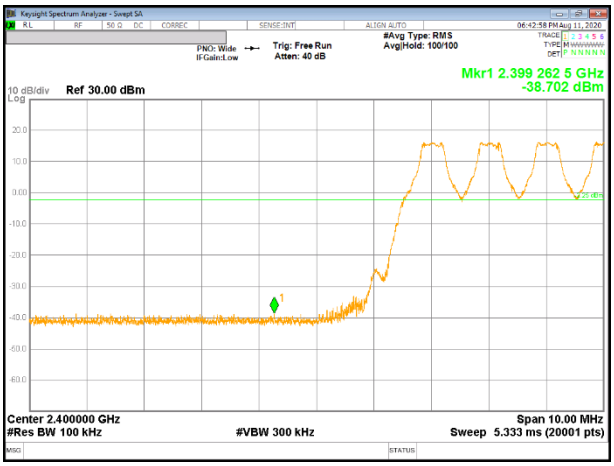
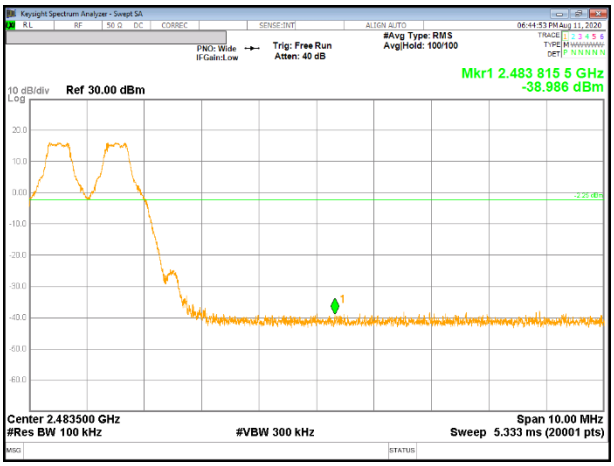
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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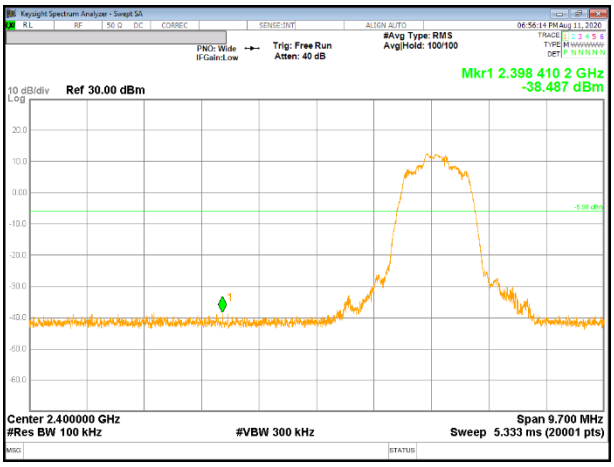
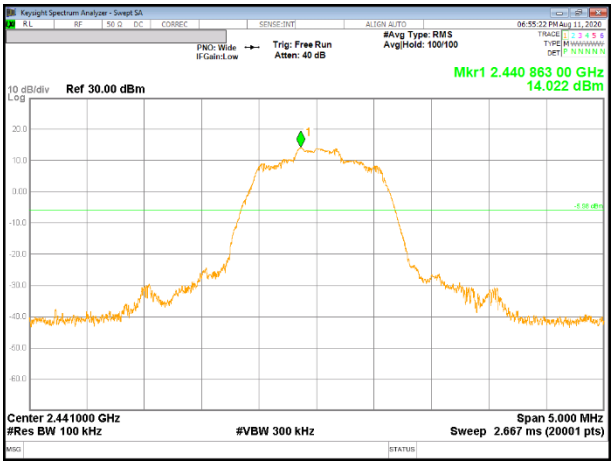
9.8.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

SPURIOUS EMISSIONS, NON-HOPPING(Antenna 1)



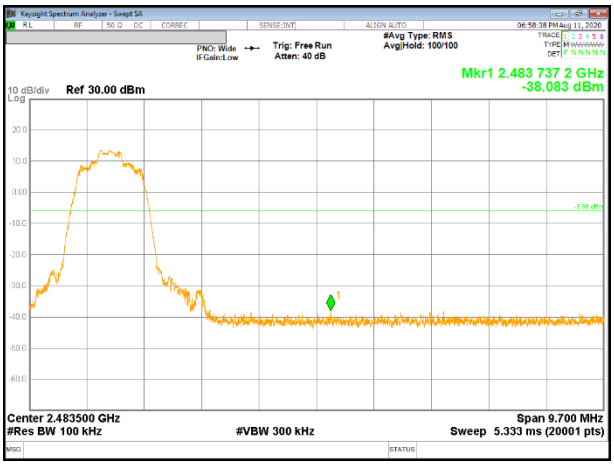
0 CHANNEL BANDEDGE

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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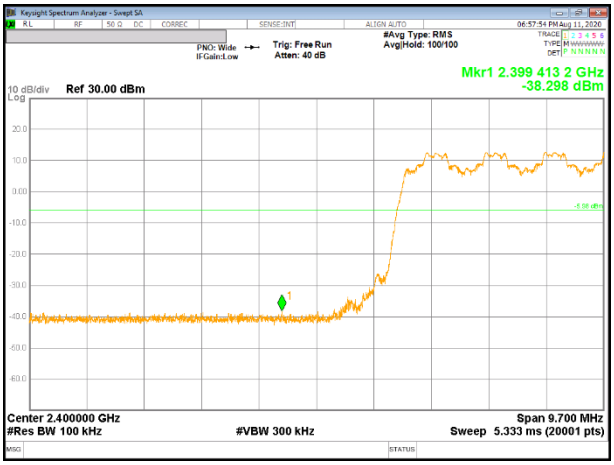
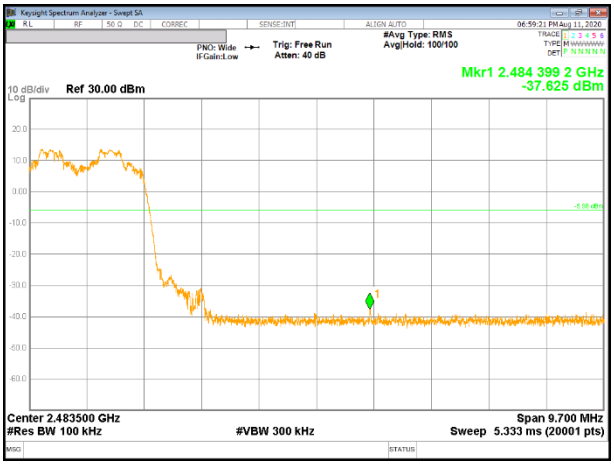
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



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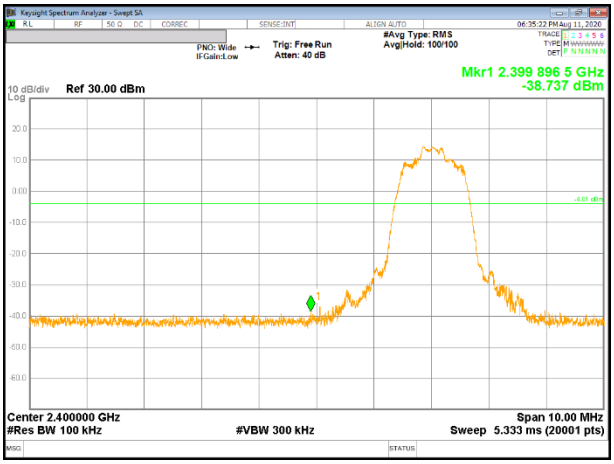
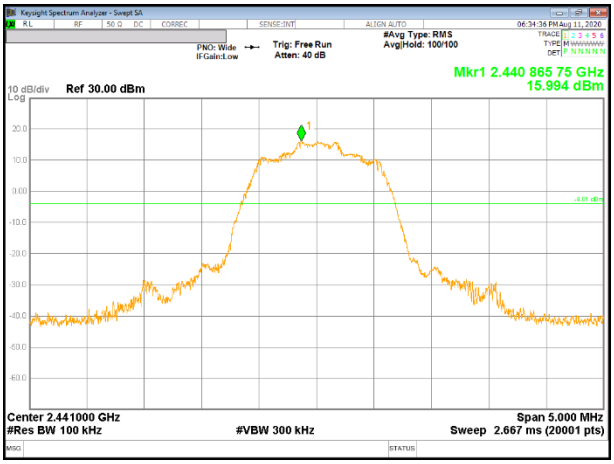
SPURIOUS EMISSIONS, NON-HOPPING(Antenna 2)



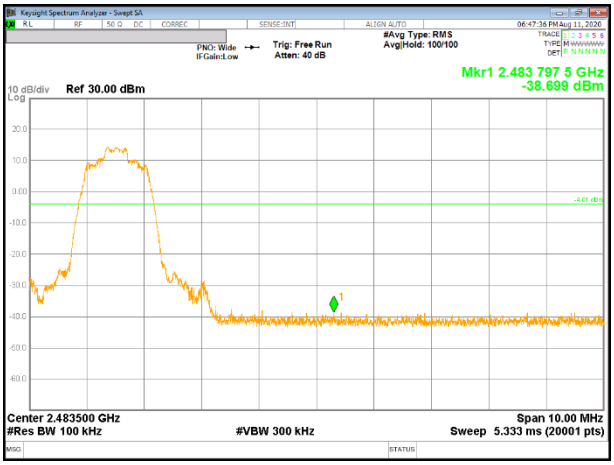
0 CHANNEL BANDEDGE

OUT-OF-BAND 0 CHANNEL

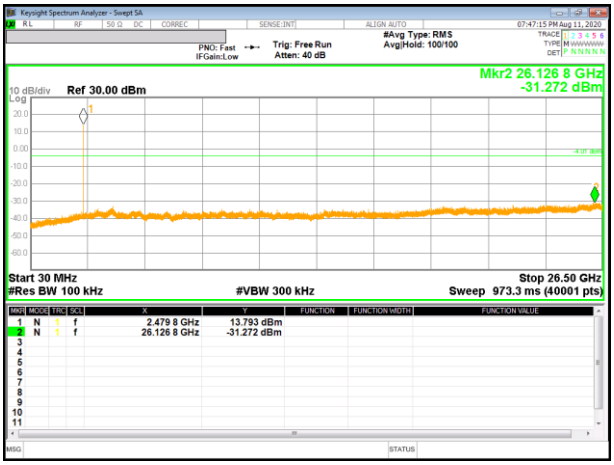


IN-BAND REFERENCE LEVEL

OUT-OF-BAND 39 CHANNEL



78 CHANNEL BANDEDGE



OUT-OF-BAND 78 CHANNEL

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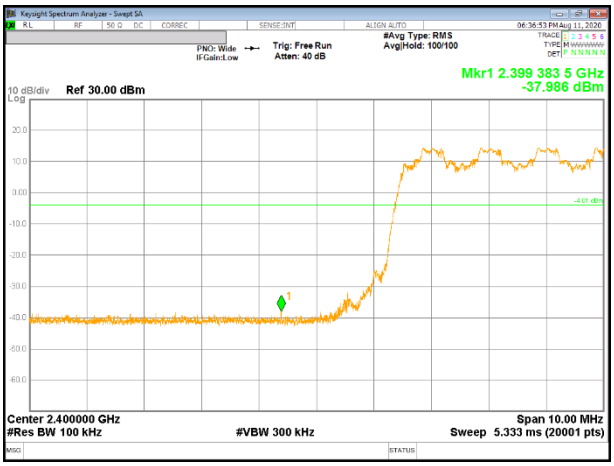
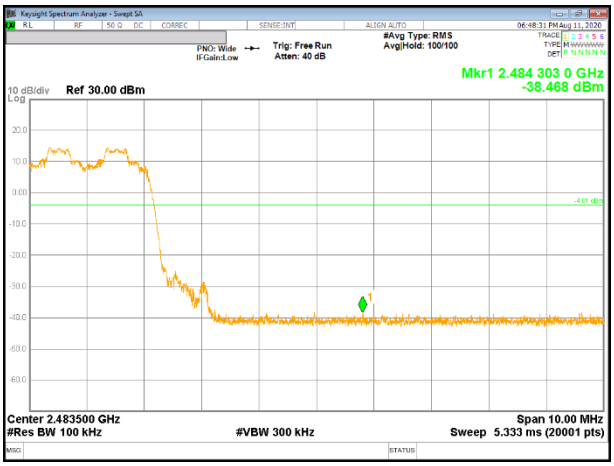
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



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 / 0.00288S = 347Hz.

The minimum VBW was 347Hz, but test receiver(ESU40) couldn't set value 347Hz. 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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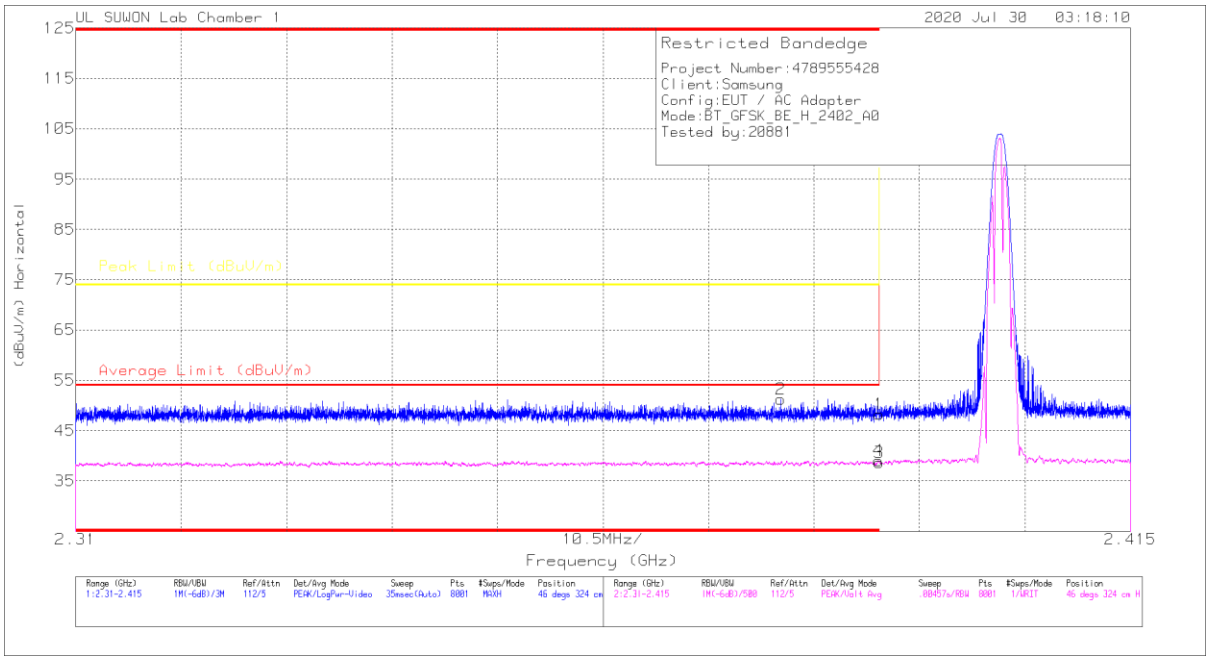
10.1. TRANSMITTER ABOVE 1 GHz

