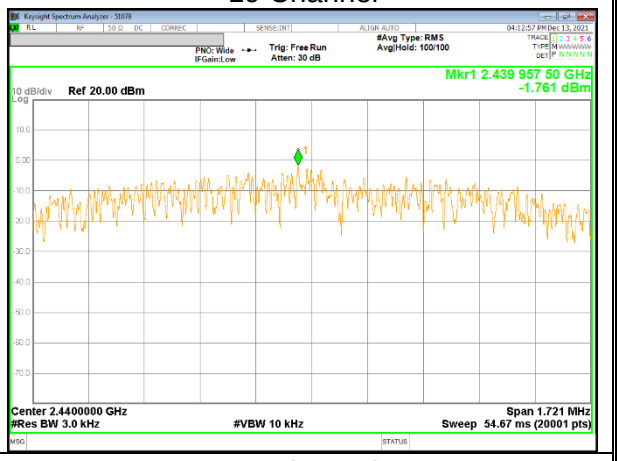
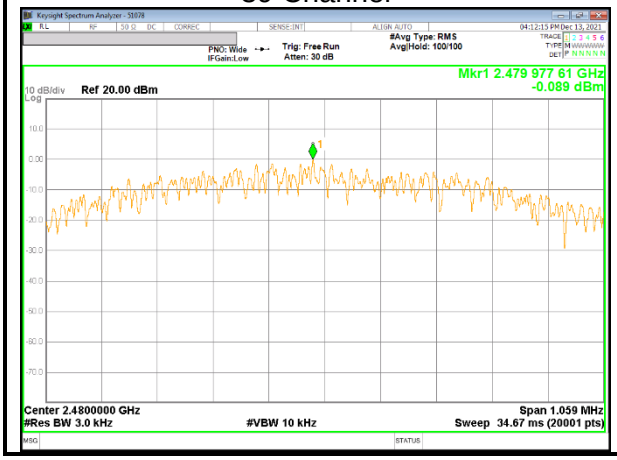
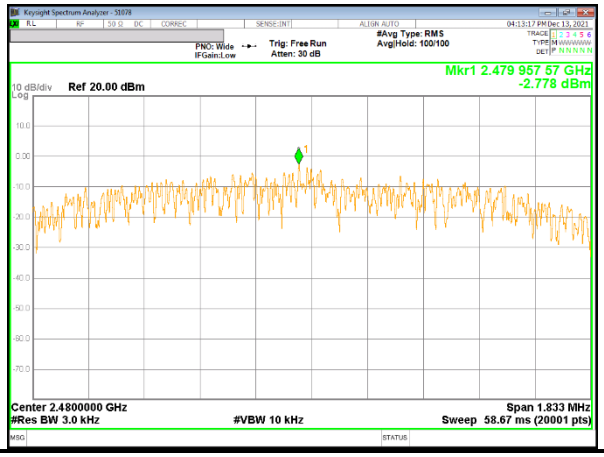
ANSI C63.10-2013, Section 11.10.2 Method PKPSD (peak PSD)

RESULTS

9.5.1. Test data

Mode	Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
1Mbps (37pkt)	0	2 402	**1.157**	8.00	-6.843
	19	2 440	0.886		-7.114
	39	2 480	-0.089		-8.089
2Mbps (37pkt)	0	2 402	-1.779		-9.779
	19	2 440	-1.761		-9.761
	39	2 480	-2.778		-10.778
Worst			**1.157**		**-6.843**

