



# **CERTIFICATION TEST REPORT**

**Report Number. :** 4789754188-E4V1

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

**Model :** SCG10

**FCC ID :** A3LSMG996JPN

**EUT Description :** GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, UWB,  
WPT and NFC

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

**Date Of Issue:**  
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Revision History

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## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS .....</b>	<b>5</b>
<b>2. TEST METHODOLOGY .....</b>	<b>6</b>
<b>3. FACILITIES AND ACCREDITATION .....</b>	<b>6</b>
<b>4. DECISION RULES AND MEASUREMENT UNCERTAINTY .....</b>	<b>7</b>
4.1. METROLOGICAL TRACEABILITY.....	7
4.2. SAMPLE CALCULATION.....	7
4.3. DECISION RULES.....	7
4.4. MEASUREMENT UNCERTAINTY.....	7
<b>5. EQUIPMENT UNDER TEST.....</b>	<b>8</b>
5.1. EUT DESCRIPTION.....	8
5.2. MAXIMUM OUTPUT POWER.....	8
5.3. DESCRIPTION OF AVAILABLE ANTENNAS .....	8
5.4. WORST-CASE CONFIGURATION AND MODE.....	9
5.5. DESCRIPTION OF TEST SETUP.....	10
<b>6. MEASUREMENT METHOD.....</b>	<b>12</b>
<b>7. TEST AND MEASUREMENT EQUIPMENT .....</b>	<b>13</b>
<b>8. TEST RESULTS SUMMARY .....</b>	<b>14</b>
<b>9. ANTENNA PORT TEST RESULTS.....</b>	<b>15</b>
9.1. ON TIME AND DUTY CYCLE .....	15
9.2. 6 dB BANDWIDTH.....	16
9.2.1. BLE (125 kbps).....	17
9.2.2. BLE (2 Mbps).....	18
9.3. PEAK OUTPUT POWER .....	19
9.3.1. BLE (125 kbps).....	20
9.3.2. BLE (2 Mbps).....	21
9.4. AVERAGE POWER .....	22
9.5. POWER SPECTRAL DENSITY .....	23
9.5.1. BLE (125 kbps).....	24
9.5.2. BLE (2Mbps).....	25
9.6. CONDUCTED SPURIOUS EMISSIONS .....	26
9.6.1. BLE (125 kbps).....	27
9.6.2. BLE (2 Mbps).....	28
<b>10. RADIATED TEST RESULTS .....</b>	<b>29</b>

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10.1.	LIMITS AND PROCEDURE .....	29
10.2.	TRANSMITTER ABOVE 1 GHz .....	31
10.2.1.	BLE (125 kbps).....	31
10.2.2.	BLE (2 Mbps) .....	38
10.3.	WORST CASE BELOW 1 GHZ.....	45
<b>11.</b>	<b>AC POWER LINE CONDUCTED EMISSIONS .....</b>	<b>46</b>
11.1.1.	AC Power Line.....	47

# 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/ax, UWB, WPT and NFC  
**MODEL:** SCG10  
**SERIAL NUMBER:** R3CNA0BB96L (CONDUCTED);  
R3CNC02XCVV (RADIATED);  
**DATE TESTED:** DEC 04, 2020 – FEB 05, 2021;

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:



Junwhan Lee  
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. DECISION RULES

Decision rule for statement(s) of conformity is based on Procedure 1, Clause 4.4.2 in IEC Guide 115:2007.

### 4.4. 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%.

## 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/ax, UWB, WPT and NFC. This test report addresses the DTS (BLE) operational mode.

### 5.2. MAXIMUM OUTPUT POWER

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

Frequency Range [MHz]	Mode	Power Mode	Output Power [dBm]	Output Power [mW]
2 402 ~ 2 480	125kbps	Peak	10.340	10.814
		Average	9.877	9.721
	2Mbps	Peak	10.499	11.218
		Average	9.703	9.339

### 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 antenna, with a maximum gain of -1.78 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, 125 kbps (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	Frequency [MHz]	Conducted Burst Avg [dBm]	Symbol Rate [Ms/s]	Mode	Frequency [MHz]	Conducted Burst Avg [dBm]		
1	1Mbps (37 pkt)	2402	7.264	2	2Mbps (37 pkt)	2402	7.683		
		2440	9.840			2440	9.703		
		2480	8.323			2480	8.676		
	1Mbps (255 pkt)	2402	6.681		2Mbps (255 pkt)	2402	6.426		
		2440	9.538			2440	9.320		
		2480	7.929			2480	7.683		
	125 kbps (37 pkt)	2402	8.025			1	125 kbps (37 pkt)	2402	6.760
		2440	9.877					2440	9.653
		2480	8.926					2480	8.012
	125 kbps (255 pkt)	2402	6.760		500 kbps (37 pkt)		2402	8.045	
		2440	9.653				2440	9.759	
		2480	8.012				2480	8.967	
	500 kbps (37 pkt)	2402	8.045	500 kbps (255 pkt)			2402	7.931	
		2440	9.759				2440	9.687	
		2480	8.967				2480	8.904	
	500 kbps (255 pkt)	2402	7.931				2402	7.931	
		2440	9.687				2440	9.687	
		2480	8.904				2480	8.904	

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA200	N/A	N/A
Data Cable	SAMSUNG	EP-DR140AWE	N/A	N/A

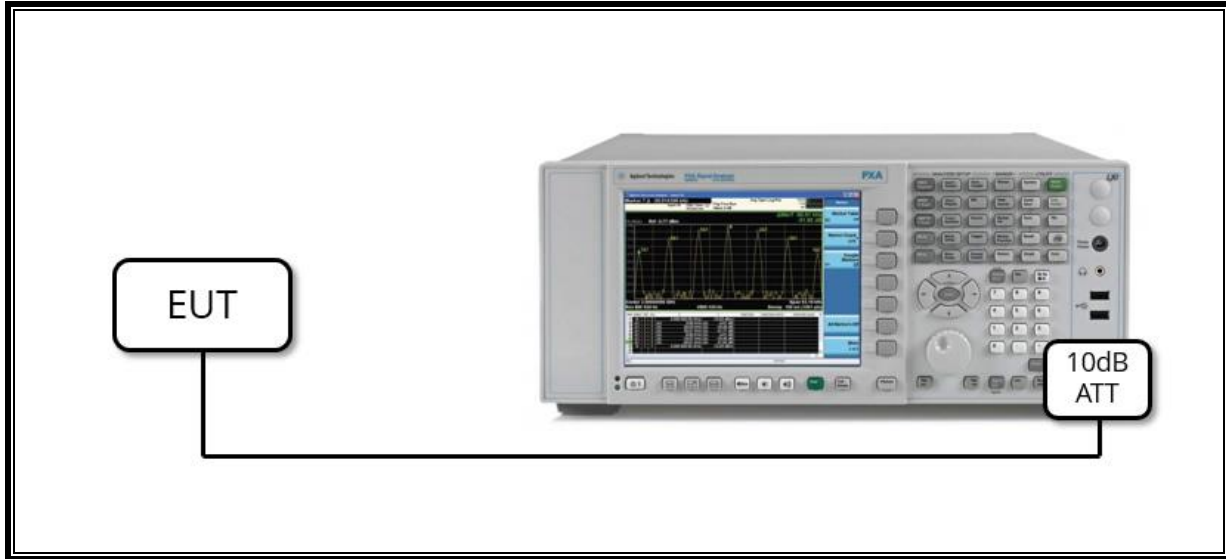
### I/O CABLE

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

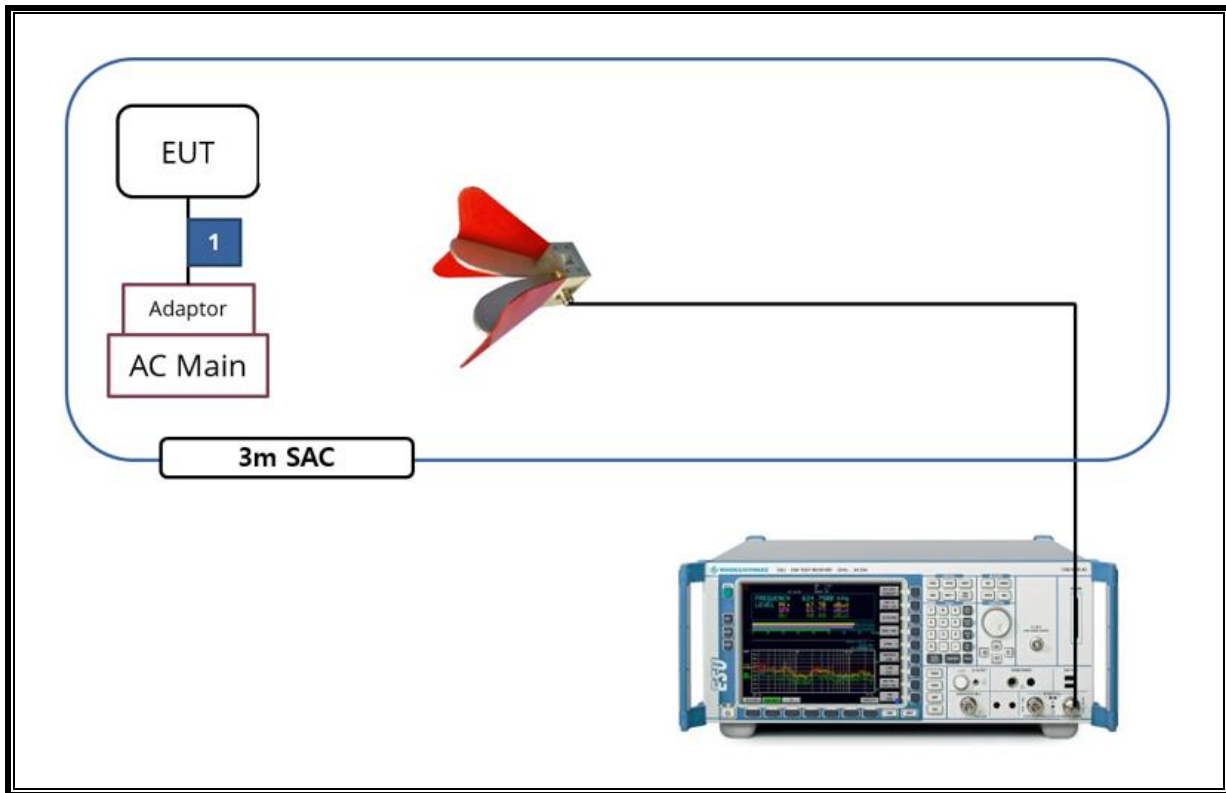
### TEST SETUP

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)**



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## 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	08-19-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	08-13-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-13-22
Antenna, Horn, 18 GHz	ETS	3115	00167211	07-27-22
Antenna, Horn, 18 GHz	ETS	3115	00161451	08-15-22
Antenna, Horn, 18 GHz	ETS	3117	00168724	07-27-22
Antenna, Horn, 18 GHz	ETS	3117	00168717	08-15-22
Antenna, Horn, 40 GHz	ETS	3116C	00166155	08-04-22
Antenna, Horn, 40 GHz	ETS	3116C	00168645	10-02-21
Preampifier	ETS	3116C-PA	00168841	08-06-21
Preampifier, 1000 MHz	Sonoma	310N	341282	08-03-21
Preampifier, 1000 MHz	Sonoma	310N	351741	08-03-21
Preampifier, 1000 MHz	Sonoma	310N	370599	08-06-21
Preampifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-03-21
Preampifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-03-21
Preampifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-04-21
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-05-21
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-05-21
Spectrum Analyzer, 43.5 GHz	R&S	FSW43	104089	08-06-21
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-05-21
Attenuator	PASTERNAK	PE7087-10	A001	08-03-21
Attenuator	PASTERNAK	PE7087-10	A008	08-03-21
Attenuator	PASTERNAK	PE7004-10	2	08-04-21
Attenuator	PASTERNAK	PE7087-10	A009	08-03-21
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-03-21
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-03-21
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	08-04-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-03-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-03-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	08-04-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	08-03-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	08-03-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	08-04-21
LISN	R&S	ENV-216	101837	08-06-21
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-02-21
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		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

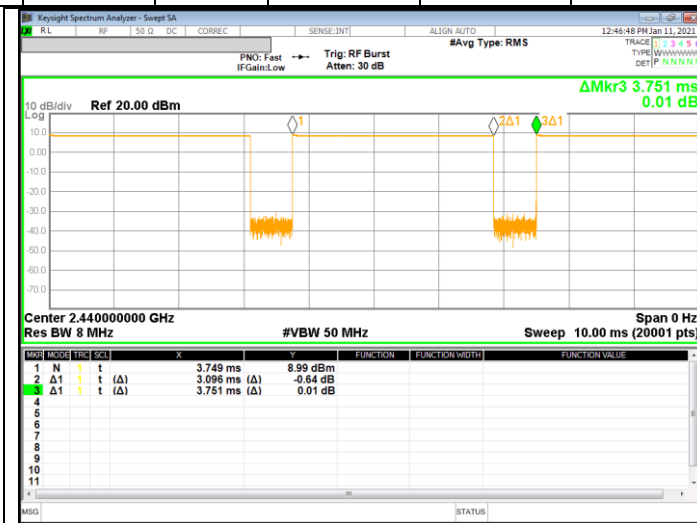
## 9. ANTENNA PORT TEST RESULTS

### 9.1. ON TIME AND DUTY CYCLE

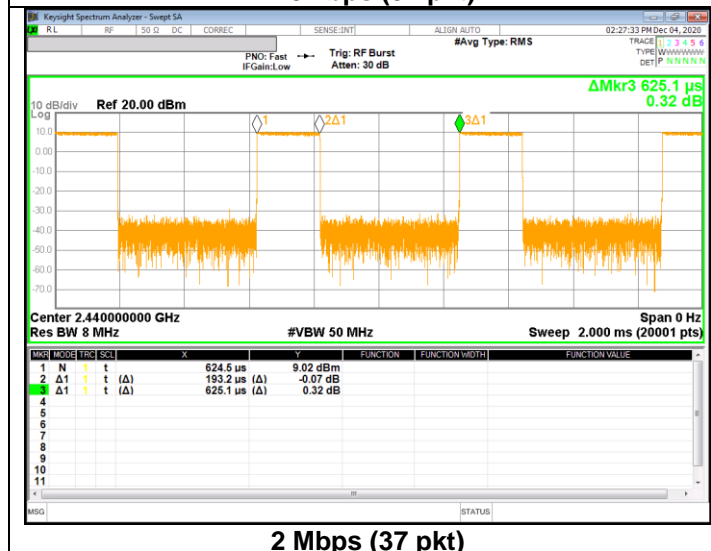
#### LIMITS

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						
BLE 125 kbps [37pkt]	3.096	3.751	0.825	82.538	0.83	0.32
BLE 2 Mbps [37pkt]	0.193	0.625	0.309	30.907	5.10	5.18



