



CERTIFICATION TEST REPORT

Report Number. : 4789497384-E4V2

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

Model : SM-F916B

FCC ID : A3LSMF916B

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:
July 29, 2020

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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	07/22/20	Initial issue	Jihyeon Park
V2	07/29/20	Updated to address TCB's question	Jihyeon Park

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

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

MODEL: SM-F916B

SERIAL NUMBER: R3CN60FSTTL (CONDUCTED)
R3CN60FSWRM (RADIATED);

DATE TESTED: JUL 08, 2020 – JUL 18, 2020;

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
UL Korea, Ltd.

Tested By:



Jihyeon Park
Suwon Lab Technician
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. 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	2.35 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.49 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.82 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 conducted output power as follows:

Frequency Range [MHz]	Mode	Power Mode	Output Power [dBm]	Output Power [mW]
2 402 ~ 2 480	500kbps	Peak	6.825	4.814
		Average	6.442	4.407
	2Mbps	Peak	6.976	4.984
		Average	6.283	4.249

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 -3.6 dBi

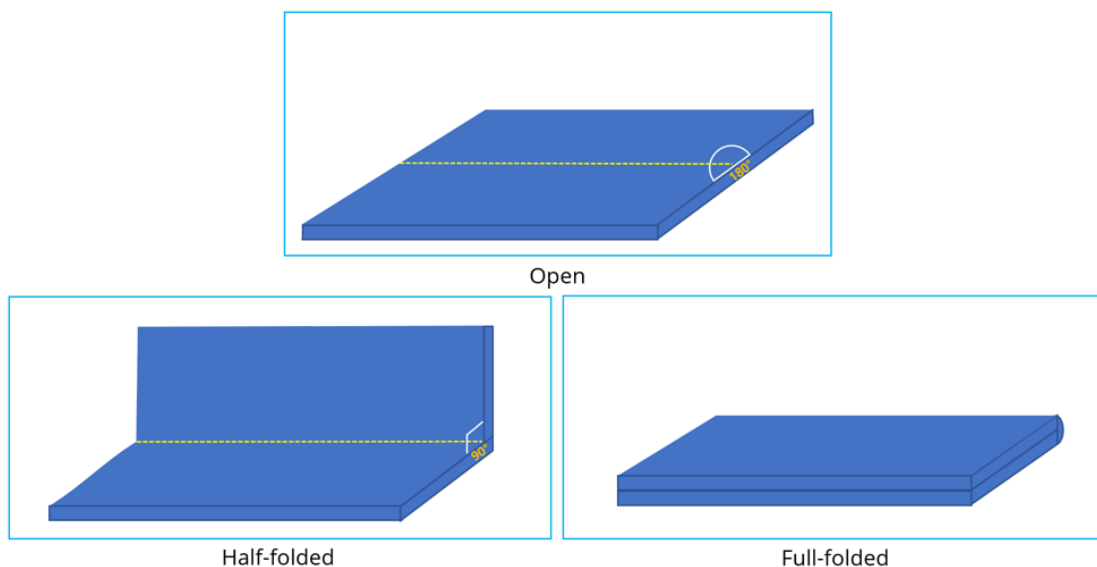
5.4. WORST-CASE CONFIGURATION AND MODE

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 Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

Foldable condition : Open



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

Power verification

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

Symbol Rate [Ms/s]	Mode	Frequency [MHz]	Conducted Burst Avg [dBm]	Symbol Rate [Ms/s]	Mode	Frequency [MHz]	Conducted Burst Avg [dBm]
1	1Mbps (37 pkt)	2402	6.318	2	2Mbps (37 pkt)	2402	6.176
		2440	6.277			2440	6.138
		2480	5.064			2480	4.950
	1Mbps (255 pkt)	2402	6.417		2Mbps (255 pkt)	2402	6.283
		2440	6.368			2440	6.251
		2480	5.165			2480	5.041
1	125 kbps (37 pkt)	2402	6.372				
		2440	6.345				
		2480	5.147				
	125 kbps (255 pkt)	2402	6.423				
		2440	6.375				
		2480	5.151				
	500 kbps (37 pkt)	2402	6.432				
		2440	6.398				
		2480	5.204				
	500 kbps (255 pkt)	2402	6.442				
		2440	6.407				
		2480	5.200				

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37N47V0G92HM3	N/A
Data Cable	SAMSUNG	EP-DG980	N/A	N/A

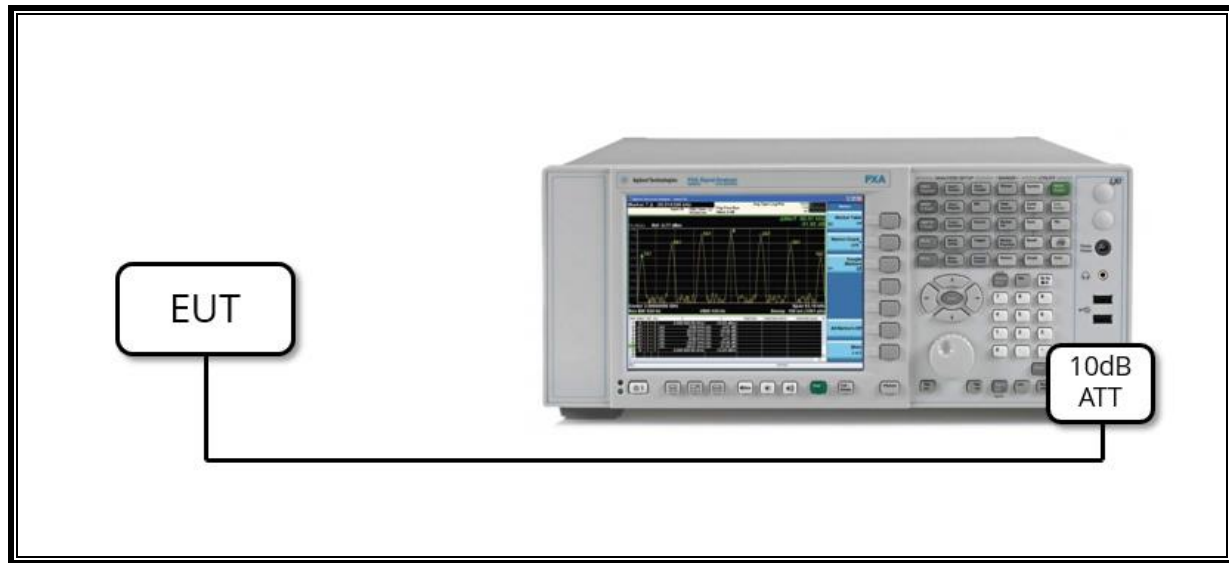
I/O CABLE

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	1.1m	N/A

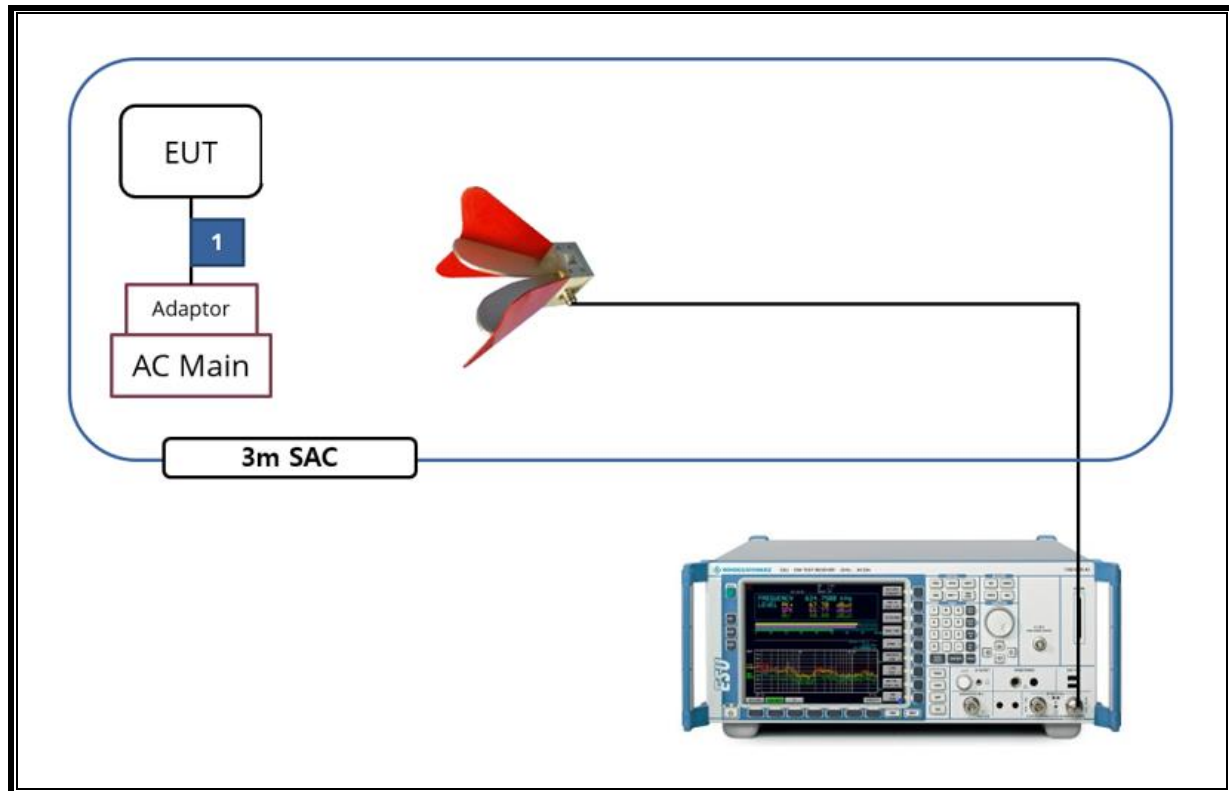
TEST SETUP

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	Next Cal. Date
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-04-20
Antenna, Horn, 18 GHz	ETS	3115	00167211	08-04-20
Antenna, Horn, 18 GHz	ETS	3115	00161451	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168724	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168717	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00205959	08-04-20
Antenna, Horn, 40 GHz	ETS	3116C	00166155	08-14-20
Antenna, Horn, 40 GHz	ETS	3116C	00168645	10-02-21
Preamplifier	ETS	3116C-PA	00168841	08-08-20
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-05-20
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-05-20
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-05-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-06-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-06-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-06-20
Spectrum Analyzer, 44 GHz	Keysight	N9030B	MY57143717	01-20-21
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-06-20
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-06-20
Spectrum Analyzer, 43.5 GHz	R&S	FSW43	104089	08-06-20
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-09-20
Attenuator	PASTERNAK	PE7087-10	A001	08-08-20
Attenuator	PASTERNAK	PE7087-10	A008	08-08-20
Attenuator	PASTERNAK	PE7004-10	2	08-06-20
Attenuator	PASTERNAK	PE7087-10	A009	08-08-20
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-06-20
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-06-20
EMI Test Receive, 44 GHz	R&S	ESW44	101590	08-05-20
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-05-20
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	08-06-20
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	08-06-20
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	08-06-20
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	08-06-20
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	08-06-20
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	08-06-20
LISN	R&S	ENV-216	101837	08-09-20
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 Band width (6dB)	>500KHz	Conducted	Pass
2.1051, 15.247 (d)	Band Edge / Conducted Spurious Emission	-20dBc		Pass
15.247 (b)(3)	TX conducted output power	<30dBm		Pass
15.247 (e)	PSD	<8dBm		Pass
15.207 (a)	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m(Av)	Radiated	Pass

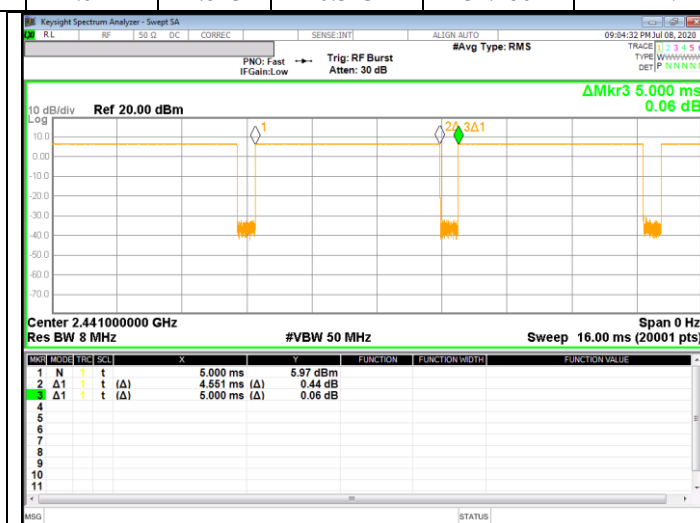
9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

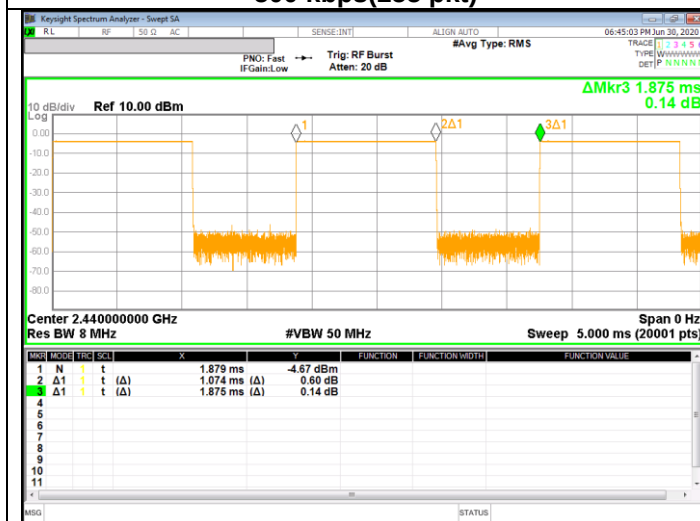
LIMITS

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 CBW [kHz]
2 400 ~ 2 483.5 MHz Bands						
BLE 500 kbps [255pkt]	4.551	5.000	0.910	91.020	0.409	0.220
BLE 2 Mbps [255pkt]	1.074	1.875	0.573	57.280	2.420	0.931



500 kbps(255 pkt)



2 Mbps(255 pkt)

9.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

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

RESULTS

9.2.1. BLE (500kbps)

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]
Low	2 402	659.00	500.00
Mid	2 440	661.70	500.00
High	2 480	676.00	500.00
Worst		659.00	500.00



9.2.2. BLE (2Mbps)

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]
Low	2 402	1137.00	500.00
Mid	2 440	1157.00	500.00
High	2 480	1096.00	500.00
Worst		1096.00	500.00