9.5.2. PSD TEST PLOTS

1 Mbps	2 Mbps
0 Channel	0 Channel
	
19 Channel	19 Channel
	
39 Channel	39 Channel
	

9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

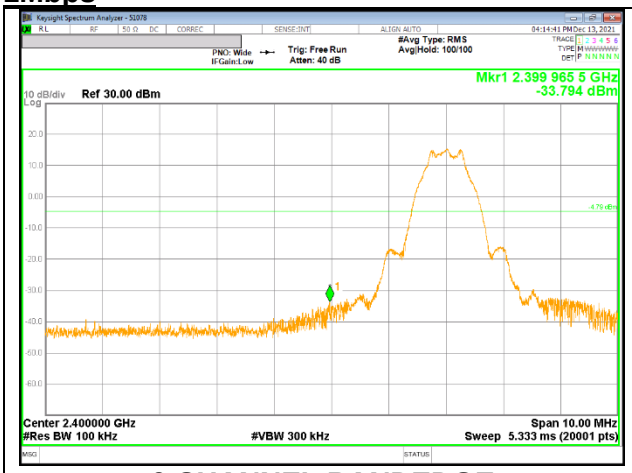
RSS-247 5.5

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

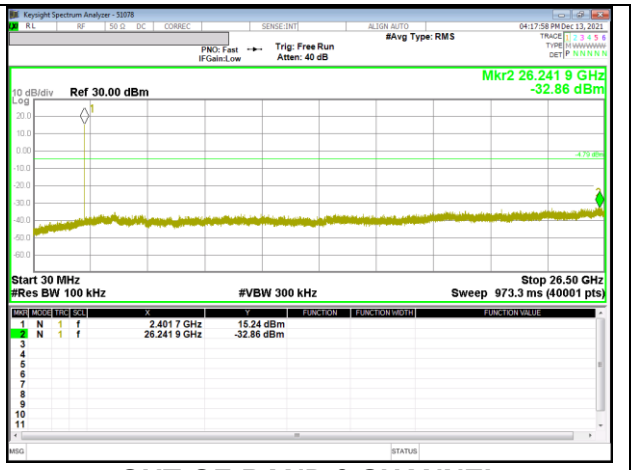
RESULTS

9.6.1. Test plot

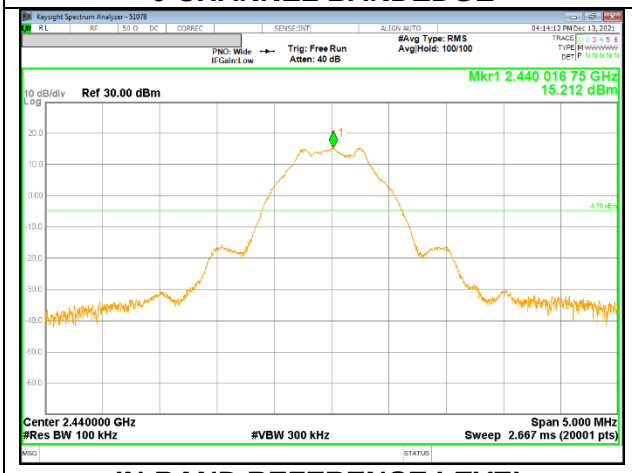
1Mbps



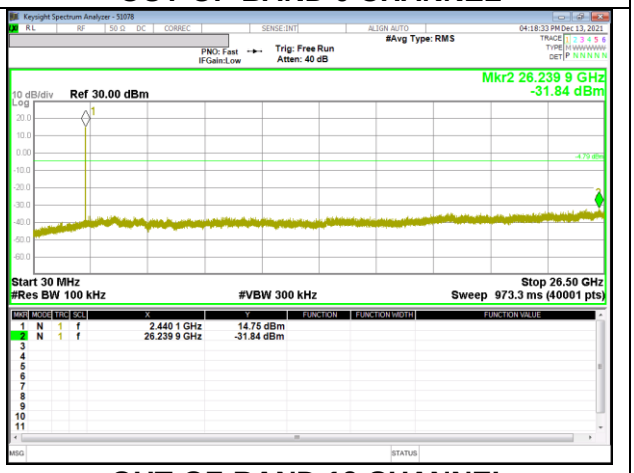
0 CHANNEL BANDEDGE



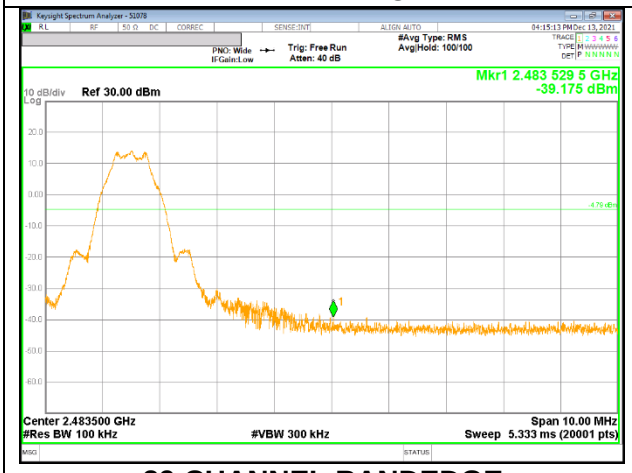
OUT-OF-BAND 0 CHANNEL



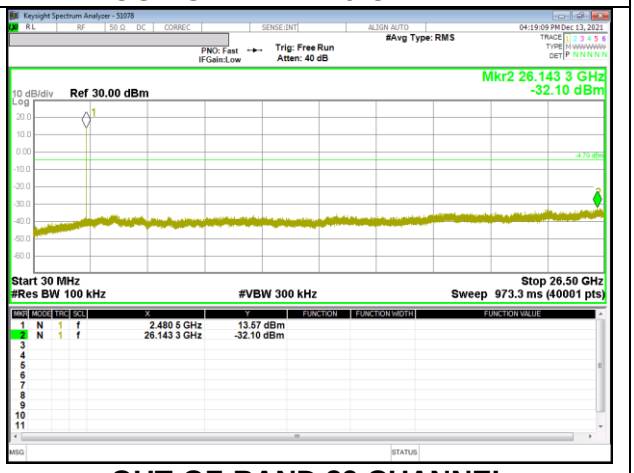
IN-BAND REFERENCE LEVEL



OUT-OF-BAND 19 CHANNEL

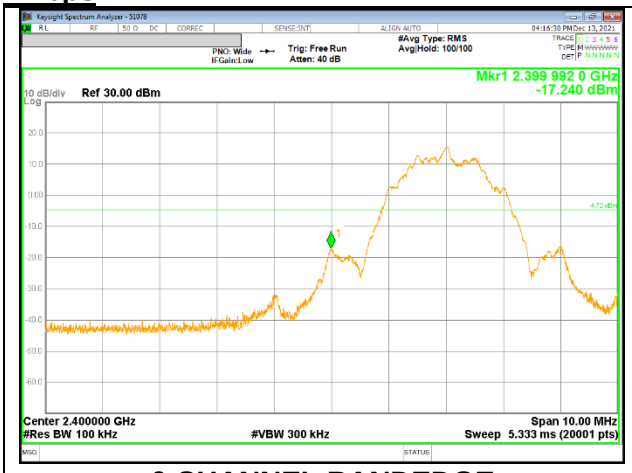


39 CHANNEL BANDEDGE

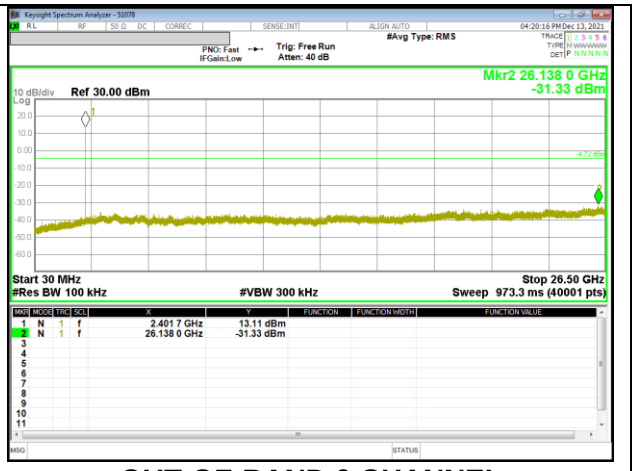


OUT-OF-BAND 39 CHANNEL

2Mbps

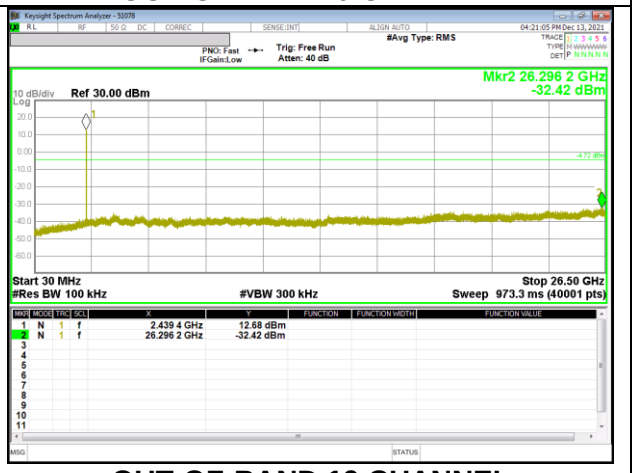


0 CHANNEL BANDEDGE



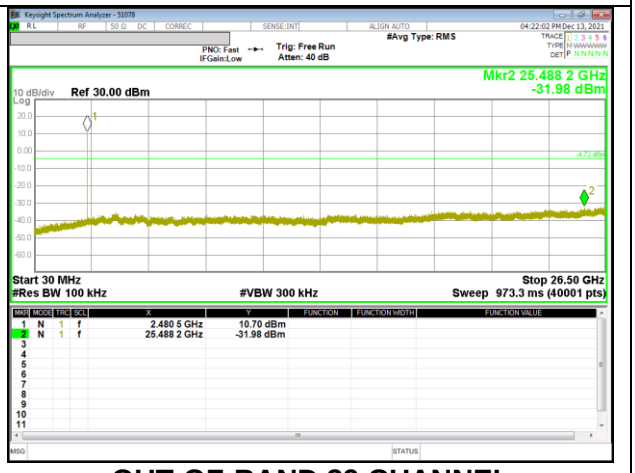
OUT-OF-BAND 0 CHANNEL

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(1/0.613)=2.126 dB (Spectrum Analyzer round it up to 2.13 dB) and for 2 Mbps, DCF = 10log(1/0.316)=4.998 dB (Spectrum Analyzer round it up to 5.00 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.

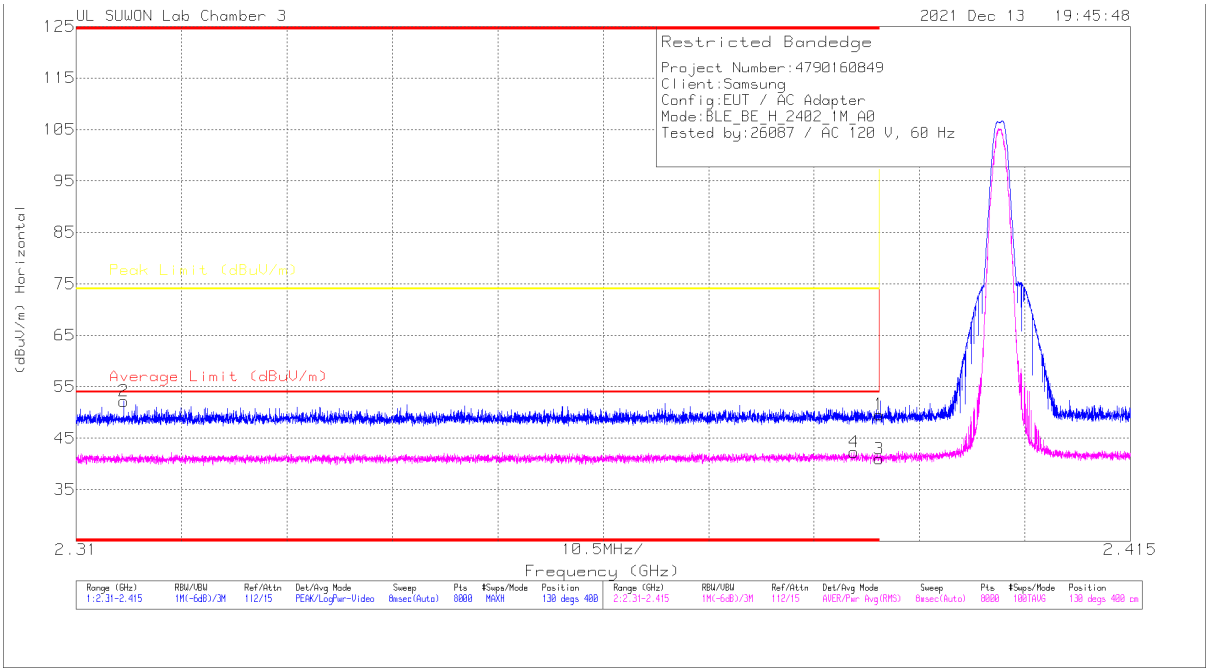
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. 1 Mbps

BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT

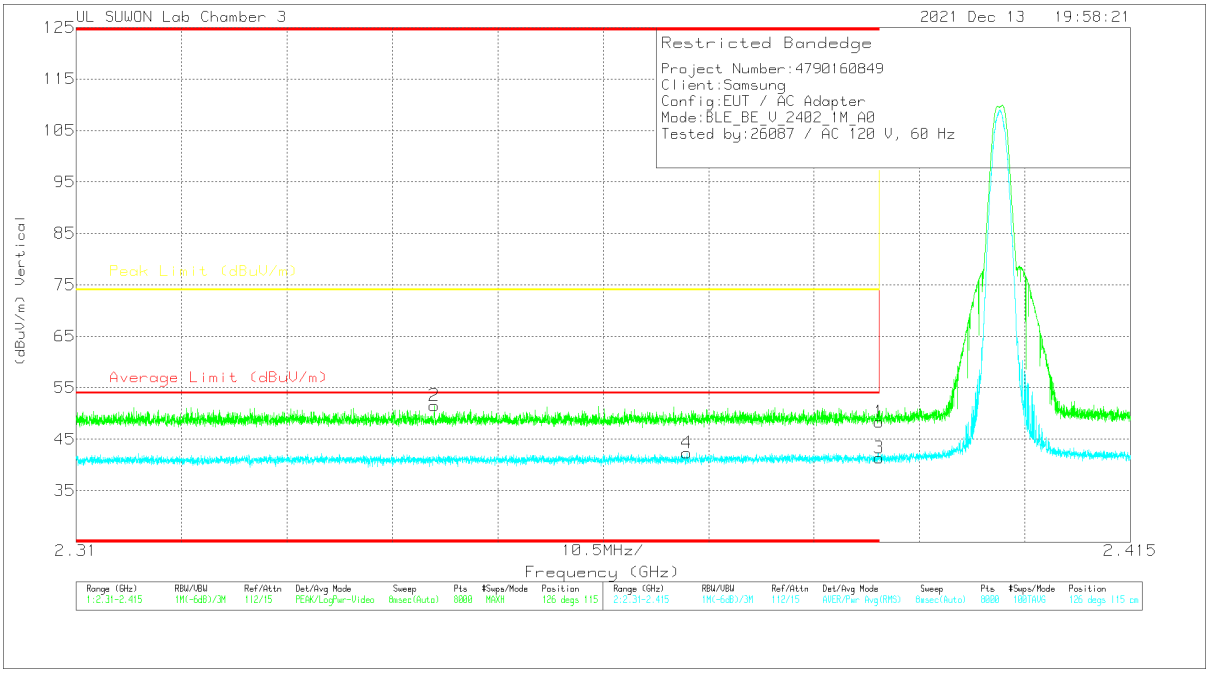


Trace Markers

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	42.18	Pk	32.8	-25.4	0	49.58	-	-	74	-24.42	130	400	H
2	* 2.31474	45.09	Pk	32.5	-25.4	0	52.19	-	-	74	-21.81	130	400	H
3	* 2.39	31.44	RMS	32.8	-25.4	2.13	40.97	54	-13.03	-	-	130	400	H
4	* 2.38748	32.77	RMS	32.7	-25.3	2.13	42.3	54	-11.7	-	-	130	400	H

