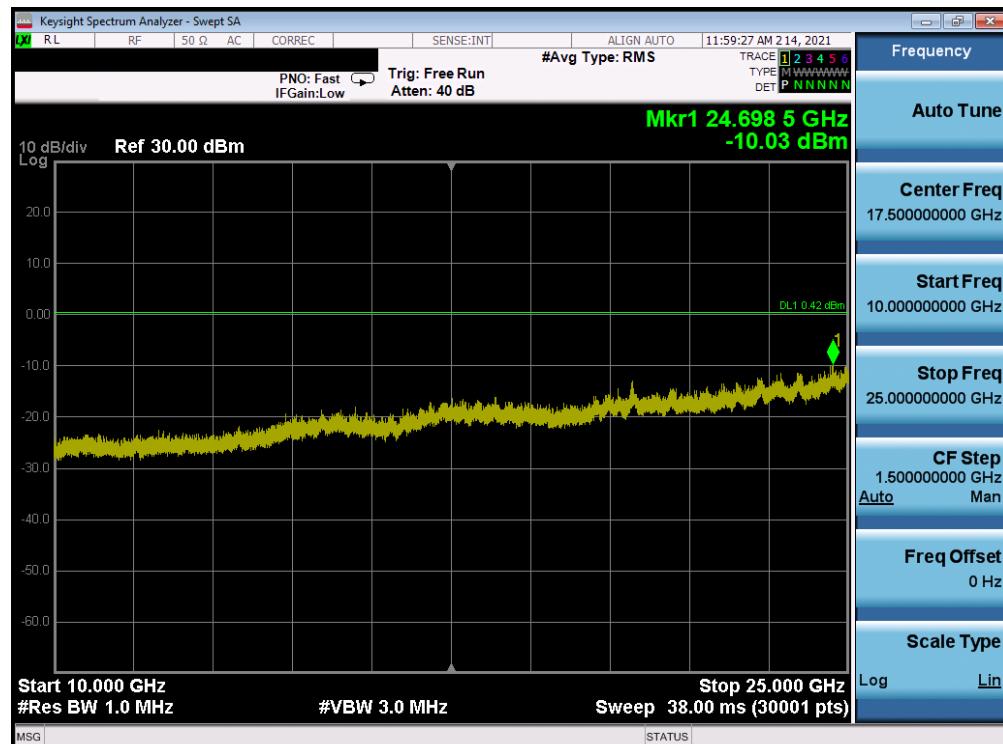


Plot 7-55. Conducted Spurious Plot Antenna 2a (Bluetooth, GFSK, ePA – Ch. 78)



Plot 7-56. Conducted Spurious Plot Antenna 2a (Bluetooth, GFSK, ePA – Ch. 78)

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7.9 Radiated Spurious Emissions – Above 1GHz

§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 7 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-12 per Section 15.209 and RSS-Gen (8.9).

Frequency	Field Strength [μ V/m]	Measured Distance [Meters]
Above 960.0 MHz	500	3

Table 7-12. Radiated Limits

Test Procedure Used

ANSI C63.10-2013 – Section 6.6.4.3

Test Settings

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

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Test Setup

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

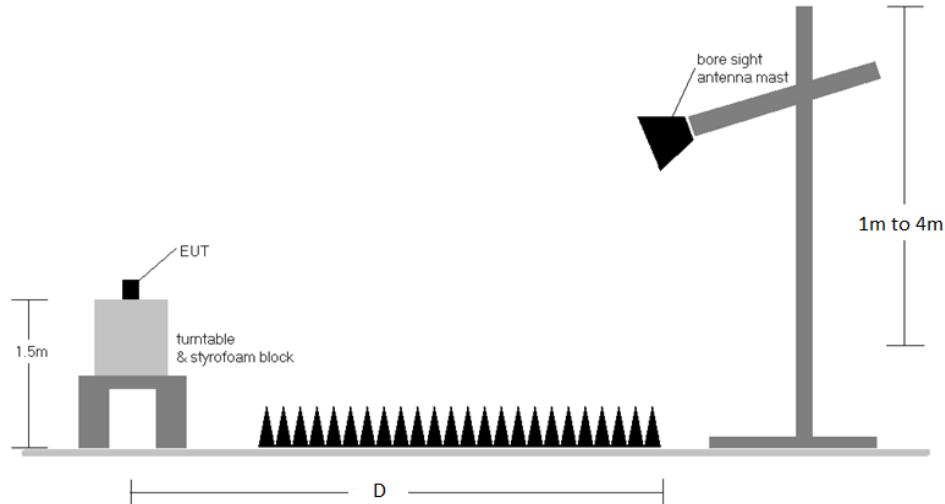


Figure 7-8. Radiated Test Setup >1GHz

Test Notes

1. All emissions lying in restricted bands specified in §15.205 and Section 8.10 of RSS-Gen are below the limit shown in Table 7-12.
2. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
3. This unit was tested with its standard battery.
4. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
5. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section.
6. D is the measurement test distance and emissions 1-18GHz were measured at a 3 meters test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
7. The "-" shown in the following RSE tables are used to denote a noise floor measurement.
8. All supported modulation, antenna (including TxBF mode) and power schemes have been tested on the unit and only worst case configuration is reported.
9. Average emissions were not reported since the duty cycle correction factor was greater than 20dB.

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Sample Calculation

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

Duty Cycle Correction Factor Calculation

- Channel hop rate = 800 hops/second (AFH Mode)
- Adjusted channel hop rate for DH5 mode = 133.33 hops/second
- Time per channel hop = 1 / 133.33 hops/second = 7.50 ms
- Time to cycle through all channels = 7.50 x 20 channels = 150 ms
- Number of times transmitter hits on one channel = 100 ms / 150 ms = 1 time(s)
- Worst case dwell time = 7.5 ms

Duty cycle correction factor = $20\log_{10}(7.5\text{ms}/100\text{ms}) = -22.5 \text{ dB}$

Average Emission Calculation

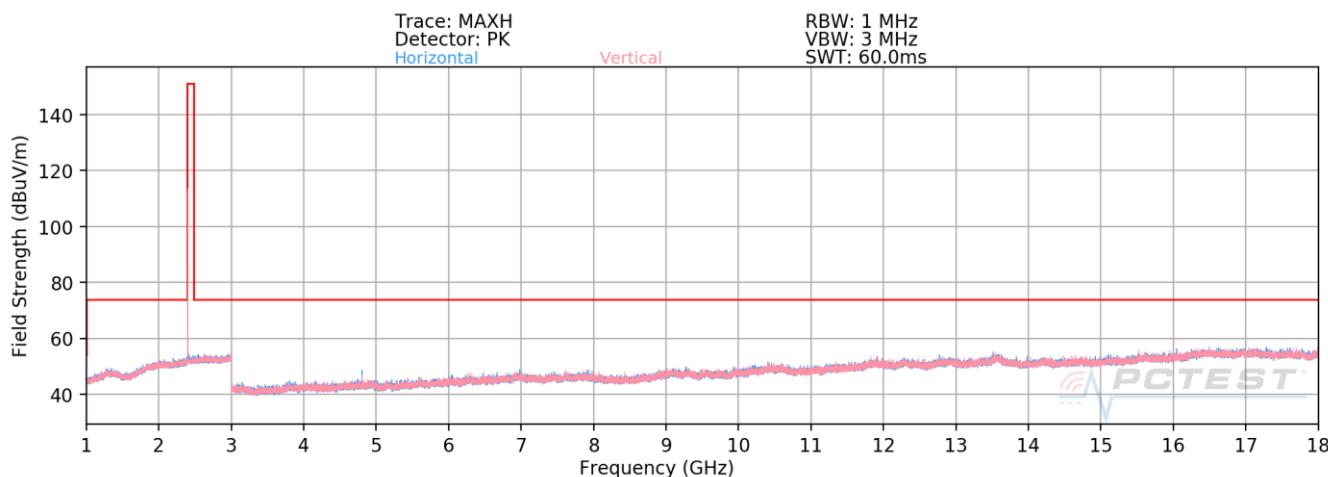
- Average Emission = Measured Peak Emissions $[\text{dB}_{\mu\text{V/m}}]$ – Duty Cycle Correction Factor $[\text{dB}]$

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Radiated Spurious Emission Measurements (1 – 18GHz)

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

Antenna 4a



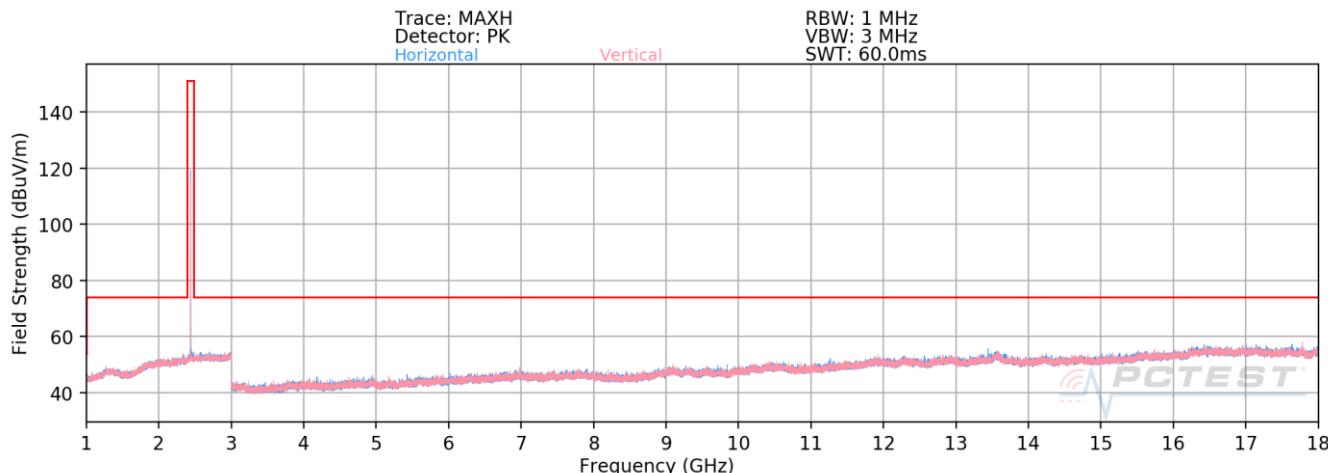
Plot 7-57. Radiated Spurious Emissions above 1GHz Antenna 4a (BT GFSK ePA – Ch. 0)

Worst Case Mode: Bluetooth
 Worst Case Data Rate: 1 Mbps
 Measurement Distance: 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 [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4804.00	Peak	V	220	195	-65.08	7.86	49.78	73.98	-24.20
12010.00	Peak	V	-	-	-71.78	16.81	52.03	73.98	-21.95