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

- 500 kbps

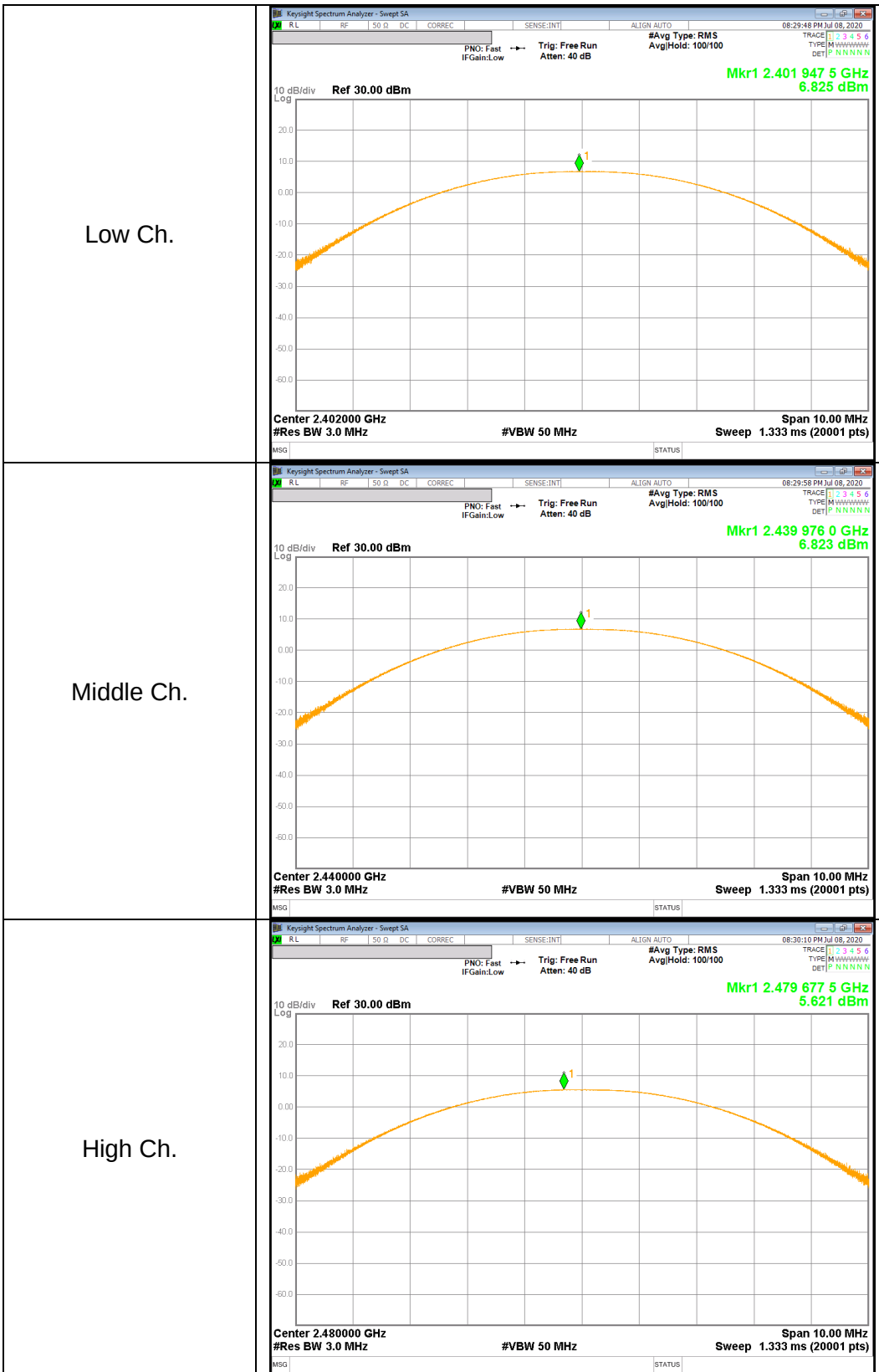
Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	6.825	30.000	-23.175
Mid	2440	6.823	30.000	-23.177
High	2480	5.621	30.000	-24.379
Worst		6.825	30.000	-23.175

- 2 Mbps

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	6.976	30.000	-23.024
Mid	2440	6.914	30.000	-23.086
High	2480	5.808	30.000	-24.192
Worst		6.976	30.000	-23.024

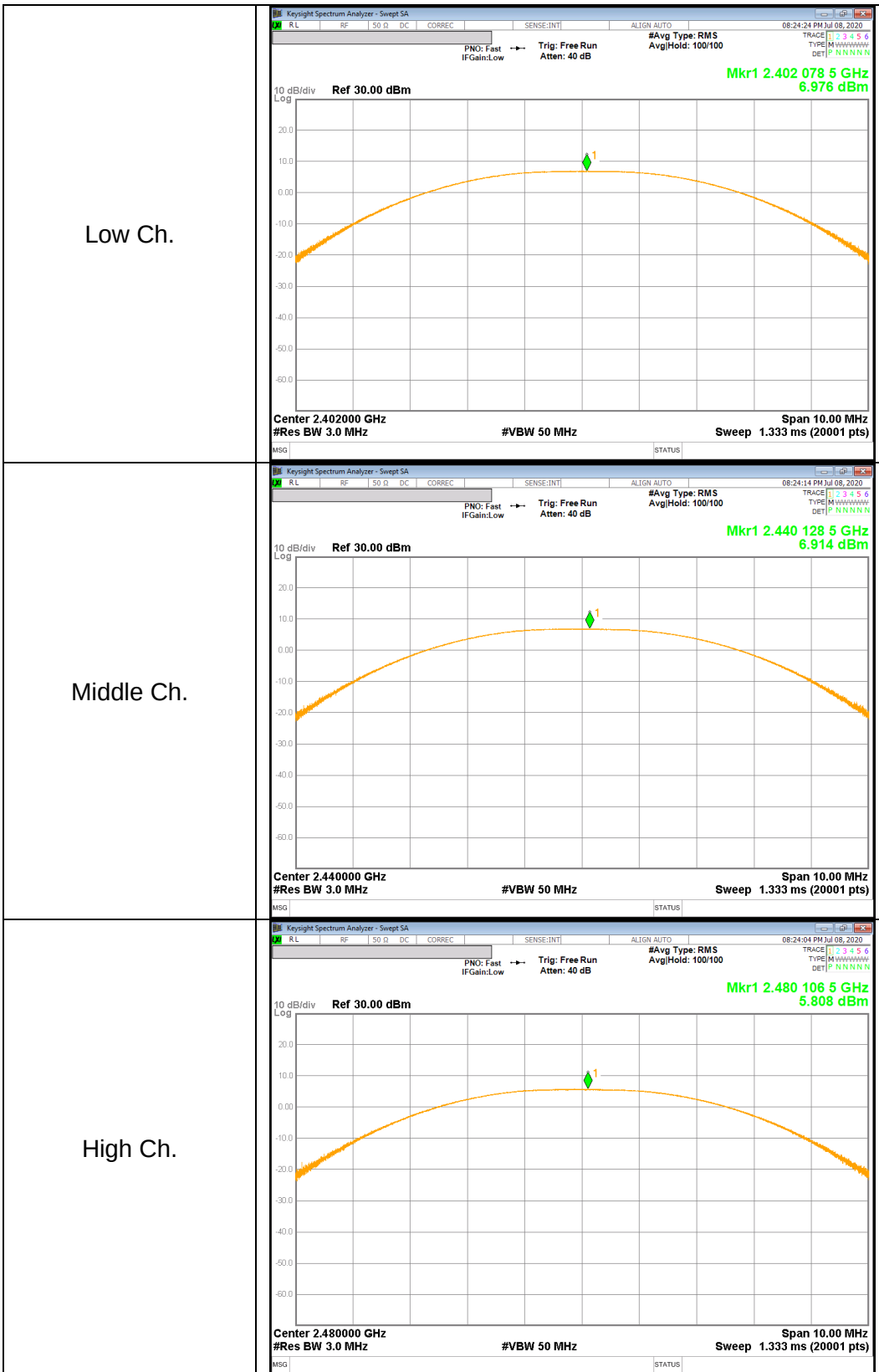
9.3.1. BLE (500 kbps)

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.

- 500 kbps

Channel	Frequency [MHz]	AV Power [dBm]	AV Power [mW]
Low	2402	6.442	4.407
Mid	2440	6.407	4.372
High	2480	5.200	3.311

- 2 Mbps

Channel	Frequency [MHz]	AV Power [dBm]	AV Power [mW]
Low	2402	6.283	4.249
Mid	2440	6.251	4.218
High	2480	5.041	3.192

9.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

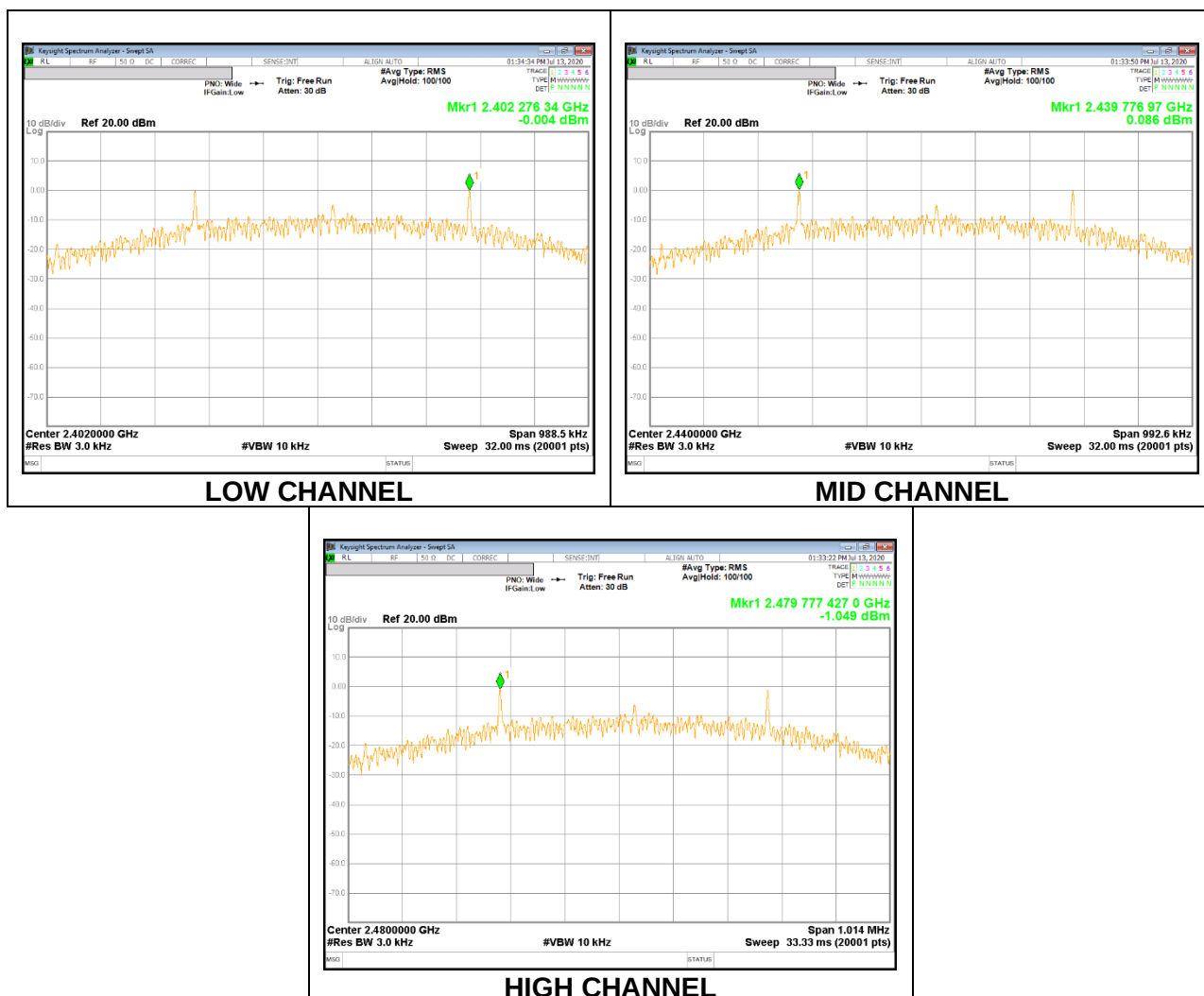
RSS-247 (5.2) (b)

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

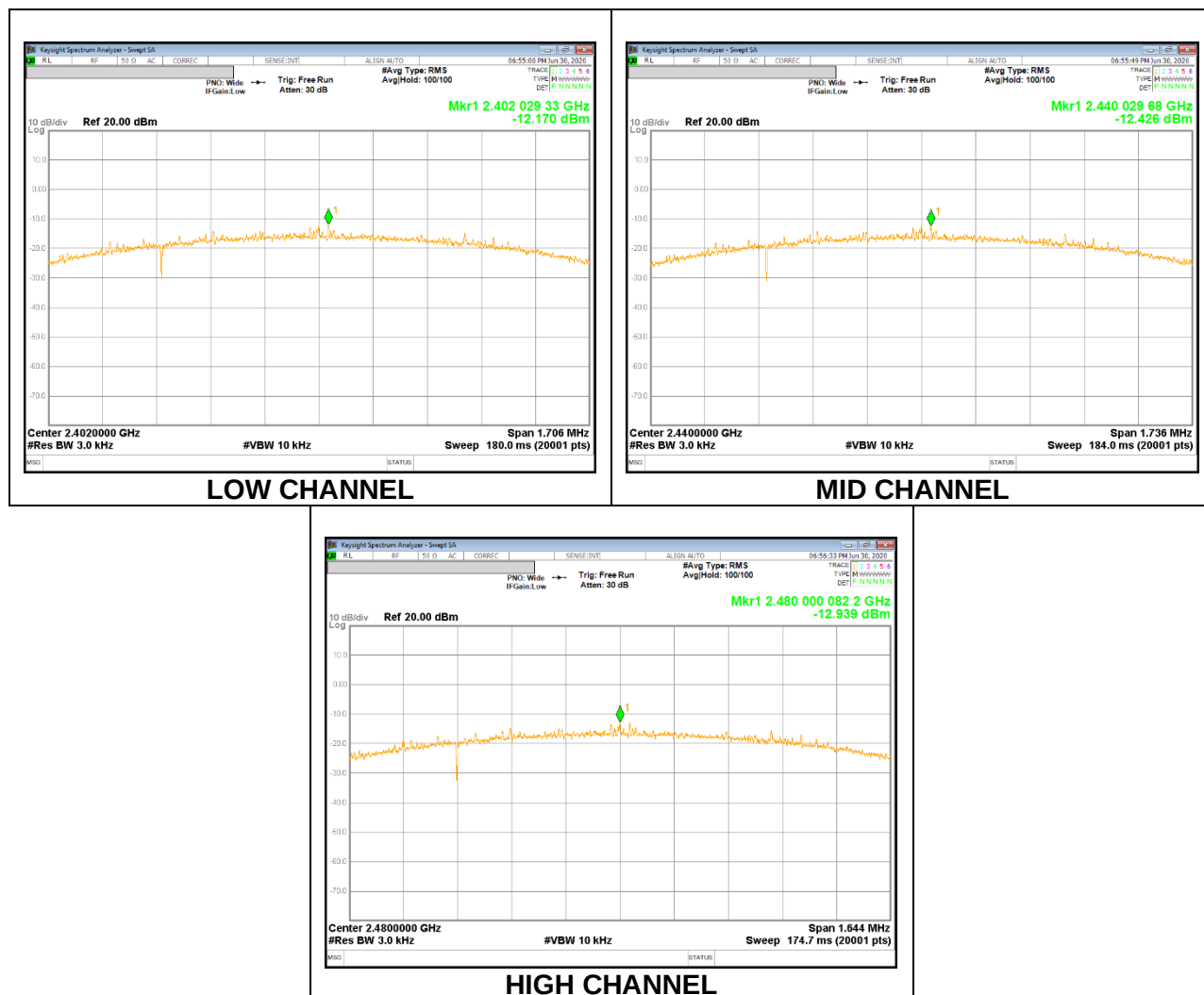
9.5.1. BLE (500 kbps)

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2402	-0.004	8.000	-8.004
Mid	2440	0.086	8.000	-7.914
High	2480	-1.049	8.000	-9.049



9.5.2. BLE (2Mbps)

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2402	-12.170	8.000	-20.170
Mid	2440	-12.426	8.000	-20.426
High	2480	-12.939	8.000	-20.939



