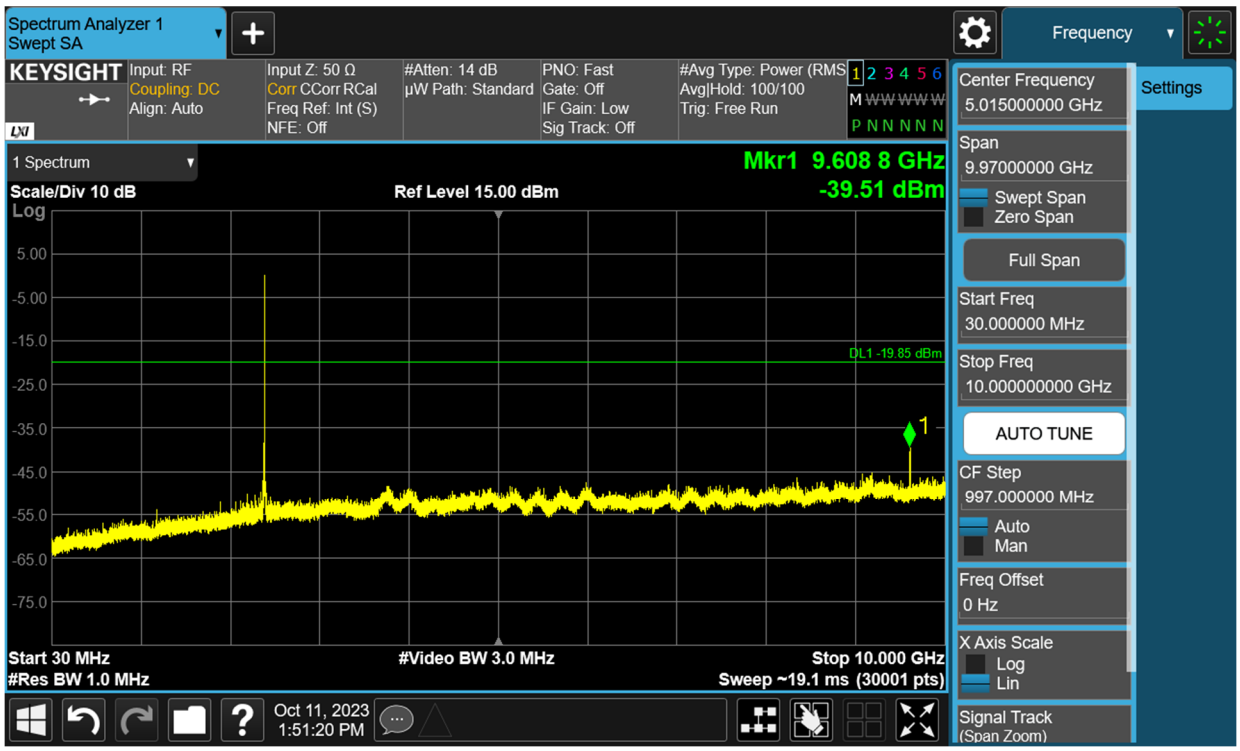
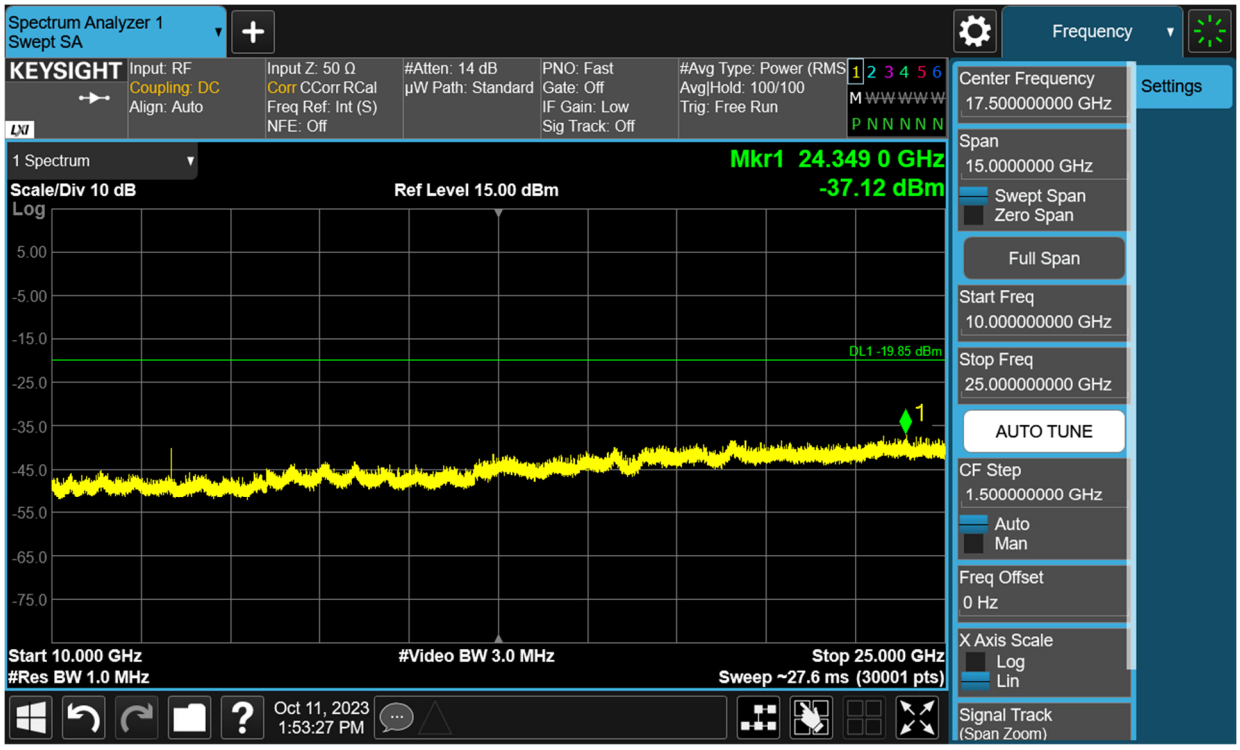
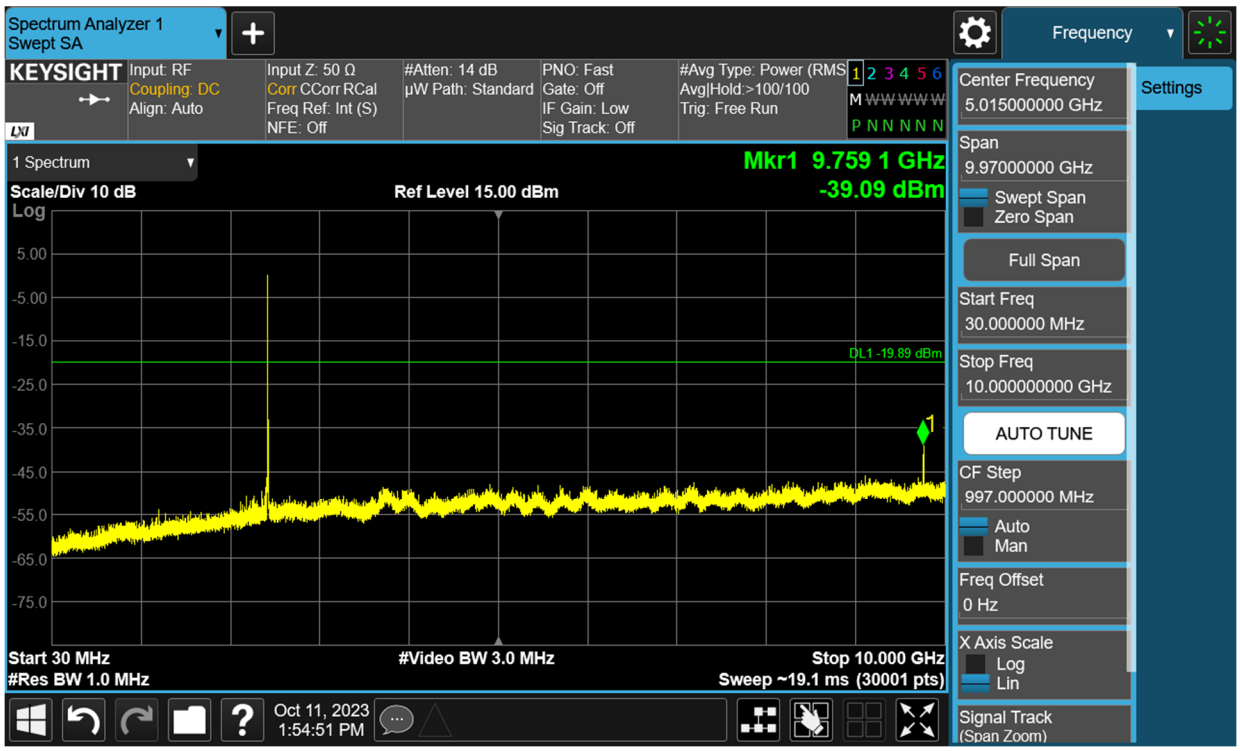


