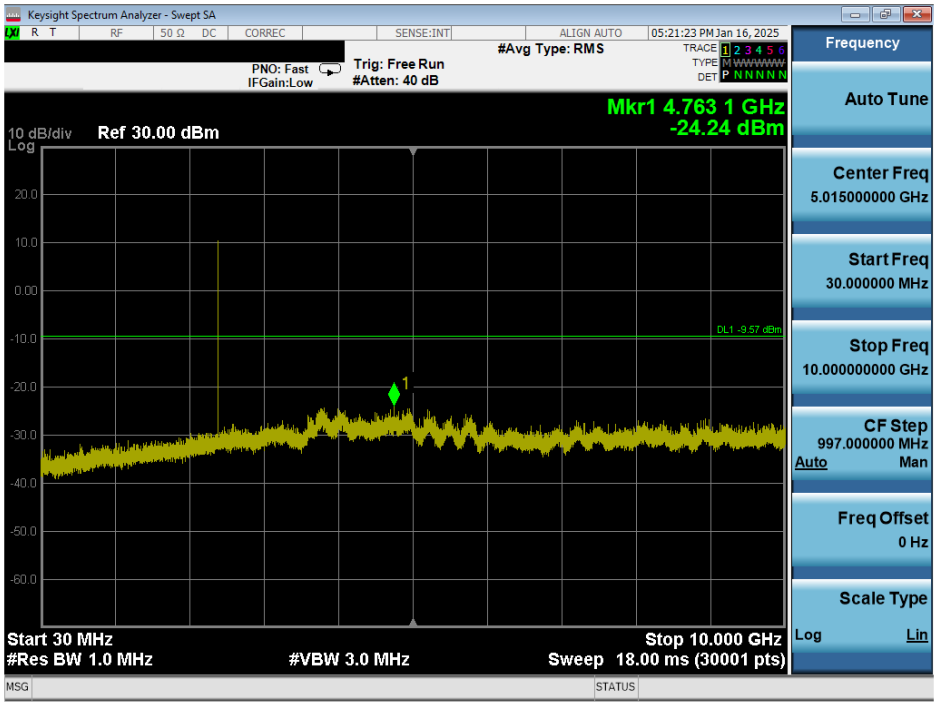
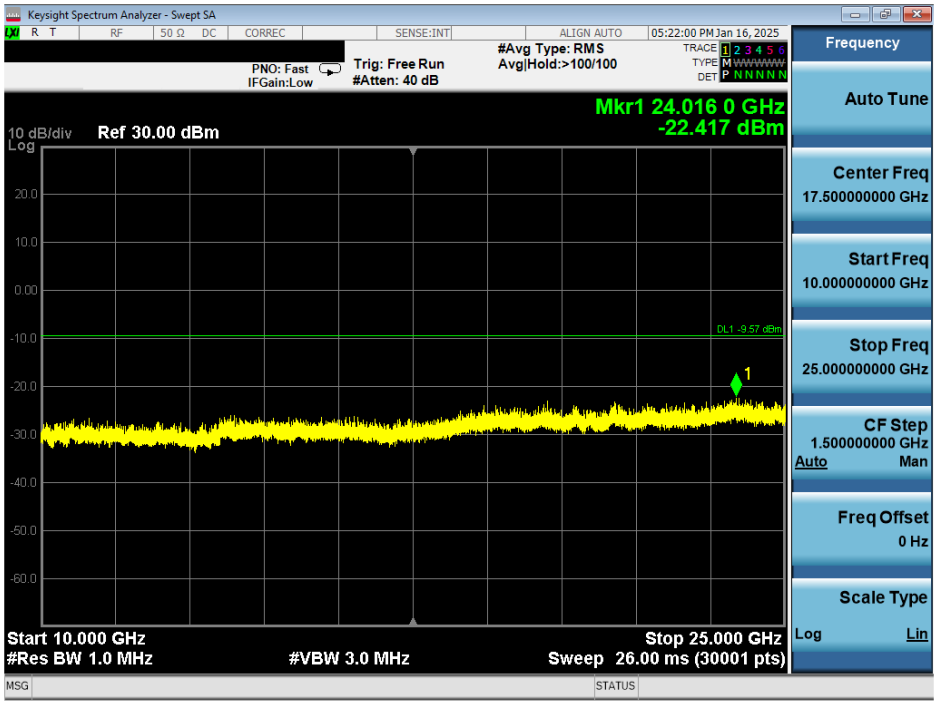
Antenna WF8 (Common)

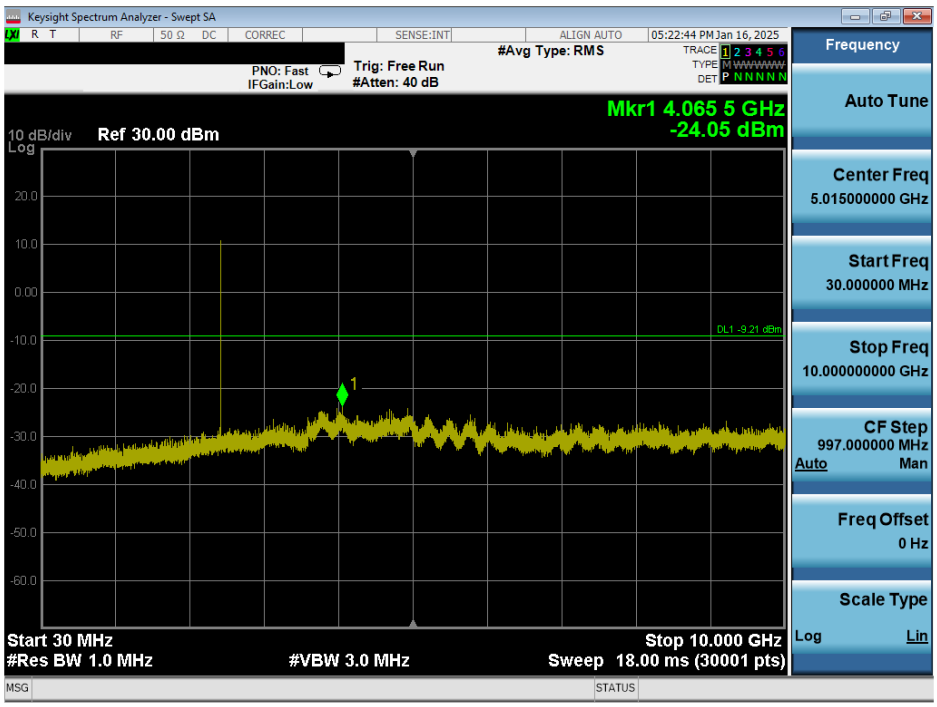


Plot 7-89. Conducted Spurious Plot Antenna WF8 (Common) (Bluetooth, GFSK, iPA – Ch. 0)

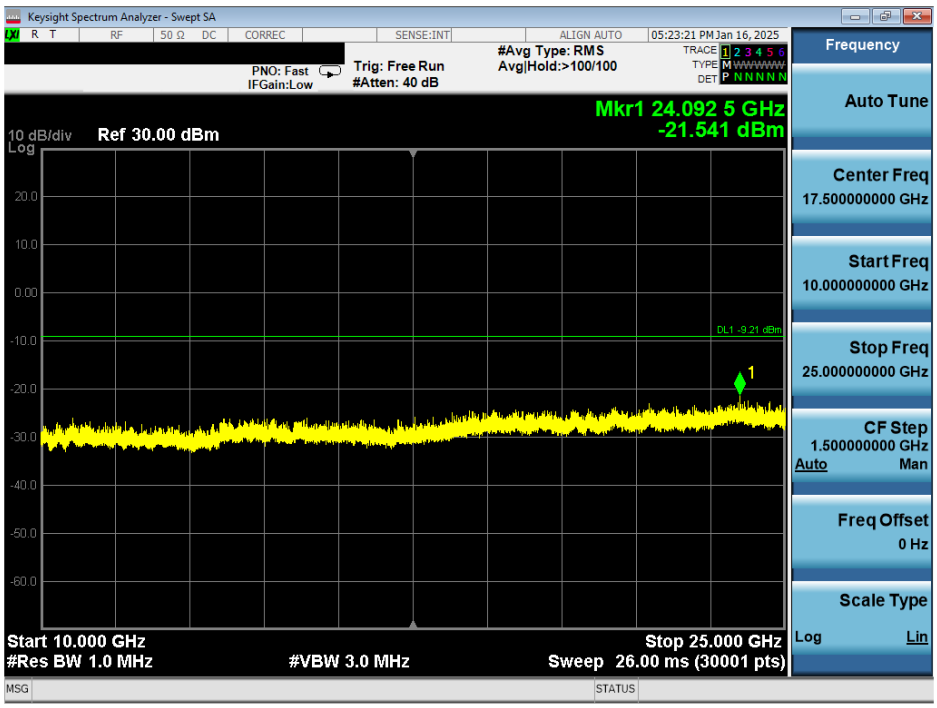


Plot 7-90. Conducted Spurious Plot Antenna WF8 (Common) (Bluetooth, GFSK, iPA – Ch. 0)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

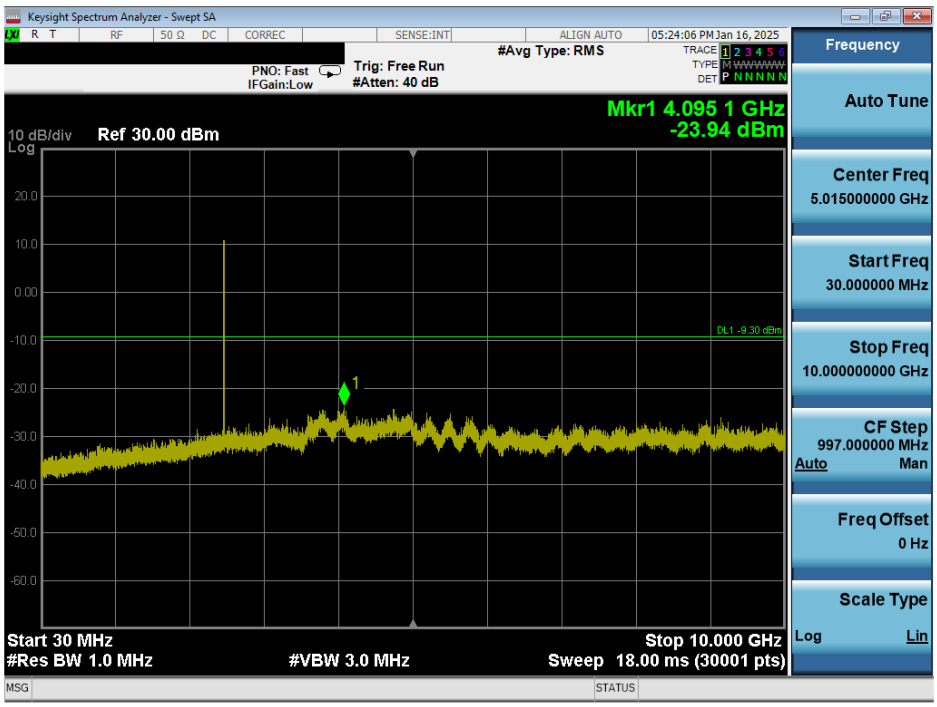


Plot 7-91. Conducted Spurious Plot Antenna WF8 (Common) (Bluetooth, GFSK, iPA – Ch. 39)

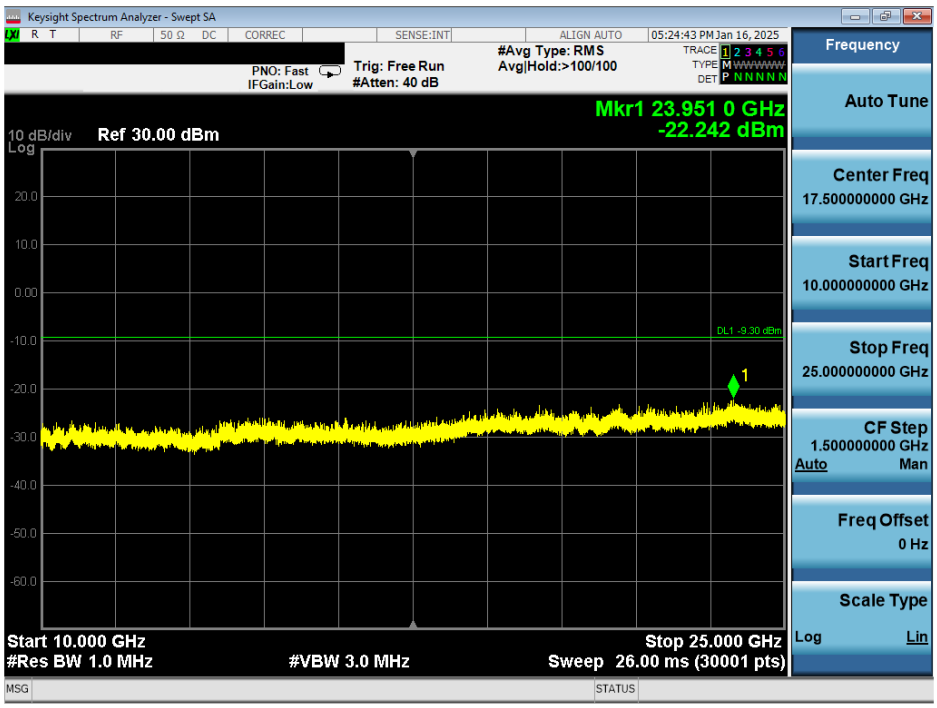


Plot 7-92. Conducted Spurious Plot Antenna WF8 (Common) (Bluetooth, GFSK, iPA Ch. 39)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.



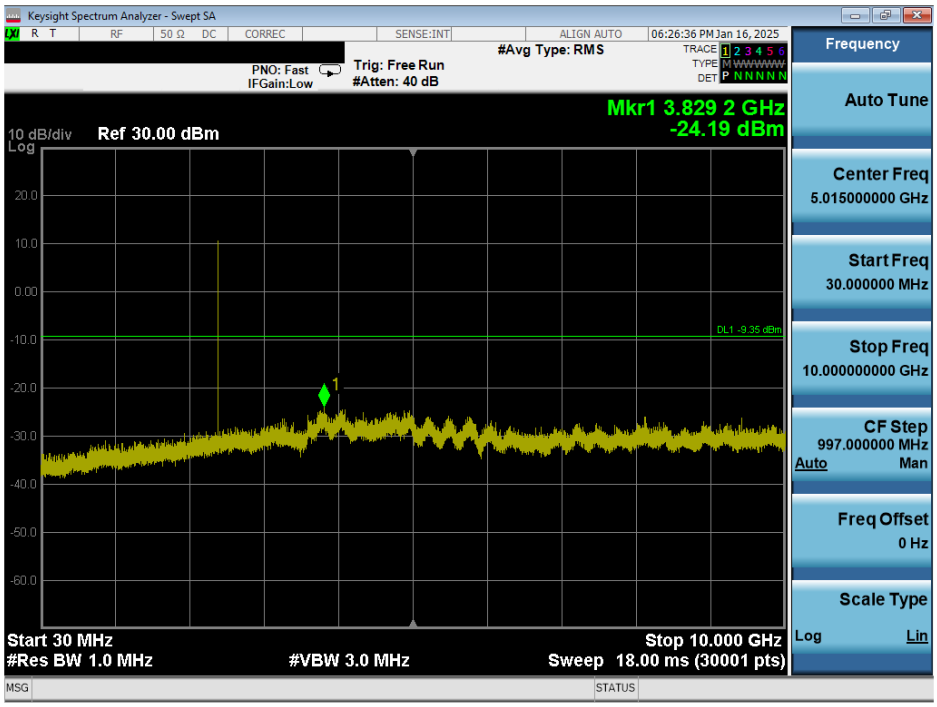
Plot 7-93. Conducted Spurious Plot Antenna WF8 (Common) (Bluetooth, GFSK, iPA – Ch. 78)



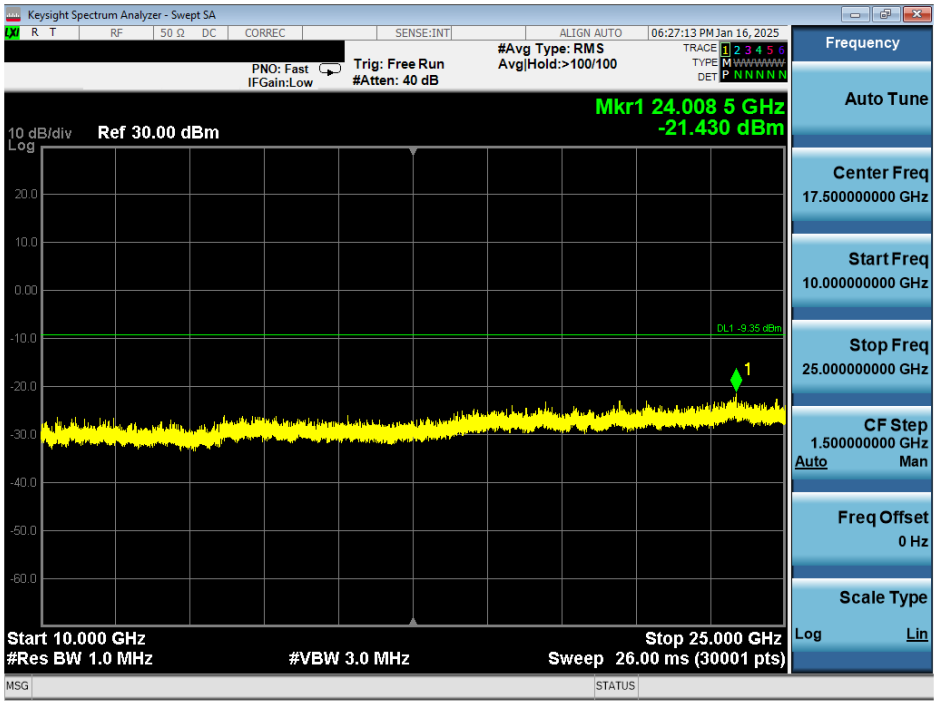
Plot 7-94. Conducted Spurious Plot Antenna WF8 (Common) (Bluetooth, GFSK, iPA – Ch. 78)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Antenna WF7b (Common)

