

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

**FCC ID** : 2A48I-RM03

**Company** : Ningbo Jiufeng Electrical Appliance Co., Ltd.

**EUT** : Walking machine

**Model Number** : RM03

**Report No.** : CTA26032701201

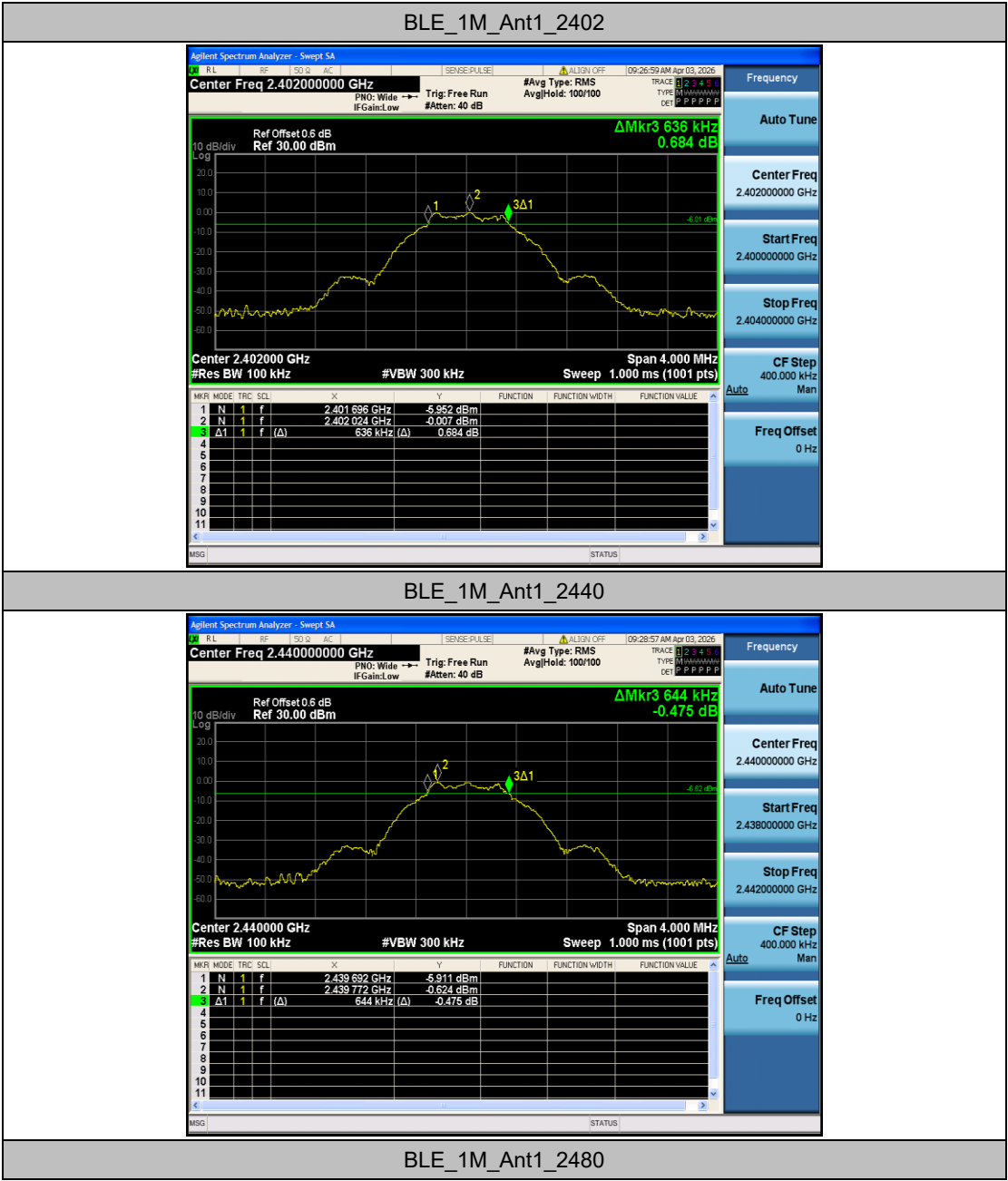
**Reviewed By** : Eric Wang

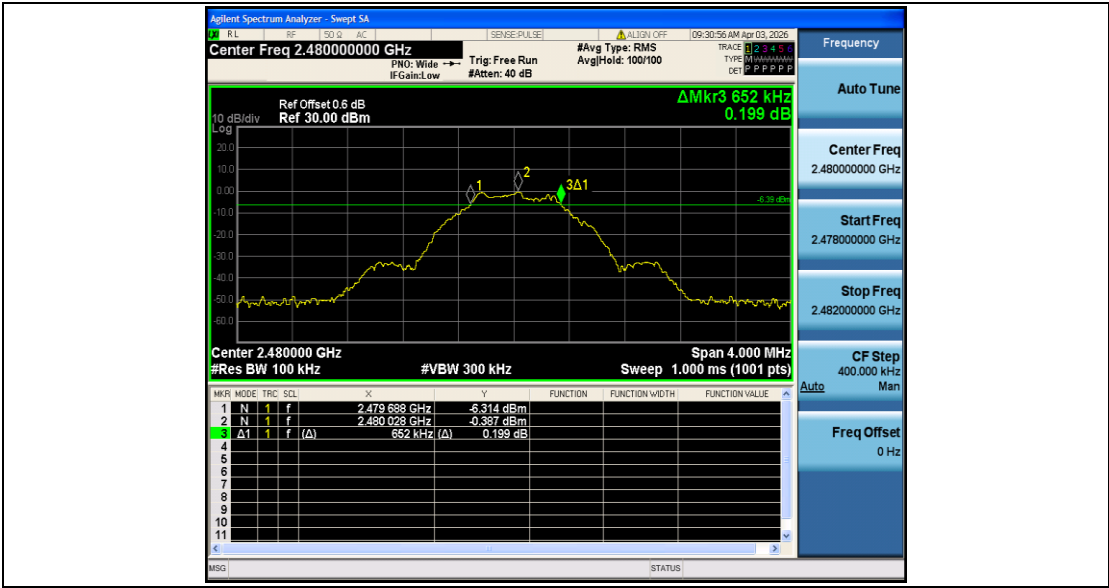
## Appendix A: DTS Bandwidth

### Test Result

| TestMode | Antenna | Freq(MHz) | DTS BW<br>[MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|----------|---------|-----------|-----------------|----------|----------|------------|---------|
| BLE_1M   | Ant1    | 2402      | 0.636           | 2401.696 | 2402.332 | 0.5        | PASS    |
|          |         | 2440      | 0.644           | 2439.692 | 2440.336 | 0.5        | PASS    |
|          |         | 2480      | 0.652           | 2479.688 | 2480.340 | 0.5        | PASS    |

Test Graphs





## Appendix B: Occupied Channel Bandwidth

### Test Result

| TestMode | Antenna | Freq(MHz) | OCB [MHz] | FL[MHz]   | FH[MHz]   | Limit[MHz] | Verdict |
|----------|---------|-----------|-----------|-----------|-----------|------------|---------|
| BLE_1M   | Ant1    | 2402      | 1.0095    | 2401.5162 | 2402.5257 | ---        | ---     |
|          |         | 2440      | 1.0078    | 2439.5166 | 2440.5244 | ---        | ---     |
