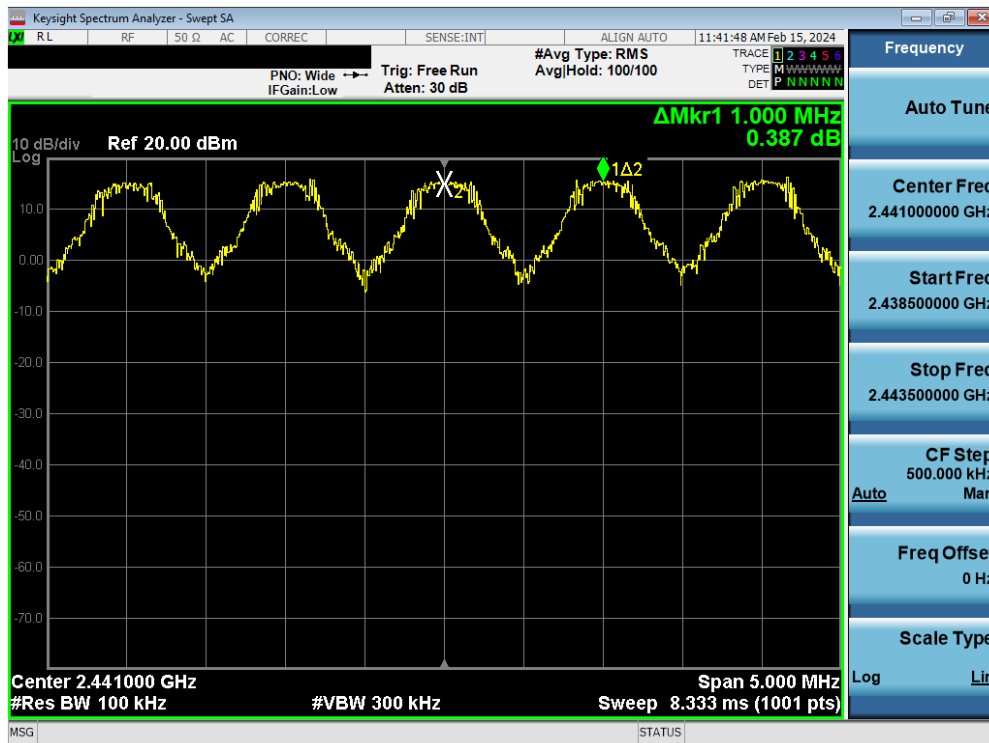


Frequency [MHz]	Data Rate [Mbps]	Mod.	Channel No.	Min. Channel Separation [MHz]
2402	1.0	GFSK	0	0.629
2441	1.0	GFSK	39	0.634
2480	1.0	GFSK	78	0.574
2402	2.0	$\pi/4$ -DQPSK	0	0.893
2441	2.0	$\pi/4$ -DQPSK	39	0.890
2480	2.0	$\pi/4$ -DQPSK	78	0.893
2402	3.0	8DPSK	0	0.871
2441	3.0	8DPSK	39	0.885
2480	3.0	8DPSK	78	0.848

Table 7-12. Minimum Channel Separation – DUAL ANT2



Plot 7-128. Channel Spacing Plot (Bluetooth) – DUAL ANT2

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 86 of 137

7.6 Time of Occupancy

§15.247 (a.1.iii); RSS-247 [5.1(4)]

Test Overview and Limit

Measurement is made while EUT is operating in hopping mode with the spectrum analyzer set to zero span. **The maximum permissible time of occupancy is 400 ms within a period of 400ms multiplied by the number of hopping channels employed.**

Test Procedure Used

ANSI C63.10-2013 – Section 7.8.4

Test Settings

1. Span = zero span, centered on a hopping channel
2. RBW \leq channel spacing and $\gg 1/T$, where T is expected dwell time per channel
3. Sweep = as necessary to capture entire dwell time. Second plot may be required to demonstrate two successive hops on a channel
4. Trigger is set with appropriate trigger delay to place pulse near the center of the plot
5. Detector = peak
6. Trace mode = max hold
7. Marker-delta function used to determine transmit time per hop

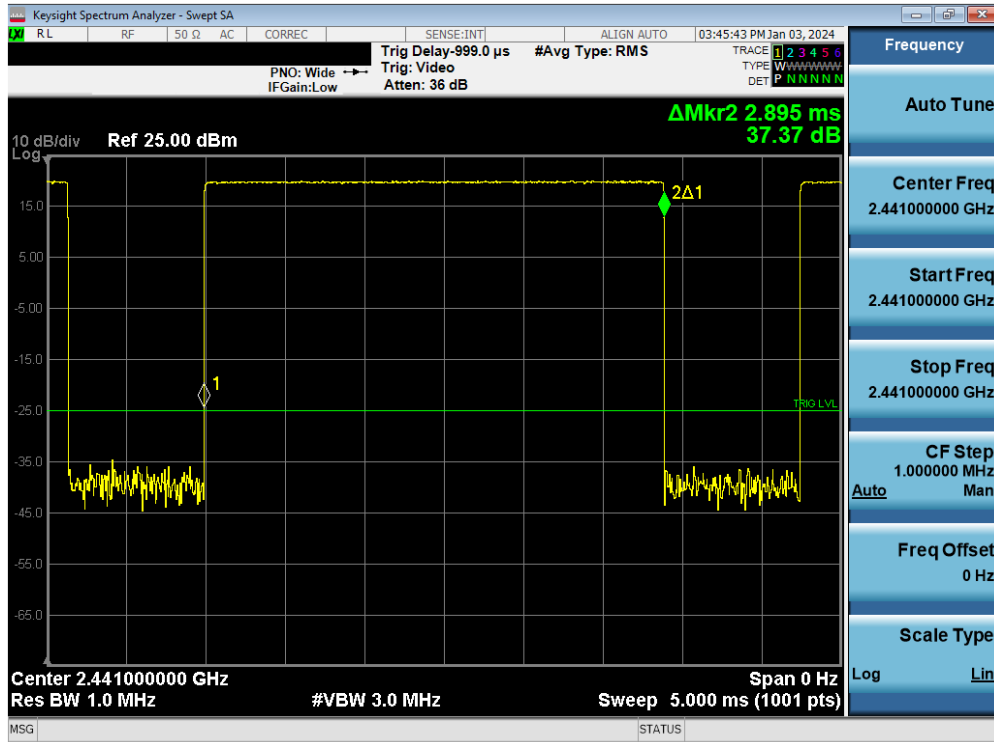
Test Setup

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

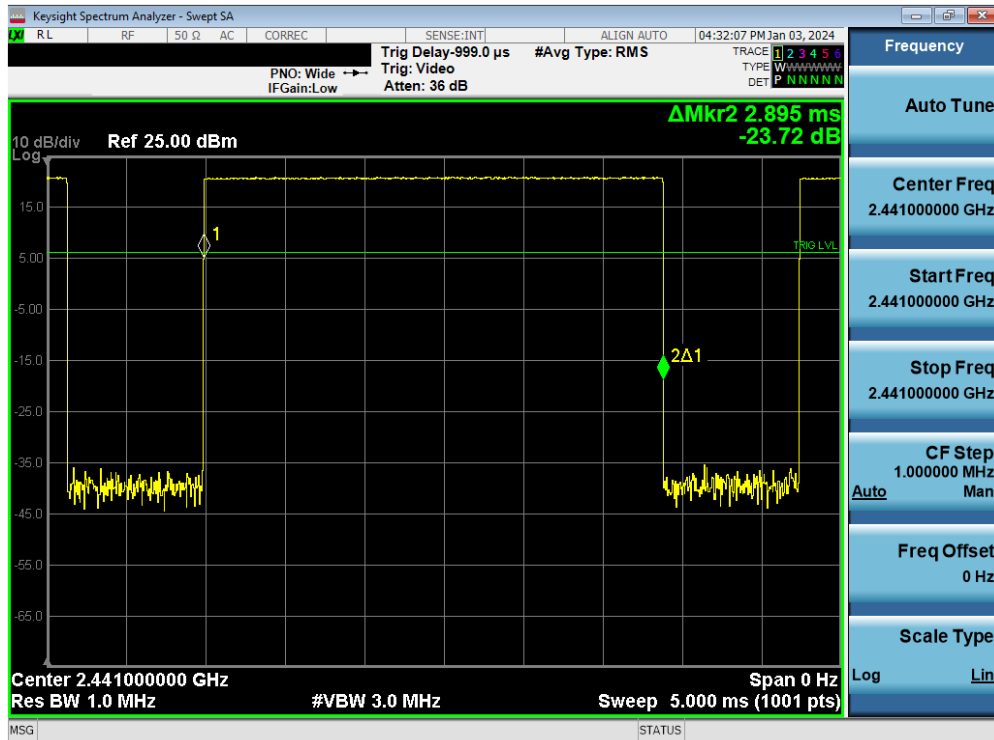


Figure 7-5. Test Instrument & Measurement Setup

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 87 of 137

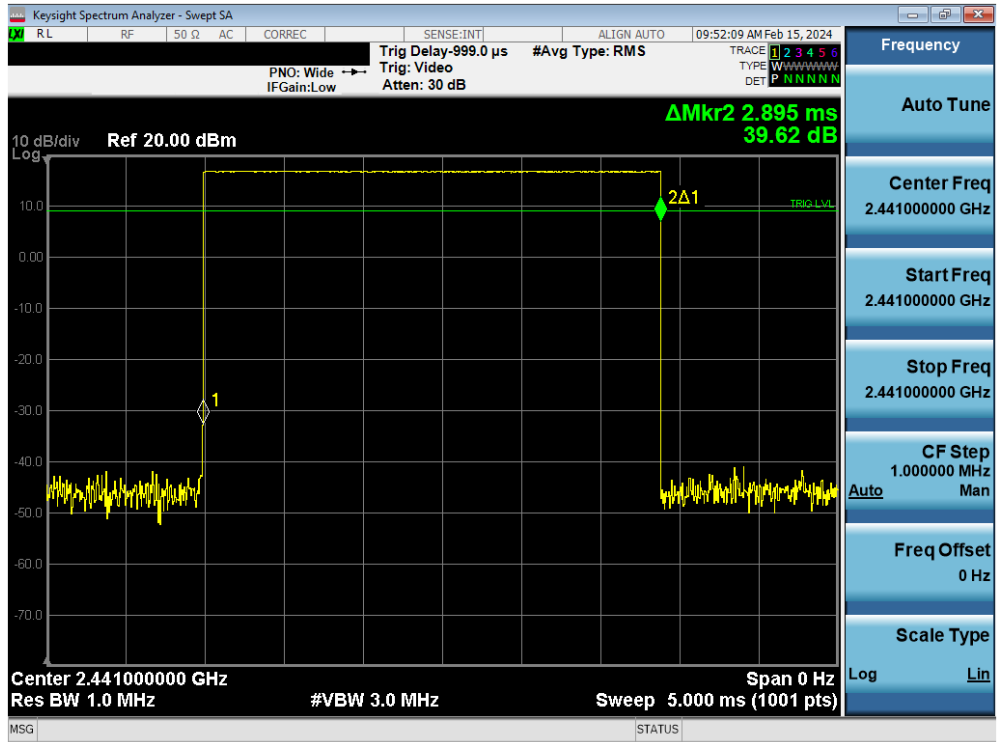


Plot 7-129. Time of Occupancy Plot (Bluetooth) – SISO ANT1

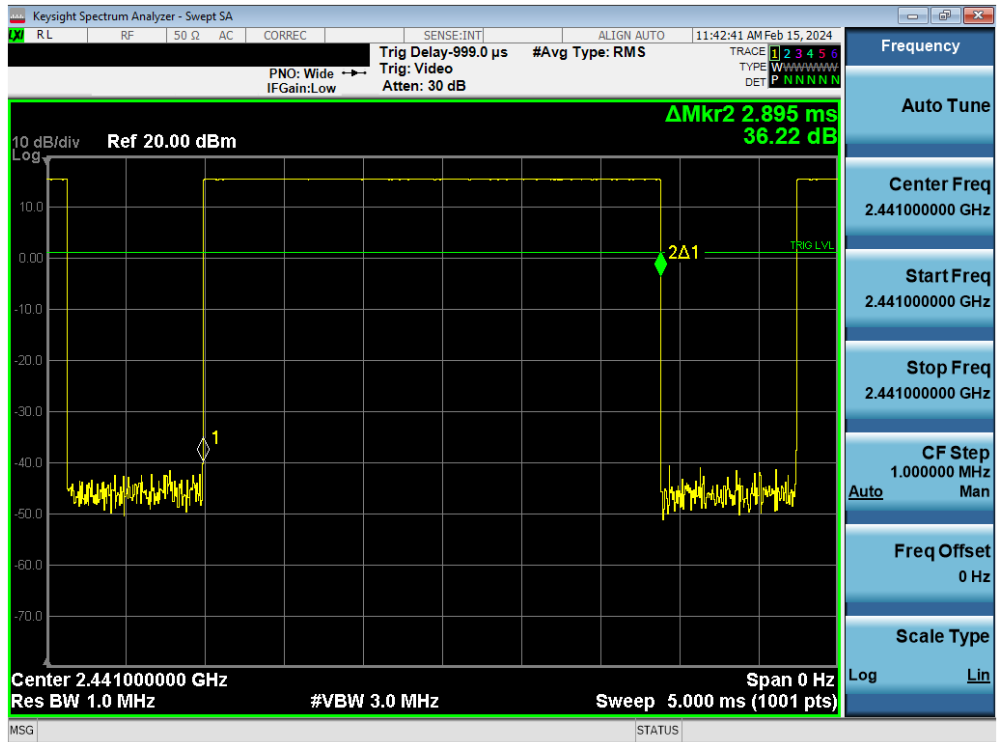


Plot 7-130. Time of Occupancy Plot (Bluetooth) – SISO ANT2

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 88 of 137



Plot 7-131. Time of Occupancy Plot (Bluetooth) – DUAL ANT1



Plot 7-132. Time of Occupancy Plot (Bluetooth) – DUAL ANT2

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 89 of 137

Bluetooth Time of Occupancy Calculation

Typically, Bluetooth 1x/EDR mode has a channel hopping rate of 1600 hops/s. Since 1x/EDR modes use 5 transmit and 1 receive slot, for a total of 6 slots, the Bluetooth transmitter is actually hopping at a rate of $1600 / 6 = 266.67$ hops/s/slot

- $400\text{ms} \times 79$ hopping channels = 31.6 sec (Time of Occupancy Limit)
- Worst case BT has 266.67 hops/second (for 1x/EDR modes with DH5 operation)
- $266.67 \text{ hops/second} / 79$ channels = 3.38 hops/second (# of hops/second on one channel)
- $3.38 \text{ hops/second/channel} \times 31.6$ seconds = 106.67 hops (# hops over a 31.6 second period)
- $106.67 \text{ hops} \times 2.895 \text{ ms/channel}$ = 308.81 ms (worst case dwell time for one channel in 1x/EDR modes)

With AFH, the number of channels is reduced to a minimum of 20 channels and the channel hopping rate is reduced by 50% to 800 hops/s. AFH mode also uses 6 total slots so the Bluetooth transmitter hops at a rate of $800 / 6 = 133.3$ hops/s/slot

- $400\text{ms} \times 20$ hopping channels = 8 sec (Time of Occupancy Limit)
- Worst case BT has 133.3 hops/second/slot (for AFH mode with DH5 operation)
- $133.3 \text{ hops/s} / 20$ channels = 6.67 hops/second (# of hops/second on one channel)
- $6.67 \text{ hops/s} / \text{channel} \times 8$ seconds = 53.34 hops (# hops over a 8 second period)
- $53.34 \text{ hops} \times 2.895 \text{ ms/channel}$ = 154.42 ms (worst case dwell time for one channel in AFH mode)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 90 of 137

7.7 Number of Hopping Channels

§15.247 (a.1.iii); RSS-247 [5.1(4)]

Test Overview and Limit

Measurement is made while EUT is operating in hopping mode. ***This frequency hopping system must employ a minimum of 15 hopping channels.***

Test Procedure Used

ANSI C63.10-2013 – Section 7.8.3

Test Settings

1. Span = frequency of band of operation (divided into two plots)
2. RBW < 30% of channel spacing or 20dB bandwidth, whichever is smaller
3. VBW ≥ RBW
4. Sweep = auto
5. Detector = peak
6. Trace mode = max hold
7. Trace was allowed to stabilize

Test Setup

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



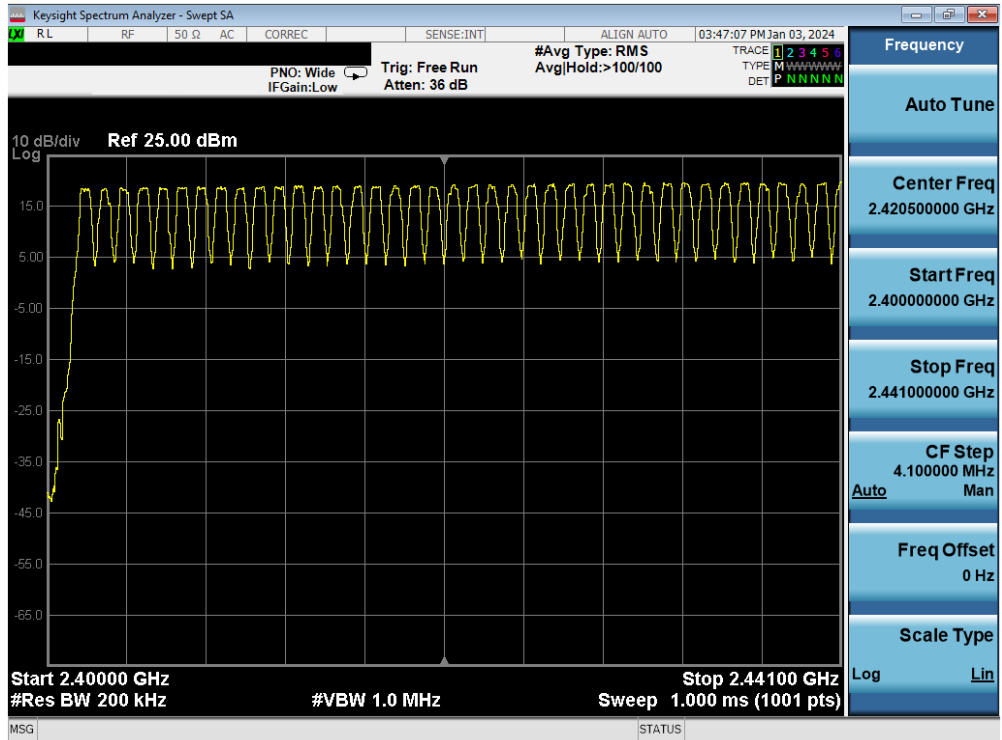
Figure 7-6. Test Instrument & Measurement Setup

Test Notes

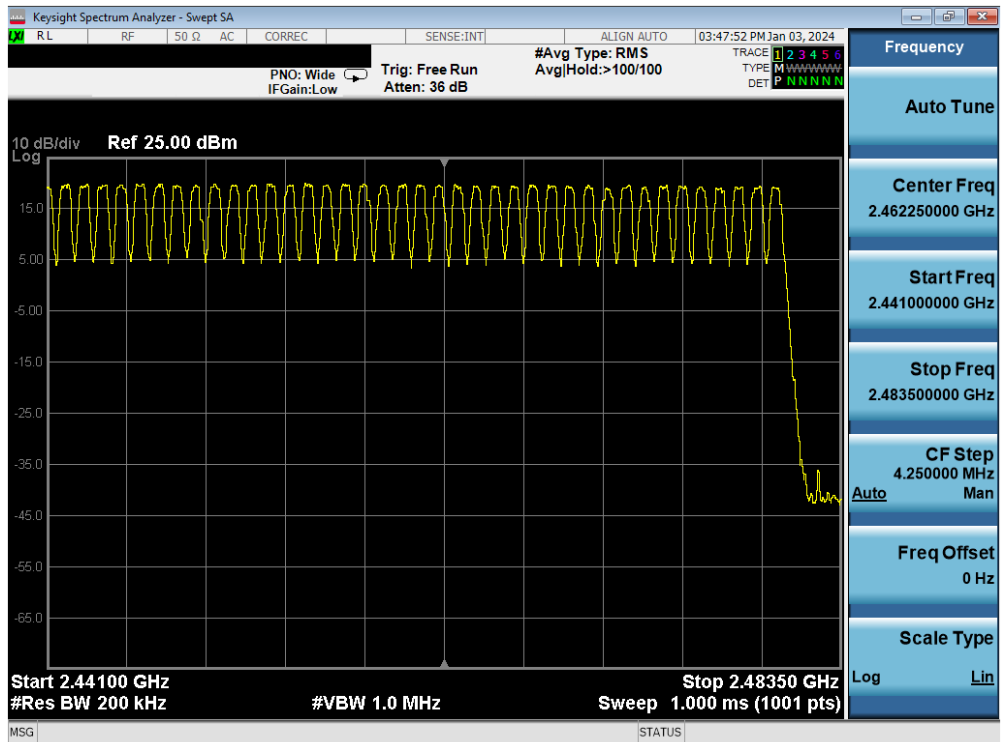
The frequency spectrum was broken up into two sub-ranges to clearly show all the hopping frequencies. In AFH mode, this device operates using 20 channels so the requirement for minimum number of hopping channels is satisfied.