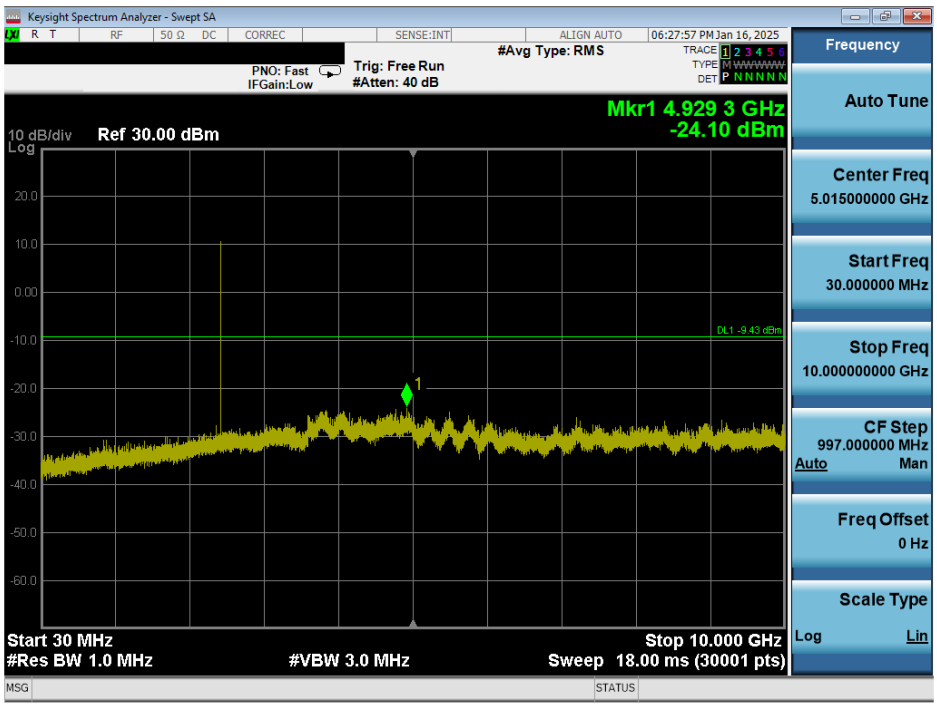


Plot 7-95. Conducted Spurious Plot Antenna WF7b (Common) (Bluetooth, GFSK, iPA – Ch. 0)

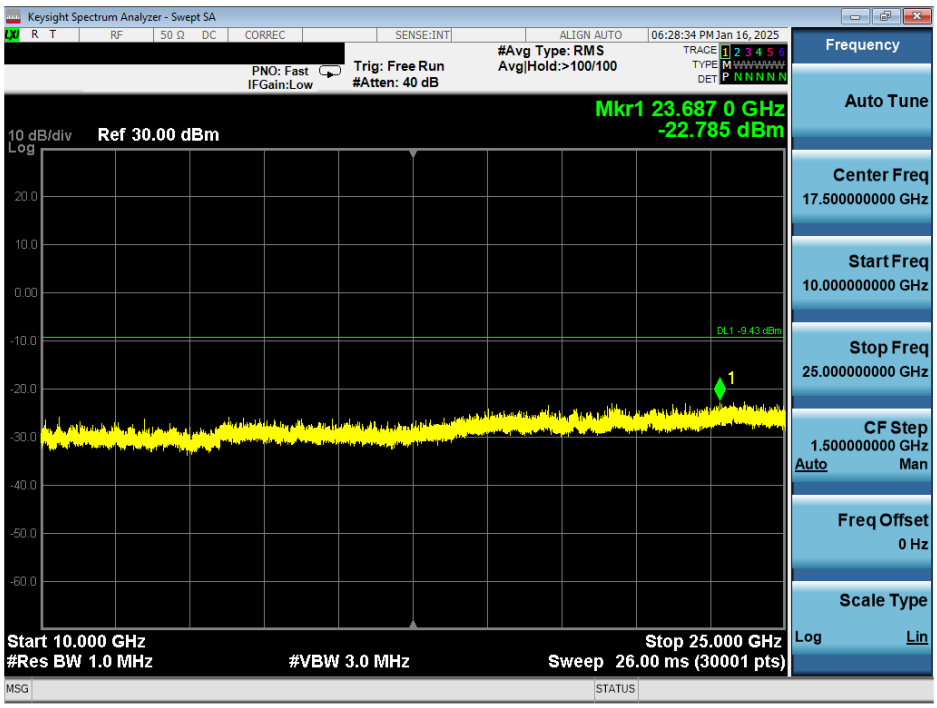


Plot 7-96. Conducted Spurious Plot Antenna WF7b (Common) (Bluetooth, GFSK, iPA – Ch. 0)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

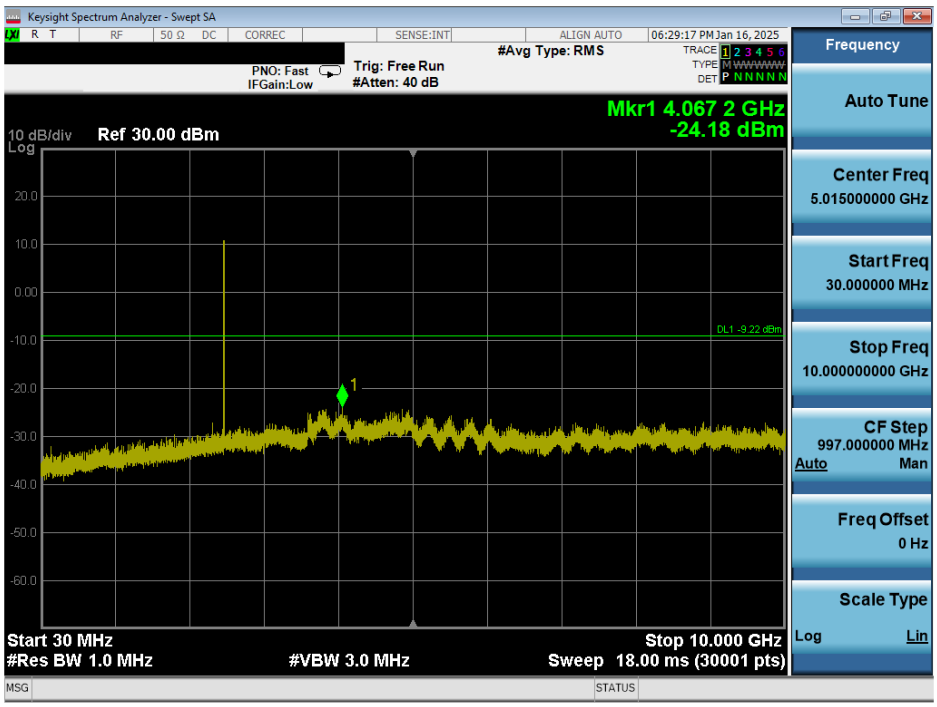


Plot 7-97. Conducted Spurious Plot Antenna WF7b (Common) (Bluetooth, GFSK, iPA – Ch. 39)

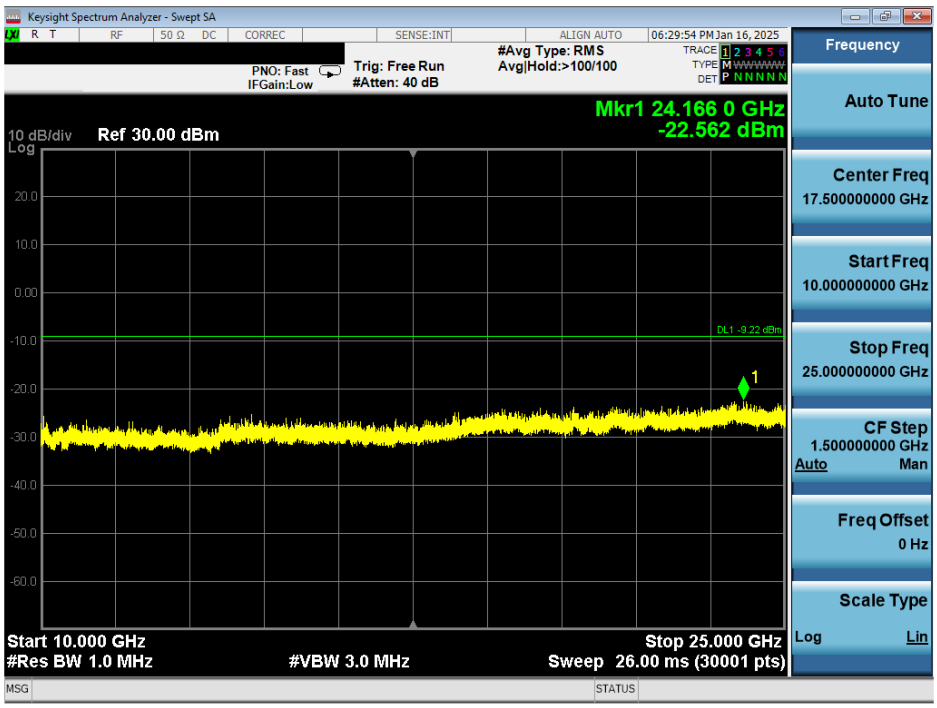


Plot 7-98. Conducted Spurious Plot Antenna WF7b (Common) (Bluetooth, GFSK, iPA Ch. 39)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.



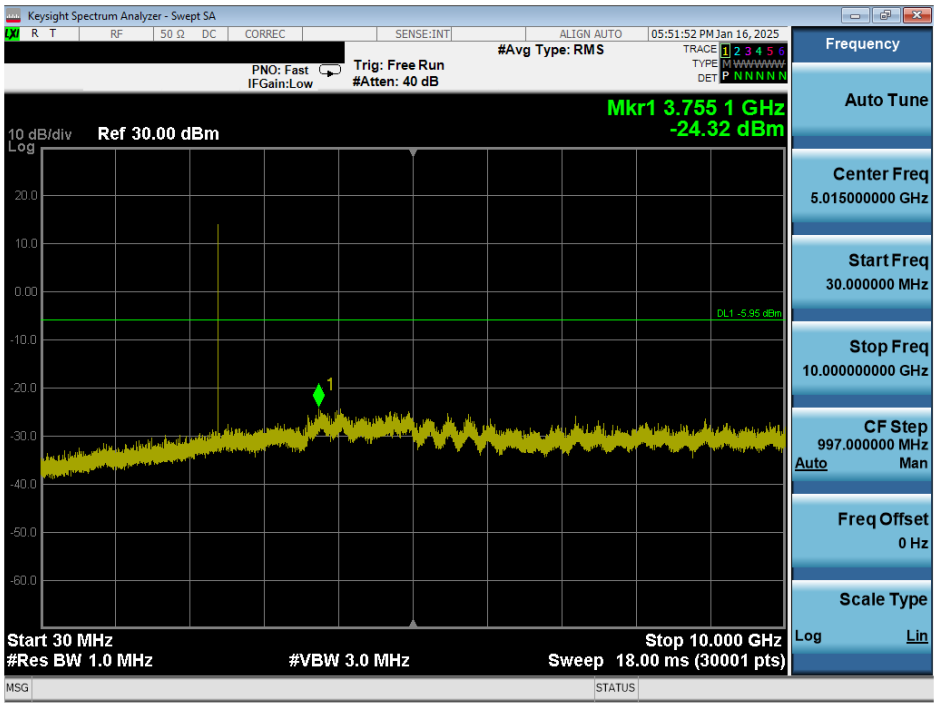
Plot 7-99. Conducted Spurious Plot Antenna WF7b (Common) (Bluetooth, GFSK, iPA – Ch. 78)



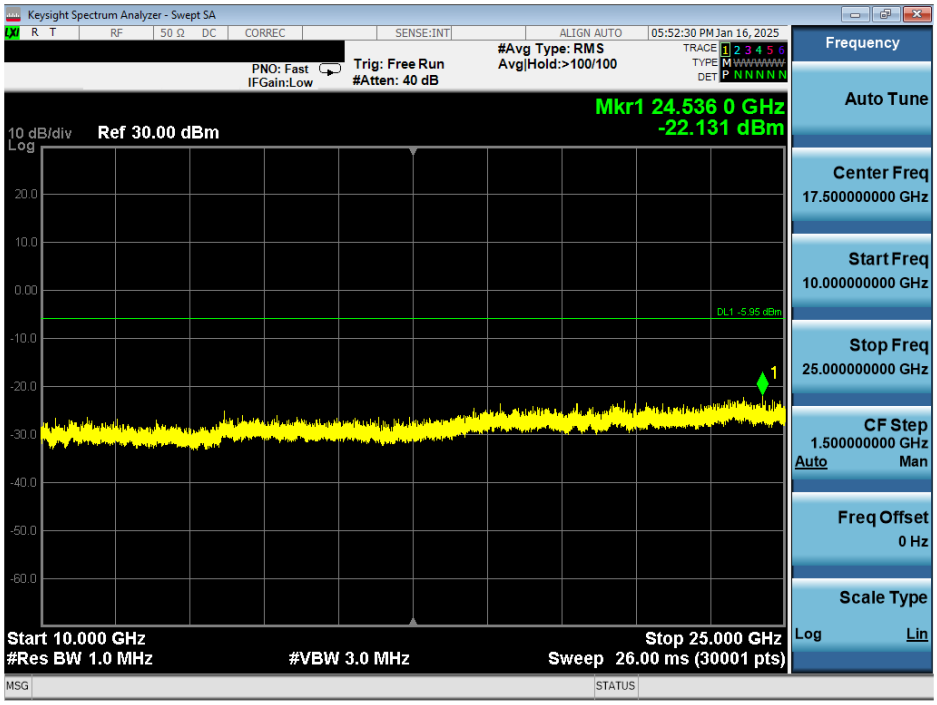
Plot 7-100. Conducted Spurious Plot Antenna WF7b (Common) (Bluetooth, GFSK, iPA – Ch. 78)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Antenna WF8 (Dedicated)

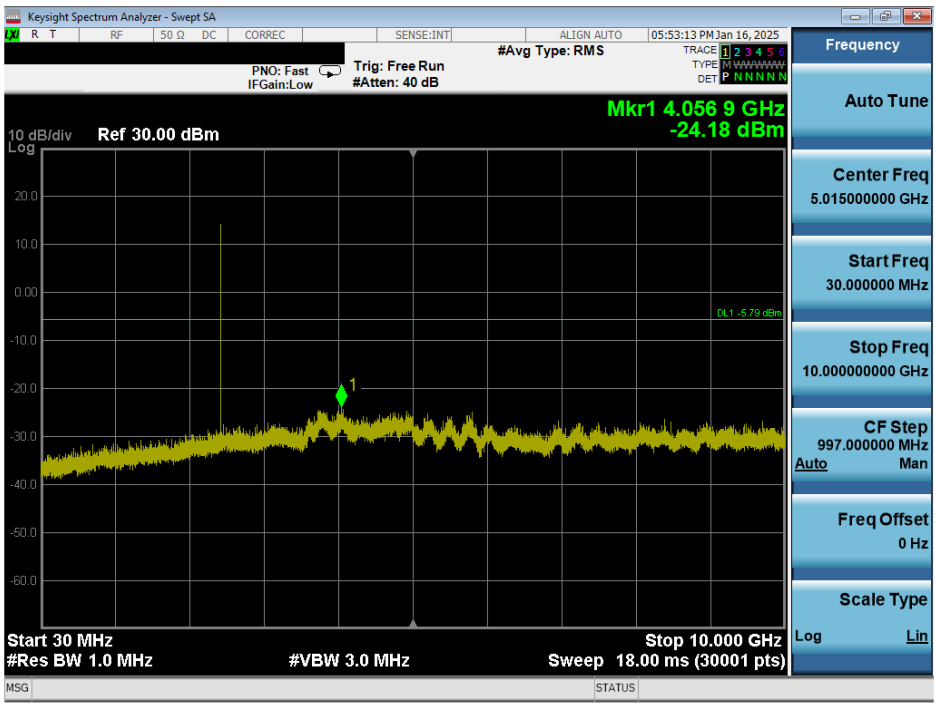


Plot 7-101. Conducted Spurious Plot Antenna WF8 (Dedicated) (Bluetooth, GFSK, iPA – Ch. 0)

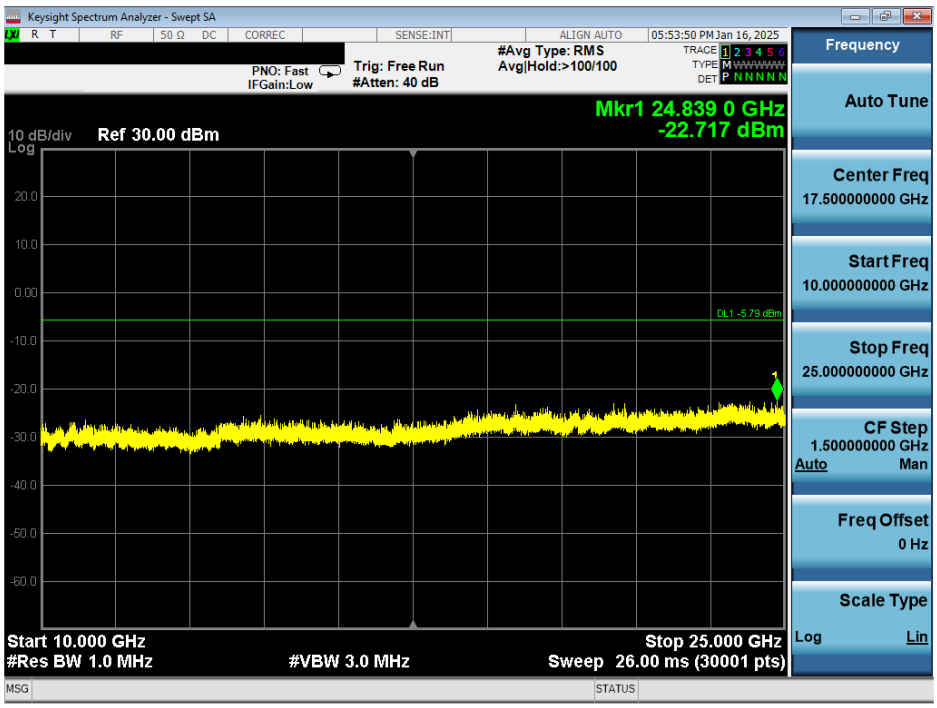


Plot 7-102. Conducted Spurious Plot Antenna WF8 (Dedicated) (Bluetooth, GFSK, iPA – Ch. 0)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

