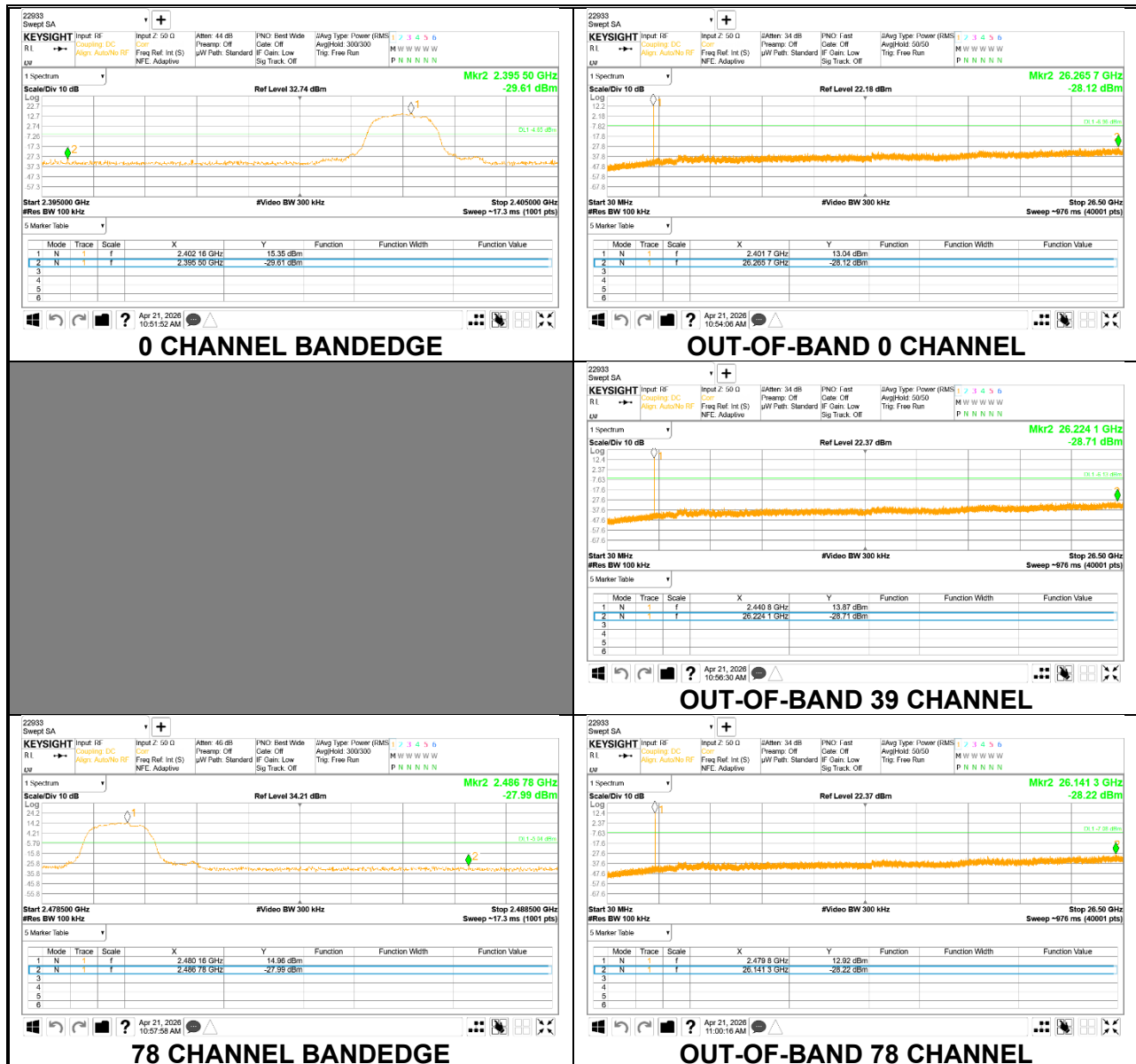
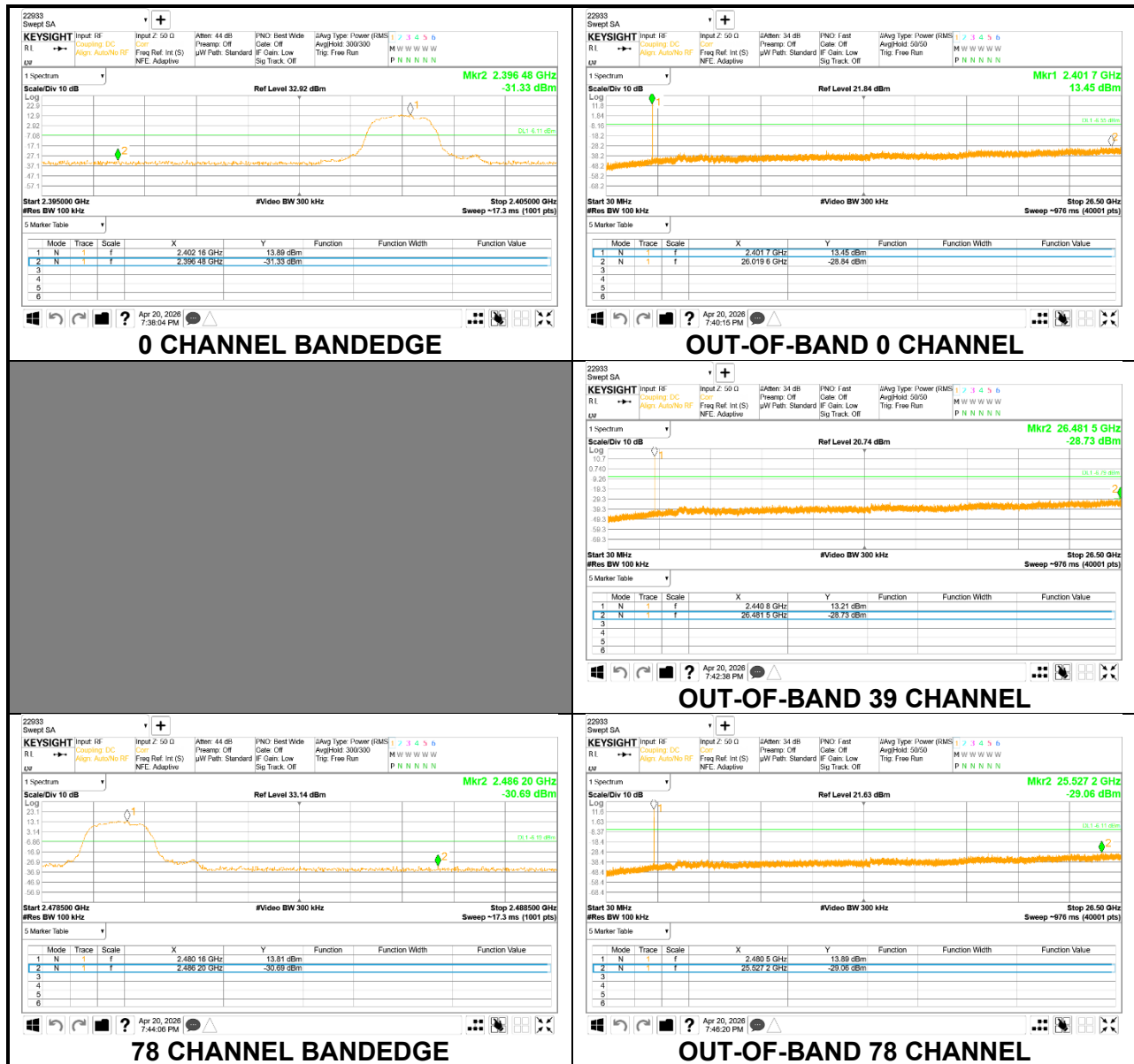