9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

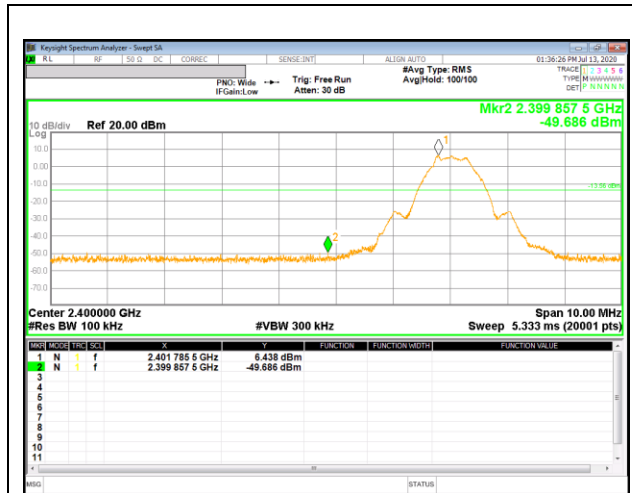
FCC §15.247 (d)

RSS-247 5.5

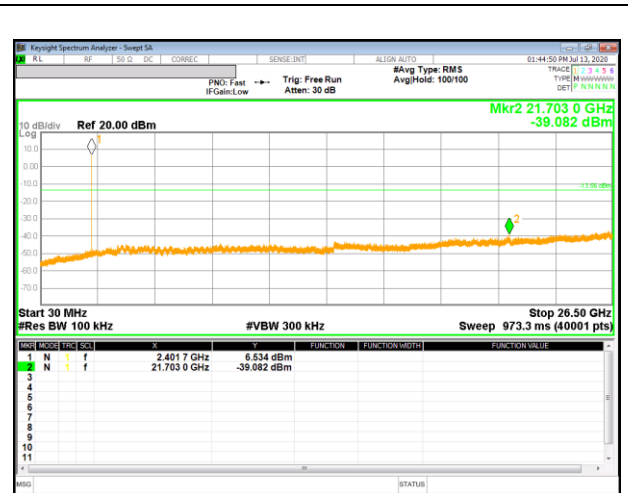
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

RESULTS

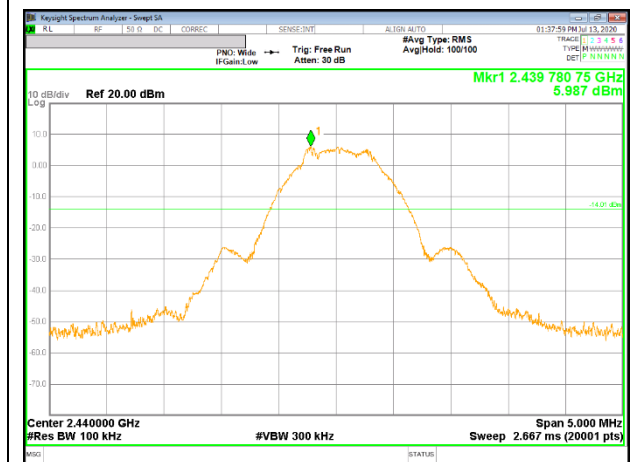
9.6.1. BLE (500 kbps)



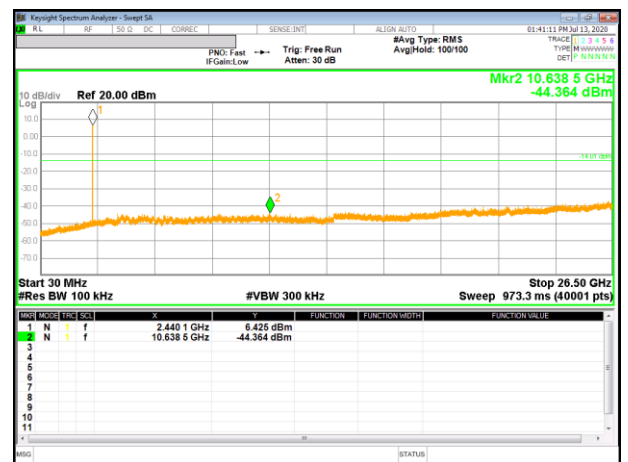
LOW CHANNEL BANDEDGE



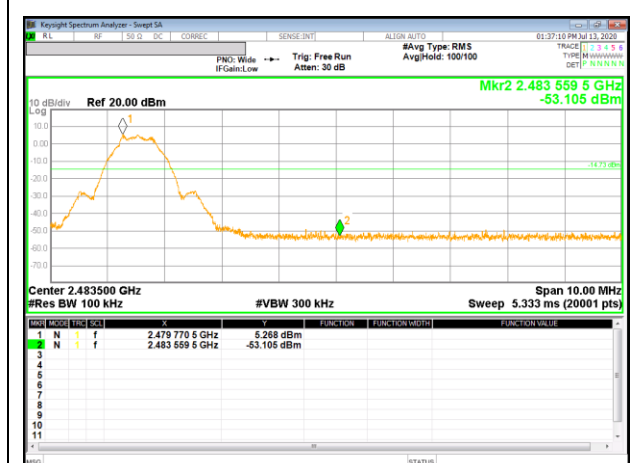
OUT-OF-BAND LOW CHANNEL



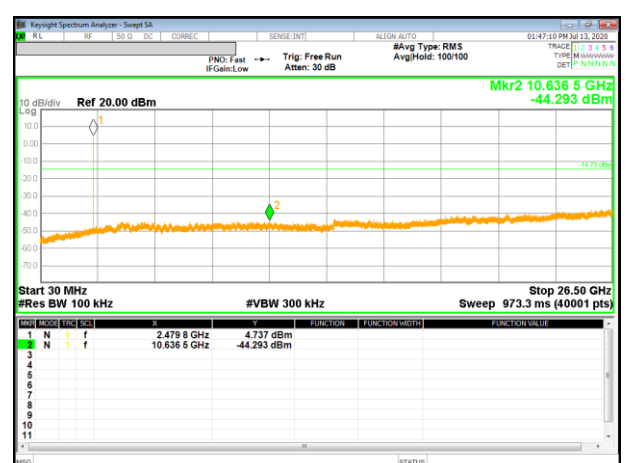
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL

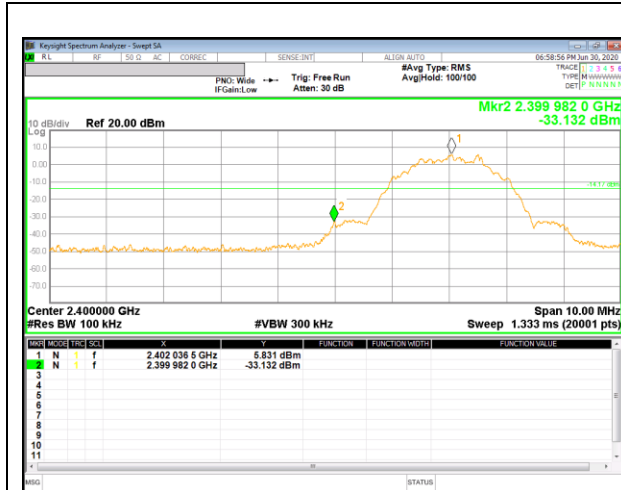


HIGH CHANNEL BANDEDGE

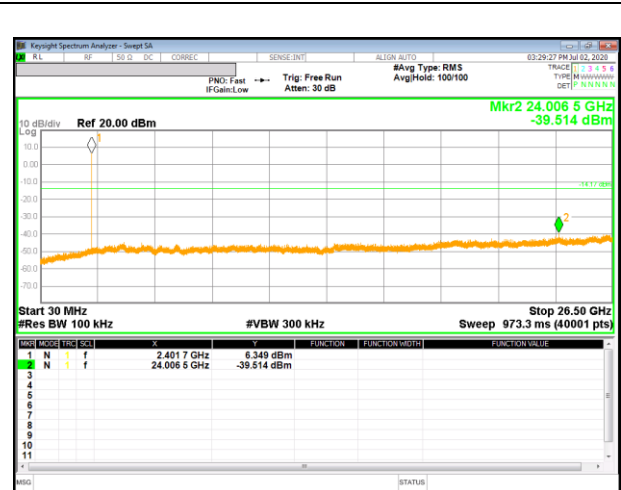


OUT-OF-BAND HIGH CHANNEL

9.6.2. BLE (2Mbps)



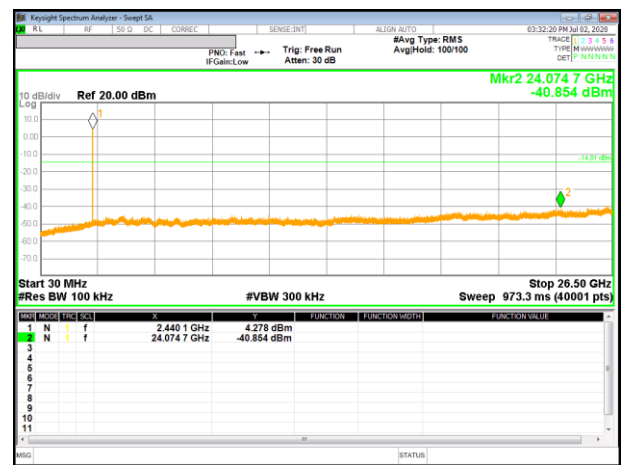
LOW CHANNEL BANDEDGE



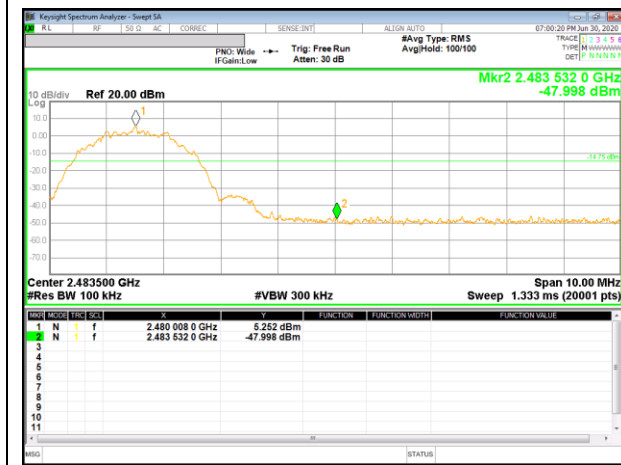
OUT-OF-BAND LOW CHANNEL



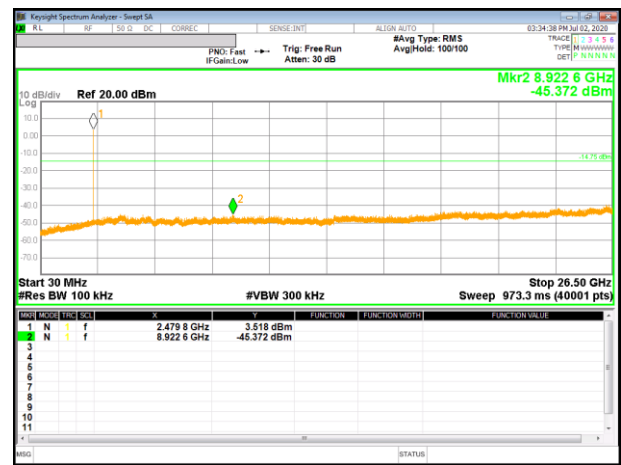
IN-BAND REFERENCE LEVEL



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 (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 = $10 \log(1/0.910) = 0.409$ dB (Spectrum Analyzer round it up to 0.41 dB) and for 2Mbps, DCF = $10 \log(1/0.573) = 2.420$ 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.

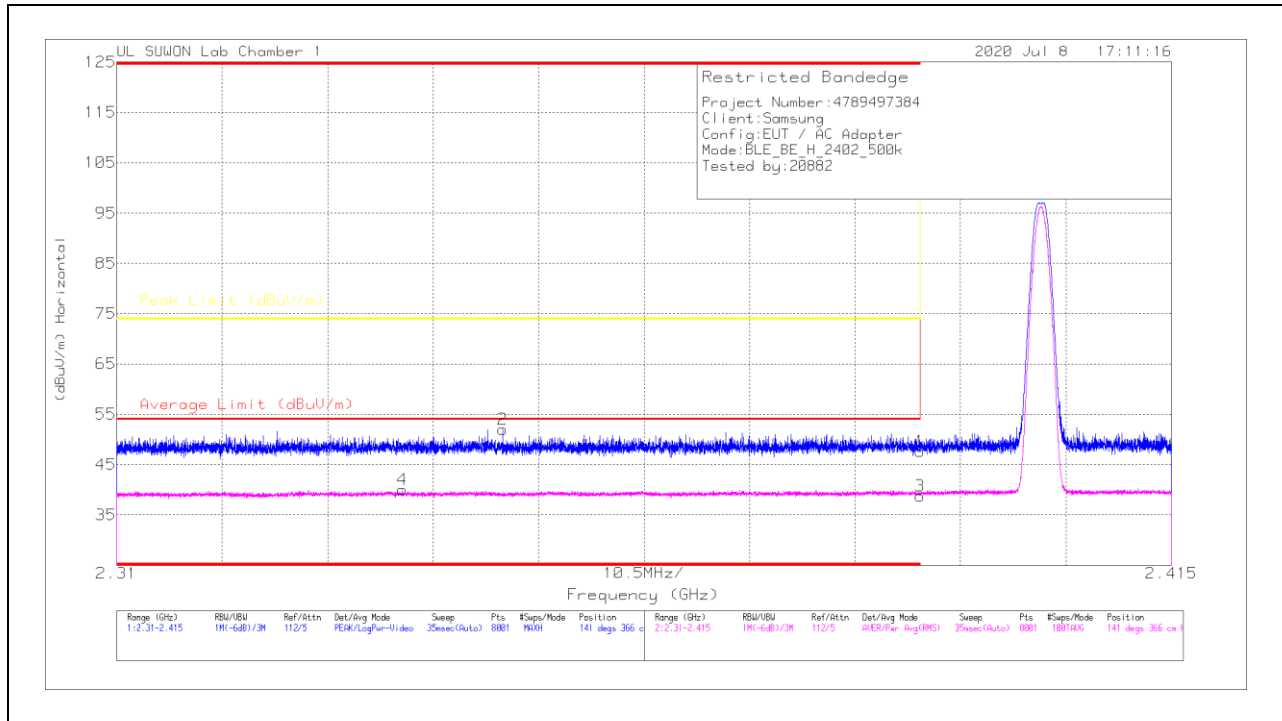
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. BLE (500kbps)