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_00168717	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	42.07	Pk	31.7	-25.5	48.27	-	-	74	-25.73	46	324	H
2	* 2.38017	45.28	Pk	31.6	-25.6	51.28	-	-	74	-22.72	46	324	H
3	* 2.39	32.52	VA1T	31.7	-25.5	38.72	54	-15.28	-	-	46	324	H
4	* 2.38991	32.88	VA1T	31.7	-25.5	39.08	54	-14.92	-	-	46	324	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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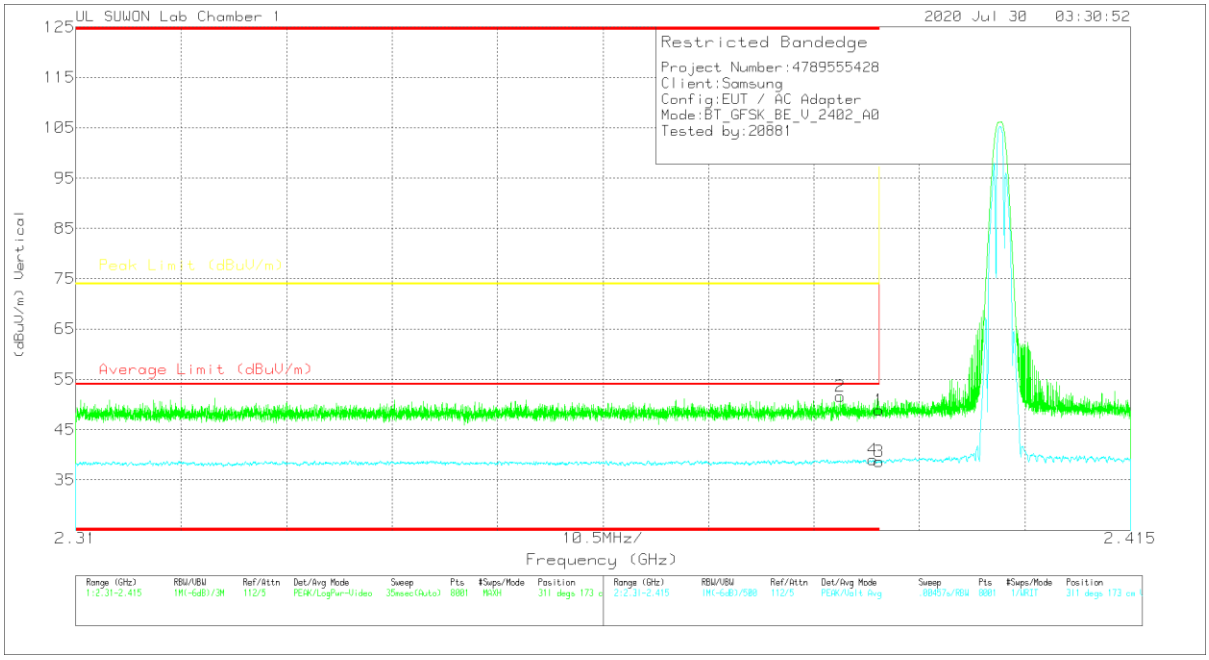
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	42.74	Pk	31.7	-25.5	48.94	-	-	74	-25.06	311	173	V
2	* 2.38614	45.46	Pk	31.7	-25.5	51.66	-	-	74	-22.34	311	173	V
3	* 2.39	32.44	VA1T	31.7	-25.5	38.64	54	-15.36	-	-	311	173	V
4	* 2.38935	32.99	VA1T	31.7	-25.6	39.09	54	-14.91	-	-	311	173	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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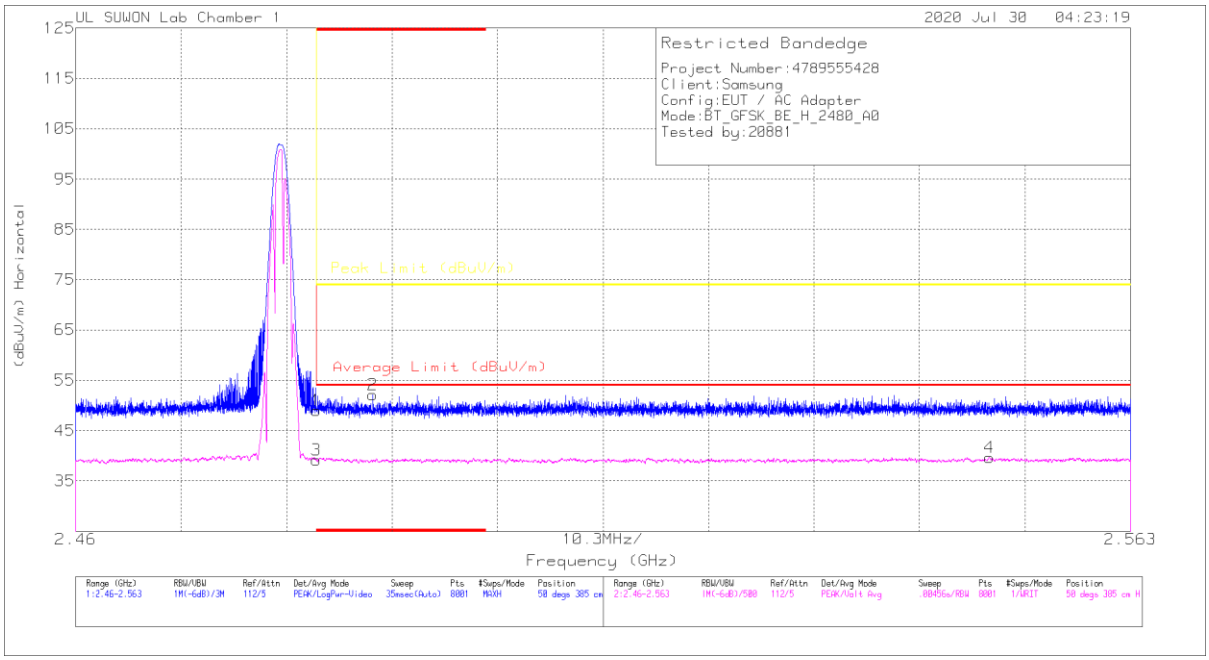
Antenna 1 BANDEDGE (78 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	42.31	Pk	31.9	-25.2	49.01	-	-	74	-24.99	50	385	H
2	* 2.48899	45.49	Pk	31.9	-25.3	52.09	-	-	74	-21.91	50	385	H
3	* 2.48351	32.51	VA1T	31.9	-25.2	39.21	54	-14.79	-	-	50	385	H
4	2.5492	32.79	VA1T	32	-25.1	39.69	54	-14.31	-	-	50	385	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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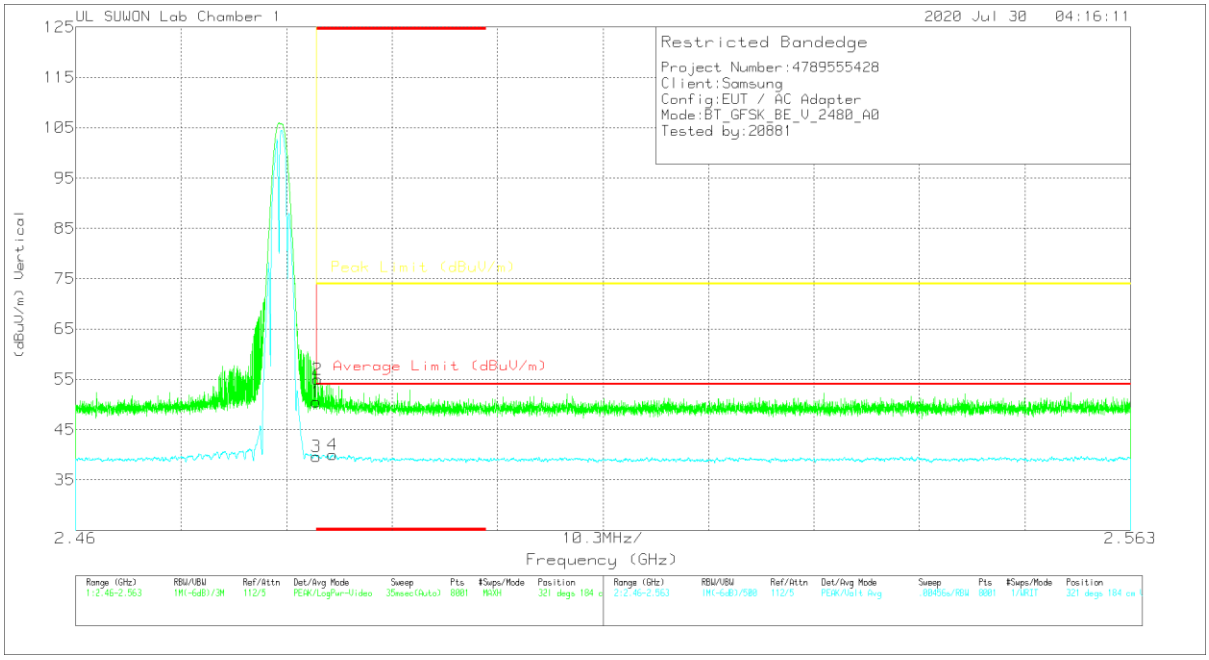
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	43.81	Pk	31.9	-25.2	50.51	-	-	74	-23.49	321	184	V
2	* 2.48361	48.26	Pk	31.9	-25.2	54.96	-	-	74	-19.04	321	184	V
3	* 2.48351	33	VA1T	31.9	-25.2	39.7	54	-14.3	-	-	321	184	V
4	* 2.48508	33.36	VA1T	31.9	-25.2	40.06	54	-13.94	-	-	321	184	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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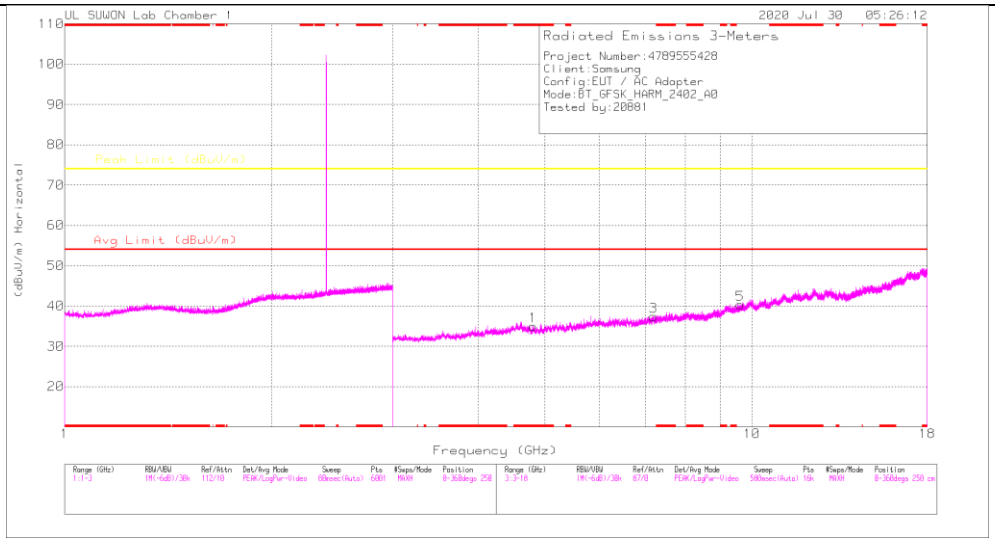
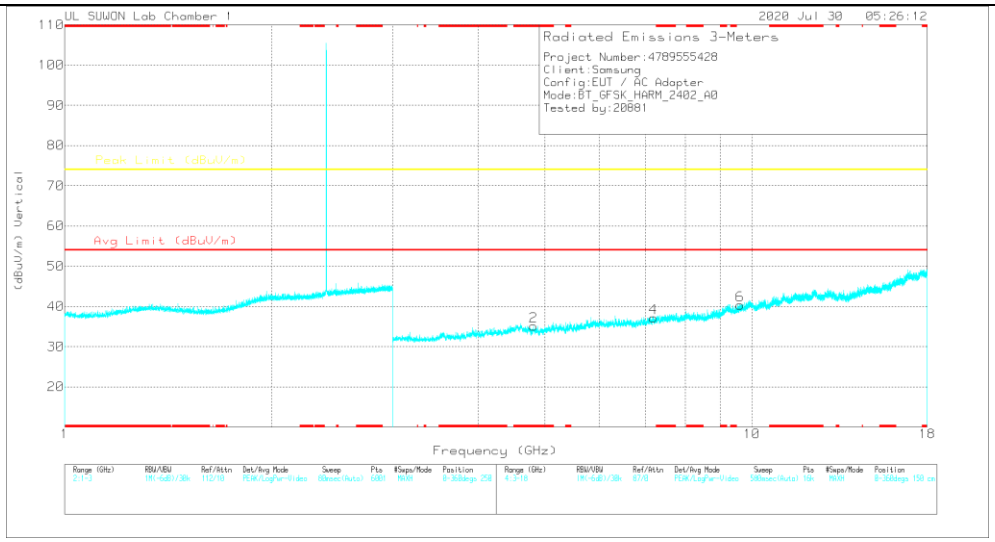
HARMONICS AND SPURIOUS EMISSIONS

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
* 4.80363	40.04	PKFH	34.2	-31.5	42.74	-	-	74	-31.26	0	100	H
* 4.80348	39.63	PKFH	34.2	-31.5	42.33	-	-	74	-31.67	0	100	V
7.20575	36.25	PKFH	35.8	-27.8	44.25	-	-	74	-29.75	0	100	H
7.2057	35.99	PKFH	35.8	-27.8	43.99	-	-	74	-30.01	0	100	V
9.60702	33.99	PKFH	37	-23.2	47.79	-	-	74	-26.21	0	100	H
9.60745	33.35	PKFH	37	-23.2	47.15	-	-	74	-26.85	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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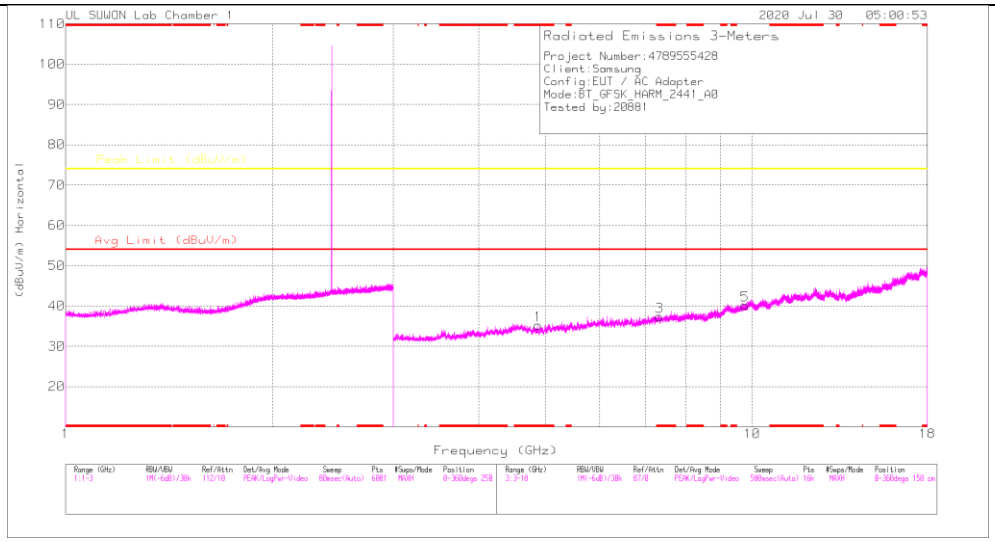
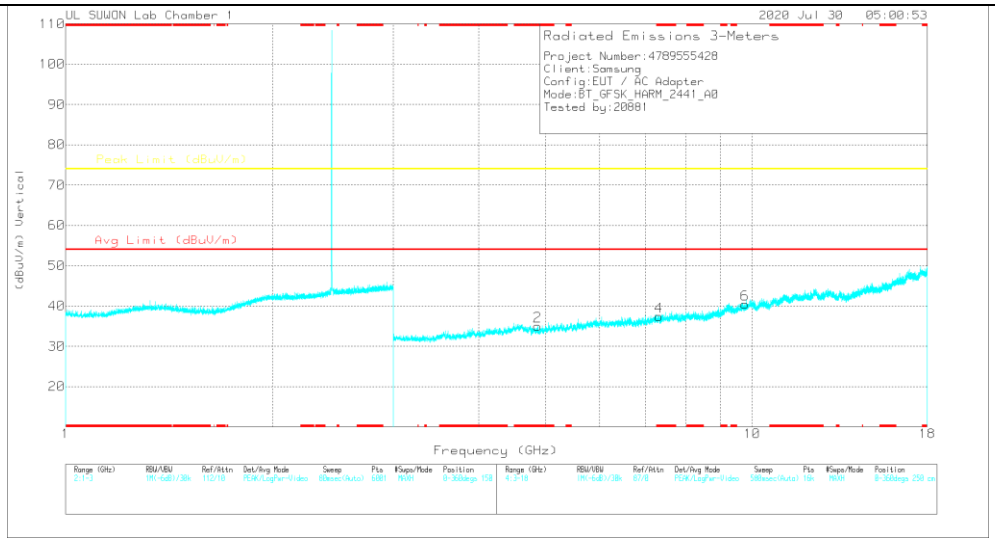
Antenna 1 / 39 CHANNEL RESULTS