Table 7-13. Radiated Measurements Antenna 4a

FCC ID: BCGA2301 IC: 579C-A2301	 MEASUREMENT REPORT (CERTIFICATION)				Approved by: Quality Manager
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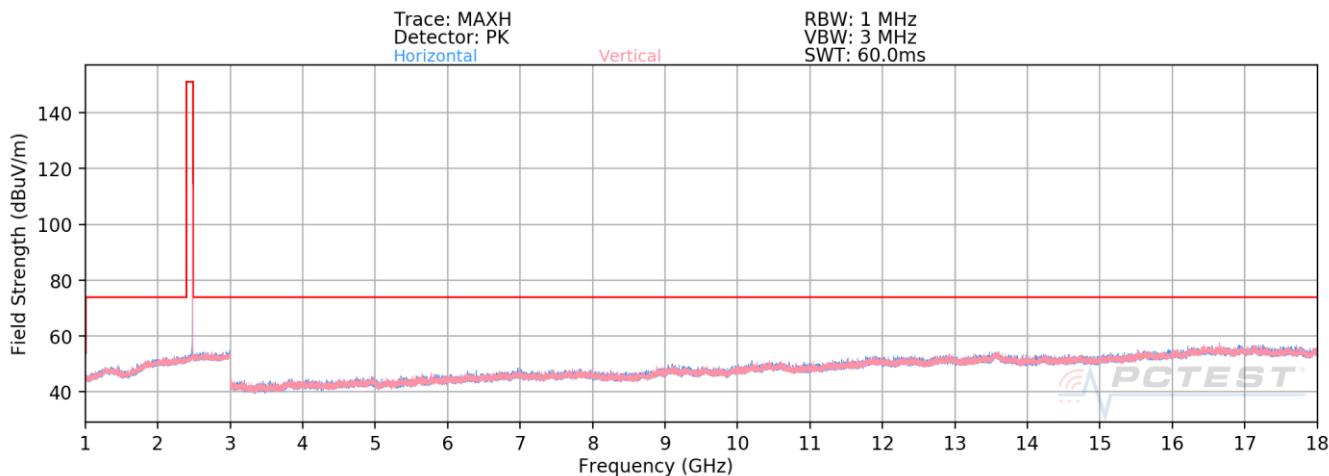
Plot 7-58. Radiated Spurious Emissions above 1GHz Antenna 4a (BT GFSK ePA – Ch. 39)

Worst Case Mode: Bluetooth
Worst Case Data Rate: 1 Mbps
Measurement Distance: 3 Meters
Operating Frequency: 2441MHz
Channel: 39

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4882.00	Peak	V	233	176	-69.10	7.88	45.78	73.98	-28.20
7323.00	Peak	V	-	-	-70.67	10.76	47.09	73.98	-26.89
12205.00	Peak	V	-	-	-72.65	17.05	51.40	73.98	-22.58

Table 7-14. Radiated Measurements Antenna 4a

FCC ID: BCGA2301 IC: 579C-A2301	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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Plot 7-59. Radiated Spurious Emissions above 1GHz Antenna 4a (BT GFSK ePA – Ch. 78)

Worst Case Mode: Bluetooth

Worst Case Data Rate: 1 Mbps

Measurement Distance: 3 Meters

Operating Frequency: 2480MHz

Channel: 78

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4960.00	Peak	V	220	189	-69.55	8.74	46.19	73.98	-27.79
7440.00	Peak	V	-	-	-71.00	12.09	48.09	73.98	-25.89
12400.00	Peak	V	-	-	-71.79	17.21	52.42	73.98	-21.56

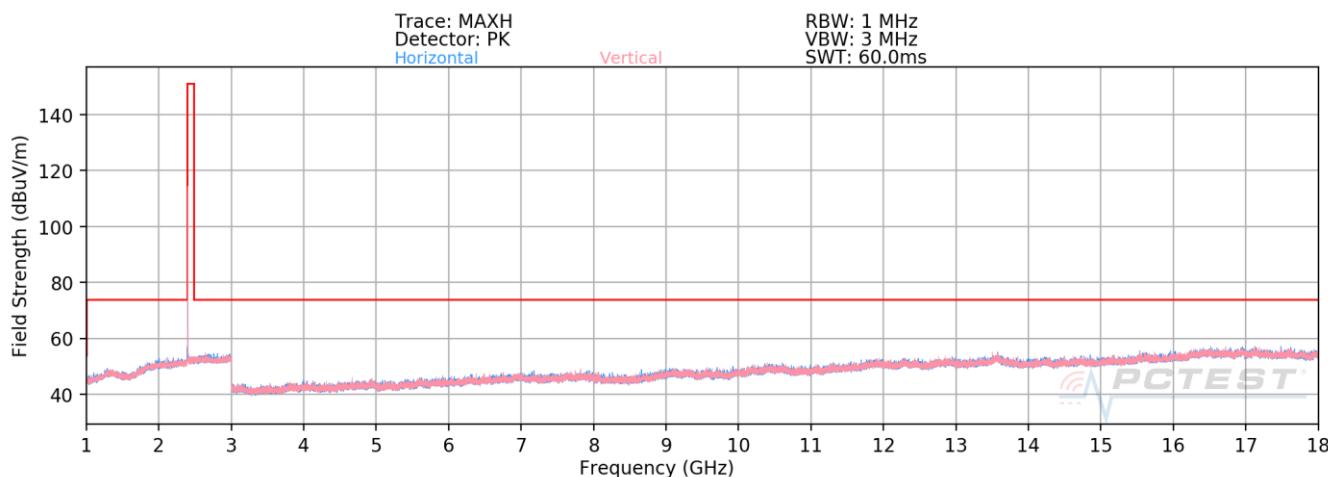
Table 7-15. Radiated Measurements Antenna 4a

FCC ID: BCGA2301 IC: 579C-A2301	 MEASUREMENT REPORT (CERTIFICATION)				Approved by: Quality Manager
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Radiated Spurious Emission Measurements (1 – 18GHz)

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

Antenna 2a



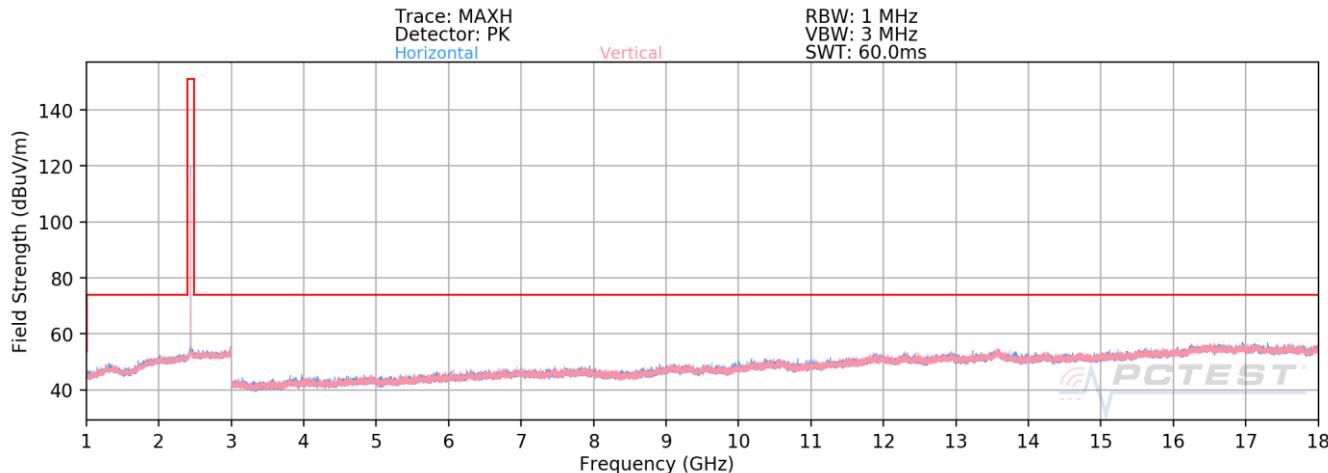
Plot 7-60. Radiated Spurious Emissions above 1GHz Antenna 2a (BT GFSK ePA – Ch. 0)

Worst Case Mode: Bluetooth
 Worst Case Data Rate: 1 Mbps
 Measurement Distance: 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 [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4804.00	Peak	V	338	109	-69.18	7.86	45.68	73.98	-28.30
12010.00	Peak	V	-	-	-71.76	16.81	52.05	73.98	-21.93

Table 7-16. Radiated Measurements Antenna 2a

FCC ID: BCGA2301 IC: 579C-A2301	 MEASUREMENT REPORT (CERTIFICATION)				Approved by: Quality Manager
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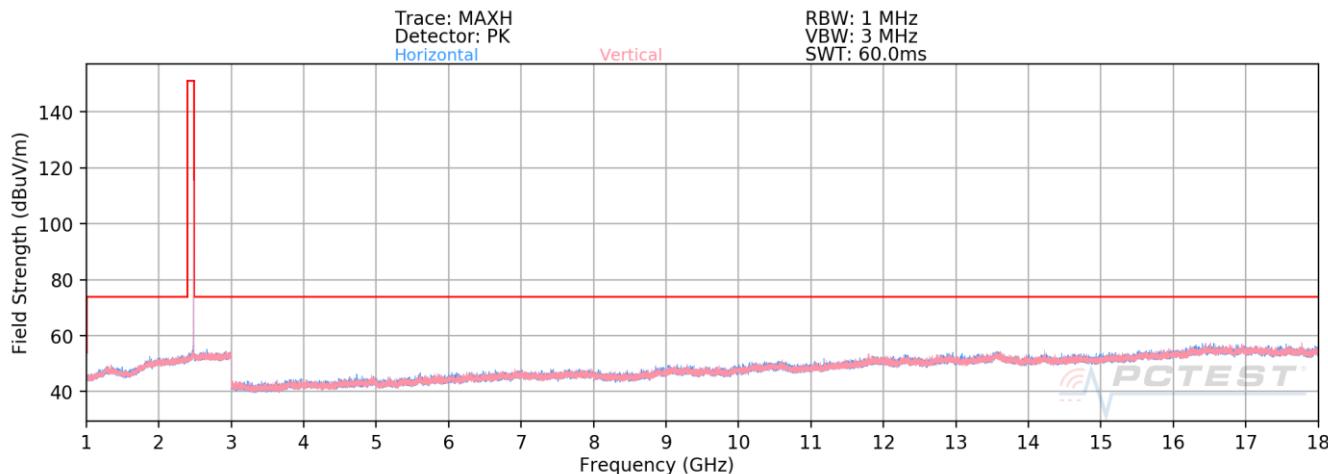
Plot 7-61. Radiated Spurious Emissions above 1GHz Antenna 2a (BT GFSK ePA – Ch. 39)

Worst Case Mode: Bluetooth
Worst Case Data Rate: 1 Mbps
Measurement Distance: 3 Meters
Operating Frequency: 2441MHz
Channel: 39

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
4882.00	Peak	V	310	115	-68.14	7.88	46.74	73.98	-27.24
7323.00	Peak	V	-	-	-70.51	10.76	47.25	73.98	-26.73
12205.00	Peak	V	-	-	-72.54	17.05	51.51	73.98	-22.47

Table 7-17. Radiated Measurements Antenna 2a

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of  MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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Plot 7-62. Radiated Spurious Emissions above 1GHz Antenna 2a (BT GFSK ePA – Ch. 78)

Worst Case Mode: Bluetooth
Worst Case Data Rate: 1 Mbps
Measurement Distance: 3 Meters
Operating Frequency: 2480MHz
Channel: 78

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4960.00	Peak	V	314	103	-67.33	8.74	48.41	73.98	-25.57
7440.00	Peak	V	272	36	-70.63	12.09	48.46	73.98	-25.52
12400.00	Peak	V	-	-	-72.18	17.21	52.03	73.98	-21.95