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 91 of 137

SISO ANT1



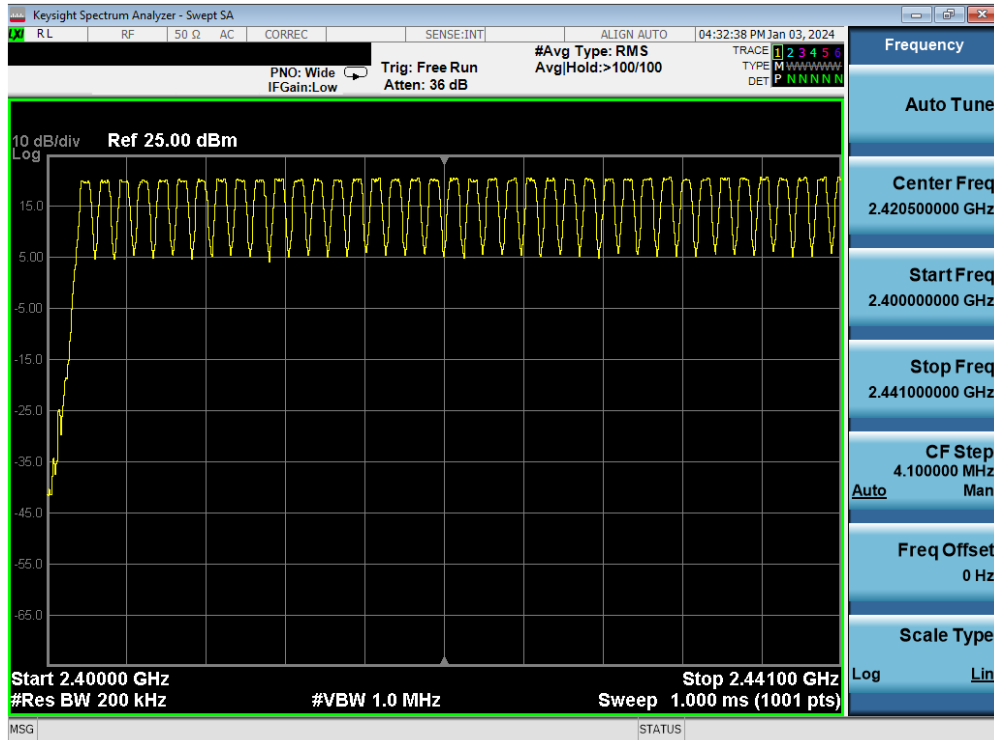
Plot 7-133. Low End Spectrum Channel Hopping Plot (Bluetooth)



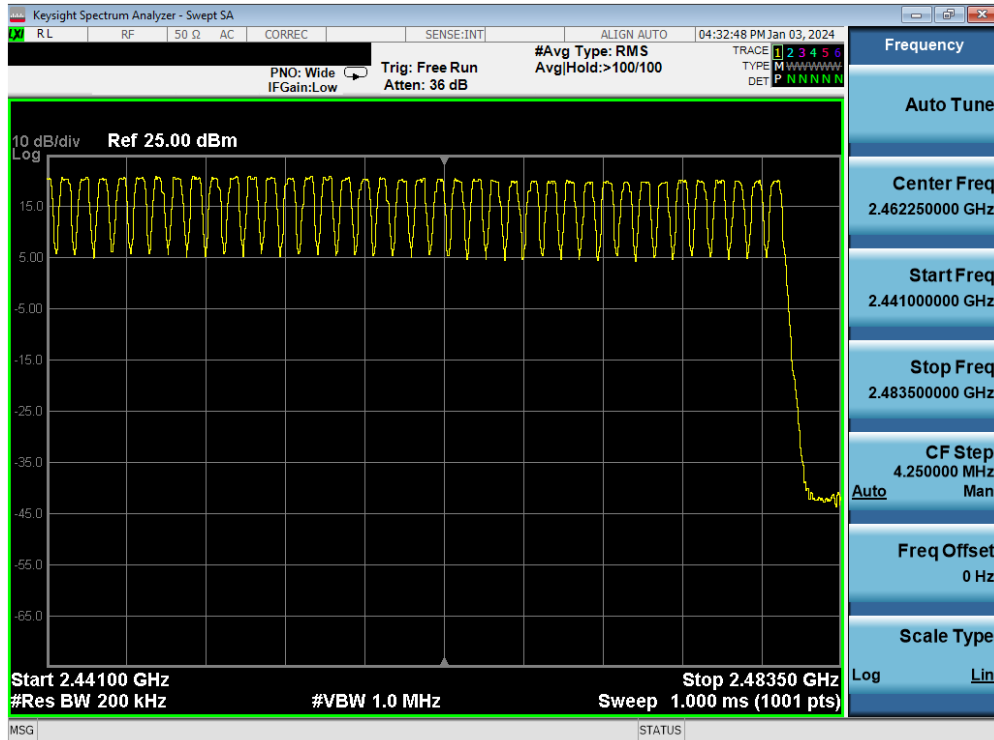
Plot 7-134. High End Spectrum Channel Hopping Plot (Bluetooth)

FCC ID: «FCC_ID» IC: 3048A-2085		MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»		Page 92 of 137

SISO ANT2



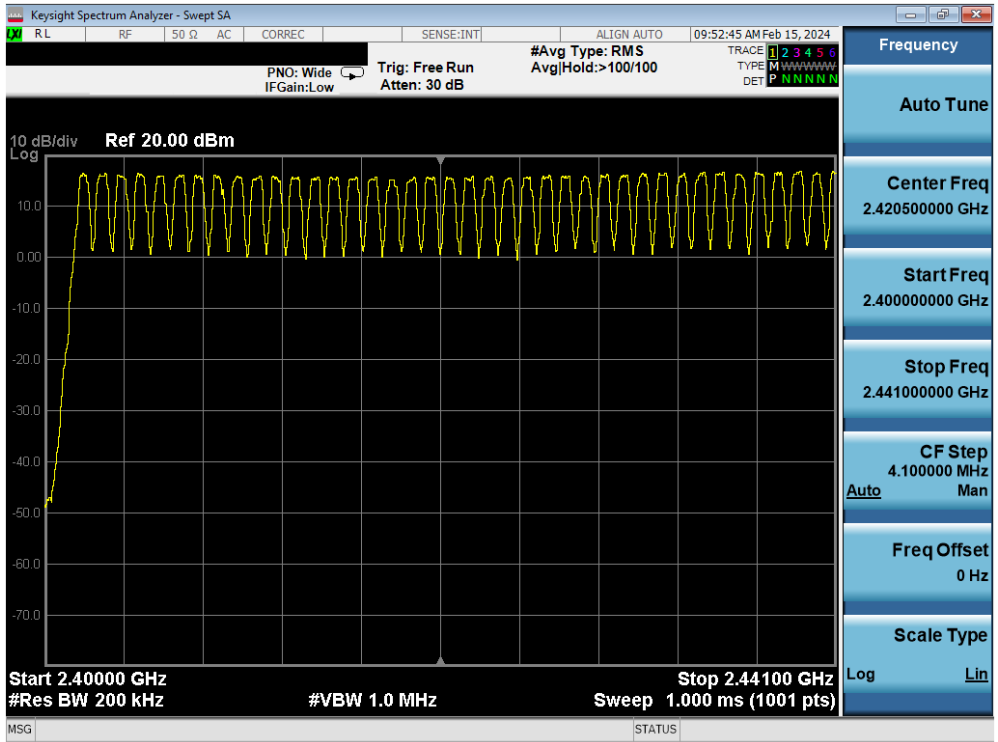
Plot 7-135. Low End Spectrum Channel Hopping Plot (Bluetooth)



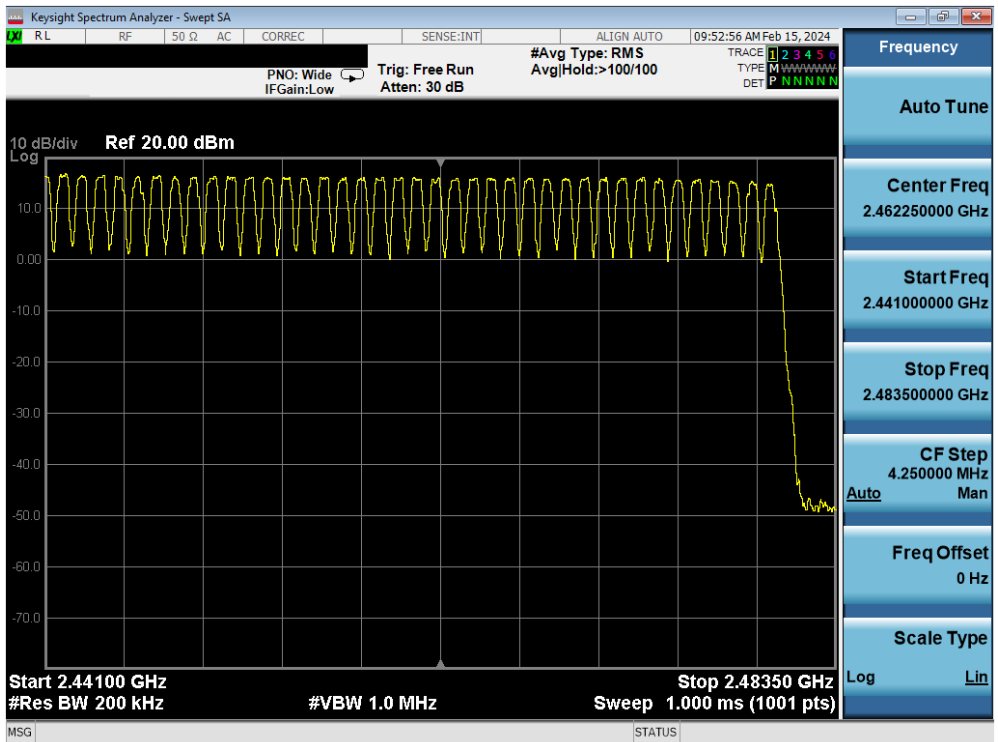
Plot 7-136. High End Spectrum Channel Hopping Plot (Bluetooth)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 93 of 137

DUAL ANT1



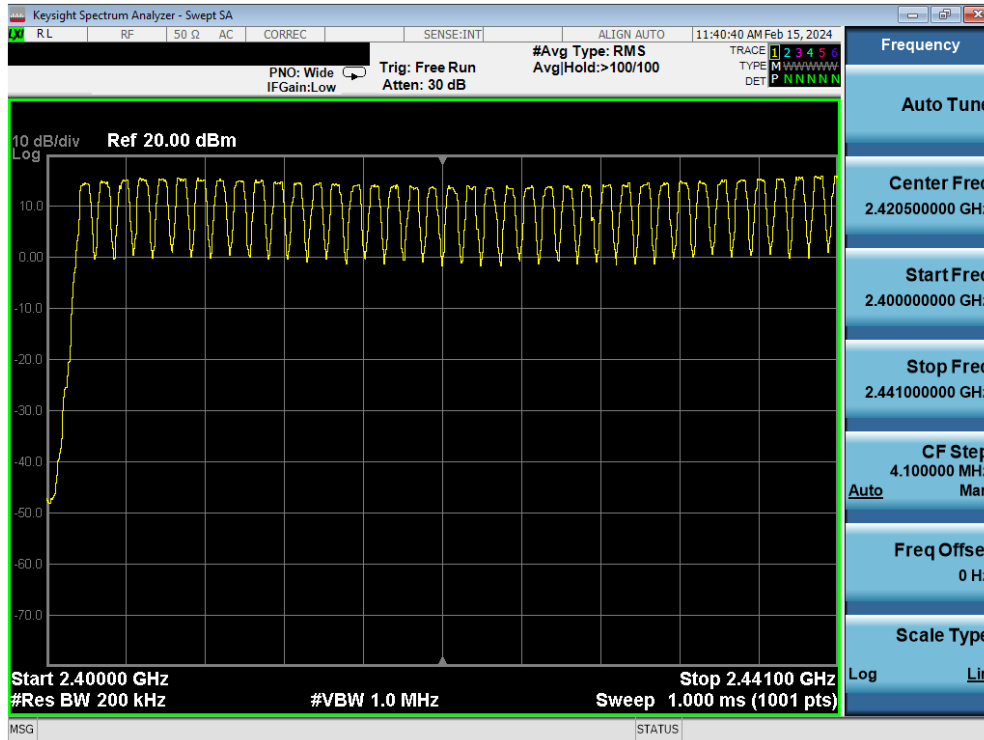
Plot 7-137. Low End Spectrum Channel Hopping Plot (Bluetooth)



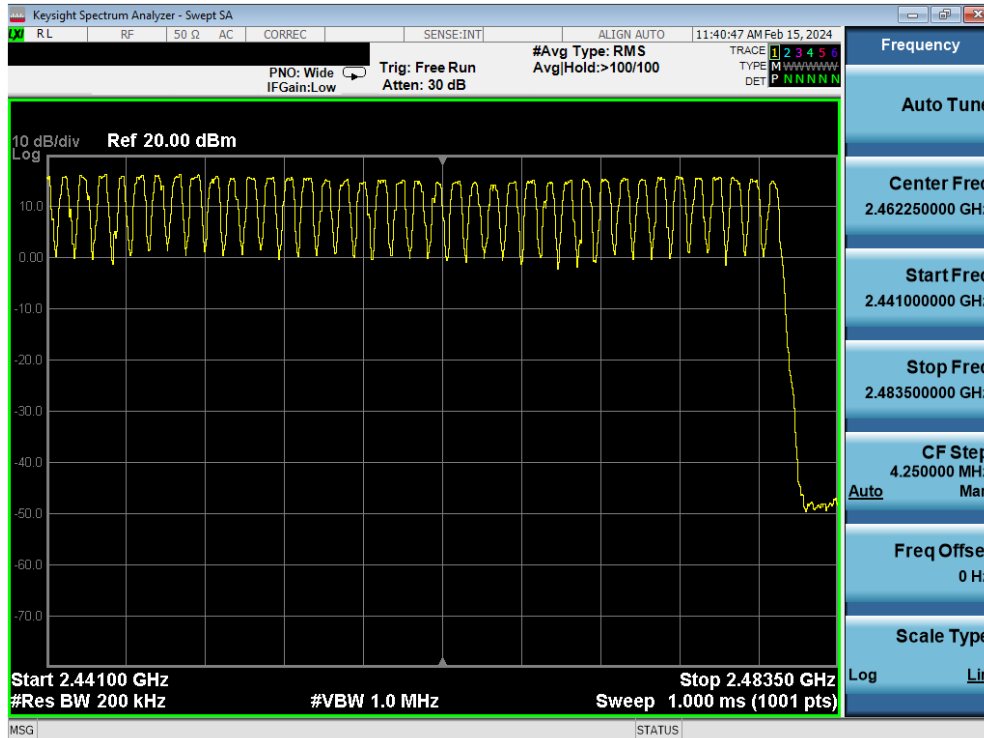
Plot 7-138. High End Spectrum Channel Hopping Plot (Bluetooth)

FCC ID: «FCC_ID» IC: 3048A-2085		MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»		Page 94 of 137

DUAL ANT2



Plot 7-139. Low End Spectrum Channel Hopping Plot (Bluetooth)



Plot 7-140. High End Spectrum Channel Hopping Plot (Bluetooth)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 95 of 137

7.8 Conducted Spurious Emissions

§15.247 (d); RSS-247 [5.5]

Test Overview and Limit

Conducted out-of-band spurious emissions were investigated from 30MHz up to 25GHz to include the 10th harmonic of the fundamental transmit frequency. **The maximum permissible out-of-band emission level is 20 dBc.**

Test Procedure Used

ANSI C63.10-2013 – Section 7.8.8

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 25GHz (separated into two plots per channel)
2. RBW = 1MHz* (See note below)
3. VBW = 3MHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Test Setup

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



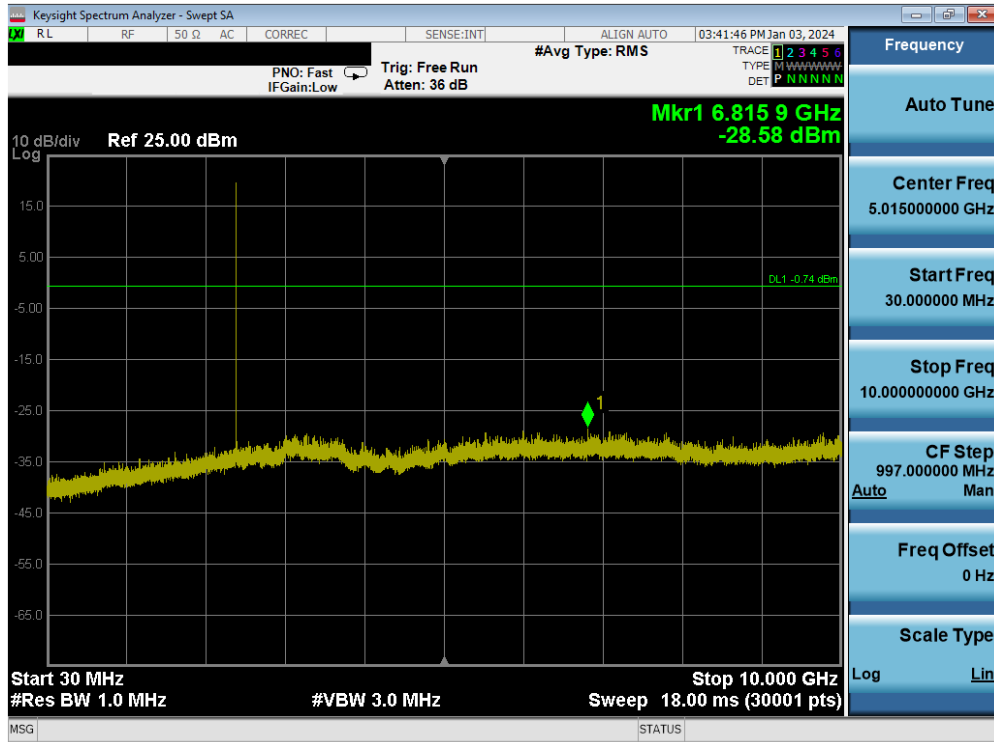
Figure 7-7. Test Instrument & Measurement Setup

Test Notes

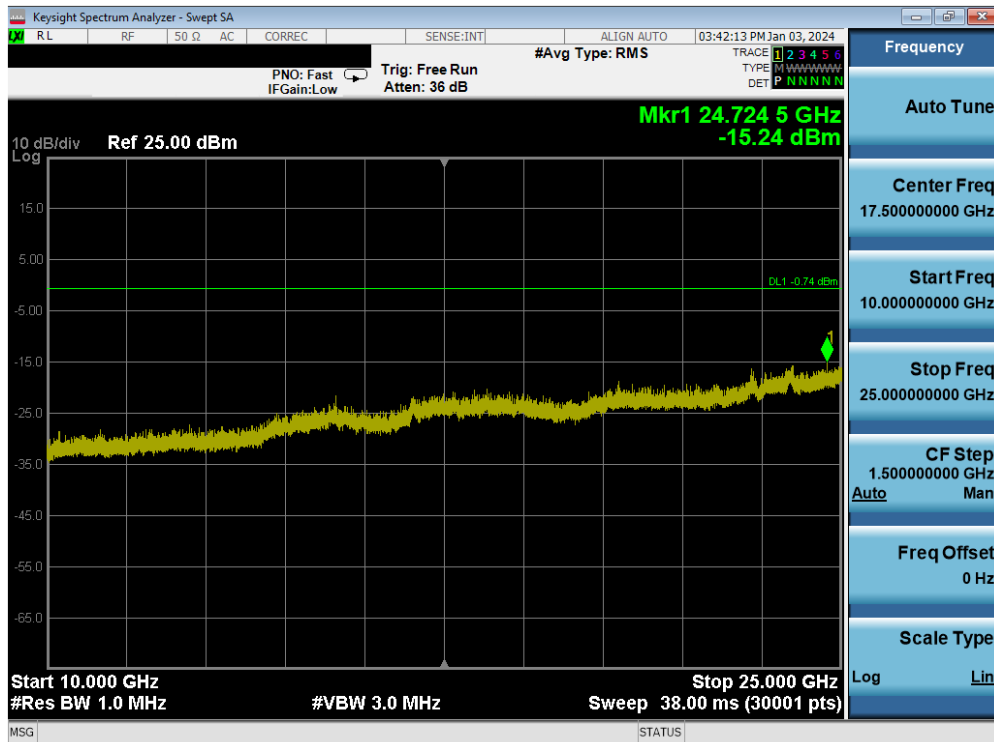
Out-of-band conducted spurious emissions were investigated for all data rates and the worst-case emissions were found with the EUT transmitting at 1Mbps. The display line shown in the following plots is the limit at 20dB below the fundamental emission level measured in a 100kHz bandwidth. However, the traces in the following plots are measured with a 1MHz RBW to reduce test time, so the display line may not necessarily appear to be 20dB below the level of the fundamental in a 1MHz bandwidth.

