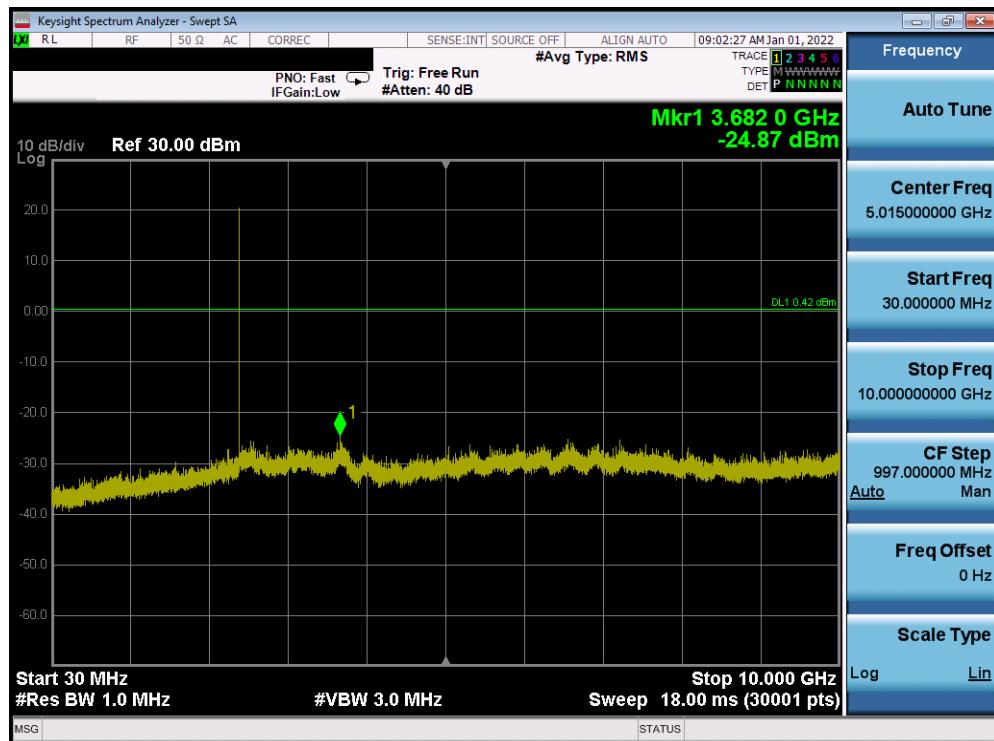
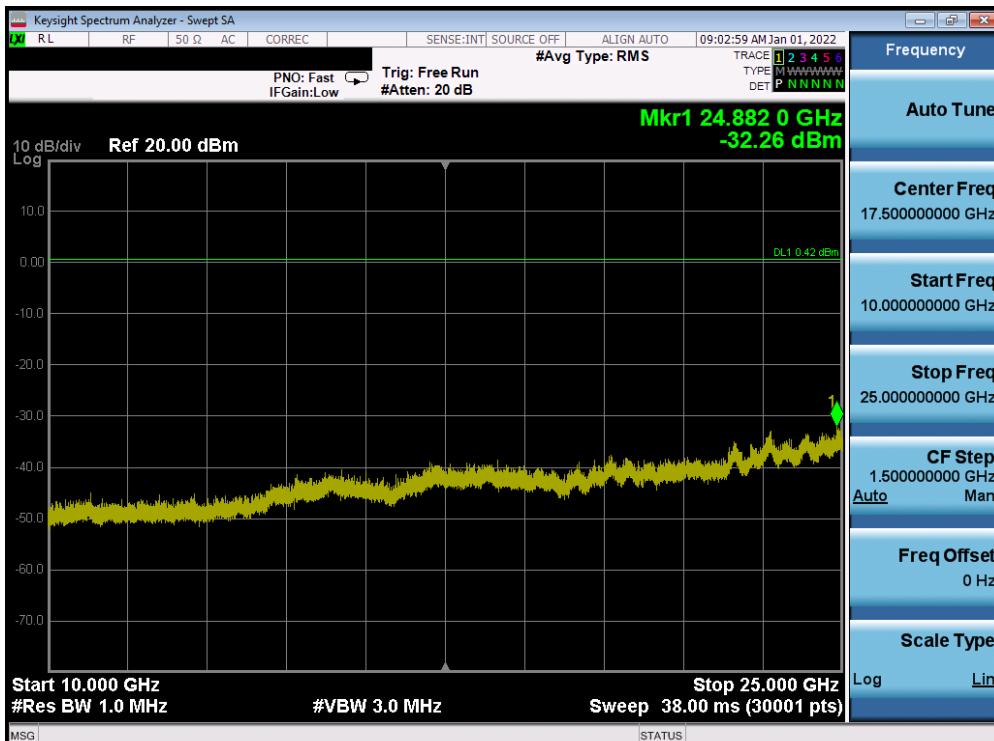


Antenna WF8

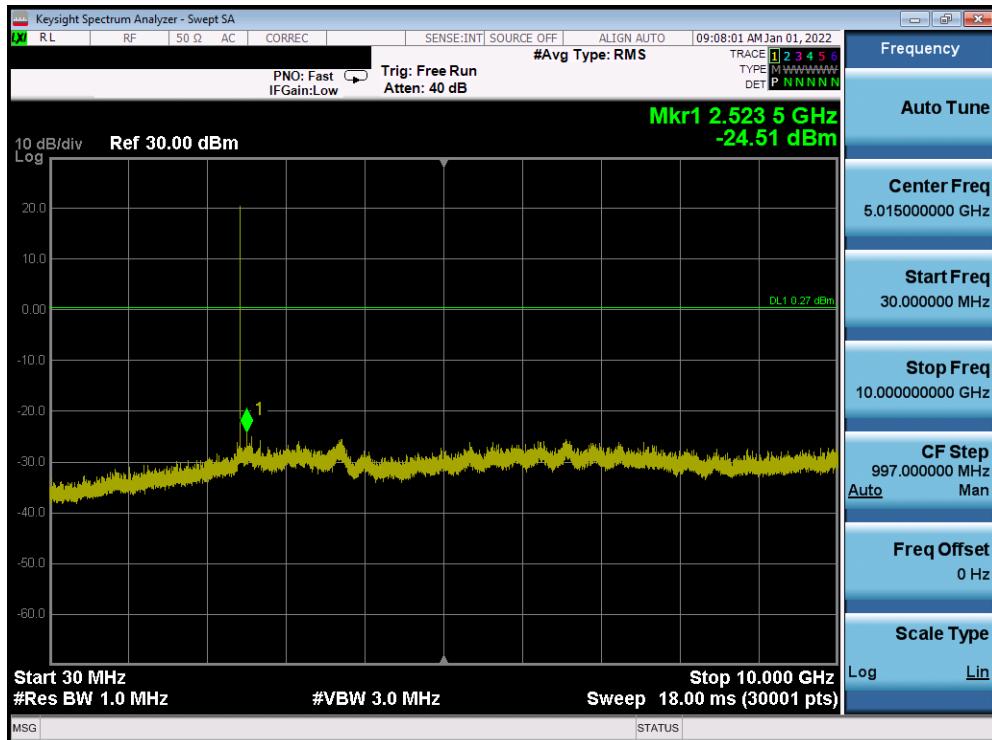


Plot 7-69. Conducted Spurious Plot Antenna WF8 (Bluetooth (LE), 1Mbps, ePA – Ch. 0)

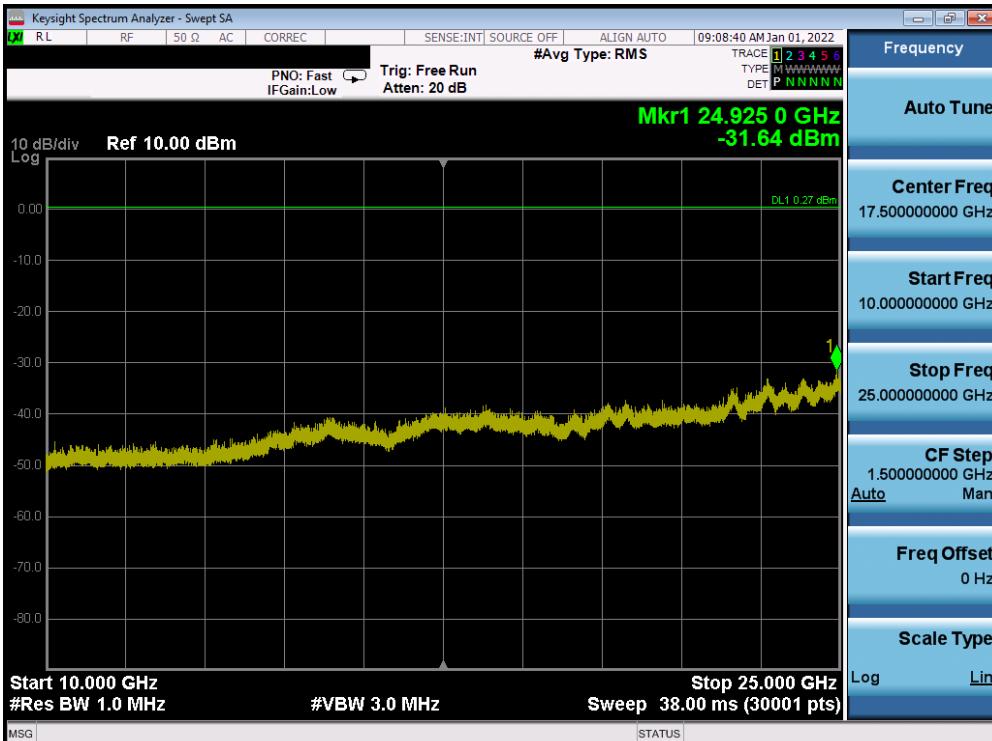


Plot 7-70. Conducted Spurious Plot Antenna WF8 (Bluetooth (LE), 1Mbps, ePA – Ch. 0)

FCC ID: BCGA2588 IC: 579C-A2588	PCTEST Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device	Page 65 of 107

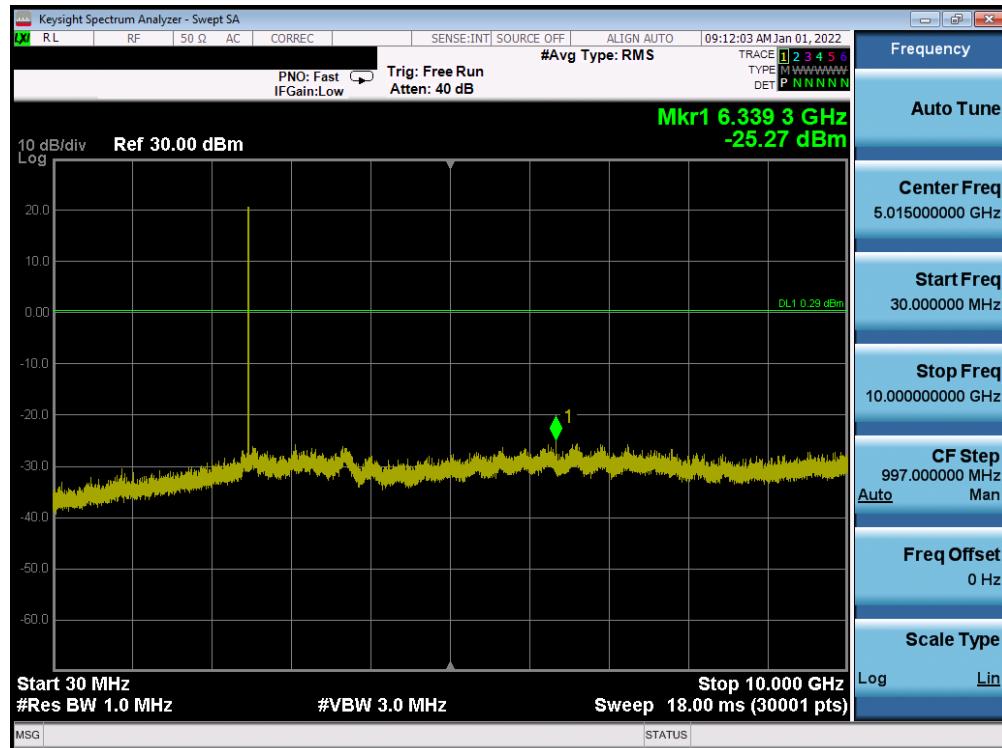


Plot 7-71. Conducted Spurious Plot Antenna WF8 (Bluetooth (LE), 1Mbps, ePA – Ch. 19)

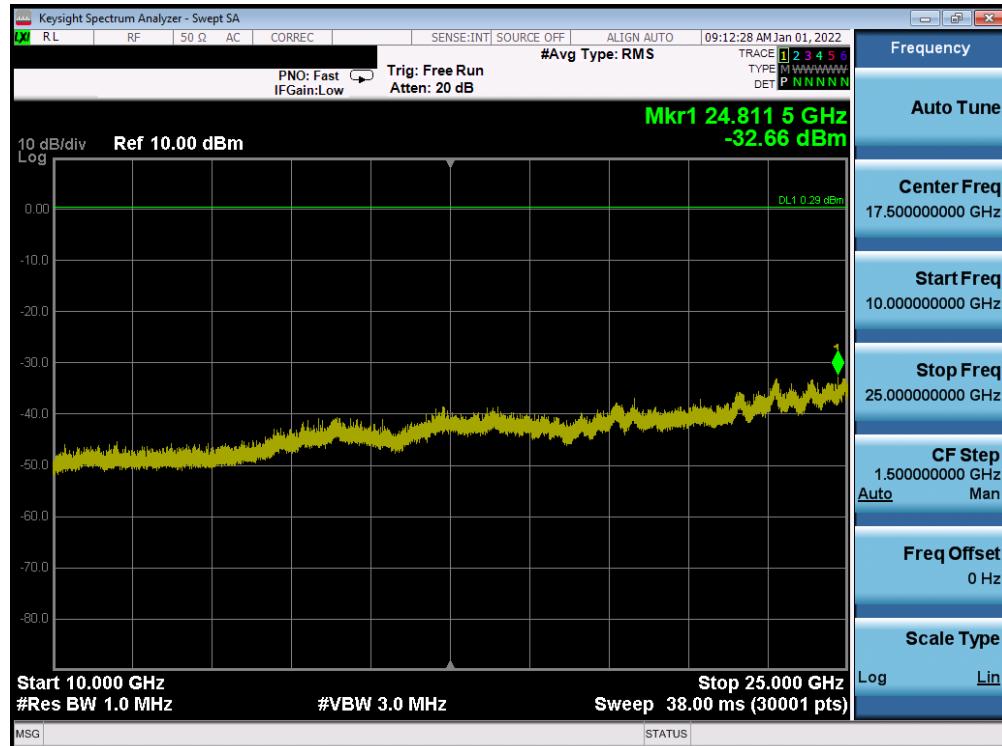


Plot 7-72. Conducted Spurious Plot Antenna WF8 (Bluetooth (LE), 1Mbps, ePA – Ch. 19)

FCC ID: BCGA2588 IC: 579C-A2588	PCTEST Proud to be part of 		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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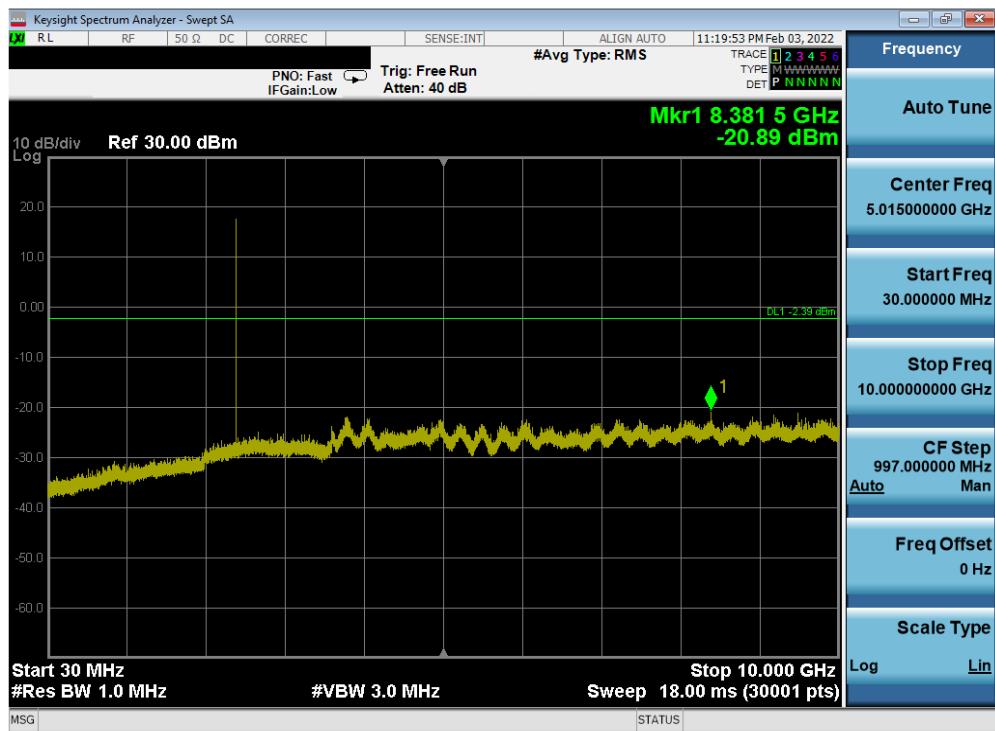
Plot 7-73. Conducted Spurious Plot Antenna WF8 (Bluetooth (LE), 1Mbps, ePA – Ch. 39)