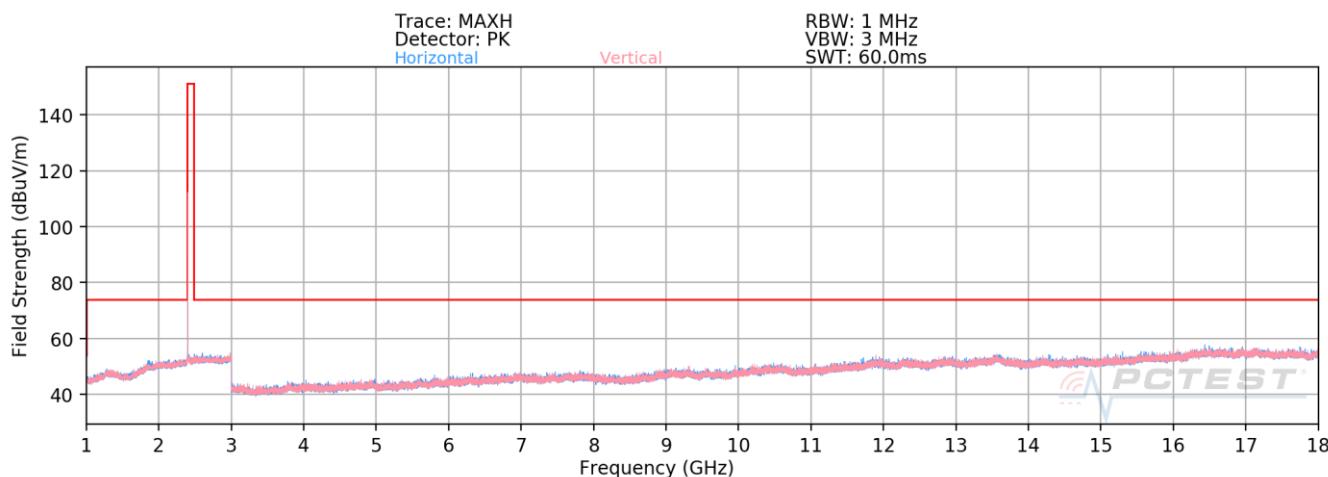
Table 7-18. Radiated Measurements Antenna 2a

FCC ID: BCGA2301 IC: 579C-A2301	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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Radiated Spurious Emission Measurements (1 – 18GHz)

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

TxBF



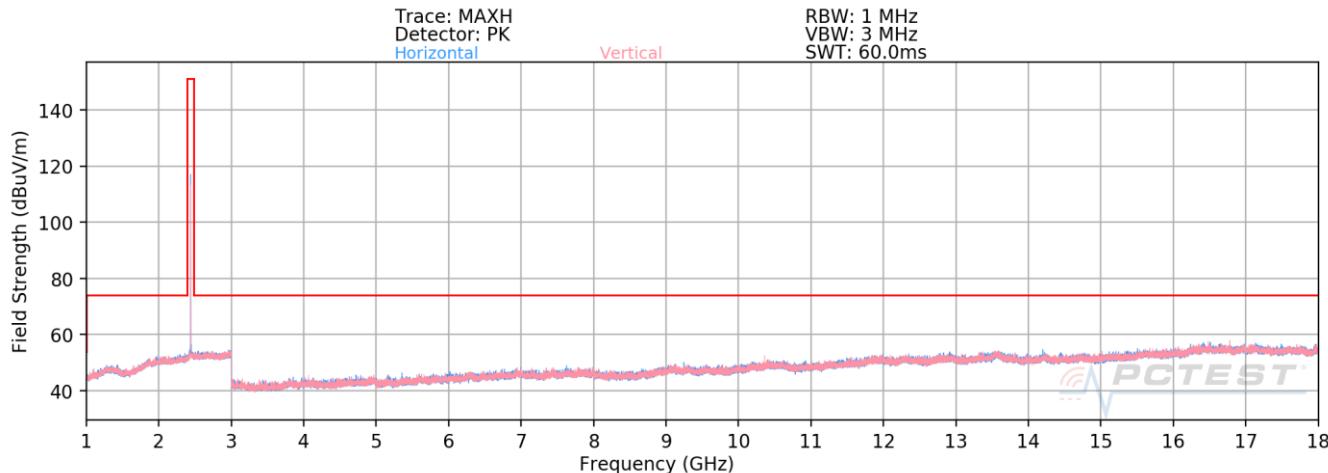
Plot 7-63. Radiated Spurious Emissions above 1GHz TxBF (BT GFSK ePA – Ch. 0)

Worst Case Mode: Bluetooth
 Worst Case Data Rate: 1 Mbps
 Measurement Distance: 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 [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4804.00	Peak	V	-	-	-70.05	7.86	44.81	73.98	-29.17
12010.00	Peak	V	-	-	-71.24	16.81	52.57	73.98	-21.41

Table 7-19. Radiated Measurements TxBF

FCC ID: BCGA2301 IC: 579C-A2301	 MEASUREMENT REPORT (CERTIFICATION)				Approved by: Quality Manager
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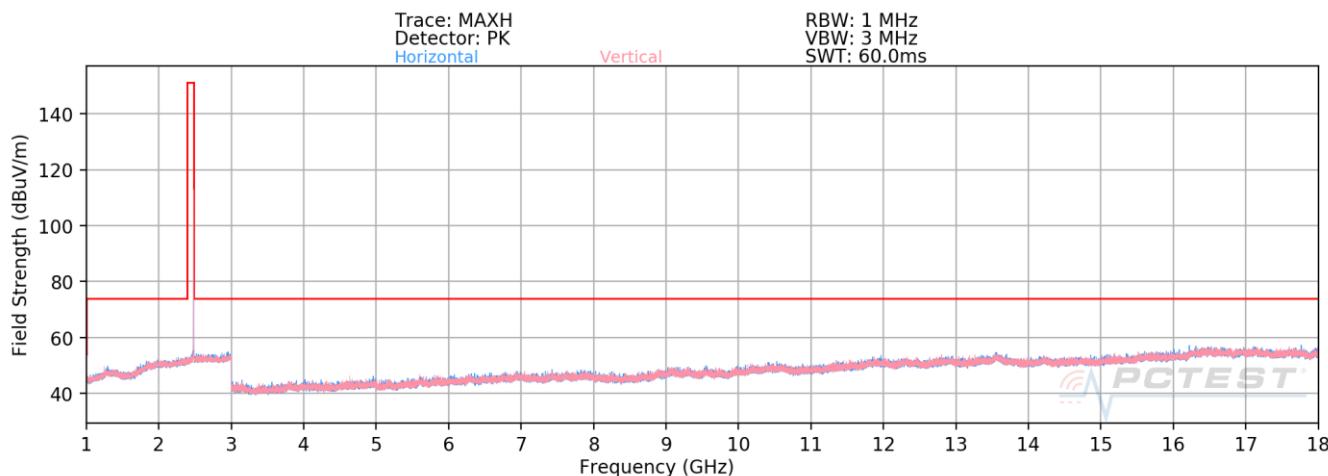
Plot 7-64. Radiated Spurious Emissions above 1GHz TxBF (BT GFSK ePA – Ch. 39)

Worst Case Mode: Bluetooth
Worst Case Data Rate: 1 Mbps
Measurement Distance: 3 Meters
Operating Frequency: 2441MHz
Channel: 39

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4882.00	Peak	V	-	-	-69.49	7.88	45.39	73.98	-28.59
7323.00	Peak	V	-	-	-70.28	10.76	47.48	73.98	-26.50
12205.00	Peak	V	-	-	-72.59	17.05	51.46	73.98	-22.52

Table 7-20. Radiated Measurements TxBF

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of  MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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Plot 7-65. Radiated Spurious Emissions above 1GHz TxBF (BT GFSK ePA – Ch. 78)

Worst Case Mode:	Bluetooth
Worst Case Data Rate:	1 Mbps
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4960.00	Peak	V	-	-	-70.21	8.74	45.53	73.98	-28.45
7440.00	Peak	V	-	-	-71.14	12.09	47.95	73.98	-26.03
12400.00	Peak	V	-	-	-72.01	17.21	52.20	73.98	-21.78

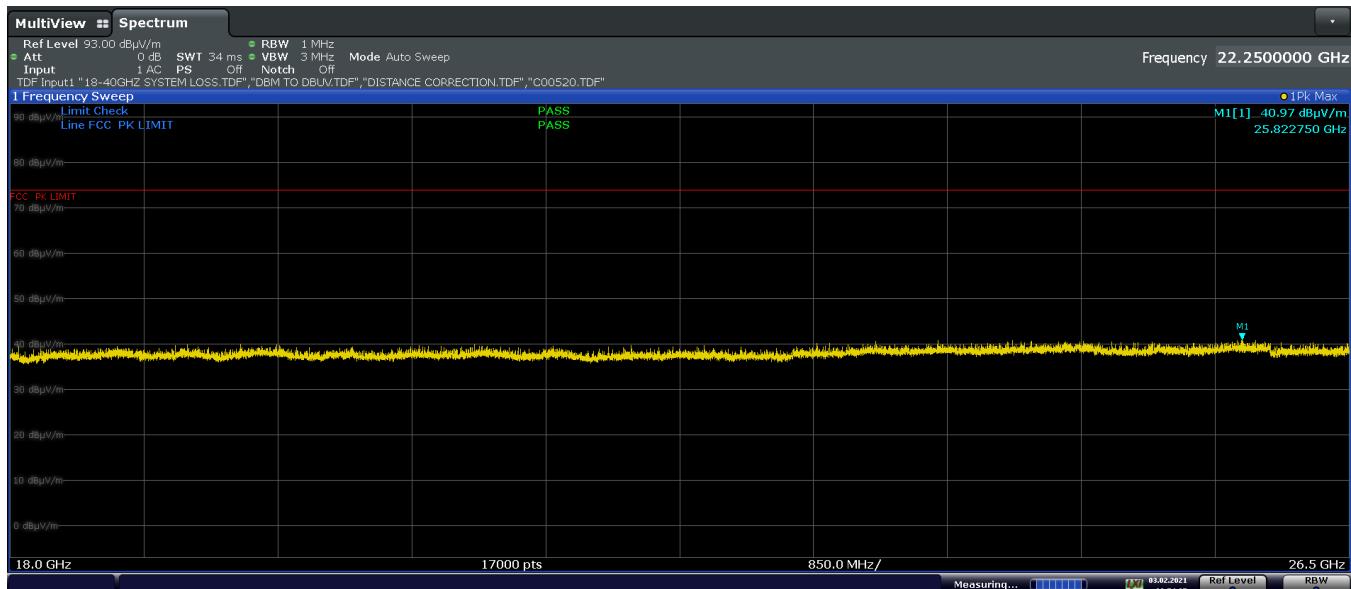
Table 7-21. Radiated Measurements TxBF

FCC ID: BCGA2301 IC: 579C-A2301	 MEASUREMENT REPORT (CERTIFICATION)				Approved by: Quality Manager
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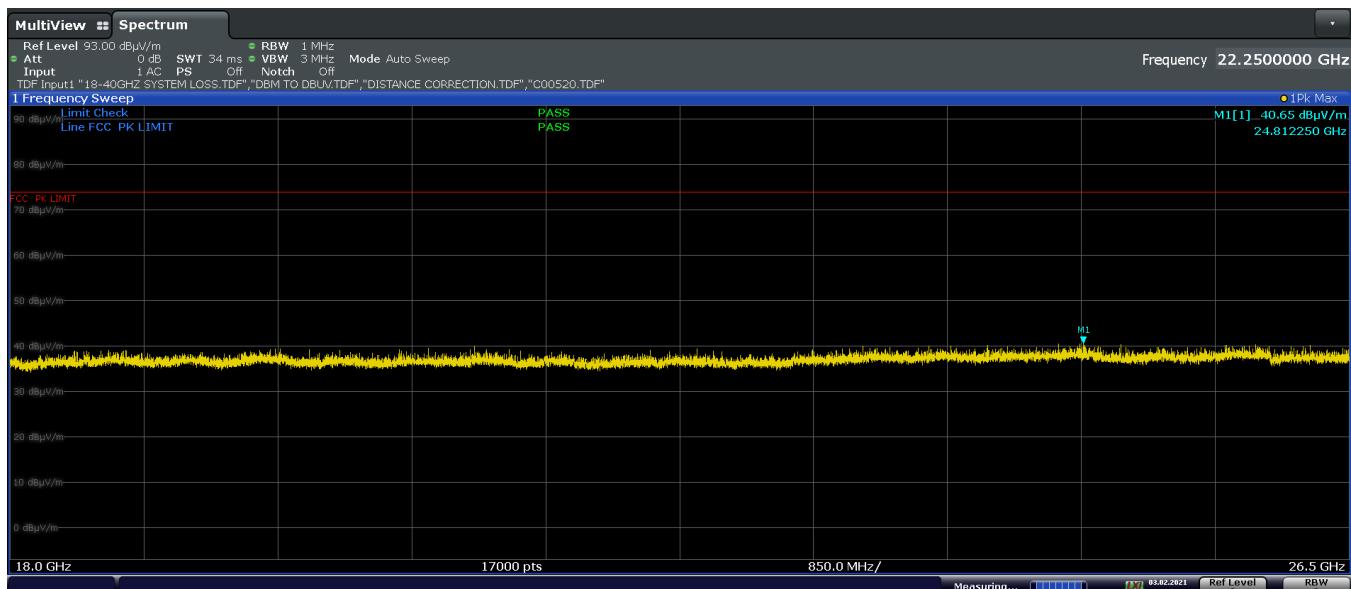
Radiated Spurious Emissions Measurements (Above 18GHz)

