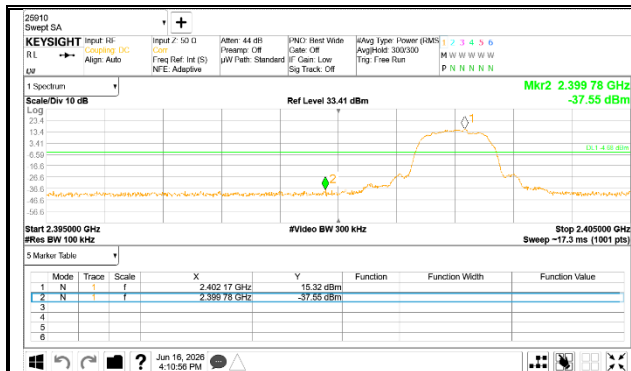
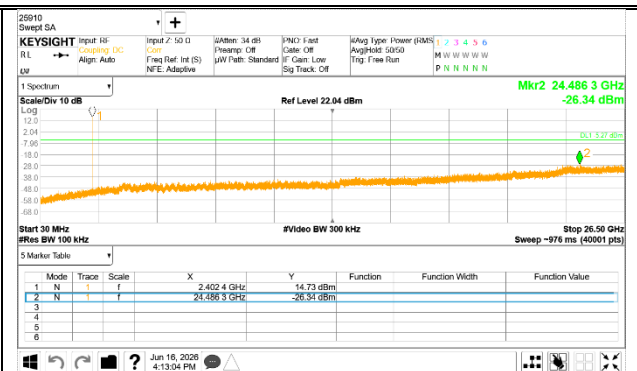