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

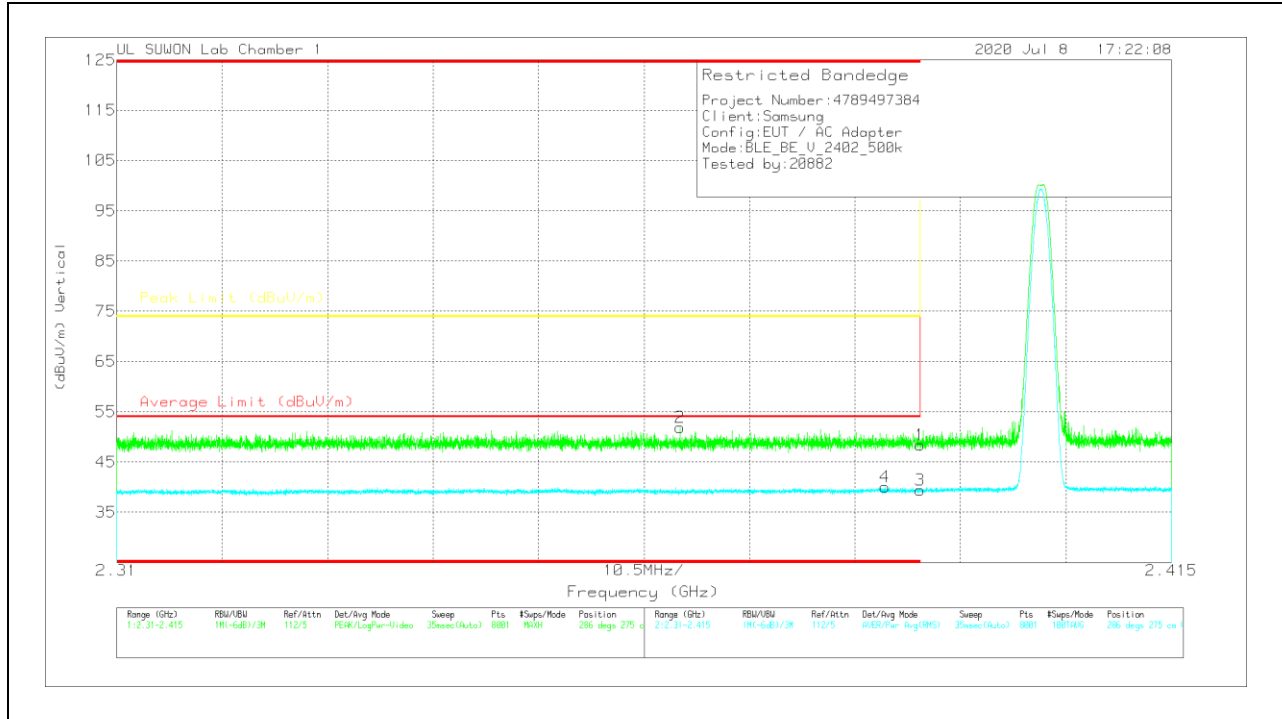
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Altitude (Degs)	Height (cm)	Polarity
1	* 2.39	41.46	PK	31.7	-25.5	0	47.66	-	-	74	-26.34	141	366	H
2	* 2.34843	46.15	PK	31.6	-25.7	0	52.05	-	-	74	-21.95	141	366	H
3	* 2.39	32.19	RMS	31.7	-25.5	41	38.8	54	-15.2	-	-	141	366	H
4	* 2.33843	33.77	RMS	31.5	-25.6	41	40.08	54	-13.92	-	-	141	366	H

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

PK - Peak detector

RMS - RMS detection

VERTICAL RESULT



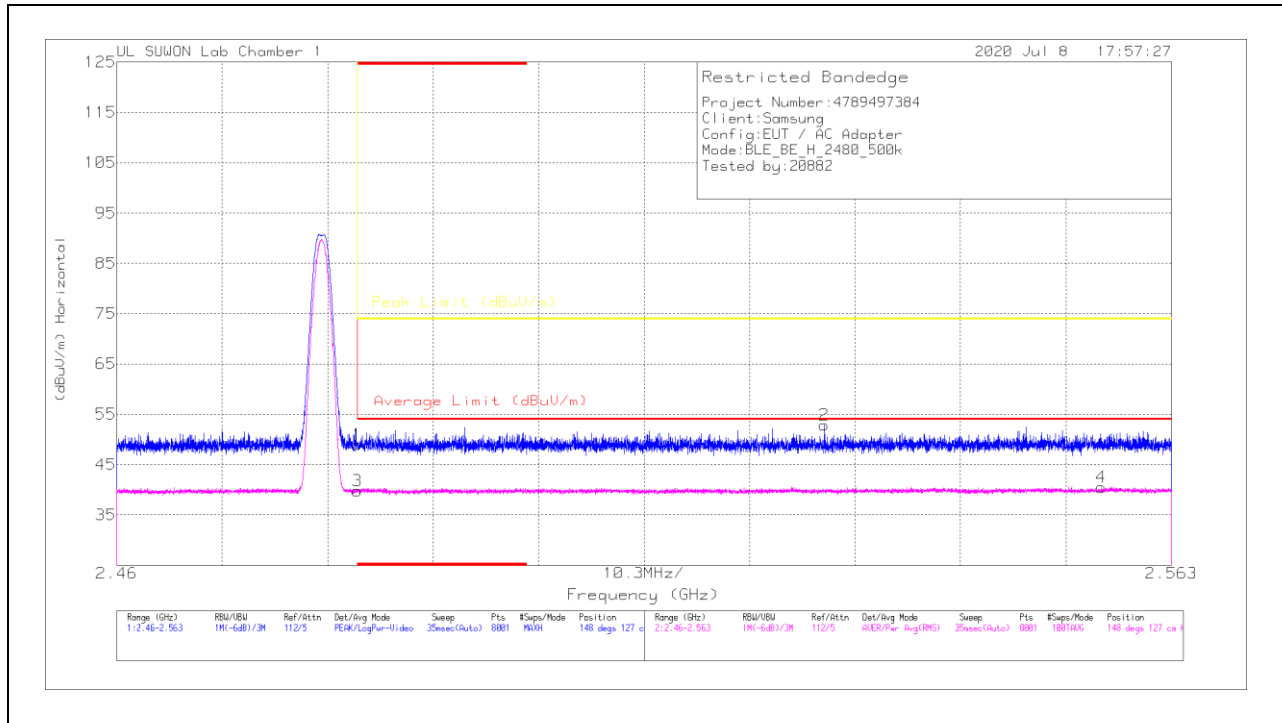
Trace Markers

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	* 2.39	42.21	PK	31.7	-25.5	0	48.41	-	-	74	-25.59	286	275	V
2	* 2.3661	46	PK	31.6	-25.7	0	51.9	-	-	74	-22.1	286	275	V
3	* 2.39	32.84	RMS	31.7	-25.5	41	39.45	54	-14.55	-	-	286	275	V
4	* 2.38651	33.4	RMS	31.7	-25.5	41	40.01	54	-13.99	-	-	286	275	V

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

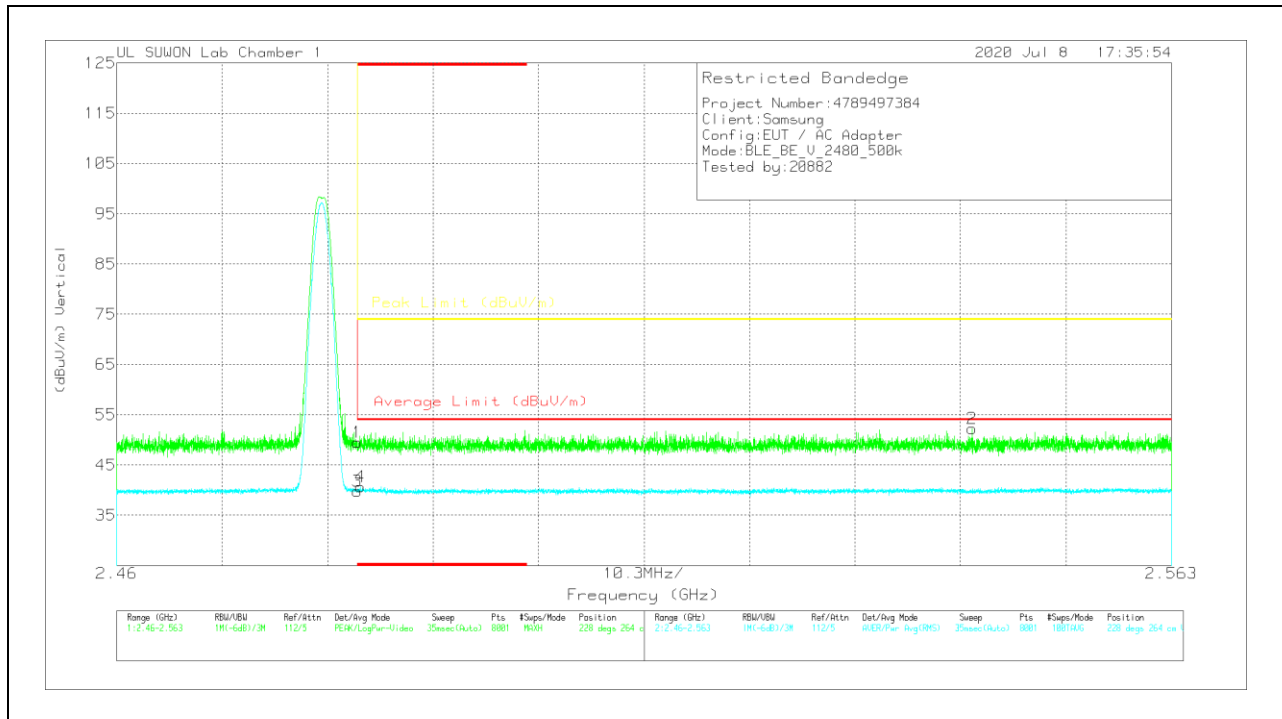


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC 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	42.33	PK	31.9	-25.2	0	49.03	-	-	74	-24.97	148	127	H
2	2.52907	46.05	PK	32	-25.2	0	52.85	-	-	74	-21.15	148	127	H
3	* 2.48351	32.68	RMS	31.9	-25.2	41	39.79	54	-14.21	-	-	148	127	H
4	2.55616	33.25	RMS	32	-25.1	41	40.56	54	-13.44	-	-	148	127	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_00166717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Altitude (feet)	Height (cm)	Polarity
1	* 2.48351	42.84	PK	31.9	-25.2	0	49.54	-	-	74	-24.46	228	264	V
2	2.54355	45.58	PK	32	-25.3	0	52.28	-	-	74	-21.72	228	264	V
3	* 2.48351	32.68	RMS	31.9	-25.2	.41	39.79	54	-14.21	-	-	228	264	V
4	* 2.48378	33.53	RMS	31.9	-25.2	.41	40.64	54	-13.36	-	-	228	264	V

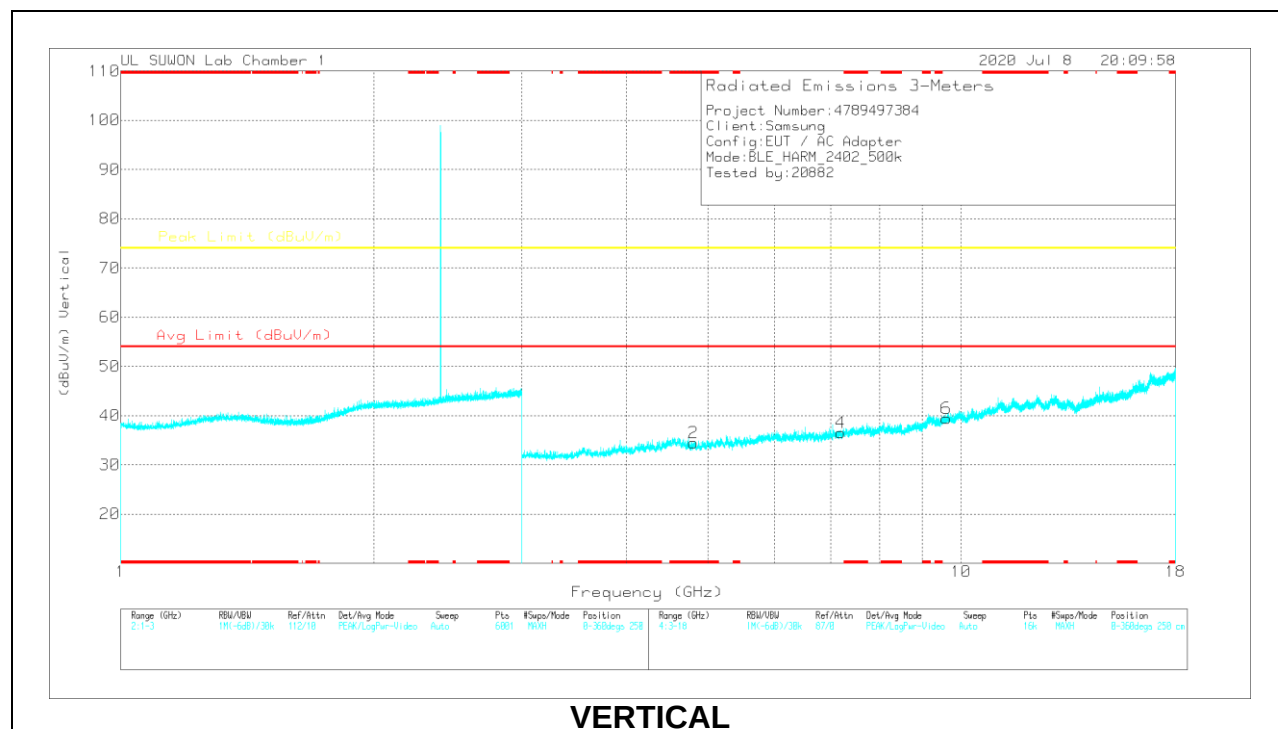
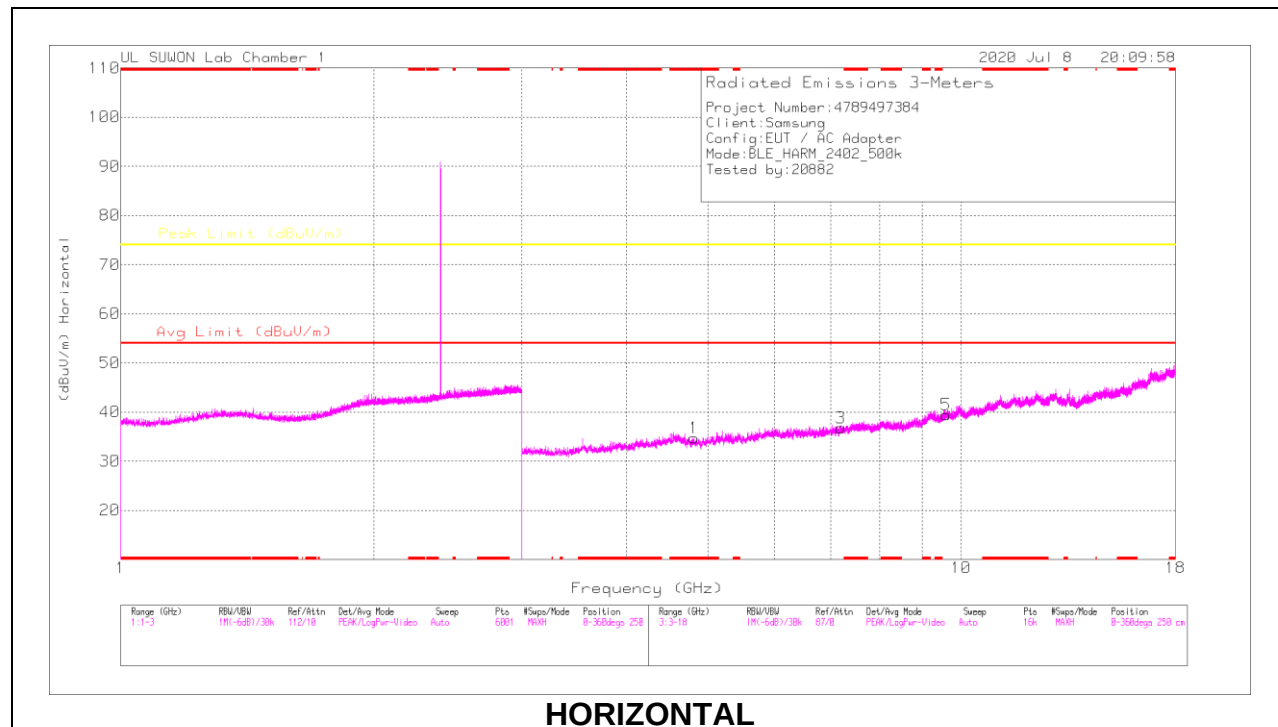
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