§15.209; RSS-Gen [8.9]

TxBF



Plot 7-66. Radiated Spurious Emissions above 18GHz TxBF (GFSK ePA – Ch.39, Pol. H)



Plot 7-67. Radiated Spurious Emissions above 18GHz TxBF (GFSK ePA – Ch.39, Pol. V)

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of 		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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7.10 Radiated Restricted Band Edge Measurements

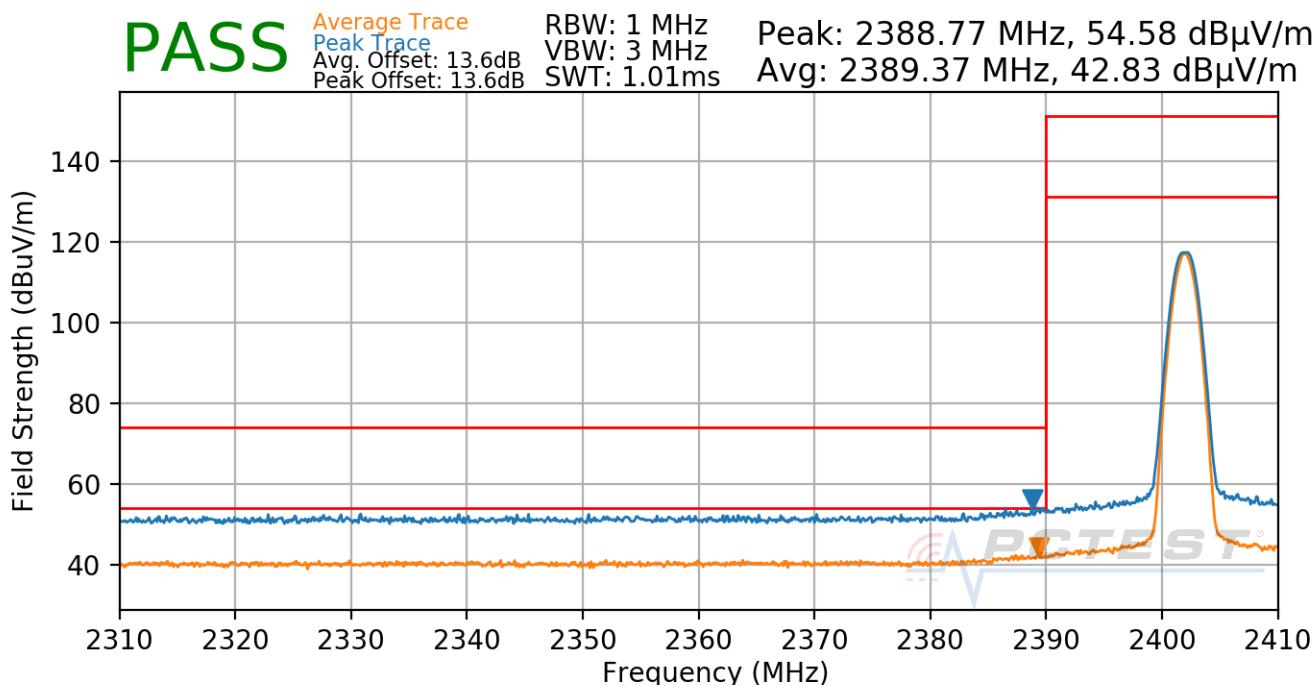
§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

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

Antenna 4a

Mode:	Bluetooth-Antenna 4a
Modulation:	GFSK
Worst Case Power Scheme:	ePA
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0



Plot 7-68. Radiated Restricted Lower Band Edge Measurement Antenna 4a (Average & Peak)

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of 		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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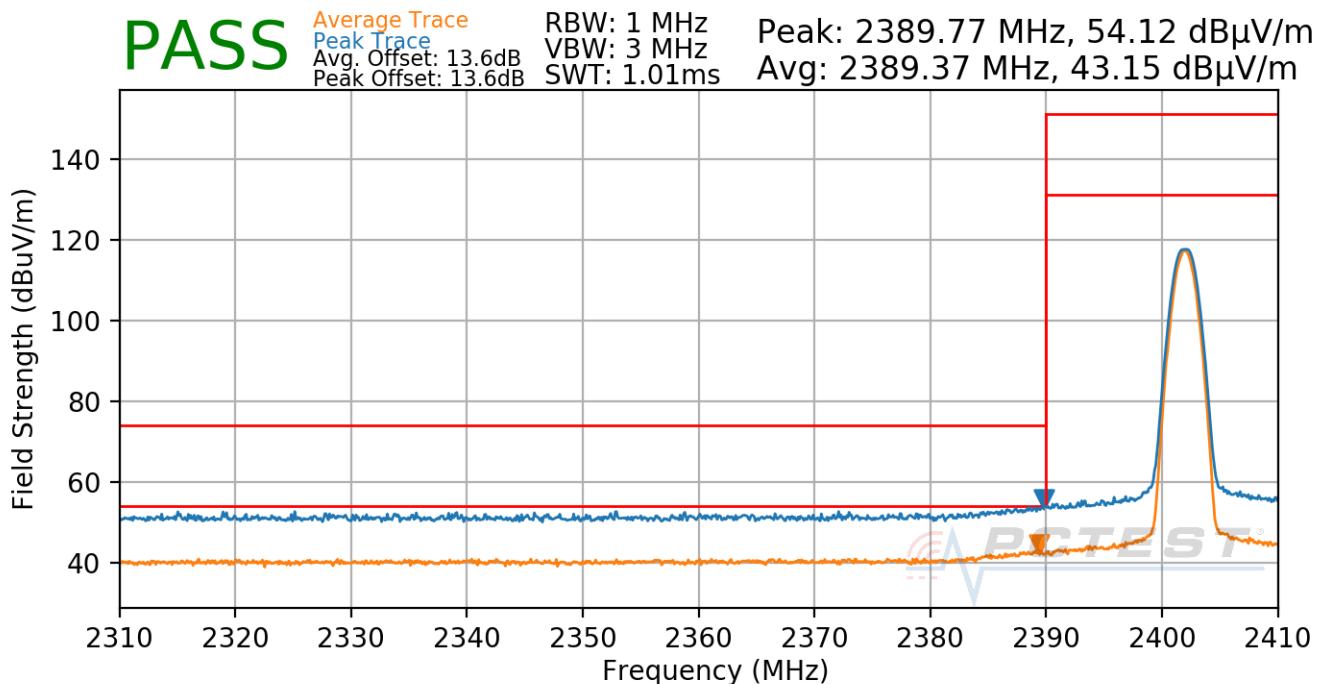
Radiated Restricted Band Edge Measurements

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

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

Mode: Bluetooth-Antenna 4a
 Modulation: 8DPSK
 Worst Case Power Scheme: ePA
 Measurement Distance: 3 Meters
 Operating Frequency: 2402MHz
 Channel: 0



Plot 7-69. Radiated Restricted Lower Band Edge Measurement Antenna 4a (Average & Peak)

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of 		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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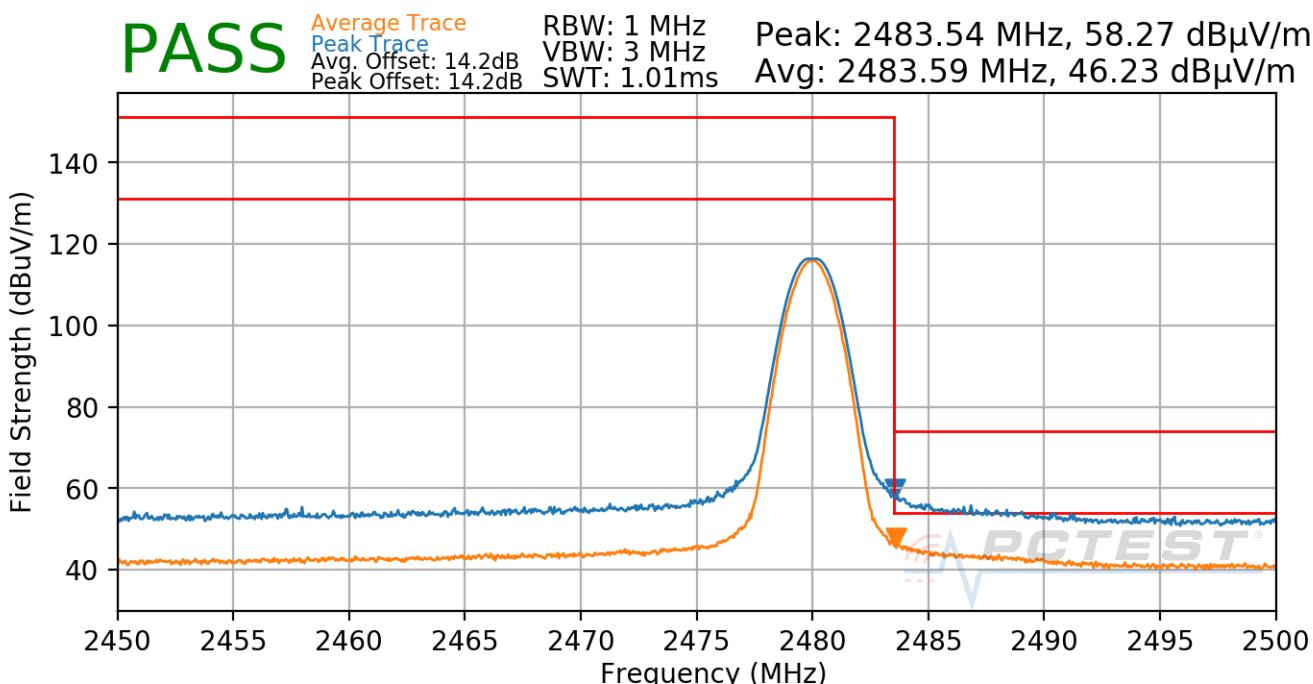
Radiated Restricted Band Edge Measurements

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

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

Mode: Bluetooth-Antenna 4a
 Modulation: GFSK
 Worst Case Power Scheme: ePA
 Measurement Distance: 3 Meters
 Operating Frequency: 2480MHz
 Channel: 78



Plot 7-70. Radiated Restricted Upper Band Edge Measurement Antenna 4a (Average & Peak)