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
* 4.88198	39.43	PKFH	34.2	-31.6	42.03	-	-	74	-31.97	0	100	H
* 4.88191	39.23	PKFH	34.2	-31.6	41.83	-	-	74	-32.17	0	100	V
* 7.32466	35.64	PKFH	35.8	-27.3	44.14	-	-	74	-29.86	0	100	H
* 7.323	36.3	PKFH	35.8	-27.2	44.9	-	-	74	-29.1	0	100	V
9.76475	33.07	PKFH	37.2	-23.9	46.37	-	-	74	-27.63	0	100	H
9.76496	33.36	PKFH	37.2	-23.9	46.66	-	-	74	-27.34	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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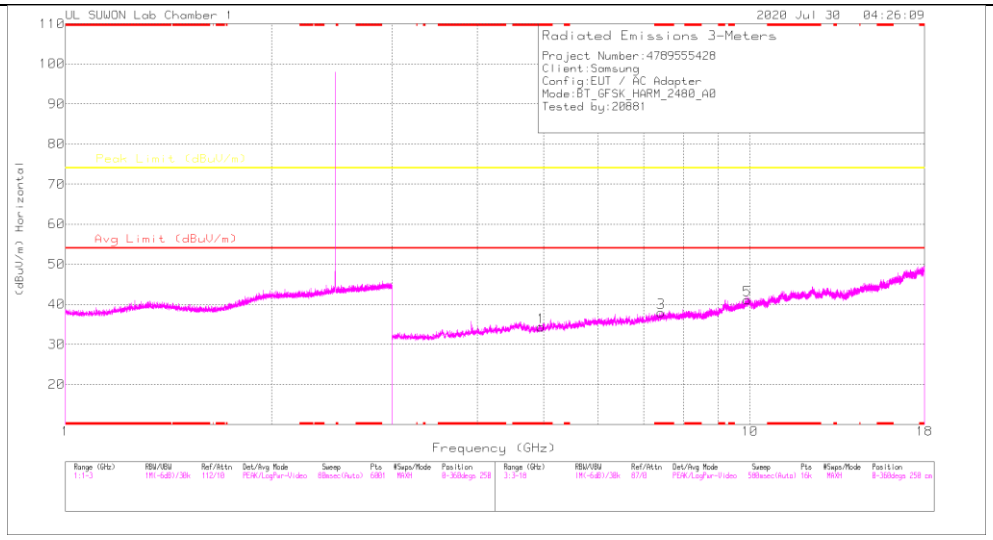
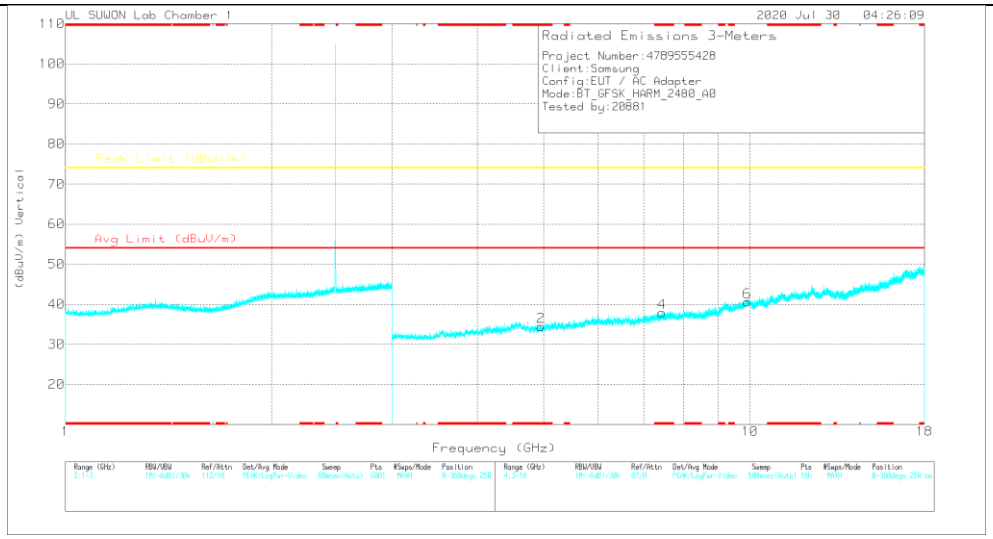
Antenna 1 / 78 CHANNEL RESULTS



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
* 4.95765	39.1	PKFH	34.2	-31.6	41.7	-	-	74	-32.3	0	100	H
* 4.95933	38.71	PKFH	34.2	-31.6	41.31	-	-	74	-32.69	0	100	V
* 7.43882	35.74	PKFH	35.8	-27.1	44.44	-	-	74	-29.56	0	100	H
* 7.43987	36.24	PKFH	35.8	-27.1	44.94	-	-	74	-29.06	0	100	V
9.92025	32.39	PKFH	37.5	-22.1	47.79	-	-	74	-26.21	0	100	H
9.91894	31.93	PKFH	37.5	-22.1	47.33	-	-	74	-26.67	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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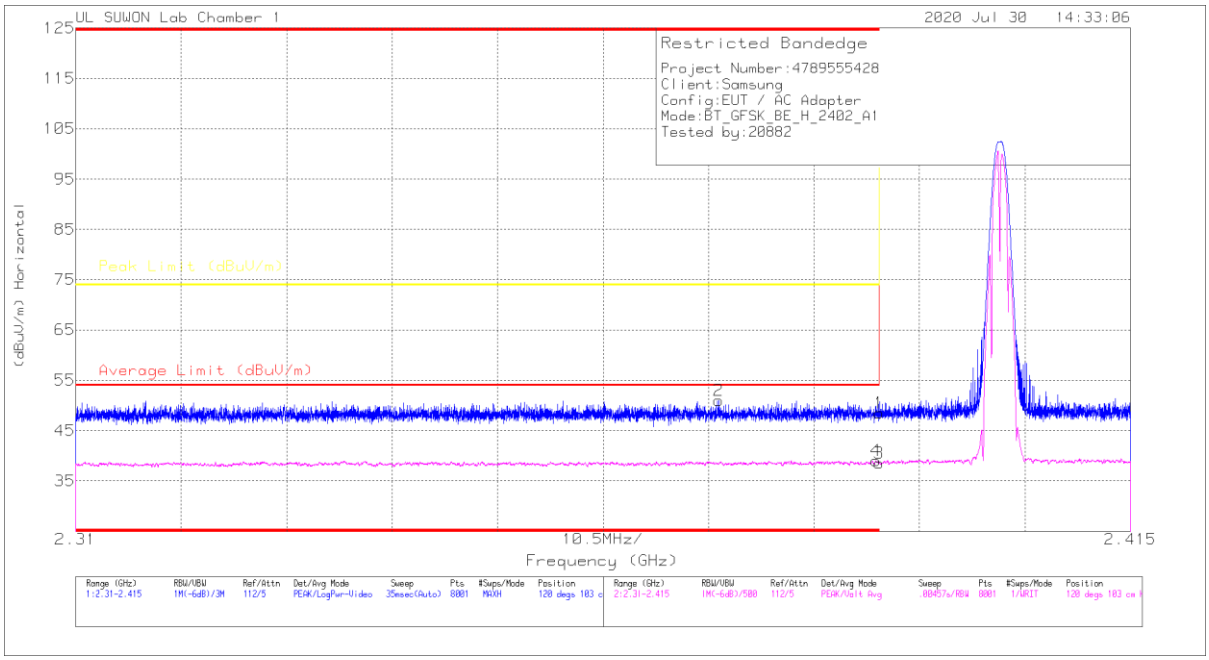
Antenna 2 BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	42.27	Pk	31.7	-25.5	48.47	-	-	74	-25.53	120	103	H
2	* 2.374	44.99	Pk	31.6	-25.6	50.99	-	-	74	-23.01	120	103	H
3	* 2.39	32.34	VA1T	31.7	-25.5	38.54	54	-15.46	-	-	120	103	H
4	* 2.38966	32.81	VA1T	31.7	-25.5	39.01	54	-14.99	-	-	120	103	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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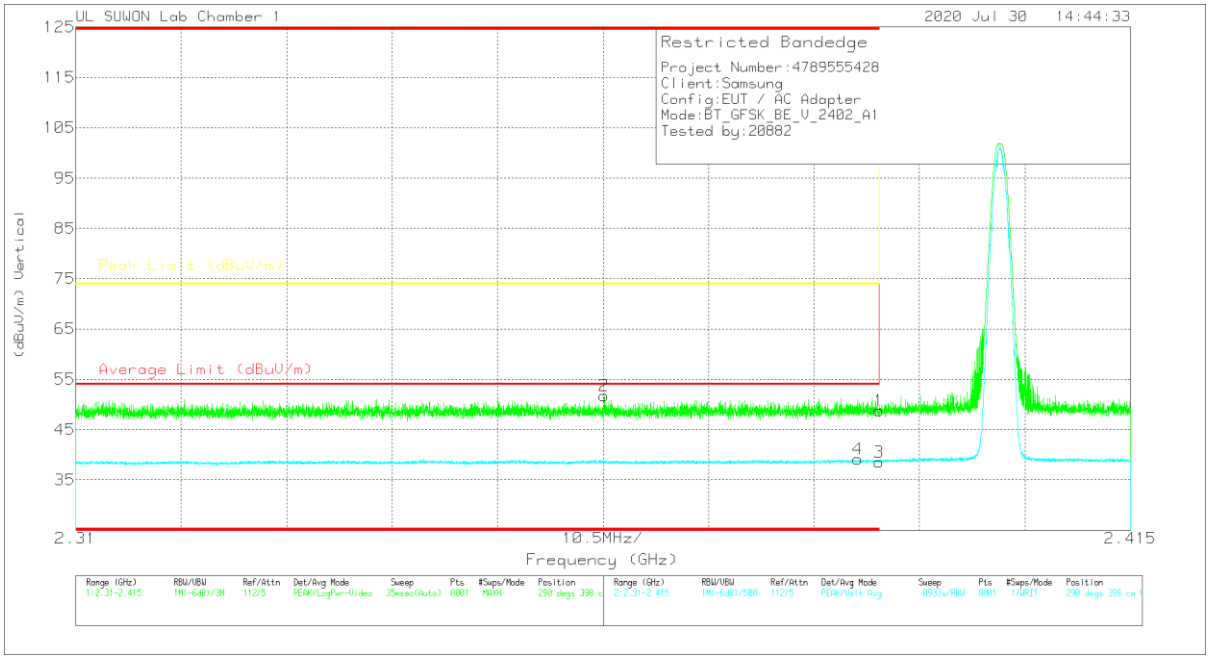
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	42.58	Pk	31.7	-25.5	48.78	-	-	74	-25.22	290	398	V
2	* 2.36262	45.71	Pk	31.6	-25.6	51.71	-	-	74	-22.29	290	398	V
3	* 2.39	32.31	VA1T	31.7	-25.5	38.51	54	-15.49	-	-	290	398	V
4	* 2.38786	32.97	VA1T	31.7	-25.5	39.17	54	-14.83	-	-	290	398	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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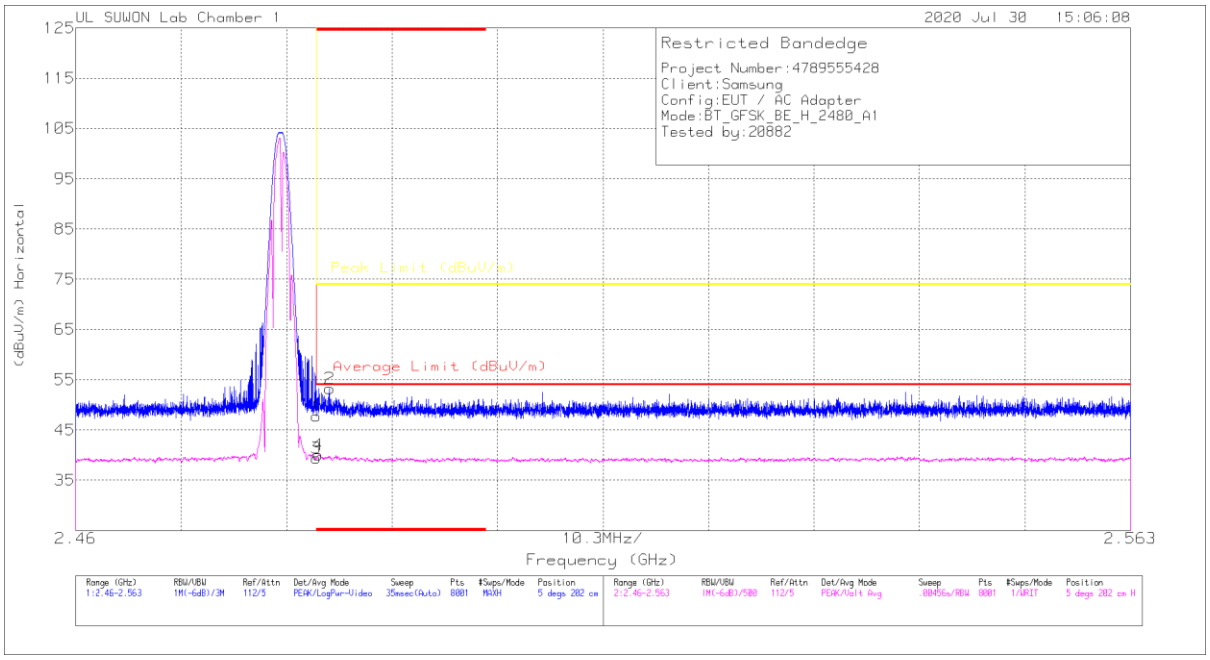
Antenna 2 BANDEDGE (78 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	41.1	Pk	31.9	-25.2	47.8	-	-	74	-26.2	5	202	H
2	* 2.48481	46.6	Pk	31.9	-25.2	53.3	-	-	74	-20.7	5	202	H
3	* 2.48351	32.69	VA1T	31.9	-25.2	39.39	54	-14.61	-	-	5	202	H
4	* 2.4837	33.37	VA1T	31.9	-25.2	40.07	54	-13.93	-	-	5	202	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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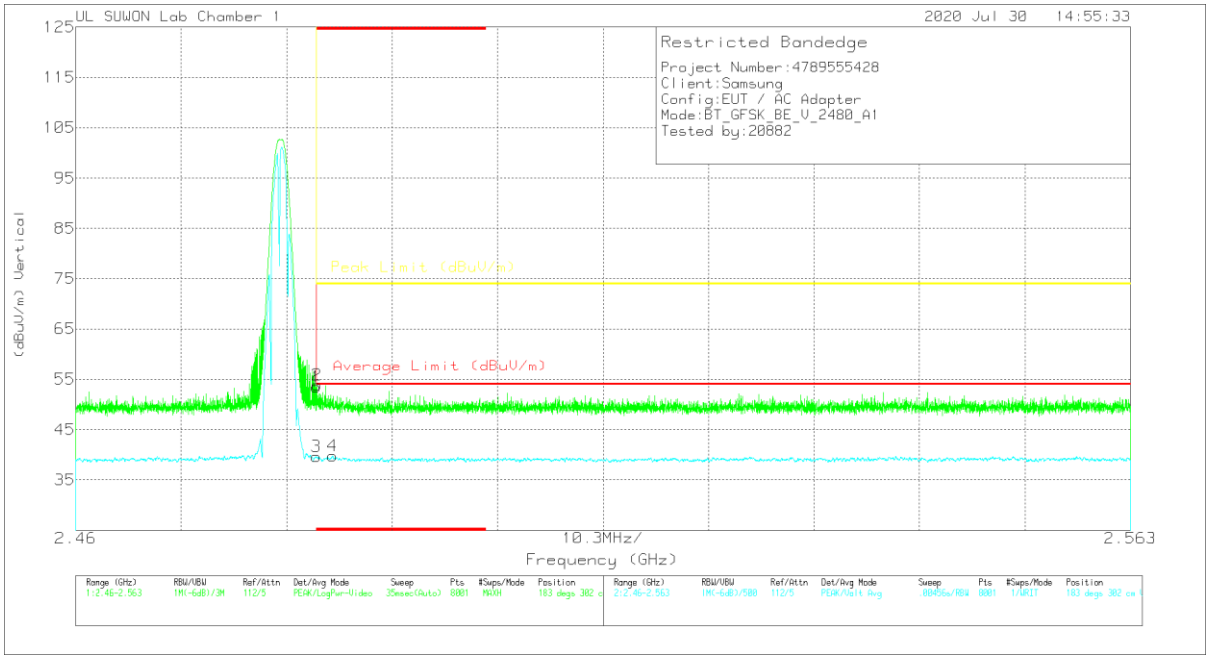
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	46.83	Pk	31.9	-25.2	53.53	-	-	74	-20.47	183	302	V
2	* 2.48355	47.19	Pk	31.9	-25.2	53.89	-	-	74	-20.11	183	302	V
3	* 2.48351	32.94	VA1T	31.9	-25.2	39.64	54	-14.36	-	-	183	302	V
4	* 2.48508	33.03	VA1T	31.9	-25.2	39.73	54	-14.27	-	-	183	302	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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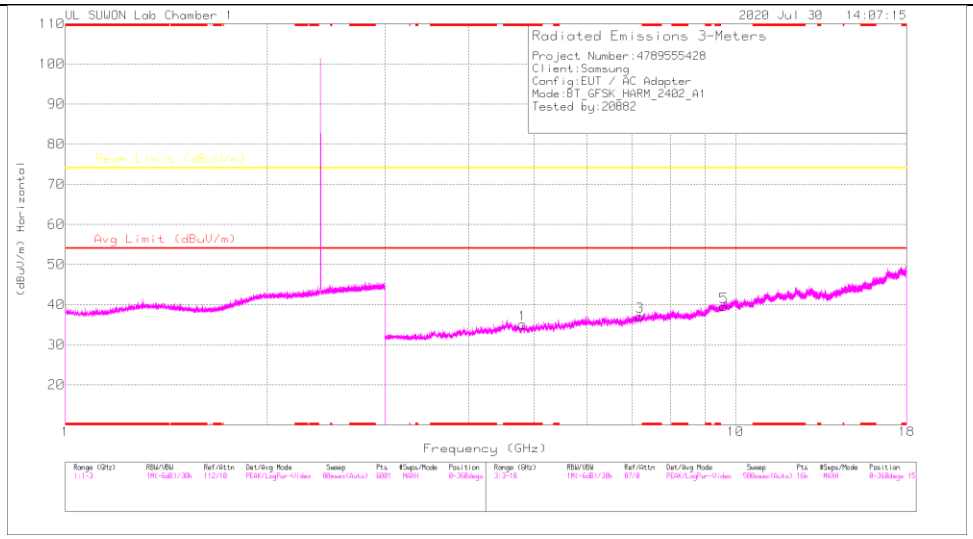
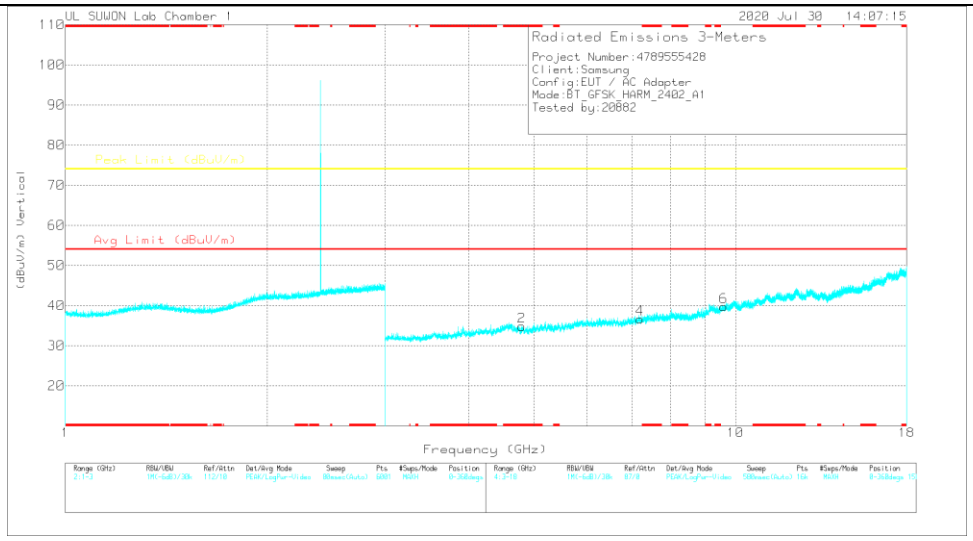
HARMONICS AND SPURIOUS EMISSIONS

