



CERTIFICATION TEST REPORT

Report Number. : 4789893923-E7V1

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

Model : NP545XLA, NP545XLA-KA1TT, NP545XLA-KA1VZ

FCC ID : A3LNP545XLA

EUT Description : WCDMA/LTE/5G NR Laptop + BT/BLE, DTS/UNII a/b/g/n/ac/ax

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

Date Of Issue:

2021-06-14

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Revision History

Rev.	Issue Date	Revisions	Revised By
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: WCDMA/LTE/5G NR Laptop + BT/BLE, DTS/UNII a/b/g/n/ac/ax

MODEL NUMBER: NP545XLA, NP545XLA-KA1TT, NP545XLA-KA1VZ

SERIAL NUMBER: FLKR01R2S00430 (CONDUCTED);
FLKJ930R400094X (RADIATED);

DATE TESTED: 2021-04-20 – 2021-06-14

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:



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Suwon Lab Engineer
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UL Korea, Ltd.

2. TEST METHODOLOGY

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 558074 D01 15.247 Meas Guidance v05r02.
4. ANSI C63.10-2013.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro	
☒	Chamber 1
☒	Chamber 2
☐	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:

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

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	3.01 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.26 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.90 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.49 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 WCDMA/LTE/5G NR Laptop + BT/BLE, DTS/UNII a/b/g/n/ac/ax.
This test report addresses the DTS (BLE) operational mode.

This report covers the Samsung models NP545XLA, NP545XLA-KA1TT and NP545XLA-KA1VZ. These models are identical in hardware except below.

NP545XLA-KA1TT: eSIM IC unmounted on PCB.

NP545XLA-KA1VZ: There is no difference in hardware(Supported RF band is different).

With some pre-scan, model NP545XLA was set for final test.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range [MHz]	Mode	Power Mode	Output Power [dBm]	Output Power [mW]
2 402 ~ 2 480	500kbps	Peak	7.840	6.081
		Average	7.581	5.729
	2Mbps	Peak	7.943	6.227
		Average	7.336	5.415

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 maximum gain of 1.61 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.

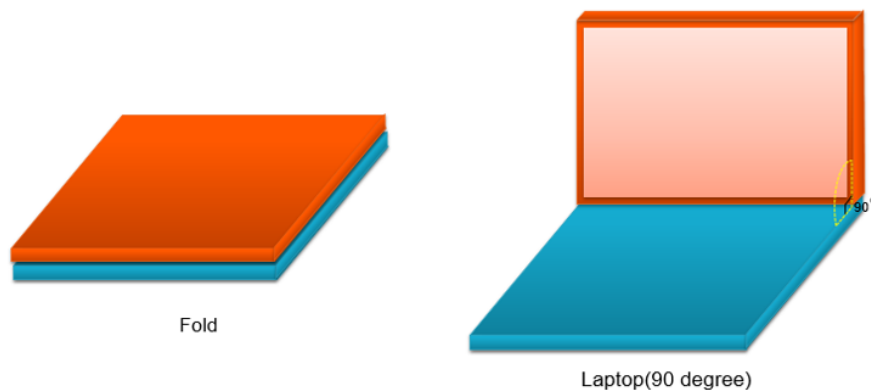
Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.

i. Worst Axis Condition

The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

ii. Foldable condition

The Fundamental of the EUT was investigated in four foldable conditions.
[Fold, Laptop(90degree)].



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

Power verification

The Output Power of all data rate are all investigated, the 500 kbps(37 pkt) and 2 Mbps(255 pkt) power is the worst case for symbol rate. All tests were performed in these two modes.

Symbol Rate [Ms/s]	Mode	Frequency [MHz]	Conducted Burst Avg [dBm]	Symbol Rate [Ms/s]	Mode	Frequency [MHz]	Conducted Burst Avg [dBm]
1	1Mbps (37 pkt)	2402	5.200	2	2Mbps (37 pkt)	2402	4.964
		2440	7.536			2440	7.331
		2480	5.541			2480	5.328
	1Mbps (255 pkt)	2402	5.157		2Mbps (255 pkt)	2402	4.968
		2440	7.515			2440	7.336
		2480	5.507			2480	5.391
1	Coded S=8 125 kbps (37 pkt)	2402	5.186				
		2440	7.539				
		2480	5.539				
	Coded S=8 125 kbps (128 pkt)	2402	5.147				
		2440	7.505				
		2480	5.507				
	Coded S=2 500 kbps (37 pkt)	2402	5.217				
		2440	7.581				
		2480	5.582				
	Coded S=2 500 kbps (128 pkt)	2402	5.161				
		2440	7.531				
		2480	5.524				

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37R32A00XADK3	N/A
Data Cable	SAMSUNG	EP-DW767JWE	N/A	N/A

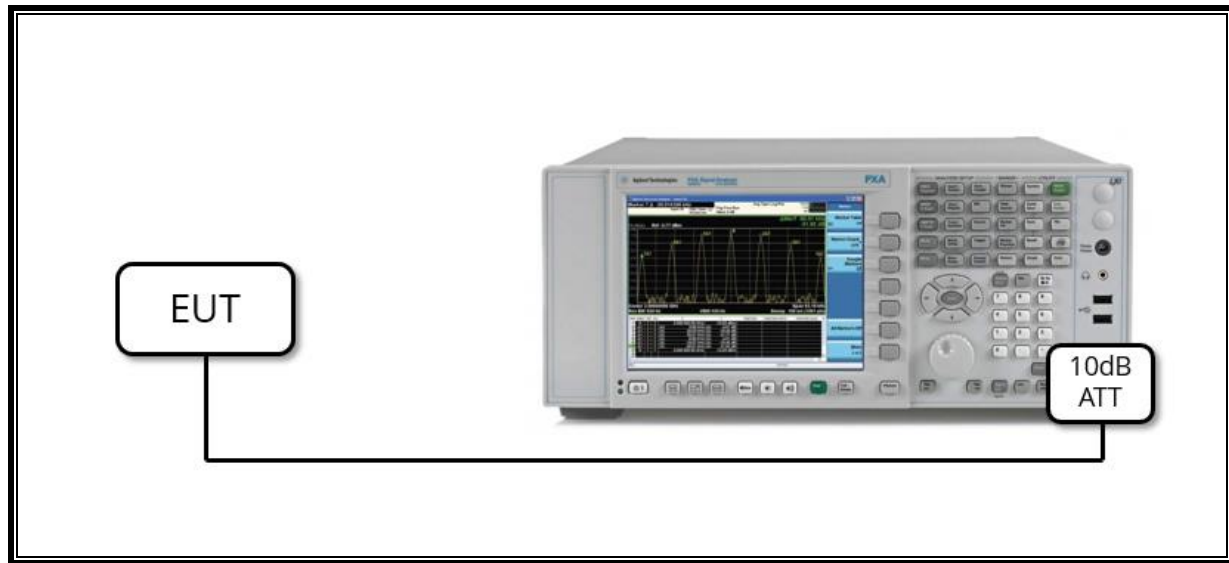
I/O CABLE

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

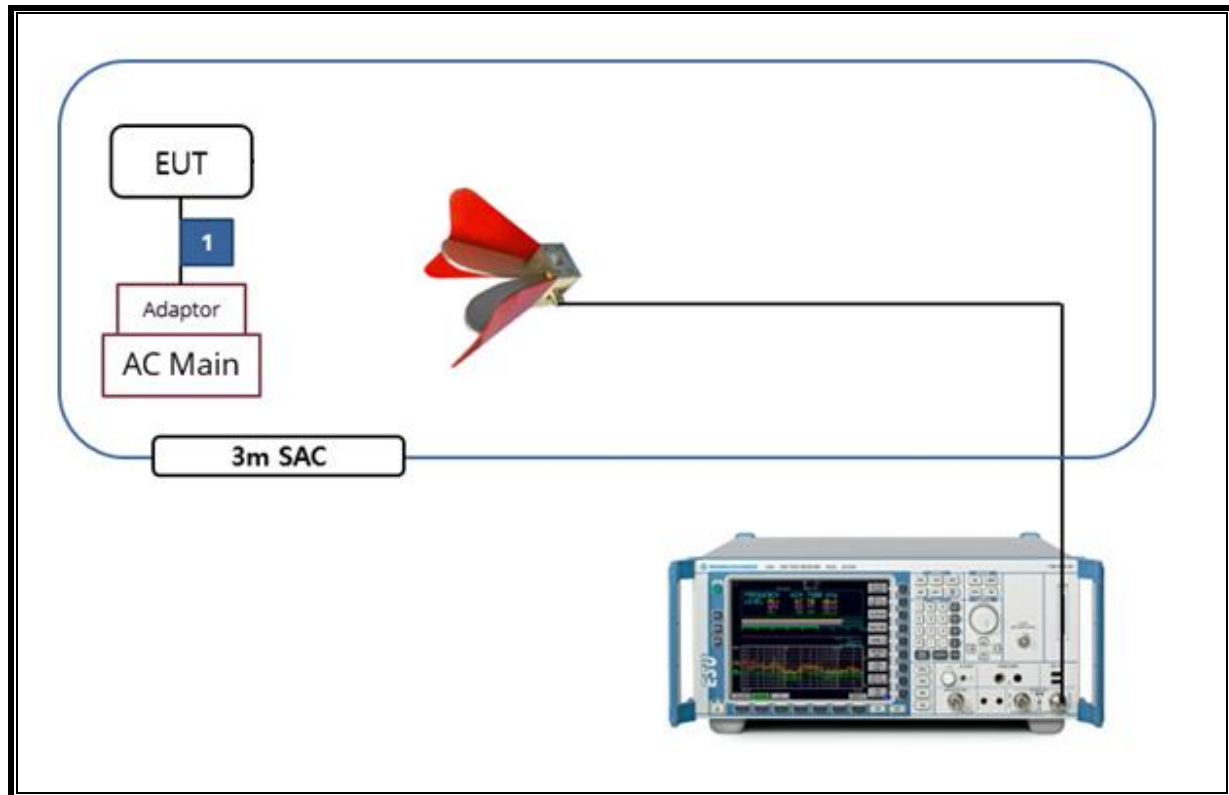
TEST SETUP

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 : KDB 558074 D01 v05r02, Section 8.2.

OUTPUT POWER : KDB 558074 D01 v05r02, Section 8.3.1.1

POWER SPECTRAL DENSITY : KDB 558074 D01 v05r02, Section 8.4.

Out-of-band Emissions (Conducted) : KDB 558074 D01 v05r02, Section 8.5.

Out-of-band Emissions in Non-restricted Bands: KDB 558074 D01 v05r02, Section 8.5.

Out-of-band Emissions in Restricted Bands : KDB 558074 D01 v05r02, Section 8.6.

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
Antenna, Horn, 40 GHz	ETS	3116C	00168645	2021-10-02
Preamplifier	ETS	3116C-PA	00168841	2021-08-06
Preamplifier, 1000 MHz	Sonoma	310N	341282	2021-08-03
Preamplifier, 1000 MHz	Sonoma	310N	351741	2021-08-03
Preamplifier, 1000 MHz	Sonoma	310N	370599	2021-08-06
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	2021-08-03
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2021-08-03
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2021-08-04
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2021-08-05
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2021-08-05
Spectrum Analyzer, 43.5 GHz	R&S	FSW43	104089	2021-08-06
Average Power Sensor	Agilent / HP	U2000	MY54270007	2021-08-05
Attenuator	PASTERNAK	PE7087-10	A001	2021-08-03
Attenuator	PASTERNAK	PE7087-10	A008	2021-08-03
Attenuator	PASTERNAK	PE7004-10	2	2021-08-04
Attenuator	PASTERNAK	PE7087-10	A009	2021-08-03
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2021-08-03
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2021-08-03
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2021-08-03
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	2021-08-03
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	2021-08-03
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	2021-08-04
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	2021-08-03
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	2021-08-03
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	2021-08-04
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	2021-08-03
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	2021-08-03
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	2021-08-04
LISN	R&S	ENV-216	101837	2021-08-06
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2021-10-02
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

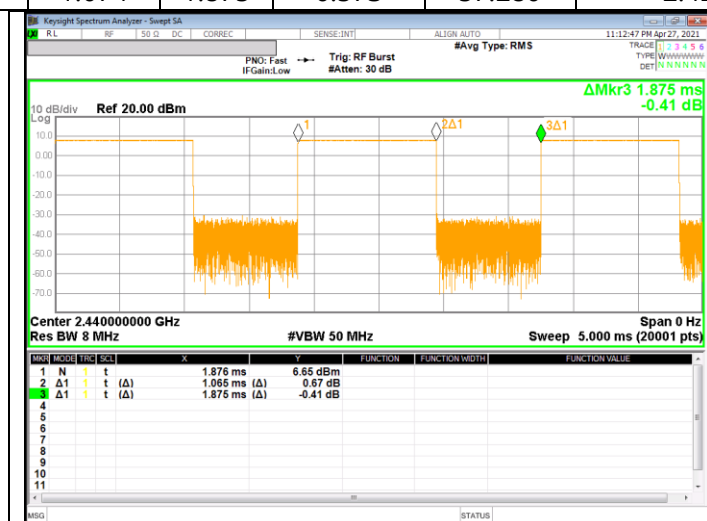
9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

