



CERTIFICATION TEST REPORT

Report Number. : 4790215260-E4V1

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

Model : SM-A135F/DSN

FCC ID : A3LSMA135FDSN

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:

2022-01-21

Prepared by:

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Revision History

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

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, and NFC
MODEL NUMBER: SM-A135F/DSN
SERIAL NUMBER: R38RB002TVY, R38RB002VFR (CONDUCTED);
R38RB01SY3Z (RADIATED);
DATE TESTED: 2021-12-22 ~ 2022-01-21

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

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf>.

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.02 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 Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC.
This test report addresses the DTS (BLE) operational mode.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range [MHz]	Mode	Power Mode	Output Power [dBm]	Output Power [mW]
2 402 ~ 2 480	1Mbps	Peak	7.007	5.020
		Average	6.285	4.251
	2Mbps	Peak	6.888	4.884
		Average	6.099	4.073

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 -5.04 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(255 pkt) and 2 Mbps(255 pkt) power is the worst case for symbol rate. All tests were performed in these two modes.

Symbol Rate [Ms/s]	Mode	Freq. [MHz]	Conducted Burst Avg [dBm]	Symbol Rate [Ms/s]	Mode	Freq. [MHz]	Conducted Burst Avg [dBm]
1	1Mbps 37pkt	2402	5.388	2	2Mbps 37pkt	2402	5.139
		2440	6.219			2440	5.988
		2480	5.636			2480	5.428
	1Mbps 255pkt	2402	5.461		2Mbps 255pkt	2402	5.264
		2440	6.285			2440	6.099
		2480	5.700			2480	5.520
1 Coded S=8	125kbps 37pkt	2402	5.444	1 Coded S=2	500kbps 37pkt	2402	5.454
		2440	6.276			2440	6.276
		2480	5.684			2480	5.699
	125kbps 255pkt	2402	5.434		500kbps 255pkt	2402	5.434
		2440	6.260			2440	6.253
		2480	5.664			2480	5.679

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37N9Q14289RT3	N/A
Data Cable	SAMSUNG	EP-DN980BWE (GH39-02115A, C to C)	N/A	N/A

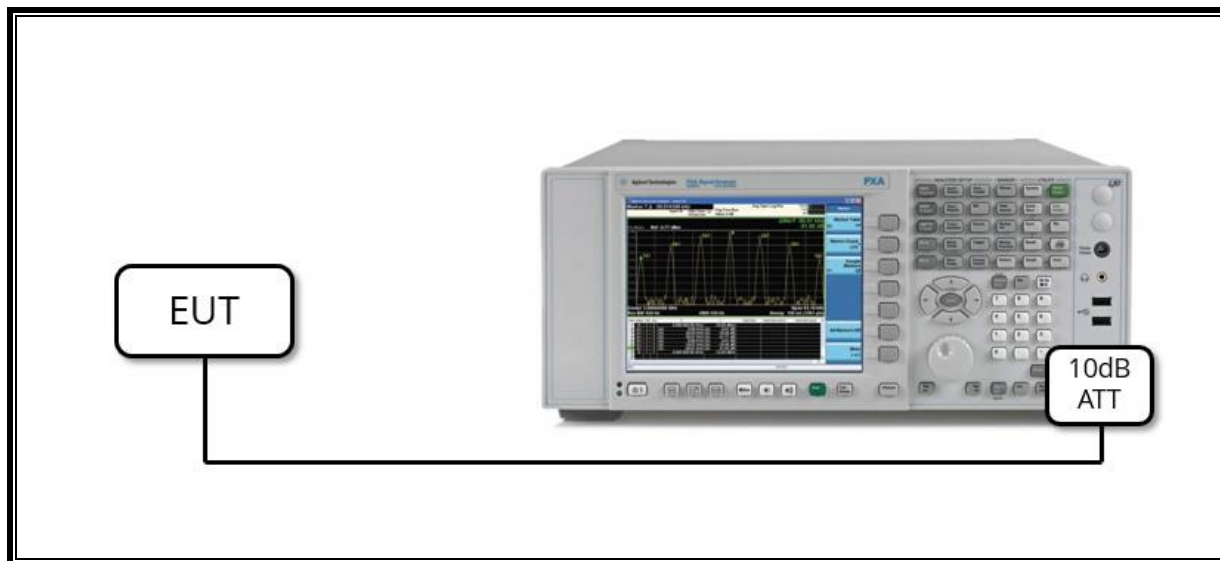
I/O CABLE

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

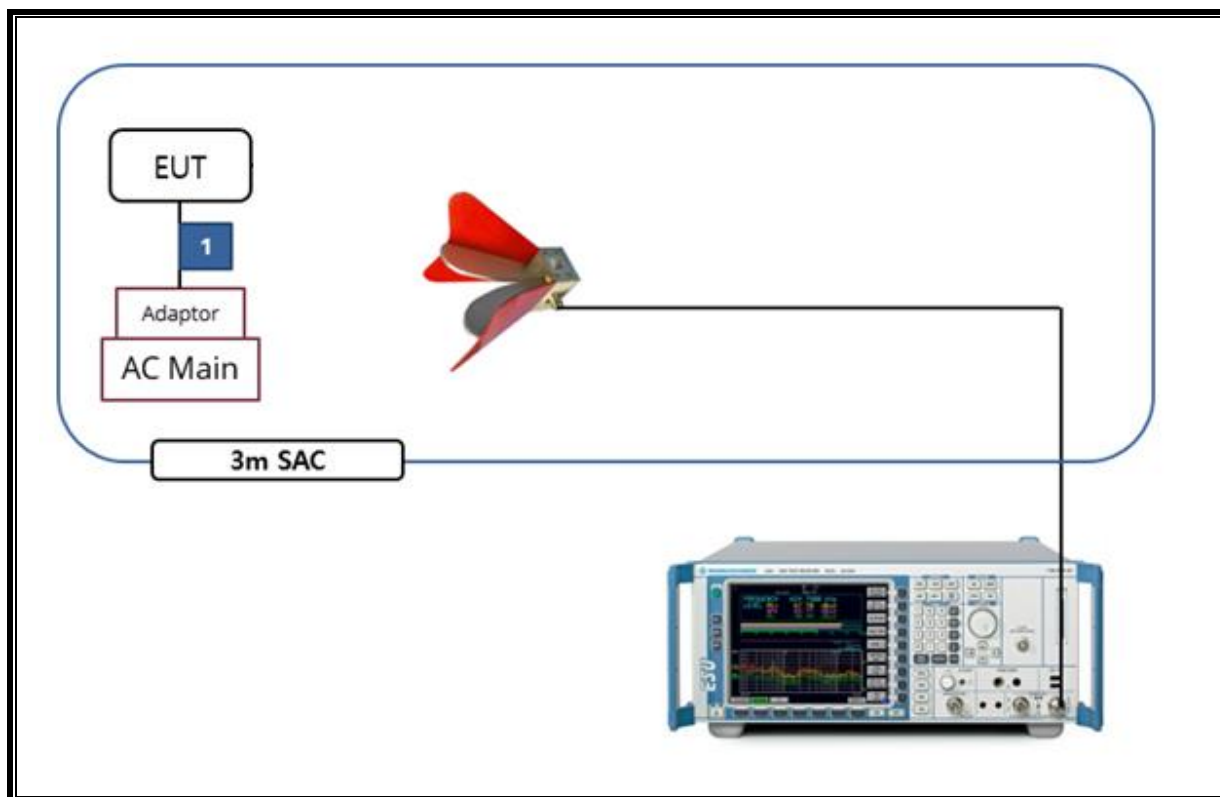
TEST SETUP

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 \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

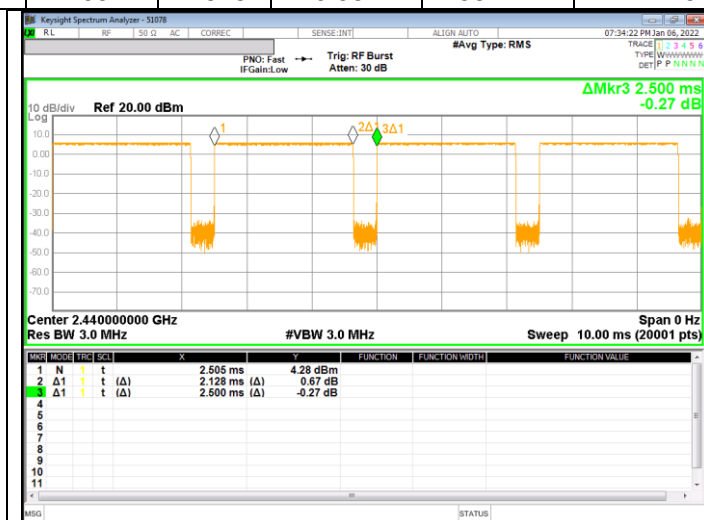
9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

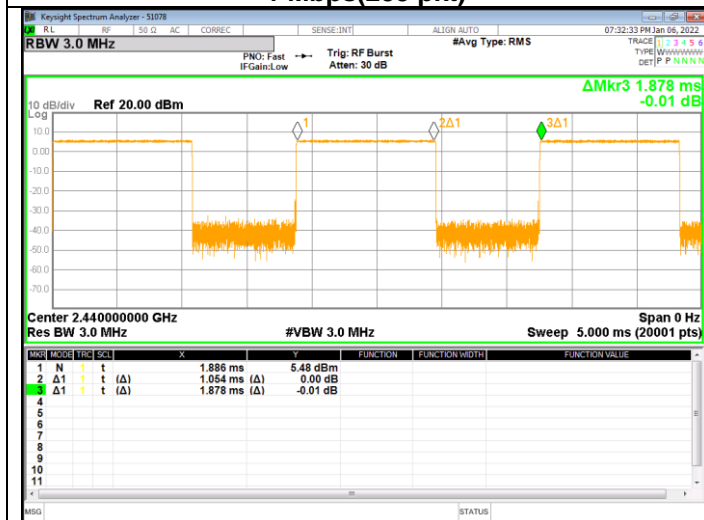
LIMITS

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 [255pkt]	2.128	2.500	0.851	85.120	0.70	0.47
2 Mbps [255pkt]	1.054	1.878	0.561	56.124	2.51	0.95