125 kbps (37 pkt)



2 Mbps (37 pkt)

## **9.2. 6 dB BANDWIDTH**

### **LIMITS**

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

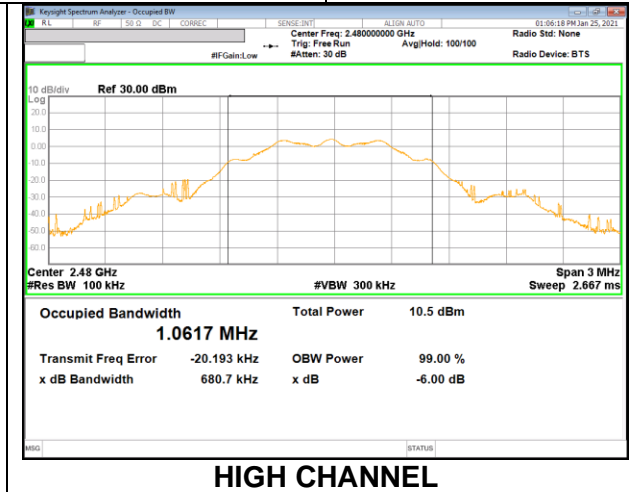
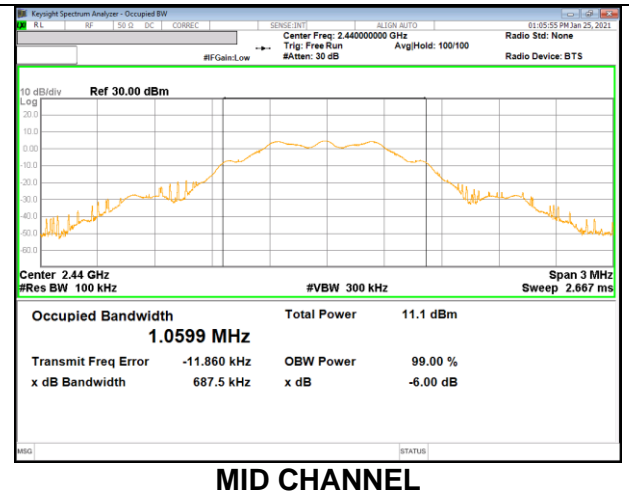
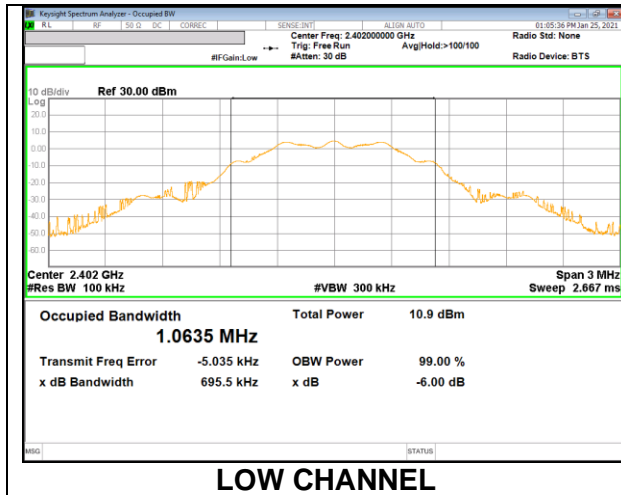
The minimum 6 dB bandwidth shall be at least 500 kHz.

### **RESULTS**



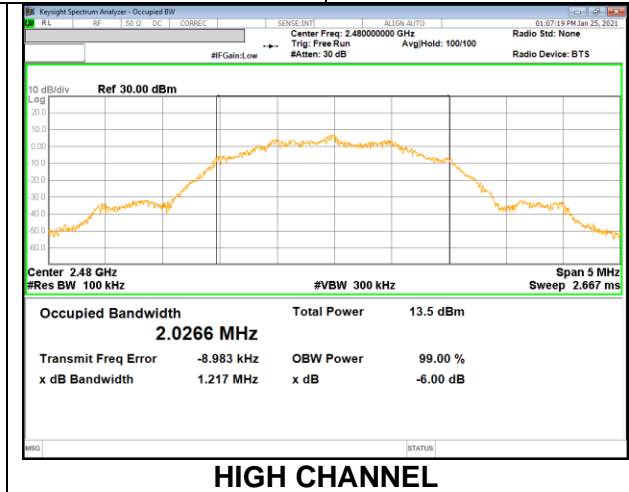
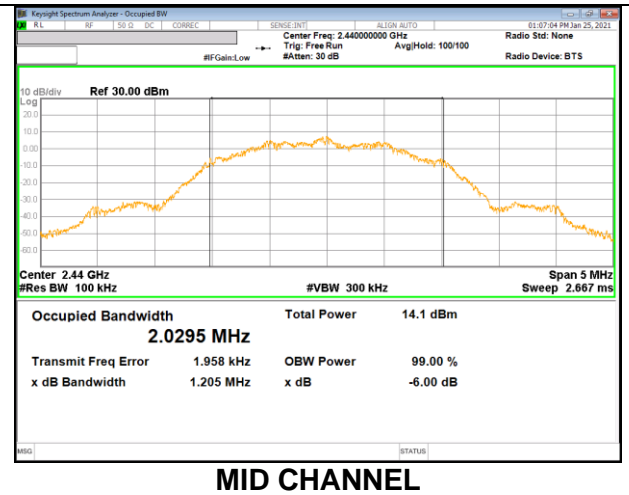
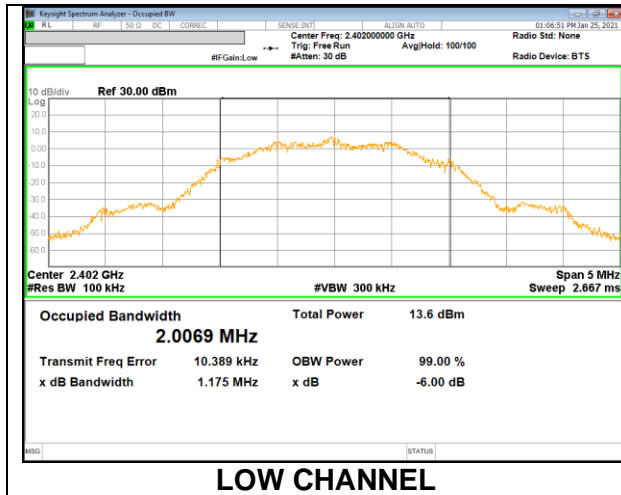
**9.2.1. BLE (125 kbps)**

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]
Low	2 402	695.5	500.0
Mid	2 440	687.5	500.0
High	2 480	680.7	500.0
Worst		<b>680.7</b>	500.0



**9.2.2. BLE (2 Mbps)**

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]
Low	2 402	1175.0	500.0
Mid	2 440	1205.0	500.0
High	2 480	1217.0	500.0
Worst		<b>1175.0</b>	500.0



**9.3. PEAK 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**

**- 125 kbps**

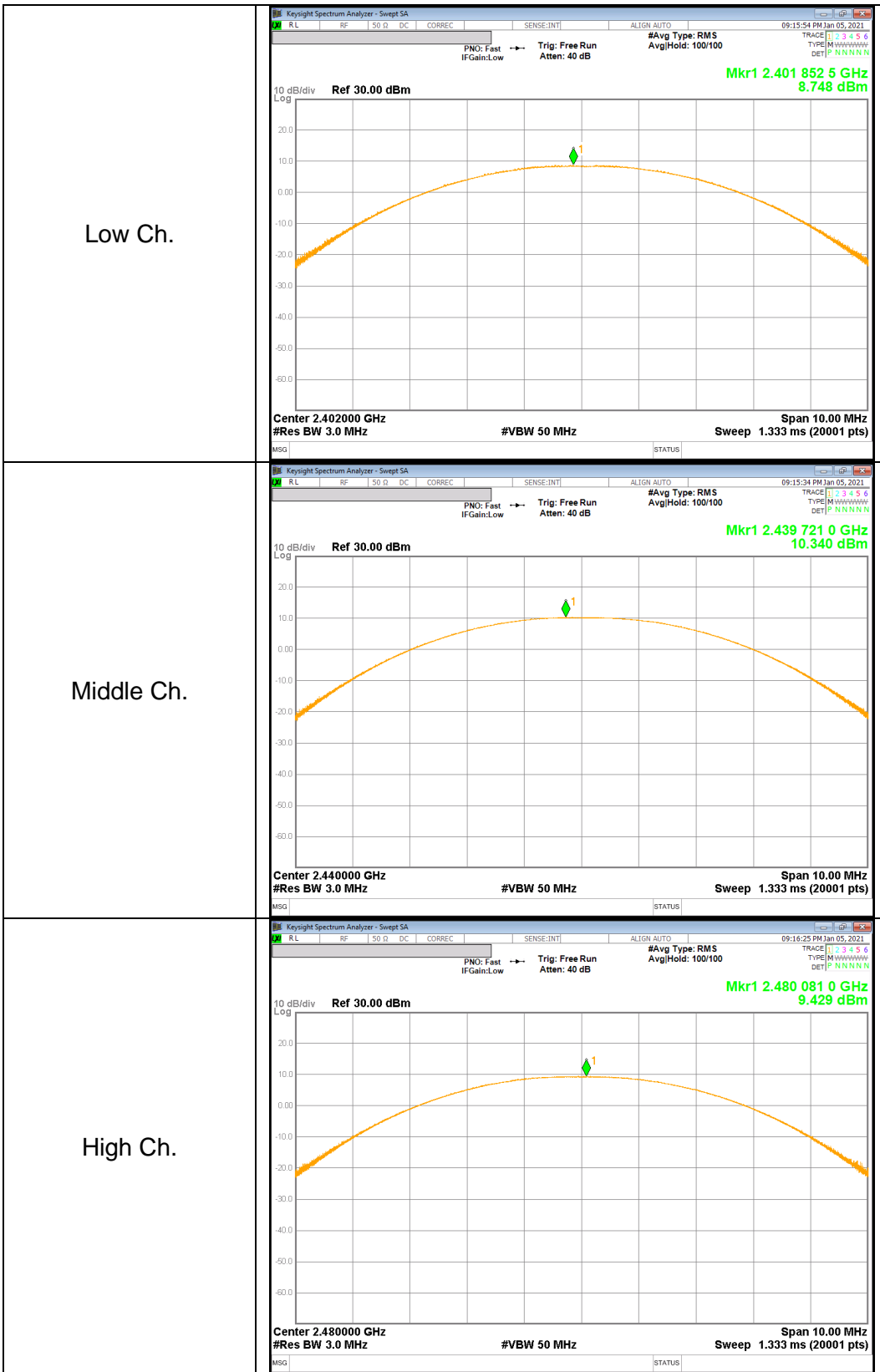
Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	8.748	30.000	-21.252
Mid	2440	10.340	30.000	-19.660
High	2480	9.429	30.000	-20.571
Worst		<b>10.340</b>	<b>30.000</b>	<b>-19.660</b>

**- 2 Mbps**

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	8.965	30.000	-21.035
Mid	2440	10.499	30.000	-19.501
High	2480	9.634	30.000	-20.366
Worst		<b>10.499</b>	<b>30.000</b>	<b>-19.501</b>

