

## **FCC Appendix RF Test Data for BLE**

**FCC ID** : 2BAQY-HE1000WIFI

**Company** : HIFIMAN KUNSHAN TECHNOLOGY GROUP CO., LTD.

**EUT** : WiFi Planar Magnetic Headphones

**Model Number** : HE1000 WiFi

**Report No.** : CTA25111402701

**Reviewed By** : Eric Wang

## Appendix A: DTS Bandwidth

### Test Result

| TestMode | Antenna | Freq(MHz) | DTS BW<br>[MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|----------|---------|-----------|-----------------|----------|----------|------------|---------|
| BLE_1M   | Ant1    | 2402      | 0.644           | 2401.688 | 2402.332 | 0.5        | PASS    |
|          |         | 2440      | 0.636           | 2439.696 | 2440.332 | 0.5        | PASS    |
|          |         | 2480      | 0.640           | 2479.692 | 2480.332 | 0.5        | PASS    |

Agilent Spectrum Analyzer - Sweep SA

Center Freq 2.402000000 GHz

Ref Offset 0.4 dB  
Ref 20.00 dBm

Trig: Free Run  
#Atten: 30 dB

#Avg Type: RMS  
Avg/Hold: 100/100

Span 4.000 MHz  
#Res BW 100 kHz  
#VBW 300 kHz  
Sweep (#Swp) 1.000 ms (1001 pts)

ΔMkr3 644 kHz  
0.141 dB

Log

10 dB/div

0.00

-10.00

-20.00

-30.00

-40.00

-50.00

-60.00

-70.00

1

2

3Δ1

Center 2.402000 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep (#Swp) 1.000 ms (1001 pts)

| MNR | MODE | TRIG | SCL   | X             | Y          | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|-----|------|------|-------|---------------|------------|----------|----------------|----------------|
| 1   | N    | 1    | f     | 2.401 688 GHz | -9.391 dBm |          |                |                |
| 2   | N    | 1    | f     | 2.402 020 GHz | -3.547 dBm |          |                |                |
| 3   | Δ1   | 1    | f (Δ) | 644 kHz (Δ)   | 0.141 dB   |          |                |                |

Frequency

Auto Tune

Center Freq  
2.402000000 GHz

Start Freq  
2.400000000 GHz

Stop Freq  
2.404000000 GHz

CF Step  
400.000 kHz  
Man

Freq Offset  
0 Hz

MSO

STATUS

BLE\_1M\_Ant1\_2402

Agilent Spectrum Analyzer - Sweep SA

Center Freq 2.440000000 GHz

Ref Offset 0.4 dB  
Ref 20.00 dBm

Trig: Free Run  
#Atten: 30 dB

#Avg Type: RMS  
Avg/Hold: 100/100

Span 4.000 MHz  
#Res BW 100 kHz  
#VBW 300 kHz  
Sweep (#Swp) 1.000 ms (1001 pts)

ΔMkr3 636 kHz  
0.007 dB

Log

10 dB/div

0.00

-10.00

-20.00

-30.00

-40.00

-50.00

-60.00

-70.00

1

2

3Δ1

Center 2.440000 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep (#Swp) 1.000 ms (1001 pts)

| MNR | MODE | TRIG | SCL   | X             | Y          | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|-----|------|------|-------|---------------|------------|----------|----------------|----------------|
| 1   | N    | 1    | f     | 2.439 696 GHz | -9.613 dBm |          |                |                |
| 2   | N    | 1    | f     | 2.440 024 GHz | -3.894 dBm |          |                |                |
| 3   | Δ1   | 1    | f (Δ) | 636 kHz (Δ)   | 0.007 dB   |          |                |                |