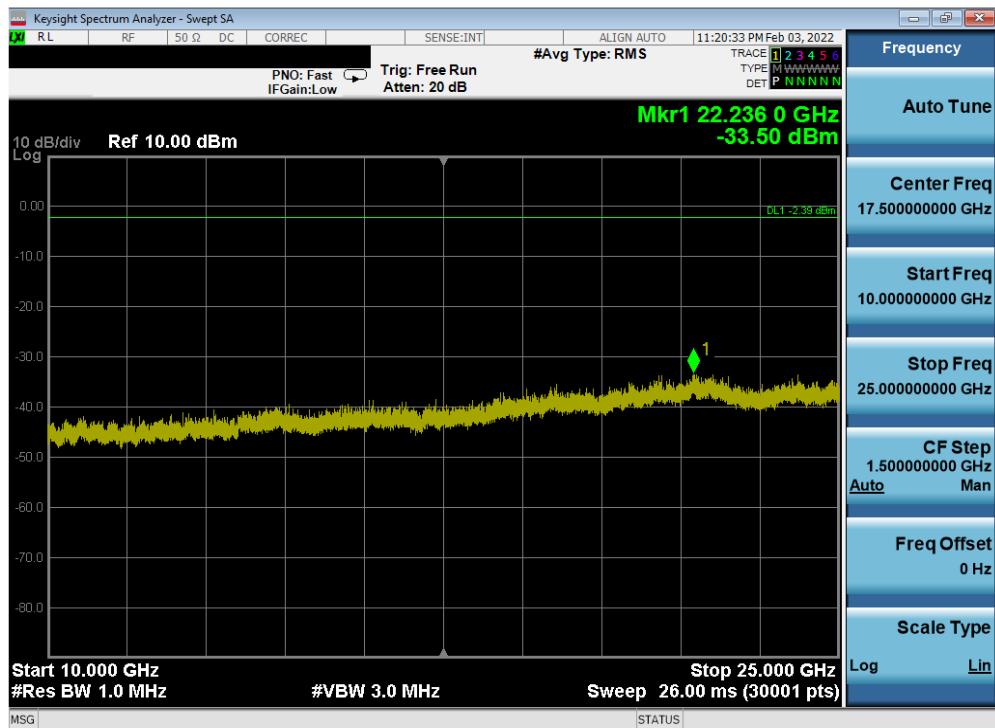
Plot 7-74. Conducted Spurious Plot Antenna WF8 (Bluetooth (LE), 1Mbps, ePA – Ch. 39)

FCC ID: BCGA2588 IC: 579C-A2588	PCTEST Proud to be part of 		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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Antenna WF7b

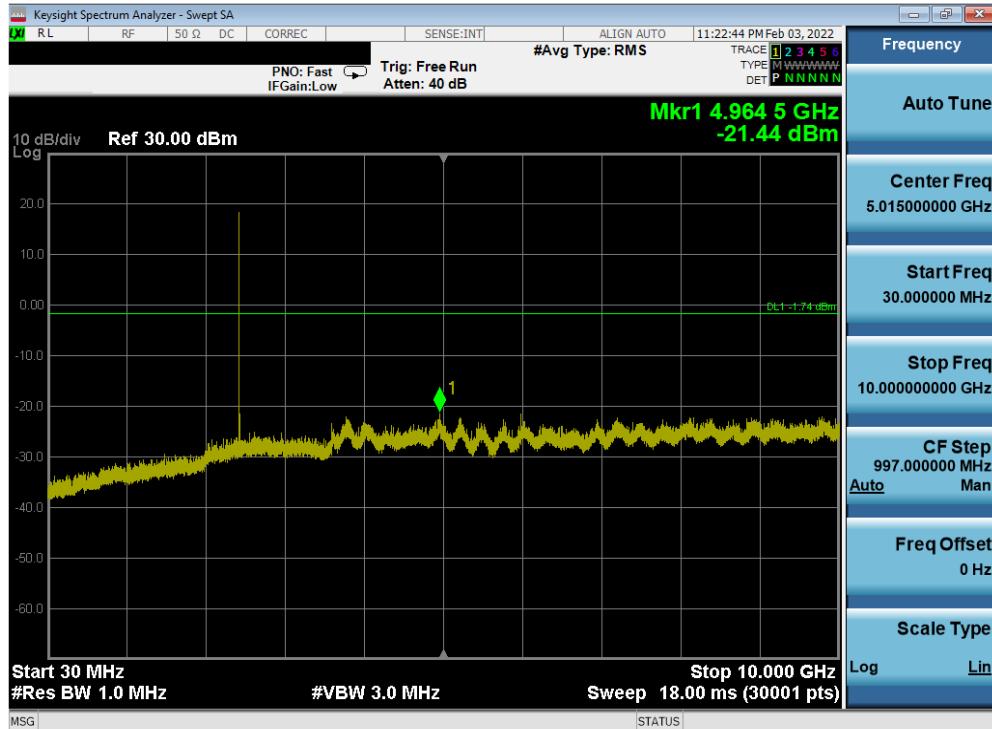


Plot 7-75. Conducted Spurious Plot Antenna WF7b (Bluetooth (LE), 1Mbps, ePA – Ch. 0)

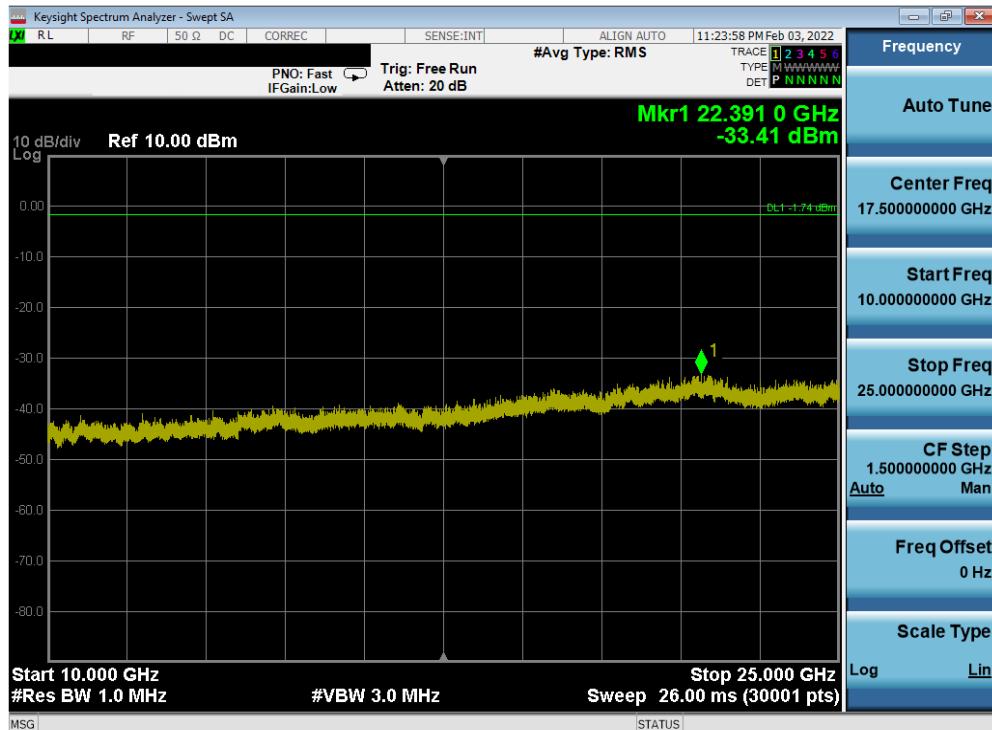


Plot 7-76. Conducted Spurious Plot Antenna WF7b (Bluetooth (LE), 1Mbps, ePA – Ch. 0)

FCC ID: BCGA2588 IC: 579C-A2588	 PCTEST® Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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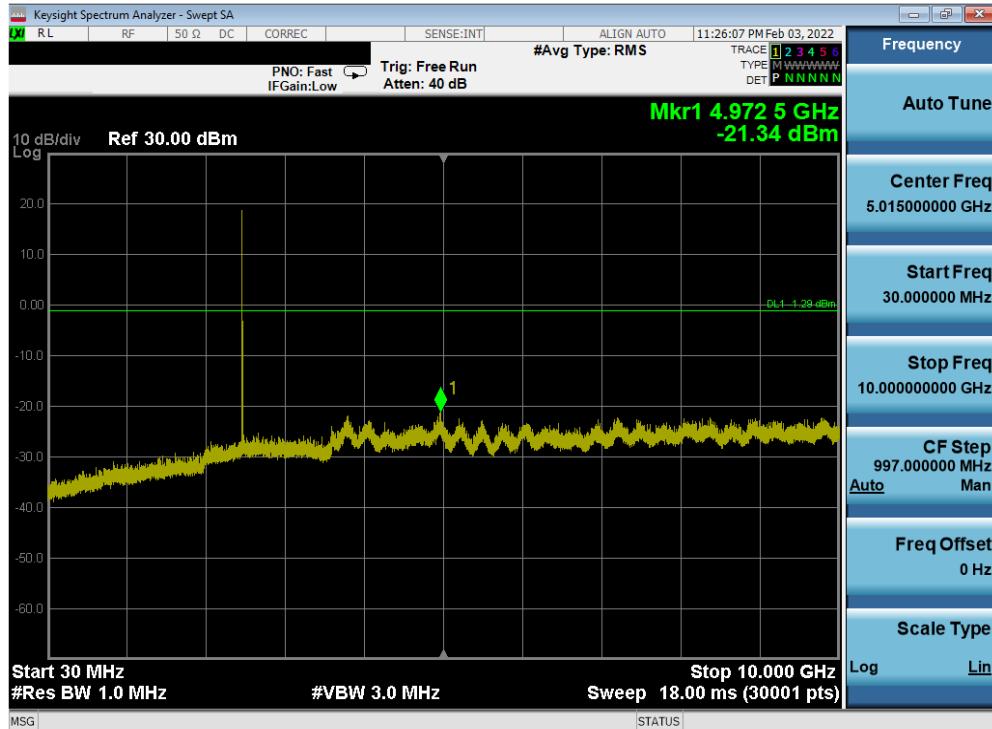


Plot 7-77. Conducted Spurious Plot Antenna WF7b (Bluetooth (LE), 1Mbps, ePA – Ch. 19)

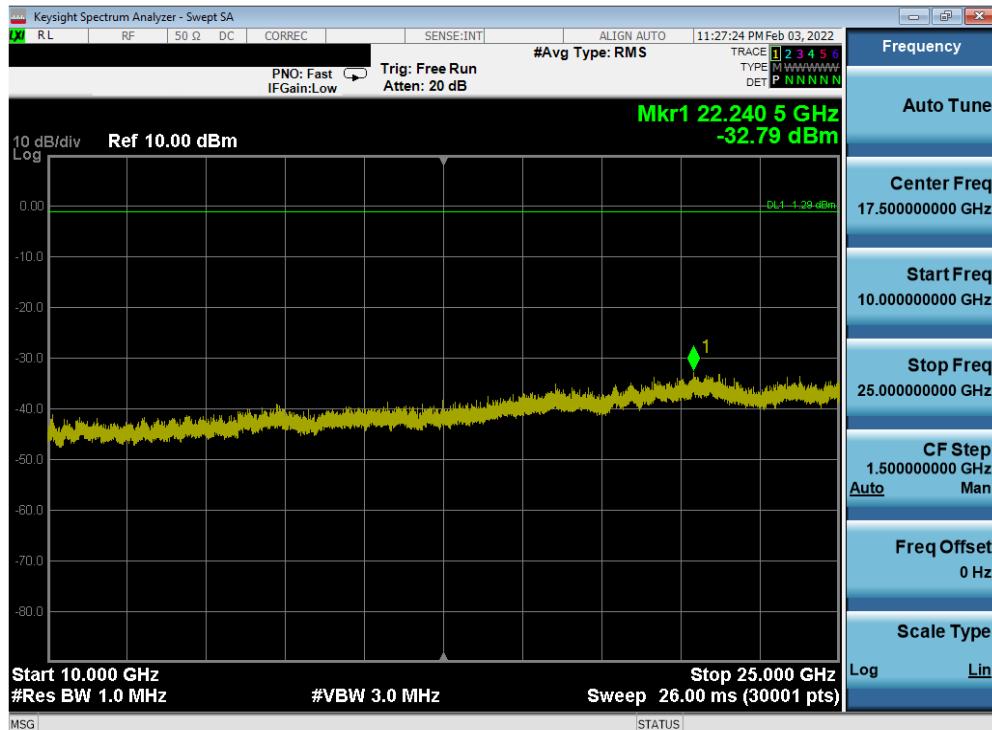


Plot 7-78. Conducted Spurious Plot Antenna WF7b (Bluetooth (LE), 1Mbps, ePA – Ch. 19)

FCC ID: BCGA2588 IC: 579C-A2588	PCTEST Proud to be part of 		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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Plot 7-79. Conducted Spurious Plot Antenna WF7b (Bluetooth (LE), 1Mbps, ePA – Ch. 39)



Plot 7-80. Conducted Spurious Plot Antenna WF7b (Bluetooth (LE), 1Mbps, ePA – Ch. 39)

FCC ID: BCGA2588 IC: 579C-A2588	PCTEST Proud to be part of 		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device		Page 70 of 107

7.7 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 7-13 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 7-13. Radiated Limits

Test Procedures Used

ANSI C63.10-2013 – Subclause 6.6.4.3

KDB 558074 D01 v05r02 – Section 8.6, 8.7

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 = 3MHz
4. Detector = power average (RMS)
5. Number of measurement points = 1001 (Number of points must be $\geq 2 \times$ span/RBW)
6. Sweep time = auto
7. Trace (RMS) averaging was performed over at least 100 traces

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.

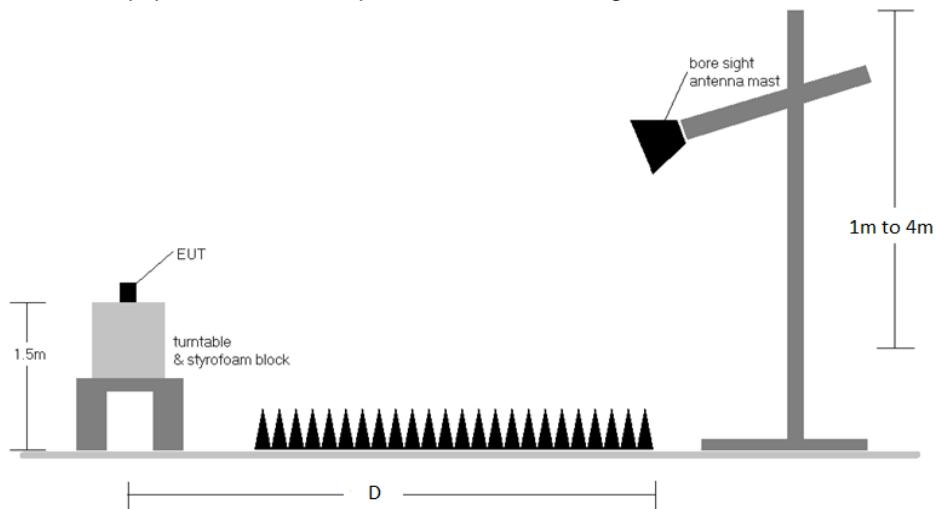


Figure 7-6. Radiated Test Setup >1GHz

Test Notes

1. The optional test procedures for antenna port conducted measurements of unwanted emissions per the guidance of KDB 558074 D01 v05r02 were not used to evaluate this device for compliance to radiated limits. 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 7-13.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. This unit was tested with its standard battery.
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.
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.