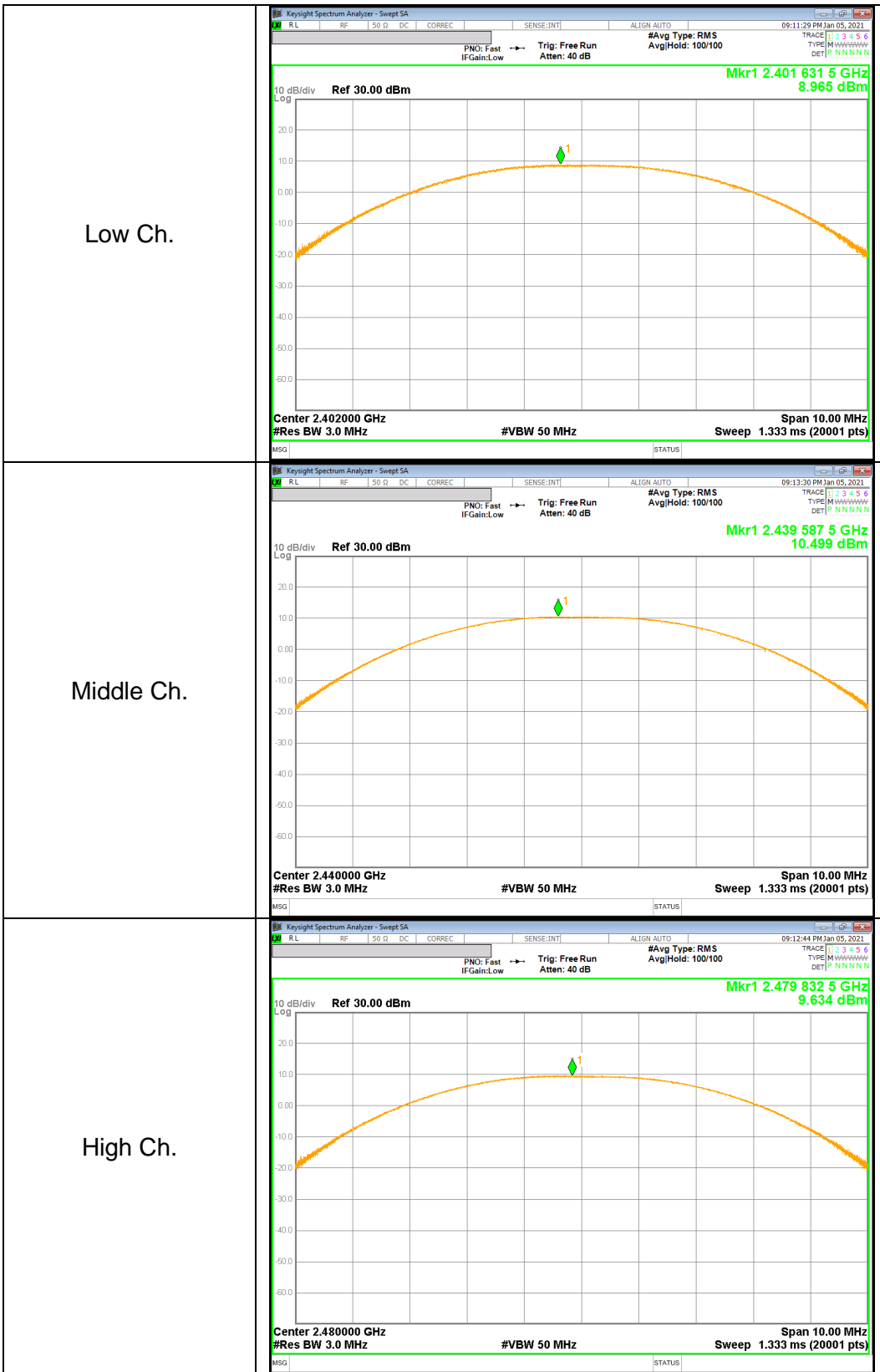
### 9.3.1. BLE (125 kbps)

#### PEAK OUTPUT POWER PLOTS



**9.3.2. BLE (2 Mbps)**

**PEAK OUTPUT POWER PLOTS**



## 9.4. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

### RESULTS

The cable assembly insertion loss was entered as an offset in the power meter to allow for direct reading of power. The duty factor already has been added.

#### - 125 kbps

Channel	Frequency [MHz]	AV Power [dBm]	AV Power [mW]
Low	2402	8.025	6.346
Mid	2440	9.877	9.721
High	2480	8.926	7.809

#### - 2 Mbps

Channel	Frequency [MHz]	AV Power [dBm]	AV Power [mW]
Low	2402	7.683	5.865
Mid	2440	9.703	9.339
High	2480	8.676	7.372

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## 9.5. POWER SPECTRAL DENSITY

### LIMITS

FCC §15.247 (e)

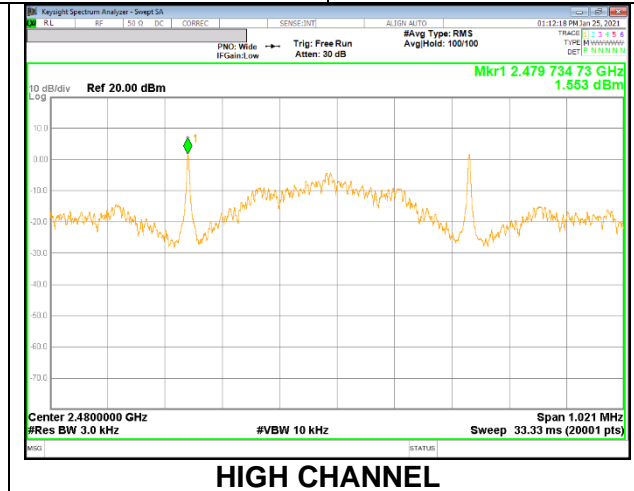
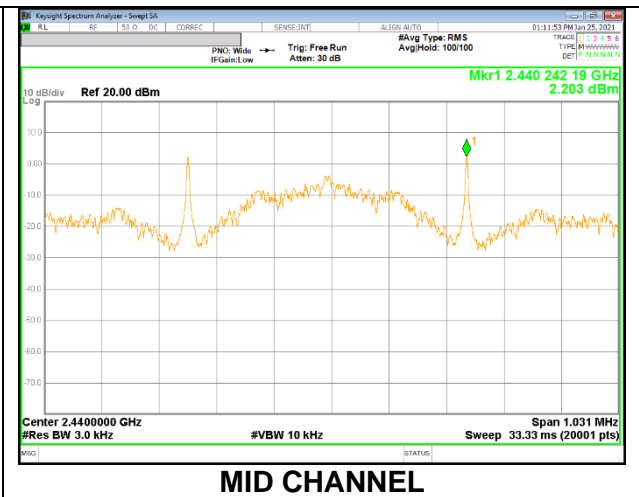
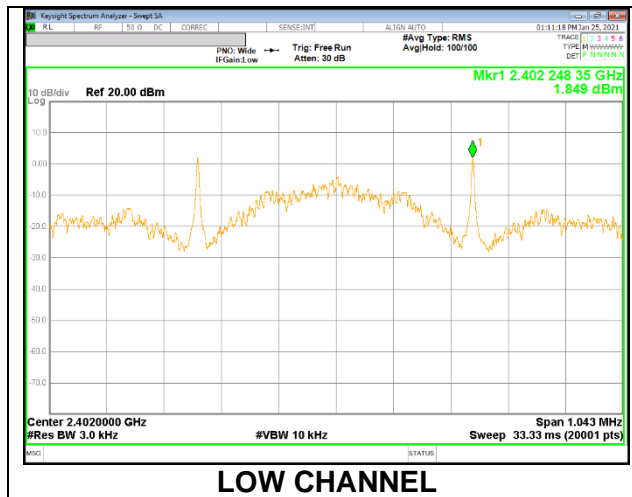
RSS-247 (5.2) (b)

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. BLE (125 kbps)

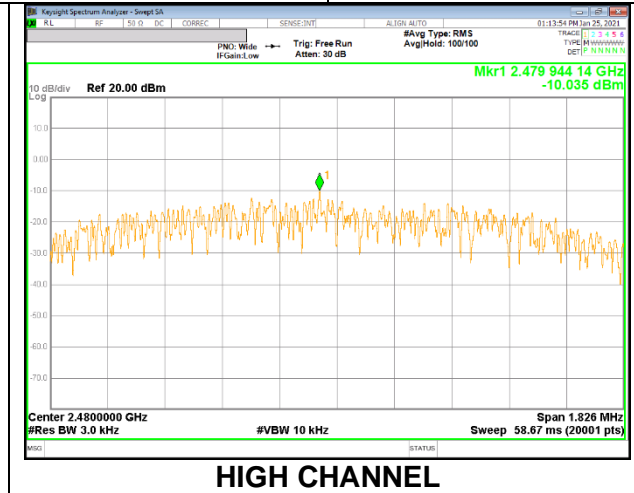
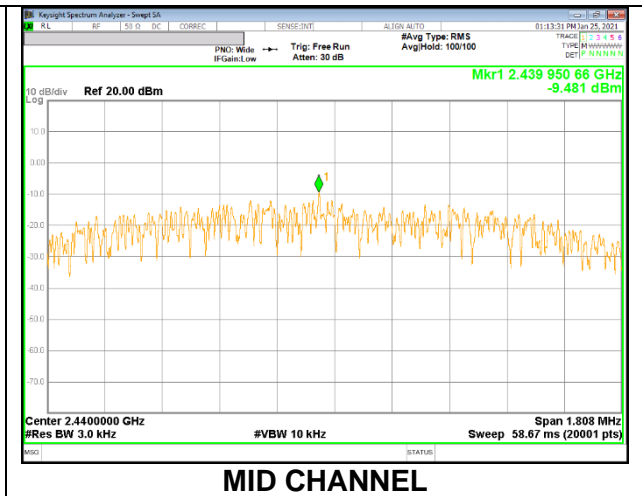
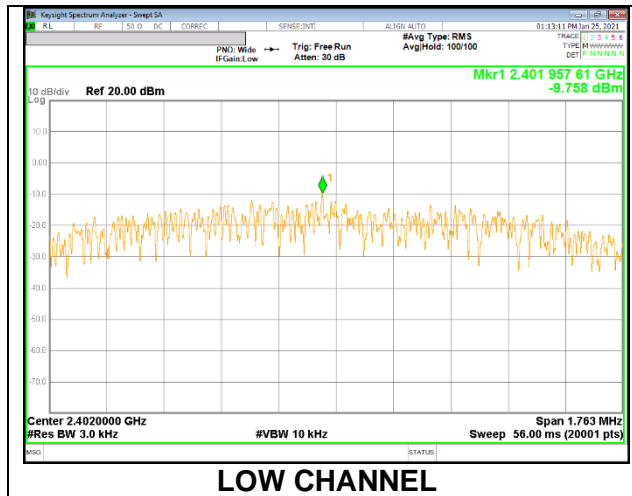
Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2402	1.849	8.000	-6.151
Mid	2440	2.203	8.000	-5.797
High	2480	1.553	8.000	-6.447





**9.5.2. BLE (2Mbps)**

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2402	-9.758	8.000	-17.758
Mid	2440	-9.481	8.000	-17.481
High	2480	-10.035	8.000	-18.035



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## **9.6. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

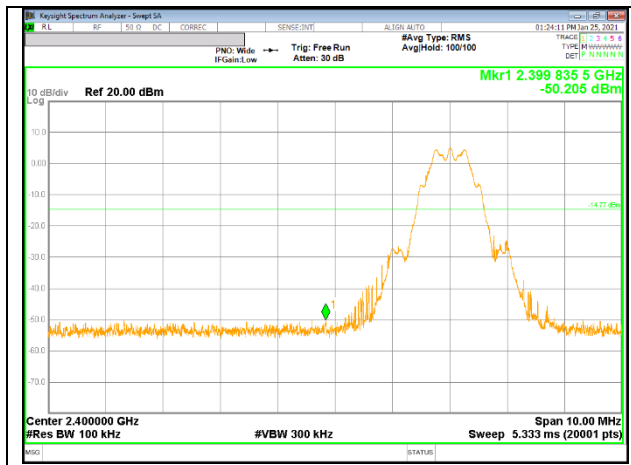
FCC §15.247 (d)

RSS-247 5.5

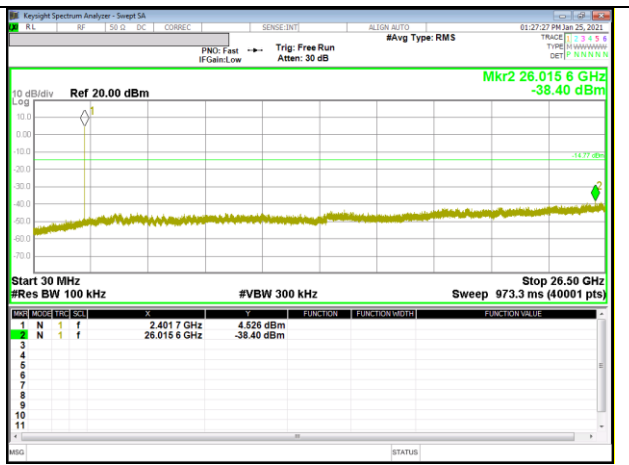
Output power was measured based on the use of a peak measurement. therefore, spurious emissions are required to be 20 dBc.

