



# CERTIFICATION TEST REPORT

**Report Number.** : 4790383643-FR1V2

**Applicant** : Samsung Electronics Co.,Ltd.  
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do 16677,  
Korea

**Model** : RMCDLB1FP1

**FCC ID** : A3LRMCDLB1FP1  
**IC** : 649E-RMCDLB1FP1

**EUT Description** : SMART CONTROL

**Test Standard(s)** : FCC 47 CFR PART 15 SUBPART C  
INDUSTRY CANADA RSS-247 Issue 2  
INDUSTRY CANADA RSS-GEN Issue 5

**Date Of Issue:**  
2022-05-16

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	05/13/22	Initial issue	Myeongjun Kwon
V2	05/16/22	Updated to address TCB's question	Myeongjun Kwon

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Samsung Electronics Co.,Ltd.  
**EUT DESCRIPTION:** SMART CONTROL  
**MODEL:** RMCDLB1FP1  
**SERIAL NUMBER:** Proto type  
**DATE TESTED:** 2022-04-27 ~ 2022-05-10;

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
INDUSTRY CANADA RSS-247 Issue 2	Complies
INDUSTRY CANADA RSS-GEN Issue 5	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:



Robby Lee  
Senior Laboratory Engineer  
UL Korea, Ltd.

Tested By:



Myeongjun Kwon  
Laboratory 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.
5. IC RSS-GEN Issue 5.
6. IC RSS-247 Issue 2.

## 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 type="checkbox"/>	Chamber 1
<input checked="" type="checkbox"/>	Chamber 2
<input checked="" type="checkbox"/>	Chamber 3

Used ISED Test Site Reg.(company number): 2324L  
CAB Identifier: KR0161

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	2.87 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%.

## 5. EQUIPMENT UNDER TEST

### 5.1. EUT DESCRIPTION

The EUT is a BLE Transceiver.  
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	0.280	1.07
		Average	0.143	1.03
2 402 ~ 2 480	2Mbps	Peak	0.280	1.07
		Average	-0.011	1.00

### 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 0.50 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.

**Power verification**

The Output Power of two packet lengths(37 pkt, 255 pkt) are all investigated, the 1 Mbps(255 pkt), 2 Mbps(255 pkt) power is the worst case. All tests were performed in this mode.

Mode	Frequency [MHz]	Conducted Burst Avg [dBm]
1Mbps (37 pkt)	2402	0.142
	2440	-0.053
	2480	-0.103
1Mbps (255 pkt)	2402	<b>0.143</b>
	2440	-0.051
	2480	-0.099
2Mbps (37 pkt)	2402	-0.016
	2440	-0.217
	2480	-0.269
2Mbps (255 pkt)	2402	<b>-0.011</b>
	2440	-0.213
	2480	-0.266

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Notebook	LG	15UD490	MEZ66836767	N/A
Adaptor (for Notebook)	Chicony Power Technology (SuZhou) Co.,Ltd.	A12-065N2A	AG19034C140	N/A
Data Cable	N/A	N/A	N/A	N/A
Test Jig Board	SAMSUNG	N/A	N/A	N/A

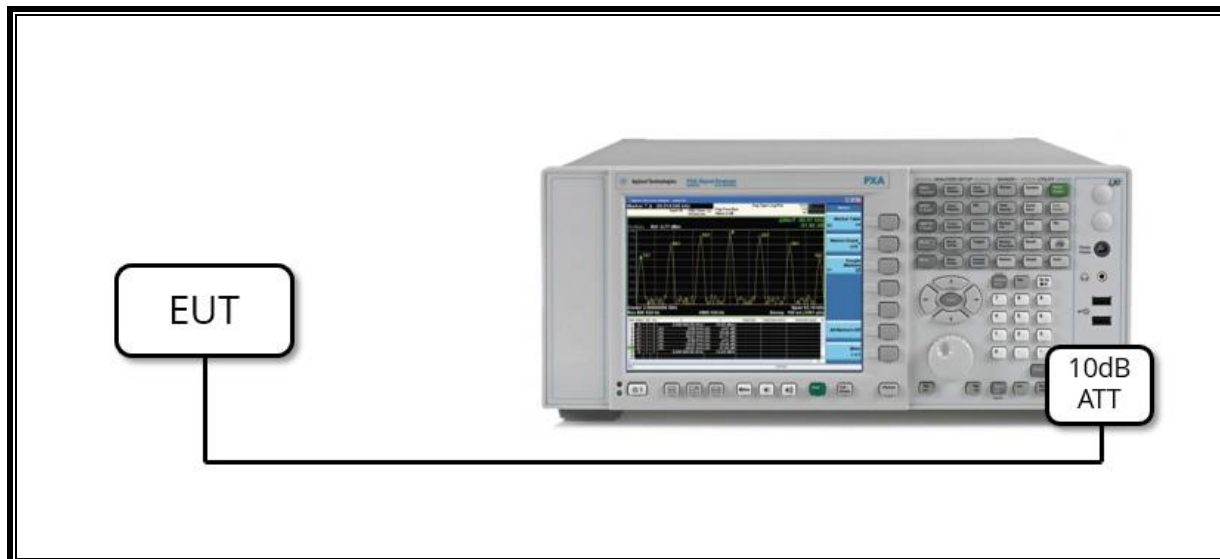
### I/O CABLE

I/O Cable List						
Cable No.	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power & Data	1	Flat	Unshielded	0.1 m	N/A
2	DC Power	2	USB-C	Shielded	1.8 m	N/A
3	Data	3	USB 2.0 serial converter	Shielded	1.7 m	N/A
2	Data	4	DB9 Female to 3.5 mm serial cable	Shielded	1.0 m	N/A

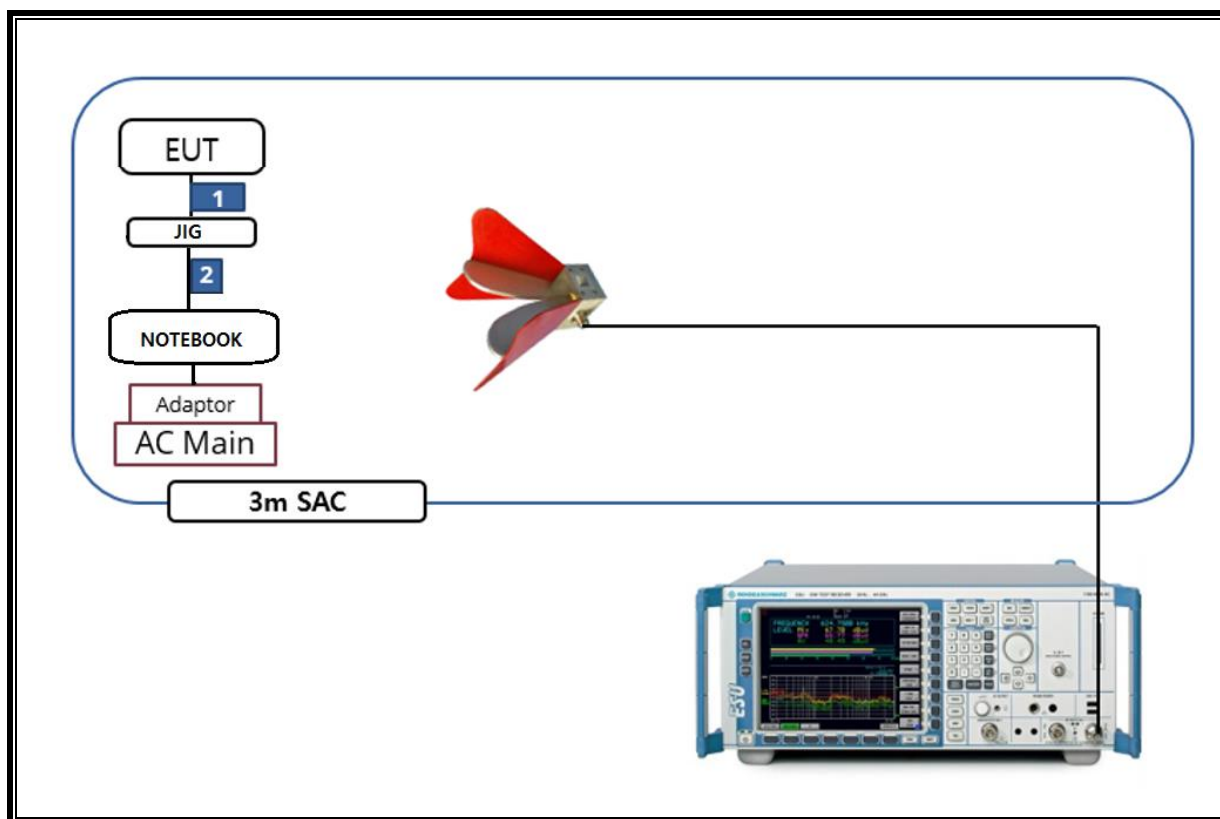
### TEST SETUP

The EUT is a unit with test jig board during the tests.  
 It was controlled by entering the test mode using a Notebook.

**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	749	2022-08-13
Antenna, Horn, 18 GHz	ETS	3117	00218957	2023-01-15
Antenna, Horn, 40 GHz	ETS	3116C	00168645	2023-01-13
Preamplifier	ETS	3116C-PA	00168841	2022-08-04
Preamplifier, 1000 MHz	Sonoma	310N	351741	2022-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029168	2022-08-02
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030B	MY57143717	2023-01-11
10dB ATTENUATOR	MINI-CIRCUITS	BW-K10-2W44+	2117	2022-10-22
EMI Test Receive, 44 GHz	R&S	ESW44	101590	2022-08-02
EMI Test Receive, 3 GHz	R&S	ESR3	102592	2022-08-02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	2022-08-02
Attenuator	PASTERNAK	PE7087-10	A009	2022-08-03
LISN	R&S	ENV216	102478	2022-08-06
OPEN SWITCH AND CONTROL	R&S	OSP220	101437	N/A
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	R&S	EMC32	Ver 10.60.10	

## 8. TEST RESULTS SUMMARY

FCC Part Section	IC Section	Test Description	Test Limit	Test Condition	Test Result
15.247 (a)(2)	RSS-247 5.2(a)	Occupied Bandwidth(6dB)	> 500kHz	Conducted	PASS
2.1051, 15.247(d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20 dBc		PASS
15.247 (b)(3)	RSS-247 5.4(d)	TX conducted output power	< 30 dBm		PASS
15.247(e)	RSS-247 5.4(b)	PSD	< 8 dBm/3kHz		PASS
15.207(a)	RSS-GEN Clause 7.2&8.8	AC Power Line conducted emissions	Section 11	Power Line conducted	PASS
15.205, 15.209	RSS-GEN Clause 8.9 & 8.10	Radiated Spurious Emission	< 54dBuV/m(Av)	Radiated	PASS

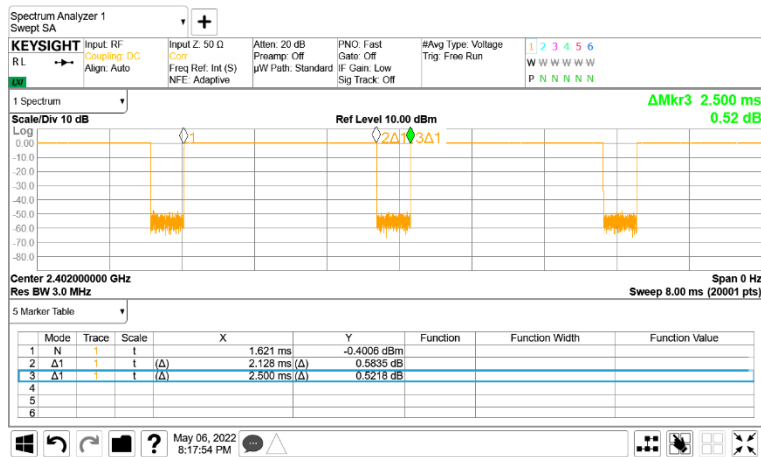
## 9. ANTENNA PORT TEST RESULTS

### 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 CBW [kHz]
2 400 ~ 2 483.5 MHz Bands						
1 Mbps [255pkt]	2.128	2.500	0.8512	85.12	0.70	0.470
2 Mbps [255pkt]	1.070	1.875	0.5707	57.07	2.44	0.935



1 Mbps(255 pkt)



2 Mbps(255 pkt)

## 9.2. 6 dB & 99% 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 Mbps

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]	99% Bandwidth [kHz]
Low	2 402	0.6692	500.0	1024.1
Mid	2 440	0.6654	500.0	1030.8
High	2 480	0.6728	500.0	<b>1036.7</b>

#### 9.2.2. 2 Mbps

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]	99% Bandwidth [kHz]
Low	2 402	1.154	500.0	2032.0
Mid	2 440	1.153	500.0	2045.4
High	2 480	1.155	500.0	<b>2056.7</b>