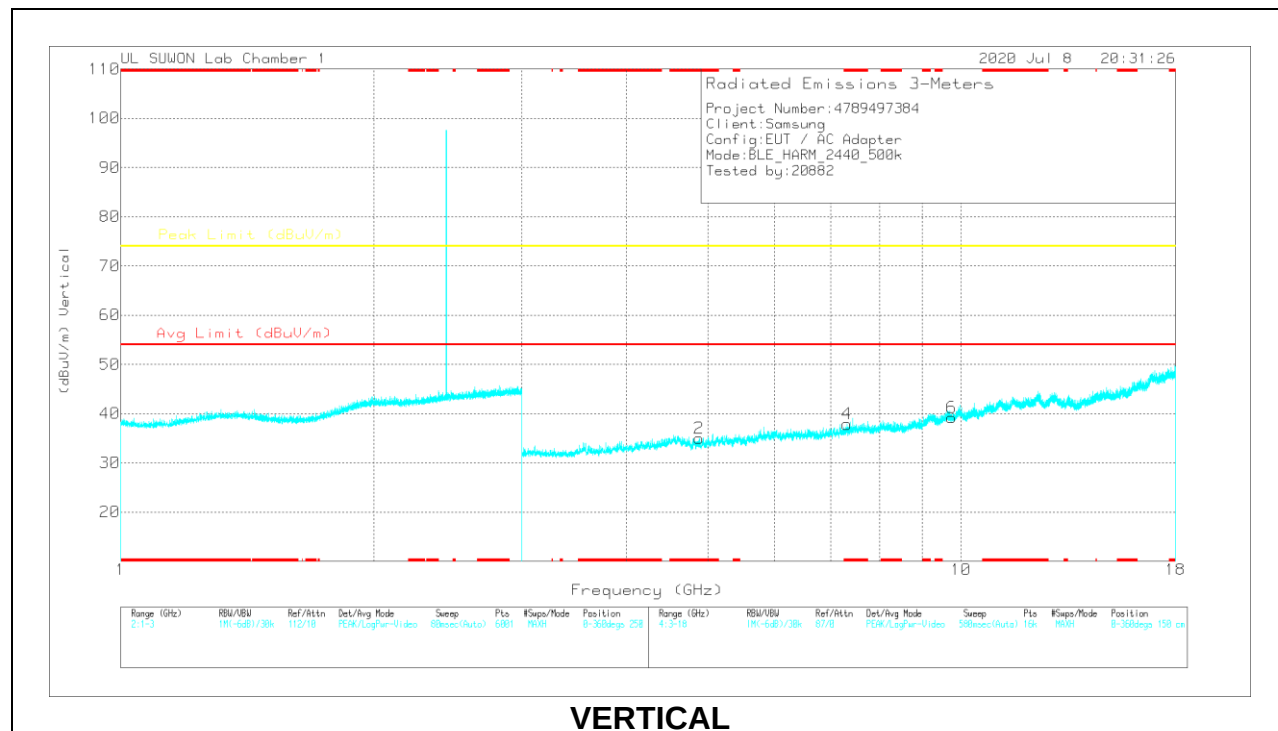
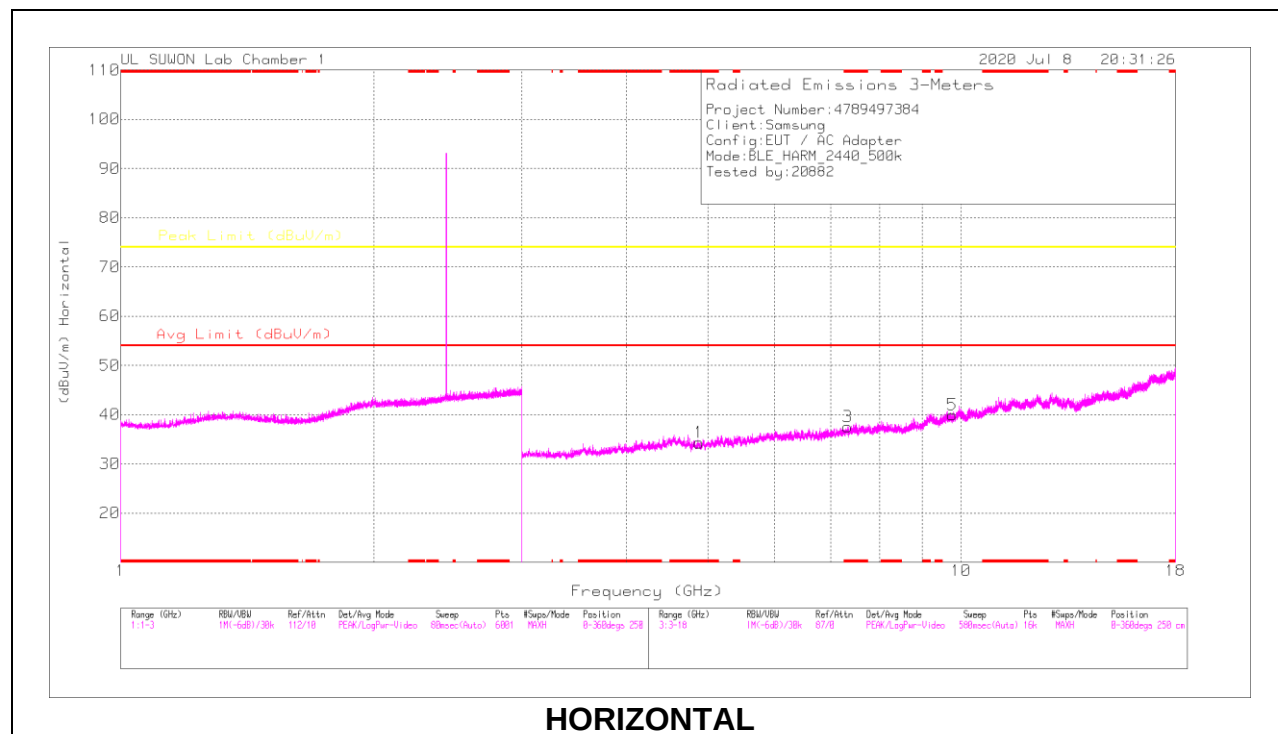
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.81395	41.59	PK2	34.2	-31.7	0	44.09	-	-	74	-29.91	0	100	H
* 4.80346	41.1	PK2	34.2	-31.5	0	43.8	-	-	74	-30.2	0	100	V
7.20411	37.29	PK2	35.8	-27.8	0	45.29	-	-	74	-28.71	0	100	H
7.20621	37.39	PK2	35.8	-27.8	0	45.39	-	-	74	-28.61	0	100	V
9.60833	34.7	PK2	37	-23.2	0	48.5	-	-	74	-25.5	0	100	H
9.60811	34.73	PK2	37	-23.2	0	48.53	-	-	74	-25.47	0	100	V

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

PK2 - KDB558074 Method: Maximum Peak

MID CHANNEL RESULTS



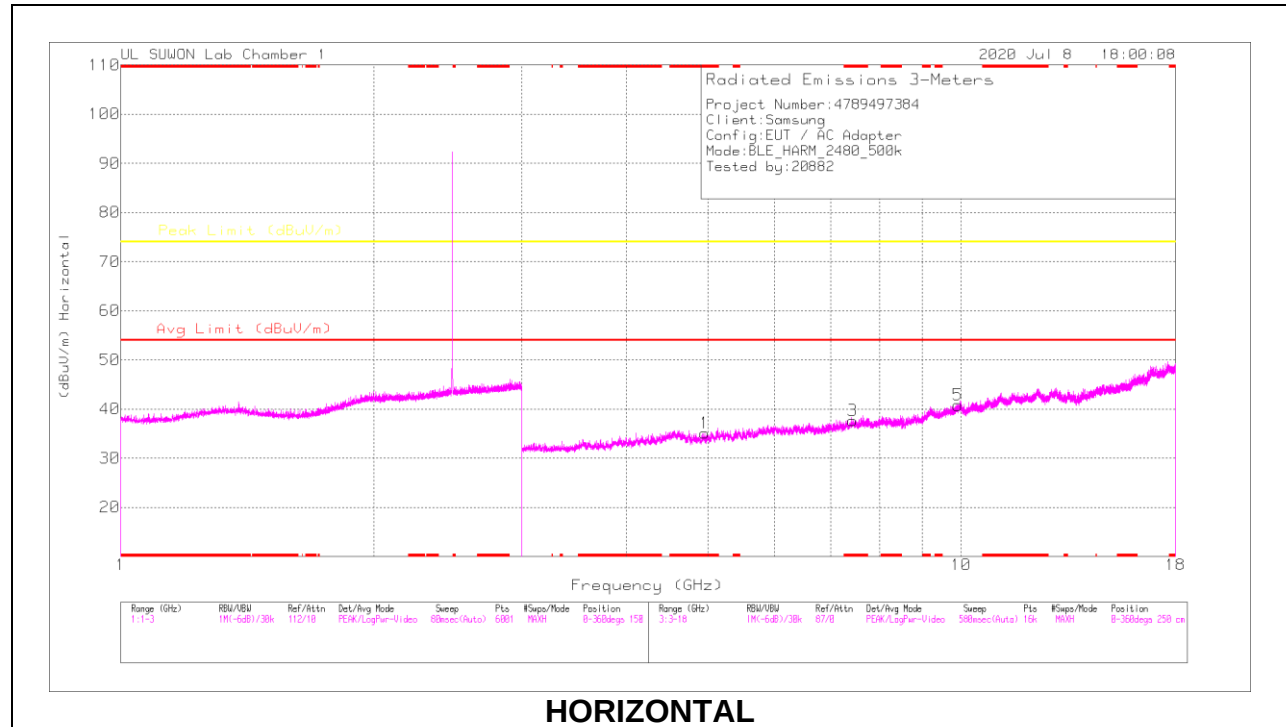
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.87983	41.05	PK2	34.2	-31.7	0	43.55	-	-	74	-30.45	0	100	H
* 4.88151	41.59	PK2	34.2	-31.6	0	44.19	-	-	74	-29.81	0	100	V
* 7.32081	38.03	PK2	35.8	-27.2	0	46.63	-	-	74	-27.37	0	100	H
* 7.31521	38.22	PK2	35.8	-27.4	0	46.62	-	-	74	-27.38	0	100	V
9.75921	34.97	PK2	37.2	-23.9	0	48.27	-	-	74	-25.73	0	100	H
9.76295	34.95	PK2	37.2	-23.9	0	48.25	-	-	74	-25.75	0	100	V

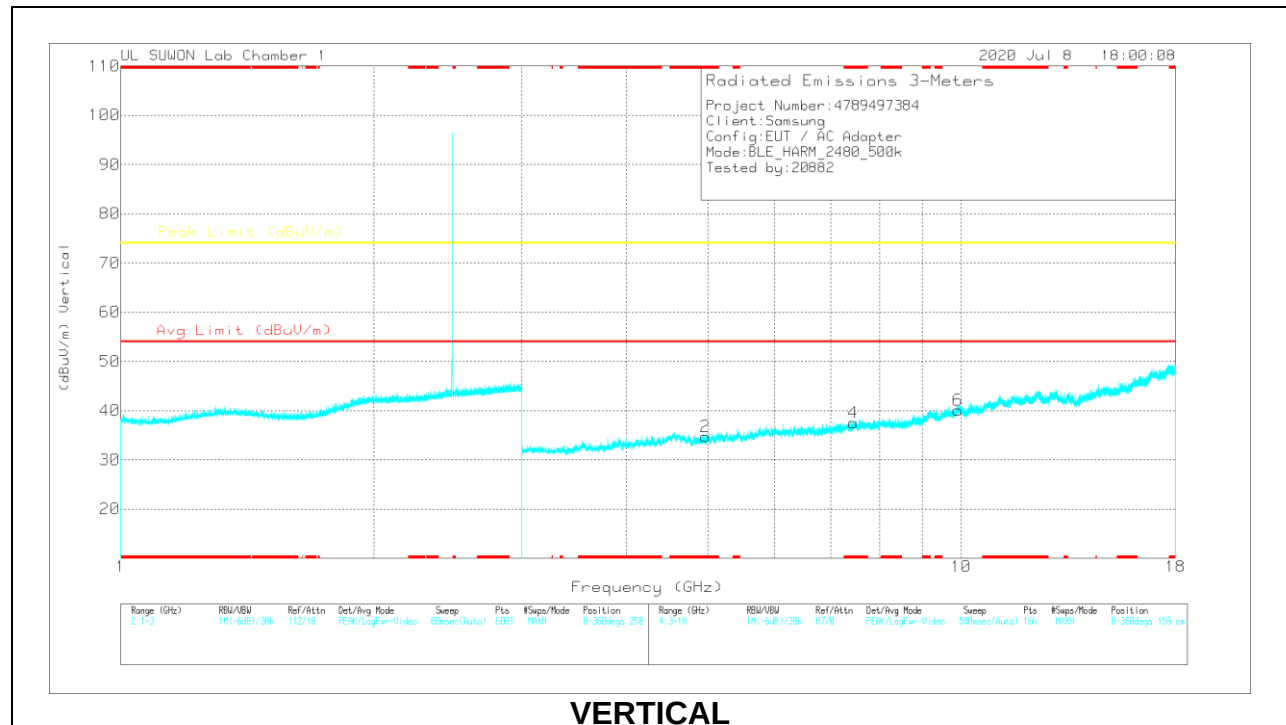
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.95094	40.76	PK2	34.2	-31.6	0	43.36	-	-	74	-30.64	0	100	H
* 4.95033	40.33	PK2	34.2	-31.6	0	42.93	-	-	74	-31.07	0	100	V
* 7.43872	37.55	PK2	35.8	-27.1	0	46.25	-	-	74	-27.75	0	100	H
* 7.43881	37.76	PK2	35.8	-27.1	0	46.46	-	-	74	-27.54	0	100	V
9.91812	34.83	PK2	37.5	-22.1	0	50.23	-	-	74	-23.77	0	100	H
9.92063	34.48	PK2	37.5	-22.1	0	49.88	-	-	74	-24.12	0	100	V

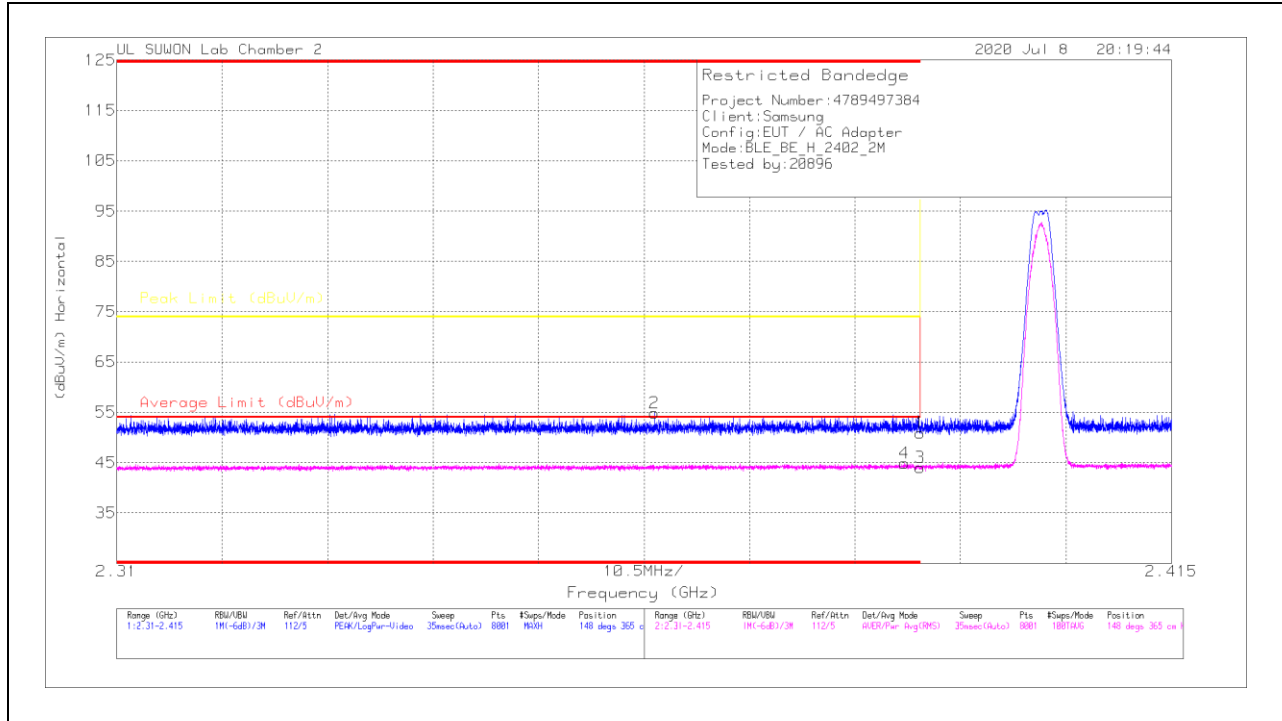
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