### **RESULTS**

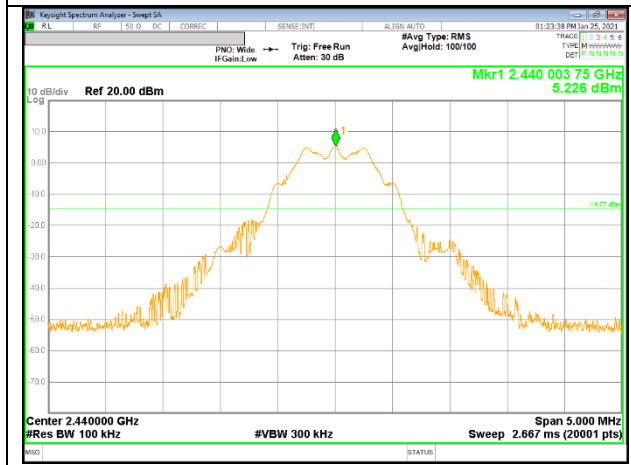
### 9.6.1. BLE (125 kbps)



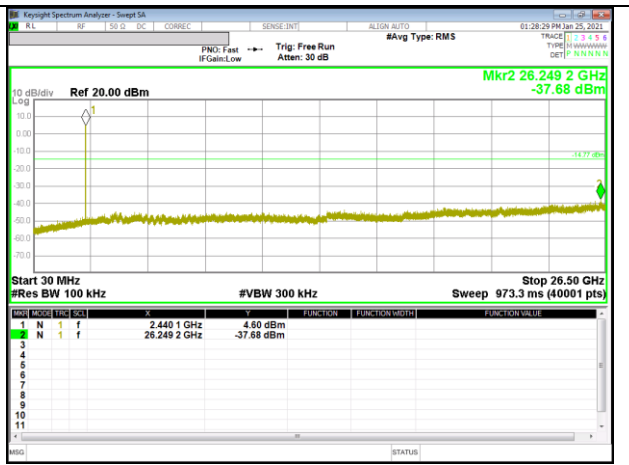
**LOW CHANNEL BANDEDGE**



**OUT-OF-BAND LOW CHANNEL**



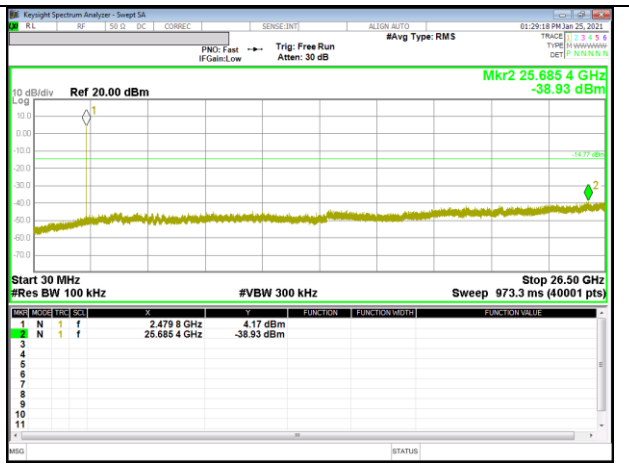
**IN-BAND REFERENCE LEVEL**



**OUT-OF-BAND MID CHANNEL**

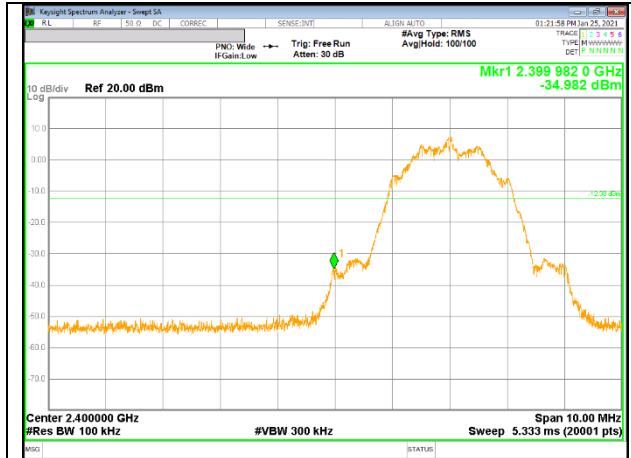


**HIGH CHANNEL BANDEDGE**

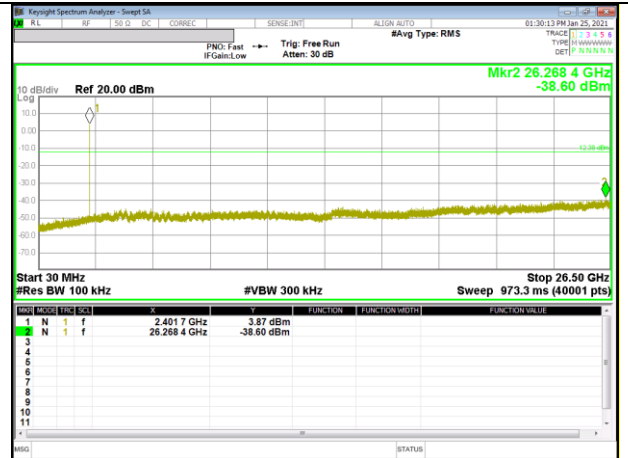


**OUT-OF-BAND HIGH CHANNEL**

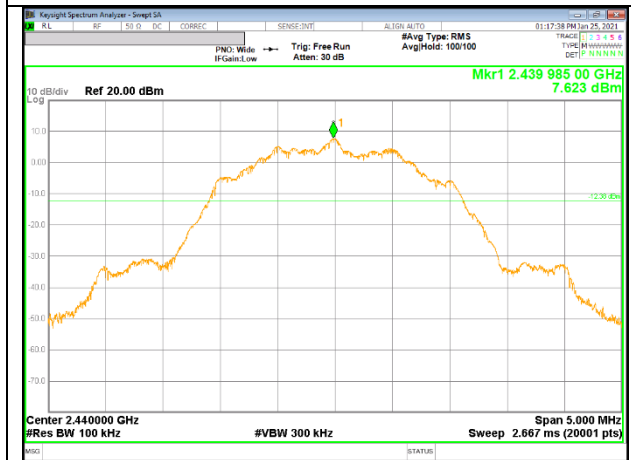
### 9.6.2. BLE (2 Mbps)



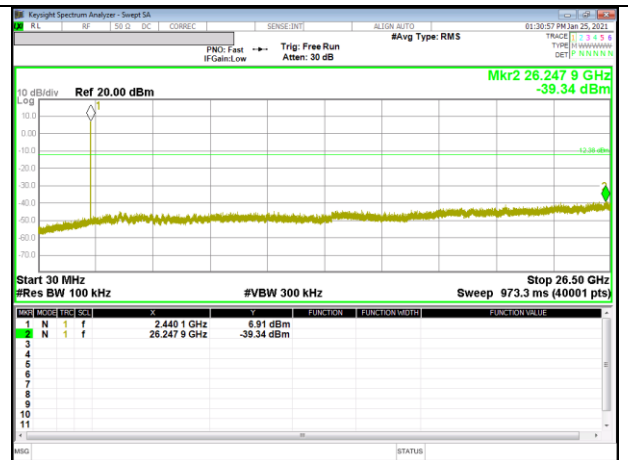
**LOW CHANNEL BANDEDGE**



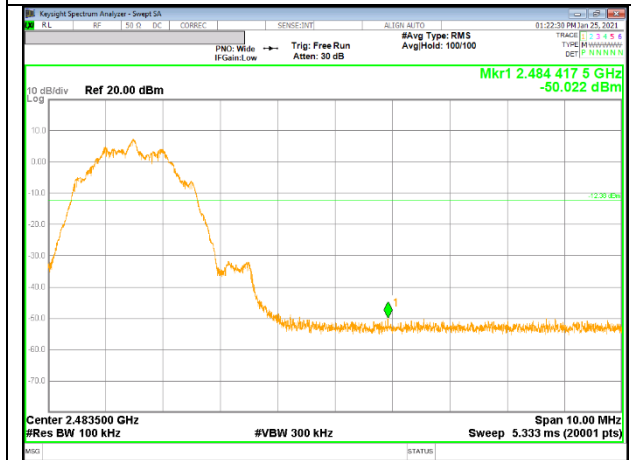
**OUT-OF-BAND LOW CHANNEL**



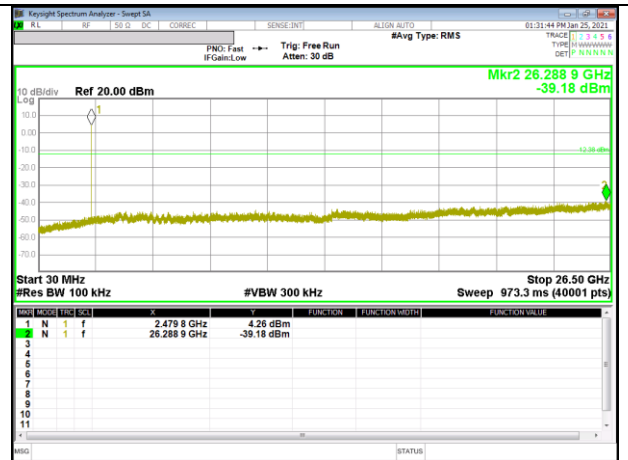
**IN-BAND REFERENCE LEVEL**



**OUT-OF-BAND MID CHANNEL**



**HIGH CHANNEL BANDEDGE**



**OUT-OF-BAND HIGH CHANNEL**

## 10. RADIATED TEST RESULTS

### 10.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits ( $\mu\text{V/m}$ )	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

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**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 125 kbps, DCF =  $10\log(1/0.825)=0.833$  dB (Spectrum Analyzer round it up to 0.83 dB) and for 2Mbps, DCF =  $10\log(1/0.309)=5.099$  dB (Spectrum Analyzer round it up to 5.10 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.

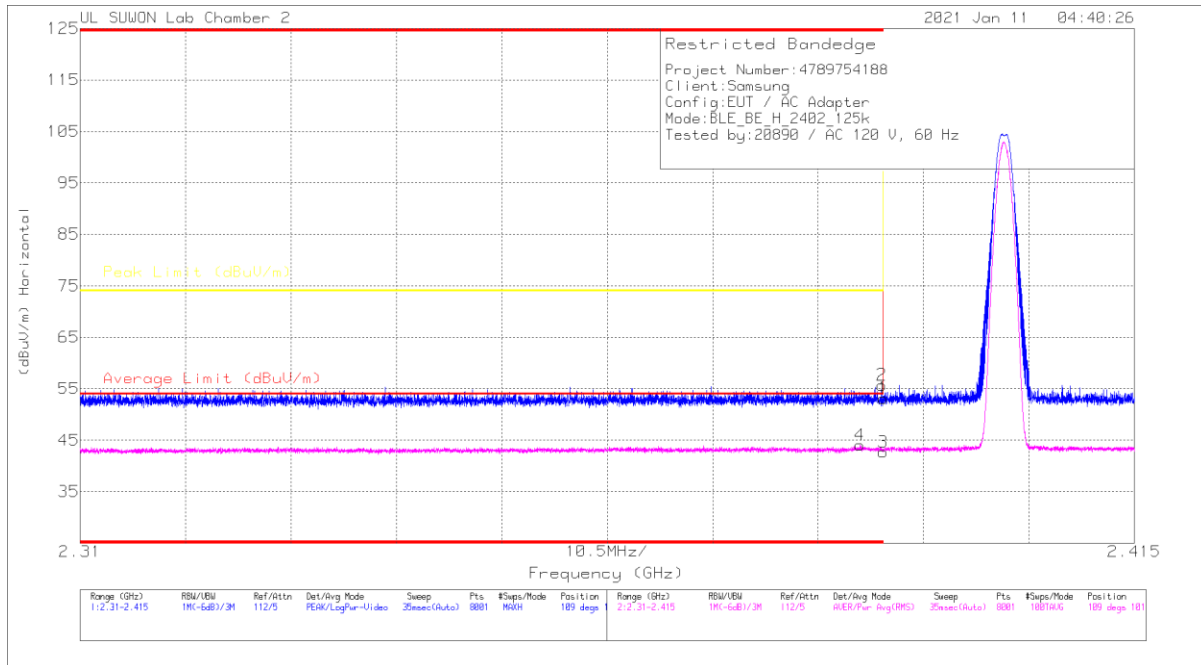
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.  
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

## 10.2. TRANSMITTER ABOVE 1 GHz

### 10.2.1. BLE (125 kbps)

#### BANDEDGE (LOW CHANNEL)

#### HORIZONTAL RESULT

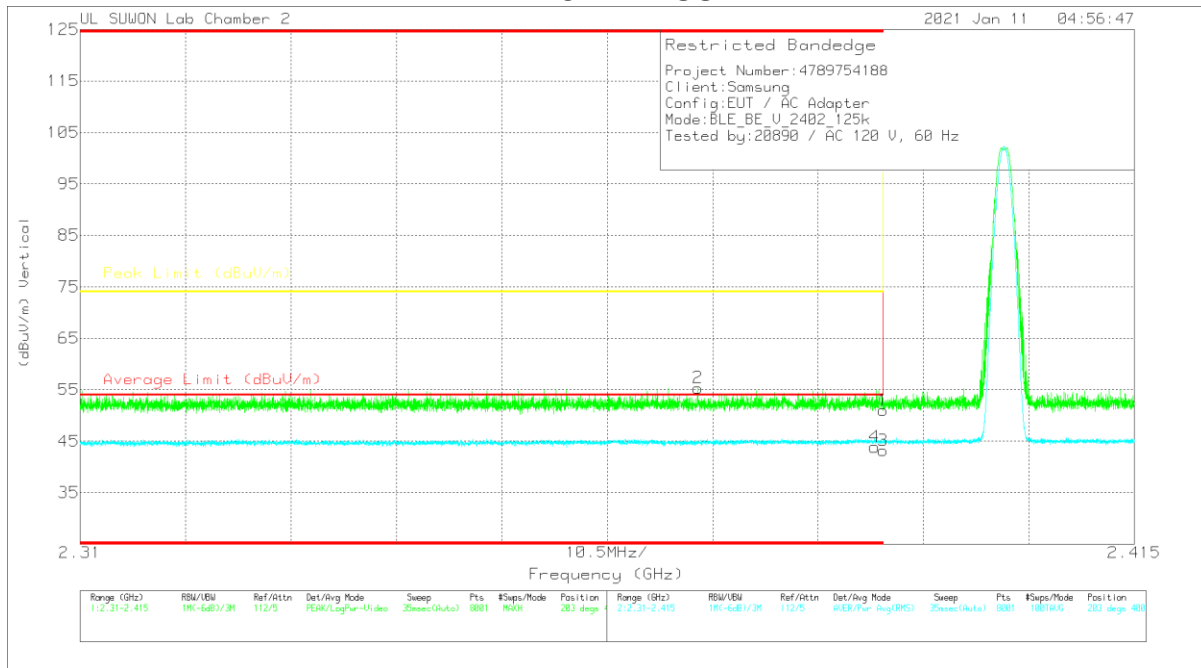


#### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Cor (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.56	PK	31.9	-20.3	0	53.16	-	-	74	-20.84	109	101	H
2	* 2.38984	44.09	PK	31.9	-20.3	0	55.69	-	-	74	-18.31	109	101	H
3	* 2.39	30.27	RMS	31.9	-20.3	.83	42.7	54	-11.3	-	-	109	101	H
4	* 2.38766	31.49	RMS	31.9	-20.2	.83	44.02	54	-9.98	-	-	109	101	H