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

VERTICAL RESULT



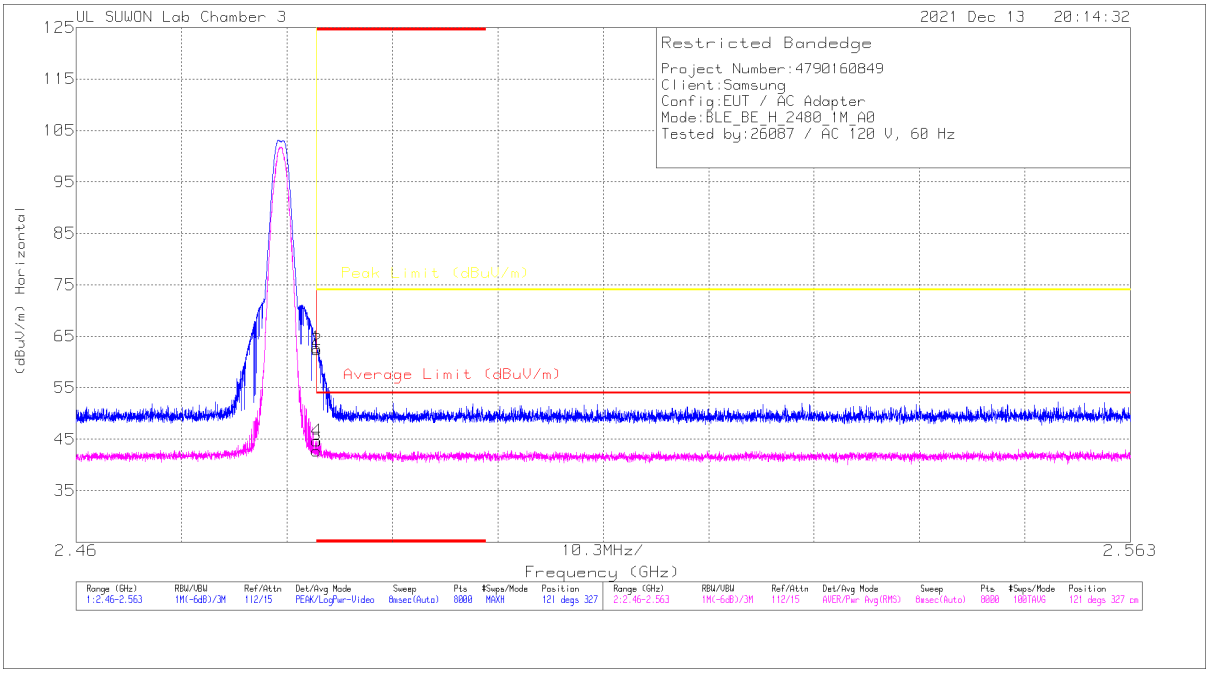
Trace Markers

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	40.95	Pk	32.8	-25.4	0	48.35	-	-	74	-25.65	126	115	V
2	* 2.34567	44.33	Pk	32.6	-25.4	0	51.53	-	-	74	-22.47	126	115	V
3	* 2.39	31.86	RMS	32.8	-25.4	2.13	41.39	54	-12.61	-	-	126	115	V
4	* 2.37082	32.94	RMS	32.7	-25.4	2.13	42.37	54	-11.63	-	-	126	115	V

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

BANDEDGE (39 CHANNEL)

HORIZONTAL RESULT

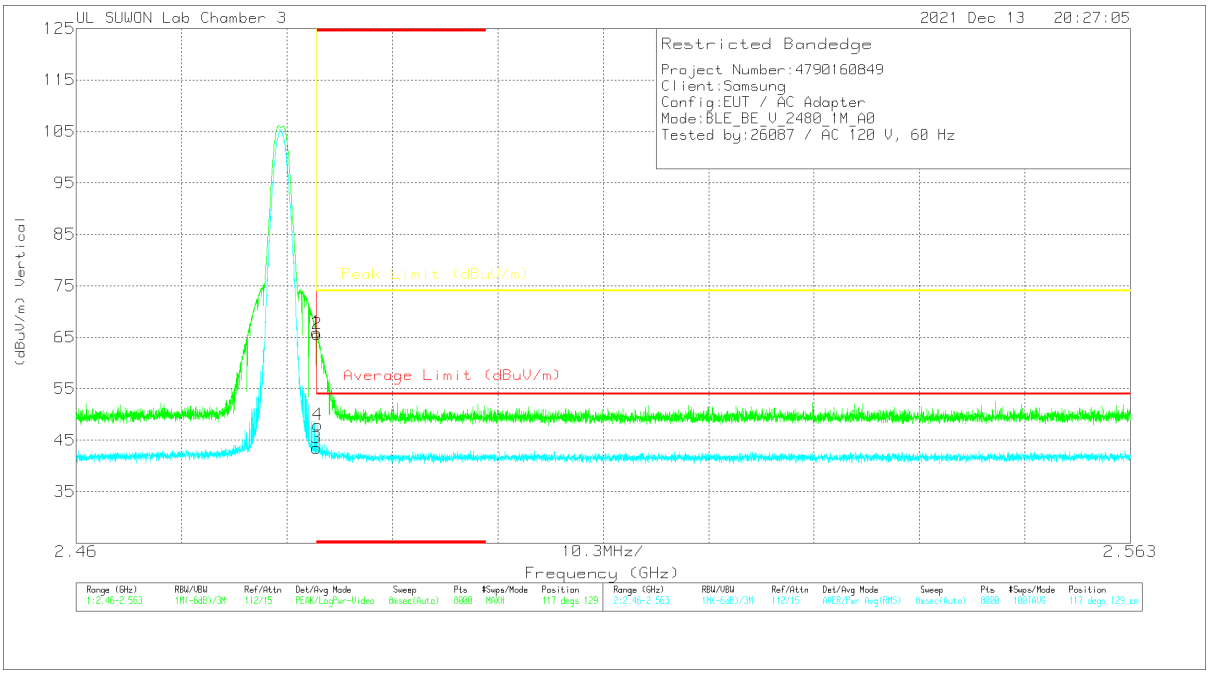


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_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	55.21	Pk	32.9	-25.3	0	62.81	-	-	74	-11.19	121	327	H
2	* 2.48354	54.79	Pk	32.9	-25.3	0	62.39	-	-	74	-11.61	121	327	H
3	* 2.4835	33.01	RMS	32.9	-25.3	2.13	42.74	54	-11.26	-	-	121	327	H
4	* 2.48351	34.94	RMS	32.9	-25.3	2.13	44.67	54	-9.33	-	-	121	327	H

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

VERTICAL RESULT



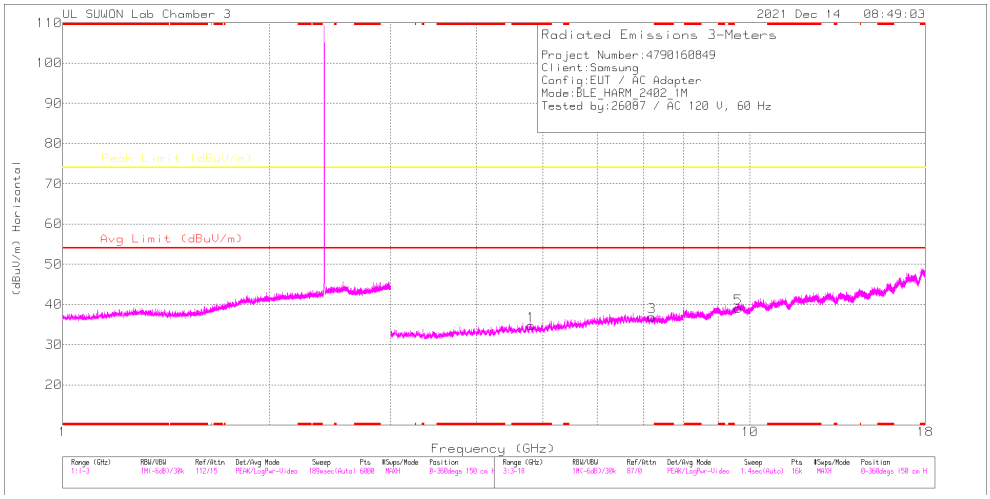
Trace Markers

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	58.37	Pk	32.9	-25.3	0	65.97	-	-	74	-8.03	117	129	V
2	* 2.48353	58.02	Pk	32.9	-25.3	0	65.62	-	-	74	-8.38	117	129	V
3	* 2.4835	33.79	RMS	32.9	-25.3	2.13	43.52	54	-10.48	-	-	117	129	V
4	* 2.48359	38.27	RMS	32.9	-25.3	2.13	48	54	-6	-	-	117	129	V