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Sample Calculations

Determining Spurious Emissions Levels

- 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 [$\text{dB}_{\mu\text{V/m}}$]

Radiated Band Edge Measurement Offset

- The amplitude offset shown in the radiated restricted band edge plots in Section 7.7.1 was calculated using the formula:

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

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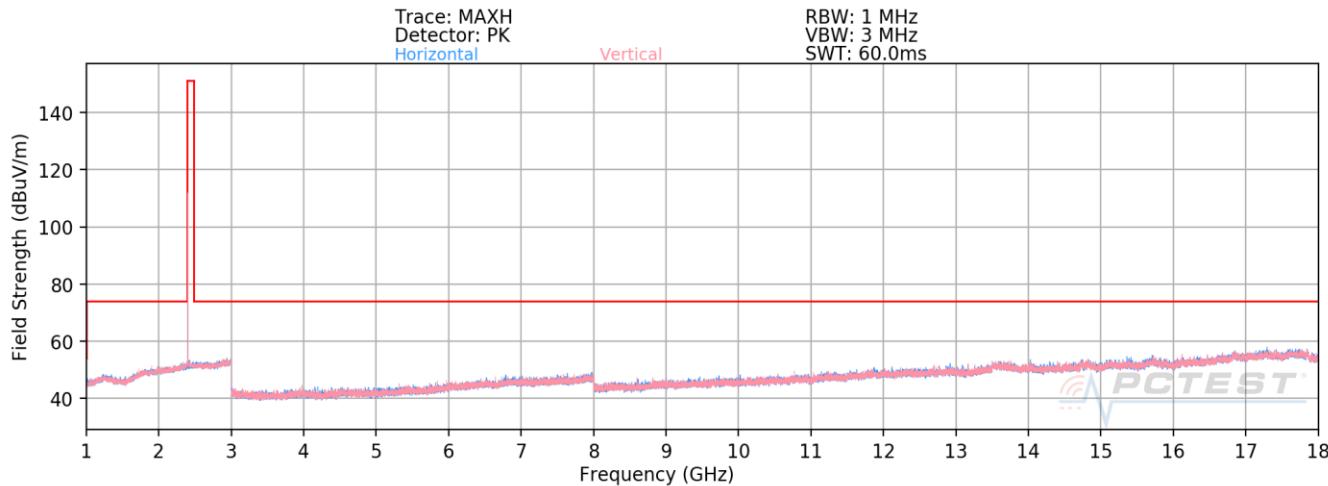
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Radiated Spurious Emission Measurements (1 – 18GHz)

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

Antenna WF8



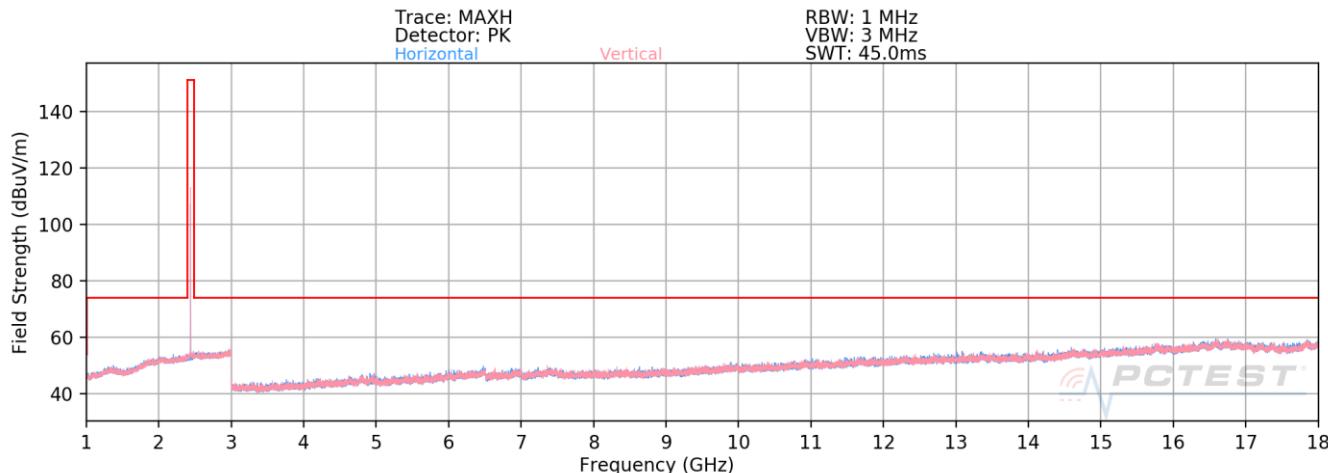
Plot 7-81. Radiated Spurious Emissions 1-18GHz Antenna WF8 (1Mbps, ePA – Ch. 0)

Bluetooth Mode: LE
 Data Rate: 1Mbps
 Power Scheme ePA
 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 [dBuV/m]	Limit [dBuV/m]	Margin [dB]
4804.00	Avg	V	-	-	-80.90	6.41	32.51	53.98	-21.47
4804.00	Peak	V	-	-	-69.93	6.41	43.48	73.98	-30.50
12010.00	Avg	V	-	-	-85.50	18.25	39.75	53.98	-14.23
12010.00	Peak	V	-	-	-73.93	18.25	51.32	73.98	-22.66

Table 7-14. Radiated Measurements Antenna WF8

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Technical Manager
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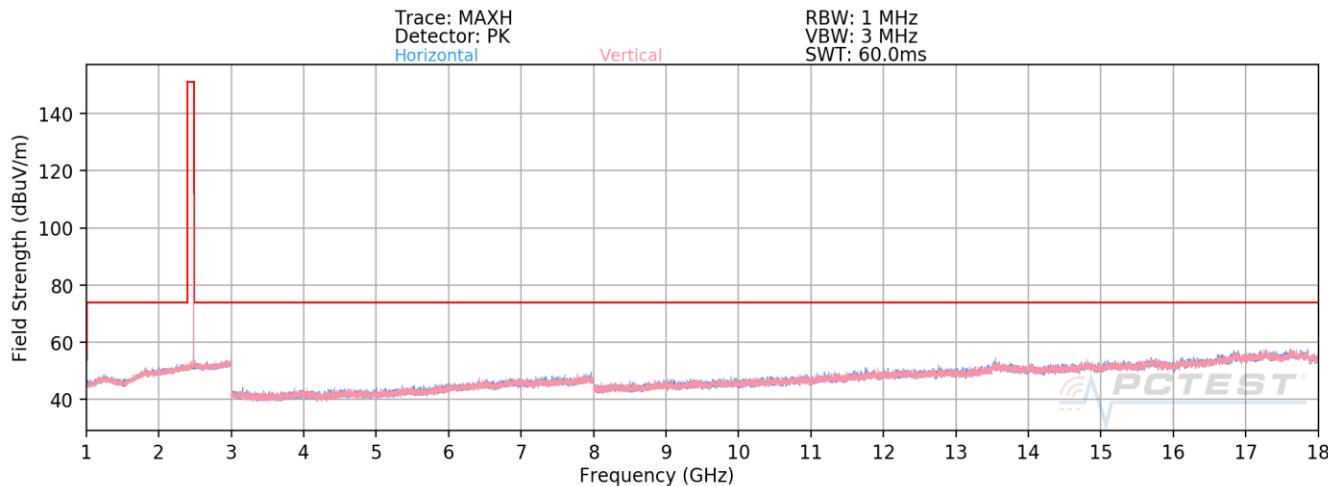
Plot 7-82. Radiated Spurious Emissions 1-18GHz Antenna WF8 (1Mbps, ePA – Ch. 19)

Bluetooth Mode: LE
Data Rate: 1Mbps
Power Scheme ePA
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 [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4880.00	Avg	V	-	-	-79.17	5.94	33.77	53.98	-20.21
4880.00	Peak	V	-	-	-68.10	5.94	44.84	73.98	-29.14
7320.00	Avg	V	-	-	-79.33	9.33	37.00	53.98	-16.98
7320.00	Peak	V	-	-	-68.22	9.33	48.11	73.98	-25.87
12200.00	Avg	V	-	-	-82.98	16.24	40.26	53.98	-13.72
12200.00	Peak	V	-	-	-71.24	16.24	52.00	73.98	-21.98

Table 7-15. Radiated Measurements Antenna WF8

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Technical Manager
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Plot 7-83. Radiated Spurious Emissions 1-18GHz Antenna WF8 (1Mbps ePA – Ch. 39)

Bluetooth Mode:	LE
Data Rate:	1Mbps
Power Scheme	ePA
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 [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4960.00	Avg	V	-	-	-81.26	6.63	32.37	53.98	-21.61
4960.00	Peak	V	-	-	-70.54	6.63	43.09	73.98	-30.89
7440.00	Avg	V	-	-	-82.09	10.48	35.39	53.98	-18.59
7440.00	Peak	V	-	-	-70.93	10.48	46.55	73.98	-27.43
12400.00	Avg	V	-	-	-86.26	17.56	38.30	53.98	-15.68
12400.00	Peak	V	-	-	-75.06	17.56	49.50	73.98	-24.48

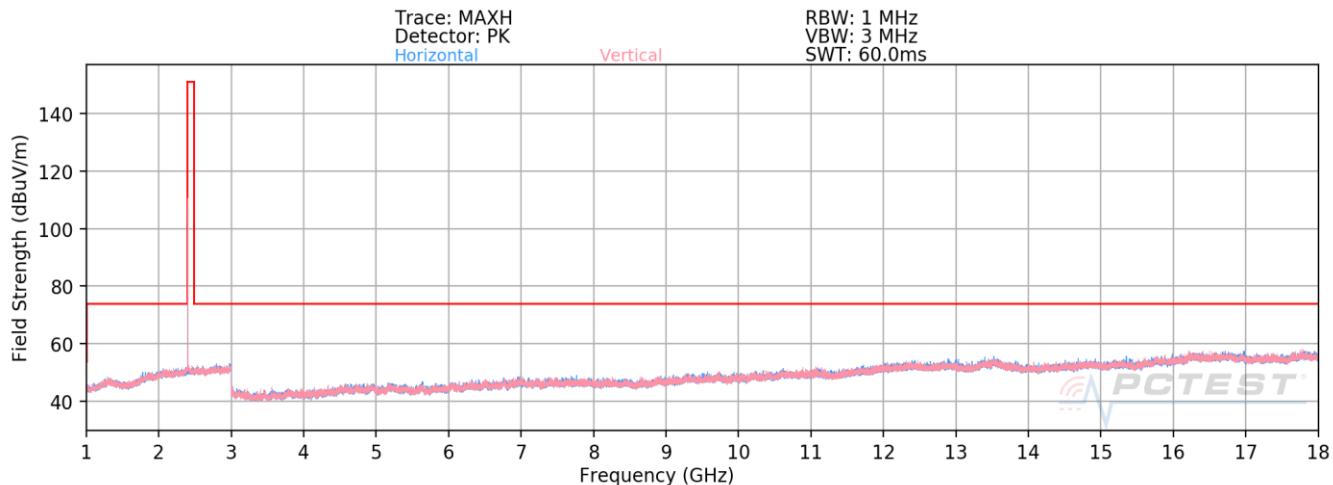
Table 7-16. Radiated Measurements Antenna WF8

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Technical Manager
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Radiated Spurious Emission Measurements (1 – 18GHz)

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

Antenna WF7b



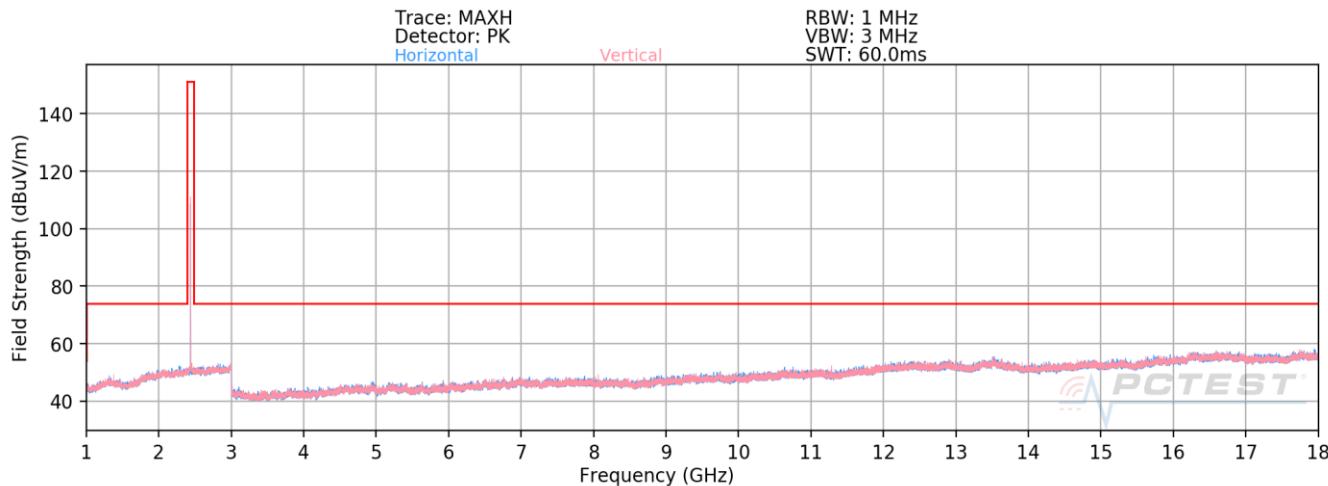
Plot 7-84. Radiated Spurious Emissions 1-18GHz Antenna WF7b (1Mbps, ePA – Ch. 0)

Bluetooth Mode: LE
Data Rate: 1Mbps
Power Scheme ePA
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 [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4804.00	Avg	V	-	-	-81.56	6.41	31.85	53.98	-22.13
4804.00	Peak	V	-	-	-69.74	6.41	43.67	73.98	-30.31
12010.00	Avg	V	-	-	-84.30	18.25	40.95	53.98	-13.03
12010.00	Peak	V	-	-	-72.40	18.25	52.85	73.98	-21.13

Table 7-17. Radiated Measurements Antenna WF7b

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Technical Manager
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Plot 7-85. Radiated Spurious Emissions 1-18GHz Antenna WF7b (1Mbps, ePA – Ch. 19)

Bluetooth Mode: LE
Data Rate: 1Mbps
Power Scheme ePA
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 [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4880.00	Avg	V	-	-	-81.50	7.00	32.50	53.98	-21.48
4880.00	Peak	V	-	-	-70.18	7.00	43.82	73.98	-30.16
7320.00	Avg	V	-	-	-83.04	10.33	34.29	53.98	-19.68
7320.00	Peak	V	-	-	-70.90	10.33	46.43	73.98	-27.54
12200.00	Avg	V	-	-	-83.67	17.56	40.89	53.98	-13.09
12200.00	Peak	V	-	-	-72.12	17.56	52.44	73.98	-21.54

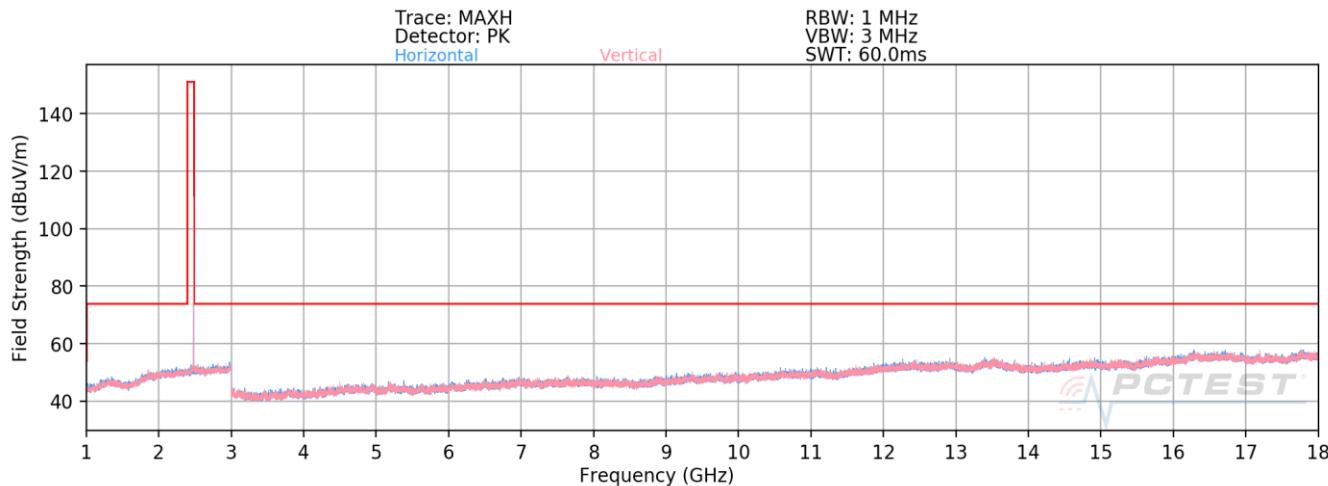
Table 7-18. Radiated Measurements Antenna WF7b

FCC ID: BCGA2588 IC: 579C-A2588	 PCTEST® Proud to be part of 			MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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Plot 7-86. Radiated Spurious Emissions 1-18GHz Antenna WF7b (1Mbps ePA – Ch. 39)

Bluetooth Mode:	LE
Data Rate:	1Mbps
Power Scheme	ePA
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 [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4960.00	Avg	V	-	-	-81.50	6.63	32.13	53.98	-21.85
4960.00	Peak	V	-	-	-70.45	6.63	43.18	73.98	-30.80
7440.00	Avg	V	-	-	-82.75	10.48	34.73	53.98	-19.25
7440.00	Peak	V	-	-	-71.48	10.48	46.00	73.98	-27.98
12400.00	Avg	V	-	-	-84.01	17.56	40.55	53.98	-13.43
12400.00	Peak	V	-	-	-72.21	17.56	52.35	73.98	-21.63