Frequency

Auto Tune

Center Freq  
2.440000000 GHz

Start Freq  
2.438000000 GHz

Stop Freq  
2.442000000 GHz

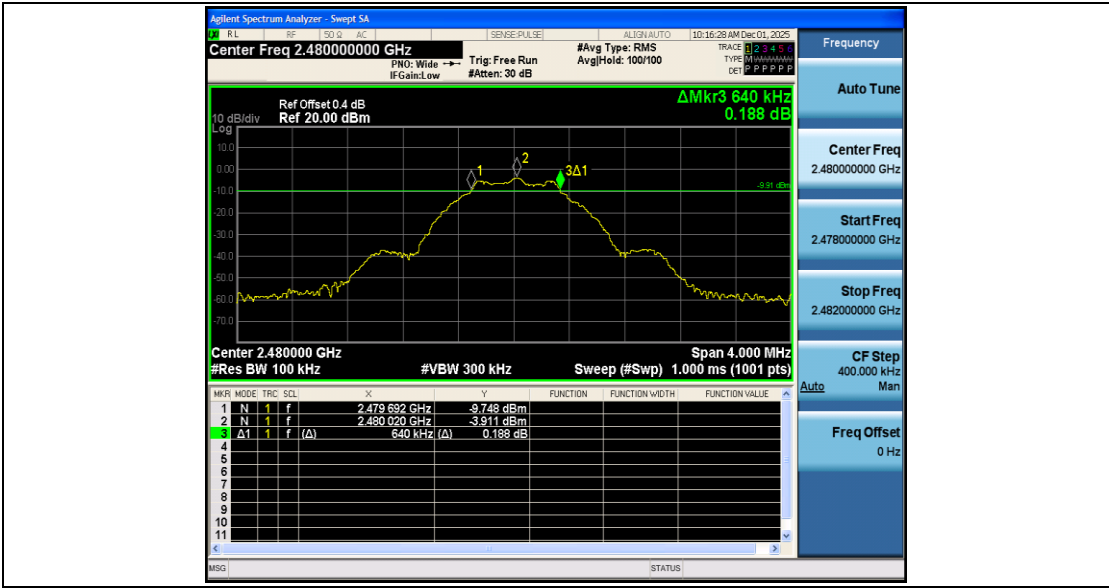
CF Step  
400.000 kHz  
Man

Freq Offset  
0 Hz

MSO

STATUS

BLE\_1M\_Ant1\_2440

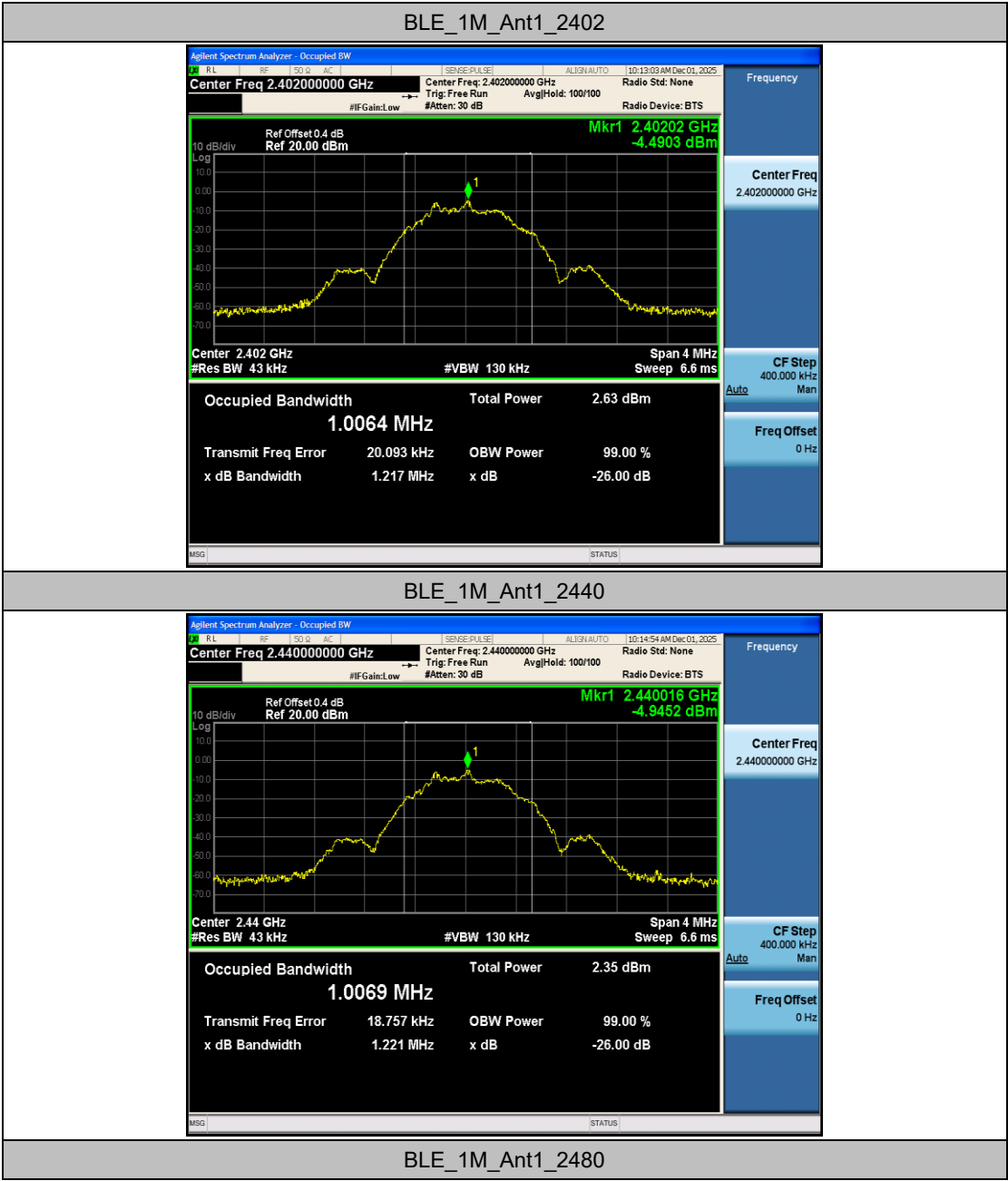


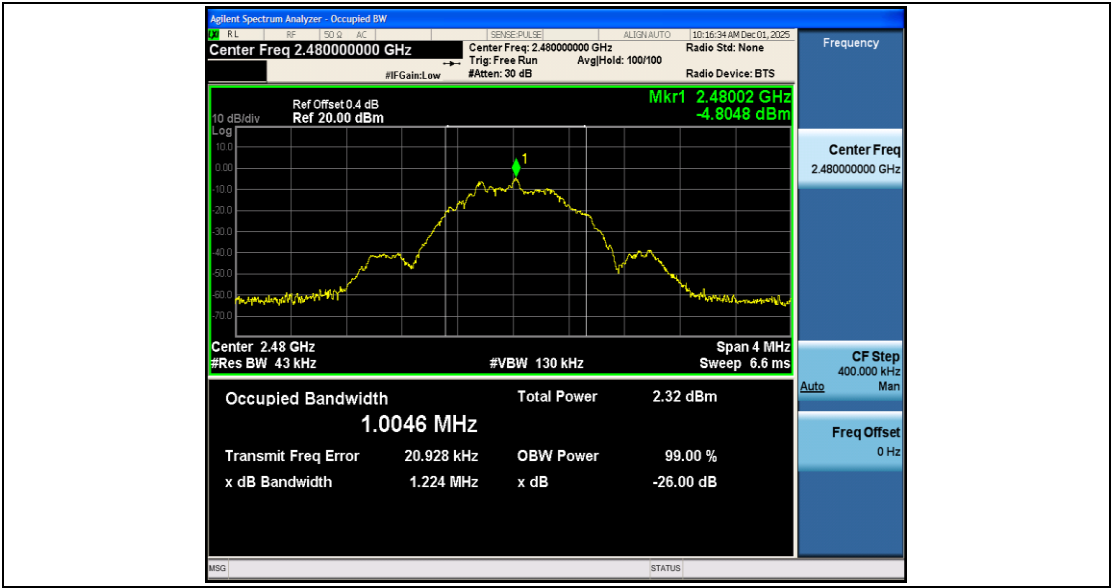
## Appendix B: Occupied Channel Bandwidth

### Test Result

| TestMode | Antenna | Freq(MHz) | OCB [MHz] | FL[MHz]   | FH[MHz]   | Limit[MHz] | Verdict |
|----------|---------|-----------|-----------|-----------|-----------|------------|---------|
| BLE_1M   | Ant1    | 2402      | 1.0064    | 2401.5169 | 2402.5233 | ---        | ---     |
|          |         | 2440      | 1.0069    | 2439.5153 | 2440.5222 | ---        | ---     |
|          |         | 2480      | 1.0046    | 2479.5186 | 2480.5232 | ---        | ---     |

Test Graphs





## Appendix C: Maximum conducted output power

### Test Result Peak

| TestMode | Antenna | Freq(MHz) | Conducted<br>Peak<br>Power[dBm] | Conducted<br>Limit[dBm] | Verdict |
|----------|---------|-----------|---------------------------------|-------------------------|---------|
| BLE_1M   | Ant1    | 2402      | -3.44                           | ≤30                     | PASS    |
|          |         | 2440      | -3.77                           | ≤30                     | PASS    |
|          |         | 2480      | -3.76                           | ≤30                     | PASS    |

