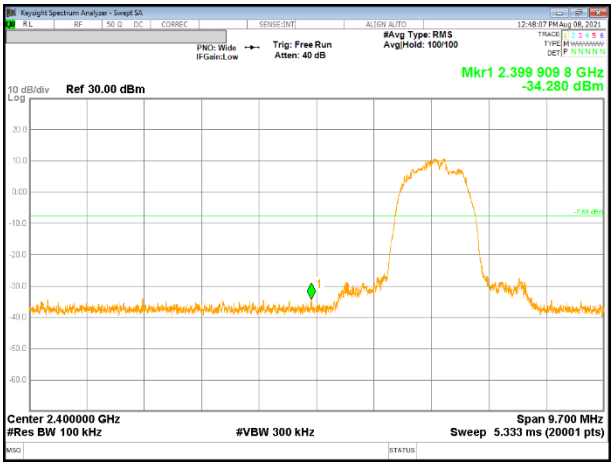
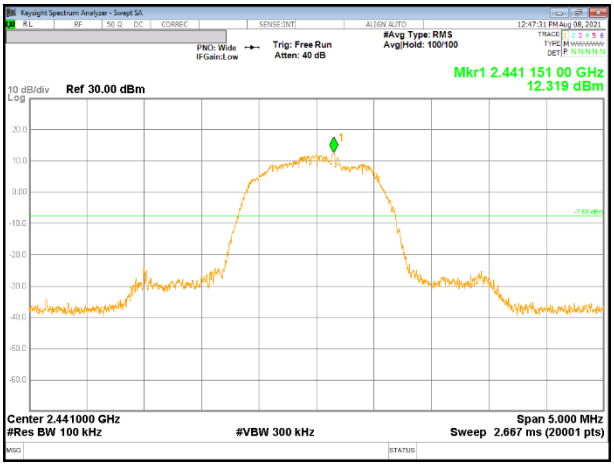
9.8.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

SPURIOUS EMISSIONS, NON-HOPPING(Antenna 1)



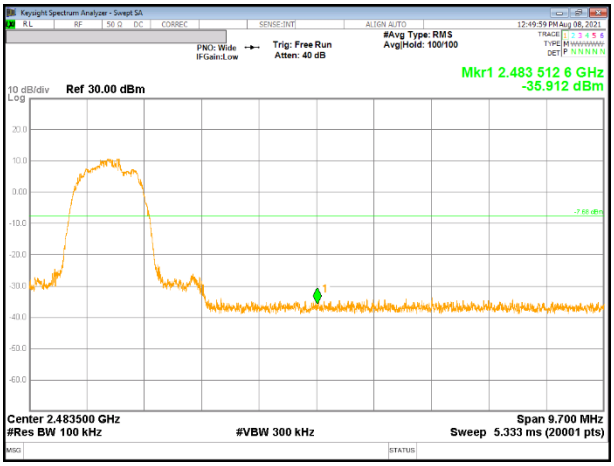
0 CHANNEL BANDEDGE

OUT-OF-BAND 0 CHANNEL



IN-BAND REFERENCE LEVEL

OUT-OF-BAND 39 CHANNEL



78 CHANNEL BANDEDGE

OUT-OF-BAND 78 CHANNEL

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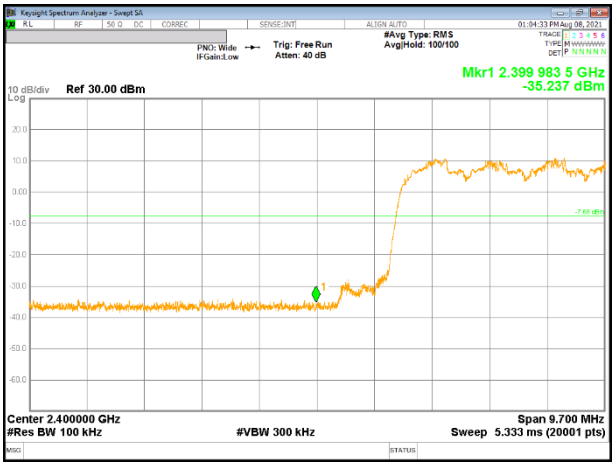
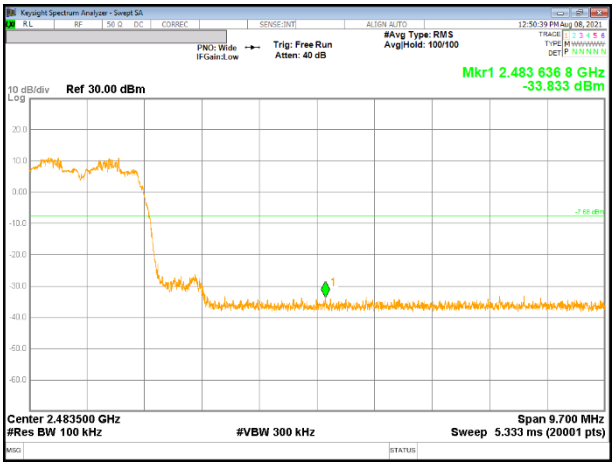
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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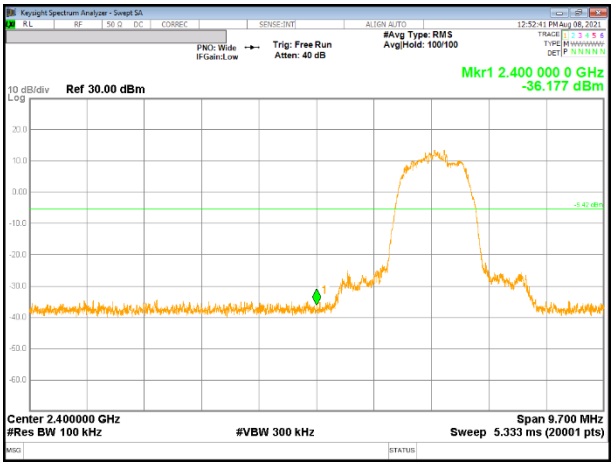
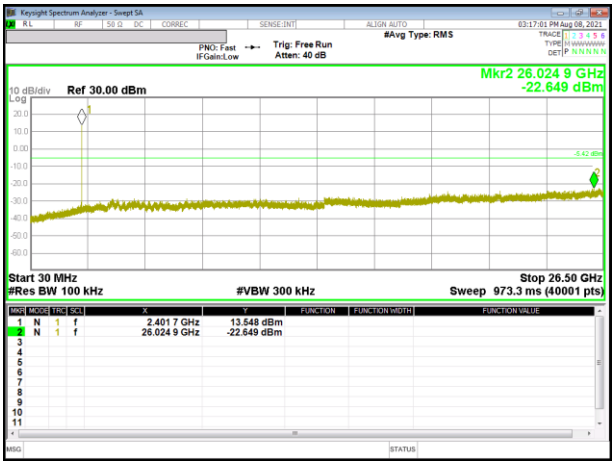
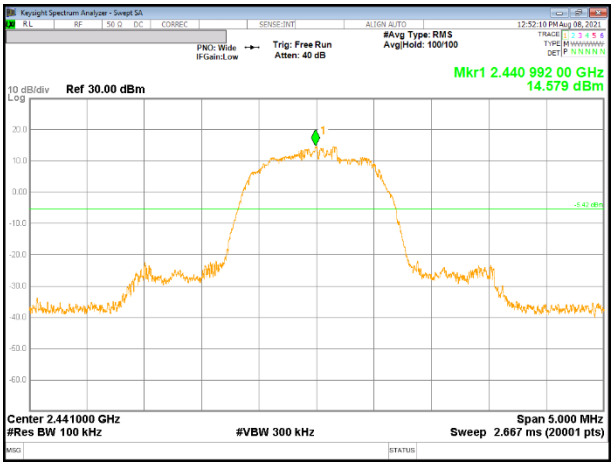
SPURIOUS EMISSIONS, NON-HOPPING(Antenna 2)



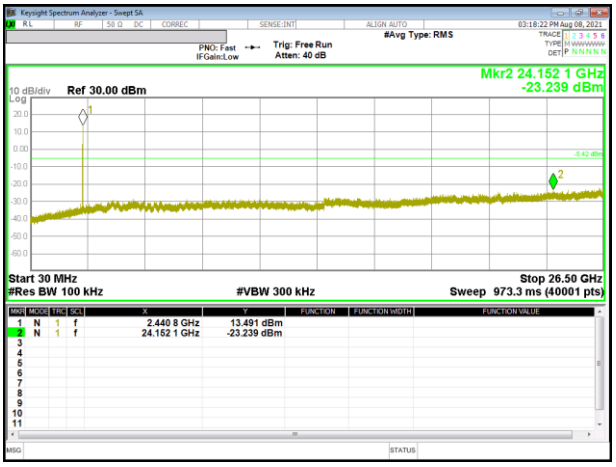
0 CHANNEL BANDEDGE



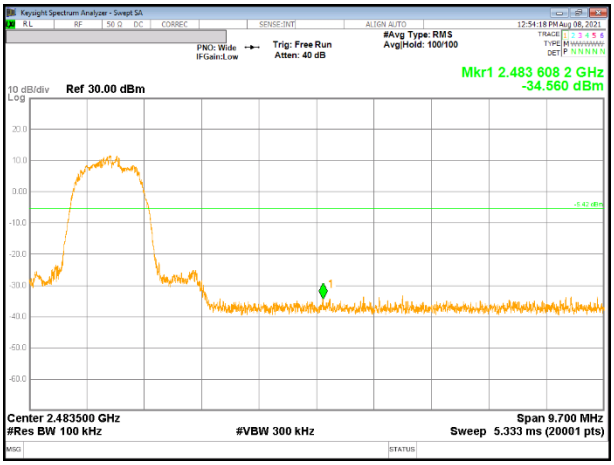
OUT-OF-BAND 0 CHANNEL



IN-BAND REFERENCE LEVEL



OUT-OF-BAND 39 CHANNEL



78 CHANNEL BANDEDGE

OUT-OF-BAND 78 CHANNEL

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C(04)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
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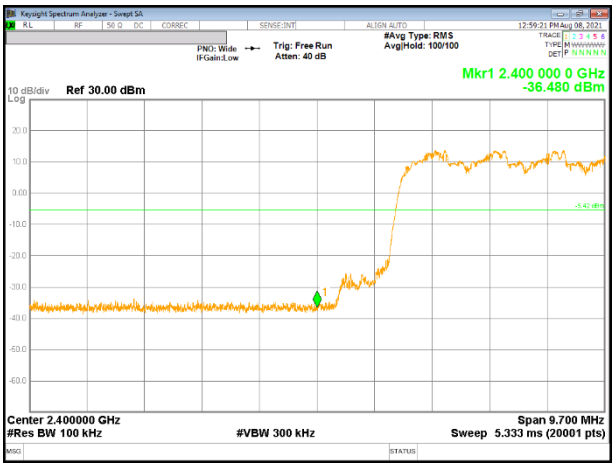
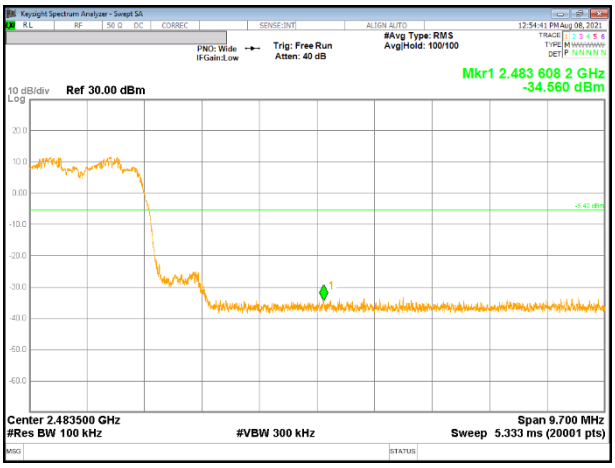
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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10. RADIATED TEST RESULTS

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.

FCC Part 15.205 (a) : Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.52525	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	156.7 ~ 156.9	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	162.0125 ~	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	167.17	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	167.72 ~ 173.2	2655 ~ 2900		
8.291 ~ 8.294	37.5 ~ 38.25	240 ~ 285	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	322 ~ 335.4	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	399.90 ~ 410	3345.8 ~ 3358		
		608 ~ 614	3600 ~ 4400		
		960 ~ 1240			

▪ FCC Part 15.205(b) : The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

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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 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; the video bandwidth is set to 3 MHz for peak measurements.(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.)

For band edge 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 1/T (on time) for average measurement.

GFSK = 1/T = 1 / 0.002874s = 348Hz.

The minimum VBW was 348Hz, but test receiver(ESU40) couldn’t set value 348Hz. Due to this reason, testing VBW was set to 500Hz(Worst cases).

The spectrum from 1GHz 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.