|          |         | 2480      | 1.0065    | 2479.5185 | 2480.5250 | ---        | ---     |

## Test Graphs

BLE\_1M\_Ant1\_2402



BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480



## Appendix C: Maximum conducted output power

### Test Result Peak

| TestMode | Antenna | Freq(MHz) | Conducted Peak Power[dBm] | Conducted Limit[dBm] | Verdict |
|----------|---------|-----------|---------------------------|----------------------|---------|
| BLE_1M   | Ant1    | 2402      | 0.24                      | ≤30                  | PASS    |
|          |         | 2440      | -0.06                     | ≤30                  | PASS    |
|          |         | 2480      | -0.11                     | ≤30                  | PASS    |

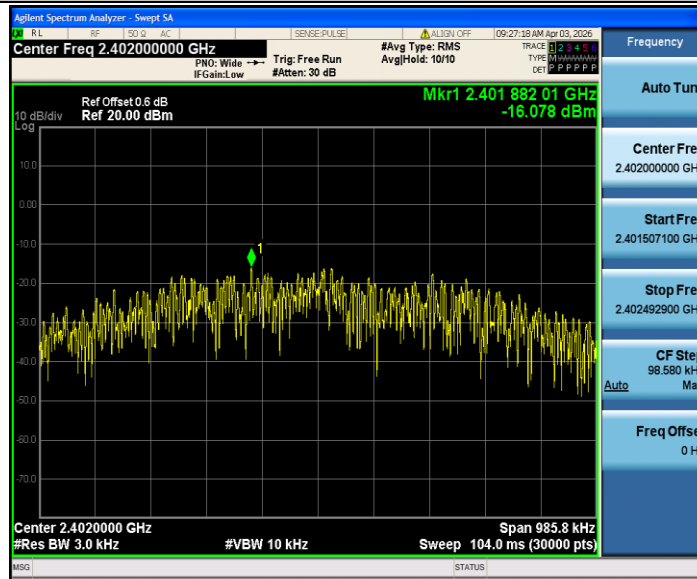
## Appendix D: Maximum power spectral density

### Test Result

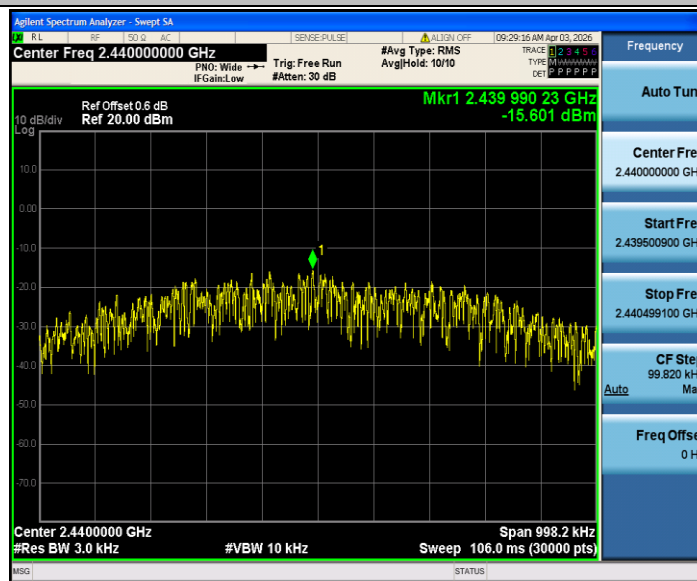
| TestMode | Antenna | Freq(MHz) | Result[dBm/3kHz] | Limit[dBm/3kHz] | Verdict |
|----------|---------|-----------|------------------|-----------------|---------|
| BLE_1M   | Ant1    | 2402      | -16.08           | ≤8.00           | PASS    |
|          |         | 2440      | -15.60           | ≤8.00           | PASS    |
|          |         | 2480      | -15.78           | ≤8.00           | PASS    |