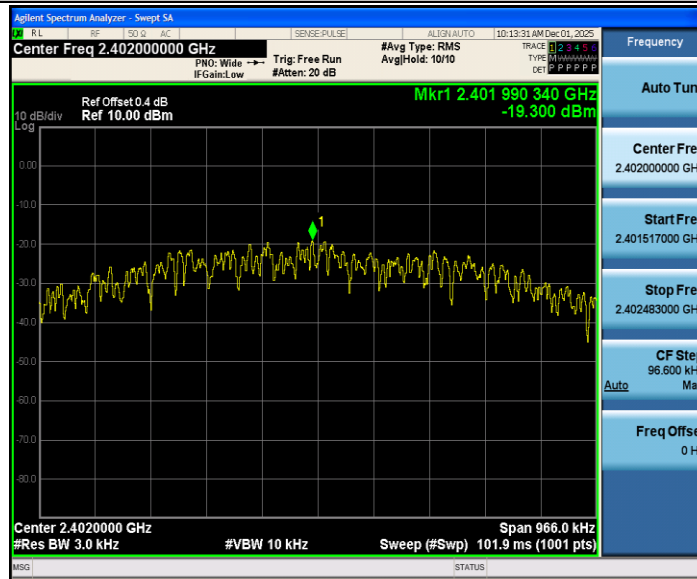
## Appendix D: Maximum power spectral density

### Test Result

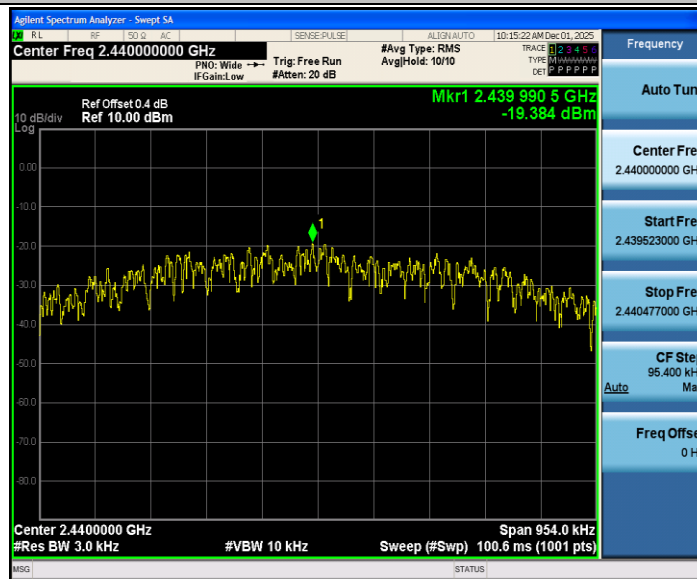
| TestMode | Antenna | Freq(MHz) | Result[dBm/3kHz] | Limit[dBm/3kHz] | Verdict |
|----------|---------|-----------|------------------|-----------------|---------|
| BLE_1M   | Ant1    | 2402      | -19.30           | ≤8.00           | PASS    |
|          |         | 2440      | -19.38           | ≤8.00           | PASS    |
|          |         | 2480      | -19.62           | ≤8.00           | PASS    |

