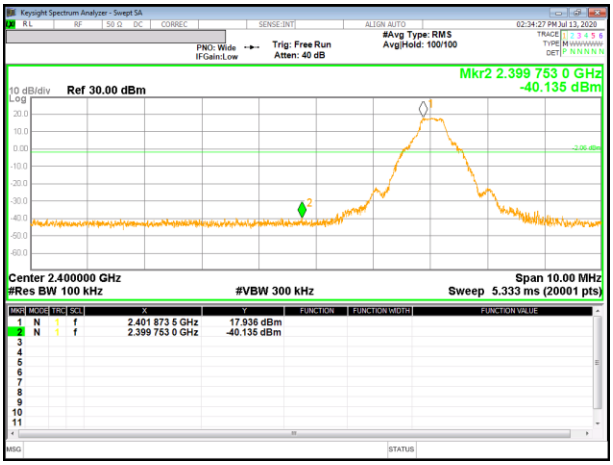
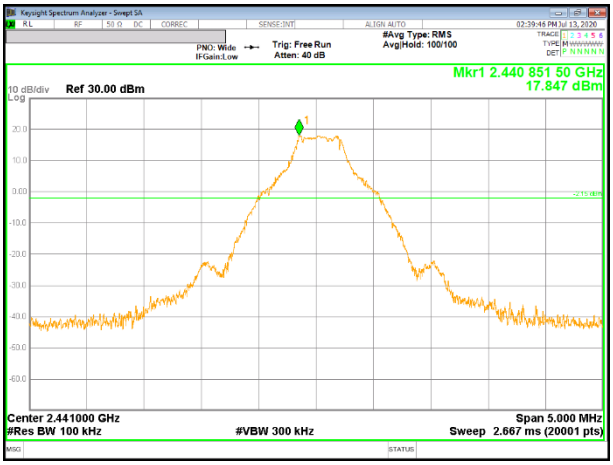
SPURIOUS EMISSIONS, NON-HOPPING(Antenna 2)



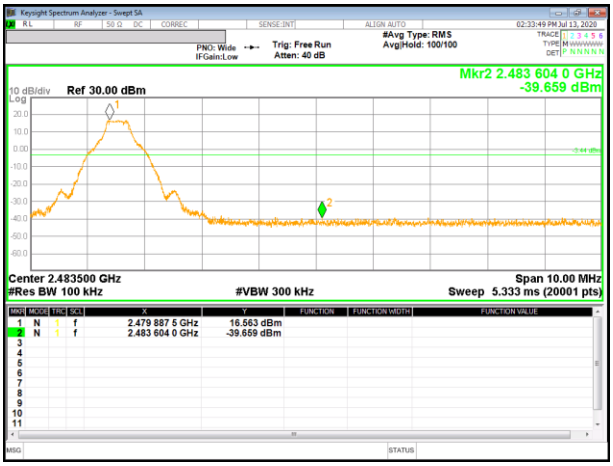
0 CHANNEL BANDEDGE

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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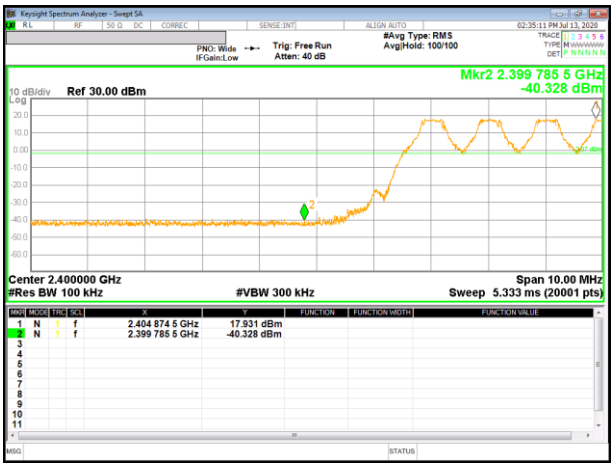
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE

HIGH BANDEDGE

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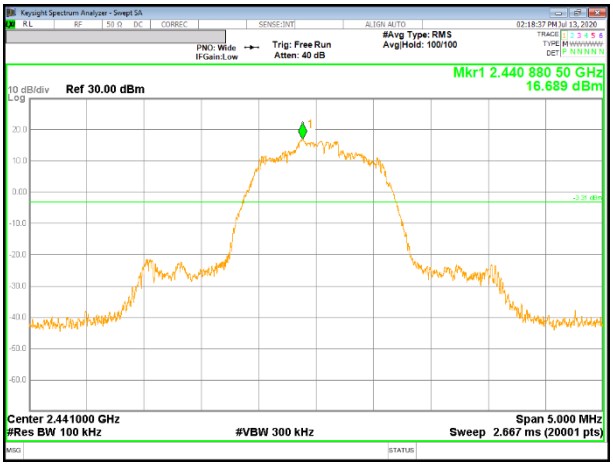
9.8.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

SPURIOUS EMISSIONS, NON-HOPPING(Antenna 1)

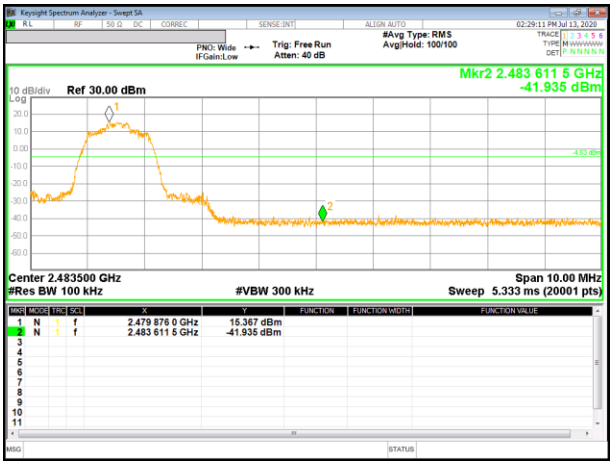
0 CHANNEL BANDEDGE

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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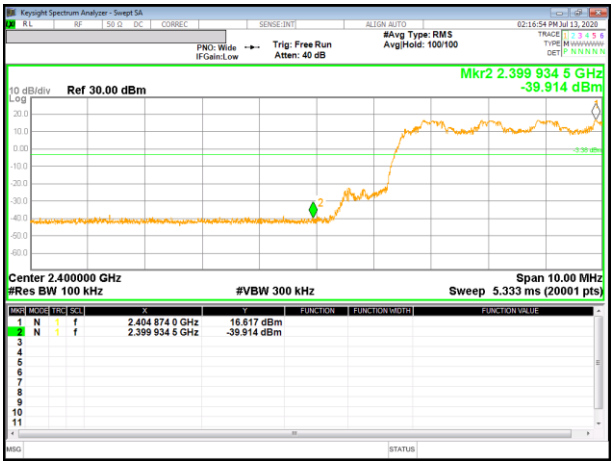
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE

HIGH BANDEDGE

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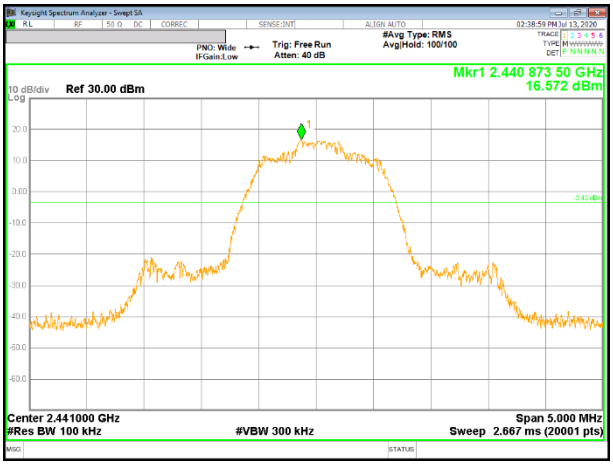
SPURIOUS EMISSIONS, NON-HOPPING(Antenna 2)

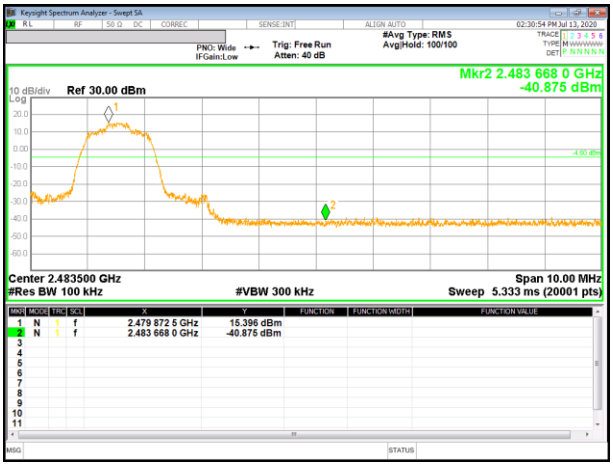
0 CHANNEL BANDEDGE

OUT-OF-BAND 0 CHANNEL



IN-BAND REFERENCE LEVEL

OUT-OF-BAND 39 CHANNEL



78 CHANNEL BANDEDGE

OUT-OF-BAND 78 CHANNEL

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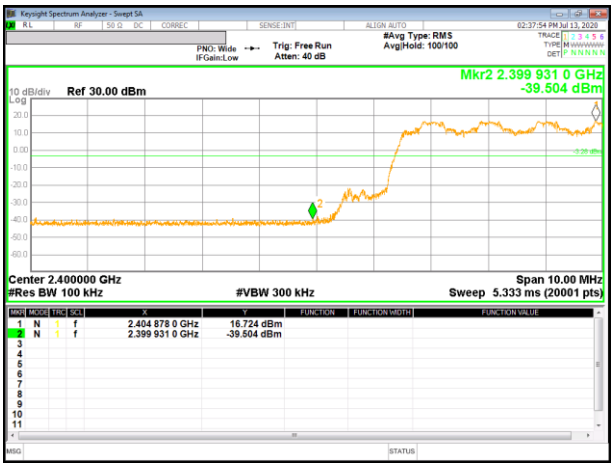
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



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 / 0.002879S = 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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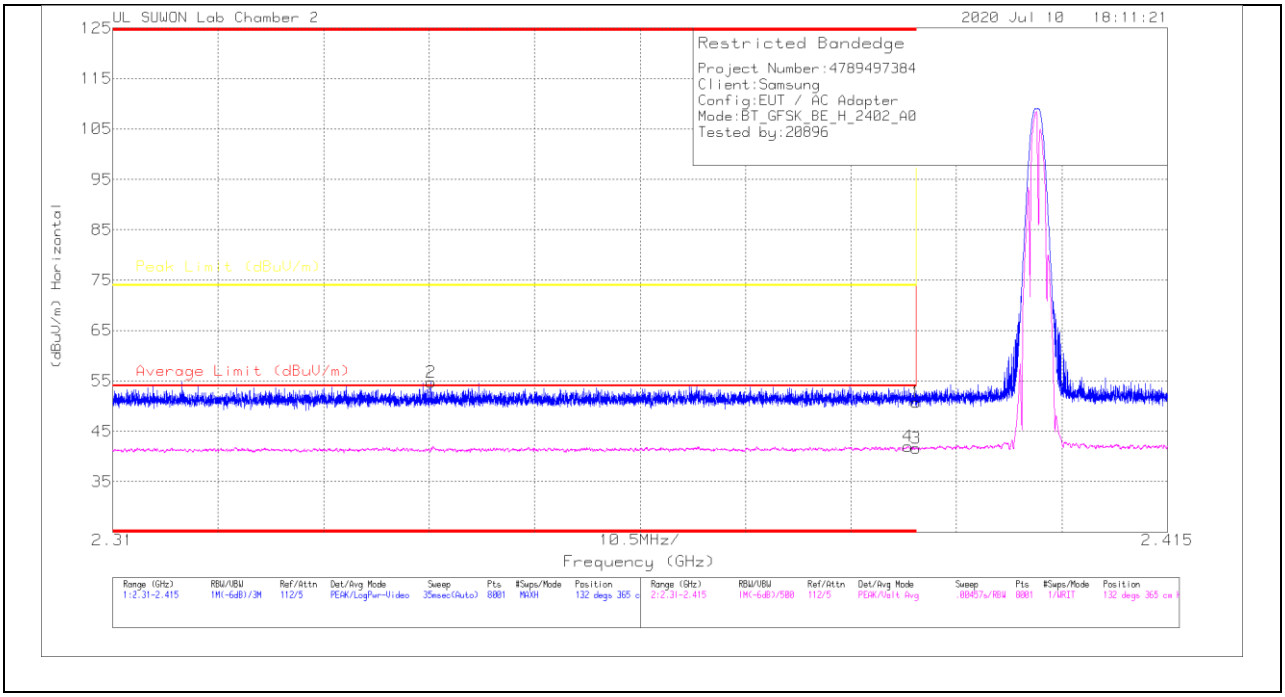
10.1. TRANSMITTER ABOVE 1 GHz

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_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	39.71	Pk	31.6	-20.6	50.71	-	-	74	-23.29	132	365	H
2	* 2.34168	43.93	Pk	31.5	-20.7	54.73	-	-	74	-19.27	132	365	H
3	* 2.39	30.65	VA1T	31.6	-20.6	41.65	54	-12.35	-	-	132	365	H
4	* 2.38916	31.06	VA1T	31.6	-20.6	42.06	54	-11.94	-	-	132	365	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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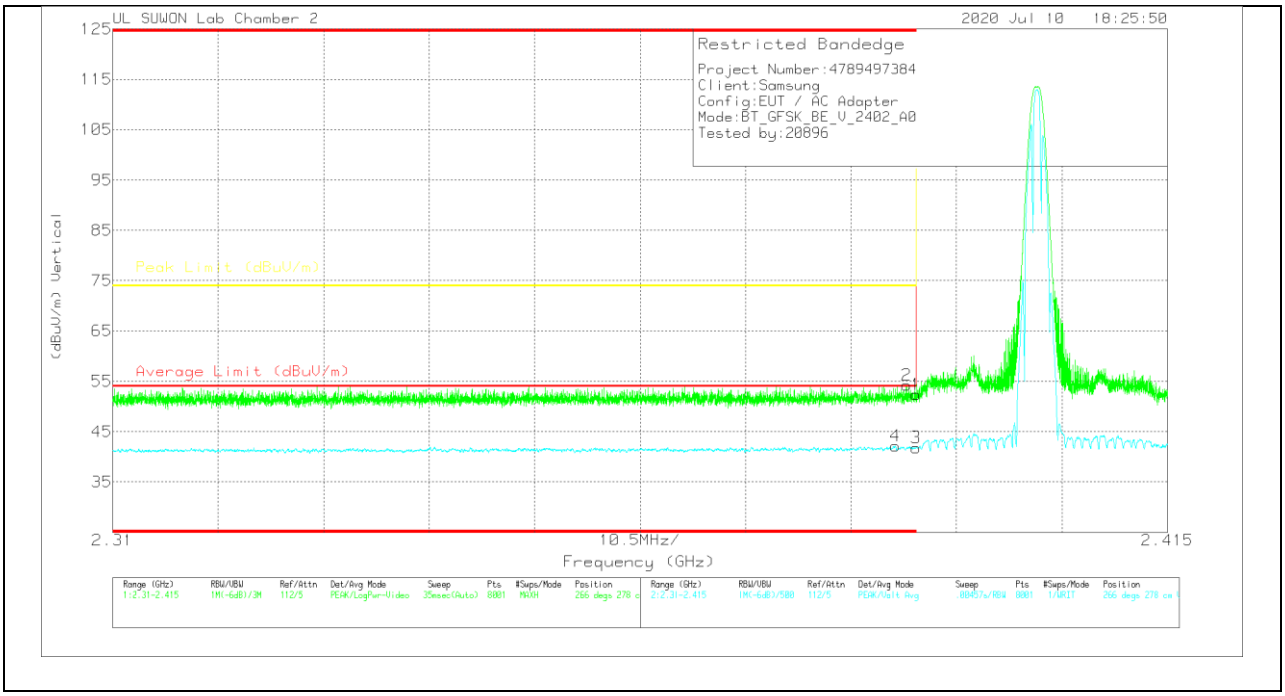
VERTICAL RESULT



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	41.34	Pk	31.6	-20.6	52.34	-	-	74	-21.66	266	278	V
2	* 2.38904	43.29	Pk	31.6	-20.6	54.29	-	-	74	-19.71	266	278	V
3	* 2.39	30.84	VA1T	31.6	-20.6	41.84	54	-12.16	-	-	266	278	V
4	* 2.38792	31.17	VA1T	31.6	-20.6	42.17	54	-11.83	-	-	266	278	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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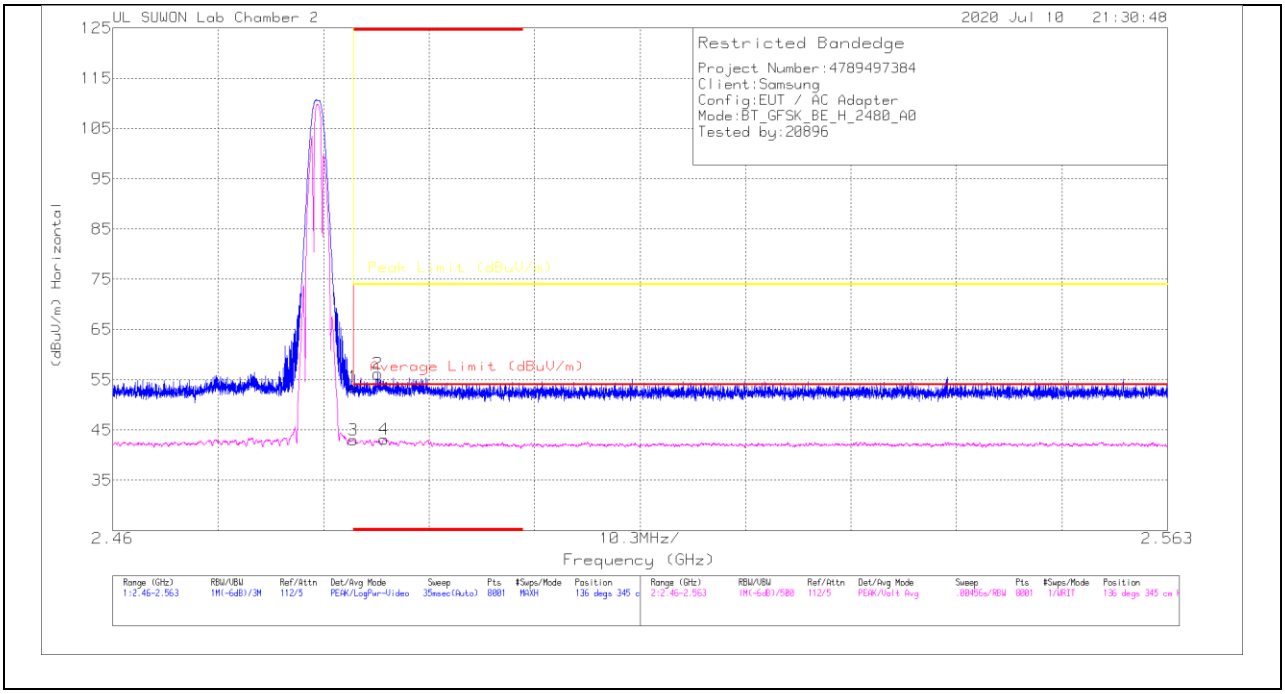
Antenna 1 BANDEDGE (78 CHANNEL)