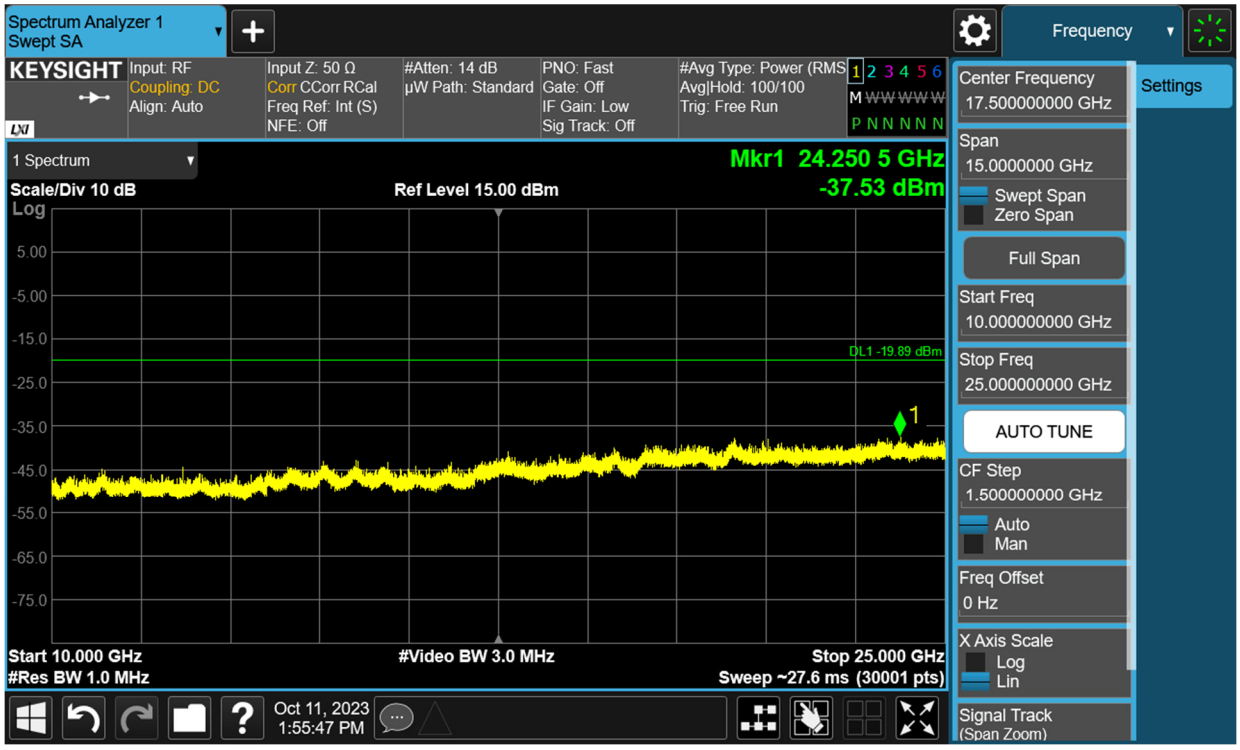
Plot 7-12. Conducted Spurious Plot (Bluetooth (LE), 1Mbps – Ch. 0)