10.2.2. BLE (2Mbps)

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

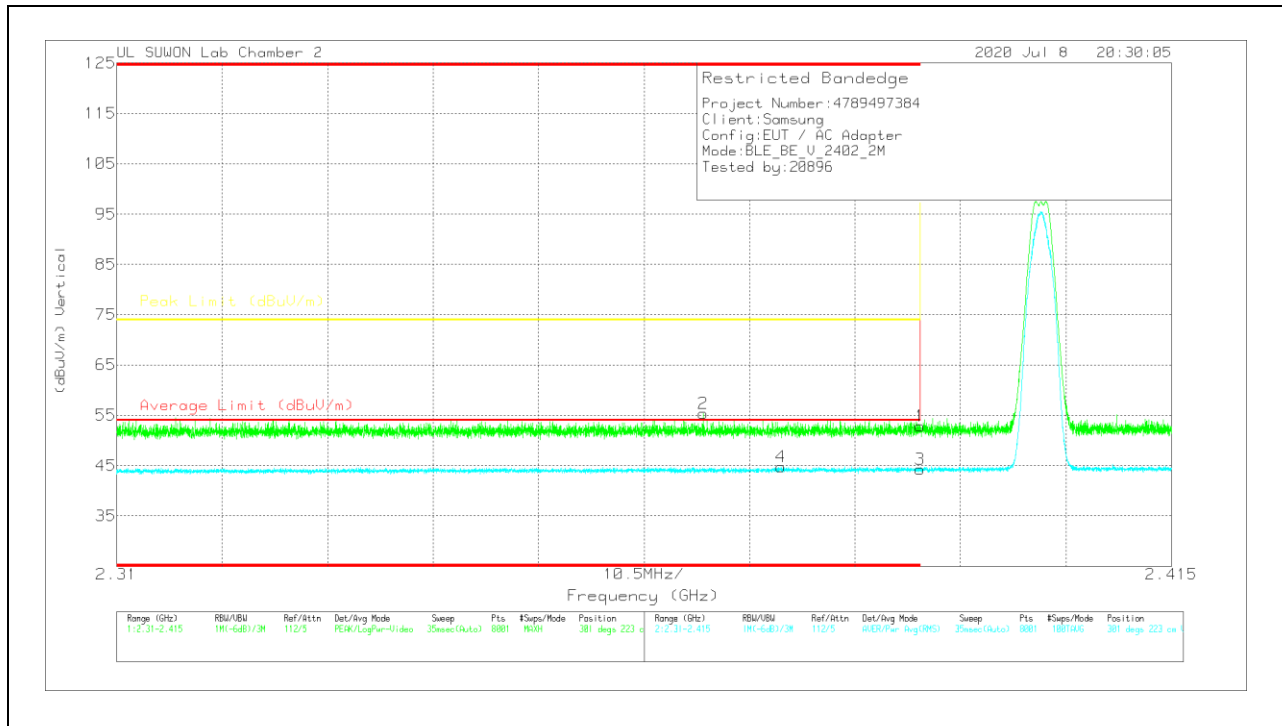
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Altitude (m)	Height (m)	Polarity
1	* 2.39	38.94	PK	31.6	-20.6	0	50.54	-	-	74	-23.06	148	365	H
2	* 2.36352	43.99	PK	31.6	-20.7	0	54.89	-	-	74	-19.11	148	365	H
3	* 2.39	30.65	RMS	31.6	-20.6	2.42	44.07	54	-9.93	-	-	148	365	H
4	* 2.38841	31.46	RMS	31.6	-20.6	2.42	44.88	54	-9.12	-	-	148	365	H

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

PK - Peak detector

RMS - RMS detection

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_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	41.86	PK	31.6	-20.6	0	52.86	-	-	74	-21.14	301	223	V
2	* 2.36837	44.42	PK	31.6	-20.6	0	55.42	-	-	74	-18.58	301	223	V
3	* 2.39	30.86	RMS	31.6	-20.6	2.42	44.28	54	-9.72	-	-	301	223	V
4	* 2.37615	31.38	RMS	31.6	-20.6	2.42	44.8	54	-9.2	-	-	301	223	V

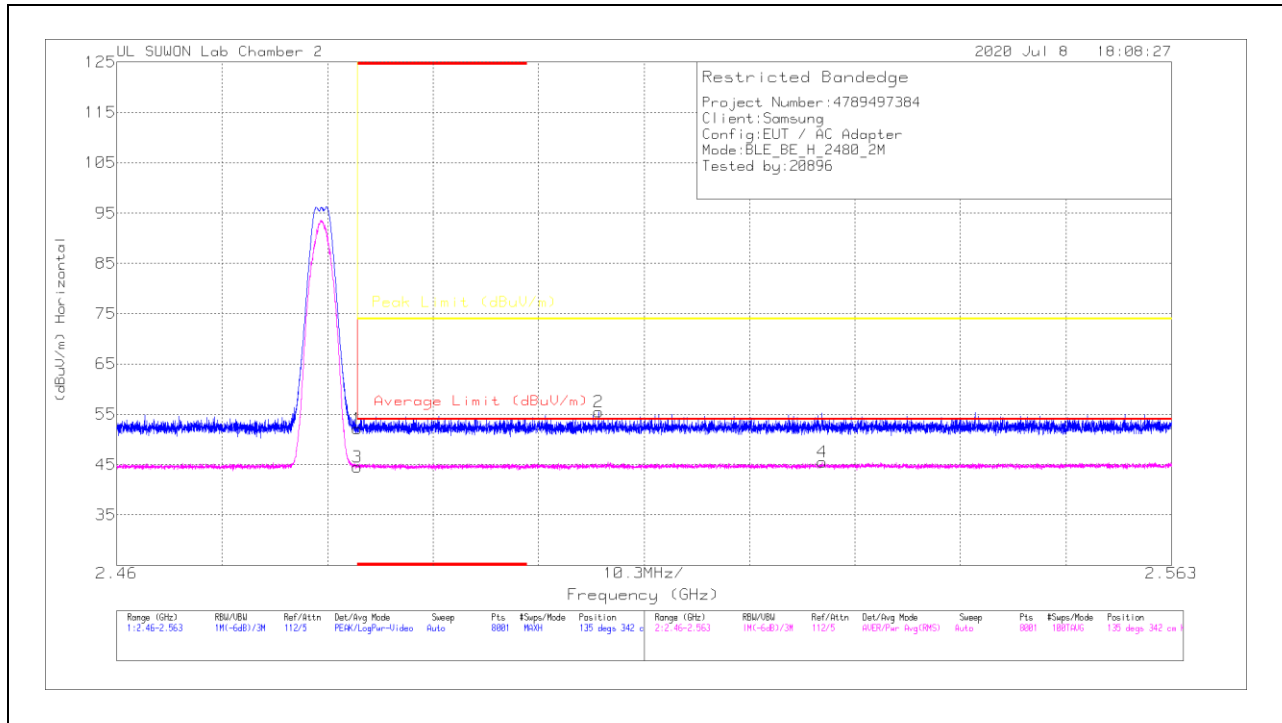
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

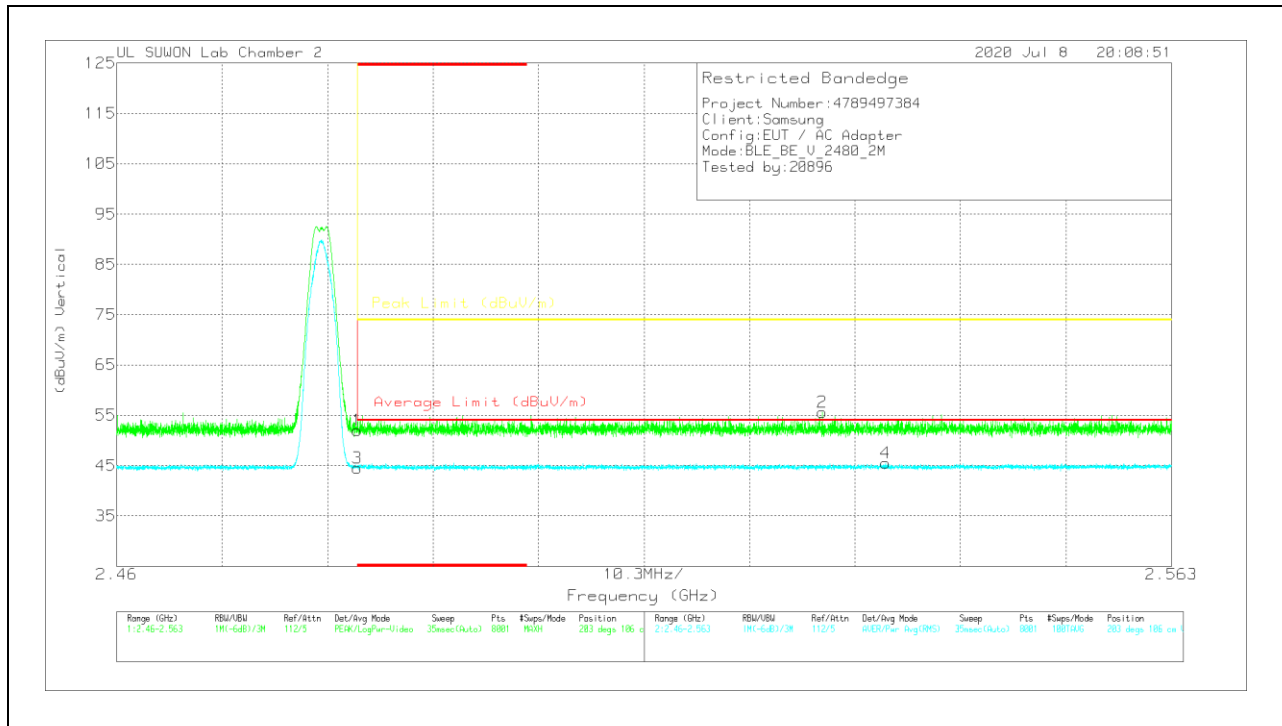


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00158724	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	40.59	PK	31.9	-20.4	0	52.09	-	-	74	-21.91	135	342	H
2	2.50705	43.97	PK	31.9	-20.4	0	55.47	-	-	74	-18.53	135	342	H
3	* 2.48351	30.65	RMS	31.9	-20.4	2.42	44.57	54	-9.43	-	-	135	342	H
4	2.52888	31.51	RMS	32	-20.4	2.42	45.53	54	-8.47	-	-	135	342	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	* 2.48251	40.49	PK	31.9	-20.4	0	51.99	-	-	74	-22.01	203	106	V
2	2.52889	44.03	PK	32	-20.4	0	55.63	-	-	74	-18.37	203	106	V
3	* 2.48351	30.6	RMS	31.9	-20.4	2.42	44.52	54	-9.48	-	-	203	106	V
4	2.53509	31.47	RMS	32	-20.4	2.42	45.49	54	-8.51	-	-	203	106	V

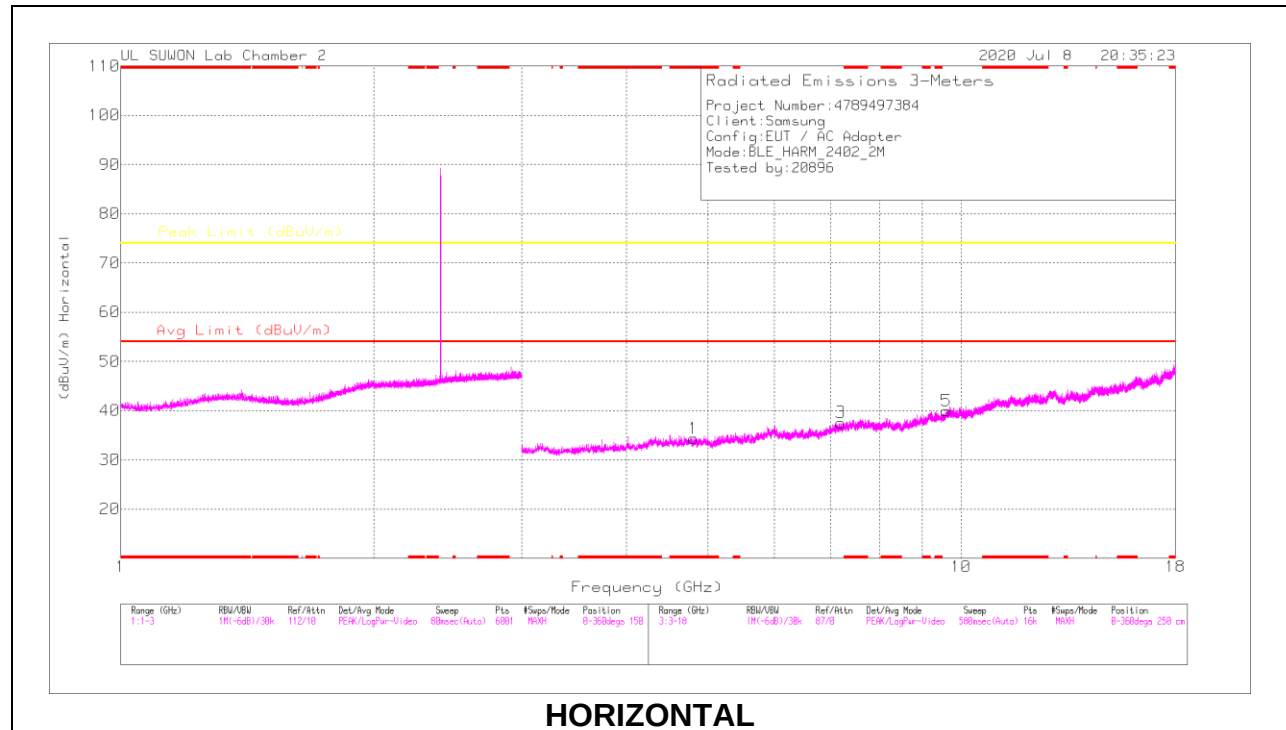
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