9.8.2. BLUETOOTH ENHANCED DATA RATE 8DPSK MODULATION

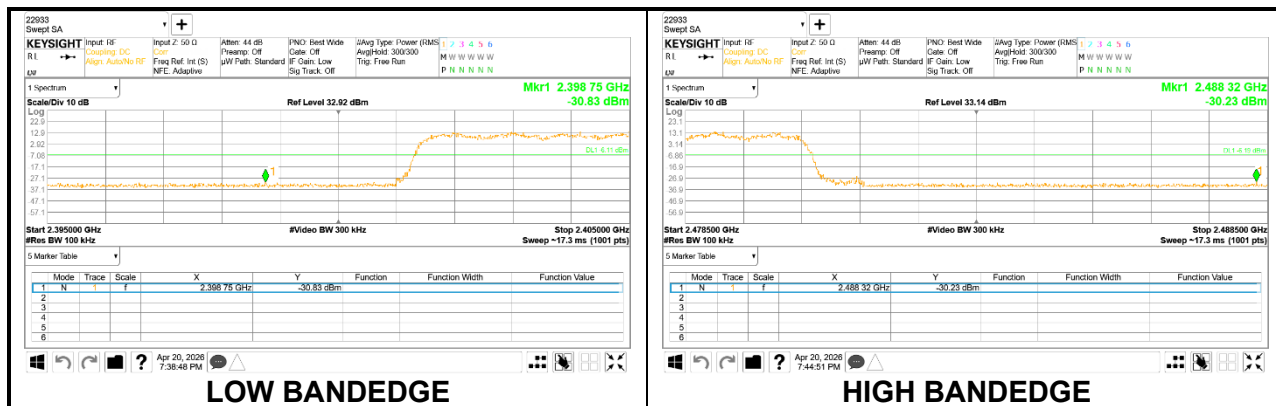
SPURIOUS EMISSIONS, NON-HOPPING – ANT1



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.

$GFSK = 1/T = 1 / 0.00287s = 0.35 \text{ kHz.}$

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.

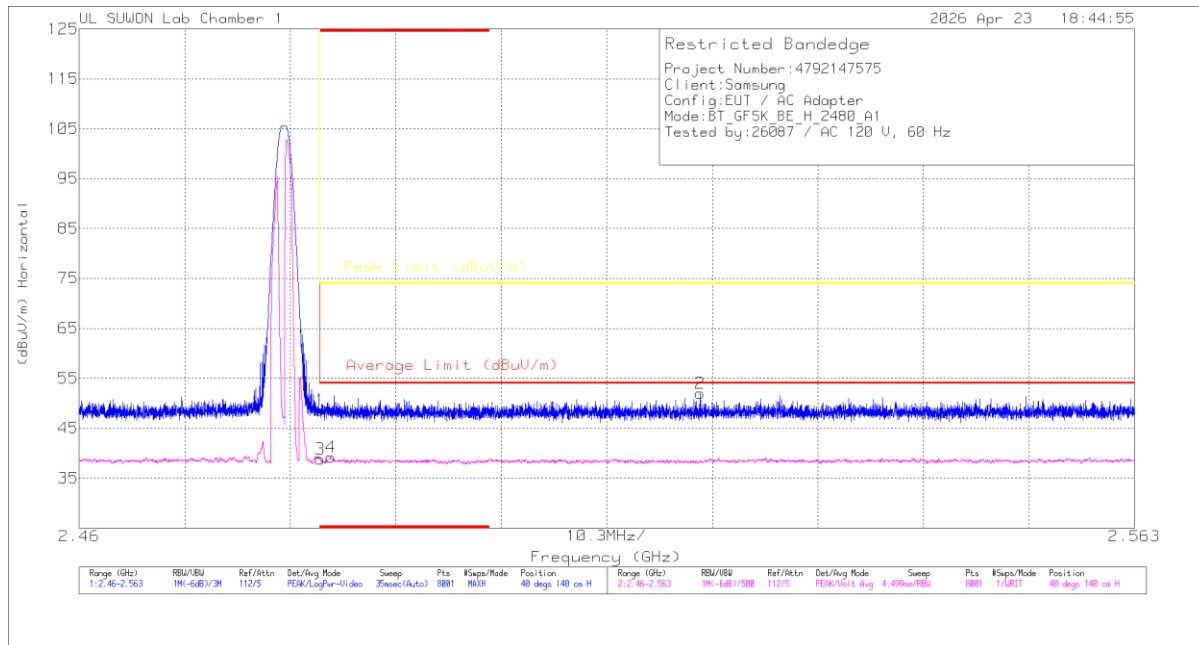
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

BANDEDGE (WORST CASE: 78 CHANNEL, ANT 2)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_Factor (dB/m)	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	*2.48351	42.46	Pk	32	-25.8	48.66	-	-	74	-25.34	40	140	H
2	2.52058	45.81	Pk	32	-25.8	52.01	-	-	74	-21.99	40	140	H