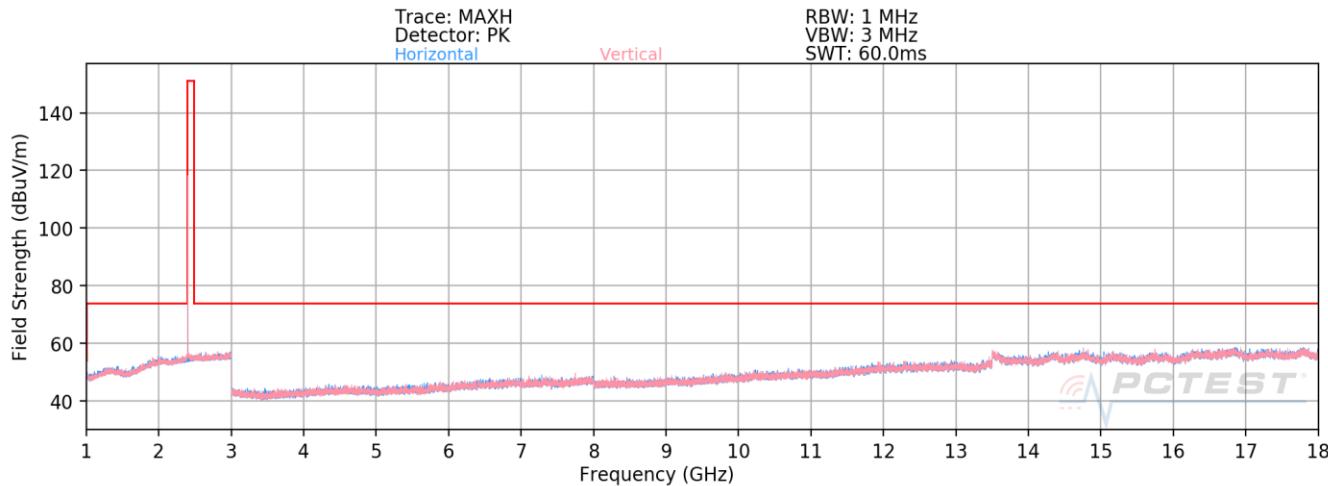
Table 7-19. Radiated Measurements Antenna WF7b

FCC ID: BCGA2588 IC: 579C-A2588	PCTEST Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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Radiated Spurious Emission Measurements (1-18GHz)

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

TxBF



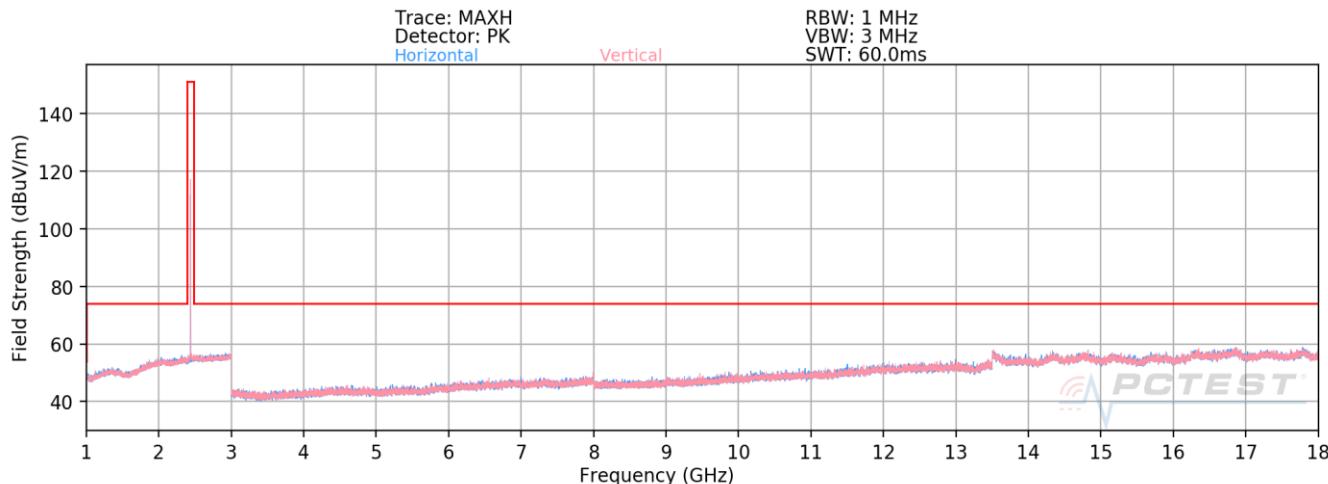
Plot 7-87. Radiated Spurious Emissions 1-18GHz TxBF (1Mbps, ePA – Ch. 0)

Bluetooth Mode: LE
 Data Rate: 1Mbps
 Power Scheme ePA
 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 [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4804.00	Avg	V	-	-	-77.96	5.01	34.05	53.98	-19.93
4804.00	Peak	V	-	-	-66.43	5.01	45.58	73.98	-28.40
12010.00	Avg	V	-	-	-84.49	17.67	40.18	53.98	-13.80
12010.00	Peak	V	-	-	-73.25	17.67	51.42	73.98	-22.56

Table 7-20. Radiated Measurements TxBF

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Technical Manager
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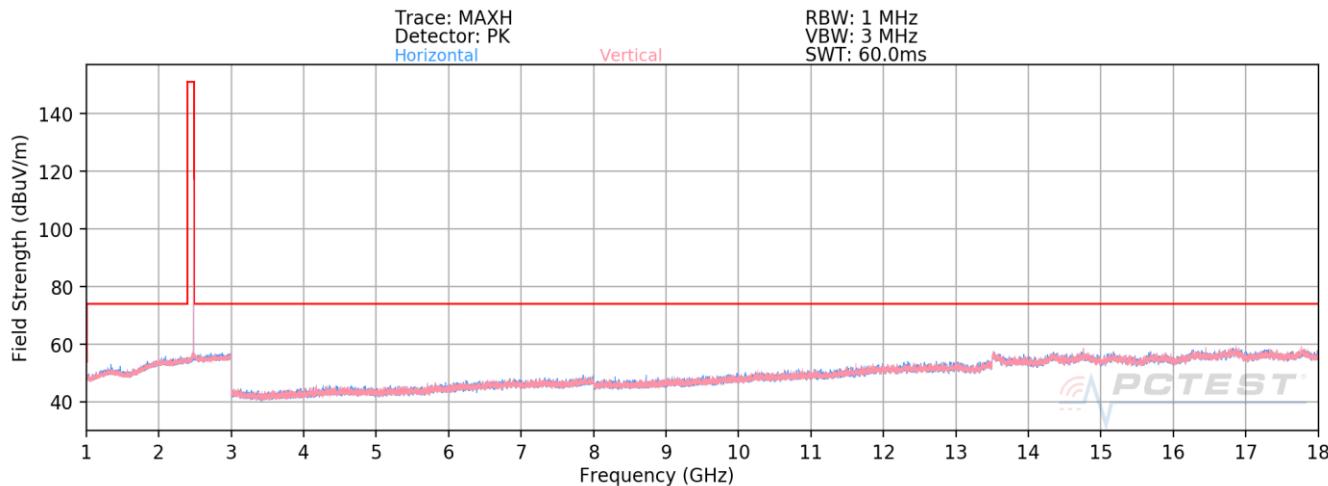
Plot 7-88. Radiated Spurious Emissions 1-18GHz TxBF (1Mbps, ePA – Ch. 19)

Bluetooth Mode: LE
Data Rate: 1Mbps
Power Scheme ePA
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 [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4880.00	Avg	V	-	-	-79.04	5.94	33.90	53.98	-20.08
4880.00	Peak	V	-	-	-68.13	5.94	44.81	73.98	-29.17
7320.00	Avg	V	291	188	-78.35	9.33	37.98	53.98	-16.00
7320.00	Peak	V	291	188	-67.48	9.33	49.06	73.98	-24.92
12200.00	Avg	V	-	-	-82.26	16.24	40.98	53.98	-13.00
12200.00	Peak	V	-	-	-71.21	16.24	52.03	73.98	-21.95

Table 7-21. Radiated Measurements TxBF

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device	Page 81 of 107	



Plot 7-89. Radiated Spurious Emissions 1-18GHz TxBF (1Mbps ePA – Ch. 39)

Bluetooth Mode: LE
Data Rate: 1Mbps
Power Scheme ePA
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 [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4960.00	Avg	V	-	-	-77.64	4.85	34.21	53.98	-19.77
4960.00	Peak	V	-	-	-66.75	4.85	45.10	73.98	-28.88
7440.00	Avg	V	248	199	-78.42	9.20	37.78	53.98	-16.20
7440.00	Peak	V	248	199	-68.82	9.20	47.38	73.98	-26.60
12400.00	Avg	V	-	-	-84.46	18.15	40.69	53.98	-13.29
12400.00	Peak	V	-	-	-73.65	18.15	51.50	73.98	-22.48

Table 7-22. Radiated Measurements TxBF

FCC ID: BCGA2588 IC: 579C-A2588	 PCTEST® Proud to be part of 			MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device			

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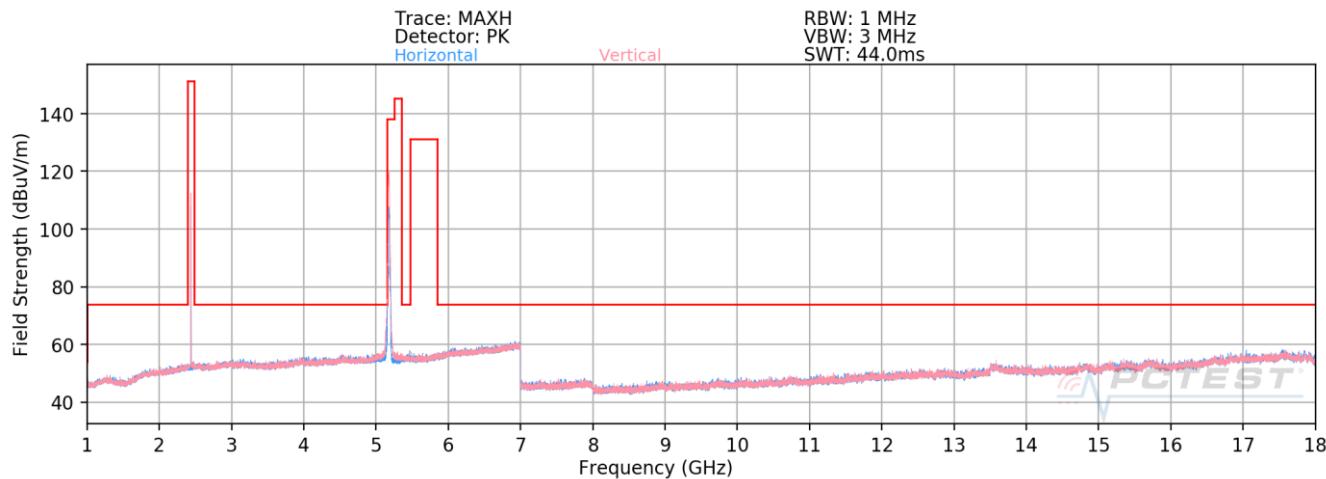
V 10.5 12/15/2021

Simultaneous Tx Radiated Spurious Emission Measurements (1 – 18GHz)

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

Description	Bluetooth	UNII
Antenna	Antenna WF8	Antenna WF8
Channel	19	36
Operating Frequency (MHz)	2440	5180
Data Rate (Mbps)	1.0	MCS0
Mode/Modulation	LE1M ePA	11n

Table 7-23. Worst Case Simultaneous Transmission Configuration



Plot 7-90. Radiated Spurious Emissions above 1GHz Simultaneous Tx

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]
4880.00	Avg	V	-	-	-81.81	16.82	42.01	53.98	-11.97
4880.00	Peak	V	-	-	-68.51	16.82	55.31	73.98	-18.67
7320.00	Avg	V	-	-	-82.75	11.13	35.38	53.98	-18.60
7320.00	Peak	V	-	-	-70.26	11.13	47.87	73.98	-26.11
12200.00	Avg	V	-	-	-86.00	18.08	39.08	53.98	-14.90
12200.00	Peak	V	-	-	-73.07	18.08	52.01	73.98	-21.97

Table 7-24. BT Harmonic Emissions Measurements in Simultaneous Transmission Mode

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]
10360.00	Peak	V	-	-	-72.37	14.47	49.10	68.20	-19.10
15540.00	Avg	V	-	-	-86.95	21.47	41.52	53.98	-12.46
15540.00	Peak	V	-	-	-74.03	21.47	54.44	73.98	-19.54

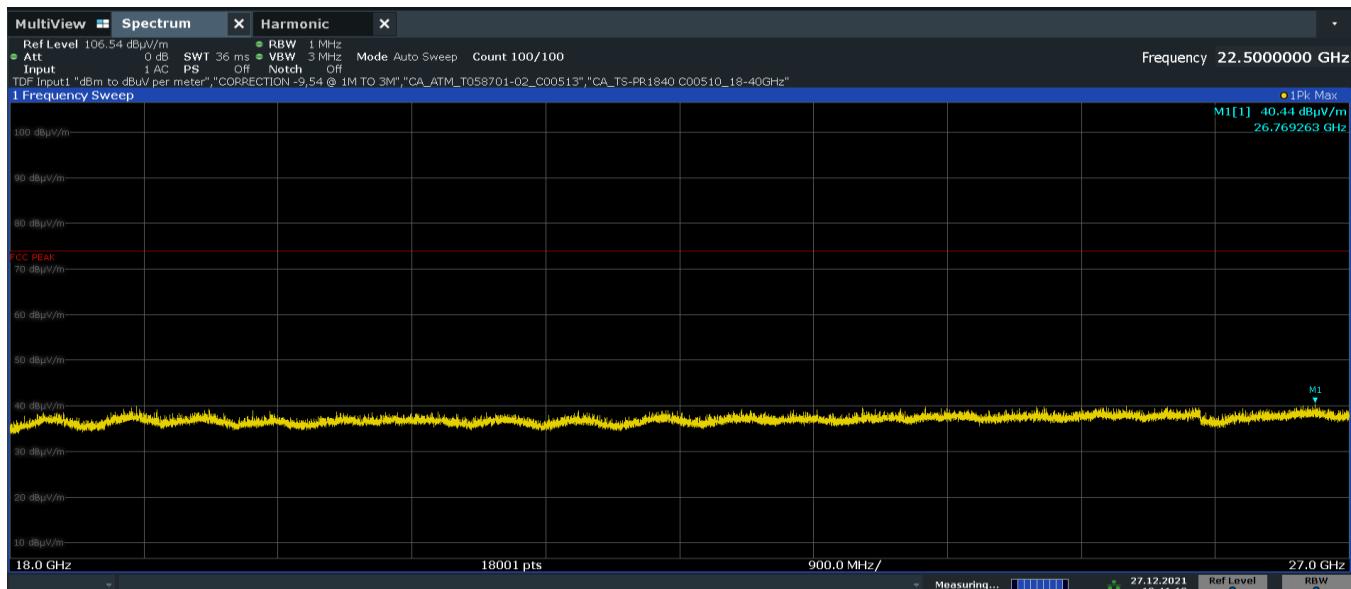
Table 7-25. UNII Harmonic Emissions Measurements in Simultaneous Transmission Mode

FCC ID: BCGA2588 IC: 579C-A2588	 PCTEST® Proud to be part of 					MEASUREMENT REPORT (CERTIFICATION)			Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022					EUT Type: Tablet Device			Page 83 of 107

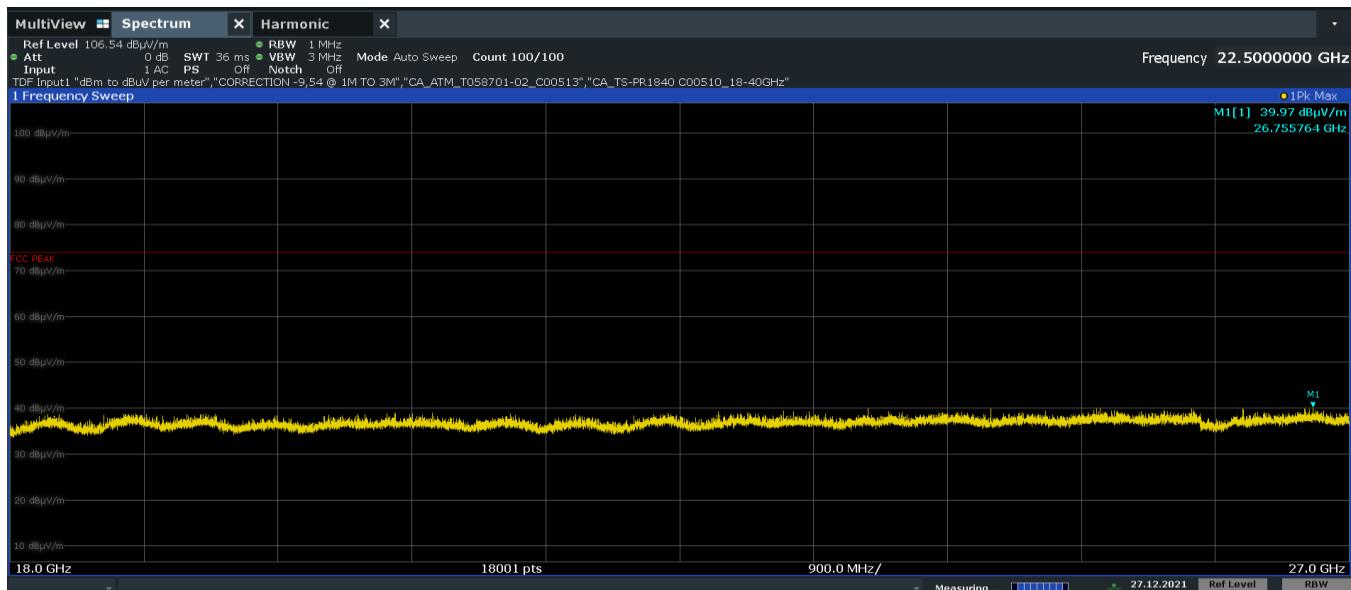
Radiated Spurious Emissions Measurements (Above 18GHz)