9.8.2. BLUETOOTH ENHANCED DATA RATE 8DPSK MODULATION

SPURIOUS EMISSIONS, NON-HOPPING – ANT1



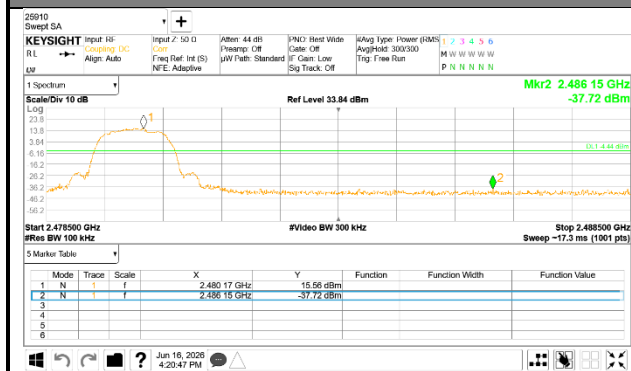
0 CHANNEL BANDEDGE



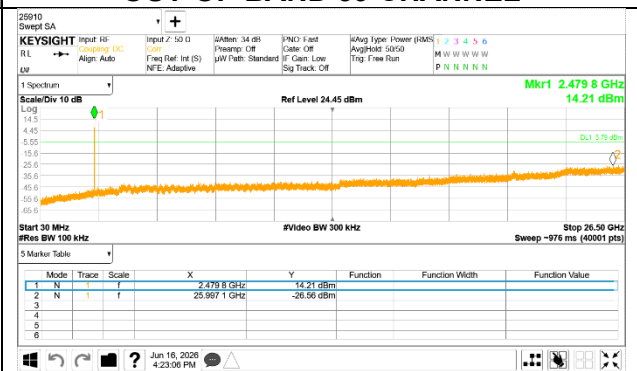
OUT-OF-BAND 0 CHANNEL



OUT-OF-BAND 39 CHANNEL

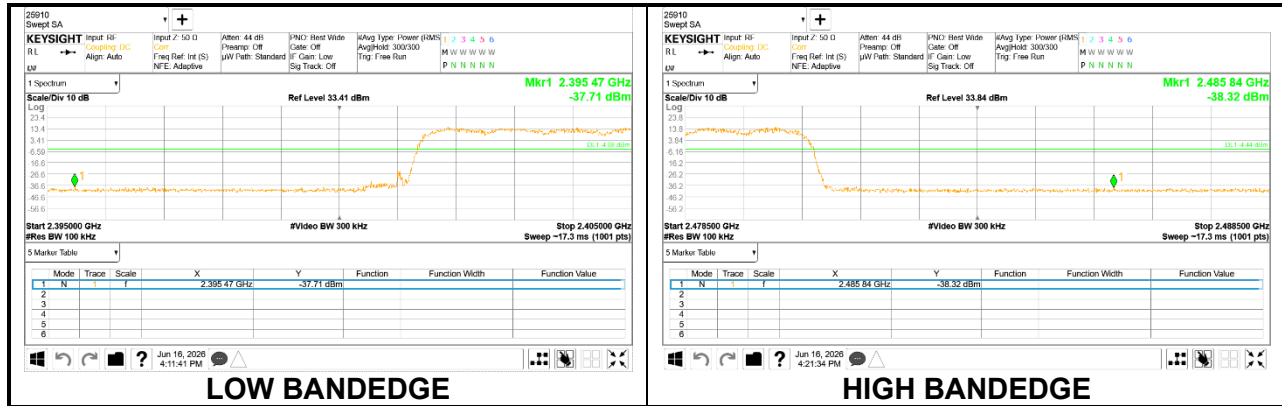


78 CHANNEL BANDEDGE

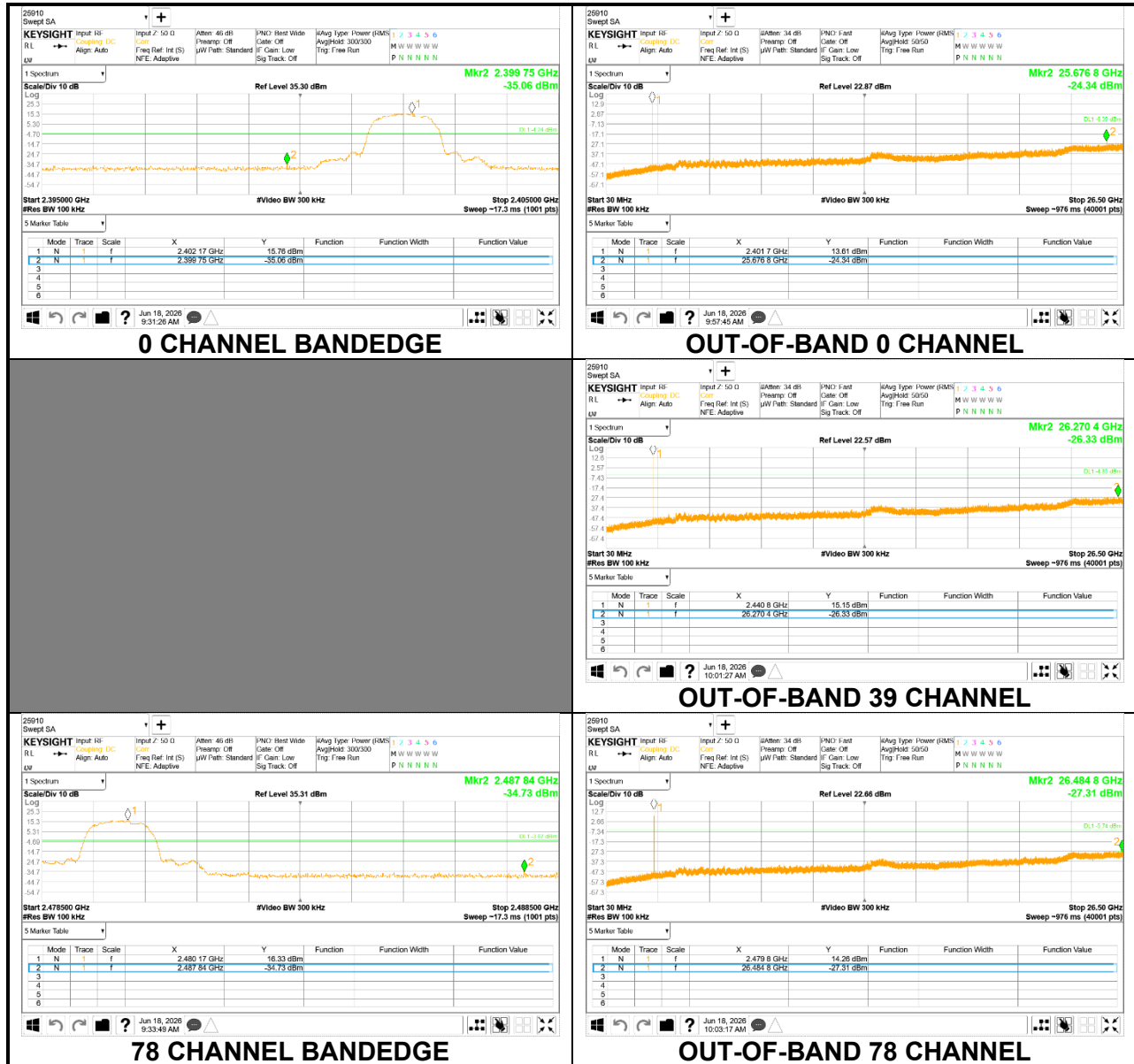


OUT-OF-BAND 78 CHANNEL

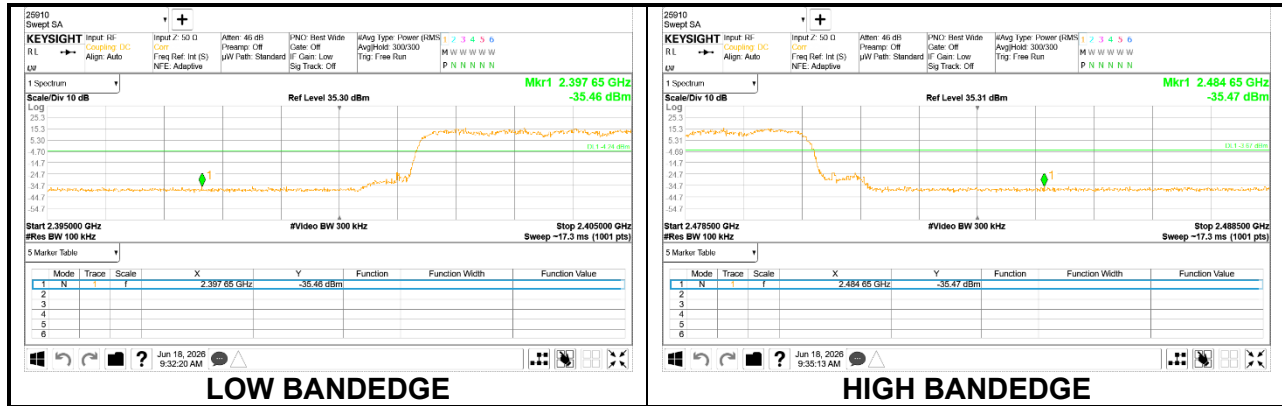
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON – ANT1



SPURIOUS EMISSIONS, NON-HOPPING – ANT2



SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON – ANT2



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.

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.

$GFSK = 1/T = 1 / 0.00286s = 0.35 \text{ kHz.}$

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).

Since Bluetooth AFH operates twice per 100 ms on a single channel. Accordingly, the duty cycle reduction factor is calculated as

$$20 \cdot \log (2.88ms \times 2 / 100ms) = -24.79 \text{ dB}$$

Because the reduction factor is greater than the 20 dB difference between the peak and average limits, average measurements were omitted.

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.

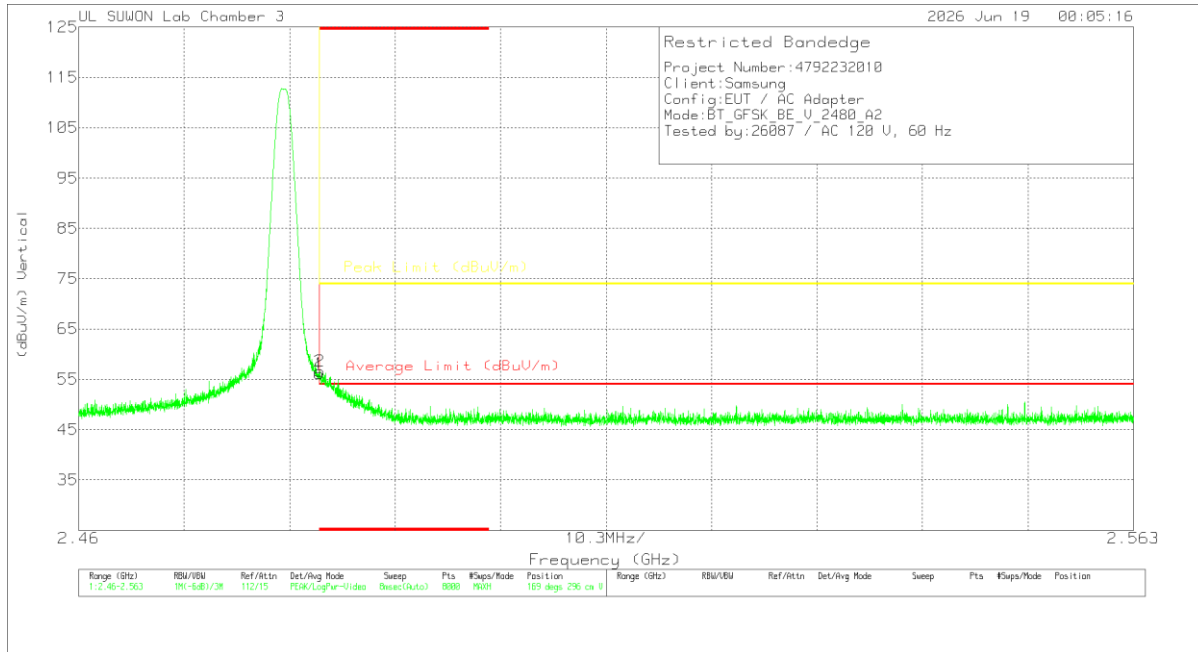
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

BANDEDGE (WORST CASE: 78 CHANNEL, ANT2)

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_Factor (dBm)	10dB_Path Loss(dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	48.67	Pk	32.4	-24.9	56.17	-	-	74	-17.83	169	296	V
2	* 2.48353	49.16	Pk	32.4	-24.9	56.66	-	-	74	-17.34	169	296	V