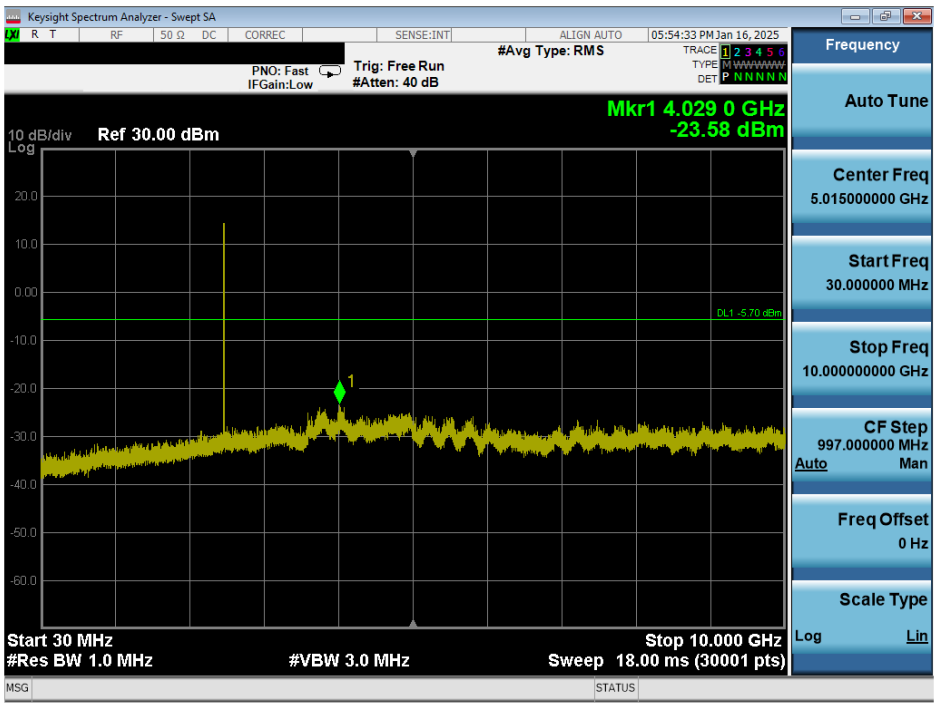


Plot 7-103. Conducted Spurious Plot Antenna WF8 (Dedicated) (Bluetooth, GFSK, iPA – Ch. 39)

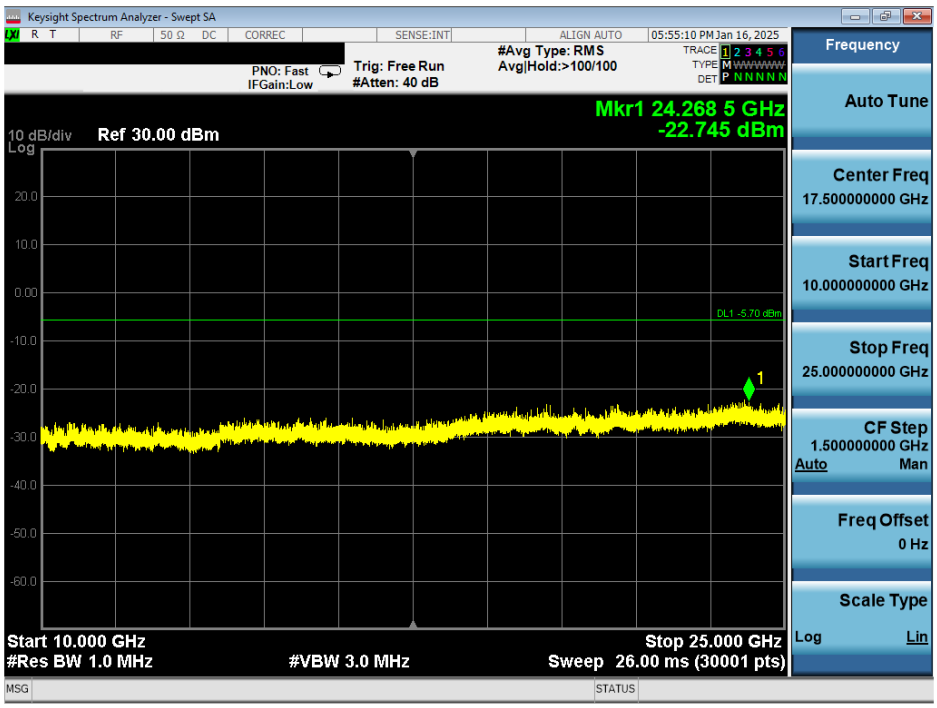


Plot 7-104. Conducted Spurious Plot Antenna WF8 (Dedicated) (Bluetooth, GFSK, iPA Ch. 39)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.



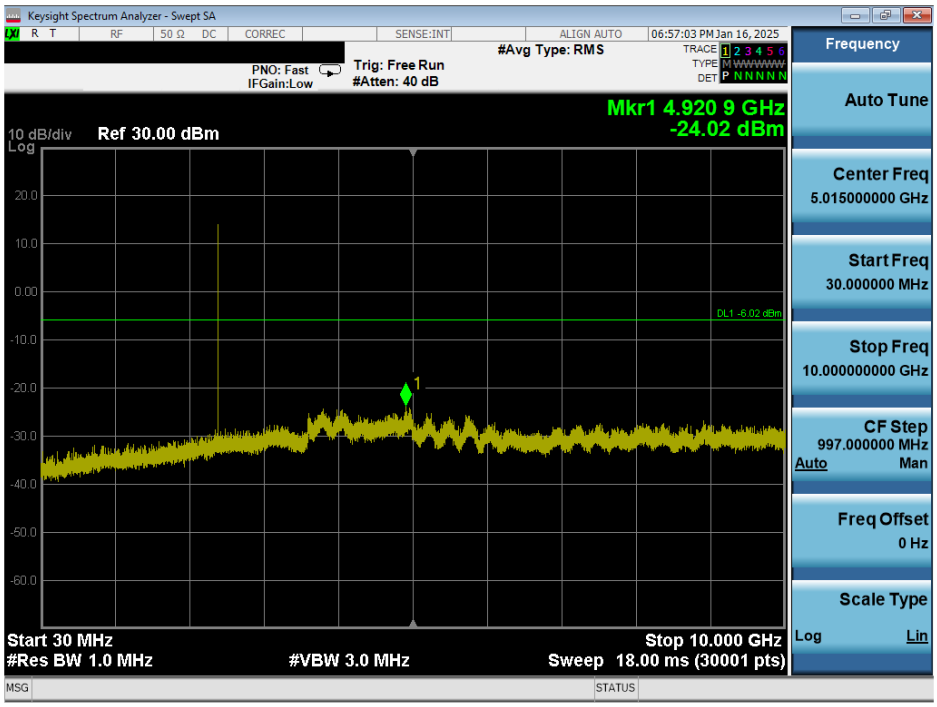
Plot 7-105. Conducted Spurious Plot Antenna WF8 (Dedicated) (Bluetooth, GFSK, iPA – Ch. 78)



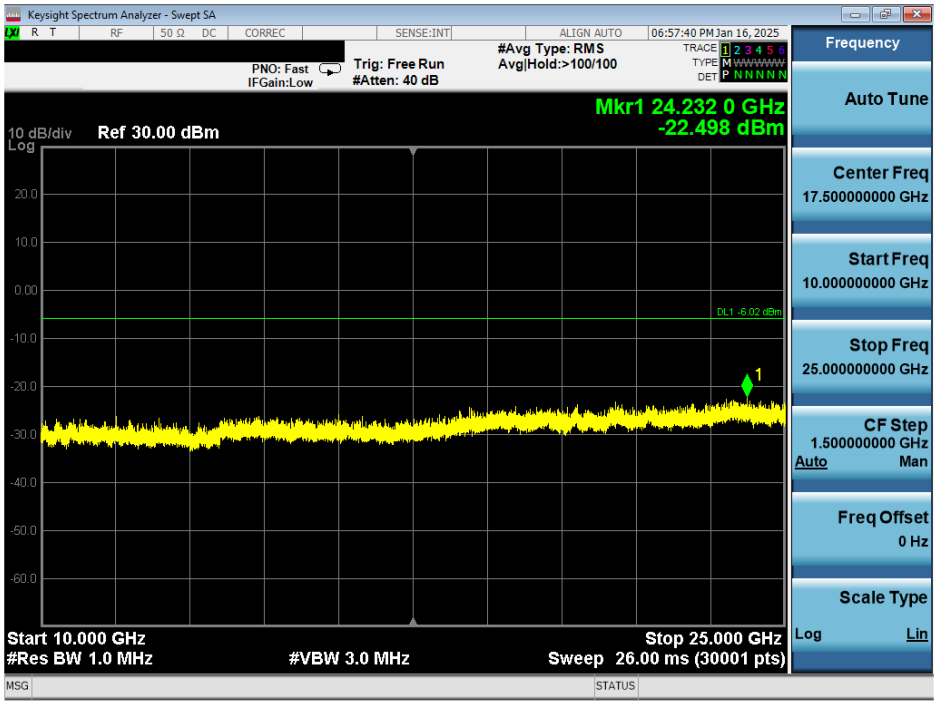
Plot 7-106. Conducted Spurious Plot Antenna WF8 (Dedicated) (Bluetooth, GFSK, iPA – Ch. 78)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Antenna WF7b (Dedicated)

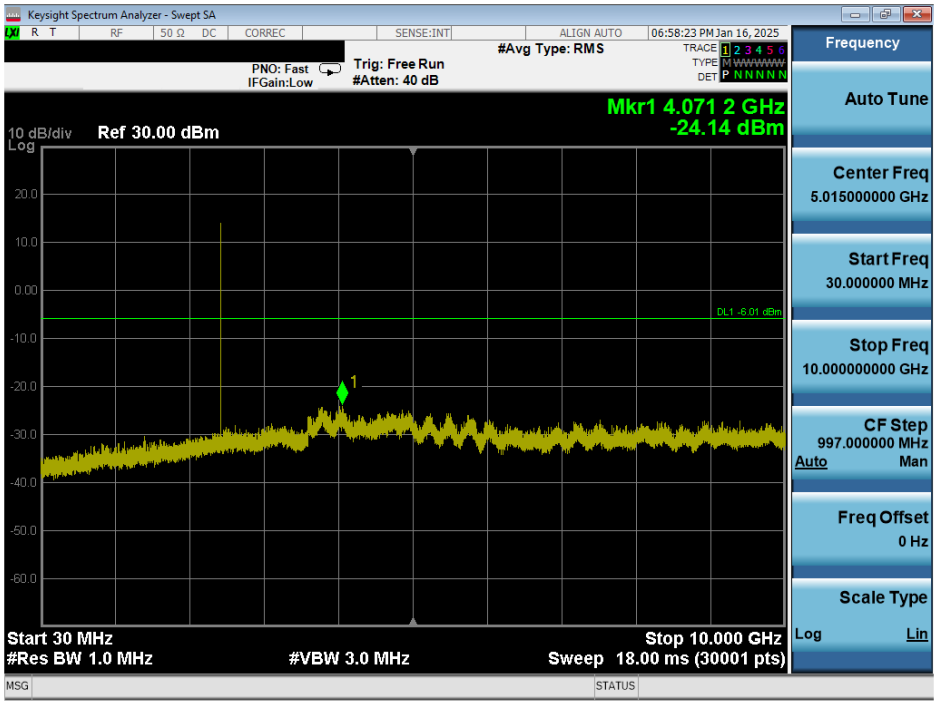


Plot 7-107. Conducted Spurious Plot Antenna WF7b (Dedicated) (Bluetooth, GFSK, iPA – Ch. 0)

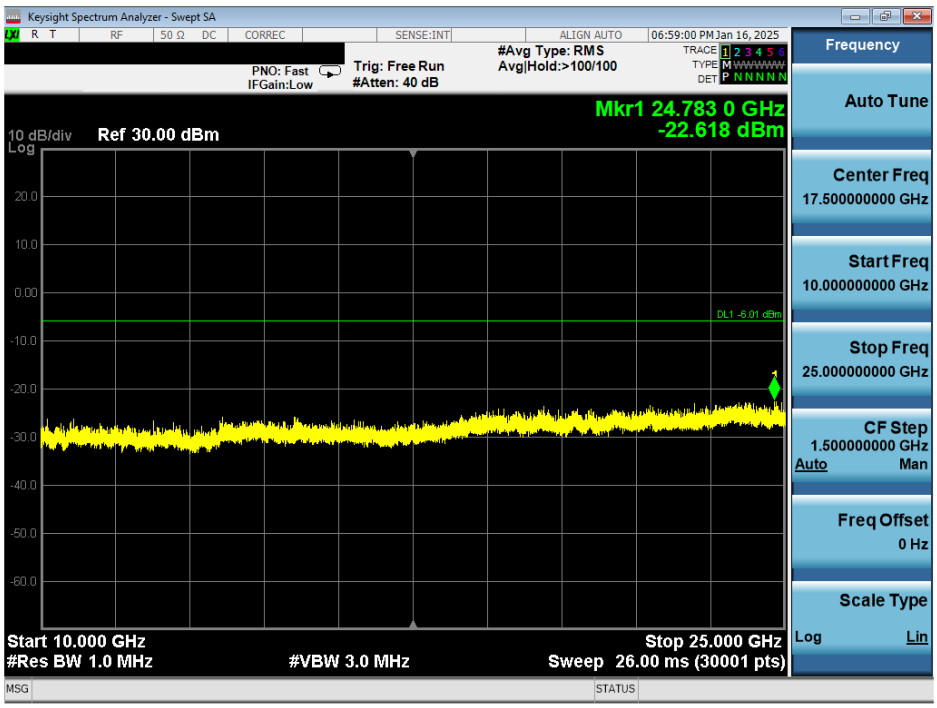


Plot 7-108. Conducted Spurious Plot Antenna WF7b (Dedicated) (Bluetooth, GFSK, iPA – Ch. 0)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

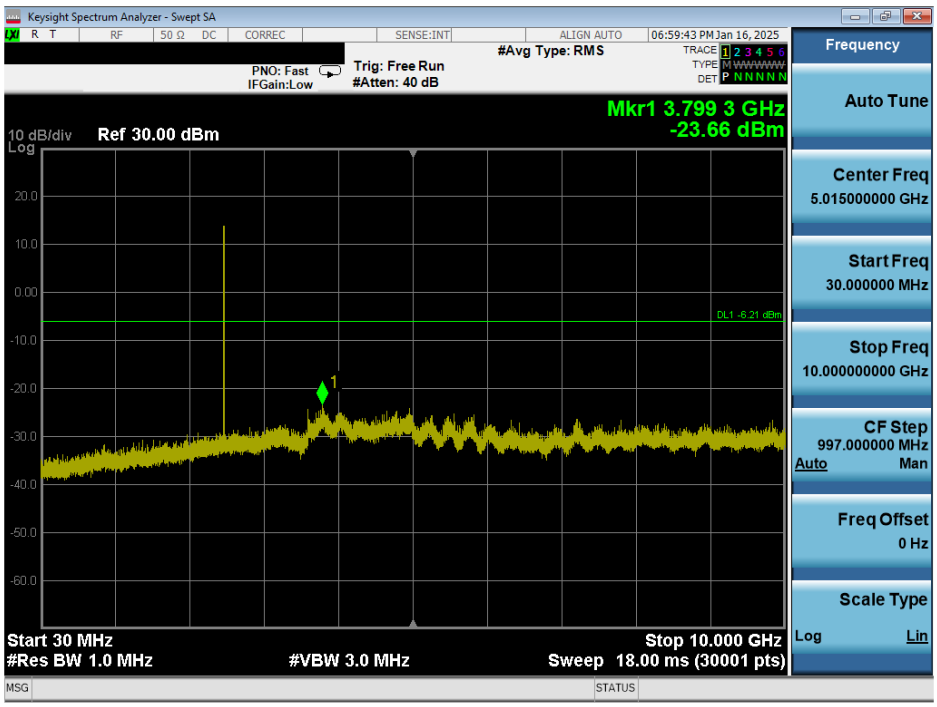


Plot 7-109. Conducted Spurious Plot Antenna WF7b (Dedicated) (Bluetooth, GFSK, iPA – Ch. 39)

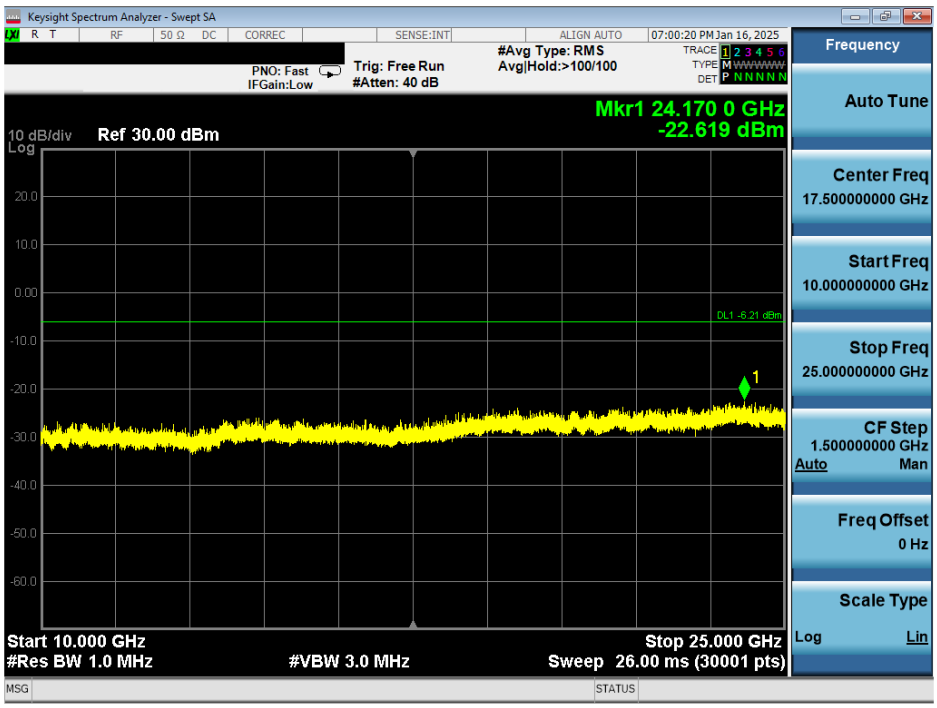


Plot 7-110. Conducted Spurious Plot Antenna WF7b (Dedicated) (Bluetooth, GFSK, iPA Ch. 39)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.