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

Pk - Peak detector

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

BANDEDGE TEST DATA

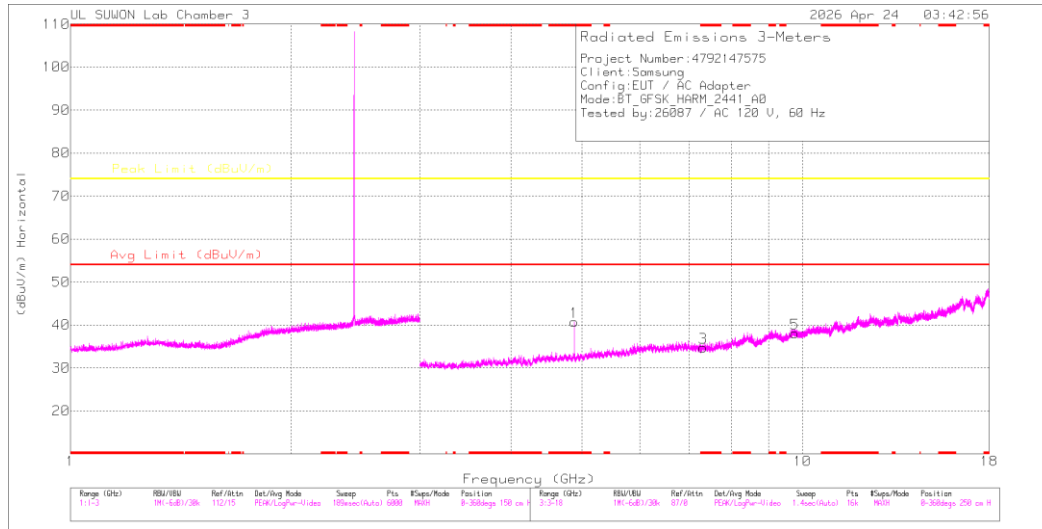
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB(1/m)]	Loss [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2402	ANT1	* 2.39	42.66	Pk	31.70	-26.20	48.16	-	-	74.00	-25.84	314	300	H
		* 2.31461	46.10	Pk	31.50	-26.30	51.30	-	-	74.00	-22.70	314	300	H
		* 2.39	43.17	Pk	31.70	-26.20	48.67	-	-	74.00	-25.33	214	250	V
		* 2.38458	45.32	Pk	31.70	-26.20	50.82	-	-	74.00	-23.18	214	250	V
2480	ANT1	* 2.48351	42.77	Pk	32.00	-25.80	48.97	-	-	74.00	-25.03	238	313	H
		* 2.547	45.41	Pk	32.10	-25.80	51.71	-	-	74.00	-22.29	238	313	H
		* 2.48351	42.54	Pk	32.00	-26.20	48.34	-	-	74.00	-25.66	205	239	V
		* 2.526	45.83	Pk	32.00	-26.10	51.73	-	-	74.00	-22.27	205	239	V
2402	ANT2	* 2.39	41.82	Pk	31.70	-26.20	47.32	-	-	74.00	-26.68	45	144	H
		* 2.38542	45.73	Pk	31.70	-26.10	51.33	-	-	74.00	-22.67	45	144	H
		* 2.39	41.05	Pk	31.70	-26.20	46.55	-	-	74.00	-27.45	150	312	V
		* 2.37752	45.29	Pk	31.70	-26.20	50.79	-	-	74.00	-23.21	150	312	V
2480	ANT2	* 2.48351	42.46	Pk	32.00	-25.80	48.66	-	-	74.00	-25.34	40	140	H
		* 2.521	45.81	Pk	32.00	-25.80	52.01	-	-	74.00	-21.99	40	140	H
		* 2.48351	41.80	Pk	32.00	-26.20	47.60	-	-	74.00	-26.40	10	363	V
		* 2.531	45.23	Pk	32.00	-26.00	51.23	-	-	74.00	-22.77	10	363	V
2402	Dual	* 2.39	39.76	Pk	32.10	-24.90	46.96	-	-	74.00	-27.04	108	100	H
		* 2.35382	42.67	Pk	32.00	-25.00	49.67	-	-	74.00	-24.33	108	100	H
		* 2.39	39.70	Pk	32.10	-24.90	46.90	-	-	74.00	-27.10	255	346	V
		* 2.32121	43.01	Pk	31.90	-24.90	50.01	-	-	74.00	-23.99	255	346	V
2480	Dual	* 2.4835	40.60	Pk	32.40	-24.90	48.10	-	-	74.00	-25.90	261	120	H
		* 2.48405	44.13	Pk	32.40	-24.90	51.63	-	-	74.00	-22.37	261	120	H
		* 2.4835	40.89	Pk	32.40	-24.90	48.39	-	-	74.00	-25.61	156	358	V
		* 2.544	42.58	Pk	32.40	-24.60	50.38	-	-	74.00	-23.62	156	358	V

Note1. Pk - Peak detector, VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

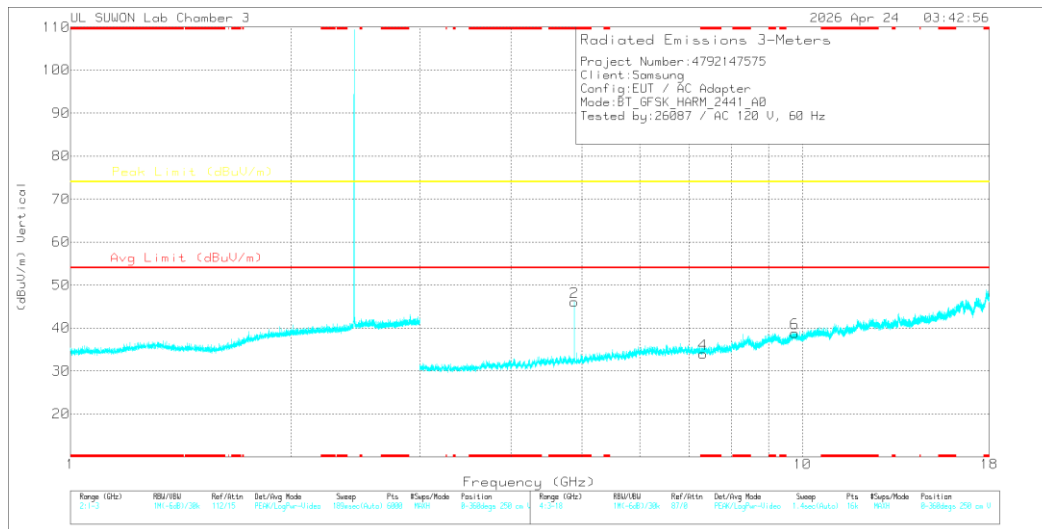
Note2. * - indicates frequency in 47 CFR Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS (WORST CASE – ANT 1)

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)	Meier Reading (dBuV)	Det	Antenna_Factor (dBm)	3GHz_HP_Pat h Loss(dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88164	41.88	PKFH	34.2	-30.8	45.28	-	-	74	-28.72	0	150	H
* 4.88181	46.34	PKFH	34.2	-30.8	49.74	-	-	74	-24.26	163	108	V
* 7.32109	33.23	PKFH	35.8	-25.2	43.83	-	-	74	-30.17	0	100	H
* 7.32132	34.24	PKFH	35.8	-25.2	44.84	-	-	74	-29.16	0	100	V
9.76364	31.46	PKFH	36.9	-21.3	47.06	-	-	74	-26.94	0	100	H
9.76433	31.15	PKFH	36.9	-21.3	46.75	-	-	74	-27.25	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