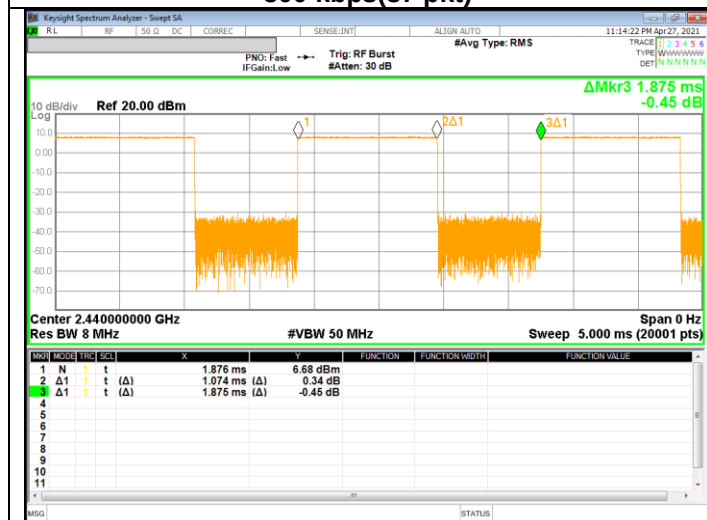
LIMITS

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						
500 kbps [37pkt]	1.065	1.875	0.568	56.800	2.46	0.939
2 Mbps [255pkt]	1.074	1.875	0.573	57.280	2.42	0.931



500 kbps(37 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

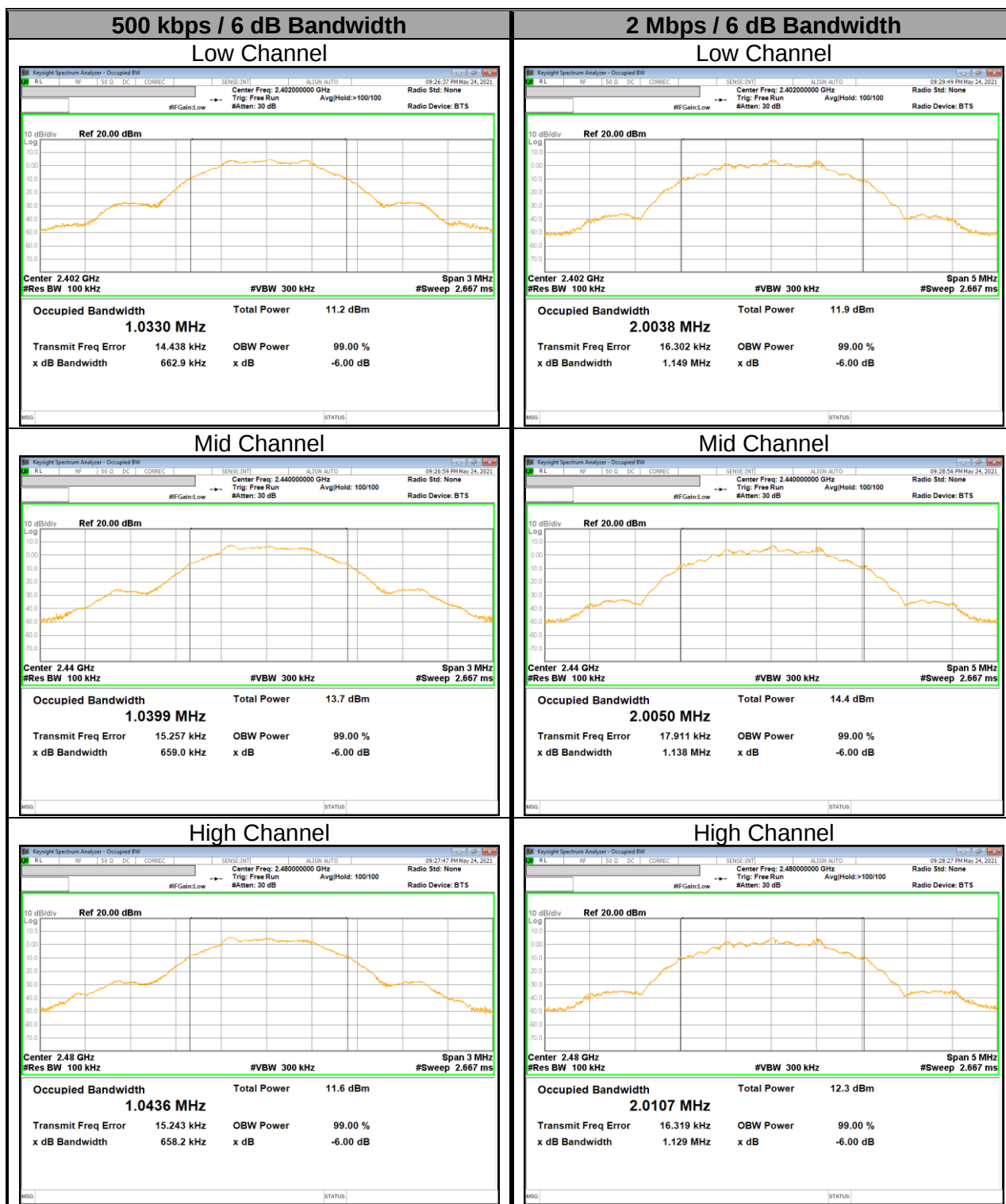
9.2.1. 500 kbps

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minumun Limit [kHz]
Low	2 402	662.9	500.0
Mid	2 440	659.0	500.0
High	2 480	658.2	500.0
Worst		658.2	500.0

9.2.2. 2 Mbps

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minumun Limit [kHz]
Low	2 402	1149.0	500.0
Mid	2 440	1138.0	500.0
High	2 480	1129.0	500.0
Worst		1129.0	500.0

9.2.3. 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.

RESULTS

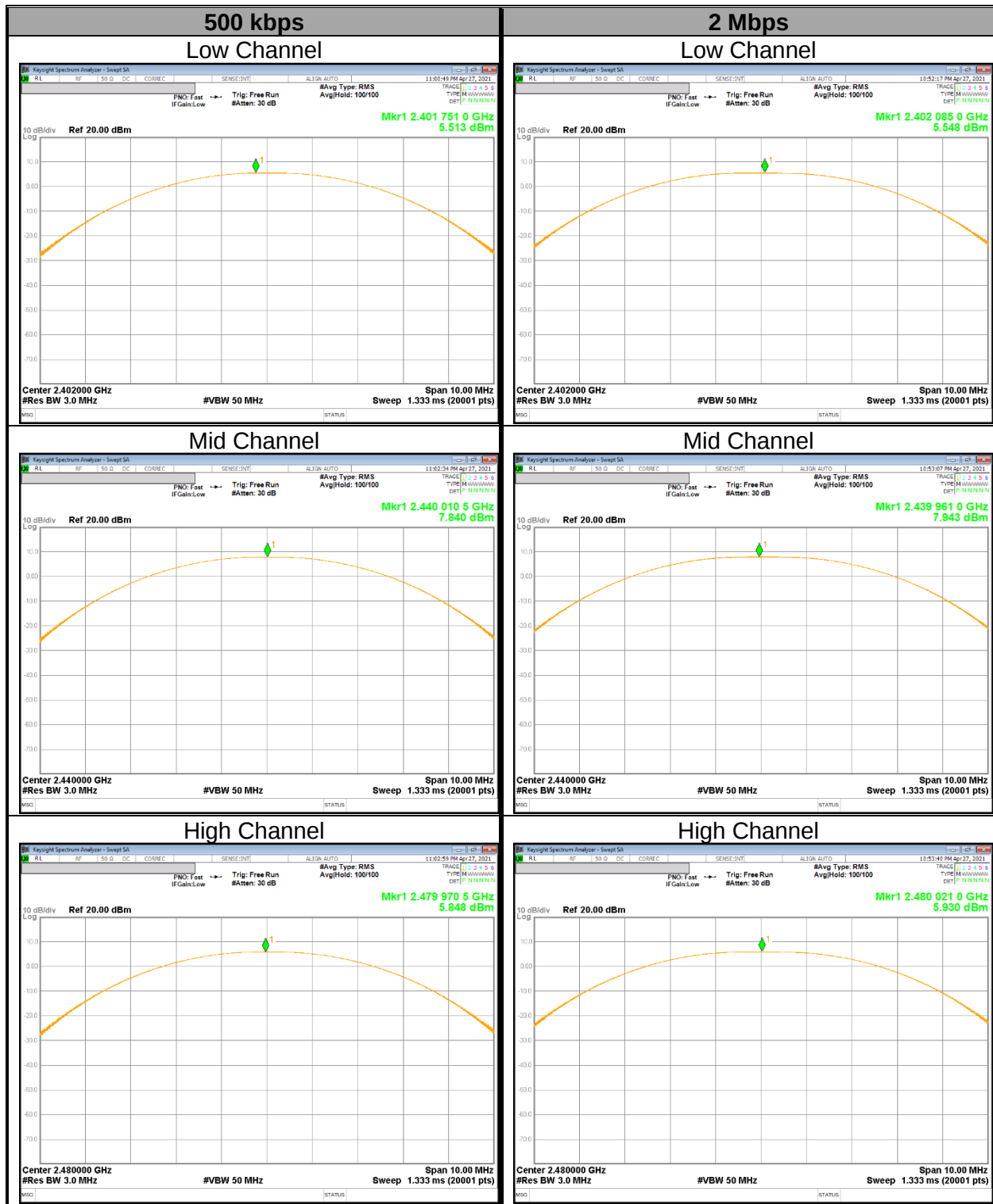
9.3.1. 500 kbps

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2 402	5.513	30.000	-24.487
Mid	2 440	7.840	30.000	-22.160
High	2 480	5.848	30.000	-24.152
Worst		7.840	30.000	-22.160

9.3.2. 2 Mbps

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2 402	5.548	30.000	-24.452
Mid	2 440	7.943	30.000	-22.057
High	2 480	5.930	30.000	-24.070
Worst		7.943	30.000	-22.057

9.3.3. 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. 500 kbps

Channel	Frequency [MHz]	AV power [dBm]	AV power [mW]
Low	2 402	5.217	3.325
Middle	2 440	7.581	5.729
High	2 480	5.582	3.616

9.4.2. 2 Mbps

Channel	Frequency [MHz]	AV power [dBm]	AV power [mW]
Low	2 402	4.968	3.139
Middle	2 440	7.336	5.415
High	2 480	5.391	3.460

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.