## Test Graphs

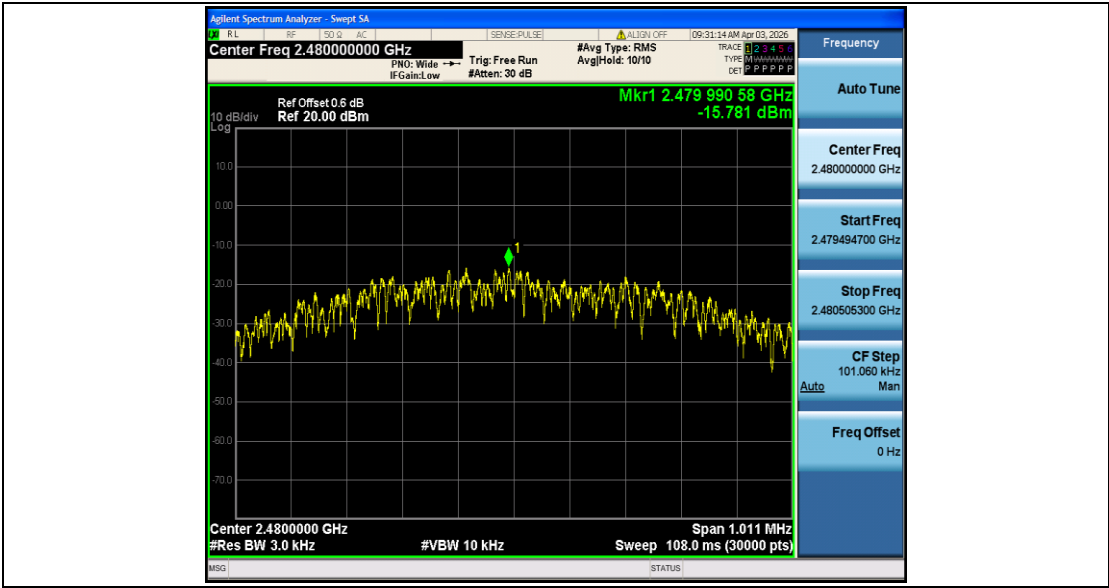
BLE\_1M\_Ant1\_2402



BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480

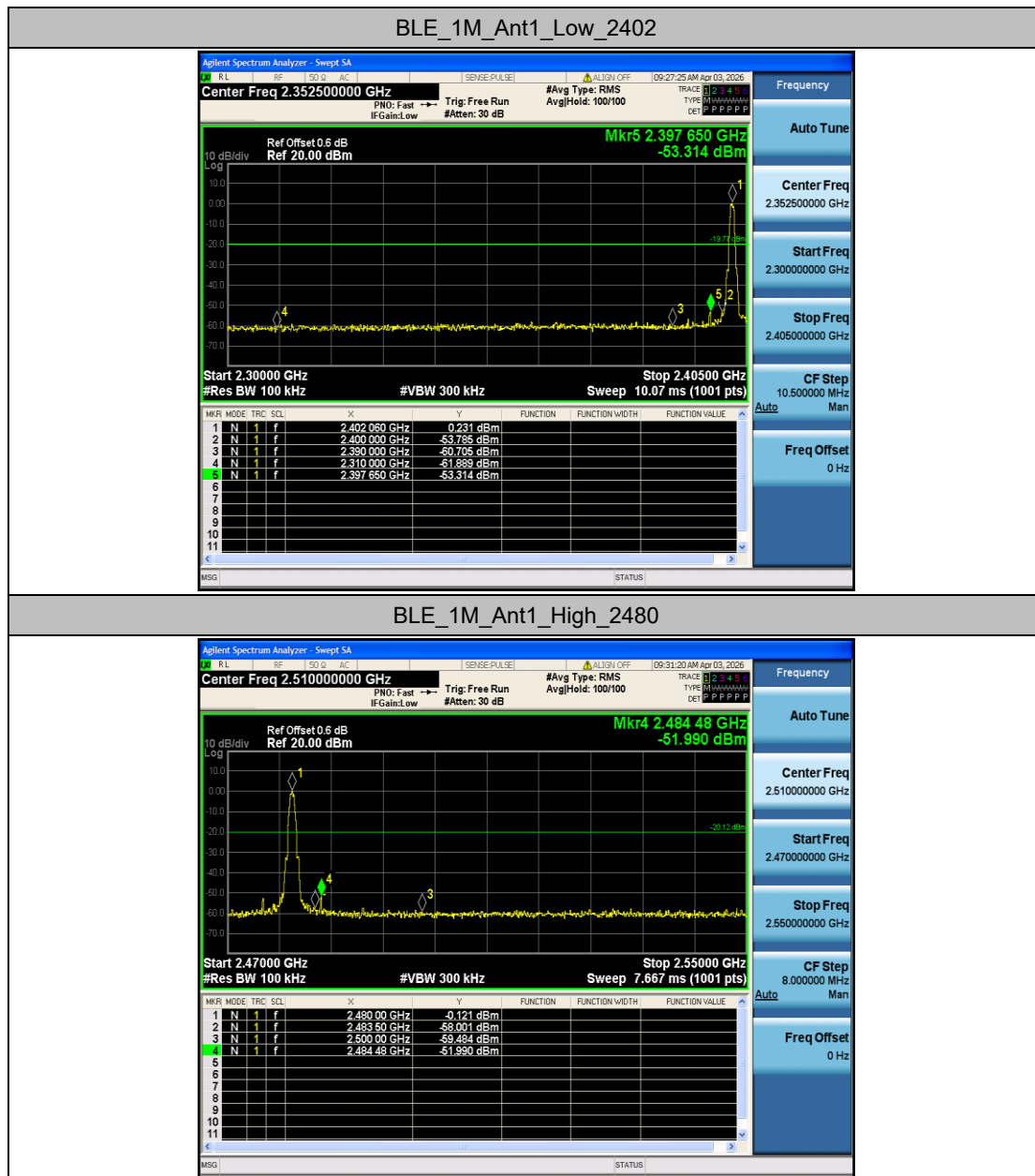


## Appendix E: Band edge measurements

### Test Result

| TestMode | Antenna | Channel | Freq(MHz) | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|---------|-----------|---------------|-------------|------------|---------|
| BLE_1M   | Ant1    | Low     | 2402      | 0.23          | -53.31      | ≤-19.77    | PASS    |
|          |         | High    | 2480      | -0.12         | -51.99      | ≤-20.12    | PASS    |