§15.209; RSS-Gen [8.9]

TxBF



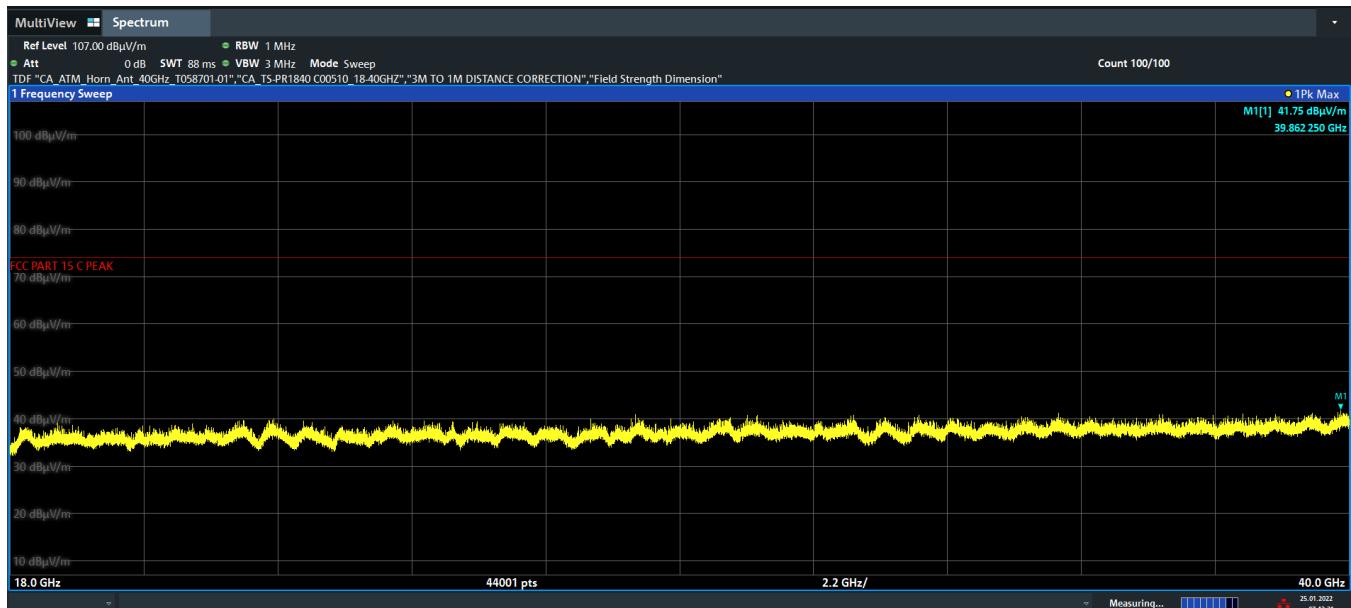
Plot 7-91. Radiated Spurious Emissions Above 18GHz TxBF (1Mbps, ePA – Ch. 39, Pol. H)



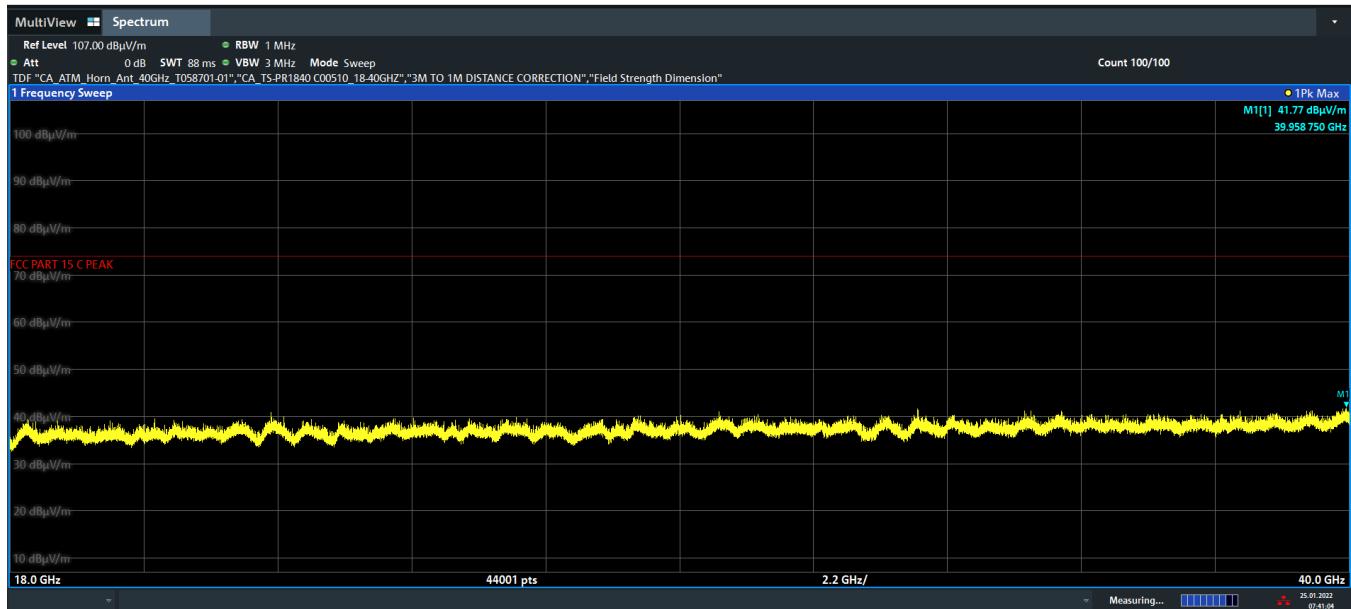
Plot 7-92. Radiated Spurious Emissions Above 18GHz TxBF (1Mbps, ePA – Ch. 39, Pol. V)

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device	Page 84 of 107

Simultaneous Tx



Plot 7-93. Radiated Spurious Emissions Above 18GHz – Simultaneous Tx (1Mbps, ePA – Ch. 39, UNII 11n – Ch. 36, Pol. H)



Plot 7-94. Radiated Spurious Emissions Above 18GHz – Simultaneous Tx (1Mbps, ePA – Ch. 39, UNII 11n – Ch. 36, Pol. V)

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device	Page 85 of 107

7.7.1 Radiated Restricted Band Edge Measurements

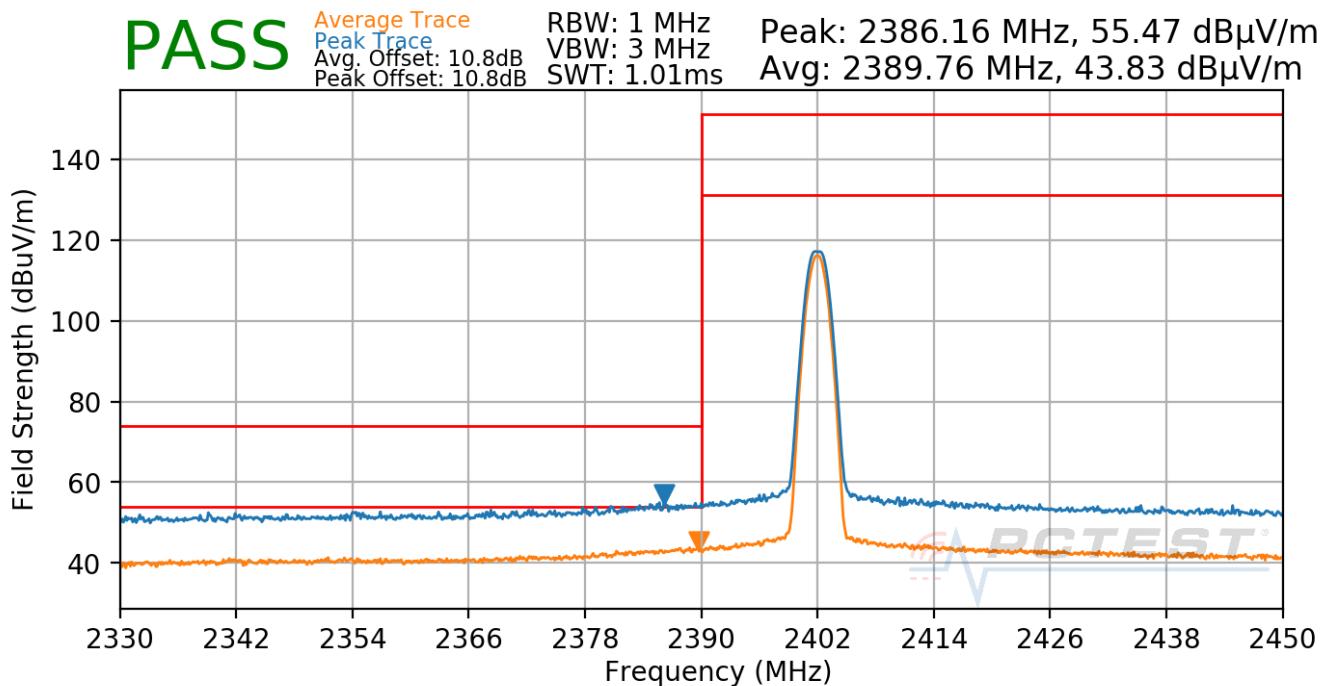
§15.205 §15.209; RSS-Gen [8.9]

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

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

Antenna WF8

Bluetooth Mode:	LE
Data Rate:	1Mbps
Power Scheme:	ePA
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0



Plot 7-95. Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Average & Peak)

FCC ID: BCGA2588 IC: 579C-A2588	 PCTEST® Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device	Page 86 of 107

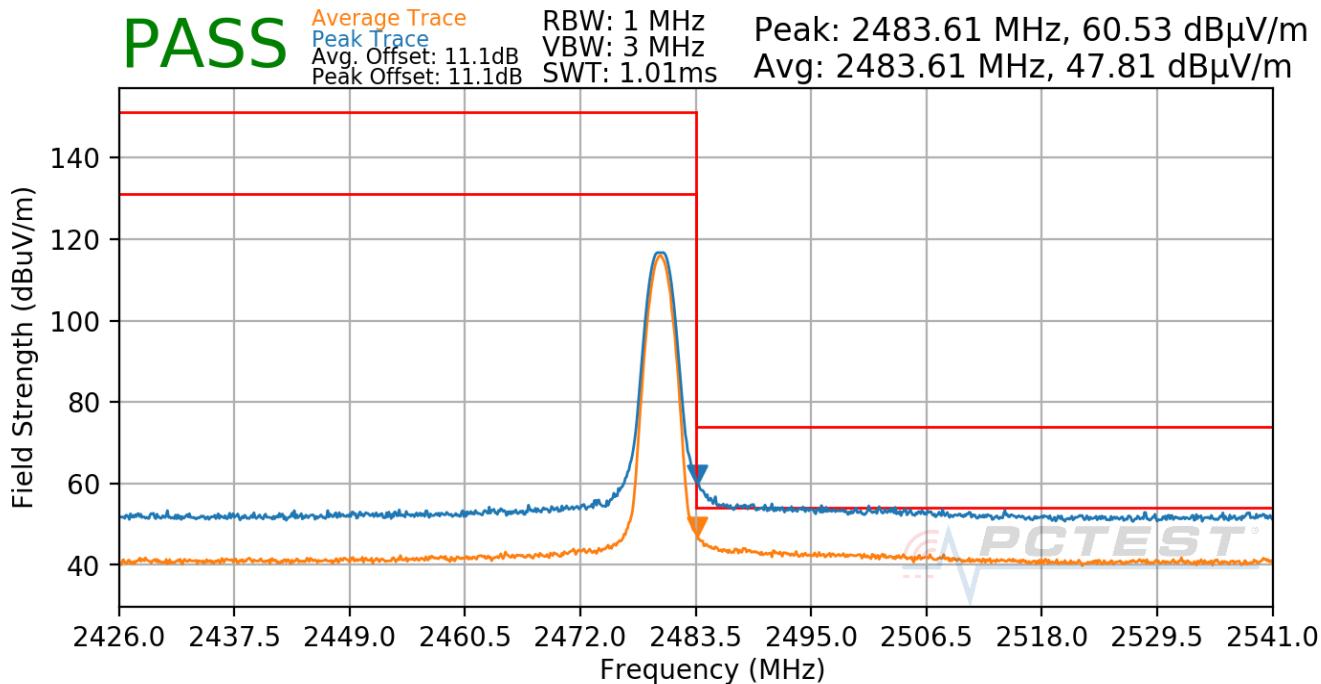
Radiated Restricted Band Edge Measurements

§15.205 §15.209; 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

Bluetooth Mode:	LE
Data Rate:	1Mbps
Power Scheme:	ePA
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	39



Plot 7-96. Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Average & Peak)

FCC ID: BCGA2588 IC: 579C-A2588	 PCTEST® Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device	Page 87 of 107

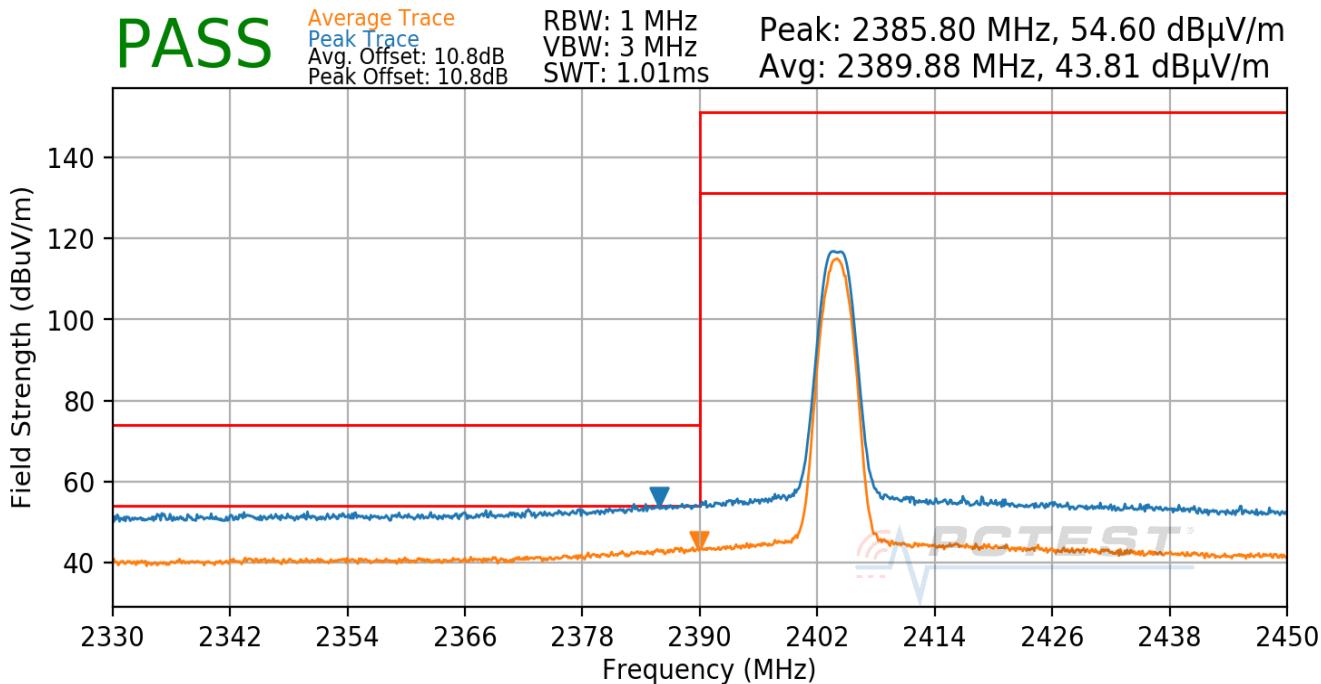
Radiated Restricted Band Edge Measurements