9.2.3. 6 dB & 99% 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

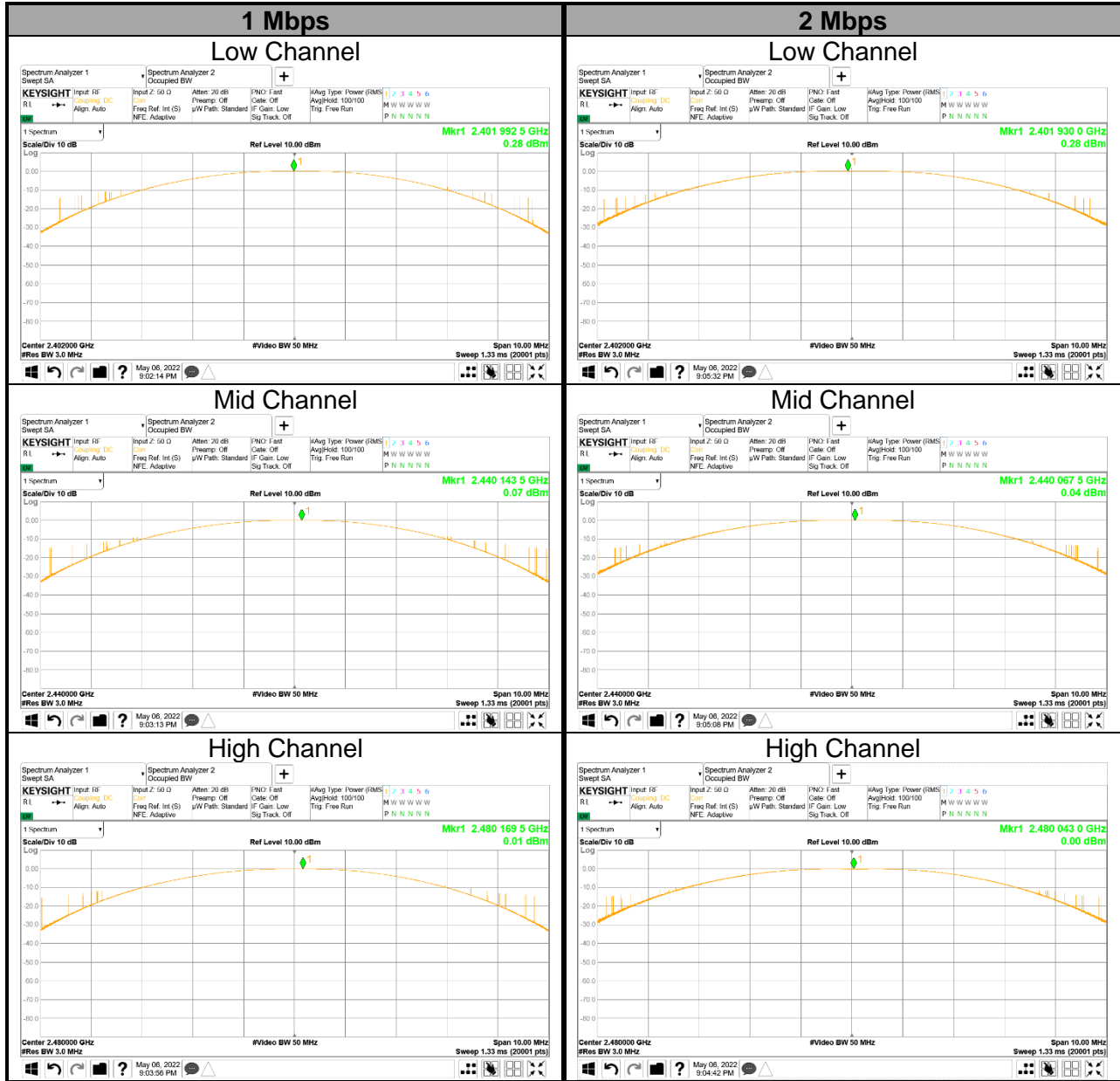
##### 9.3.1. 1 Mbps

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	0.28	30.00	-29.72
Mid	2440	0.07	30.00	-29.93
High	2480	0.01	30.00	-29.99
<b>Worst</b>		<b>0.28</b>	<b>30.00</b>	<b>-29.72</b>

##### 9.3.2. 2 Mbps

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	0.28	30.00	-29.72
Mid	2440	0.04	30.00	-29.96
High	2480	0.00	30.00	-30.00
<b>Worst</b>		<b>0.28</b>	<b>30.00</b>	<b>-29.72</b>

### 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. 1 Mbps

Channel	Frequency [MHz]	AV Power [dBm]	AV Power [mW]
Low	2402	<b>0.143</b>	<b>1.033</b>
Mid	2440	-0.051	0.988
High	2480	-0.099	0.978

#### 9.4.2. 2 Mbps

Channel	Frequency [MHz]	AV Power [dBm]	AV Power [mW]
Low	2402	<b>-0.011</b>	<b>0.997</b>
Mid	2440	-0.213	0.952
High	2480	-0.266	0.941

## 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

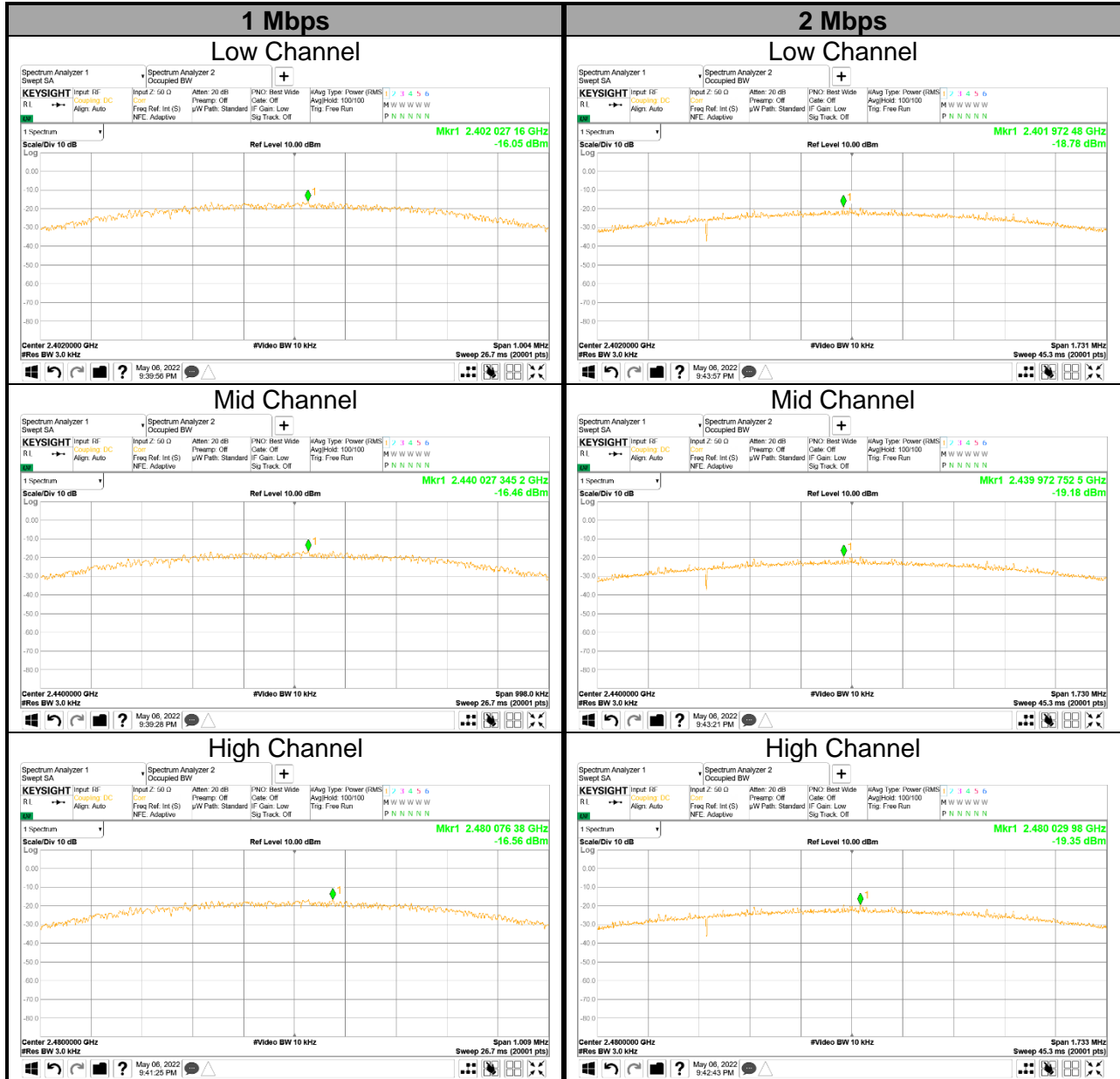
#### 9.5.1. 1Mbps

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2402	<b>-16.05</b>	8.00	-24.05
Mid	2440	-16.46	8.00	-24.46
High	2480	-16.56	8.00	-24.56

#### 9.5.2. 2Mbps

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2402	<b>-18.78</b>	8.00	-26.78
Mid	2440	-19.18	8.00	-27.18
High	2480	-19.35	8.00	-27.35

### 9.5.3. PSD TEST PLOTS



## **9.6. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

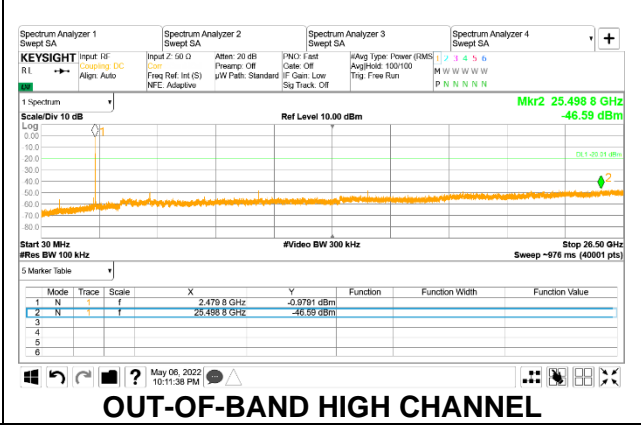
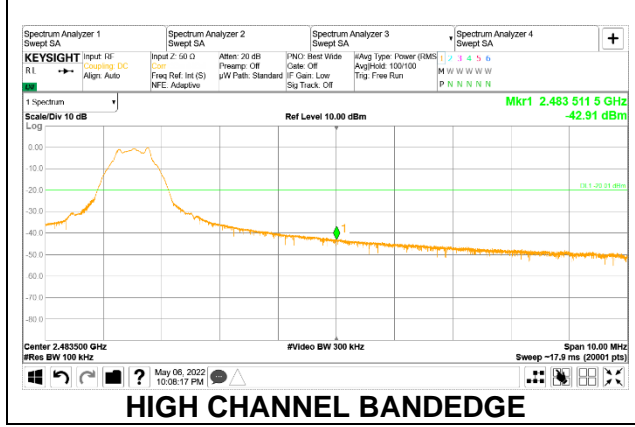
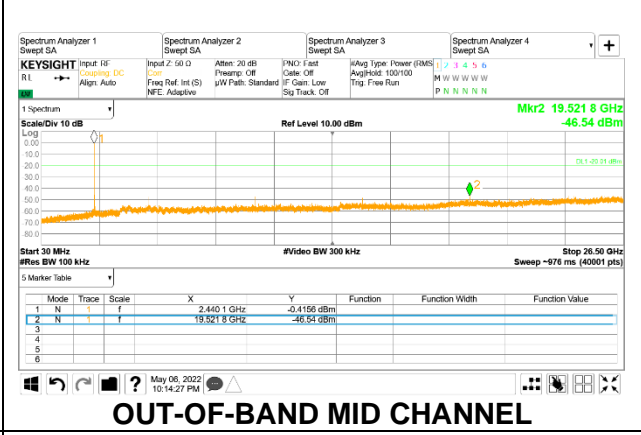
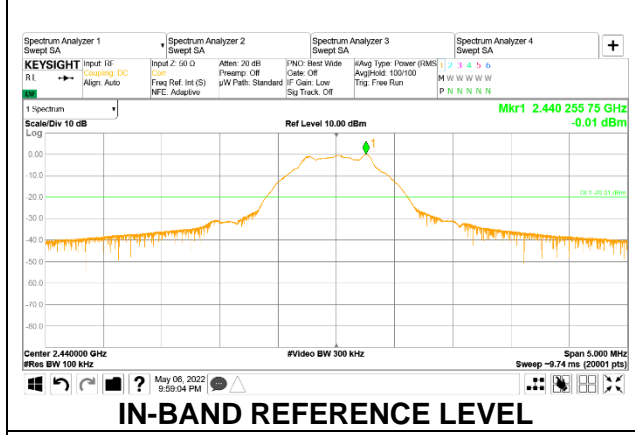
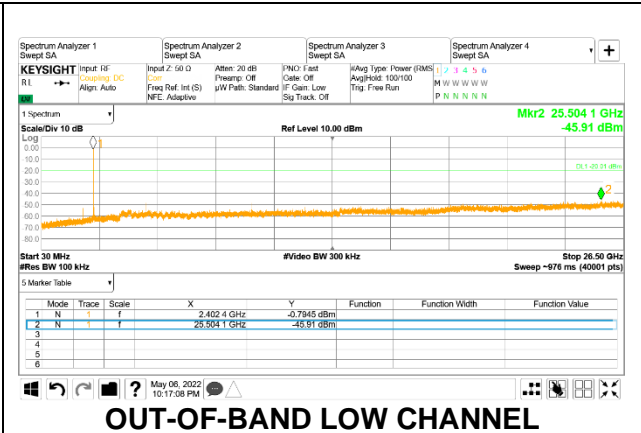
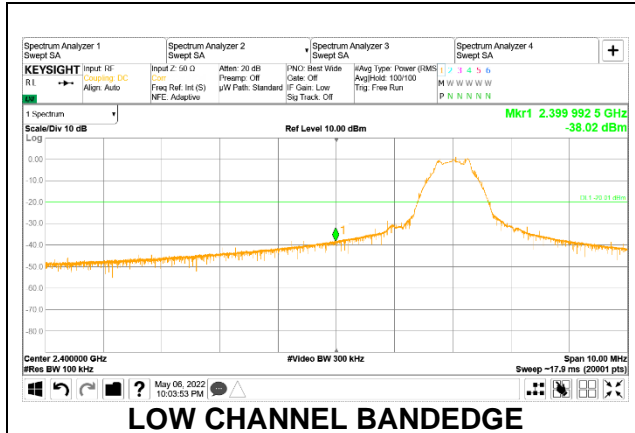
RSS-247 5.5