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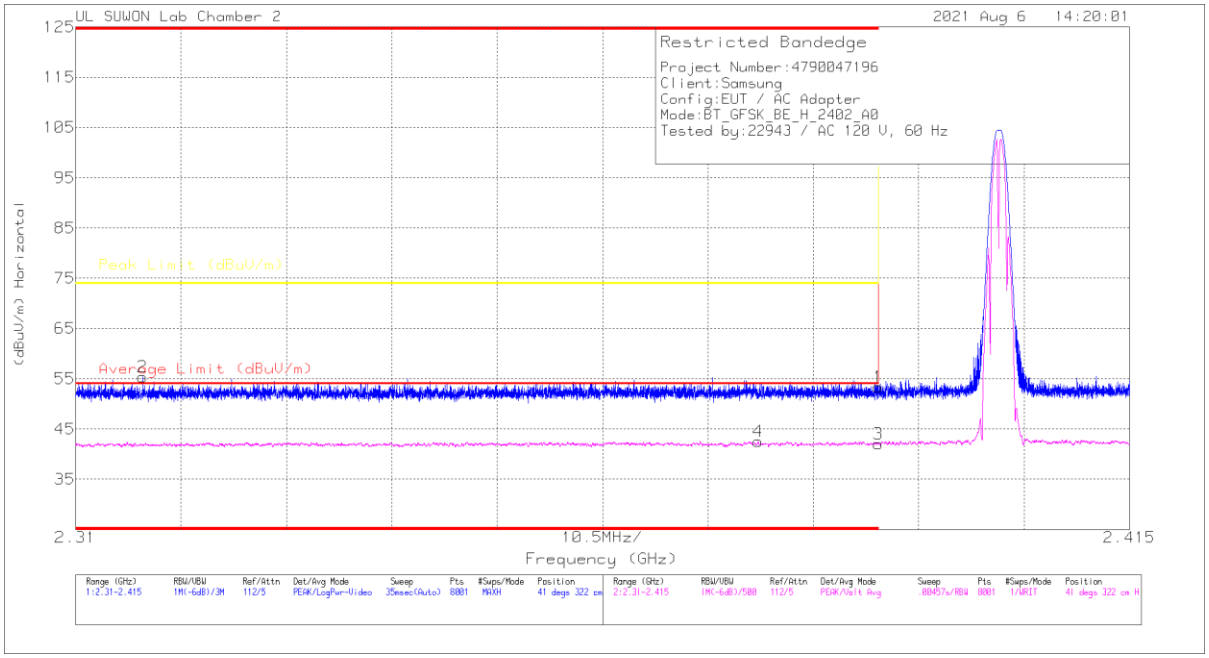
10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Antenna 1 BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.72	Pk	31.9	-20.3	53.32	-	-	74	-20.68	41	322	H
2	* 2.31665	44.21	Pk	31.7	-20.5	55.41	-	-	74	-18.59	41	322	H
3	* 2.39	30.47	VA1T	31.9	-20.3	42.07	54	-11.93	-	-	41	322	H
4	* 2.37797	31.11	VA1T	31.9	-20.5	42.51	54	-11.49	-	-	41	322	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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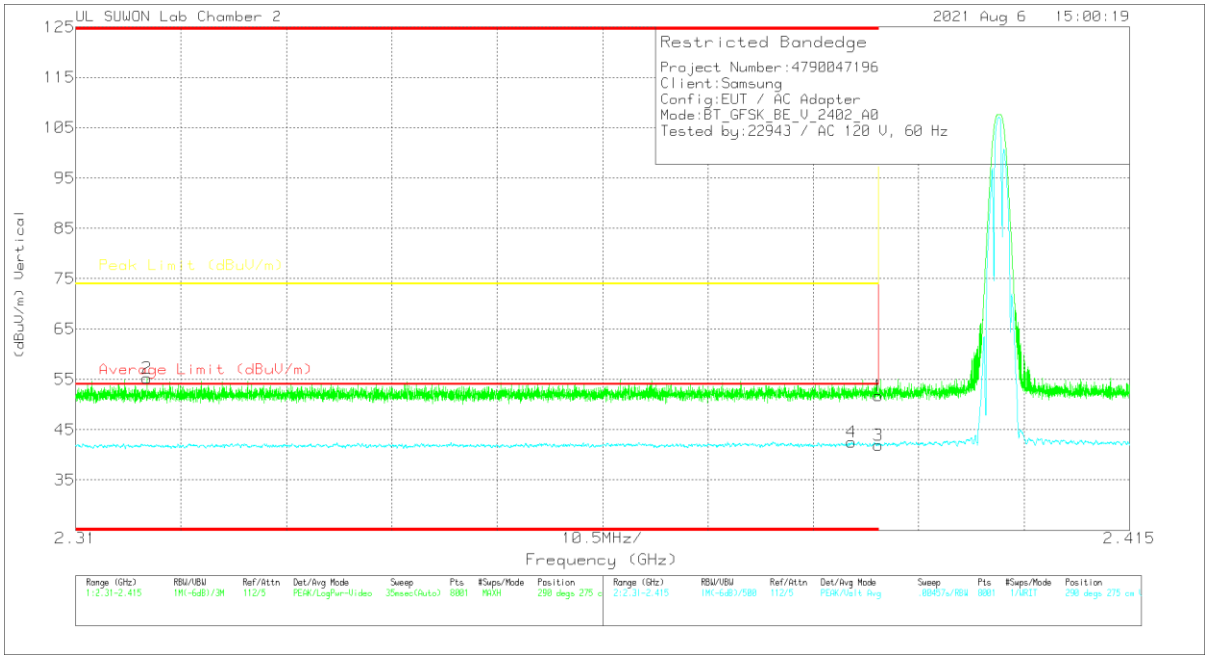
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	40.19	Pk	31.9	-20.3	51.79	-	-	74	-22.21	290	275	V
2	* 2.3171	44.03	Pk	31.7	-20.5	55.23	-	-	74	-18.77	290	275	V
3	* 2.39	30.29	VA1T	31.9	-20.3	41.89	54	-12.11	-	-	290	275	V
4	* 2.38732	30.85	VA1T	31.9	-20.2	42.55	54	-11.45	-	-	290	275	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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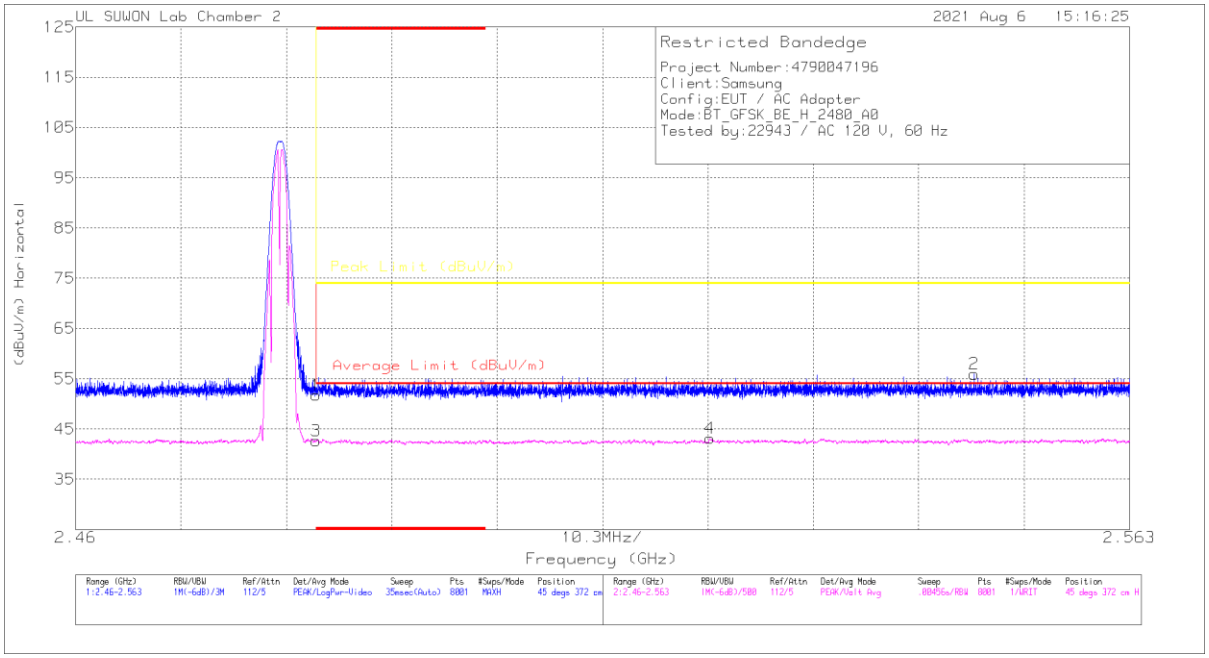
Antenna 1 BANDEDGE (78 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	Pk	32	-20.2	51.8	-	-	74	-22.2	45	372	H
2	2.54781	43.93	Pk	32.1	-20.1	55.93	-	-	74	-18.07	45	372	H
3	* 2.48351	30.89	VA1T	32	-20.2	42.69	54	-11.31	-	-	45	372	H
4	2.52199	31.1	VA1T	32.1	-20.1	43.1	54	-10.9	-	-	45	372	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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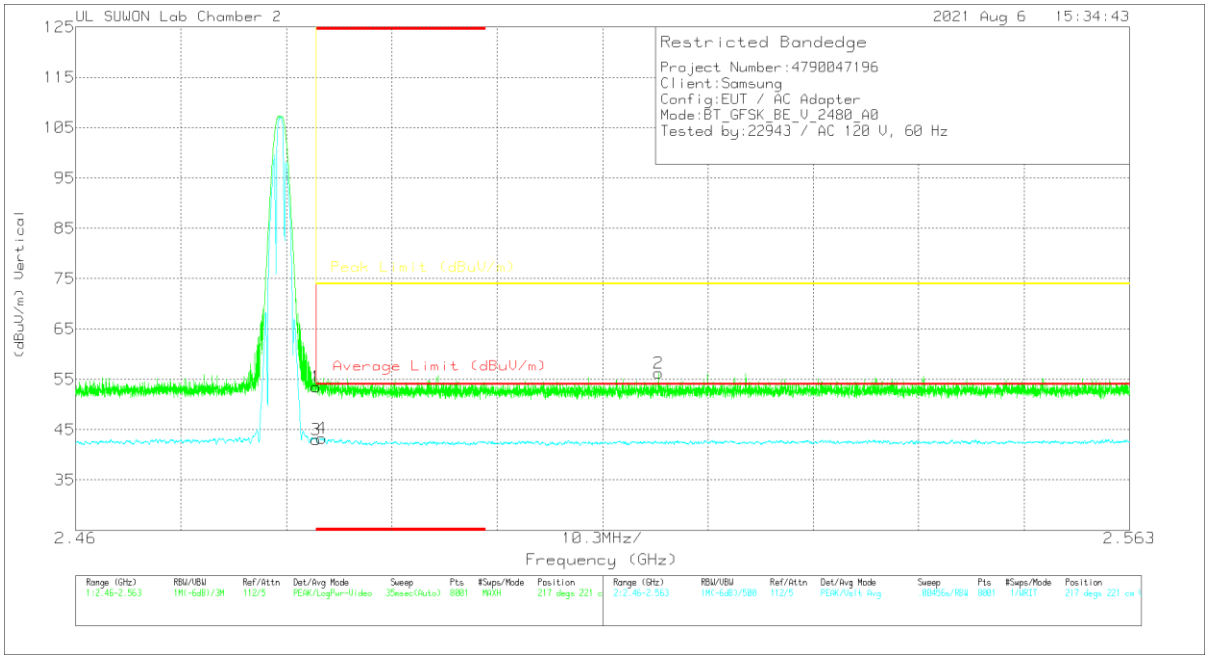
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	41.73	Pk	32	-20.2	53.53	-	-	74	-20.47	217	221	V
2	2.51697	44.32	Pk	32.1	-20.2	56.22	-	-	74	-17.78	217	221	V
3	* 2.48351	31.26	VA1T	32	-20.2	43.06	54	-10.94	-	-	217	221	V
4	* 2.48406	31.47	VA1T	32	-20.2	43.27	54	-10.73	-	-	217	221	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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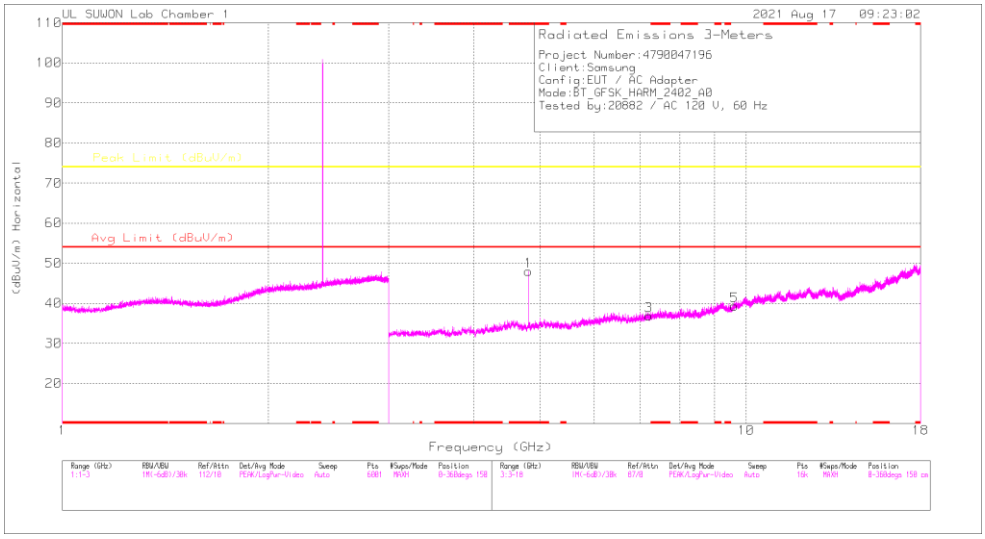
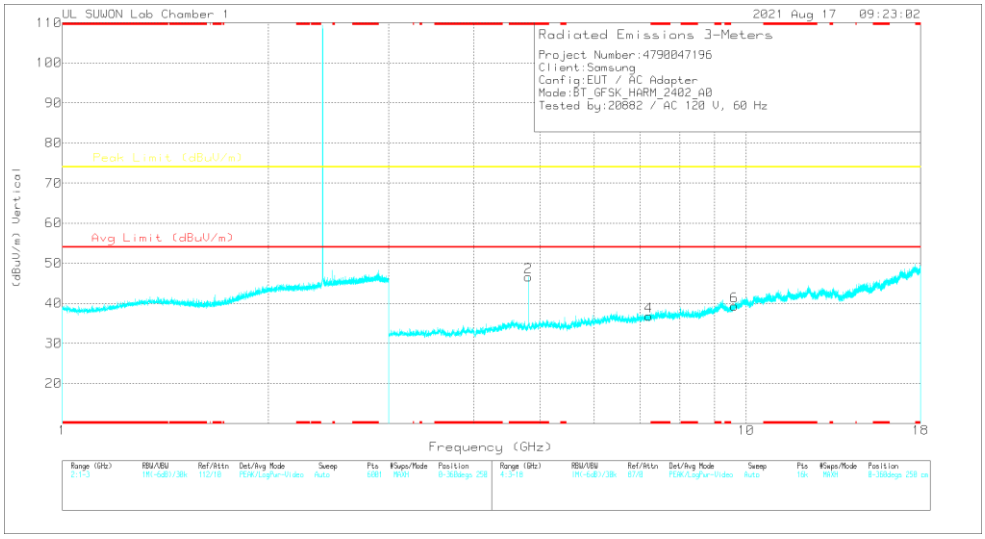
HARMONICS AND SPURIOUS EMISSIONS