## Test Graphs

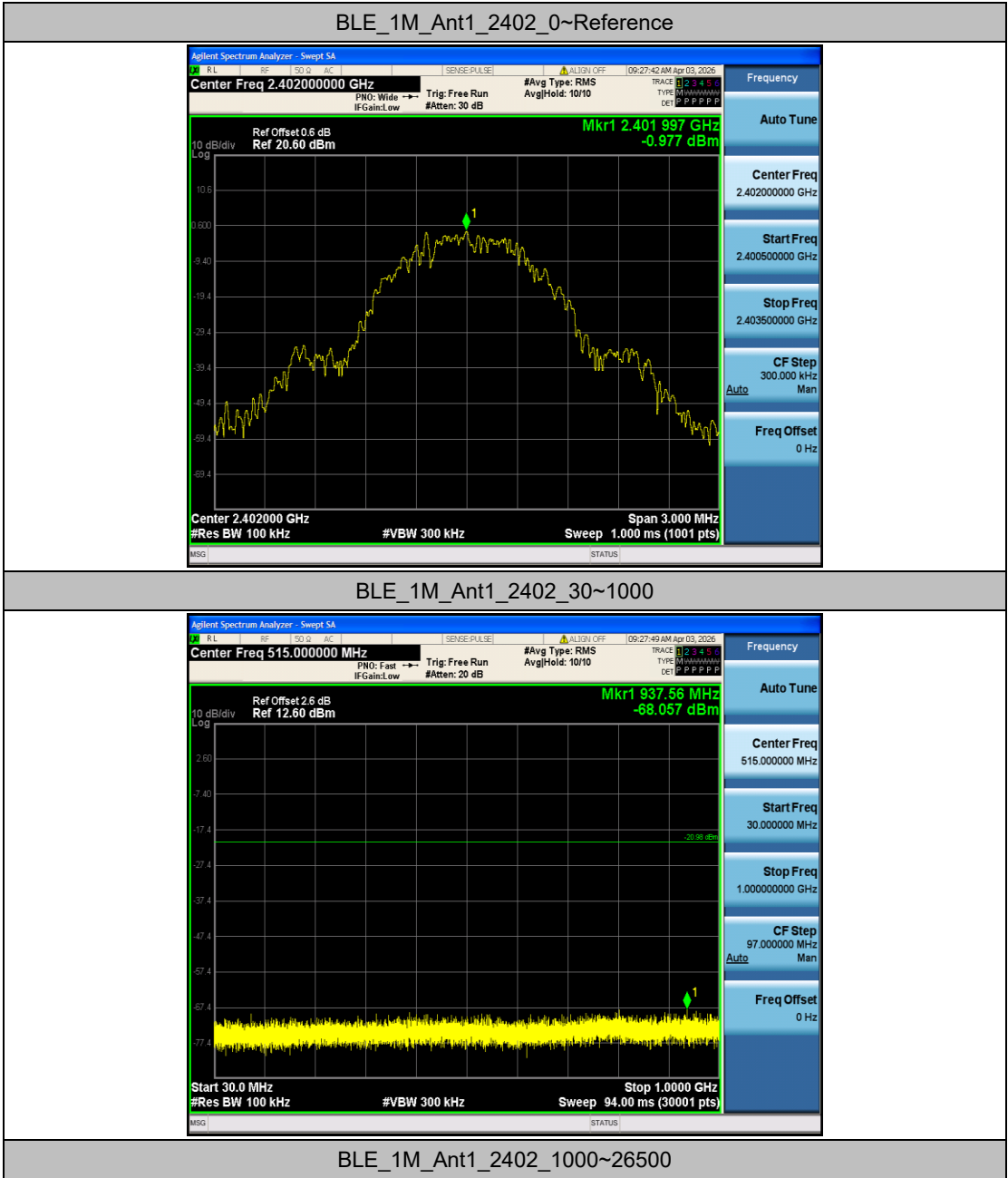


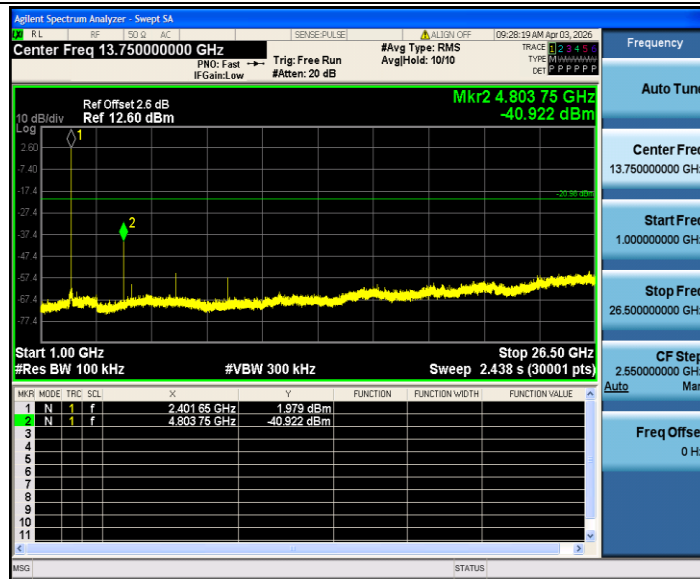
## Appendix F: Conducted Spurious Emission

### Test Result

| TestMode | Antenna | Freq(MHz) | FreqRange<br>[MHz] | RefLevel<br>[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|-----------|--------------------|-------------------|-------------|------------|---------|
| BLE_1M   | Ant1    | 2402      | Reference          | -0.98             | -0.98       | ---        | PASS    |
|          |         |           | 30~1000            | -0.98             | -68.06      | ≤-20.98    | PASS    |
|          |         |           | 1000~26500         | -0.98             | -40.92      | ≤-20.98    | PASS    |
|          |         | 2440      | Reference          | -0.69             | -0.69       | ---        | PASS    |
|          |         |           | 30~1000            | -0.69             | -66.79      | ≤-20.69    | PASS    |
|          |         |           | 1000~26500         | -0.69             | -44.51      | ≤-20.69    | PASS    |
|          |         | 2480      | Reference          | -1.55             | -1.55       | ---        | PASS    |
|          |         |           | 30~1000            | -1.55             | -67.94      | ≤-21.55    | PASS    |
|          |         |           | 1000~26500         | -1.55             | -43.36      | ≤-21.55    | PASS    |