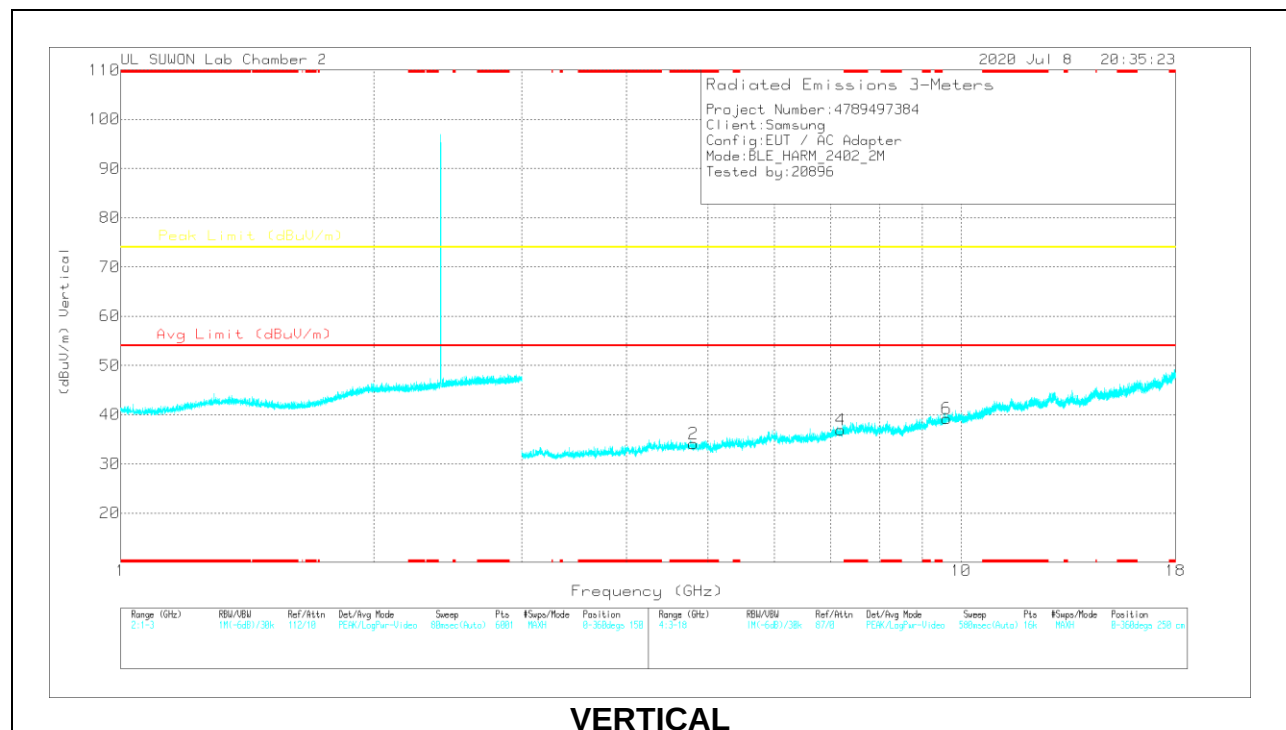
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

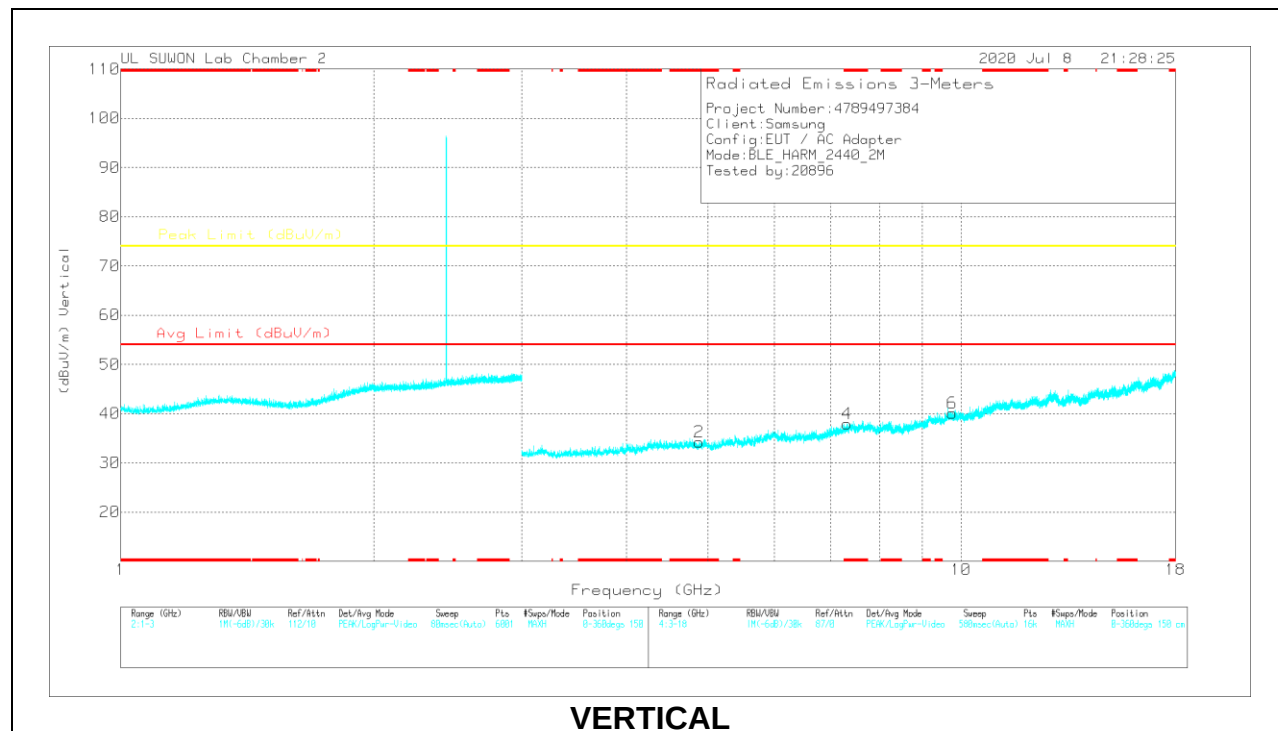
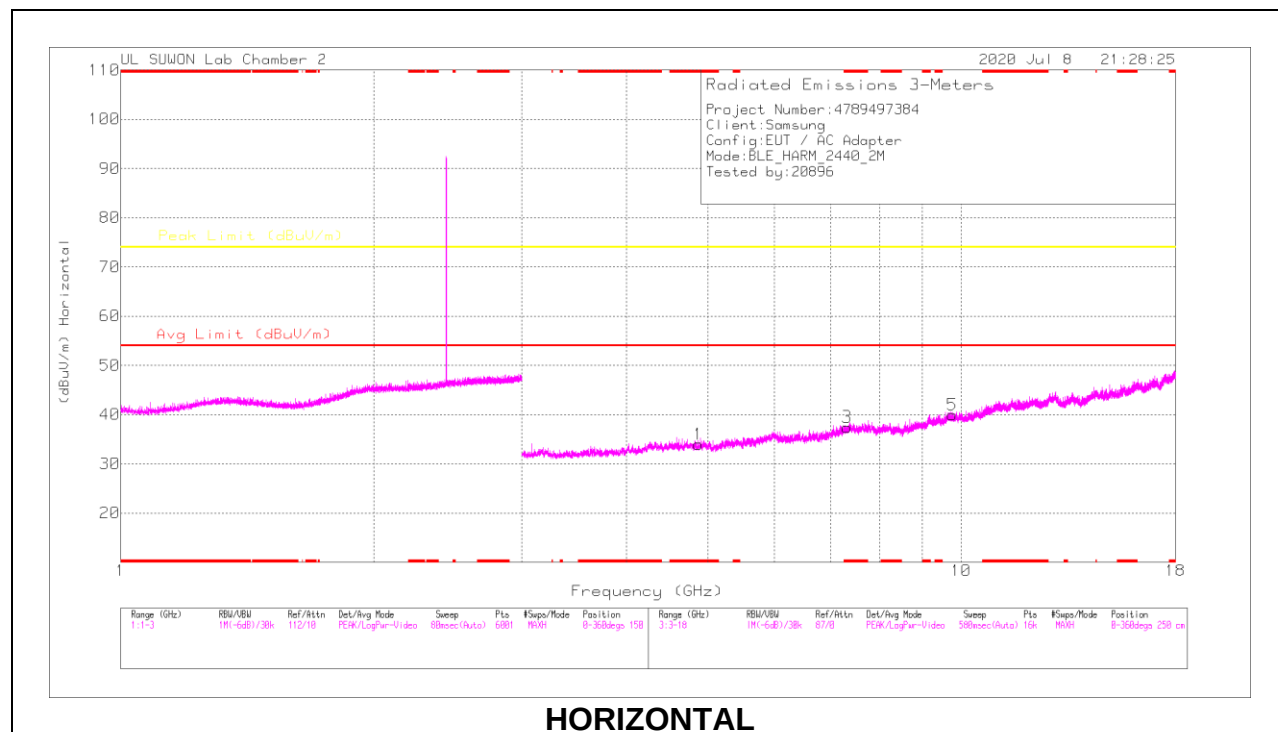
RADIATED EMISSIONS

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
* 4.80698	36.35	PK2	34	-28	0	42.35	-	-	74	-31.65	360	100	H
* 4.8065	36.29	PK2	34	-28	0	42.29	-	-	74	-31.71	360	100	V
7.19524	34.8	PK2	36.1	-25.2	0	45.7	-	-	74	-28.3	360	100	H
7.19501	35.16	PK2	36.1	-25.2	0	46.06	-	-	74	-27.94	360	100	V
9.60997	32.81	PK2	37	-21.7	0	48.11	-	-	74	-25.89	360	100	H
9.60658	33.15	PK2	37	-21.7	0	48.45	-	-	74	-25.55	360	100	V

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

PK2 - KDB558074 Method: Maximum Peak

MID CHANNEL RESULTS



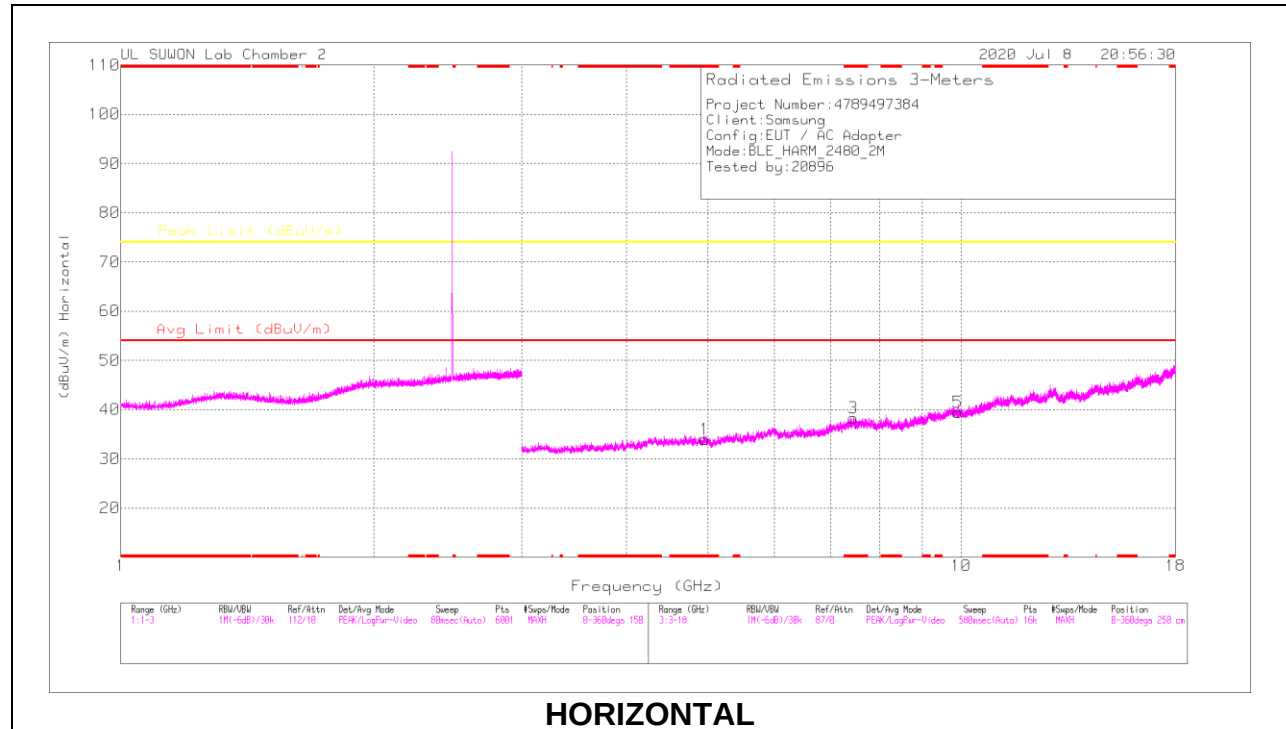
RADIATED EMISSIONS

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
* 4.8758	36.53	PK2	34	-27.9	0	42.63	-	-	74	-31.37	0	100	H
* 4.874	36.73	PK2	34	-27.9	0	42.83	-	-	74	-31.17	0	100	V
* 7.31411	35.4	PK2	36.2	-24.9	0	46.7	-	-	74	-27.3	0	100	H
* 7.31723	34.88	PK2	36.2	-24.8	0	46.28	-	-	74	-27.72	0	100	V
9.76007	32.32	PK2	37.2	-21.2	0	48.32	-	-	74	-25.68	0	100	H
9.76181	32.53	PK2	37.2	-21.2	0	48.53	-	-	74	-25.47	0	100	V

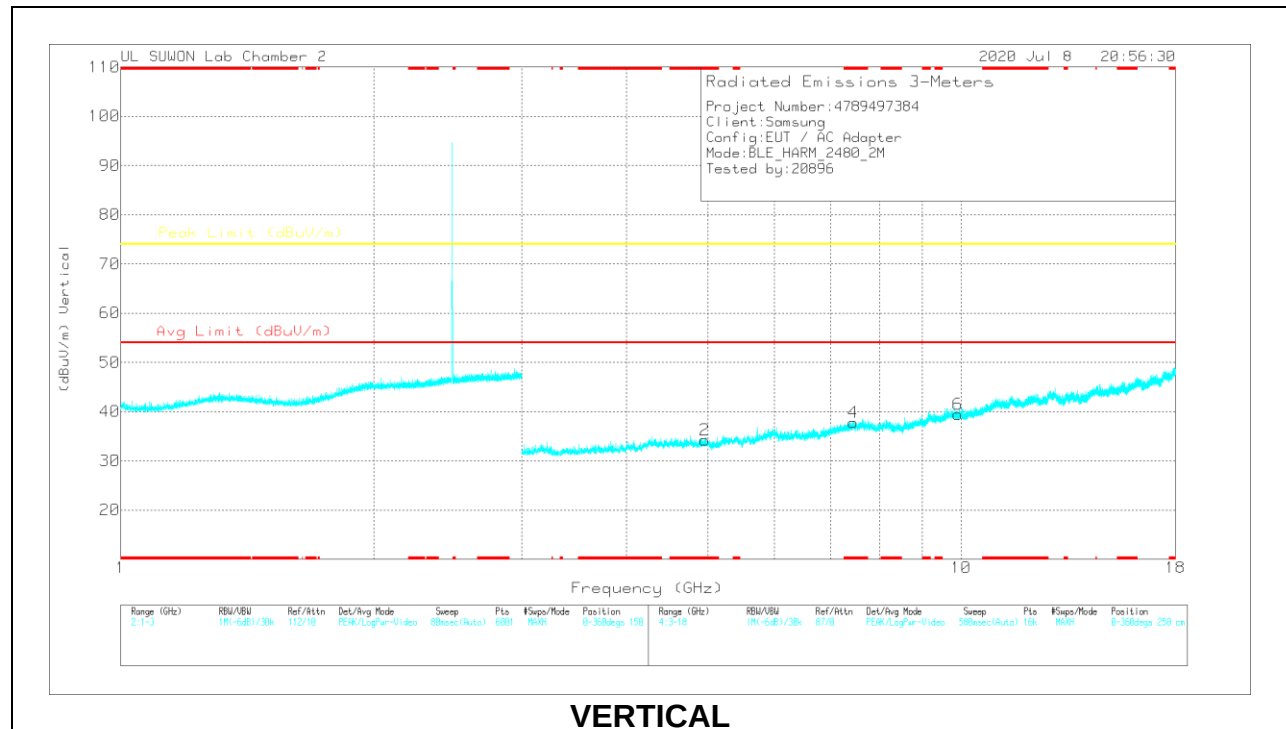
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