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

Pk - Peak detector

BANDEDGE TEST DATA

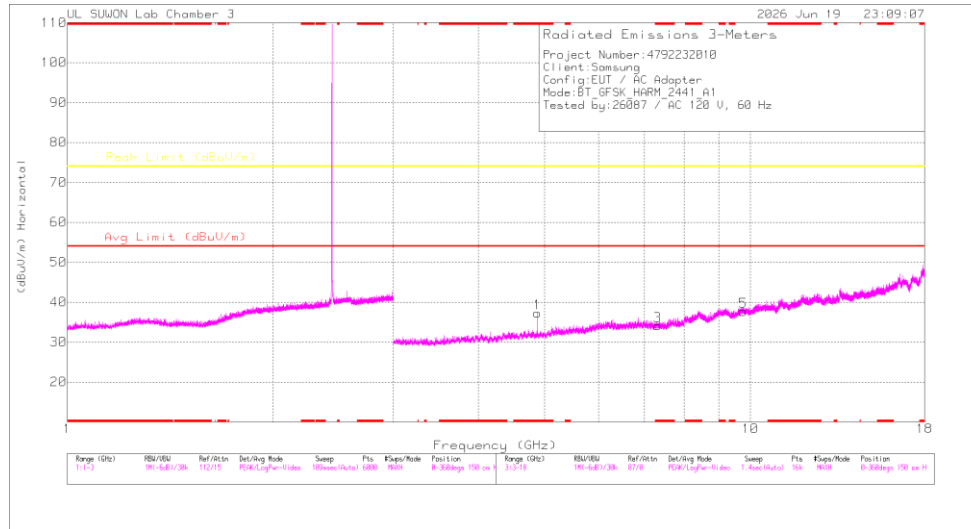
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB(1/m)]	Loss [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2402	ANT1	* 2.39	39.99	Pk	32.10	-24.90	47.19	-	-	74.00	-26.81	153	105	H
		* 2.38035	42.42	Pk	32.10	-25.10	49.42	-	-	74.00	-24.58	153	105	H
		* 2.39	39.73	Pk	32.10	-24.90	46.93	-	-	74.00	-27.07	204	319	V
		* 2.38709	41.71	Pk	32.10	-25.00	48.81	-	-	74.00	-25.19	204	319	V
2480	ANT1	* 2.4835	46.18	Pk	32.40	-24.90	53.68	-	-	74.00	-20.32	155	100	H
		* 2.48353	46.69	Pk	32.40	-24.90	54.19	-	-	74.00	-19.81	155	100	H
		* 2.4835	46.89	Pk	32.40	-24.90	54.39	-	-	74.00	-19.61	204	297	V
		* 2.48359	47.63	Pk	32.40	-24.90	55.13	-	-	74.00	-18.87	204	297	V
2402	ANT2	* 2.39	40.48	Pk	32.10	-24.90	47.68	-	-	74.00	-26.32	206	115	H
		* 2.38435	41.96	Pk	32.10	-25.00	49.06	-	-	74.00	-24.94	206	115	H
		* 2.39	40.58	Pk	32.10	-24.90	47.78	-	-	74.00	-26.22	166	318	V
		* 2.38162	42.19	Pk	32.10	-25.00	49.29	-	-	74.00	-24.71	166	318	V
2480	ANT2	* 2.4835	47.24	Pk	32.40	-24.90	54.74	-	-	74.00	-19.26	206	122	H
		* 2.4836	48.17	Pk	32.40	-24.90	55.67	-	-	74.00	-18.33	206	122	H
		* 2.4835	48.67	Pk	32.40	-24.90	56.17	-	-	74.00	-17.83	169	296	V
		* 2.48353	49.16	Pk	32.40	-24.90	56.66	-	-	74.00	-17.34	169	296	V
2402	Dual	* 2.39	42.42	Pk	31.70	-26.20	47.92	-	-	74.00	-26.08	61	263	H
		* 2.36675	45.84	Pk	31.70	-26.20	51.34	-	-	74.00	-22.66	61	263	H
		* 2.39	42.97	Pk	31.70	-26.20	48.47	-	-	74.00	-25.53	172	316	V
		* 2.38357	45.25	Pk	31.70	-26.20	50.75	-	-	74.00	-23.25	172	316	V
2480	Dual	* 2.48351	43.45	Pk	32.00	-25.80	49.65	-	-	74.00	-24.35	120	212	H
		* 2.547	45.02	Pk	32.10	-25.80	51.32	-	-	74.00	-22.68	120	212	H
		* 2.48351	42.78	Pk	32.00	-26.20	48.58	-	-	74.00	-25.42	172	298	V
		* 2.554	44.84	Pk	32.10	-26.00	50.94	-	-	74.00	-23.06	172	298	V

Note1. Pk - Peak detector.

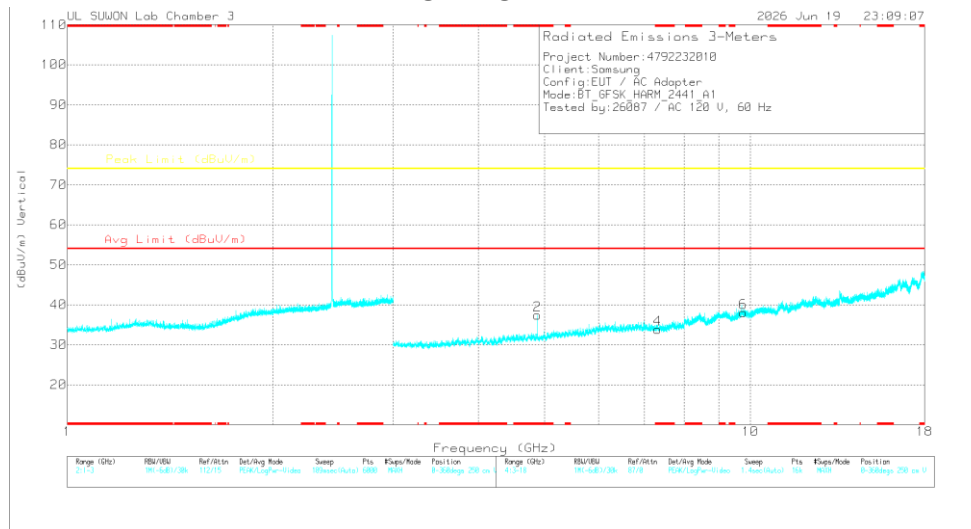
Note2. * - indicates frequency in 47 CFR Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE – ANT1)

39 CHANNEL RESULTS



HORIZONTAL



VERTICAL

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Factor (dB/m)	3GHz_HP_Path Loss(dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88183	40.51	PKFH	34.2	-30.8	43.91	-	-	74	-30.09	64	179	H
* 4.88165	39.89	PKFH	34.2	-30.8	43.29	-	-	74	-30.71	339	225	V
* 7.32568	32.36	PKFH	35.8	-25.3	42.86	-	-	74	-31.14	0	100	H
* 7.31933	32.82	PKFH	35.8	-25.3	43.32	-	-	74	-30.68	0	100	V
9.76279	30.02	PKFH	36.9	-21.3	45.62	-	-	74	-28.38	0	100	H
9.76895	30.15	PKFH	36.9	-21.4	45.65	-	-	74	-28.35	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