Antenna 2 / 0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_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
* 4.80759	39.21	PKFH	34.2	-31.6	41.81	-	-	74	-32.19	360	100	H
* 4.8103	39.41	PKFH	34.2	-31.6	42.01	-	-	74	-31.99	360	100	V
7.20433	36.11	PKFH	35.8	-27.8	44.11	-	-	74	-29.89	360	100	H
7.20468	36.01	PKFH	35.8	-27.8	44.01	-	-	74	-29.99	360	100	V
9.60616	33.36	PKFH	37	-23.3	47.06	-	-	74	-26.94	360	100	H
9.60636	33.24	PKFH	37	-23.3	46.94	-	-	74	-27.06	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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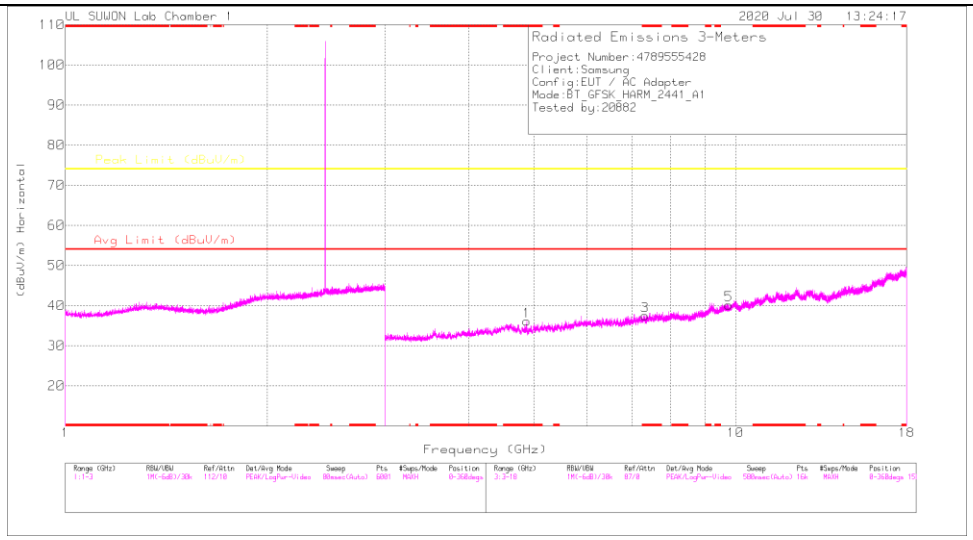
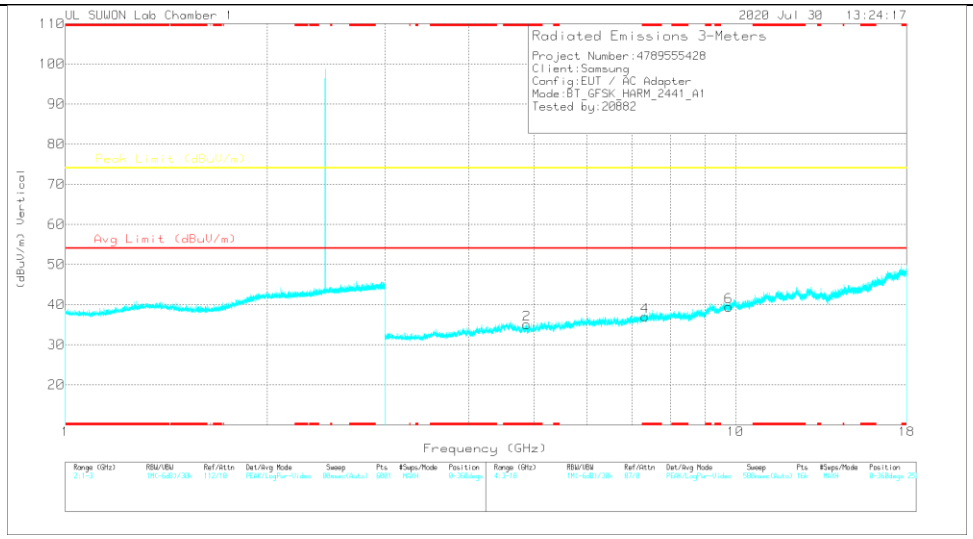
Antenna 2 / 39 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_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
* 4.88169	41.87	PKFH	34.2	-31.6	44.47	-	-	74	-29.53	332	121	H
* 4.88201	32.58	VA1T	34.2	-31.6	35.18	54	-18.82	-	-	332	121	H
* 4.88169	39.64	PKFH	34.2	-31.6	42.24	-	-	74	-31.76	248	101	V
* 4.88193	29.97	VA1T	34.2	-31.6	32.57	54	-21.43	-	-	248	101	V
* 7.32204	35.88	PKFH	35.8	-27.2	44.48	-	-	74	-29.52	360	100	H
* 7.32251	37.05	PKFH	35.8	-27.2	45.65	-	-	74	-28.35	360	100	V
9.76458	33.74	PKFH	37.2	-23.9	47.04	-	-	74	-26.96	360	100	H
9.76401	34.35	PKFH	37.2	-24	47.55	-	-	74	-26.45	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
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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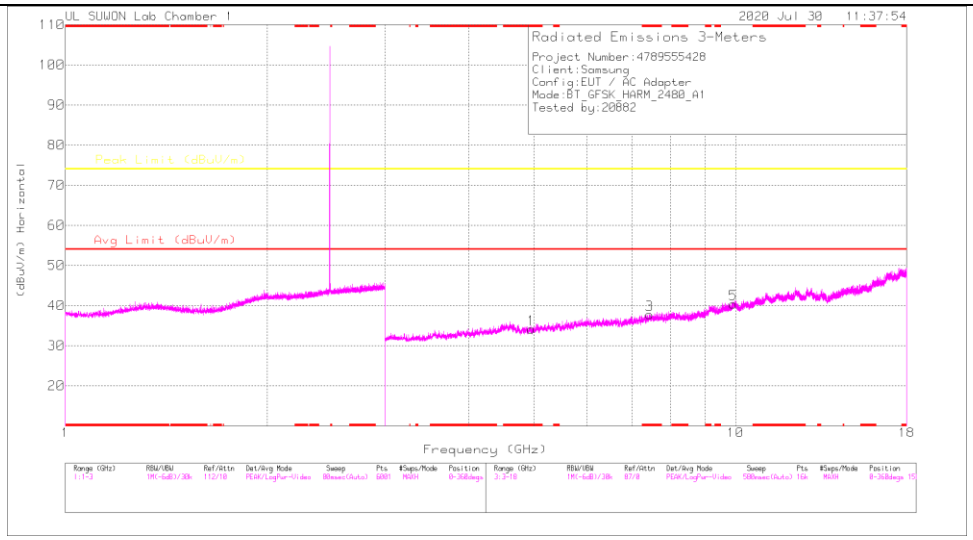
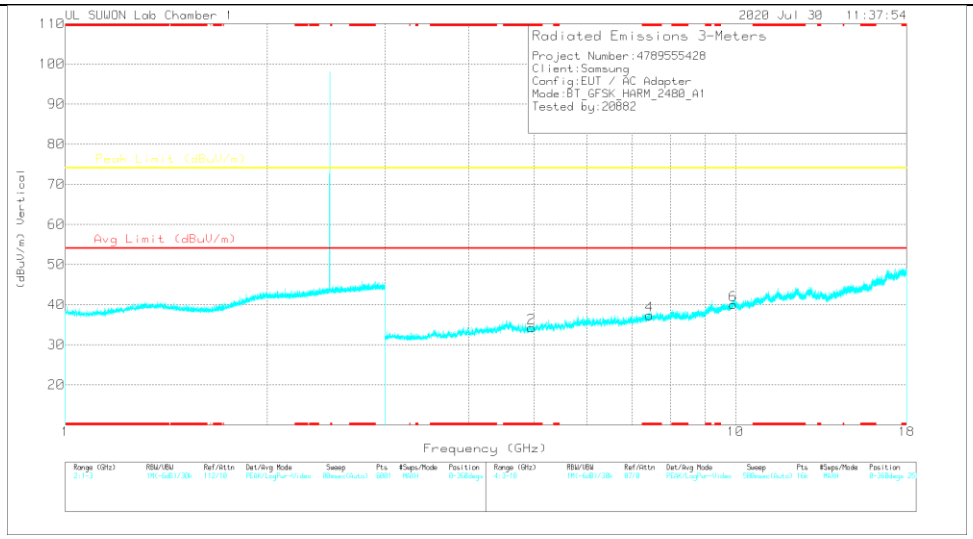
Antenna 2 / 78 CHANNEL RESULTS