RESULTS

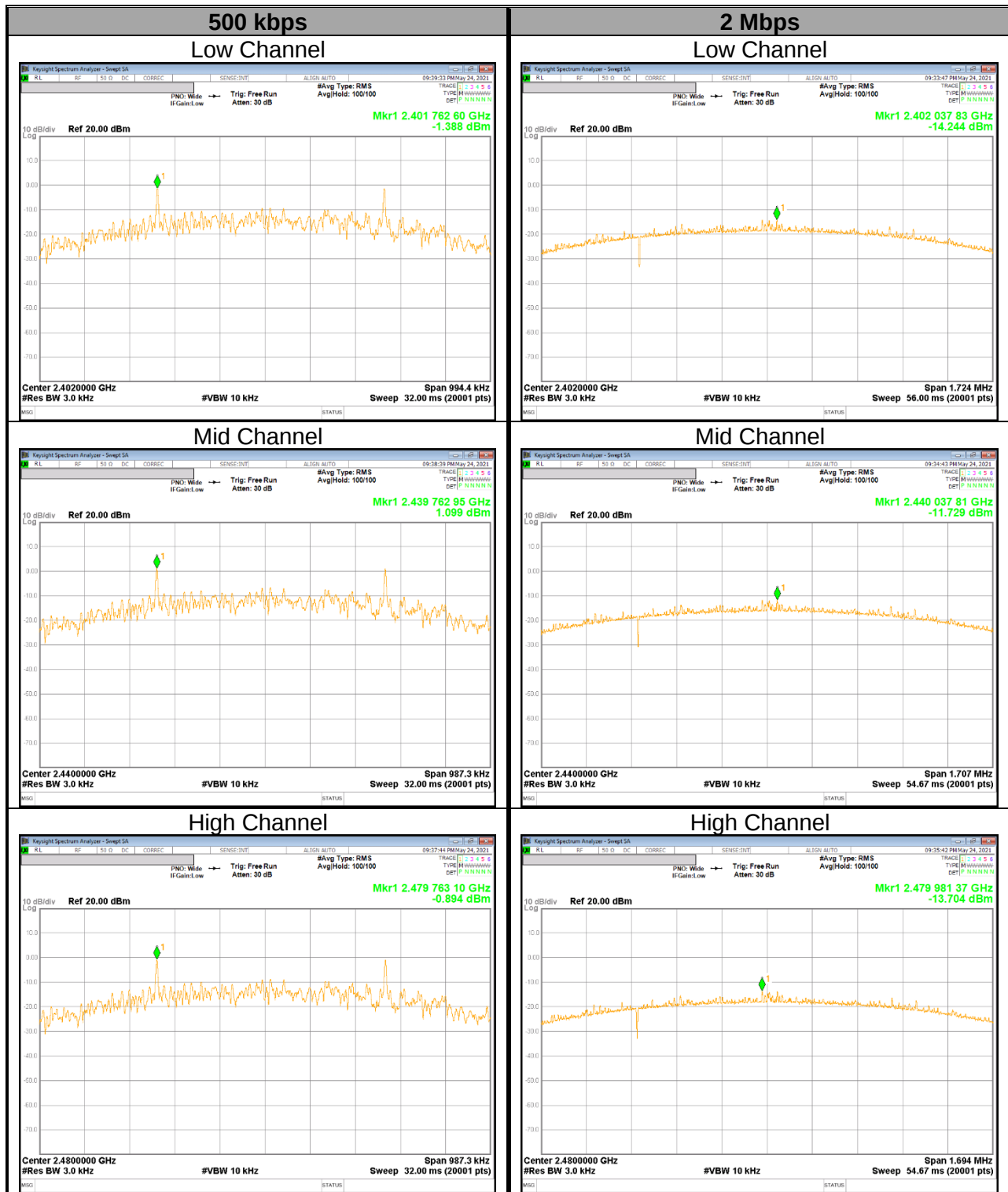
9.5.1. 500 kbps

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2 402	-1.39	8.00	-9.39
Mid	2 440	1.10	8.00	-6.90
High	2 480	-0.89	8.00	-8.89

9.5.2. 2Mbps

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2 402	-14.24	8.00	-22.24
Mid	2 440	-11.73	8.00	-19.73
High	2 480	-13.70	8.00	-21.70

9.5.3. PSD TEST PLOTS



9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

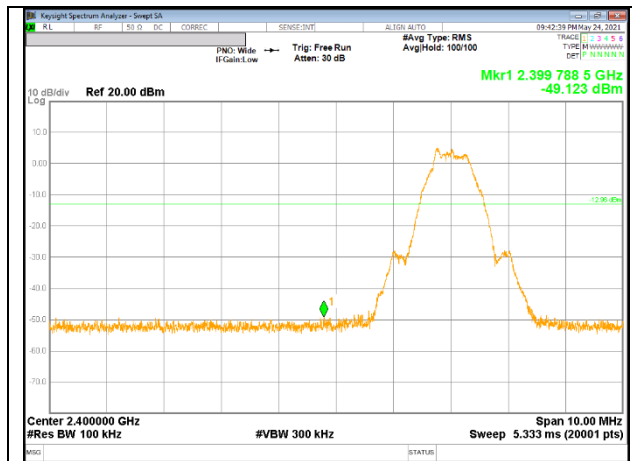
FCC §15.247 (d)

RSS-247 5.5

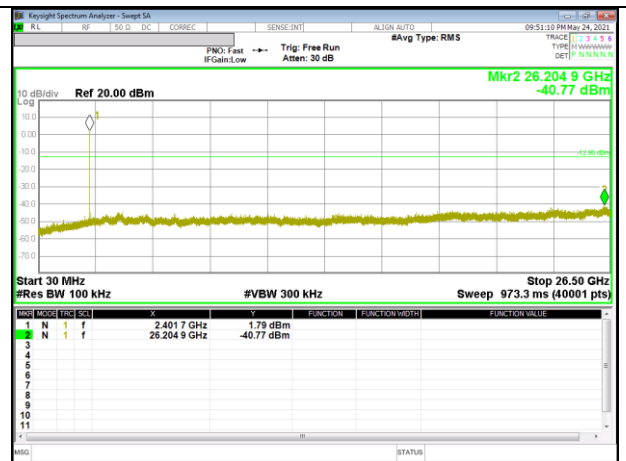
Output power was measured based on the use of a peak measurement.
Therefore, spurious emissions are required to be 20 dBc.

RESULTS

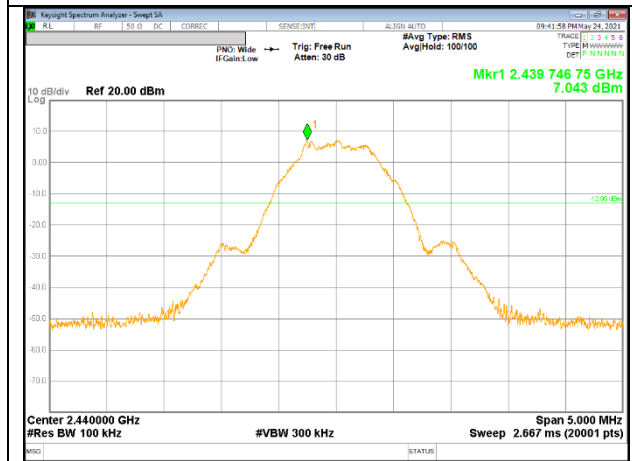
9.6.1. 500 kbps



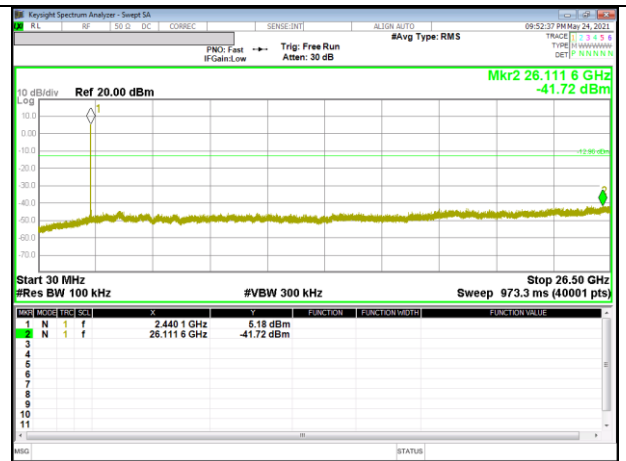
LOW CHANNEL BANDEDGE



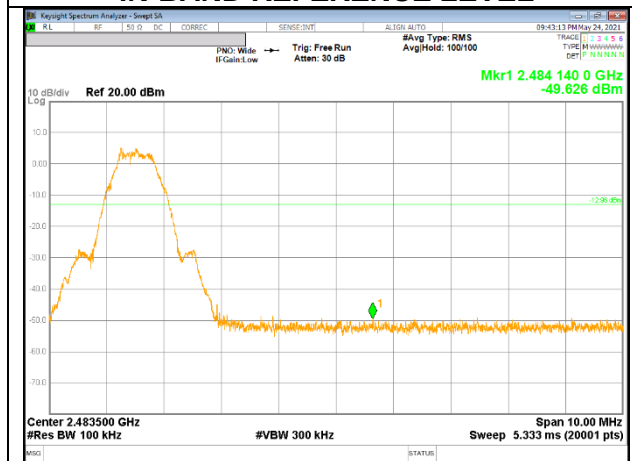
OUT-OF-BAND LOW CHANNEL



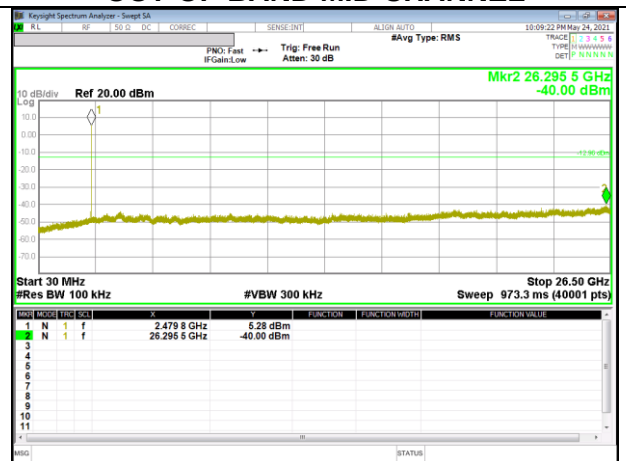
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL

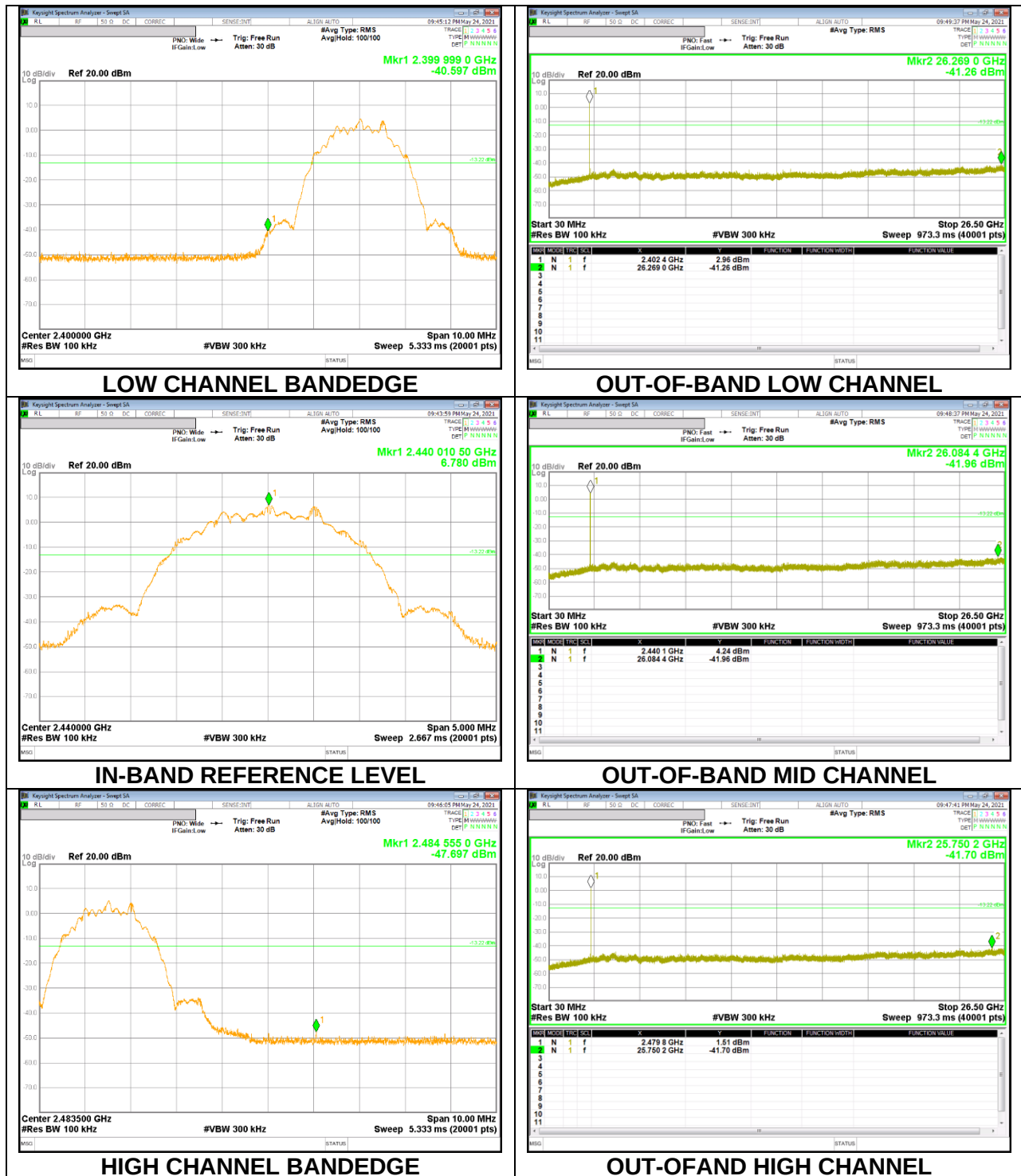


HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

9.6.2. 2Mbps



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 bandedge, Final detection of spurious harmonic emissions) Duty cycle factor = $10 \log(1/x)$. For this sample: For 500 kbps, DCF = $10 \log(1/0.5680) = 2.456$ dB (Spectrum Analyzer round it up to 2.46 dB) and for 2 Mbps, DCF = $10 \log(1/0.5728) = 2.419$ dB (Spectrum Analyzer round it up to 2.42 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.