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

**VERTICAL RESULT**



**Trace Markers**

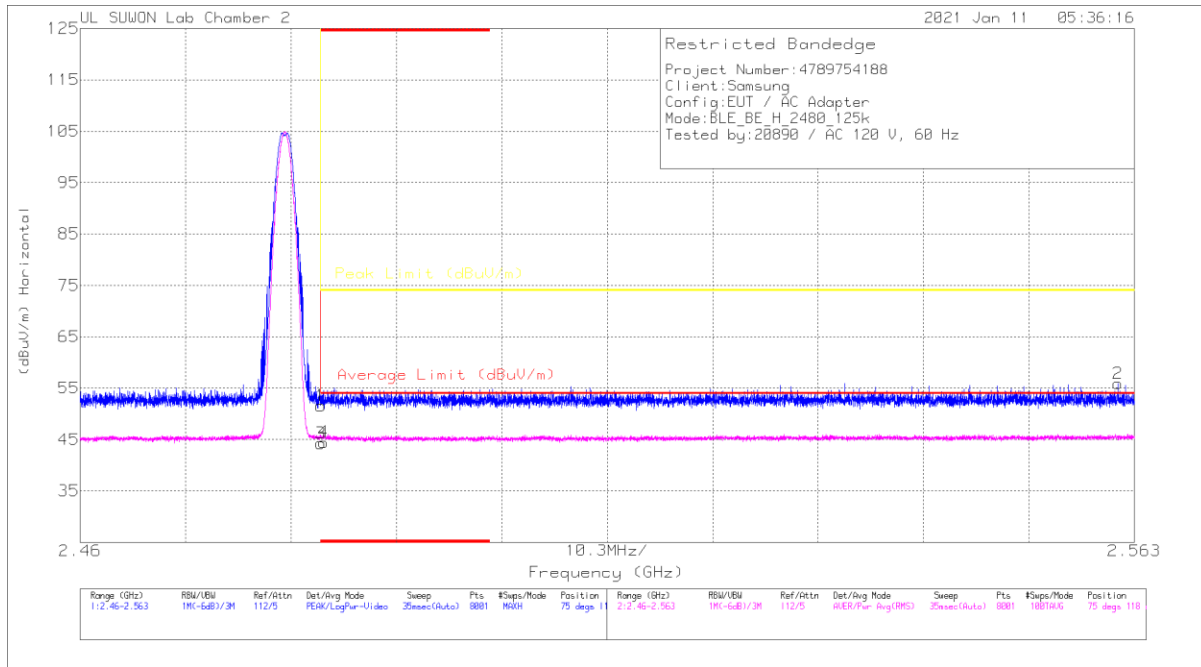
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	39.42	Pk	31.9	-20.3	0	51.02	-	-	74	-22.98	203	400	V
2	* 2.37153	44.06	Pk	31.8	-20.5	0	55.36	-	-	74	-18.64	203	400	V
3	* 2.39	30.74	RMS	31.9	-20.3	.83	43.17	54	-10.83	-	-	203	400	V
4	* 2.38913	31.46	RMS	31.9	-20.3	.83	43.89	54	-10.11	-	-	203	400	V

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



**BANDEDGE (HIGH CHANNEL)**

**HORIZONTAL RESULT**

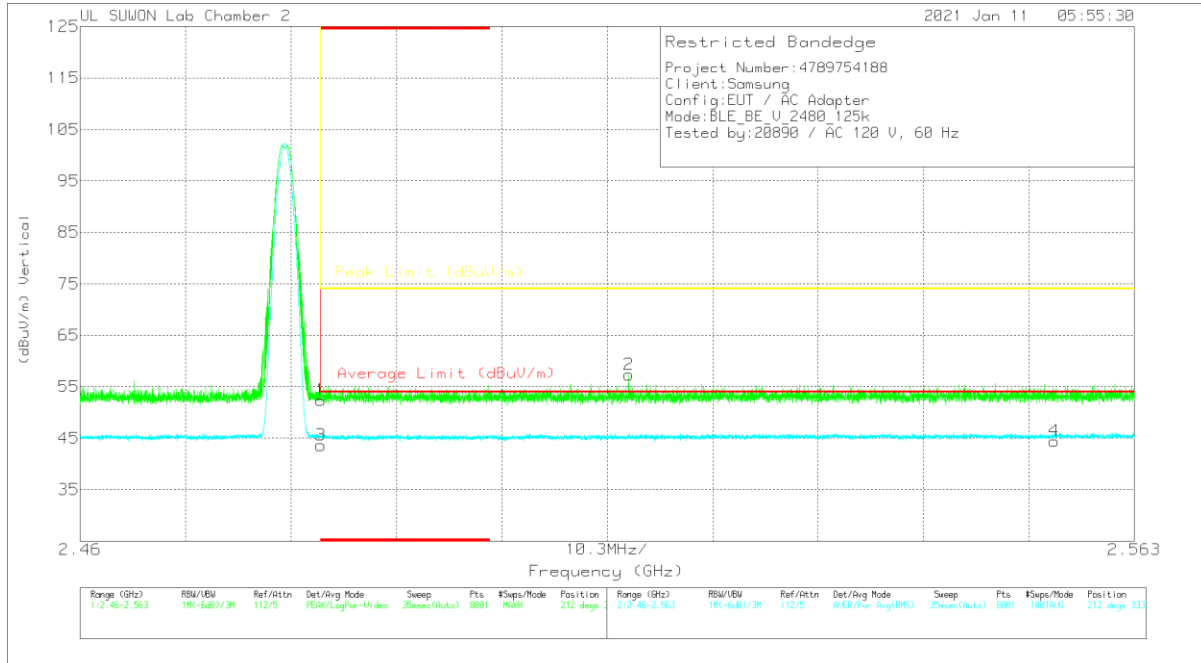


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Cor (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	39.79	Pk	32	-20.2	0	51.59	-	-	74	-22.41	75	118	H
2	2.56139	43.71	Pk	32.2	-20	0	55.91	-	-	74	-18.09	75	118	H
3	* 2.48351	31.63	RMS	32	-20.2	.83	44.26	54	-9.74	-	-	75	118	H
4	* 2.48379	31.83	RMS	32	-20.2	.83	44.46	54	-9.54	-	-	75	118	H

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

### VERTICAL RESULT

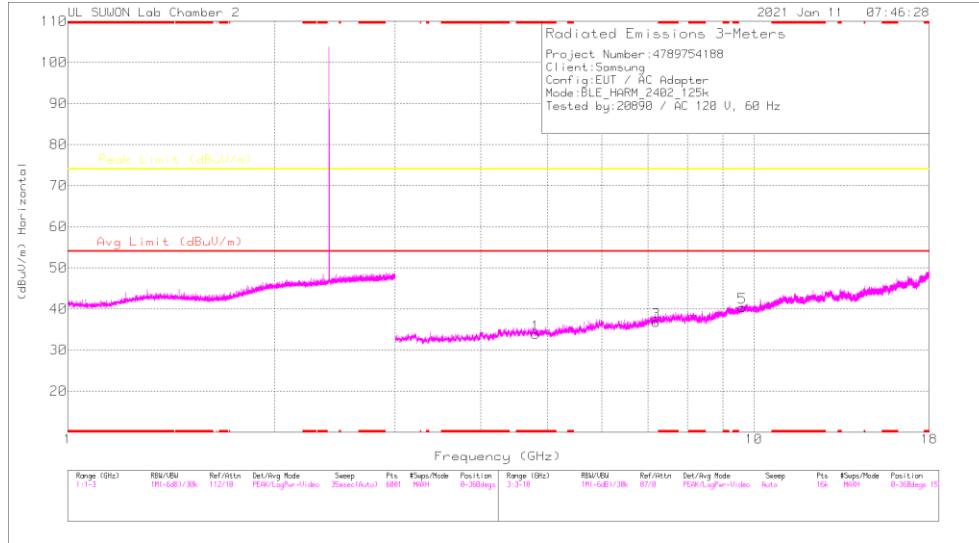


### Trace Markers

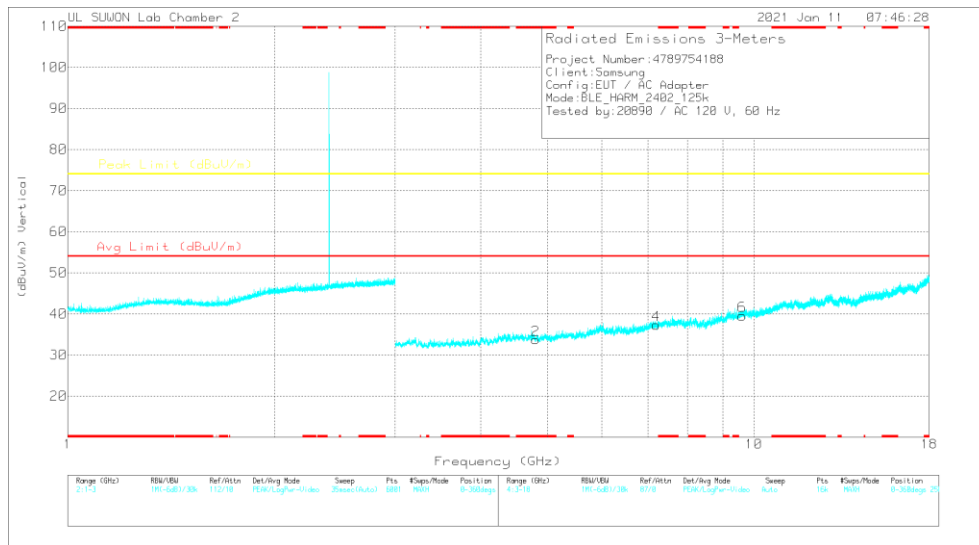
Marker	Frequency (GHz)	Meas Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	40.57	Pk	32	-20.2	0	52.37	-	-	74	-21.63	212	333	V
2	2.51359	45.44	Pk	32.1	-20.2	0	57.34	-	-	74	-16.66	212	333	V
3	* 2.48351	31	RMS	32	-20.2	.83	43.63	54	-10.37	-	-	212	333	V
4	2.55517	31.42	RMS	32.2	-20	.83	44.45	54	-9.55	-	-	212	333	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



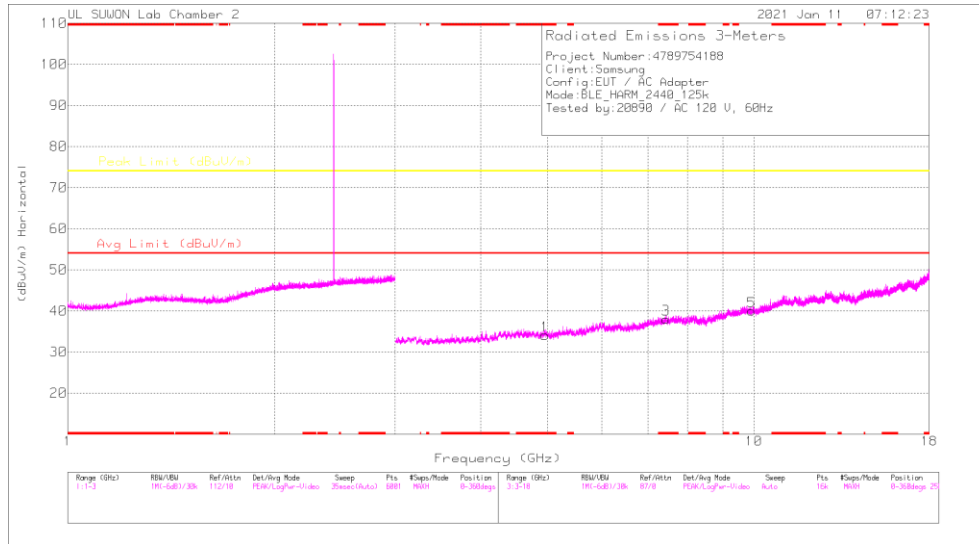
### VERTICAL

### Radiated Emissions

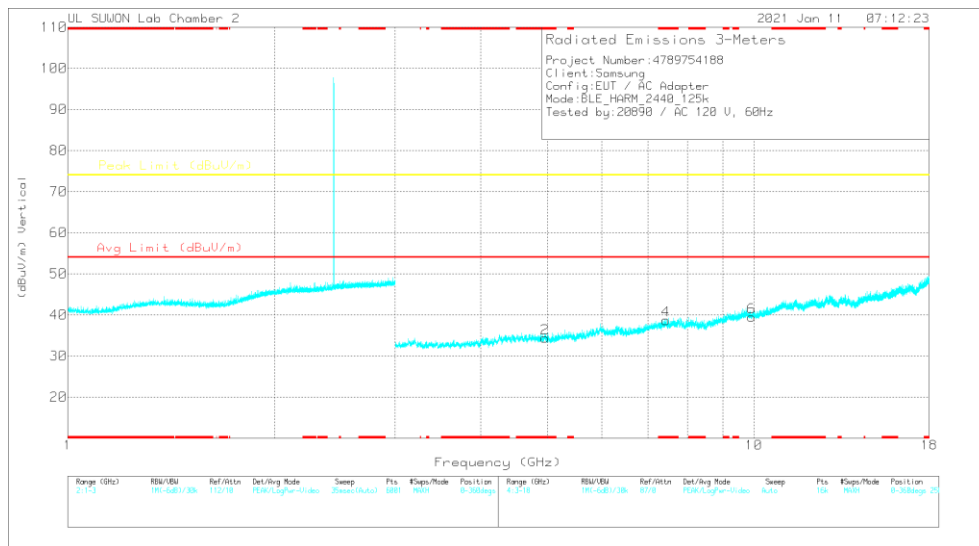
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80331	36.72	PK2	34.1	-27.7	0	43.12	-	-	74	-30.88	360	100	H
* 4.80524	36.85	PK2	34.1	-27.7	0	43.25	-	-	74	-30.75	360	100	V
7.2074	35.4	PK2	36.2	-24.9	0	46.7	-	-	74	-27.3	360	100	H
7.20809	35.61	PK2	36.2	-24.9	0	46.91	-	-	74	-27.09	360	100	V
9.60896	33.35	PK2	37	-20.8	0	49.55	-	-	74	-24.45	360	100	H
9.61076	33.06	PK2	37	-20.8	0	49.26	-	-	74	-24.74	360	100	V