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	42.06	Pk	31.9	-20.4	53.56	-	-	74	-20.44	136	345	H
2	* 2.48588	44.78	Pk	31.9	-20.5	56.18	-	-	74	-17.82	136	345	H
3	* 2.48351	31.53	VA1T	31.9	-20.4	43.03	54	-10.97	-	-	136	345	H
4	* 2.48648	31.79	VA1T	31.9	-20.5	43.19	54	-10.81	-	-	136	345	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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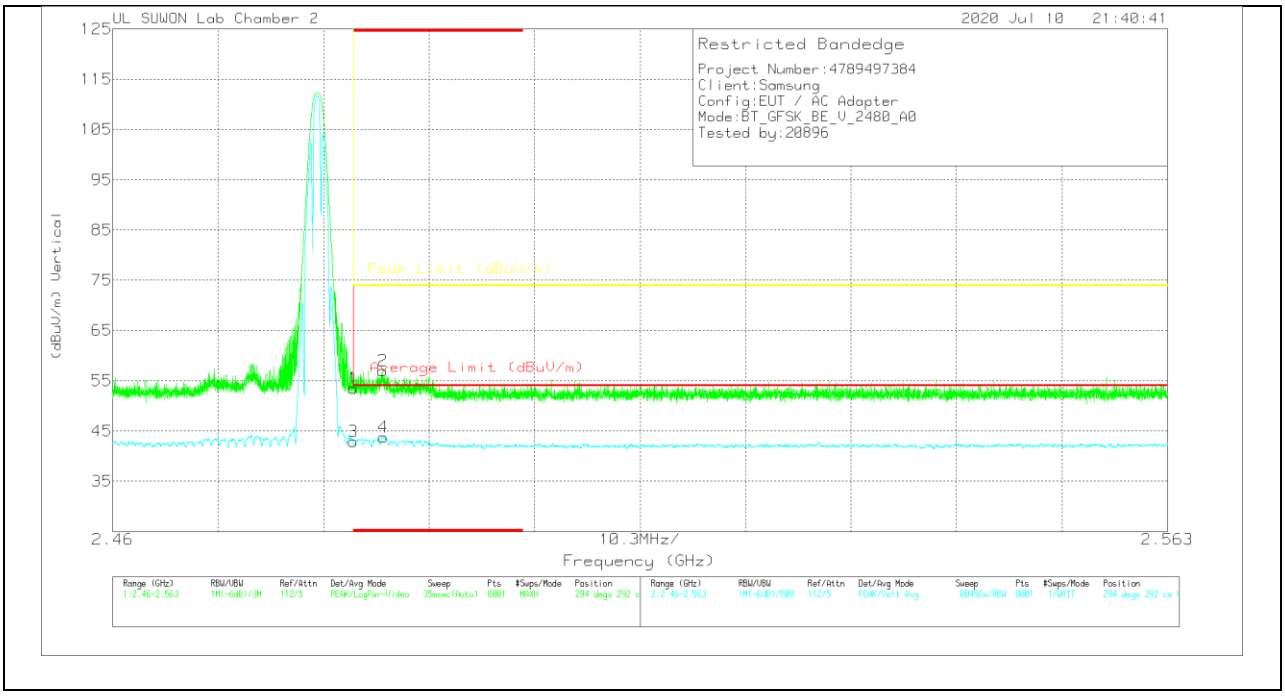
VERTICAL RESULT



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	41.99	Pk	31.9	-20.4	53.49	-	-	74	-20.51	294	292	V
2	* 2.48637	45.55	Pk	31.9	-20.5	56.95	-	-	74	-17.05	294	292	V
3	* 2.48351	31.44	VA1T	31.9	-20.4	42.94	54	-11.06	-	-	294	292	V
4	* 2.48646	32.43	VA1T	31.9	-20.5	43.83	54	-10.17	-	-	294	292	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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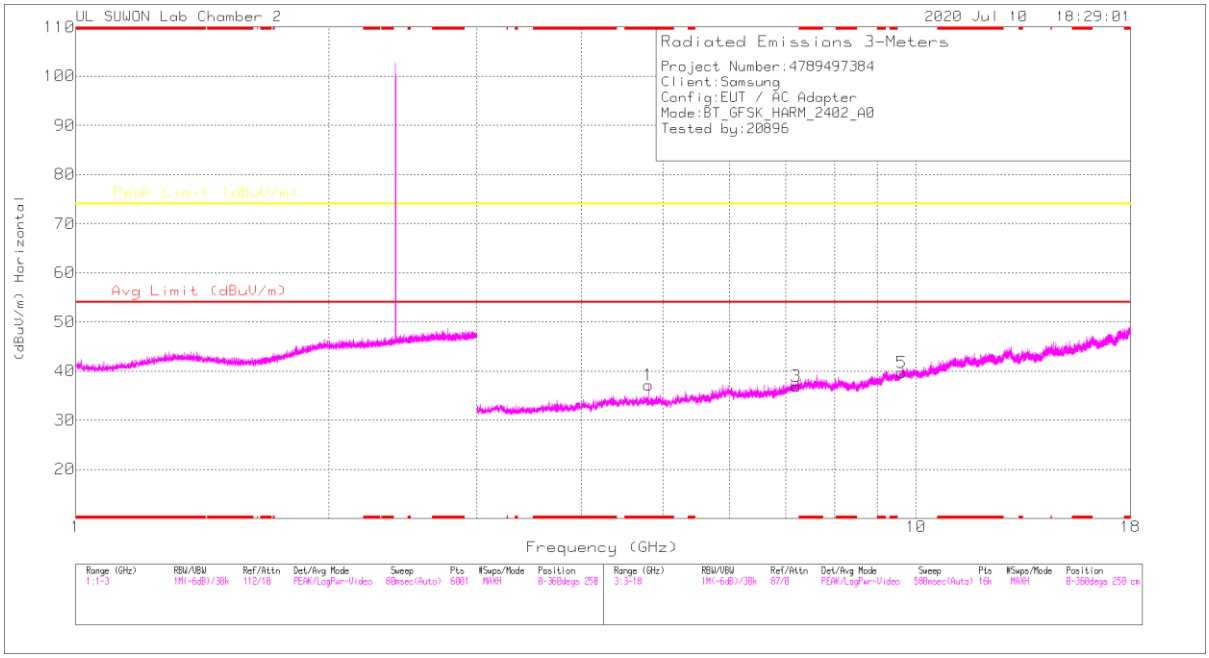
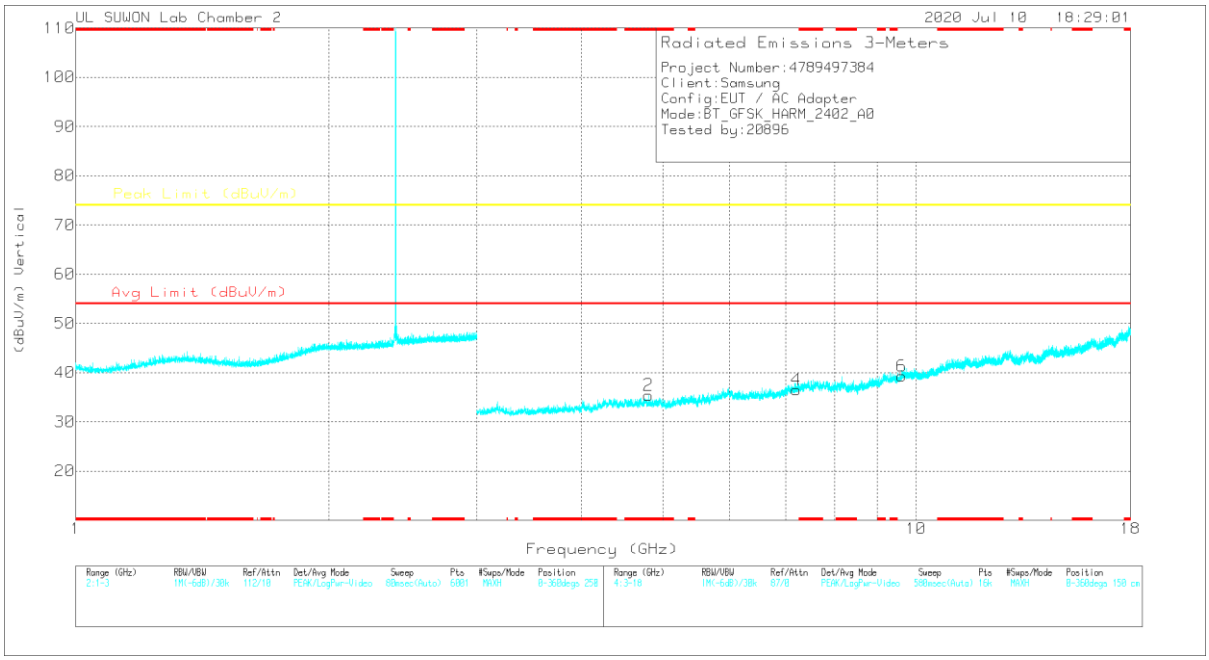
HARMONICS AND SPURIOUS EMISSIONS

Antenna 1 / 0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

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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
* 4.80334	37.4	PKFH	34	-28	43.4	-	-	74	-30.6	57	266	H
* 4.80404	29.68	VA1T	34	-28	35.68	54	-18.32	-	-	57	266	H
* 4.80415	37.55	PKFH	34	-28	43.55	-	-	74	-30.45	241	144	V
* 4.8041	26.92	VA1T	34	-28	32.92	54	-21.08	-	-	241	144	V
7.20541	33.64	PKFH	36.1	-25.3	44.44	-	-	74	-29.56	360	100	H
7.20809	34.28	PKFH	36.1	-25.2	45.18	-	-	74	-28.82	360	100	V
9.60723	31.84	PKFH	37	-21.6	47.24	-	-	74	-26.76	360	100	H
9.60986	31.23	PKFH	37	-21.7	46.53	-	-	74	-27.47	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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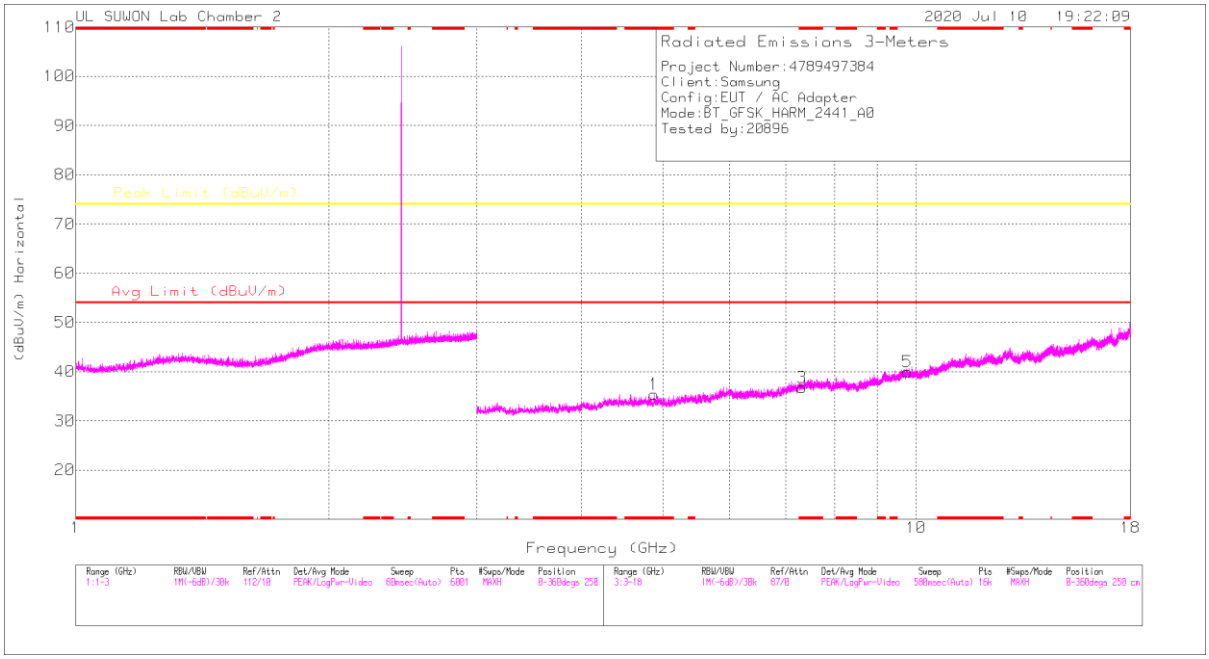
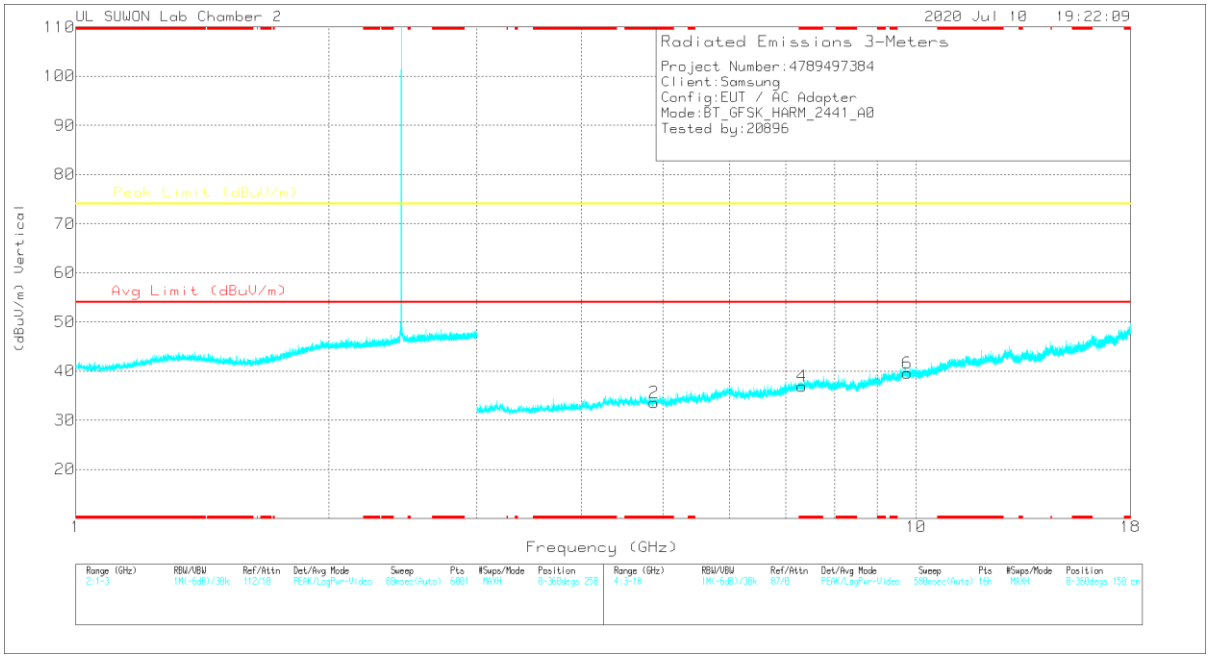
Antenna 1 / 39 CHANNEL RESULTS