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 96 of 137

SISO ANT1

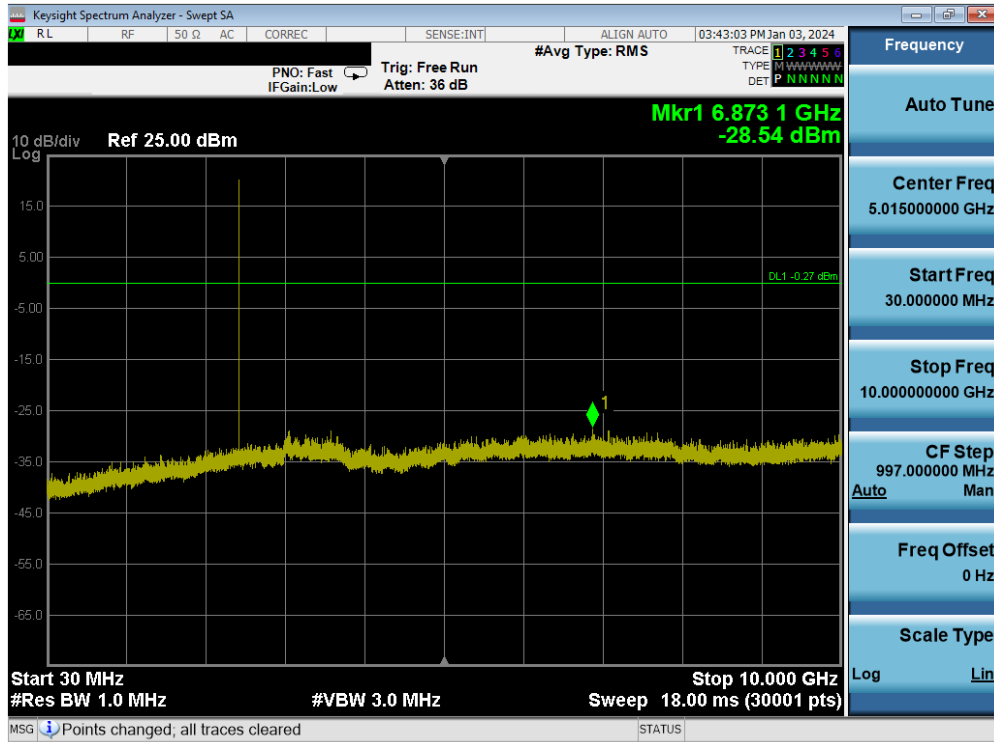


Plot 7-141. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 0)

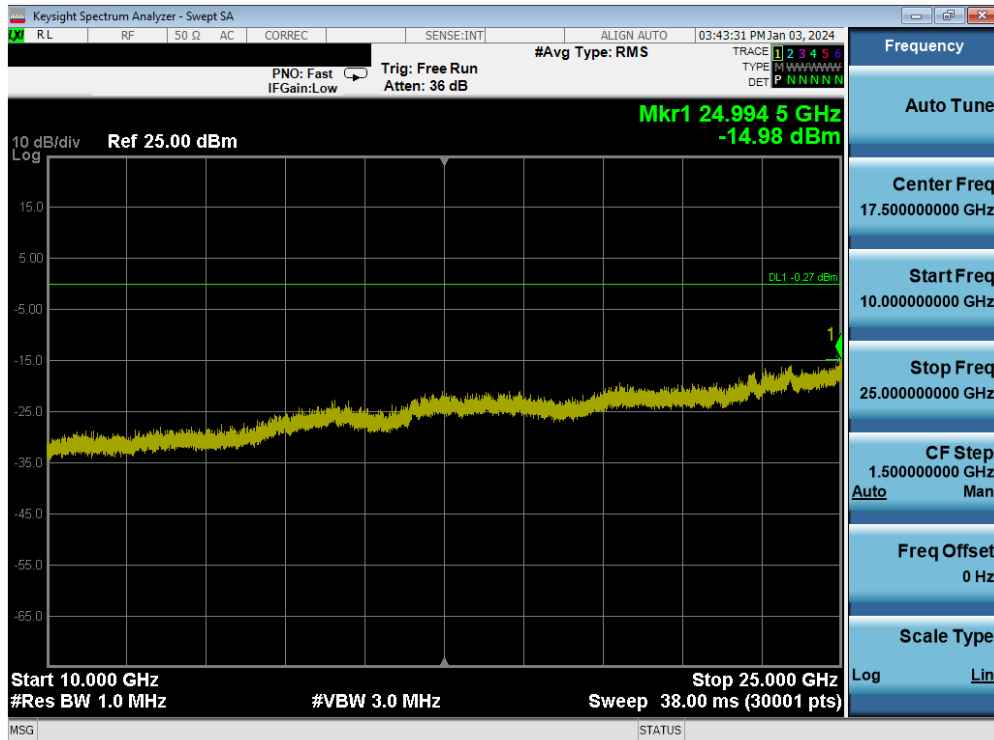


Plot 7-142. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 0)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 97 of 137

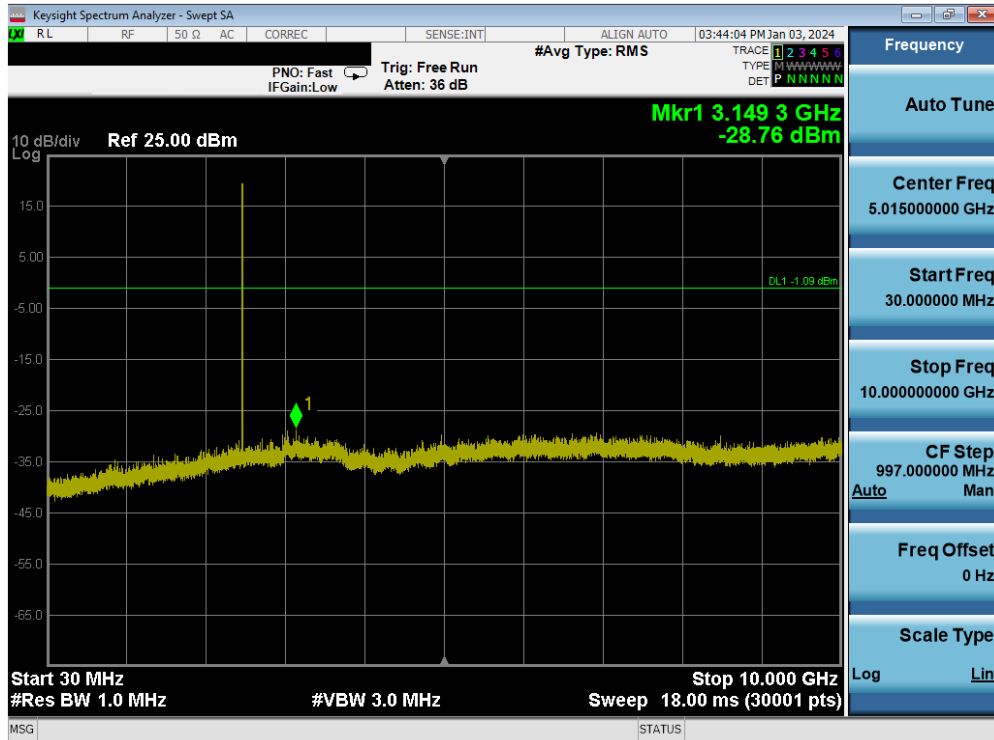


Plot 7-143. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 39)

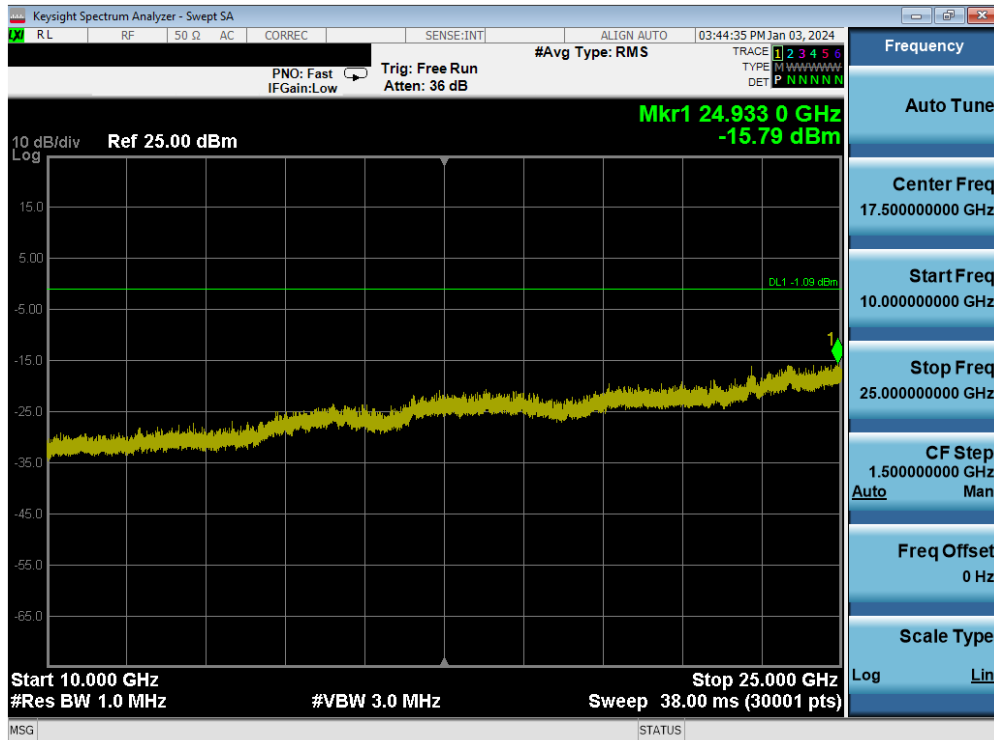


Plot 7-144. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 39)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 98 of 137



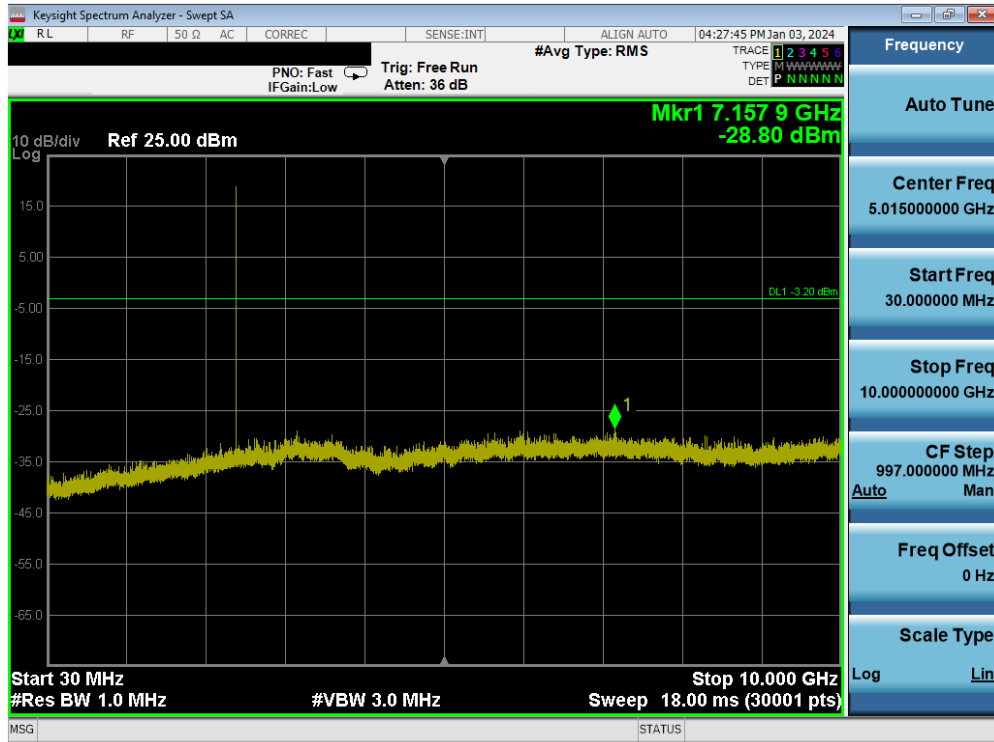
Plot 7-145. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 78)



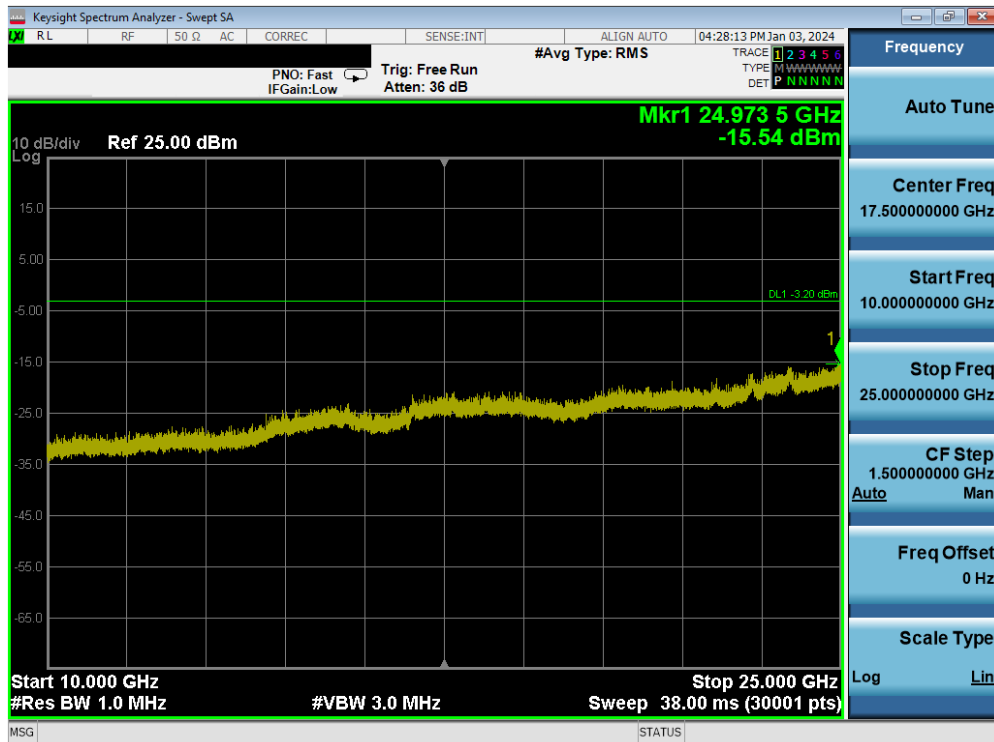
Plot 7-146. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 78)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 99 of 137

SISO ANT2

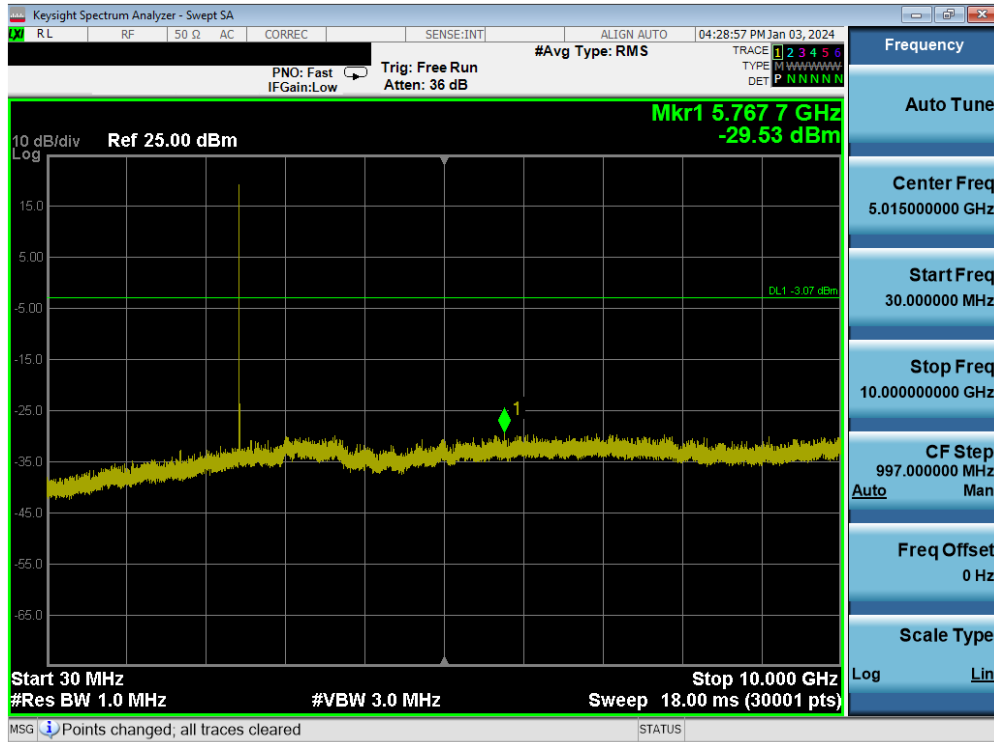


Plot 7-147. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 0)

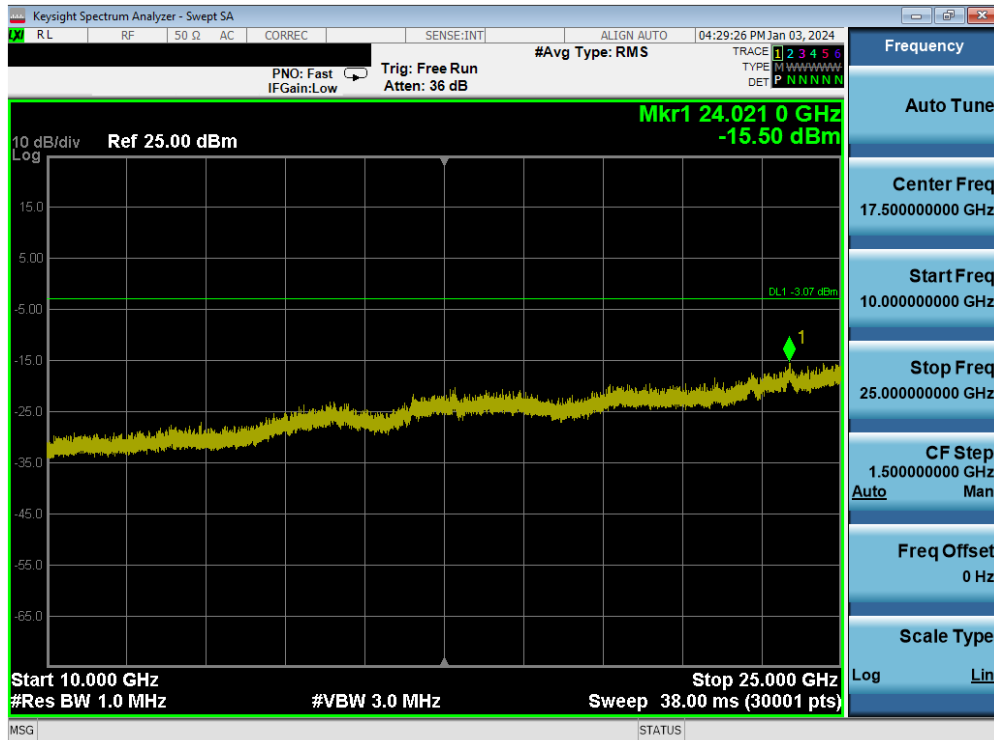


Plot 7-148. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 0)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 100 of 137