Test Graphs

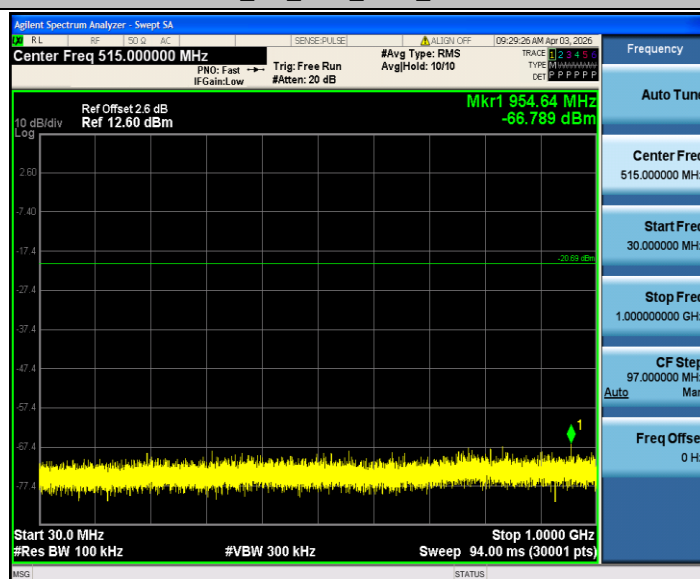




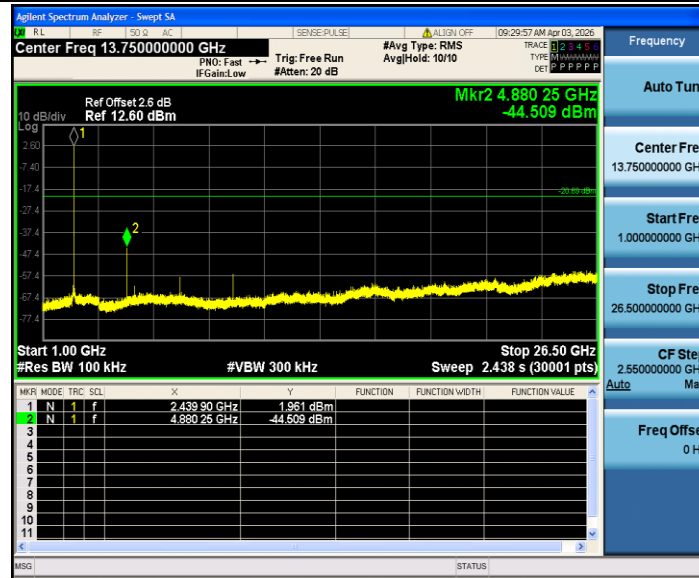
BLE\_1M\_Ant1\_2440\_0~Reference



BLE\_1M\_Ant1\_2440\_30~1000



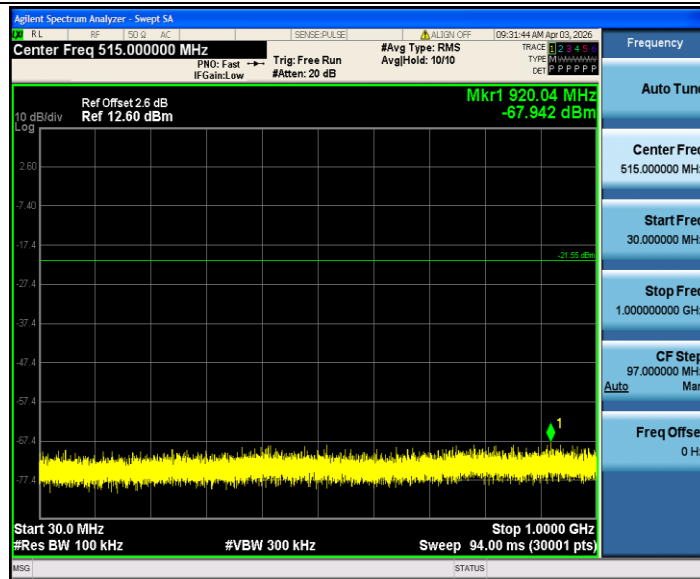
# BLE\_1M\_Ant1\_2440\_1000~26500



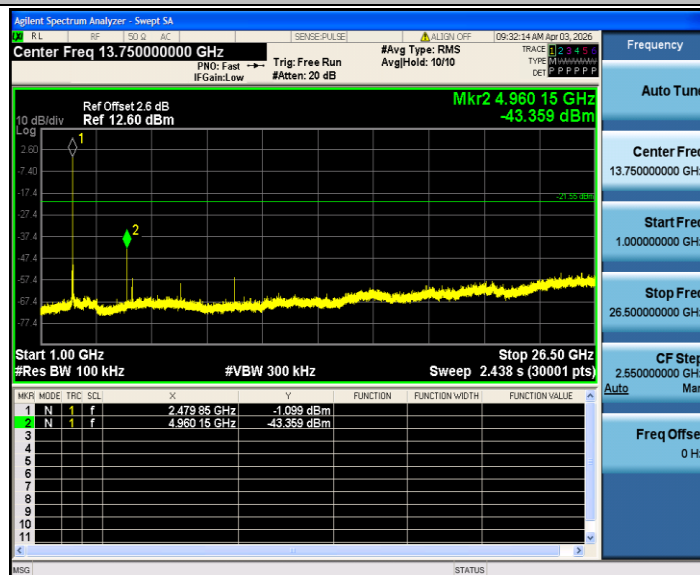
# BLE\_1M\_Ant1\_2480\_0~Reference



# 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            | 0.62           | 0.6613 | 66.13     | 1.80    | ---   | ---     |
|          |         | 2440      | 0.41            | 0.62           | 0.6613 | 66.13     | 1.80    | ---   | ---     |
|          |         | 2480      | 0.42            | 0.63           | 0.6667 | 66.67     | 1.76    | ---   | ---     |

Figure 10 shows two screenshots of the Agilent Spectrum Analyzer interface, displaying the results of a sweep measurement for the BLE\_1M\_Ant1\_2402 and BLE\_1M\_Ant1\_2440 channels. The top screenshot shows the results for the BLE\_1M\_Ant1\_2402 channel, with a center frequency of 2.402000000 GHz. The bottom screenshot shows the results for the BLE\_1M\_Ant1\_2440 channel, with a center frequency of 2.440000000 GHz. Both screenshots show a signal with a peak at 2.402 GHz and a peak at 2.440 GHz. The signal is identified as a BLE signal, and the measurement is performed using a sweep measurement. The top screenshot shows a peak at 2.402 GHz with a power level of -11.17 dBm. The bottom screenshot shows a peak at 2.440 GHz with a power level of -11.64 dBm. The signal is identified as a BLE signal, and the measurement is performed using a sweep measurement.