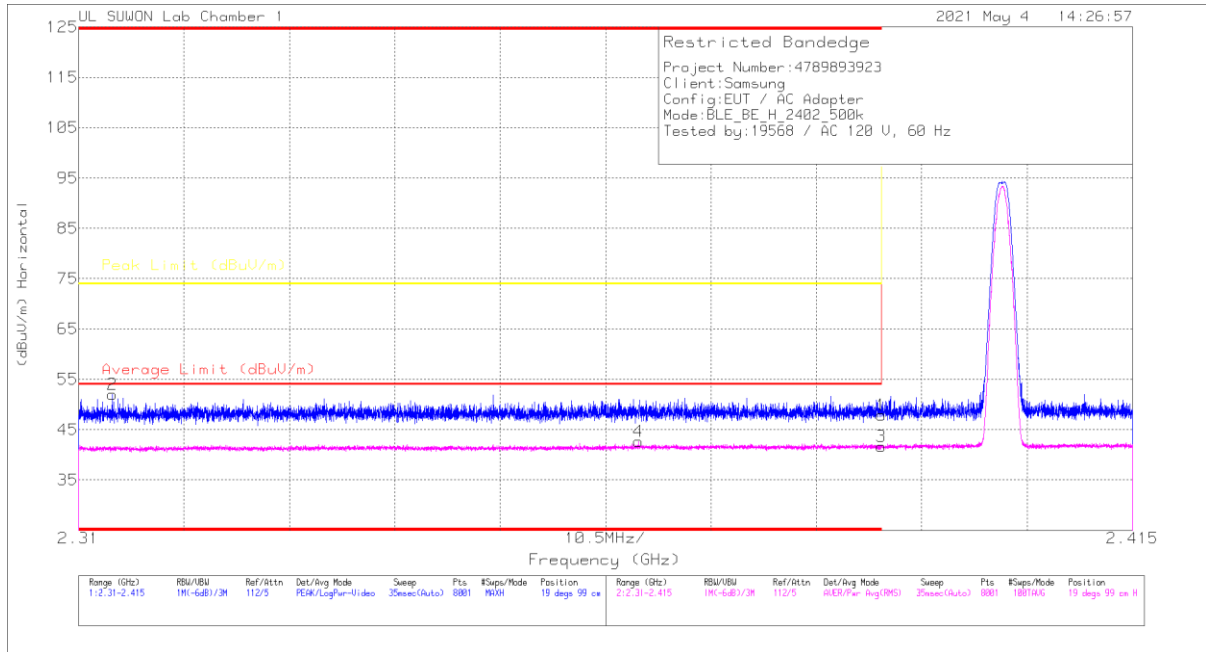
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. 500 kbps

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

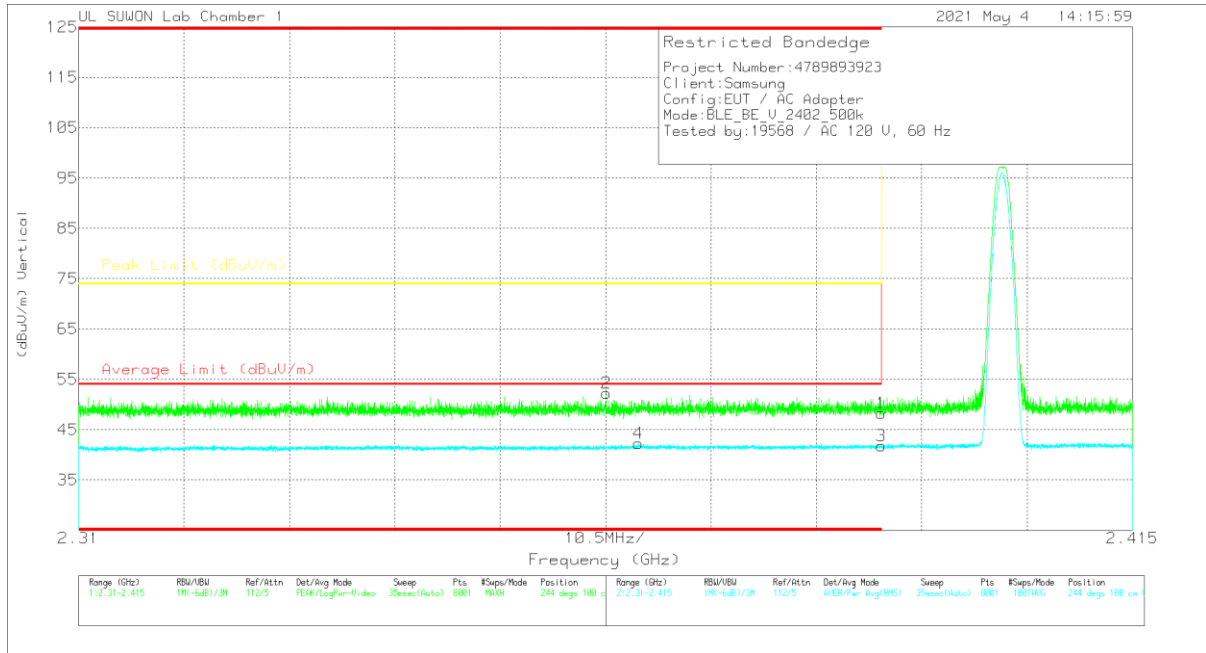
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.72	PK	31.8	-25.6	0	47.92	-	-	74	-26.08	19	99	H
2	* 2.31336	46.06	PK	31.6	-25.7	0	51.96	-	-	74	-22.04	19	99	H
3	* 2.39	33.05	RMS	31.8	-25.6	2.46	41.71	54	-12.29	-	-	19	99	H
4	* 2.36579	34	RMS	31.7	-25.5	2.46	42.66	54	-11.34	-	-	19	99	H

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

PK - Peak detector

RMS - RMS detection

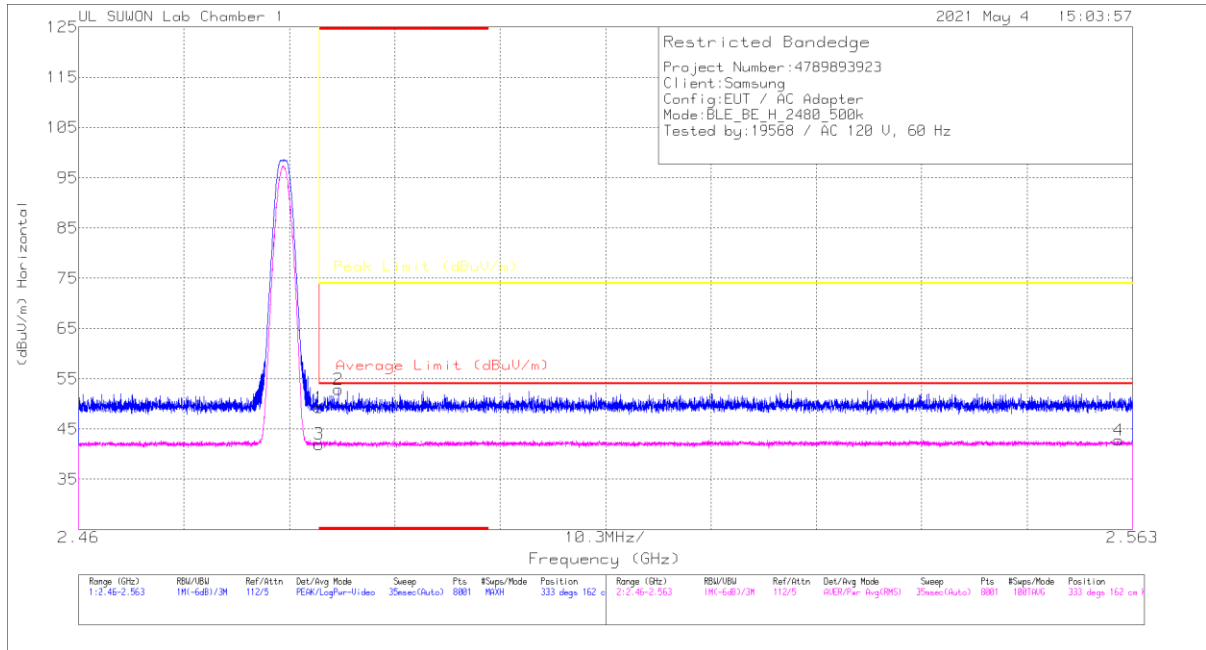
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00180717	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	42.04	PK	31.8	-25.6	0	48.24	-	-	74	-25.76	244	100	V
2	* 2.36261	46.12	PK	31.7	-25.6	0	52.22	-	-	74	-21.78	244	100	V
3	* 2.39	33.07	RMS	31.8	-25.6	2.46	41.73	54	-12.27	-	-	244	100	V
4	* 2.36577	33.58	RMS	31.7	-25.6	2.46	42.24	54	-11.76	-	-	244	100	V

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

BANDEDGE (HIGH CHANNEL)**HORIZONTAL RESULT****Trace Markers**

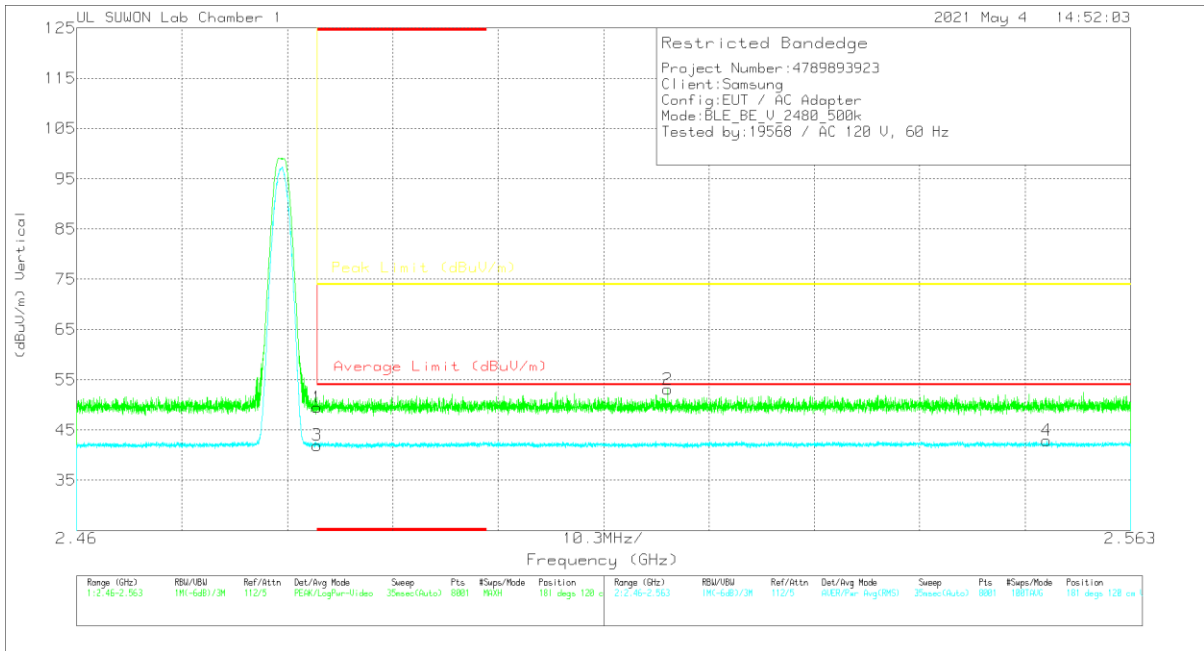
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	42.6	PK	32	-25.3	0	49.3	-	-	74	-24.7	333	162	H
2	* 2.48539	46.04	PK	32	-25.2	0	52.84	-	-	74	-21.16	333	162	H
3	* 2.48351	32.81	RMS	32	-25.3	2.46	41.97	54	-12.03	-	-	333	162	H
4	2.56164	33.35	RMS	32.1	-25.1	2.46	42.81	54	-11.19	-	-	333	162	H