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
* 4.96082	38.52	PKFH	34.2	-31.6	41.12	-	-	74	-32.88	0	100	H
* 4.9603	40.11	PKFH	34.2	-31.6	42.71	-	-	74	-31.29	0	100	V
* 7.4394	35.37	PKFH	35.8	-27.1	44.07	-	-	74	-29.93	0	100	H
* 7.43845	36.78	PKFH	35.8	-27.2	45.38	-	-	74	-28.62	0	100	V
9.91906	32.99	PKFH	37.5	-22.1	48.39	-	-	74	-25.61	0	100	H
9.9175	32.7	PKFH	37.5	-22.1	48.1	-	-	74	-25.9	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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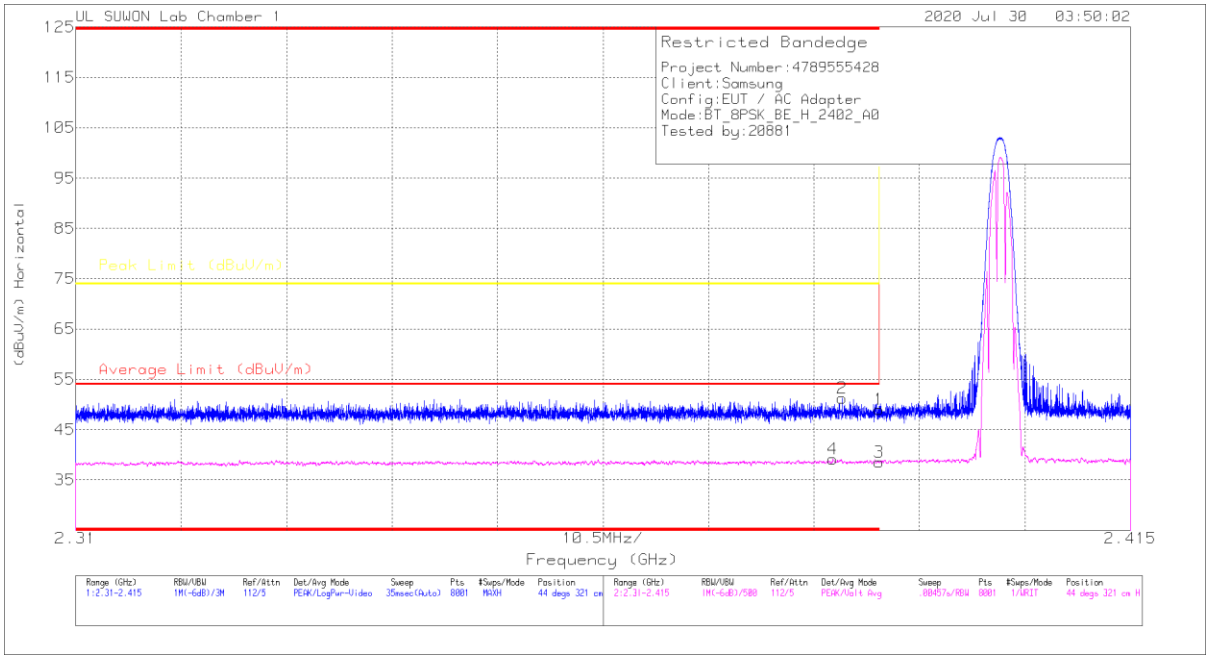
10.1.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Antenna 1 / BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	42.81	Pk	31.7	-25.5	49.01	-	-	74	-24.99	44	321	H
2	* 2.3863	45.05	Pk	31.7	-25.5	51.25	-	-	74	-22.75	44	321	H
3	* 2.39	32.3	VA1T	31.7	-25.5	38.5	54	-15.5	-	-	44	321	H
4	* 2.38539	32.96	VA1T	31.7	-25.5	39.16	54	-14.84	-	-	44	321	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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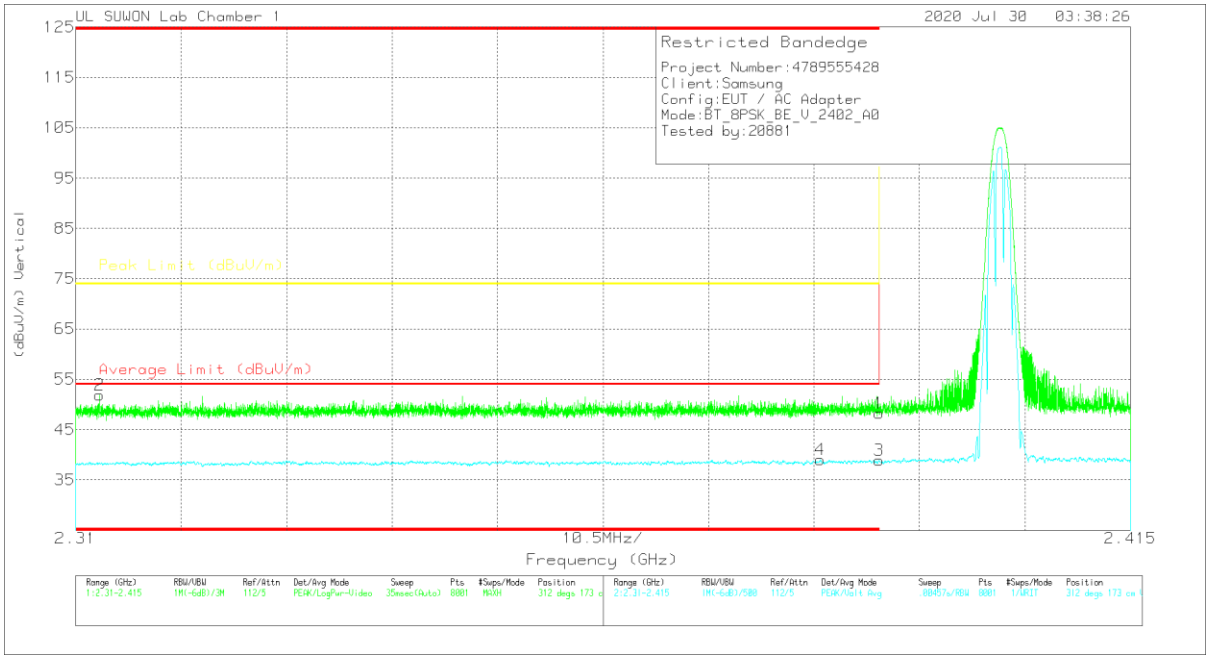
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	42.01	Pk	31.7	-25.5	48.21	-	-	74	-25.79	312	173	V
2	* 2.31234	46.03	Pk	31.5	-25.6	51.93	-	-	74	-22.07	312	173	V
3	* 2.39	32.71	VA1T	31.7	-25.5	38.91	54	-15.09	-	-	312	173	V
4	* 2.38414	32.79	VA1T	31.7	-25.5	38.99	54	-15.01	-	-	312	173	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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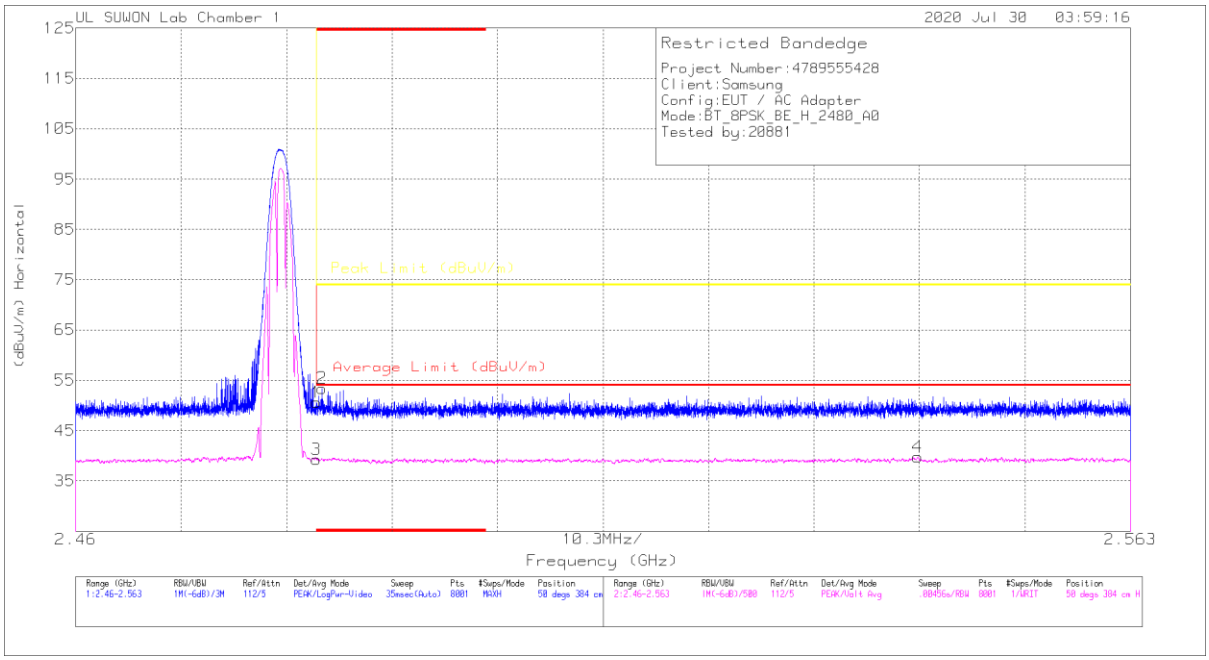
Antenna 1 / BANDEDGE (78 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	43.98	Pk	31.9	-25.2	50.68	-	-	74	-23.32	50	384	H
2	* 2.48406	46.63	Pk	31.9	-25.1	53.43	-	-	74	-20.57	50	384	H
3	* 2.48351	32.61	VA1T	31.9	-25.2	39.31	54	-14.69	-	-	50	384	H
4	2.54222	32.84	VA1T	32	-25.1	39.74	54	-14.26	-	-	50	384	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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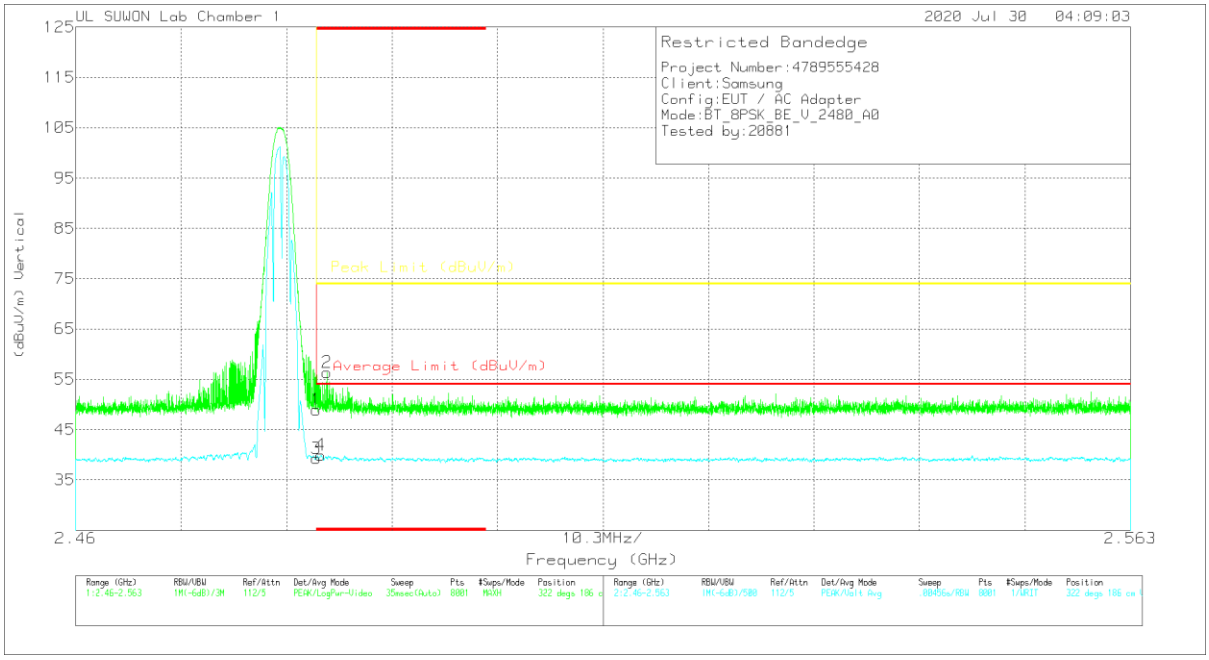
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	42.25	Pk	31.9	-25.2	48.95	-	-	74	-25.05	322	186	V
2	* 2.48453	49.72	Pk	31.9	-25.2	56.42	-	-	74	-17.58	322	186	V
3	* 2.48351	32.64	VA1T	31.9	-25.2	39.34	54	-14.66	-	-	322	186	V
4	* 2.48393	33.27	VA1T	31.9	-25.2	39.97	54	-14.03	-	-	322	186	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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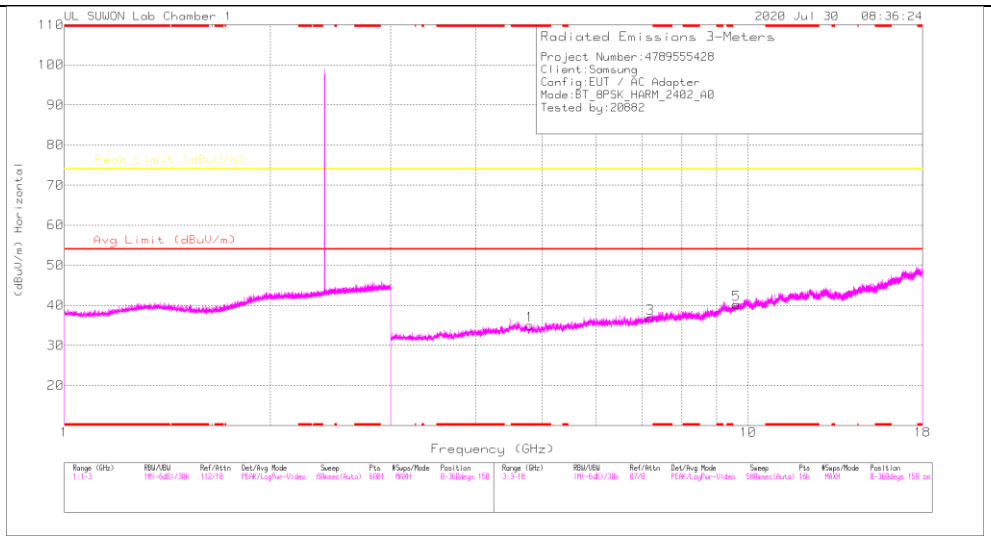
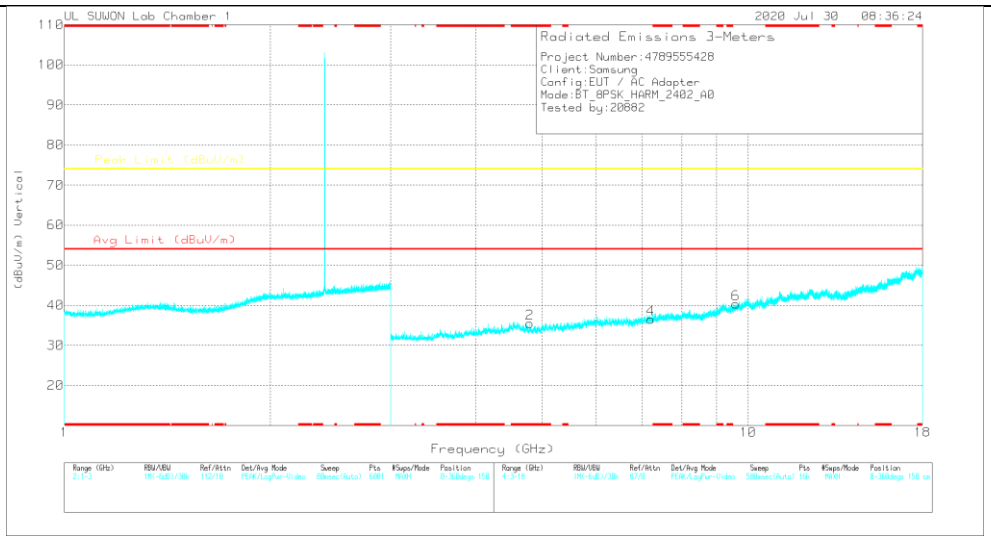
HARMONICS AND SPURIOUS EMISSIONS