## Test Graphs

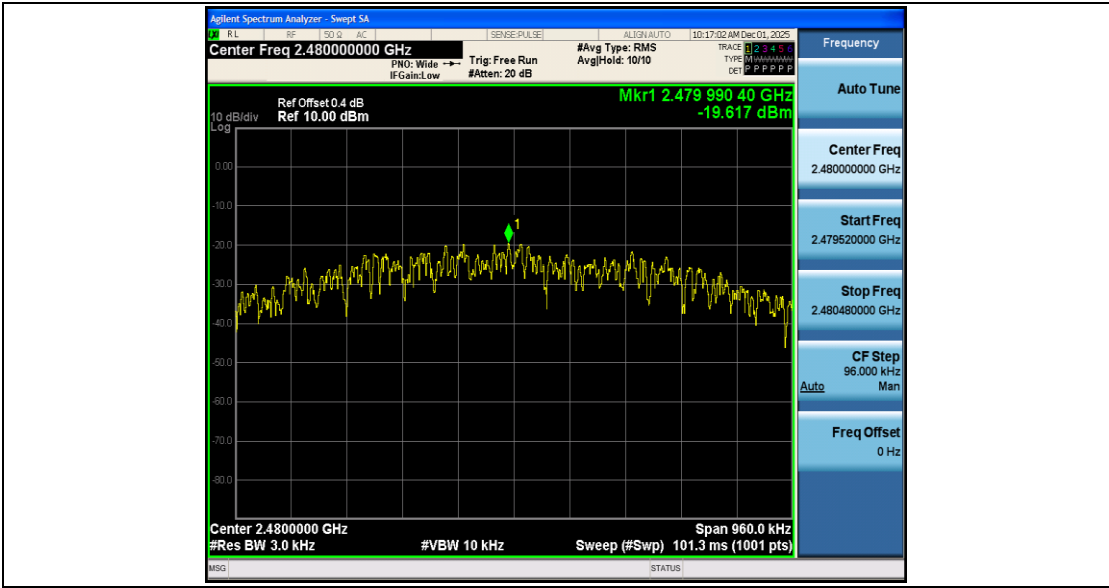
BLE\_1M\_Ant1\_2402



BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480



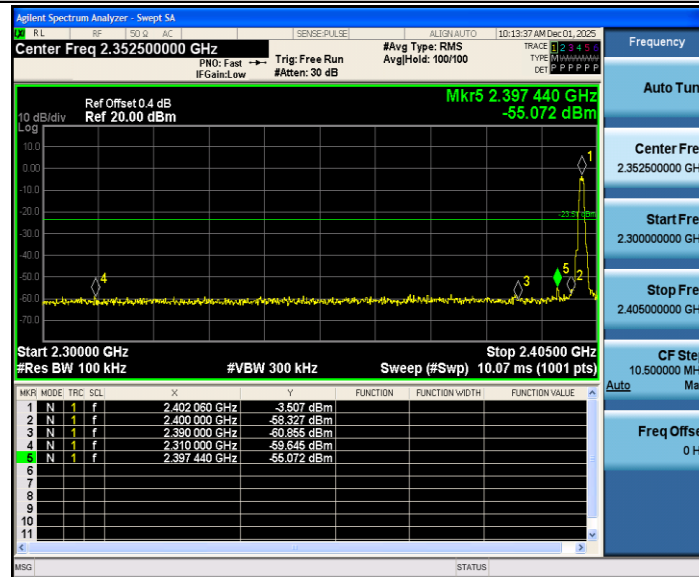
## Appendix E: Band edge measurements

### Test Result

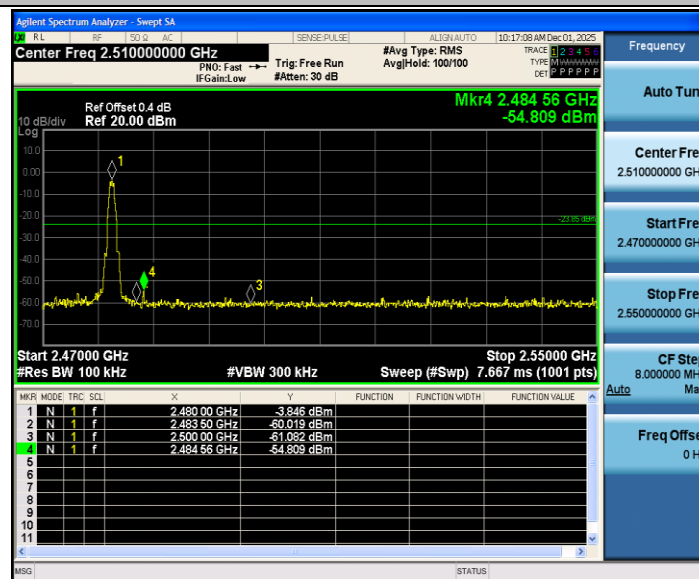
| TestMod<br>e | Antenn<br>a | ChNam<br>e | Freq(MHz<br>) | RefLevel[dBm<br>] | Result[dBm<br>] | Limit[dBm<br>] | Verdic<br>t |
|--------------|-------------|------------|---------------|-------------------|-----------------|----------------|-------------|
| BLE_1M       | Ant1        | Low        | 2402          | -3.51             | -55.07          | ≤-23.51        | PASS        |
|              |             | High       | 2480          | -3.85             | -54.81          | ≤-23.85        | PASS        |