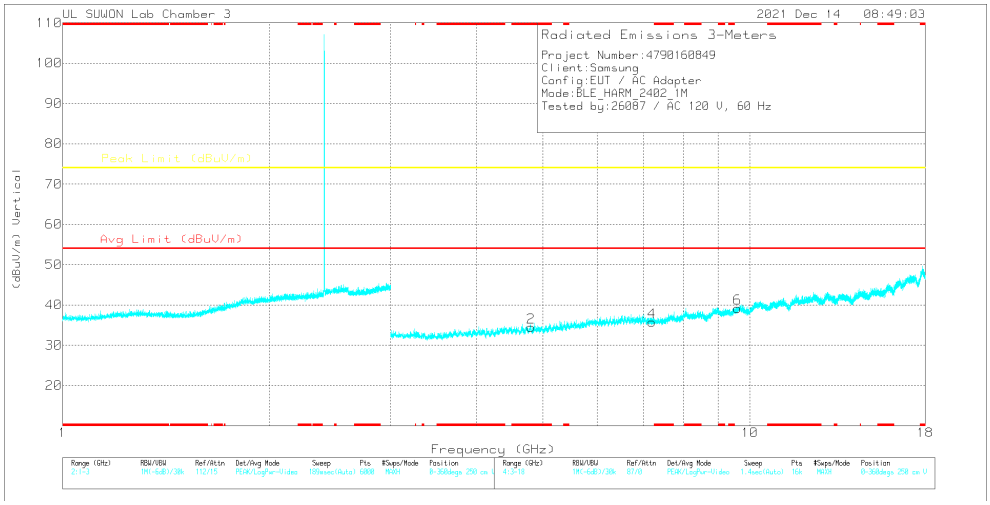
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

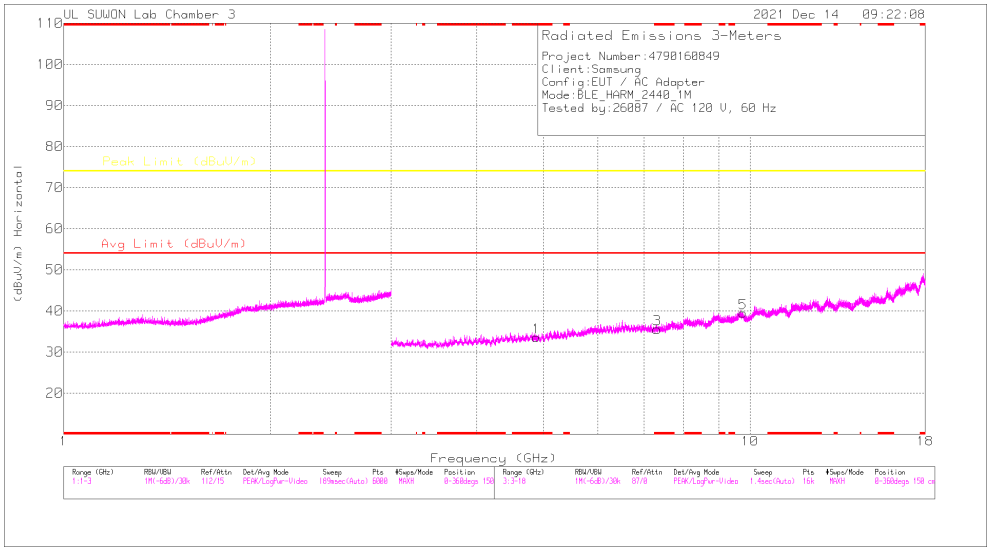
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

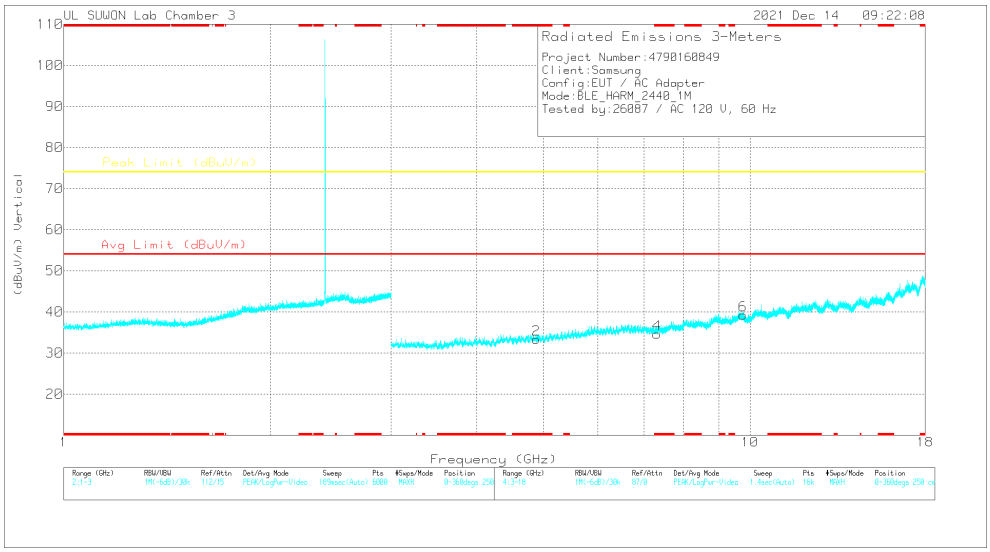
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80371	40.35	PK2	34.6	-30.4	0	44.55	-	-	74	-29.45	360	100	H
7.20506	36.49	PK2	36.1	-26.1	0	46.49	-	-	74	-27.51	360	100	H
9.61	34.1	PK2	37.3	-22.1	0	49.3	-	-	74	-24.7	360	100	H
* 4.80396	40.87	PK2	34.6	-30.4	0	45.07	-	-	74	-28.93	360	100	V
7.21069	35.96	PK2	36.1	-26.1	0	45.96	-	-	74	-28.04	360	100	V
9.60572	34.47	PK2	37.3	-22.1	0	49.67	-	-	74	-24.33	360	100	V

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

19 CHANNEL RESULTS



HORIZONTAL



VERTICAL

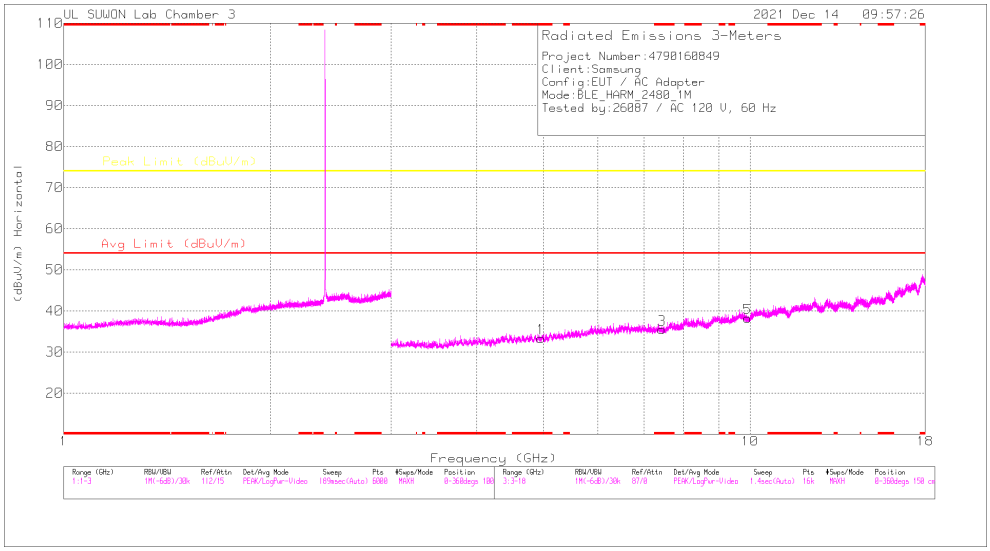
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

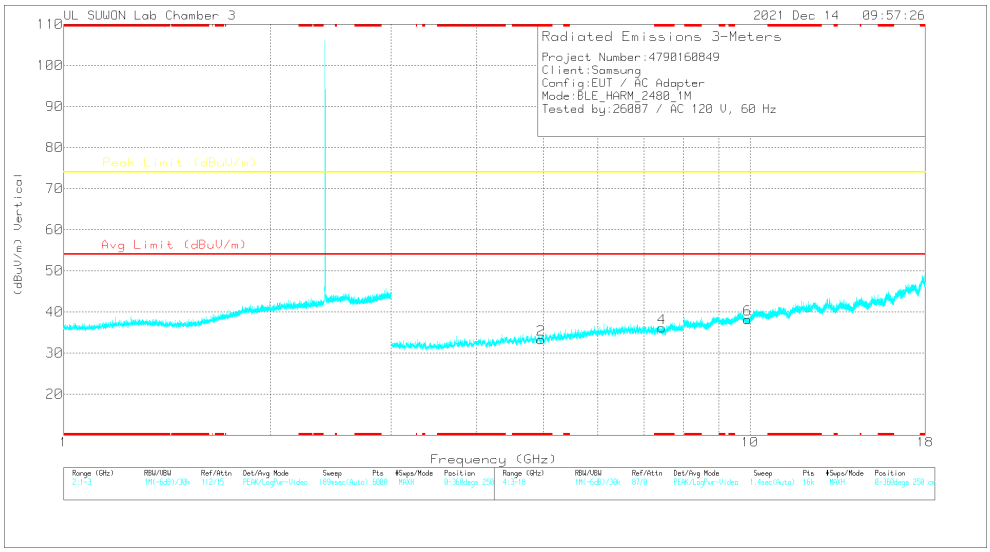
Frequency(GHz)	MeterReading(dBuV)	Det	3117_00218957	3GHz_HP[dB]	DC Corr (dB)	CorrectedReading(dBuV/m)	Avg Limit (dBuV/m)	Margin(dB)	Peak Limit (dBuV/m)	Margin(dB)	Azimuth(Degs)	Height(cm)	Polarity
* 4.88073	39.87	PK2	34.7	-31.2	0	43.37	-	-	74	-30.63	360	100	H
* 4.87965	40.35	PK2	34.7	-31.2	0	43.85	-	-	74	-30.15	360	100	V
* 7.32113	35.2	PK2	36	-25.5	0	45.7	-	-	74	-28.3	360	100	H
* 7.32111	34.95	PK2	36	-25.5	0	45.45	-	-	74	-28.55	360	100	V
9.76405	33.08	PK2	37.5	-21.7	0	48.88	-	-	74	-25.12	360	100	H
9.76094	33.1	PK2	37.5	-21.7	0	48.9	-	-	74	-25.1	360	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