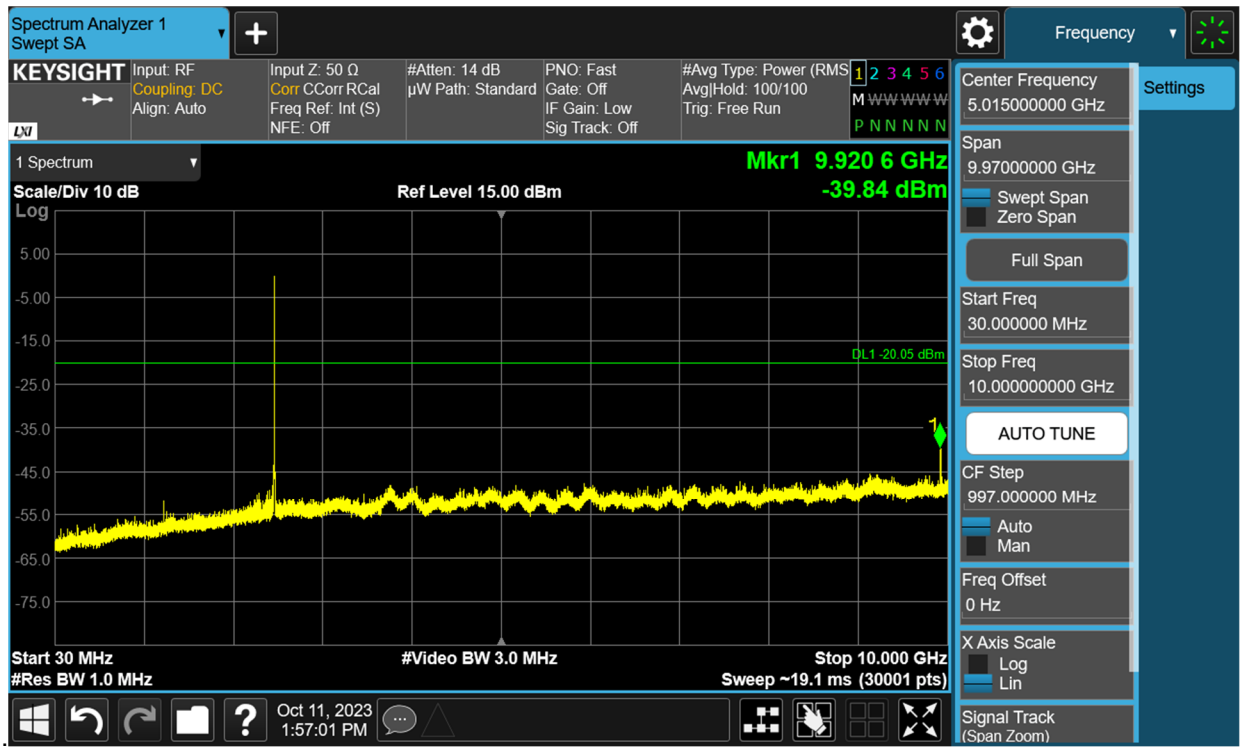
Plot 7-13. Conducted Spurious Plot (Bluetooth (LE), 1Mbps – Ch. 0)



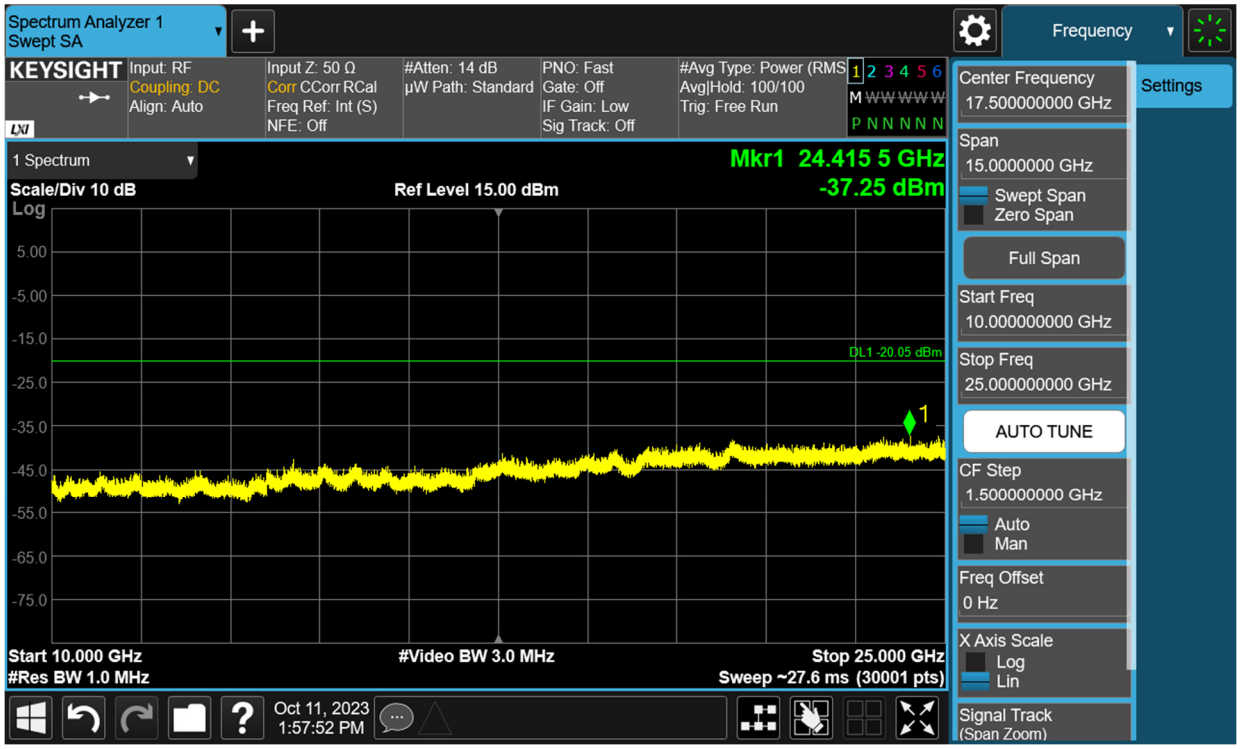
Plot 7-14. Conducted Spurious Plot (Bluetooth (LE), 1Mbps – Ch. 19)



Plot 7-15. Conducted Spurious Plot (Bluetooth (LE), 1Mbps – Ch. 19)



Plot 7-16. Conducted Spurious Plot (Bluetooth (LE), 1Mbps – Ch. 39)



Plot 7-17. Conducted Spurious Plot (Bluetooth (LE), 1Mbps – Ch. 39)

7.7 Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247(d); RSS-Gen [8.9]

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at maximum power and at the appropriate frequencies. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR and Table 6 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-5 per Section 15.209 and RSS-Gen (8.9).