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

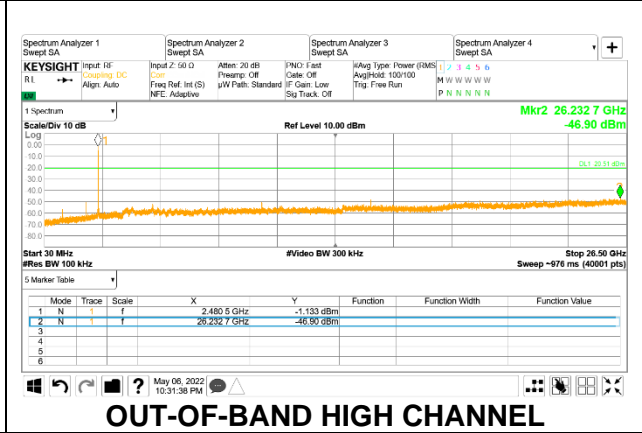
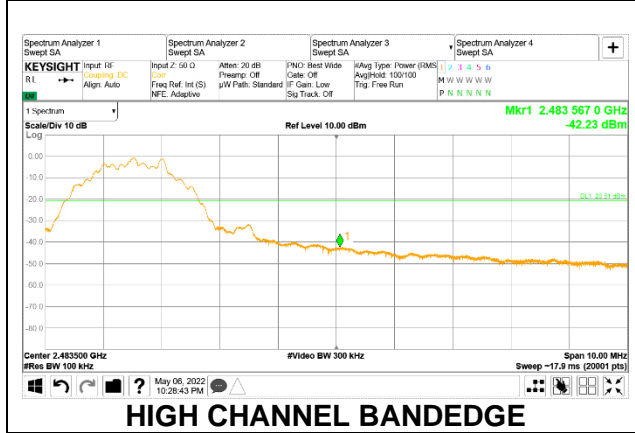
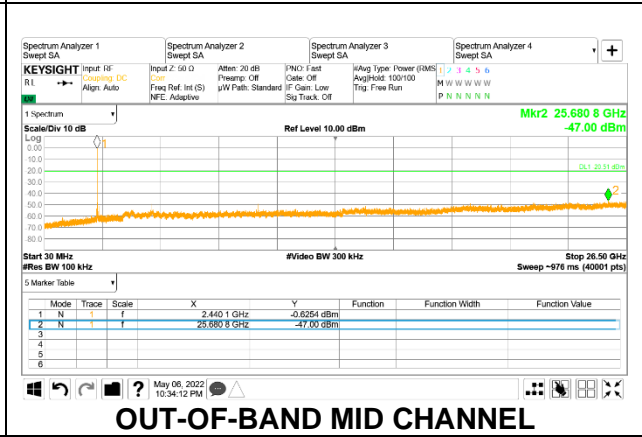
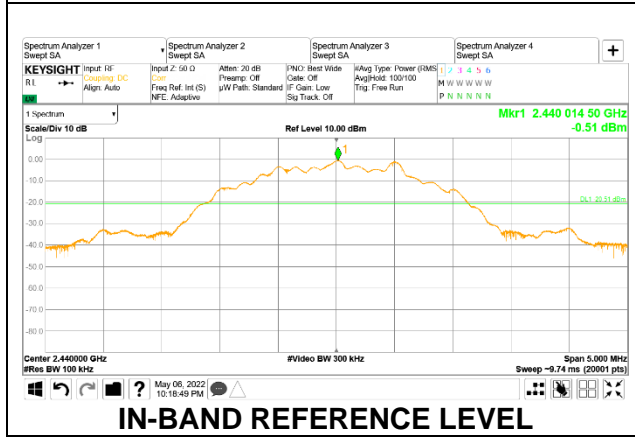
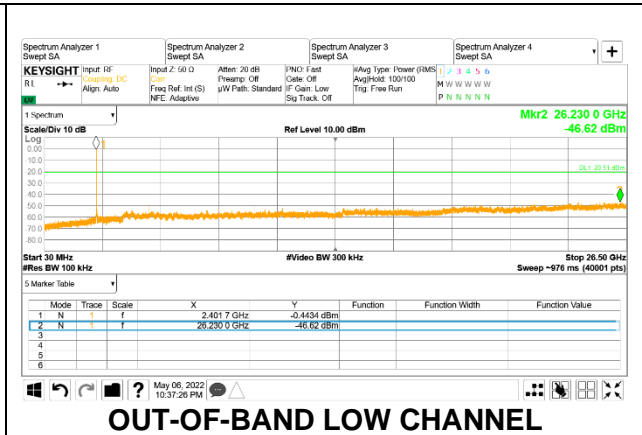
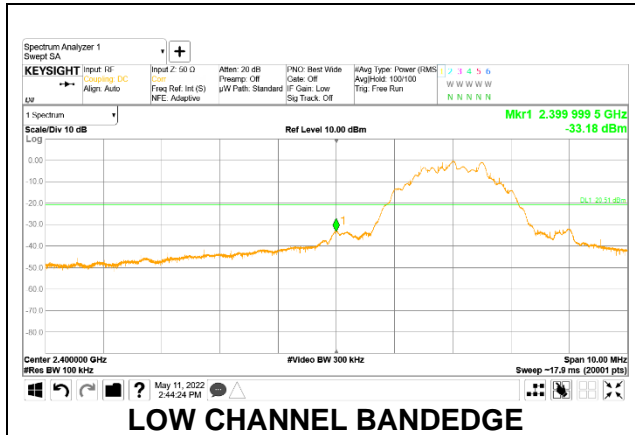
### **RESULTS**



### 9.6.1. 1 Mbps



### 9.6.2. 2 Mbps



## 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 1 Mbps, DCF =  $10\log(1/0.8512)=0.70$  dB and For 2Mbps, DCF =  $10\log(1/0.5707)=2.44$  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.

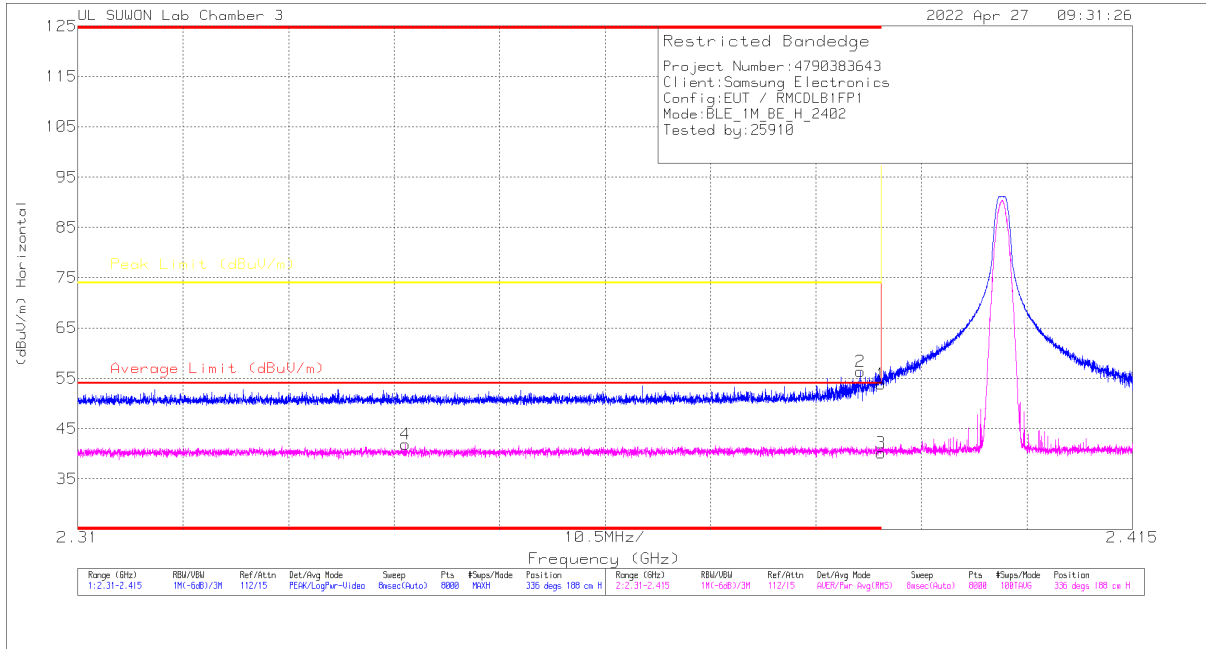
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open field test site.  
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open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

## 10.2. TRANSMITTER ABOVE 1 GHz

### 10.2.1. 1 Mbps

#### BANDEDGE (LOW CHANNEL)

#### HORIZONTAL RESULT

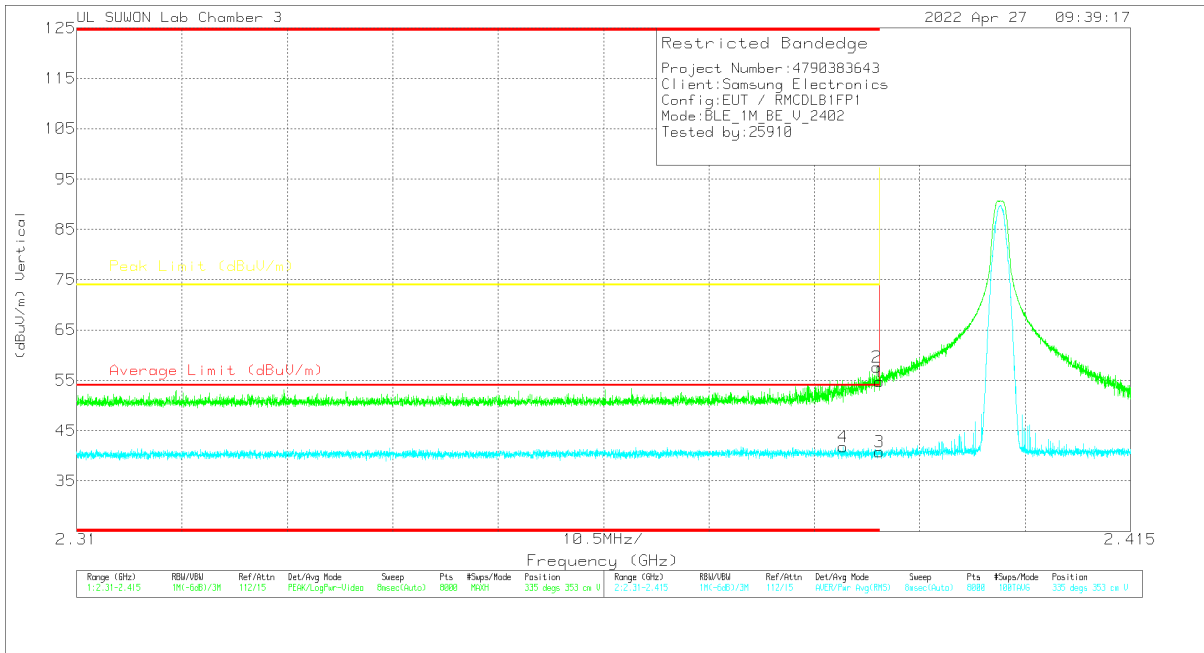


#### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	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	45.9	PK		-24.8	0	53.9	-	-	74	-20.1	336	188	H
2	* 2.38792	48.29	PK		-24.7	0	56.39	-	-	74	-17.61	336	188	H
3	* 2.39	31.41	RMS		-24.8	0.7	40.11	54	-13.89	-	-	336	188	H
4	* 2.34262	33.44	RMS		-24.8	0.7	41.94	54	-12.06	-	-	336	188	H

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

### VERTICAL RESULT



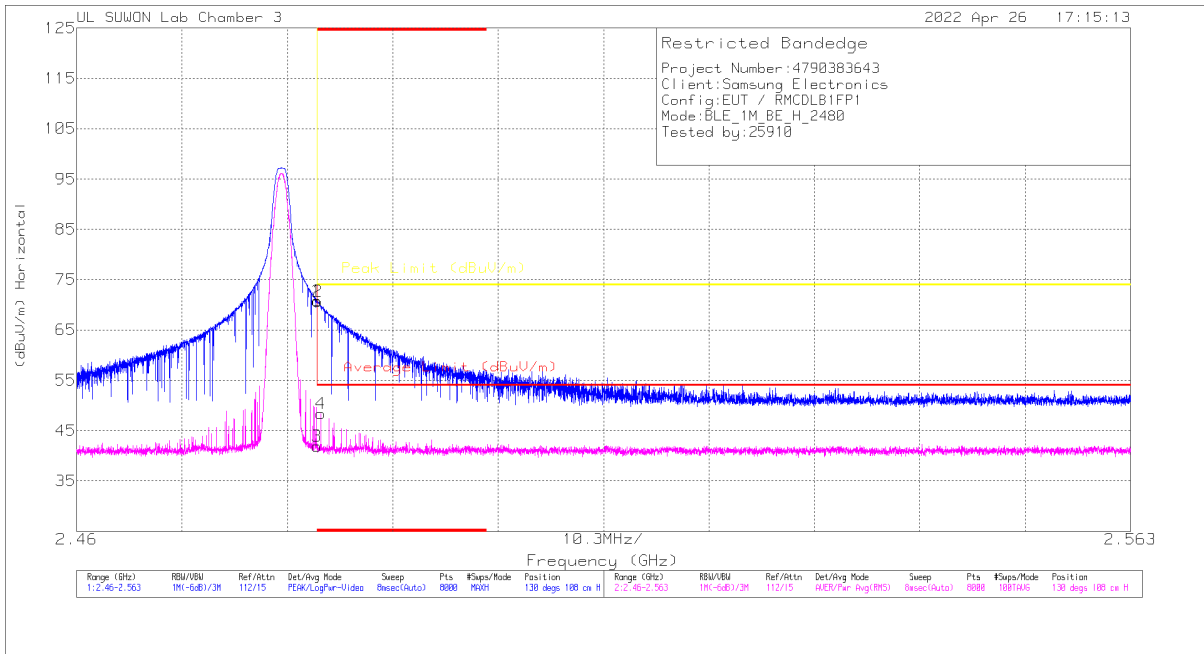
### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBu)	Det	3117_00218957	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBu/m)	Average Limit (dBu/m)	Margin (dB)	Peak Limit (dBu/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	46.69	Pk	32.8	-24.8	0	54.69	-	-	74	-19.31	335	353	V
2	* 2.38972	49.56	Pk	32.8	-24.8	0	57.56	-	-	74	-16.44	335	353	V
3	* 2.39	32.11	RMS	32.8	-24.8	0.7	40.81	54	-13.19	-	-	335	353	V
4	* 2.38635	33.1	RMS	32.7	-24.7	0.7	41.8	54	-12.2	-	-	335	353	V