§15.205 §15.209; 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

Bluetooth Mode: LE
 Data Rate: 2Mbps
 Power Scheme: ePA
 Measurement Distance: 3 Meters
 Operating Frequency: 2404MHz
 Channel: 1



Plot 7-97. Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Average & Peak)

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022 EUT Type: Tablet Device	Page 88 of 107

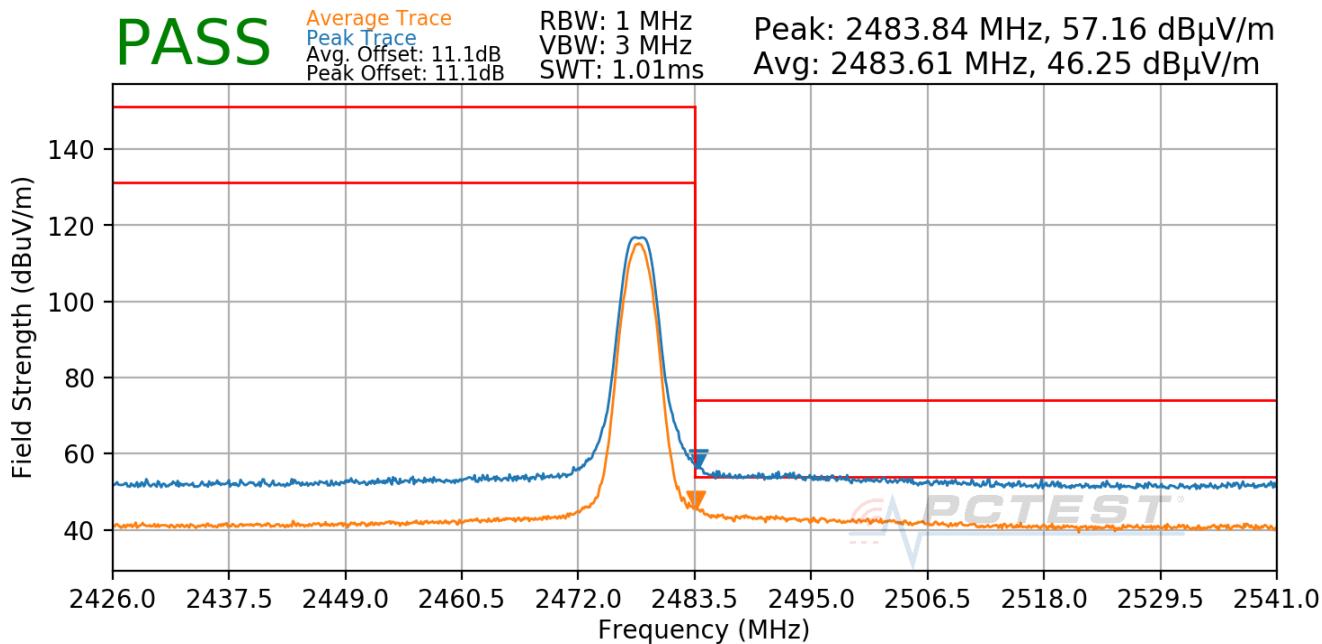
Radiated Restricted Band Edge Measurements

§15.205 §15.209; 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

Bluetooth Mode:	LE
Data Rate:	2Mbps
Power Scheme:	ePA
Measurement Distance:	3 Meters
Operating Frequency:	2478MHz
Channel:	38



Plot 7-98. Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Average & Peak)

FCC ID: BCGA2588 IC: 579C-A2588	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device	Page 89 of 107

Radiated Restricted Band Edge Measurements

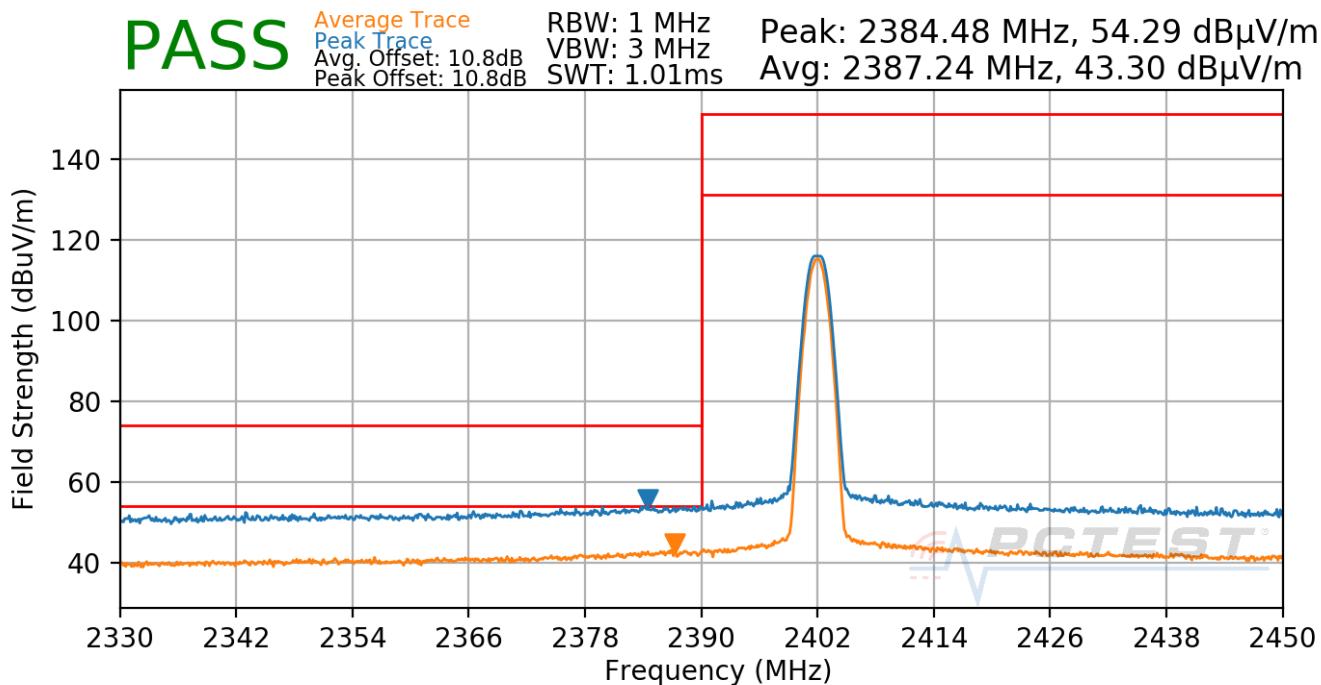
§15.205 §15.209; RSS-Gen [8.9]

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

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

Antenna WF7b

Bluetooth Mode:	LE _____
Data Rate:	1Mbps _____
Power Scheme:	ePA _____
Measurement Distance:	3 Meters _____
Operating Frequency:	2402MHz _____
Channel:	0 _____



Plot 7-99. Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Average & Peak)

FCC ID: BCGA2588 IC: 579C-A2588	 PCTEST® Proud to be part of 		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device		Page 90 of 107

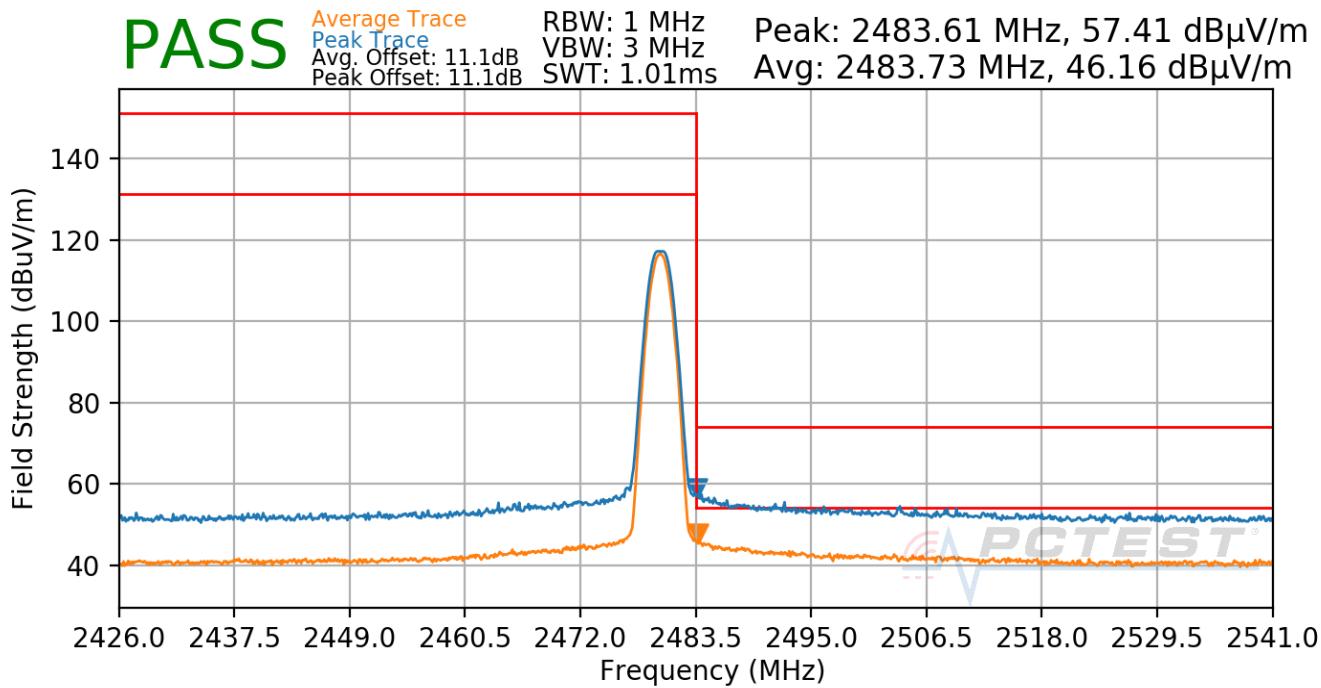
Radiated Restricted Band Edge Measurements

§15.205 §15.209; RSS-Gen [8.9]

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

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

Bluetooth Mode: LE
 Data Rate: 1Mbps
 Power Scheme: ePA
 Measurement Distance: 3 Meters
 Operating Frequency: 2480MHz
 Channel: 39



Plot 7-100. Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Average & Peak)

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device	Page 91 of 107

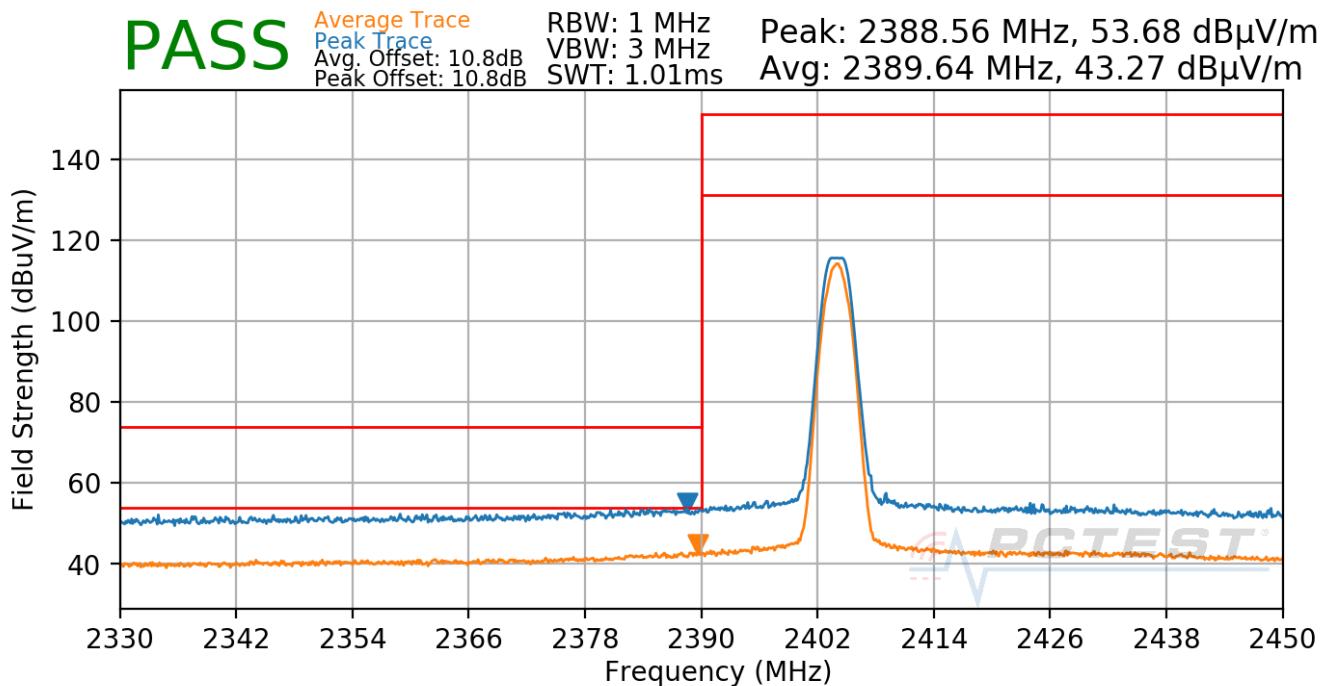
Radiated Restricted Band Edge Measurements

§15.205 §15.209; 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

Bluetooth Mode: LE
 Data Rate: 2Mbps
 Power Scheme: ePA
 Measurement Distance: 3 Meters
 Operating Frequency: 2404MHz
 Channel: 1



Plot 7-101. Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Average & Peak)

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device	Page 92 of 107

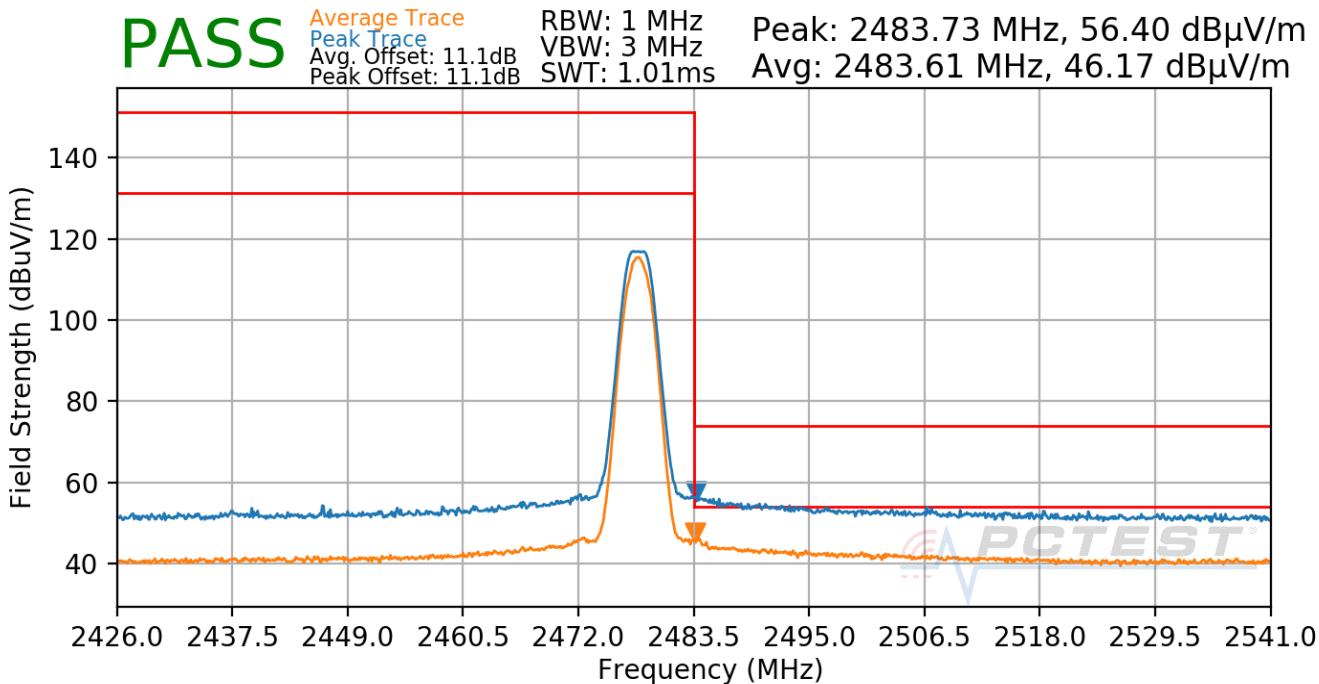
Radiated Restricted Band Edge Measurements

§15.205 §15.209; 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

Bluetooth Mode: LE
 Data Rate: 2Mbps
 Power Scheme: ePA
 Measurement Distance: 3 Meters
 Operating Frequency: 2478MHz
 Channel: 38



Plot 7-102. Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Average & Peak)

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device	Page 93 of 107

Radiated Restricted Band Edge Measurements

§15.205 §15.209; RSS-Gen [8.9]

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

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

TxBF

Bluetooth Mode:	LE
Data Rate:	1Mbps
Power Scheme:	ePA
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0