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB(1/m)]	Loss [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2402	ANT1	* 4.80465	38.01	PKFH	34.30	-30.10	42.21	-	-	74.00	-31.79	296	184	H
		* 4.8045	37.92	PKFH	34.30	-30.10	42.12	-	-	74.00	-31.88	331	149	V
		7.203	31.84	PKFH	35.80	-25.80	41.84	-	-	74.00	-32.16	0	100	H
		7.210	32.55	PKFH	35.80	-25.80	42.55	-	-	74.00	-31.45	0	100	V
		9.606	30.49	PKFH	36.70	-21.70	45.49	-	-	74.00	-28.51	0	100	H
		9.604	32.18	PKFH	36.70	-21.70	47.18	-	-	74.00	-26.82	0	100	V
2441	ANT1	* 4.88183	40.51	PKFH	34.20	-30.80	43.91	-	-	74.00	-30.09	64	179	H
		* 4.88165	39.89	PKFH	34.20	-30.80	43.29	-	-	74.00	-30.71	339	225	V
		* 7.32568	32.36	PKFH	35.80	-25.30	42.86	-	-	74.00	-31.14	0	100	H
		* 7.31933	32.82	PKFH	35.80	-25.30	43.32	-	-	74.00	-30.68	0	100	V
		9.763	30.02	PKFH	36.90	-21.30	45.62	-	-	74.00	-28.38	0	100	H
		9.769	30.15	PKFH	36.90	-21.40	45.65	-	-	74.00	-28.35	0	100	V
2480	ANT1	* 4.96028	38.72	PKFH	34.30	-30.30	42.72	-	-	74.00	-31.28	78	100	H
		* 4.96031	38.13	PKFH	34.30	-30.30	42.13	-	-	74.00	-31.87	344	111	V
		* 7.44358	32.16	PKFH	35.70	-25.00	42.86	-	-	74.00	-31.14	0	100	H
		* 7.43637	31.61	PKFH	35.70	-24.90	42.41	-	-	74.00	-31.59	0	100	V
		9.919	30.53	PKFH	37.10	-21.50	46.13	-	-	74.00	-27.87	0	100	H
		9.916	29.86	PKFH	37.10	-21.40	45.56	-	-	74.00	-28.44	0	100	V
2402	ANT2	* 4.80051	37.73	PKFH	34.30	-30.00	42.03	-	-	74.00	-31.97	28	137	H
		* 4.80365	36.32	PKFH	34.30	-30.10	40.52	-	-	74.00	-33.48	343	319	V
		7.206	33.47	PKFH	35.80	-25.80	43.47	-	-	74.00	-30.53	0	100	H
		7.203	32.28	PKFH	35.80	-25.80	42.28	-	-	74.00	-31.72	0	100	V
		9.612	31.11	PKFH	36.70	-21.70	46.11	-	-	74.00	-27.89	0	100	H
		9.612	30.77	PKFH	36.70	-21.70	45.77	-	-	74.00	-28.23	0	100	V
2441	ANT2	* 4.87902	36.79	PKFH	34.20	-30.80	40.19	-	-	74.00	-33.81	303	127	H
		* 4.88173	38.07	PKFH	34.20	-30.80	41.47	-	-	74.00	-32.53	342	100	V
		* 7.32517	32.50	PKFH	35.80	-25.30	43.00	-	-	74.00	-31.00	0	100	H
		* 7.32052	31.60	PKFH	35.80	-25.20	42.20	-	-	74.00	-31.80	0	100	V
		9.763	30.53	PKFH	36.90	-21.30	46.13	-	-	74.00	-27.87	0	100	H
		9.760	30.12	PKFH	36.90	-21.30	45.72	-	-	74.00	-28.28	0	100	V
2480	ANT2	* 4.96018	37.03	PKFH	34.30	-30.30	41.03	-	-	74.00	-32.97	28	132	H
		* 4.95996	37.18	PKFH	34.30	-30.40	41.08	-	-	74.00	-32.92	352	100	V
		* 7.44144	32.19	PKFH	35.70	-25.00	42.89	-	-	74.00	-31.11	0	100	H
		* 7.43567	32.50	PKFH	35.70	-24.90	43.30	-	-	74.00	-30.70	0	100	V
		9.924	30.59	PKFH	37.10	-21.40	46.29	-	-	74.00	-27.71	0	100	H
		9.916	30.14	PKFH	37.10	-21.40	45.84	-	-	74.00	-28.16	0	100	V
2402	DUAL	* 4.80406	41.16	PKFH	34.20	-33.00	42.36	-	-	74.00	-31.64	17	250	H
		* 4.80425	41.38	PKFH	34.20	-33.00	42.58	-	-	74.00	-31.42	14	174	V
		7.207	38.47	PKFH	35.50	-31.00	42.97	-	-	74.00	-31.03	0	100	H
		7.207	38.79	PKFH	35.50	-31.00	43.29	-	-	74.00	-30.71	0	100	V
		9.609	34.82	PKFH	37.00	-27.10	44.72	-	-	74.00	-29.28	0	100	H
		9.608	34.83	PKFH	37.00	-27.10	44.73	-	-	74.00	-29.27	0	100	V
2441	DUAL	* 4.88312	40.45	PKFH	34.20	-33.00	41.65	-	-	74.00	-32.35	323	394	H
		* 4.88206	40.78	PKFH	34.20	-33.00	41.98	-	-	74.00	-32.02	16	159	V
		* 7.32083	38.12	PKFH	35.50	-30.80	42.82	-	-	74.00	-31.18	0	100	H
		* 7.32406	38.35	PKFH	35.50	-30.80	43.05	-	-	74.00	-30.95	0	100	V
		9.763	35.70	PKFH	37.20	-26.50	46.40	-	-	74.00	-27.60	0	100	H
		9.762	34.63	PKFH	37.20	-26.50	45.33	-	-	74.00	-28.67	0	100	V
2480	DUAL	* 4.96008	42.17	PKFH	34.20	-32.90	43.47	-	-	74.00	-30.53	320	190	H
		* 4.96006	42.54	PKFH	34.20	-32.90	43.84	-	-	74.00	-30.16	20	157	V
		* 7.44067	38.68	PKFH	35.60	-30.40	43.88	-	-	74.00	-30.12	0	100	H
		* 7.43824	37.87	PKFH	35.60	-30.30	43.17	-	-	74.00	-30.83	0	100	V
		9.922	34.56	PKFH	37.40	-27.10	44.86	-	-	74.00	-29.14	0	100	H
		9.919	35.26	PKFH	37.40	-27.10	45.56	-	-	74.00	-28.44	0	100	V