1 Mbps(255 pkt)



2 Mbps(255 pkt)

9.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

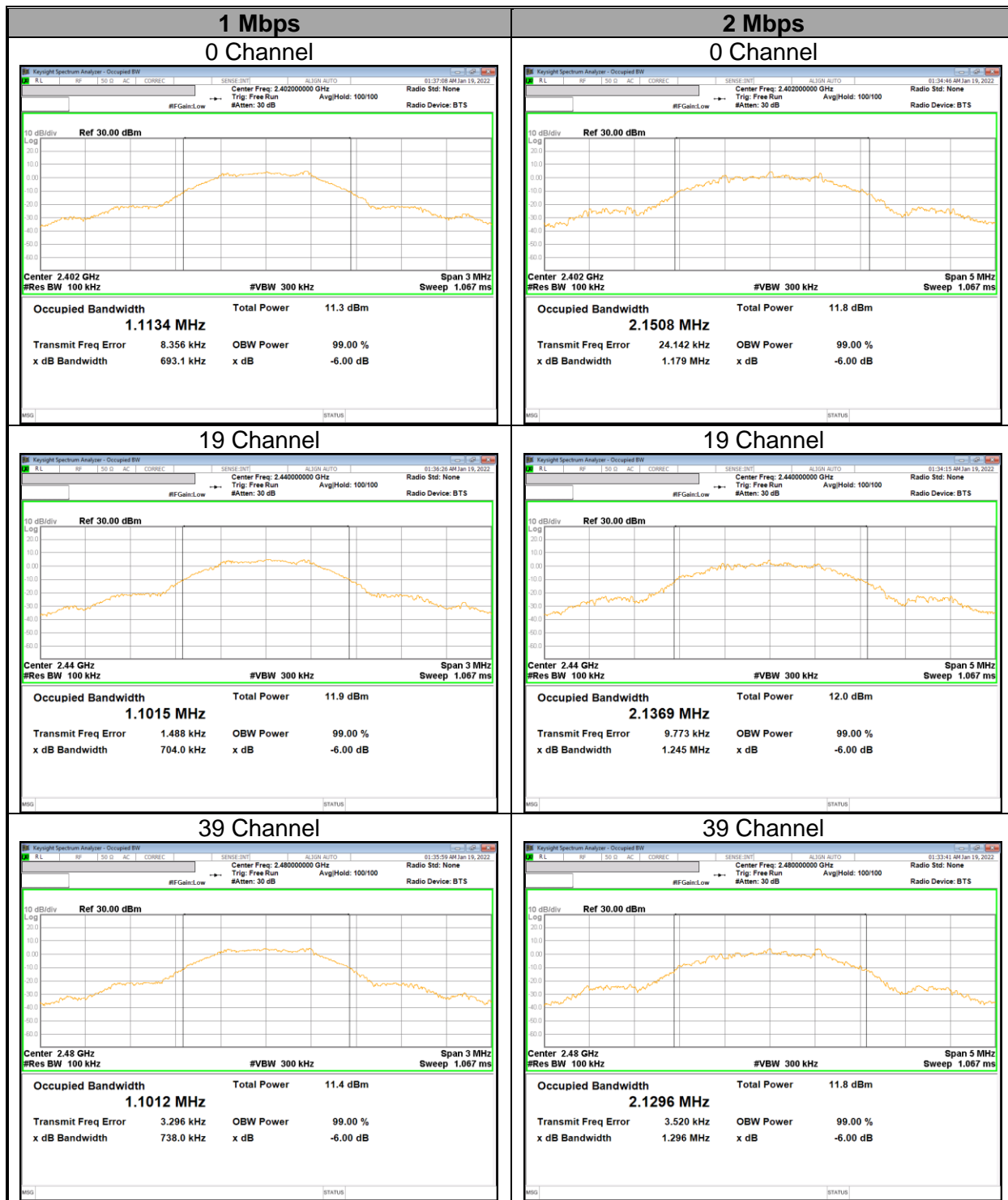
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

9.2.1. 1 Test data

Mode	Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]
1Mbps	0	2 402	693.1	500.0
	19	2 440	704.0	500.0
	39	2 480	738.0	500.0
2Mbps	0	2 402	1179.0	500.0
	19	2 440	1245.0	500.0
	39	2 480	1296.0	500.0
Worst				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

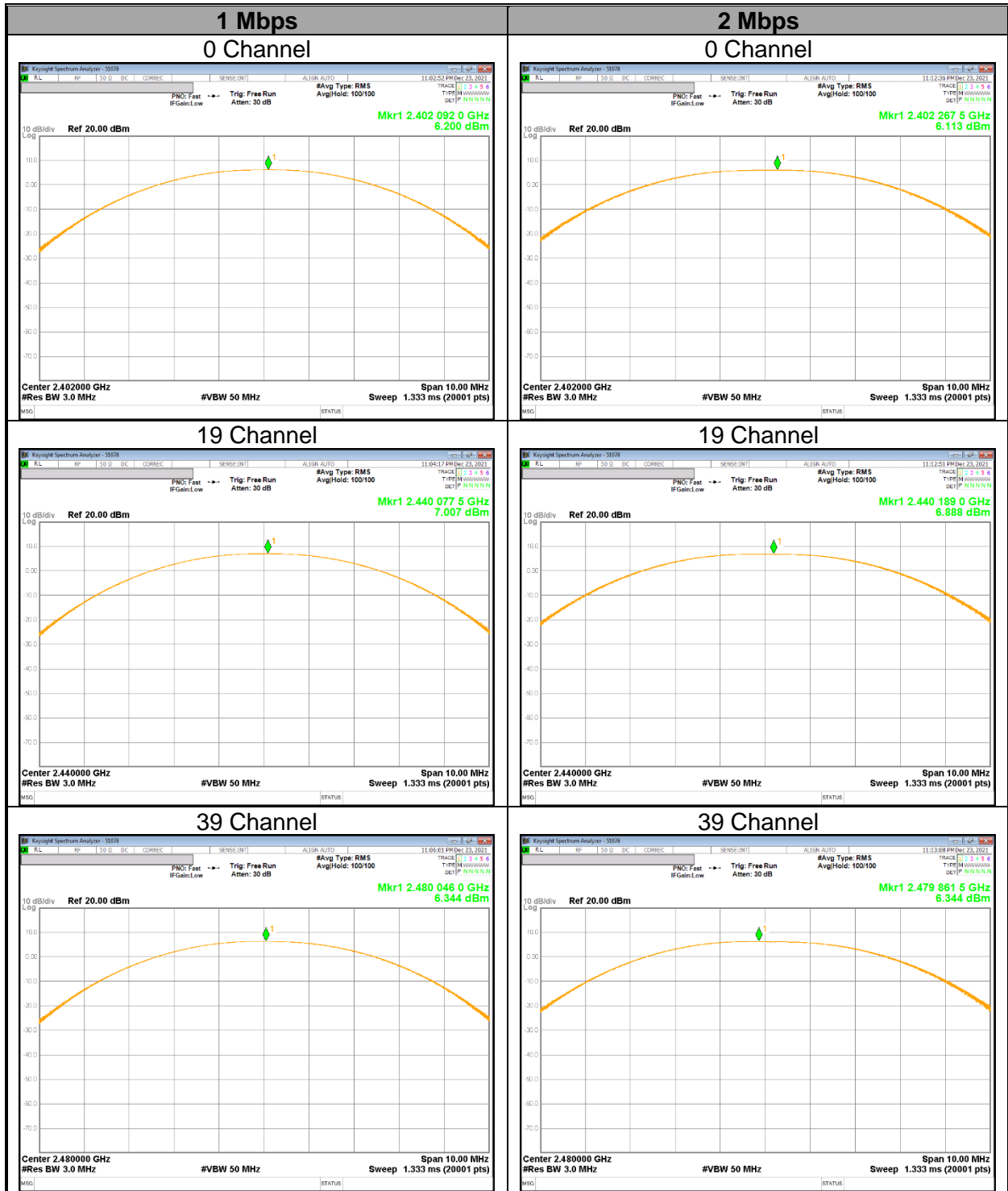
Peak power is measured using ANSI C63.10(2013) under section 11.9.1.1 utilizing spectrum analyzer(RBW \cong DTS bandwidth).

RESULTS

9.3.1. 1 Test data

Mode	Channel	Frequency [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]
1Mbps (255 pkt)	0	2 402	6.200	30.000	-23.800
	19	2 440	7.007		-22.993
	39	2 480	6.344		-23.656
2Mbps (255 pkt)	0	2 402	6.113		-23.887
	19	2 440	6.888		-23.112
	39	2 480	6.344		-23.656
Worst			7.007		-22.993

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	5.461	3.516
	19	2 440	6.285	4.251
	39	2 480	5.700	3.715
2Mbps	0	2 402	5.264	3.360
	19	2 440	6.099	4.073
	39	2 480	5.520	3.565

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

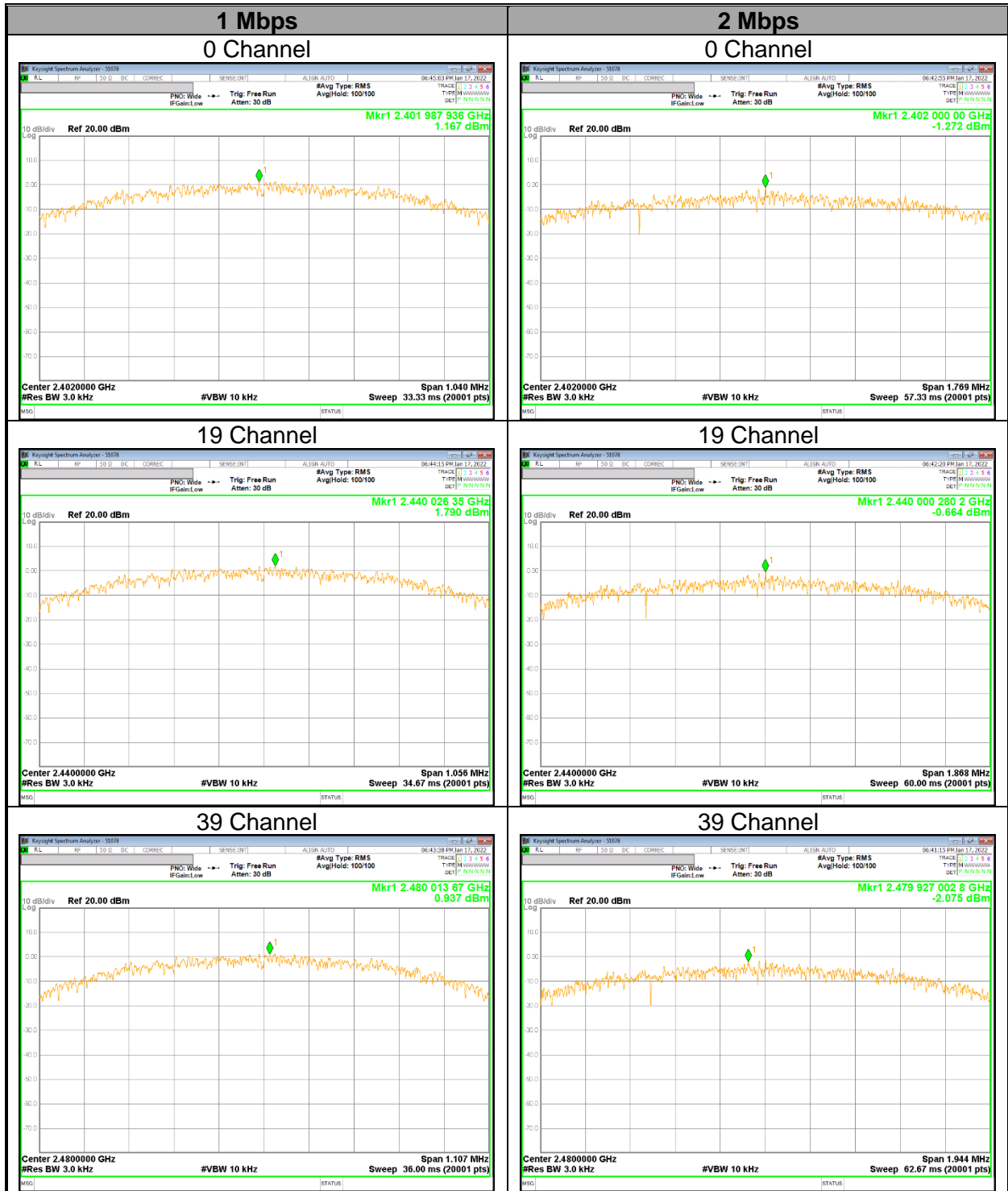
ANSI C63.10-2013, Section 11.10.2 Method PKPSD (peak PSD)

RESULTS

9.5.1. Test data

Mode	Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
1Mbps (255pkt)	0	2 402	1.167	8.00	-6.833
	19	2 440	1.790		-6.210
	39	2 480	0.937		-7.063
2Mbps (255pkt)	0	2 402	-1.272		-9.272
	19	2 440	-0.664		-8.664
	39	2 480	-2.075		-10.075
Worst			1.790	-6.210	