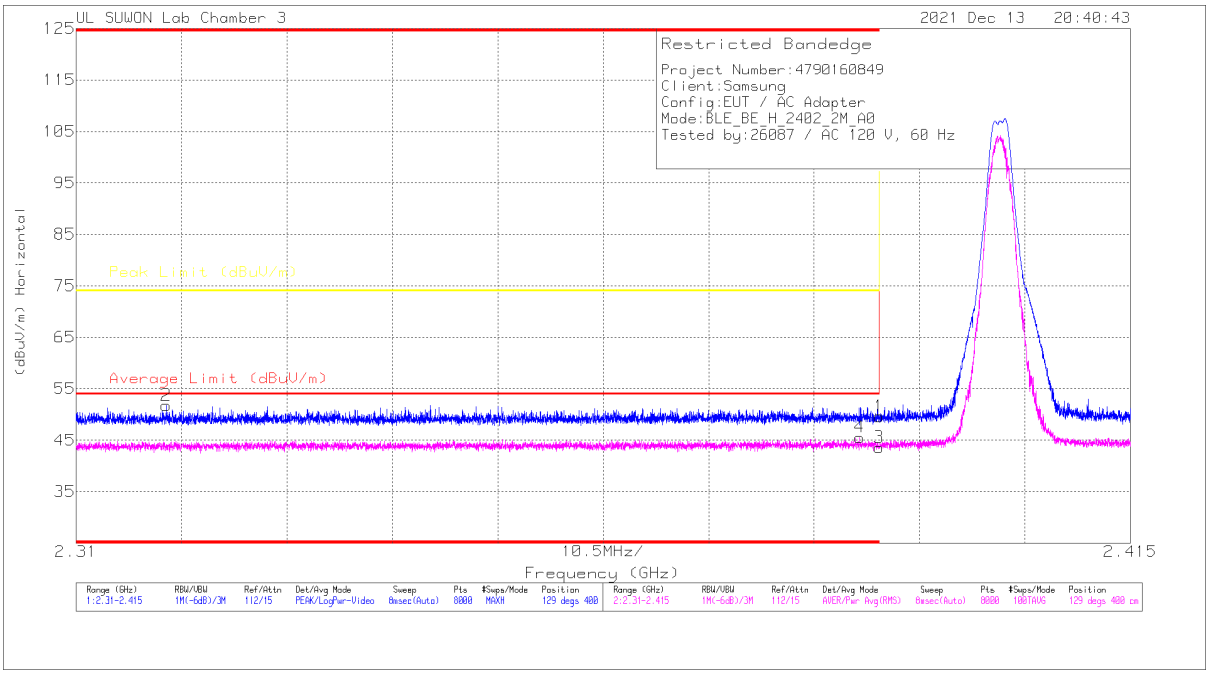
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.96052	39.1	PK2	34.7	-30.9	0	42.9	-	-	74	-31.1	360	100	H
* 4.96121	39.19	PK2	34.7	-30.9	0	42.99	-	-	74	-31.01	360	100	V
* 7.43928	34.9	PK2	36	-25.3	0	45.6	-	-	74	-28.4	360	100	H
* 7.43934	35.06	PK2	36	-25.3	0	45.76	-	-	74	-28.24	360	100	V
9.91675	32.7	PK2	37.7	-21.9	0	48.5	-	-	74	-25.5	360	100	H
9.92287	32.23	PK2	37.7	-21.9	0	48.03	-	-	74	-25.97	360	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

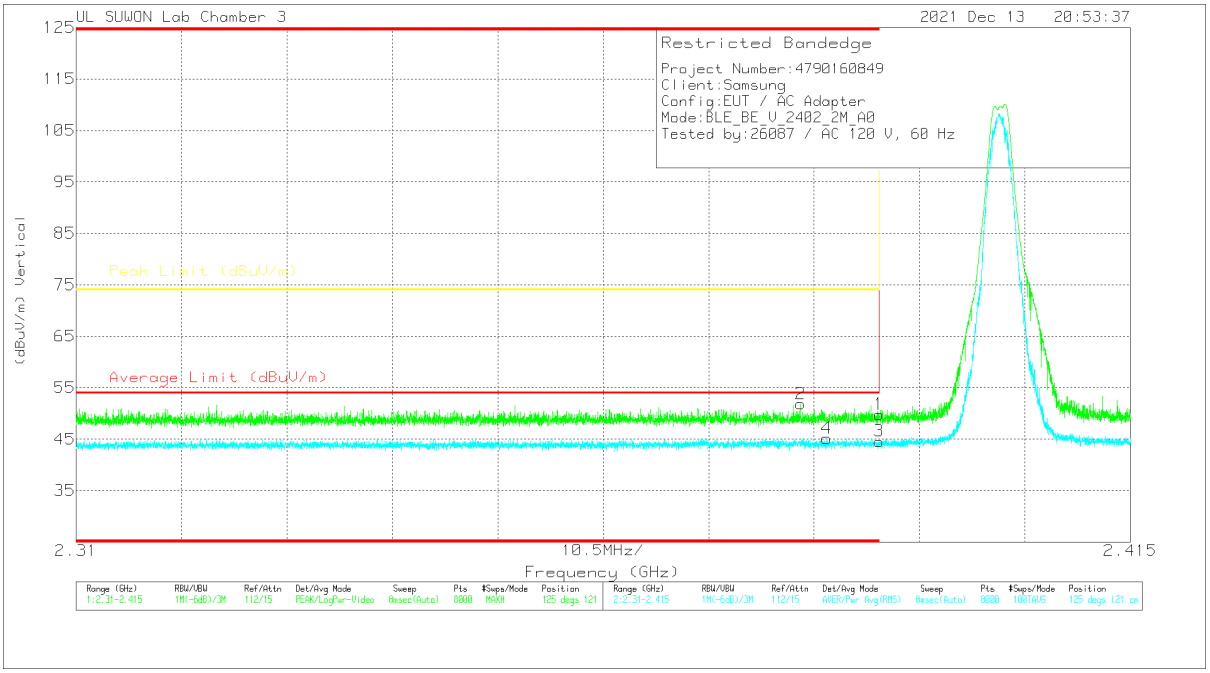


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_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	42.22	Pk	32.8	-25.4	0	49.62	-	-	74	-24.38	129	400	H
2	* 2.31897	44.67	Pk	32.5	-25.4	0	51.77	-	-	74	-22.23	129	400	H
3	* 2.39	31.2	RMS	32.8	-25.4	5	43.6	54	-10.4	-	-	129	400	H
4	* 2.38805	33.08	RMS	32.8	-25.3	5	45.58	54	-8.42	-	-	129	400	H

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

VERTICAL RESULT



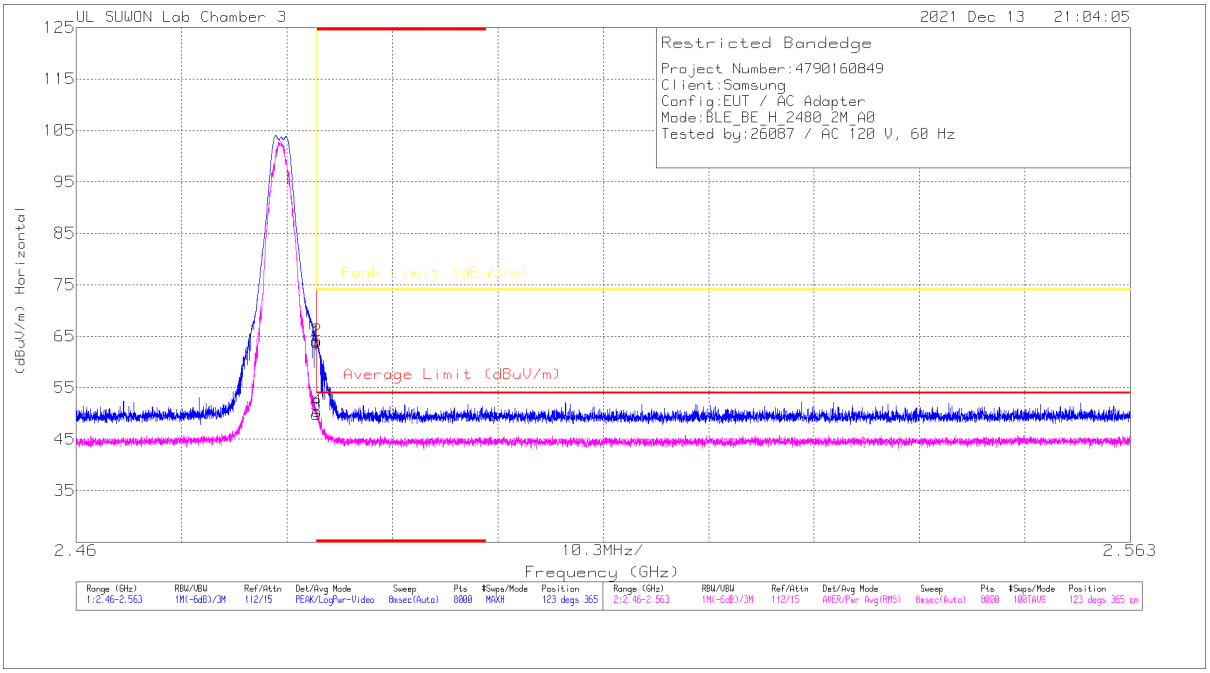
Trace Markers

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	42.41	Pk	32.8	-25.4	0	49.81	-	-	74	-24.19	125	121	V
2	* 2.38217	44.57	Pk	32.7	-25.4	0	51.87	-	-	74	-22.13	125	121	V
3	* 2.39	32.19	RMS	32.8	-25.4	5	44.59	54	-9.41	-	-	125	121	V
4	* 2.38476	32.87	RMS	32.7	-25.4	5	45.17	54	-8.83	-	-	125	121	V