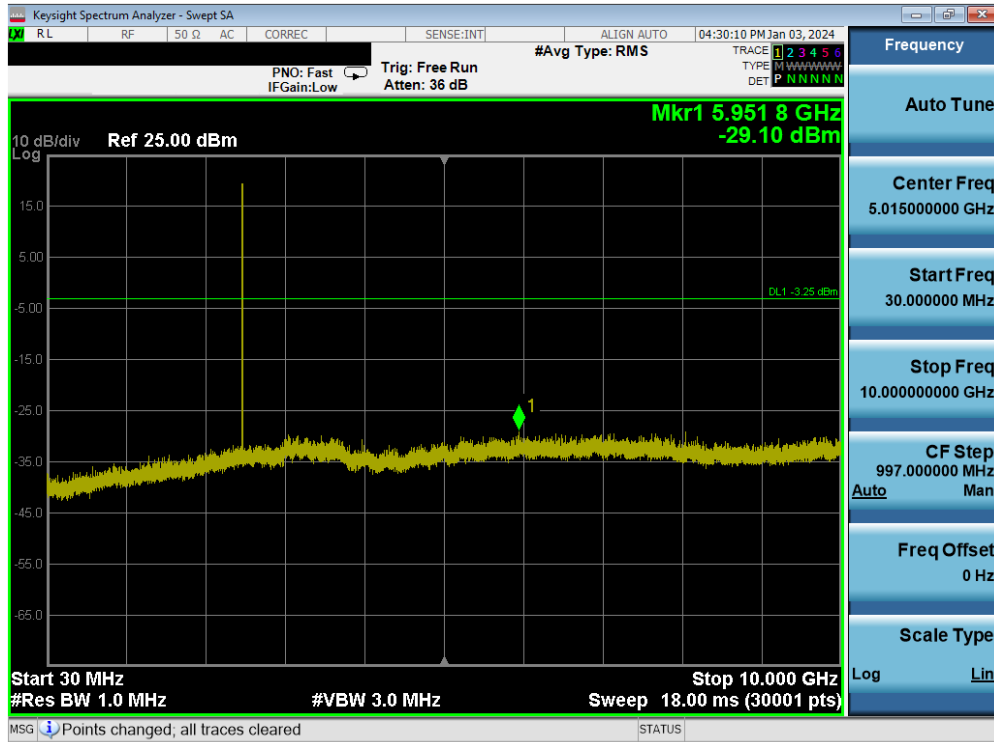


Plot 7-149. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 39)

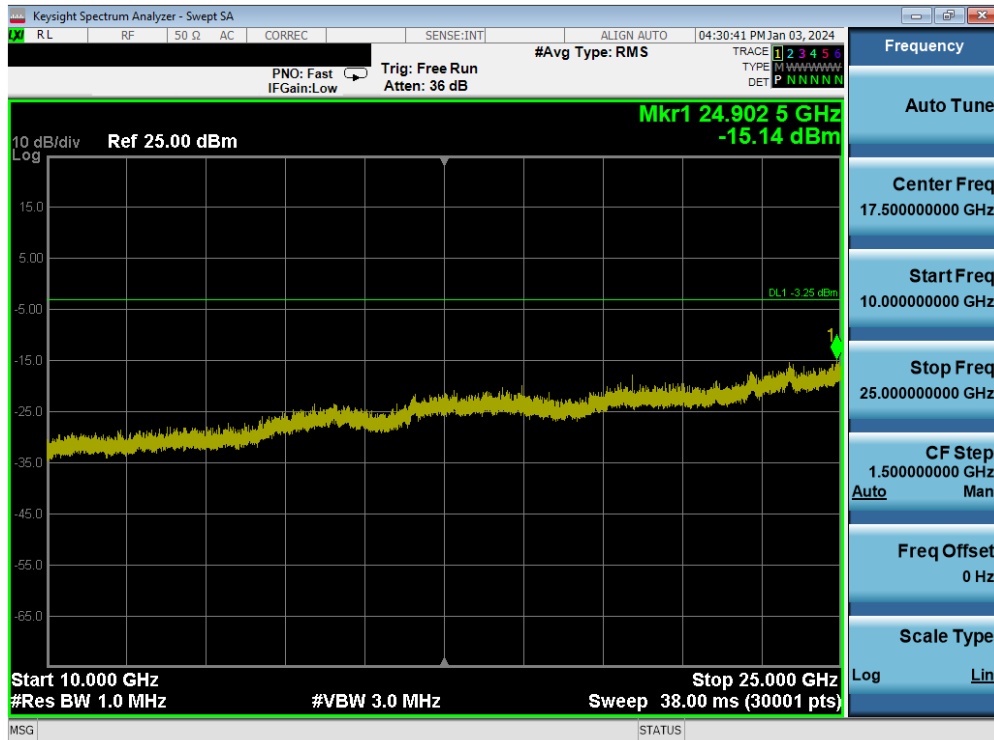


Plot 7-150. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 39)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 101 of 137

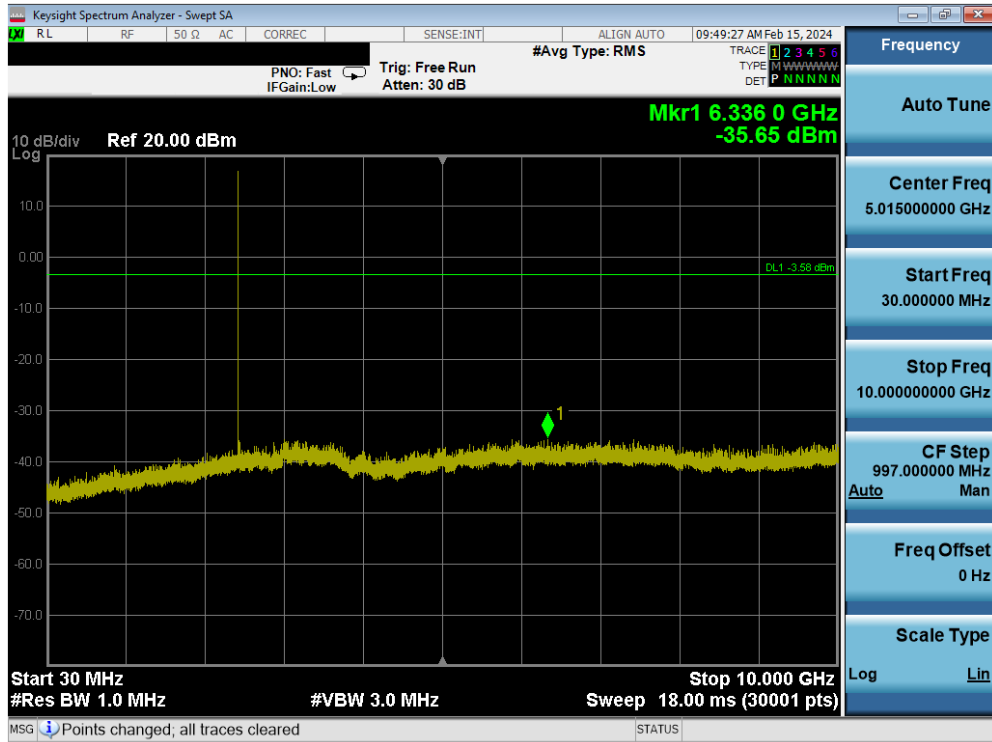


Plot 7-151. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 78)

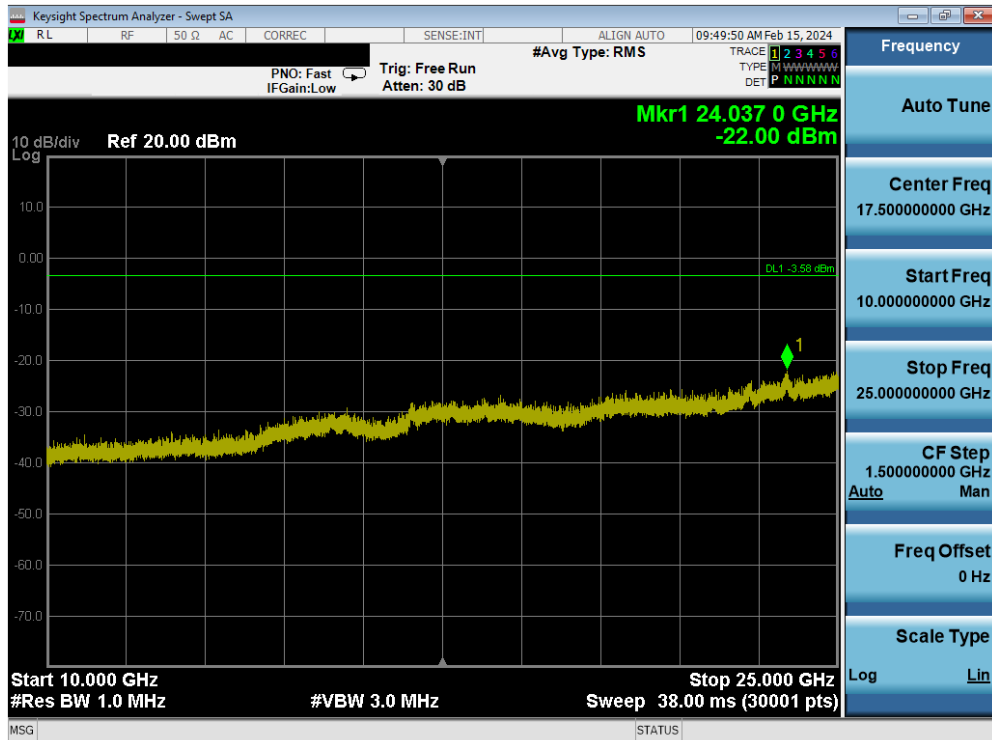


Plot 7-152. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 78)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 102 of 137

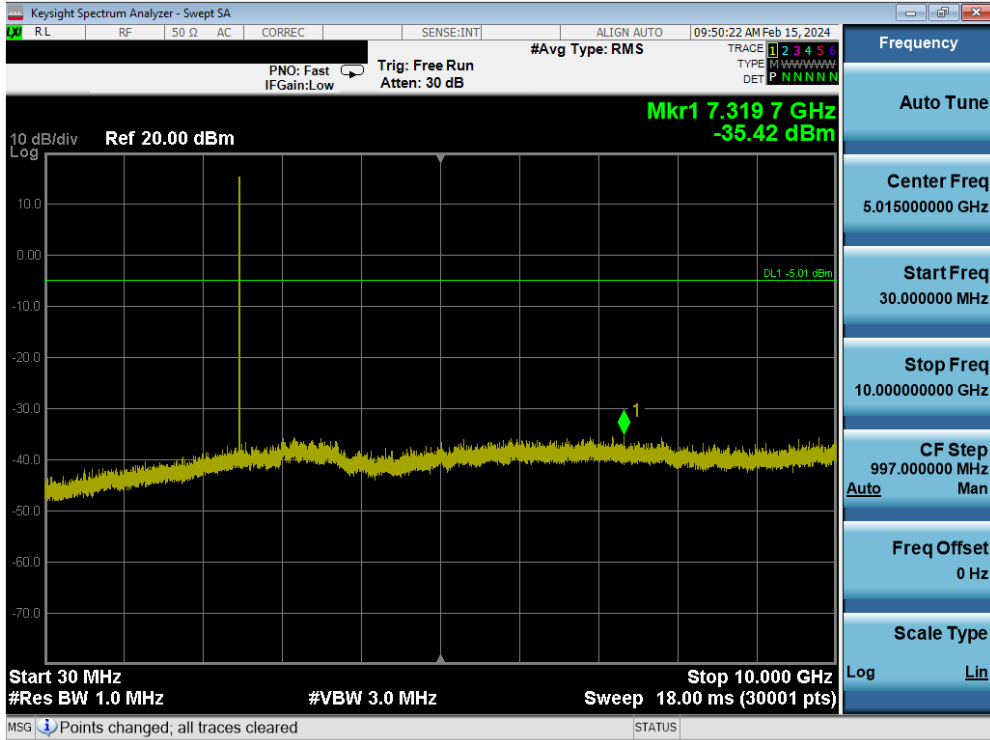


Plot 7-155. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 39)

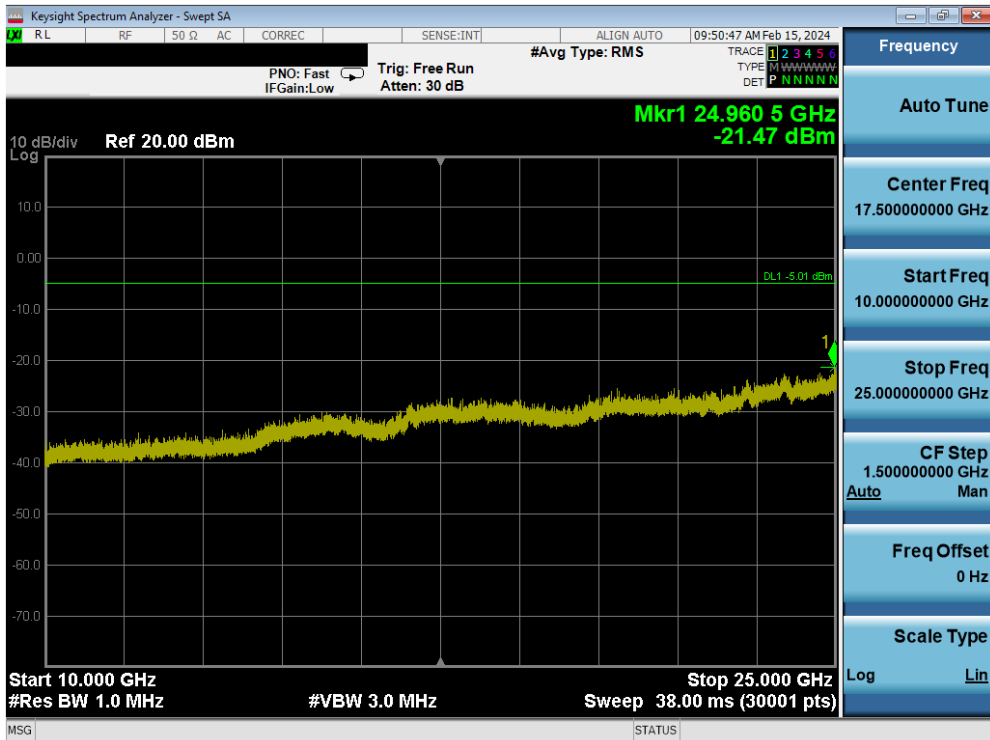


Plot 7-156. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 39)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 104 of 137



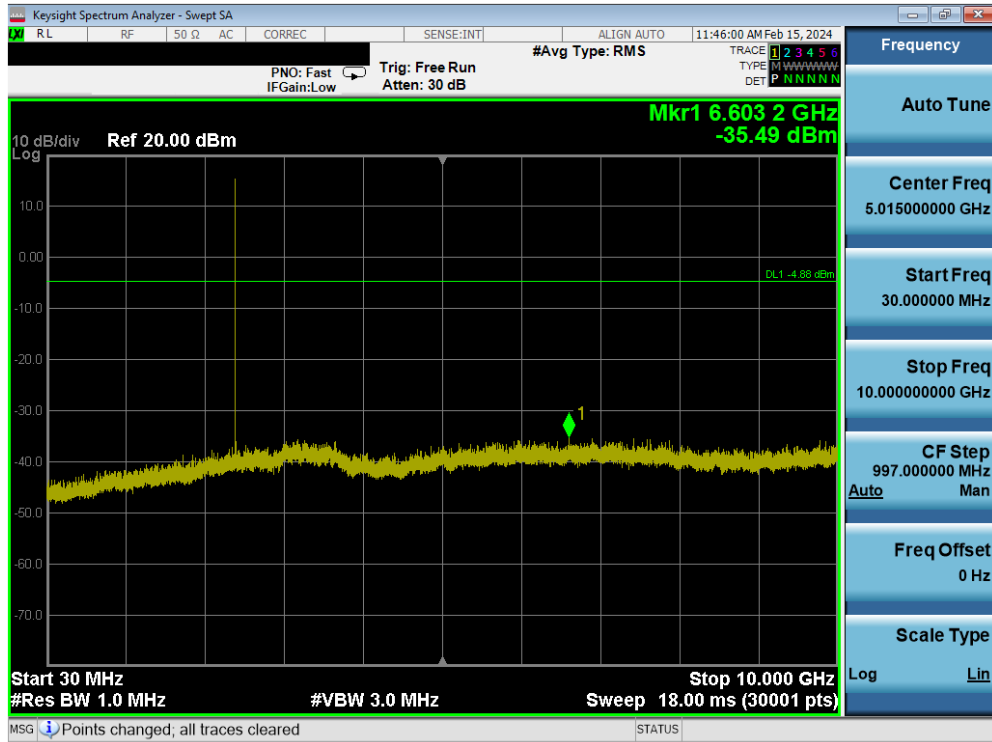
Plot 7-157. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 78)



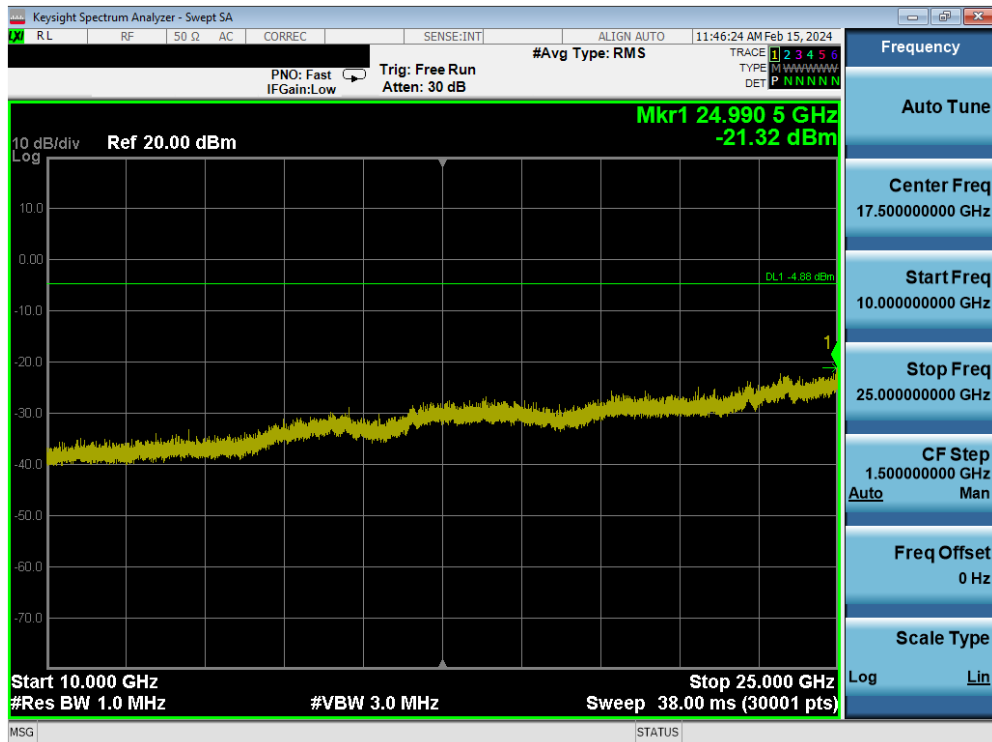
Plot 7-158. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 78)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 105 of 137

DUAL ANT2

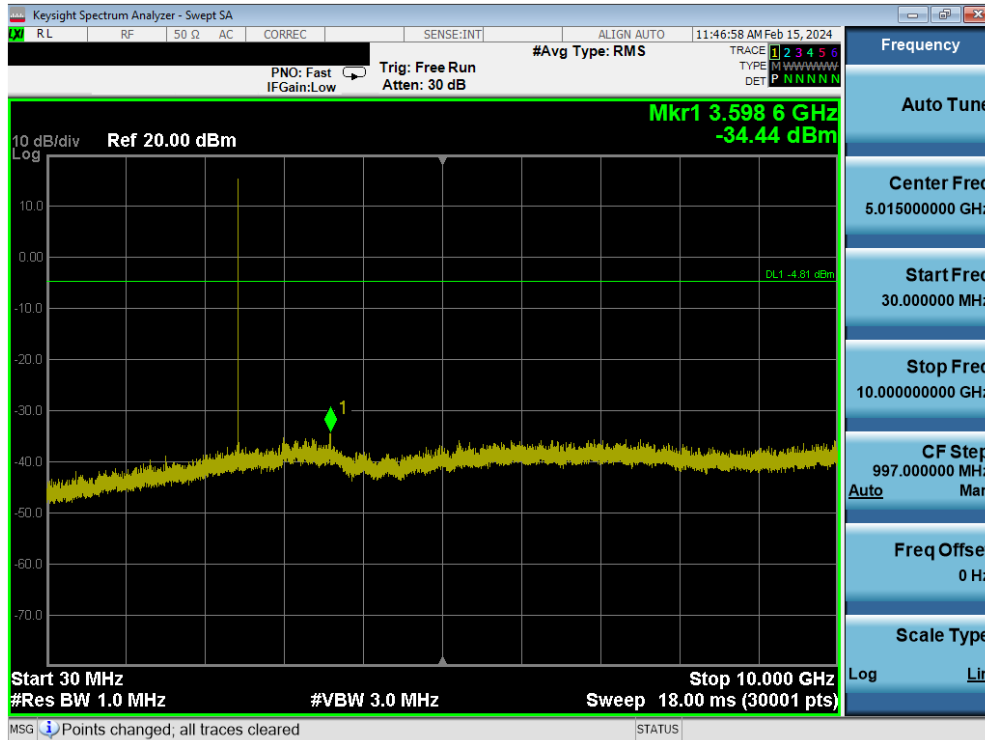


Plot 7-159. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 0)