HORIZONTAL



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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
* 4.88157	35.61	PKFH	34	-27.8	41.81	-	-	74	-32.19	360	100	H
* 4.88217	36.32	PKFH	34	-27.8	42.52	-	-	74	-31.48	360	100	V
* 7.32196	34	PKFH	36.2	-24.8	45.4	-	-	74	-28.6	360	100	H
* 7.32166	34.01	PKFH	36.2	-24.8	45.41	-	-	74	-28.59	360	100	V
9.7638	31.81	PKFH	37.2	-21.3	47.71	-	-	74	-26.29	360	100	H
9.76499	31.21	PKFH	37.2	-21.3	47.11	-	-	74	-26.89	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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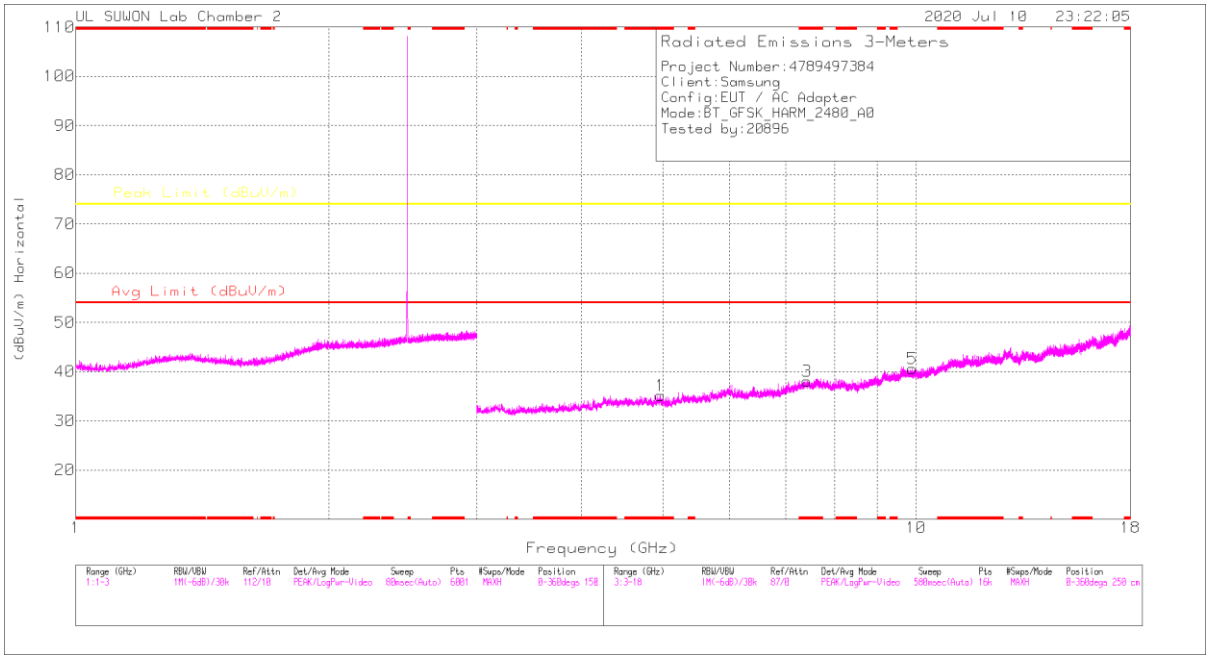
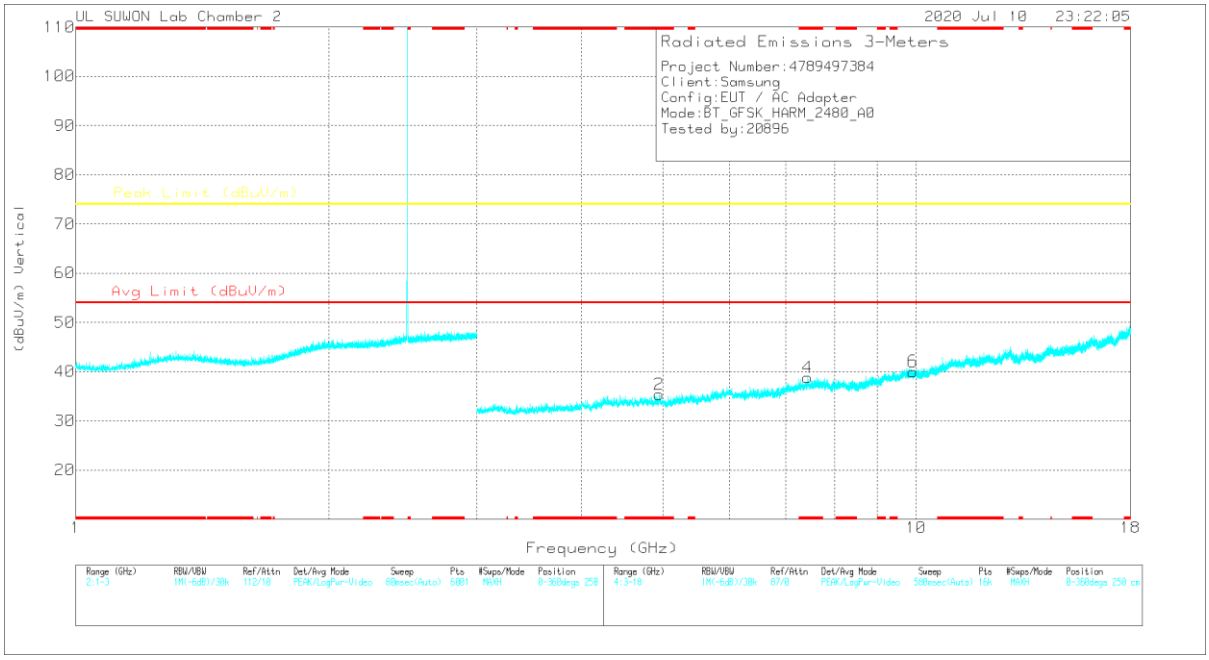
Antenna 1 / 78 CHANNEL RESULTS



HORIZONTAL



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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
* 4.96001	34.04	PKFH	34.1	-27	41.14	-	-	74	-32.86	360	100	H
* 4.94558	34.32	PKFH	34.1	-27	41.42	-	-	74	-32.58	360	100	V
* 7.41369	33.41	PKFH	36.2	-24	45.61	-	-	74	-28.39	360	100	H
* 7.43469	32.66	PKFH	36.2	-23.9	44.96	-	-	74	-29.04	360	100	V
9.8963	30.63	PKFH	37.4	-21.1	46.93	-	-	74	-27.07	360	100	H
9.89494	30.44	PKFH	37.4	-21.1	46.74	-	-	74	-27.26	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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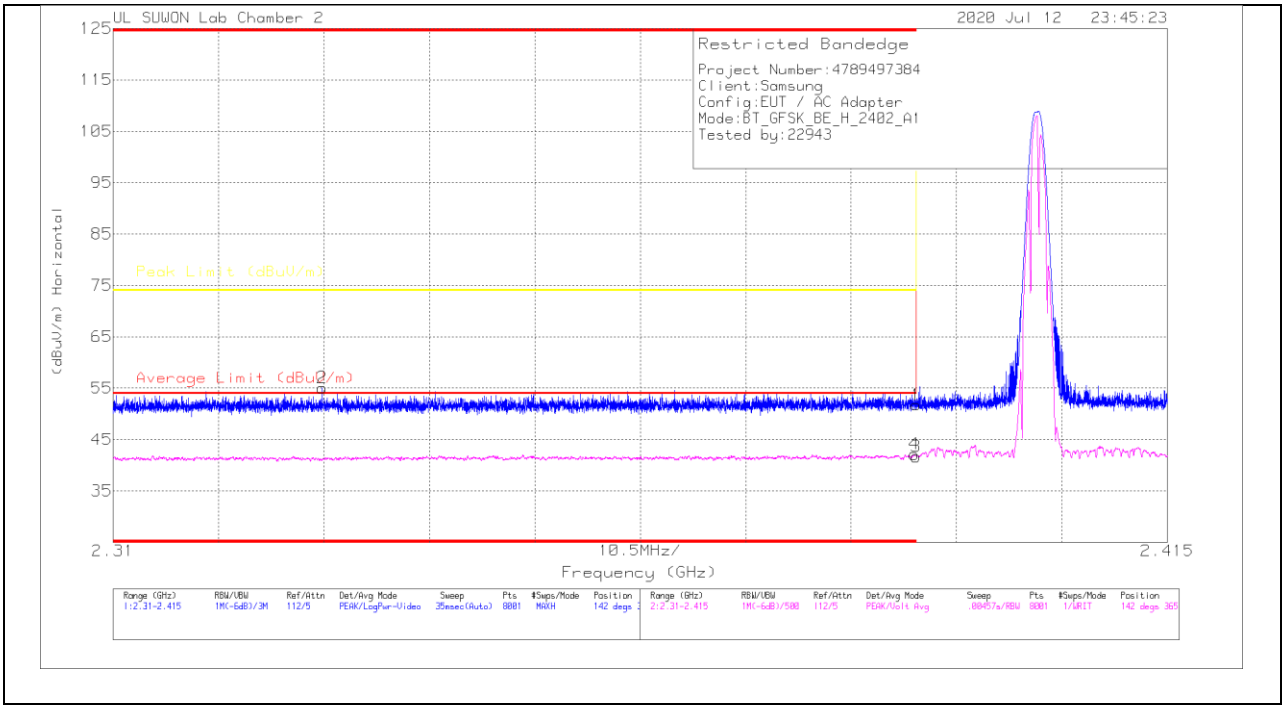
Antenna 2 BANDEDGE (0 CHANNEL)

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	40.74	Pk	31.6	-20.6	51.74	-	-	74	-22.26	142	365	H
2	* 2.3308	44.26	Pk	31.5	-20.7	55.06	-	-	74	-18.94	142	365	H
3	* 2.39	30.69	VA1T	31.6	-20.6	41.69	54	-12.31	-	-	142	365	H
4	* 2.3898	31.16	VA1T	31.6	-20.6	42.16	54	-11.84	-	-	142	365	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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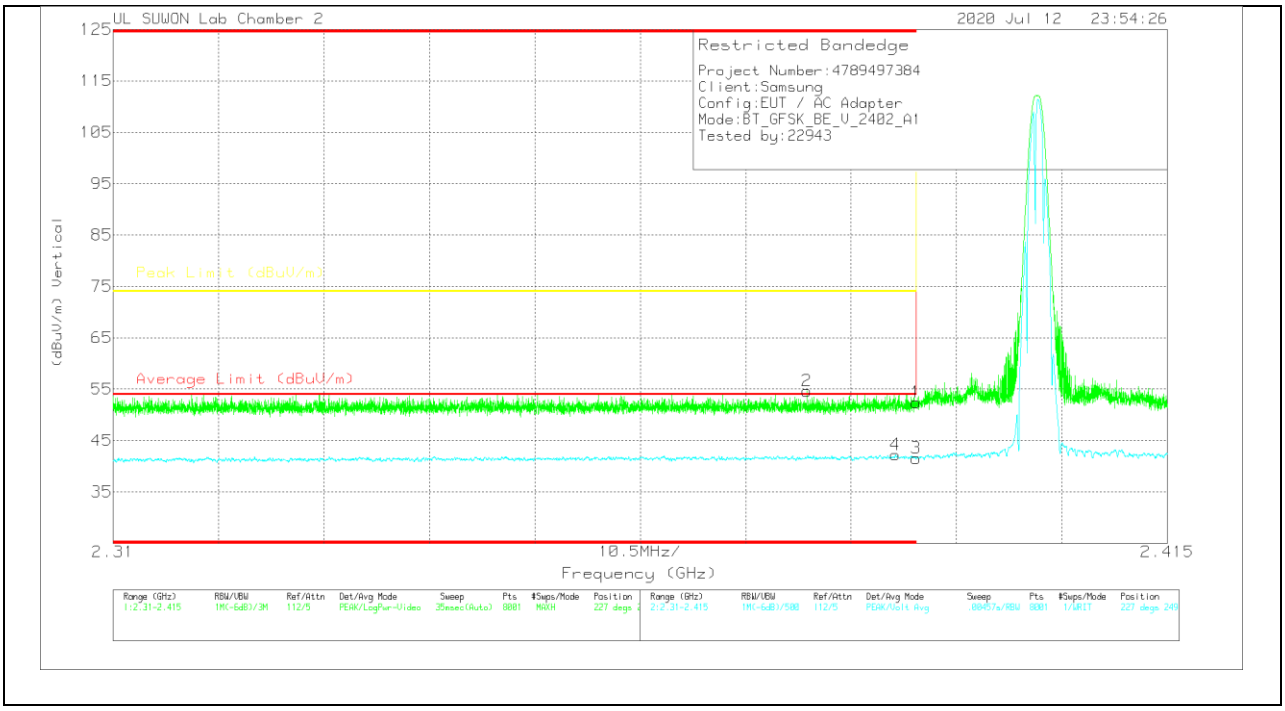
VERTICAL RESULT



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	41.44	Pk	31.6	-20.6	52.44	-	-	74	-21.56	227	249	V
2	* 2.37909	43.75	Pk	31.6	-20.7	54.65	-	-	74	-19.35	227	249	V
3	* 2.39	30.55	VA1T	31.6	-20.6	41.55	54	-12.45	-	-	227	249	V
4	* 2.38794	31.24	VA1T	31.6	-20.6	42.24	54	-11.76	-	-	227	249	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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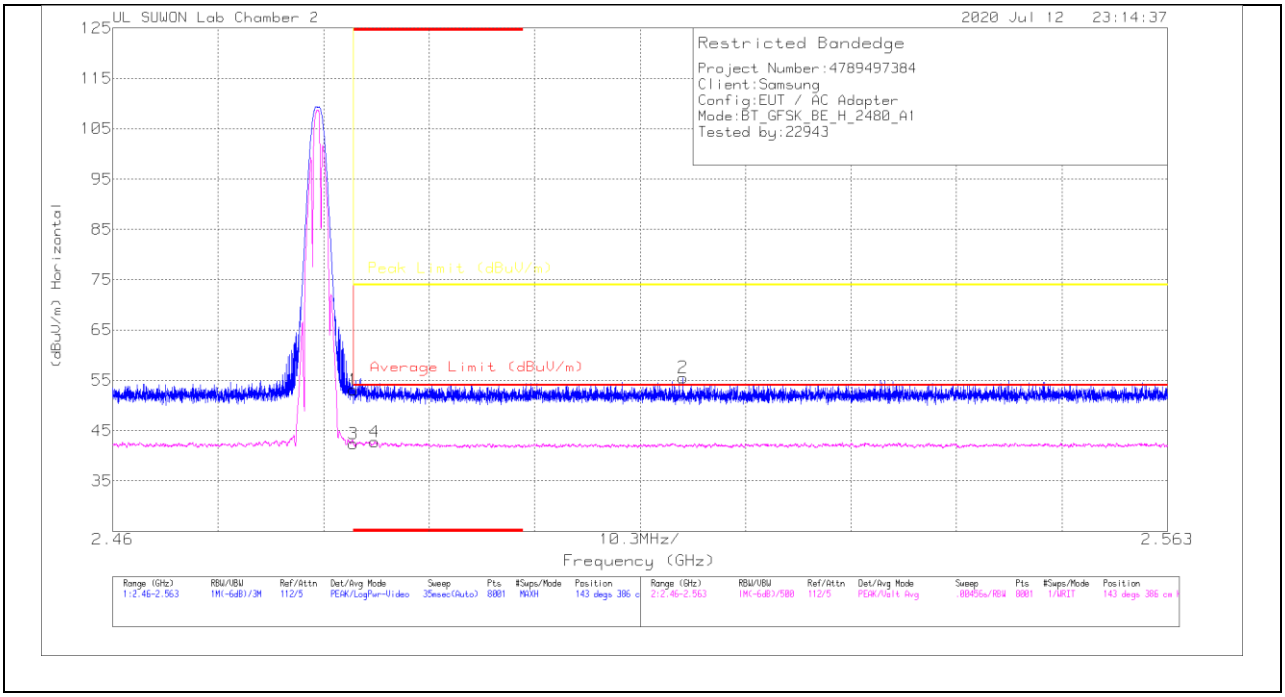
Antenna 2 BANDEDGE (78 CHANNEL)

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	41.57	Pk	31.9	-20.4	53.07	-	-	74	-20.93	143	386	H
2	2.5157	44.05	Pk	31.9	-20.4	55.55	-	-	74	-18.45	143	386	H
3	* 2.48351	30.94	VA1T	31.9	-20.4	42.44	54	-11.56	-	-	143	386	H
4	* 2.48556	31.33	VA1T	31.9	-20.4	42.83	54	-11.17	-	-	143	386	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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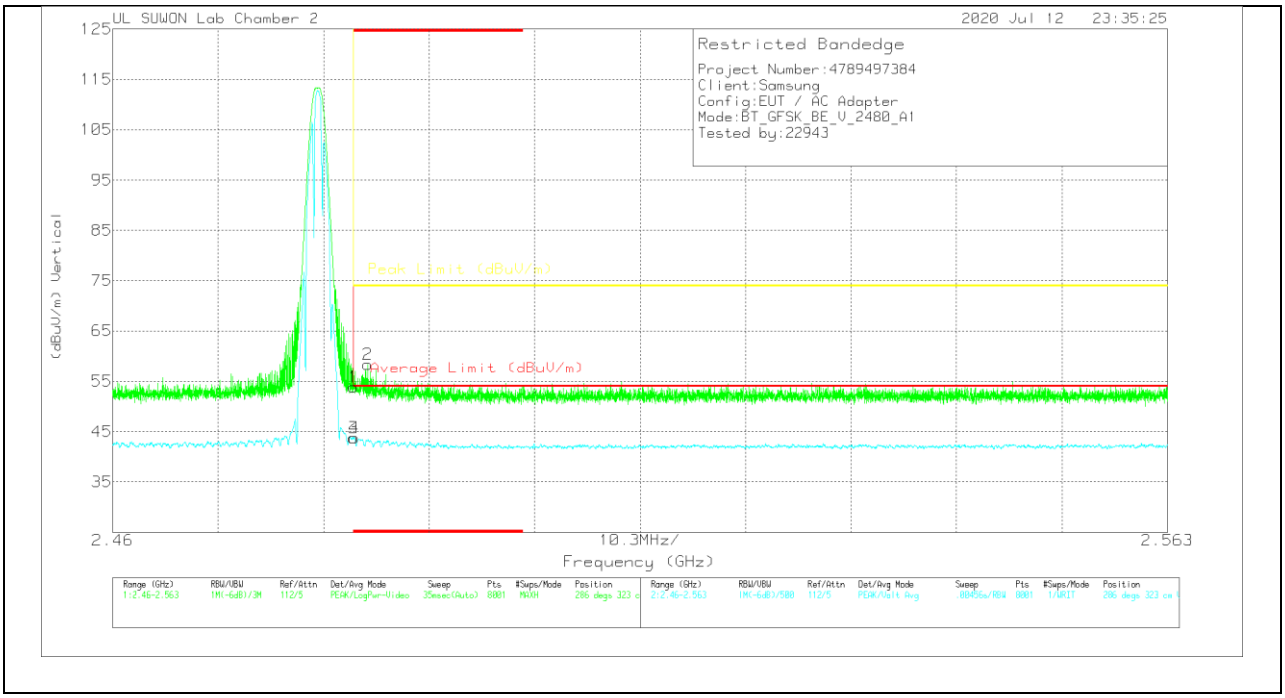
VERTICAL RESULT