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	* 4.80376	40.92	PKFH	34.30	-30.10	45.12	-	-	74.00	-28.88	303	282	H
		* 4.80362	44.89	PKFH	34.30	-30.10	49.09	-	-	74.00	-24.91	157	100	V
		7.205	33.02	PKFH	35.80	-25.80	43.02	-	-	74.00	-30.98	0	100	H
		7.208	34.00	PKFH	35.80	-25.70	44.10	-	-	74.00	-29.90	0	100	V
		9.607	31.85	PKFH	36.70	-21.70	46.85	-	-	74.00	-27.15	0	100	H
		9.609	31.85	PKFH	36.70	-21.70	46.85	-	-	74.00	-27.15	0	100	V
		4.88164	41.88	PKFH	34.20	-30.80	45.28	-	-	74.00	-28.72	0	150	H
2441	ANT1	* 4.88181	46.34	PKFH	34.20	-30.80	49.74	-	-	74.00	-24.26	163	108	V
		* 7.32109	33.23	PKFH	35.80	-25.20	43.83	-	-	74.00	-30.17	0	100	H
		* 7.32132	34.24	PKFH	35.80	-25.20	44.84	-	-	74.00	-29.16	0	100	V
		9.764	31.46	PKFH	36.90	-21.30	47.06	-	-	74.00	-26.94	0	100	H
		9.764	31.15	PKFH	36.90	-21.30	46.75	-	-	74.00	-27.25	0	100	V
		* 4.95993	42.37	PKFH	34.30	-30.40	46.27	-	-	74.00	-27.73	337	118	H
		* 4.95987	44.91	PKFH	34.30	-30.40	48.81	-	-	74.00	-25.19	178	125	V
2480	ANT1	* 7.43816	32.84	PKFH	35.70	-24.90	43.64	-	-	74.00	-30.36	0	100	H
		* 7.44195	33.24	PKFH	35.70	-25.00	43.94	-	-	74.00	-30.06	0	100	V
		9.920	31.00	PKFH	37.10	-21.50	46.60	-	-	74.00	-27.40	0	100	H
		9.919	31.57	PKFH	37.10	-21.50	47.17	-	-	74.00	-26.83	0	100	V
		* 4.80658	36.82	PKFH	34.30	-30.10	41.02	-	-	74.00	-32.98	119	109	H
		* 4.80445	37.05	PKFH	34.30	-30.10	41.25	-	-	74.00	-32.75	156	255	V
		7.205	33.11	PKFH	35.80	-25.80	43.11	-	-	74.00	-30.89	0	100	H
2402	ANT2	7.201	33.27	PKFH	35.80	-25.80	43.27	-	-	74.00	-30.73	0	100	V
		9.611	30.75	PKFH	36.70	-21.70	45.75	-	-	74.00	-28.25	0	100	H
		9.606	30.64	PKFH	36.70	-21.70	45.64	-	-	74.00	-28.36	0	100	V
		* 4.87898	37.36	PKFH	34.20	-30.80	40.76	-	-	74.00	-33.24	136	128	H
		* 4.88189	37.49	PKFH	34.20	-30.80	40.89	-	-	74.00	-33.11	181	263	V
		* 7.32441	32.04	PKFH	35.80	-25.30	42.54	-	-	74.00	-31.46	0	100	H
		* 7.32509	32.21	PKFH	35.80	-25.30	42.71	-	-	74.00	-31.29	0	100	V
2441	ANT2	9.767	30.01	PKFH	36.90	-21.40	45.51	-	-	74.00	-28.49	0	100	H
		9.767	29.90	PKFH	36.90	-21.40	45.40	-	-	74.00	-28.60	0	100	V
		* 4.95959	37.29	PKFH	34.30	-30.40	41.19	-	-	74.00	-32.81	127	196	H
		* 4.95768	36.58	PKFH	34.30	-30.40	40.48	-	-	74.00	-33.52	176	121	V
		* 7.44238	32.31	PKFH	35.70	-25.00	43.01	-	-	74.00	-30.99	0	100	H
		* 7.43612	32.68	PKFH	35.70	-24.90	43.48	-	-	74.00	-30.52	0	100	V
		9.924	30.55	PKFH	37.10	-21.40	46.25	-	-	74.00	-27.75	0	100	H
2480	ANT2	9.917	31.30	PKFH	37.10	-21.40	47.00	-	-	74.00	-27.00	0	100	V
		* 4.80228	37.65	PKFH	34.30	-30.20	41.75	-	-	74.00	-32.25	24	130	H
		* 4.8028	37.73	PKFH	34.30	-30.10	41.93	-	-	74.00	-32.07	0	100	V
		7.205	38.58	PKFH	35.80	-25.80	48.58	-	-	74.00	-25.42	329	113	H
		7.206	38.99	PKFH	35.80	-25.80	48.99	-	-	74.00	-25.01	178	101	V
		9.606	32.38	PKFH	36.70	-21.70	47.38	-	-	74.00	-26.62	0	100	H
		9.606	31.45	PKFH	36.70	-21.70	46.45	-	-	74.00	-27.55	0	100	V
2402	DUAL	* 4.8807	37.61	PKFH	34.20	-30.80	41.01	-	-	74.00	-32.99	21	108	H
		* 4.88113	37.20	PKFH	34.20	-30.80	40.60	-	-	74.00	-33.40	0	100	V
		* 7.32243	36.52	PKFH	35.80	-25.20	47.12	-	-	74.00	-26.88	329	111	H
		* 7.32248	37.33	PKFH	35.80	-25.20	47.93	-	-	74.00	-26.07	175	103	V
		9.759	30.23	PKFH	36.90	-21.30	45.83	-	-	74.00	-28.17	0	100	H
		9.765	31.72	PKFH	36.90	-21.30	47.32	-	-	74.00	-26.68	0	100	V
		* 4.96078	37.43	PKFH	34.30	-30.30	41.43	-	-	74.00	-32.57	21	116	H
2441	DUAL	* 4.95958	37.63	PKFH	34.30	-30.40	41.53	-	-	74.00	-32.47	270	105	V
		* 7.43954	35.14	PKFH	35.70	-25.00	45.84	-	-	74.00	-28.16	323	101	H
		* 7.4394	37.58	PKFH	35.70	-25.00	48.28	-	-	74.00	-25.72	182	101	V
		9.916	29.90	PKFH	37.10	-21.40	45.60	-	-	74.00	-28.40	0	100	H
		9.922	30.87	PKFH	37.10	-21.40	46.57	-	-	74.00	-27.43	0	100	V