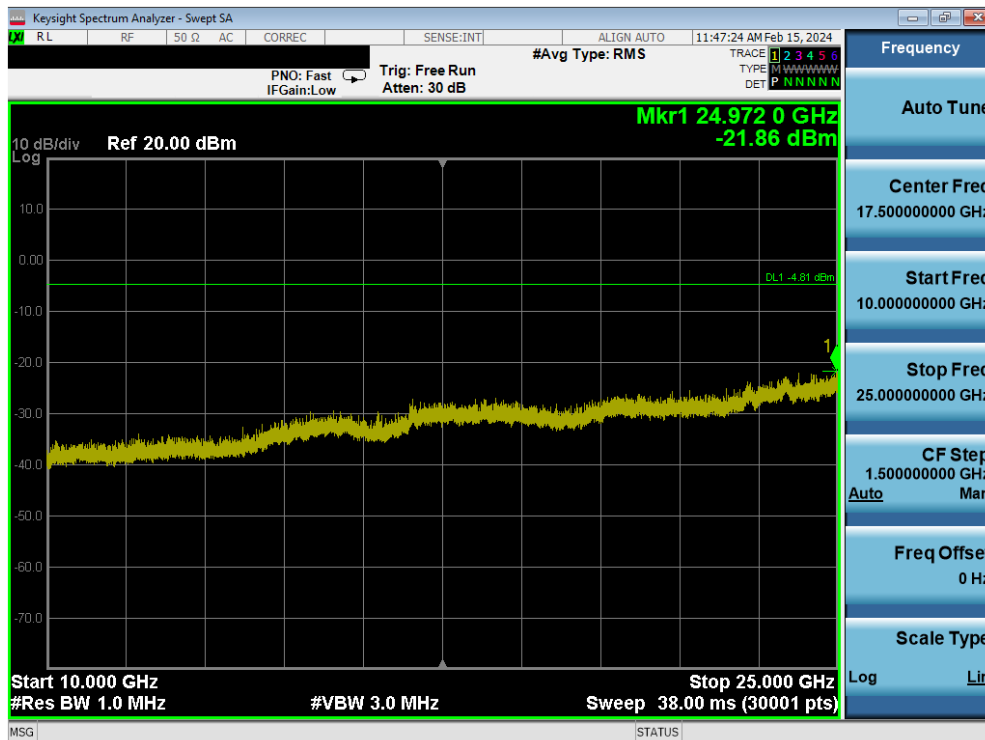


Plot 7-160. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 0)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 106 of 137

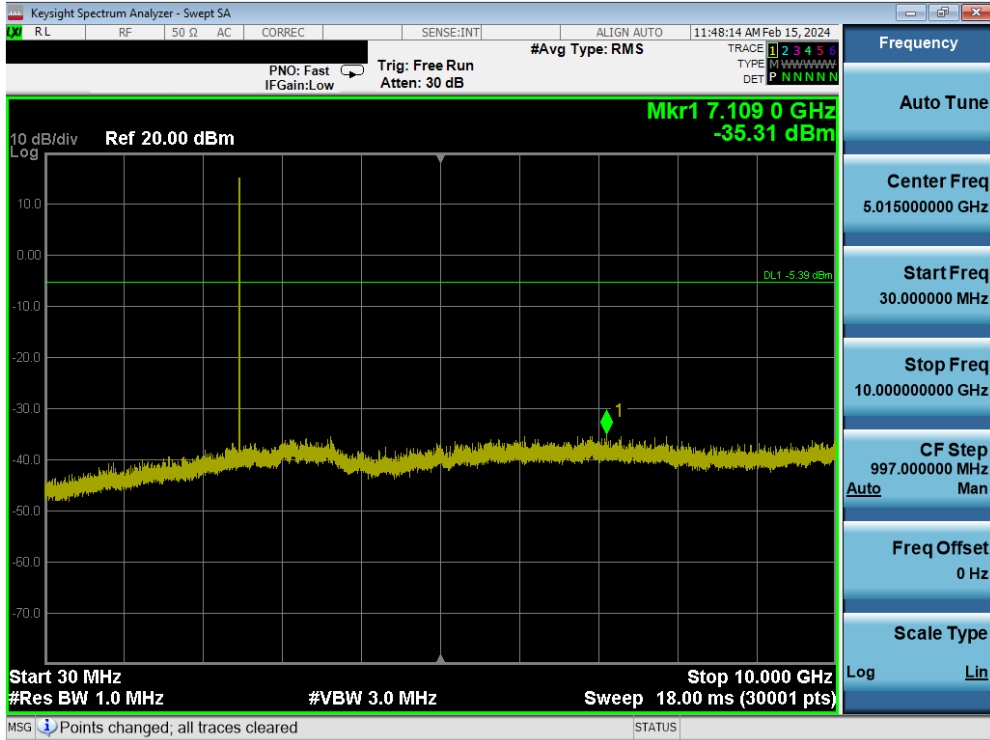


Plot 7-161. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 39)

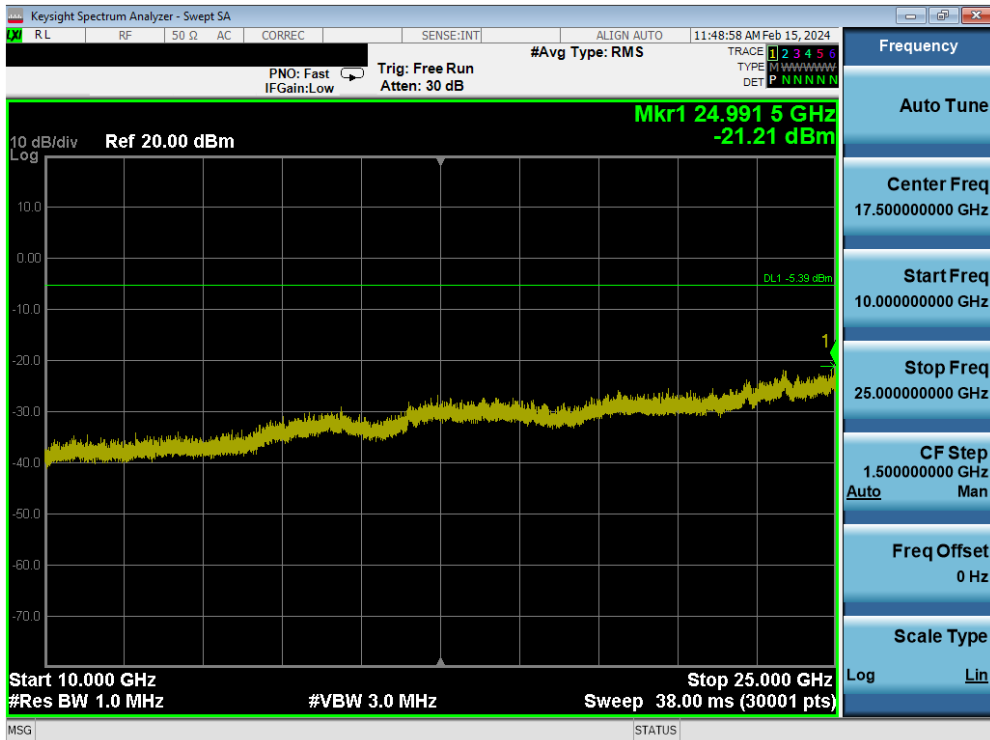


Plot 7-162. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 39)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 107 of 137



Plot 7-163. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 78)



Plot 7-164. Conducted Spurious Plot (Bluetooth, 1Mbps – Ch. 78)

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 108 of 137

7.9 Radiated Spurious Emission Measurements – 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 6 of RSS-Gen (8.10) must not exceed the limits shown below per Section 15.209 and RSS-Gen (8.9).

Frequency	Field Strength [$\mu\text{V/m}$]	Measured Distance [Meters]
Above 960.0 MHz	500	3

Table 7-13. Radiated Limits

Test Procedure Used

ANSI C63.10-2013 – Section 6.6.4.3

Test Settings

Average Field Strength Measurements per Section 4.1.4.2.3 of ANSI C63.10-2013

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 1kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds
4. Averaging type was set to RMS to ensure that video filtering was applied in the power domain
5. Detector = peak
6. Sweep time = auto
7. Trace mode = max hold
8. Trace was allowed to stabilize

Peak Field Strength Measurements per Section 4.1.4.2.2 of ANSI C63.10-2013

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW is set depending on measurement frequency, as specified in Table 7-14 below
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 109 of 137

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

Table 7-14. RBW as a Function of Frequency

Test Setup

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

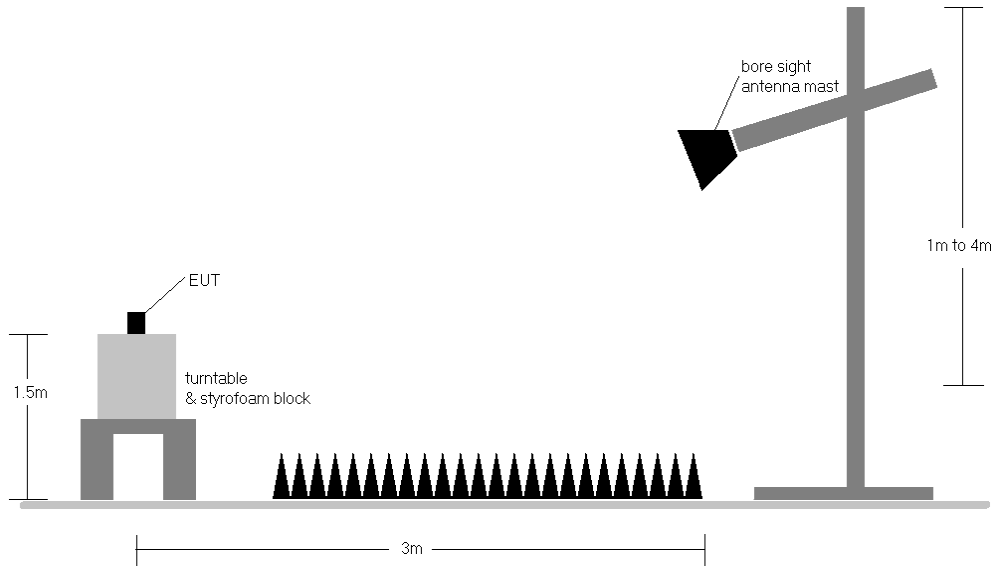


Figure 7-8. Radiated Test Setup >1GHz

Test Notes

- All emissions lying in restricted bands specified in §15.205 and Section 8.10 of RSS-Gen are below the limit shown in §15.209.
- No significant radiated emissions were found in the 2310 - 2390MHz restricted band.
- The antenna is manipulated through typical positions, polarity, and length during the tests. The EUT is manipulated through three orthogonal planes.
- This unit was tested with its standard battery.
- The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
- The duty cycle correction factor was not applied to noise floor measurements.
- 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.
- The "-" shown in the following RSE tables is used to denote a noise floor measurement.

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 110 of 137

Sample Calculation

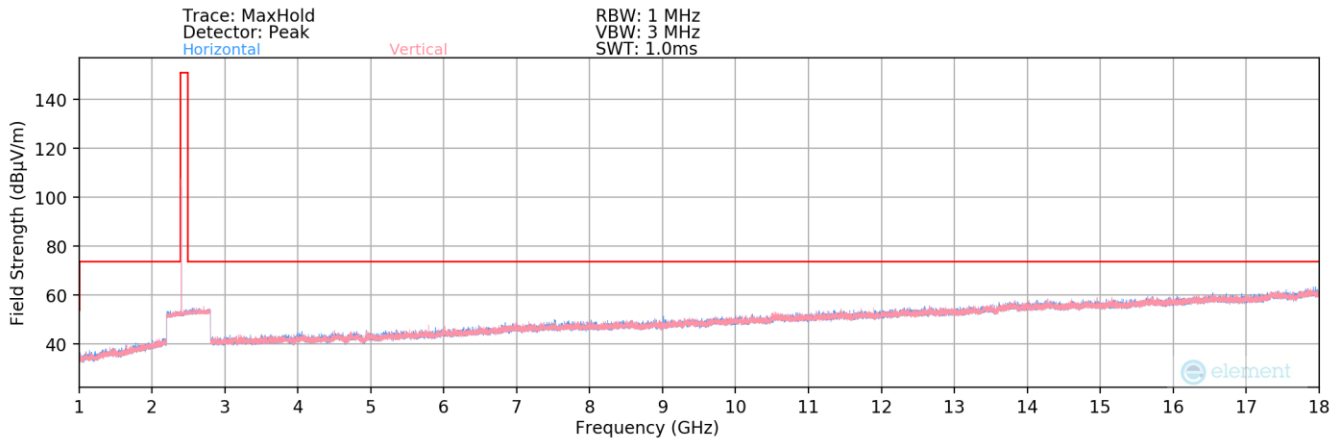
- Field Strength Level $_{[dB_{\mu V/m}]}$ = Analyzer Level $_{[dBm]}$ + 107 + AFCL $_{[dB/m]}$ + Duty Cycle Correction $_{[dB]}$
- AFCL $_{[dB/m]}$ = Antenna Factor $_{[dB/m]}$ + Cable Loss $_{[dB]}$
- Margin $_{[dB]}$ = Field Strength Level $_{[dB_{\mu V/m}]}$ – Limit $_{[dB_{\mu V/m}]}$

Duty Cycle Correction Factor Calculation

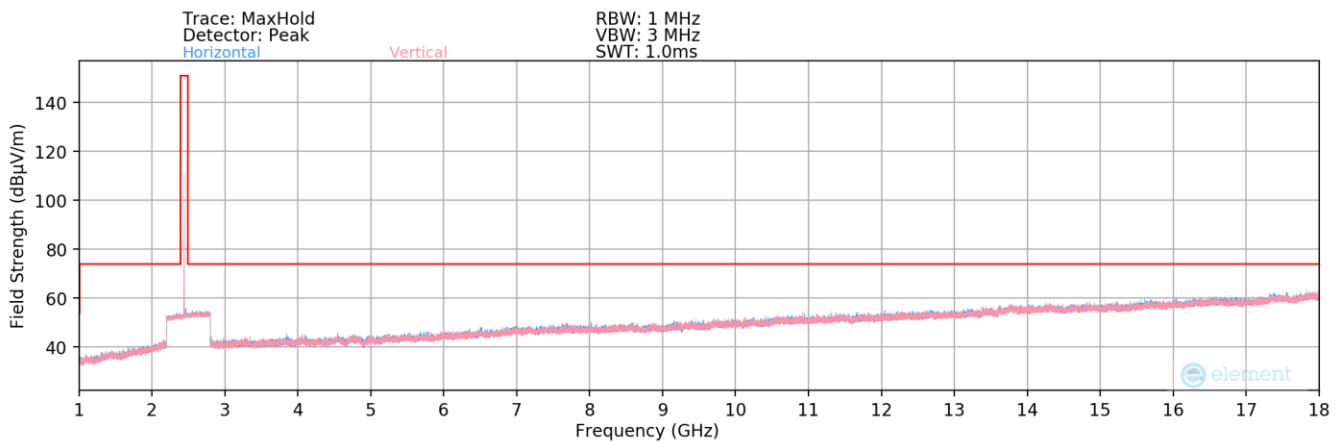
- Channel hop rate = 800 hops/second (AFH Mode)
- Adjusted channel hop rate for DH5 mode = 133.33 hops/second
- Time per channel hop = $1 / 133.33$ hops/second = 7.50 ms
- Time to cycle through all channels = 7.50×20 channels = 150 ms
- Number of times transmitter hits on one channel = $100 \text{ ms} / 150 \text{ ms} = 1$ time(s)
- Worst case dwell time = 7.5 ms
- Duty cycle correction factor = $20\log_{10}(7.5\text{ms}/100\text{ms}) = -22.5 \text{ dB}$

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 111 of 137

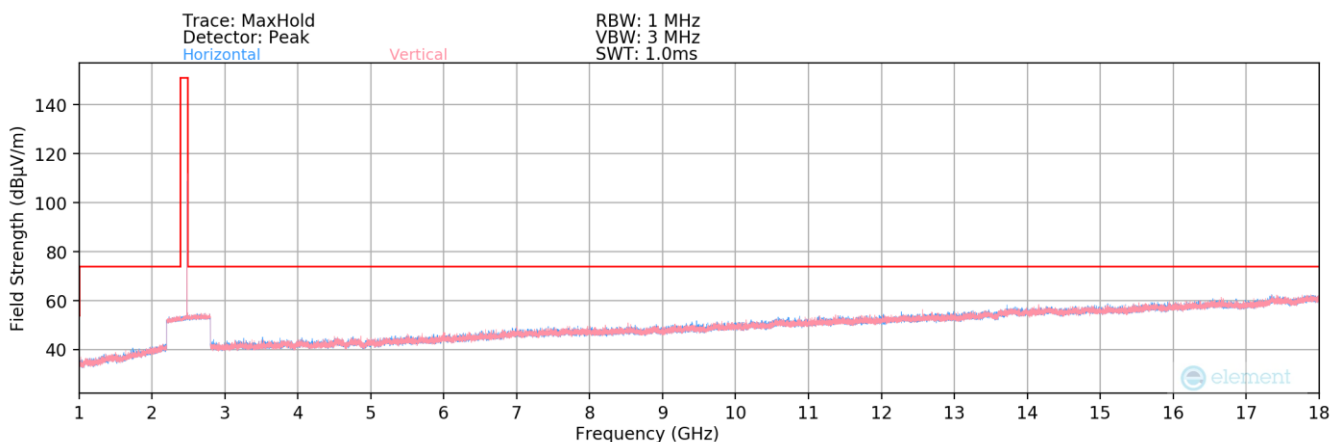
SISO ANT1



Plot 7-165. Radiated Spurious Plot above 1GHz (BT – Ch. 0)



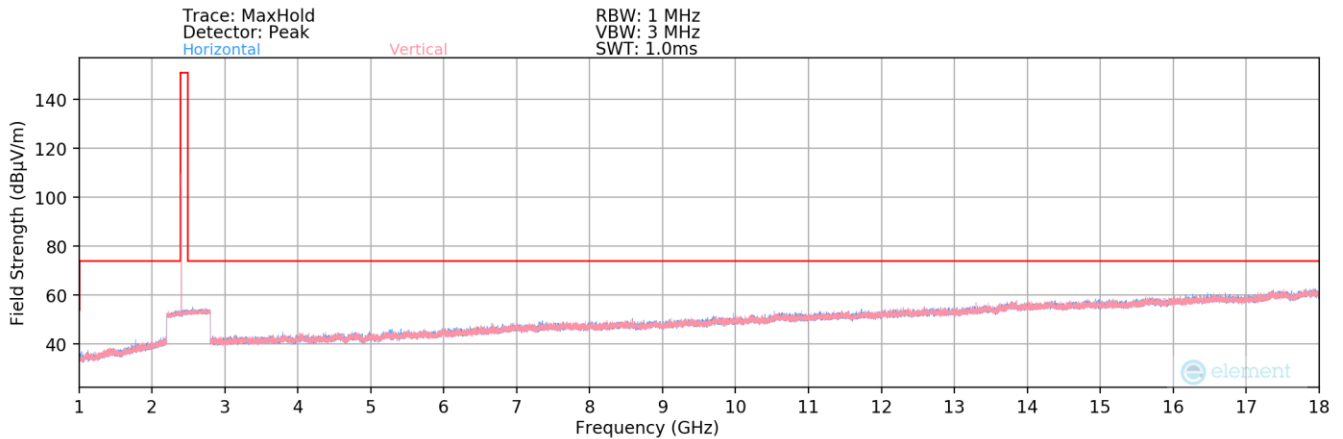
Plot 7-166. Radiated Spurious Plot above 1GHz (BT – Ch. 39)