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

BANDEDGE (39 CHANNEL)

HORIZONTAL RESULT

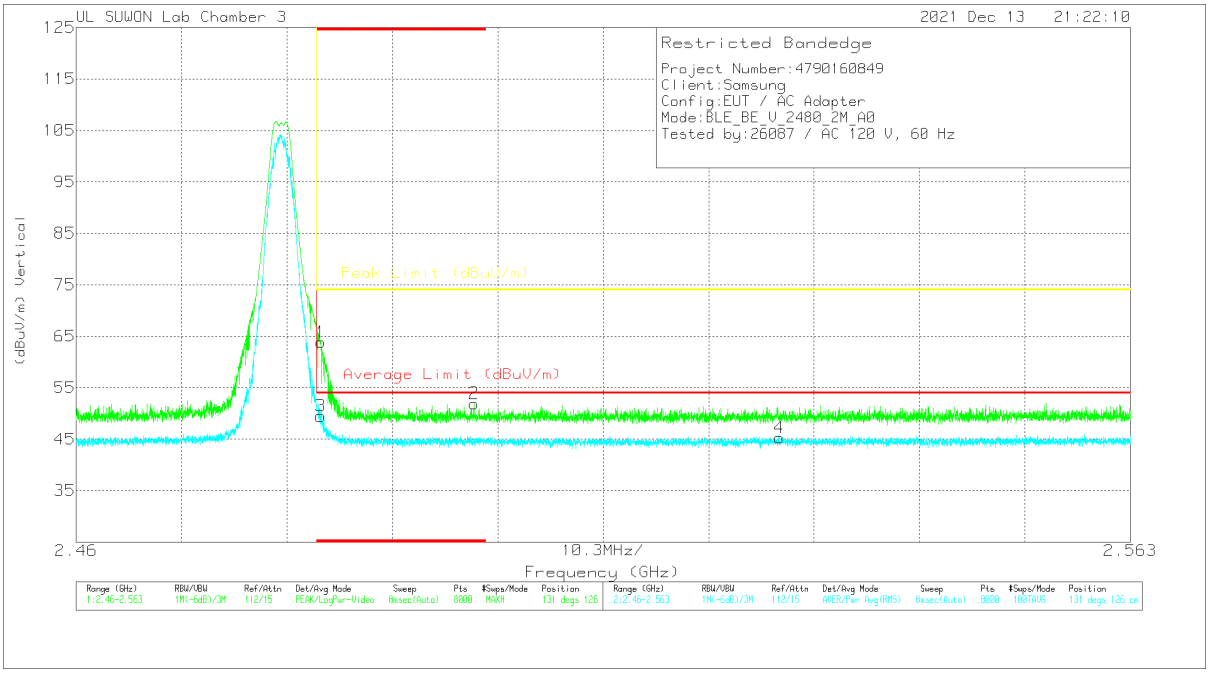


Trace Markers

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	56.34	Pk	32.9	-25.3	0	63.94	-	-	74	-10.06	123	365	H
2	* 2.48351	56.58	Pk	32.9	-25.3	0	64.18	-	-	74	-9.82	123	365	H
3	* 2.4835	37.18	RMS	32.9	-25.3	5	49.78	54	-4.22	-	-	123	365	H
4	* 2.48356	37.82	RMS	32.9	-25.3	5	50.42	54	-3.58	-	-	123	365	H

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

VERTICAL RESULT



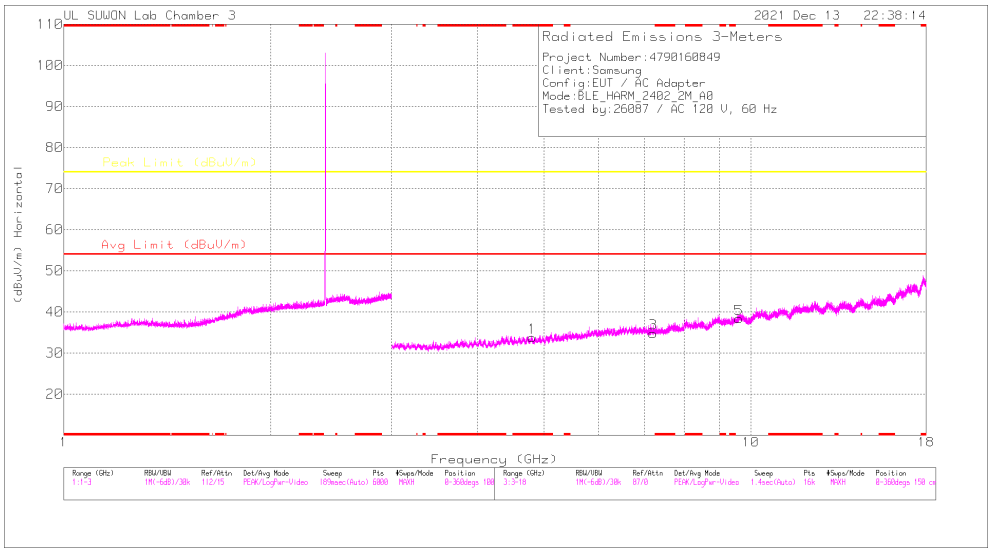
Trace Markers

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	* 2.48391	56.23	Pk	32.9	-25.3	0	63.83	-	-	74	-10.17	131	126	V
2	* 2.49886	44.22	Pk	32.9	-25.2	0	51.92	-	-	74	-22.08	131	126	V
3	* 2.48389	36.91	RMS	32.9	-25.3	5	49.51	54	-4.49	-	-	131	126	V
4	2.5287	32.55	RMS	32.9	-25.2	5	45.25	54	-8.75	-	-	131	126	V

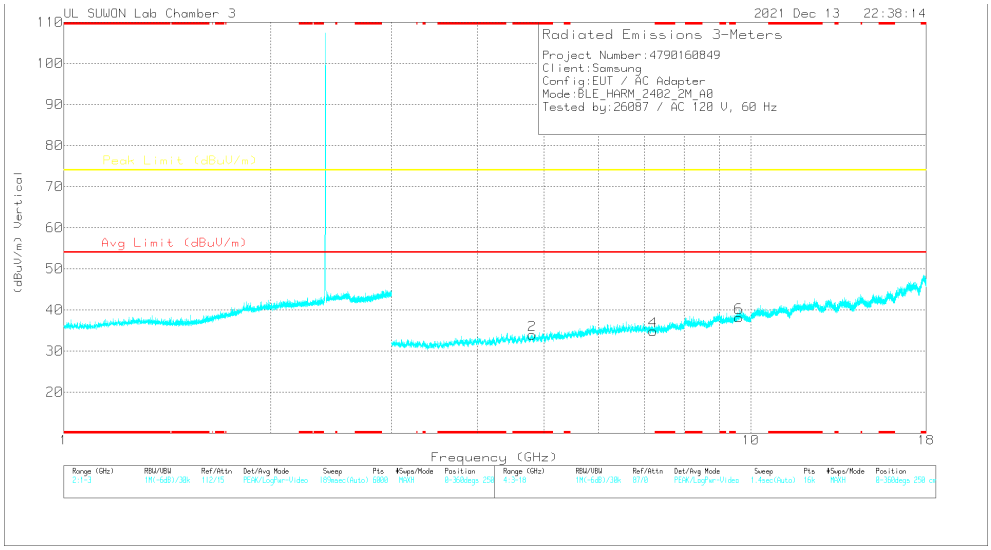
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

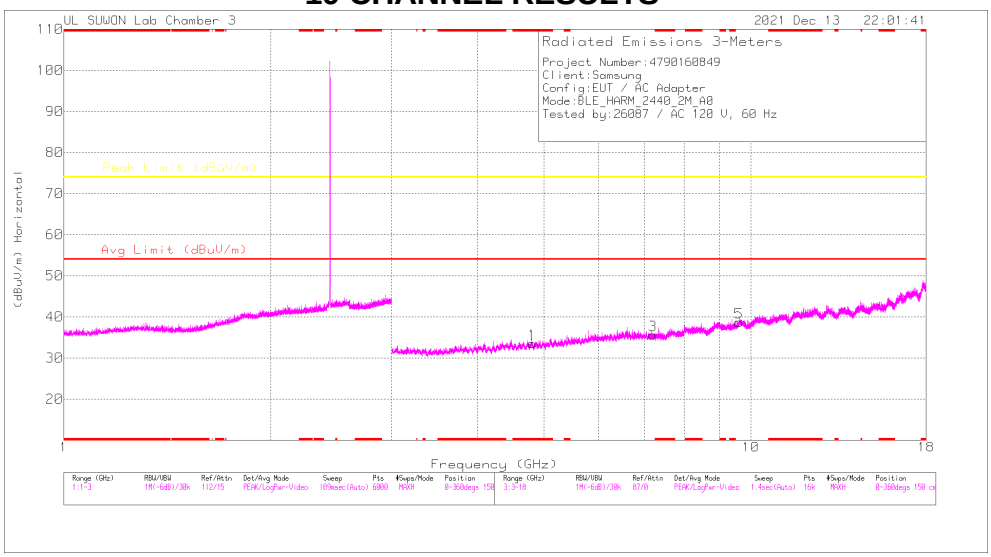
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