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	42.37	Pk	31.9	-20.4	53.87	-	-	74	-20.13	286	323	V
2	* 2.48489	46.81	Pk	31.9	-20.4	58.31	-	-	74	-15.69	286	323	V
3	* 2.48351	32.22	VA1T	31.9	-20.4	43.72	54	-10.28	-	-	286	323	V
4	* 2.48359	32.31	VA1T	31.9	-20.4	43.81	54	-10.19	-	-	286	323	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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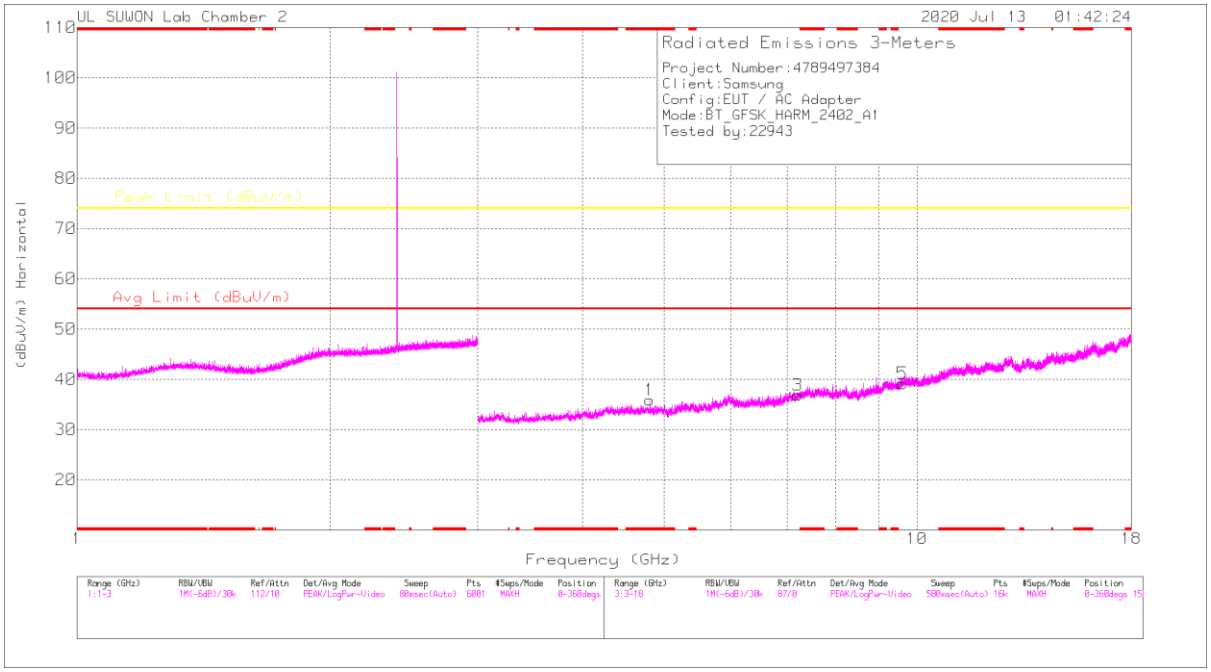
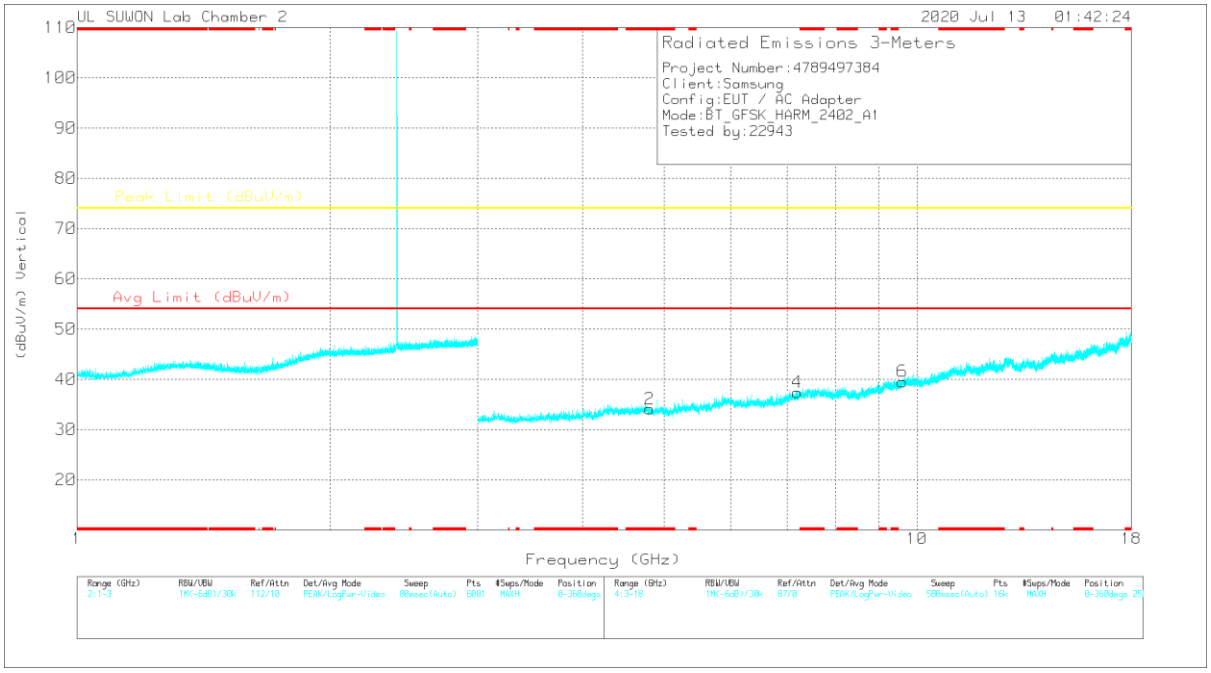
HARMONICS AND SPURIOUS EMISSIONS

Antenna 2 / 0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

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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
* 4.8046	35.53	PKFH	34	-27.9	41.63	-	-	74	-32.37	59	256	H
* 4.80402	27.34	VA1T	34	-28	33.34	54	-20.66	-	-	59	256	H
* 4.80414	35.96	PKFH	34	-28	41.96	-	-	74	-32.04	191	101	V
* 4.80418	24.55	VA1T	34	-28	30.55	54	-23.45	-	-	191	101	V
7.20618	33.74	PKFH	36.1	-25.2	44.64	-	-	74	-29.36	360	100	H
7.20594	32.84	PKFH	36.1	-25.2	43.74	-	-	74	-30.26	360	100	V
9.60825	30.93	PKFH	37	-21.7	46.23	-	-	74	-27.77	360	100	H
9.6091	31.82	PKFH	37	-21.7	47.12	-	-	74	-26.88	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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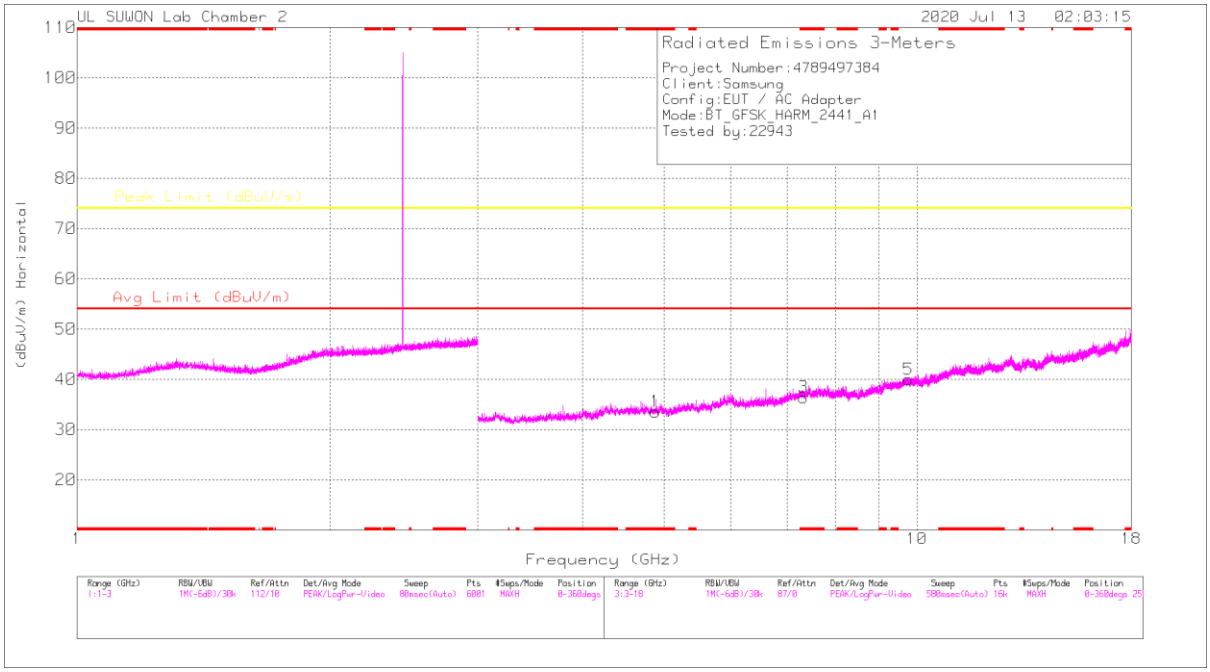
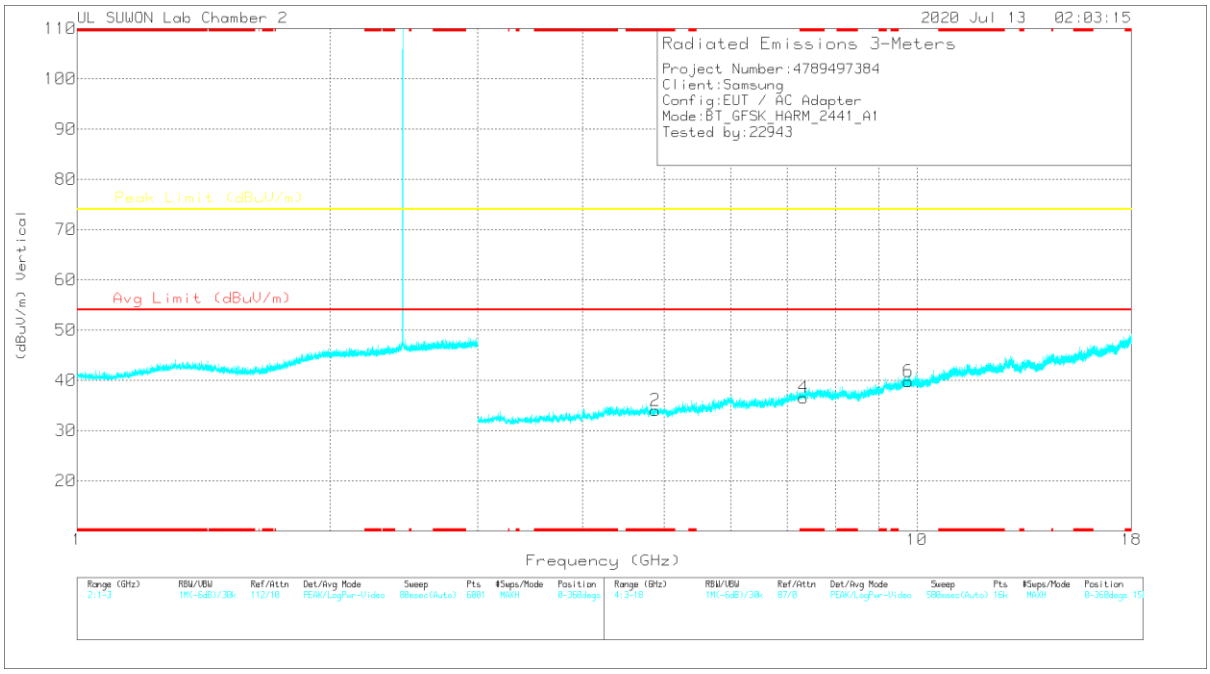
Antenna 2 / 39 CHANNEL RESULTS



HORIZONTAL



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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
* 4.88001	34.97	PKFH	34	-27.8	41.17	-	-	74	-32.83	360	100	H
* 4.88111	35.97	PKFH	34	-27.8	42.17	-	-	74	-31.83	360	100	V
* 7.32192	34.22	PKFH	36.2	-24.8	45.62	-	-	74	-28.38	360	100	H
* 7.32409	33.74	PKFH	36.2	-24.8	45.14	-	-	74	-28.86	360	100	V
9.76508	31.03	PKFH	37.2	-21.3	46.93	-	-	74	-27.07	360	100	H
9.7634	30.53	PKFH	37.2	-21.2	46.53	-	-	74	-27.47	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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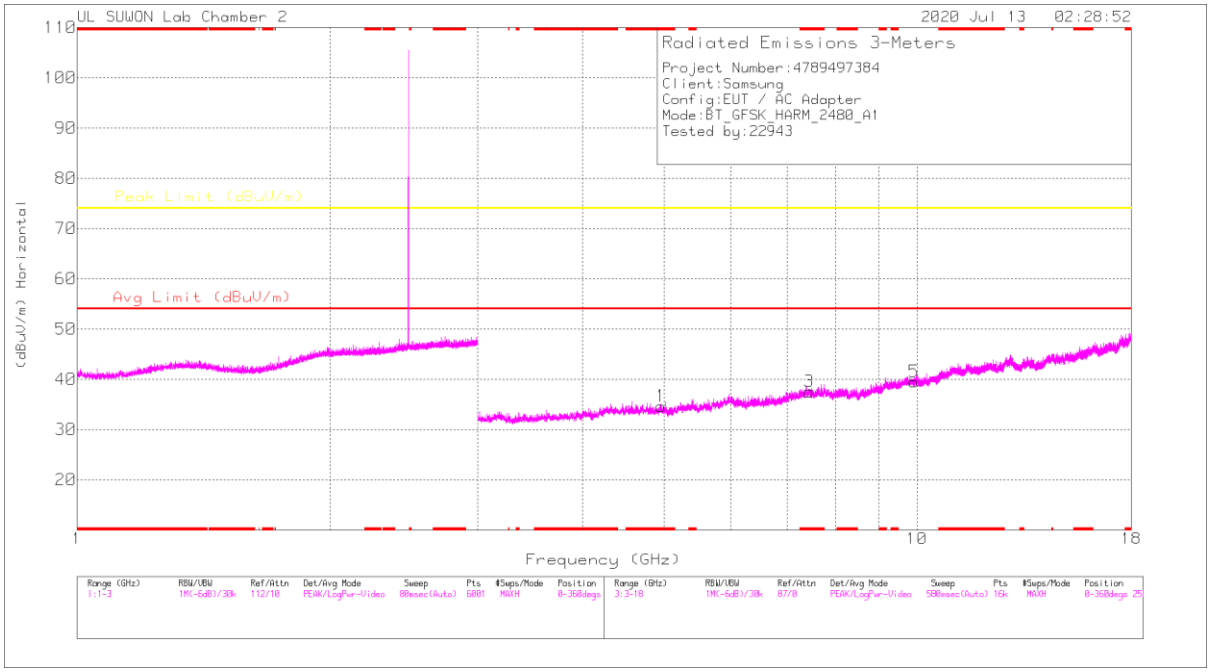
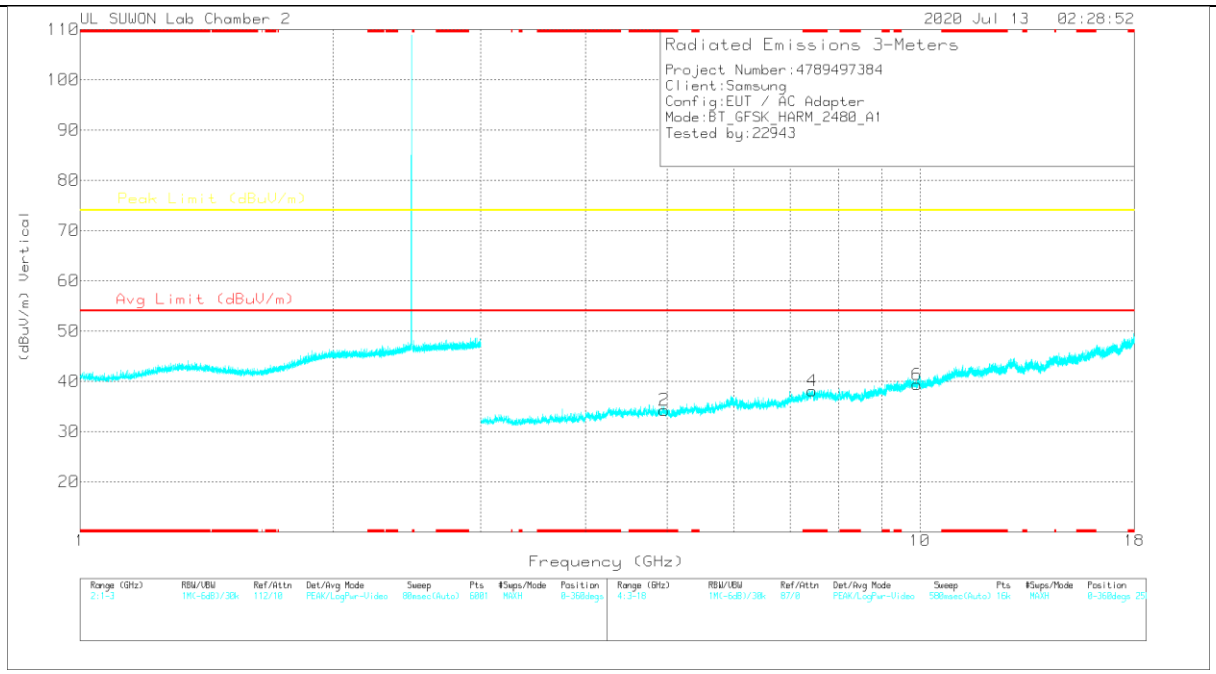
Antenna 2 / 78 CHANNEL RESULTS