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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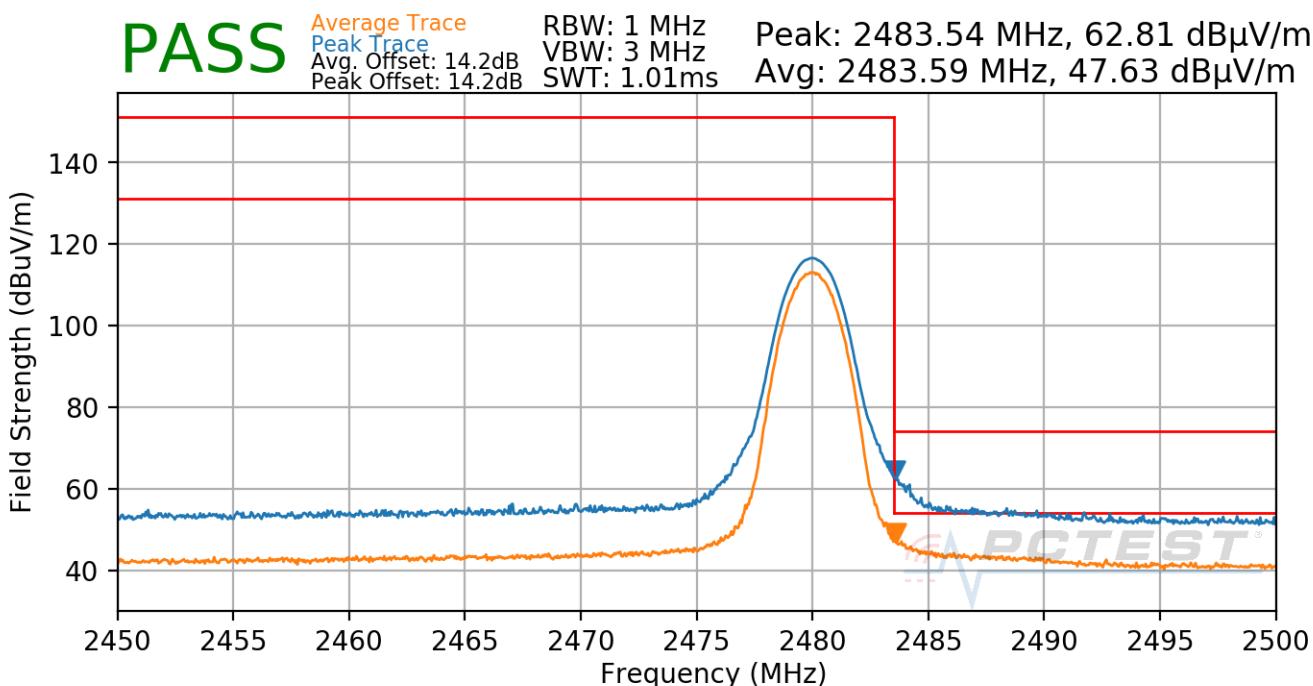
Radiated Restricted Band Edge Measurements

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

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

Mode: Bluetooth-Antenna 4a
 Modulation: 8DPSK
 Worst Case Power Scheme: ePA
 Measurement Distance: 3 Meters
 Operating Frequency: 2480MHz
 Channel: 78



Plot 7-71. Radiated Restricted Upper Band Edge Measurement Antenna 4a (Average & Peak)

FCC ID: BCGA2301 IC: 579C-A2301	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Radiated Restricted Band Edge Measurements

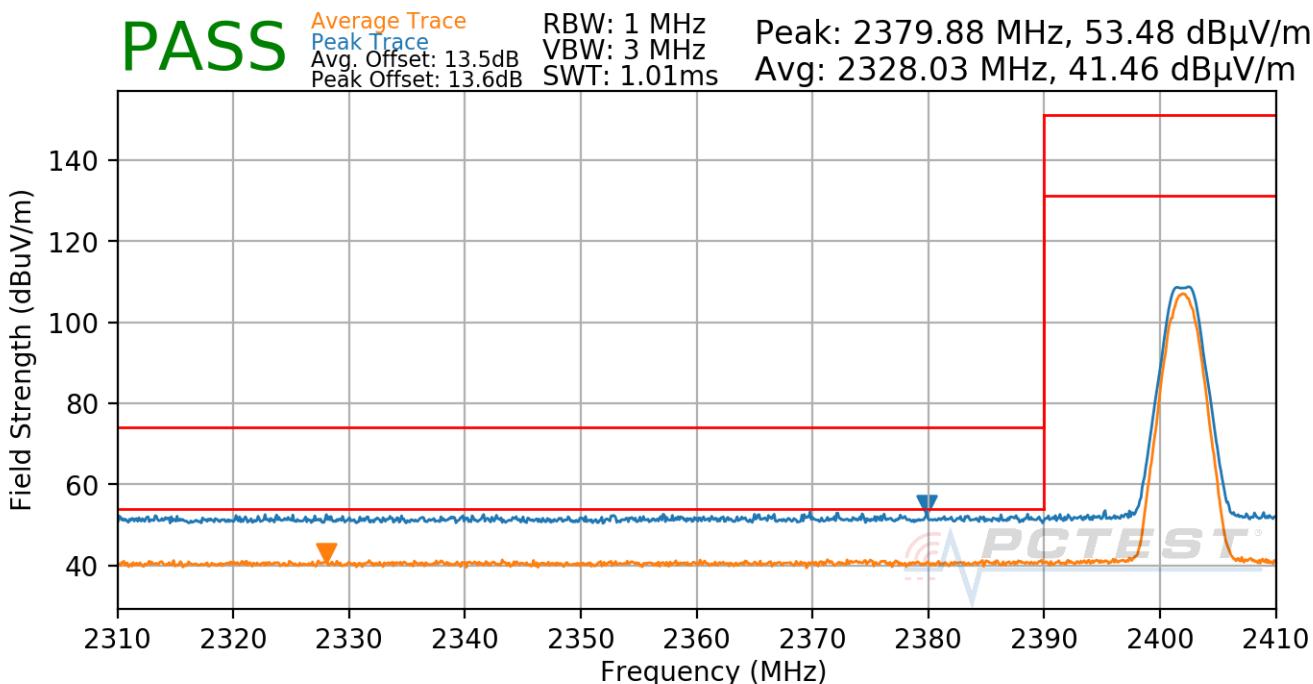
§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

Antenna 2a

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

Mode:	Bluetooth-Antenna 2a
Modulation:	GFSK
Worst Case Power Scheme:	ePA
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0



Plot 7-72. Radiated Restricted Lower Band Edge Measurement Antenna 2a (Average & Peak)

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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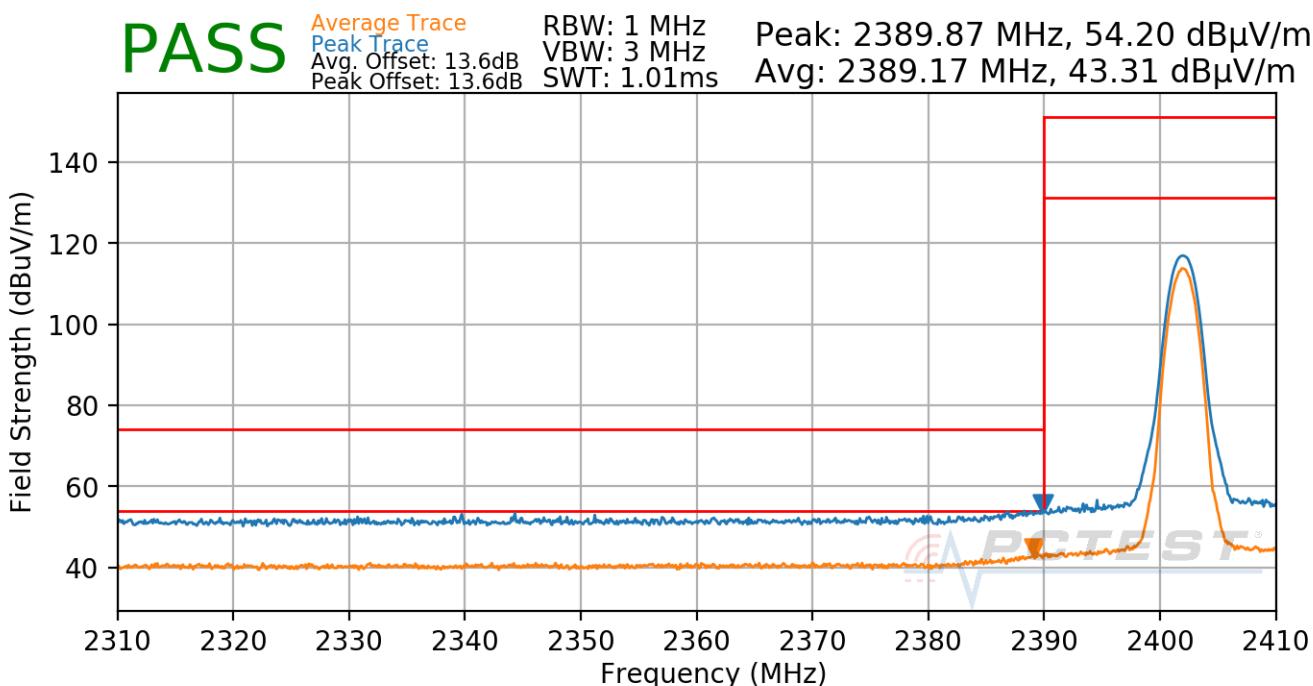
Radiated Restricted Band Edge Measurements

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

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

Mode: Bluetooth-Antenna 2a
 Modulation: 8DPSK
 Worst Case Power Scheme: ePA
 Measurement Distance: 3 Meters
 Operating Frequency: 2402MHz
 Channel: 0



Plot 7-73. Radiated Restricted Lower Band Edge Measurement Antenna 2a (Average & Peak)

FCC ID: BCGA2301 IC: 579C-A2301	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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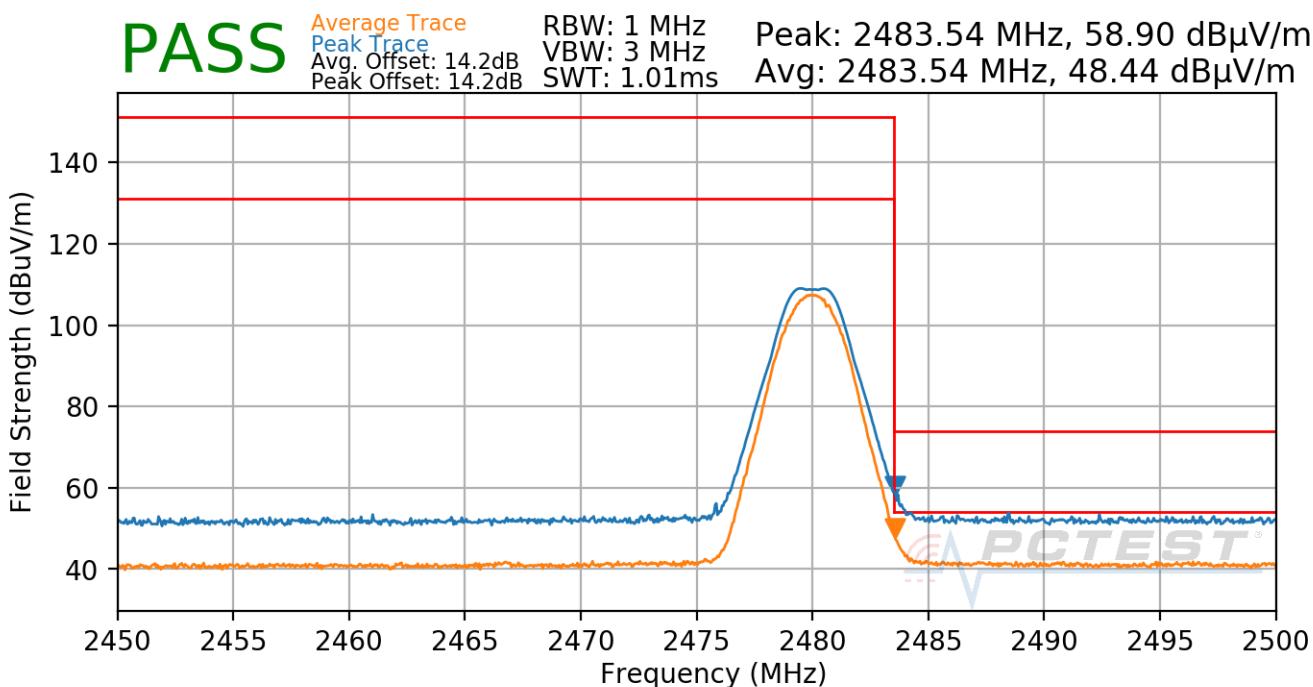
Radiated Restricted Band Edge Measurements