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
* 4.80018	39.31	PKFH	34.2	-31.5	42.01	-	-	74	-31.99	0	100	H
* 4.80451	39.75	PKFH	34.2	-31.5	42.45	-	-	74	-31.55	0	100	V
7.2043	36.44	PKFH	35.8	-27.8	44.44	-	-	74	-29.56	0	100	H
7.20589	36.04	PKFH	35.8	-27.8	44.04	-	-	74	-29.96	0	100	V
9.60639	33.74	PKFH	37	-23.3	47.44	-	-	74	-26.56	0	100	H
9.60891	34.41	PKFH	37	-23.2	48.21	-	-	74	-25.79	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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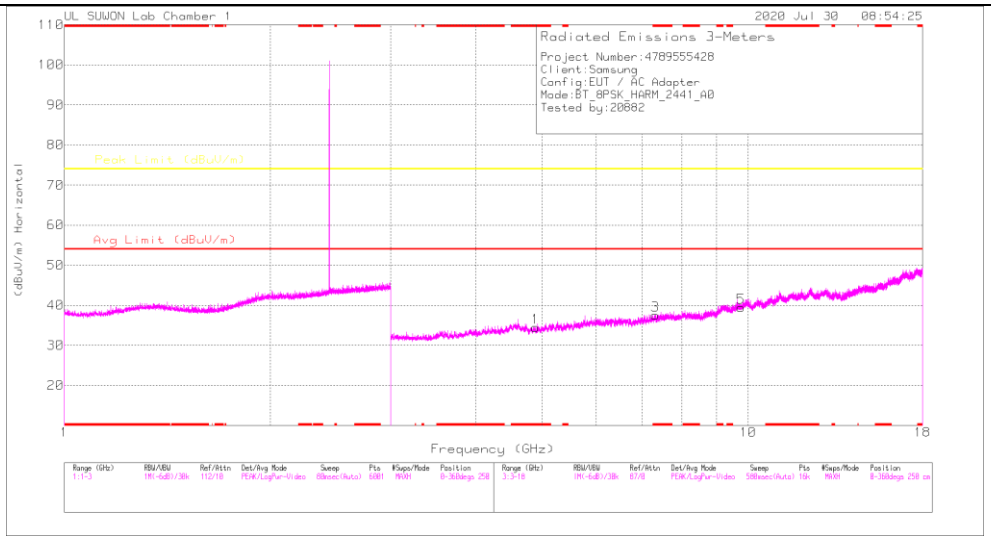
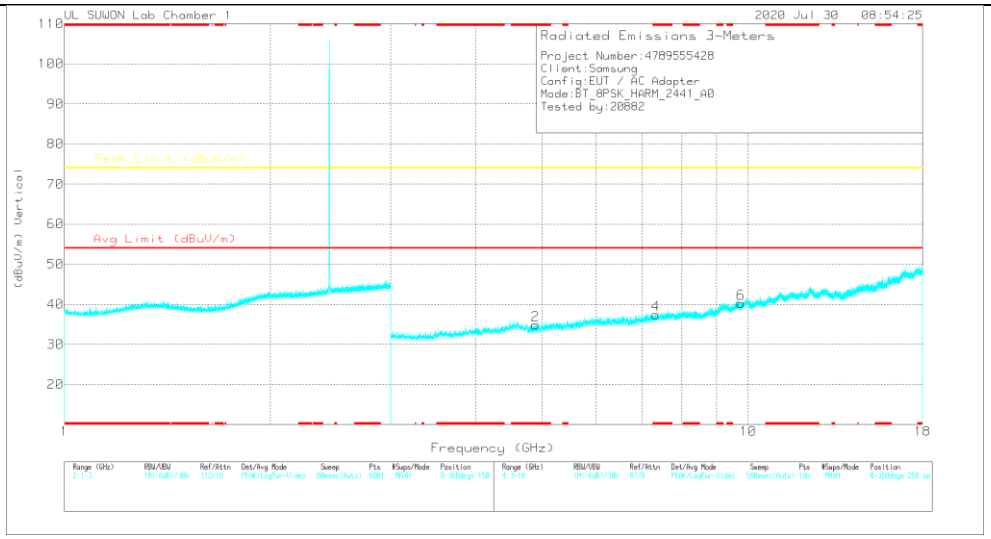
Antenna 1 / 39 CHANNEL RESULTS



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
* 4.88807	41.57	PKFH	34.2	-31.7	44.07	-	-	74	-29.93	0	100	H
* 4.88068	39.71	PKFH	34.2	-31.6	42.31	-	-	74	-31.69	0	100	V
* 7.32372	35.88	PKFH	35.8	-27.2	44.48	-	-	74	-29.52	0	100	H
* 7.32282	36.96	PKFH	35.8	-27.2	45.56	-	-	74	-28.44	0	100	V
9.76222	33.51	PKFH	37.2	-23.9	46.81	-	-	74	-27.19	0	100	H
9.76302	33.25	PKFH	37.2	-23.9	46.55	-	-	74	-27.45	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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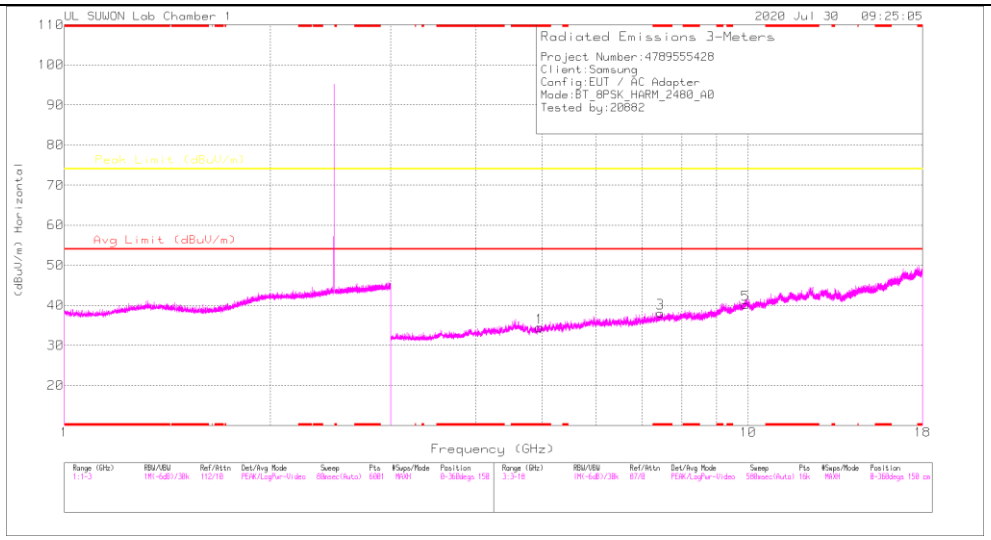
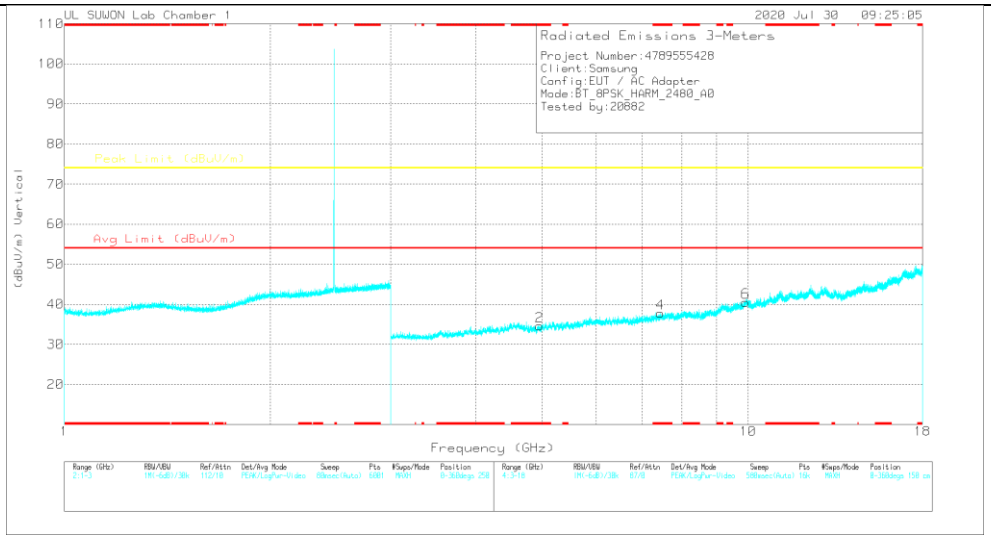
Antenna 1 / 78 CHANNEL RESULTS