PASS

Average Trace

Peak Trace

Avg. Offset: 10.8dB
Peak Offset: 10.8dB

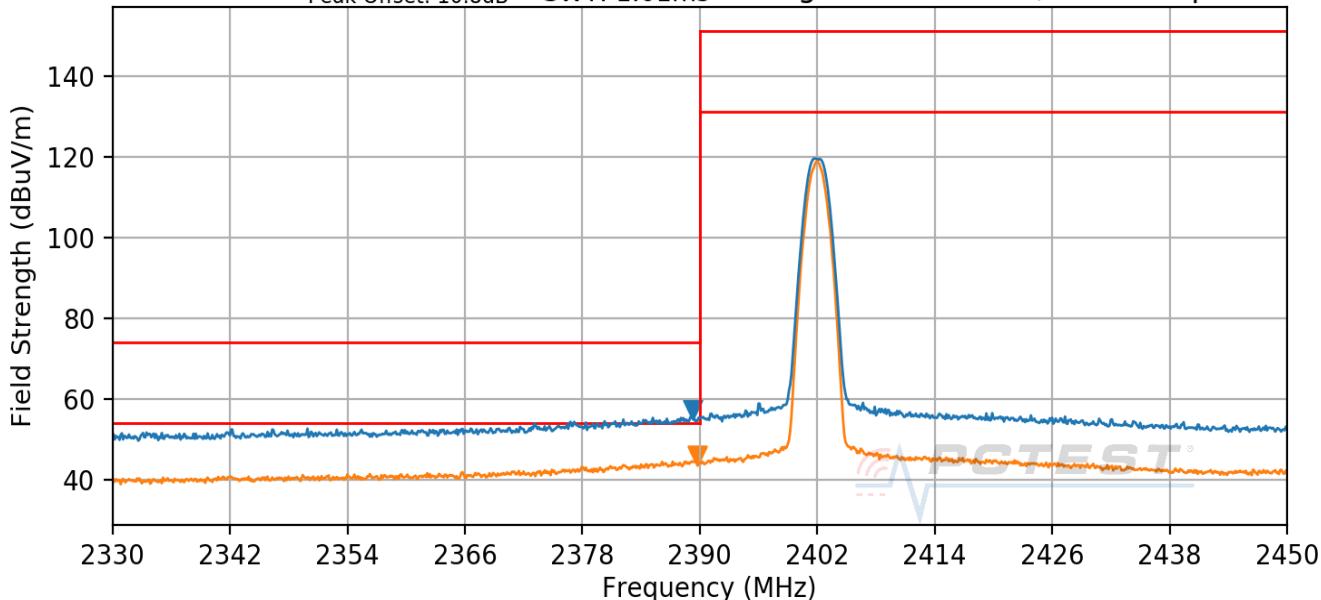
RBW: 1 MHz

VBW: 3 MHz

SWT: 1.01ms

Peak: 2389.28 MHz, 55.81 dB μ V/m

Avg: 2389.76 MHz, 44.42 dB μ V/m



Plot 7-103. Radiated Restricted Lower Band Edge Measurement TxBF (Average & Peak)

FCC ID: BCGA2588 IC: 579C-A2588	 PCTEST® Proud to be part of 		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device		Page 94 of 107

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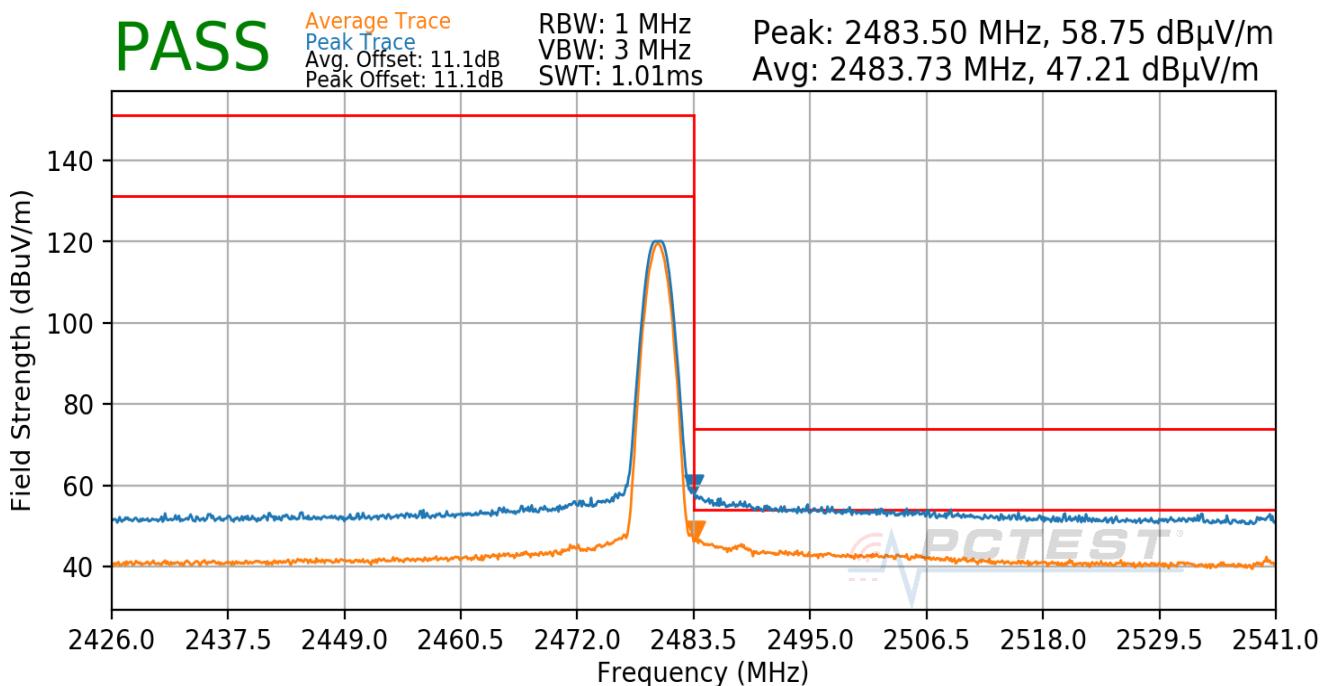
Radiated Restricted Band Edge Measurements

§15.205 §15.209; 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

Bluetooth Mode:	LE
Data Rate:	1Mbps
Power Scheme:	ePA
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	39



Plot 7-104. Radiated Restricted Upper Band Edge Measurement TxBF (Average & Peak)

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device	Page 95 of 107

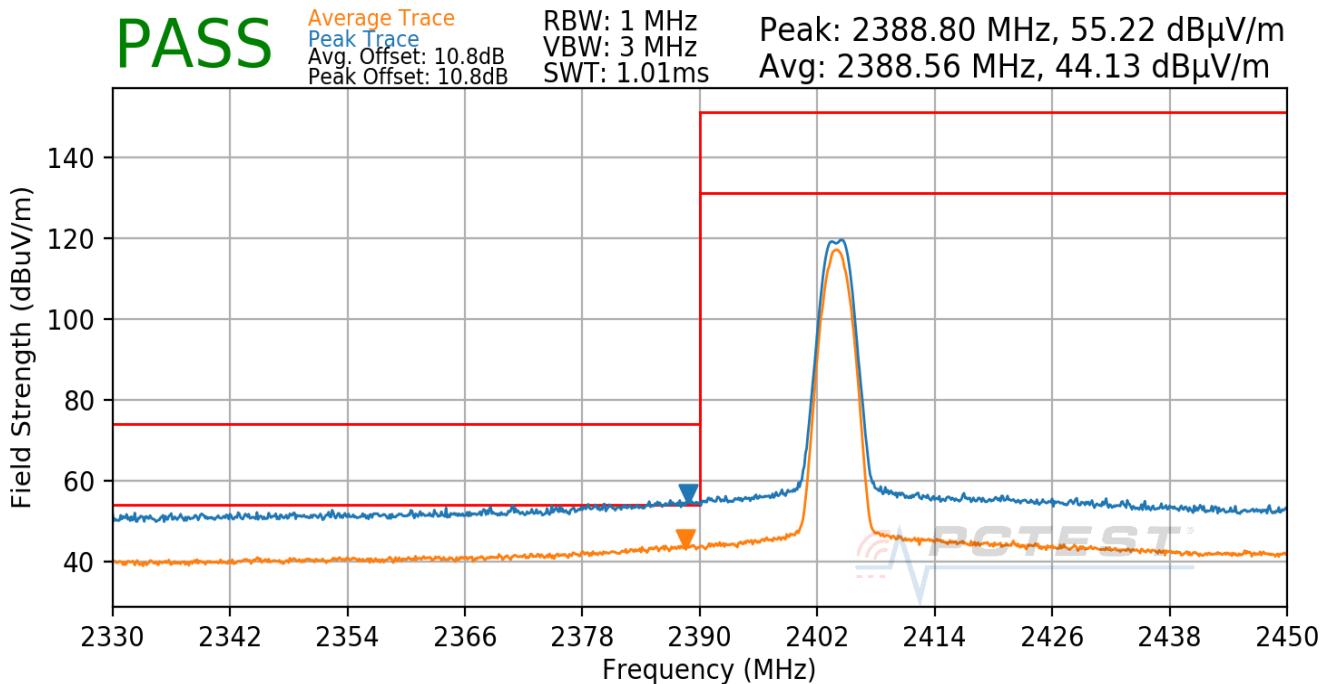
Radiated Restricted Band Edge Measurements

§15.205 §15.209; 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

Bluetooth Mode: LE
Data Rate: 2Mbps
Power Scheme: ePA
Measurement Distance: 3 Meters
Operating Frequency: 2404MHz
Channel: 1



Plot 7-105. Radiated Restricted Lower Band Edge Measurement TxBF (Average & Peak)

FCC ID: BCGA2588 IC: 579C-A2588	 PCTEST® Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2111150078-04.BCG	Test Dates: 12/02/2021 - 02/04/2022	EUT Type: Tablet Device	Page 96 of 107

Radiated Restricted Band Edge Measurements

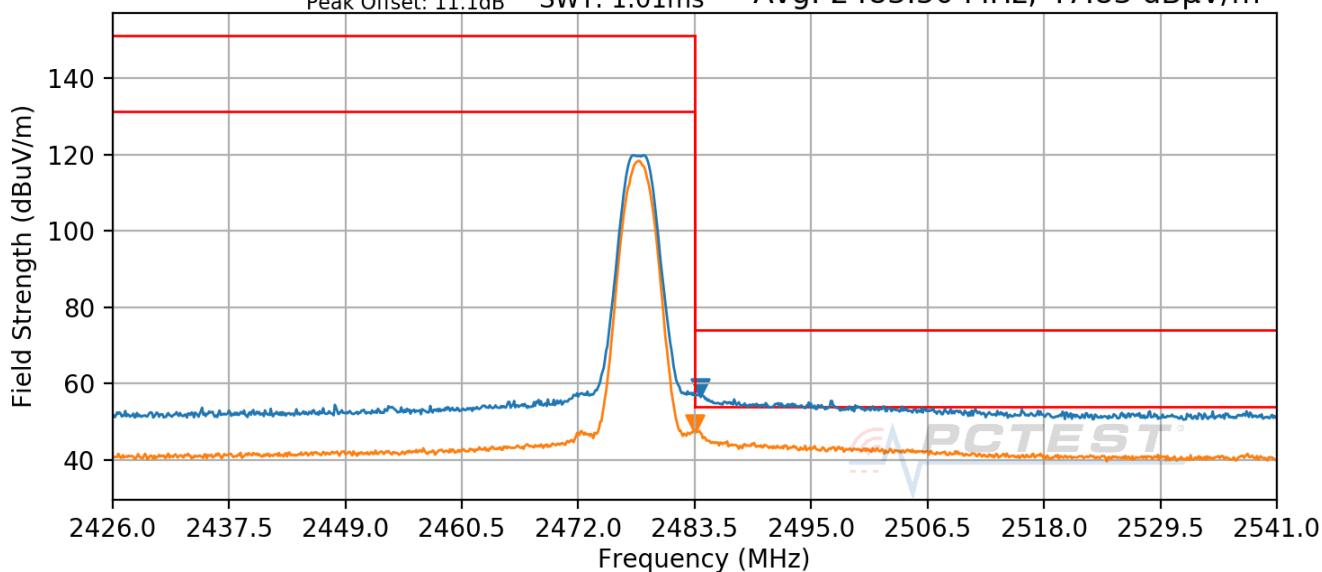
§15.205 §15.209; RSS-Gen [8.9]

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

Bluetooth Mode: LE
Data Rate: 2Mbps
Power Scheme: ePA
Measurement Distance: 3 Meters
Operating Frequency: 2478MHz
Channel: 38

PASS Average Trace Peak Trace
Avg. Offset: 11.1dB RBW: 1 MHz
Peak Offset: 11.1dB VBW: 3 MHz
 SWT: 1.01ms Peak: 2484.07 MHz, 57.29 dB μ V/m
 Avg: 2483.50 MHz, 47.83 dB μ V/m



Plot 7-106. Radiated Restricted Upper Band Edge Measurement Tx BF (Average & Peak)

FCC ID: BCGA2588 IC: 579C-A2588	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
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7.8 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 7-26 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 7-26. 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

FCC ID: BCGA2588 IC: 579C-A2588	 PCTEST® Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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Test Setup

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

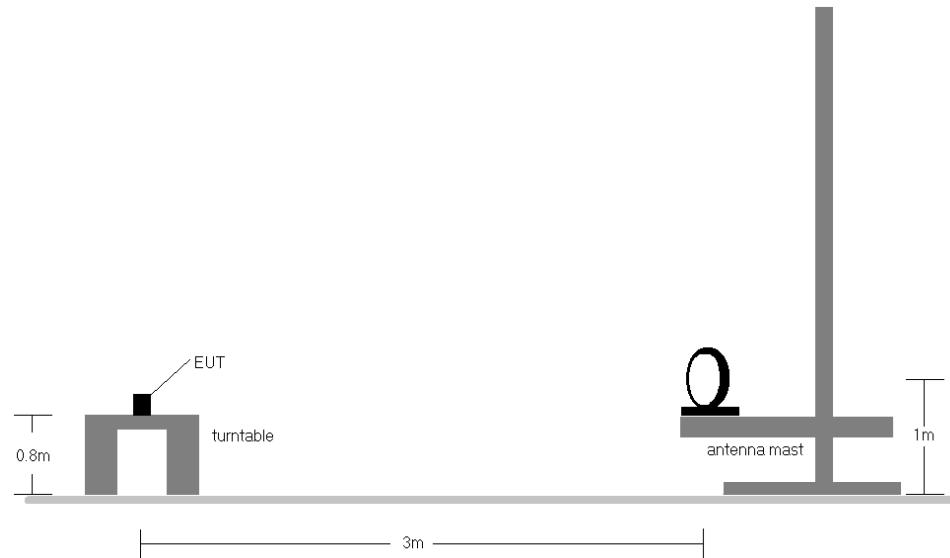


Figure 7-7. Radiated Test Setup < 30MHz

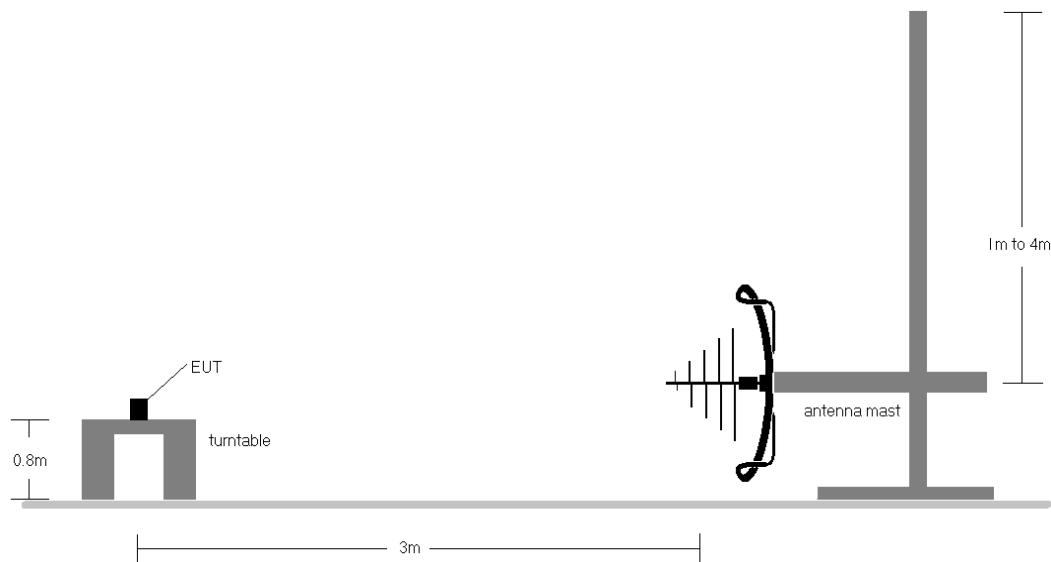


Figure 7-8. Radiated Test Setup < 1GHz

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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 7-26.
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. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.
10. All supported modulation, antenna (including TxBF mode) and power schemes have been tested on the unit and only worst case configuration is reported.
11. 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