9.5.2. PSD TEST PLOTS



9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

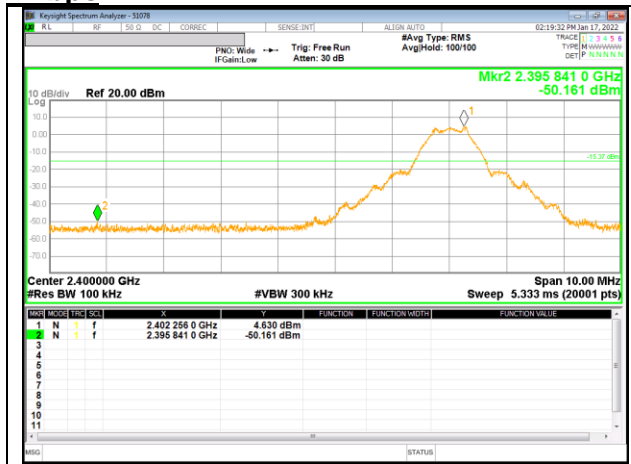
RSS-247 5.5

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

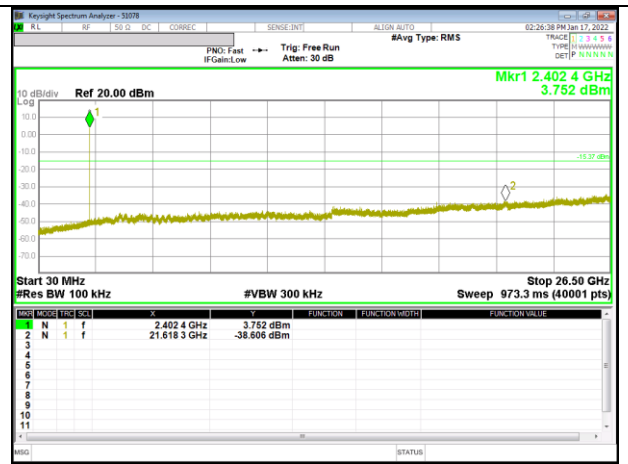
RESULTS

9.6.1. Test plot

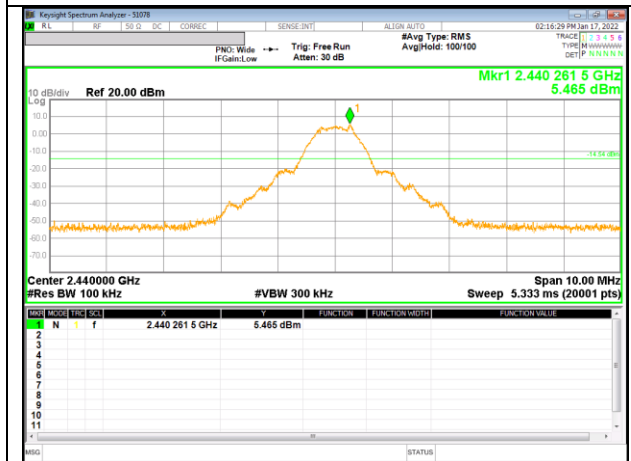
1Mbps



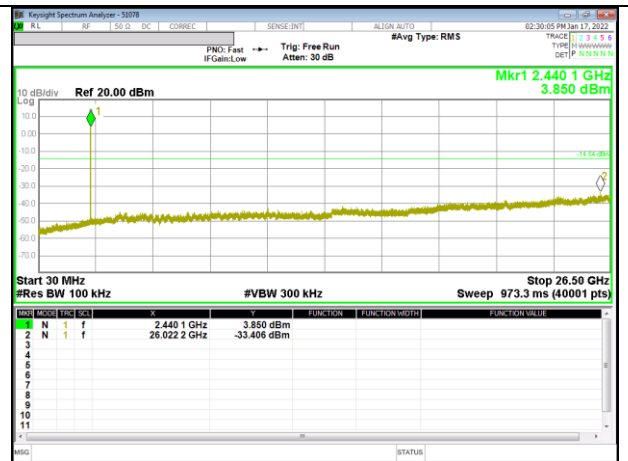
0 CHANNEL BANDEDGE



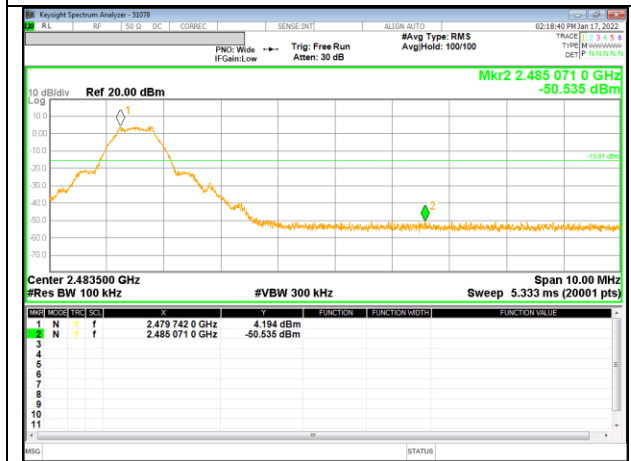
OUT-OF-BAND 0 CHANNEL



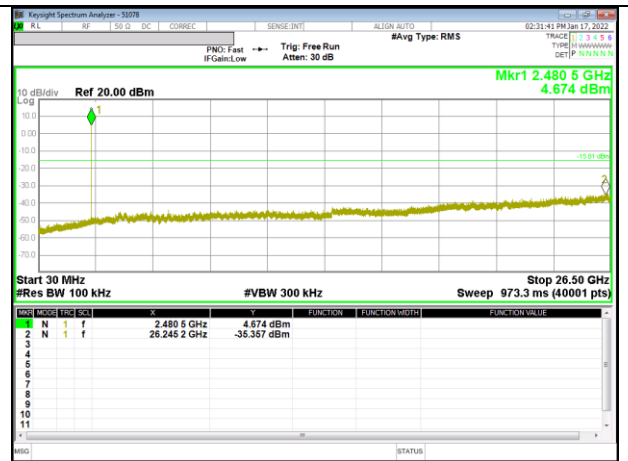
IN-BAND REFERENCE LEVEL



OUT-OF-BAND 19 CHANNEL



39 CHANNEL BANDEDGE

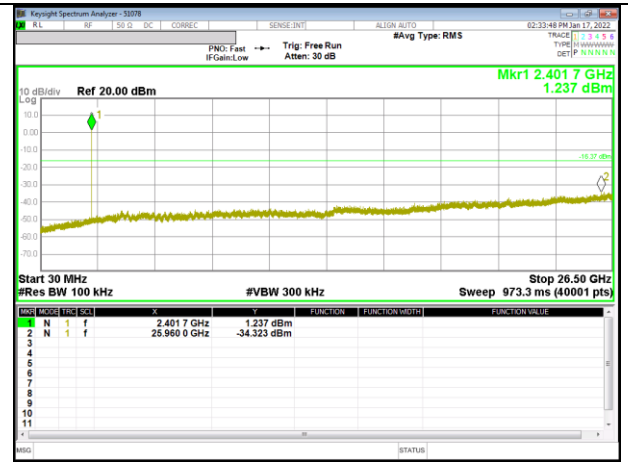


OUT-OF-BAND 39 CHANNEL

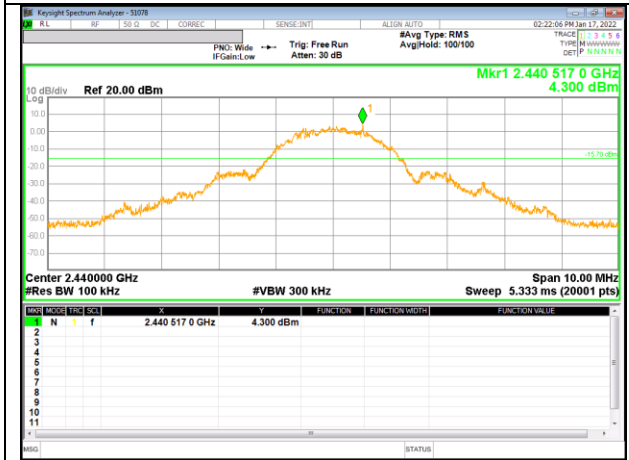
2Mbps



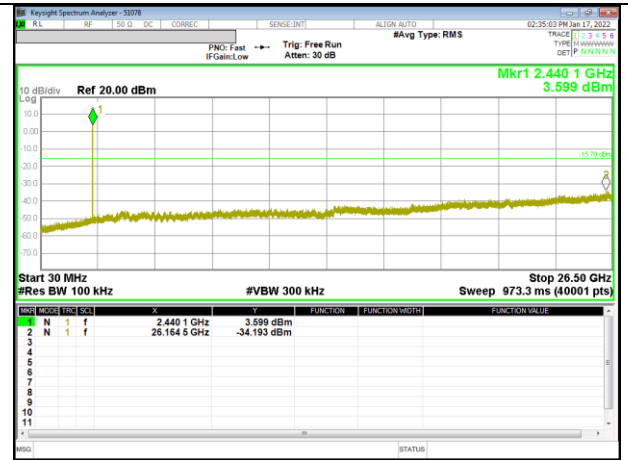
0 CHANNEL BANDEDGE



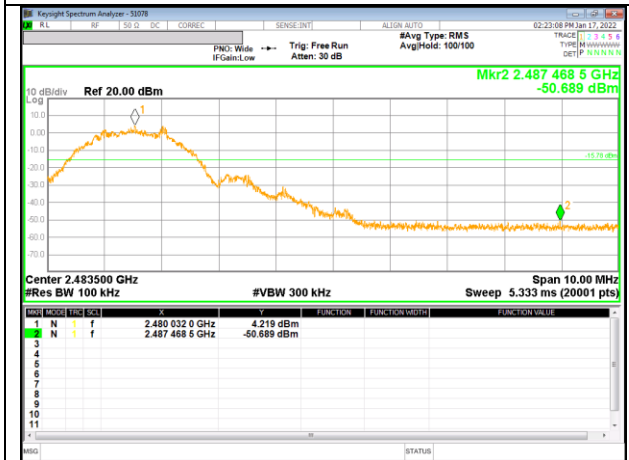
OUT-OF-BAND 0 CHANNEL



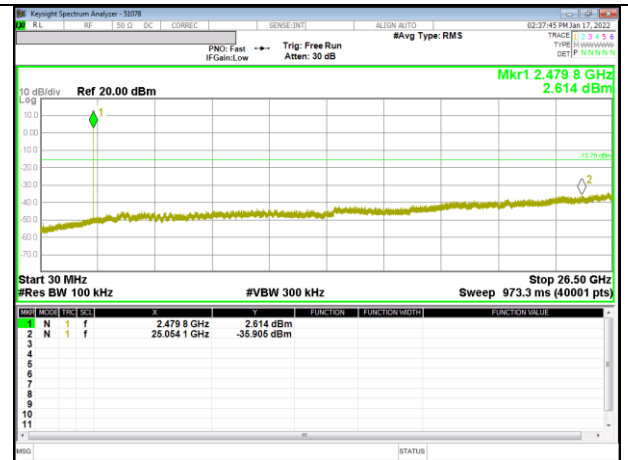
IN-BAND REFERENCE LEVEL



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 ($\mu\text{V}/\text{m}$)	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 = $10 \log(1/0.851) = 0.700$ dB (Spectrum Analyzer round it up to 0.70 dB) and for 2 Mbps, DCF = $10 \log(1/0.561) = 2.509$ dB (Spectrum Analyzer round it up to 2.51 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.