Antenna 1 / 0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.8037	48.77	PKFH	34.1	-31.5	51.37	-	-	74	-22.63	124	103	H
* 4.80405	44.85	VA1T	34.1	-31.5	47.45	54	-6.55	-	-	124	103	H
* 4.80421	47.4	PKFH	34.1	-31.5	50	-	-	74	-24	96	147	V
* 4.80395	43.6	VA1T	34.1	-31.5	46.2	54	-7.8	-	-	96	147	V
7.21046	35.34	PKFH	35.9	-27.6	43.64	-	-	74	-30.36	0	100	H
7.20713	36.52	PKFH	35.9	-27.7	44.72	-	-	74	-29.28	0	100	V
9.61199	32.79	PKFH	37.1	-23.1	46.79	-	-	74	-27.21	0	100	H
9.61227	31.87	PKFH	37.1	-23.1	45.87	-	-	74	-28.13	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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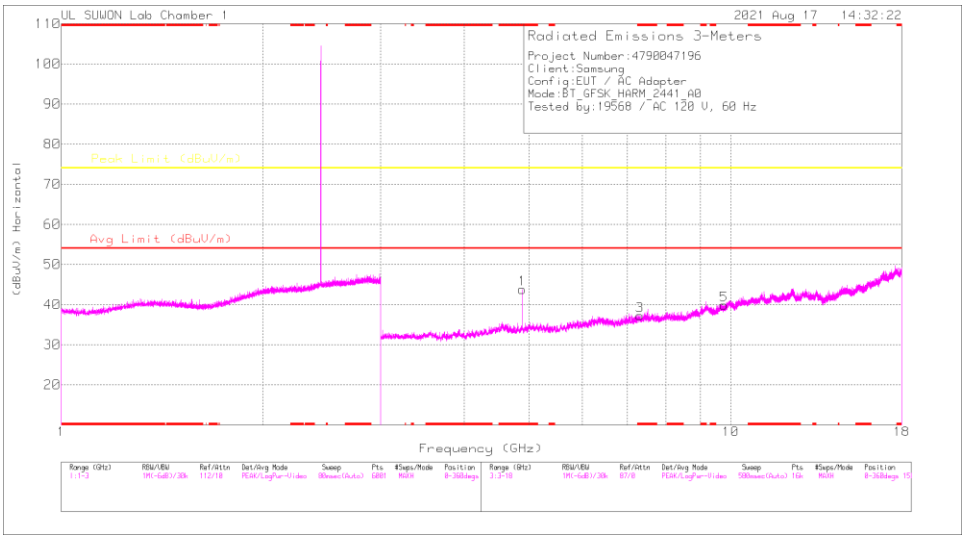
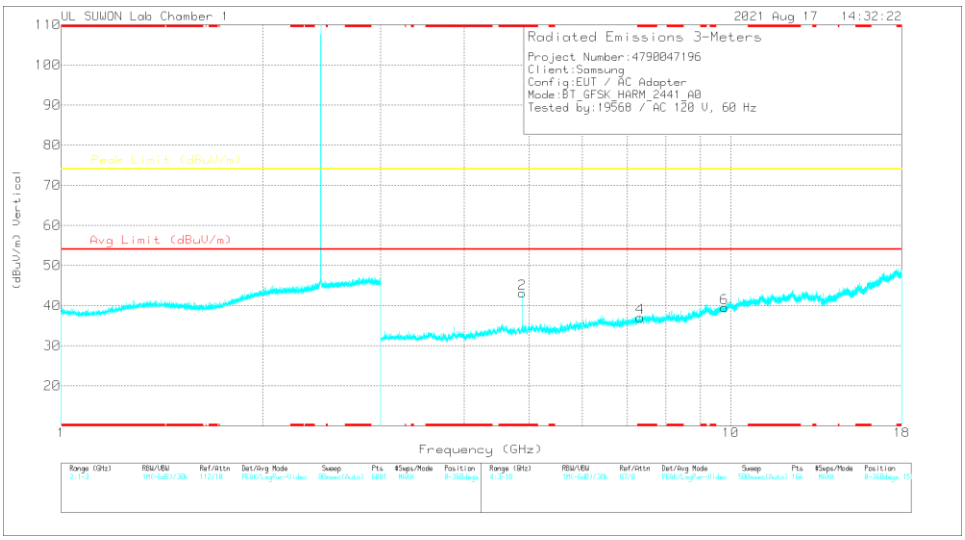
Antenna 1 / 39 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88204	46.18	PKFH	34.1	-31.3	48.98	-	-	74	-25.02	112	192	H
* 4.88214	41.06	VA1T	34.1	-31.3	43.86	54	-10.14	-	-	112	192	H
* 4.88213	45.75	PKFH	34.1	-31.3	48.55	-	-	74	-25.45	93	145	V
* 4.88197	40.56	VA1T	34.1	-31.3	43.36	54	-10.64	-	-	93	145	V
* 7.31411	36.21	PKFH	35.8	-27.4	44.61	-	-	74	-29.39	0	100	H
* 7.31153	35.89	PKFH	35.8	-27.4	44.29	-	-	74	-29.71	0	100	V
9.77024	32.9	PKFH	37.5	-23.8	46.6	-	-	74	-27.4	0	100	H
9.77111	32.61	PKFH	37.5	-23.7	46.41	-	-	74	-27.59	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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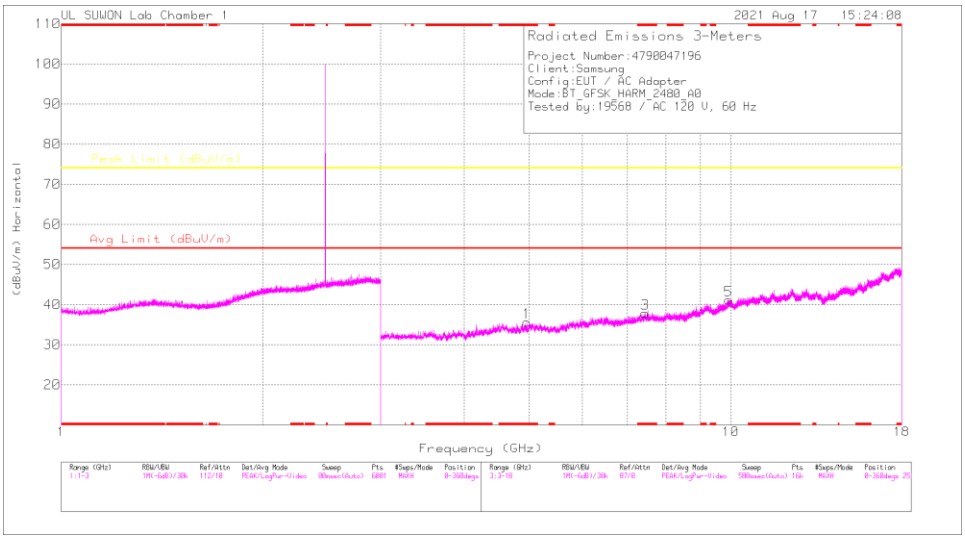
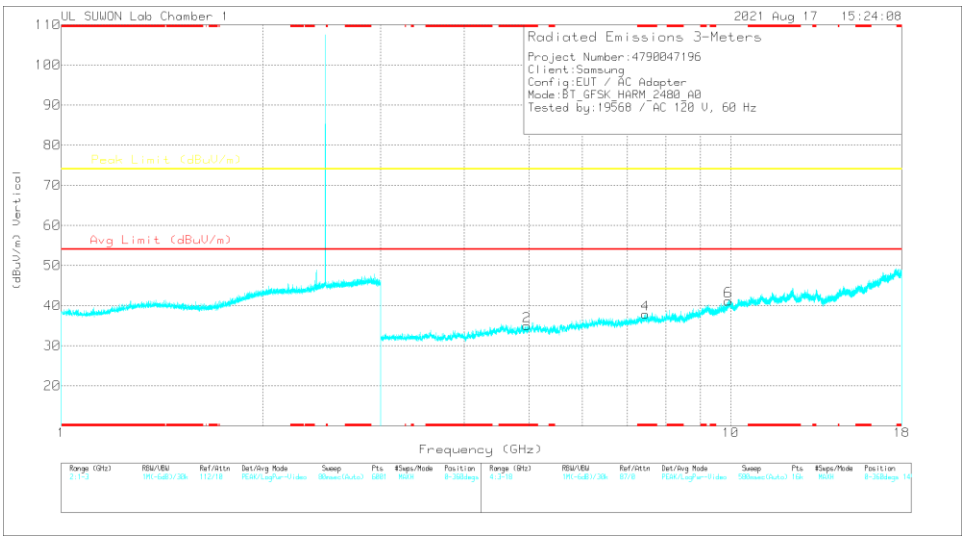
Antenna 1 / 78 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.96028	39.57	PKFH	34.1	-31.5	42.17	-	-	74	-31.83	0	100	H
* 4.9598	39.01	PKFH	34.1	-31.4	41.71	-	-	74	-32.29	0	100	V
* 7.44676	34.77	PKFH	35.8	-26.9	43.67	-	-	74	-30.33	0	100	H
* 7.44577	35.6	PKFH	35.8	-26.9	44.5	-	-	74	-29.5	0	100	V
9.91284	31.6	PKFH	37.7	-21.7	47.6	-	-	74	-26.4	0	100	H
9.91624	31.94	PKFH	37.7	-21.6	48.04	-	-	74	-25.96	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

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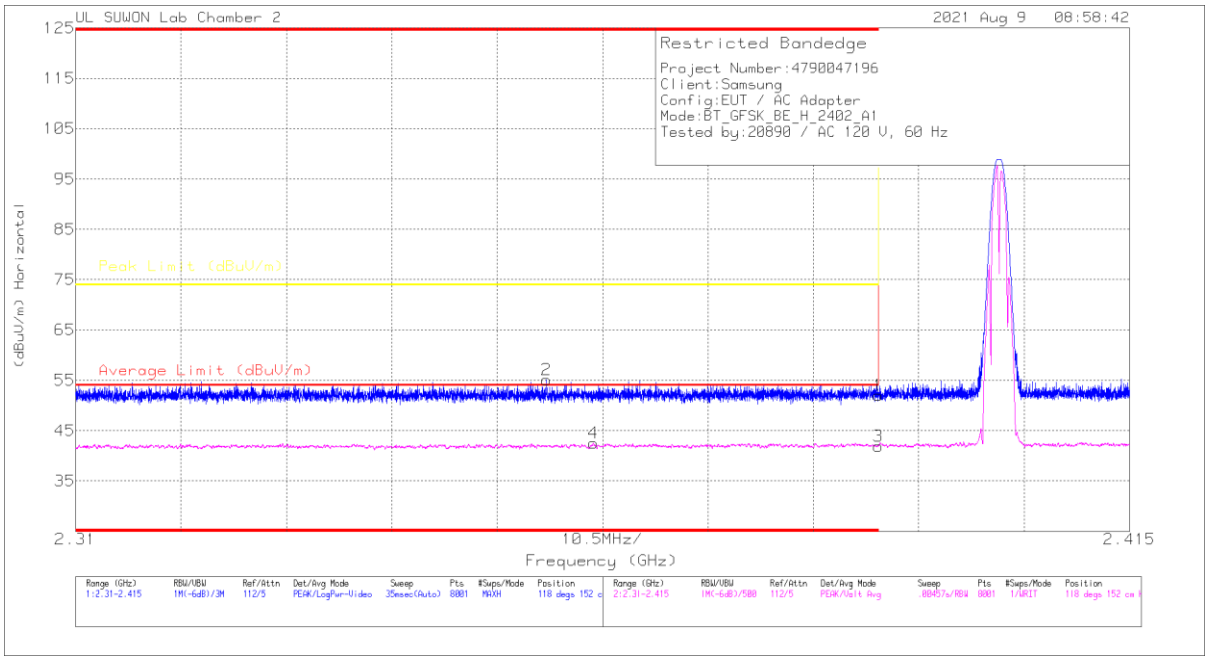
Antenna 2 BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	31.9	-20.3	51.99	-	-	74	-22.01	118	152	H
2	* 2.35694	43.7	Pk	31.8	-20.4	55.1	-	-	74	-18.9	118	152	H
3	* 2.39	30.36	VA1T	31.9	-20.3	41.96	54	-12.04	-	-	118	152	H
4	* 2.36159	31.19	VA1T	31.8	-20.5	42.49	54	-11.51	-	-	118	152	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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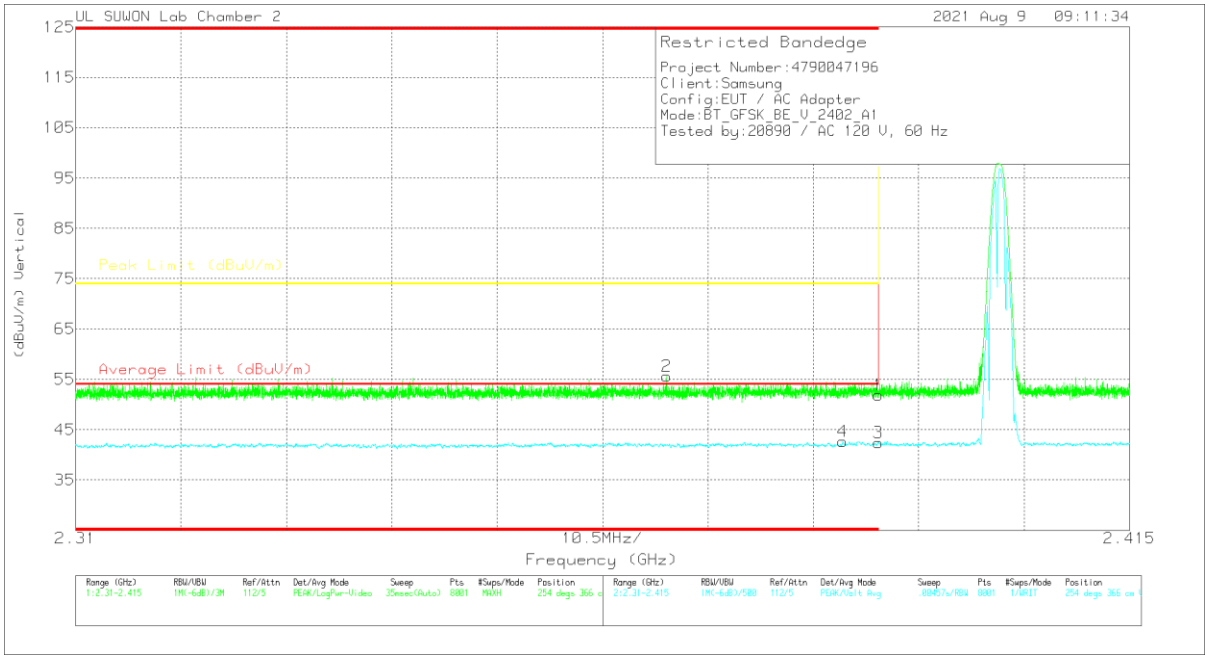
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	40.32	Pk	31.9	-20.3	51.92	-	-	74	-22.08	254	366	V
2	* 2.36887	44.18	Pk	31.8	-20.4	55.58	-	-	74	-18.42	254	366	V
3	* 2.39	30.77	VA1T	31.9	-20.3	42.37	54	-11.63	-	-	254	366	V
4	* 2.38644	31.15	VA1T	31.9	-20.4	42.65	54	-11.35	-	-	254	366	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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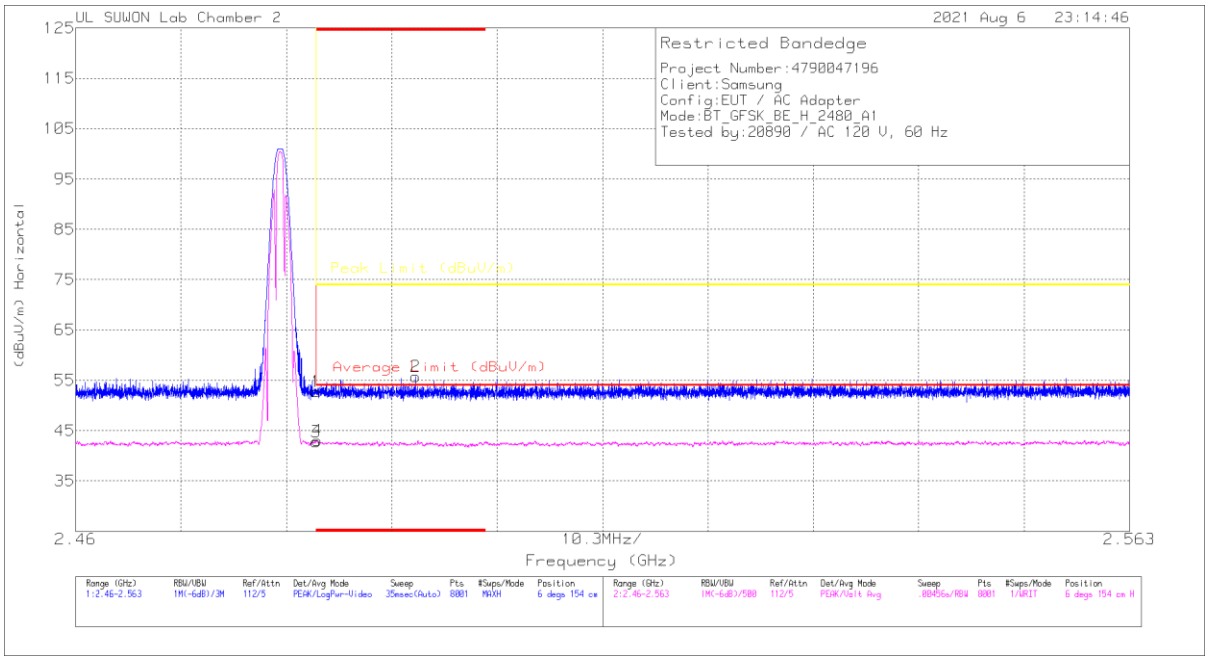
Antenna 2 BANDEDGE (78 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	40.9	Pk	32	-20.2	52.7	-	-	74	-21.3	6	154	H
2	* 2.49323	43.8	Pk	32.1	-20.2	55.7	-	-	74	-18.3	6	154	H
3	* 2.48351	31.02	VA1T	32	-20.2	42.82	54	-11.18	-	-	6	154	H
4	* 2.48361	31.27	VA1T	32	-20.2	43.07	54	-10.93	-	-	6	154	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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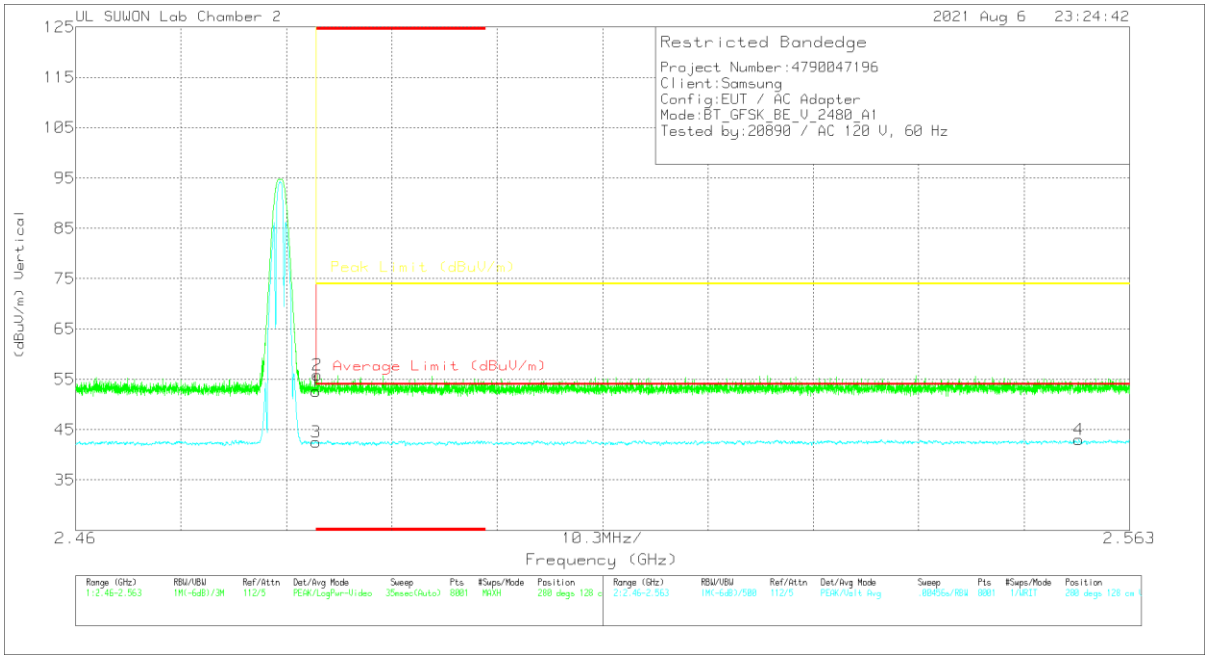
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	Fixture 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	40.78	Pk	32	-20.2	0	52.58	-	-	74	-21.42	280	128	V
2	* 2.48361	44.03	Pk	32	-20.2	0	55.83	-	-	74	-18.17	280	128	V
3	* 2.48351	30.71	VA1T	32	-20.2	0	42.51	54	-11.49	-	-	280	128	V
4	2.55804	30.95	VA1T	32.2	-20.1	0	43.05	54	-10.95	-	-	280	128	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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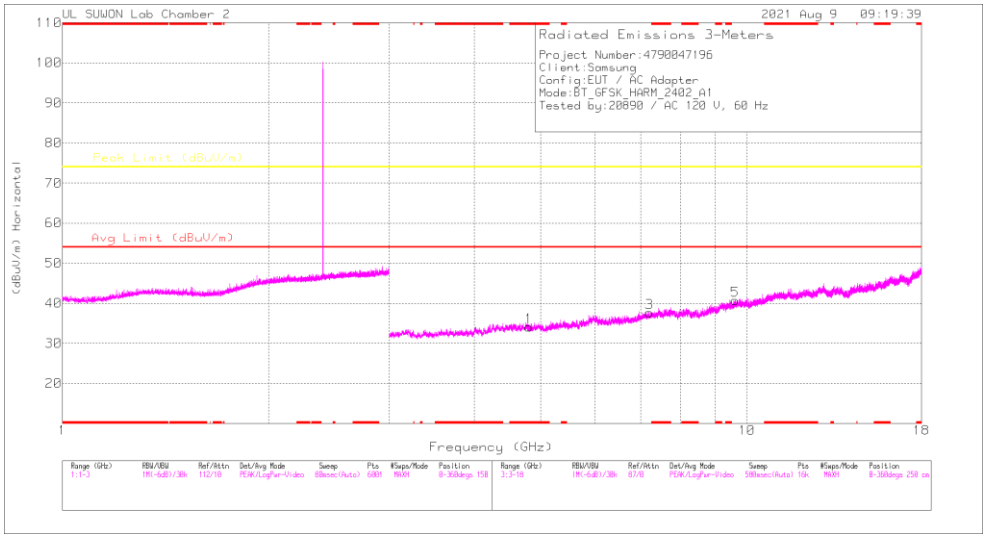
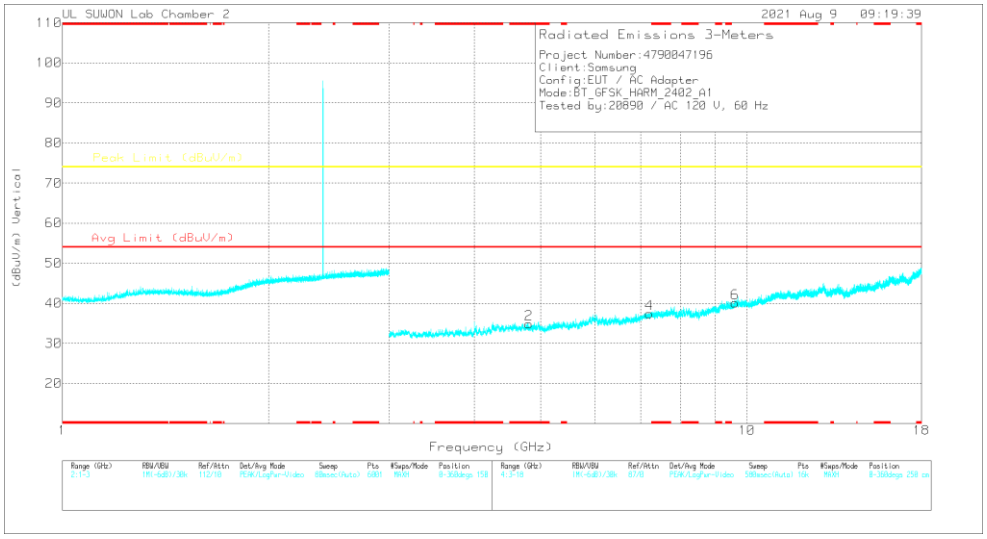
HARMONICS AND SPURIOUS EMISSIONS