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

### MID CHANNEL RESULTS



### HORIZONTAL



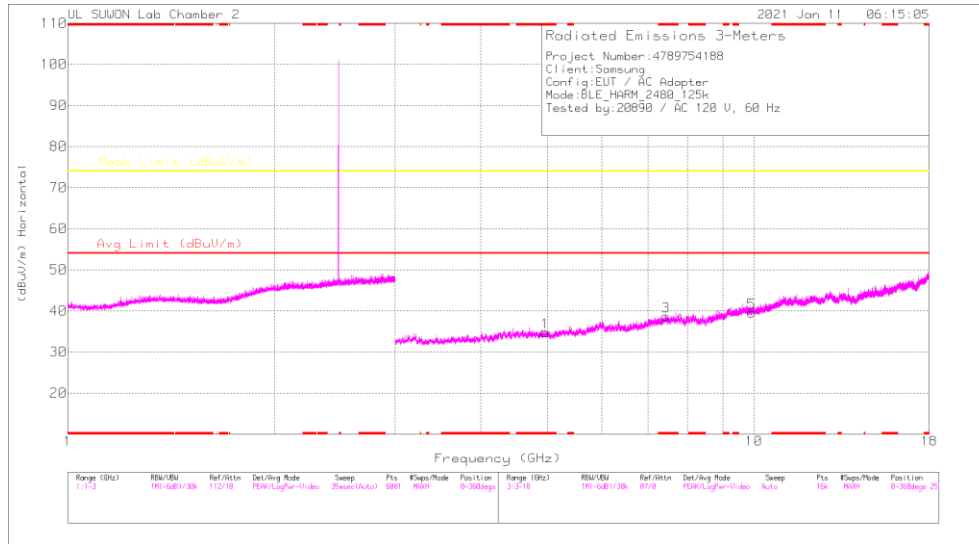
### VERTICAL

### Radiated Emissions

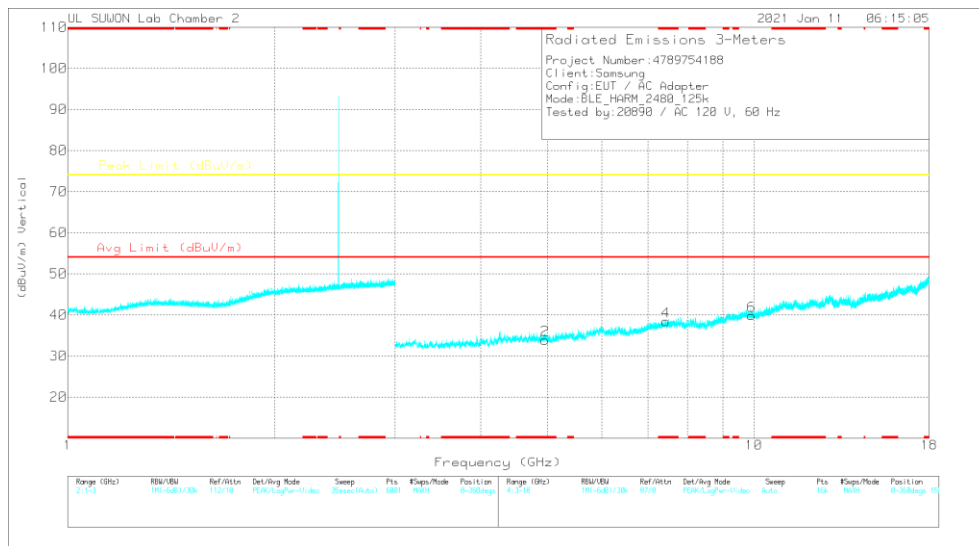
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.95859	36.48	PK2	34.1	-26.8	0	43.78	-	-	74	-30.22	0	100	H
* 4.96092	36.24	PK2	34.1	-26.8	0	43.54	-	-	74	-30.46	0	100	V
* 7.43941	34.69	PK2	36	-23.8	0	46.89	-	-	74	-27.11	0	100	H
* 7.44016	35.41	PK2	36	-23.6	0	47.81	-	-	74	-26.19	0	100	V
9.91937	31.96	PK2	37.4	-20.4	0	48.96	-	-	74	-25.04	0	100	H
9.92044	32.25	PK2	37.4	-20.3	0	49.35	-	-	74	-24.65	0	100	V

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

### HIGH CHANNEL RESULTS



### HORIZONTAL



### VERTICAL

### Radiated Emissions

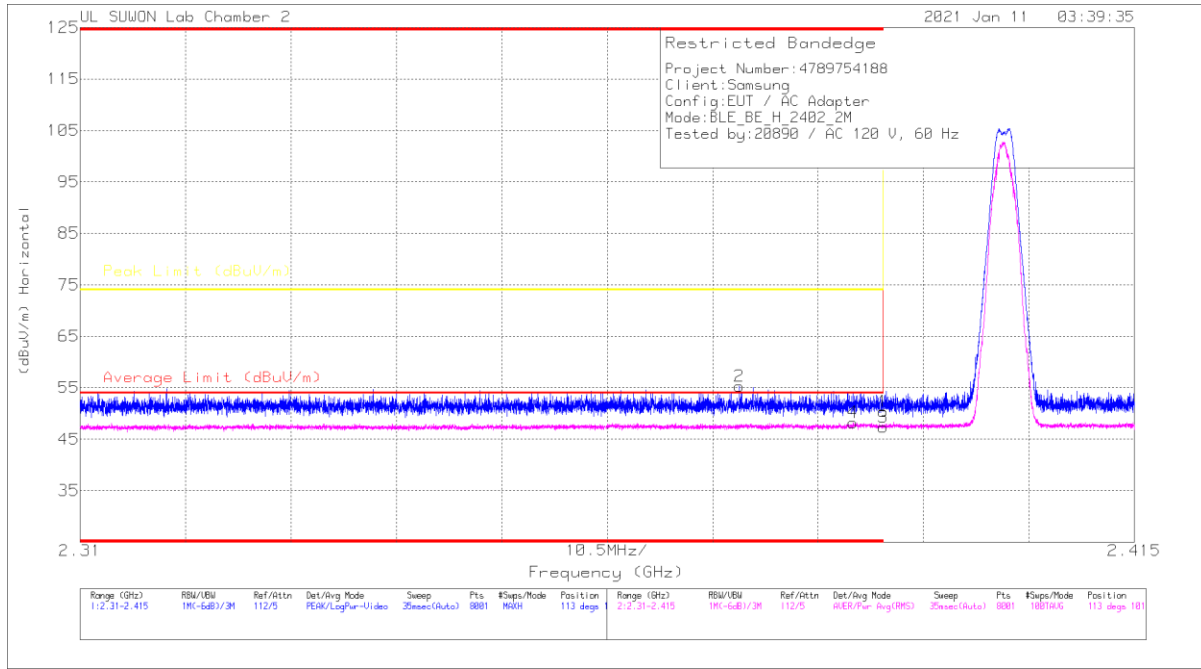
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.96255	36.83	PK2	34.1	-26.8	0	44.13	-	-	74	-29.87	0	100	H
* 4.95925	36.83	PK2	34.1	-26.8	0	44.13	-	-	74	-29.87	0	100	V
* 7.43997	34.76	PK2	36	-23.7	0	47.06	-	-	74	-26.94	0	100	H
* 7.43797	34.75	PK2	36	-23.6	0	47.15	-	-	74	-26.85	0	100	V
9.92055	31.81	PK2	37.4	-20.2	0	49.01	-	-	74	-24.99	0	100	H
9.92219	31.87	PK2	37.4	-20.3	0	48.97	-	-	74	-25.03	0	100	V

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

**10.2.2. BLE (2 Mbps)**

**BANDEDGE (LOW CHANNEL)**

**HORIZONTAL RESULT**

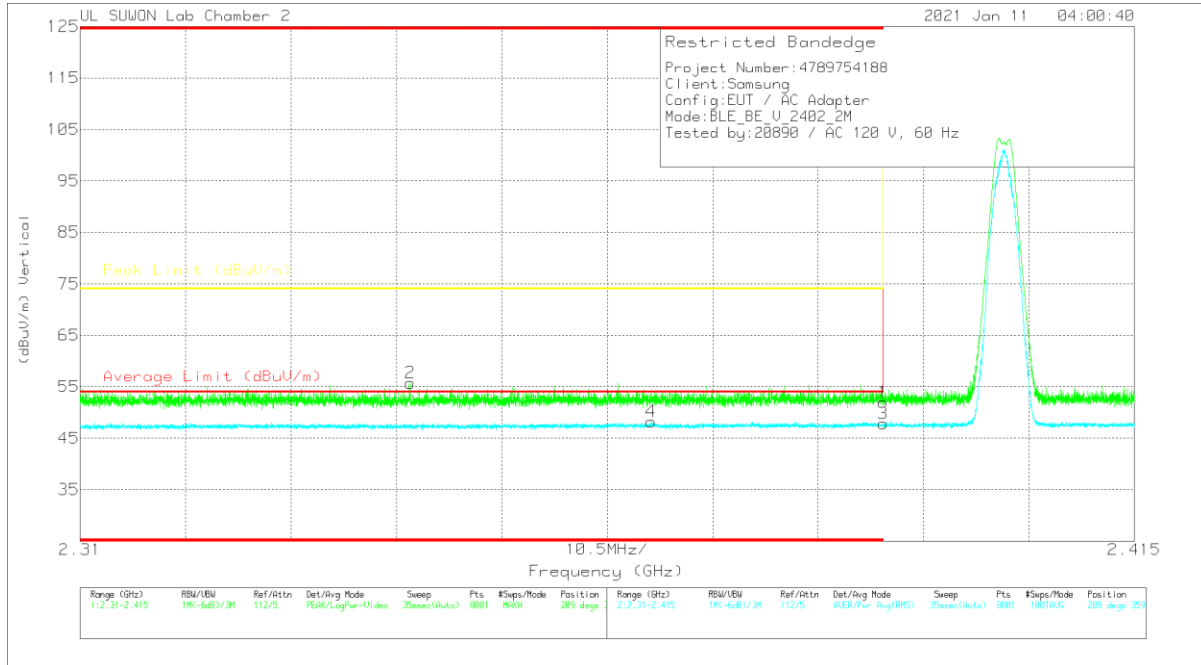


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Cor (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	38.8	PK		-20.3	0	50.4	-	-	74	-23.6	113	101	H
2	* 2.37565	43.78	PK		-20.4	0	55.28	-	-	74	-18.72	113	101	H
3	* 2.39	30.64	RMS		-20.3	5.1	47.34	54	-6.66	-	-	113	101	H
4	* 2.38699	31.55	RMS		-20.3	5.1	48.25	54	-5.75	-	-	113	101	H

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

### VERTICAL RESULT



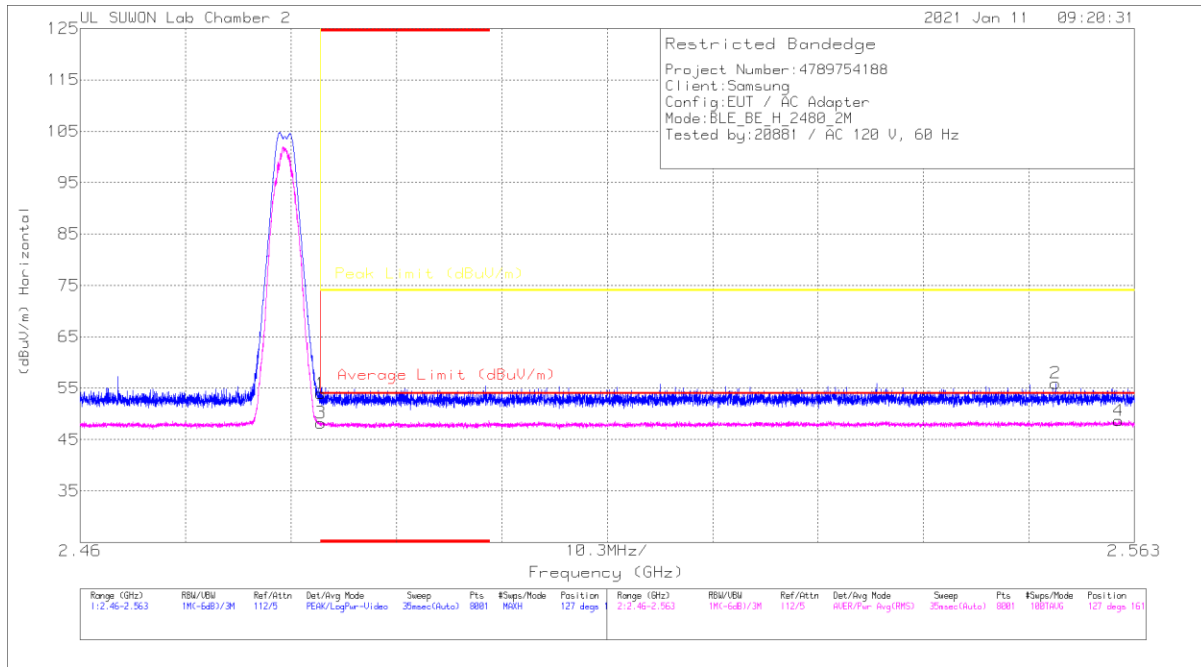
### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.39	Pk		-20.3	0	51.99	-	-	74	-22.01	209	359	V
2	* 2.34289	44.44	Pk		-20.5	0	55.74	-	-	74	-18.26	209	359	V
3	* 2.39	31.11	RMS		-20.3	5.1	47.81	54	-6.19	-	-	209	359	V
4	* 2.36687	31.62	RMS		-20.3	5.1	48.22	54	-5.78	-	-	209	359	V