**Top Screenshot: BLE\_1M\_Ant1\_2402**

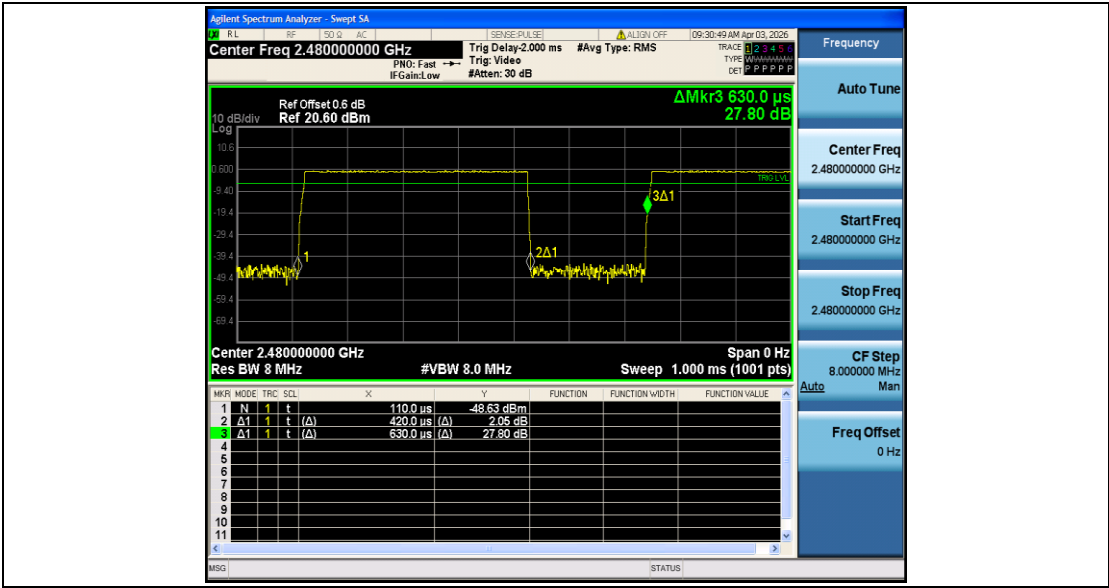
Center Freq 2.402000000 GHz  
Ref Offset 0.6 dB  
Ref 20.60 dBm  
Trig Delay: 2.000 ms  
#Avg Type: RMS  
PNO: Fast  
IF Gain: Low  
#Atten: 30 dB  
Mkr3 620.0  $\mu$ s  
-10.60 dB  
Span 0 Hz  
Res BW 8 MHz  
#VBW 8.0 MHz  
Sweep 1.000 ms (1001 pts)

| MNR | MODE | TRIG | SCL | X   | Y                 | FUNCTION   | FUNCTION WIDTH | FUNCTION VALUE |
|-----|------|------|-----|-----|-------------------|------------|----------------|----------------|
| 1   | N    | 1    | t   |     | 120.0 $\mu$ s     | -11.17 dBm |                |                |
| 2   | A1   | 1    | t   | (A) | 410.0 $\mu$ s (A) | -23.54 dB  |                |                |
| 3   | A1   | 1    | t   | (A) | 620.0 $\mu$ s (A) | -10.60 dB  |                |                |

**Bottom Screenshot: BLE\_1M\_Ant1\_2440**

Center Freq 2.440000000 GHz  
Ref Offset 0.6 dB  
Ref 20.60 dBm  
Trig Delay: 2.000 ms  
#Avg Type: RMS  
PNO: Fast  
IF Gain: Low  
#Atten: 30 dB  
Mkr3 620.0  $\mu$ s  
-10.77 dB  
Span 0 Hz  
Res BW 8 MHz  
#VBW 8.0 MHz  
Sweep 1.000 ms (1001 pts)

| MNR | MODE | TRIG | SCL | X   | Y                 | FUNCTION   | FUNCTION WIDTH | FUNCTION VALUE |
|-----|------|------|-----|-----|-------------------|------------|----------------|----------------|
| 1   | N    | 1    | t   |     | 120.0 $\mu$ s     | -11.64 dBm |                |                |
| 2   | A1   | 1    | t   | (A) | 410.0 $\mu$ s (A) | -23.33 dB  |                |                |
| 3   | A1   | 1    | t   | (A) | 620.0 $\mu$ s (A) | -10.77 dB  |                |                |