Antenna 2 / 0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.8045	36.1	PKFH	34.1	-27.7	42.5	-	-	74	-31.5	360	100	H
* 4.80415	35.76	PKFH	34.1	-27.7	42.16	-	-	74	-31.84	360	100	V
7.20742	33.47	PKFH	36.2	-24.9	44.77	-	-	74	-29.23	360	100	H
7.21014	33.41	PKFH	36.2	-24.9	44.71	-	-	74	-29.29	360	100	V
9.61468	30.87	PKFH	37	-20.8	47.07	-	-	74	-26.93	360	100	H
9.61216	30.44	PKFH	37	-20.8	46.64	-	-	74	-27.36	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

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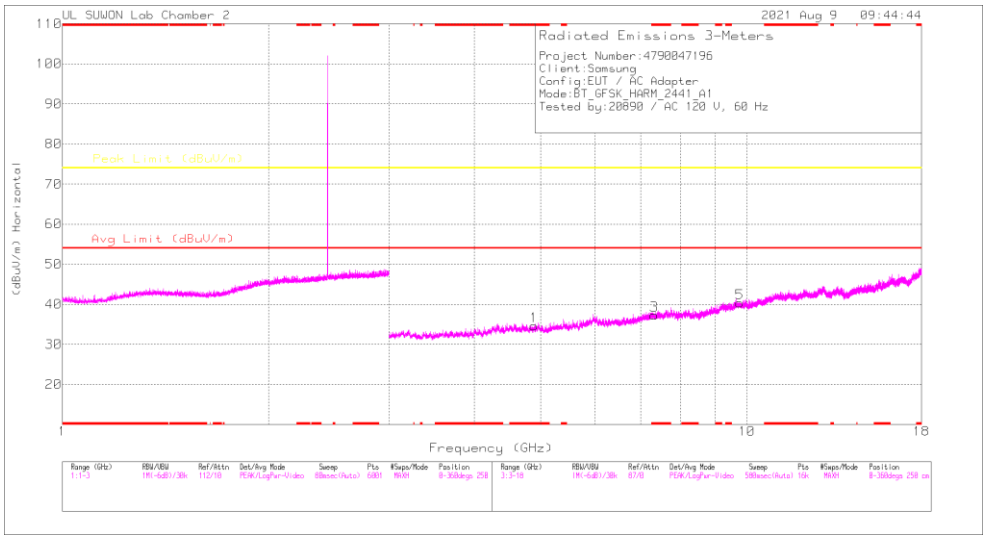
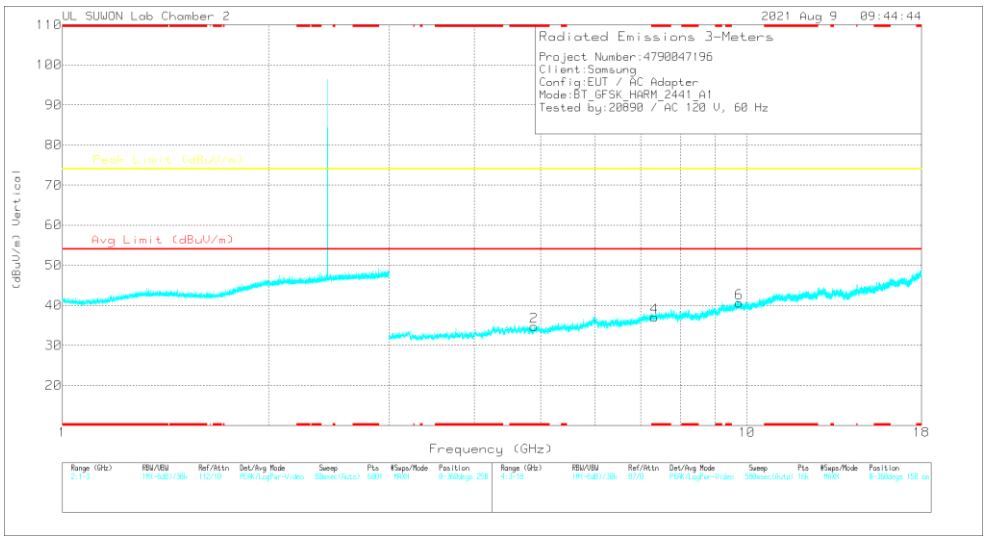
Antenna 2 / 39 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88938	34.77	PKFH	34.1	-27.4	41.47	-	-	74	-32.53	360	100	H
* 4.89076	35.74	PKFH	34.1	-27.4	42.44	-	-	74	-31.56	360	100	V
* 7.32331	33.64	PKFH	36.1	-24.6	45.14	-	-	74	-28.86	360	100	H
* 7.32266	33.53	PKFH	36.1	-24.6	45.03	-	-	74	-28.97	360	100	V
9.76984	30.54	PKFH	37.2	-20.5	47.24	-	-	74	-26.76	360	100	H
9.77051	30.15	PKFH	37.2	-20.5	46.85	-	-	74	-27.15	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

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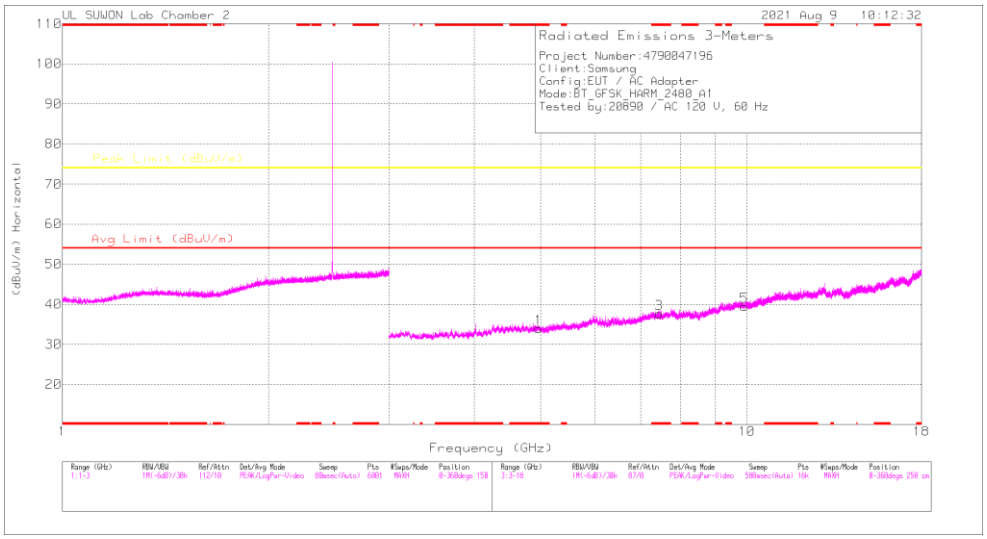
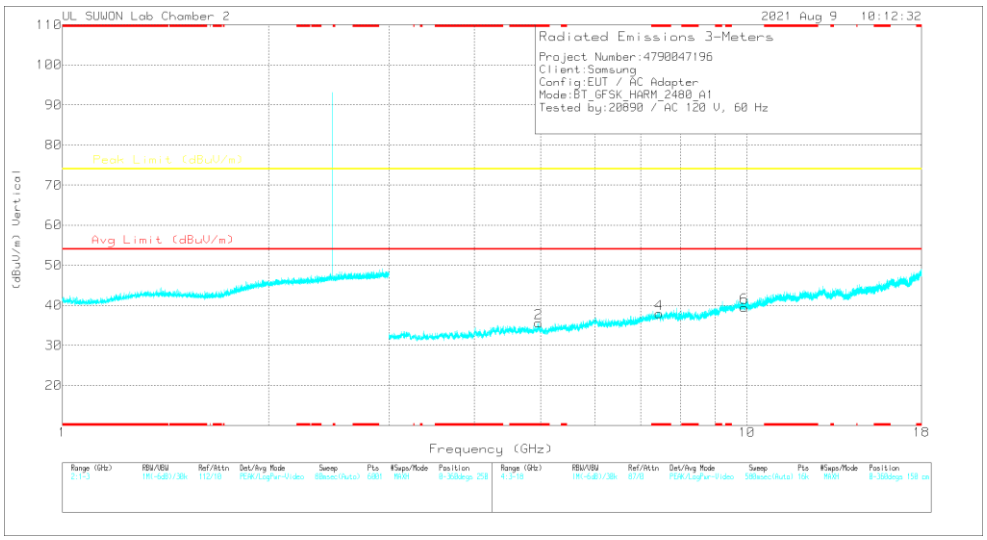
Antenna 2 / 78 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.96298	33.7	PKFH	34.1	-26.8	41	-	-	74	-33	360	100	H
* 4.96364	34.04	PKFH	34.1	-26.8	41.34	-	-	74	-32.66	360	100	V
* 7.44242	32.43	PKFH	36	-23.7	44.73	-	-	74	-29.27	360	100	H
* 7.4417	32.87	PKFH	36	-23.6	45.27	-	-	74	-28.73	360	100	V
9.92118	30.11	PKFH	37.4	-20.3	47.21	-	-	74	-26.79	360	100	H
9.92118	29.94	PKFH	37.4	-20.3	47.04	-	-	74	-26.96	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