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

PK - Peak detector

RMS - RMS detection

VERTICAL RESULT



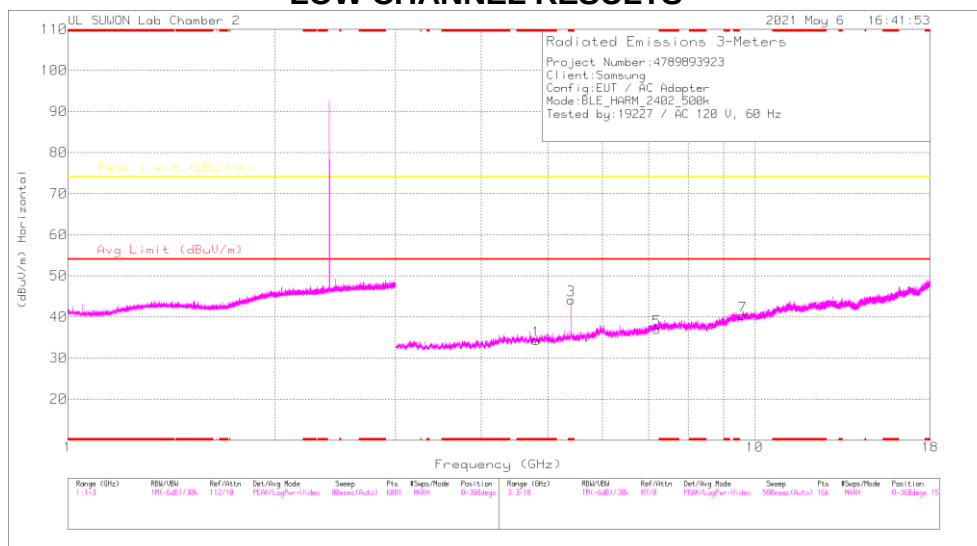
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_90168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Asimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	42.81	PK	32	-25.3	0	49.51	-	-	74	-24.49	181	120	V
2	2.51777	46.31	PK	32	-25.2	0	53.11	-	-	74	-20.89	181	120	V
3	* 2.48351	32.81	RMS	32	-25.3	2.46	41.97	54	-12.03	-	-	181	120	V
4	2.5548	33.5	RMS	32.1	-25.1	2.46	42.96	54	-11.04	-	-	181	120	V

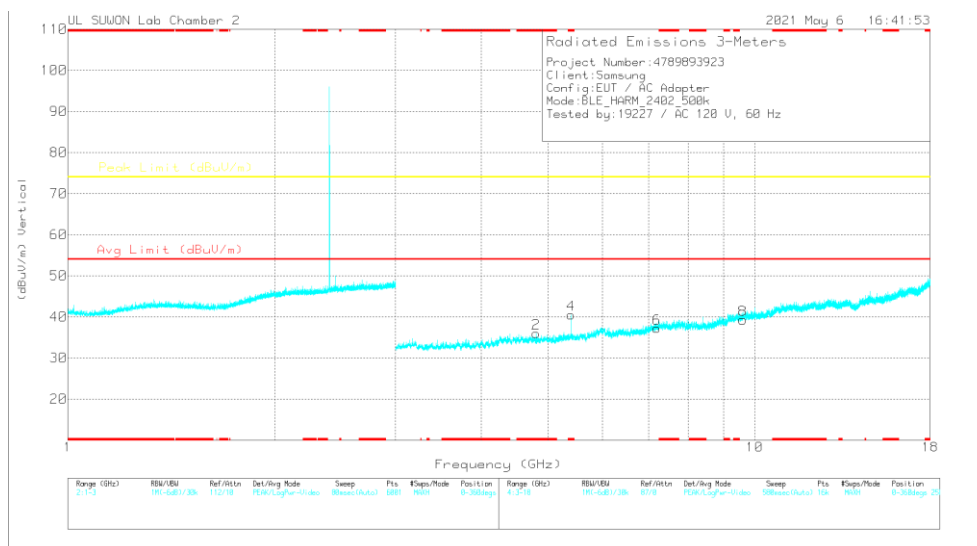
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK - Peak detector
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

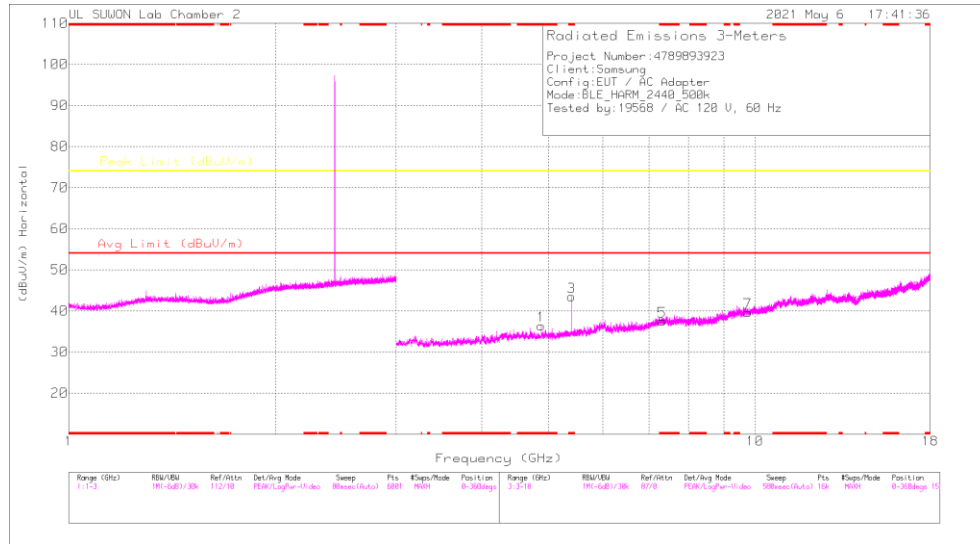
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

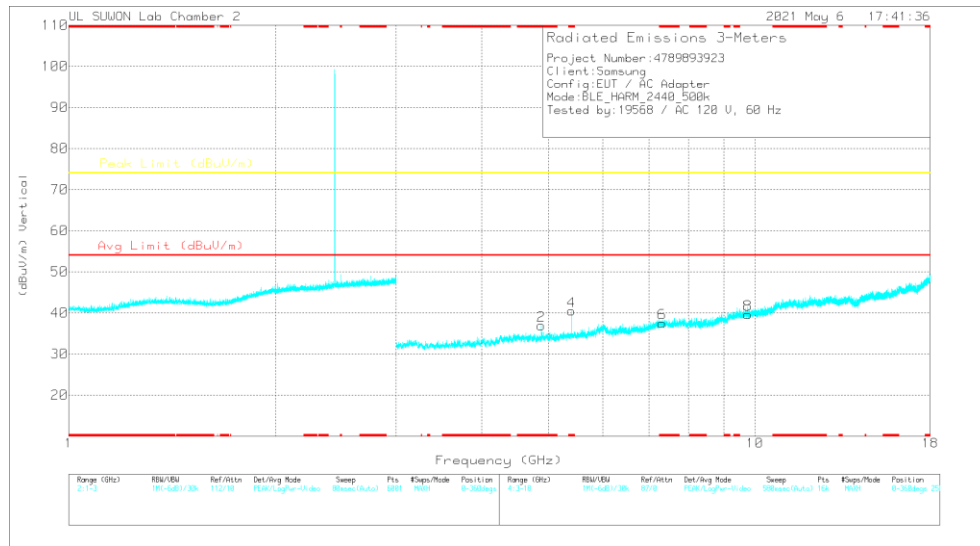
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80276	36.69	PK2	34.1	-27.7	0	43.09	-	-	74	-30.91	360	100	H
* 4.80398	36.35	PK2	34.1	-27.7	0	42.75	-	-	74	-31.25	360	100	V
7.20643	35.18	PK2	36.2	-24.9	0	46.48	-	-	74	-27.52	360	100	H
7.20467	35.38	PK2	36.2	-25	0	46.58	-	-	74	-27.42	360	100	V
9.60974	32.7	PK2	37	-20.8	0	48.9	-	-	74	-25.1	360	100	H
9.60836	33.83	PK2	37	-20.8	0	50.03	-	-	74	-23.97	360	100	V

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

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

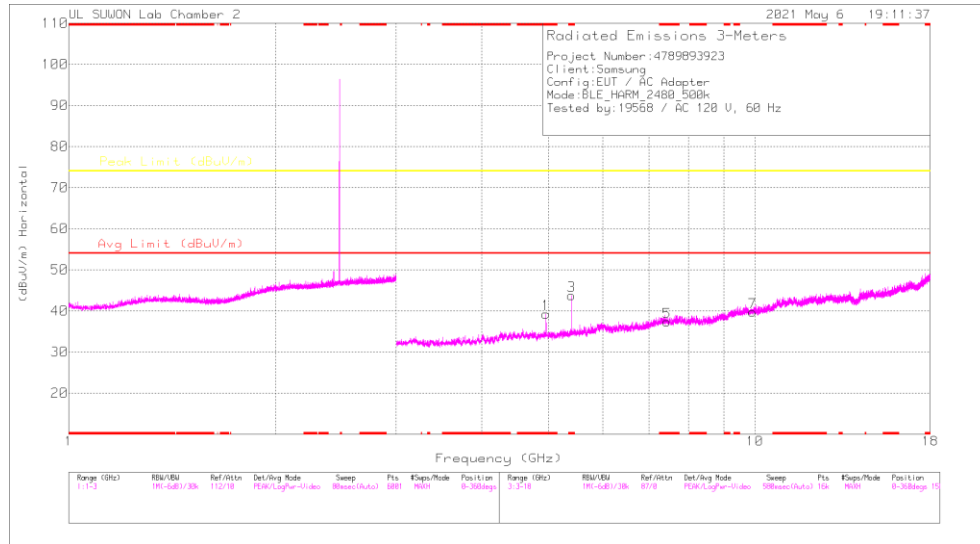
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

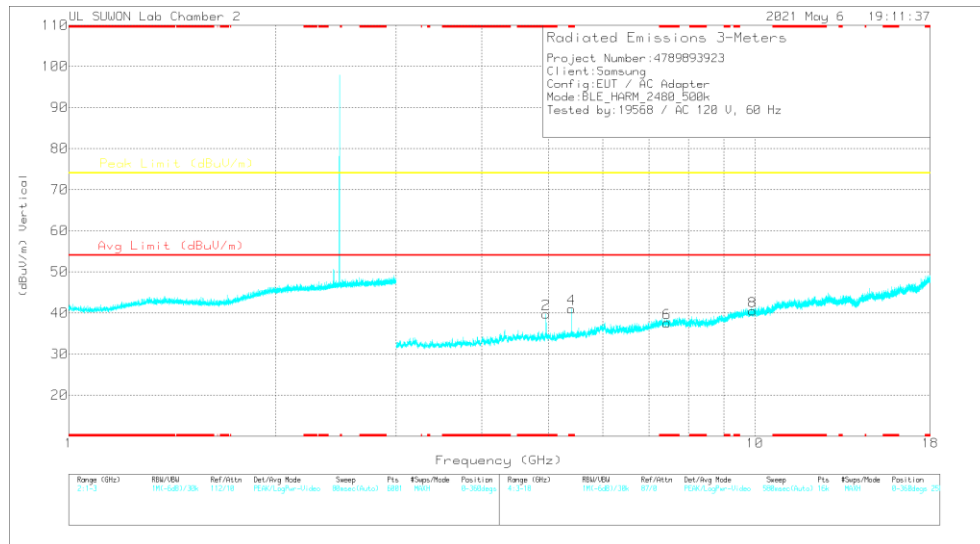
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016872 4	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88793	36.95	PK2	34.1	-27.5	0	43.55	-	-	74	-30.45	1	141	H
* 4.88004	25.57	MAV1	34.1	-27.6	2.46	34.53	54	-19.47	-	-	1	141	H
* 4.8794	39.55	PK2	34.1	-27.7	0	45.95	-	-	74	-28.05	266	280	V
* 4.88037	30.36	MAV1	34.1	-27.6	2.46	39.32	54	-14.68	-	-	266	280	V
* 5.40039	40.16	PK2	34.6	-27.5	0	47.26	-	-	74	-26.74	360	100	H
* 5.39971	37.84	PK2	34.5	-27.5	0	44.84	-	-	74	-29.16	360	100	V
* 7.32198	34.45	PK2	36.1	-24.6	0	45.95	-	-	74	-28.05	360	100	H
* 7.31884	35.55	PK2	36.1	-24.6	0	47.05	-	-	74	-26.95	360	100	V
9.7586	33	PK2	37.2	-20.5	0	49.7	-	-	74	-24.3	360	100	H
9.76122	32.07	PK2	37.2	-20.5	0	48.77	-	-	74	-25.23	360	100	V