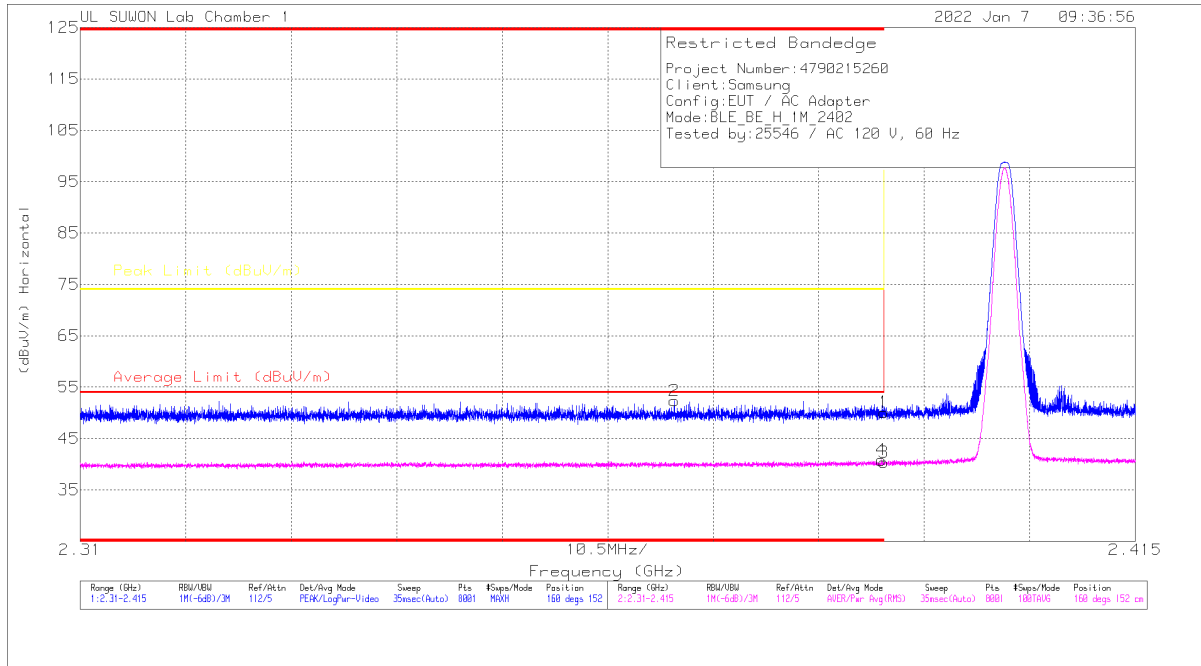
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. 1 Mbps

BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT

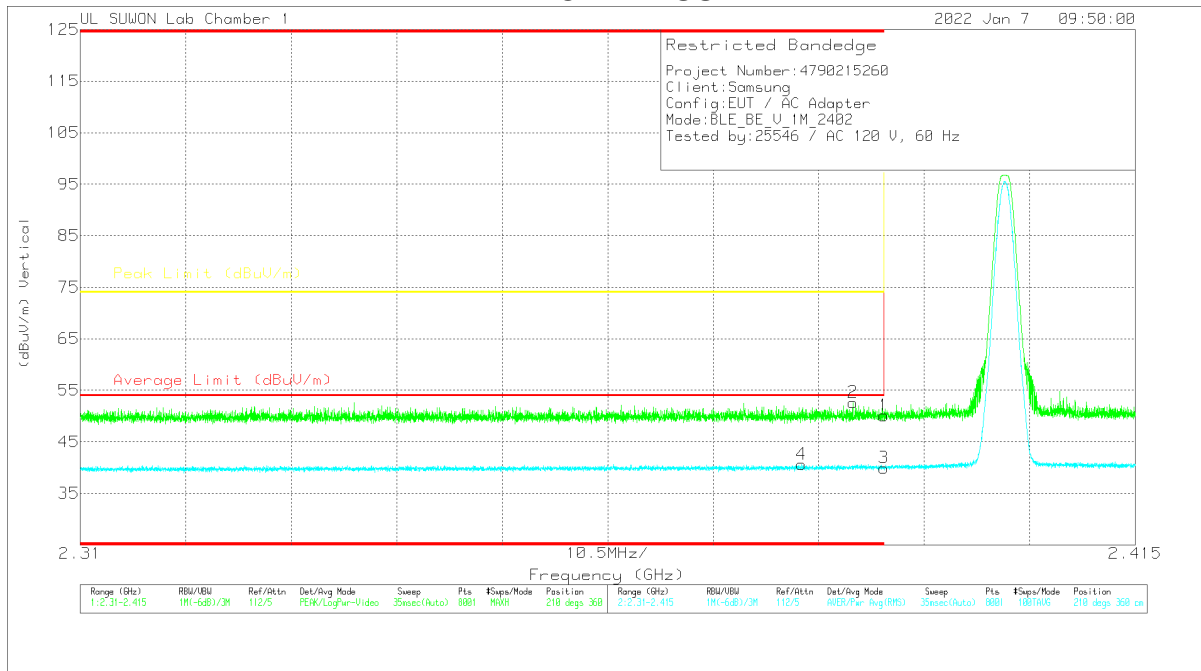


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	43.58	PK	31.8	-25.3	0	50.08	-	-	74	-23.92	160	152	H
2	* 2.38913	46.04	PK	31.7	-25.4	0	52.34	-	-	74	-21.66	160	152	H
3	* 2.39	33.17	RMS	31.8	-25.3	.7	40.37	S4	-13.63	-	-	160	152	H
4	* 2.38975	33.62	RMS	31.8	-25.3	.7	40.82	S4	-13.18	-	-	160	152	H

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

VERTICAL RESULT



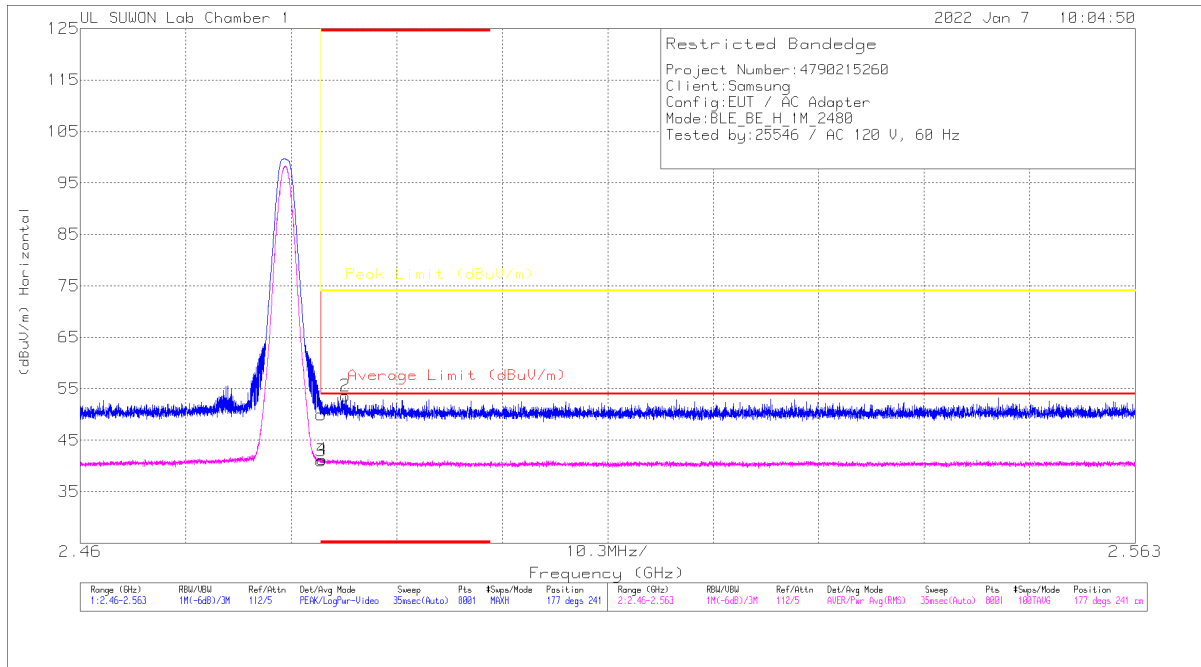
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	43.61	Pk	31.8	-25.3	0	50.11	-	-	74	-23.89	210	360	V
2	* 2.3869	46.15	Pk	31.8	-25.3	0	52.65	-	-	74	-21.35	210	360	V
3	* 2.39	32.75	RMS	31.8	-25.3	.7	39.95	54	-14.05	-	-	210	360	V
4	* 2.38178	33.43	RMS	31.8	-25.3	.7	40.63	54	-13.37	-	-	210	360	V

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

BANDEDGE (39 CHANNEL)

HORIZONTAL RESULT

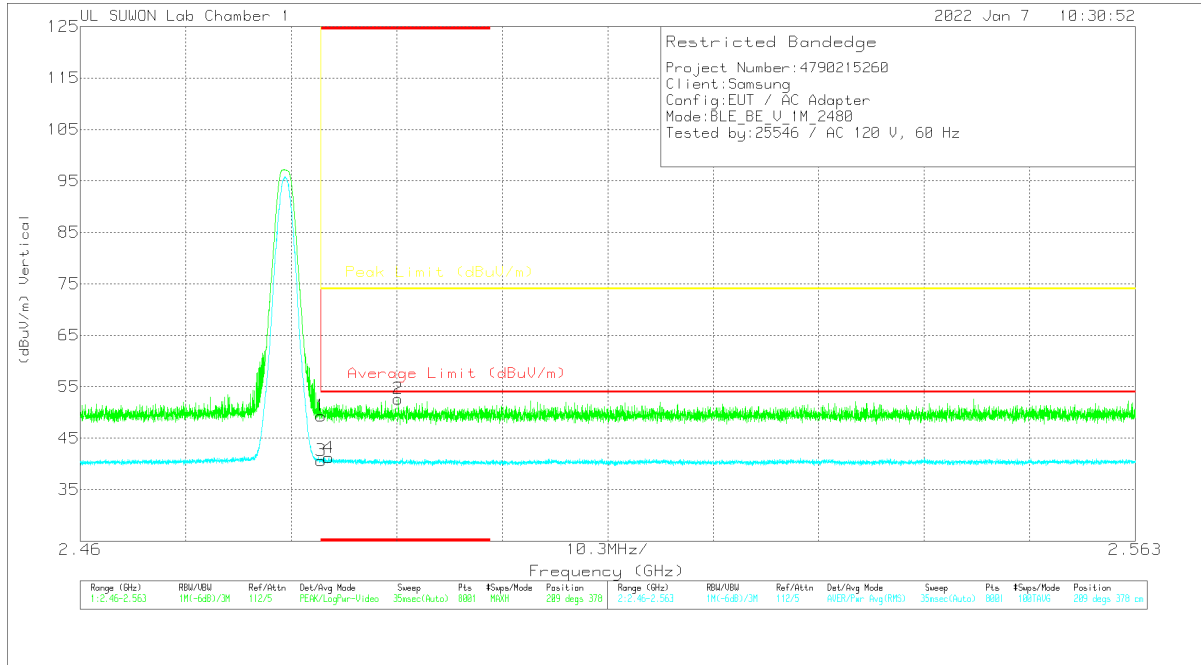


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	43.1	Pk	-32	-25.1	0	50	-	-	74	-24	177	241	H
2	* 2.48589	46.62	Pk	-32	-25	0	53.62	-	-	74	-20.38	177	241	H
3	* 2.48351	33.41	RMS	-32	-25.1	-7	41.01	54	-12.99	-	-	177	241	H
4	* 2.48363	33.69	RMS	-32	-25.1	-7	41.29	54	-12.71	-	-	177	241	H

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

VERTICAL RESULT



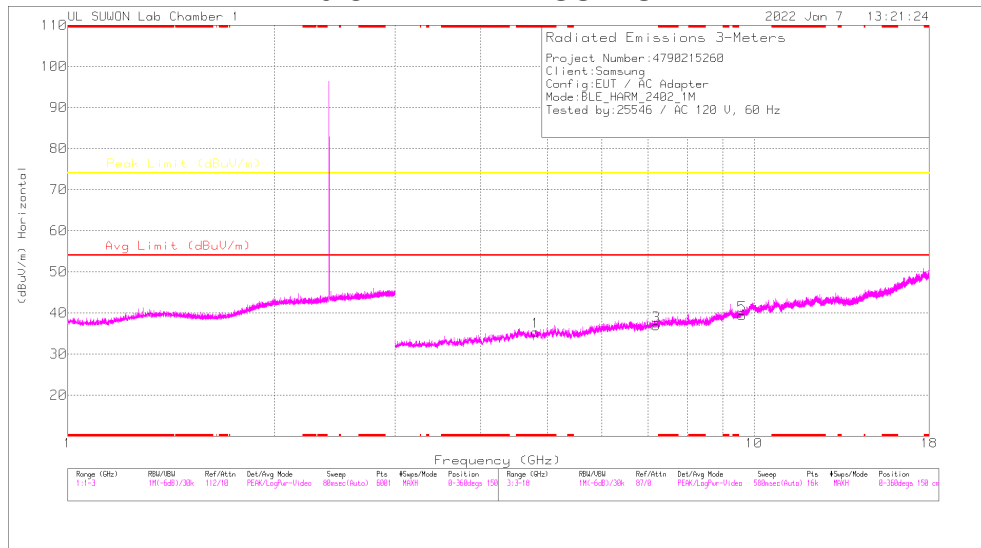
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	42.46	Pk	32	-25.1	0	49.36	-	-	74	-24.64	209	378	V
2	* 2.49105	45.66	Pk	32	-25	0	52.66	-	-	74	-21.34	209	378	V
3	* 2.48351	33.06	RMS	32	-25.1	.7	40.66	54	-13.34	-	-	209	378	V
4	* 2.48426	33.63	RMS	32	-25.1	.7	41.23	54	-12.77	-	-	209	378	V