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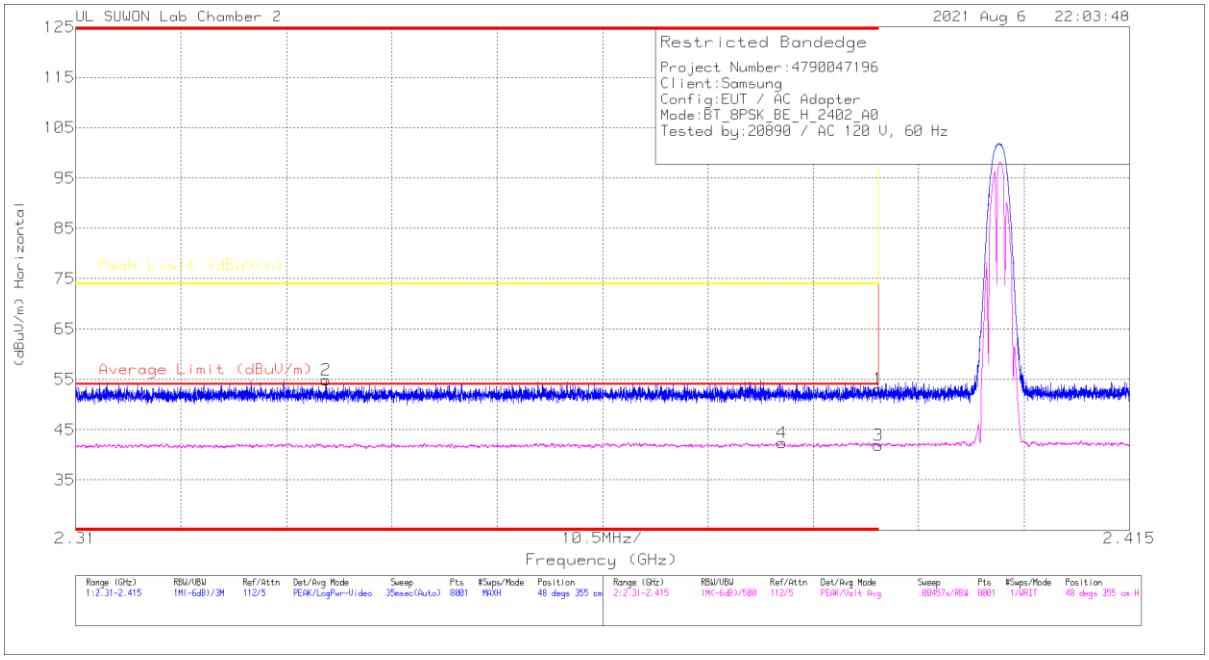
10.1.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Antenna 1 / BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	41.53	Pk	31.9	-20.3	53.13	-	-	74	-20.87	48	355	H
2	* 2.33498	43.52	Pk	31.8	-20.4	54.92	-	-	74	-19.08	48	355	H
3	* 2.39	30.26	VA1T	31.9	-20.3	41.86	54	-12.14	-	-	48	355	H
4	* 2.38038	30.81	VA1T	31.9	-20.3	42.41	54	-11.59	-	-	48	355	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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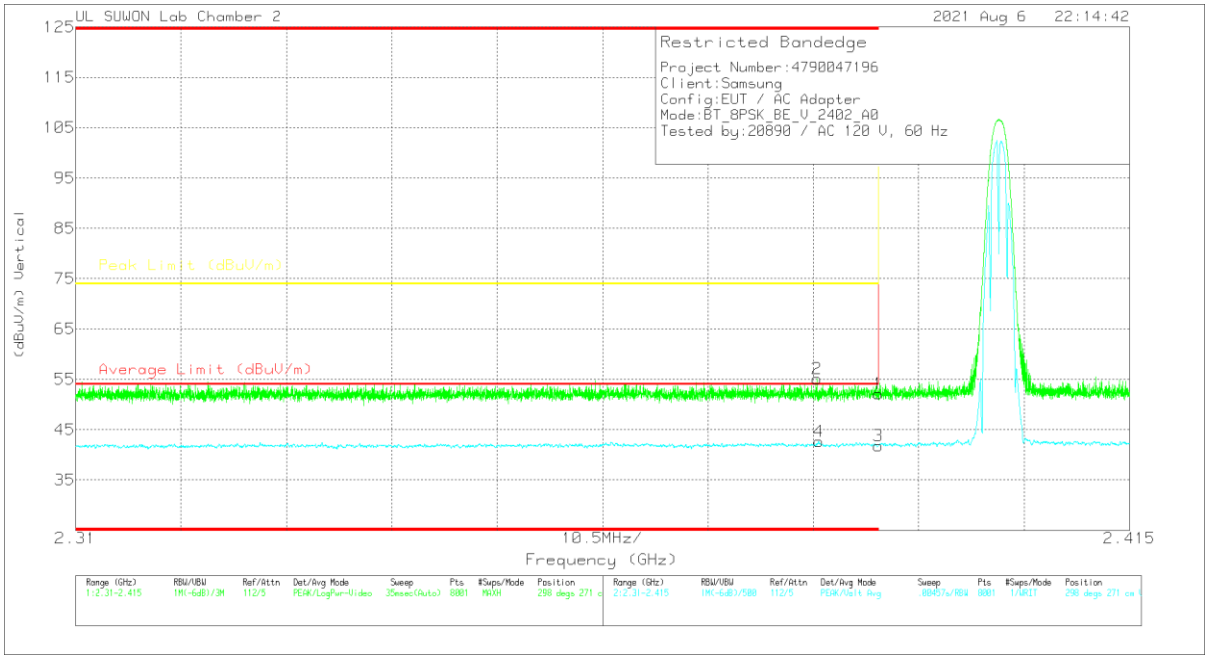
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	40.56	Pk	31.9	-20.3	52.16	-	-	74	-21.84	298	271	V
2	* 2.38385	43.64	Pk	31.9	-20.4	55.14	-	-	74	-18.86	298	271	V
3	* 2.39	30.22	VA1T	31.9	-20.3	41.82	54	-12.18	-	-	298	271	V
4	* 2.38403	31.11	VA1T	31.9	-20.4	42.61	54	-11.39	-	-	298	271	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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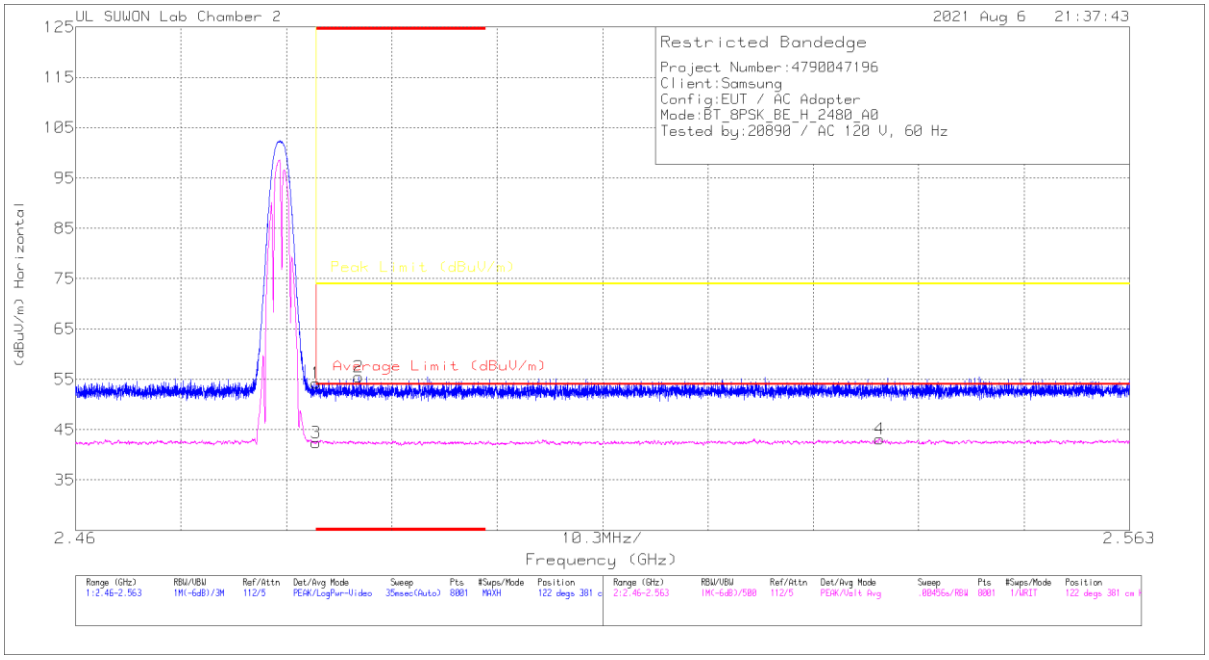
Antenna 1 / BANDEDGE (78 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	42.43	Pk	32	-20.2	54.23	-	-	74	-19.77	122	381	H
2	* 2.48764	43.72	Pk	32.1	-20.3	55.52	-	-	74	-18.48	122	381	H
3	* 2.48351	30.63	VA1T	32	-20.2	42.43	54	-11.57	-	-	122	381	H
4	2.53856	31.06	VA1T	32.1	-20	43.16	54	-10.84	-	-	122	381	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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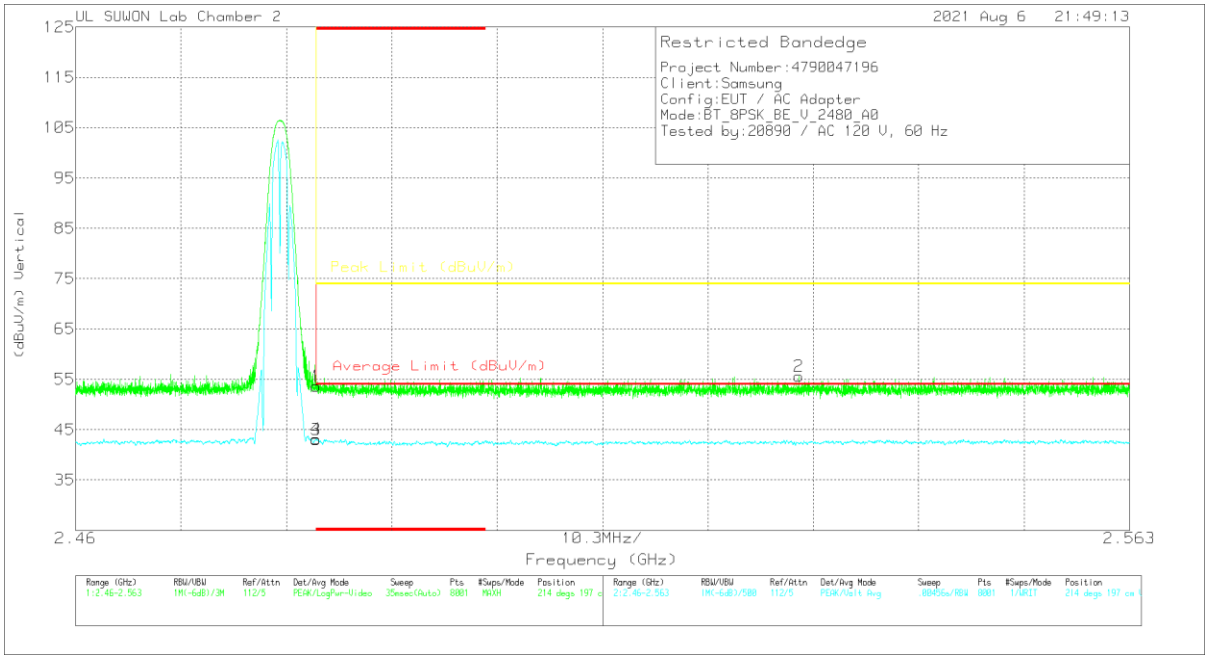
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	41.77	Pk	32	-20.2	53.57	-	-	74	-20.43	214	197	V
2	2.53068	43.56	Pk	32.1	-20.1	55.56	-	-	74	-18.44	214	197	V
3	* 2.48351	31.28	VA1T	32	-20.2	43.08	54	-10.92	-	-	214	197	V
4	* 2.48352	31.31	VA1T	32	-20.2	43.11	54	-10.89	-	-	214	197	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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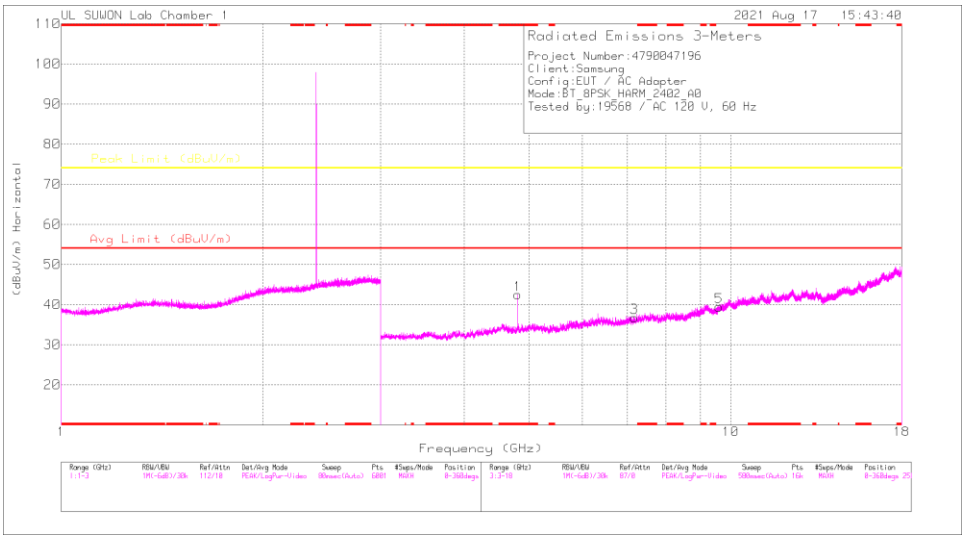
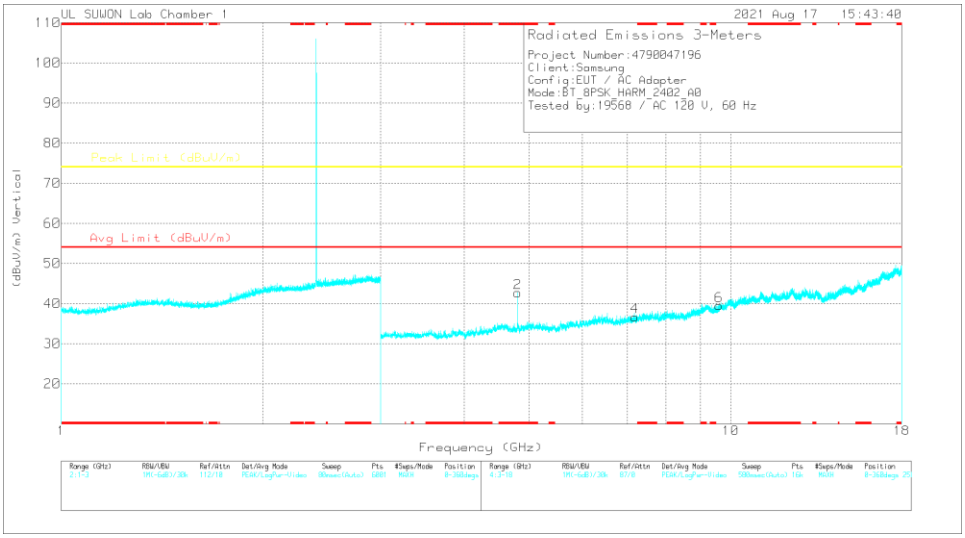
HARMONICS AND SPURIOUS EMISSIONS