Frequency	Field Strength [µV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 7-5. Radiated Limits

Test Procedures Used

ANSI C63.10-2013 – Section 6.6.4.3

Test Settings

Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3kHz > 1/T
4. Averaging type was set to RMS to ensure that video filtering was applied in the power domain
5. Detector = peak
6. Sweep time = auto
7. Trace mode = max hold
8. Trace was allowed to run for at least 50 times (1/duty cycle) traces

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW is set depending on measurement frequency, as specified in Table 7-6 below
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Frequency	RBW
9 – 150kHz	200 – 300Hz
0.15 – 30MHz	9 – 10kHz
30 – 1000MHz	100 – 120kHz
> 1000MHz	1MHz

Table 7-6. RBW as a Function of Frequency

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

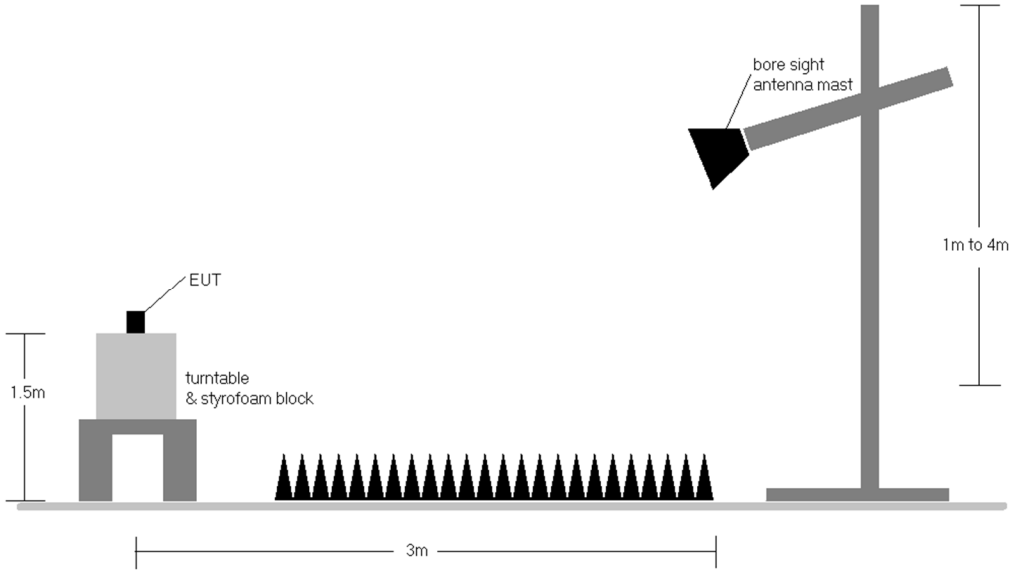


Figure 7-6. Radiated Test Setup >1GHz

Test Notes

1. All radiated spurious emissions levels were measured in a radiated test setup.
2. All emissions lying in restricted bands specified in §15.205 and Section 8.10 of RSS-Gen are below the limit shown in Table 7-5.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. EUT was tested while powered by a DC power supply at 2.6 VDC.
5. The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average and peak measurements were taken using linearly polarized horn antennas. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
6. Average measurements were recorded using a VBW of 3kHz, per Section 4.1.4.2.3 of ANSI C63.10-2013, since 1/T is equal to just under 3kHz. This method was used because the EUT could not be configured to operate with a duty cycle > 98%. Both average and peak measurements were made using a peak detector
7. Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
8. The "-" shown in the following RSE tables are used to denote a noise floor measurement.
9. No Emission was founded above 18GHz.

Sample Calculations

Determining Spurious Emissions Levels

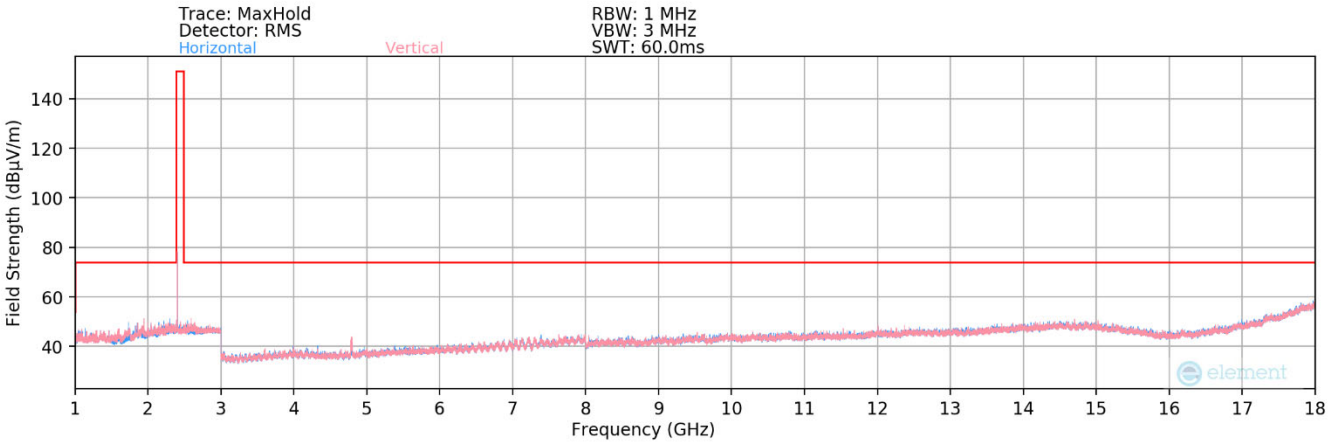
- Field Strength Level $_{[dB\mu V/m]}$ = Analyzer Level $_{[dBm]}$ + 107 + AFCL $_{[dB/m]}$
- AFCL $_{[dB/m]}$ = Antenna Factor $_{[dB/m]}$ + Cable Loss $_{[dB]}$
- Margin $_{[dB]}$ = Field Strength Level $_{[dB\mu V/m]}$ – Limit $_{[dB\mu V/m]}$