Plot 7-111. Conducted Spurious Plot Antenna WF7b (Dedicated) (Bluetooth, GFSK, iPA – Ch. 78)



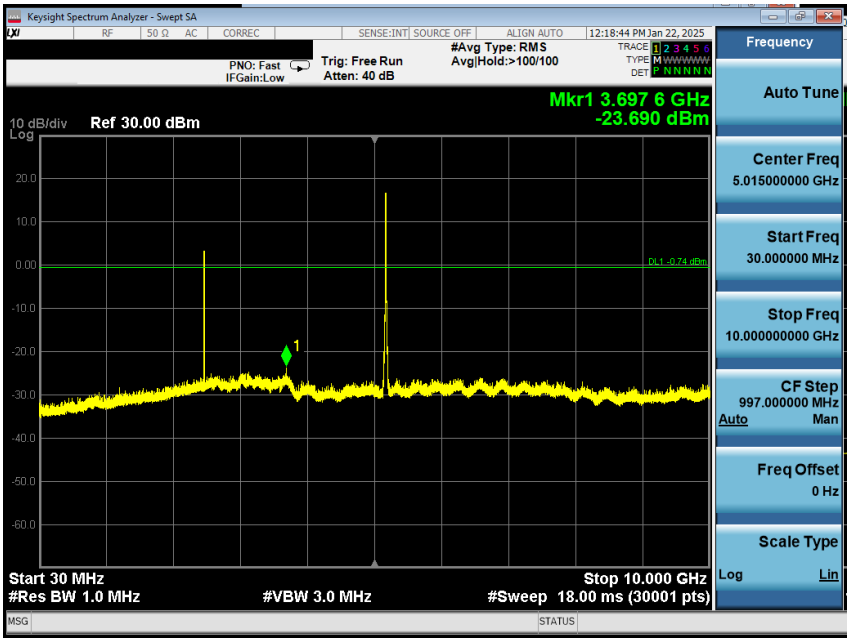
Plot 7-112. Conducted Spurious Plot Antenna WF7b (Dedicated) (Bluetooth, GFSK, iPA – Ch. 78)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Simultaneous Tx

Description	Bluetooth	UNII
Antenna	Antenna WF8	Antenna WF8
Channel	78	36
Operating Frequency (MHz)	2480	5180
Mode/Modulation	GFSK iPA	802.11n

Table 7-18. Worst Case Simultaneous Transmission Configuration



Plot 7-113. Conducted Simultaneous Tx Spurious Plots Antenna WF8 (Bluetooth + UNII)

Plot 7-114. Conducted Simultaneous Tx Spurious Plots Antenna WF8 (Bluetooth + UNII)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

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 7-19 per Section 15.209 and RSS-Gen (8.9).

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

Table 7-19. Radiated Limits

Test Procedure Used

ANSI C63.10-2020 – 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

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Test Setup

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

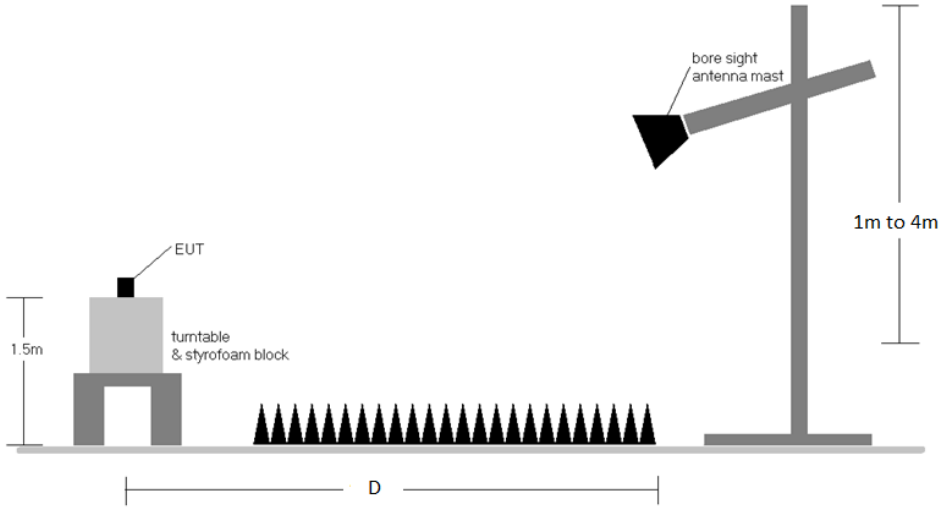


Figure 7-8. Radiated Test Setup >1GHz

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 7-19.
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 and antenna 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.

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Sample Calculation

Determining Spurious Emissions Levels

- Field Strength Level [dBµV/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 [dBµV/m] – Limit [dBµV/m]

Radiated Band Edge Measurement Offset

- The amplitude offset shown in the radiated restricted band edge plots in Section 7.9.2 was calculated using the formula:
  Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

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 = $20\log_{10}(7.5ms/100ms)$ = -22.5 dB

Average Emission Calculation

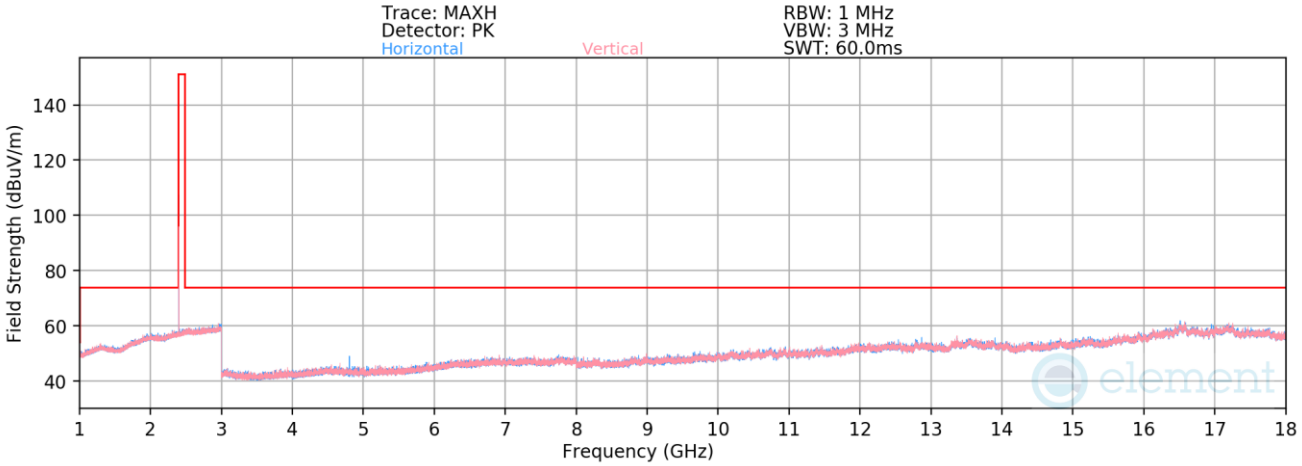
- Average Emission = Measured Peak Emissions [dBµV/m] – Duty Cycle Correction Factor [dB]

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

7.9.1 Radiated Spurious Emission Measurements (1 – 18GHz)

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

Antenna WF8 (Common)



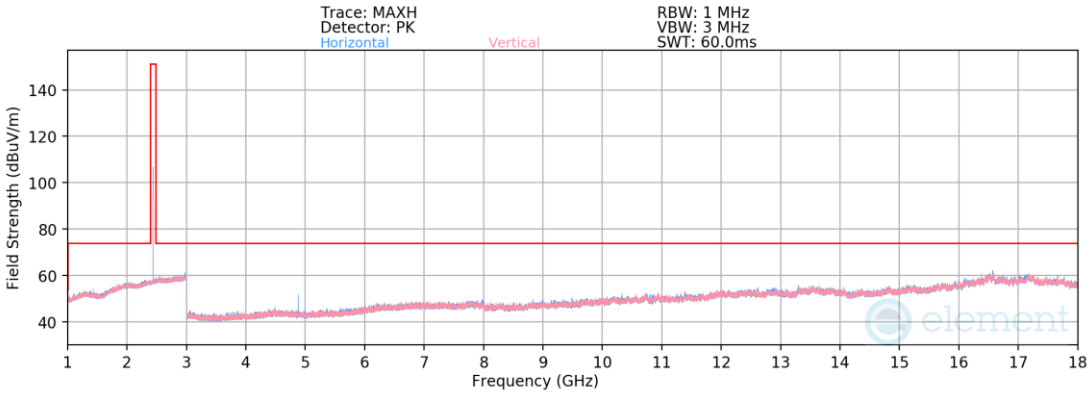
Plot 7-115. Radiated Spurious Emissions above 1GHz Antenna WF8 (Common) (BT GFSK iPA – Ch. 0)

Bluetooth Mode:	GFSK
Data Rate:	1Mbps
Power Scheme	iPA
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	Peak	V	240	245	-63.43	7.31	50.88	73.98	-23.10
12010.00	Peak	V	-	-	-71.83	18.75	53.92	73.98	-20.06

Table 7-20. Radiated Measurements Antenna WF8 (Common)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.



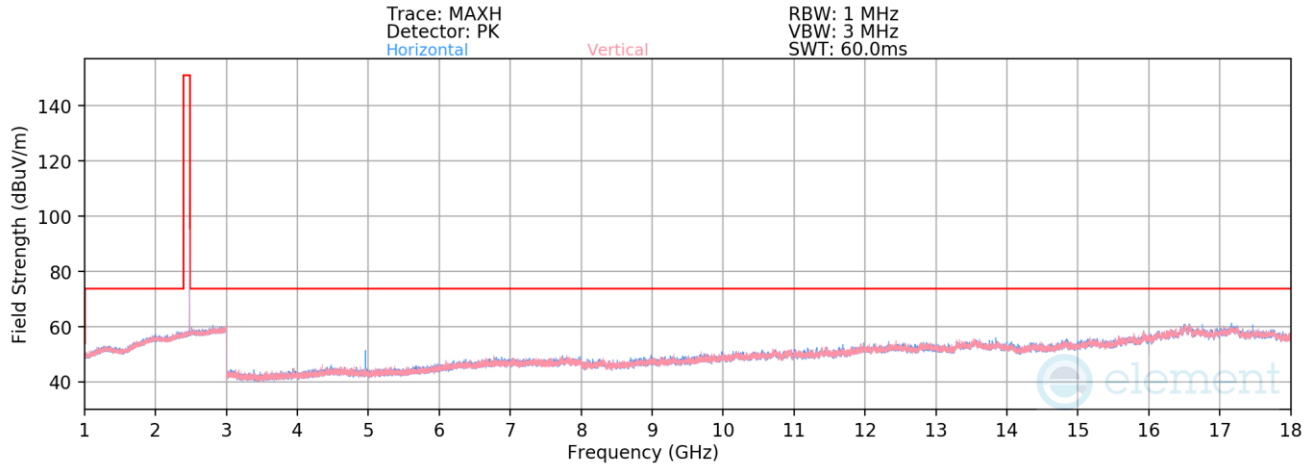
Plot 7-116. Radiated Spurious Emissions Above 1GHz Antenna WF8 (Common) (BT GFSK iPA – Ch. 39)

Bluetooth Mode:	GFSK
Data Rate:	1Mbps
Power Scheme	iPA
Distance of Measurements:	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 [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4882.00	Peak	H	246	247	-62.13	7.65	52.52	73.98	-21.46
7323.00	Peak	H	-	-	-69.96	11.21	48.25	73.98	-25.73
12205.00	Peak	H	-	-	-71.69	18.87	54.18	73.98	-19.80

Table 7-21. Radiated Measurements Antenna WF8 (Common)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.



Plot 7-117. Radiated Spurious Emissions above 1GHz Antenna WF8 (Common) (BT GFSK iPA – Ch. 78)

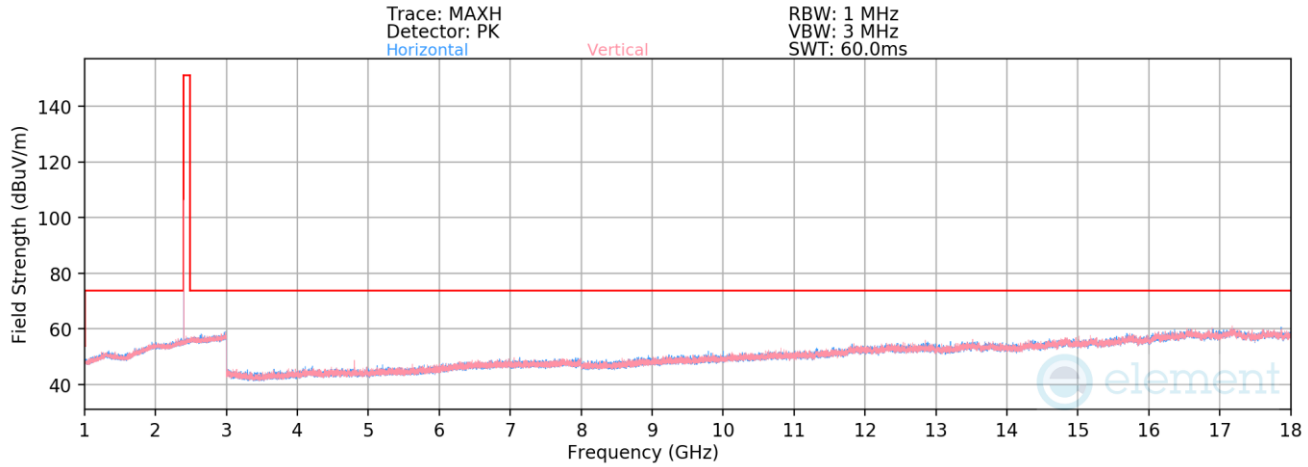
Bluetooth Mode:	GFSK
Data Rate:	1Mbps
Power Scheme	iPA
Distance of Measurements:	3 Meters
Operating Frequency:	2480MHz
Channel:	78

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4960.00	Peak	H	241	247	-60.72	7.25	53.53	73.98	-20.45
7440.00	Peak	H	-	-	-70.19	11.20	48.01	73.98	-25.97
12400.00	Peak	H	-	-	-72.71	19.43	53.72	73.98	-20.26

Table 7-22. Radiated Measurements Antenna WF8 (Common)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Antenna WF7b (Common)



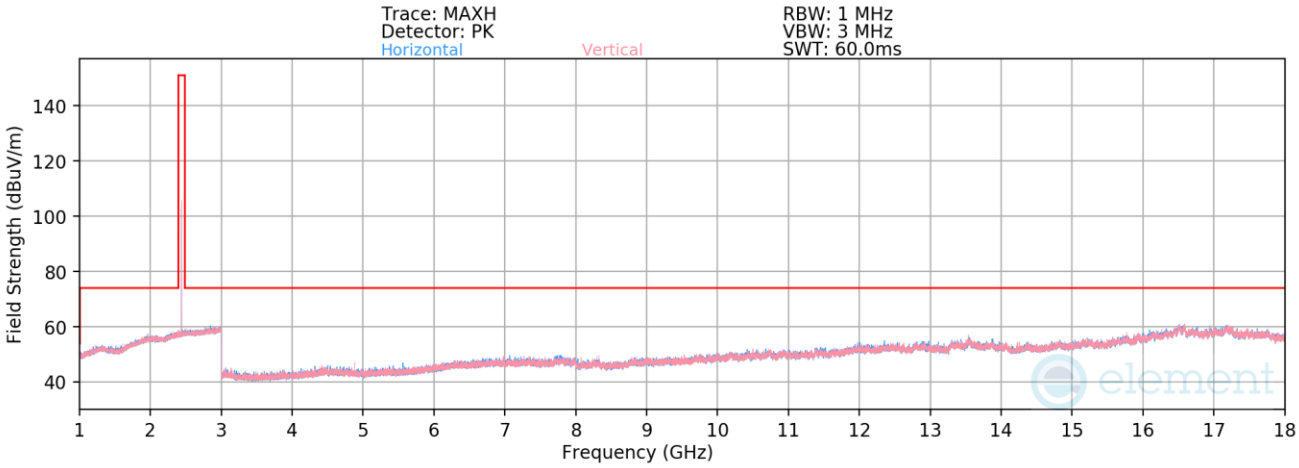
Plot 7-118. Radiated Spurious Emissions above 1GHz Antenna WF7b (Common) (BT GFSK iPA – Ch. 0)

Bluetooth Mode:	GFSK
Data Rate:	1Mbps
Power Scheme	iPA
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	Peak	V	296	214	-64.73	7.06	49.33	73.98	-24.65
12010.00	Peak	V	-	-	-70.99	18.28	54.29	73.98	-19.69

Table 7-23. Radiated Measurements Antenna WF7b (Common)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.