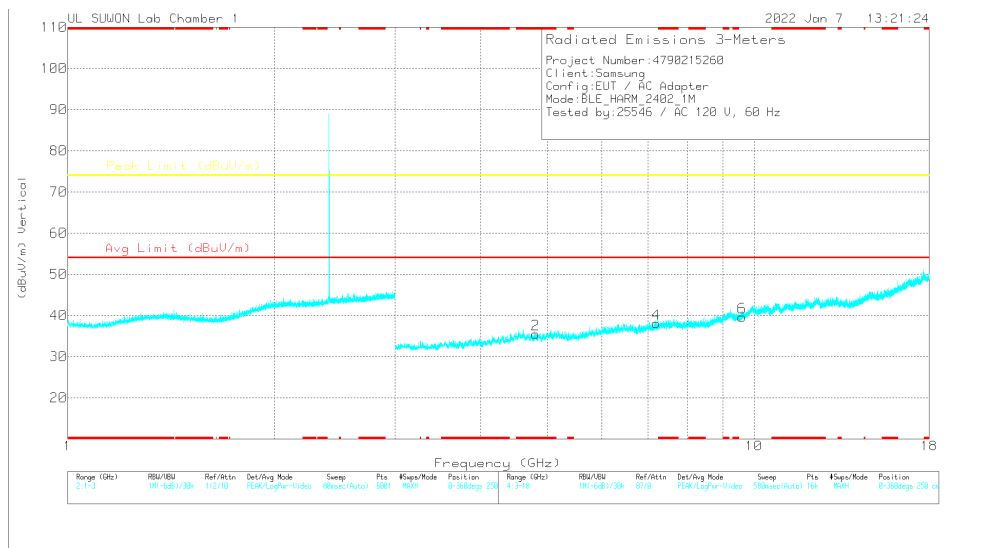
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

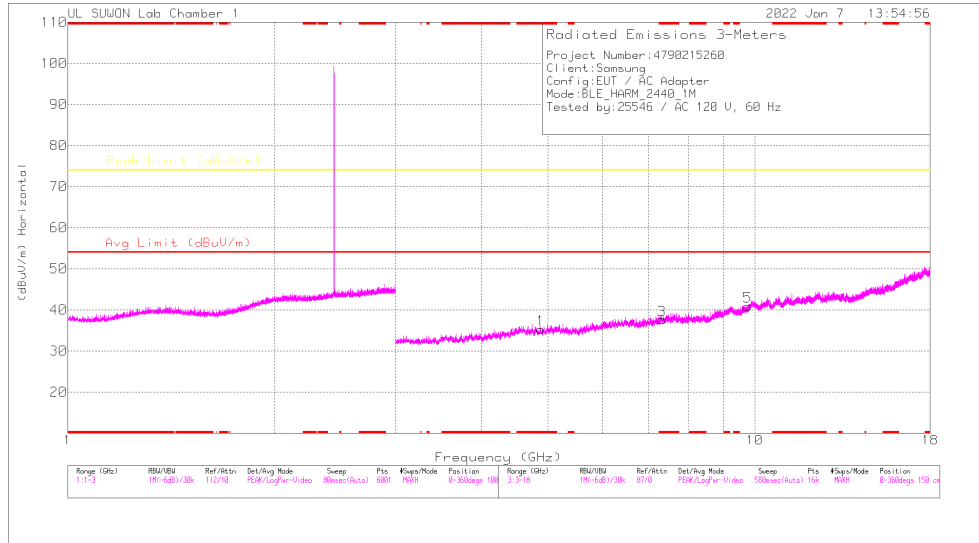
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

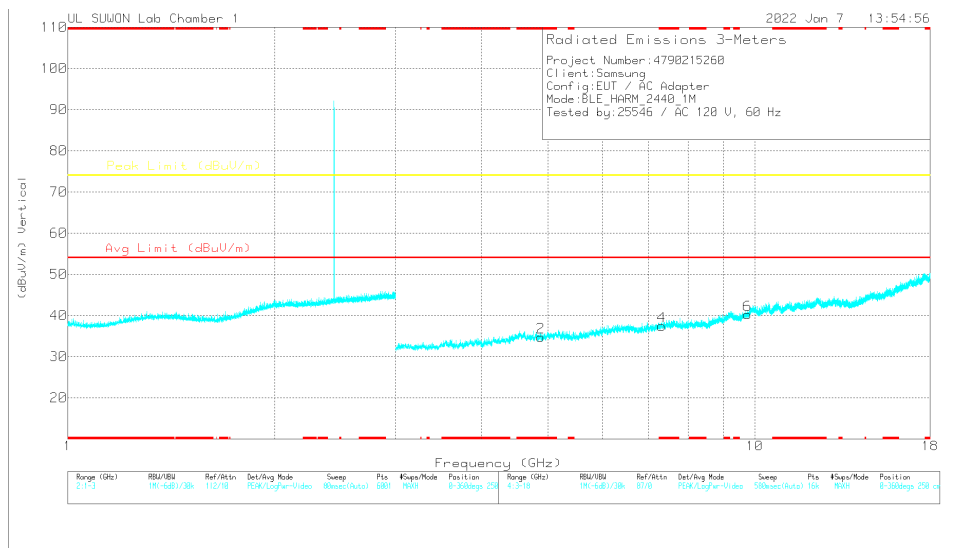
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HPI(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80513	42.09	PK2	34.1	-31.2	0	44.99	-	-	74	-29.01	0	100	H
* 4.80343	41.29	PK2	34.1	-31.2	0	44.19	-	-	74	-29.81	0	100	V
7.19782	37.67	PK2	35.9	-27.5	0	46.07	-	-	74	-27.93	0	100	H
7.201	37.48	PK2	35.9	-27.5	0	45.88	-	-	74	-28.12	0	100	V
9.61781	35.09	PK2	37.2	-22.9	0	49.39	-	-	74	-24.61	0	100	H
9.60758	35.15	PK2	37.1	-22.8	0	49.45	-	-	74	-24.55	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.

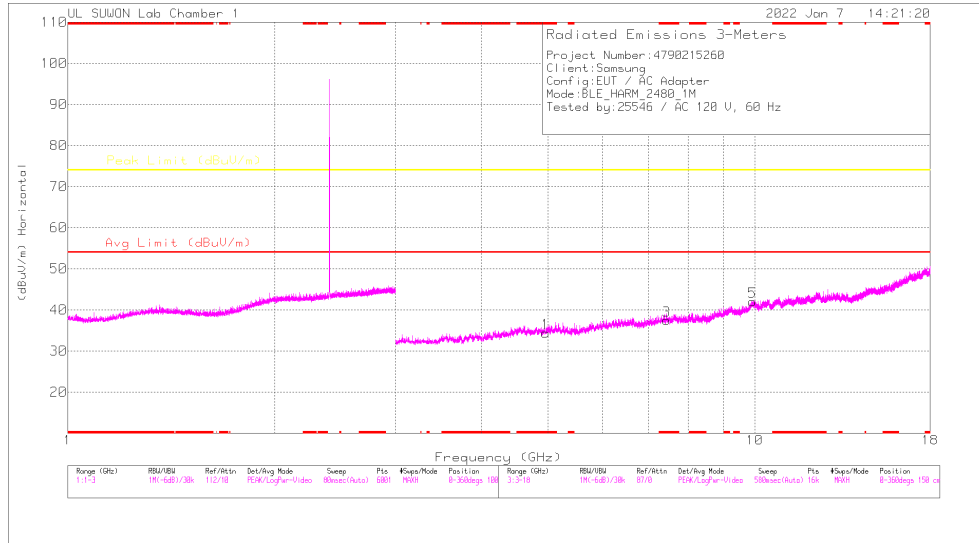
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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
* 4.87444	42.06	PK2	34.1	-31.3	0	44.86	-	-	74	-29.14	0	100	H
* 4.87496	41.82	PK2	34.1	-31.3	0	44.62	-	-	74	-29.38	0	100	V
* 7.33051	38.68	PK2	35.8	-27.1	0	47.38	-	-	74	-26.62	0	100	H
* 7.31157	38.11	PK2	35.8	-27.2	0	46.71	-	-	74	-27.29	0	100	V
9.75104	34.95	PK2	37.4	-23.5	0	48.85	-	-	74	-25.15	0	100	H
9.75843	35.44	PK2	37.4	-23.6	0	49.24	-	-	74	-24.76	0	100	V

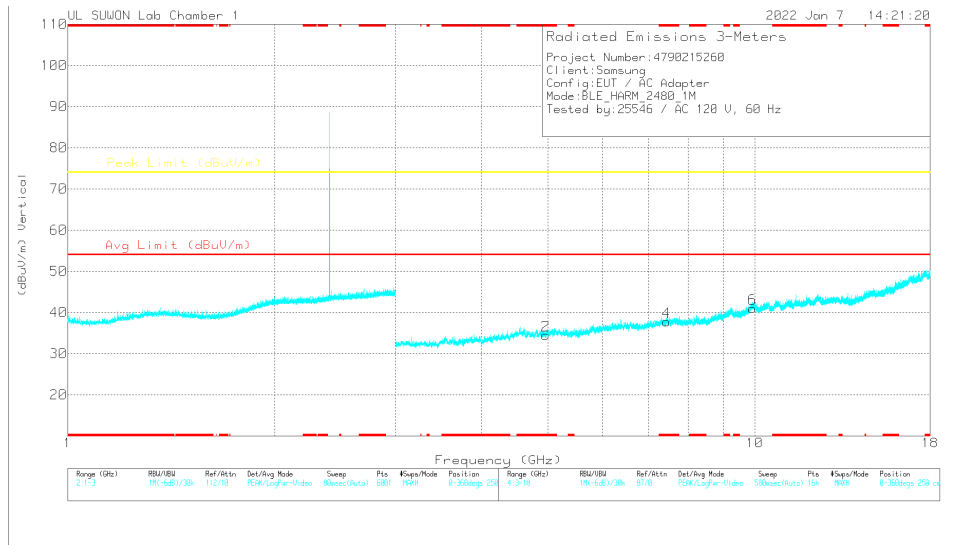
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