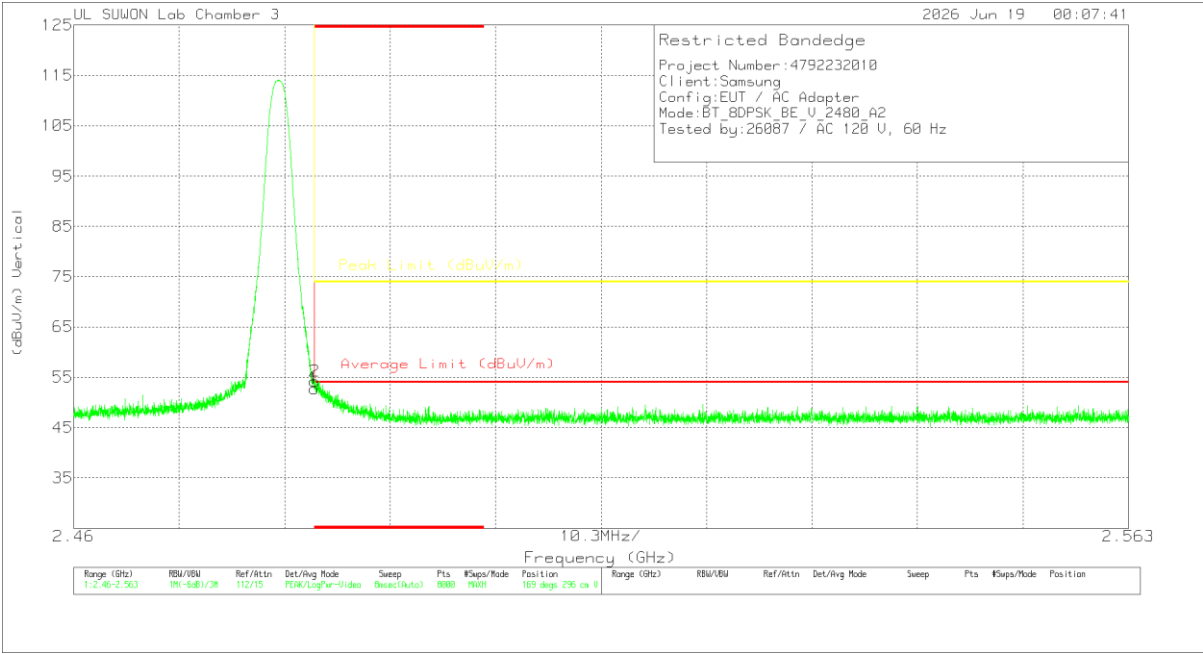
* - indicates frequency in 47 CFR Pt 15 / IC RSS-Restricted Band

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

10.1.2. BLUETOOTH ENHANCED DATA RATE 8DPSK
MODULATION
BANDEDGE (WORST CASE: 78 CHANNEL, ANT2)

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBUV)	Det	Antenna_Factor (dBm)	10dB_Path Loss(dB)	Corrected Reading (dBUV/m)	Average Limit (dBUV/m)	Margin (dB)	Peak Limit (dBUV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	45.27	Pk	32.4	-24.9	52.77	-	-	74	-21.23	169	296	V
2	* 2.48353	46.78	Pk	32.4	-24.9	54.28	-	-	74	-19.72	169	296	V

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

BANEDGE TEST DATA

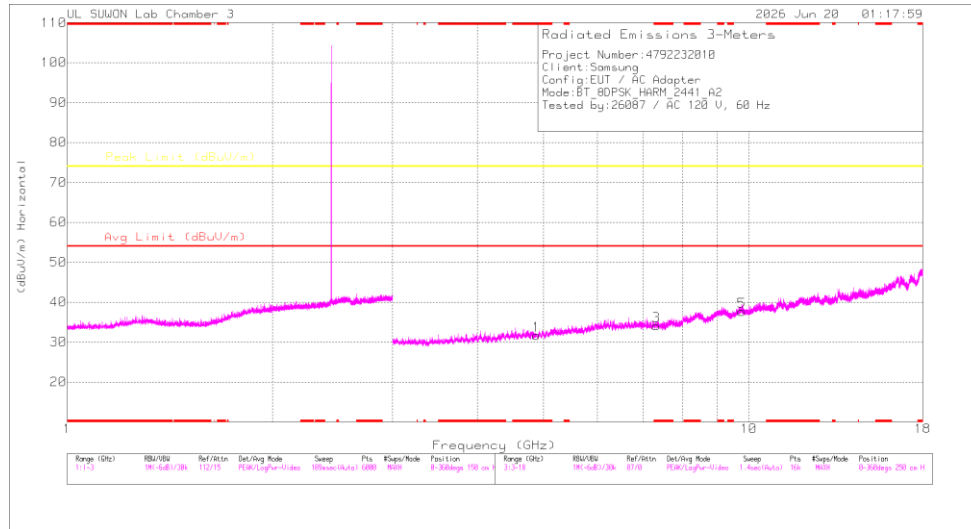
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB(1/m)]	Loss [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2402	ANT1	* 2.39	40.84	Pk	32.10	-24.90	48.04	-	-	74.00	-25.96	153	105	H
		* 2.38942	42.11	Pk	32.10	-24.90	49.31	-	-	74.00	-24.69	153	105	H
		* 2.39	40.09	Pk	32.10	-24.90	47.29	-	-	74.00	-26.71	204	319	V
		* 2.36057	42.32	Pk	32.00	-24.90	49.42	-	-	74.00	-24.58	204	319	V
2480	ANT1	* 2.4835	44.57	Pk	32.40	-24.90	52.07	-	-	74.00	-21.93	155	100	H
		* 2.48356	45.67	Pk	32.40	-24.90	53.17	-	-	74.00	-20.83	155	100	H
		* 2.4835	44.82	Pk	32.40	-24.90	52.32	-	-	74.00	-21.68	204	297	V
		* 2.48376	45.62	Pk	32.40	-24.90	53.12	-	-	74.00	-20.88	204	297	V
2402	ANT2	* 2.39	39.68	Pk	32.10	-24.90	46.88	-	-	74.00	-27.12	206	115	H
		* 2.38698	41.96	Pk	32.10	-25.00	49.06	-	-	74.00	-24.94	206	115	H
		* 2.39	39.95	Pk	32.10	-24.90	47.15	-	-	74.00	-26.85	166	318	V
		* 2.37356	42.27	Pk	32.00	-25.00	49.27	-	-	74.00	-24.73	166	318	V
2480	ANT2	* 2.4835	44.43	Pk	32.40	-24.90	51.93	-	-	74.00	-22.07	206	122	H
		* 2.48378	46.35	Pk	32.40	-24.90	53.85	-	-	74.00	-20.15	206	122	H
		* 2.4835	45.27	Pk	32.40	-24.90	52.77	-	-	74.00	-21.23	169	296	V
		* 2.48353	46.78	Pk	32.40	-24.90	54.28	-	-	74.00	-19.72	169	296	V
2402	Dual	* 2.39	41.83	Pk	31.70	-26.20	47.33	-	-	74.00	-26.67	61	263	H
		* 2.38228	45.01	Pk	31.70	-26.20	50.51	-	-	74.00	-23.49	61	263	H
		* 2.39	42.57	Pk	31.70	-26.20	48.07	-	-	74.00	-25.93	172	316	V
		* 2.37741	45.20	Pk	31.70	-26.20	50.70	-	-	74.00	-23.30	172	316	V
2480	Dual	* 2.48351	42.91	Pk	32.00	-25.80	49.11	-	-	74.00	-24.89	120	212	H
		* 2.48748	45.09	Pk	32.00	-25.80	51.29	-	-	74.00	-22.71	120	212	H
		* 2.48351	41.59	Pk	32.00	-26.20	47.39	-	-	74.00	-26.61	172	298	V
		2.507	45.33	Pk	32.00	-26.20	51.13	-	-	74.00	-22.87	172	298	V

Note1. Pk - Peak detector.