HORIZONTAL



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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
* 4.95839	34.97	PKFH	34.1	-27	42.07	-	-	74	-31.93	360	100	H
* 4.95863	35.09	PKFH	34.1	-27	42.19	-	-	74	-31.81	360	100	V
* 7.44044	33.5	PKFH	36.2	-23.9	45.8	-	-	74	-28.2	360	100	H
* 7.43951	32.69	PKFH	36.2	-23.9	44.99	-	-	74	-29.01	360	100	V
9.91915	31.57	PKFH	37.4	-20.9	48.07	-	-	74	-25.93	360	100	H
9.92187	30.12	PKFH	37.4	-20.9	46.62	-	-	74	-27.38	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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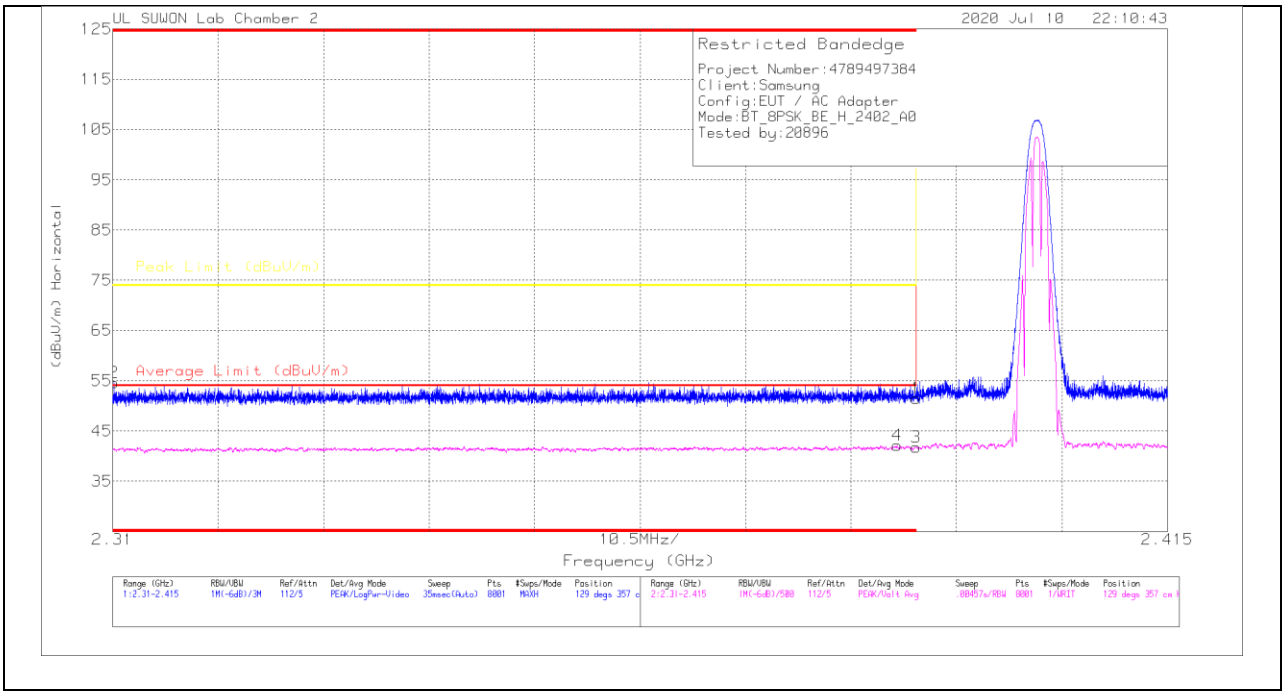
10.1.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

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	40.48	Pk	31.6	-20.6	51.48	-	-	74	-22.52	129	357	H
2	* 2.31013	43.93	Pk	31.5	-20.8	54.63	-	-	74	-19.37	129	357	H
3	* 2.39	30.74	VA1T	31.6	-20.6	41.74	54	-12.26	-	-	129	357	H
4	* 2.38811	31.1	VA1T	31.6	-20.6	42.1	54	-11.9	-	-	129	357	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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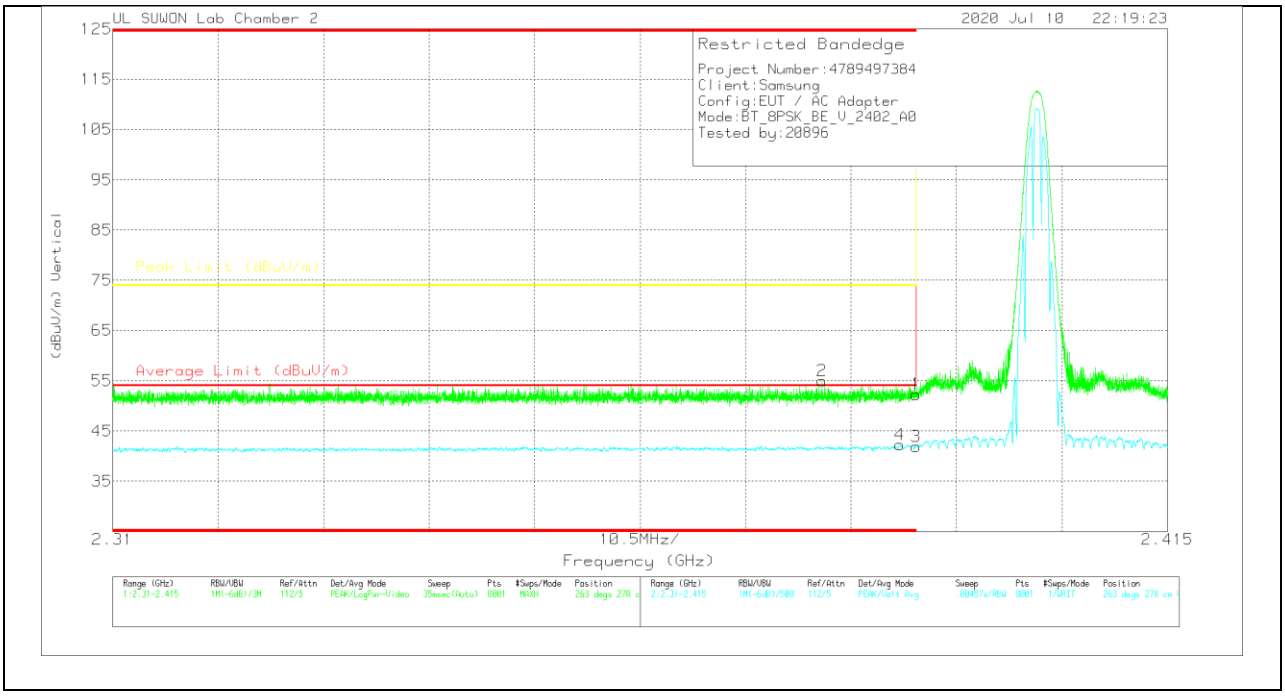
VERTICAL RESULT



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	41.31	Pk	31.6	-20.6	52.31	-	-	74	-21.69	263	278	V
2	* 2.3806	44	Pk	31.6	-20.6	55	-	-	74	-19	263	278	V
3	* 2.39	30.89	VA1T	31.6	-20.6	41.89	54	-12.11	-	-	263	278	V
4	* 2.38834	31.32	VA1T	31.6	-20.6	42.32	54	-11.68	-	-	263	278	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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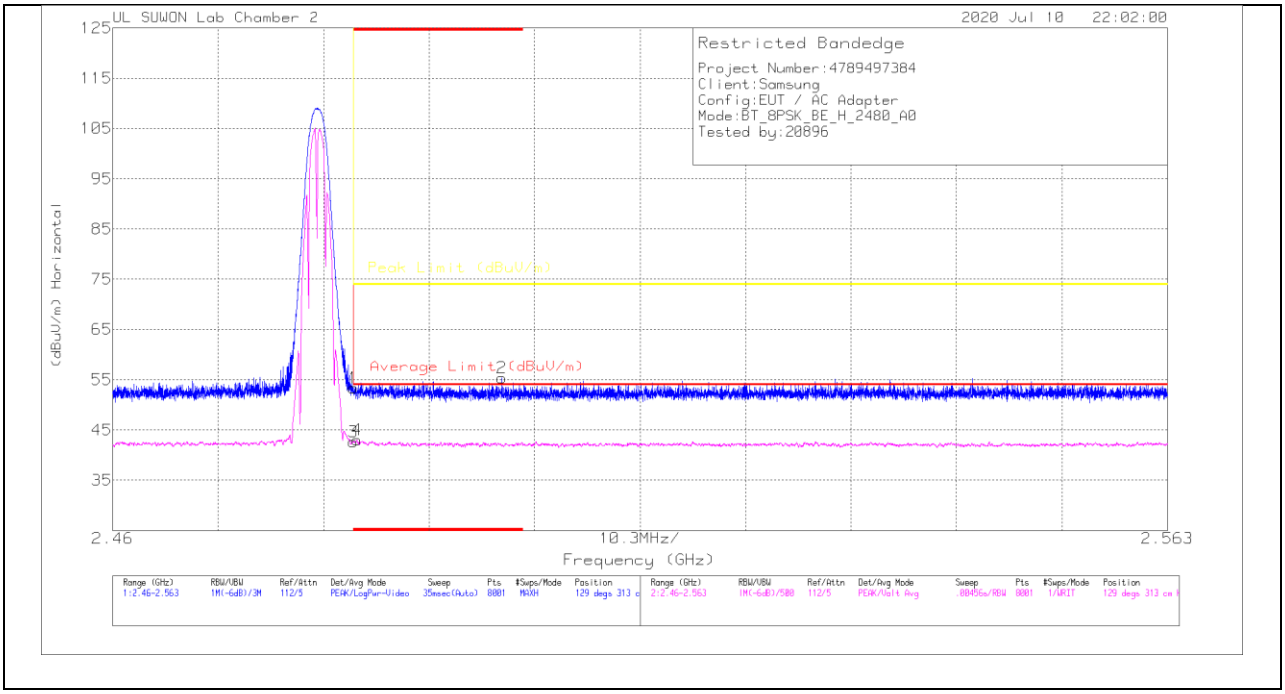
Antenna 1 / BANDEDGE (78 CHANNEL)

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	41.84	Pk	31.9	-20.4	53.34	-	-	74	-20.66	129	313	H
2	* 2.49802	44.01	Pk	31.9	-20.5	55.41	-	-	74	-18.59	129	313	H
3	* 2.48351	31.17	VA1T	31.9	-20.4	42.67	54	-11.33	-	-	129	313	H
4	* 2.48384	31.49	VA1T	31.9	-20.4	42.99	54	-11.01	-	-	129	313	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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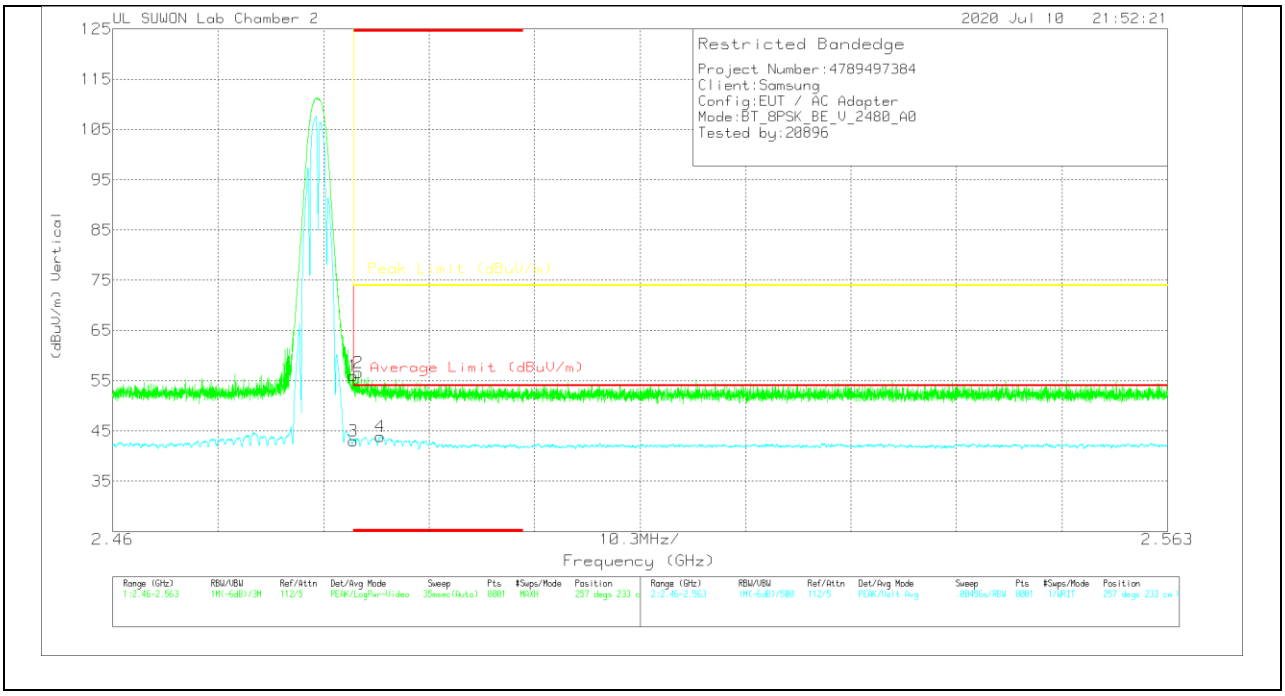
VERTICAL RESULT



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	44.46	Pk	31.9	-20.4	55.96	-	-	74	-18.04	257	233	V
2	* 2.48399	45.12	Pk	31.9	-20.4	56.62	-	-	74	-17.38	257	233	V
3	* 2.48351	31.58	VA1T	31.9	-20.4	43.08	54	-10.92	-	-	257	233	V
4	* 2.48615	32.51	VA1T	31.9	-20.5	43.91	54	-10.09	-	-	257	233	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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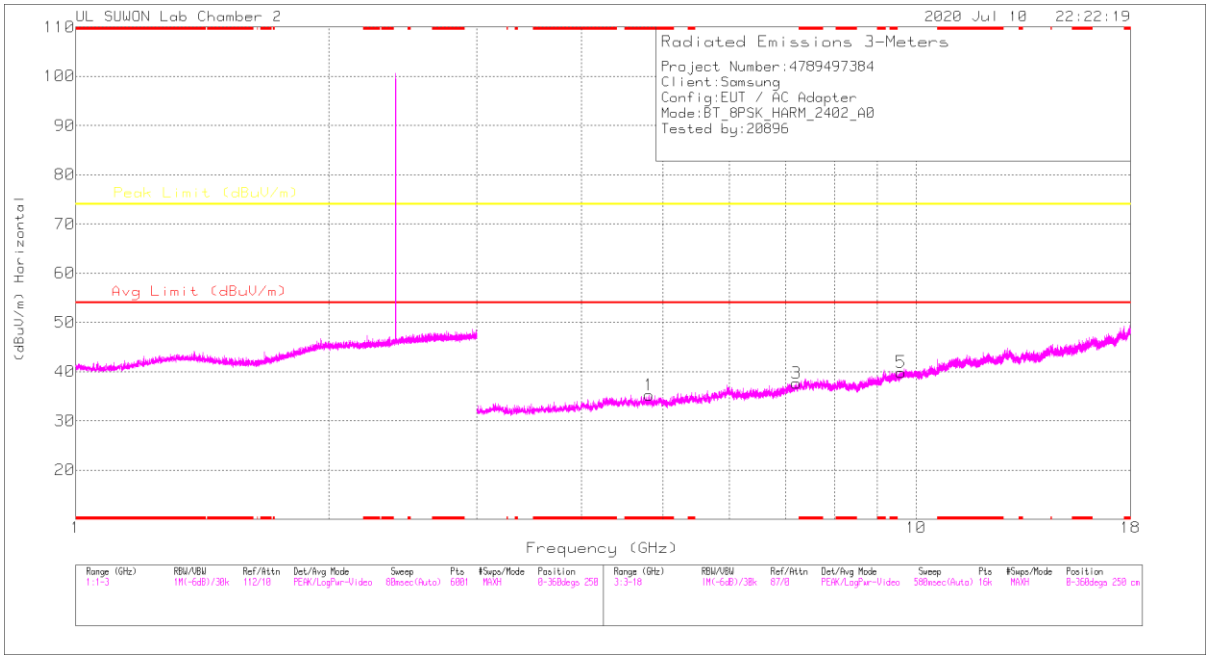
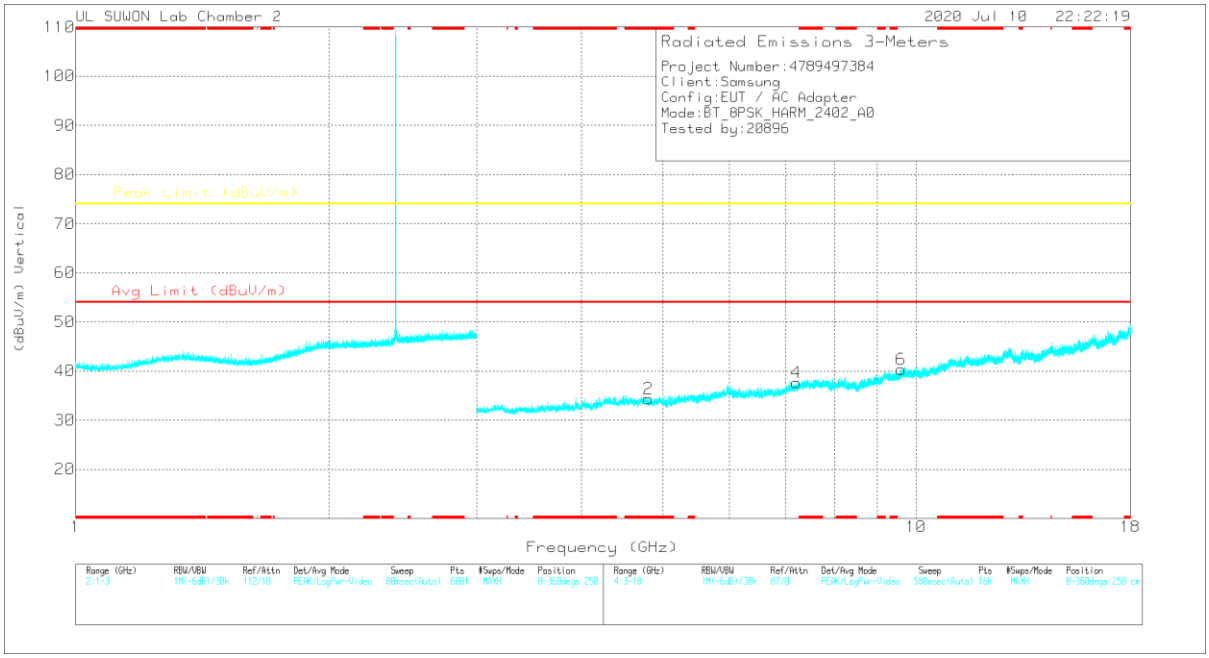
HARMONICS AND SPURIOUS EMISSIONS