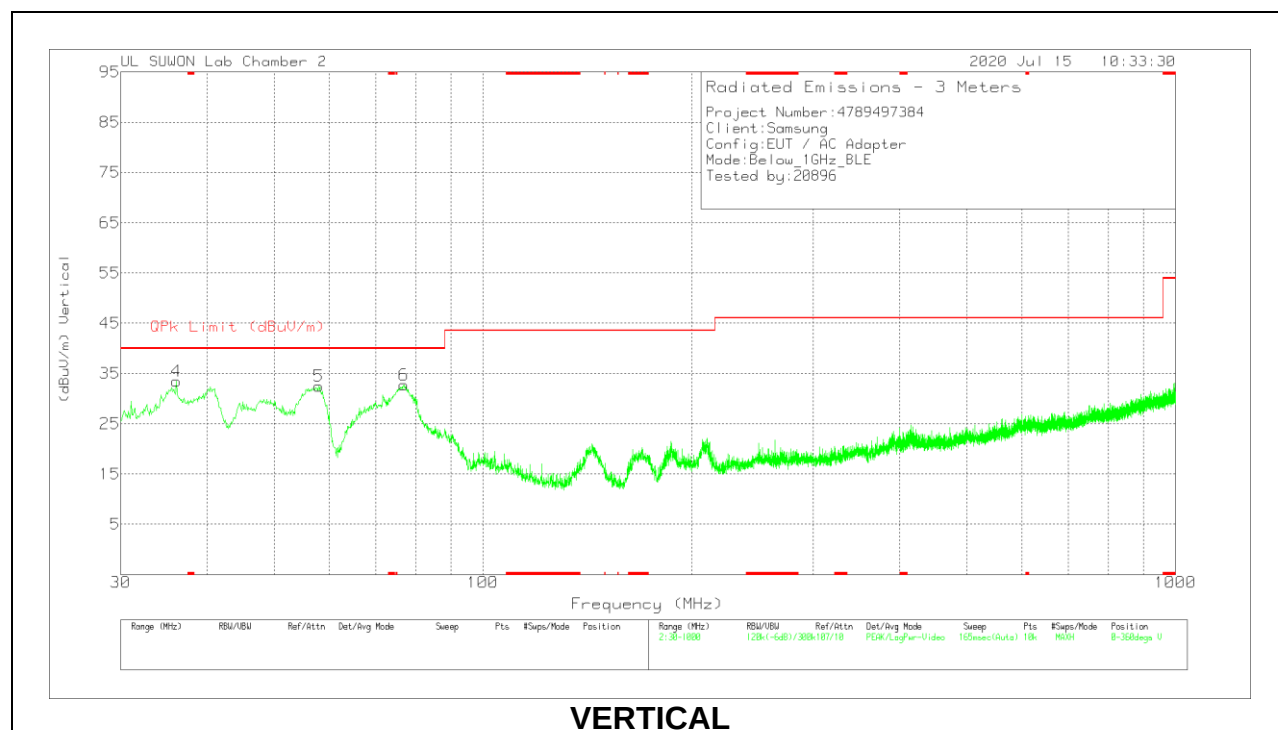
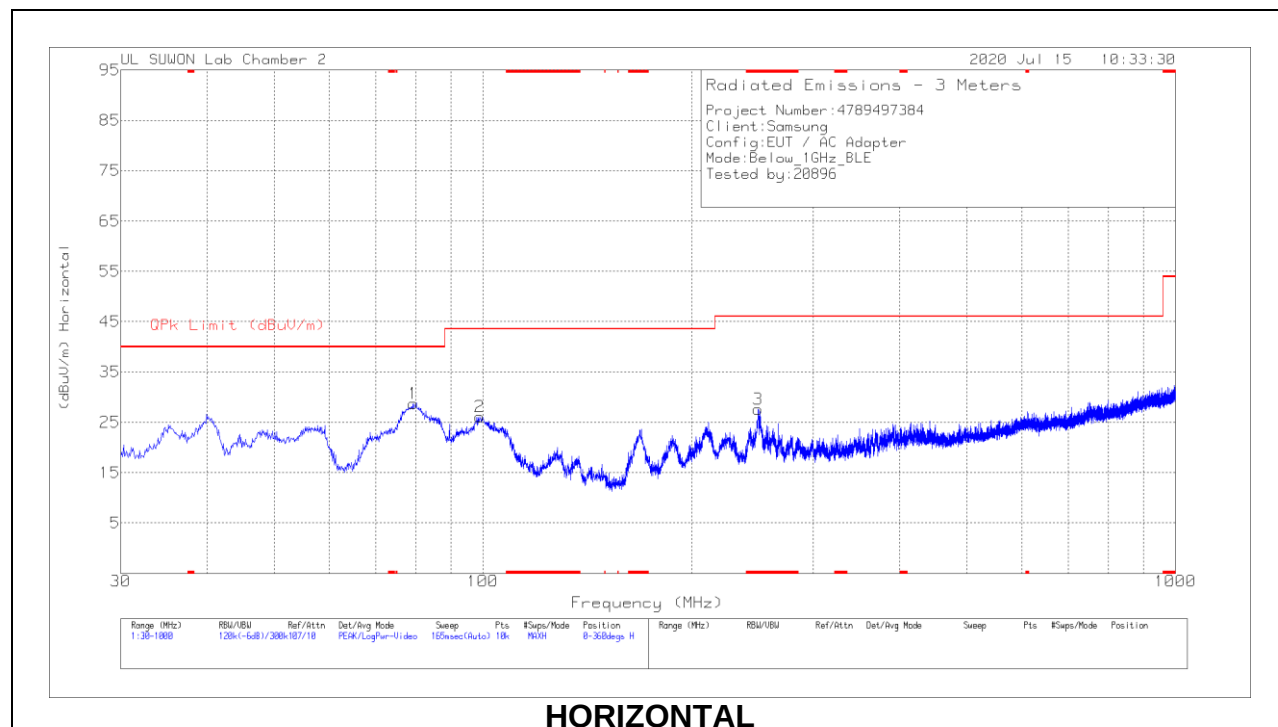
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.95826	35.91	PK2	34.1	-27	0	43.01	-	-	74	-30.99	360	100	H
* 4.9592	36.29	PK2	34.1	-27	0	43.39	-	-	74	-30.61	360	100	V
* 7.44332	34.44	PK2	36.2	-23.9	0	46.74	-	-	74	-27.26	360	100	H
* 7.44472	34.25	PK2	36.2	-23.9	0	46.55	-	-	74	-27.45	360	100	V
9.92185	31.99	PK2	37.4	-20.9	0	48.49	-	-	74	-25.51	360	100	H
9.92006	31.58	PK2	37.4	-20.9	0	48.08	-	-	74	-25.92	360	100	V

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

PK2 - KDB558074 Method: Maximum Peak

10.3. WORST CASE BELOW 1 GHZ

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



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	79.373	47.6	Pk	12.6	-31.5	28.7	40	-11.3	0-360	200	H
2	99.064	39.86	Pk	17.7	-31.4	26.16	43.52	-17.36	0-360	300	H
3	* 249.802	39.15	Pk	19	-30.5	27.65	46.02	-18.37	0-360	100	H
4	36.111	48.16	Pk	17.1	-31.8	33.46	40	-6.54	0-360	100	V
5	57.936	45.32	Pk	18.9	-31.7	32.52	40	-7.48	0-360	100	V
6	76.948	51.23	Pk	13	-31.5	32.73	40	-7.27	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

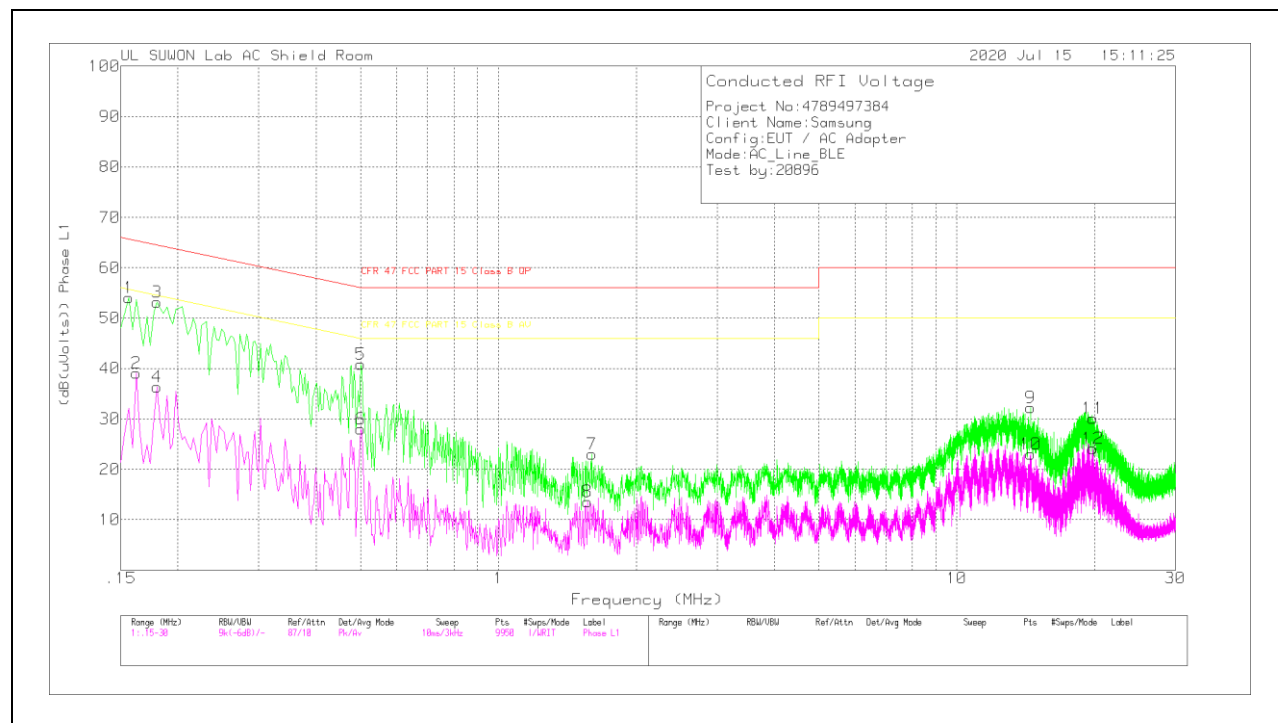
Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

RESULTS

11.1.1. AC Power Line

LINE 1 RESULTS



Trace Markers

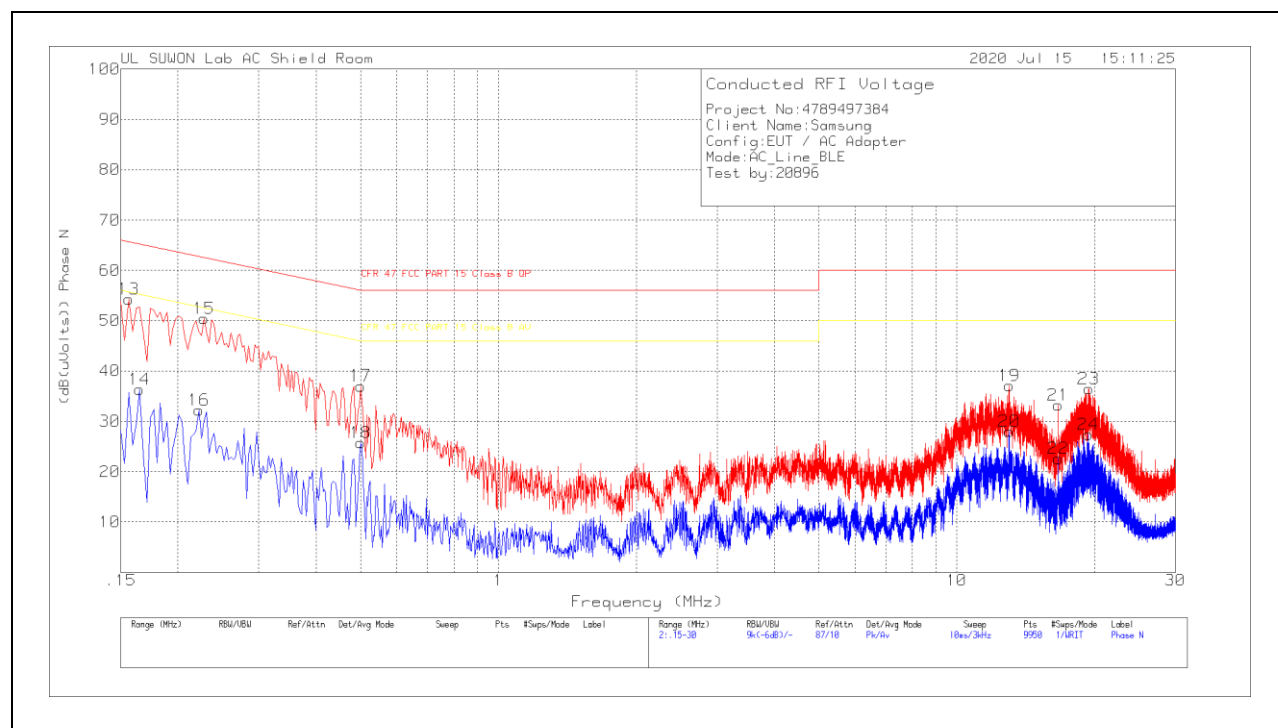
Range 1: Phase L1 .15 - 30MHz

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 OP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.156	43.99	Pk	9.9	.1	53.99	65.67	-11.68	-	-
2	.162	28.98	Av	10	.1	39.08	-	-	55.36	-16.28
3	.18	42.93	Pk	10	.2	53.13	64.49	-11.36	-	-
4	.18	26.19	Av	10	.2	36.39	-	-	54.49	-18.1
5	.501	30.71	Pk	9.9	.2	40.81	56	-15.19	-	-
6	.501	17.93	Av	9.9	.2	28.03	-	-	46	-17.97
7	1.599	12.88	Pk	9.8	.3	22.98	56	-33.02	-	-
8	1.566	3.5	Av	9.8	.3	13.6	-	-	46	-32.4
9	14.502	21.7	Pk	10.1	.4	32.2	60	-27.8	-	-
10	14.484	12.53	Av	10.1	.4	23.03	-	-	50	-26.97
11	19.827	19.43	Pk	10.3	.4	30.13	60	-29.87	-	-
12	19.827	13.47	Av	10.3	.4	24.17	-	-	50	-25.83

Pk - Peak detector

Av - Average detection

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	44.32	Pk	9.9	.1	54.32	65.67	-11.35	-	-
14	.165	26.27	Av	10	.1	36.37	-	-	55.21	-18.84
15	.228	40.41	Pk	9.8	.2	50.41	62.52	-12.11	-	-
16	.222	22.23	Av	9.8	.2	32.23	-	-	52.74	-20.51
17	.501	26.93	Pk	9.9	.2	37.03	56	-18.97	-	-
18	.501	15.61	Av	9.9	.2	25.71	-	-	46	-20.29
19	13.005	26.58	Pk	10.1	.4	37.08	60	-22.92	-	-
20	13.005	17.52	Av	10.1	.4	28.02	-	-	50	-21.98
21	16.647	22.6	Pk	10.2	.4	33.2	60	-26.8	-	-
22	16.647	11.98	Av	10.2	.4	22.58	-	-	50	-27.42
23	19.398	25.76	Pk	10.3	.4	36.46	60	-23.54	-	-
24	19.365	16.73	Av	10.3	.4	27.43	-	-	50	-22.57

Pk - Peak detector

Av - Average detection

END OF TEST REPORT