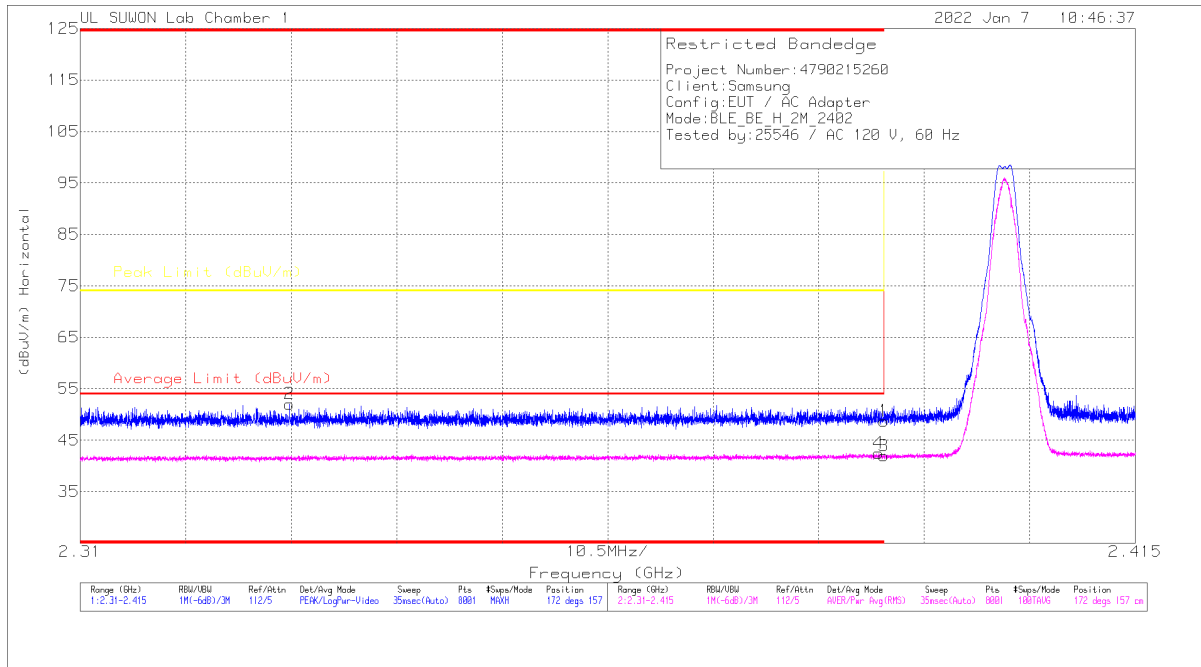
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.95197	41.14	PK2	34.1	-31.4	0	43.84	-	-	74	-30.16	0	100	H
* 4.95843	41.22	PK2	34.1	-31.4	0	43.92	-	-	74	-30.08	0	100	V
* 7.449	38.16	PK2	35.8	-26.7	0	47.26	-	-	74	-26.74	0	100	H
* 7.43459	37.55	PK2	35.8	-26.6	0	46.75	-	-	74	-27.25	0	100	V
9.91572	33.67	PK2	37.7	-21.6	0	49.77	-	-	74	-24.23	0	100	H
9.92981	33.68	PK2	37.7	-21.4	0	49.98	-	-	74	-24.02	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

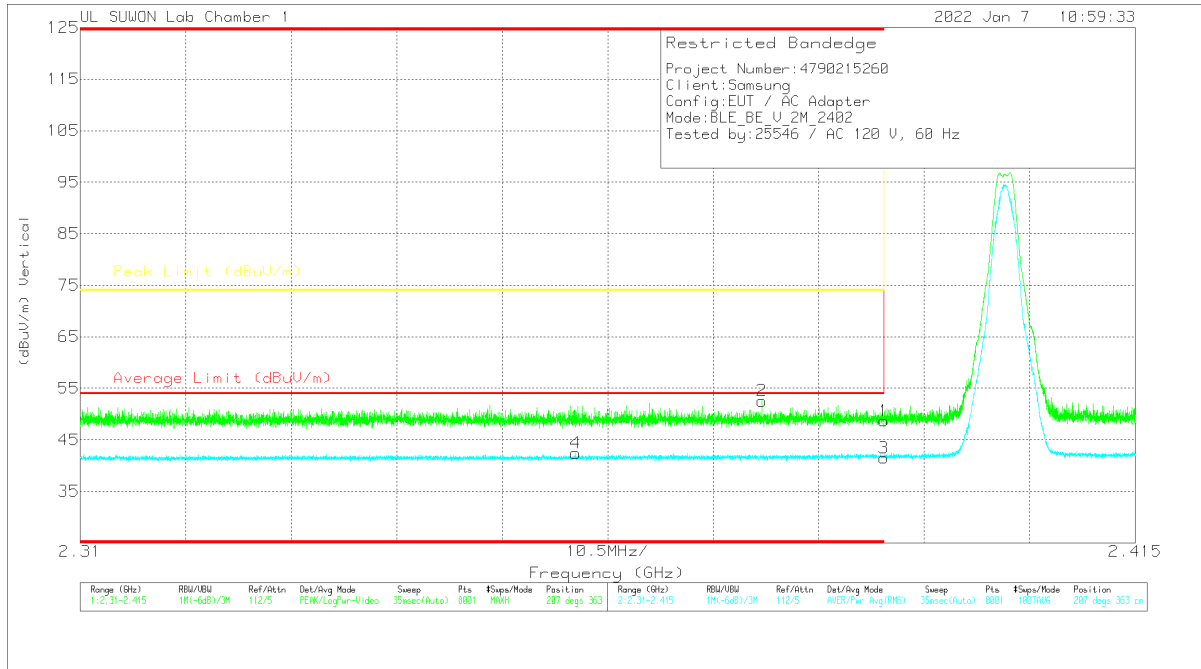


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	42.24	Pk	31.8	-25.3	0	48.74	-	-	74	-25.26	172	157	H
2	* 2.33082	45.85	Pk	31.7	-25.5	0	52.05	-	-	74	-21.95	172	157	H
3	* 2.39	32.93	RMS	31.8	-25.3	2.51	41.94	54	-12.06	-	-	172	157	H
4	* 2.38945	33.47	RMS	31.8	-25.3	2.51	42.48	54	-11.52	-	-	172	157	H

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

VERTICAL RESULT



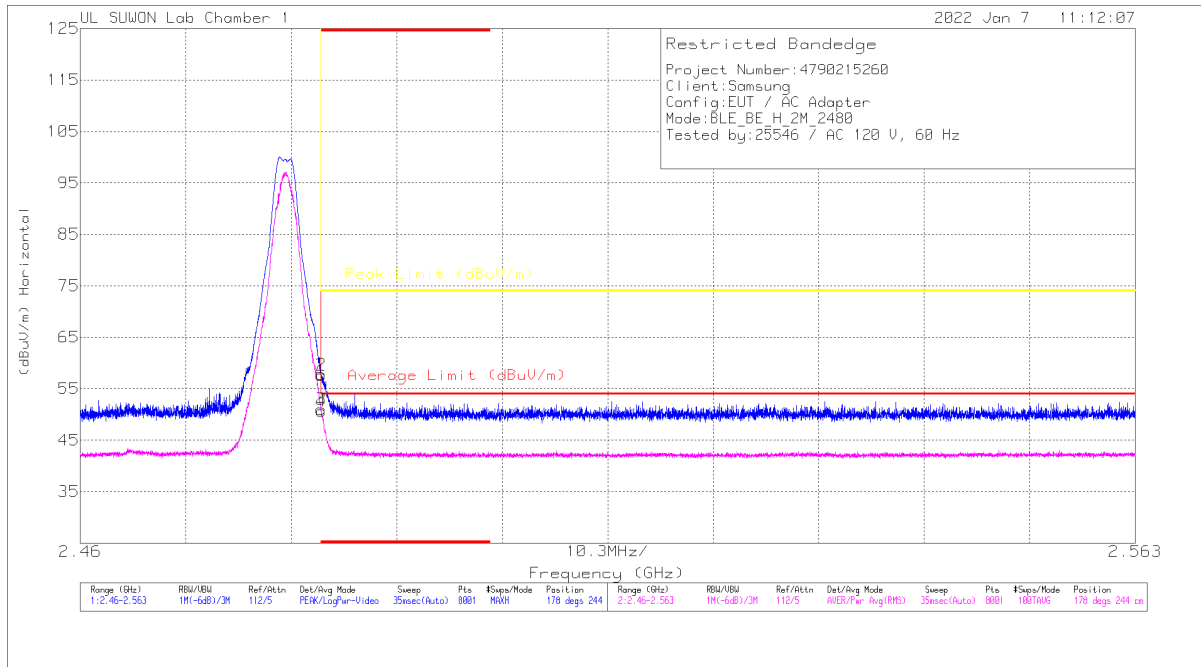
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	42.19	Pk	31.8	-25.3	0	48.69	-	-	74	-25.31	207	363	V
2	* 2.37783	46.16	Pk	31.8	-25.4	0	52.56	-	-	74	-21.44	207	363	V
3	* 2.39	32.44	RMS	31.8	-25.3	2.51	41.45	54	-12.55	-	-	207	363	V
4	* 2.3593	33.71	RMS	31.7	-25.5	2.51	42.42	54	-11.58	-	-	207	363	V

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

BANDEDGE (39 CHANNEL)

HORIZONTAL RESULT

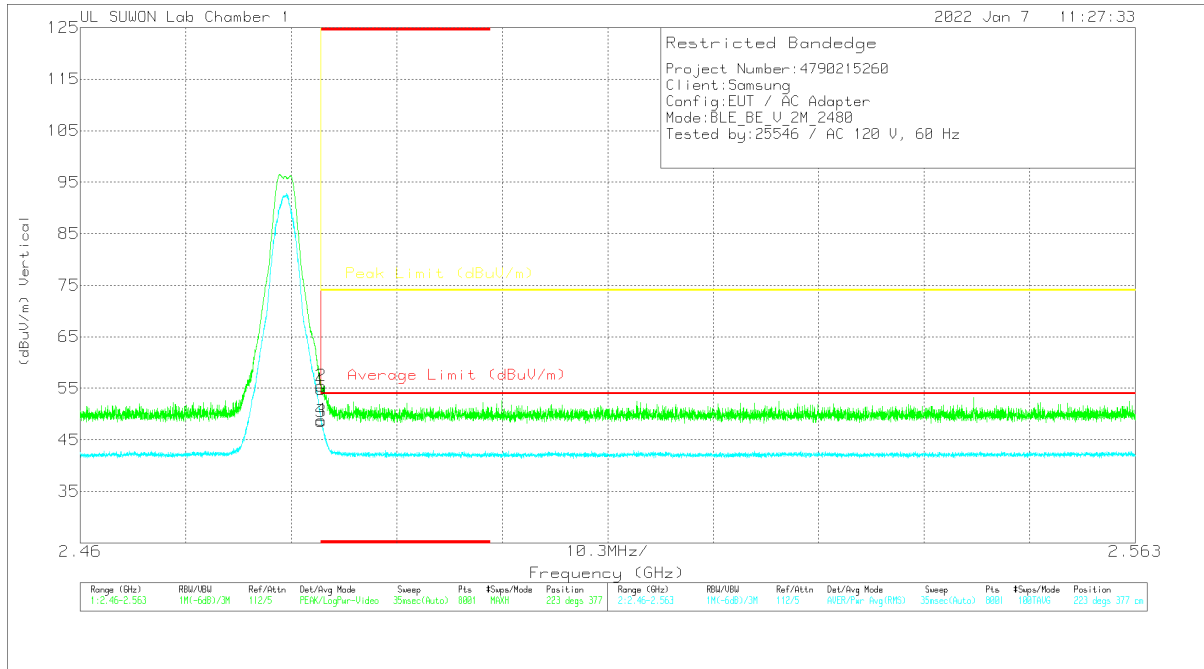


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Cor (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Altitude (Degs)	Height (cm)	Polarity
1	* 2.48351	50.92	Pk	-32	-25.1	0	57.82	-	-	74	-16.18	178	244	H
2	* 2.48354	50.75	PK	-32	-25.1	0	57.65	-	-	74	-16.35	178	244	H
3	* 2.48351	41.61	RMS	-32	-25.1	2.51	51.02	54	-2.98	-	-	178	244	H
4	* 2.48355	41.22	RMS	-32	-25.1	2.51	50.63	54	-3.37	-	-	178	244	H