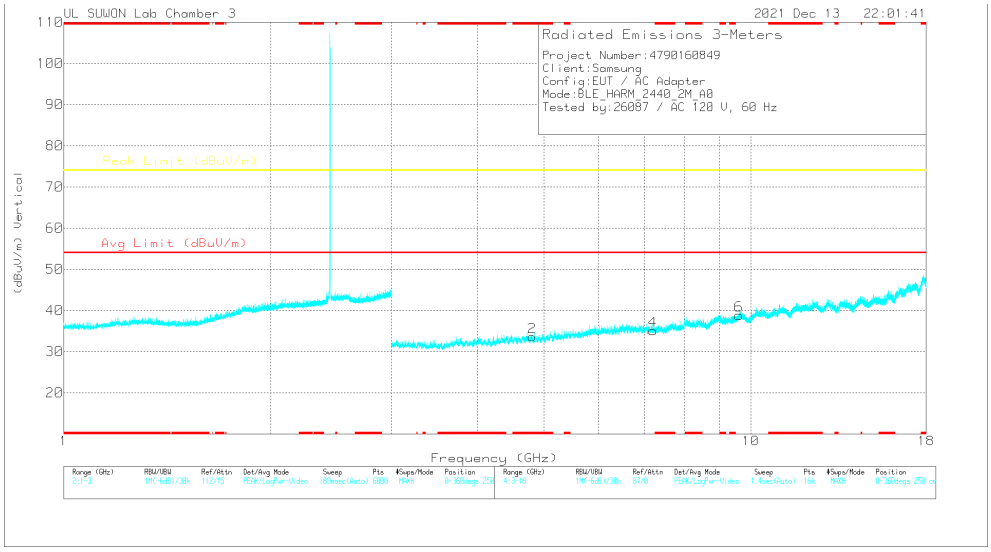
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.79999	23.78	PK2	34.6	-30.5	0	27.88	-	-	74	-46.12	0	100	H
* 4.80147	28.34	PK2	34.6	-30.4	0	32.54	-	-	74	-41.46	0	100	V
7.21599	21.92	PK2	36.1	-26.1	0	31.92	-	-	74	-42.08	0	100	H
7.21277	21.84	PK2	36.1	-26.1	0	31.84	-	-	74	-42.16	0	100	V
9.61628	18.77	PK2	37.3	-22.1	0	33.97	-	-	74	-40.03	0	100	H
9.60746	17.89	PK2	37.3	-22.1	0	33.09	-	-	74	-40.91	0	100	V

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

19 CHANNEL RESULTS



HORIZONTAL



VERTICAL

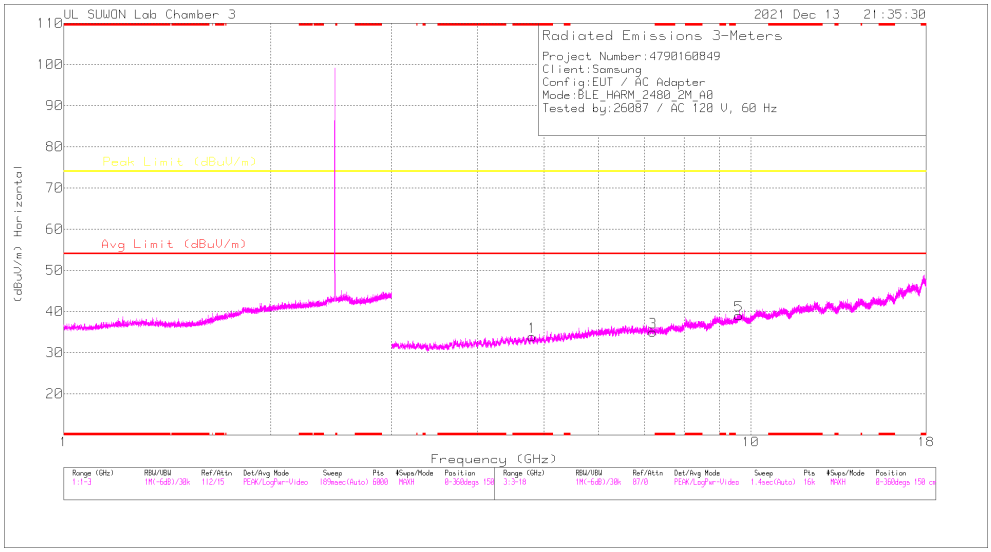
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

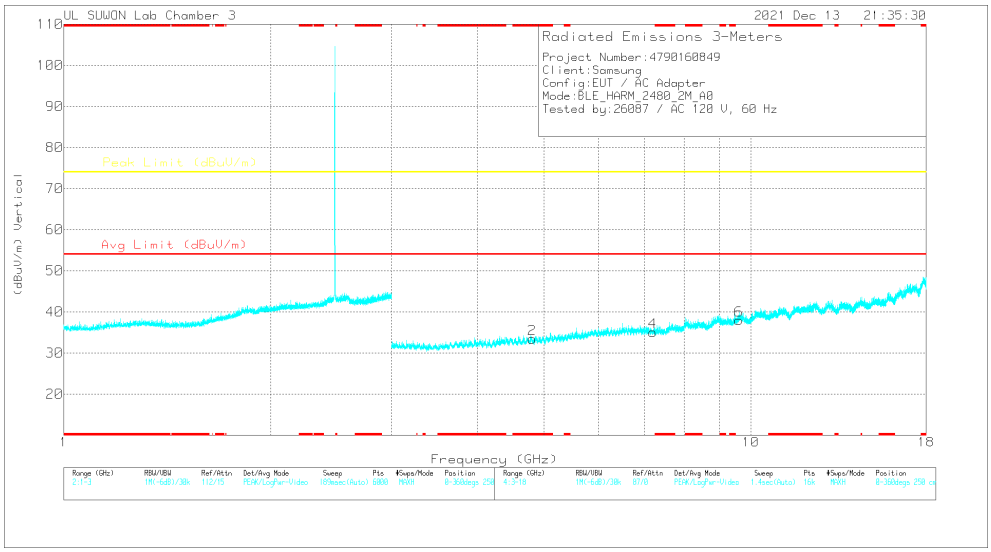
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80201	25.43	PK2	34.6	-30.5	0	29.53	-	-	74	-44.47	0	100	H
* 4.7956	30.1	PK2	34.6	-30.4	0	34.3	-	-	74	-39.7	0	100	V
7.19682	23.66	PK2	36.1	-26.1	0	33.66	-	-	74	-40.34	0	100	H
7.20598	27.7	PK2	36.1	-26.1	0	37.7	-	-	74	-36.3	0	100	V
9.60696	20.8	PK2	37.3	-22.1	0	36	-	-	74	-38	0	100	H
9.61564	17.13	PK2	37.3	-22.1	0	32.33	-	-	74	-41.67	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.

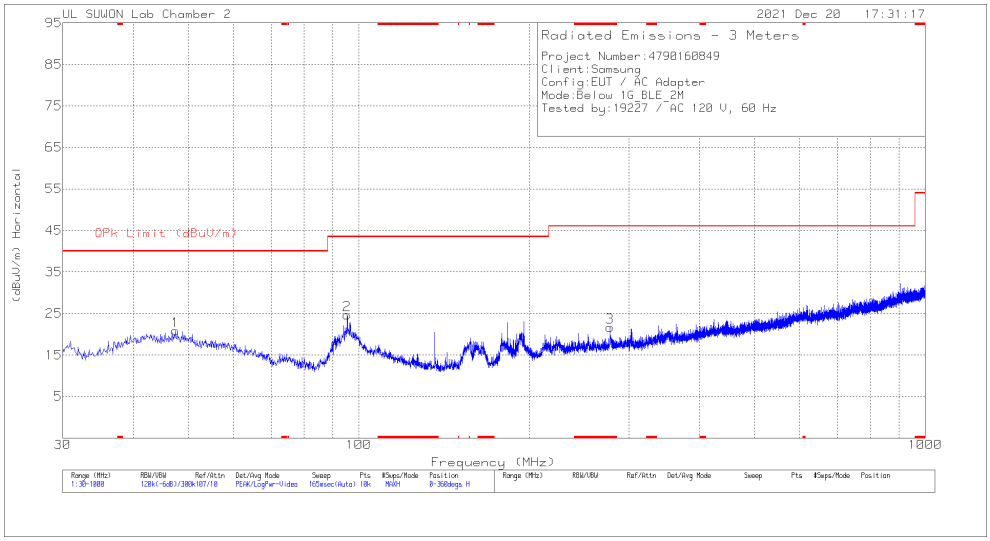
Radiated Emissions

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
* 4.8108	24.73	PK2	34.6	-30.5	0	28.83	-	-	74	-45.17	0	100	H
* 4.80755	31.09	PK2	34.6	-30.5	0	35.19	-	-	74	-38.81	0	100	V
7.21198	23.04	PK2	36.1	-26.1	0	33.04	-	-	74	-40.96	0	100	H
7.21058	29.31	PK2	36.1	-26.2	0	39.21	-	-	74	-34.79	0	100	V
9.61686	24.03	PK2	37.3	-22.1	0	39.23	-	-	74	-34.77	0	100	H
9.61023	12.18	PK2	37.3	-22.1	0	27.38	-	-	74	-46.62	0	100	V