Radiated Band Edge Measurement Offset

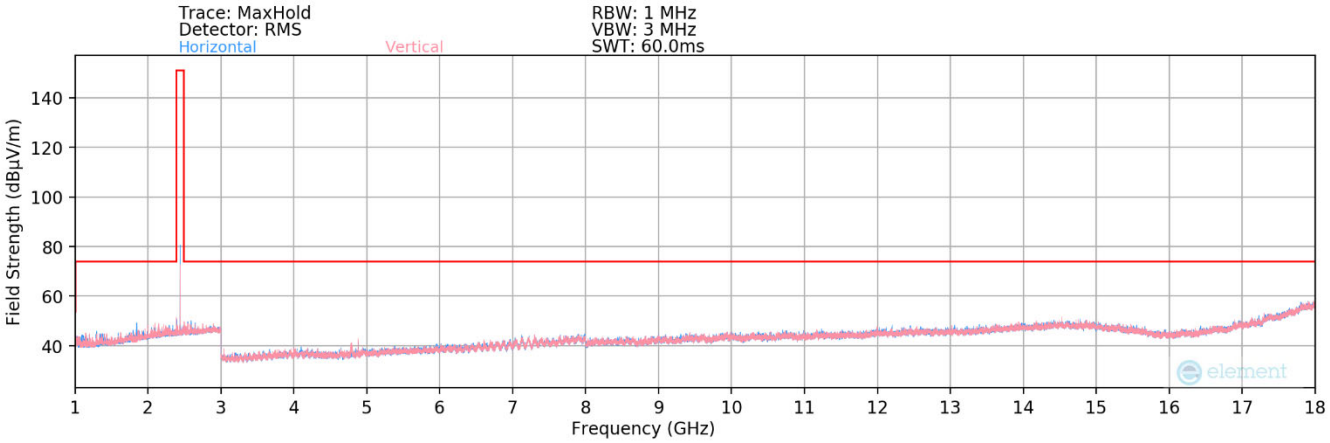
- The amplitude offset shown in the radiated restricted band edge plots in Section 7.8 was calculated using the formula:
  Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

Radiated Spurious Emission Measurements

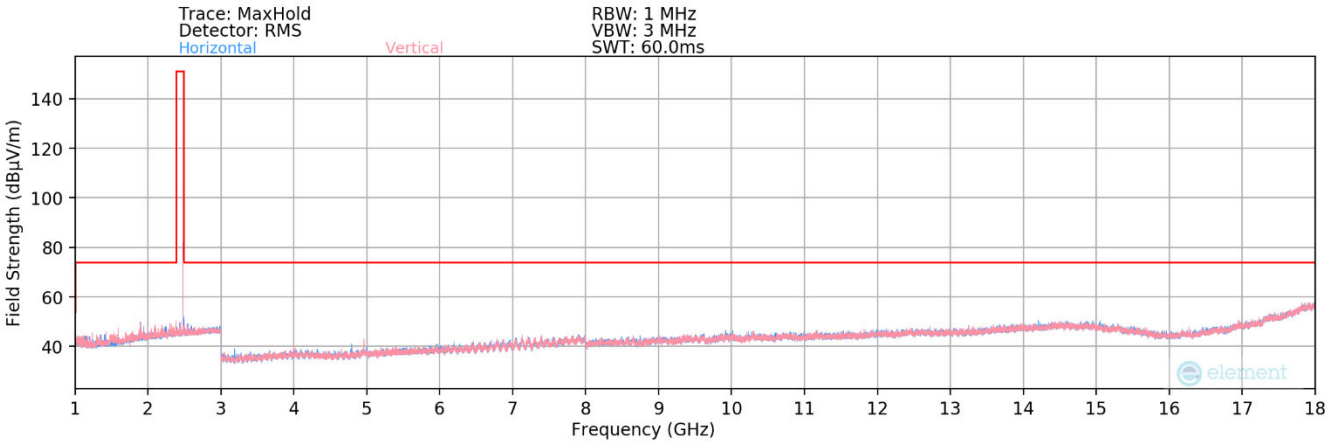
§15.205 §15.209 §15.247(d); RSS-Gen [8.9]



Plot 7-18. Radiated Spurious Plot above 1GHz (Bluetooth (LE) – Ch. 0)



Plot 7-19. Radiated Spurious Plot above 1GHz (Bluetooth (LE) – Ch. 19)



Plot 7-20. Radiated Spurious Plot above 1GHz (Bluetooth (LE) – Ch. 39)

Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247(d); RSS-Gen [8.9]

Bluetooth Mode: LE
Distance of Measurements: 3 Meters
Operating Frequency: 2402MHz
Channel: 0

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4804.00	Avg	V	339	165	-63.58	0.66	44.08	53.98	-9.90
4804.00	Peak	V	339	165	-60.62	0.66	47.04	73.98	-26.94
7206.00	Avg	V	335	172	-71.90	6.54	41.64	53.98	-12.34
7206.00	Peak	V	335	172	-67.98	6.54	45.56	73.98	-28.42
12010.00	Avg	V	321	170	-75.32	13.33	45.01	53.98	-8.97
12010.00	Peak	V	321	170	-68.92	13.33	51.41	73.98	-22.57

Table 7-7. Radiated Measurements @ 3 meters

Bluetooth Mode: LE
Distance of Measurements: 3 Meters
Operating Frequency: 2440MHz
Channel: 19

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4880.00	Avg	V	308	160	-63.58	1.18	44.60	53.98	-9.38
4880.00	Peak	V	308	160	-60.37	1.18	47.81	73.98	-26.17
9760.00	Avg	V	322	155	-73.84	6.57	39.73	53.98	-14.25
9760.00	Peak	V	322	155	-67.19	6.57	46.38	73.98	-27.60
12200.00	Avg	V	337	170	-74.44	13.15	45.71	53.98	-8.26
12200.00	Peak	V	337	170	-68.17	13.15	51.98	73.98	-21.99

