

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

**FCC ID** : 2BBPB-HK50

**Company** : Shenzhen Hongbo Intelligent Electronics Co., Ltd

**EUT** : SMART WATCH

**Model Number** : HK50

**Report No.** : CTA26091600101

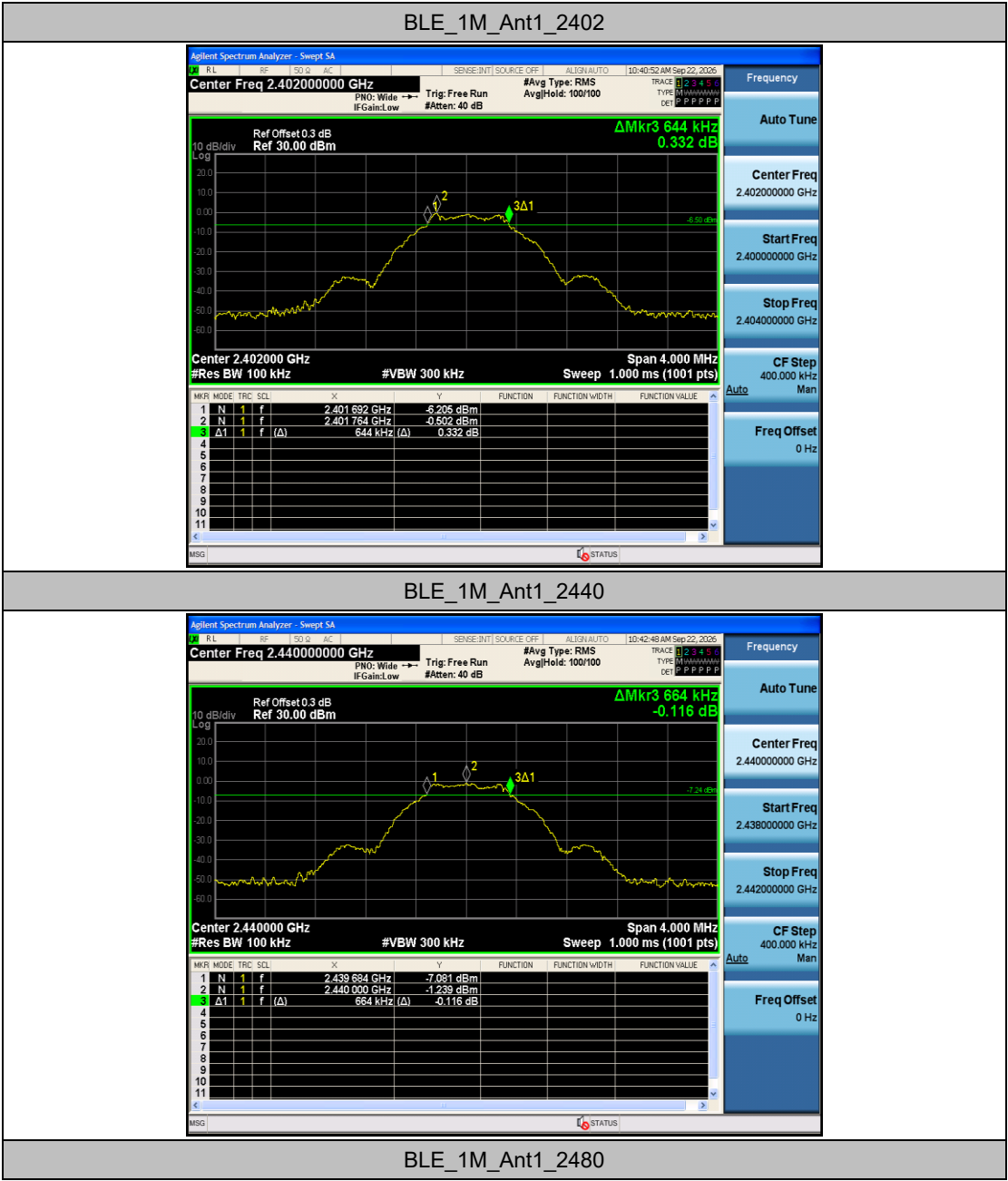
**Reviewed By** : Eric Wang

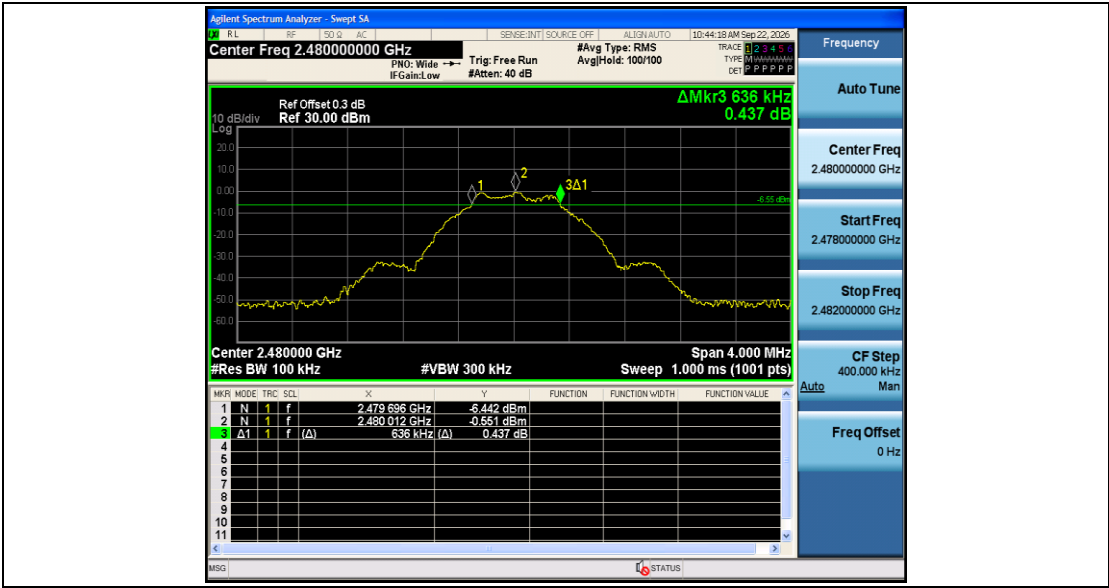
## Appendix A: DTS Bandwidth

### Test Result

| TestMode | Antenna | Freq(MHz) | DTS BW<br>[MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|----------|---------|-----------|-----------------|----------|----------|------------|---------|
| BLE_1M   | Ant1    | 2402      | 0.644           | 2401.692 | 2402.336 | 0.5        | PASS    |
|          |         | 2440      | 0.664           | 2439.684 | 2440.348 | 0.5        | PASS    |
|          |         | 2480      | 0.636           | 2479.696 | 2480.332 | 0.5        | PASS    |