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

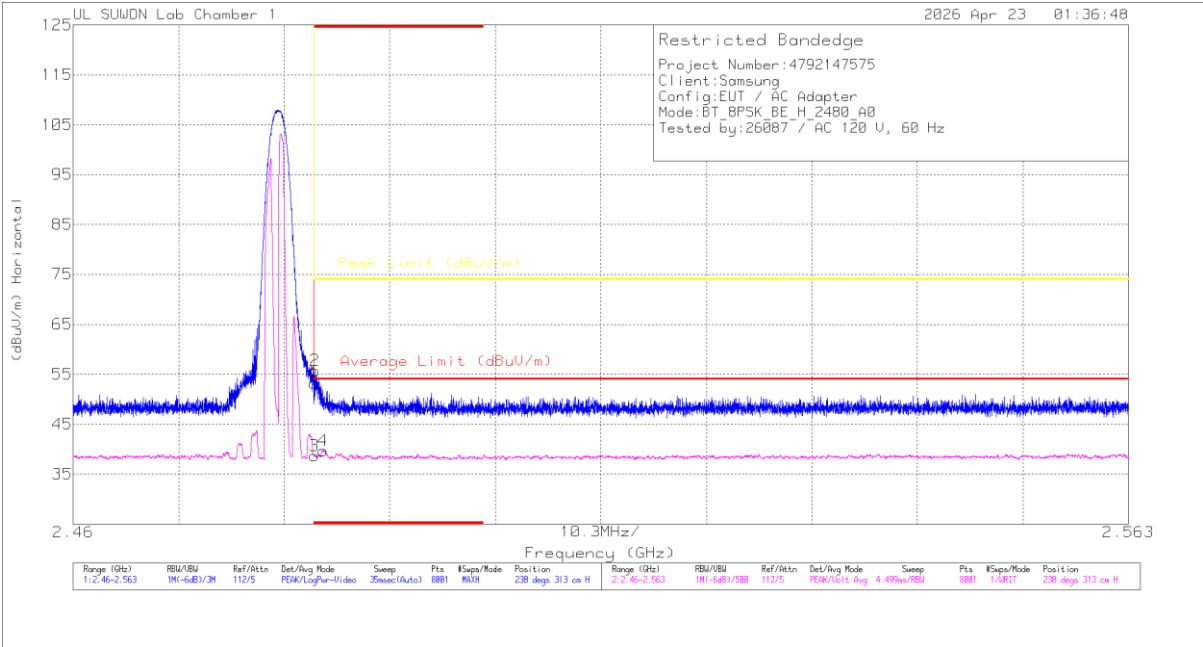
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

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, ANT 1)

HORIZONTAL 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	* 2.48351	47.05	Pk	32	-25.8	53.25	-	-	74	-20.75	238	313	H
2	* 2.48361	49.57	Pk	32	-25.8	55.77	-	-	74	-18.23	238	313	H

* - indicates frequency in 47 CFR Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

BANDEDGE TEST DATA

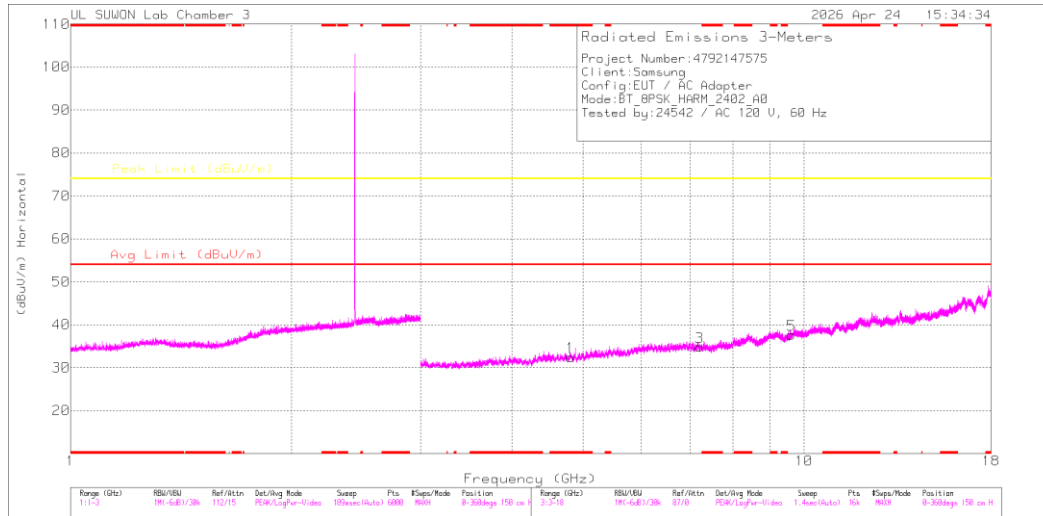
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB(1/m)]	Loss [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2402	ANT1	* 2.39	41.84	Pk	31.70	-26.20	47.34	-	-	74.00	-26.66	314	300	H
		* 2.36203	45.08	Pk	31.70	-26.20	50.58	-	-	74.00	-23.42	314	300	H
		* 2.39	42.66	Pk	31.70	-26.20	48.16	-	-	74.00	-25.84	214	250	V
		* 2.38118	45.47	Pk	31.70	-26.20	50.97	-	-	74.00	-23.03	214	250	V
2480	ANT1	* 2.48351	47.05	Pk	32.00	-25.80	53.25	-	-	74.00	-20.75	238	313	H
		* 2.48361	49.57	Pk	32.00	-25.80	55.77	-	-	74.00	-18.23	238	313	H
		* 2.48351	45.84	Pk	32.00	-26.20	51.64	-	-	74.00	-22.36	205	239	V
		* 2.48354	49.17	Pk	32.00	-26.20	54.97	-	-	74.00	-19.03	205	239	V
2402	ANT2	* 2.39	42.23	Pk	31.70	-26.20	47.73	-	-	74.00	-26.27	45	144	H
		* 2.38064	45.37	Pk	31.70	-26.20	50.87	-	-	74.00	-23.13	45	144	H
		* 2.39	41.58	Pk	31.70	-26.20	47.08	-	-	74.00	-26.92	150	312	V
		* 2.35742	45.27	Pk	31.70	-26.20	50.77	-	-	74.00	-23.23	150	312	V
2480	ANT2	* 2.48351	40.77	Pk	32.00	-25.80	46.97	-	-	74.00	-27.03	40	140	H
		2.527	45.12	Pk	32.00	-25.70	51.42	-	-	74.00	-22.58	40	140	H
		* 2.48351	45.16	Pk	32.00	-26.20	50.96	-	-	74.00	-23.04	10	363	V
		* 2.48408	45.65	Pk	32.00	-26.20	51.45	-	-	74.00	-22.55	10	363	V
2402	Dual	* 2.39	39.44	Pk	32.10	-24.90	46.64	-	-	74.00	-27.36	105	141	H
		* 2.33317	42.97	Pk	31.90	-24.90	49.97	-	-	74.00	-24.03	105	141	H
		* 2.39	39.83	Pk	32.10	-24.90	47.03	-	-	74.00	-26.97	255	345	V
		* 2.37791	42.69	Pk	32.10	-25.00	49.79	-	-	74.00	-24.21	255	345	V
2480	Dual	* 2.4835	42.01	Pk	32.40	-24.90	49.51	-	-	74.00	-24.49	260	120	H
		2.553	42.90	Pk	32.40	-24.80	50.50	-	-	74.00	-23.50	260	120	H
		* 2.4835	40.67	Pk	32.40	-24.90	48.17	-	-	74.00	-25.83	244	357	V
		2.525	43.38	Pk	32.40	-24.80	50.98	-	-	74.00	-23.02	244	357	V

Note1. Pk - Peak detector, VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