Table 7-8. Radiated Measurements @ 3 meters

Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247(d); RSS-Gen [8.9]

Bluetooth Mode:	LE
Distance of Measurements:	3 Meters
Operating Frequency:	2480MHz
Channel:	39

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4960.00	Avg	V	391	198	-64.49	1.68	44.19	53.98	-9.79
4960.00	Peak	V	391	198	-61.45	1.68	47.23	73.98	-26.75
7440.00	Avg	V	392	191	-72.14	7.12	41.98	53.98	-12.00
7440.00	Peak	V	392	191	-66.02	7.12	48.10	73.98	-25.88
12400.00	Avg	V	388	186	-76.96	13.48	43.52	53.98	-10.46
12400.00	Peak	V	388	186	-67.23	13.48	53.25	73.98	-20.73

Table 7-9. Radiated Measurements @ 3 meters

7.8 Radiated Restricted Band Edge Measurements

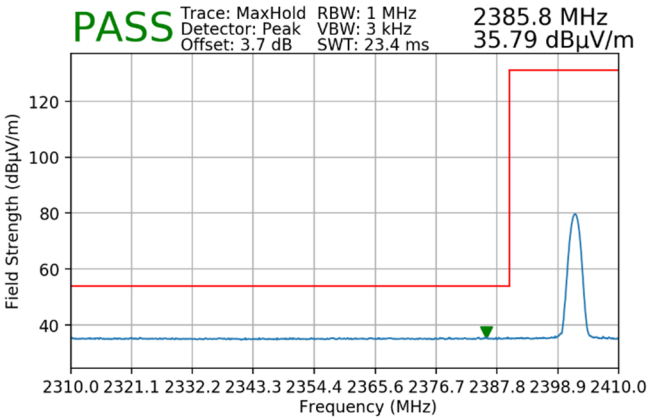
§15.205 §15.209; RSS-Gen [8.9]

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

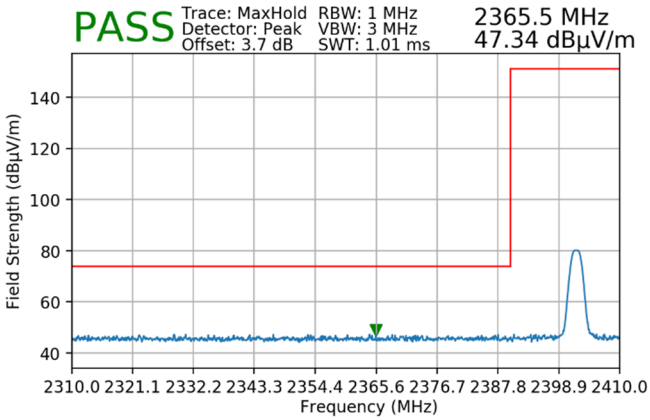
The amplitude offset shown in the following plots for average measurements was calculated using the formula:

Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

Bluetooth Mode:	LE
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0

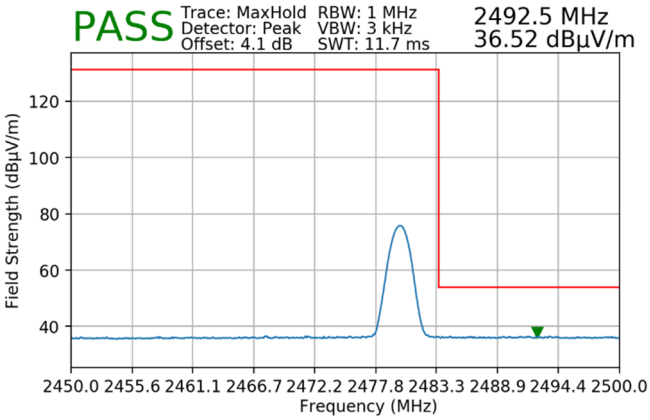


Plot 7-21. Radiated Restricted Lower Band Edge Measurement (Average)

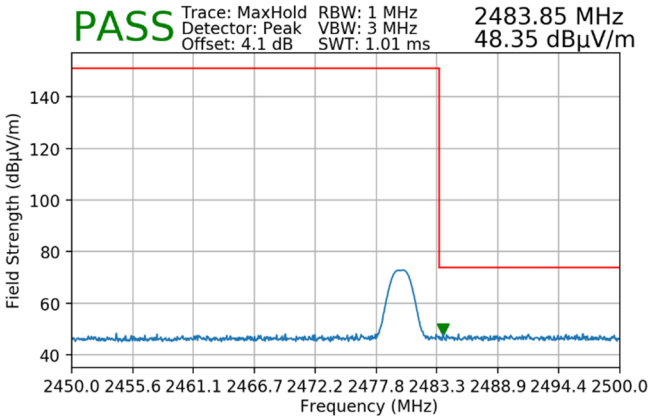


Plot 7-22. Radiated Restricted Lower Band Edge Measurement (Peak)

Bluetooth Mode:	LE
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	39



Plot 7-23. Radiated Restricted Upper Band Edge Measurement (Average)



Plot 7-24. Radiated Restricted Upper Band Edge Measurement (Peak)

7.9 Radiated Spurious Emissions Measurements – Below 1GHz

§15.209; RSS-Gen [8.9]

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All out of band emissions must not exceed the limits shown in Table 7-10 per Section 15.209 and RSS-Gen (8.9).

Frequency	Field Strength [μV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 7-10. Radiated Limits

Test Procedures Used

ANSI C63.10-2013

Test Settings

Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagrams below.