Antenna 1 / 0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

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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
* 4.81287	35.63	PKFH	34	-28	41.63	-	-	74	-32.37	360	100	H
* 4.802	35.21	PKFH	34	-27.9	41.31	-	-	74	-32.69	360	100	V
7.20716	33.8	PKFH	36.1	-25.2	44.7	-	-	74	-29.3	360	100	H
7.20539	33.42	PKFH	36.1	-25.3	44.22	-	-	74	-29.78	360	100	V
9.60144	31.02	PKFH	37	-21.7	46.32	-	-	74	-27.68	360	100	H
9.59975	31.04	PKFH	37	-21.7	46.34	-	-	74	-27.66	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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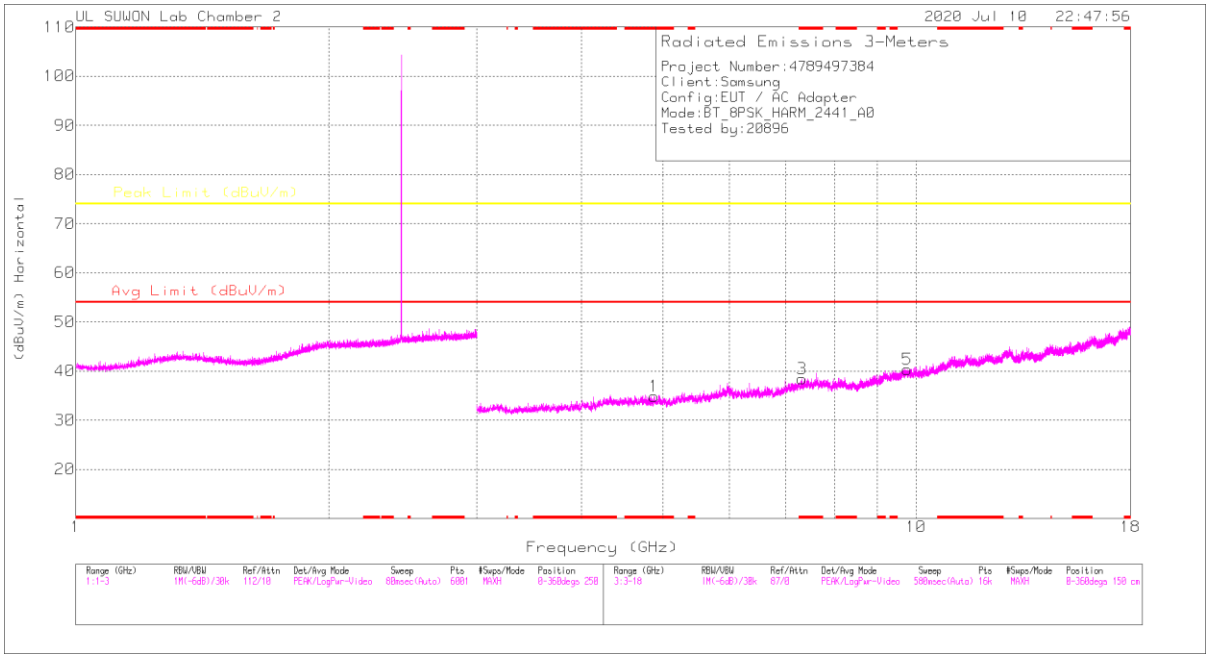
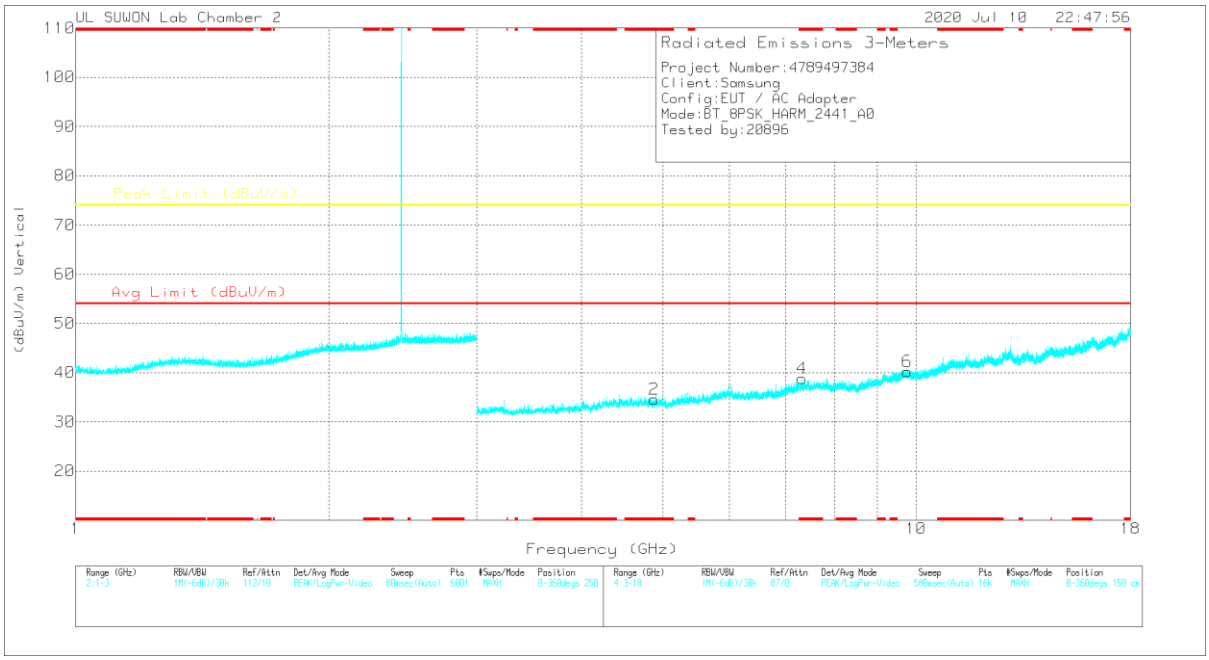
Antenna 1 / 39 CHANNEL RESULTS



HORIZONTAL



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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
* 4.882	35.28	PKFH	34	-27.8	41.48	-	-	74	-32.52	360	100	H
* 4.87719	36.08	PKFH	34	-27.8	42.28	-	-	74	-31.72	360	100	V
* 7.32053	34.87	PKFH	36.2	-24.8	46.27	-	-	74	-27.73	360	100	H
* 7.31189	33.53	PKFH	36.2	-24.8	44.93	-	-	74	-29.07	360	100	V
9.76359	31.75	PKFH	37.2	-21.2	47.75	-	-	74	-26.25	360	100	H
9.76264	31.45	PKFH	37.2	-21.2	47.45	-	-	74	-26.55	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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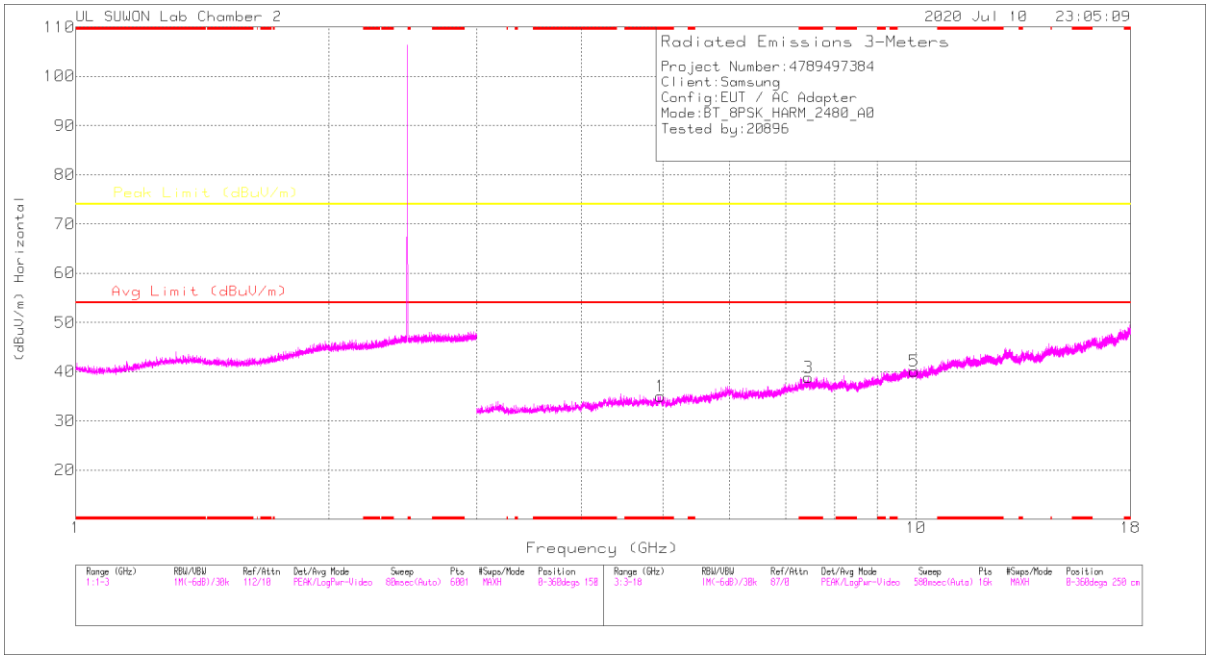
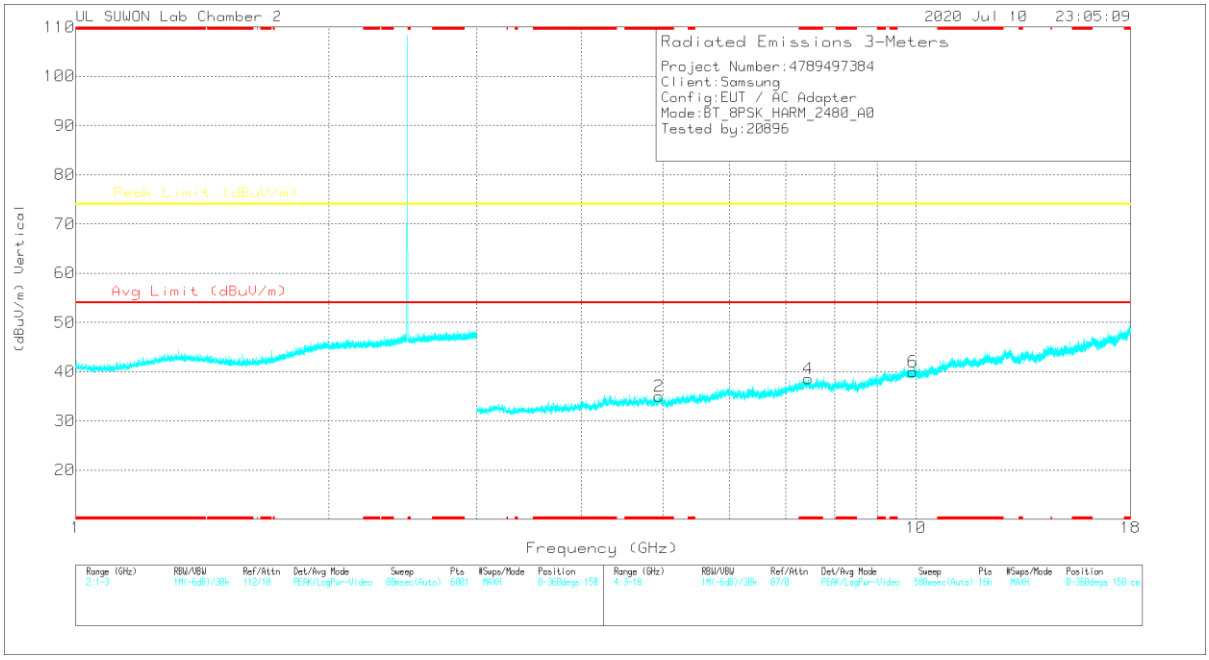
Antenna 1 / 78 CHANNEL RESULTS



HORIZONTAL



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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
* 4.96042	34.22	PKFH	34.1	-27	41.32	-	-	74	-32.68	360	100	H
* 4.94782	34.19	PKFH	34.1	-27	41.29	-	-	74	-32.71	360	100	V
* 7.44608	33.39	PKFH	36.2	-23.9	45.69	-	-	74	-28.31	360	100	H
* 7.4454	32.43	PKFH	36.2	-24	44.63	-	-	74	-29.37	360	100	V
9.94814	30.09	PKFH	37.5	-20.6	46.99	-	-	74	-27.01	360	100	H
9.9448	30.46	PKFH	37.5	-20.6	47.36	-	-	74	-26.64	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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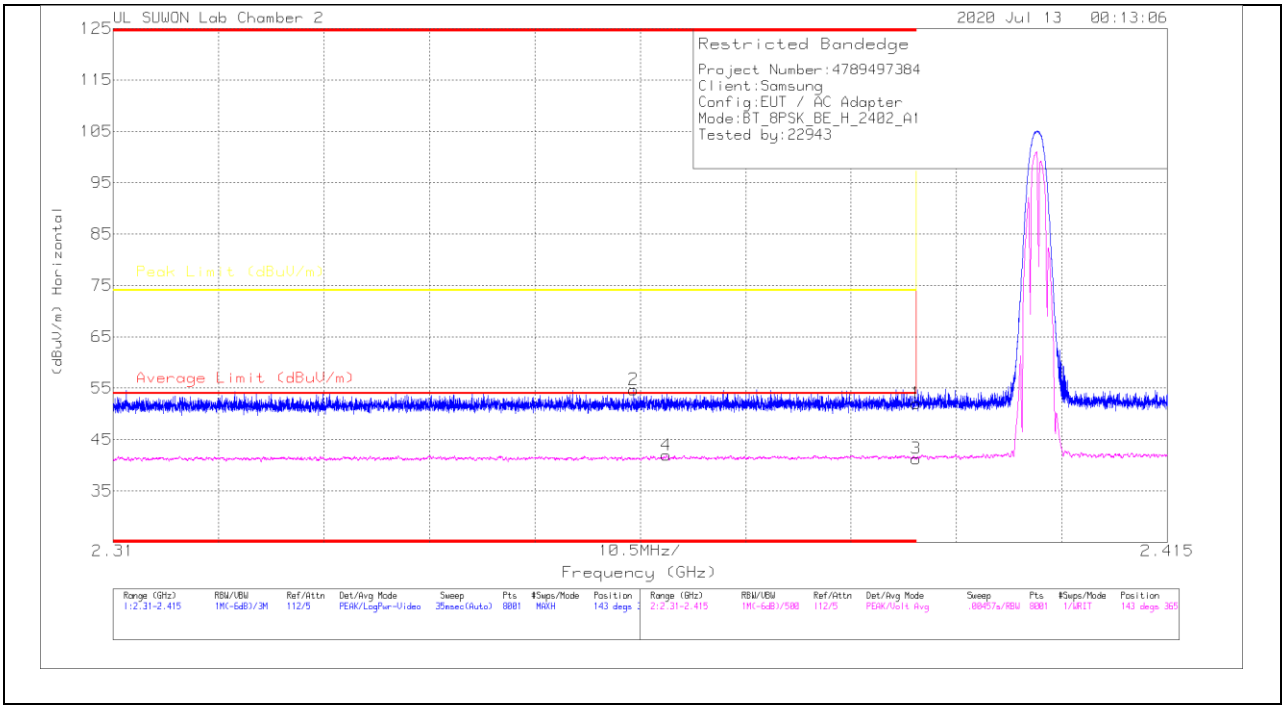
Antenna 2 / BANDEDGE (0 CHANNEL)

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	41.02	Pk	31.6	-20.6	52.02	-	-	74	-21.98	143	365	H
2	* 2.36186	43.81	Pk	31.6	-20.7	54.71	-	-	74	-19.29	143	365	H
3	* 2.39	30.3	VA1T	31.6	-20.6	41.3	54	-12.7	-	-	143	365	H
4	* 2.3651	31.07	VA1T	31.6	-20.7	41.97	54	-12.03	-	-	143	365	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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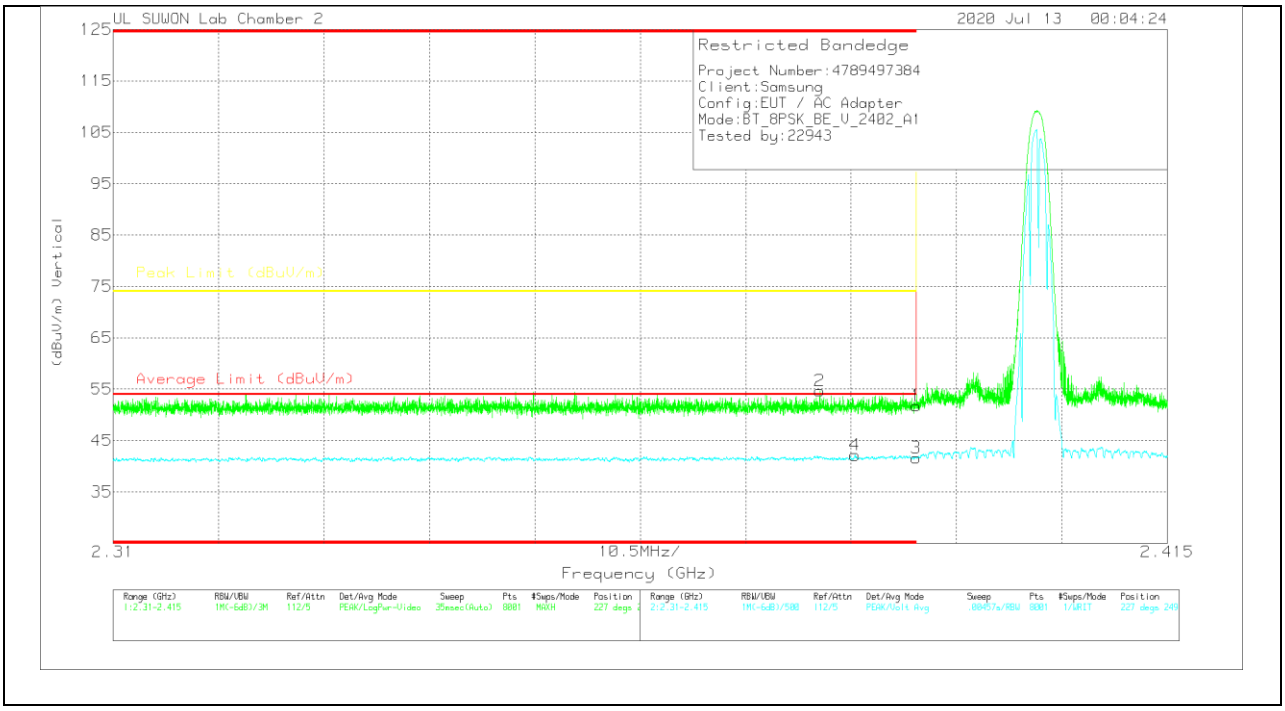
VERTICAL RESULT