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

HIGH 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

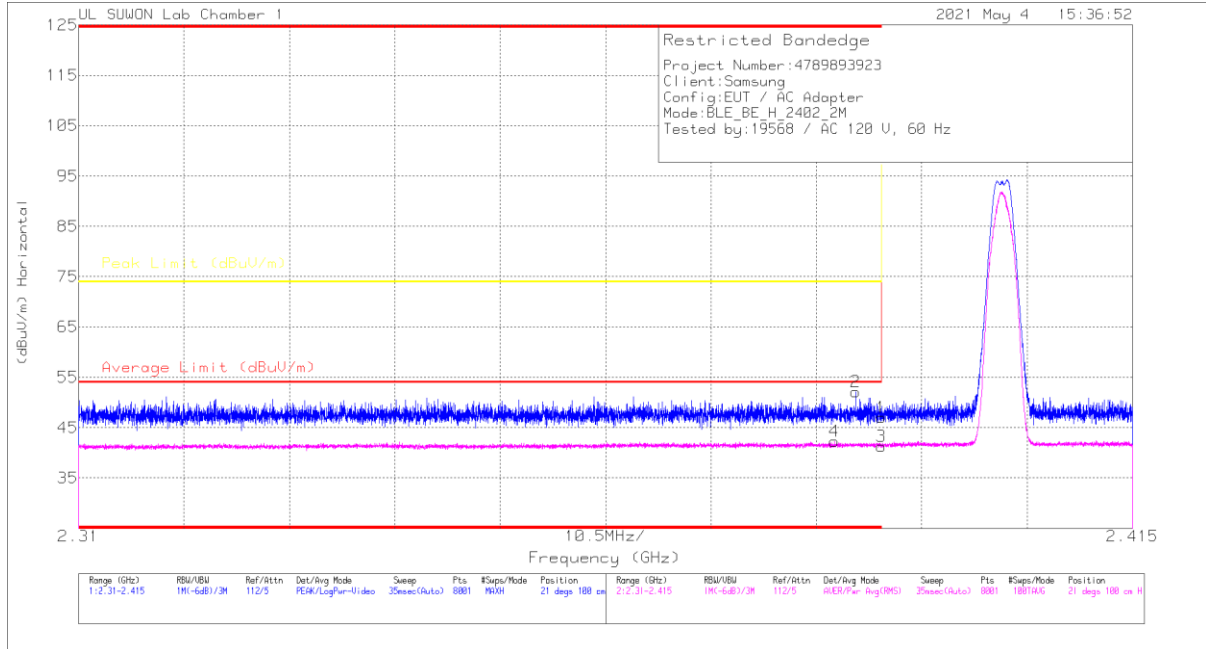
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016872 4	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.95965	39.12	PK2	34.1	-26.8	0	46.42	-	-	74	-27.58	18	302	H
* 4.96033	29.15	MAV1	34.1	-26.8	2.46	38.91	54	-15.09	-	-	18	302	H
* 4.95952	40.48	PK2	34.1	-26.8	0	47.78	-	-	74	-26.22	264	258	V
* 4.9603	31.35	MAV1	34.1	-26.8	2.46	41.11	54	-12.89	-	-	264	258	V
* 5.40024	40.2	PK2	34.6	-27.5	0	47.3	-	-	74	-26.7	360	100	H
* 5.40036	36.82	PK2	34.6	-27.5	0	43.92	-	-	74	-30.08	360	100	V
* 7.43894	34.59	PK2	36	-23.7	0	46.89	-	-	74	-27.11	360	100	H
* 7.43998	34.23	PK2	36	-23.7	0	46.53	-	-	74	-27.47	360	100	V
9.91926	31.99	PK2	37.4	-20.4	0	48.99	-	-	74	-25.01	360	100	H
9.92218	31.89	PK2	37.4	-20.3	0	48.99	-	-	74	-25.01	360	100	V

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

10.2.2. 2Mbps

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT

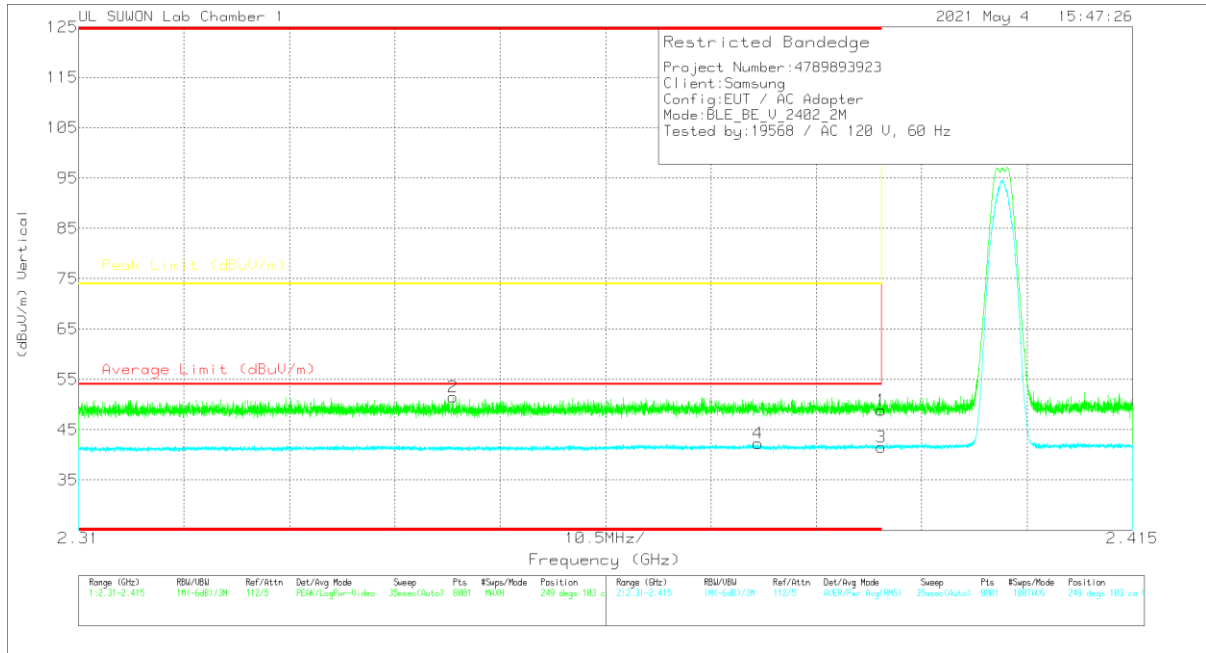


Trace Markers

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	40.86	Pk	31.8	-25.6	0	47.06	-	-	74	-26.94	21	100	H
2	* 2.38744	45.85	Pk	31.8	-25.5	0	52.15	-	-	74	-21.85	21	100	H
3	* 2.39	32.7	RMS	31.8	-25.6	2.42	41.32	54	-12.68	-	-	21	100	H
4	* 2.38531	33.61	RMS	31.8	-25.6	2.42	42.23	54	-11.77	-	-	21	100	H

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

VERTICAL RESULT



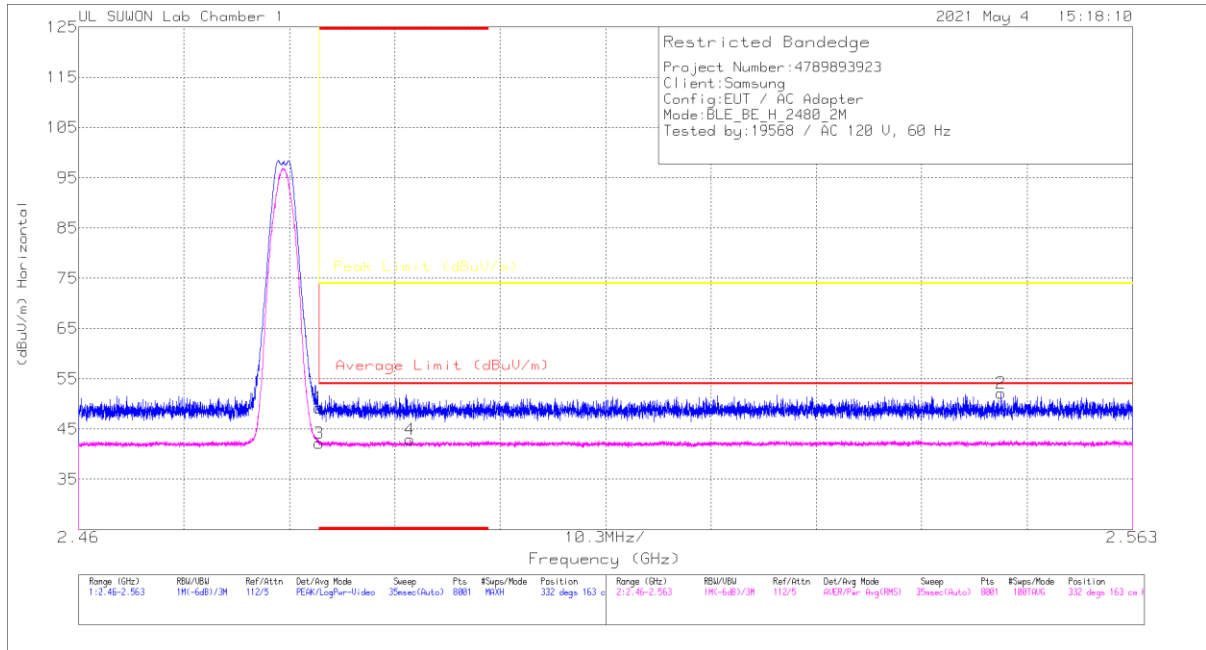
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00188717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Acimuth (Degs)	Height (cm)	Polarity
1	* 2.39	42.63	PK	31.8	-25.6	0	48.83	-	-	74	-25.17	249	103	V
2	* 2.34731	45.54	PK	31.7	-25.7	0	51.54	-	-	74	-22.46	249	103	V
3	* 2.39	32.92	RMS	31.8	-25.6	2.42	41.54	54	-12.46	-	-	249	103	V
4	* 2.37771	33.67	RMS	31.8	-25.6	2.42	42.29	54	-11.71	-	-	249	103	V

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

PK - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)**HORIZONTAL RESULT****Trace Markers**

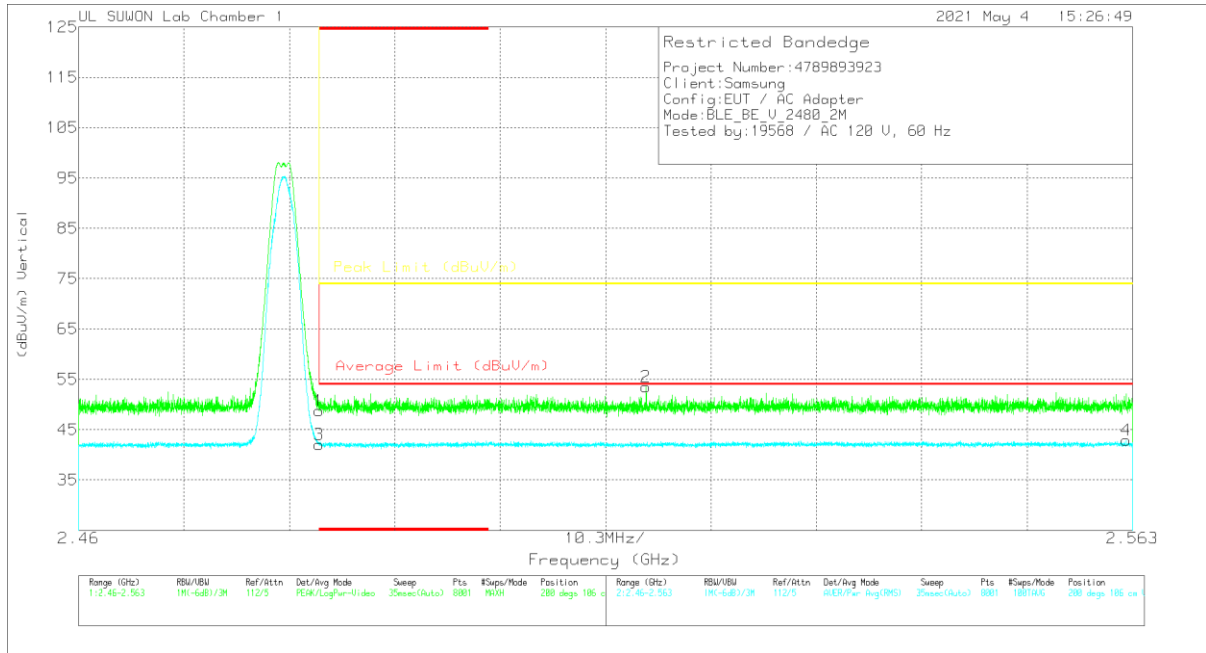
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Altitude (Degs)	Height (cm)	Polarity
1	* 2.48351	42.5	PK	32	-25.3	0	49.2	-	-	74	-24.8	332	163	H
2	2.55016	45.18	PK	32.1	-25.2	0	52.08	-	-	74	-21.92	332	163	H
3	* 2.48351	33.09	RMS	32	-25.3	2.42	42.21	54	-11.79	-	-	332	163	H
4	* 2.49238	33.65	RMS	32	-25.2	2.42	42.87	54	-11.13	-	-	332	163	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)	Acimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	42.05	PK	32	-25.3	0	48.75	-	-	74	-25.25	200	106	V
2	2.51547	46.67	PK	32	-25.2	0	53.47	-	-	74	-20.53	200	106	V
3	* 2.48351	32.94	RMS	32	-25.3	2.42	42.06	54	-11.94	-	-	200	106	V
4	2.56238	33.45	RMS	32.1	-25.1	2.42	42.07	54	-11.13	-	-	200	106	V