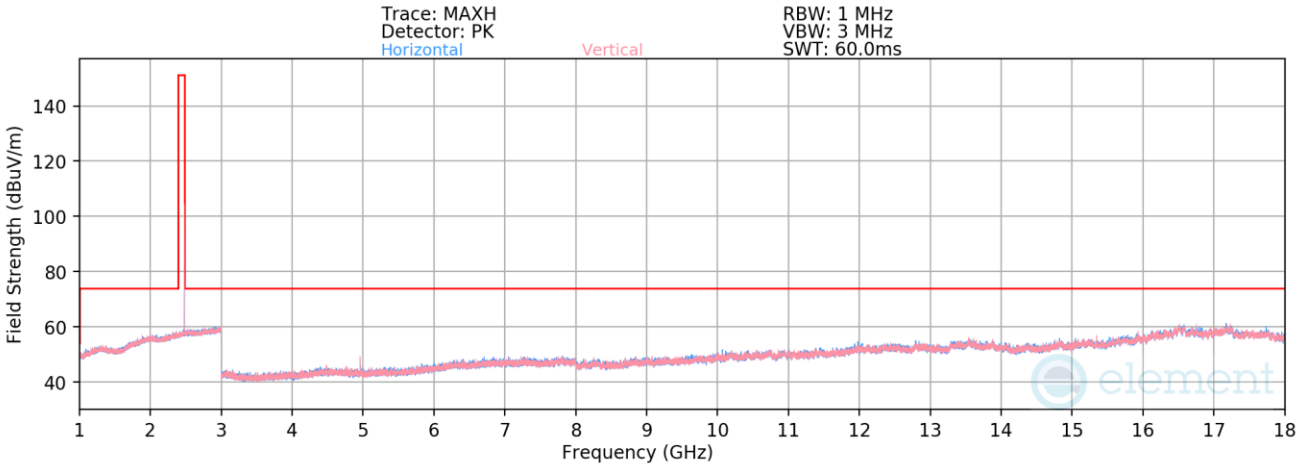
Plot 7-119. Radiated Spurious Emissions above 1GHz Antenna WF7b (Common) (BT GFSK iPA – Ch. 39)

Bluetooth Mode:	GFSK
Data Rate:	1Mbps
Power Scheme	iPA
Distance of Measurements:	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 [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4882.00	Peak	V	302	198	-64.38	7.65	50.27	73.98	-23.71
7323.00	Peak	V	-	-	-70.16	11.67	48.51	73.98	-25.47
12205.00	Peak	V	-	-	-72.57	18.94	53.37	73.98	-20.61

Table 7-24. Radiated Measurements Antenna WF7b (Common)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.



Plot 7-120. Radiated Spurious Emissions above 1GHz Antenna WF7b (Common) (BT GFSK iPA – Ch. 78)

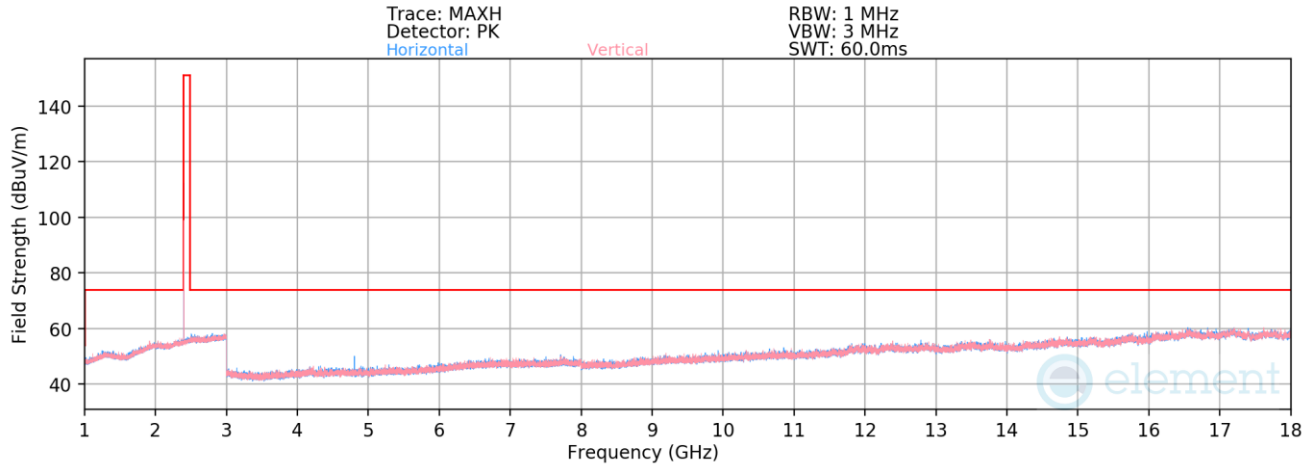
Bluetooth Mode:	GFSK
Data Rate:	1Mbps
Power Scheme	iPA
Distance of Measurements:	3 Meters
Operating Frequency:	2480MHz
Channel:	78

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4960.00	Peak	V	288	195	-63.32	7.25	50.93	73.98	-23.05
7440.00	Peak	V	-	-	-70.00	11.20	48.20	73.98	-25.78
12400.00	Peak	V	-	-	-72.76	19.43	53.67	73.98	-20.31

Table 7-25. Radiated Measurements Antenna WF7b (Common)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Antenna WF8 (Dedicated)



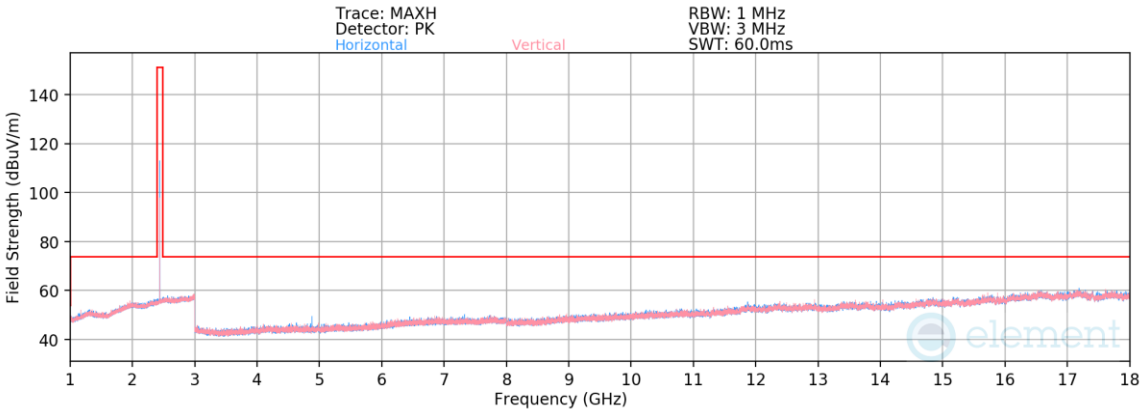
Plot 7-121. Radiated Spurious Emissions above 1GHz Antenna WF8 (Dedicated) (BT GFSK iPA – Ch. 0)

Bluetooth Mode:	GFSK
Data Rate:	1Mbps
Power Scheme	iPA
Distance of Measurements:	3 Meters
Operating Frequency:	2402MHz
Channel:	0

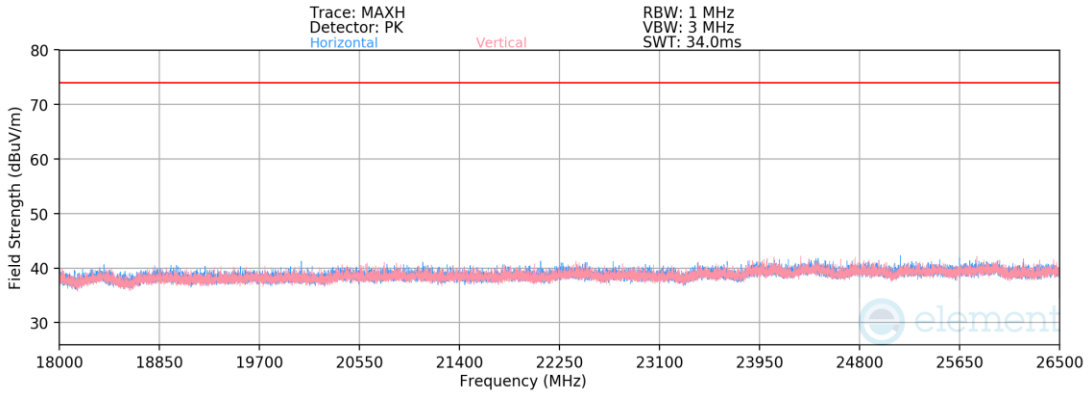
Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4804.00	Peak	H	238	241	-61.41	7.06	52.65	73.98	-21.33
12010.00	Peak	H	-	-	-71.06	18.39	54.33	73.98	-19.65

Table 7-26. Radiated Measurements Antenna WF8 (Dedicated)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.



Plot 7-122. Radiated Spurious Emissions Above 1GHz Antenna WF8 (Dedicated) (BT GFSK iPA – Ch. 39)



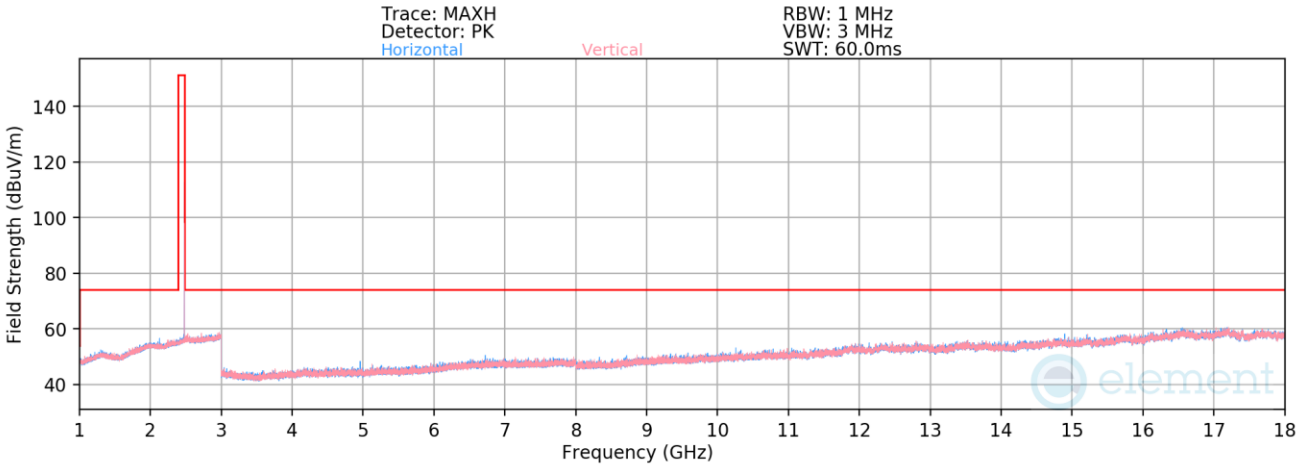
Plot 7-123. Radiated Spurious Emissions Above 18GHz Antenna WF8 (Dedicated) (BT GFSK iPA – Ch. 39)

Bluetooth Mode:	GFSK
Data Rate:	1Mbps
Power Scheme	iPA
Distance of Measurements:	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 [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4882.00	Peak	H	231	243	-62.25	7.57	52.32	73.98	-21.66
7323.00	Peak	H	-	-	-68.52	10.60	49.08	73.98	-24.90
12205.00	Peak	H	-	-	-69.08	17.38	55.30	73.98	-18.68

Table 7-27. Radiated Measurements Antenna WF8 (Dedicated)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.



Plot 7-124. Radiated Spurious Emissions above 1GHz Antenna WF8 (Dedicated) (BT GFSK iPA – Ch. 78)

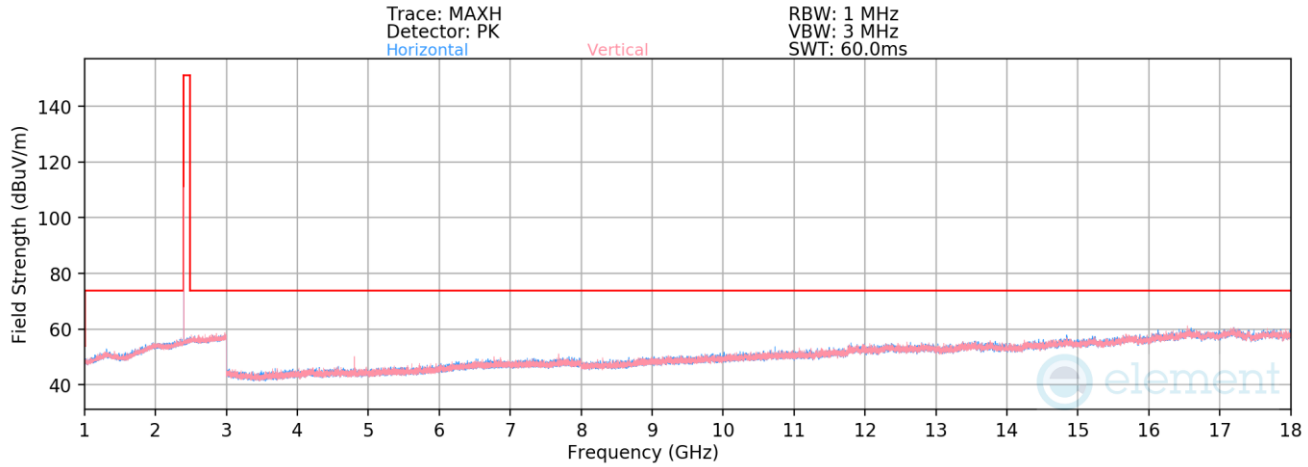
Bluetooth Mode:	GFSK
Data Rate:	1Mbps
Power Scheme	iPA
Distance of Measurements:	3 Meters
Operating Frequency:	2480MHz
Channel:	78

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4960.00	Peak	H	214	244	-63.10	7.30	51.20	73.98	-22.78
7440.00	Peak	H	-	-	-67.89	10.51	49.62	73.98	-24.36
12400.00	Peak	H	-	-	-70.68	18.79	55.11	73.98	-18.87

Table 7-28. Radiated Measurements Antenna WF8 (Dedicated)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Antenna WF7b (Dedicated)



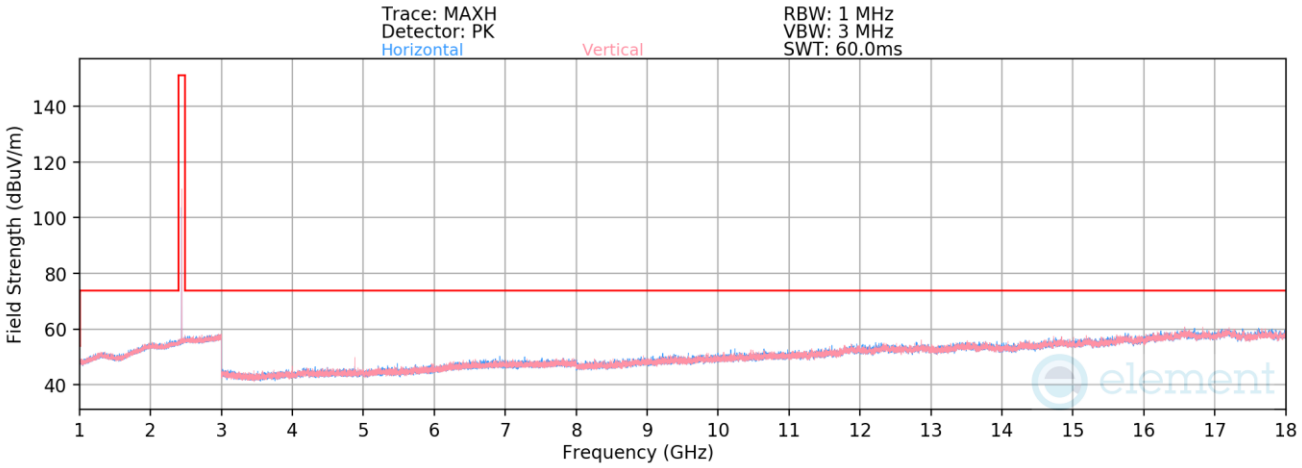
Plot 7-125. Radiated Spurious Emissions above 1GHz Antenna WF7b (Dedicated) (BT GFSK iPA – Ch. 0)

Bluetooth Mode:	GFSK
Data Rate:	1Mbps
Power Scheme	iPA
Distance of Measurements:	3 Meters
Operating Frequency:	2402MHz
Channel:	0

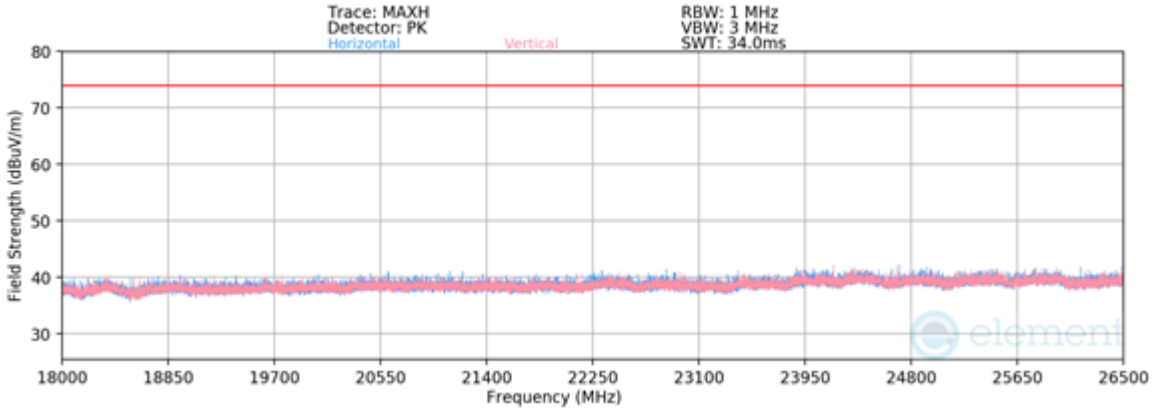
Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4804.00	Peak	V	266	195	-62.38	7.06	51.68	73.98	-22.30
12010.00	Peak	V	-	-	-70.05	18.28	55.23	73.98	-18.75

Table 7-29. Radiated Measurements Antenna WF7b (Dedicated)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.