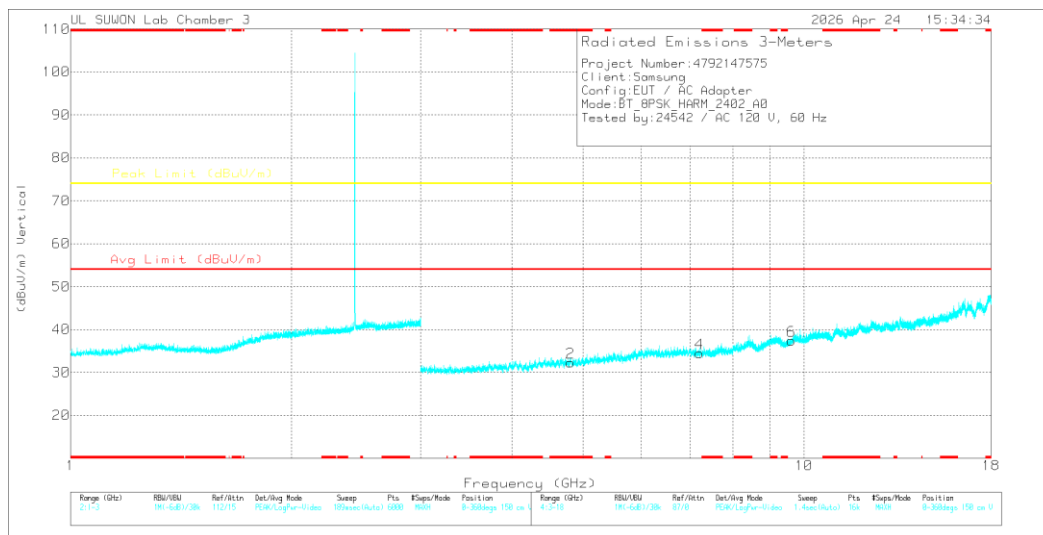
Note2. * - indicates frequency in 47 CFR Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS (WORST CASE – ANT 1)

0 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_Pat h Loss(dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80389	38.73	PKFH	34.3	-30.1	42.93	-	-	74	-31.07	303	282	H
* 4.8035	42.25	PKFH	34.3	-30.1	46.45	-	-	74	-27.55	157	100	V
7.20779	33.98	PKFH	35.8	-25.7	44.08	-	-	74	-29.92	0	100	H
7.20762	33.65	PKFH	35.8	-25.7	43.75	-	-	74	-30.25	0	100	V
9.60858	31.37	PKFH	36.7	-21.7	46.37	-	-	74	-27.63	0	100	H
9.60776	32.69	PKFH	36.7	-21.7	47.69	-	-	74	-26.31	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

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

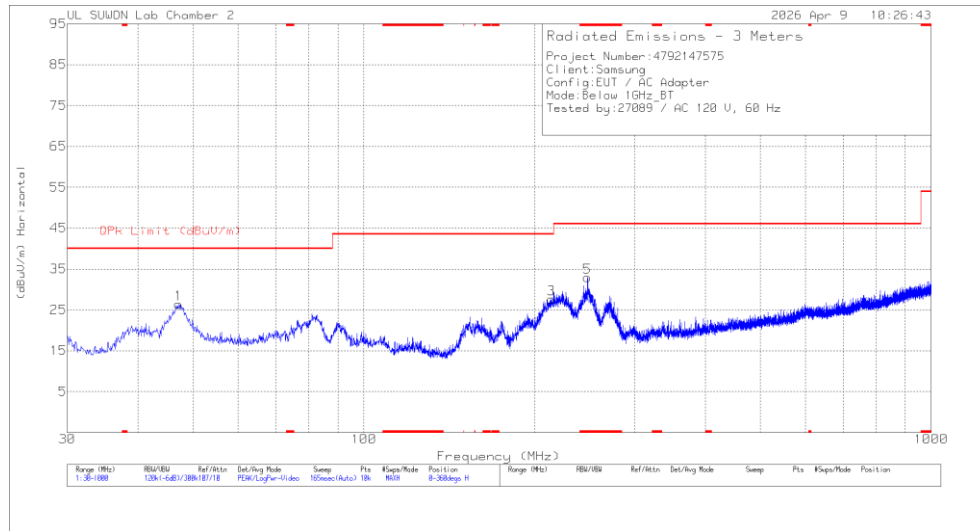
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB(1/m)]	Loss [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2402	ANT1	* 4.80389	38.73	PKFH	34.30	-30.10	42.93	-	-	74.00	-31.07	303	282	H
		* 4.8035	42.25	PKFH	34.30	-30.10	46.45	-	-	74.00	-27.55	157	100	V
		7.208	33.98	PKFH	35.80	-25.70	44.08	-	-	74.00	-29.92	0	100	H
		7.208	33.95	PKFH	35.80	-25.70	43.75	-	-	74.00	-30.25	0	100	V
		9.609	31.37	PKFH	36.70	-21.70	46.37	-	-	74.00	-27.63	0	100	H
		9.608	32.69	PKFH	36.70	-21.70	47.69	-	-	74.00	-26.31	0	100	V
2441	ANT1	* 4.88146	39.13	PKFH	34.20	-30.80	42.53	-	-	74.00	-31.47	0	150	H
		* 4.88237	43.50	PKFH	34.20	-30.80	46.90	-	-	74.00	-27.10	163	108	V
		* 7.32366	33.66	PKFH	35.80	-25.20	44.26	-	-	74.00	-29.74	0	100	H
		* 7.3243	33.25	PKFH	35.80	-25.30	43.75	-	-	74.00	-30.25	0	100	V
		9.763	31.01	PKFH	36.90	-21.30	46.61	-	-	74.00	-27.39	0	100	H
		9.766	31.56	PKFH	36.90	-21.40	47.06	-	-	74.00	-26.94	0	100	V
2480	ANT1	* 4.96001	40.91	PKFH	34.30	-30.30	44.91	-	-	74.00	-29.09	337	118	H
		* 4.95981	42.31	PKFH	34.30	-30.40	46.21	-	-	74.00	-27.79	178	125	V
		* 7.43836	33.74	PKFH	35.70	-24.90	44.54	-	-	74.00	-29.46	0	100	H
		* 7.4369	33.22	PKFH	35.70	-24.90	44.02	-	-	74.00	-29.98	0	100	V
		9.919	31.67	PKFH	37.10	-21.50	47.27	-	-	74.00	-26.73	0	100	H
		9.919	31.38	PKFH	37.10	-21.50	46.98	-	-	74.00	-27.02	0	100	V
2402	ANT2	* 4.79903	37.21	PKFH	34.30	-30.00	41.51	-	-	74.00	-32.49	119	109	H
		* 4.8087	37.61	PKFH	34.30	-30.10	41.81	-	-	74.00	-32.19	156	255	V
		7.209	32.18	PKFH	35.80	-25.80	42.18	-	-	74.00	-31.82	0	100	H
		7.205	32.29	PKFH	35.80	-25.80	42.29	-	-	74.00	-31.71	0	100	V
		9.611	30.03	PKFH	36.70	-21.70	45.03	-	-	74.00	-28.97	0	100	H
		9.608	30.21	PKFH	36.70	-21.70	45.21	-	-	74.00	-28.79	0	100	V
2441	ANT2	* 4.87986	37.02	PKFH	34.20	-30.80	40.42	-	-	74.00	-33.58	136	128	H
		* 4.88238	37.00	PKFH	34.20	-30.80	40.40	-	-	74.00	-33.60	181	263	V
		* 7.32006	32.54	PKFH	35.80	-25.30	43.04	-	-	74.00	-30.96	0	100	H
		* 7.31867	32.35	PKFH	35.80	-25.30	42.85	-	-	74.00	-31.15	0	100	V
		9.760	30.03	PKFH	36.90	-21.30	45.63	-	-	74.00	-28.37	0	100	H
		9.764	30.02	PKFH	36.90	-21.30	45.62	-	-	74.00	-28.38	0	100	V
2480	ANT2	* 4.96117	36.63	PKFH	34.30	-30.30	40.63	-	-	74.00	-33.37	0	196	H
		* 4.9631	37.07	PKFH	34.30	-30.30	41.07	-	-	74.00	-32.93	176	121	V
		* 7.44404	32.43	PKFH	35.70	-25.00	43.13	-	-	74.00	-30.87	0	100	H
		* 7.44256	31.80	PKFH	35.70	-25.00	42.50	-	-	74.00	-31.50	0	100	V
		9.918	30.20	PKFH	37.10	-21.40	45.90	-	-	74.00	-28.10	0	100	H
		9.923	30.80	PKFH	37.10	-21.40	46.50	-	-	74.00	-27.50	0	100	V
2402	DUAL	* 4.80236	37.43	PKFH	34.30	-30.20	41.53	-	-	74.00	-32.47	24	130	H
		* 4.79959	37.33	PKFH	34.30	-30.00	41.63	-	-	74.00	-32.37	0	100	V
		7.206	34.00	PKFH	35.80	-25.80	44.00	-	-	74.00	-30.00	329	113	H
		7.206	33.36	PKFH	35.80	-25.80	43.36	-	-	74.00	-30.64	178	101	V
		9.605	30.70	PKFH	36.70	-21.70	45.70	-	-	74.00	-28.30	0	100	H
		9.610	30.43	PKFH	36.70	-21.70	45.43	-	-	74.00	-28.57	0	100	V
2441	DUAL	* 4.88671	37.26	PKFH	34.20	-30.70	40.76	-	-	74.00	-33.24	21	108	H
		* 4.88001	37.41	PKFH	34.20	-30.80	40.81	-	-	74.00	-33.19	0	100	V
		* 7.32292	32.73	PKFH	35.80	-25.20	43.33	-	-	74.00	-30.67	329	111	H
		* 7.32302	33.80	PKFH	35.80	-25.20	44.40	-	-	74.00	-29.60	175	104	V
		9.762	30.42	PKFH	36.90	-21.40	45.92	-	-	74.00	-28.08	0	100	H
		9.764	30.71	PKFH	36.90	-21.30	46.31	-	-	74.00	-27.69	0	100	V
2480	DUAL	* 4.95561	37.38	PKFH	34.30	-30.50	41.18	-	-	74.00	-32.82	21	116	H
		* 4.95859	36.02	PKFH	34.30	-30.40	39.92	-	-	74.00	-34.08	270	105	V
		* 7.44062	33.36	PKFH	35.70	-25.00	44.06	-	-	74.00	-29.94	323	101	H
		* 7.43946	32.67	PKFH	35.70	-25.00	43.57	-	-	74.00	-30.43	162	101	V
		9.920	30.20	PKFH	37.10	-21.50	45.80	-	-	74.00	-28.20	0	100	H
		9.916	30.78	PKFH	37.10	-21.40	46.48	-	-	74.00	-27.52	0	100	V