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

**BANDEDGE (HIGH CHANNEL)**

**HORIZONTAL RESULT**



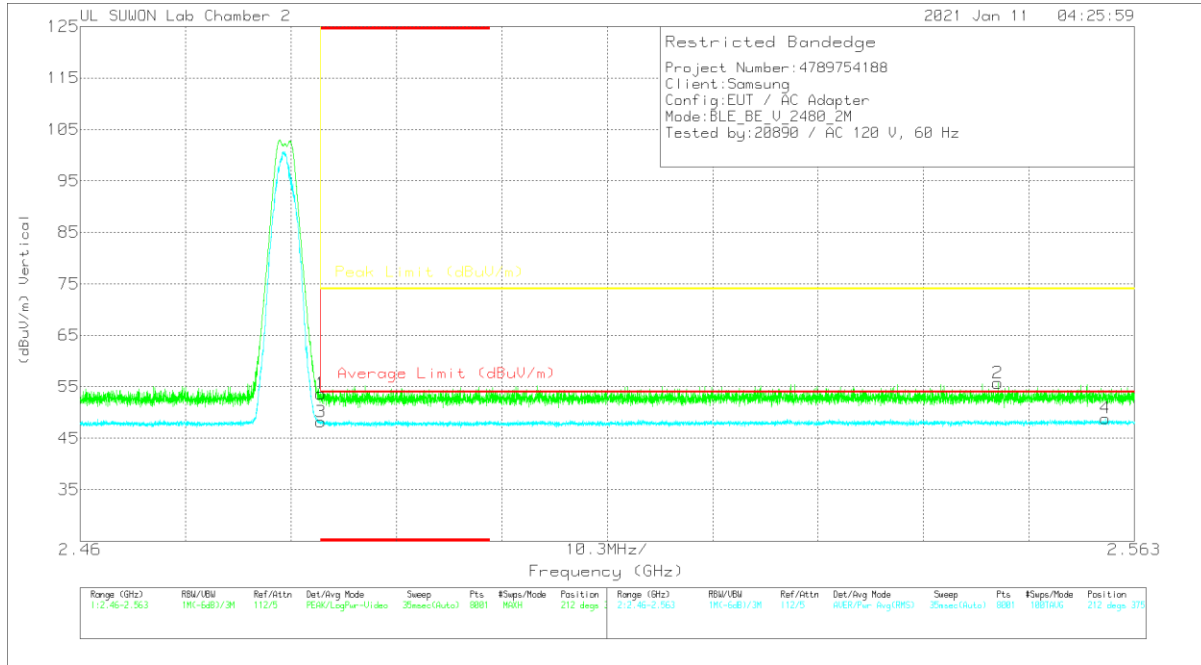
**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Cor (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	42.12	Pk	32	-20.2	0	53.92	-	-	74	-20.08	127	161	H
2	2.5553	43.76	Pk	32.2	-20	0	55.96	-	-	74	-18.04	127	161	H
3	* 2.48351	31.35	RMS	32	-20.2	5.1	48.25	54	-5.75	-	-	127	161	H
4	2.56144	31.39	RMS	32.2	-20	5.1	48.69	54	-5.31	-	-	127	161	H

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



### VERTICAL RESULT

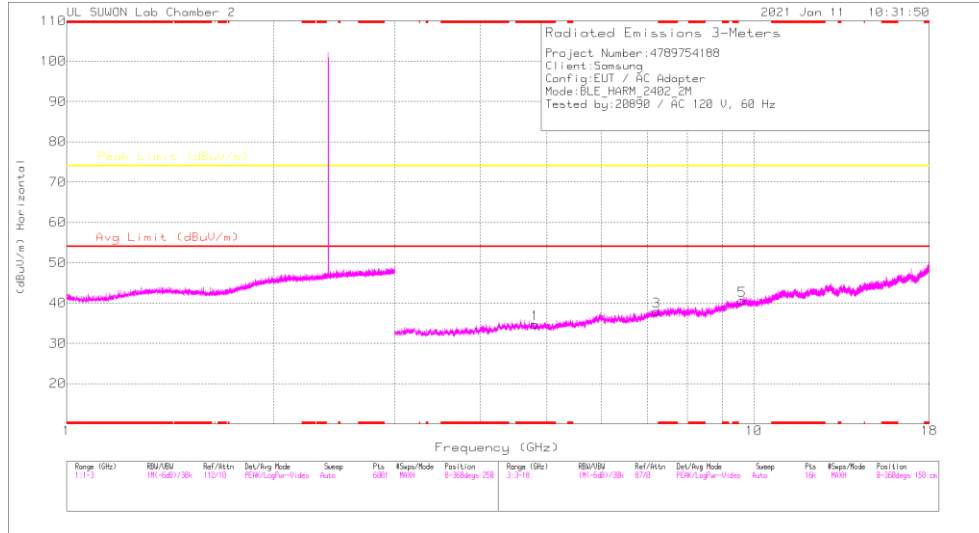


### Trace Markers

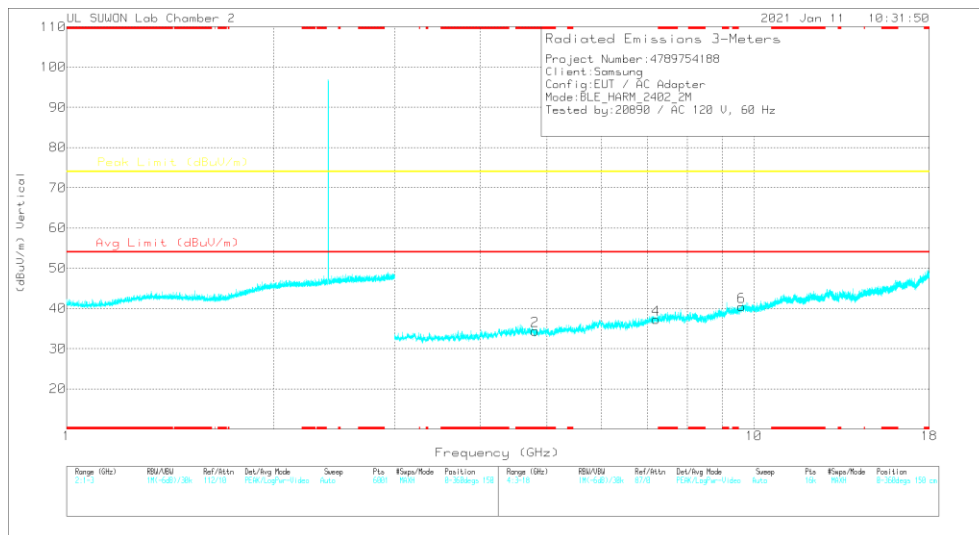
Marker	Frequency (GHz)	Meas Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	41.86	Pk	32	-20.2	0	53.66	-	-	74	-20.34	212	375	V
2	2.54965	43.84	Pk	32.1	-20.2	0	55.74	-	-	74	-18.26	212	375	V
3	* 2.48351	31.28	RMS	32	-20.2	5.1	48.18	54	-5.82	-	-	212	375	V
4	2.56018	31.67	RMS	32.2	-20.1	5.1	48.87	54	-5.13	-	-	212	375	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



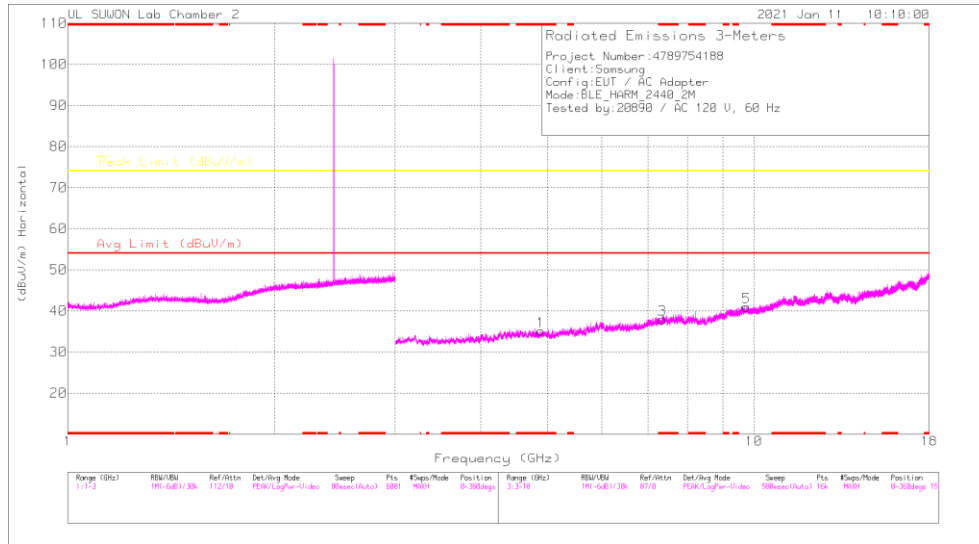
### VERTICAL

### Radiated Emissions

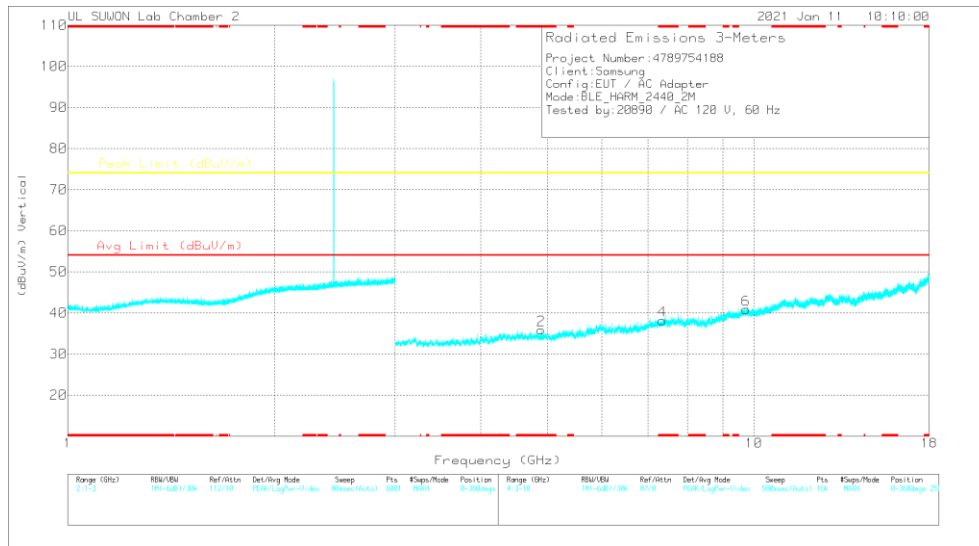
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80705	37.08	PK2	34.1	-27.8	0	43.38	-	-	74	-30.62	0	100	H
* 4.80655	36.55	PK2	34.1	-27.8	0	42.85	-	-	74	-31.15	0	100	V
7.21853	35.23	PK2	36.2	-24.9	0	46.53	-	-	74	-27.47	0	100	H
7.21587	35.38	PK2	36.2	-24.9	0	46.68	-	-	74	-27.32	0	100	V
9.61012	33.2	PK2	37	-20.8	0	49.4	-	-	74	-24.6	0	100	H
9.60862	32.76	PK2	37	-20.8	0	48.96	-	-	74	-25.04	0	100	V