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

VERTICAL RESULT



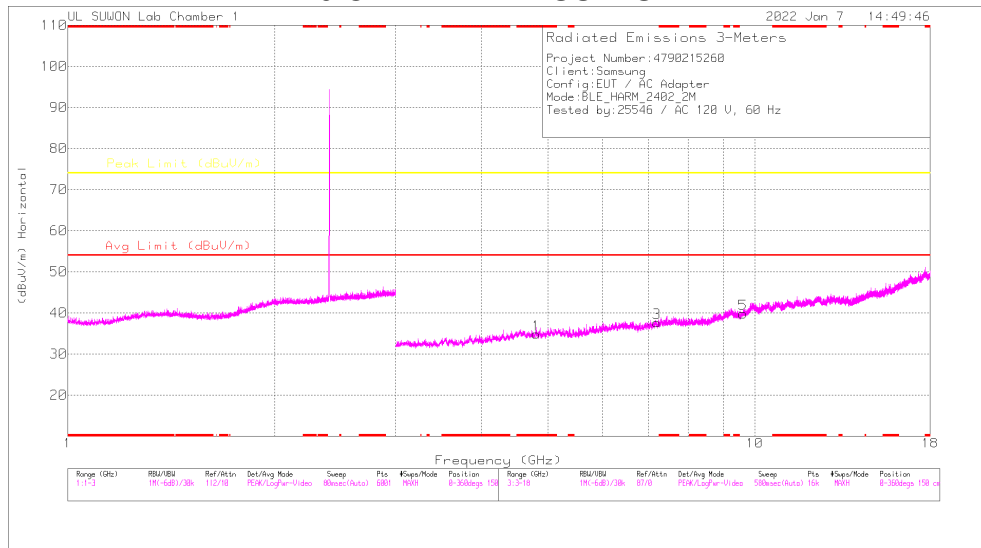
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBUV)	Det	3117_00168717	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	47.91	PK	32	-25.1	0	54.81	-	-	74	-19.19	223	377	V
2	* 2.48352	48.59	PK	32	-25.1	0	55.49	-	-	74	-18.51	223	377	V
3	* 2.48351	39.19	RMS	32	-25.1	2.51	48.6	54	-5.4	-	-	223	377	V
4	* 2.48352	39.44	RMS	32	-25.1	2.51	48.85	54	-5.15	-	-	223	377	V

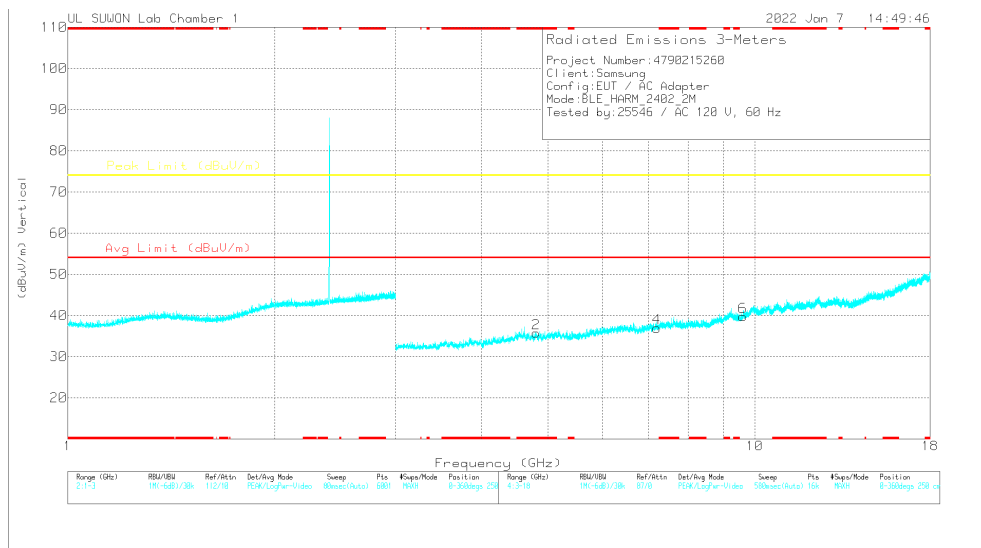
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK - Peak detector
 RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

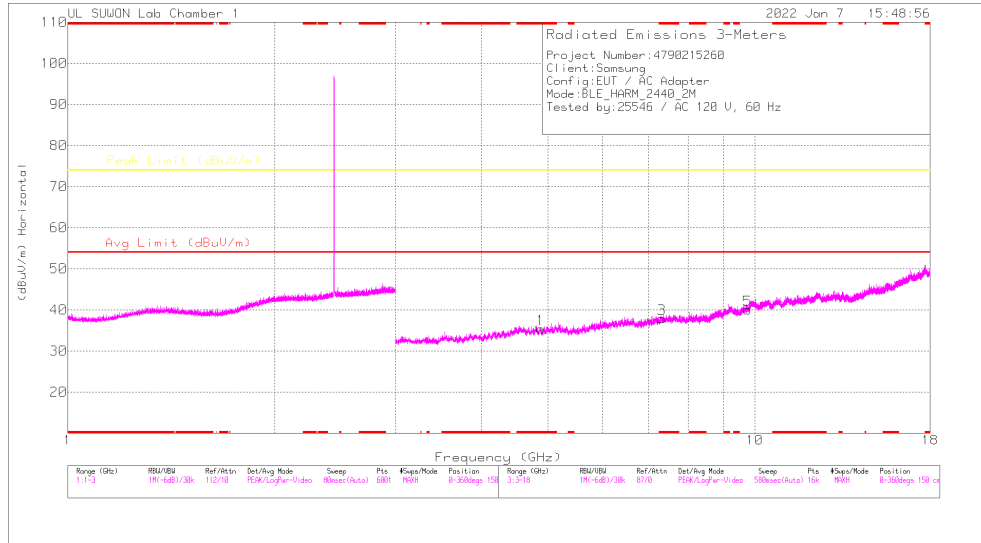
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

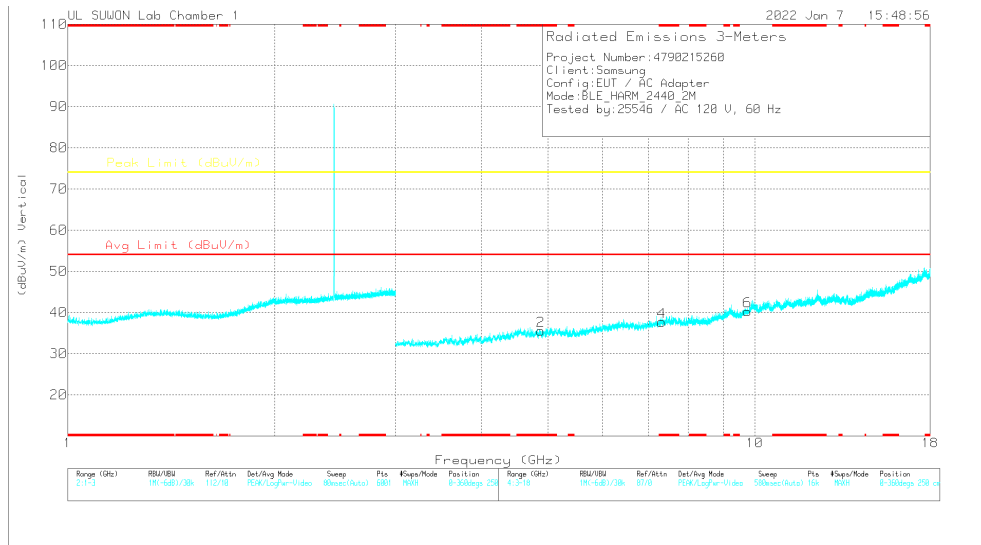
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HPI(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.81338	42.71	PK2	34.1	-31.2	0	45.61	-	-	74	-28.39	0	100	H
* 4.80016	41.52	PK2	34.1	-31.2	0	44.42	-	-	74	-29.58	0	100	V
7.20434	37.95	PK2	35.9	-27.5	0	46.35	-	-	74	-27.65	0	100	H
7.20252	37.77	PK2	35.9	-27.5	0	46.17	-	-	74	-27.83	0	100	V
9.5994	35.14	PK2	37.1	-22.8	0	49.44	-	-	74	-24.56	0	100	H
9.60584	35.06	PK2	37.1	-22.8	0	49.36	-	-	74	-24.64	0	100	V

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

19 CHANNEL RESULTS



HORIZONTAL



VERTICAL

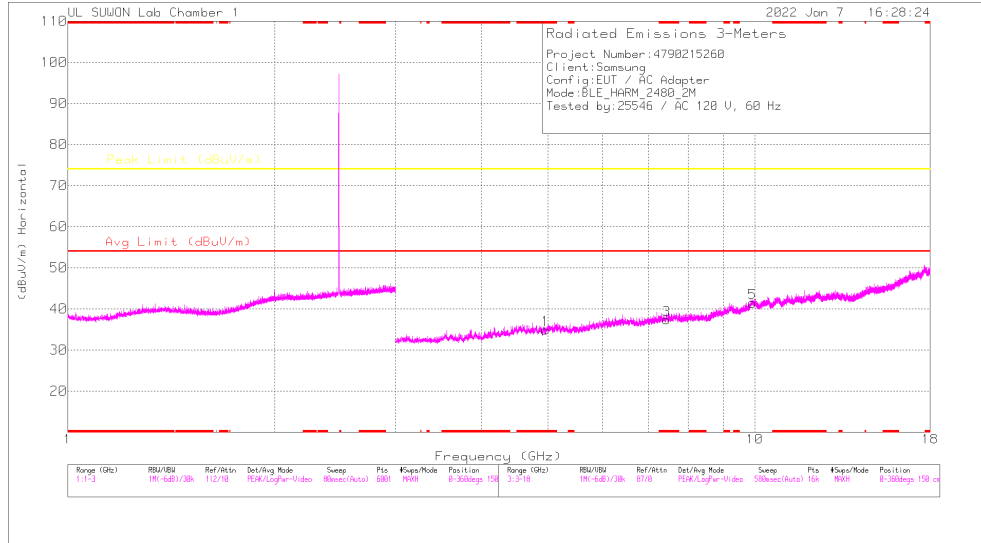
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

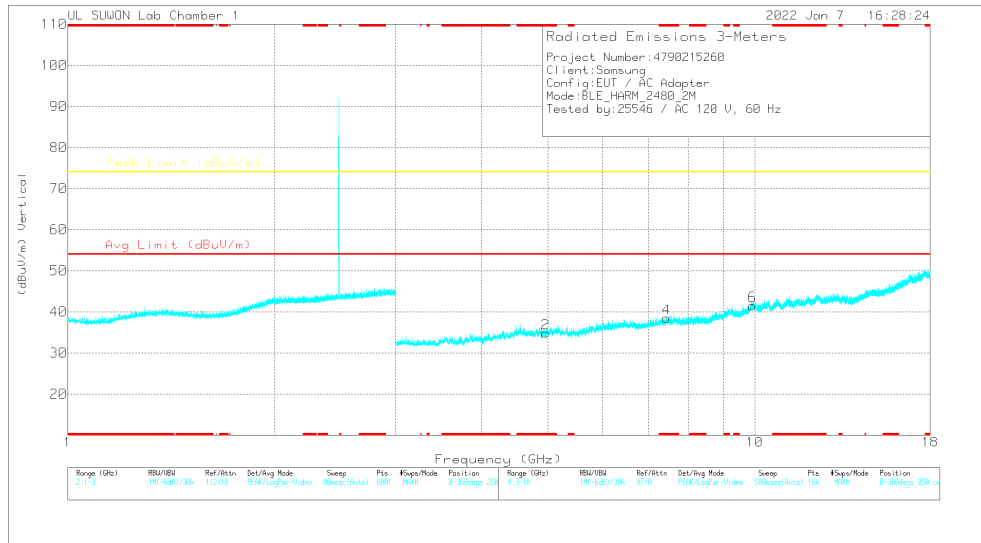
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.8764	41.81	PK2	34.1	-31.3	0	44.61	-	-	74	-29.39	0	100	H
* 4.87757	42	PK2	34.1	-31.3	0	44.8	-	-	74	-29.2	0	100	V
* 7.31369	38.4	PK2	35.8	-27.2	0	47	-	-	74	-27	0	100	H
* 7.31762	38.48	PK2	35.8	-27.2	0	47.08	-	-	74	-26.92	0	100	V
9.76672	34.98	PK2	37.5	-23.6	0	48.88	-	-	74	-25.12	0	100	H
9.75736	35.31	PK2	37.4	-23.5	0	49.21	-	-	74	-24.79	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.