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

**BANDEDGE (HIGH CHANNEL)**

**HORIZONTAL RESULT**

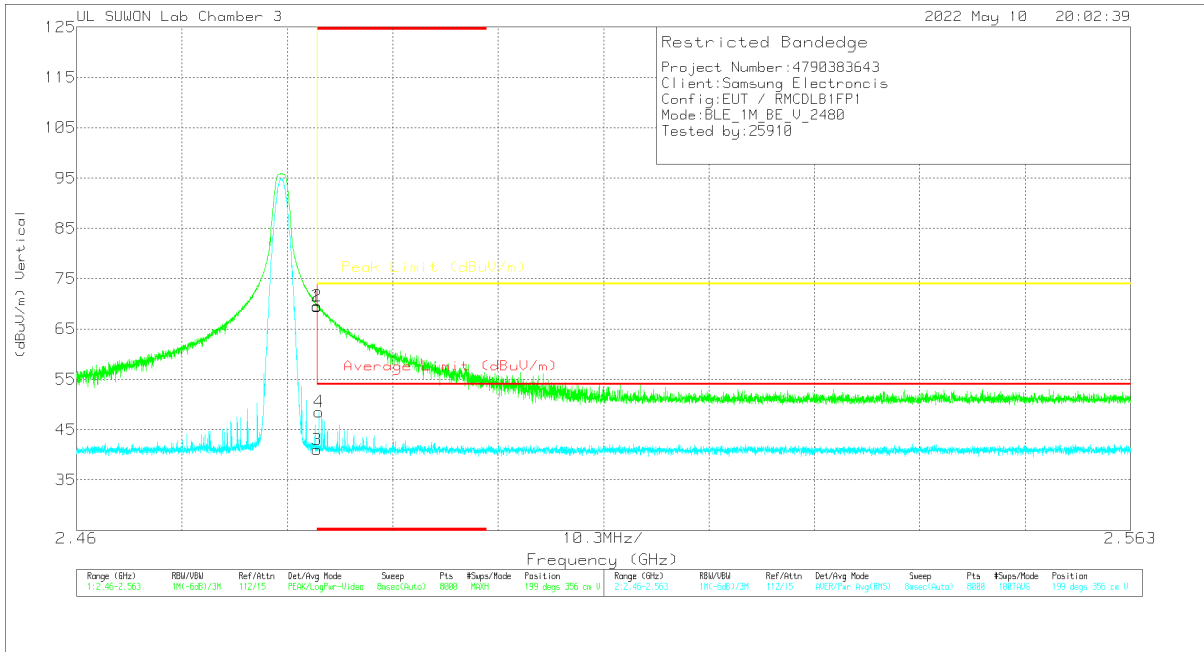


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	62.48	Pk	32.9	-24.6	0	70.78	-	-	74	-3.22	130	108	H
2	* 2.48355	62.36	Pk	32.9	-24.6	0	70.66	-	-	74	-3.34	130	108	H
3	* 2.4835	32.91	RMS	32.9	-24.6	0.7	41.91	54	-12.09	-	-	130	108	H
4	* 2.48385	39.4	RMS	32.9	-24.6	0.7	48.4	54	-5.6	-	-	130	108	H

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

### VERTICAL RESULT



### Trace Markers

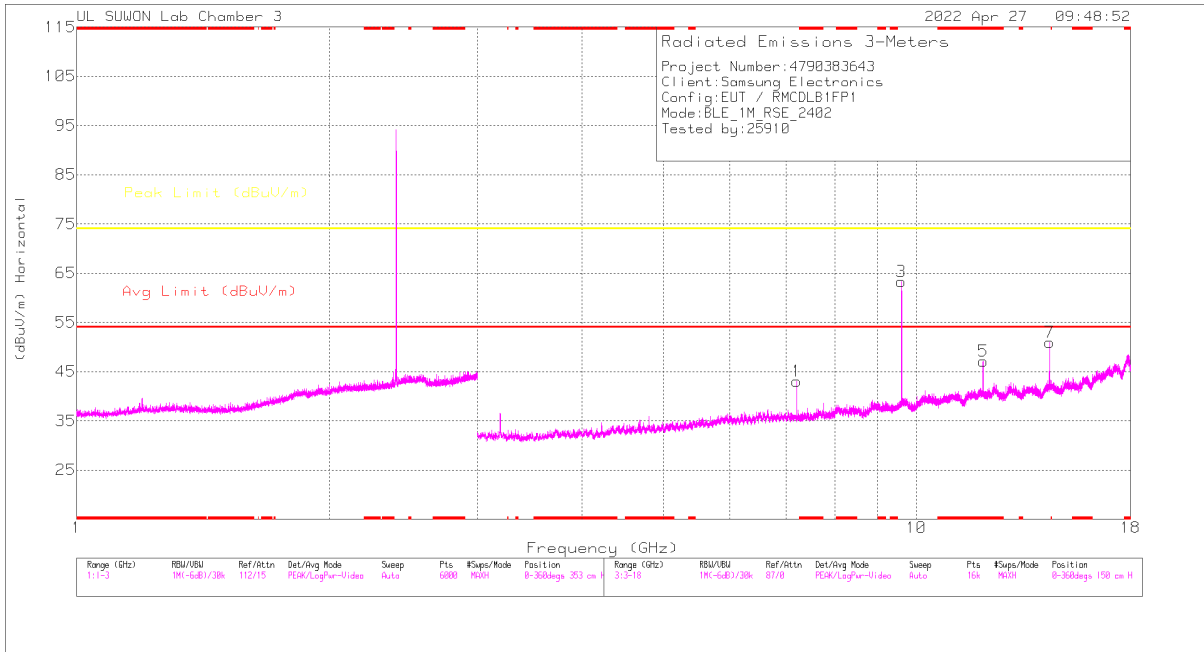
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	61.21	Pk	32.9	-24.7	0	69.41	-	-	74	-4.59	199	356	V
2	* 2.48351	61.41	Pk	32.9	-24.7	0	69.61	-	-	74	-4.39	199	356	V
3	* 2.4835	32.17	RMS	32.9	-24.7	0.7	41.07	54	-12.93	-	-	199	356	V
4	* 2.48369	39.67	RMS	32.9	-24.7	0.7	48.57	54	-5.43	-	-	199	356	V

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

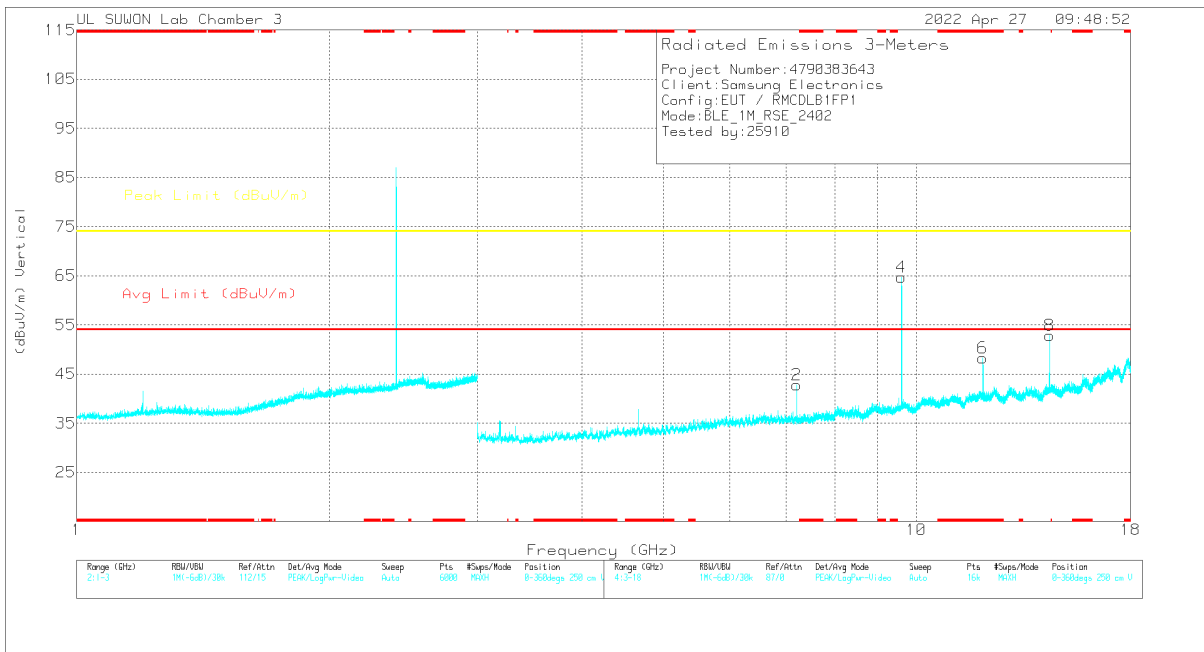


**HARMONICS AND SPURIOUS EMISSIONS**

**LOW CHANNEL RESULTS**



**HORIZONTAL**



**VERTICAL**

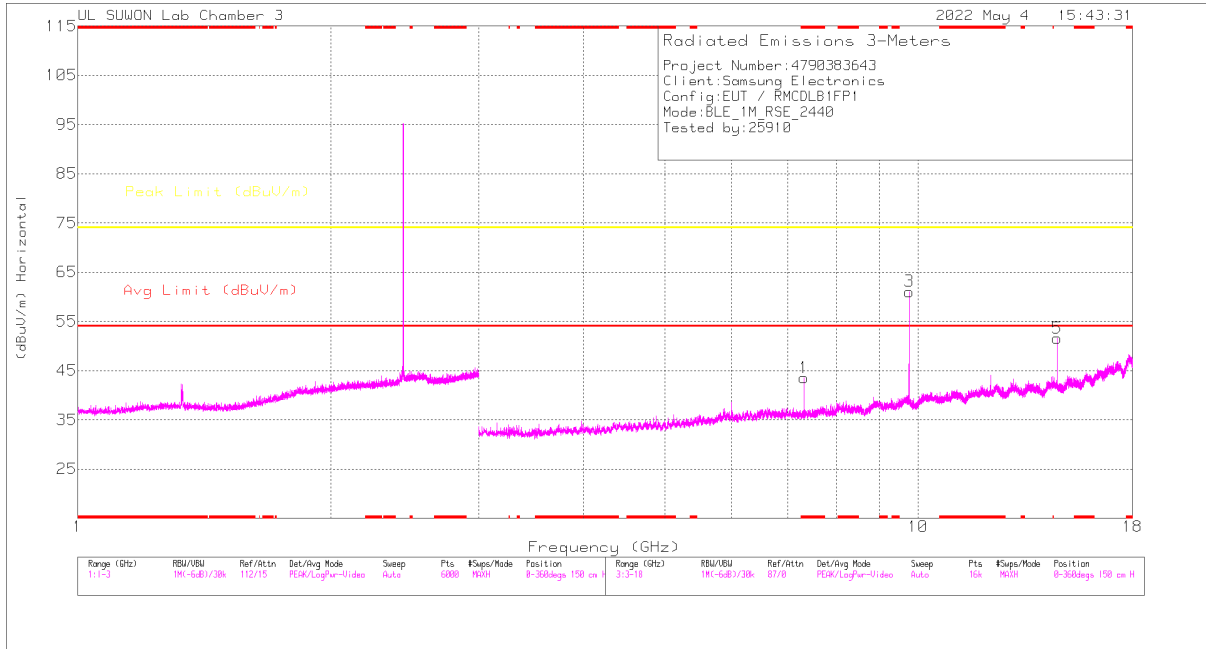
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