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	40.8	Pk	31.6	-20.6	51.8	-	-	74	-22.2	227	249	V
2	* 2.38038	43.66	Pk	31.6	-20.6	54.66	-	-	74	-19.34	227	249	V
3	* 2.39	30.62	VA1T	31.6	-20.6	41.62	54	-12.38	-	-	227	249	V
4	* 2.38388	31.17	VA1T	31.6	-20.6	42.17	54	-11.83	-	-	227	249	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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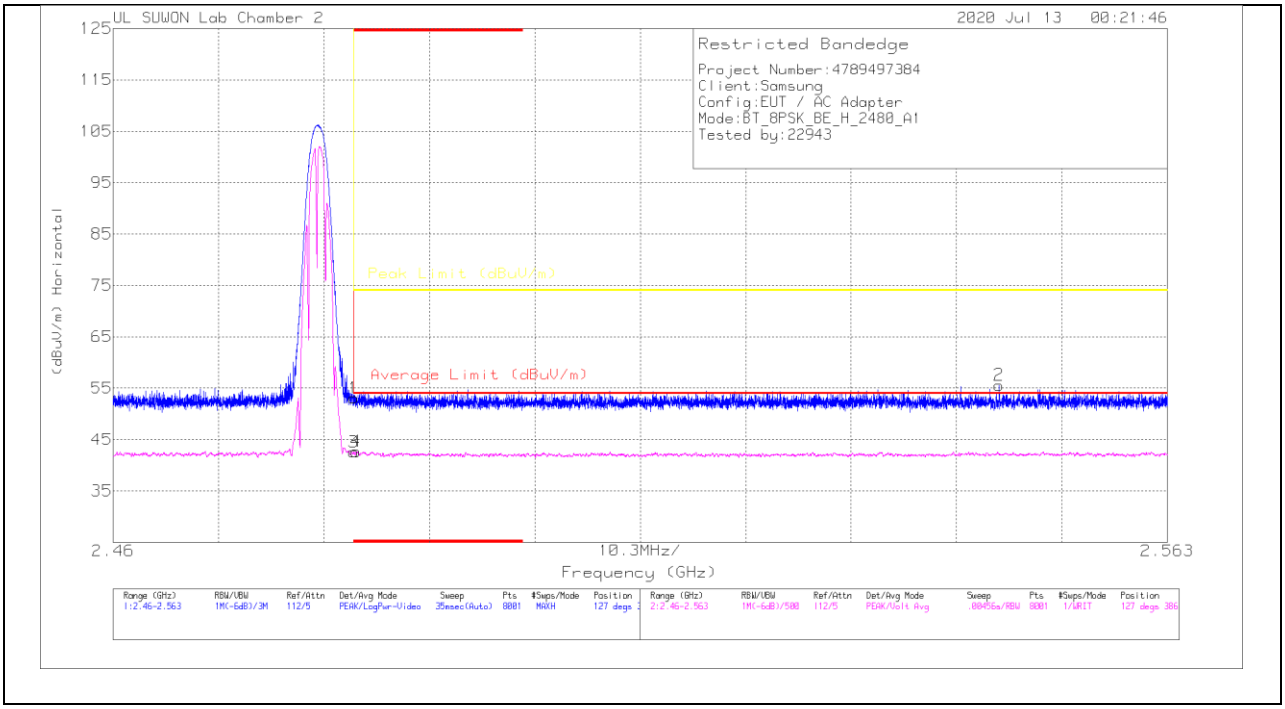
Antenna 2 / BANDEDGE (78 CHANNEL)

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	41.57	Pk	31.9	-20.4	53.07	-	-	74	-20.93	127	386	H
2	2.54655	43.98	Pk	32	-20.4	55.58	-	-	74	-18.42	127	386	H
3	* 2.48351	31.05	VA1T	31.9	-20.4	42.55	54	-11.45	-	-	127	386	H
4	* 2.48372	31.17	VA1T	31.9	-20.4	42.67	54	-11.33	-	-	127	386	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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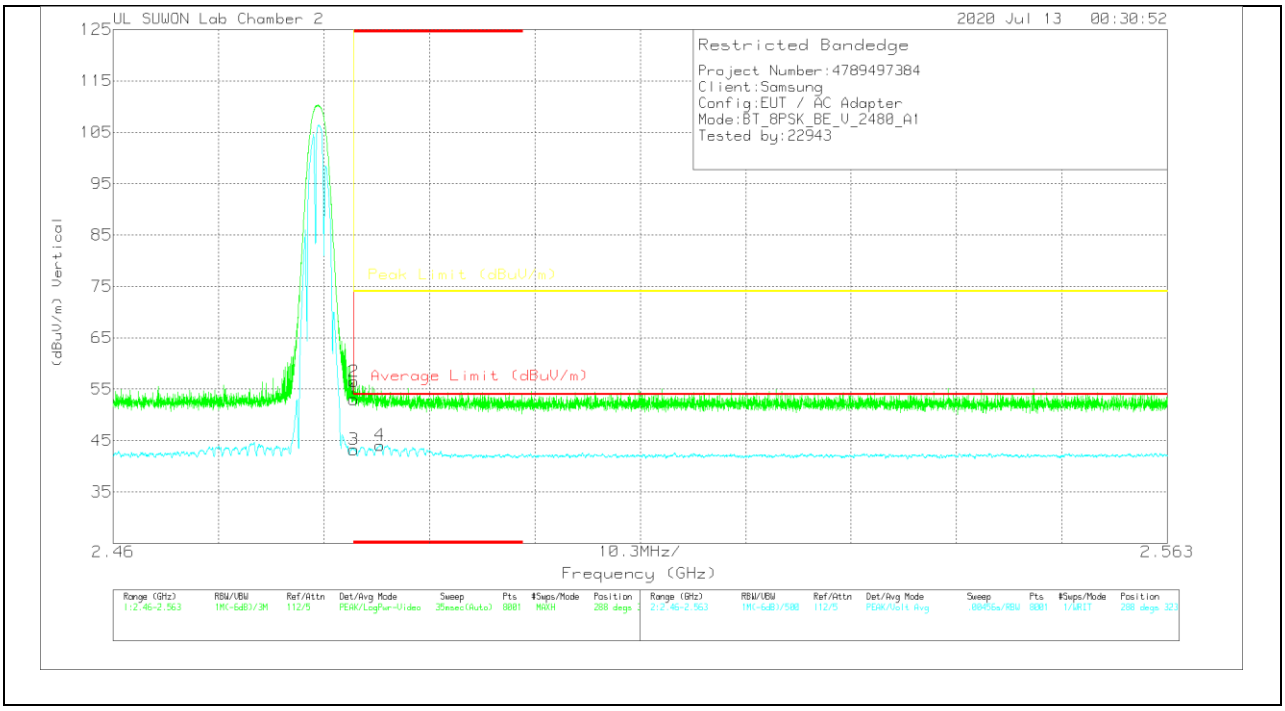
VERTICAL RESULT



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	41.54	Pk	31.9	-20.4	53.04	-	-	74	-20.96	288	323	V
2	* 2.48352	45.01	Pk	31.9	-20.4	56.51	-	-	74	-17.49	288	323	V
3	* 2.48351	31.77	VA1T	31.9	-20.4	43.27	54	-10.73	-	-	288	323	V
4	* 2.48606	32.7	VA1T	31.9	-20.5	44.1	54	-9.9	-	-	288	323	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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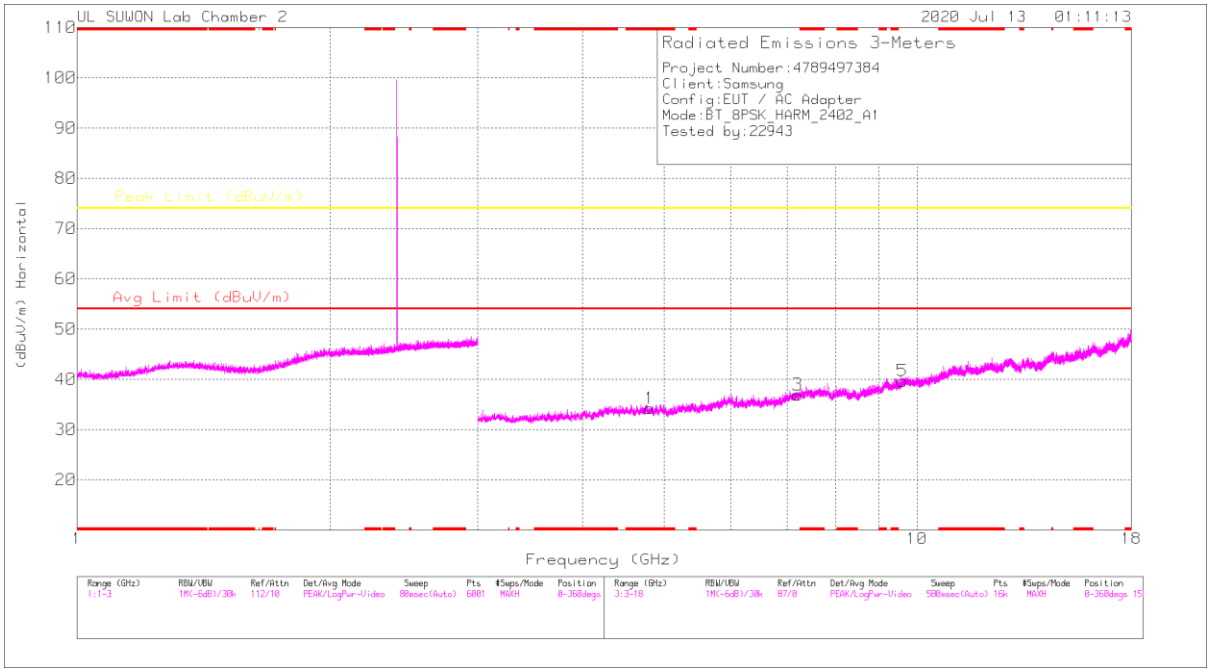
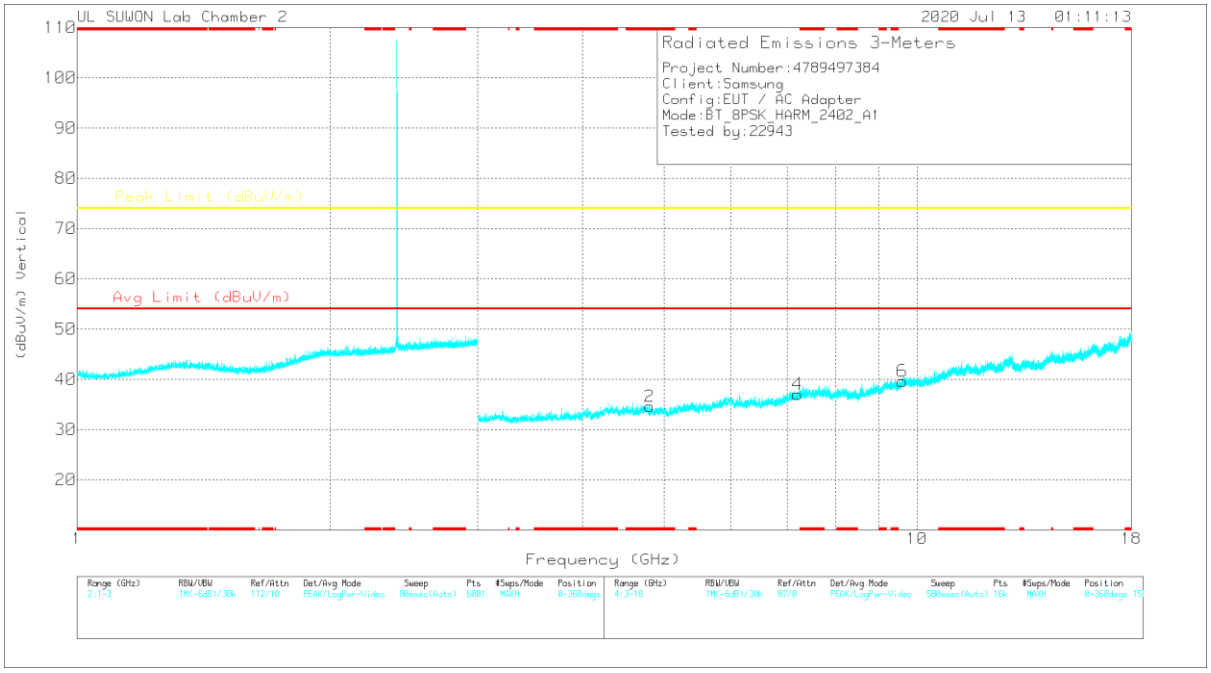
HARMONICS AND SPURIOUS EMISSIONS

Antenna 2 / 0 CHANNEL RESULTS



HORIZONTAL



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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
* 4.80417	35.36	PKFH	34	-28	41.36	-	-	74	-32.64	360	100	H
* 4.80323	35.52	PKFH	34	-28	41.52	-	-	74	-32.48	360	100	V
7.20723	33.15	PKFH	36.1	-25.2	44.05	-	-	74	-29.95	360	100	H
7.2059	33.27	PKFH	36.1	-25.2	44.17	-	-	74	-29.83	360	100	V
9.60836	31.59	PKFH	37	-21.7	46.89	-	-	74	-27.11	360	100	H
9.60655	30.9	PKFH	37	-21.7	46.2	-	-	74	-27.8	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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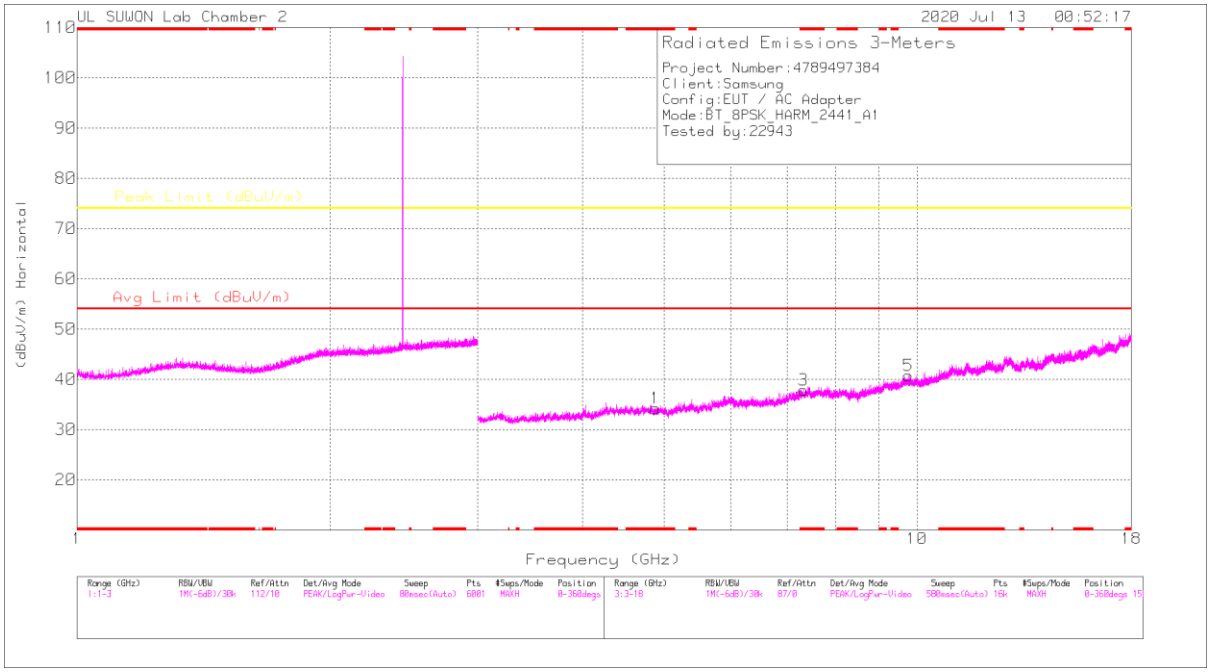
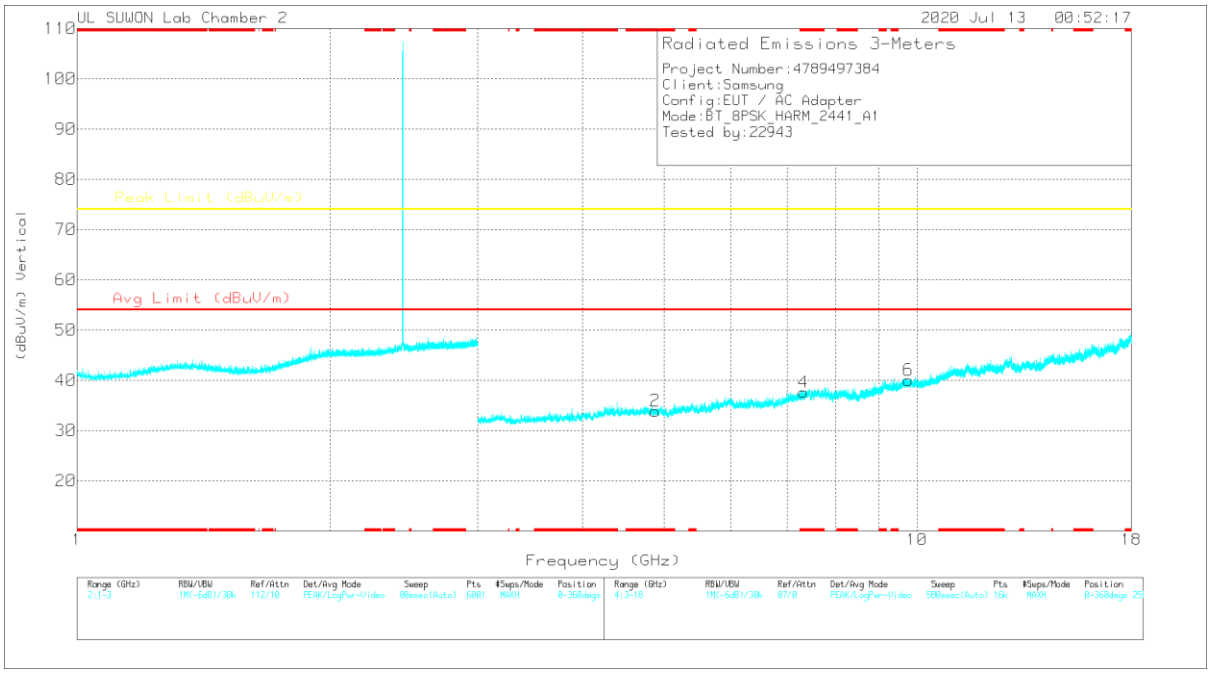
Antenna 2 / 39 CHANNEL RESULTS