## Test Graphs

BLE\_1M\_Ant1\_Low\_2402



BLE\_1M\_Ant1\_High\_2480

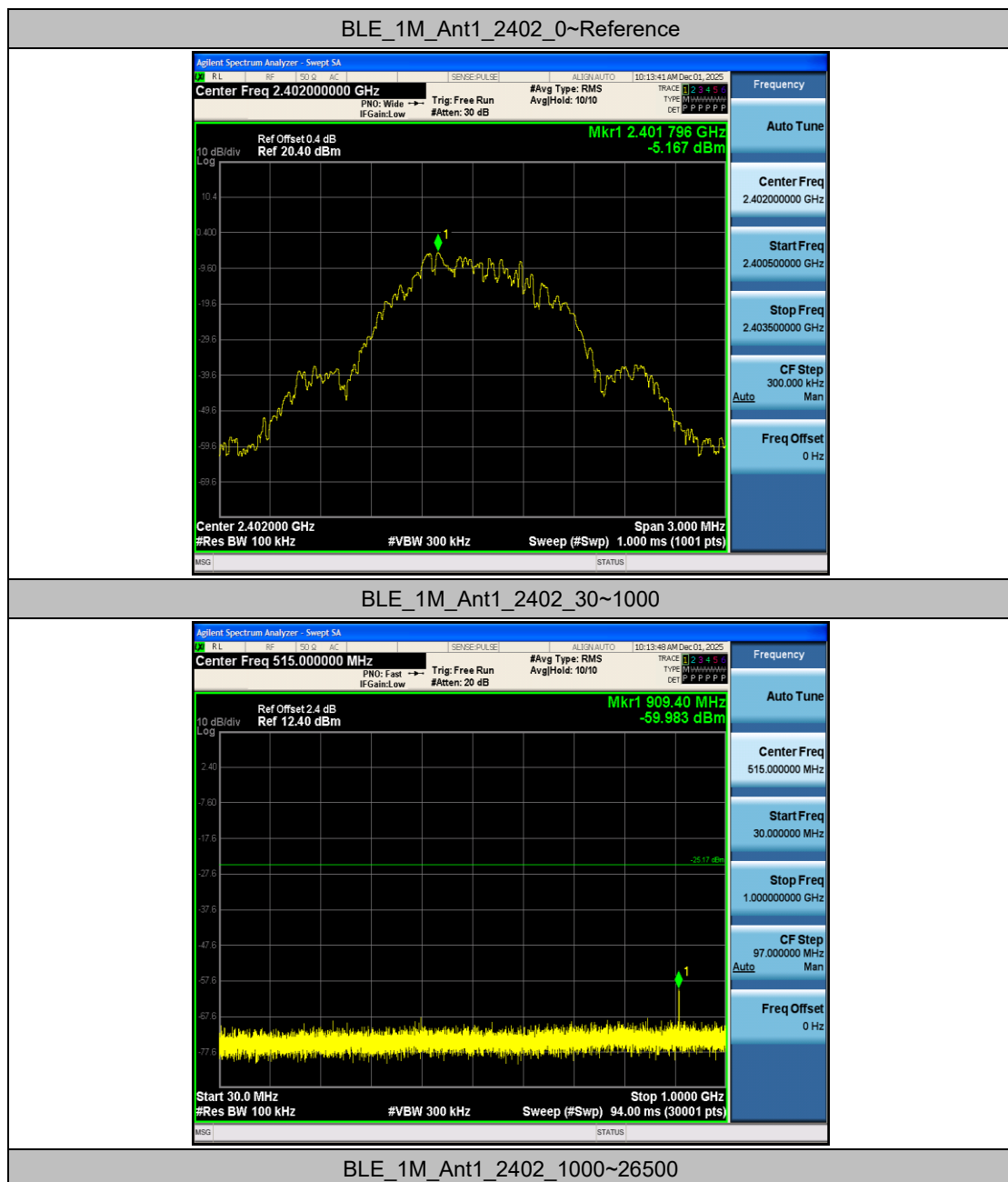


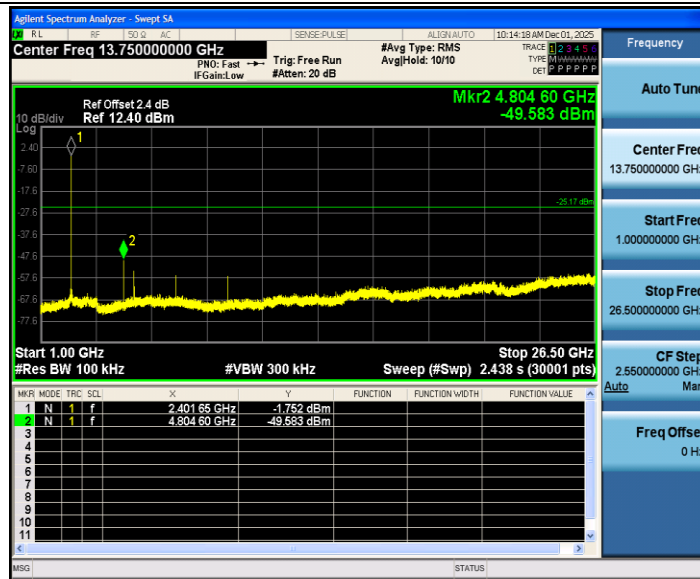
## Appendix F: Conducted Spurious Emission

### Test Result

| TestMode | Antenna | Freq(MHz) | FreqRange<br>[MHz] | RefLevel<br>[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|-----------|--------------------|-------------------|-------------|------------|---------|
| BLE_1M   | Ant1    | 2402      | Reference          | -5.17             | -5.17       | ---        | PASS    |
|          |         |           | 30~1000            | -5.17             | -59.98      | ≤-25.17    | PASS    |
|          |         |           | 1000~26500         | -5.17             | -49.58      | ≤-25.17    | PASS    |
|          |         | 2440      | Reference          | -4.46             | -4.46       | ---        | PASS    |
|          |         |           | 30~1000            | -4.46             | -68.14      | ≤-24.46    | PASS    |
|          |         |           | 1000~26500         | -4.46             | -47.11      | ≤-24.46    | PASS    |
|          |         | 2480      | Reference          | -4.11             | -4.11       | ---        | PASS    |
|          |         |           | 30~1000            | -4.11             | -68.01      | ≤-24.11    | PASS    |
|          |         |           | 1000~26500         | -4.11             | -47.25      | ≤-24.11    | PASS    |