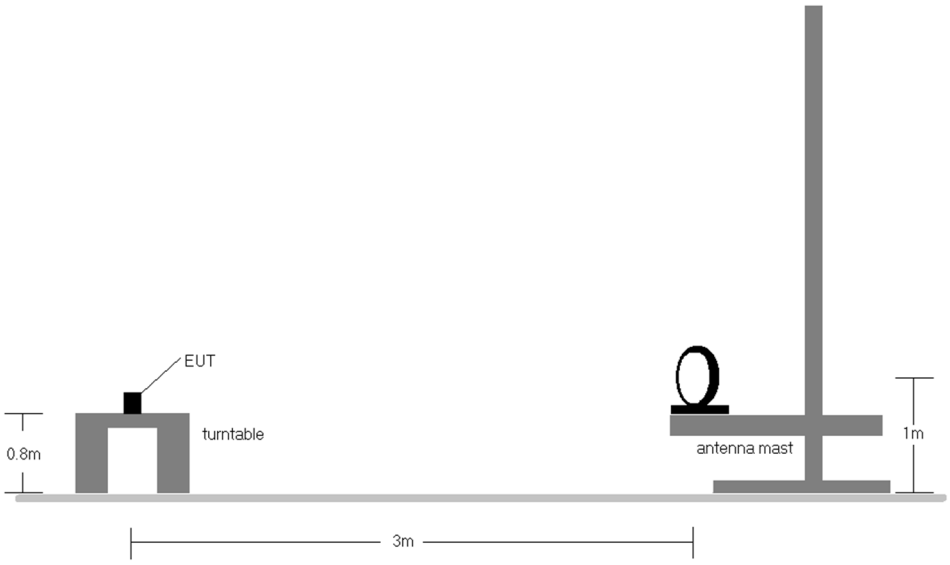


Figure 7-7. Radiated Test Setup < 30Mhz

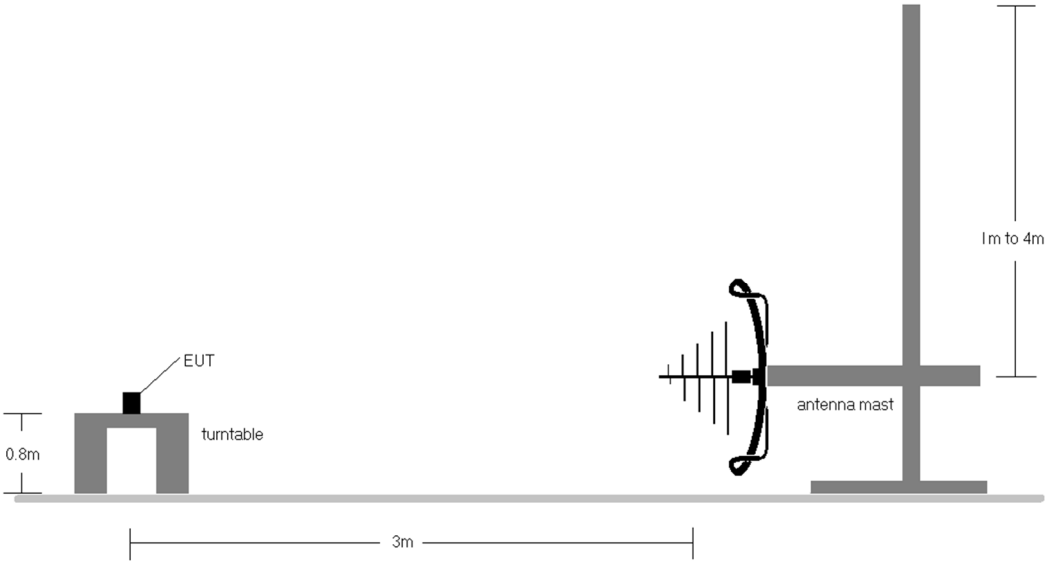


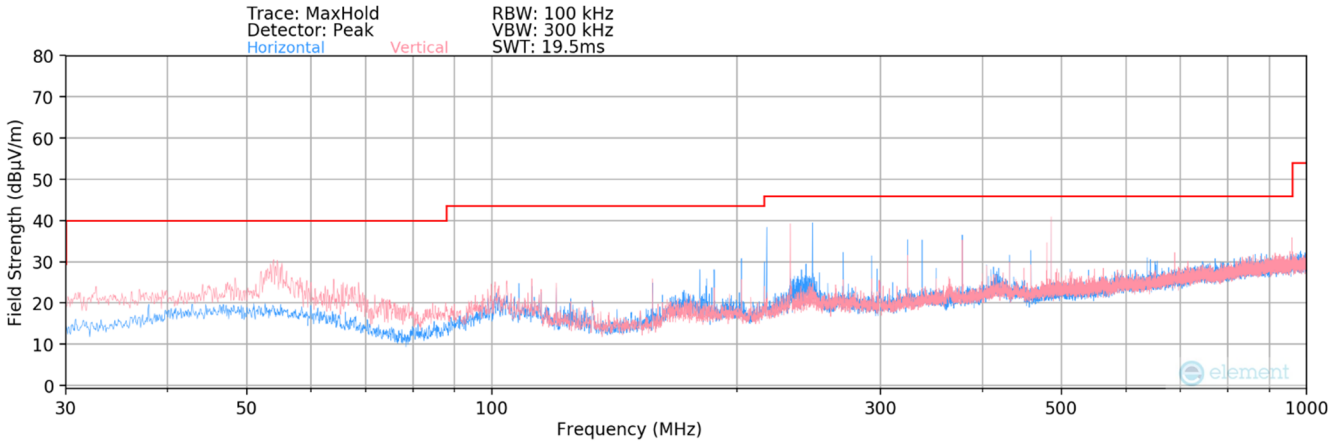
Figure 7-8. Radiated Test Setup < 1GHz

Test Notes

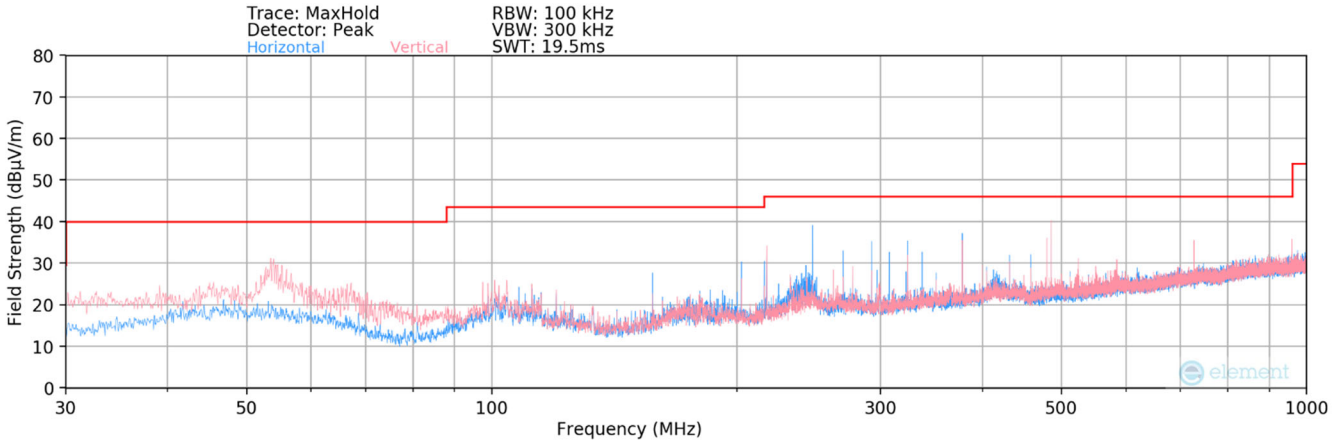
1. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
2. EUT was tested while powered by DC power supply at 2.6 VDC.
3. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
4. Emissions were measured at a 3 meter test distance.
5. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
6. No spurious emissions were detected within 20dB of the limit below 30MHz.
7. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.