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

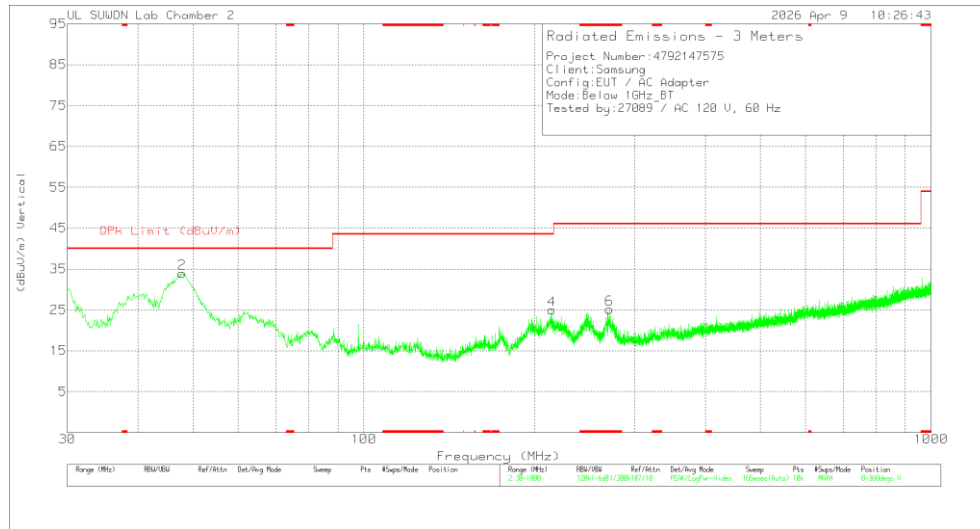
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

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	47.072	38.54	Pk	19.7	-31.8	26.44	40	-13.56	0-360	200	H
3	213.912	41.54	Pk	16.8	-30.7	27.64	43.52	-15.88	0-360	100	H
5	* 247.959	45.18	Pk	18.3	-30.5	32.98	46.02	-13.04	0-360	100	H
2	47.848	45.97	Pk	19.7	-31.7	33.97	40	-6.03	0-360	100	V
4	214.494	38.86	Pk	16.8	-30.7	24.96	43.52	-18.56	0-360	100	V
6	* 270.754	37.15	Pk	18.5	-30.5	25.15	46.02	-20.87	0-360	100	V

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

Pk - Peak detector

Radiated Emissions

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
47.848	38.98	Qp	19.7	-31.7	26.98	40	-13.02	302	108	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.