**RADIATED EMISSIONS**

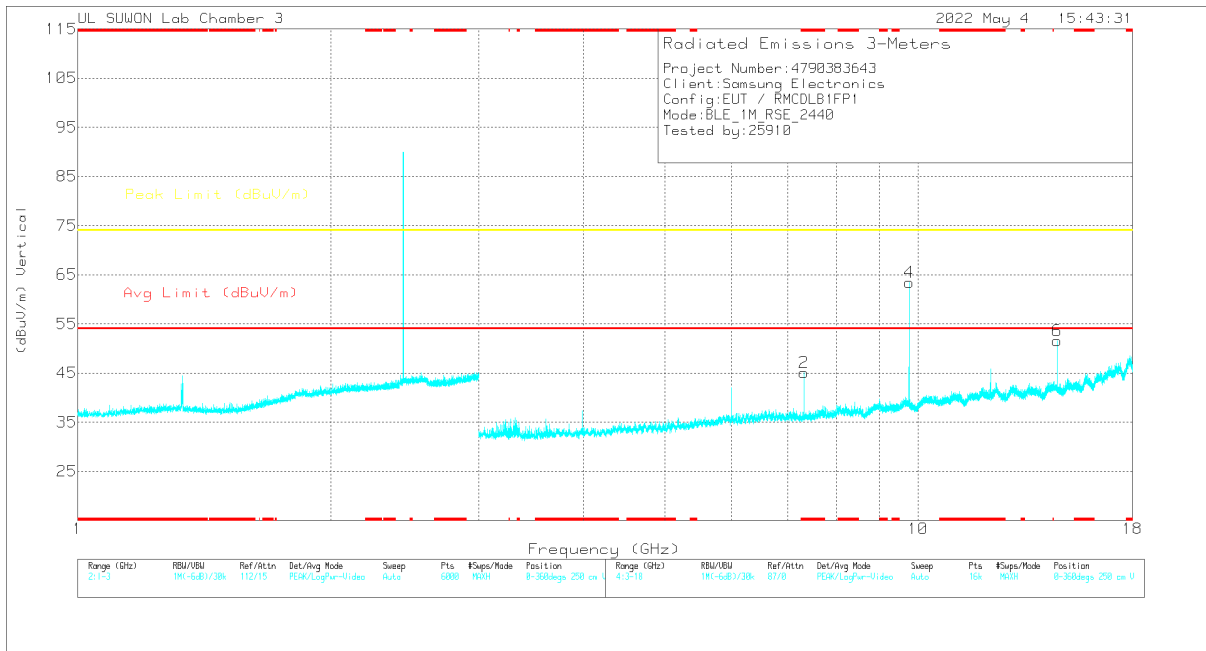
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7.20515	39.33	PK2	36.1	-25.5	0	49.93	-	-	74	-24.07	55	110	H
9.60903	51.32	PK2	37.3	-21.5	0	67.12	-	-	74	-6.88	196	135	H
* 12.01125	38.41	PK2	39.2	-22.1	0	55.51	-	-	74	-18.49	307	106	H
* 12.01125	30.33	MAv1	39.2	-22.1	0.7	48.13	54	-5.87	-	-	307	106	H
14.41334	40.45	PK2	39.8	-22.5	0	57.75	-	-	74	-16.25	115	106	H
7.20679	41.33	PK2	36.1	-25.6	0	51.83	-	-	74	-22.17	151	110	V
9.60708	52.44	PK2	37.3	-21.5	0	68.24	-	-	74	-5.76	113	226	V
* 12.00877	41.95	PK2	39.2	-22.1	0	59.05	-	-	74	-14.95	310	110	V
* 12.00889	35.24	MAv1	39.2	-22.1	0.7	53.04	54	-0.96	-	-	310	110	V
14.41065	42.03	PK2	39.8	-22.5	0	59.33	-	-	74	-14.67	57	106	V

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

### MID CHANNEL RESULTS



### HORIZONTAL



### VERTICAL

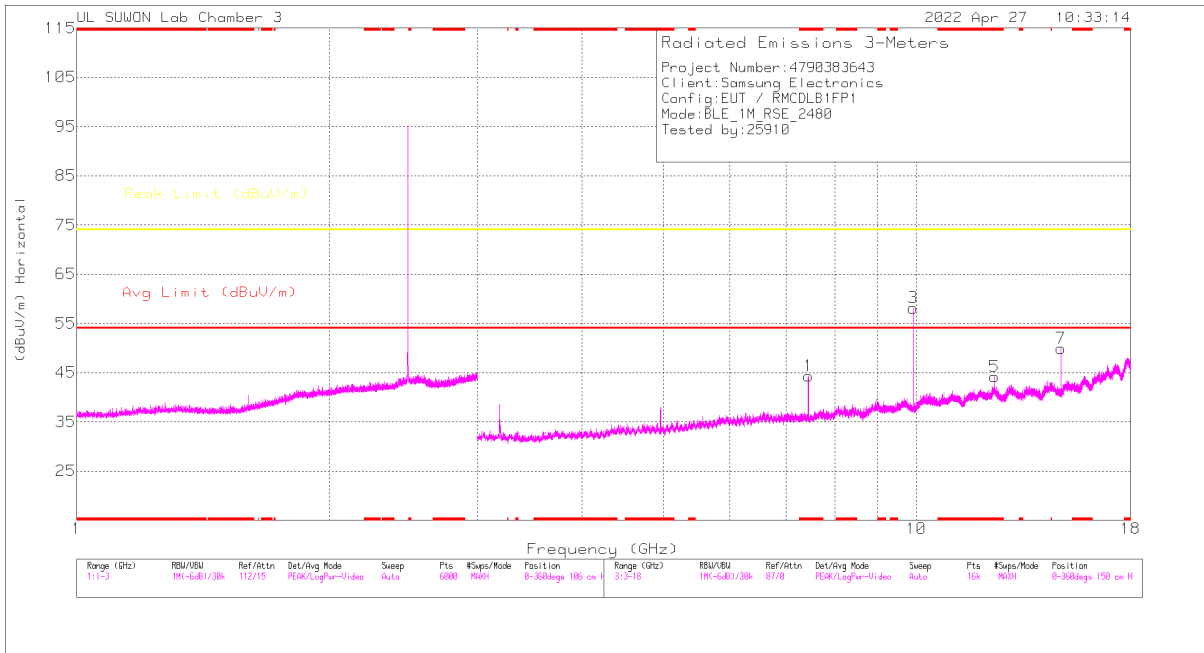
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

**RADIATED EMISSIONS**

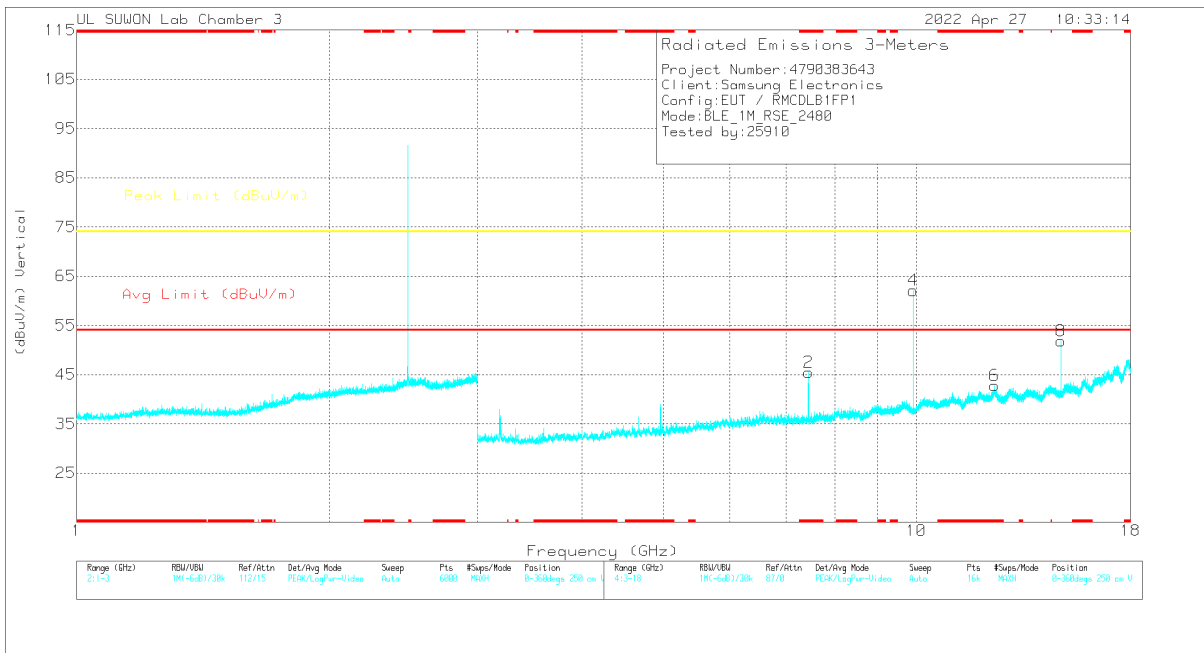
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.31946	39.83	PK2	36	-25	0	50.83	-	-	74	-23.17	51	100	H
* 7.32077	31.19	MAv1	36	-25	0.7	42.89	54	-11.11	-	-	51	100	H
9.76094	48.68	PK2	37.5	-21.2	0	64.98	-	-	74	-9.02	183	104	H
14.64152	41.01	PK2	40	-22.6	0	58.41	-	-	74	-15.59	68	243	H
* 7.31936	41.9	PK2	36	-25	0	52.9	-	-	74	-21.1	125	106	V
* 7.32067	34.32	MAv1	36	-25	0.7	46.02	54	-7.98	-	-	125	106	V
9.75905	51.23	PK2	37.5	-21.2	0	67.53	-	-	74	-6.47	176	101	V
14.64158	41.92	PK2	40	-22.6	0	59.32	-	-	74	-14.68	269	101	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**

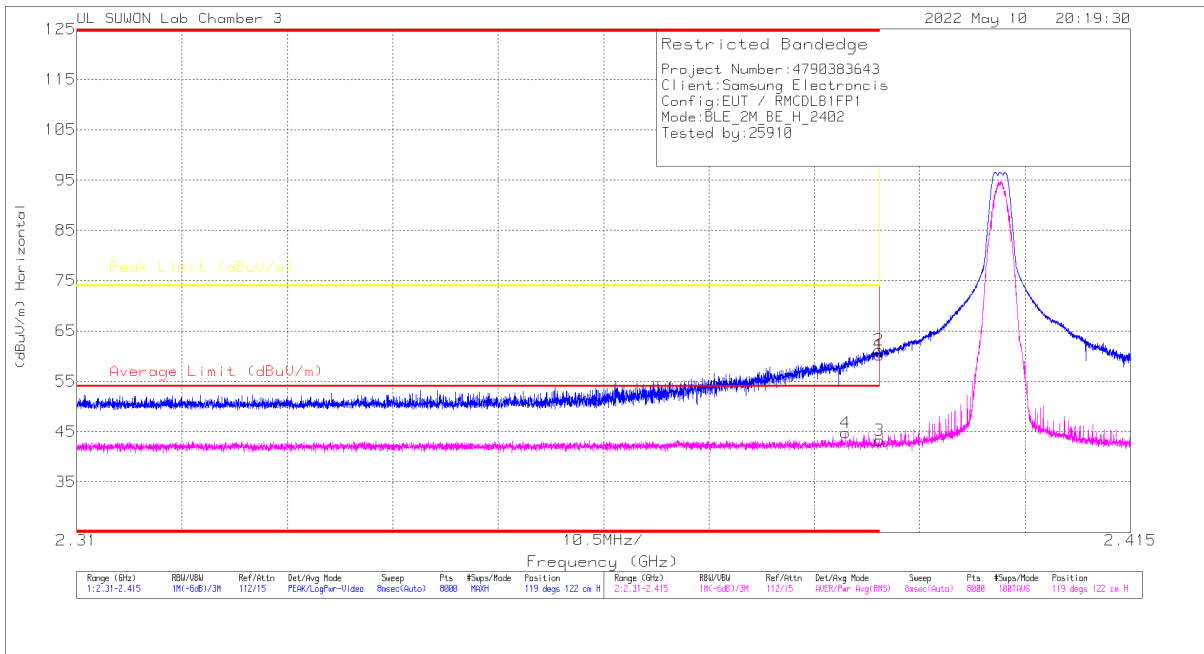
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.43927	39.19	PK2	36	-24.8	0	50.39	-	-	74	-23.61	20	101	H
* 7.43943	30.57	MAv1	36	-24.8	0.7	42.47	54	-11.53	-	-	20	101	H
9.92092	47.33	PK2	37.7	-21.4	0	63.63	-	-	74	-10.37	198	144	H
* 12.40142	35.94	PK2	39.3	-22.3	0	52.94	-	-	74	-21.06	49	211	H
* 12.40132	25.36	MAv1	39.3	-22.3	0.7	43.06	54	-10.94	-	-	49	211	H
14.8817	40.03	PK2	40	-22.4	0	57.63	-	-	74	-16.37	72	103	H
* 7.43932	40.85	PK2	36	-24.8	0	52.05	-	-	74	-21.95	148	101	V
* 7.43926	33.52	MAv1	36	-24.8	0.7	45.42	54	-8.58	-	-	148	101	V
9.92098	49.82	PK2	37.7	-21.4	0	66.12	-	-	74	-7.88	47	235	V
* 12.39898	33.62	PK2	39.3	-22.2	0	50.72	-	-	74	-23.28	161	370	V
* 12.39404	21.88	MAv1	39.3	-22.2	0.7	39.68	54	-14.32	-	-	161	370	V
14.87859	40.88	PK2	40	-22.3	0	58.58	-	-	74	-15.42	288	110	V