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

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

Mode: Bluetooth-Antenna 2a
 Modulation: GFSK
 Worst Case Power Scheme: ePA
 Measurement Distance: 3 Meters
 Operating Frequency: 2480MHz
 Channel: 78



Plot 7-74. Radiated Restricted Upper Band Edge Measurement Antenna 2a (Average & Peak)

FCC ID: BCGA2301 IC: 579C-A2301	PCTEST Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C2101020002-13.BCG	Test Dates: 12/15/2020-2/25/2021	EUT Type: Tablet Device	Page 77 of 91

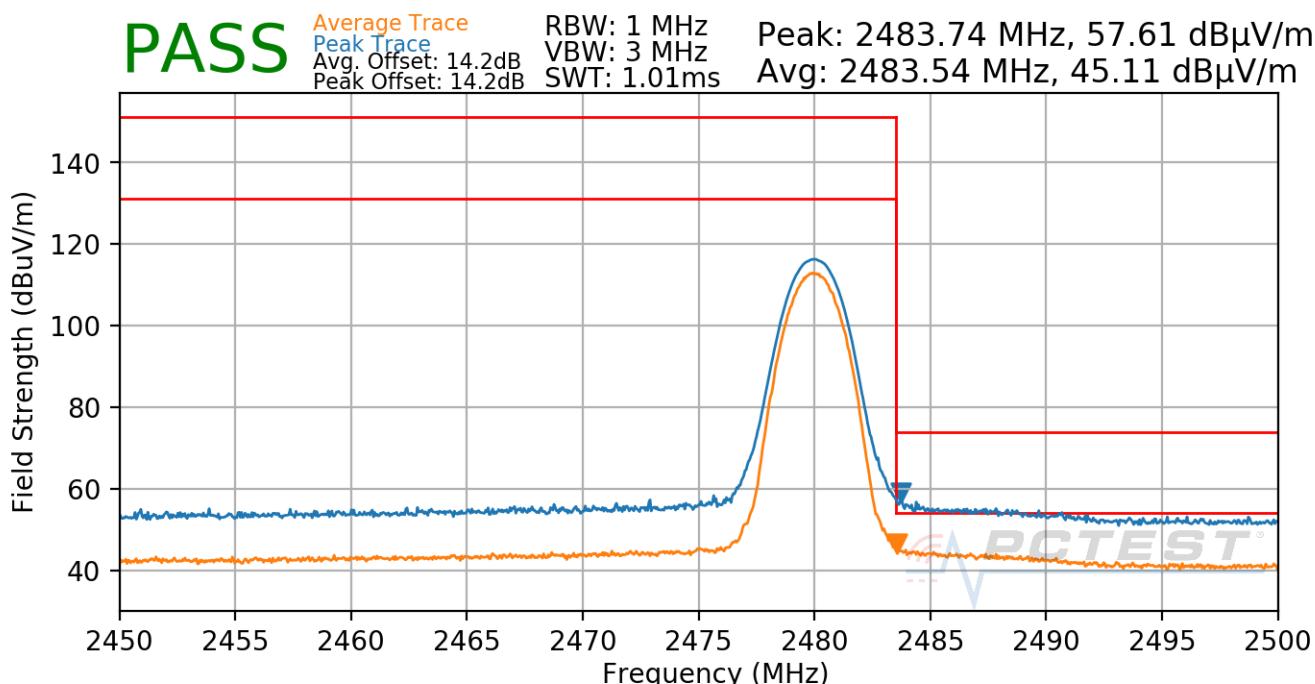
Radiated Restricted Band Edge Measurements

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

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

Mode: Bluetooth-Antenna 2a
 Modulation: 8DPSK
 Worst Case Power Scheme: ePA
 Measurement Distance: 3 Meters
 Operating Frequency: 2480MHz
 Channel: 78



Plot 7-75. Radiated Restricted Upper Band Edge Measurement Antenna 2a (Average & Peak)

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Radiated Restricted Band Edge Measurements

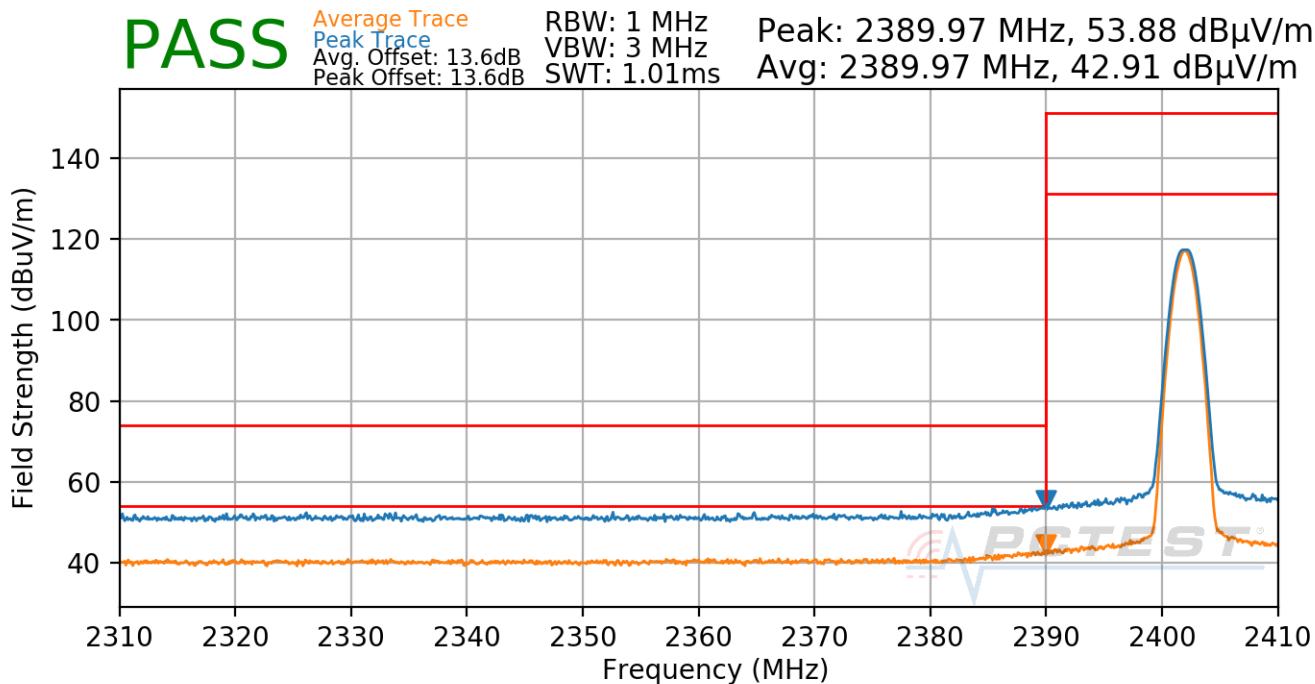
§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

TxBF

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

$$\text{Offset (dB)} = (\text{Antenna Factor} + \text{Cable Loss} + \text{Attenuator}) - \text{Preamplifier Gain}$$

Mode:	Bluetooth-TxBF
Modulation:	GFSK
Worst Case Power Scheme:	ePA
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0



Plot 7-76. Radiated Restricted Lower Band Edge Measurement TxBF (Average & Peak)

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of 		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C2101020002-13.BCG	Test Dates: 12/15/2020-2/25/2021	EUT Type: Tablet Device		Page 79 of 91

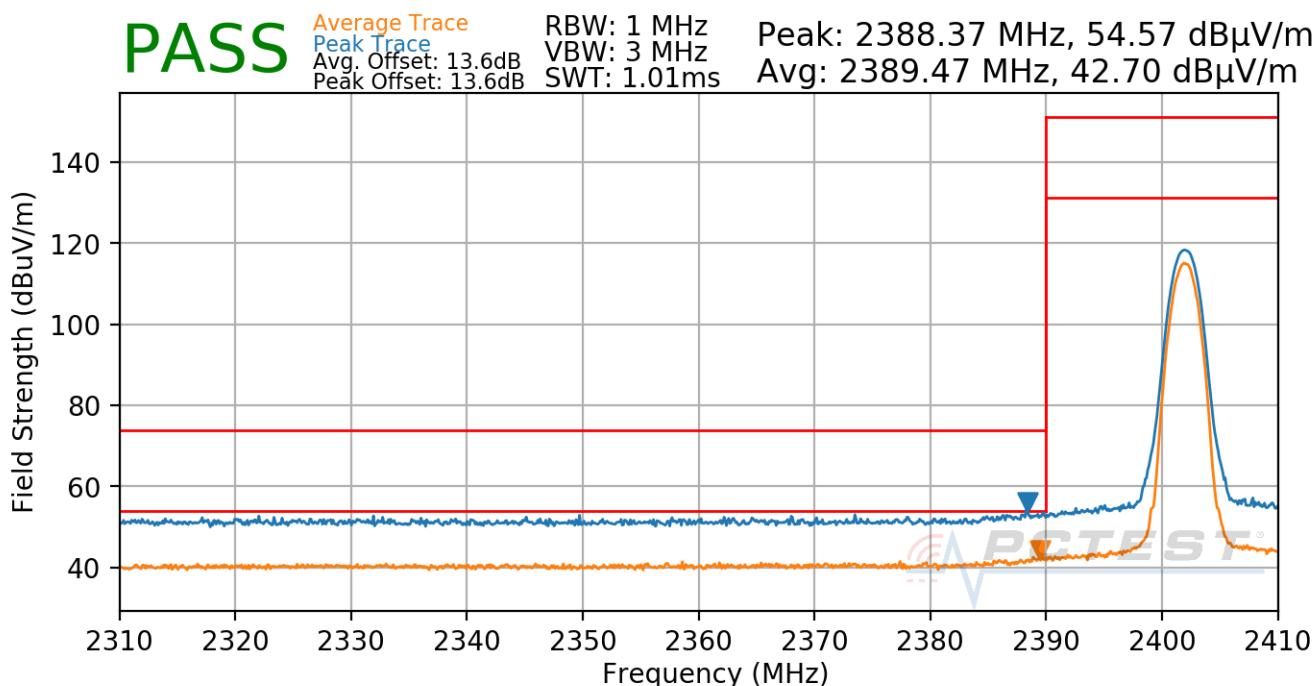
Radiated Restricted Band Edge Measurements

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

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

Mode: Bluetooth-TxBF
Modulation: 8DPSK
Worst Case Power Scheme: ePA
Measurement Distance: 3 Meters
Operating Frequency: 2402MHz
Channel: 0



Plot 7-77. Radiated Restricted Lower Band Edge Measurement TxBF (Average & Peak)