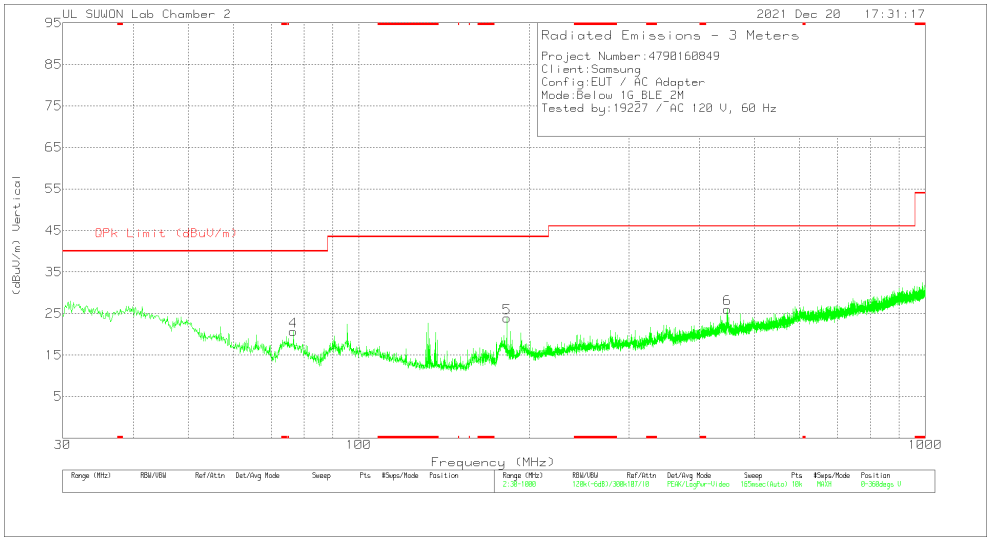
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak

10.3. WORST CASE BELOW 1 GHZ

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



HORIZONTAL



VERTICAL

Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_749	Below 1G[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	47.46	32.77	Pk	19.8	-31.7	0	20.87	40	-19.13	0-360	300	H
2	95.378	39.36	Pk	16.6	-31.3	0	24.66	43.52	-18.86	0-360	200	H
3	* 277.544	33.37	Pk	18.7	-30.4	0	21.67	46.02	-24.35	0-360	101	H
4	76.657	39.39	Pk	12.7	-31.4	0	20.69	40	-19.31	0-360	100	V
5	182.581	39.16	Pk	15.6	-30.8	0	23.96	43.52	-19.56	0-360	100	V
6	447.003	33.88	Pk	22	-29.8	0	26.08	46.02	-19.94	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.

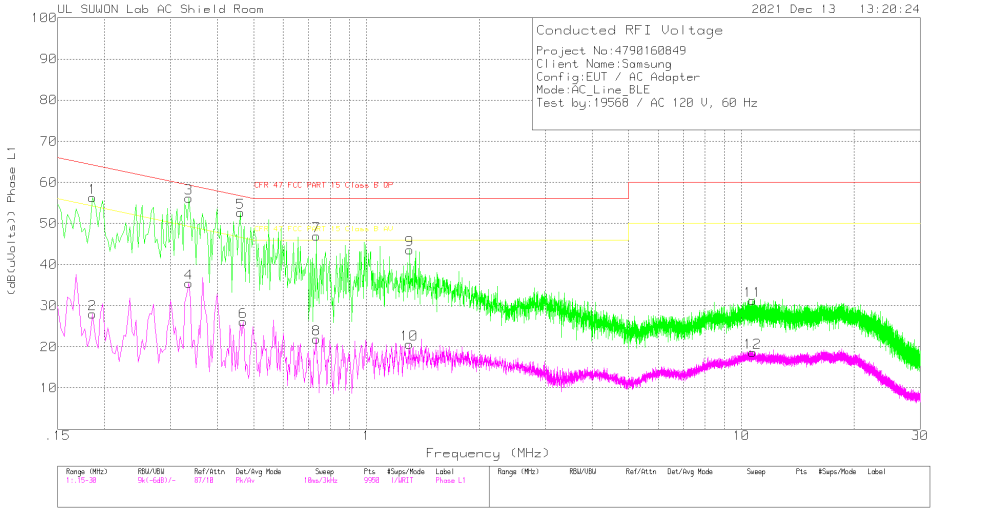
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

11.1.1. AC Power Line

LINE 1 RESULTS



Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_L1[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)
1	.186	46.24	Pk	9.9	.2	56.34	64.21	-7.87	-	-
2	.186	17.95	Av	9.9	.2	28.05	-	-	54.21	-26.16
3	.336	46.2	Pk	9.8	.2	56.2	59.3	-3.1	-	-
4	.336	25.51	Av	9.8	.2	35.51	-	-	49.3	-13.79
5	.462	42.53	Pk	9.9	.2	52.63	56.66	-4.03	-	-
6	.468	16.04	Av	9.9	.2	26.14	-	-	46.55	-20.41
7	.735	36.98	Pk	9.8	.2	46.98	56	-9.02	-	-
8	.735	11.92	Av	9.8	.2	21.92	-	-	46	-24.08
9	1.305	33.62	Pk	9.7	.3	43.62	56	-12.38	-	-
10	1.299	10.66	Av	9.7	.3	20.66	-	-	46	-25.34
11	10.719	21.08	Pk	9.9	.3	31.28	60	-28.72	-	-
12	10.719	8.45	Av	9.9	.3	18.65	-	-	50	-31.35

Pk - Peak detector
Av - Average detection

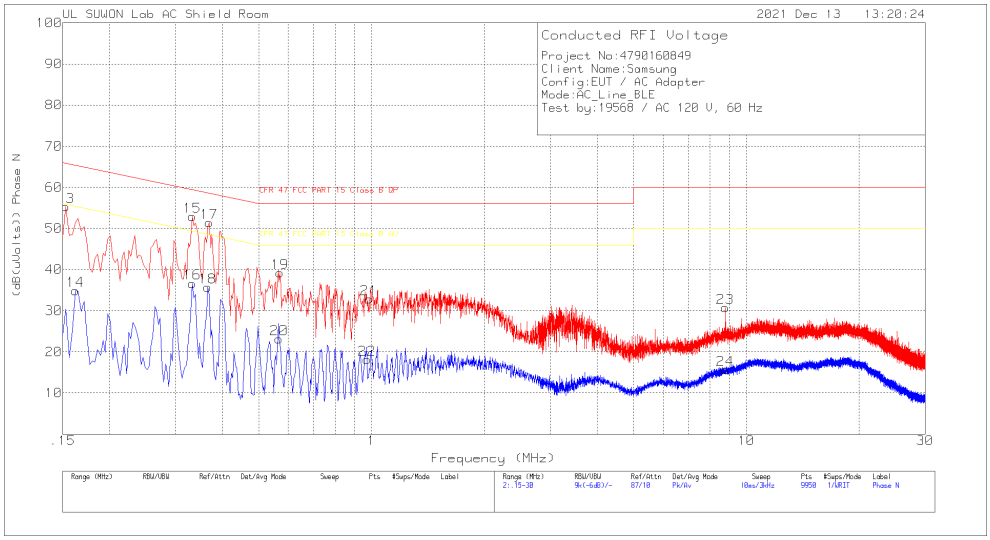
Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_L1[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)
.18525	30.73	Qp	9.9	.2	40.83	64.25	-23.42	-	-
.33525	41.23	Qp	9.8	.2	51.23	59.32	-8.09	-	-
.46275	28.69	Qp	9.9	.2	38.79	56.64	-17.85	-	-
.73425	23.77	Qp	9.8	.2	33.77	56	-22.23	-	-

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	.153	45.41	Pk	9.8	.1	55.31	65.84	-10.53	-	-
14	.162	24.91	Av	9.9	.1	34.91	-	-	55.36	-20.45
15	.333	42.88	Pk	9.8	.2	52.88	59.38	-6.5	-	-
16	.333	26.66	Av	9.8	.2	36.66	-	-	49.38	-12.72
17	.369	41.48	Pk	9.8	.2	51.48	58.52	-7.04	-	-
18	.366	25.74	Av	9.8	.2	35.74	-	-	48.59	-12.85
19	.57	29.08	Pk	9.9	.2	39.18	56	-16.82	-	-
20	.567	12.99	Av	9.9	.2	23.09	-	-	46	-22.91
21	.984	22.91	Pk	9.7	.3	32.91	56	-23.09	-	-
22	.972	8.13	Av	9.7	.3	18.13	-	-	46	-27.87
23	8.799	20.54	Pk	9.8	.4	30.74	60	-29.26	-	-
24	8.784	5.47	Av	9.8	.4	15.67	-	-	50	-34.33

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)
.15375	38.61	Qp	9.8	.1	48.51	65.79	-17.28	-	-
.33375	40.96	Qp	9.8	.2	50.96	59.36	-8.4	-	-
.56925	27.02	Qp	9.9	.2	37.12	56	-18.88	-	-

Qp - Quasi-Peak detector

END OF TEST REPORT