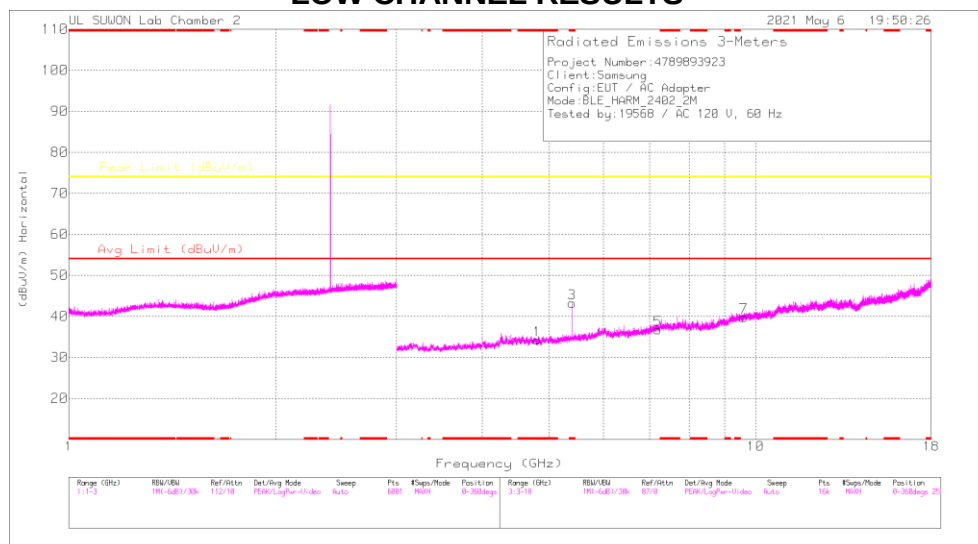
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

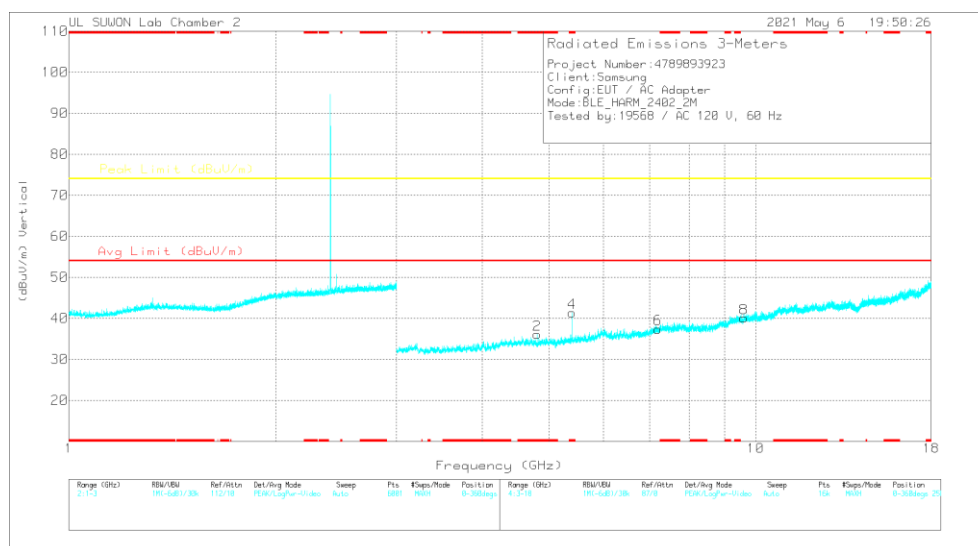
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

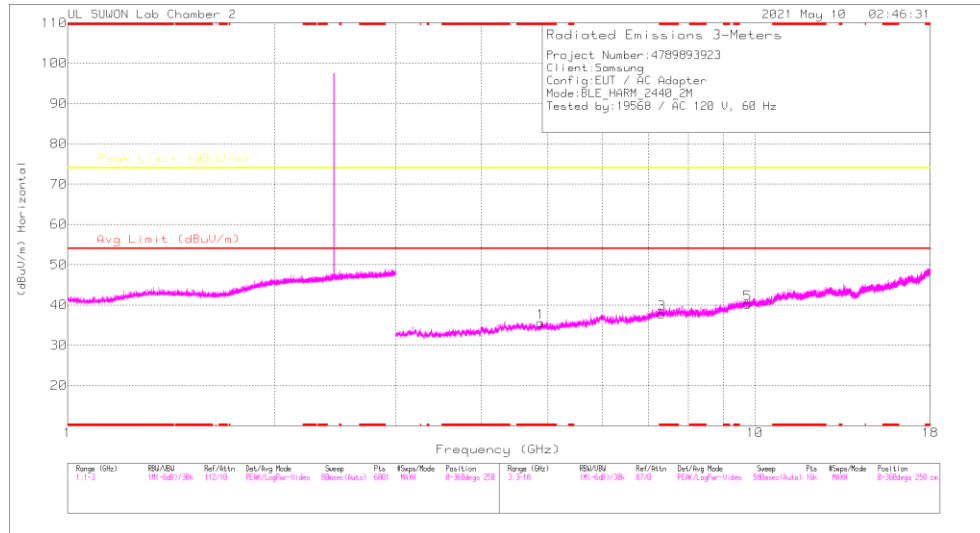
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

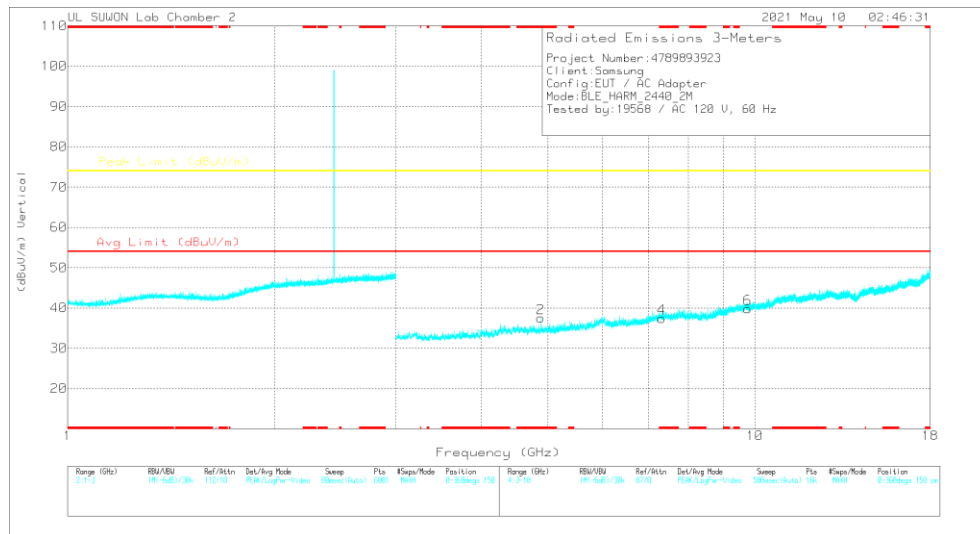
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80386	36.65	PK2	34.1	-27.7	0	43.05	-	-	74	-30.95	360	100	H
* 4.80274	36.44	PK2	34.1	-27.7	0	42.84	-	-	74	-31.16	360	100	V
7.20781	34.69	PK2	36.2	-24.9	0	45.99	-	-	74	-28.01	360	100	H
7.20706	35.97	PK2	36.2	-24.9	0	47.27	-	-	74	-26.73	360	100	V
9.60791	32.68	PK2	37	-20.9	0	48.78	-	-	74	-25.22	360	100	H
9.60733	32.65	PK2	37	-20.9	0	48.75	-	-	74	-25.25	360	100	V

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

MID 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

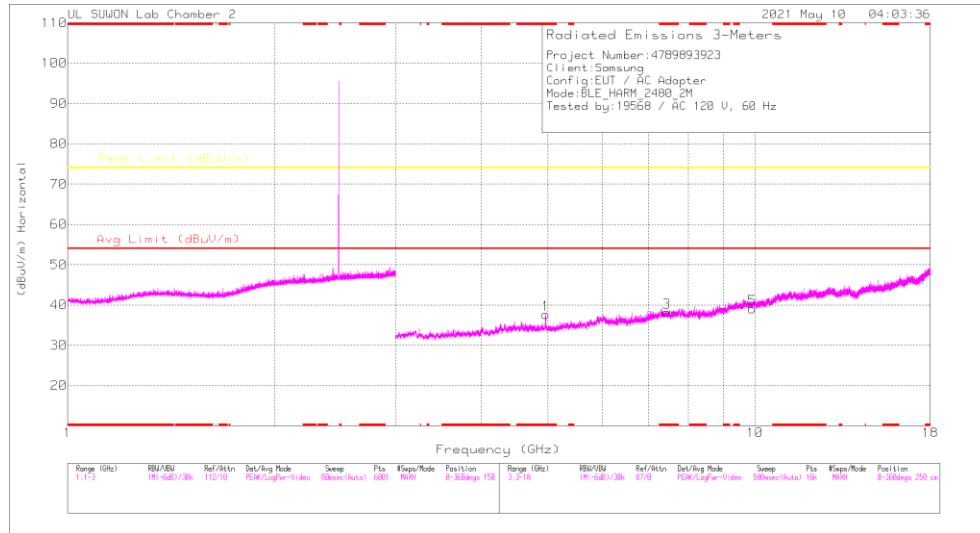
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016872_4	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.87917	33.43	PK2	34.1	-27.7	0	39.83	-	-	74	-34.17	65	129	H
* 4.87927	26.78	MAV1	34.1	-27.7	2.42	35.6	54	-18.4	-	-	65	129	H
* 4.88013	38	PK2	34.1	-27.6	0	44.5	-	-	74	-29.5	189	311	V
* 4.87913	26.11	MAV1	34.1	-27.7	2.42	34.93	54	-19.07	-	-	189	311	V
* 7.32169	35.66	PK2	36.1	-24.6	0	47.16	-	-	74	-26.84	360	100	H
* 7.32147	36.07	PK2	36.1	-24.6	0	47.57	-	-	74	-26.43	360	100	V
9.75798	33.21	PK2	37.2	-20.5	0	49.91	-	-	74	-24.09	360	100	H
9.75879	32.64	PK2	37.2	-20.5	0	49.34	-	-	74	-24.66	360	100	V

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

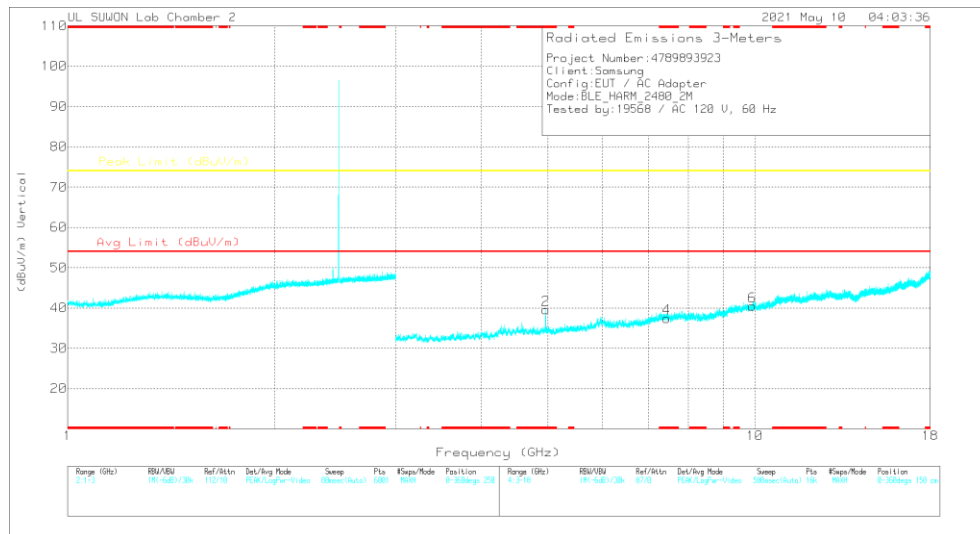
PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