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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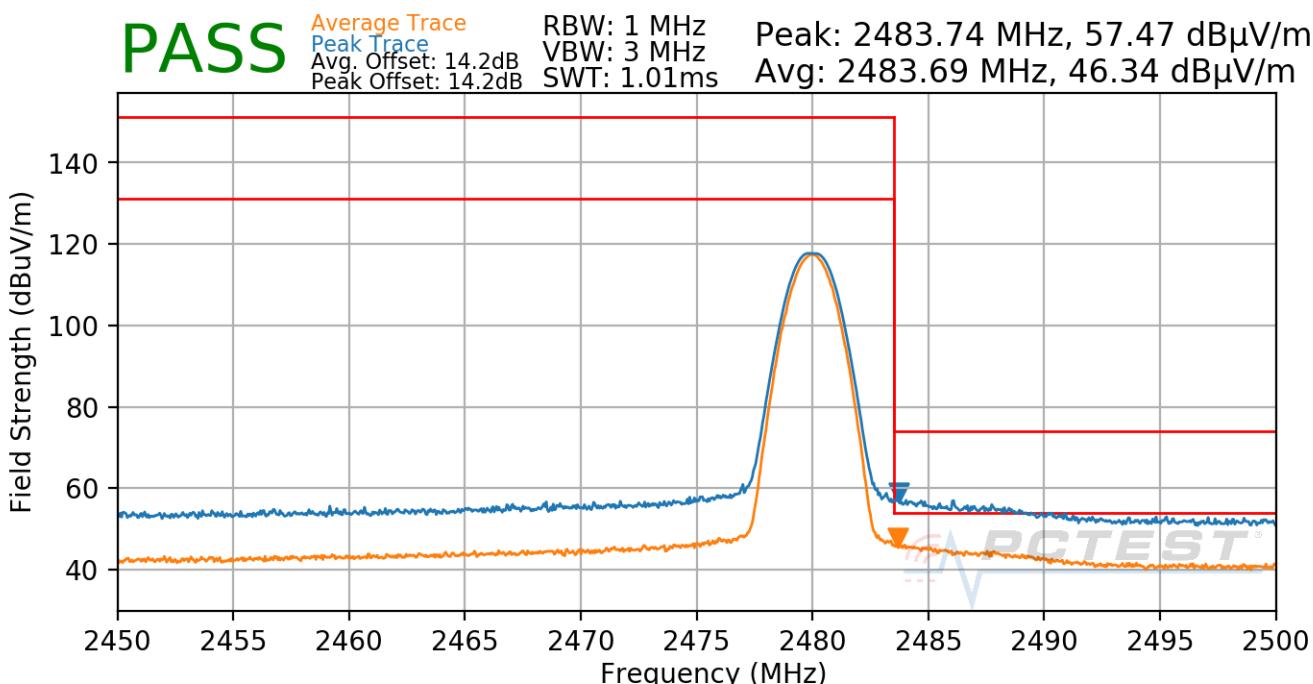
Radiated Restricted Band Edge Measurements

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

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

Mode: Bluetooth-TxBF
 Modulation: GFSK
 Worst Case Power Scheme: ePA
 Measurement Distance: 3 Meters
 Operating Frequency: 2480MHz
 Channel: 78



Plot 7-78. Radiated Restricted Upper Band Edge Measurement TxBF (Average & Peak)

FCC ID: BCGA2301 IC: 579C-A2301	PCTEST Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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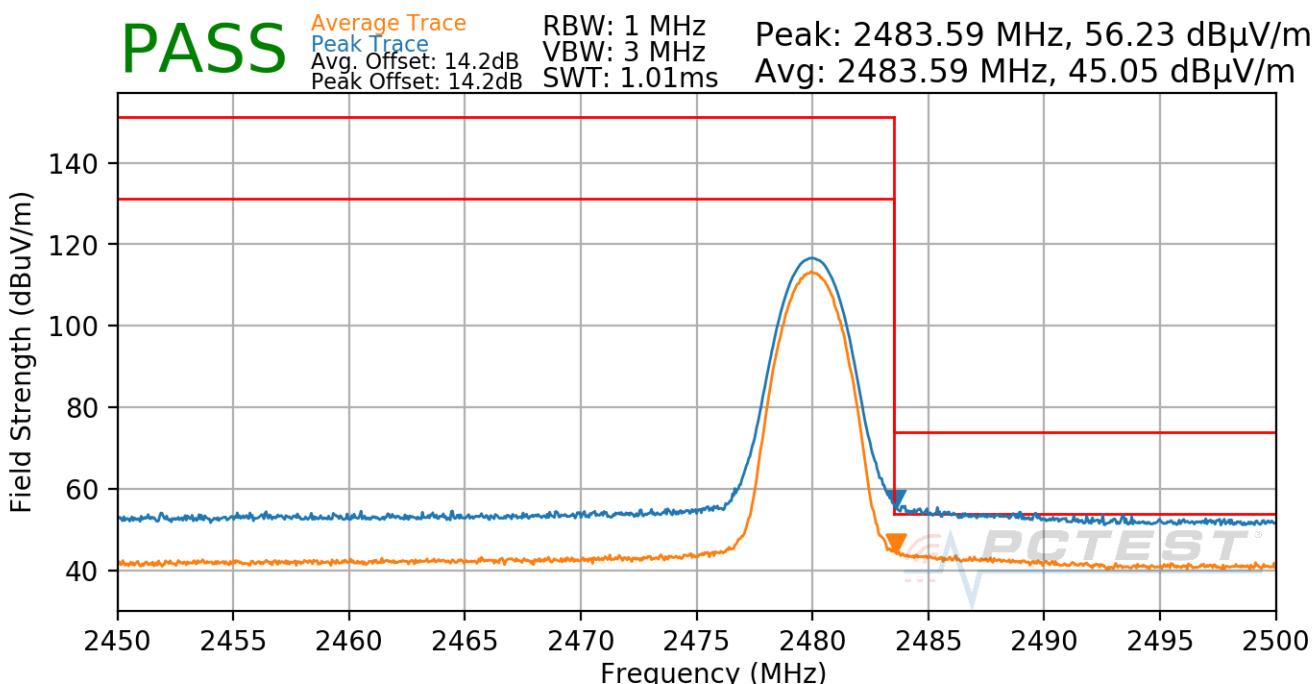
Radiated Restricted Band Edge Measurements

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

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

Mode: Bluetooth-TxBF
 Modulation: 8DPSK
 Worst Case Power Scheme: ePA
 Measurement Distance: 3 Meters
 Operating Frequency: 2480MHz
 Channel: 78



Plot 7-79. Radiated Restricted Upper Band Edge Measurement TxBF (Average & Peak)

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of 		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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7.11 Radiated Spurious Emissions – 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 appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR and Table 7 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-22 per Section 15.209 and RSS-Gen (8.9).

Frequency	Field Strength [μ V/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 7-22. 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

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. VBW = 300kHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

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Test Setup

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

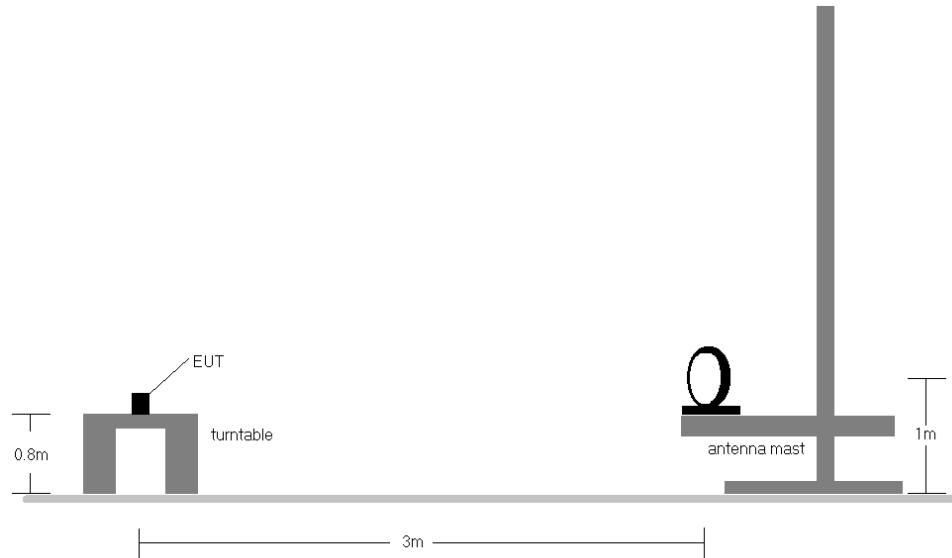


Figure 7-9. Radiated Test Setup < 30Mhz

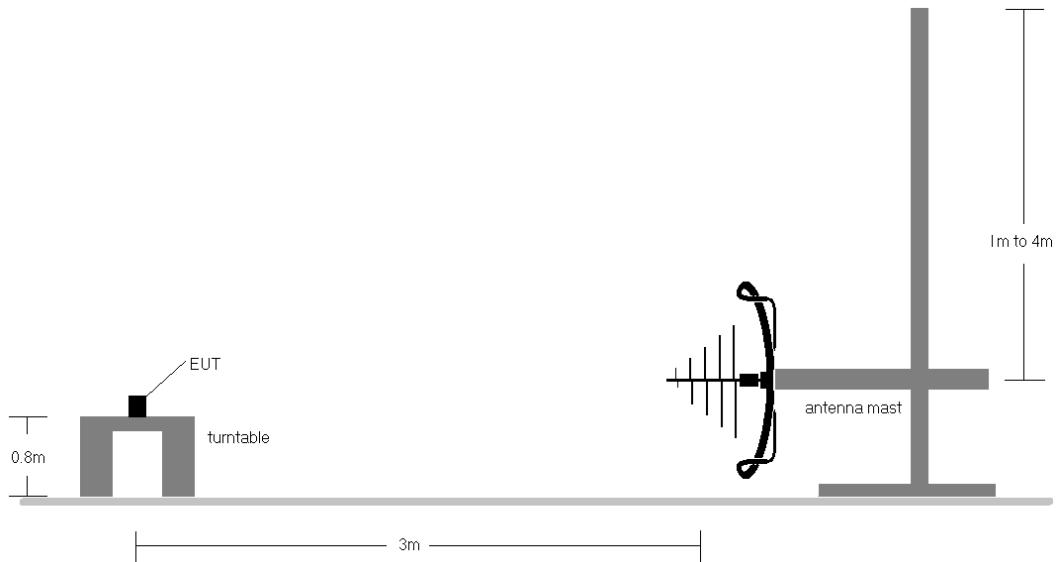


Figure 7-10. Radiated Test Setup < 1GHz

FCC ID: BCGA2301 IC: 579C-A2301	PCTEST® Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Test Notes

1. All emissions lying in restricted bands specified in §15.205 and RSS-Gen (8.10) are below the limit shown in Table 7-22.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes. For below 30MHz the loop antenna was positioned in 3 orthogonal planes (X front, Y side, Z top) to determine the orientation resulting in the worst case emissions.
3. This unit was tested with its standard battery.
4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector on emissions that were within 6dB of the limit.
5. Emissions were measured at a 3 meter test distance.
6. 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.
7. No spurious emissions were detected within 20dB of the limit below 30MHz.
8. 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.
9. Both configurations below were investigated, and the worst case has been reported.
 - a. EUT powered by AC/DC adaptor via USB-C cable with wire charger
 - b. EUT powered by host PC via USB-C cable with wire charger
10. All supported modulation, antenna (including TxBF mode) and power schemes have been tested on the unit and only worst case configuration is reported.