## Appendix H: Emissions in Restricted Bands

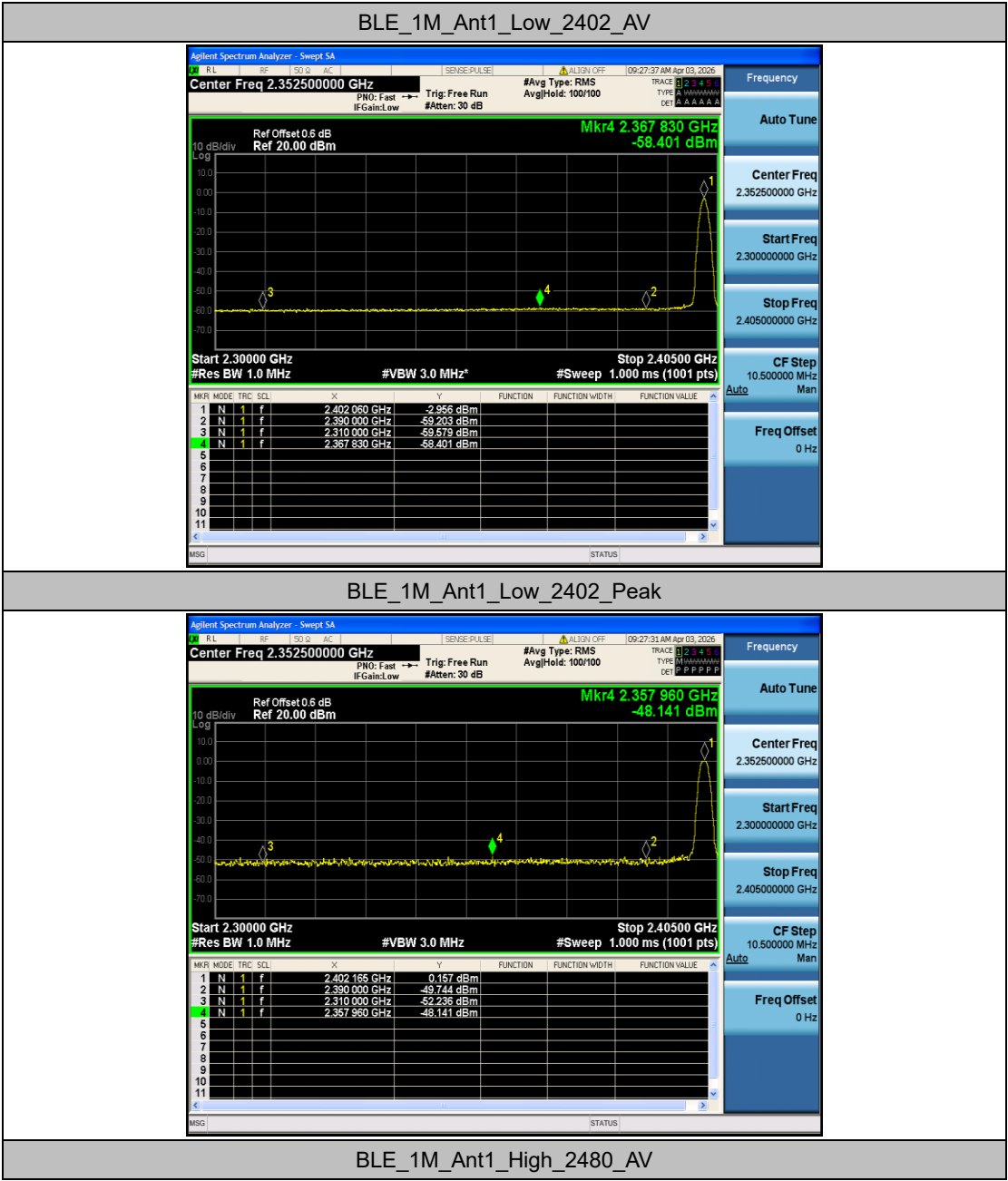
### Test Result

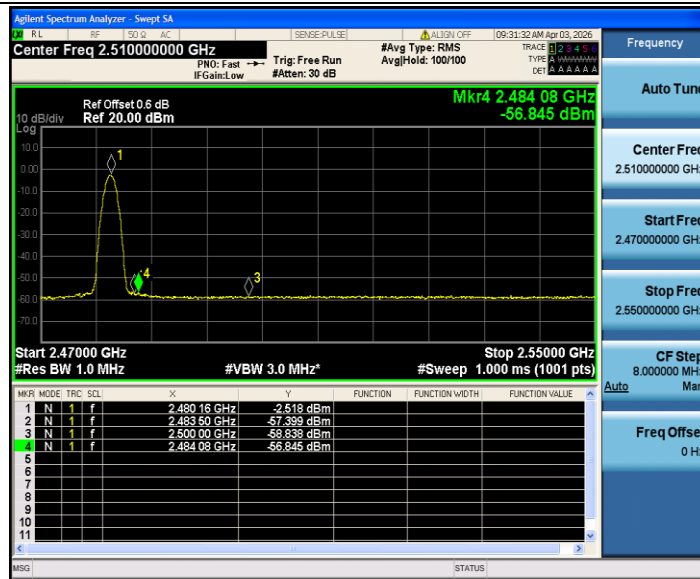
| TestMode | Antenna | ChName | Freq(MHz) | Detector | Freq [MHz] | Result [dBm] | Gain [dB] | DC Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Verdict |
|----------|---------|--------|-----------|----------|------------|--------------|-----------|----------------|-----------------|----------------|---------|
| BLE_1M   | Ant1    | Low    | 2402      | AV       | 2310.000   | -59.58       | 2.00      | 1.80           | 39.42           | ≤54            | PASS    |
|          |         |        |           | AV       | 2367.830   | -58.4        | 2.00      | 1.80           | 40.60           | ≤54            | PASS    |
|          |         |        |           | AV       | 2390.000   | -59.2        | 2.00      | 1.80           | 39.80           | ≤54            | PASS    |
|          |         |        |           | Peak     | 2310.000   | -52.24       | 2.00      | 0.00           | 44.96           | ≤74            | PASS    |
|          |         |        |           | Peak     | 2357.960   | -48.14       | 2.00      | 0.00           | 49.06           | ≤74            | PASS    |
|          |         |        |           | Peak     | 2390.000   | -49.74       | 2.00      | 0.00           | 47.46           | ≤74            | PASS    |
|          |         | High   | 2480      | AV       | 2483.500   | -57.4        | 2.00      | 1.76           | 41.56           | ≤54            | PASS    |
|          |         |        |           | AV       | 2484.080   | -56.85       | 2.00      | 1.76           | 42.11           | ≤54            | PASS    |
|          |         |        |           | AV       | 2500.000   | -58.84       | 2.00      | 1.76           | 40.12           | ≤54            | PASS    |
|          |         |        |           | Peak     | 2483.500   | -48.17       | 2.00      | 0.00           | 49.03           | ≤74            | PASS    |
|          |         |        |           | Peak     | 2484.640   | -43.5        | 2.00      | 0.00           | 53.70           | ≤74            | PASS    |
|          |         |        |           | Peak     | 2500.000   | -51.56       | 2.00      | 0.00           | 45.64           | ≤74            | PASS    |

Note:

1. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs





BLE\_1M\_Ant1\_High\_2480\_Peak