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

### MID CHANNEL RESULTS



### HORIZONTAL



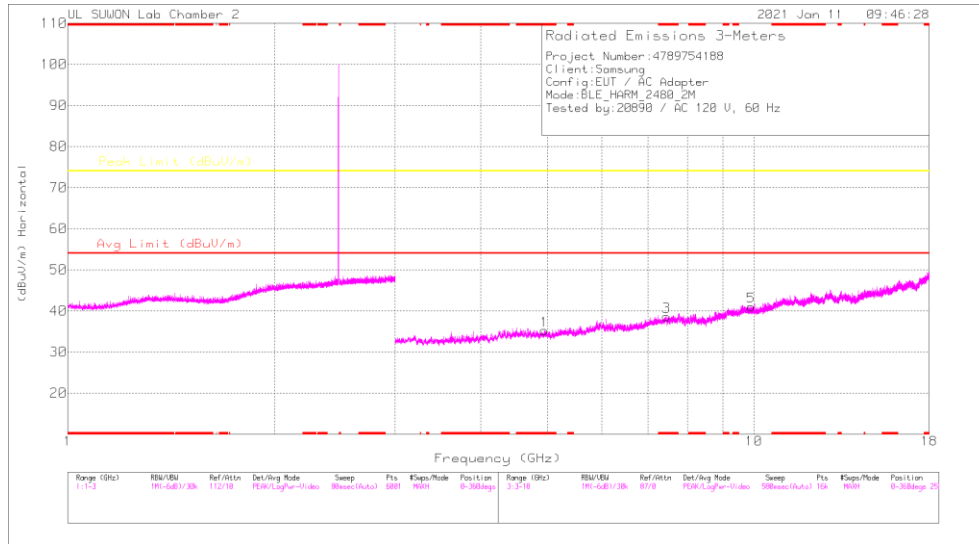
### VERTICAL

### Radiated Emissions

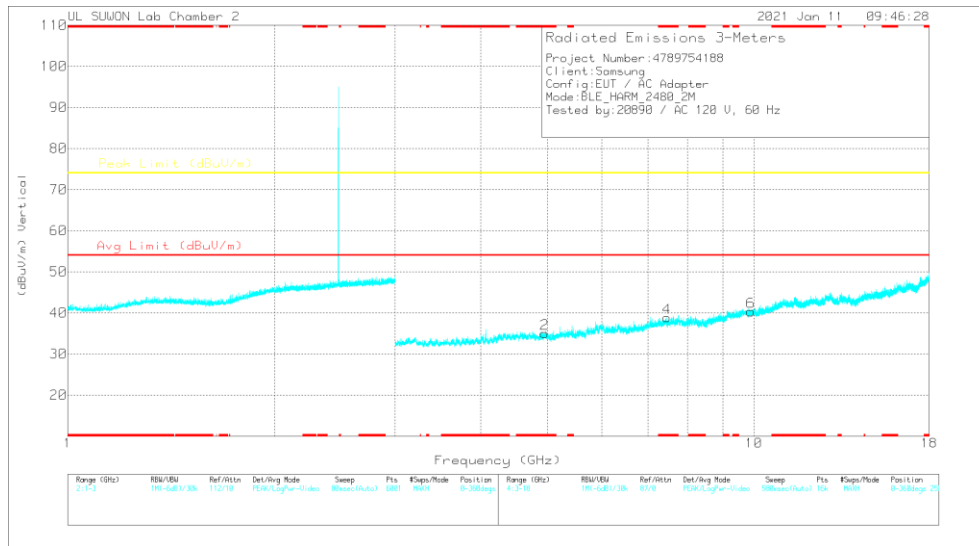
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88944	37.41	PK2	34.1	-27.4	0	44.11	-	-	74	-29.89	0	100	H
* 4.88893	37.23	PK2	34.1	-27.4	0	43.93	-	-	74	-30.07	0	100	V
* 7.34644	34.87	PK2	36.1	-24.1	0	46.87	-	-	74	-27.13	0	100	H
* 7.34818	35.29	PK2	36.1	-24.1	0	47.29	-	-	74	-26.71	0	100	V
9.74512	32.98	PK2	37.2	-20.4	0	49.78	-	-	74	-24.22	0	100	H
9.74555	32.84	PK2	37.2	-20.4	0	49.64	-	-	74	-24.36	0	100	V

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

### HIGH CHANNEL RESULTS



### HORIZONTAL



### VERTICAL

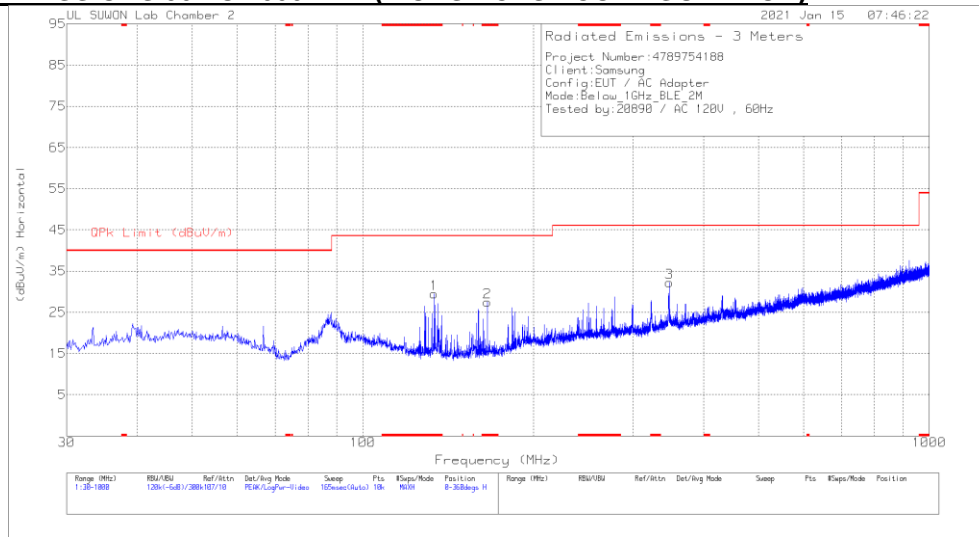
### Radiated Emissions

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
* 4.94591	36.65	PK2	34.1	-26.9	0	43.85	-	-	74	-30.15	0	100	H
* 4.94715	36.82	PK2	34.1	-26.9	0	44.02	-	-	74	-29.98	0	100	V
* 7.45198	34.78	PK2	36	-23.7	0	47.08	-	-	74	-26.92	0	100	H
* 7.45076	34.64	PK2	36	-23.7	0	46.94	-	-	74	-27.06	0	100	V
9.90606	31.92	PK2	37.3	-20.5	0	48.72	-	-	74	-25.28	0	100	H
9.90787	32.71	PK2	37.3	-20.5	0	49.51	-	-	74	-24.49	0	100	V

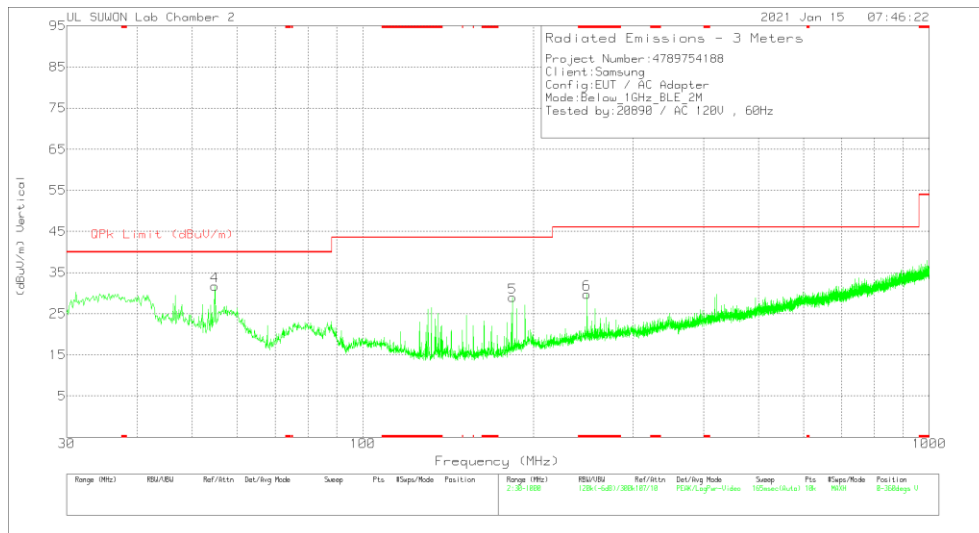
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 PK2 - KDB558074 Method: Maximum Peak

### 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_750	Below_1G[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 133.693	44.61	Pk	14	-29.1	0	29.51	43.52	-14.01	0-360	100	H
2	* 165.994	41.91	Pk	14.5	-28.9	0	27.51	43.52	-16.01	0-360	200	H
3	347.481	38.55	PK	20.9	-27.2	0	32.25	46.02	-13.77	0-360	100	H
4	54.735	42.76	PK	19.4	-30.4	0	31.76	40	-8.24	0-360	100	V
5	183.648	41.82	PK	15.8	-28.6	0	29.02	43.52	-14.5	0-360	100	V
6	* 248.735	39.39	PK	18.5	-28.1	0	29.79	46.02	-16.23	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

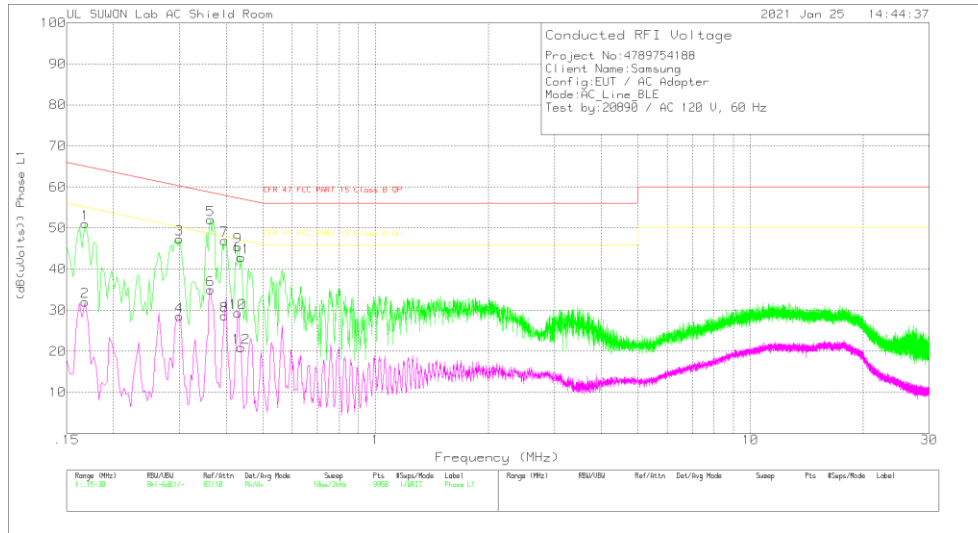
Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

### 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	.168	41.01	Pk	10	.1	51.11	65.06	-13.95	-	-
2	.168	21.95	Av	10	.1	32.05	-	-	55.06	-23.01
3	.3	37.31	Pk	9.8	.2	47.31	60.24	-12.93	-	-
4	.3	18.48	Av	9.8	.2	28.48	-	-	50.24	-21.76
5	.363	41.93	Pk	9.9	.2	52.03	58.66	-6.63	-	-
6	.363	24.93	Av	9.9	.2	35.03	-	-	48.66	-13.63
7	.396	36.9	Pk	9.9	.2	47	57.94	-10.94	-	-
8	.396	18.57	Av	9.9	.2	28.67	-	-	47.94	-19.27
9	.429	35.32	Pk	9.9	.2	45.42	57.27	-11.85	-	-
10	.429	19.21	Av	9.9	.2	29.31	-	-	47.27	-17.96
11	.438	32.73	Pk	9.9	.2	42.83	57.1	-14.27	-	-
12	.438	10.78	Av	9.9	.2	20.88	-	-	47.1	-26.22

Pk - Peak detector

Av - Average detection

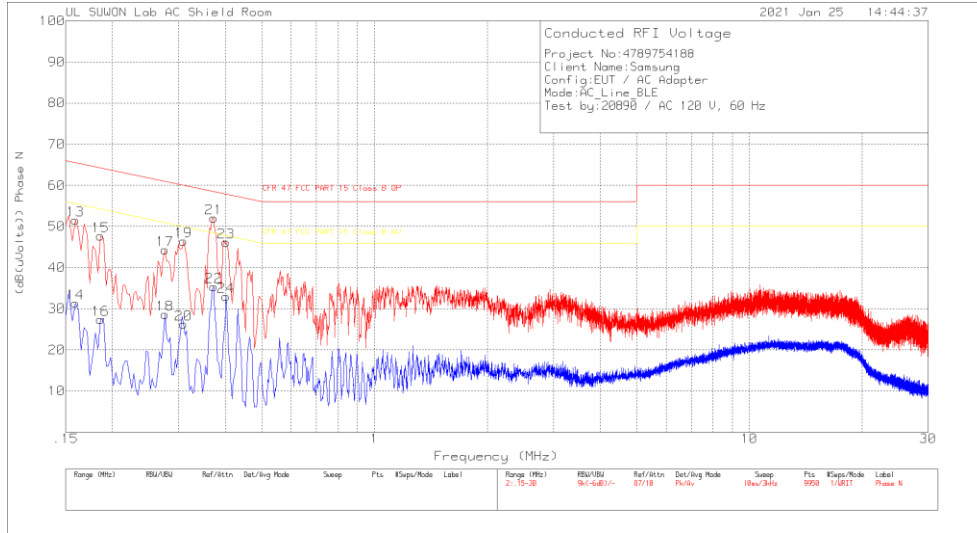
Quasi-Peak Emissions

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)
.36225	25.95	Qp	9.9	.2	36.05	58.68	-22.63	-	-

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	41.56	Pk	9.9	.1	51.56	65.52	-13.96	-	-
14	.159	21.4	Av	9.9	.1	31.4	-	-	55.52	-24.12
15	.186	37.51	Pk	10	.2	47.71	64.21	-16.5	-	-
16	.186	17.16	Av	10	.2	27.36	-	-	54.21	-26.85
17	.276	34.45	Pk	9.7	.2	44.35	60.94	-16.59	-	-
18	.276	18.74	Av	9.7	.2	28.64	-	-	50.94	-22.3
19	.309	36.47	Pk	9.8	.2	46.47	60	-13.53	-	-
20	.309	16.26	Av	9.8	.2	26.26	-	-	50	-23.74
21	.372	41.92	Pk	9.9	.2	52.02	58.46	-6.44	-	-
22	.372	25.21	Av	9.9	.2	35.31	-	-	48.46	-13.15
23	.402	36.09	Pk	9.9	.2	46.19	57.81	-11.62	-	-
24	.402	22.9	Av	9.9	.2	33	-	-	47.81	-14.81

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)
.37215	25.64	Qp	9.9	.2	35.74	58.45	-22.71	-	-

Qp - Quasi-Peak detector

## END OF TEST REPORT