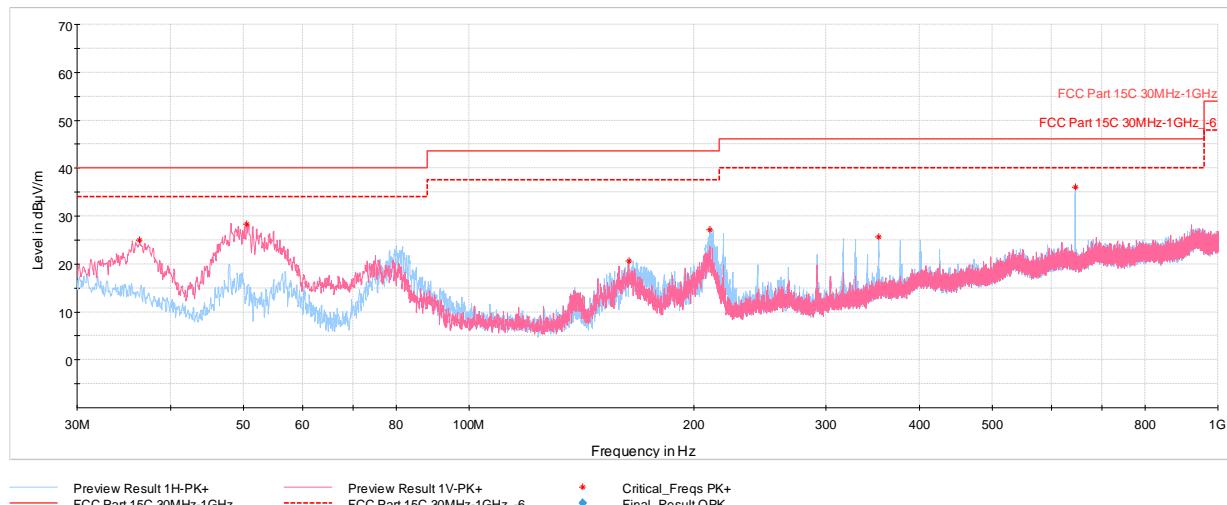
Sample Calculation

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

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TxBF Radiated Spurious Emissions Measurements (Below 1GHz)

§15.209; RSS-Gen [8.9]



Plot 7-80. Radiated Spurious Emissions below 1GHz TxBF (GFSK ePA – Ch.39, with AC/DC Adapter)

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]
36.35	Max Peak	V	100	108	-67.08	-15.01	24.91	40.00	-15.09
50.52	Max Peak	V	100	61	-57.66	-21.07	28.27	40.00	-11.73
163.52	Max Peak	V	250	44	-69.07	-17.37	20.56	43.52	-22.96
209.89	Max Peak	H	100	127	-63.38	-16.47	27.15	43.52	-16.37
352.33	Max Peak	H	100	258	-70.02	-11.31	25.67	46.02	-20.35
644.79	Max Peak	H	100	104	-66.24	-4.76	36.00	46.02	-10.02

Table 7-23. Radiated Spurious Emissions Below 1GHz TxBF (GFSK ePA – Ch.39 with AC/DC Adapter)

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of  MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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7.12 AC Line-Conducted Emissions Measurement

§15.207; RSS-Gen [8.8]

Test Overview and Limit

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN 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 AC Line conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.

All conducted emissions must not exceed the limits shown in the table below, per Section 15.207 and RSS-Gen (8.8).

Frequency of emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

Table 7-24. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10-2013, Section 6.2

Test Settings

Quasi-Peak Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Average Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST [®] Proud to be part of element		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Test Setup

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

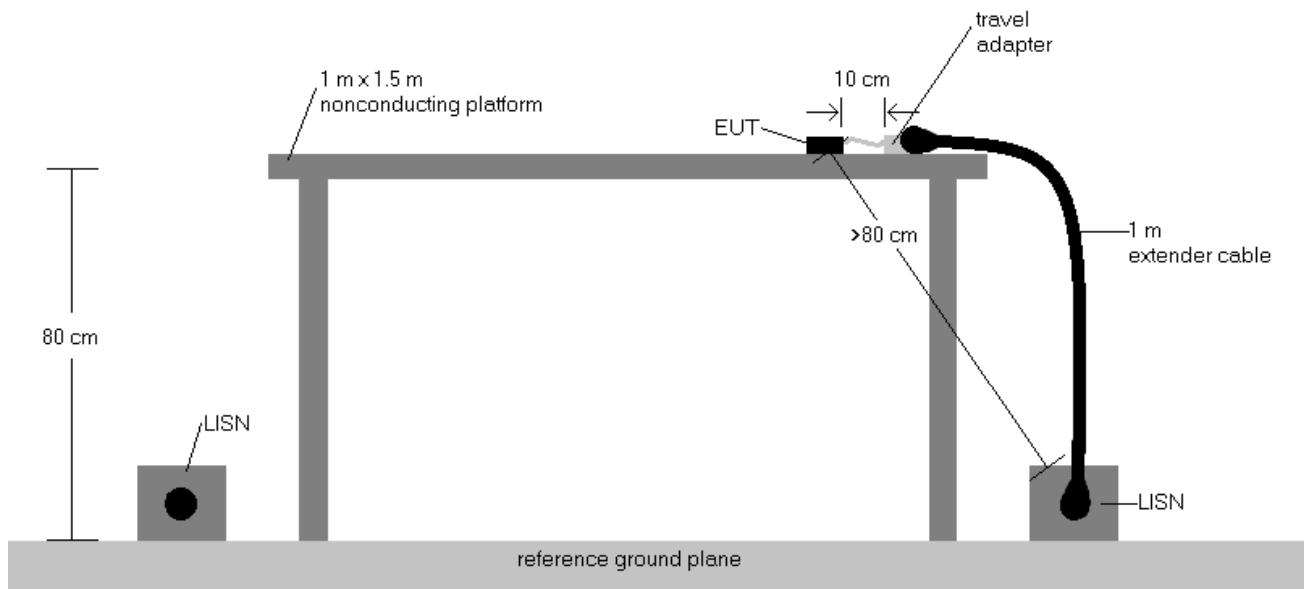
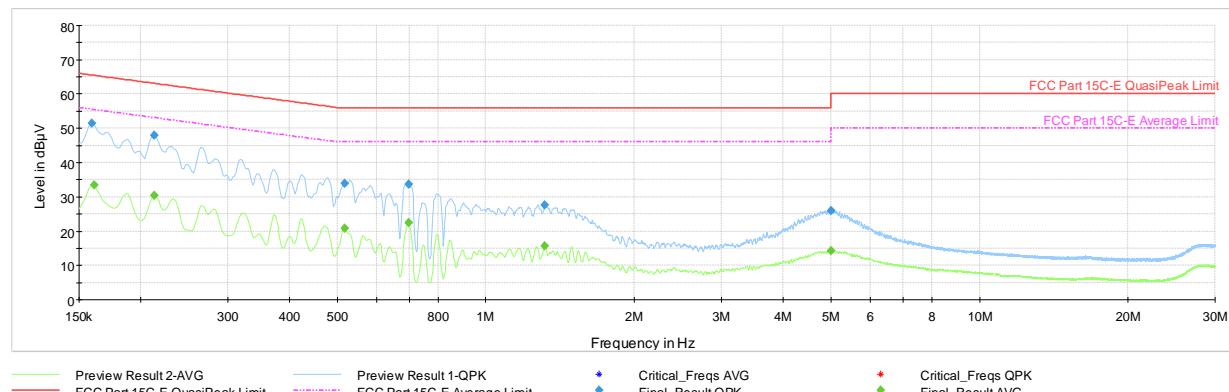


Figure 7-11. Test Instrument & Measurement Setup

Test Notes

1. All modes of operation were investigated and the worst-case emissions are reported. The emissions found were not affected by the choice of channel used during testing.
2. The limit for an intentional radiator from 150kHz to 30MHz are specified in Part 15.207 and RSS-Gen (8.8).
3. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dB μ V) = QP/AV Analyzer/Receiver Level (dB μ V) + Corr. (dB)
5. Margin (dB) = QP/AV Level (dB μ V) - QP/AV Limit (dB μ V)
6. Traces shown in plot are made using a quasi peak and average detectors.
7. Deviations to the Specifications: None.
8. All supported modulation, antenna (including TxBF mode) and power schemes have been tested on the unit and only worst case configuration is reported.
9. Both configurations below were investigated, and the worst case has been reported.
 - a. EUT powered by AC/DC adaptor via USB-C cable with wire charger
 - b. EUT powered by host PC via USB-C cable with wire charger

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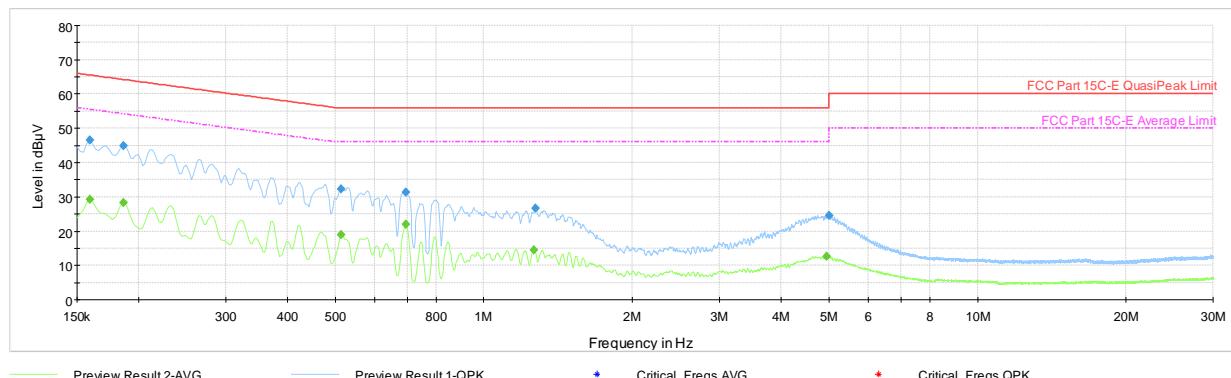


Plot 7-81. AC Line-Conducted Test Plot TxBF (L1, GFSK ePA – Ch.39, with AC/DC Adapter)

Frequency [MHz]	Process State	QuasiPeak [dBμV]	Average [dBμV]	Limit [dBμV]	Margin [dB]	Line	PE
0.159	FINAL	51.6	—	65.52	-13.97	L1	GND
0.161	FINAL	—	33.40	55.40	-22.00	L1	GND
0.213	FINAL	48.0	—	63.09	-15.05	L1	GND
0.213	FINAL	—	30.34	53.09	-22.75	L1	GND
0.517	FINAL	33.9	—	56.00	-22.12	L1	GND
0.517	FINAL	—	20.79	46.00	-25.21	L1	GND
0.697	FINAL	33.7	—	56.00	-22.31	L1	GND
0.699	FINAL	—	22.44	46.00	-23.56	L1	GND
1.318	FINAL	—	15.59	46.00	-30.41	L1	GND
1.318	FINAL	27.6	—	56.00	-28.44	L1	GND
5.008	FINAL	—	14.24	50.00	-35.76	L1	GND
5.012	FINAL	26.0	—	60.00	-33.96	L1	GND

Table 7-25. AC Line-Conducted Test Data TxBF (L1, GFSK ePA – Ch.39, with AC/DC Adapter)

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of  MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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Plot 7-82. AC Line-Conducted Test Plot TxBF (N, GFSK ePA – Ch.39, with AC/DC Adapter)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.159	FINAL	46.5	—	65.52	-19.03	N	GND
0.159	FINAL	—	29.25	55.52	-26.27	N	GND
0.186	FINAL	44.9	—	64.21	-19.32	N	GND
0.186	FINAL	—	28.31	54.21	-25.90	N	GND
0.515	FINAL	—	19.05	46.00	-26.95	N	GND
0.515	FINAL	32.3	—	56.00	-23.70	N	GND
0.695	FINAL	—	21.96	46.00	-24.04	N	GND
0.695	FINAL	31.4	—	56.00	-24.57	N	GND
1.262	FINAL	—	14.54	46.00	-31.46	N	GND
1.271	FINAL	26.6	—	56.00	-29.45	N	GND
4.956	FINAL	—	12.66	46.00	-33.34	N	GND
5.006	FINAL	24.5	—	60.00	-35.52	N	GND

Table 7-26. AC Line-Conducted Test Data TxBF (N, GFSK ePA – Ch.39, with AC/DC Adapter)

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST® Proud to be part of  MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Apple Tablet Device** **FCC ID: BCGA2301, IC: 579C-A2301** 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.

FCC ID: BCGA2301 IC: 579C-A2301	 PCTEST Proud to be part of  element		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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