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

**10.2.2. 2 Mbps**

**BANDEDGE (LOW CHANNEL)**

**HORIZONTAL RESULT**

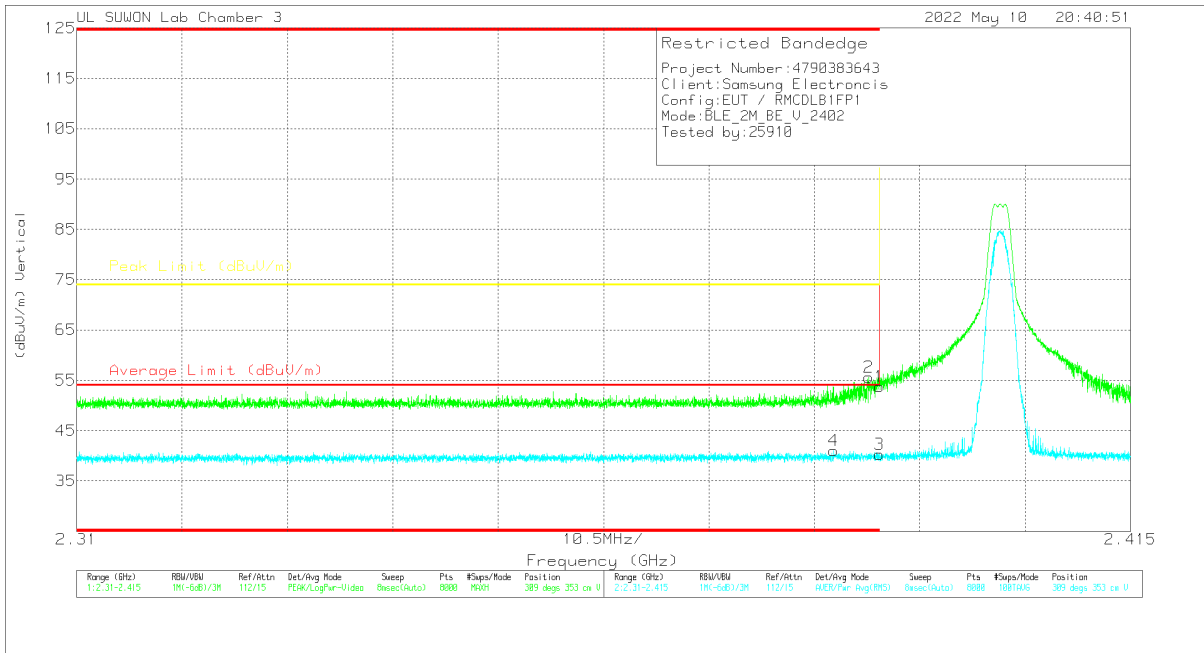


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	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	52.18	Pk	32.8	-24.8	0	60.18	-	-	74	-13.82	119	122	H
2	* 2.38993	53.28	Pk	32.8	-24.8	0	61.28	-	-	74	-12.72	119	122	H
3	* 2.39	32.78	RMS	32.8	-24.8	2.44	43.22	54	-10.78	-	-	119	122	H
4	* 2.38662	34.58	RMS	32.7	-24.9	2.44	44.82	54	-9.18	-	-	119	122	H

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

### VERTICAL RESULT



### Trace Markers

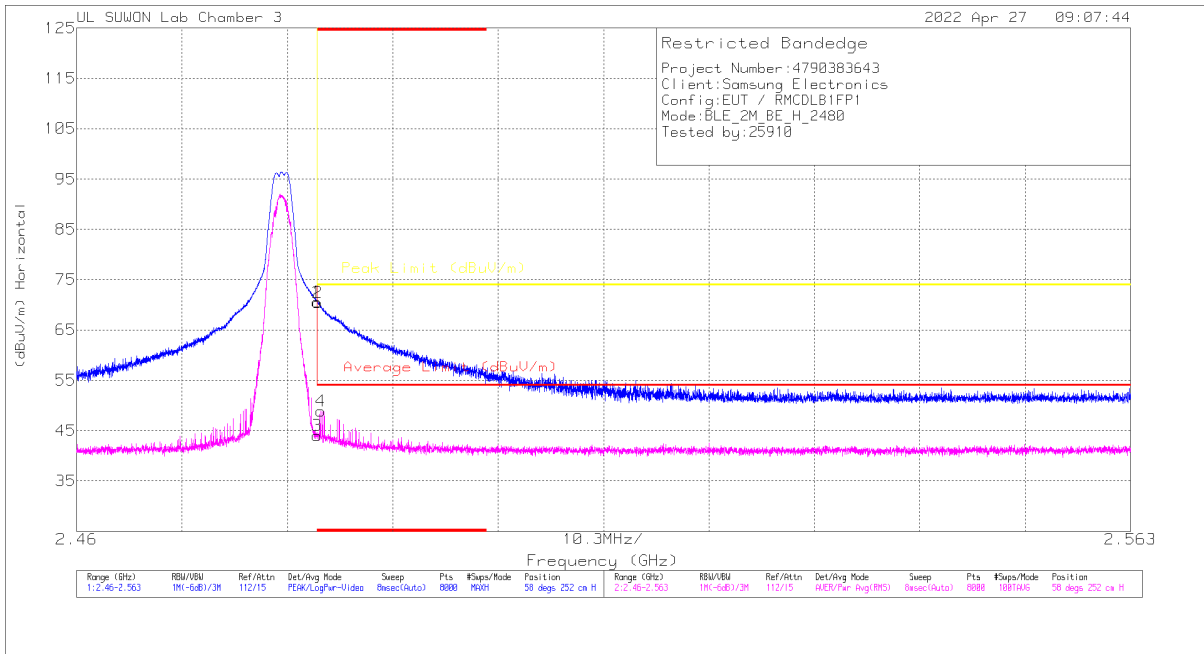
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218057	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	45.76	PK	32.8	-24.8	0	53.76	-	-	74	-20.24	309	353	V
2	* 2.38889	47.6	PK	32.8	-24.8	0	55.6	-	-	74	-18.4	309	353	V
3	* 2.39	29.84	RMS	32.8	-24.8	2.44	40.28	54	-13.72	-	-	309	353	V
4	* 2.38543	30.77	RMS	32.7	-24.9	2.44	41.01	54	-12.99	-	-	309	353	V

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



**BANDEDGE (HIGH CHANNEL)**

**HORIZONTAL RESULT**

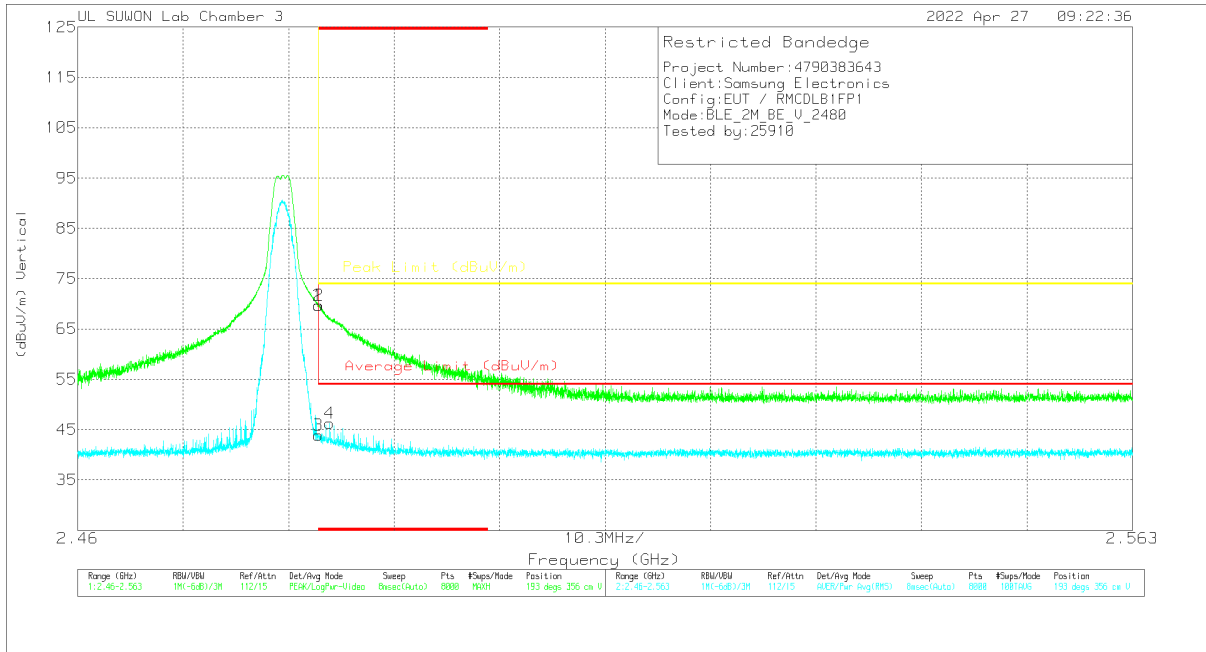


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	62.24	Pk	32.9	-24.6	0	70.54	-	-	74	-3.46	58	252	H
2	* 2.48355	62.2	Pk	32.9	-24.6	0	70.5	-	-	74	-3.5	58	252	H
3	* 2.4835	33.26	RMS	32.9	-24.6	2.44	44	54	-10	-	-	58	252	H
4	* 2.48387	38.12	RMS	32.9	-24.6	2.44	48.86	54	-5.14	-	-	58	252	H

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

### VERTICAL RESULT



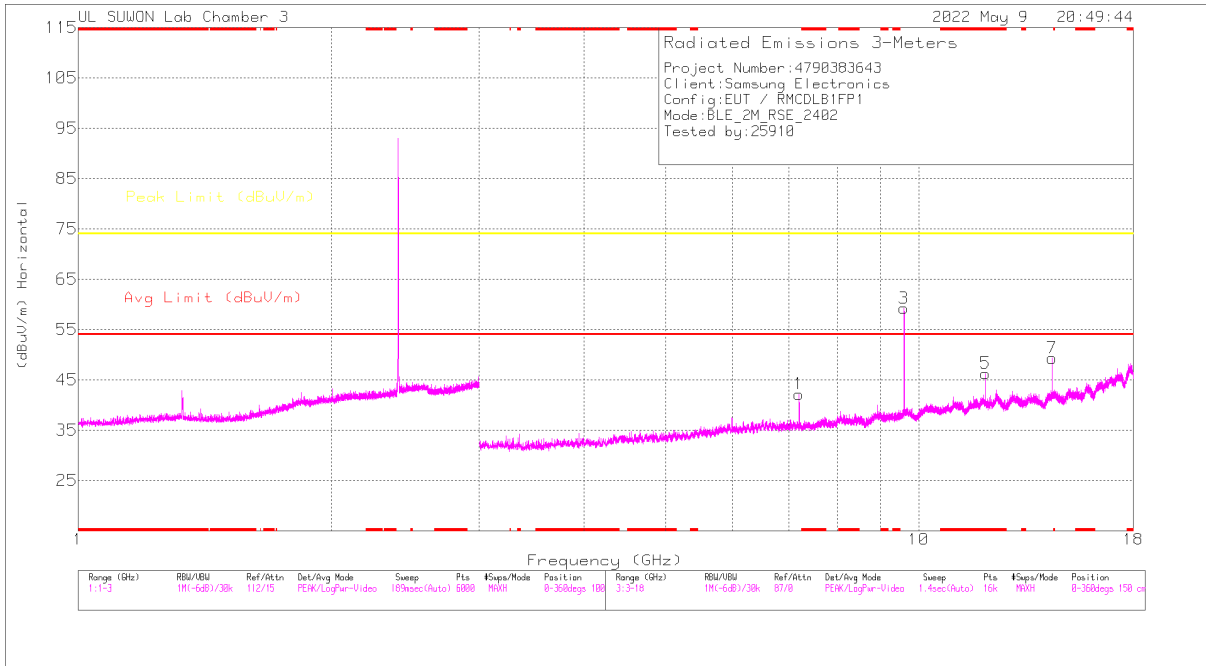
### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218857	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	61.38	Pk	32.9	-24.6	0	69.68	-	-	74	-4.32	193	356	V
2	* 2.48353	61.4	Pk	32.9	-24.6	0	69.7	-	-	74	-4.3	193	356	V
3	* 2.4835	35.55	RMS	32.9	-24.6	2.44	46.29	54	-7.71	-	-	193	356	V
4	* 2.48462	37.95	RMS	32.9	-24.6	2.44	48.69	54	-5.31	-	-	193	356	V

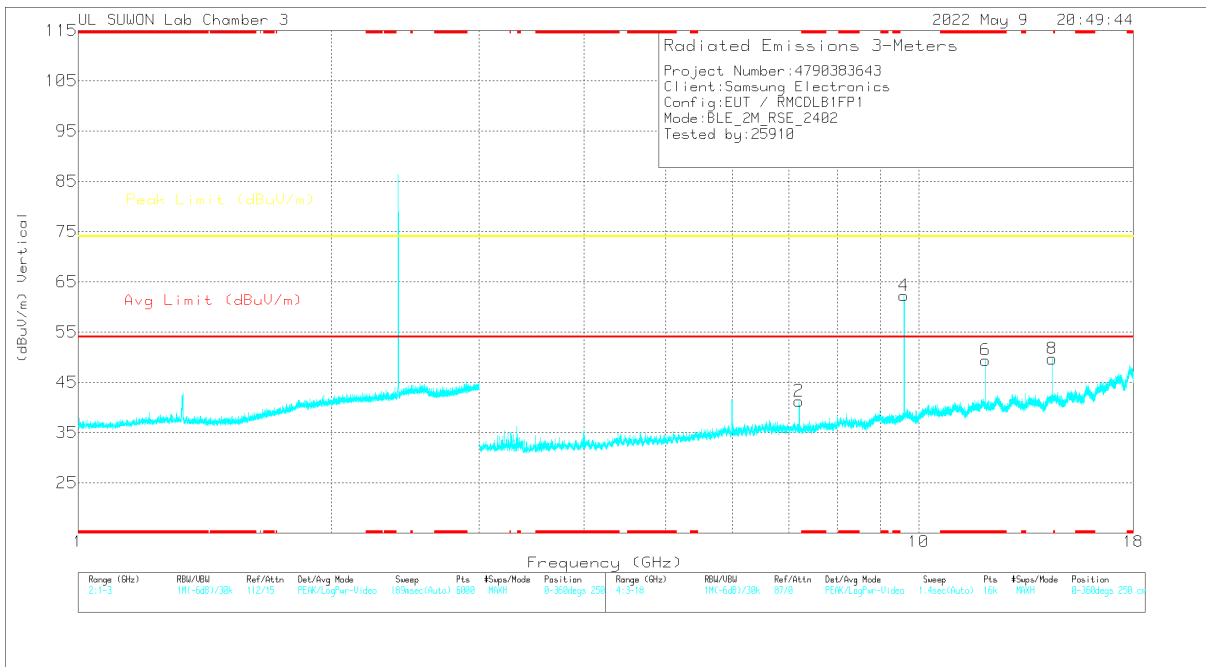
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