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
* 4.95298	39.79	PKFH	34.2	-31.7	42.29	-	-	74	-31.71	0	100	H
* 4.9613	39.17	PKFH	34.2	-31.6	41.77	-	-	74	-32.23	0	100	V
* 7.44007	36.89	PKFH	35.8	-27.1	45.59	-	-	74	-28.41	0	100	H
* 7.44167	35.74	PKFH	35.8	-27.1	44.44	-	-	74	-29.56	0	100	V
9.91913	32.52	PKFH	37.5	-22.1	47.92	-	-	74	-26.08	0	100	H
9.91805	33.23	PKFH	37.5	-22.1	48.63	-	-	74	-25.37	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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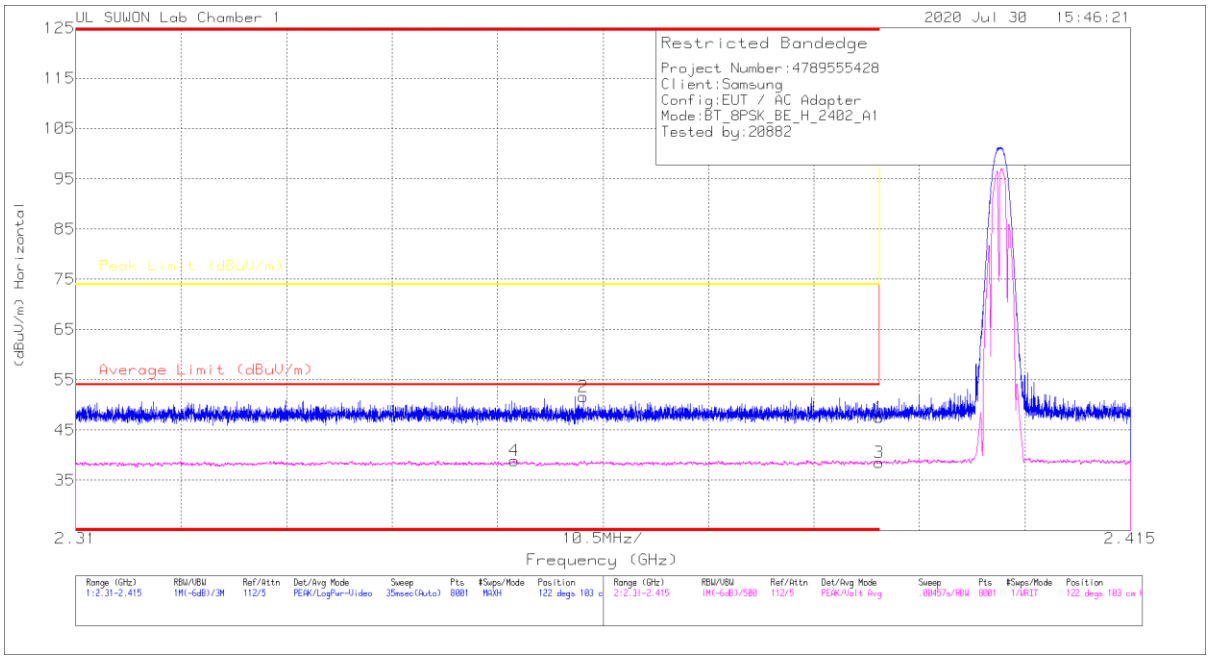
Antenna 2 / BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	41.37	Pk	31.7	-25.5	47.57	-	-	74	-26.43	122	103	H
2	* 2.36052	45.59	Pk	31.6	-25.6	51.59	-	-	74	-22.41	122	103	H
3	* 2.39	32.39	VA1T	31.7	-25.5	38.59	54	-15.41	-	-	122	103	H
4	* 2.35364	32.87	VA1T	31.6	-25.5	38.97	54	-15.03	-	-	122	103	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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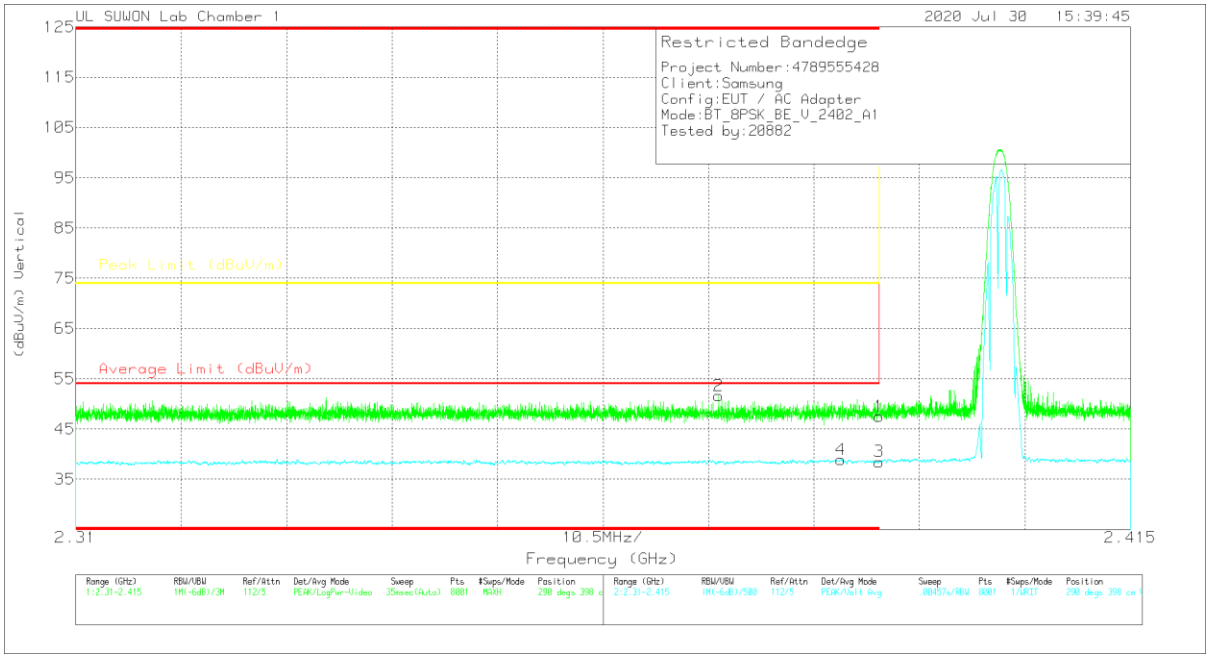
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	41.32	Pk	31.7	-25.5	47.52	-	-	74	-26.48	290	398	V
2	* 2.374	45.61	Pk	31.6	-25.6	51.61	-	-	74	-22.39	290	398	V
3	* 2.39	32.28	VA1T	31.7	-25.5	38.48	54	-15.52	-	-	290	398	V
4	* 2.38618	32.76	VA1T	31.7	-25.5	38.96	54	-15.04	-	-	290	398	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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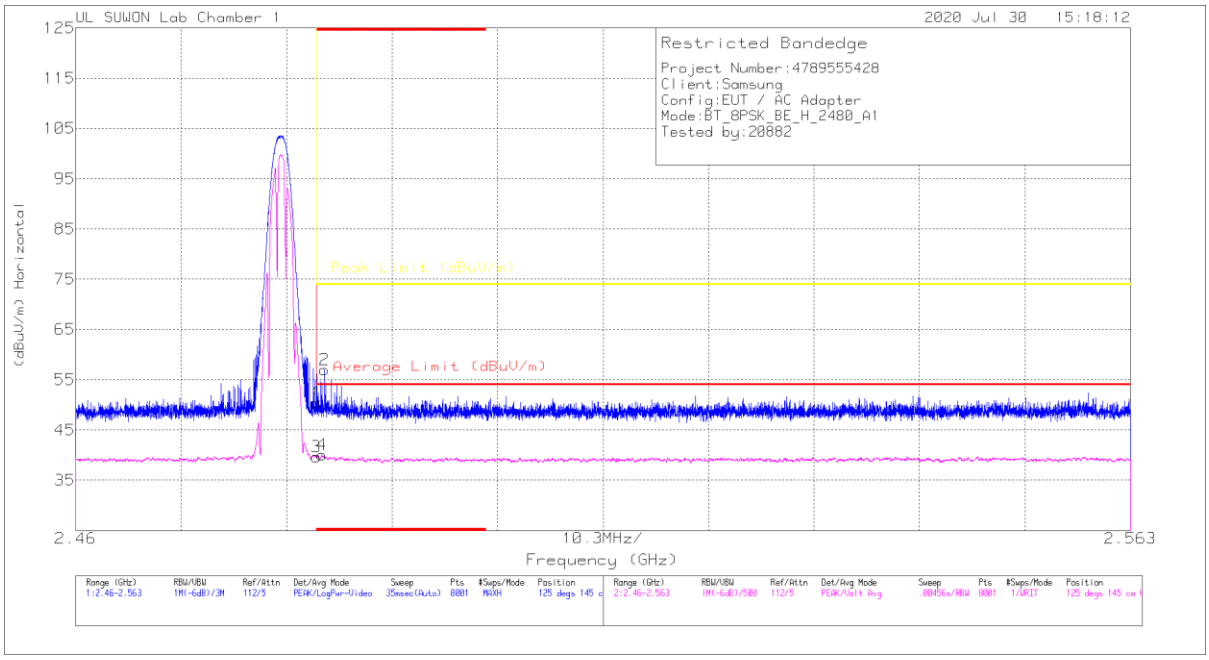
Antenna 2 / BANDEDGE (78 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	43.67	Pk	31.9	-25.2	50.37	-	-	74	-23.63	125	145	H
2	* 2.4843	50.2	Pk	31.9	-25.1	57	-	-	74	-17	125	145	H
3	* 2.48351	32.94	VA1T	31.9	-25.2	39.64	54	-14.36	-	-	125	145	H
4	* 2.48402	33.23	VA1T	31.9	-25.1	40.03	54	-13.97	-	-	125	145	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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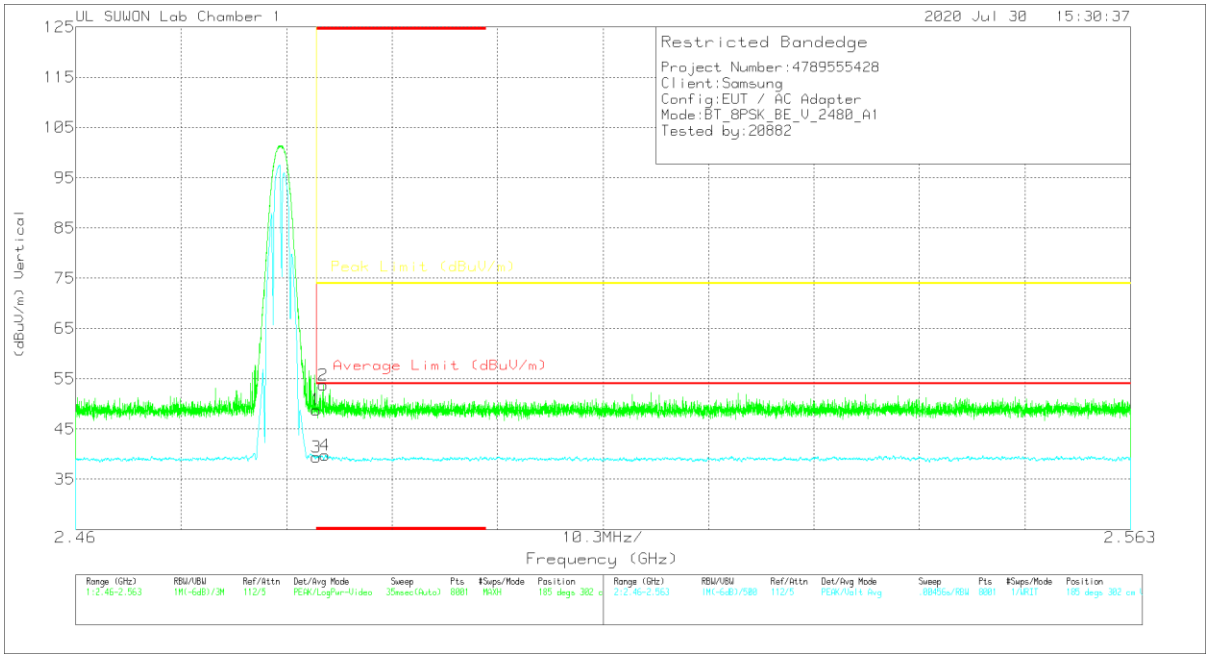
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	42.12	Pk	31.9	-25.2	48.82	-	-	74	-25.18	185	302	V
2	* 2.48418	46.98	Pk	31.9	-25.1	53.78	-	-	74	-20.22	185	302	V
3	* 2.48351	32.69	VA1T	31.9	-25.2	39.39	54	-14.61	-	-	185	302	V
4	* 2.48437	33.09	VA1T	31.9	-25.2	39.79	54	-14.21	-	-	185	302	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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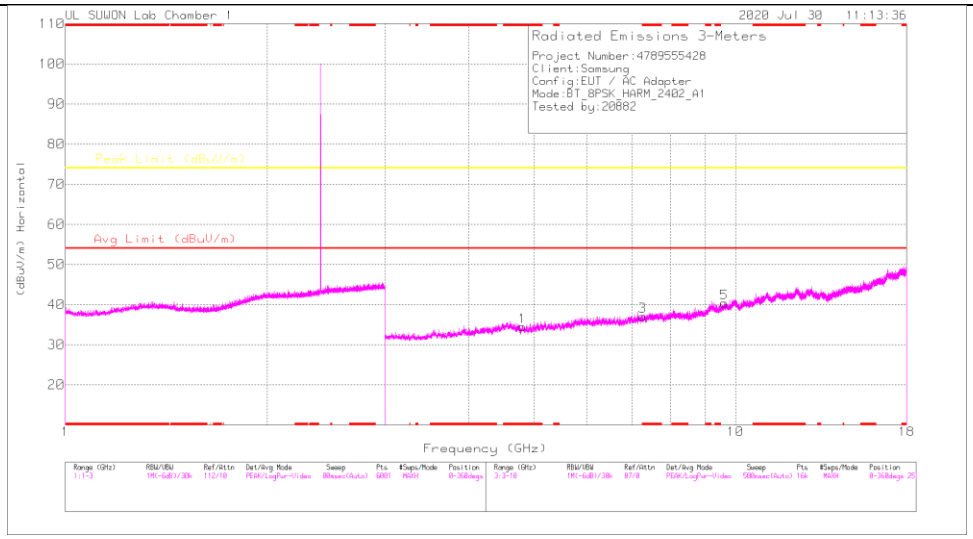
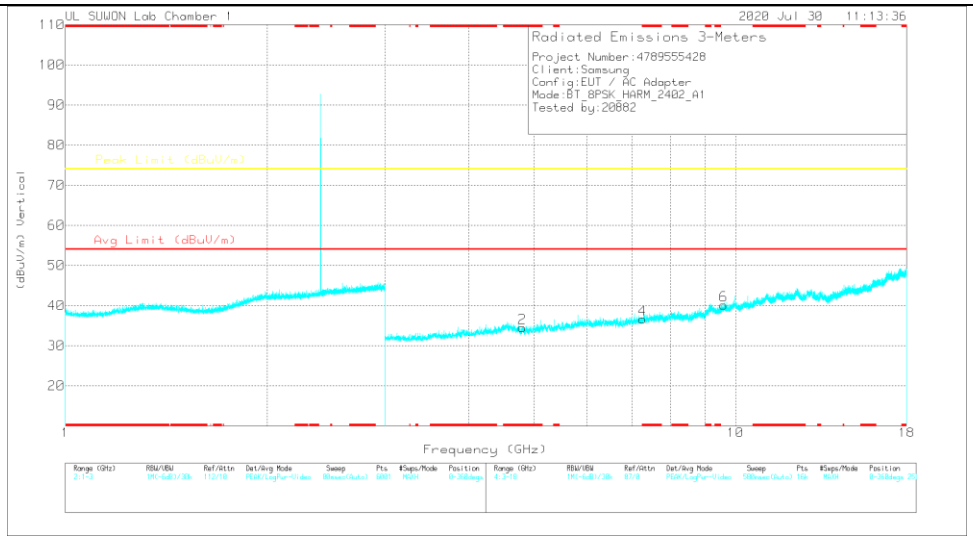
HARMONICS AND SPURIOUS EMISSIONS

Antenna 2 / 0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_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
* 4.80381	39.41	PKFH	34.2	-31.5	42.11	-	-	74	-31.89	0	100	H
* 4.80487	39.2	PKFH	34.2	-31.5	41.9	-	-	74	-32.1	0	100	V
* 7.25891	35.69	PKFH	35.8	-27.5	43.99	-	-	74	-30.01	0	100	H
* 7.25953	36.62	PKFH	35.8	-27.5	44.92	-	-	74	-29.08	0	100	V
9.62118	32.68	PKFH	37	-23.1	46.58	-	-	74	-27.42	0	100	H
9.62143	33.2	PKFH	37	-23.1	47.1	-	-	74	-26.9	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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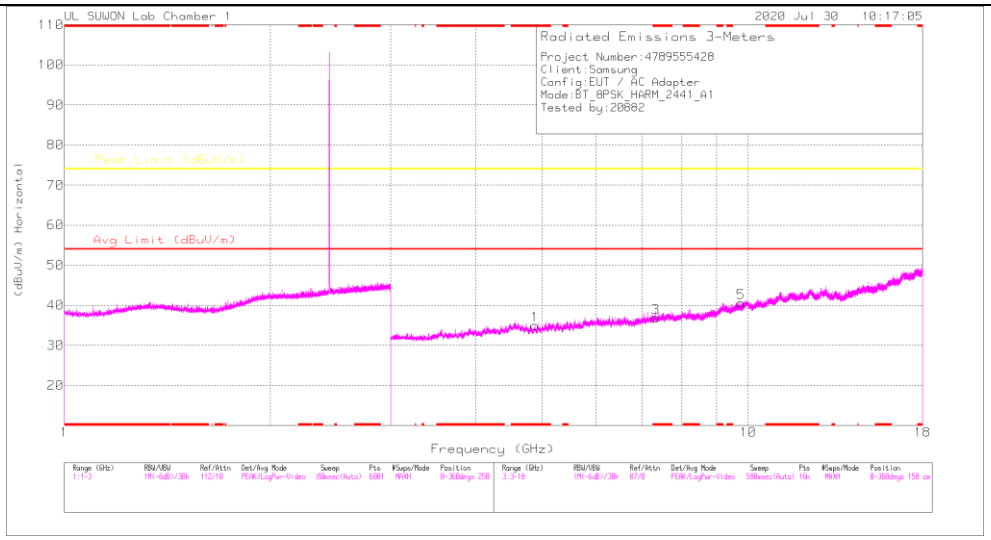
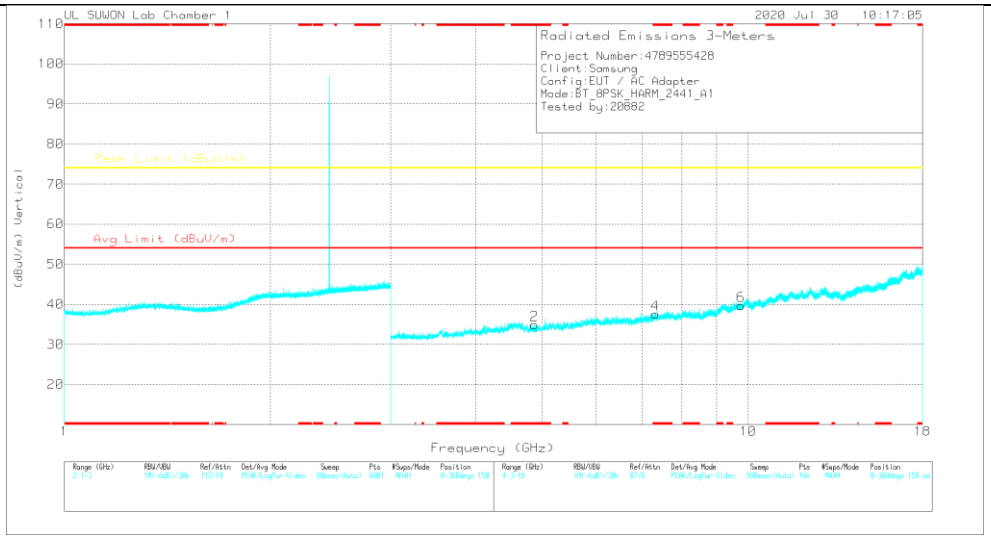
Antenna 2 / 39 CHANNEL RESULTS