HORIZONTAL



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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
* 4.88203	35.6	PKFH	34	-27.8	41.8	-	-	74	-32.2	360	100	H
* 4.88191	35.05	PKFH	34	-27.8	41.25	-	-	74	-32.75	360	100	V
* 7.32217	33.51	PKFH	36.2	-24.8	44.91	-	-	74	-29.09	360	100	H
* 7.32449	33.53	PKFH	36.2	-24.8	44.93	-	-	74	-29.07	360	100	V
9.7631	31.43	PKFH	37.2	-21.2	47.43	-	-	74	-26.57	360	100	H
9.76553	31.34	PKFH	37.2	-21.3	47.24	-	-	74	-26.76	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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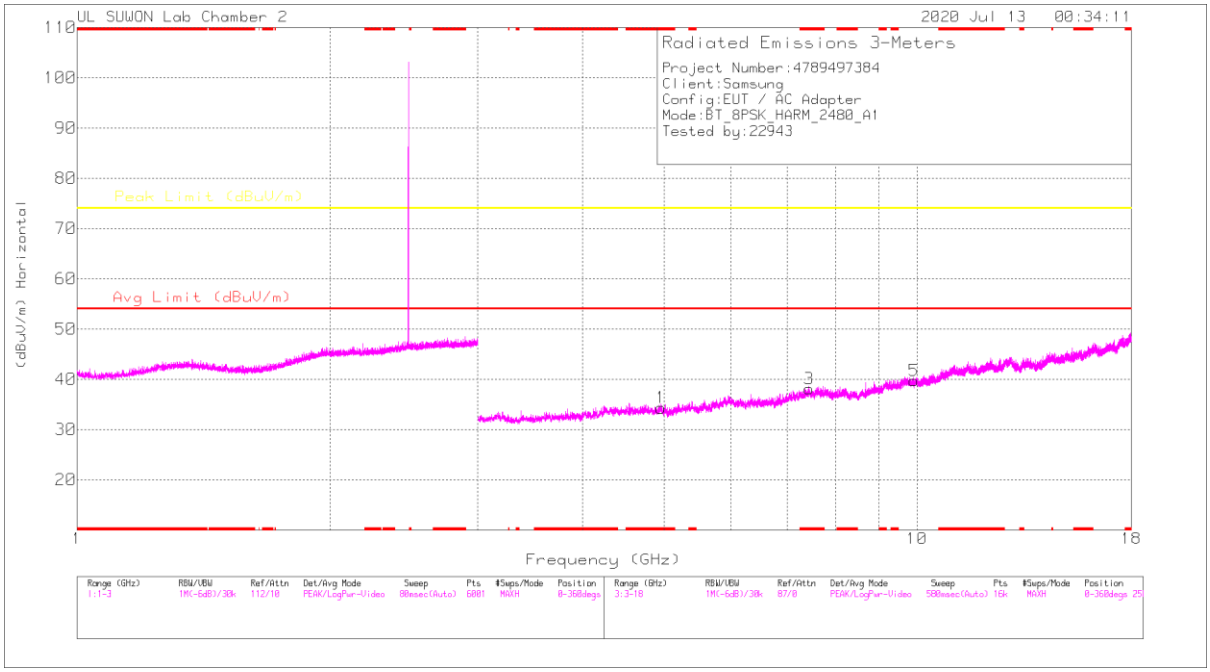
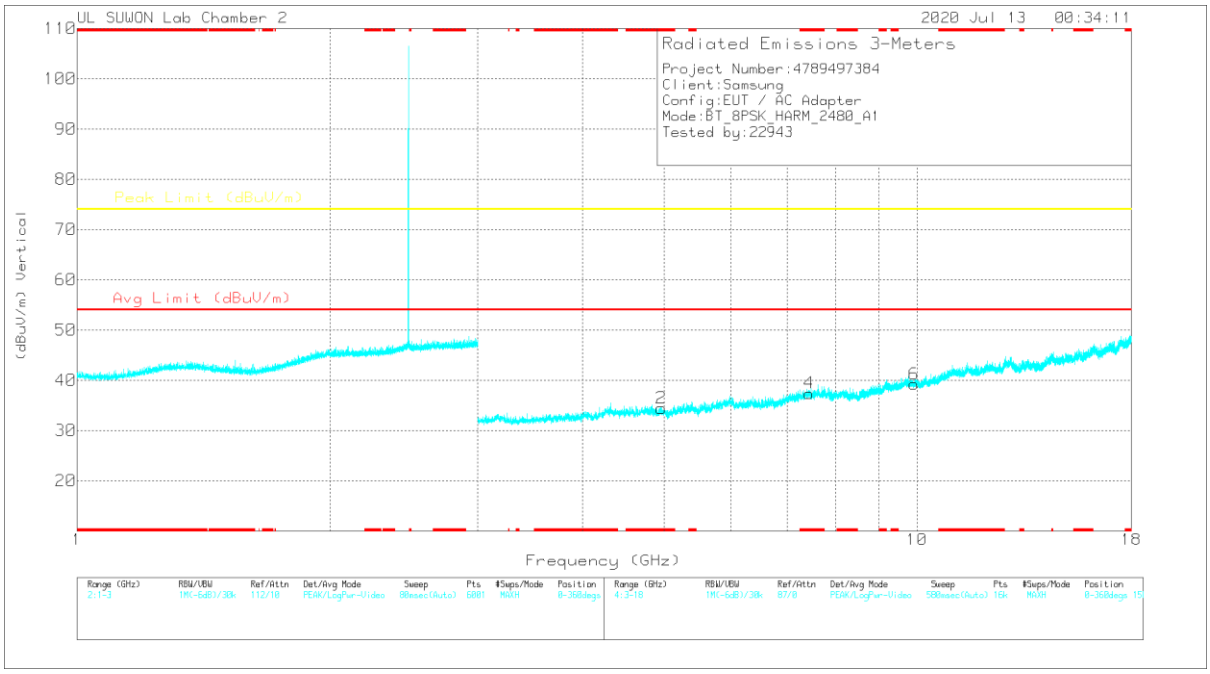
Antenna 2 / 78 CHANNEL RESULTS



HORIZONTAL



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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
* 4.96093	34.16	PKFH	34.1	-27	41.26	-	-	74	-32.74	360	100	H
* 4.96065	35.83	PKFH	34.1	-27	42.93	-	-	74	-31.07	360	100	V
* 7.43845	32.73	PKFH	36.2	-23.9	45.03	-	-	74	-28.97	360	100	H
* 7.44015	32.57	PKFH	36.2	-23.9	44.87	-	-	74	-29.13	360	100	V
9.92151	30.65	PKFH	37.4	-21	47.05	-	-	74	-26.95	360	100	H
9.92003	30.32	PKFH	37.4	-20.9	46.82	-	-	74	-27.18	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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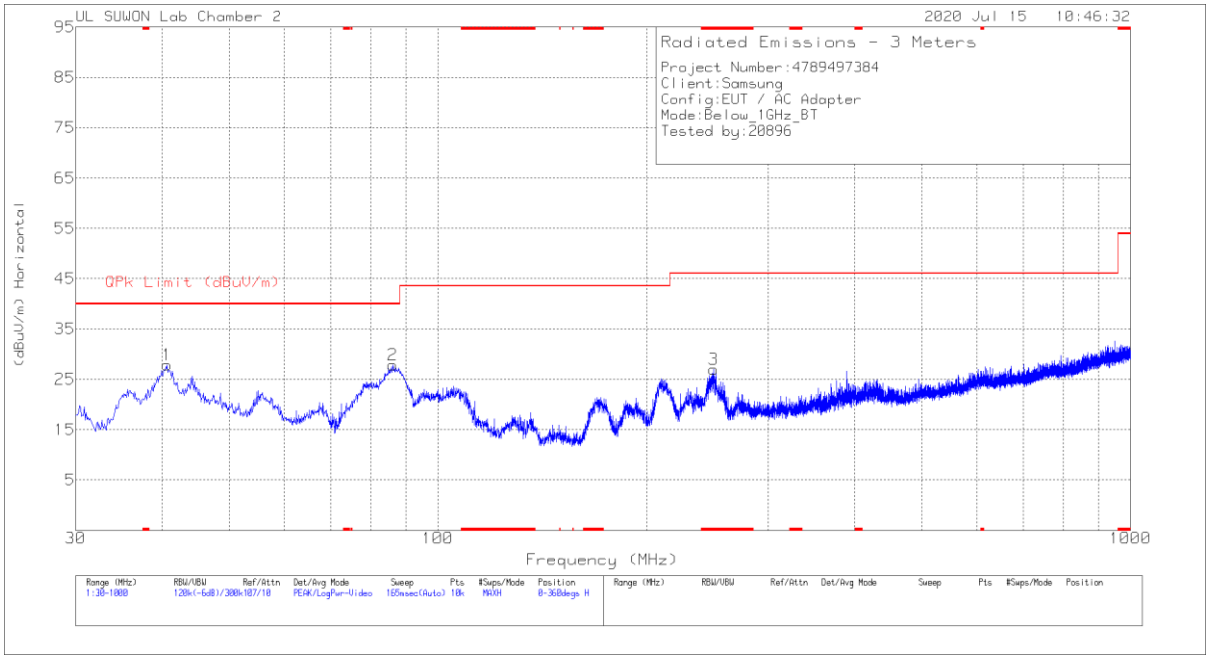
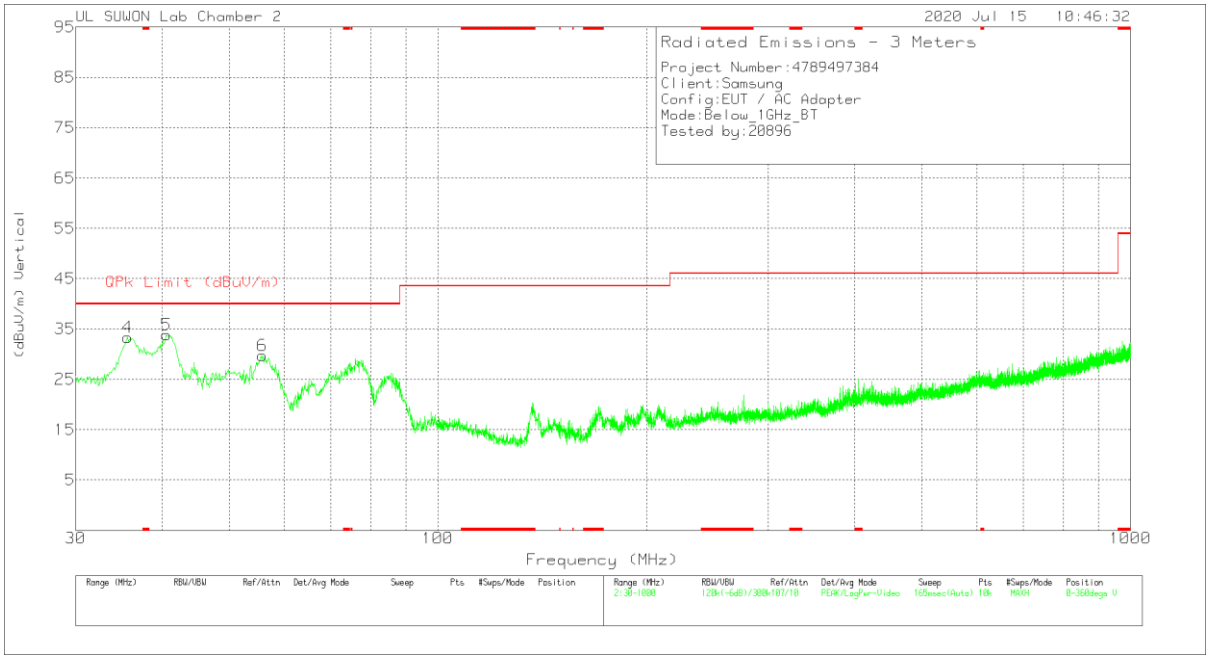
10.2. WORST CASE BELOW 1 GHZ

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



HORIZONTAL



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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	40.67	40.8	Pk	18.9	-31.8	27.9	40	-12.1	0-360	300	H
2	86.163	45.22	Pk	14	-31.4	27.82	40	-12.18	0-360	200	H
3	* 250.093	38.43	Pk	19	-30.5	26.93	46.02	-19.09	0-360	100	H
4	35.626	48.31	Pk	16.9	-31.9	33.31	40	-6.69	0-360	100	V
5	40.573	46.85	Pk	18.9	-31.9	33.85	40	-6.15	0-360	100	V
6	55.802	42.13	Pk	19.2	-31.6	29.73	40	-10.27	0-360	100	V

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

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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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

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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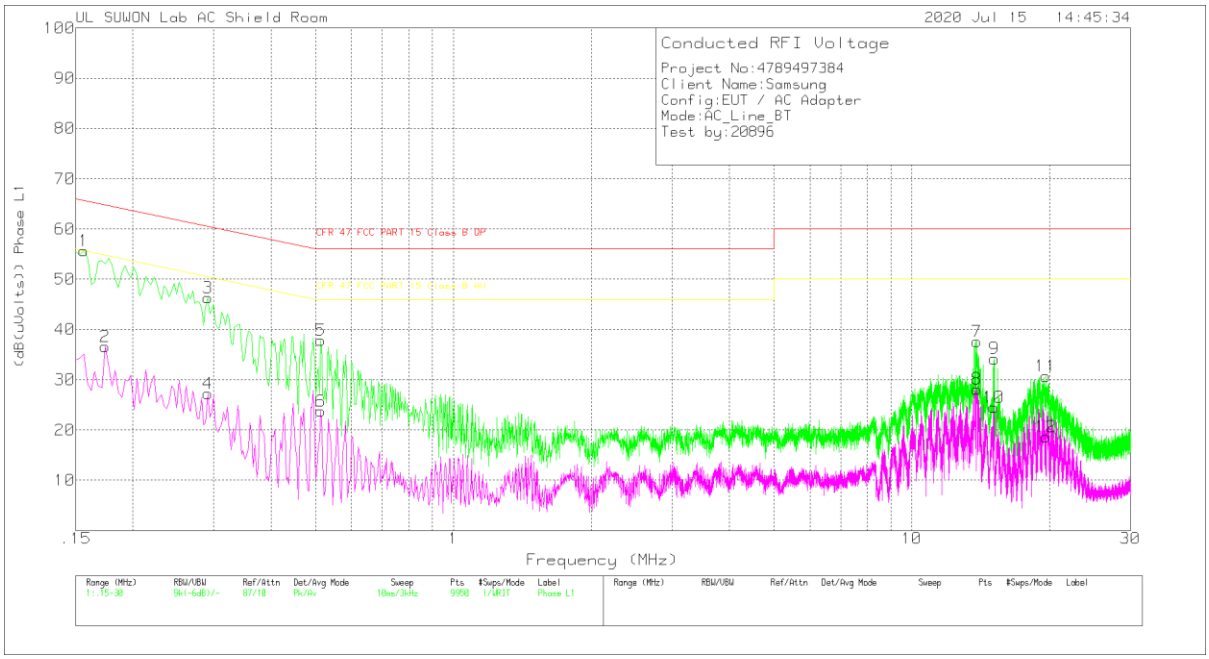
11.1.1. AC Power Line Host

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	.156	45.67	Pk	9.9	.1	55.67	65.67	-10	-	-
2	.174	26.28	Av	10.1	.2	36.58	-	-	54.77	-18.19
3	.291	36.33	Pk	9.8	.2	46.33	60.5	-14.17	-	-
4	.291	17.25	Av	9.8	.2	27.25	-	-	50.5	-23.25
5	.513	27.71	Pk	9.9	.2	37.81	56	-18.19	-	-
6	.513	13.63	Av	9.9	.2	23.73	-	-	46	-22.27
7	13.866	27.12	Pk	10.1	.4	37.62	60	-22.38	-	-
8	13.866	17.68	Av	10.1	.4	28.18	-	-	50	-21.82
9	15.126	23.67	Pk	10.1	.4	34.17	60	-25.83	-	-
10	15.117	14.05	Av	10.1	.4	24.55	-	-	50	-25.45
11	19.599	19.98	Pk	10.3	.4	30.68	60	-29.32	-	-
12	19.599	8	Av	10.3	.4	18.7	-	-	50	-31.3

Pk - Peak detector
Av - Average detection

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