Test Graphs



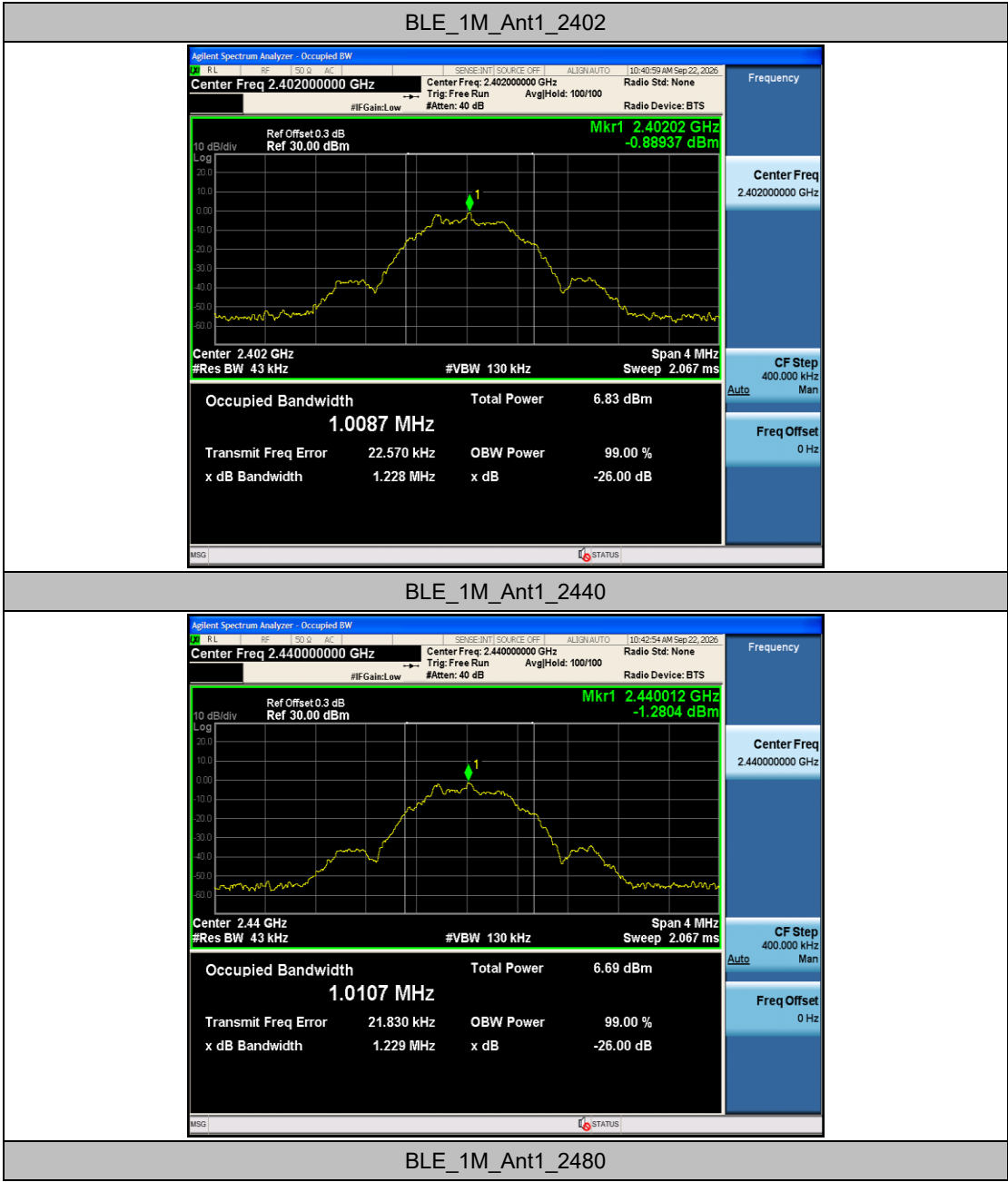


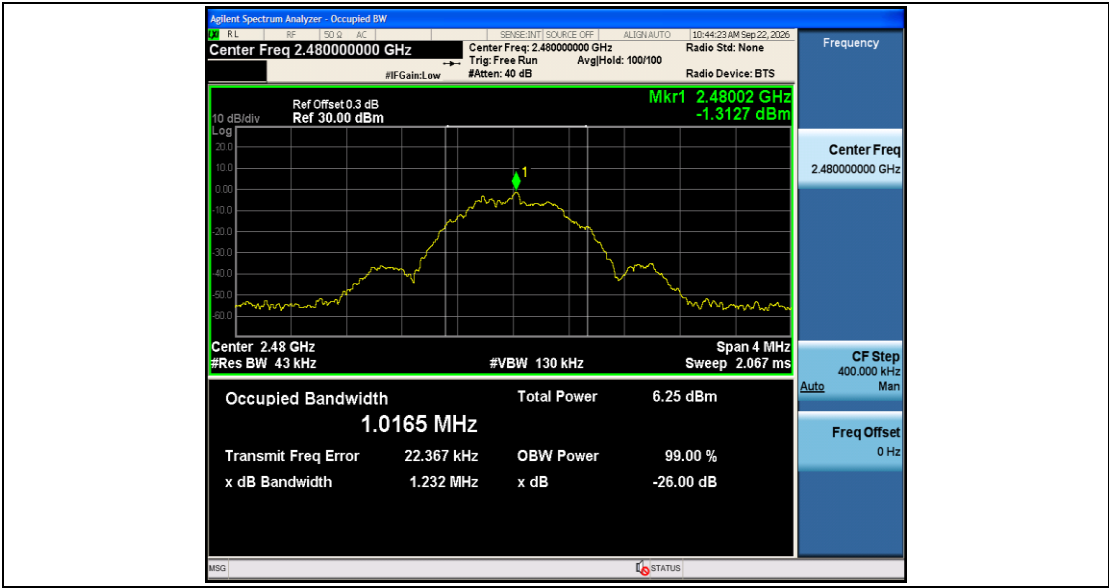
## Appendix B: Occupied Channel Bandwidth

### Test Result

| TestMode | Antenna | Freq(MHz) | OCB [MHz] | FL[MHz]   | FH[MHz]   | Limit[MHz] | Verdict |
|----------|---------|-----------|-----------|-----------|-----------|------------|---------|
| BLE_1M   | Ant1    | 2402      | 1.0087    | 2401.5182 | 2402.5269 | ---        | ---     |
|          |         | 2440      | 1.0107    | 2439.5165 | 2440.5272 | ---        | ---     |
|          |         | 2480      | 1.0165    | 2479.5141 | 2480.5306 | ---        | ---     |

Test Graphs





## 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      | 0.09                      | ≤30                  | PASS    |
|          |         | 2440      | -0.05                     | ≤30                  | PASS    |
|          |         | 2480      | -0.34                     | ≤30                  | PASS    |