### HARMONICS AND SPURIOUS EMISSIONS

#### LOW CHANNEL RESULTS



#### HORIZONTAL



#### VERTICAL

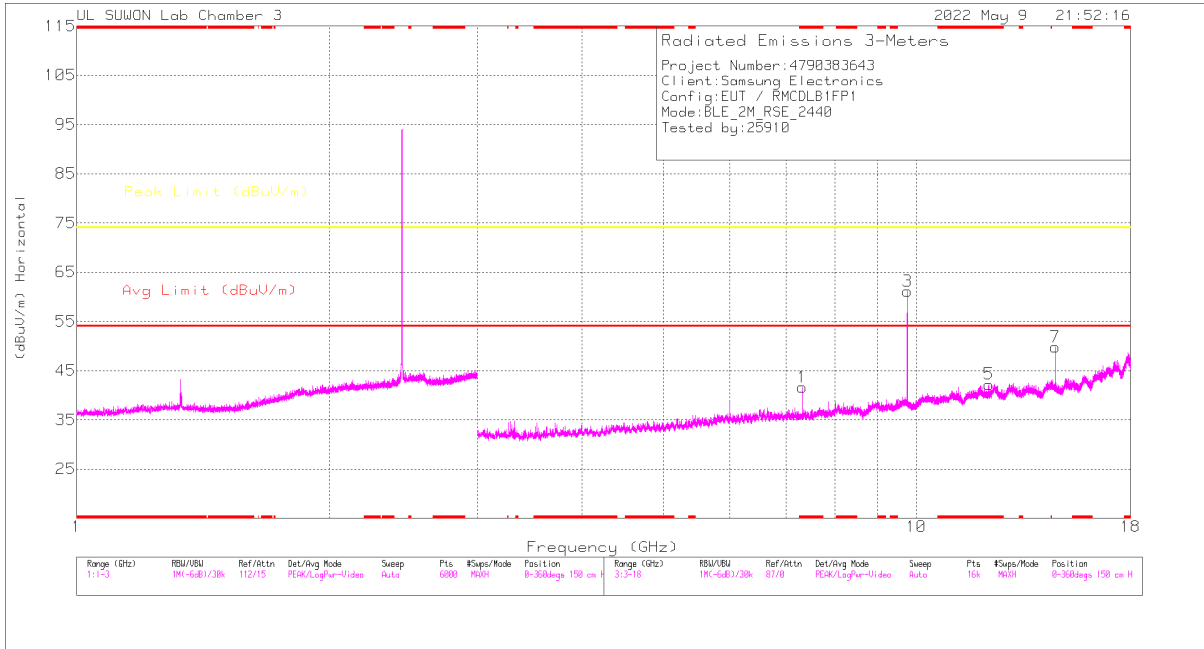
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

**RADIATED EMISSIONS**

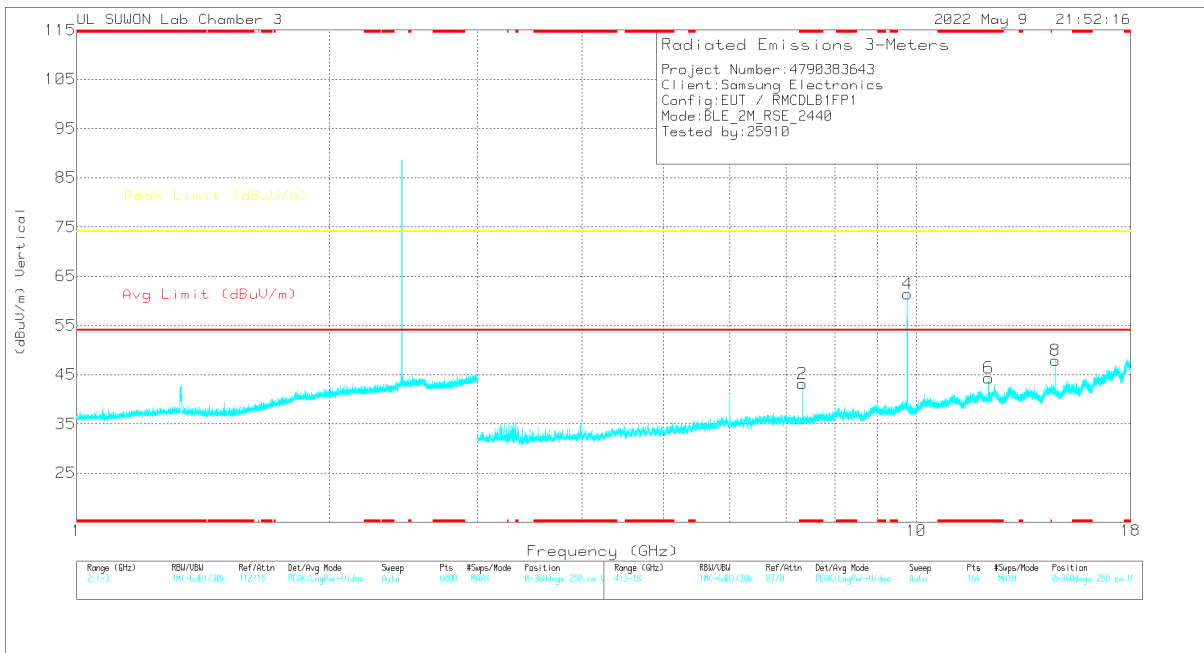
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7.20728	39.57	PK2	36.1	-25.6	0	50.07	-	-	74	-23.93	47	391	H
9.606	49.91	PK2	37.3	-21.6	0	65.61	-	-	74	-8.39	186	115	H
* 12.0125	38.28	PK2	39.2	-22.1	0	55.38	-	-	74	-18.62	309	104	H
* 12.00778	28.04	MAv1	39.2	-22.1	2.44	47.58	54	-6.42	-	-	309	104	H
14.41499	39.74	PK2	39.8	-22.5	0	57.04	-	-	74	-16.96	160	110	H
7.20738	39.41	PK2	36.1	-25.6	0	49.91	-	-	74	-24.09	143	108	V
9.6101	51.59	PK2	37.3	-21.5	0	67.39	-	-	74	-6.61	174	108	V
* 12.0101	41.39	PK2	39.2	-22.1	0	58.49	-	-	74	-15.51	307	106	V
* 12.01248	32.3	MAv1	39.2	-22.1	2.44	51.84	54	-2.16	-	-	307	106	V
14.41487	41.41	PK2	39.8	-22.5	0	58.71	-	-	74	-15.29	63	100	V

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

### MID CHANNEL RESULTS



### HORIZONTAL



### VERTICAL

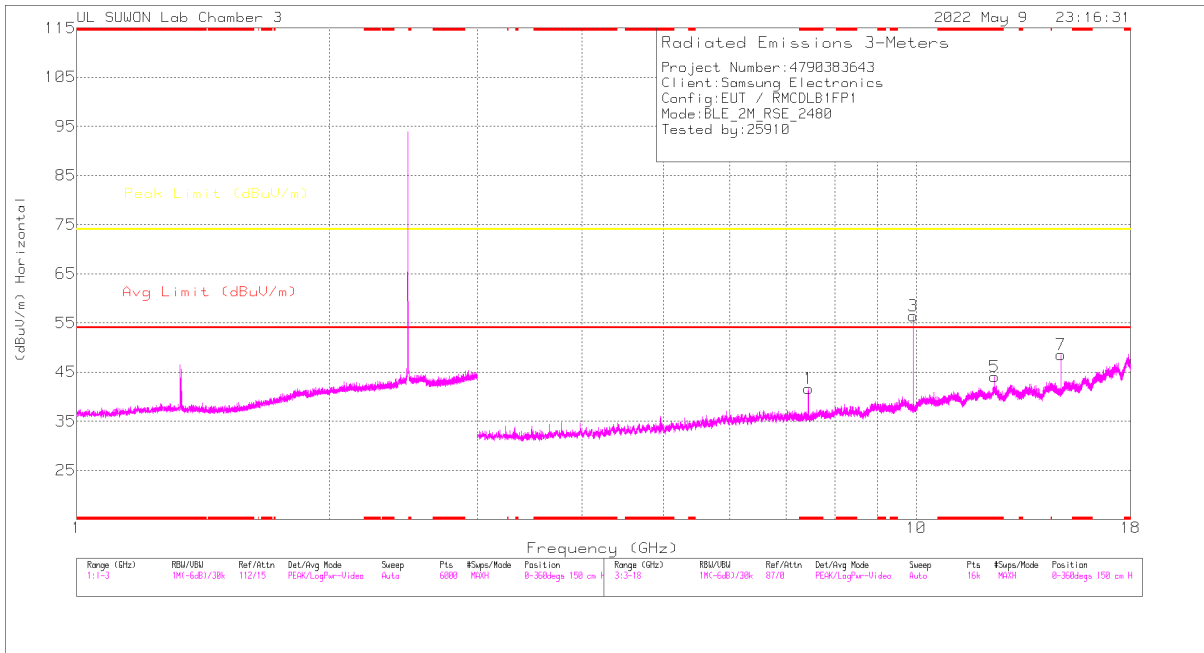
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

**RADIATED EMISSIONS**

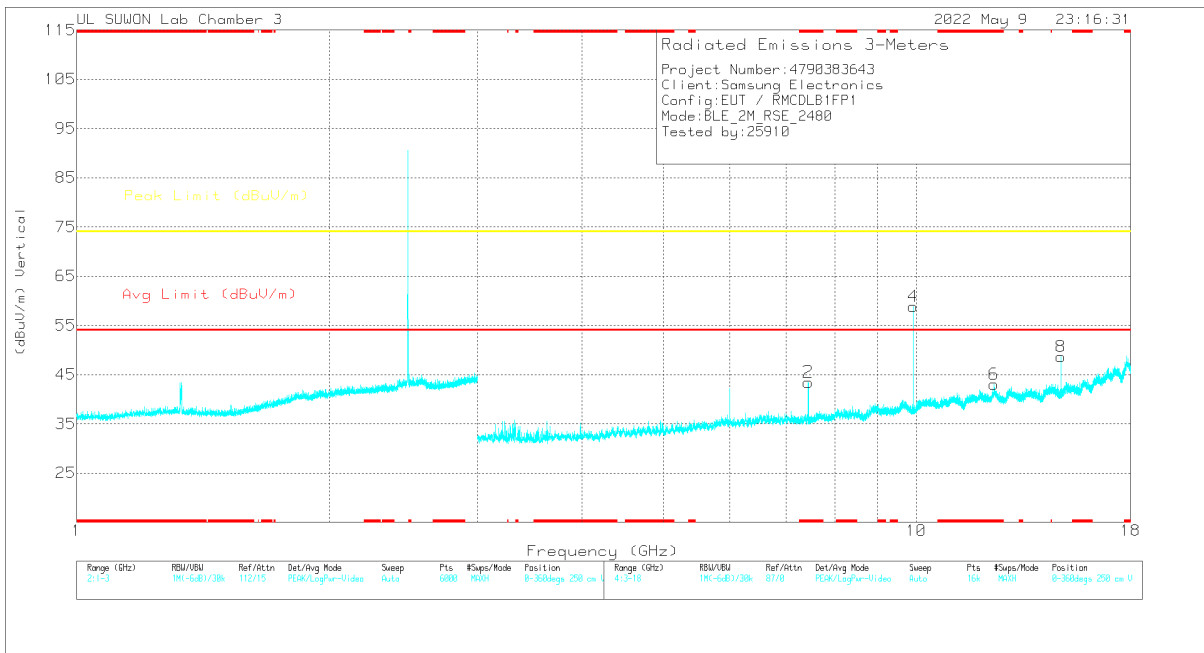
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.32147	38.69	PK2	36	-25	0	49.69	-	-	74	-24.31	50	103	H
* 7.3187	28.37	MAv1	36	-25	2.44	41.81	54	-12.19	-	-	50	103	H
9.75798	48.61	PK2	37.5	-21.2	0	64.91	-	-	74	-9.09	183	113	H
* 12.19775	35.67	PK2	39.3	-21.8	0	53.17	-	-	74	-20.83	47	100	H
* 12.19781	25.02	MAv1	39.3	-21.8	2.44	44.96	54	-9.04	-	-	47	100	H
14.64287	39.86	PK2	40	-22.6	0	57.26	-	-	74	-16.74	159	206	H
* 7.31847	41.21	PK2	36	-25	0	52.21	-	-	74	-21.79	149	100	V
* 7.32137	31.4	MAv1	36	-25	2.44	44.84	54	-9.16	-	-	149	100	V
9.75815	50.67	PK2	37.5	-21.2	0	66.97	-	-	74	-7.03	180	102	V
* 12.20235	37.95	PK2	39.3	-21.9	0	55.35	-	-	74	-18.65	307	106	V
* 12.1975	28	MAv1	39.3	-21.9	2.44	47.84	54	-6.16	-	-	307	106	V
14.63696	41.09	PK2	40	-22.6	0	58.49	-	-	74	-15.51	275	101	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**