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
* 4.87951	39.65	PKFH	34.2	-31.6	42.25	-	-	74	-31.75	0	100	H
* 4.8817	39.07	PKFH	34.2	-31.6	41.67	-	-	74	-32.33	0	100	V
* 7.32335	36.61	PKFH	35.8	-27.2	45.21	-	-	74	-28.79	0	100	H
* 7.32498	36.64	PKFH	35.8	-27.3	45.14	-	-	74	-28.86	0	100	V
9.76556	33.33	PKFH	37.2	-23.9	46.63	-	-	74	-27.37	0	100	H
9.76573	33.18	PKFH	37.2	-23.9	46.48	-	-	74	-27.52	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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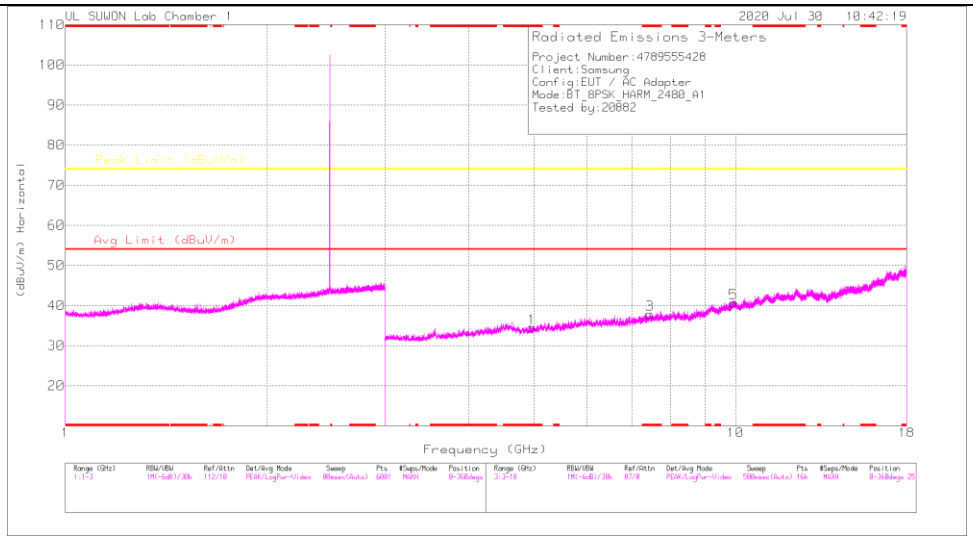
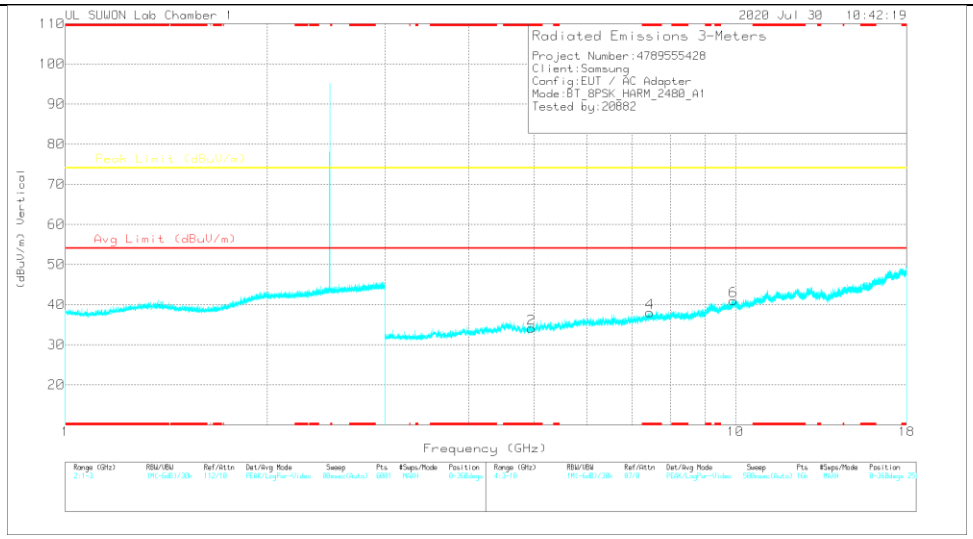
Antenna 2 / 78 CHANNEL RESULTS



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
* 4.96277	38.58	PKFH	34.2	-31.6	41.18	-	-	74	-32.82	0	100	H
* 4.96414	38.35	PKFH	34.2	-31.5	41.05	-	-	74	-32.95	0	100	V
* 7.4476	36.09	PKFH	35.8	-27	44.89	-	-	74	-29.11	0	100	H
* 7.44771	36.52	PKFH	35.8	-27	45.32	-	-	74	-28.68	0	100	V
9.93007	31.83	PKFH	37.5	-21.6	47.73	-	-	74	-26.27	0	100	H
9.93236	32.21	PKFH	37.5	-21.5	48.21	-	-	74	-25.79	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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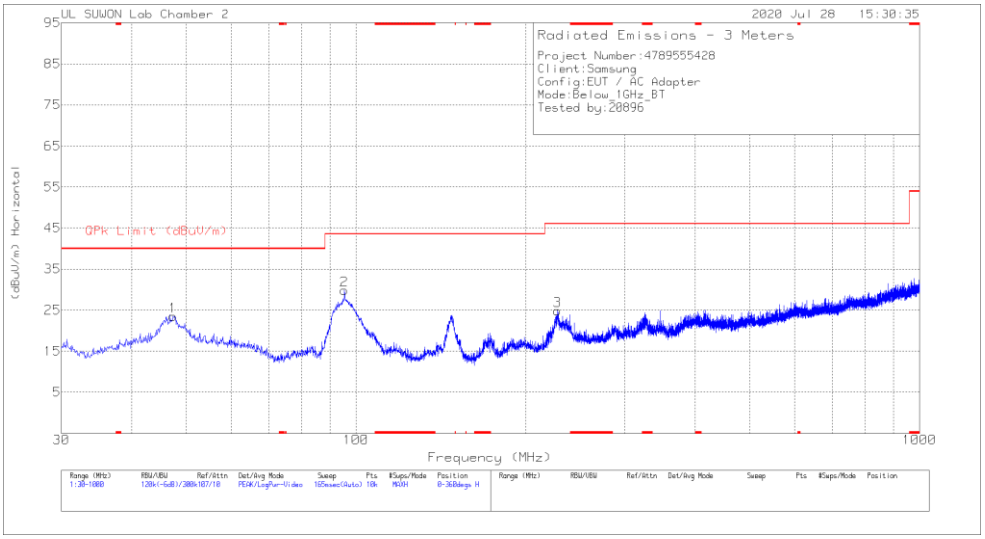
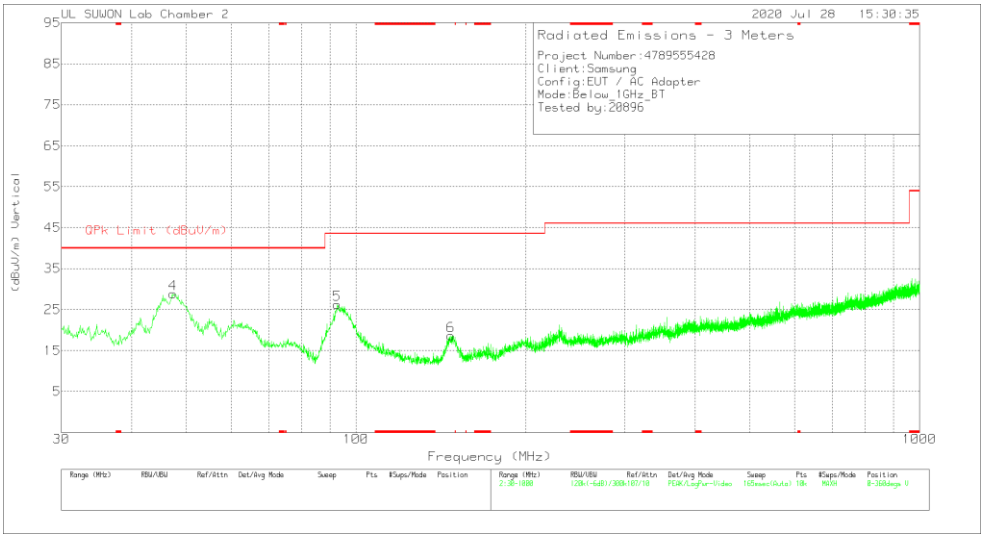
10.2. WORST CASE BELOW 1 GHZ

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



HORIZONTAL



VERTICAL

Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_749	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	47.363	35.45	Pk	19.8	-31.7	23.55	40	-16.45	0-360	300	H
2	95.378	43.93	Pk	17.3	-31.4	29.83	43.52	-13.69	0-360	300	H
3	227.783	37.32	Pk	18.2	-30.7	24.82	46.02	-21.2	0-360	100	H
4	47.363	40.81	Pk	19.8	-31.7	28.91	40	-11.09	0-360	200	V
5	92.662	41.07	Pk	16.6	-31.4	26.27	43.52	-17.25	0-360	100	V
6	147.467	35.68	Pk	14.1	-31.1	18.68	43.52	-24.84	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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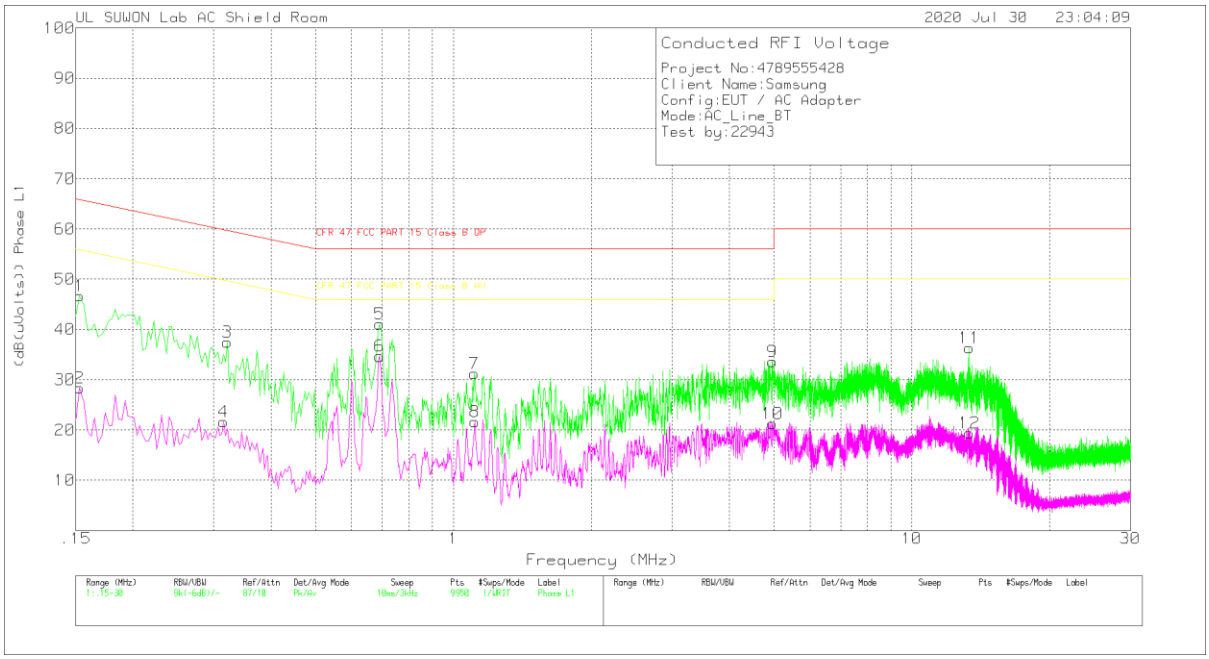
11.1.1. AC Power Line Host

LINE 1 RESULTS



Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With Ex_L1[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)
1	.153	36.83	Pk	9.8	.1	46.73	65.84	-19.11	-	-
2	.153	18.52	Av	9.8	.1	28.42	-	-	55.84	-27.42
3	.321	27.43	Pk	9.8	.2	37.43	59.68	-22.25	-	-
4	.315	11.69	Av	9.8	.2	21.69	-	-	49.84	-28.15
5	.69	31	Pk	9.9	.2	41.1	56	-14.9	-	-
6	.69	24.57	Av	9.9	.2	34.67	-	-	46	-11.33
7	1.11	21.16	Pk	9.8	.3	31.26	56	-24.74	-	-
8	1.113	11.54	Av	9.8	.3	21.64	-	-	46	-24.36
9	4.974	23.5	Pk	9.8	.3	33.6	56	-22.4	-	-
10	4.965	11.14	Av	9.8	.3	21.24	-	-	46	-24.76
11	13.368	25.89	Pk	10.1	.4	36.39	60	-23.61	-	-
12	13.368	8.93	Av	10.1	.4	19.43	-	-	50	-30.57

Pk - Peak detector
Av - Average detection

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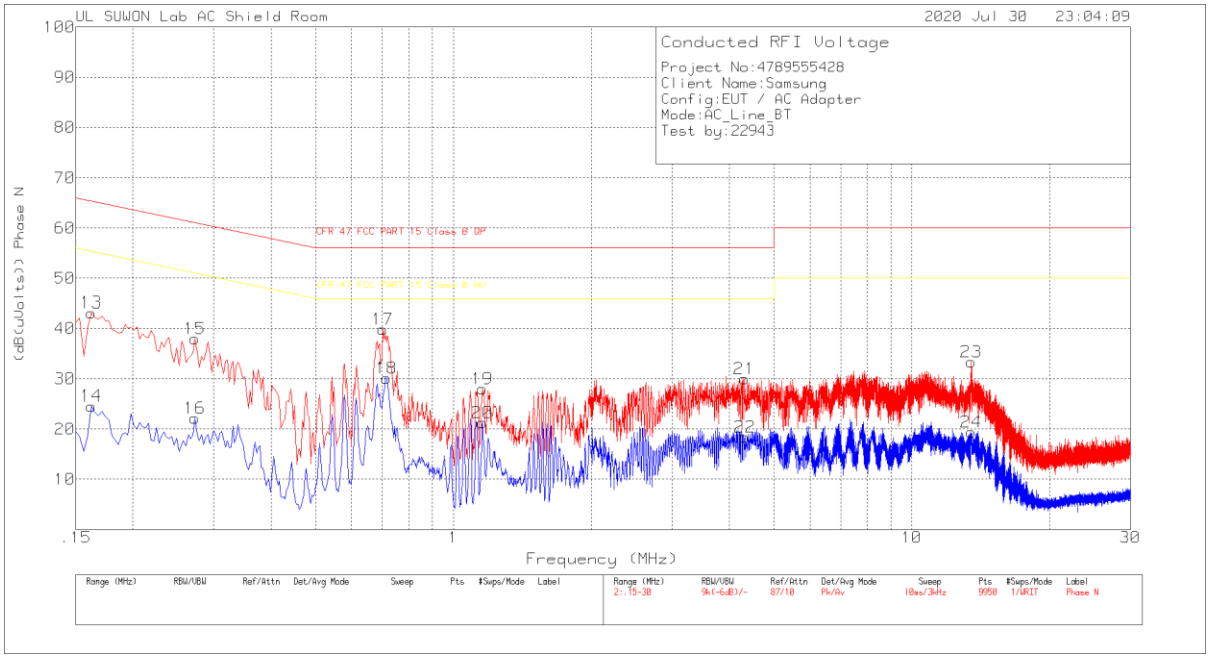
LINE 2 RESULTS



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	.162	33.04	Pk	10	.1	43.14	65.36	-22.22	-	-
14	.162	14.47	Av	10	.1	24.57	-	-	55.36	-30.79
15	.273	28.05	Pk	9.7	.2	37.95	61.03	-23.08	-	-
16	.273	12.22	Av	9.7	.2	22.12	-	-	51.03	-28.91
17	.702	29.79	Pk	9.9	.2	39.89	56	-16.11	-	-
18	.714	20.03	Av	9.9	.2	30.13	-	-	46	-15.87
19	1.158	17.93	Pk	9.8	.3	28.03	56	-27.97	-	-
20	1.158	11.13	Av	9.8	.3	21.23	-	-	46	-24.77
21	4.317	19.86	Pk	9.8	.3	29.96	56	-26.04	-	-
22	4.323	8.27	Av	9.8	.3	18.37	-	-	46	-27.63
23	13.479	22.86	Pk	10.1	.4	33.36	60	-26.64	-	-
24	13.491	8.88	Av	10.1	.4	19.38	-	-	50	-30.62

Pk - Peak detector
Av - Average detection

END OF TEST REPORT

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