Antenna 1 / 0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80389	47.7	PKFH	34.1	-31.5	50.3	-	-	74	-23.7	113	235	H
* 4.80392	39.97	VA1T	34.1	-31.5	42.57	54	-11.43	-	-	113	235	H
* 4.80411	44.8	PKFH	34.1	-31.5	47.4	-	-	74	-26.6	96	158	V
* 4.80396	36.94	VA1T	34.1	-31.5	39.54	54	-14.46	-	-	96	158	V
7.17964	36.29	PKFH	35.9	-27.8	44.39	-	-	74	-29.61	0	100	H
7.17825	35.53	PKFH	35.9	-27.7	43.73	-	-	74	-30.27	0	100	V
9.59875	32.36	PKFH	37.1	-23	46.46	-	-	74	-27.54	0	100	H
9.59747	31.89	PKFH	37.1	-23	45.99	-	-	74	-28.01	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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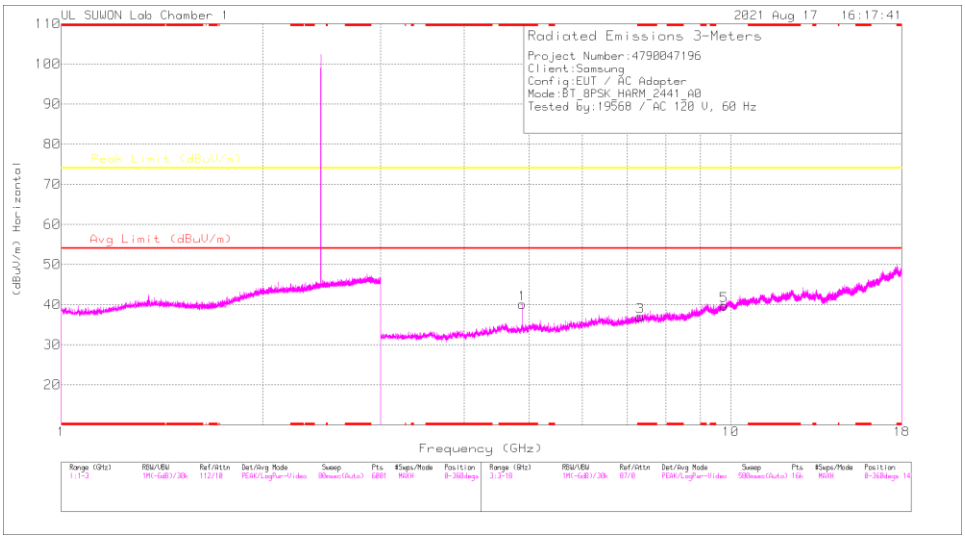
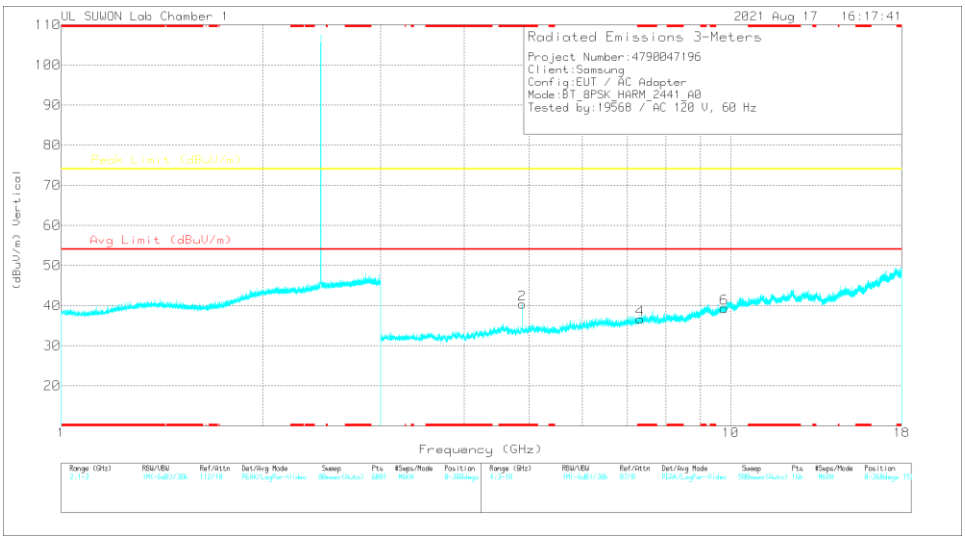
Antenna 1 / 39 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88136	44.62	PKFH	34.1	-31.3	47.42	-	-	74	-26.58	113	246	H
* 4.88189	36.1	VA1T	34.1	-31.3	38.9	54	-15.1	-	-	113	246	H
* 4.88187	43.48	PKFH	34.1	-31.3	46.28	-	-	74	-27.72	101	136	V
* 4.88203	35.09	VA1T	34.1	-31.3	37.89	54	-16.11	-	-	101	136	V
* 7.32232	35.28	PKFH	35.8	-27.3	43.78	-	-	74	-30.22	0	100	H
* 7.31894	36.32	PKFH	35.8	-27.3	44.82	-	-	74	-29.18	0	100	V
9.77112	32.41	PKFH	37.5	-23.7	46.21	-	-	74	-27.79	0	100	H
9.77072	32.19	PKFH	37.5	-23.7	45.99	-	-	74	-28.01	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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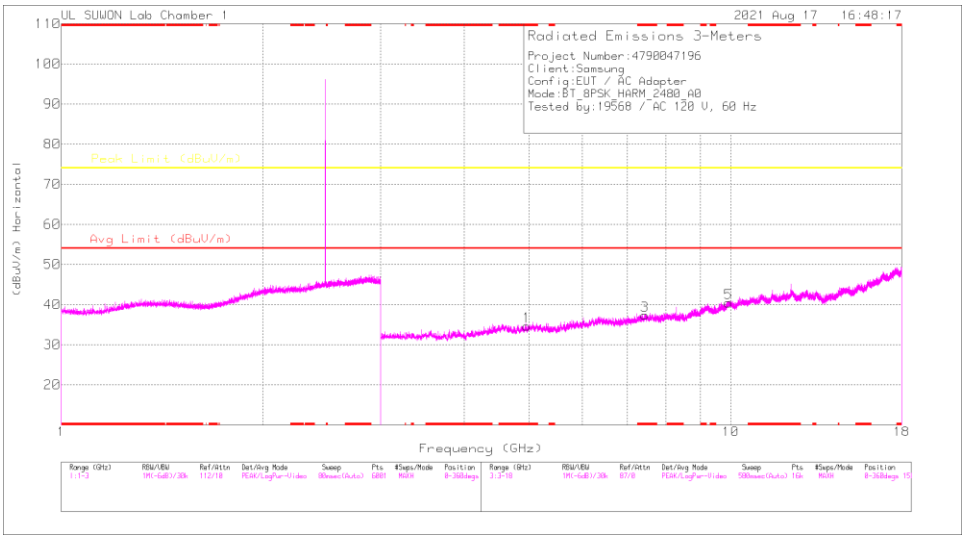
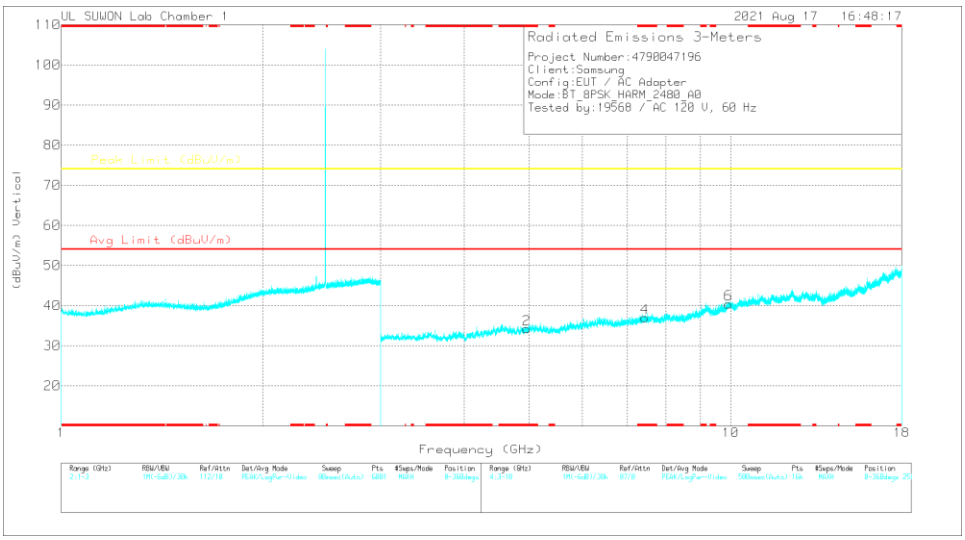
Antenna 1 / 78 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.95901	39.97	PKFH	34.1	-31.4	42.67	-	-	74	-31.33	0	100	H
* 4.95932	39.86	PKFH	34.1	-31.4	42.56	-	-	74	-31.44	0	100	V
* 7.43933	35.77	PKFH	35.8	-26.8	44.77	-	-	74	-29.23	0	100	H
* 7.44015	36.29	PKFH	35.8	-26.8	45.29	-	-	74	-28.71	0	100	V
9.92146	32.03	PKFH	37.7	-21.5	48.23	-	-	74	-25.77	0	100	H
9.92102	32.18	PKFH	37.7	-21.6	48.28	-	-	74	-25.72	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