HIGH 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
* 4.95913	39.35	PK2	34.1	-26.8	0	46.65	-	-	74	-27.35	357	180	H
* 4.96109	27.71	MAV1	34.1	-26.8	2.42	37.43	54	-16.57	-	-	357	180	H
* 4.95891	41.23	PK2	34.1	-26.8	0	48.53	-	-	74	-25.47	257	300	V
* 4.96093	31.35	MAV1	34.1	-26.8	2.42	41.07	54	-12.93	-	-	257	300	V
* 7.43826	35.3	PK2	36	-23.6	0	47.7	-	-	74	-26.3	360	100	H
* 7.43929	35.01	PK2	36	-23.8	0	47.21	-	-	74	-26.79	360	100	V
9.91932	32.61	PK2	37.4	-20.4	0	49.61	-	-	74	-24.39	360	100	H
9.92138	32.36	PK2	37.4	-20.3	0	49.46	-	-	74	-24.54	360	100	V

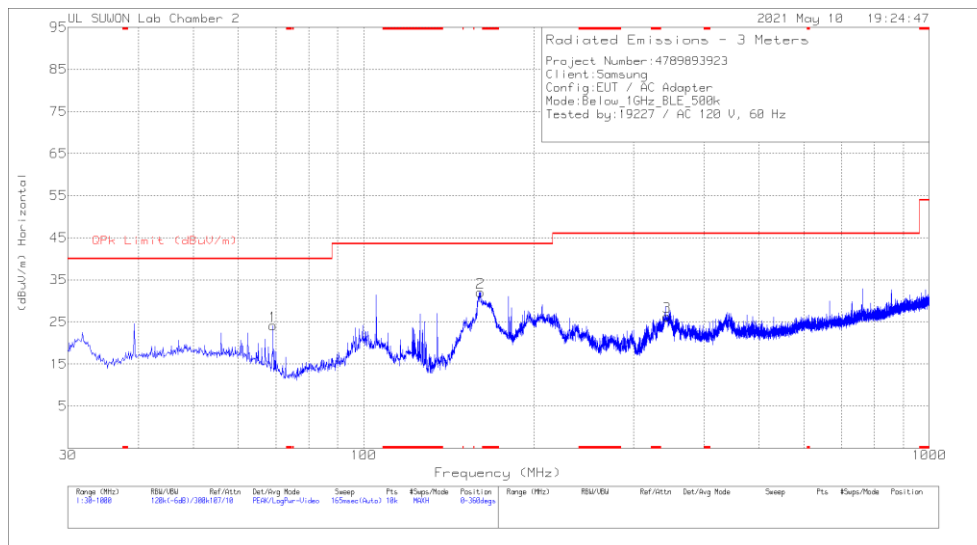
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

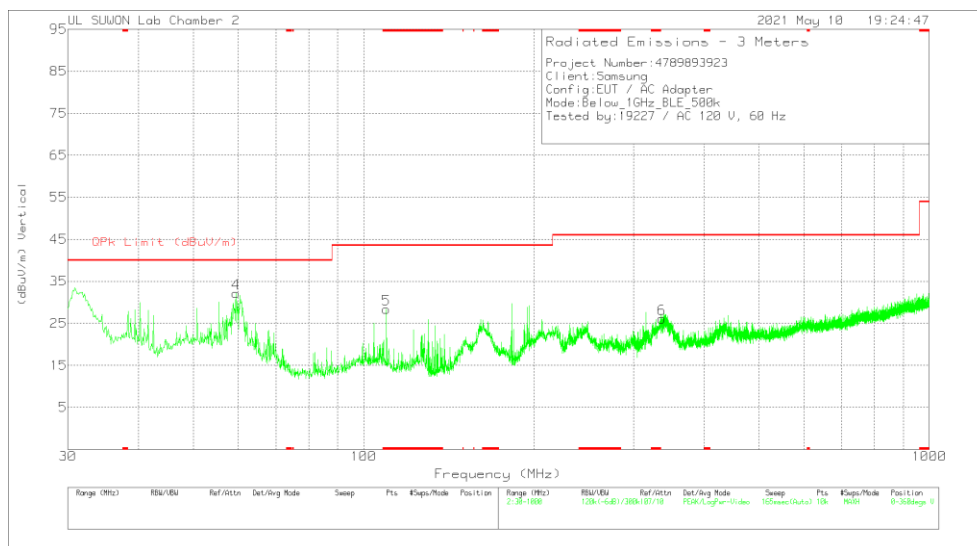
MAV1 - KDB558074 Option 1 Maximum RMS Average

10.3. 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]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	69.188	40.14	Pk	15.6	-31.6	24.14	40	-15.86	0-360	300	H
2	160.95	48.76	Pk	14.3	-31	32.06	43.52	-11.46	0-360	200	H
3	344.086	35.81	Pk	20.6	-30.1	26.31	46.02	-19.71	0-360	100	H
4	59.488	45.25	Pk	18.6	-31.7	32.15	40	-7.85	0-360	100	V
5	* 109.734	42.69	Pk	17	-31.3	28.39	43.52	-15.13	0-360	300	V
6	336.52	36.02	Pk	20.3	-30.2	26.12	46.02	-19.9	0-360	200	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.

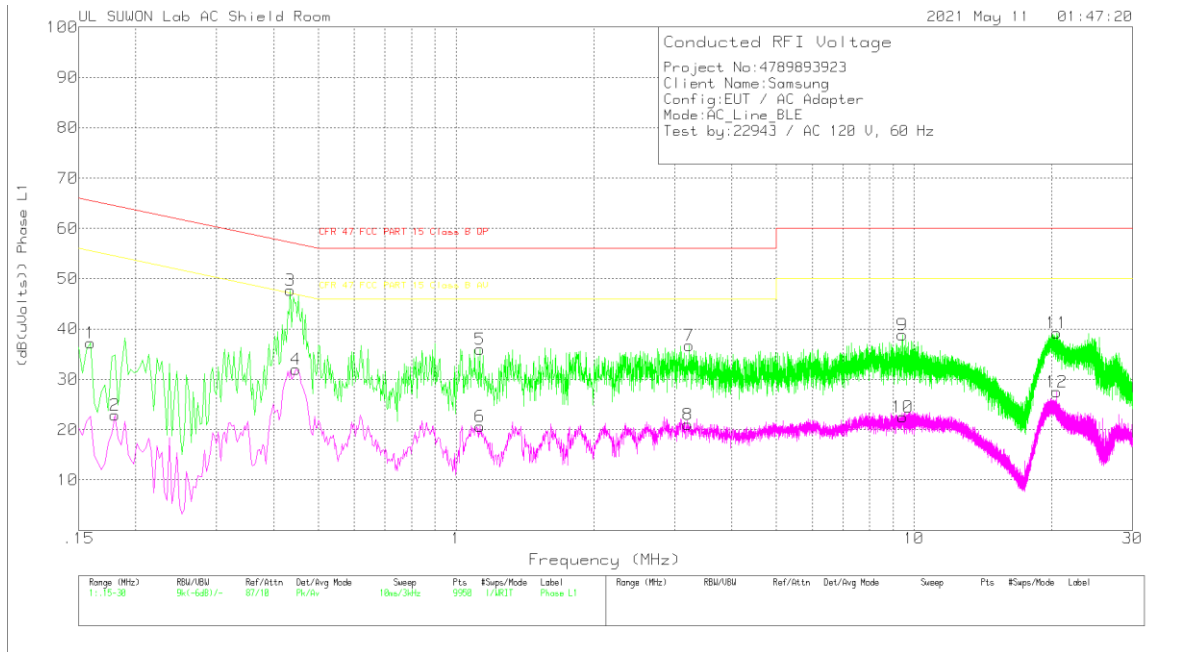
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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	.159	27.19	Pk	9.9	.1	37.19	65.52	-28.33	-	-
2	.18	12.68	Av	10	.2	22.88	-	-	54.49	-31.61
3	.435	37.63	Pk	9.9	.2	47.73	57.16	-9.43	-	-
4	.447	21.87	Av	9.9	.2	31.97	-	-	46.93	-14.96
5	1.128	25.93	Pk	9.8	.3	36.03	56	-19.97	-	-
6	1.128	10.5	Av	9.8	.3	20.6	-	-	46	-25.4
7	3.228	26.59	Pk	9.8	.3	36.69	56	-19.31	-	-
8	3.21	10.97	Av	9.8	.3	21.07	-	-	46	-24.93
9	9.432	28.52	Pk	9.9	.4	38.82	60	-21.18	-	-
10	9.438	12.23	Av	9.9	.4	22.53	-	-	50	-27.47
11	20.502	28.63	Pk	10.2	.4	39.23	60	-20.77	-	-
12	20.505	16.89	Av	10.2	.4	27.49	-	-	50	-22.51

Pk - Peak detector

Av - Average detection

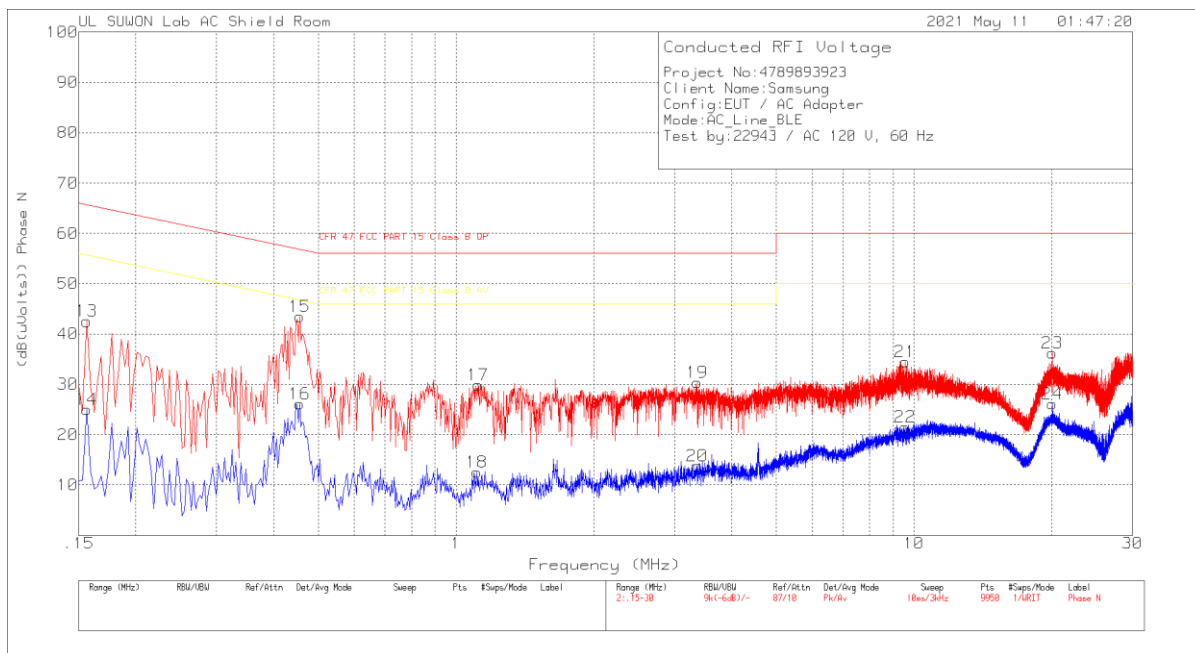
Quasi-Peak Emissions

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)
.43515	31.65	Qp	9.9	.2	41.75	57.15	-15.4	-	-

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	.156	32.52	Pk	9.9	.1	42.52	65.67	-23.15	-	-
14	.156	15.05	Av	9.9	.1	25.05	-	-	55.67	-30.62
15	.456	33.31	Pk	9.9	.2	43.41	56.77	-13.36	-	-
16	.456	16.06	Av	9.9	.2	26.16	-	-	46.77	-20.61
17	1.119	19.71	Pk	9.8	.3	29.81	56	-26.19	-	-
18	1.11	2.4	Av	9.8	.3	12.5	-	-	46	-33.5
19	3.36	20.31	Pk	9.8	.3	30.41	56	-25.59	-	-
20	3.366	3.64	Av	9.8	.3	13.74	-	-	46	-32.26
21	9.558	24.16	Pk	9.9	.4	34.46	60	-25.54	-	-
22	9.555	11.23	Av	9.9	.4	21.53	-	-	50	-28.47
23	20.037	25.57	Pk	10.3	.4	36.27	60	-23.73	-	-
24	20.037	15.47	Av	10.3	.4	26.17	-	-	50	-23.83

Pk - Peak detector

Av - Average detection

END OF TEST REPORT