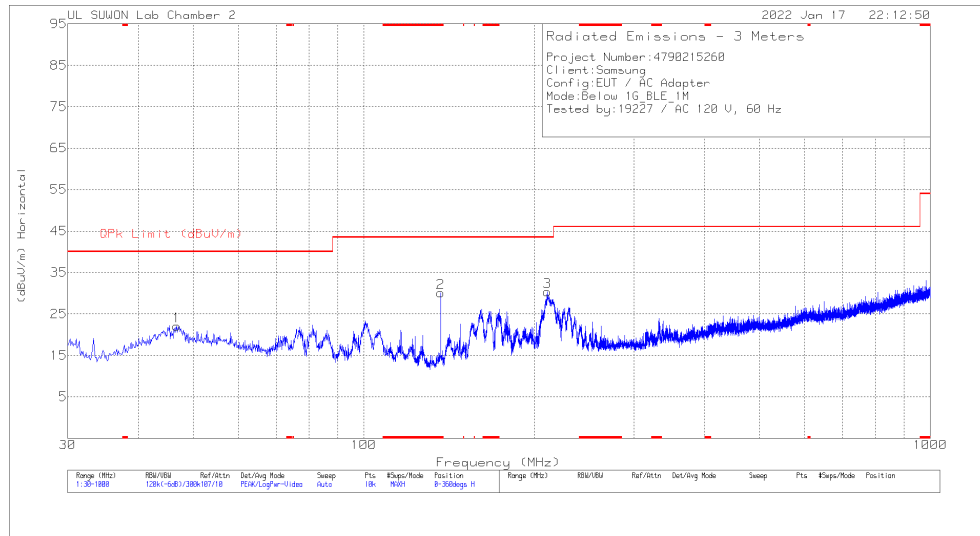
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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
* 4.95842	41.07	PK2	34.1	-31.4	0	43.77	-	-	74	-30.23	360	100	H
* 4.95276	41.11	PK2	34.1	-31.4	0	43.81	-	-	74	-30.19	360	100	V
* 7.43742	38.27	PK2	35.8	-26.6	0	47.47	-	-	74	-26.53	360	100	H
* 7.44668	37.5	PK2	35.8	-26.7	0	46.6	-	-	74	-27.4	360	100	V
9.92814	34.44	PK2	37.7	-21.4	0	50.74	-	-	74	-23.26	360	100	H
9.92499	33.76	PK2	37.7	-21.4	0	50.06	-	-	74	-23.94	360	100	V

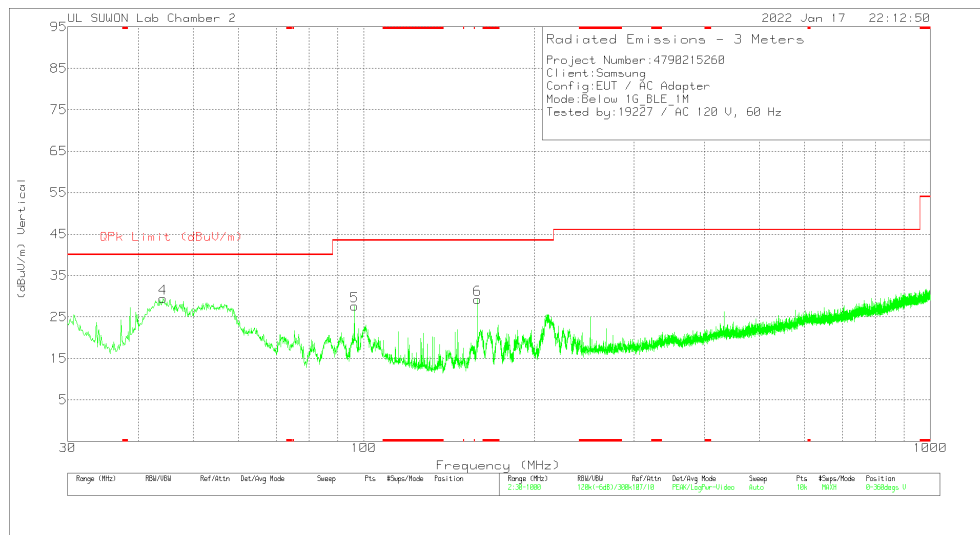
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak

10.3. WORST CASE BELOW 1 GHZ

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



HORIZONTAL



VERTICAL

Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_749	Below 1G[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	OPK Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	46.781	33.97	Pk	19.8	-31.7	0	22.07	40	-17.93	0-360	100	H
2	* 136.7	47.43	Pk	13.8	-31.1	0	30.13	43.52	-13.39	0-360	100	H
3	210.711	44.44	Pk	16.6	-30.7	0	30.34	43.52	-13.18	0-360	100	H
4	44.162	41.73	Pk	19.5	-31.7	0	29.53	40	-10.47	0-360	100	V
5	96.251	41.97	Pk	16.9	-31.3	0	27.57	43.52	-15.95	0-360	100	V
6	158.816	45.98	Pk	14.2	-30.9	0	29.28	43.52	-14.24	0-360	100	V

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

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

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

*Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

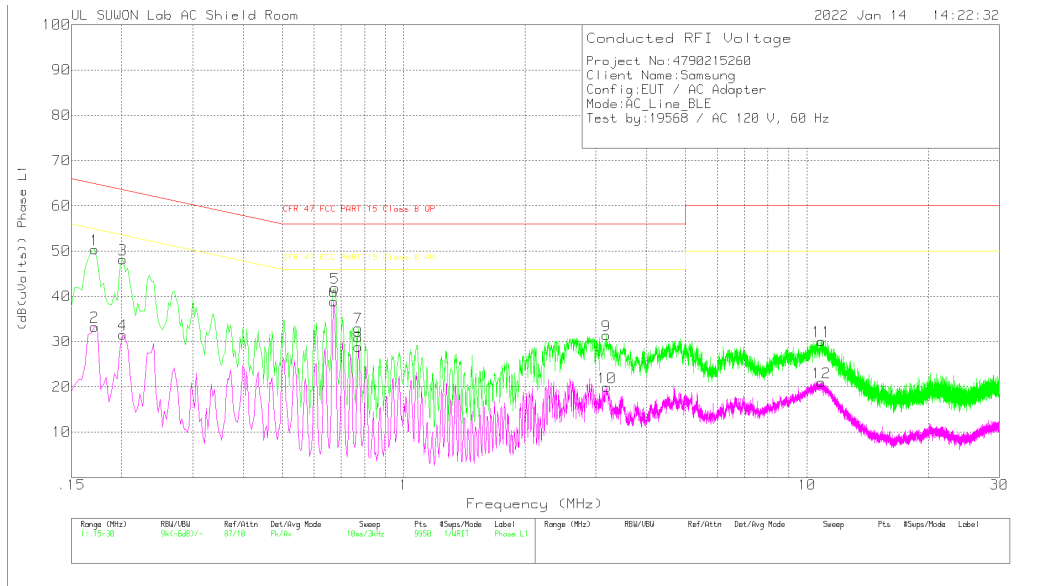
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

11.1.1. AC Power Line

LINE 1 RESULTS



Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_L1[dB]	CABLELOS S(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.171	40.16	Pk	10	.2	50.36	64.91	-14.55	-	-
2	.171	23.07	Av	10	.2	33.27	-	-	54.91	-21.64
3	.201	38.17	Pk	9.8	.2	48.17	63.57	-15.4	-	-
4	.201	21.55	Av	9.8	.2	31.55	-	-	53.57	-22.02
5	.675	31.86	Pk	9.8	.2	41.86	56	-14.14	-	-
6	.672	28.91	Av	9.8	.2	38.91	-	-	46	-7.09
7	.771	23.04	Pk	9.8	.2	33.04	56	-22.96	-	-
8	.771	18.89	Av	9.8	.2	28.89	-	-	46	-17.11
9	3.18	21.4	Pk	9.7	.3	31.4	56	-24.6	-	-
10	3.189	9.88	Av	9.7	.3	19.88	-	-	46	-26.12
11	10.857	19.87	Pk	9.9	.3	30.07	60	-29.93	-	-
12	10.857	10.79	Av	9.9	.3	20.99	-	-	50	-29.01

Pk - Peak detector

Av - Average detection

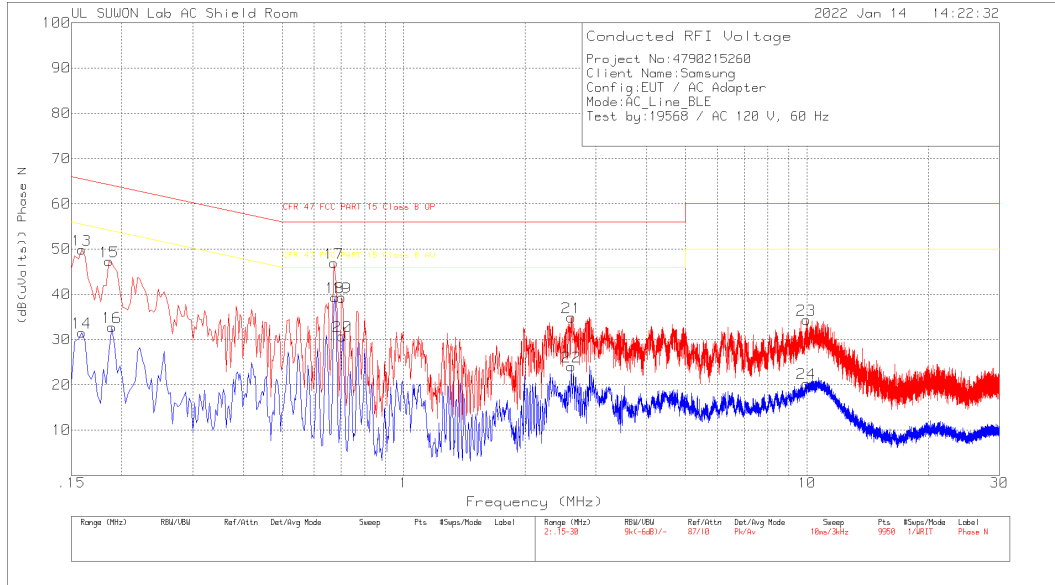
Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_L1[dB]	CABLELOS S(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
.67275	16.03	Qp	9.8	.2	26.03	56	-29.97	-	-

Qp - Quasi-Peak detector

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	.159	39.93	Pk	9.8	.1	49.83	65.52	-15.69	-	-
14	.159	21.64	Av	9.8	.1	31.54	-	-	55.52	-23.98
15	.186	37.17	Pk	9.9	.2	47.27	64.21	-16.94	-	-
16	.189	22.66	Av	9.9	.2	32.76	-	-	54.08	-21.32
17	.672	36.91	Pk	9.8	.2	46.91	56	-9.09	-	-
18	.675	29.35	Av	9.8	.2	39.35	-	-	46	-6.65
19	.702	29.29	Pk	9.8	.2	39.29	56	-16.71	-	-
20	.705	20.74	Av	9.8	.2	30.74	-	-	46	-15.26
21	2.604	24.91	Pk	9.7	.3	34.91	56	-21.09	-	-
22	2.604	14.03	Av	9.7	.3	24.03	-	-	46	-21.97
23	9.96	24.06	Pk	9.9	.4	34.36	60	-25.64	-	-
24	9.96	10.03	Av	9.9	.4	20.33	-	-	50	-29.67

Pk - Peak detector

Av - Average detection

Quasi-Peak Emissions

Range 2: Phase N .15 - 30MHz

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)
.67275	19.61	Qp	9.8	.2	29.61	56	-26.39	-	-
.67575	24.06	Qp	9.8	.2	34.06	56	-21.94	-	-

Qp - Quasi-Peak detector

END OF TEST REPORT