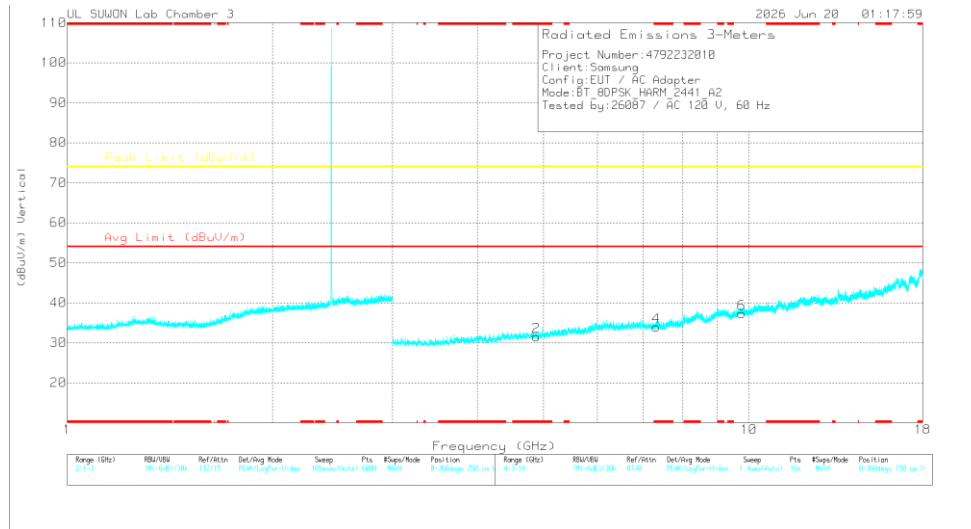
Note2. * - indicates frequency in 47 CFR Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE – ANT2)

39 CHANNEL RESULTS



HORIZONTAL



VERTICAL

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Factor (dB/m)	3GHz_HP_Path Loss(dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88464	36.84	PKFH	34.2	-30.8	40.24	-	-	74	-33.76	303	127	H
* 4.88195	38.78	PKFH	34.2	-30.8	42.18	-	-	74	-31.82	342	100	V
* 7.32199	33.33	PKFH	35.8	-25.2	43.93	-	-	74	-30.07	0	100	H
* 7.32246	32.38	PKFH	35.8	-25.2	42.98	-	-	74	-31.02	0	100	V
9.76106	30.96	PKFH	36.9	-21.3	46.56	-	-	74	-27.44	0	100	H
9.76442	30.9	PKFH	36.9	-21.3	46.5	-	-	74	-27.5	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

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB(1/m)]	Loss [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2402	ANT1	* 4.80353	38.38	PKFH	34.30	-30.10	42.58	-	-	74.00	-31.42	296	184	H
		* 4.8039	38.65	PKFH	34.30	-30.10	42.85	-	-	74.00	-31.15	331	149	V
		7.204	32.75	PKFH	35.80	-25.80	42.75	-	-	74.00	-31.25	0	100	H
		7.210	32.49	PKFH	35.80	-25.80	42.49	-	-	74.00	-31.51	0	100	V
		9.607	30.55	PKFH	36.70	-21.70	45.55	-	-	74.00	-28.45	0	100	H
		9.610	30.14	PKFH	36.70	-21.70	45.14	-	-	74.00	-28.86	0	100	V
2441	ANT1	* 4.88209	40.35	PKFH	34.20	-30.80	43.75	-	-	74.00	-30.25	64	179	H
		* 4.88162	39.64	PKFH	34.20	-30.80	43.04	-	-	74.00	-30.96	339	225	V
		* 7.32148	31.94	PKFH	35.80	-25.20	42.54	-	-	74.00	-31.46	0	100	H
		* 7.31918	31.65	PKFH	35.80	-25.30	42.15	-	-	74.00	-31.85	0	100	V
		9.766	30.63	PKFH	36.90	-21.40	46.13	-	-	74.00	-27.87	0	100	H
		9.761	30.70	PKFH	36.90	-21.40	46.20	-	-	74.00	-27.80	0	100	V
2480	ANT1	* 4.96035	38.93	PKFH	34.30	-30.30	42.93	-	-	74.00	-31.07	78	100	H
		* 7.4414	31.83	PKFH	35.70	-25.00	42.53	-	-	74.00	-31.47	0	100	H
		9.923	30.24	PKFH	37.10	-21.40	45.94	-	-	74.00	-28.06	0	100	H
		* 4.9598	38.33	PKFH	34.30	-30.40	42.23	-	-	74.00	-31.77	344	111	V
		* 7.43926	31.95	PKFH	35.70	-25.00	42.65	-	-	74.00	-31.35	360	100	V
		9.917	30.19	PKFH	37.10	-21.40	45.89	-	-	74.00	-28.11	360	100	V
2402	ANT2	* 4.80815	36.99	PKFH	34.30	-30.10	41.19	-	-	74.00	-32.81	28	137	H
		* 4.80892	37.24	PKFH	34.30	-30.10	41.44	-	-	74.00	-32.56	343	318	V
		7.202	32.18	PKFH	35.80	-25.80	42.18	-	-	74.00	-31.82	0	100	H
		7.204	32.38	PKFH	35.80	-25.80	42.38	-	-	74.00	-31.62	0	100	V
		9.611	30.13	PKFH	36.70	-21.70	45.13	-	-	74.00	-28.87	0	100	H
		9.604	30.80	PKFH	36.70	-21.70	45.80	-	-	74.00	-28.20	0	100	V
2441	ANT2	* 4.88464	36.84	PKFH	34.20	-30.80	40.24	-	-	74.00	-33.76	303	127	H
		* 4.88195	38.78	PKFH	34.20	-30.80	42.18	-	-	74.00	-31.82	342	100	V
		* 7.32199	33.33	PKFH	35.80	-25.20	43.93	-	-	74.00	-30.07	0	100	H
		* 7.32246	32.38	PKFH	35.80	-25.20	42.98	-	-	74.00	-31.02	0	100	V
		9.761	30.96	PKFH	36.90	-21.30	46.56	-	-	74.00	-27.44	0	100	H
		9.764	30.90	PKFH	36.90	-21.30	46.50	-	-	74.00	-27.50	0	100	V
2480	ANT2	* 4.96103	36.69	PKFH	34.30	-30.30	40.69	-	-	74.00	-33.31	28	132	H
		* 4.95991	37.92	PKFH	34.30	-30.40	41.82	-	-	74.00	-32.18	352	100	V
		* 7.43979	31.60	PKFH	35.70	-25.00	42.30	-	-	74.00	-31.70	0	100	H
		* 7.44084	32.79	PKFH	35.70	-25.00	43.49	-	-	74.00	-30.51	0	100	V
		9.916	30.33	PKFH	37.10	-21.40	46.03	-	-	74.00	-27.97	0	100	H
		9.920	30.14	PKFH	37.10	-21.50	45.74	-	-	74.00	-28.26	0	100	V
2402	DUAL	* 4.80339	40.39	PKFH	34.20	-33.00	41.59	-	-	74.00	-32.41	17	250	H
		* 4.80463	41.02	PKFH	34.20	-33.00	42.22	-	-	74.00	-31.78	14	174	V
		7.208	38.66	PKFH	35.50	-31.00	43.16	-	-	74.00	-30.84	0	100	H
		7.208	38.73	PKFH	35.50	-30.90	43.33	-	-	74.00	-30.67	0	100	V
		9.610	35.55	PKFH	37.00	-27.10	45.45	-	-	74.00	-28.55	0	100	H
		9.607	34.77	PKFH	37.00	-27.10	44.67	-	-	74.00	-29.33	0	100	V
2441	DUAL	* 4.8828	40.28	PKFH	34.20	-33.00	41.48	-	-	74.00	-32.52	323	394	H
		* 4.88194	40.41	PKFH	34.20	-33.00	41.61	-	-	74.00	-32.39	16	159	V
		* 7.32472	38.37	PKFH	35.50	-30.80	43.07	-	-	74.00	-30.93	0	100	H
		* 7.32116	38.71	PKFH	35.50	-30.70	43.51	-	-	74.00	-30.49	0	100	V
		9.766	34.34	PKFH	37.20	-26.50	45.04	-	-	74.00	-28.96	0	100	H
		9.764	34.89	PKFH	37.20	-26.60	45.49	-	-	74.00	-28.51	0	100	V
2480	DUAL	* 4.96008	41.73	PKFH	34.20	-32.90	43.03	-	-	74.00	-30.97	320	190	H
		* 4.9596	42.10	PKFH	34.20	-32.90	43.40	-	-	74.00	-30.60	20	157	V
		* 7.43909	37.41	PKFH	35.60	-30.40	42.61	-	-	74.00	-31.39	0	100	H
		* 7.43997	38.22	PKFH	35.60	-30.40	43.42	-	-	74.00	-30.58	0	100	V
		9.922	35.25	PKFH	37.40	-27.10	45.55	-	-	74.00	-28.45	0	100	H
		9.919	35.23	PKFH	37.40	-27.10	45.53	-	-	74.00	-28.47	0	100	V