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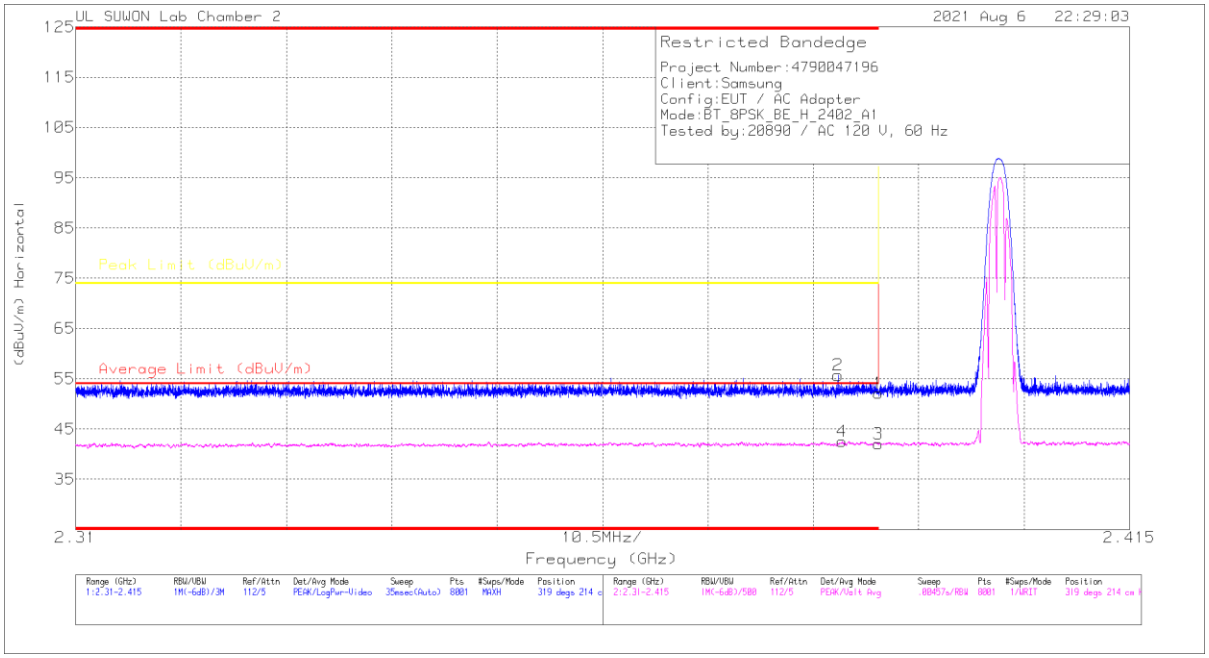
Antenna 2 / BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	40.58	Pk	31.9	-20.3	52.18	-	-	74	-21.82	319	214	H
2	* 2.38595	44.28	Pk	31.9	-20.5	55.68	-	-	74	-18.32	319	214	H
3	* 2.39	30.44	VA1T	31.9	-20.3	42.04	54	-11.96	-	-	319	214	H
4	* 2.38637	31	VA1T	31.9	-20.4	42.5	54	-11.5	-	-	319	214	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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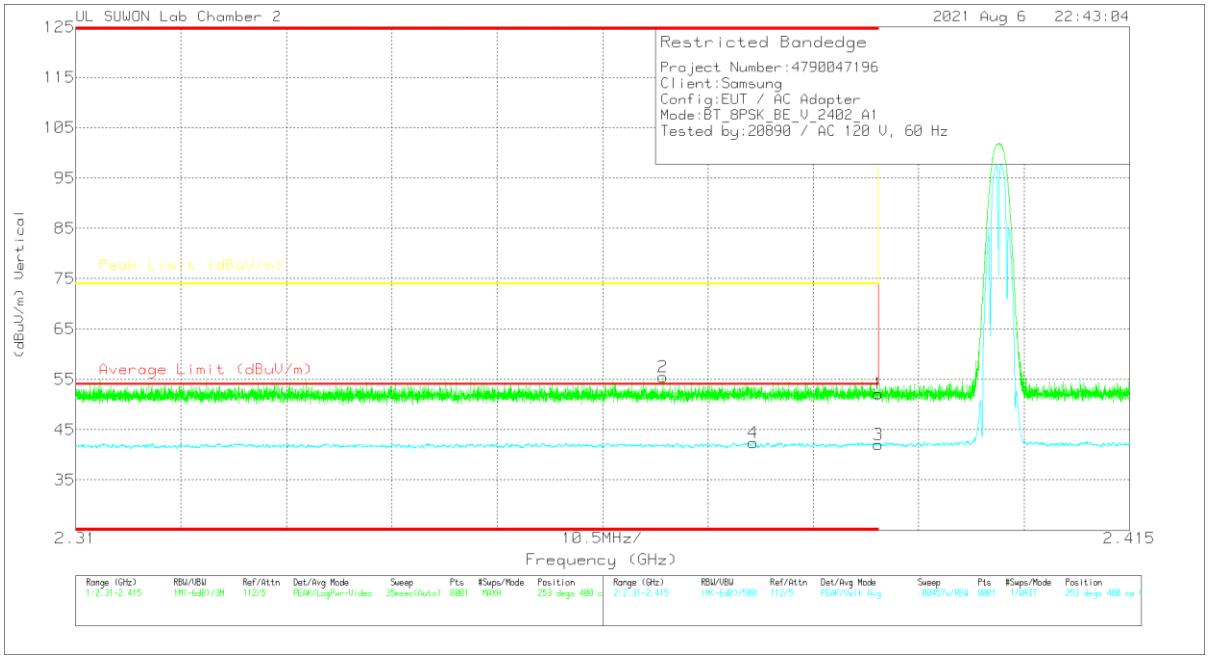
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	40.58	Pk	31.9	-20.3	52.18	-	-	74	-21.82	253	400	V
2	* 2.3685	44.21	Pk	31.8	-20.5	55.51	-	-	74	-18.49	253	400	V
3	* 2.39	30.48	VA1T	31.9	-20.3	42.08	54	-11.92	-	-	253	400	V
4	* 2.37748	30.92	VA1T	31.9	-20.4	42.42	54	-11.58	-	-	253	400	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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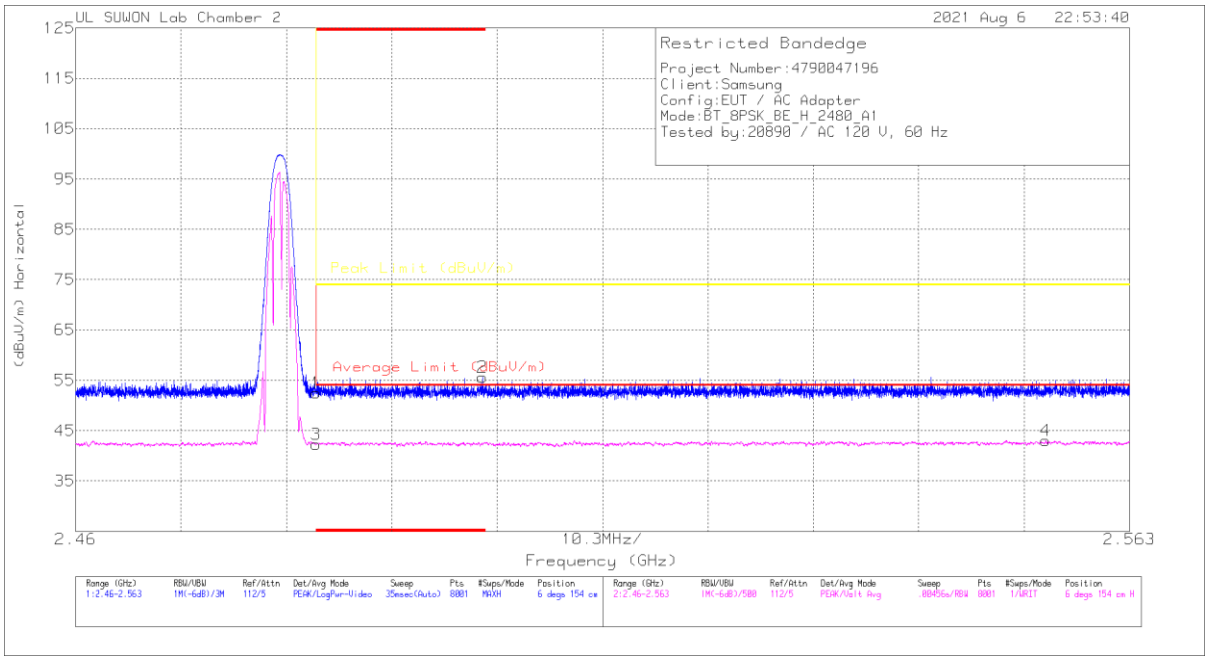
Antenna 2 / BANDEDGE (78 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	40.69	Pk	32	-20.2	52.49	-	-	74	-21.51	6	154	H
2	* 2.49975	43.67	Pk	32.1	-20.1	55.67	-	-	74	-18.33	6	154	H
3	* 2.48351	30.53	VA1T	32	-20.2	42.33	54	-11.67	-	-	6	154	H
4	2.55482	30.92	VA1T	32.2	-20.1	43.02	54	-10.98	-	-	6	154	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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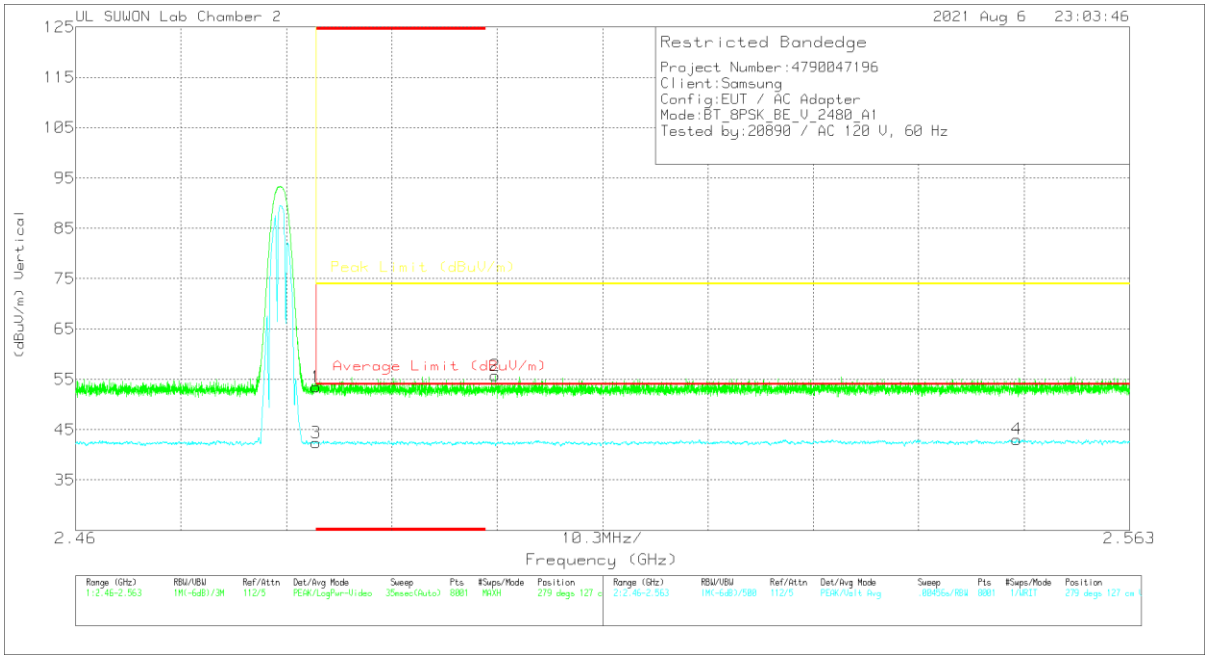
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	41.7	Pk	32	-20.2	53.5	-	-	74	-20.5	279	127	V
2	2.50099	43.94	Pk	32.1	-20.3	55.74	-	-	74	-18.26	279	127	V
3	* 2.48351	30.61	VA1T	32	-20.2	42.41	54	-11.59	-	-	279	127	V
4	2.55199	30.99	VA1T	32.2	-20.1	43.09	54	-10.91	-	-	279	127	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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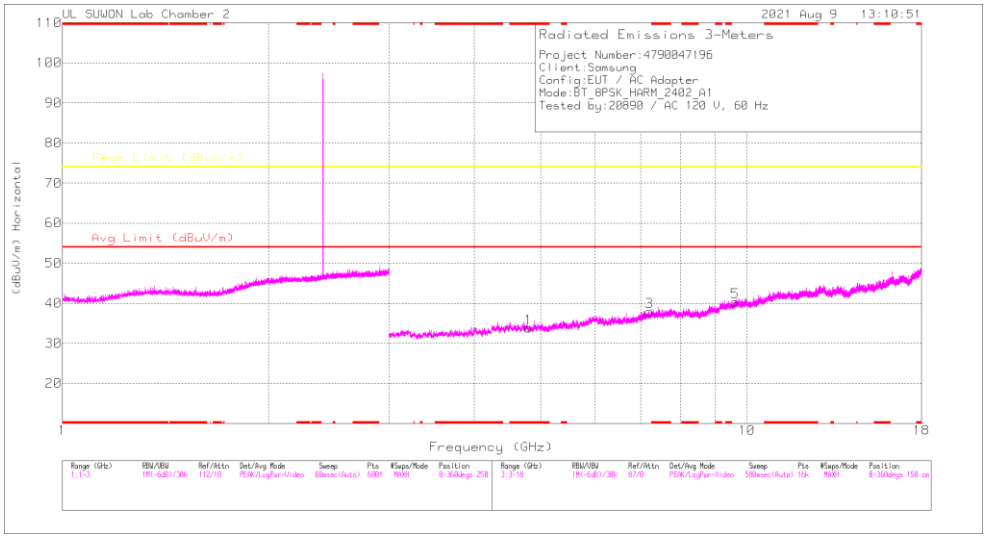
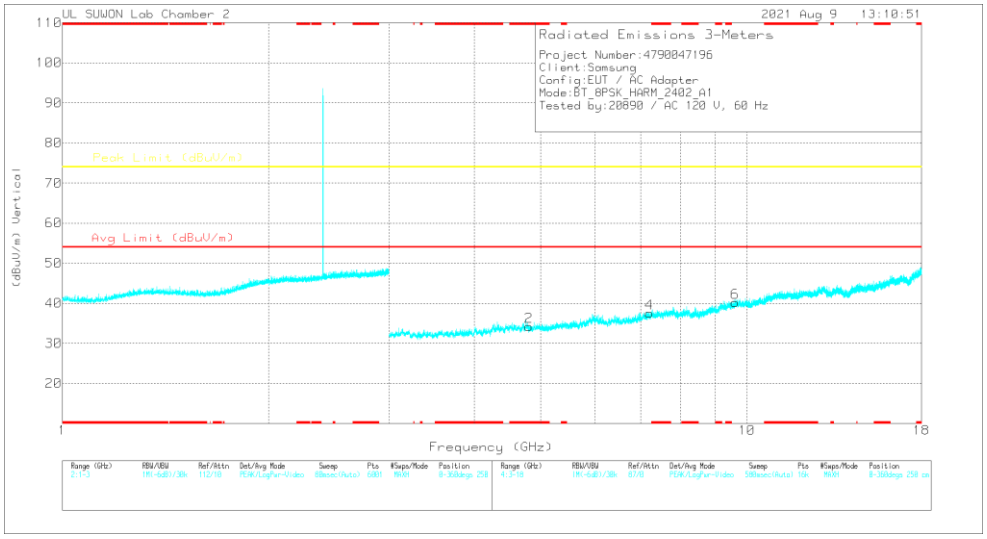
HARMONICS AND SPURIOUS EMISSIONS

Antenna 2 / 0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.79608	34.8	PKFH	34.1	-27.7	41.2	-	-	74	-32.8	360	100	H
* 4.79606	34.45	PKFH	34.1	-27.7	40.85	-	-	74	-33.15	360	100	V
7.20885	33.1	PKFH	36.2	-24.9	44.4	-	-	74	-29.6	360	100	H
7.20686	33.98	PKFH	36.2	-24.9	45.28	-	-	74	-28.72	360	100	V
9.60887	31.49	PKFH	37	-20.8	47.69	-	-	74	-26.31	360	100	H
9.60872	31	PKFH	37	-20.8	47.2	-	-	74	-26.8	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

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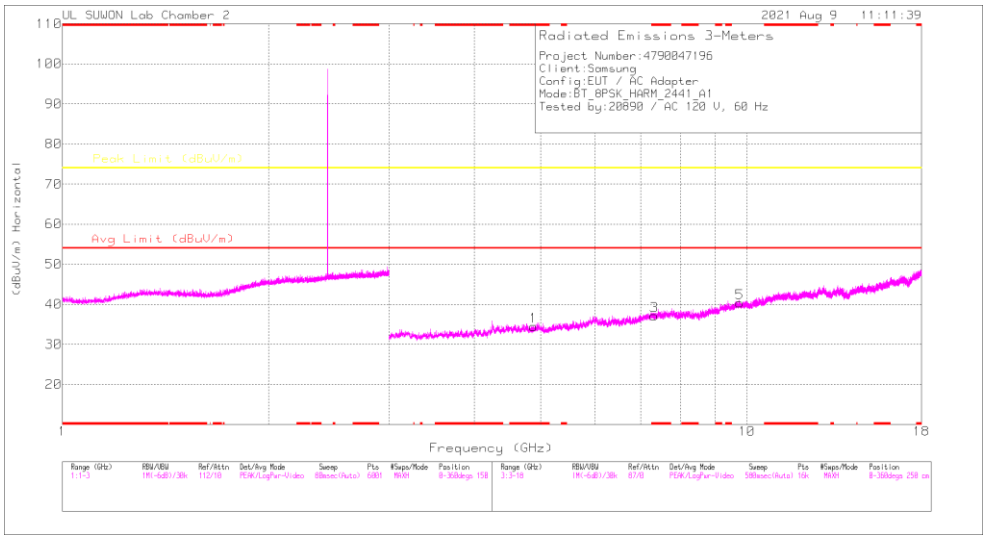
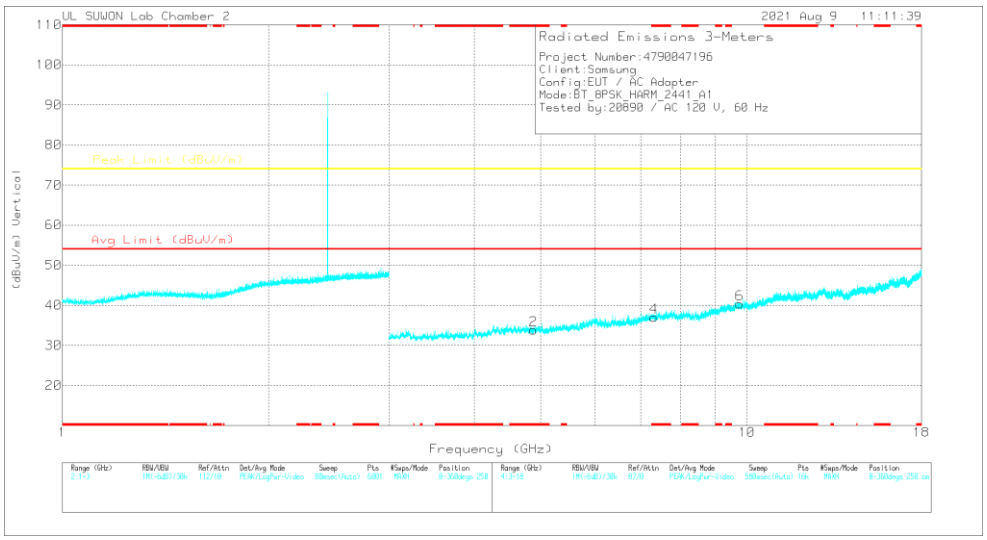
Antenna 2 / 39 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.87963	35.38	PKFH	34.1	-27.6	41.88	-	-	74	-32.12	360	100	H
* 4.88163	34.97	PKFH	34.1	-27.5	41.57	-	-	74	-32.43	360	100	V
* 7.32609	33.21	PKFH	36.1	-24.5	44.81	-	-	74	-29.19	360	100	H
* 7.32589	32.8	PKFH	36.1	-24.5	44.4	-	-	74	-29.6	360	100	V
9.76634	30.5	PKFH	37.2	-20.6	47.1	-	-	74	-26.9	360	100	H
9.76274	31.2	PKFH	37.2	-20.4	48	-	-	74	-26	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