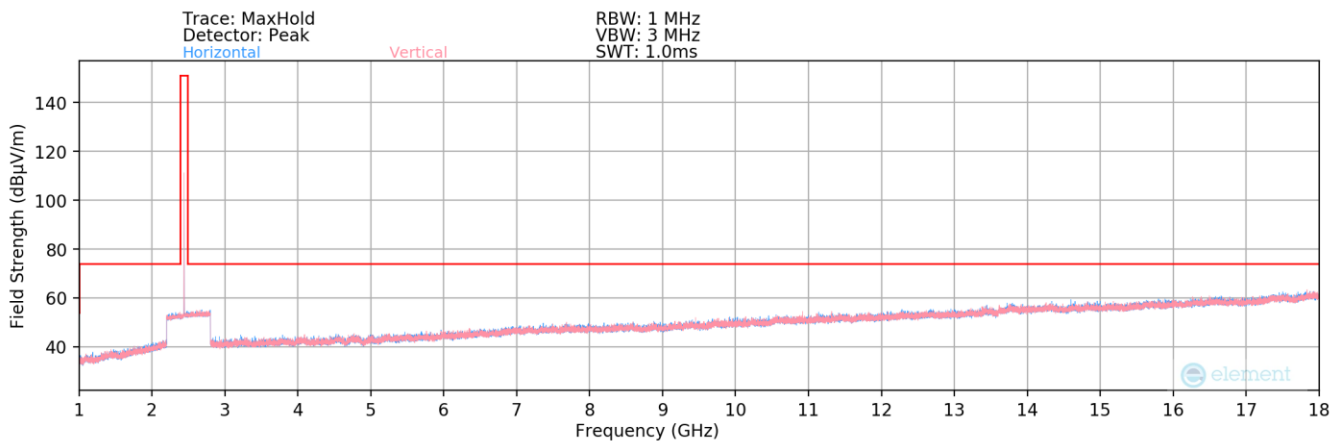
Plot 7-167. Radiated Spurious Plot above 1GHz (BT – Ch. 78)

FCC ID: «FCC_ID» IC: 3048A-2085		MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»		Page 112 of 137

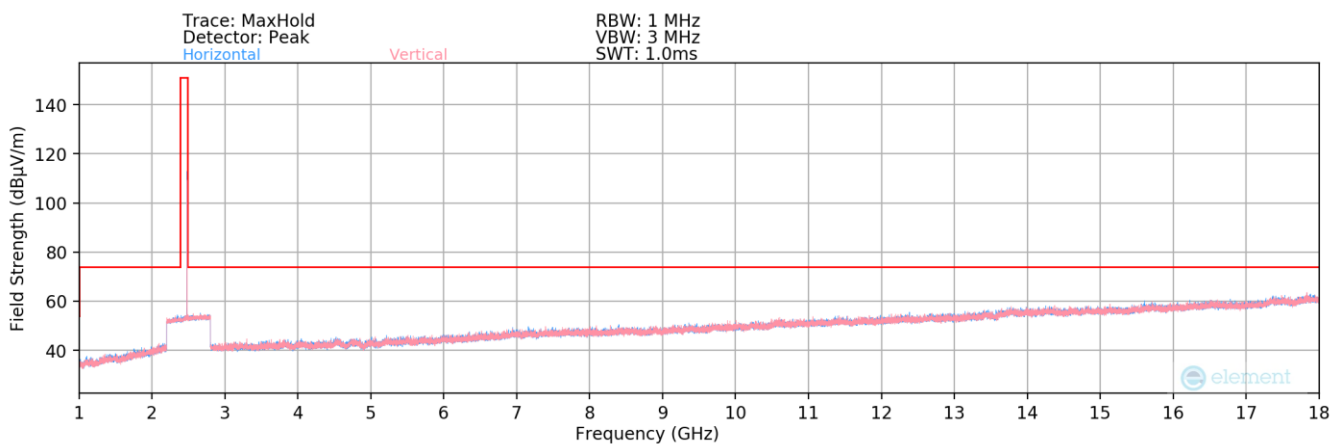
SISO ANT2



Plot 7-168. Radiated Spurious Plot above 1GHz (BT – Ch. 0)



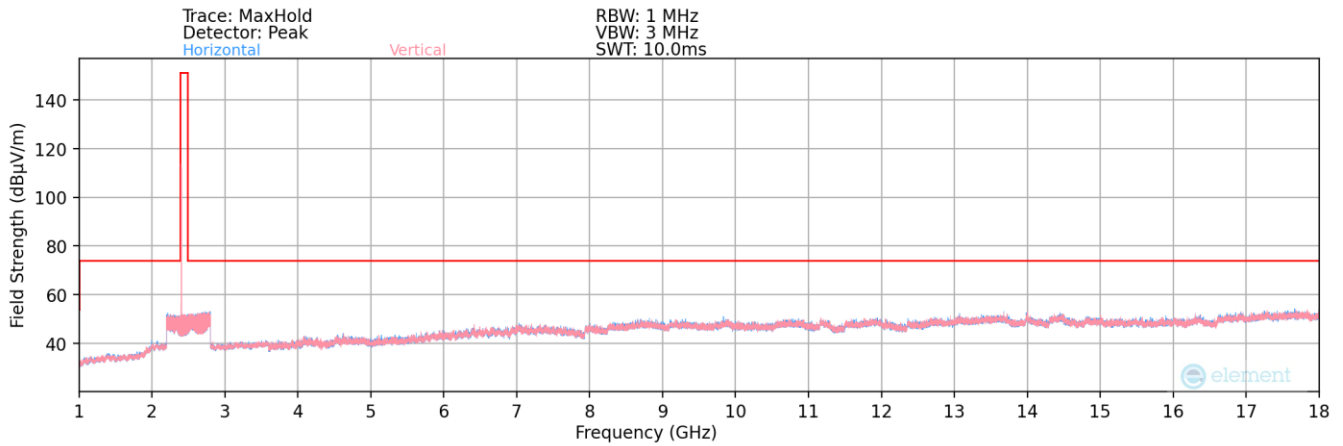
Plot 7-169. Radiated Spurious Plot above 1GHz (BT – Ch. 39)



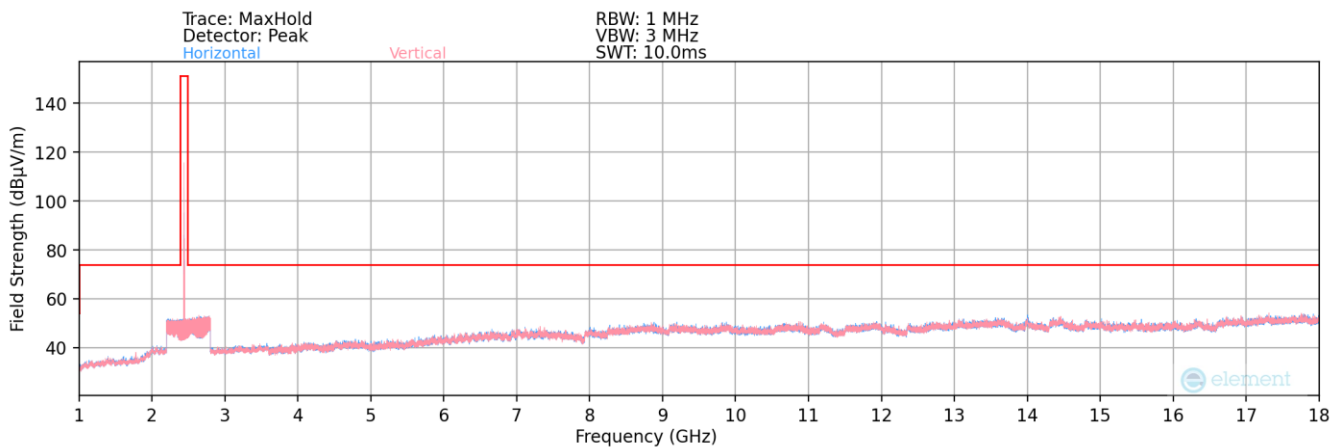
Plot 7-170. Radiated Spurious Plot above 1GHz (BT – Ch. 78)

FCC ID: «FCC_ID» IC: 3048A-2085		MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»		Page 113 of 137

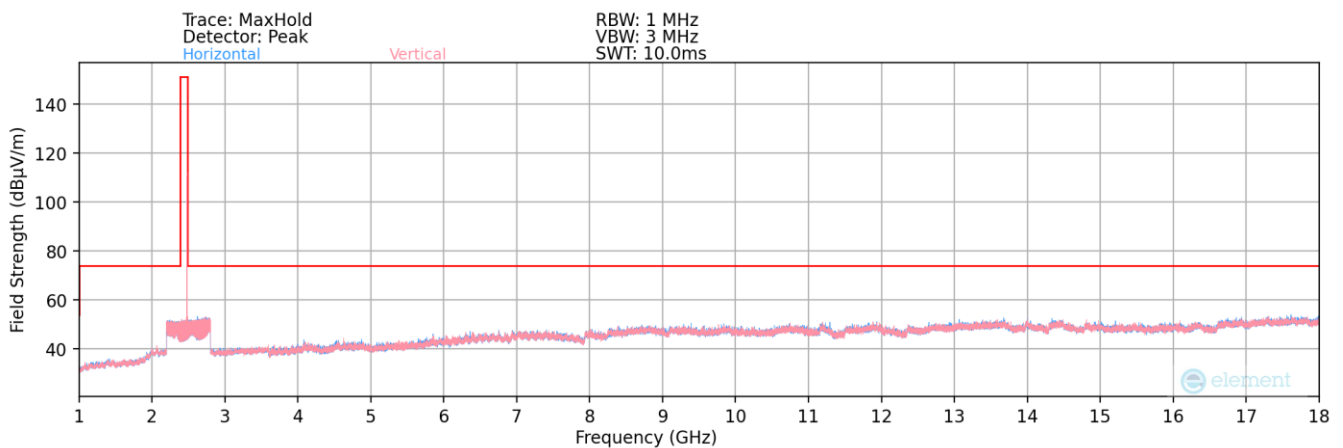
DUAL



Plot 7-171. Radiated Spurious Plot above 1GHz (BT – Ch. 0)



Plot 7-172. Radiated Spurious Plot above 1GHz (BT – Ch. 39)



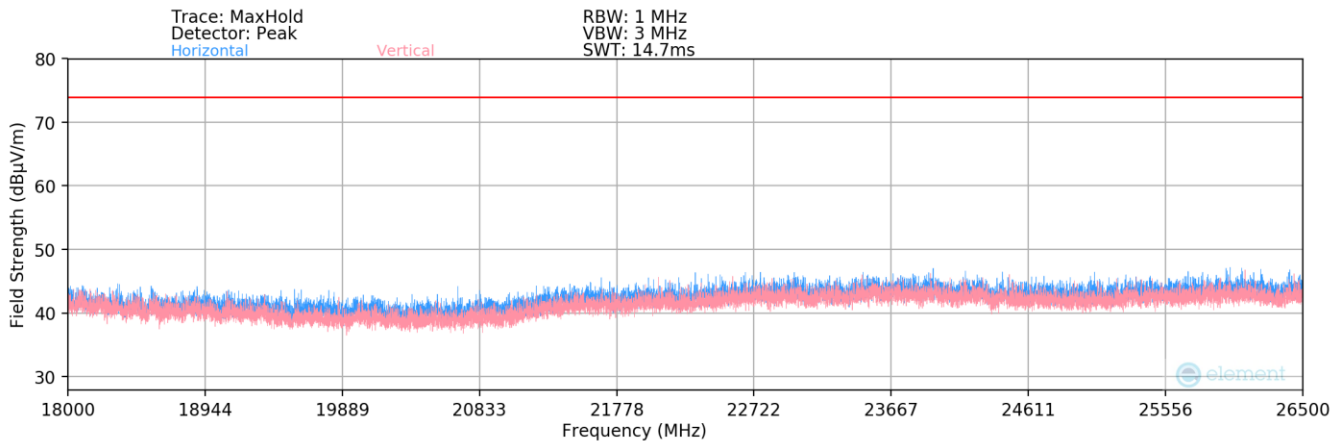
Plot 7-173. Radiated Spurious Plot above 1GHz (BT – Ch. 78)

FCC ID: «FCC_ID» IC: 3048A-2085		MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»		Page 114 of 137

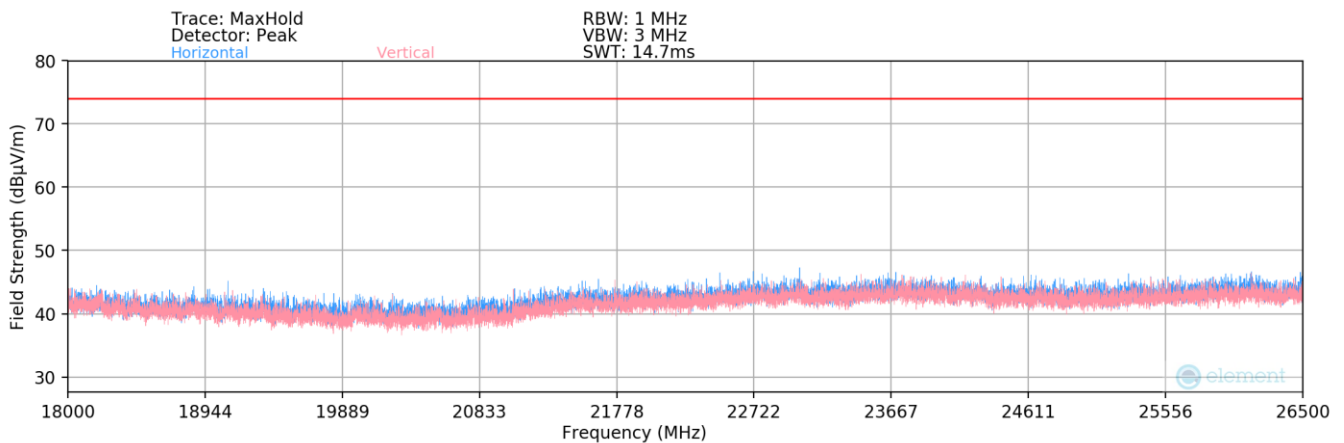
Radiated Spurious Emissions Measurements (Above 18GHz)

§15.209; RSS-Gen [8.9]

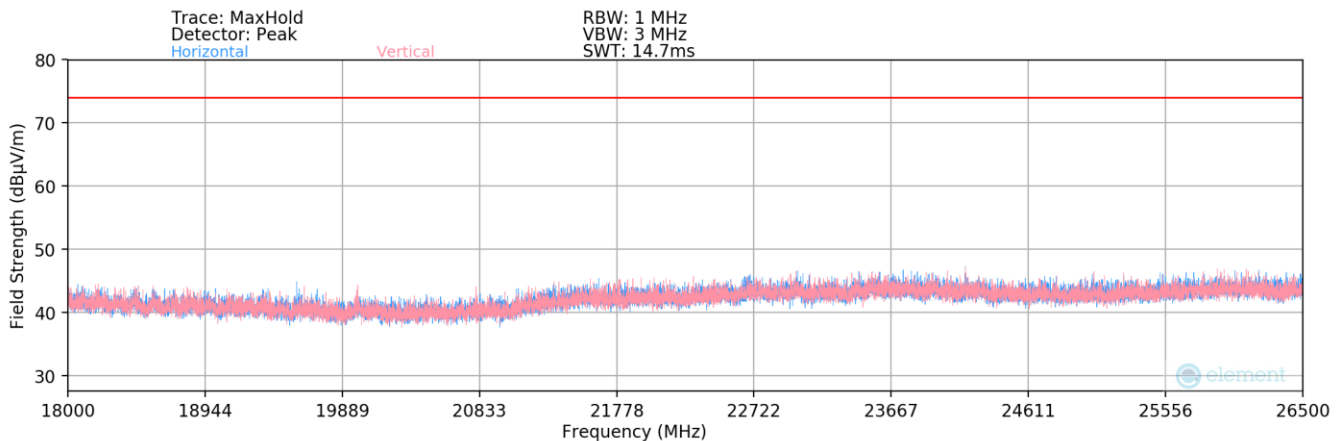
SISO ANT1



SISO ANT2



DUAL



FCC ID: «FCC_ID» IC: 3048A-2085		MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»		Page 115 of 137



Radiated Spurious Emission Measurements
 §15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

SISO ANT1

Worst Case Mode: Bluetooth
 Worst Case Data Rate: 1 Mbps
 Measurement Distance: 3 Meters
 Operating Frequency: 2402MHz
 Channel: 0

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4804.00	Avg	V	-	-	-80.21	7.36	34.15	53.98	-19.83
4804.00	Peak	V	-	-	-69.74	7.36	44.62	73.98	-29.36
12010.00	Avg	V	-	-	-81.46	19.05	44.59	53.98	-9.39
12010.00	Peak	V	-	-	-71.76	19.05	54.29	73.98	-19.69

Table 7-15. Radiated Measurements

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

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4882.00	Avg	V	-	-	-79.90	7.68	34.79	53.98	-19.19
4882.00	Peak	V	-	-	-69.35	7.68	45.33	73.98	-28.65
7323.00	Avg	V	-	-	-80.12	13.02	39.90	53.98	-14.08
7323.00	Peak	V	-	-	-69.90	13.02	50.11	73.98	-23.87
12205.00	Avg	V	-	-	-81.95	19.48	44.53	53.98	-9.45
12205.00	Peak	V	-	-	-71.46	19.48	55.02	73.98	-18.96

Table 7-16. Radiated Measurements

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 116 of 137



Radiated Spurious Emission Measurements
 §15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

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

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4960.00	Avg	V	-	-	-79.56	7.13	34.57	53.98	-19.41
4960.00	Peak	V	-	-	-69.31	7.13	44.82	73.98	-29.16
7440.00	Avg	V	-	-	-80.52	12.58	39.06	53.98	-14.92
7440.00	Peak	V	-	-	-70.27	12.58	49.31	73.98	-24.67
12400.00	Avg	V	-	-	-81.68	19.40	44.72	53.98	-9.25
12400.00	Peak	V	-	-	-71.85	19.40	54.56	73.98	-19.42

Table 7-17. Radiated Measurements

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 117 of 137

SISO ANT2

Worst Case Mode: Bluetooth
 Worst Case Data Rate: 1 Mbps
 Measurement Distance: 3 Meters
 Operating Frequency: 2402MHz
 Channel: 0

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4804.00	Avg	V	-	-	-80.62	7.36	33.74	53.98	-20.24
4804.00	Peak	V	-	-	-70.01	7.36	44.36	73.98	-29.62
12010.00	Avg	V	-	-	-81.22	19.05	44.83	53.98	-9.15
12010.00	Peak	V	-	-	-71.45	19.05	54.60	73.98	-19.38

Table 7-18. Radiated Measurements

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

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4882.00	Avg	V	-	-	-79.65	7.68	35.03	53.98	-18.95
4882.00	Peak	V	-	-	-69.04	7.68	45.64	73.98	-28.34
7323.00	Avg	V	-	-	-80.27	13.02	39.75	53.98	-14.23
7323.00	Peak	V	-	-	-70.61	13.02	49.41	73.98	-24.57
12205.00	Avg	V	-	-	-82.17	19.48	44.31	53.98	-9.67
12205.00	Peak	V	-	-	-71.23	19.48	55.25	73.98	-18.73

Table 7-19. Radiated Measurements

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 118 of 137

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

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4960.00	Avg	V	-	-	-79.67	7.13	34.46	53.98	-19.52
4960.00	Peak	V	-	-	-69.22	7.13	44.92	73.98	-29.06
7440.00	Avg	V	-	-	-80.82	12.58	38.76	53.98	-15.22
7440.00	Peak	V	-	-	-70.17	12.58	49.41	73.98	-24.57
12400.00	Avg	V	-	-	-81.81	19.40	44.59	53.98	-9.38
12400.00	Peak	V	-	-	-72.08	19.40	54.32	73.98	-19.66

Table 7-20. Radiated Measurements

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 119 of 137

DUAL

Worst Case Mode: Bluetooth
 Worst Case Data Rate: 1 Mbps
 Measurement Distance: 3 Meters
 Operating Frequency: 2402MHz
 Channel: 0

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4804.00	Avg	V	157	204	-74.16	2.69	-22.50	13.04	53.98	-40.94
4804.00	Peak	V	157	204	-64.56	2.69	0.00	45.13	73.98	-28.85
12010.00	Avg	V	-	-	-79.53	13.53	0.00	41.00	53.98	-12.98
12010.00	Peak	V	-	-	-67.73	13.53	0.00	52.80	73.98	-21.18

Table 7-21. Radiated Measurements

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

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4882.00	Avg	V	148	201	-74.81	3.16	-22.50	12.85	53.98	-41.13
4882.00	Peak	V	148	201	-64.53	3.16	0.00	45.63	73.98	-28.35
7323.00	Avg	V	263	178	-71.35	9.56	-22.50	22.71	53.98	-31.27
7323.00	Peak	V	263	178	-63.11	9.56	0.00	53.45	73.98	-20.53
12205.00	Avg	V	-	-	-79.79	13.00	0.00	40.21	53.98	-13.77
12205.00	Peak	V	-	-	-68.22	13.00	0.00	51.78	73.98	-22.20

Table 7-22. Radiated Measurements

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 120 of 137

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

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4960.00	Avg	V	126	205	-71.43	3.34	-22.50	16.41	53.98	-37.57
4960.00	Peak	V	126	205	-63.47	3.34	0.00	46.87	73.98	-27.11
7440.00	Avg	V	268	175	-73.29	9.07	-22.50	20.28	53.98	-33.69
7440.00	Peak	V	268	175	-64.34	9.07	0.00	51.73	73.98	-22.25
12400.00	Avg	V	-	-	-79.82	13.05	0.00	40.23	53.98	-13.75
12400.00	Peak	V	-	-	-68.38	13.05	0.00	51.67	73.98	-22.31

Table 7-23. Radiated Measurements

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 121 of 137



7.10 Radiated Restricted Band Edge Measurements
 §15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

Test Overview and Limit

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

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR and Table 6 of RSS-Gen (8.10) must not exceed the limits shown below 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 7-24. Radiated Limits

Test Procedure Used

ANSI C63.10-2013 – Section 6.10.5.2

Test Settings

- Span is set large enough to capture the peak level of the emission operating on the channel closest to the band edge
- Reference level offset is set with the appropriate corrections for the frequencies shown in the plots
- Reference level is set to provide the appropriate amount of “head room” above the signal as specified in ANSI C63.10-2013 Section 4.1.5.2
- Attenuation is set to a low enough level to maintain enough dynamic range between the noise floor and the radiated limit
- Sweep time = Auto coupled
- RBW = 1MHz
- VBW = 3 x RBW for peak measurements and 1kHz for RMS measurements
- Detector = RMS and peak
- Trace = Max Hold
- Trace was allowed to stabilize

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 122 of 137

Test Setup

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

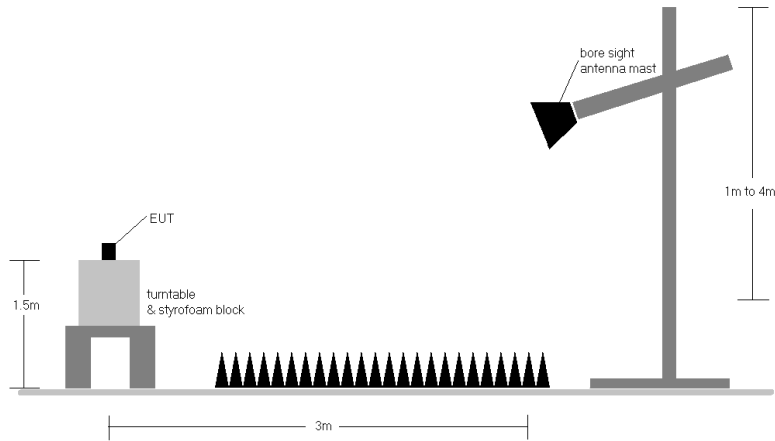


Figure 7-9. Radiated Test Setup >1GHz

Test Notes

1. All emissions lying in restricted bands specified in §15.205 and Section 8.10 of RSS-Gen are below the limits shown in §15.209.
2. No significant radiated emissions were found in the 2310 - 2390MHz restricted band.
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 and the worst-case emissions are reported.
6. Two different amplitude offsets were used depending on whether peak or average measurements were measured. The average measurements use a duty cycle correction factor (DCCF).