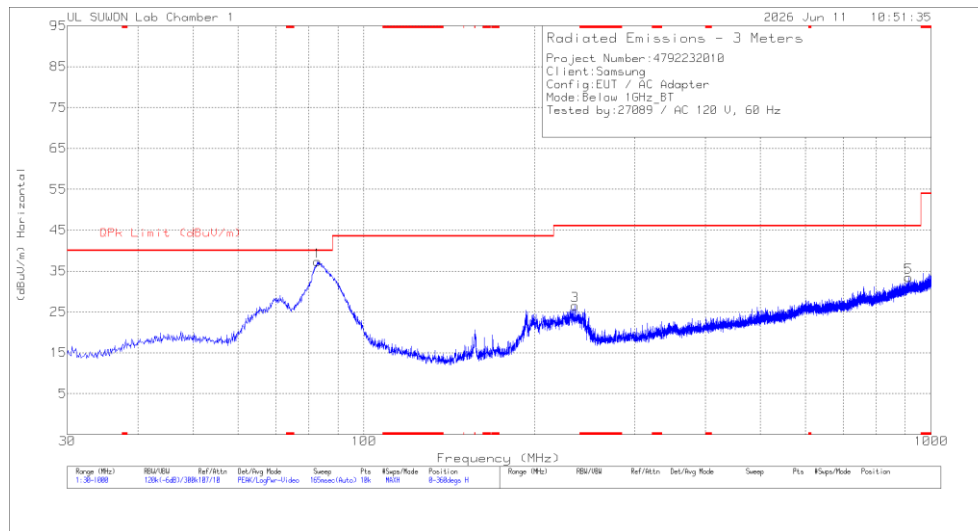
* - indicates frequency in 47 CFR Pt 15 / IC RSS-Restricted Band

PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

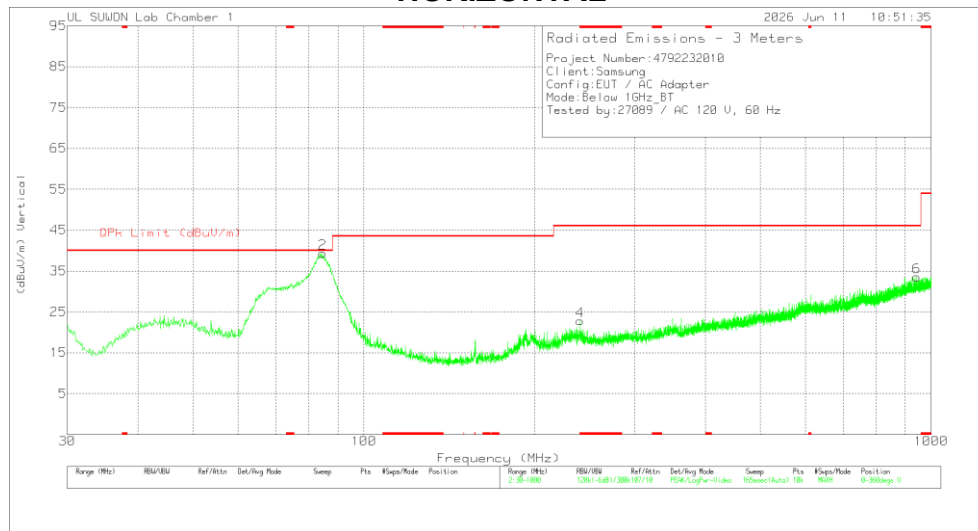
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

10.2. WORST CASE BELOW 1 GHz

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



HORIZONTAL



VERTICAL

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna_Factor (dB/m)	Below_1G_Path Loss(dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	82.768	54.68	Pk	13.1	-30.5	37.28	40	-2.72	0-360	100	H
3	235.446	37.77	Pk	17.8	-29	26.57	46.02	-19.45	0-360	100	H
5	912.409	30.9	Pk	28	-25.5	33.4	46.02	-12.62	0-360	300	H
2	84.611	56	Pk	13.7	-30.4	39.3	40	-7	0-360	100	V
4	* 240.684	33.71	Pk	18.1	-29	22.81	46.02	-23.21	0-360	100	V
6	942.867	30.61	Pk	28	-25.1	33.51	46.02	-12.51	0-360	100	V

Pk - Peak detector

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna_Factor (dB/m)	Below_1G_Pat h Loss(dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
82.768	51.35	Qp	13.1	-30.5	33.95	40	-6.05	158	221	H
84.611	53.62	Qp	13.7	-30.4	36.92	40	-3.08	157	142	V

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

Qp - Quasi-Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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 C63.10:2020.