Plot 7-126. Radiated Spurious Emissions Above 1GHz Antenna WF7b (Dedicated) (BT GFSK iPA – Ch. 39)



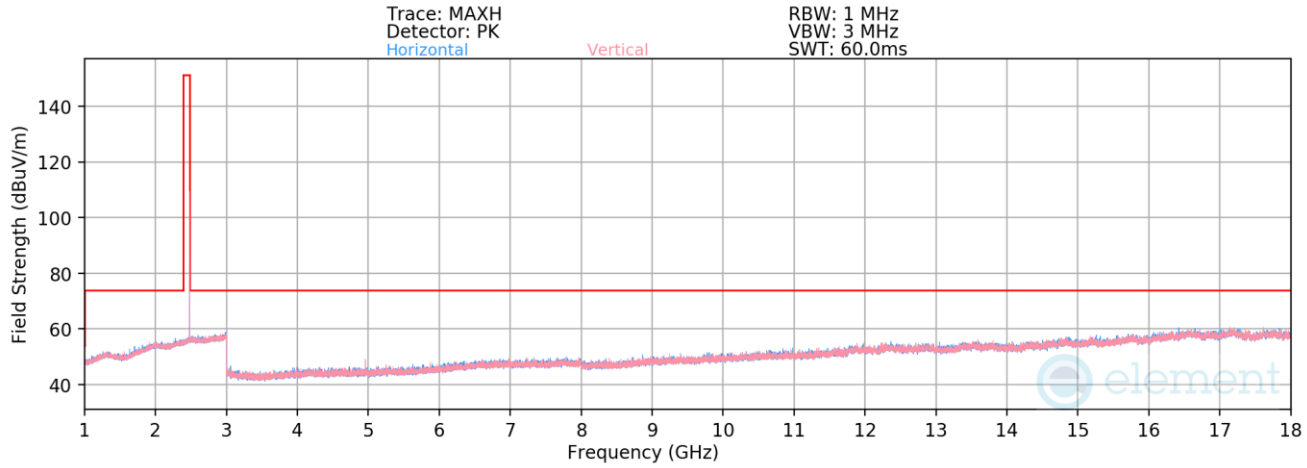
Plot 7-127. Radiated Spurious Emissions Above 18GHz Antenna WF7b (Dedicated) (BT GFSK iPA – Ch. 39)

Bluetooth Mode:	GFSK
Data Rate:	1Mbps
Power Scheme	iPA
Distance of Measurements:	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 [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4882.00	Peak	V	277	192	-63.01	7.57	51.56	73.98	-22.42
7323.00	Peak	V	-	-	-68.71	10.43	48.72	73.98	-25.26
12205.00	Peak	V	-	-	-70.67	18.45	54.78	73.98	-19.20

Table 7-30. Radiated Measurements Antenna WF7b (Dedicated)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.



Plot 7-128. Radiated Spurious Emissions above 1GHz Antenna WF7b (Dedicated) (BT GFSK iPA – Ch. 78)

Bluetooth Mode:	GFSK
Data Rate:	1Mbps
Power Scheme	iPA
Distance of Measurements:	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 [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4960.00	Peak	V	269	184	-63.88	7.30	50.42	73.98	-23.56
7440.00	Peak	V	-	-	-68.16	10.48	49.32	73.98	-24.66
12400.00	Peak	V	-	-	-70.21	18.99	55.78	73.98	-18.20

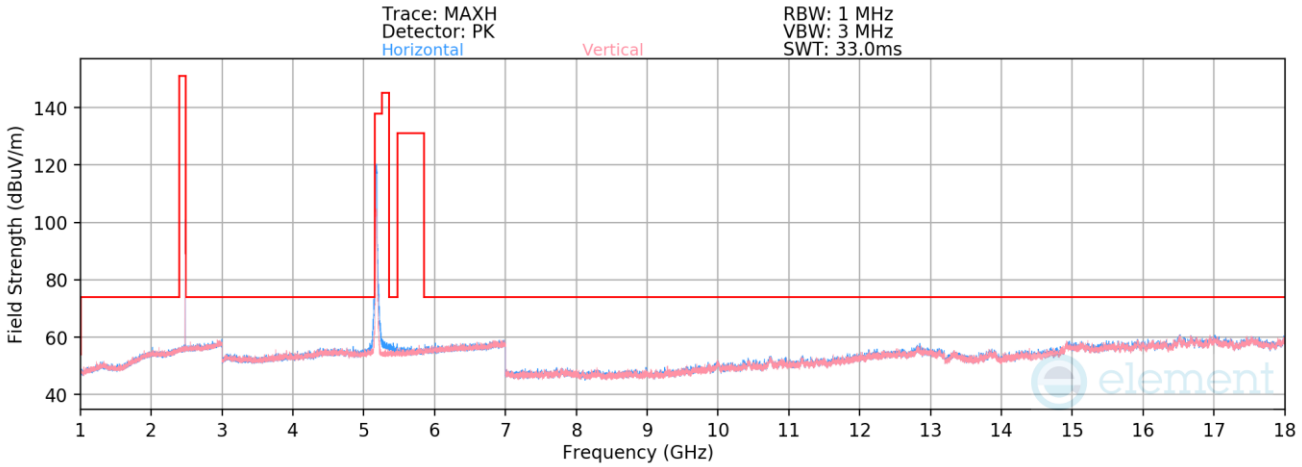
Table 7-31. Radiated Measurements Antenna WF7b (Dedicated)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

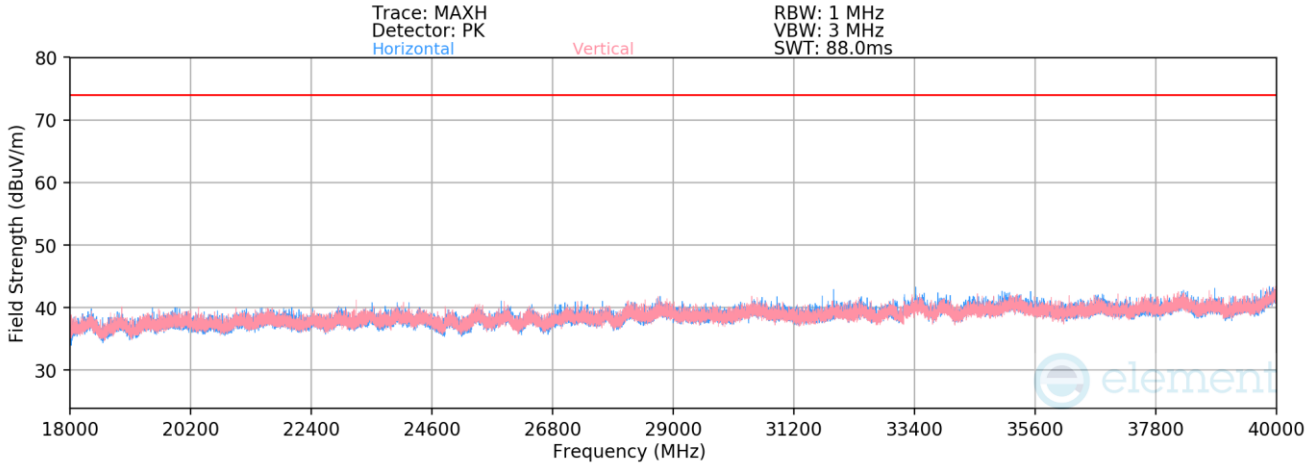
Simultaneous Tx

Description	Bluetooth	UNII
Antenna	Antenna WF8	Antenna WF8
Channel	78	36
Operating Frequency (MHz)	2480	5180
Mode/Modulation	GFSK iPA	802.11n

Table 7-32. Worst Case Simultaneous Transmission Configuration



Plot 7-129. Radiated Spurious Emissions - Simultaneous Transmission Above 1GHz



Plot 7-130. Radiated Spurious Emissions - Simultaneous Transmission Above 18GHz

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

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	Peak	H	238	250	-67.70	17.06	56.36	73.98	-17.61
7440.00	Peak	H	-	-	-69.06	12.25	50.19	73.98	-23.79
12400.00	Peak	H	-	-	-71.36	19.38	55.02	73.98	-18.96

Table 7-33. Bluetooth Harmonics 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 [dBµV/m]	Limit [dBµV/m]	Margin [dB]
10360.00	Peak	H	-	-	-70.80	16.28	52.48	68.23	-15.75
15540.00	Avg	H	-	-	-83.30	23.00	46.70	53.98	-7.28
15540.00	Peak	H	-	-	-72.08	23.00	57.92	73.98	-16.06

Table 7-34. UNII Harmonics Emissions Measurements in Simultaneous Transmission Mode

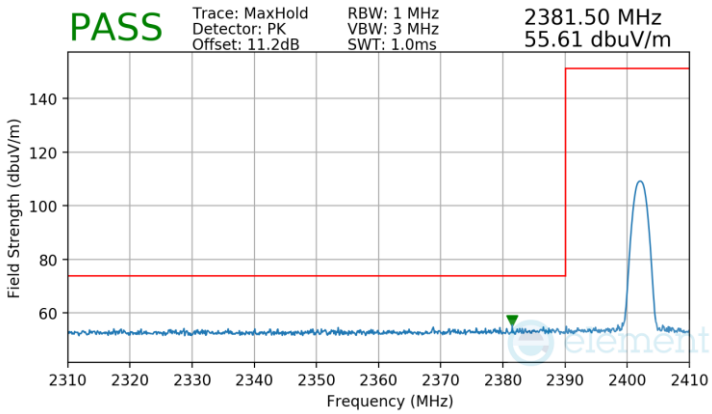
Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

7.9.2 Radiated Restricted Band Edge Measurements

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

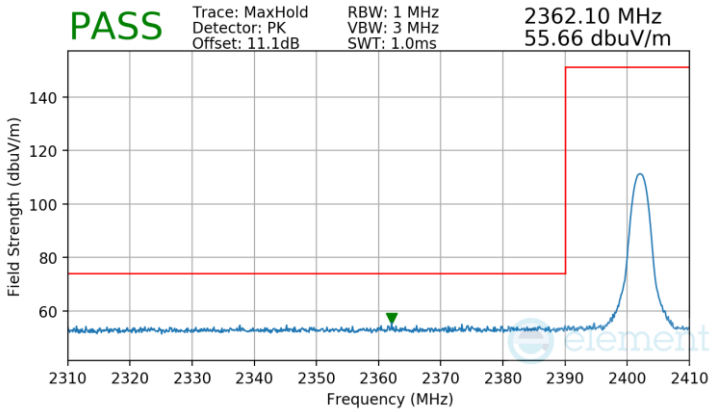
Antenna WF8 (Common)

Bluetooth Mode:	GFSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0



Plot 7-131. Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Common)

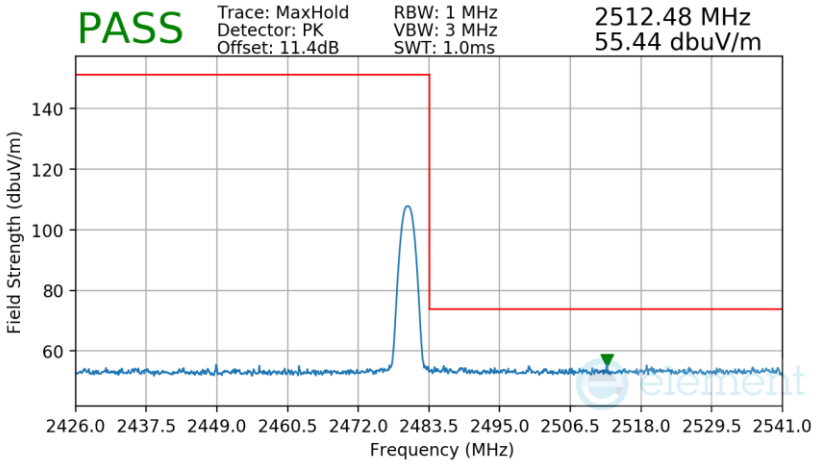
Bluetooth Mode:	8DPSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0



Plot 7-132. Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Common)

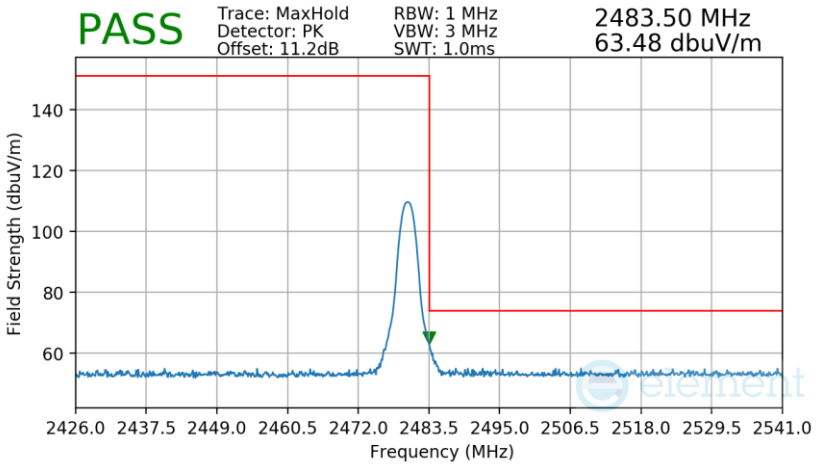
Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Bluetooth Mode:	GFSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78



Plot 7-133. Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Common)

Bluetooth Mode:	8DPSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78

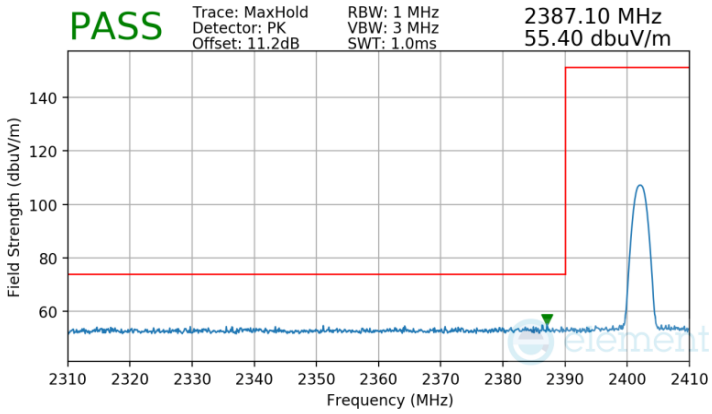


Plot 7-134. Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Common)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

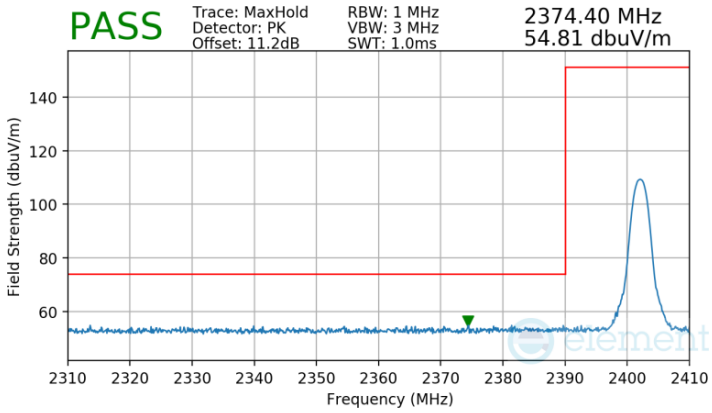
Antenna WF7b (Common)

Bluetooth Mode:	GFSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0



Plot 7-135. Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Common)

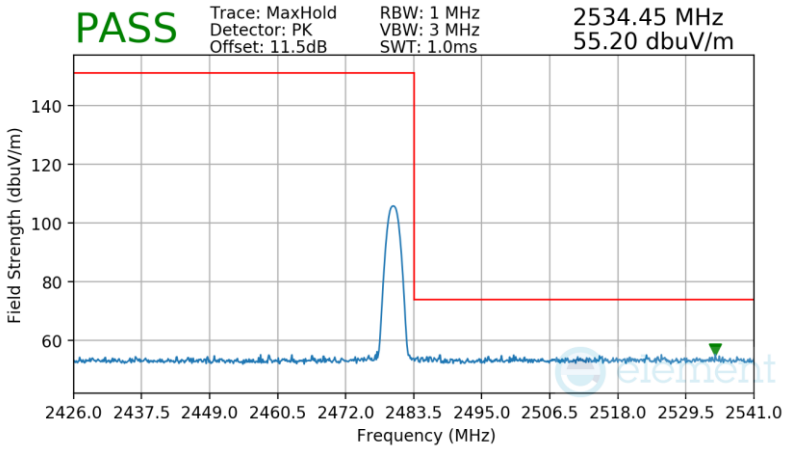
Bluetooth Mode:	8DPSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0



Plot 7-136. Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Common)

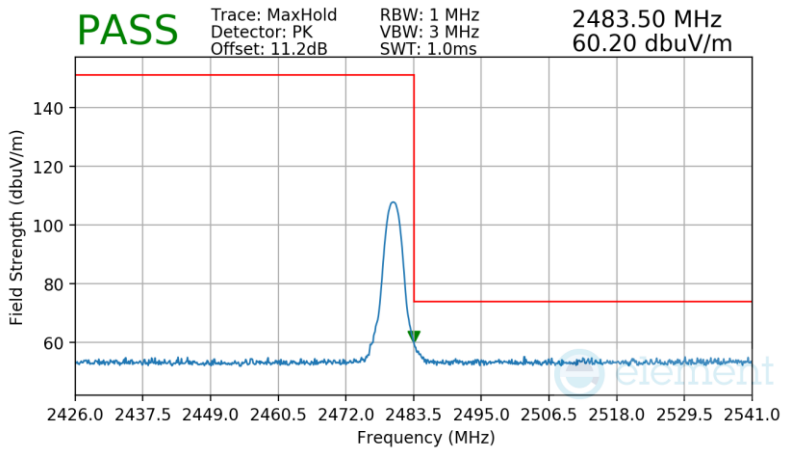
Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Bluetooth Mode:	GFSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78



Plot 7-137. Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Common)