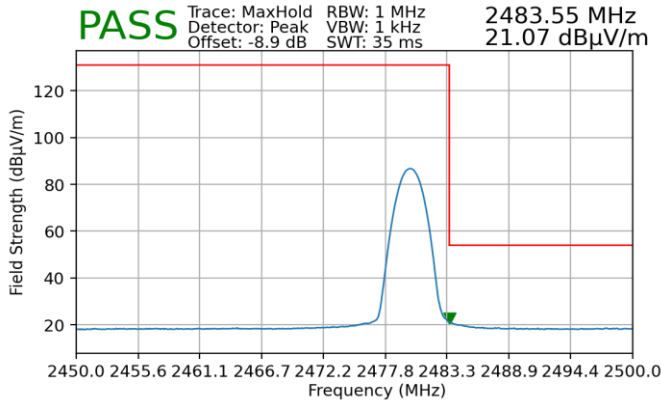
The amplitude offset shown in the following plots for average measurements was calculated using the formula:

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

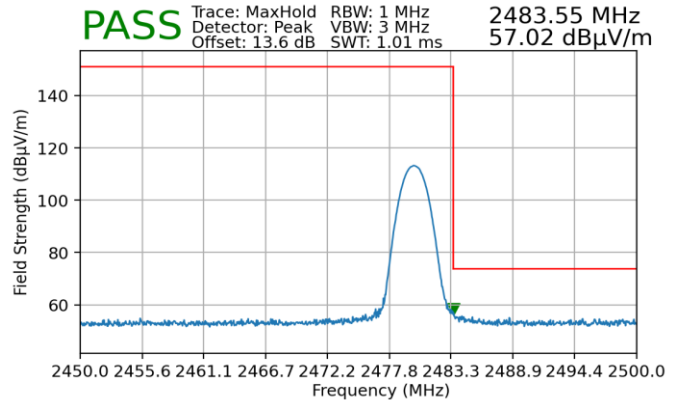
7. The "-" shown in the following RSE tables is used to denote a noise floor measurement.

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 123 of 137

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

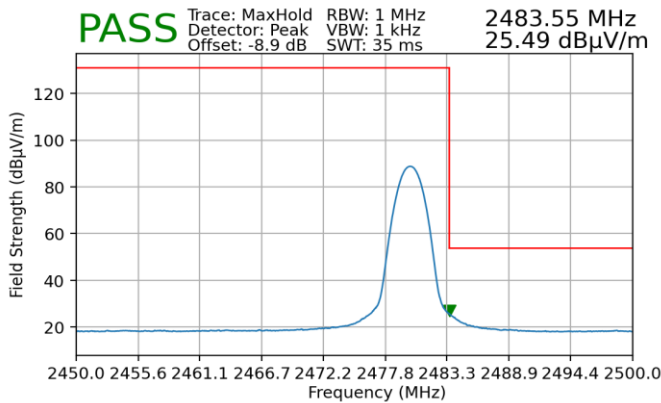


Plot 7-177. Radiated Restricted Upper Band Edge Measurement (Average) – SISO ANT1

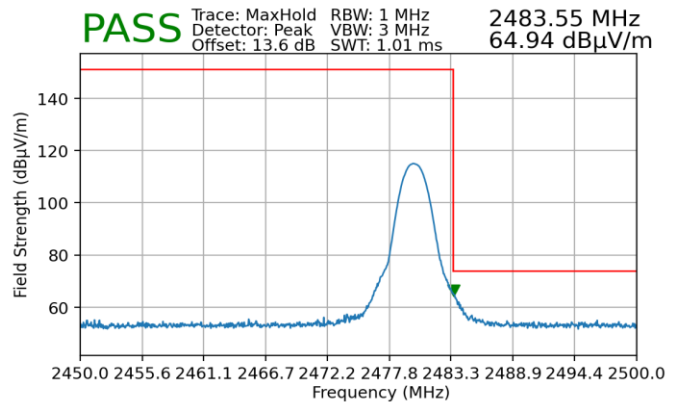


Plot 7-178. Radiated Restricted Upper Band Edge Measurement (Peak) – SISO ANT1

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



Plot 7-179. Radiated Restricted Upper Band Edge Measurement (Average) – SISO ANT2

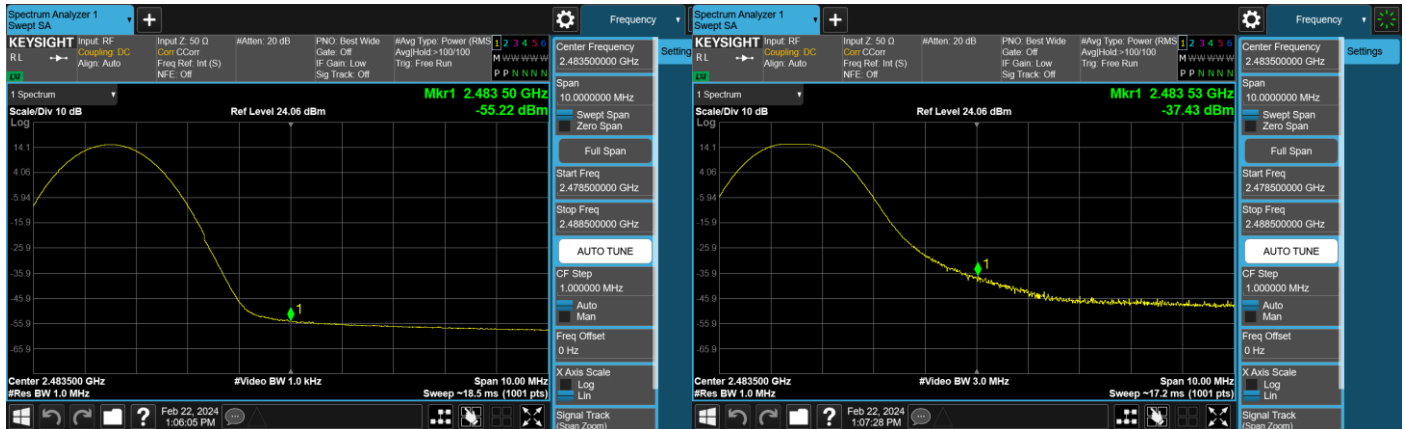


Plot 7-180. Radiated Restricted Upper Band Edge Measurement (Peak) – SISO ANT2

FCC ID: «FCC_ID» IC: 3048A-2085		MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»		Page 124 of 137



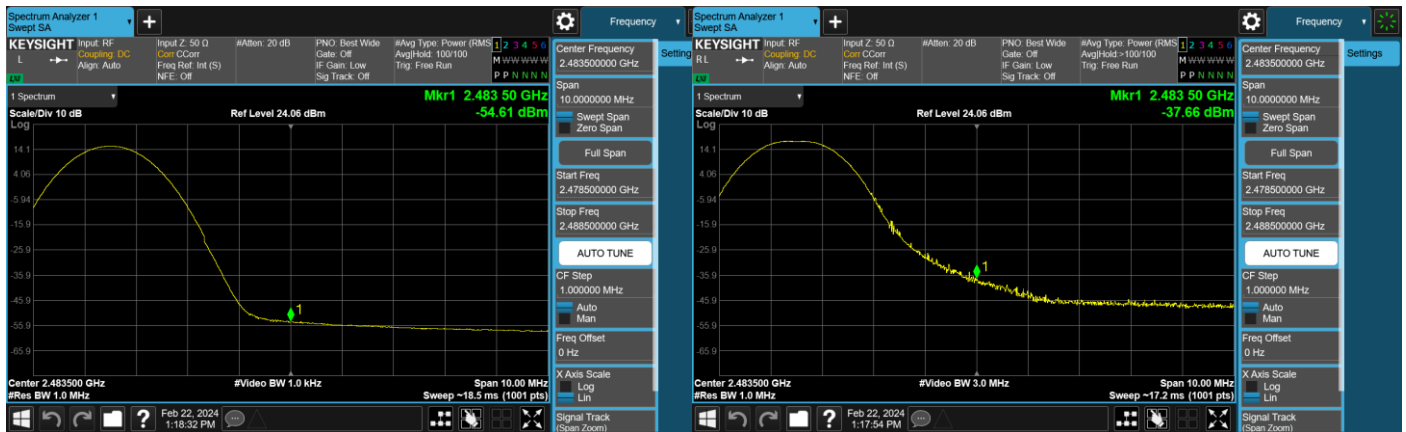
Worst Case Mode:	Bluetooth
Worst Case Data Rate:	1 Mbps
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78



Plot 7-181. Radiated Restricted Upper Band Edge Measurement (Average) – DUAL ANT1

Plot 7-182. Radiated Restricted Upper Band Edge Measurement (Peak) – DUAL ANT1

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



Plot 7-183. Radiated Restricted Upper Band Edge Measurement (Average) – DUAL ANT2

Plot 7-184. Radiated Restricted Upper Band Edge Measurement (Peak) – DUAL ANT2

FCC ID: «FCC_ID» IC: 3048A-2085	MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
Test Report S/N: «Report_SN_BT_FCC»	Test Dates: «Date_of_Testing»	EUT Type: «EUT_Type»	Page 125 of 137

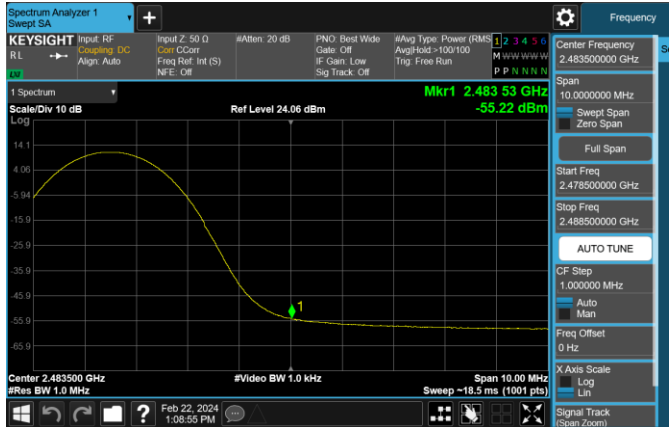
© 2024 ELEMENT

V «VerNo» «VerDate»

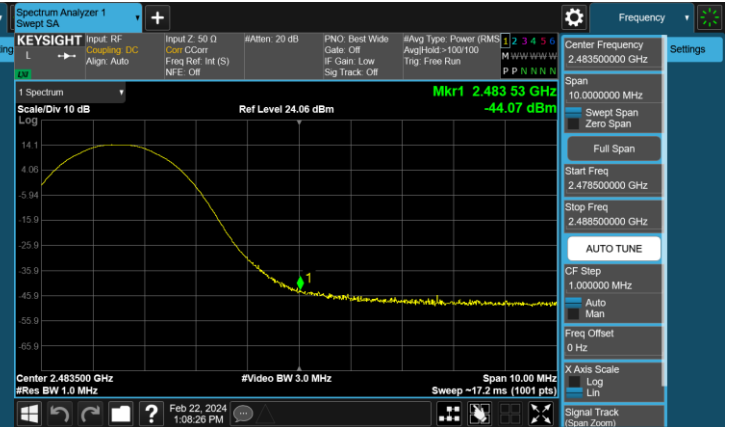
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Worst Case Mode: Bluetooth
 Worst Case Data Rate: 2 Mbps
 Measurement Distance: 3 Meters
 Operating Frequency: 2480MHz
 Channel: 78

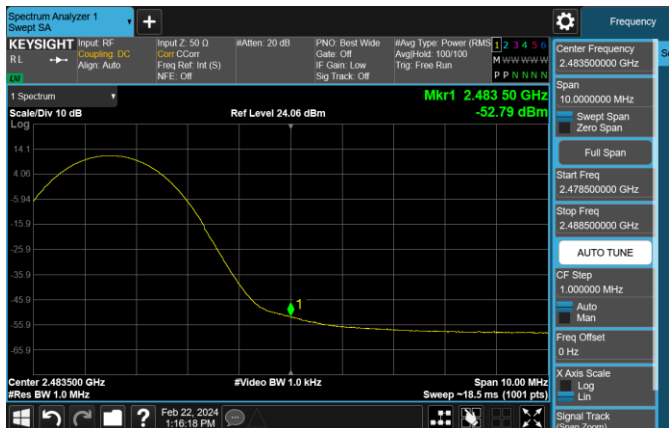


Plot 7-185. Radiated Restricted Upper Band Edge Measurement (Average) – DUAL ANT1

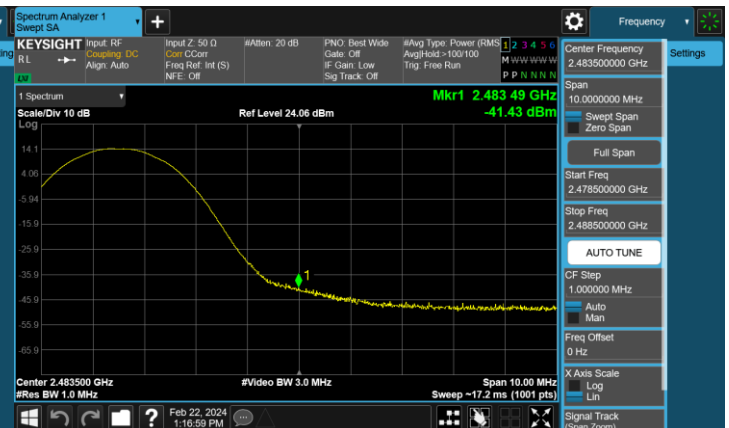


Plot 7-186. Radiated Restricted Upper Band Edge Measurement (Peak) – DUAL ANT1

Worst Case Mode: Bluetooth
 Worst Case Data Rate: 2 Mbps
 Measurement Distance: 3 Meters
 Operating Frequency: 2480MHz
 Channel: 78



Plot 7-187. Radiated Restricted Upper Band Edge Measurement (Average) – DUAL ANT2

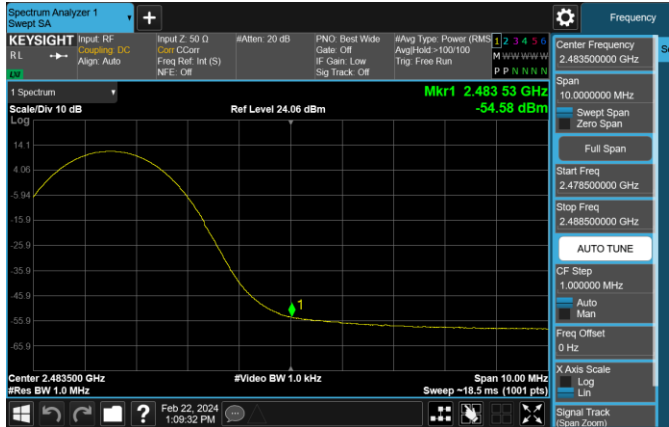


Plot 7-188. Radiated Restricted Upper Band Edge Measurement (Peak) – DUAL ANT2

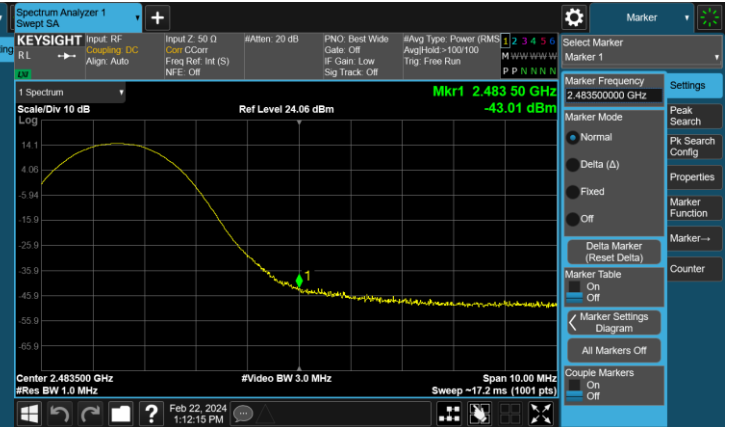
FCC ID: «FCC_ID» IC: 3048A-2085		MEASUREMENT REPORT («APPLICATION_TYPE»)		Approved by: Technical Manager
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Worst Case Mode: Bluetooth
 Worst Case Data Rate: 3 Mbps
 Measurement Distance: 3 Meters
 Operating Frequency: 2480MHz
 Channel: 78

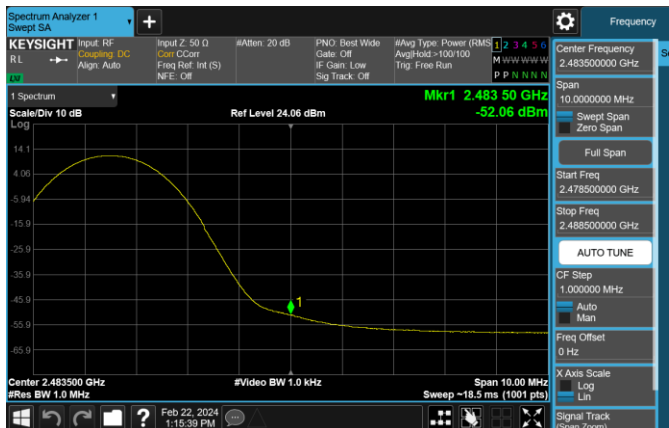


Plot 7-189. Radiated Restricted Upper Band Edge Measurement (Average) – DUAL ANT1



Plot 7-190. Radiated Restricted Upper Band Edge Measurement (Peak) – DUAL ANT1

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



Plot 7-191. Radiated Restricted Upper Band Edge Measurement (Average) – DUAL ANT2



Plot 7-192. Radiated Restricted Upper Band Edge Measurement (Peak) – DUAL ANT2

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Data Rate [Mbps]	Frequency [MHz]	Detector	Analyzer Level [dBm]			Directional Gain [dBi]	Analyzer Level [dBm]	EIRP [dBm]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
			Chain 0	Chain 1	Dual							
1.0	2483.50	Avg	-55.22	-54.61	-51.89	4.37	-51.89	-47.52	1.13	48.87	53.98	-5.11
	2483.50	Peak	-37.43	-37.66	-34.53	4.37	-34.53	-30.16	1.13	66.23	73.98	-7.75
2.0	2483.50	Avg	-55.22	-52.79	-50.83	4.37	-50.83	-46.46	1.13	49.93	53.98	-4.05
	2483.50	Peak	-44.07	-41.43	-39.54	4.37	-39.54	-35.17	1.13	61.22	73.98	-12.76
3.0	2483.50	Avg	-54.58	-52.06	-50.13	4.37	-50.13	-45.76	1.13	50.63	53.98	-3.35
	2483.50	Peak	-43.01	-41.21	-39.01	4.37	-39.01	-34.64	1.13	61.75	73.98	-12.23

Table 7-25. Radiated Band Edge Measurements

Note

The radiated band edge with Dual Tx was performed with conducted band edge measurements which antenna 1 and 2 were first measured separately during MIMO transmission. The measured values were then summed in linear power units then converted back to dBm.