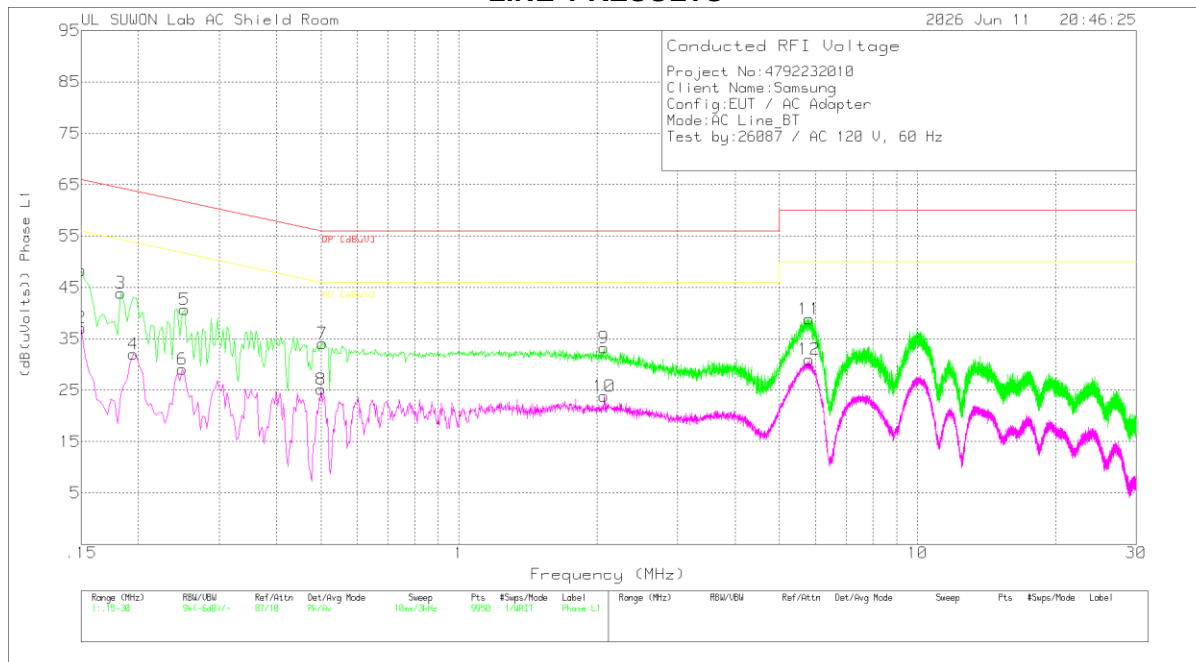
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

11.1. AC Power Line

LINE 1 RESULTS



Trace Markers

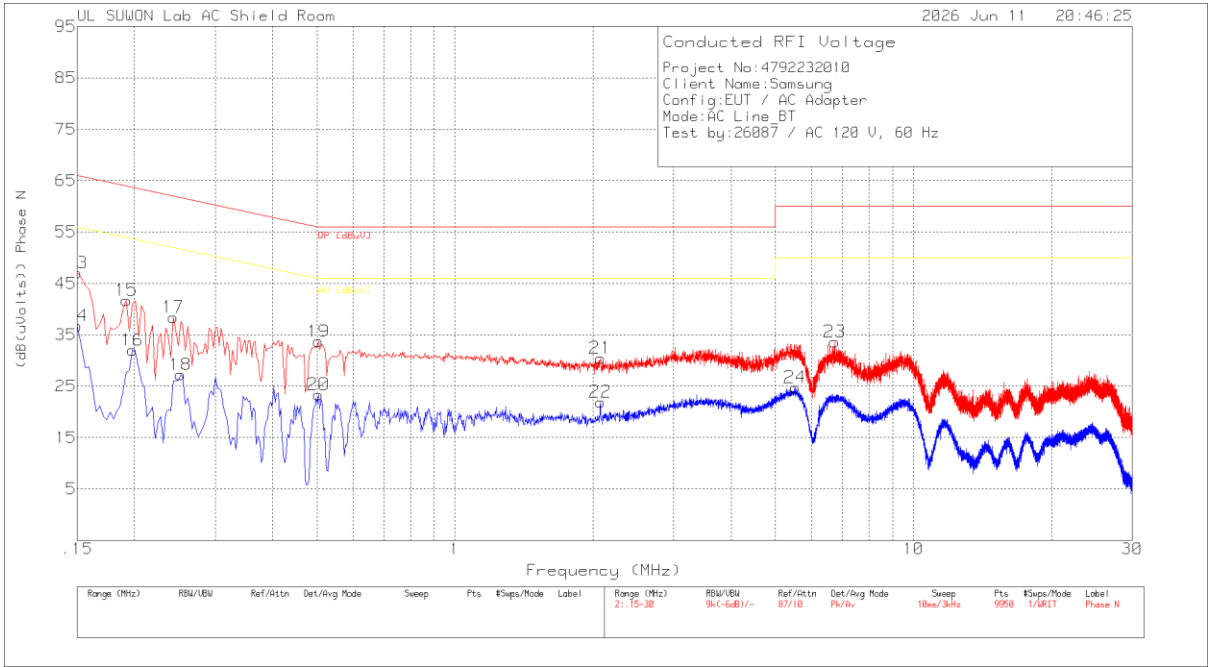
Range 1: Phase L1 .15 - 30MHz

Marker	Frequency [MHz]	Meter Reading [dBuV]	Det	101836_Wit h EX_N [dB]	Cable Loss [dB]	Corrected Reading [dBuV]	FCC 15 Class B QP [dBuV]	Margin [dB]	FCC 15 Class B AV [dBuV]	Margin [dB]
1	.15	38.56	Pk	9.7	.1	48.36	66	-17.64	-	-
2	.15	27.31	Av	9.7	.1	37.11	-	-	56	-18.89
3	.183	33.89	Pk	9.9	.1	43.89	64.35	-20.46	-	-
4	.195	22.02	Av	9.9	.1	32.02	-	-	53.82	-21.8
5	.252	30.98	Pk	9.6	.1	40.68	61.69	-21.01	-	-
6	.249	19.39	Av	9.6	.1	29.09	-	-	51.79	-22.7
7	.504	24.08	Pk	9.9	.1	34.08	56	-21.92	-	-
8	.501	15.17	Av	9.9	.1	25.17	-	-	46	-20.83
9	2.073	23.43	Pk	9.7	.1	33.23	56	-22.77	-	-
10	2.073	14.02	Av	9.7	.1	23.82	-	-	46	-22.18
11	5.802	28.85	Pk	9.8	.2	38.85	60	-21.15	-	-
12	5.802	20.98	Av	9.8	.2	30.98	-	-	50	-19.02

Pk - Peak detector

Av - Average detection

LINE 2 RESULTS



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency [MHz]	Meter Reading [dBuV]	Det	101836_Wit h EX_N [dB]	Cable Loss [dB]	Corrected Reading [dBuV]	FCC 15 Class B QP [dBuV]	Margin [dB]	FCC 15 Class B AV [dBuV]	Margin [dB]
13	.15	37.26	Pk	9.7	.1	47.06	66	-18.94	-	-
14	.15	26.95	Av	9.7	.1	36.75	-	-	56	-19.25
15	.192	31.71	Pk	9.9	.1	41.71	63.95	-22.24	-	-
16	.198	22.02	Av	9.9	.1	32.02	-	-	53.69	-21.67
17	.243	28.6	Pk	9.7	.1	38.4	61.99	-23.59	-	-
18	.252	17.55	Av	9.6	.1	27.25	-	-	51.69	-24.44
19	.504	23.73	Pk	9.9	.1	33.73	56	-22.27	-	-
20	.504	13.36	Av	9.9	.1	23.36	-	-	46	-22.64
21	2.076	20.66	Pk	9.7	.1	30.46	56	-25.54	-	-
22	2.076	12.11	Av	9.7	.1	21.91	-	-	46	-24.09
23	6.732	23.62	Pk	9.8	.2	33.62	60	-26.38	-	-
24	5.52	14.73	Av	9.8	.2	24.73	-	-	50	-25.27

Pk - Peak detector

Av - Average detection

END OF TEST REPORT