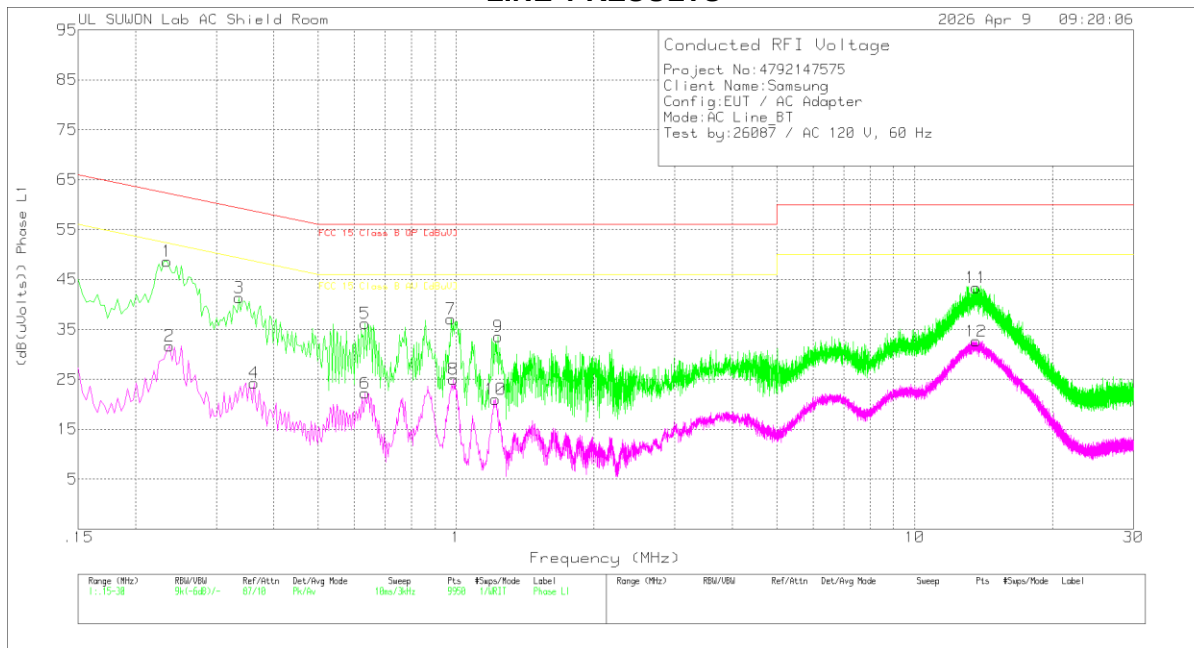
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

11.1. AC Power Line

LINE 1 RESULTS



Trace Markers

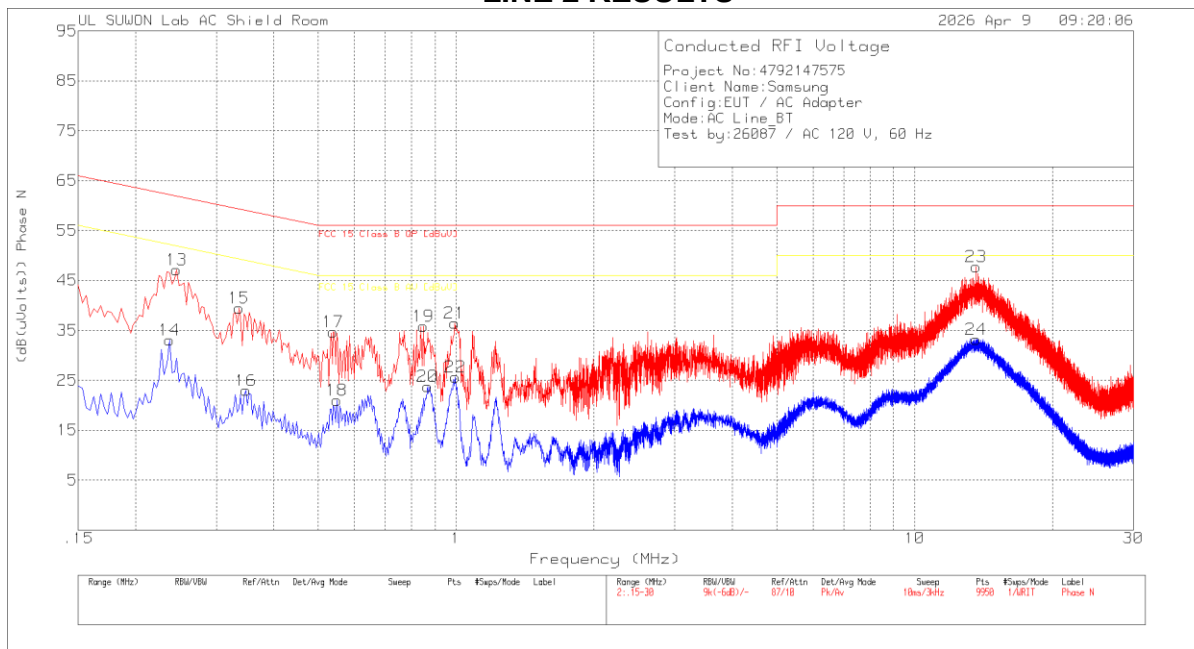
Range 1: Phase L1 .15 - 30MHz

Marker	Frequency [MHz]	Meter Reading [dBuV]	Det	101836 With EX_L1 [dB]	Cable Loss [dB]	Corrected Reading [dBuV]	FCC 15 Class B QP [dBuV]	Margin [dB]	FCC 15 Class B AV [dBuV]	Margin [dB]
1	.234	38.87	Pk	9.7	.1	48.67	62.31	-13.64	-	-
2	.237	21.92	Av	9.7	.1	31.72	-	-	52.2	-20.48
3	.336	31.45	Pk	9.8	.1	41.35	59.3	-17.95	-	-
4	.363	14.35	Av	9.8	.1	24.25	-	-	48.66	-24.41
5	.633	26.31	Pk	9.8	.1	36.21	56	-19.79	-	-
6	.633	12.3	Av	9.8	.1	22.2	-	-	46	-23.8
7	.975	27.18	Pk	9.8	.1	37.08	56	-18.92	-	-
8	.987	15.09	Av	9.8	.1	24.99	-	-	46	-21.01
9	1.236	23.77	Pk	9.7	.1	33.57	56	-22.43	-	-
10	1.218	11.15	Av	9.7	.1	20.95	-	-	46	-25.05
11	13.632	33.03	Pk	10	.3	43.33	60	-16.67	-	-
12	13.626	22.33	Av	10	.3	32.63	-	-	50	-17.37

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_L1 [dB]	Cable Loss [dB]	Corrected Reading [dBuV]	FCC 15 Class B QP [dBuV]	Margin [dB]	FCC 15 Class B AV [dBuV]	Margin [dB]
13	.246	37.42	Pk	9.6	.1	47.12	61.89	-14.77	-	-
14	.237	23.3	Av	9.7	.1	33.1	-	-	52.2	-19.1
15	.336	29.6	Pk	9.8	.1	39.5	59.3	-19.8	-	-
16	.348	13.05	Av	9.8	.1	22.95	-	-	49.01	-26.06
17	.54	24.74	Pk	9.9	.1	34.74	56	-21.26	-	-
18	.549	11.01	Av	9.9	.1	21.01	-	-	46	-24.99
19	.849	25.92	Pk	9.8	.1	35.82	56	-20.18	-	-
20	.867	13.82	Av	9.8	.1	23.72	-	-	46	-22.28
21	.993	26.55	Pk	9.8	.1	36.45	56	-19.55	-	-
22	.996	15.79	Av	9.8	.1	25.69	-	-	46	-20.31
23	13.602	37.44	Pk	10	.3	47.74	60	-12.26	-	-
24	13.608	22.9	Av	10	.3	33.2	-	-	50	-16.8

Pk - Peak detector

Av - Average detection

END OF TEST REPORT