Radiated Spurious Emissions Measurements (Below 1GHz)

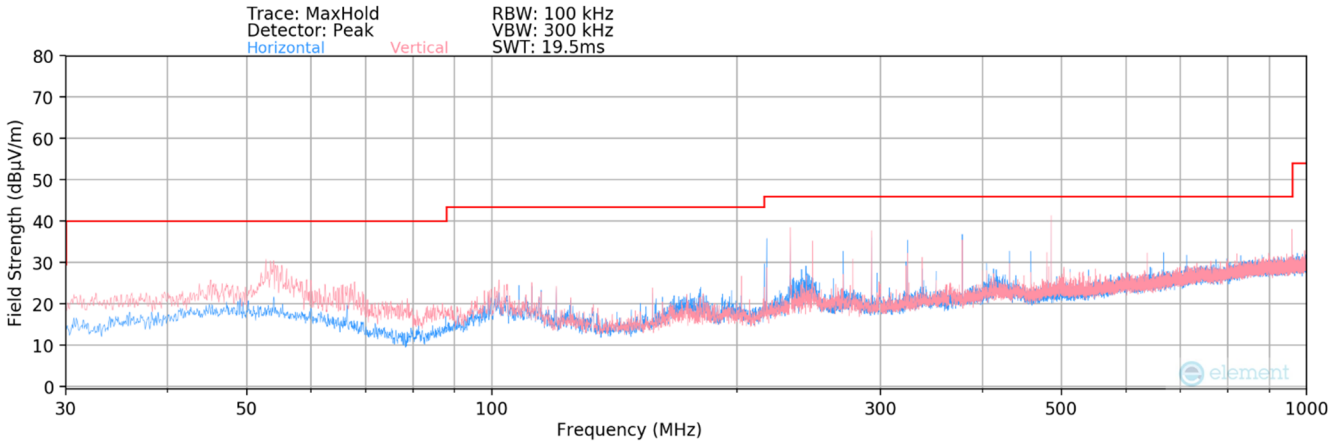
§15.209; RSS-Gen [8.9]



Plot 7-25. Radiated Spurious Plot below 1GHz (Bluetooth (LE) – Ch. 0)



Plot 7-26. Radiated Spurious Plot below 1GHz (Bluetooth (LE) – Ch. 19)



Plot 7-27. Radiated Spurious Plot below 1GHz (Bluetooth (LE) – Ch. 39)

Radiated Spurious Emission Measurements

§15.209; RSS-Gen [8.9]

Bluetooth Mode: LE
Distance of Measurements: 3 Meters
Operating Frequency: 2402MHz
Channel: 0

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
53.98	Quasi-Peak	V	117	245	-97.60	20.22	29.62	40.00	-10.38
202.50	Quasi-Peak	H	207	262	-94.70	17.91	30.21	43.52	-13.31
217.49	Quasi-Peak	H	187	35	-90.40	18.15	34.75	46.02	-11.27
232.44	Quasi-Peak	V	211	161	-93.30	19.09	32.79	46.02	-13.23
247.50	Quasi-Peak	H	148	218	-88.20	19.73	38.53	46.02	-7.49
485.96	Quasi-Peak	V	143	122	-93.30	24.58	38.28	46.02	-7.74

Table 7-11. Radiated Measurements @ 3 meters

Bluetooth Mode: LE
Distance of Measurements: 3 Meters
Operating Frequency: 2440MHz
Channel: 19

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
54.11	Quasi-Peak	V	121	292	-96.80	20.19	30.39	40.00	-9.61
202.44	Quasi-Peak	H	184	265	-94.20	17.91	30.71	43.52	-12.81
217.35	Quasi-Peak	V	233	188	-98.80	18.14	26.34	46.02	-19.68
247.51	Quasi-Peak	H	155	223	-88.60	19.73	38.13	46.02	-7.89
384.22	Quasi-Peak	H	166	89	-91.50	22.58	38.08	46.02	-7.94
485.81	Quasi-Peak	V	155	273	-93.50	24.58	38.08	46.02	-7.94

Table 7-12. Radiated Measurements @ 3 meters

Radiated Spurious Emission Measurements

§15.209; RSS-Gen [8.9]

Bluetooth Mode: LE

Distance of Measurements: 3 Meters

Operating Frequency: 2480MHz

Channel: 39

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
54.04	Quasi-Peak	V	136	204	-97.30	20.21	29.91	40.00	-10.09
217.84	Quasi-Peak	H	188	45	-93.10	18.17	32.07	46.02	-13.95
232.18	Quasi-Peak	V	225	178	-93.50	19.07	32.57	46.02	-13.45
326.88	Quasi-Peak	H	139	58	-94.20	21.28	34.08	46.02	-11.94
384.17	Quasi-Peak	H	143	117	-92.80	22.58	36.78	46.02	-9.24
485.79	Quasi-Peak	V	163	259	-93.80	24.58	37.78	46.02	-8.24

Table 7-13. Radiated Measurements @ 3 meters

8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Samsung Stylus Pen FCC ID: A3LEJPS928** is in compliance with Part 15 Subpart C (15.247) of the FCC Rules and RSS-247 of the Innovation, Science and Economic Development Canada Rules.