Bluetooth Mode:	8DPSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78

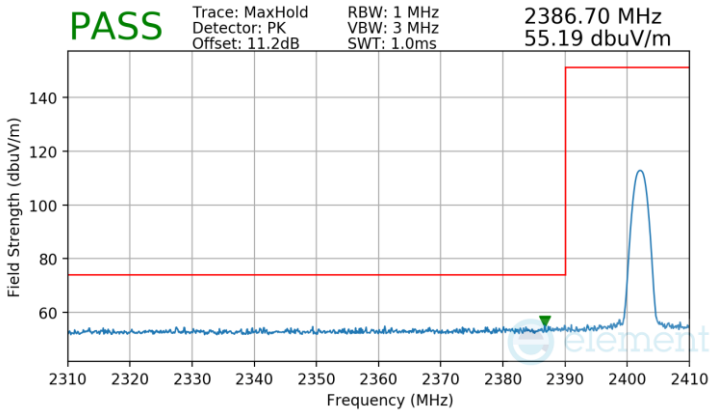


Plot 7-138. Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Common)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

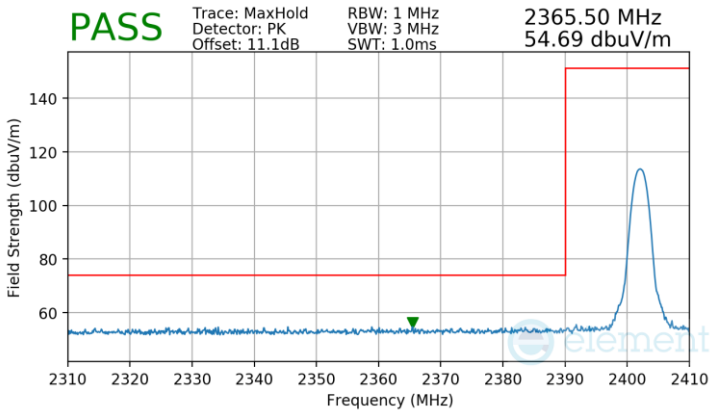
Antenna WF8 (Dedicated)

Bluetooth Mode:	GFSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0



Plot 7-139. Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Dedicated)

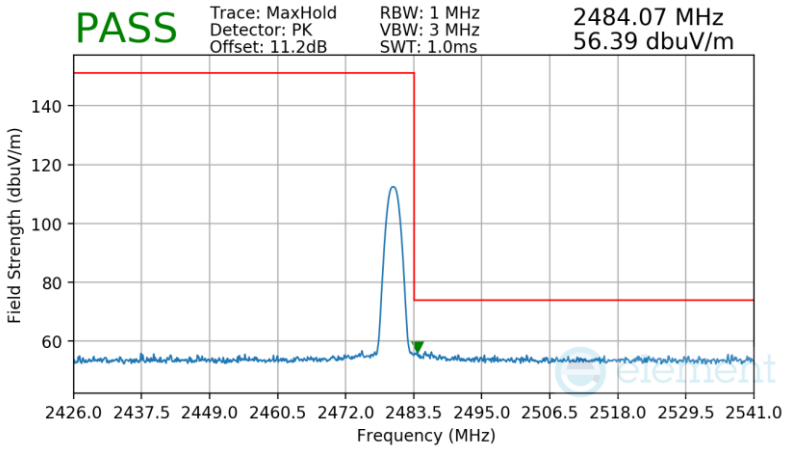
Bluetooth Mode:	8DPSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0



Plot 7-140. Radiated Restricted Lower Band Edge Measurement Antenna WF8 (Dedicated)

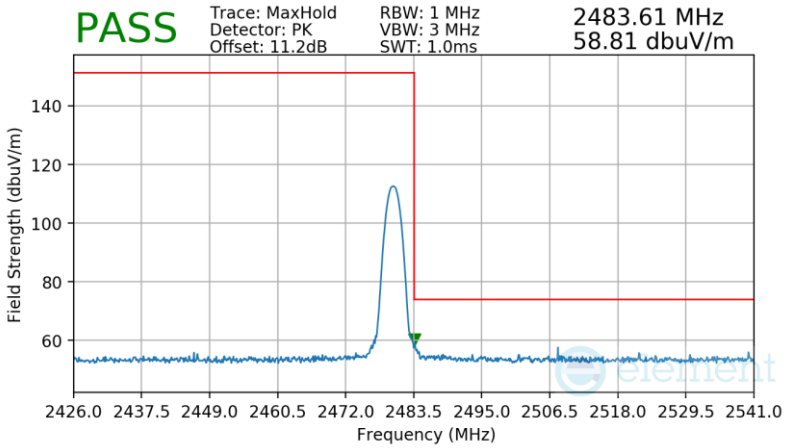
Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Bluetooth Mode:	GFSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78



Plot 7-141. Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Dedicated)

Bluetooth Mode:	8DPSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78

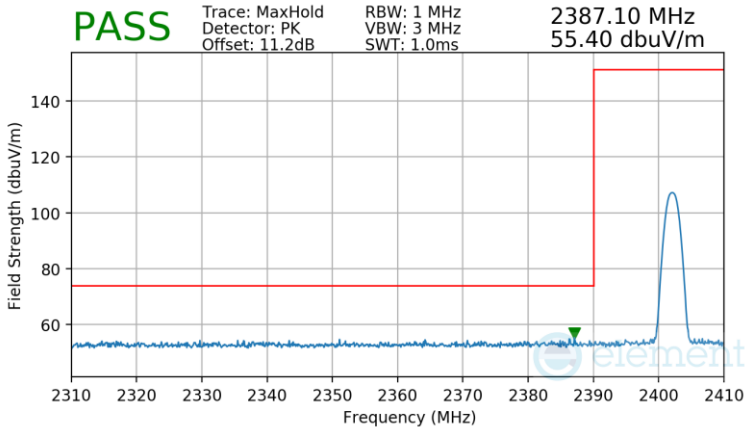


Plot 7-142. Radiated Restricted Upper Band Edge Measurement Antenna WF8 (Dedicated)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

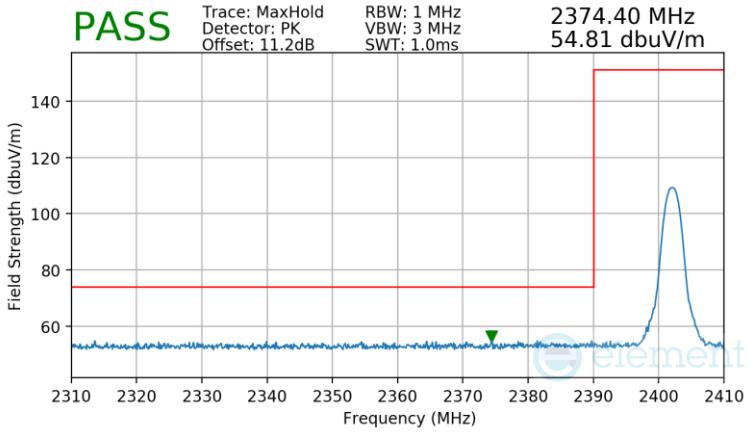
Antenna WF7b (Dedicated)

Bluetooth Mode:	GFSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0



Plot 7-143. Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Dedicated)

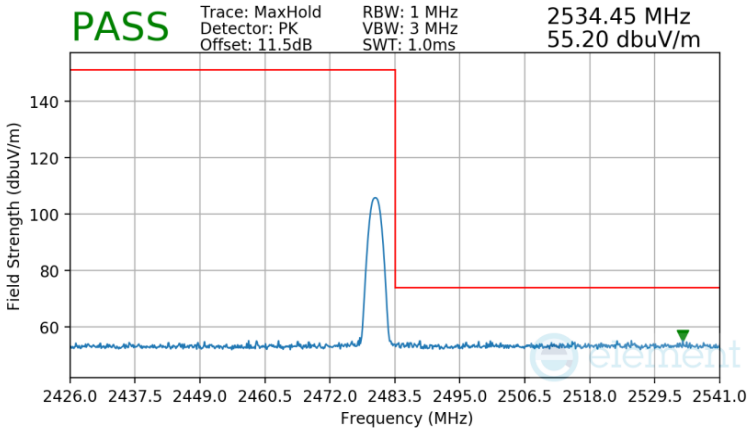
Bluetooth Mode:	8DPSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0



Plot 7-144. Radiated Restricted Lower Band Edge Measurement Antenna WF7b (Dedicated)

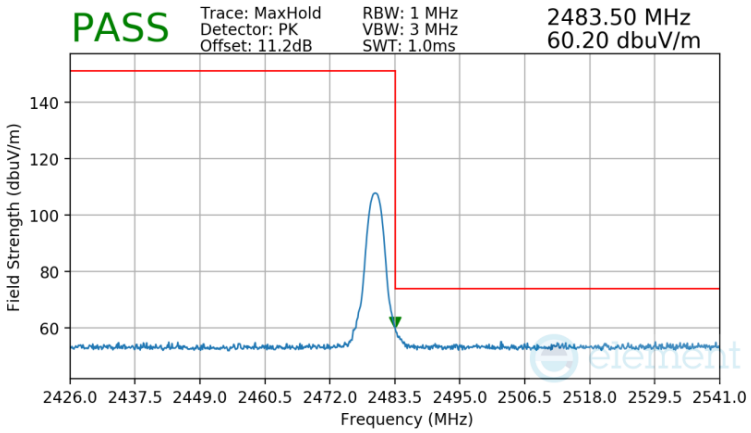
Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Bluetooth Mode:	GFSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78



Plot 7-145. Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Dedicated)

Bluetooth Mode:	8DPSK
Power Scheme:	iPA
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78



Plot 7-146. Radiated Restricted Upper Band Edge Measurement Antenna WF7b (Dedicated)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

7.10 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 7-35 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 7-35. Radiated Limits

Test Procedures Used

ANSI C63.10-2020

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

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Test Setup

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

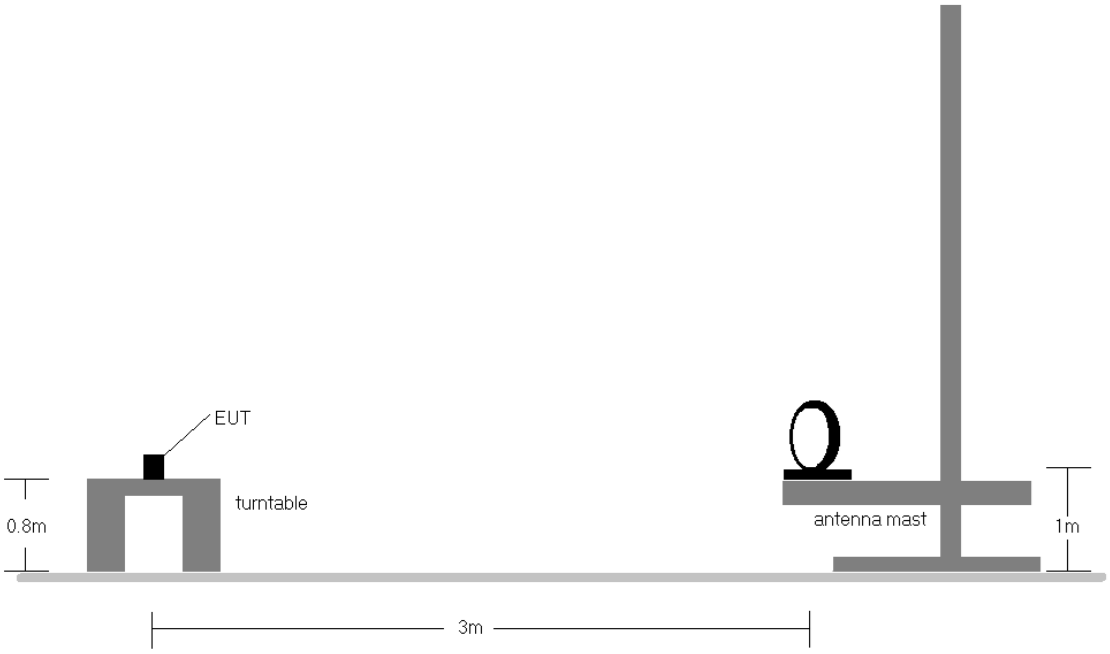


Figure 7-9. Radiated Test Setup < 30MHz

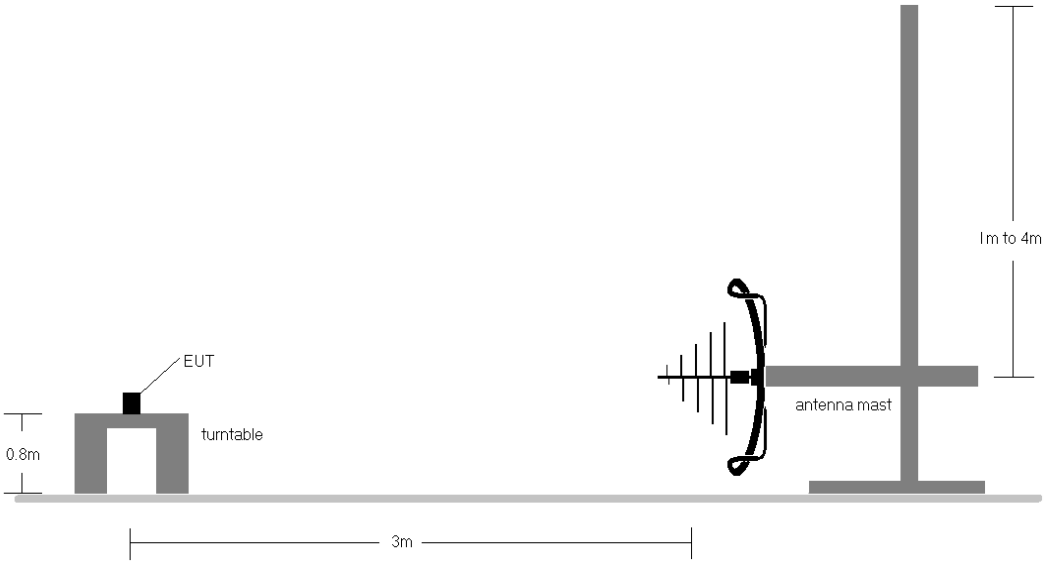


Figure 7-10. Radiated Test Setup < 1GHz

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

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 7-35.
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. All supported modulation and antenna have been tested on the unit and only worst case configuration is reported.
10. 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

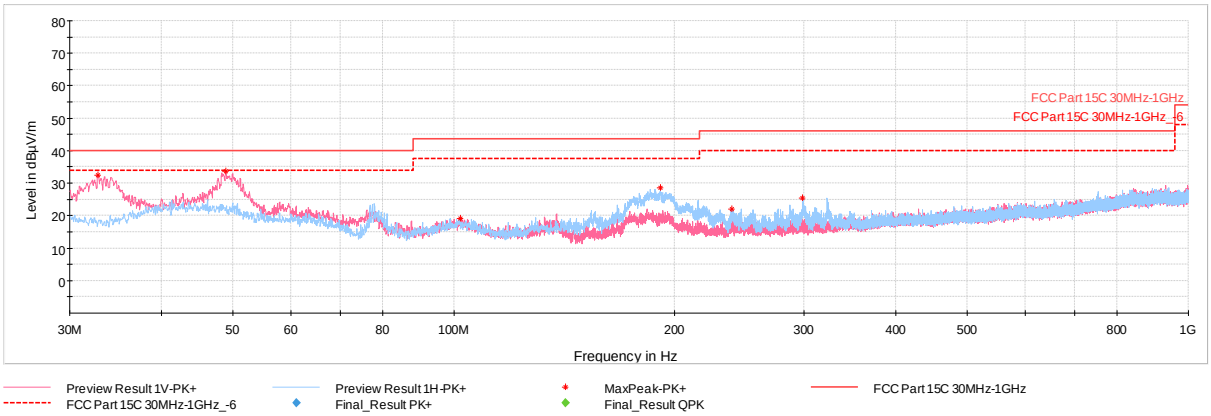
- Field Strength Level $[dB\mu V/m]$ = Analyzer Level $[dBm]$ + 107 + AFCL $[dB/m]$
- AFCL $[dB/m]$ = Antenna Factor $[dB/m]$ + Cable Loss $[dB]$ – Preamplifier Gain $[dB]$
- Margin $[dB]$ = Field Strength Level $[dB\mu V/m]$ – Limit $[dB\mu V/m]$

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Radiated Spurious Emissions Measurements (Below 1GHz)

§15.209; RSS-Gen [8.9]

Antenna WF8 (Dedicated)



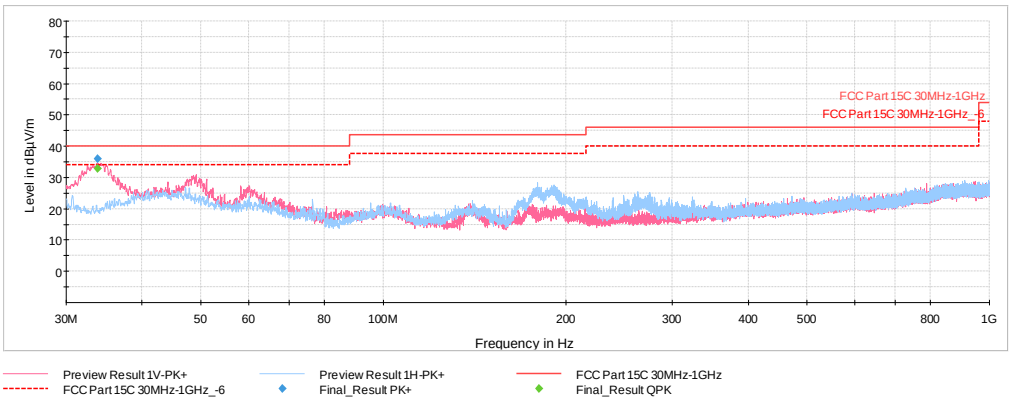
Plot 7-147. Radiated Spurious Emissions Below 1GHz Antenna WF8 (Dedicated) (GFSK iPA – Ch.39, with AC/DC Adapter via USB-C cable with wire charger)