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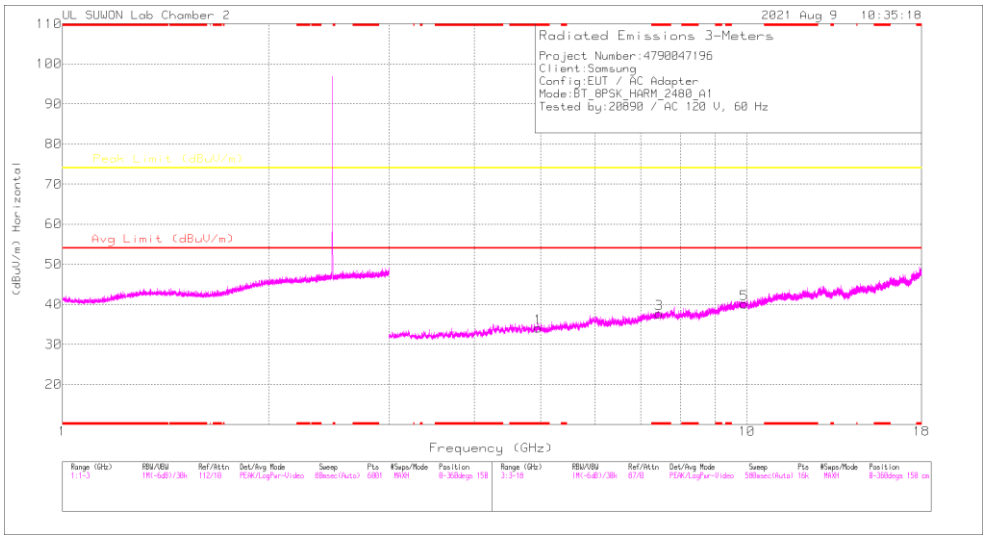
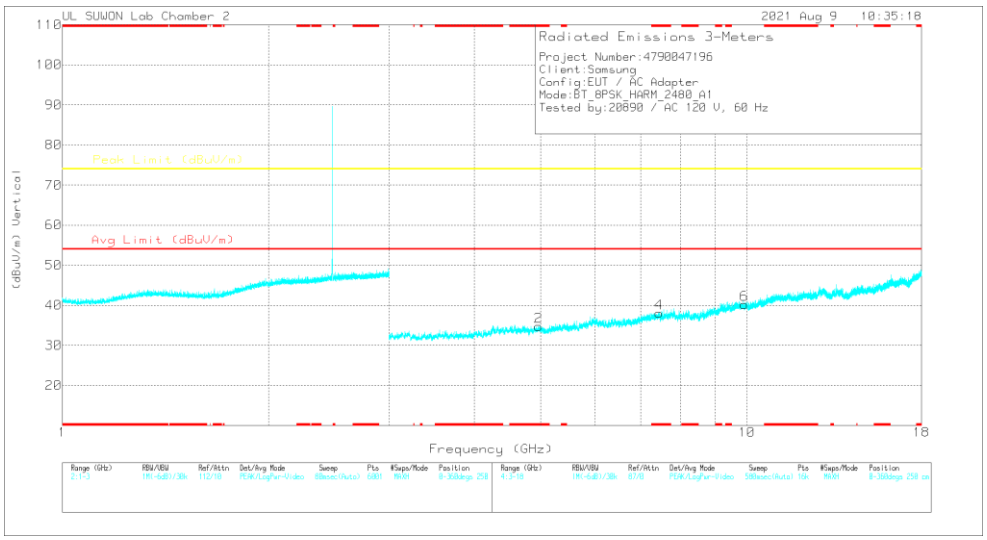
Antenna 2 / 78 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.95728	34.27	PKFH	34.1	-26.8	41.57	-	-	74	-32.43	360	100	H
* 4.95943	34.14	PKFH	34.1	-26.8	41.44	-	-	74	-32.56	360	100	V
* 7.44026	32.97	PKFH	36	-23.6	45.37	-	-	74	-28.63	360	100	H
* 7.43999	32.46	PKFH	36	-23.7	44.76	-	-	74	-29.24	360	100	V
9.92176	30.19	PKFH	37.4	-20.3	47.29	-	-	74	-26.71	360	100	H
9.9218	30.32	PKFH	37.4	-20.3	47.42	-	-	74	-26.58	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

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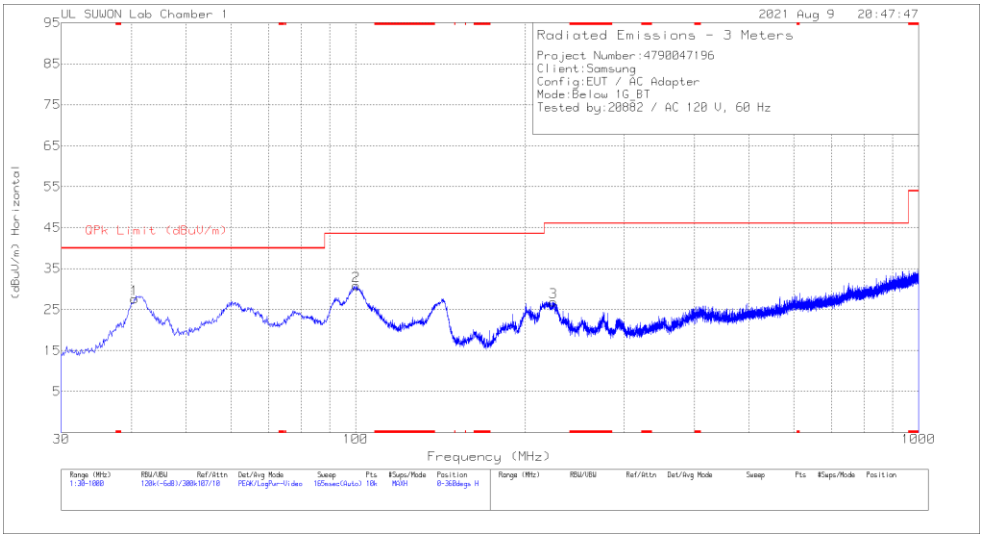
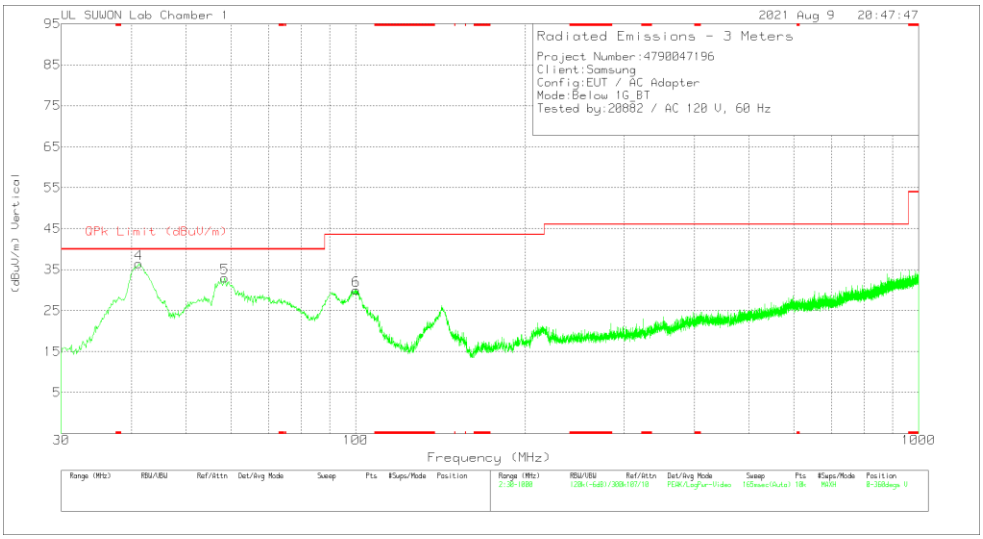
10.2. WORST CASE BELOW 1 GHZ

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]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	40.476	39.83	Pk	18.8	-31	27.63	40	-12.37	0-360	200	H
2	100.131	43.56	Pk	17.5	-30.2	30.86	43.52	-12.66	0-360	200	H
3	224.679	38.52	Pk	17.4	-29.1	26.82	46.02	-19.2	0-360	100	H
4	41.155	48.54	Pk	18.9	-31	36.44	40	-3.56	0-360	100	V
5	58.518	44.93	Pk	18.9	-30.8	33.03	40	-6.97	0-360	100	V
6	100.228	42.67	Pk	17.5	-30.2	29.97	43.52	-13.55	0-360	100	V

Pk - Peak detector

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11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

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

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

RESULTS

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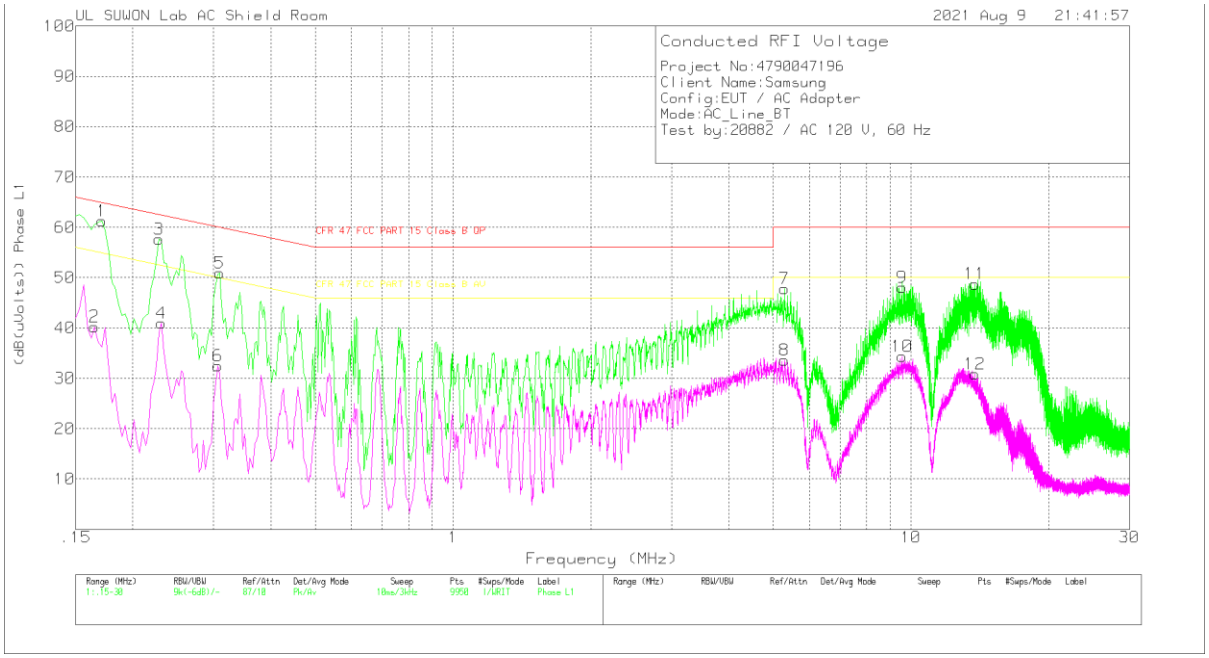
11.1.1. AC Power Line

LINE 1 RESULTS



Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_L1[dB]	CABLELOS S(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.171	51.08	Pk	10	.2	61.28	64.91	-3.63	-	-
2	.165	30.17	Av	10	.1	40.27	-	-	55.21	-14.94
3	.228	47.66	Pk	9.8	.2	57.66	62.52	-4.86	-	-
4	.231	31.01	Av	9.8	.2	41.01	-	-	52.41	-11.4
5	.309	40.96	Pk	9.8	.2	50.96	60	-9.04	-	-
6	.306	22.49	Av	9.8	.2	32.49	-	-	50.08	-17.59
7	5.295	37.7	Pk	9.8	.3	47.8	60	-12.2	-	-
8	5.301	23.48	Av	9.8	.3	33.58	-	-	50	-16.42
9	9.555	37.78	Pk	9.9	.4	48.08	60	-11.92	-	-
10	9.555	24.03	Av	9.9	.4	34.33	-	-	50	-15.67
11	13.77	38.35	Pk	10	.4	48.75	60	-11.25	-	-
12	13.782	20.52	Av	10	.4	30.92	-	-	50	-19.08

Pk - Peak detector
Av - Average detection

Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With 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)
.22725	29.48	Qp	9.8	.2	39.48	62.55	-23.07	-	-
.17025	32.38	Qp	10	.2	42.58	64.95	-22.37	-	-
.30825	23.14	Qp	9.8	.2	33.14	60.02	-26.88	-	-

Qp - Quasi-Peak detector

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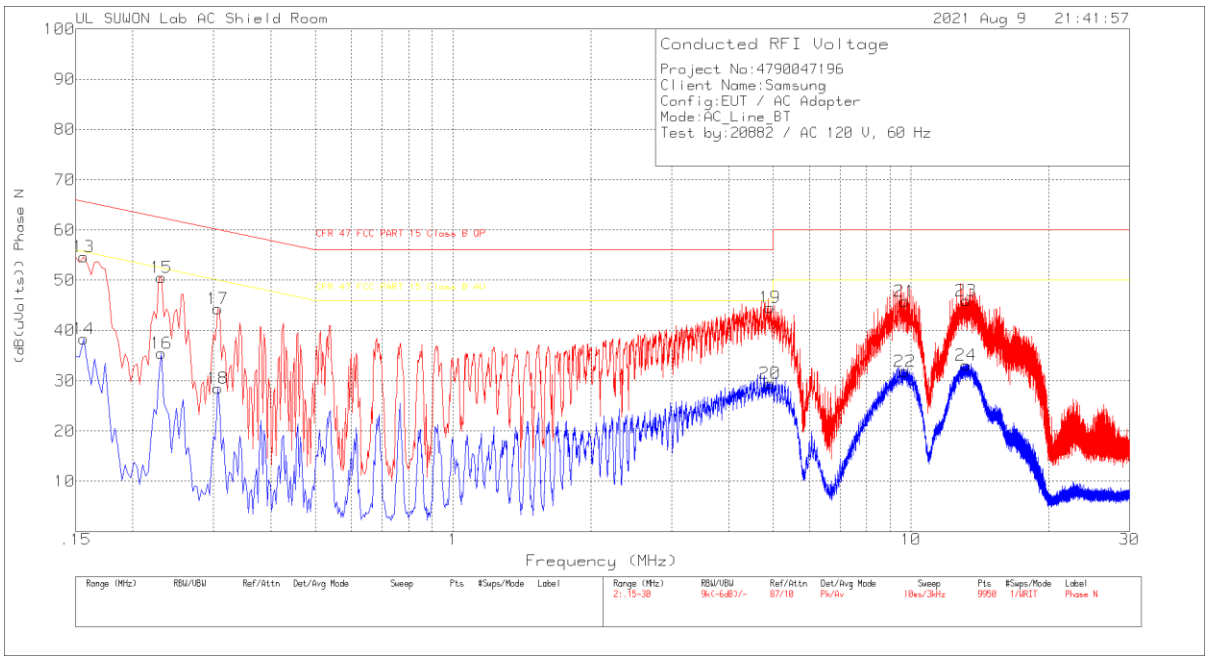
LINE 2 RESULTS



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_N[dB]	CABLELOSS(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	44.63	Pk	9.9	.1	54.63	65.67	-11.04	-	-
14	.156	28.31	Av	9.9	.1	38.31	-	-	55.67	-17.36
15	.231	40.56	Pk	9.8	.2	50.56	62.41	-11.85	-	-
16	.231	25.46	Av	9.8	.2	35.46	-	-	52.41	-16.95
17	.306	34.32	Pk	9.8	.2	44.32	60.08	-15.76	-	-
18	.306	18.54	Av	9.8	.2	28.54	-	-	50.08	-21.54
19	4.926	34.52	Pk	9.8	.3	44.62	56	-11.38	-	-
20	4.923	19.4	Av	9.8	.3	29.5	-	-	46	-16.5
21	9.696	35.5	Pk	9.9	.4	45.8	60	-14.2	-	-
22	9.702	21.56	Av	9.9	.4	31.86	-	-	50	-18.14
23	13.176	35.5	Pk	10.1	.4	46	60	-14	-	-
24	13.176	22.6	Av	10.1	.4	33.1	-	-	50	-16.9

Pk - Peak detector
Av - Average detection

END OF TEST REPORT

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