Per ANSI C63.10-2013 Section 14.4.3, the directional gain is calculated using the following formula, where G_N is the gain of the nth antenna and N_{ANT} , the total number of antennas used.

$$\text{Directional gain} = 10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}] \text{ dBi}$$

Per ANSI C63.10, we additionally performed case radiated emissions with the antenna ports terminated.

Sample Calculations

Radiated Band Edge Measurement

- Field Strength Level [dBμV/m] = Analyzer Level [dBm] + Directional Gain[dBi] + 107 + Duty Cycle Correction[dB] +104.8-20log(D)
- Margin [dB] = Field Strength Level [dBμV/m] – Limit [dBμV/m]

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7.11 Radiated Spurious Emissions Measurements – Below 1GHz §15.209; RSS-Gen [8.9]

Test Overview and Limit

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

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

Frequency	Field Strength [$\mu\text{V/m}$]	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

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Test Setup

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

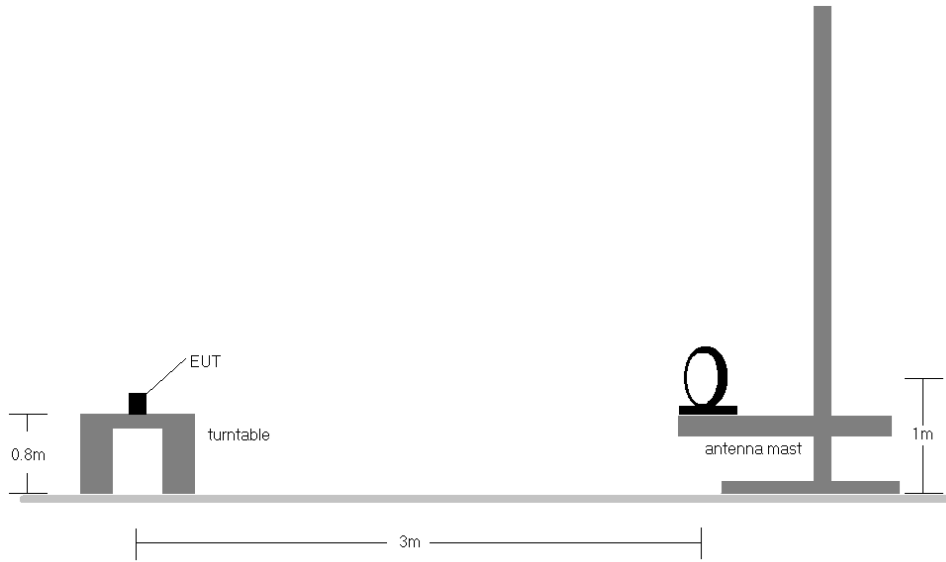


Figure 7-10. Radiated Test Setup < 30Mhz

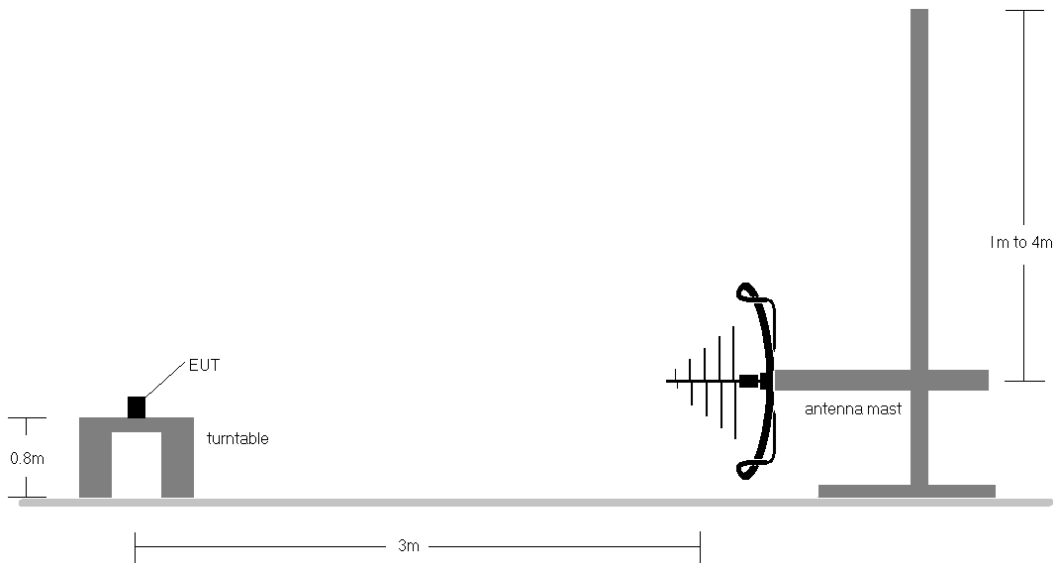


Figure 7-11. Radiated Test Setup < 1GHz

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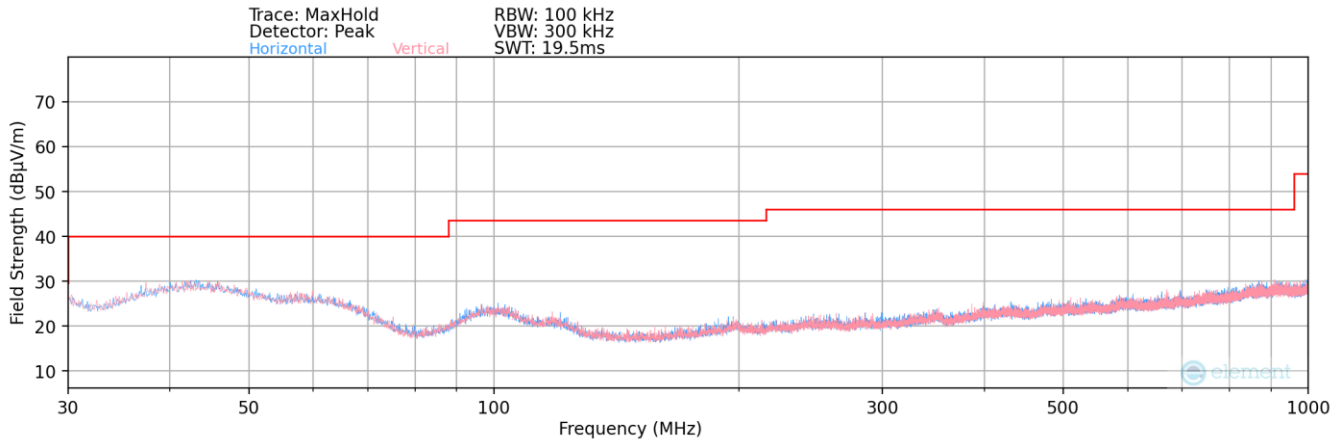
Test Notes

1. All emissions lying in restricted bands specified in §15.205 and RSS-Gen (8.10) are below the limits shown in §15.209.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
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. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
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.

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Radiated Spurious Emissions Measurements (Below 1GHz)

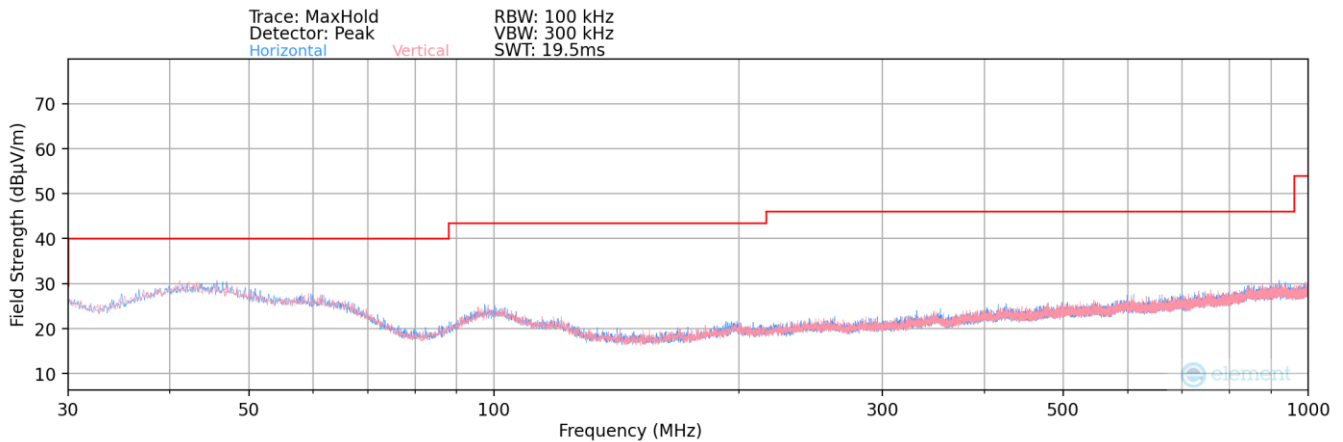
§15.209; RSS-Gen [8.9]



Plot 7-193. Radiated Spurious Plot below 1GHz – SISO ANT1

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]
911.54	Quasi-Peak	V	-	-	-76.93	-0.52	29.55	46.02	-16.47

Table 7-27. Radiated Spurious Emissions Below 1GHz – SISO ANT1

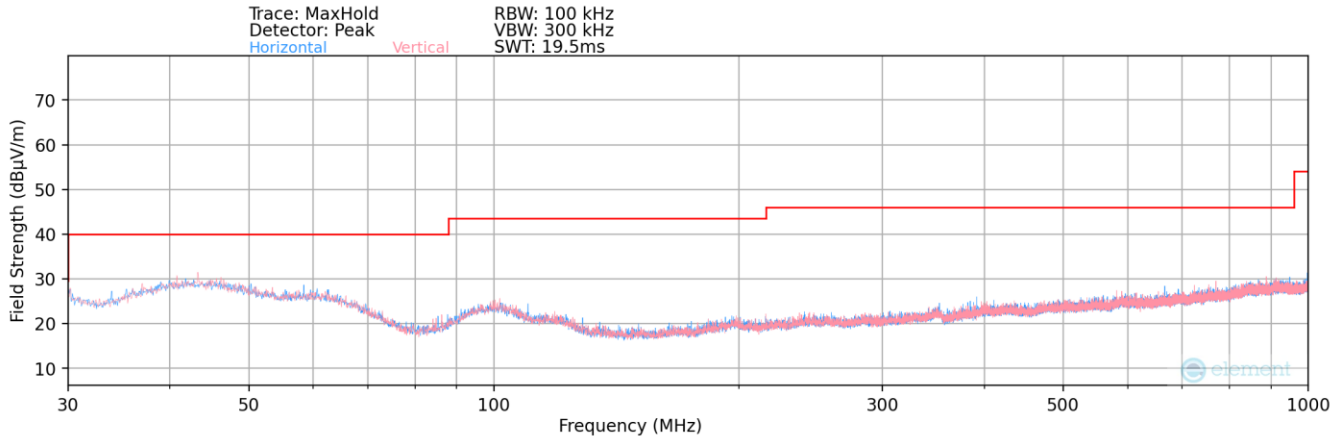


Plot 7-194. Radiated Spurious Plot below 1GHz – SISO ANT2

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]
860.04	Quasi-Peak	V	-	-	-76.83	-1.04	29.13	46.02	-16.90

Table 7-28. Radiated Spurious Emissions Below 1GHz – SISO ANT2

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Plot 7-195. Radiated Spurious Plot below 1GHz – DUAL

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]
779.50	Quasi-Peak	V	-	-	-76.18	-2.58	28.24	46.02	-17.78

Table 7-29. Radiated Spurious Emissions Below 1GHz – DUAL

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7.12 Line Conducted Measurement Data

§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 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, Section 6.2

Test Settings

Quasi-Peak Field Strength 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 Field Strength 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.

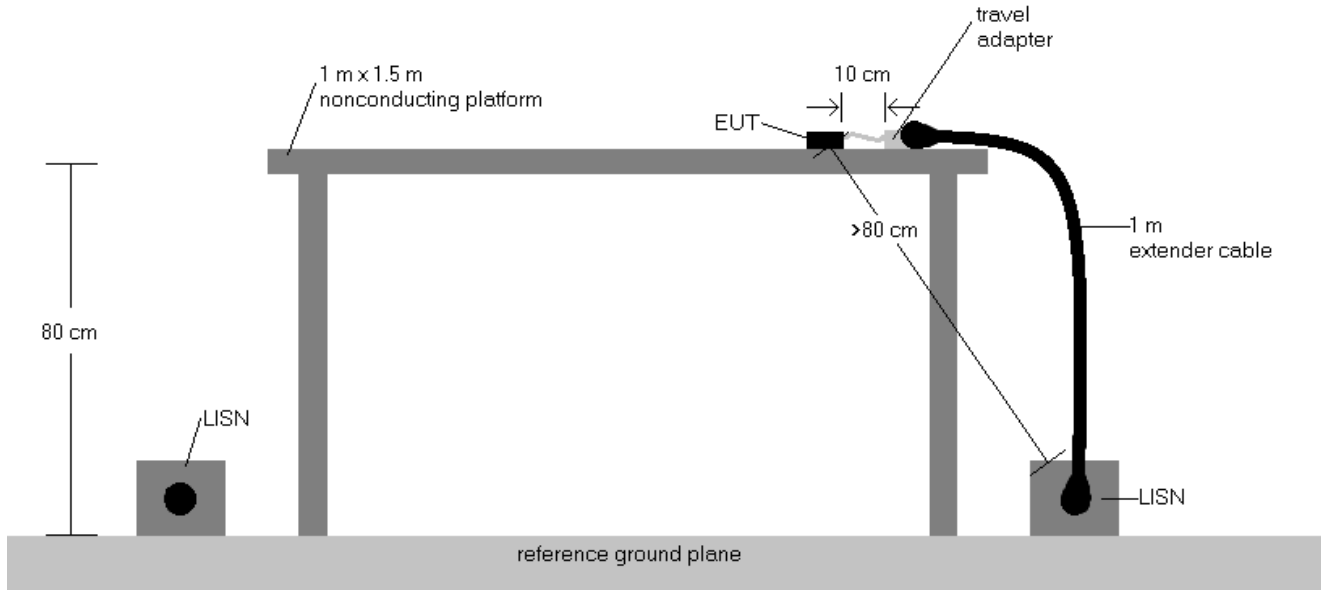
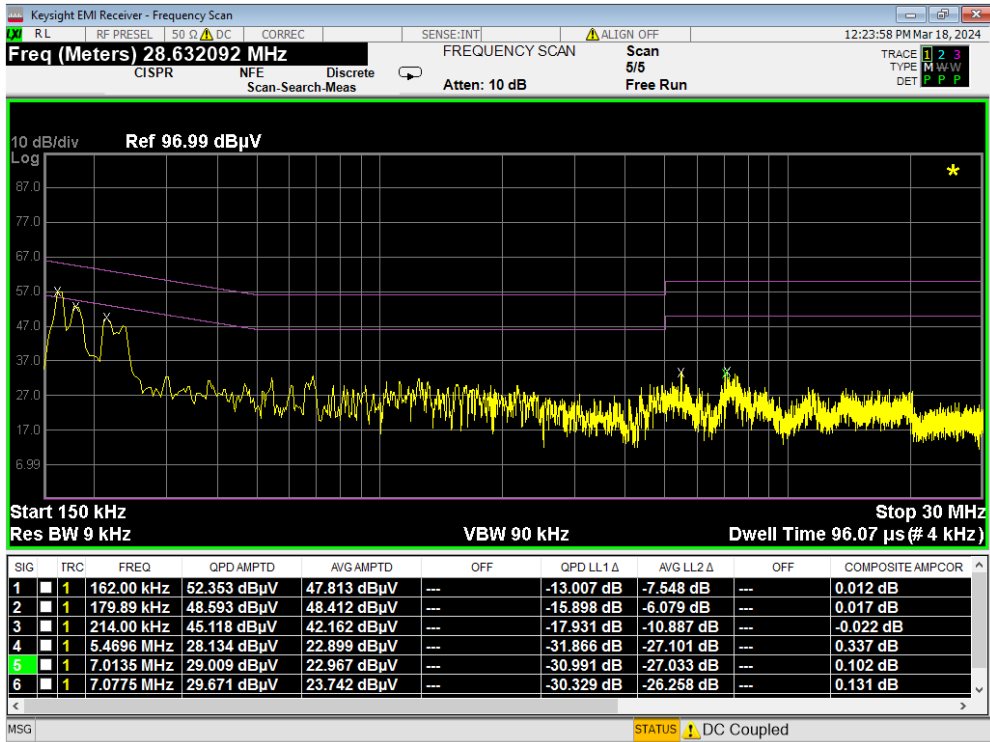


Figure 7-12. Test Instrument & Measurement Setup

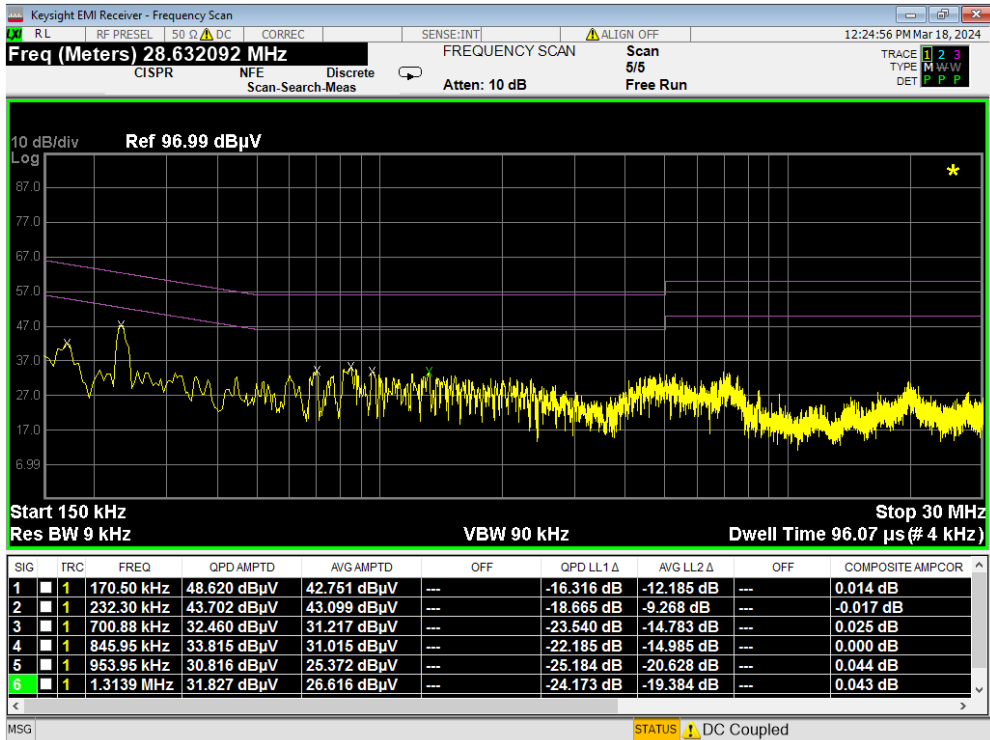
Test Notes

1. All modes of operation were investigated, and the worst-case emissions are reported using mid channel. The emissions found were not affected by the choice of channel used during testing.
2. The limit for an intentional radiator from 150kHz to 30MHz are specified in 15.207 and RSS-Gen (8.8).
3. $Corr. (dB) = Cable\ loss (dB) + LISN\ insertion\ factor (dB)$
4. $QP/AV\ Level (dB\mu V) = QP/AV\ Analyzer/Receiver\ Level (dB\mu V) + Corr. (dB)$
5. $Margin (dB) = QP/AV\ Limit (dB\mu V) - QP/AV\ Level (dB\mu V)$
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.

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Plot 7-196. Line-Conducted Test Plot (L1)



Plot 7-197. Line-Conducted Test Plot (N)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Microsoft Corporation Portable Computing Device FCC ID: C3K2085 / IC: 3048A-2085** is in compliance with Part 15 Subpart C (15.247) of the FCC Rules and RSS-247 of the ISED rules.

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