Sample Calculations

Determining Spurious Emissions Levels

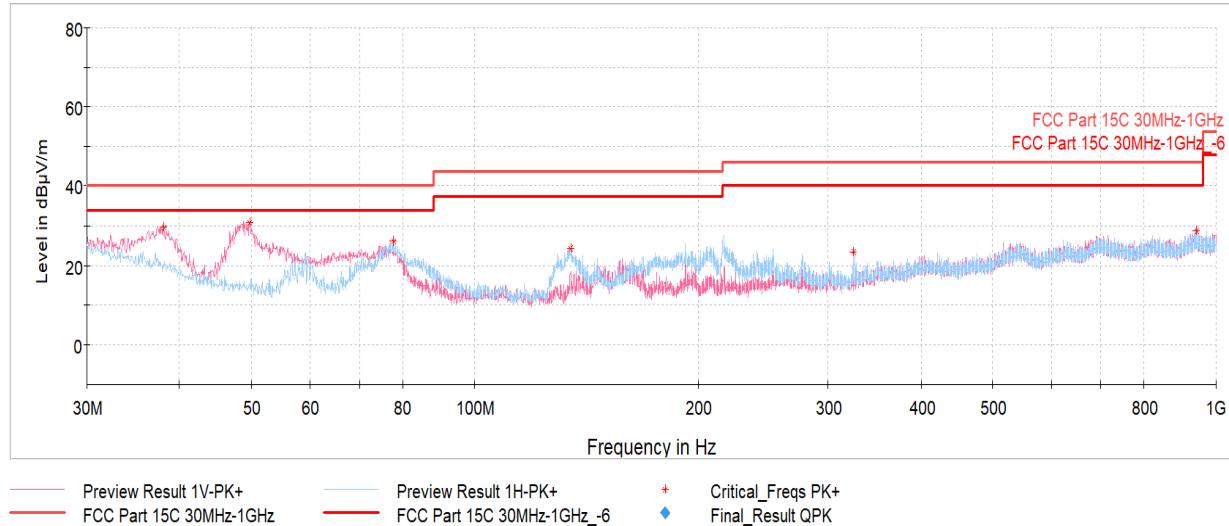
- Field Strength Level $[\text{dB}_{\mu\text{V/m}}]$ = Analyzer Level $[\text{dBm}]$ + 107 + AFCL $[\text{dB}/\text{m}]$
- AFCL $[\text{dB}/\text{m}]$ = Antenna Factor $[\text{dB}/\text{m}]$ + Cable Loss $[\text{dB}]$ – Preamplifier Gain $[\text{dB}]$
- Margin $[\text{dB}]$ = Field Strength Level $[\text{dB}_{\mu\text{V/m}}]$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

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Radiated Spurious Emissions Measurements (Below 1GHz)

§15.209; RSS-Gen [8.9]

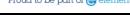
TxBF



Plot 7-107. Radiated Spurious Emissions Below 1GHz TxBF (1Mbps, ePA – Ch.19, Pol. H & V, 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]
38.05	Max Peak	V	100	44	-61.82	-15.71	29.47	40.00	-10.53
49.69	Max Peak	V	100	15	-55.82	-20.48	30.70	40.00	-9.30
77.68	Max Peak	H	300	139	-60.76	-20.30	25.94	40.00	-14.06
135.05	Max Peak	H	100	250	-64.89	-17.91	24.20	43.52	-19.32
324.59	Max Peak	H	100	320	-71.40	-12.21	23.39	46.02	-22.63
942.33	Max Peak	V	300	280	-78.55	0.10	28.55	46.02	-17.47

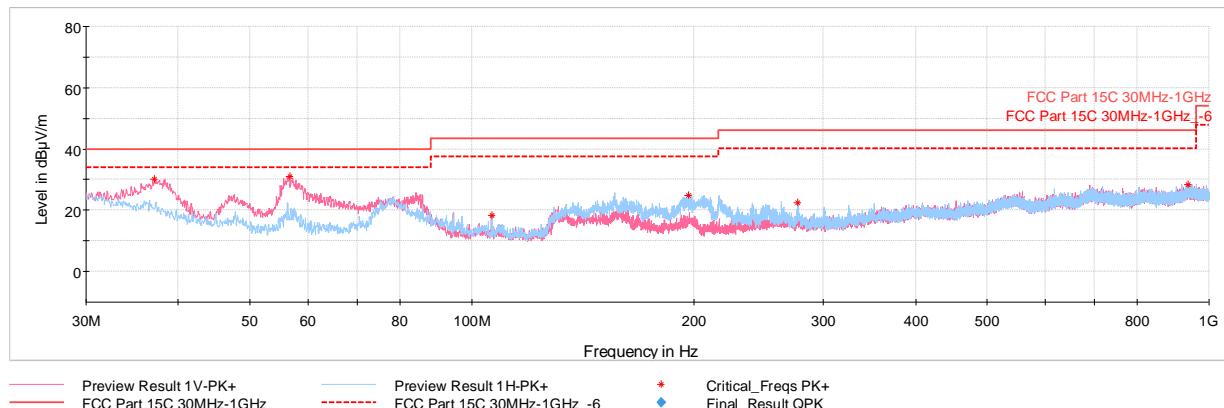
Table 7-27. Radiated Spurious Emissions Below 1GHz TxBF (1Mbps, ePA – Ch.19, Pol. H & V, with AC/DC Adapter)

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Simultaneous Tx Radiated Spurious Emission Measurements (Below 1GHz) [§15.209; RSS-Gen \[8.9\]](#)

Description	Bluetooth	UNII
Antenna	Antenna WF8	Antenna WF8
Channel	19	36
Operating Frequency (MHz)	2440	5180
Data Rate (Mbps)	1.0	MCS0
Mode/Modulation	LE1M ePA	11n

Table 7-28. Worst Case Simultaneous Transmission Configuration



Plot 7-108. Radiated Spurious Emissions below 1GHz Simultaneous Transmission (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]
37.13	Max Peak	V	100	233	-62.05	-14.95	30.00	40.00	-10.00
56.68	Max Peak	V	100	193	-55.06	-21.04	30.90	40.00	-9.10
106.44	Max Peak	V	100	296	-68.65	-19.93	18.42	43.52	-25.10
197.08	Max Peak	H	100	118	-65.68	-16.51	24.81	43.52	-18.71
277.11	Max Peak	H	100	292	-71.69	-12.91	22.40	46.02	-23.62
935.88	Max Peak	V	100	13	-78.80	0.18	28.38	46.02	-17.64

Table 7-29. Radiated Spurious Emissions Simultaneous Transmission below 1GHz (with AC/DC adapter)

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7.9 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 7-30. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10-2013, Subclause 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

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Test Setup

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

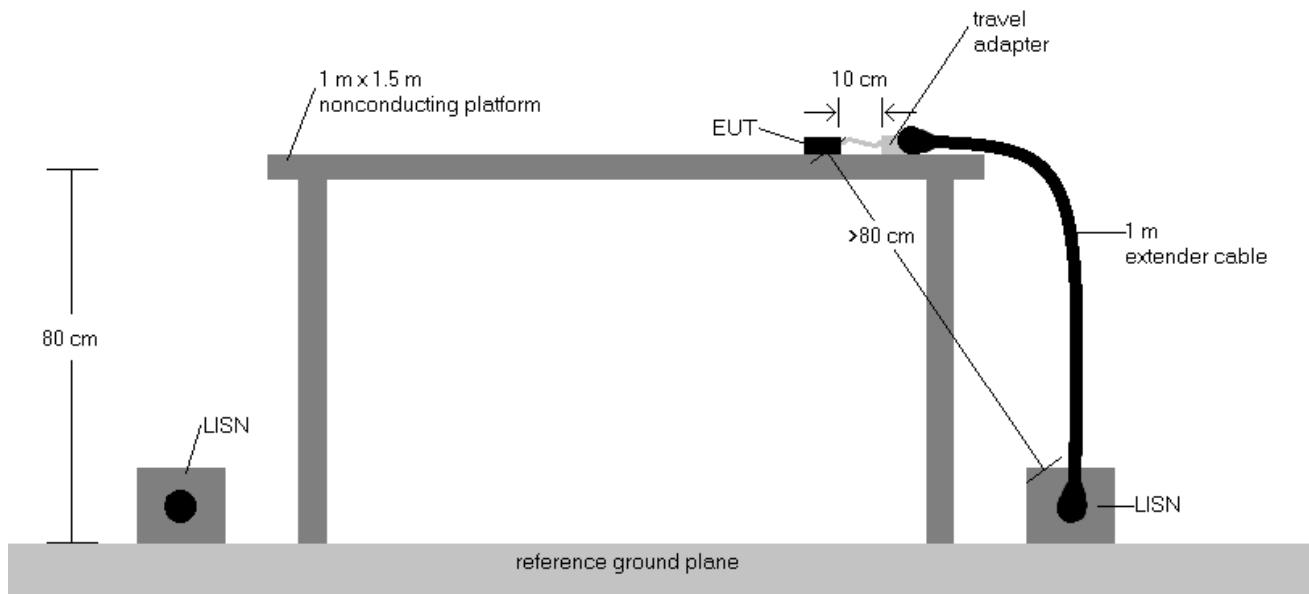
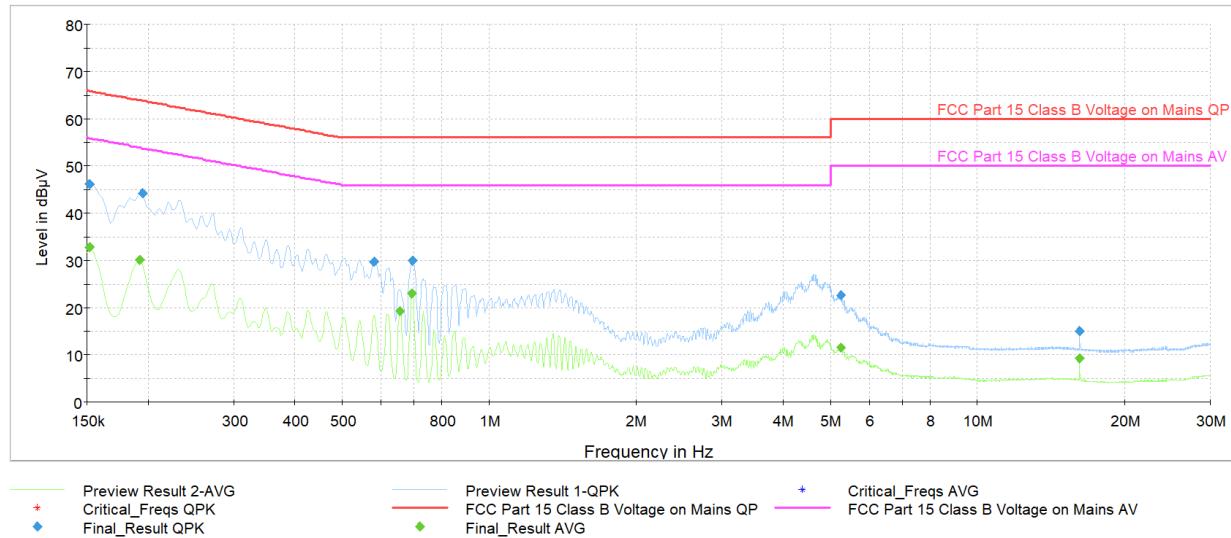


Figure 7-9. Test Instrument & Measurement Setup

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. 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
3. The limit for an intentional radiator from 150kHz to 30MHz are specified in Part 15.207 and RSS-Gen (8.8).
4. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
5. QP/AV Level (dB μ V) = QP/AV Analyzer/Receiver Level (dB μ V) + Correction Factor (dB)
6. Margin (dB) = QP/AV Level (dB μ V) - QP/AV Limit (dB μ V)
7. Traces shown in plot are made using a quasi peak and average detectors.
8. Deviations to the Specifications: None.
9. All supported modulation, antenna (including TxBF mode) and power schemes have been tested on the unit and only the worse case configuration is reported.

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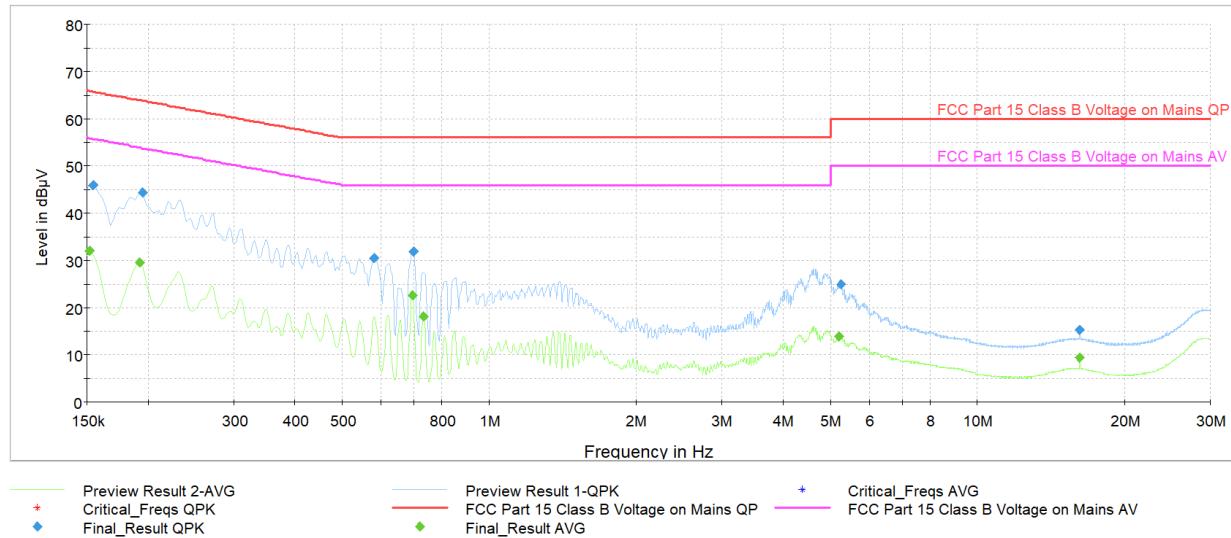


Plot 7-109. AC Line Conducted Plot with Bluetooth LE TxBF (L1, 1Mbps ePA – Ch.19 with AC/DC Adapter)

Frequency [MHz]	Process State	QuasiPeak [dBμV]	Average [dBμV]	Limit [dBμV]	Margin [dB]	Line	PE
0.152	FINAL	—	32.80	55.88	-23.07	L1	GND
0.152	FINAL	46.1	—	65.88	-19.77	L1	GND
0.193	FINAL	—	30.09	53.92	-23.83	L1	GND
0.195	FINAL	44.3	—	63.82	-19.49	L1	GND
0.582	FINAL	29.8	—	56.00	-26.18	L1	GND
0.656	FINAL	—	19.36	46.00	-26.64	L1	GND
0.695	FINAL	—	23.02	46.00	-22.98	L1	GND
0.697	FINAL	29.9	—	56.00	-26.07	L1	GND
5.242	FINAL	—	11.58	50.00	-38.42	L1	GND
5.244	FINAL	22.6	—	60.00	-37.43	L1	GND
16.217	FINAL	—	9.19	50.00	-40.81	L1	GND
16.217	FINAL	15.1	—	60.00	-44.89	L1	GND

Table 7-31. AC Line Conducted Data with Bluetooth LE TxBF (L1, 1Mbps ePA – Ch.19 with AC/DC Adapter)

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Plot 7-110. AC Line Conducted Plot with Bluetooth LE TxBF (N, 1Mbps ePA – Ch.19, with AC/DC Adapter)

Frequency [MHz]	Process State	QuasiPeak [dBμV]	Average [dBμV]	Limit [dBμV]	Margin [dB]	Line	PE
0.152	FINAL	—	32.14	55.88	-23.74	N	GND
0.155	FINAL	46.1	—	65.75	-19.70	N	GND
0.193	FINAL	—	29.48	53.92	-24.44	N	GND
0.195	FINAL	44.4	—	63.82	-19.41	N	GND
0.582	FINAL	30.5	—	56.00	-25.55	N	GND
0.697	FINAL	—	22.55	46.00	-23.45	N	GND
0.699	FINAL	31.9	—	56.00	-24.15	N	GND
0.735	FINAL	—	18.20	46.00	-27.80	N	GND
5.199	FINAL	—	13.92	50.00	-36.08	N	GND
5.242	FINAL	25.0	—	60.00	-35.04	N	GND
16.220	FINAL	—	9.42	50.00	-40.58	N	GND
16.220	FINAL	15.3	—	60.00	-44.73	N	GND

Table 7-32. AC Line Conducted Data with Bluetooth LE TxBF (N, 1Mbps ePA – Ch.19 with AC/DC Adapter)

FCC ID: BCGA2588 IC: 579C-A2588	PCTEST Proud to be part of 			MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical 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: BCGA2588 and IC: 579C-A2588** 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: BCGA2588 IC: 579C-A2588	 PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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