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]
32.76	Max Peak	V	100	268	-56.19	-18.47	32.34	40.00	-7.66
48.96	Max Peak	V	100	353	-58.96	-14.35	33.69	40.00	-6.31
101.97	Max Peak	H	300	344	-71.34	-16.43	19.23	43.52	-24.29
191.02	Max Peak	H	100	178	-62.03	-16.52	28.45	43.52	-15.07
238.84	Max Peak	H	100	142	-70.14	-14.78	22.08	46.02	-23.94
298.50	Max Peak	H	100	5	-68.18	-13.33	25.49	46.02	-20.53

Table 7-36. Radiated Spurious Emissions Below 1GHz Antenna WF8 (Dedicated) (GFSK iPA – Ch.39, with AC/DC Adapter via USB-C cable with wire charger)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Antenna WF7b (Dedicated)



Plot 7-148. Radiated Spurious Emissions Below 1GHz Antenna WF7b (Dedicated) (GFSK iPA – Ch.39, with AC/DC Adapter via USB-C cable with wire charger)

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]
33.78	Quasi Peak	V	100	331	-56.06	-18.13	32.81	40.00	-7.19
49.16	Max Peak	V	200	90	-61.65	-14.33	31.02	40.00	-8.98
76.46	Max Peak	H	300	69	-62.63	-21.26	23.11	40.00	-16.89
140.48	Max Peak	H	200	155	-64.37	-20.05	22.58	43.52	-20.94
179.62	Max Peak	H	100	167	-60.89	-17.81	28.30	43.52	-15.22
275.27	Max Peak	H	100	90	-67.71	-14.00	25.29	46.02	-20.73

Table 7-37. Radiated Spurious Emissions Below 1GHz Antenna WF7b (Dedicated) (GFSK iPA – Ch.39, with AC/DC Adapter via USB-C cable with wire charger)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

7.11 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 (dBµV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

Table 7-38. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10-2020, 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

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

Test Setup

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

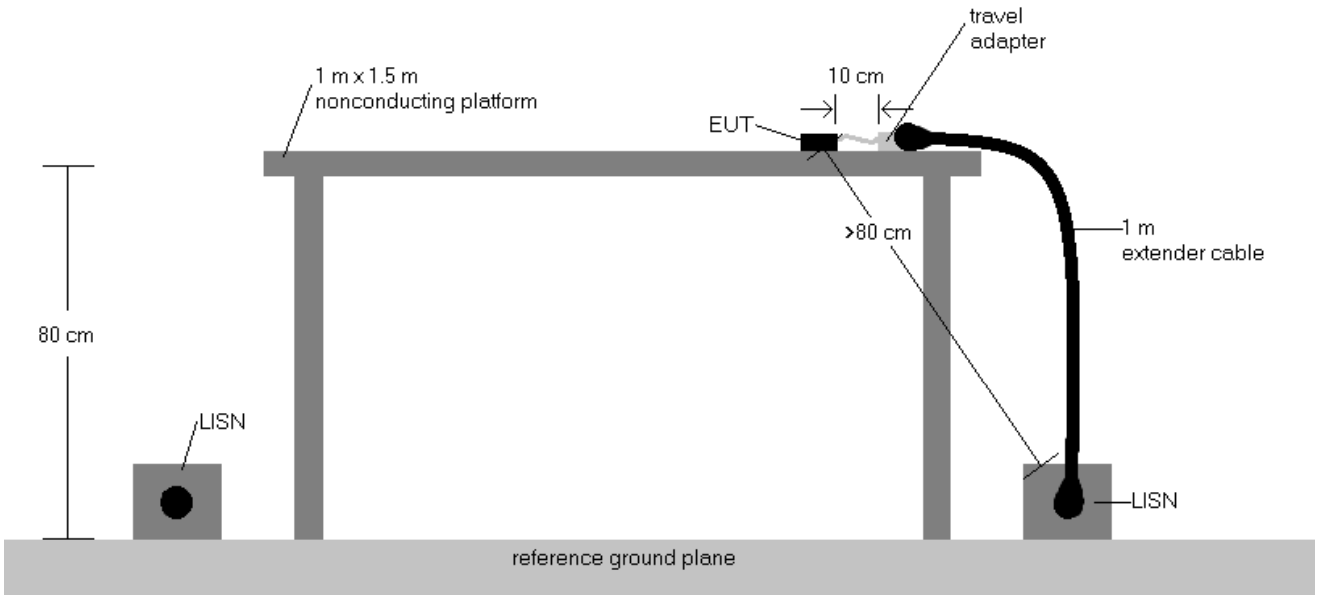
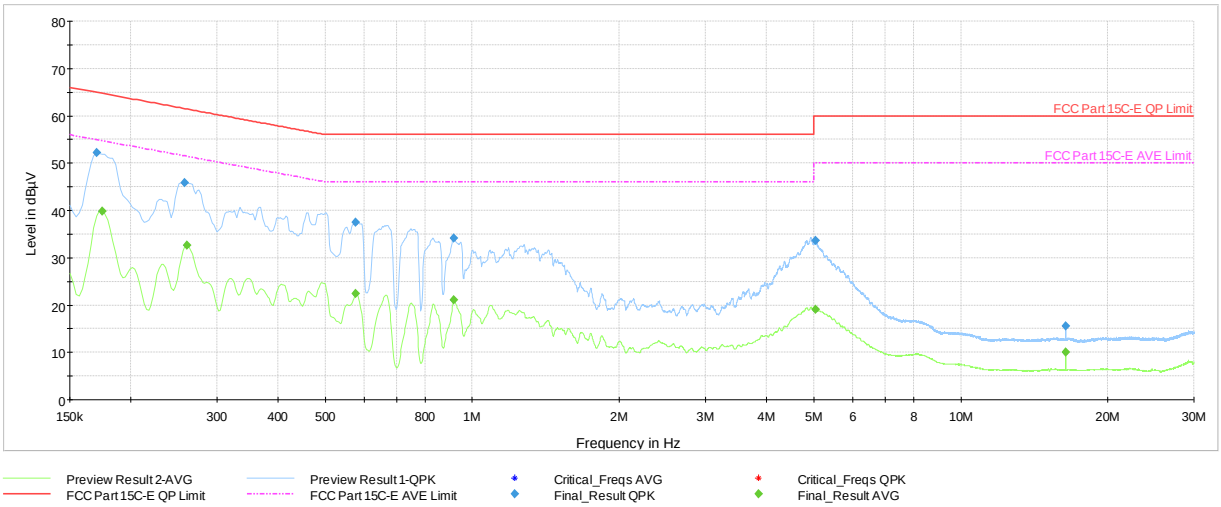


Figure 7-11. Test Instrument & Measurement Setup

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. 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 (dBμV) = QP/AV Analyzer/Receiver Level (dBμV) + Correction Factor (dB)
6. Margin (dB) = QP/AV Level (dBμV) - QP/AV Limit (dBμV)
7. Traces shown in plot are made using a quasi peak and average detectors.
8. Deviations to the Specifications: None.

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

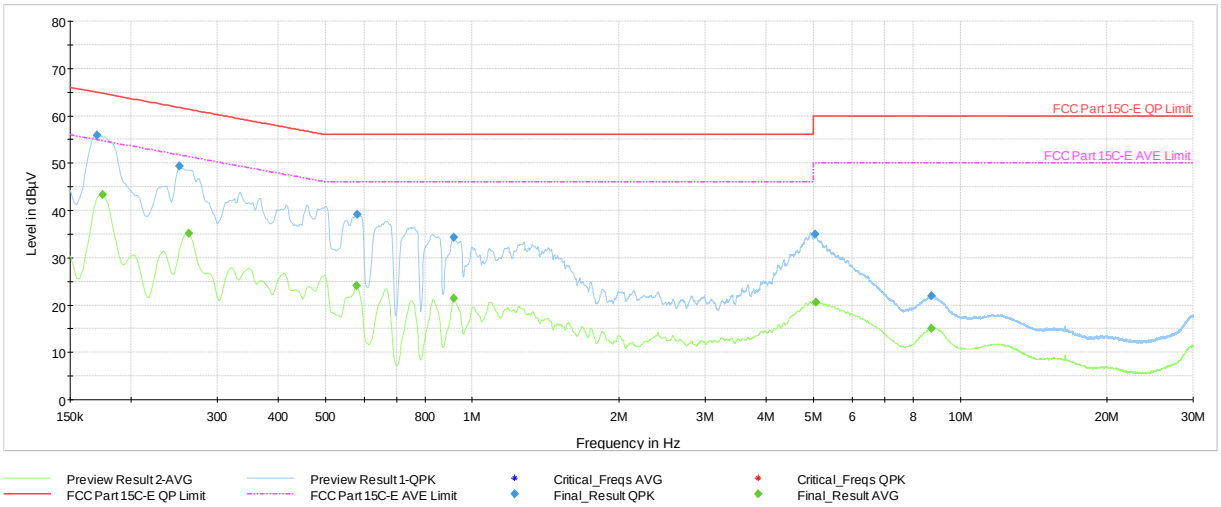


Plot 7-149. AC Line-Conducted Test Plot Antenna WF8 (Dedicated) (L1, GFSK iPA – Ch.39, with AC/DC Adapter via USB-C cable with wire charger)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.17	FINAL	52.24	---	64.95	-12.71	L1	GND
0.18	FINAL	---	39.91	54.73	-14.82	L1	GND
0.26	FINAL	45.93	---	61.50	-15.57	L1	GND
0.26	FINAL	---	32.58	51.42	-18.84	L1	GND
0.58	FINAL	---	22.39	46.00	-23.61	L1	GND
0.58	FINAL	37.52	---	56.00	-18.48	L1	GND
0.92	FINAL	34.21	---	56.00	-21.79	L1	GND
0.92	FINAL	---	21.06	46.00	-24.94	L1	GND
5.04	FINAL	33.69	---	60.00	-26.31	L1	GND
5.04	FINAL	---	19.11	50.00	-30.89	L1	GND
16.39	FINAL	---	10.12	50.00	-39.88	L1	GND
16.39	FINAL	15.57	---	60.00	-44.43	L1	GND

Table 7-39. AC Line-Conducted Test Data Antenna WF8 (Dedicated) (L1, GFSK iPA – Ch.39, with AC/DC Adapter via USB-C cable with wire charger)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

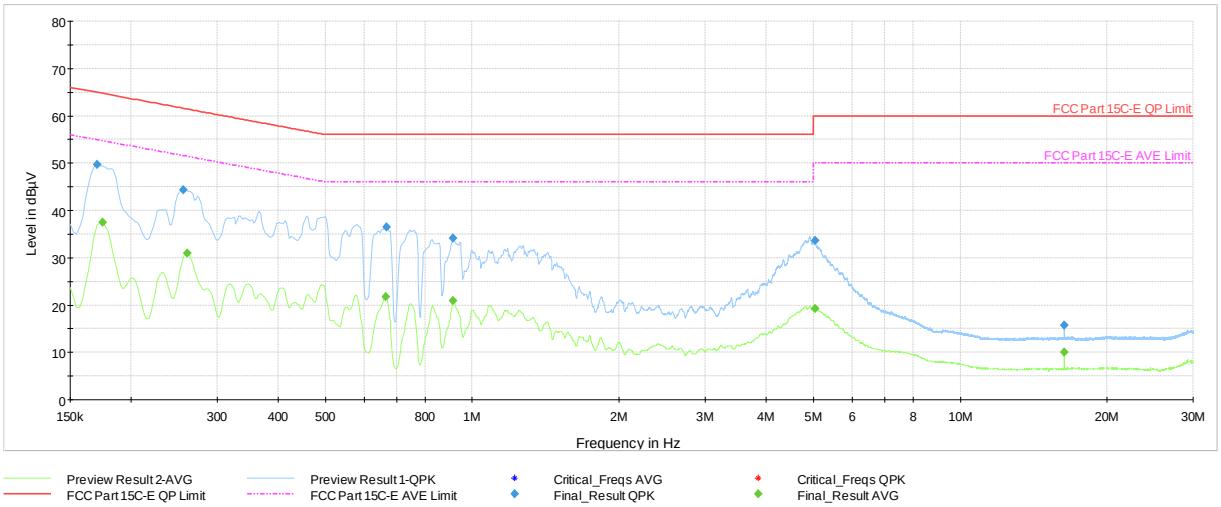


Plot 7-150. AC Line-Conducted Test Plot Antenna WF8 (Dedicated) (N, GFSK iPA – Ch.39, with AC/DC Adapter via USB-C cable with wire charger)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.17	FINAL	55.95	---	64.95	-9.00	N	GND
0.18	FINAL	---	43.38	54.73	-11.35	N	GND
0.25	FINAL	49.30	---	61.72	-12.42	N	GND
0.26	FINAL	---	35.09	51.35	-16.26	N	GND
0.58	FINAL	---	24.15	46.00	-21.85	N	GND
0.58	FINAL	39.11	---	56.00	-16.89	N	GND
0.92	FINAL	34.37	---	56.00	-21.63	N	GND
0.92	FINAL	---	21.44	46.00	-24.56	N	GND
5.05	FINAL	34.93	---	60.00	-25.07	N	GND
5.05	FINAL	---	20.52	50.00	-29.48	N	GND
8.71	FINAL	21.98	---	60.00	-38.02	N	GND
8.72	FINAL	---	15.11	50.00	-34.89	N	GND

Table 7-40. AC Line-Conducted Test Data Antenna WF8 (Dedicated) (N, GFSK iPA – Ch.39, with AC/DC Adapter via USB-C cable with wire charger)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

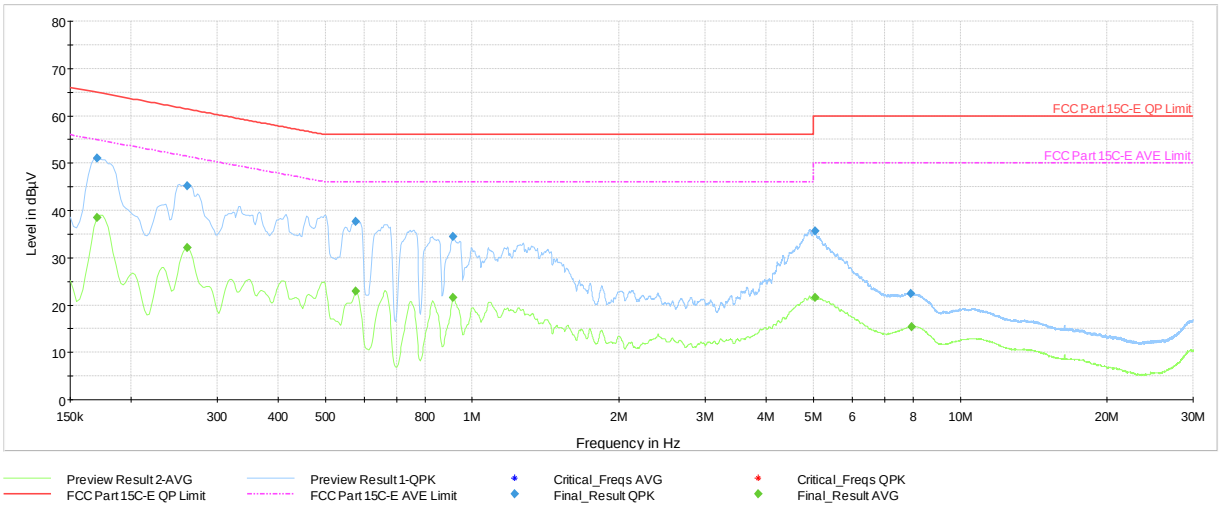


Plot 7-151. AC Line-Conducted Test Plot Antenna WF7b (Dedicated) (L1, GFSK iPA – Ch.39, with AC/DC Adapter via USB-C cable with wire charger)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.17	FINAL	49.72	---	64.95	-15.23	L1	GND
0.18	FINAL	---	37.46	54.73	-17.27	L1	GND
0.26	FINAL	44.35	---	61.57	-17.22	L1	GND
0.26	FINAL	---	31.01	51.42	-20.41	L1	GND
0.67	FINAL	---	21.79	46.00	-24.21	L1	GND
0.67	FINAL	36.43	---	56.00	-19.57	L1	GND
0.91	FINAL	34.17	---	56.00	-21.83	L1	GND
0.91	FINAL	---	20.88	46.00	-25.12	L1	GND
5.03	FINAL	33.62	---	60.00	-26.38	L1	GND
5.04	FINAL	---	19.23	50.00	-30.77	L1	GND
16.35	FINAL	---	10.09	50.00	-39.91	L1	GND
16.35	FINAL	15.68	---	60.00	-44.32	L1	GND

Table 7-41. AC Line-Conducted Test Data Antenna WF7b (Dedicated) (L1, GFSK iPA – Ch.39, with AC/DC Adapter via USB-C cable with wire charger)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.



Plot 7-152. AC Line-Conducted Test Plot Antenna WF7b (Dedicated) (N, GFSK iPA – Ch.39, with AC/DC Adapter via USB-C cable with wire charger)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.17	FINAL	---	38.42	54.95	-16.53	N	GND
0.17	FINAL	51.13	---	64.95	-13.82	N	GND
0.26	FINAL	---	32.14	51.42	-19.28	N	GND
0.26	FINAL	45.18	---	61.42	-16.24	N	GND
0.58	FINAL	---	22.92	46.00	-23.08	N	GND
0.58	FINAL	37.72	---	56.00	-18.28	N	GND
0.91	FINAL	34.40	---	56.00	-21.60	N	GND
0.91	FINAL	---	21.52	46.00	-24.48	N	GND
5.03	FINAL	35.69	---	60.00	-24.31	N	GND
5.03	FINAL	---	21.52	50.00	-28.48	N	GND
7.92	FINAL	22.47	---	60.00	-37.53	N	GND
7.94	FINAL	---	15.37	50.00	-34.63	N	GND

Table 7-42. AC Line-Conducted Test Data Antenna WF7b (Dedicated) (N, GFSK iPA – Ch.39, with AC/DC Adapter via USB-C cable with wire charger)

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Apple Tablet Device** **FCC ID: BCGA3354 and IC: 579C-A3354** 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.

Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Element Materials Technology. If you have any questions about this or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact ct.info@element.com.