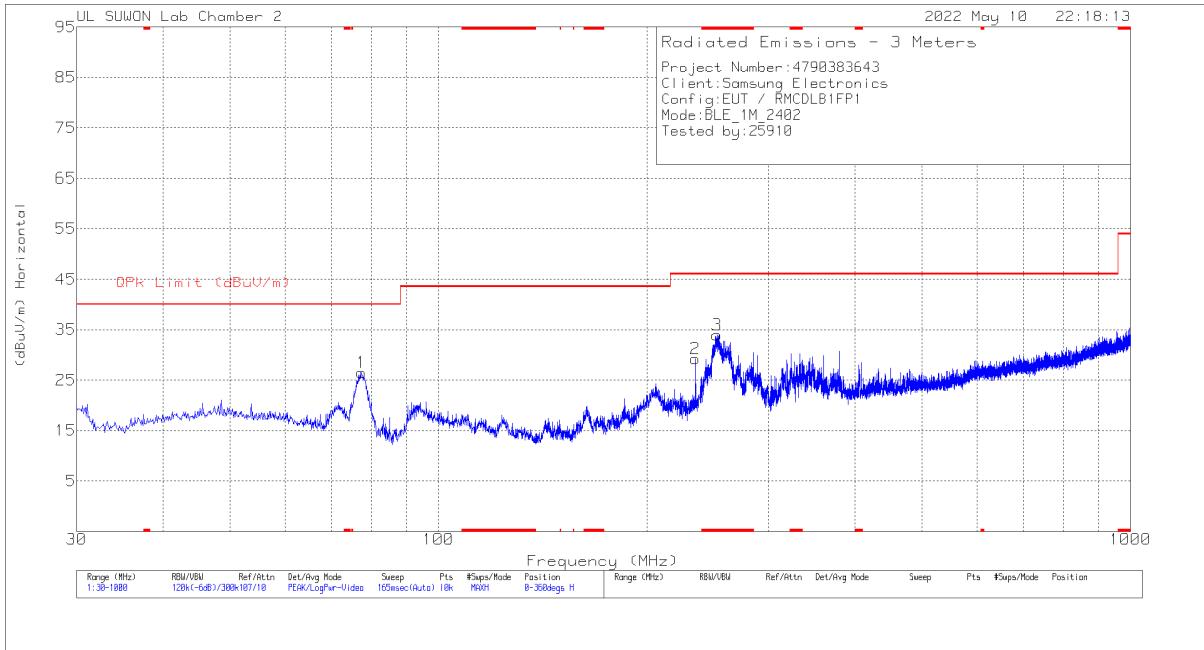
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.44141	38.92	PK2	36	-24.8	0	50.12	-	-	74	-23.88	20	133	H
* 7.43865	28.74	MAv1	36	-24.8	2.44	42.38	54	-11.62	-	-	20	133	H
9.92204	46.97	PK2	37.7	-21.4	0	63.27	-	-	74	-10.73	198	152	H
* 12.40256	35.22	PK2	39.3	-22.3	0	52.22	-	-	74	-21.78	48	212	H
* 12.40218	23.81	MAv1	39.3	-22.3	2.44	43.25	54	-10.75	-	-	48	212	H
14.88034	39.23	PK2	40	-22.4	0	56.83	-	-	74	-17.17	71	100	H
* 7.43864	41.11	PK2	36	-24.8	0	52.31	-	-	74	-21.69	149	100	V
* 7.4412	31.75	MAv1	36	-24.8	2.44	45.39	54	-8.61	-	-	149	100	V
9.92192	49.72	PK2	37.7	-21.4	0	66.02	-	-	74	-7.98	47	235	V
* 12.3714	33.43	PK2	39.3	-22.2	0	50.53	-	-	74	-23.47	138	335	V
* 12.37943	21.83	MAv1	39.3	-22.2	2.44	41.37	54	-12.63	-	-	138	335	V
14.88316	39.64	PK2	40	-22.4	0	57.24	-	-	74	-16.76	286	115	V

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

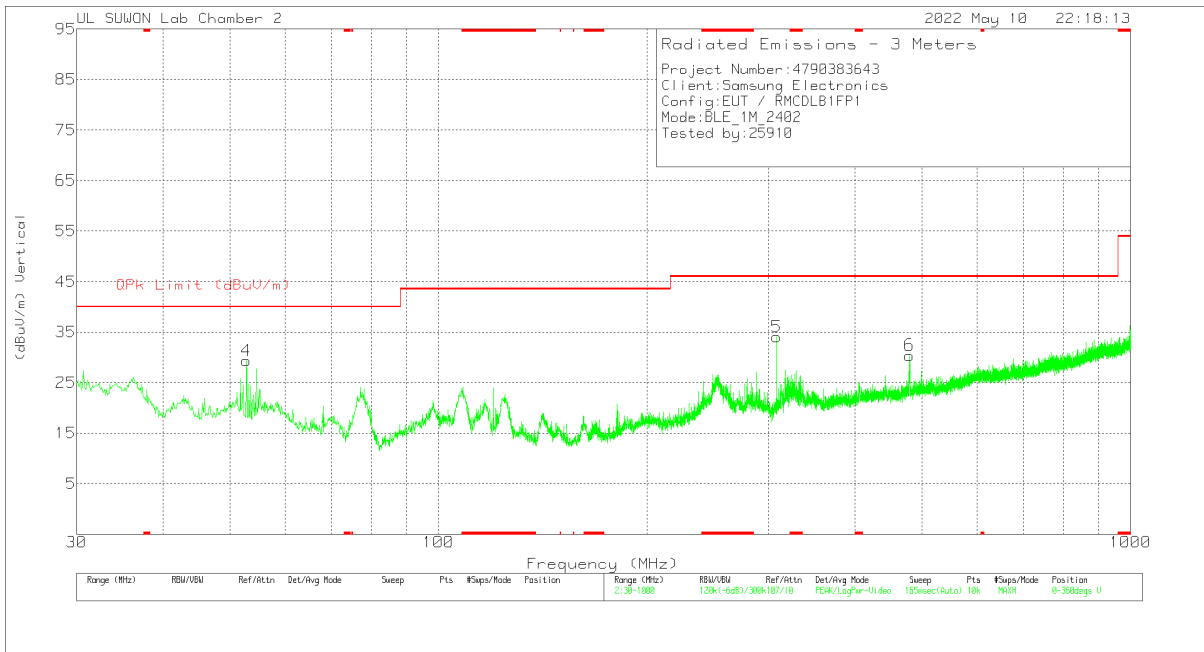


### 10.3. WORST CASE BELOW 1 GHZ

#### 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	77.433	44.77	Pk	12.6	-30.9	26.47	40	-13.53	0-360	100	H
2	235.155	40.78	Pk	17.9	-29.4	29.28	46.02	-16.74	0-360	100	H
3	* 252.518	44.81	Pk	18.4	-29.3	33.91	46.02	-12.11	0-360	100	H
4	52.795	40.96	Pk	19.6	-31.2	29.36	40	-10.64	0-360	100	V
5	308.002	43.74	Pk	19.2	-28.9	34.04	46.02	-11.98	0-360	100	V
6	479.595	36.11	Pk	22.6	-28.3	30.41	46.02	-15.61	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

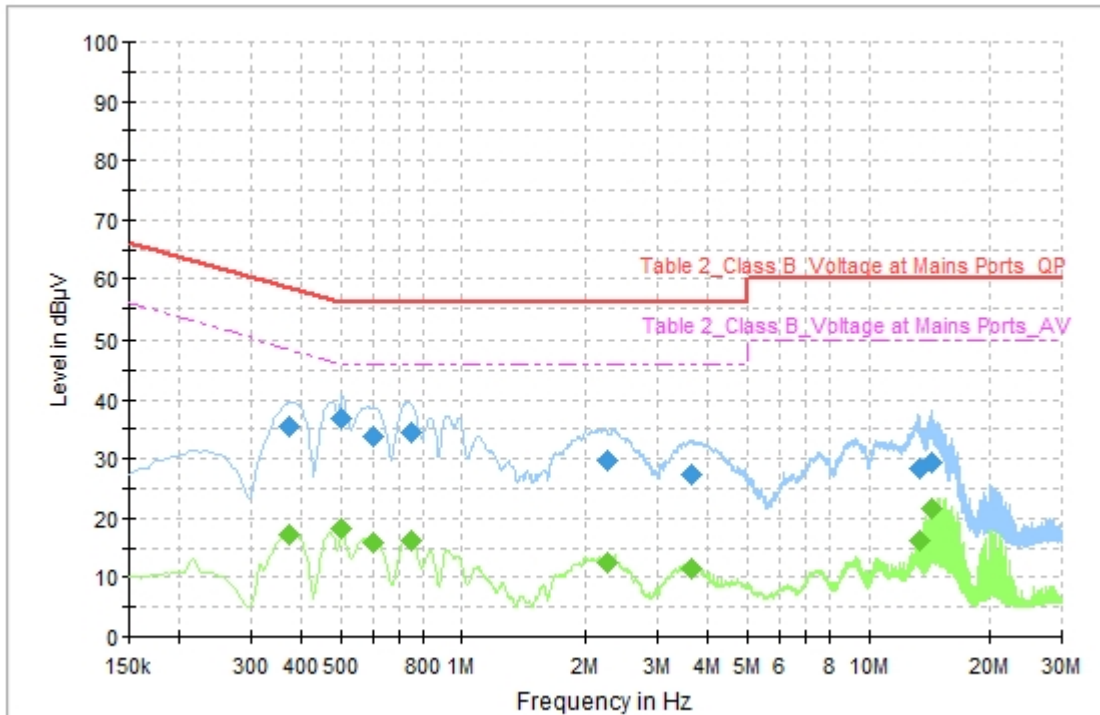
Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

### RESULTS

11.1.1. AC Power Line

LINE 1 RESULTS



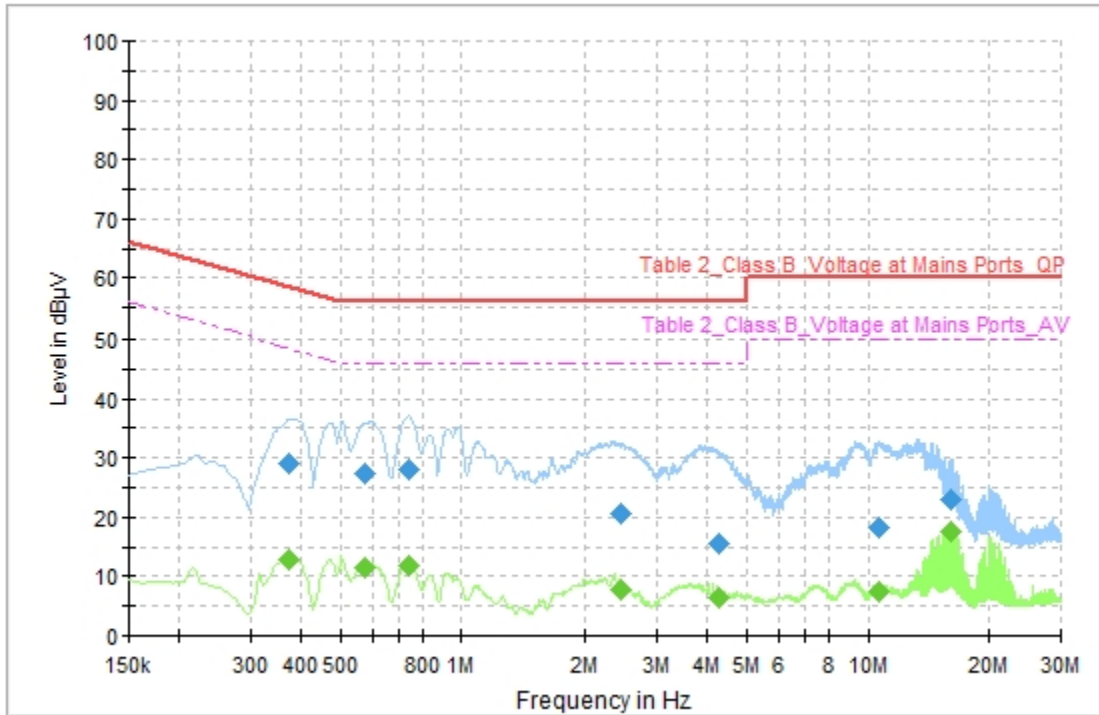
Final\_Result\_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.374000	35.38	58.41	23.03	L1	ON	9.8
0.503750	36.66	56.00	19.34	L1	ON	9.9
0.605000	33.87	56.00	22.13	L1	ON	9.9
0.743750	34.61	56.00	21.39	L1	ON	9.8
2.247500	29.83	56.00	26.17	L1	ON	9.7
3.638750	27.52	56.00	28.48	L1	ON	9.7
13.358333	28.32	60.00	31.68	L1	ON	9.8
14.362500	29.46	60.00	30.54	L1	ON	9.8

Final\_Result\_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.374000	17.09	48.41	31.32	L1	ON	9.8
0.503750	18.21	46.00	27.79	L1	ON	9.9
0.605000	15.76	46.00	30.24	L1	ON	9.9
0.743750	16.30	46.00	29.70	L1	ON	9.8
2.247500	12.64	46.00	33.37	L1	ON	9.7
3.638750	11.41	46.00	34.59	L1	ON	9.7
13.358333	16.21	50.00	33.79	L1	ON	9.8
14.362500	21.61	50.00	28.39	L1	ON	9.8

### LINE 2 RESULTS



#### Final Result QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.374000	29.19	58.41	29.22	N	ON	9.8
0.575000	27.35	56.00	28.65	N	ON	9.9
0.736250	28.05	56.00	27.95	N	ON	9.8
2.438750	20.50	56.00	35.50	N	ON	9.7
4.272500	15.68	56.00	40.32	N	ON	9.7
10.691667	18.37	60.00	41.63	N	ON	9.7
16.000000	22.94	60.00	37.06	N	ON	9.8

#### Final Result CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.374000	12.97	48.41	35.45	N	ON	9.8
0.575000	11.55	46.00	34.45	N	ON	9.9
0.736250	11.99	46.00	34.01	N	ON	9.8
2.438750	7.69	46.00	38.31	N	ON	9.7
4.272500	6.26	46.00	39.74	N	ON	9.7
10.691667	7.30	50.00	42.70	N	ON	9.7
16.000000	17.57	50.00	32.43	N	ON	9.8

## END OF TEST REPORT