## Test Graphs

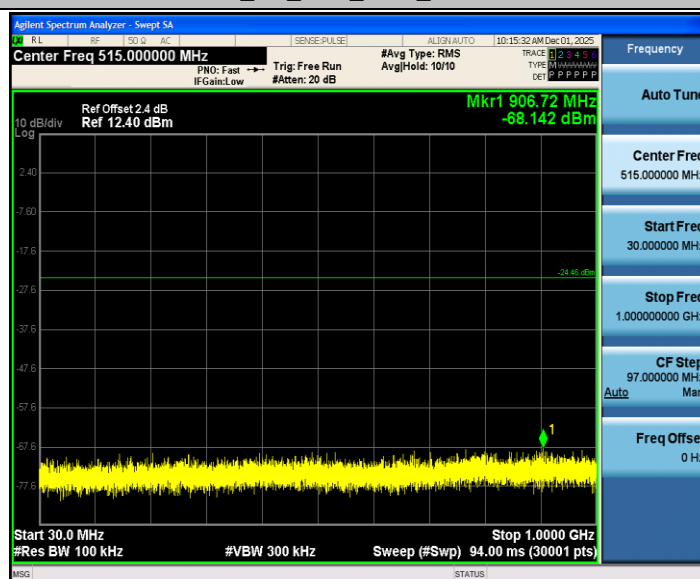




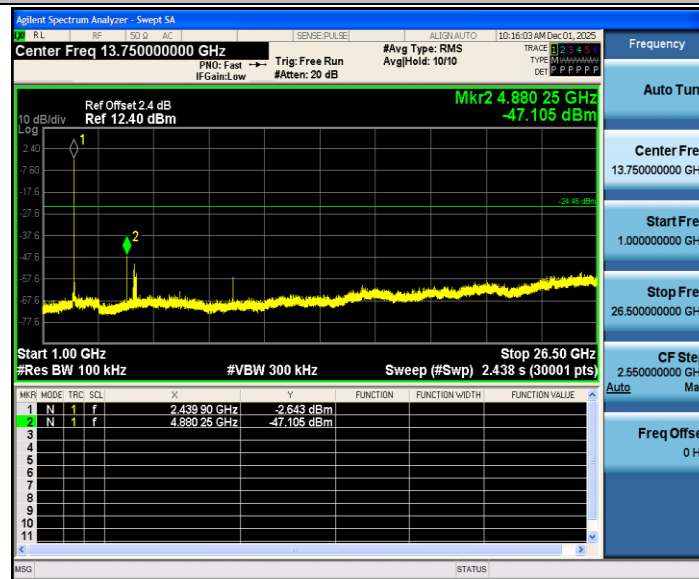
BLE\_1M\_Ant1\_2440\_0~Reference



BLE\_1M\_Ant1\_2440\_30~1000



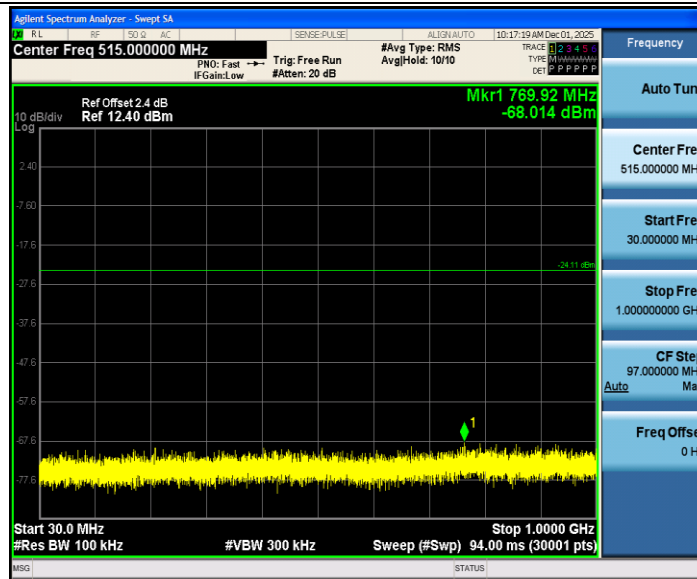
# BLE\_1M\_Ant1\_2440\_1000~26500



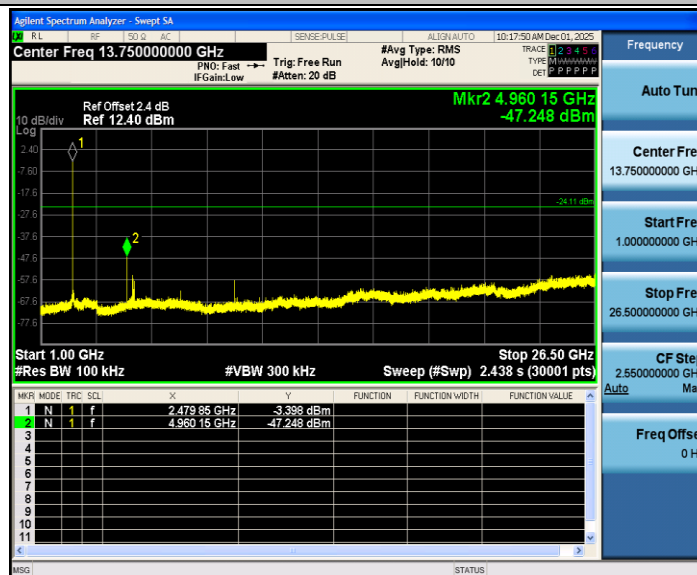
# BLE\_1M\_Ant1\_2480\_0~Reference



# BLE\_1M\_Ant1\_2480\_30~1000



BLE\_1M\_Ant1\_2480\_1000~26500



## Appendix G: Duty Cycle

### Test Result

| TestMode | Antenna | Freq(MHz) | ON Time<br>[ms] | Period<br>[ms] | X      | DC<br>[%] | xFactor | Limit | Verdict |
|----------|---------|-----------|-----------------|----------------|--------|-----------|---------|-------|---------|
| BLE_1M   | Ant1    | 2402      | 0.41            | 0.63           | 0.6508 | 65.08     | 1.87    | ---   | ---     |
|          |         | 2440      | 0.41            | 0.63           | 0.6508 | 65.08     | 1.87    | ---   | ---     |
|          |         | 2480      | 0.41            | 0.63           | 0.6508 | 65.08     | 1.87    | ---   | ---     |

Test Graphs