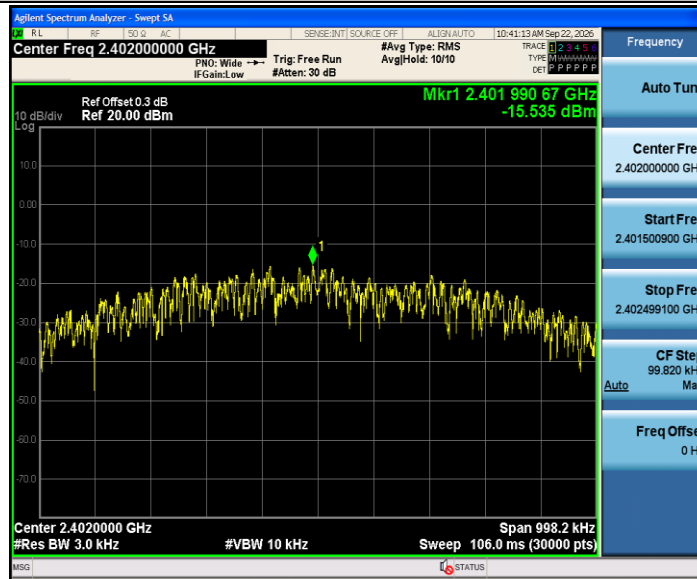
## Appendix D: Maximum power spectral density

### Test Result

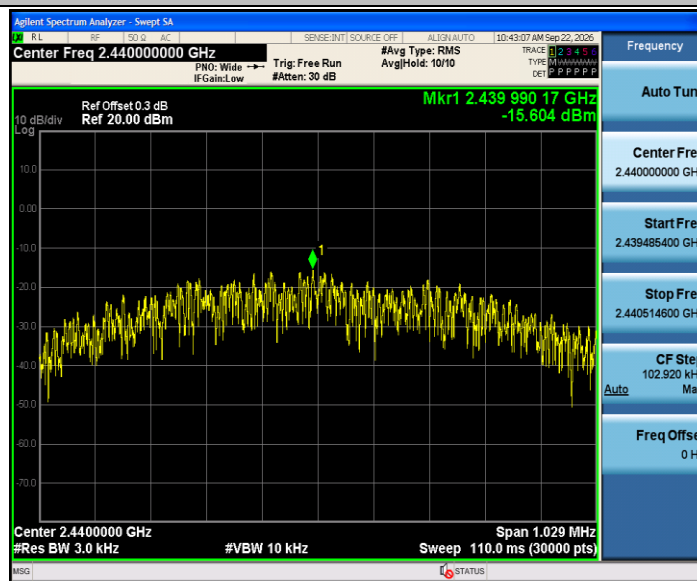
| TestMode | Antenna | Freq(MHz) | Result[dBm/3kHz] | Limit[dBm/3kHz] | Verdict |
|----------|---------|-----------|------------------|-----------------|---------|
| BLE_1M   | Ant1    | 2402      | -15.54           | ≤8.00           | PASS    |
|          |         | 2440      | -15.60           | ≤8.00           | PASS    |
|          |         | 2480      | -15.98           | ≤8.00           | PASS    |

## Test Graphs

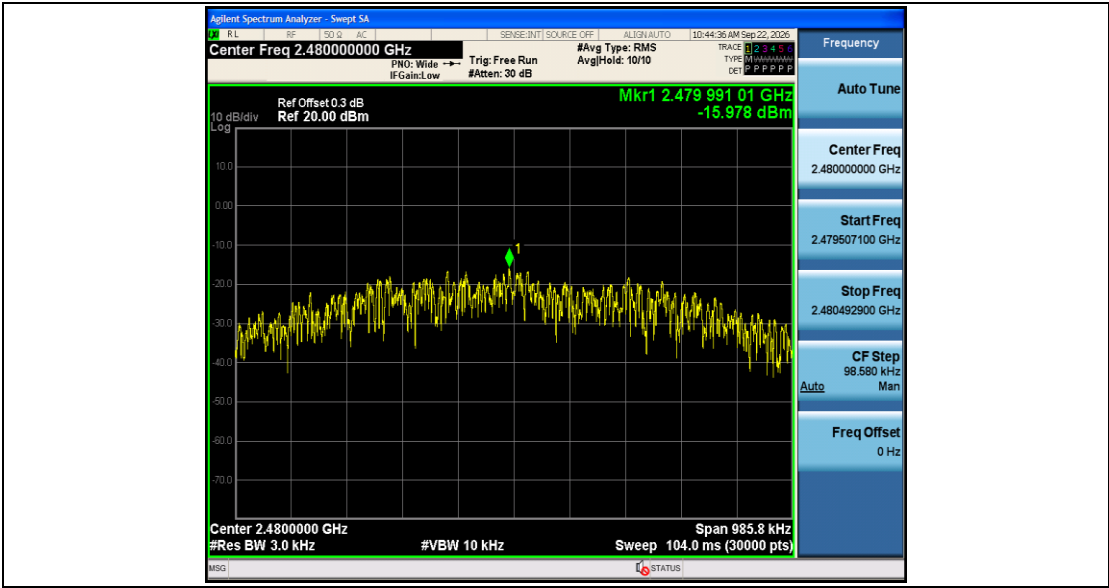
BLE\_1M\_Ant1\_2402



BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480

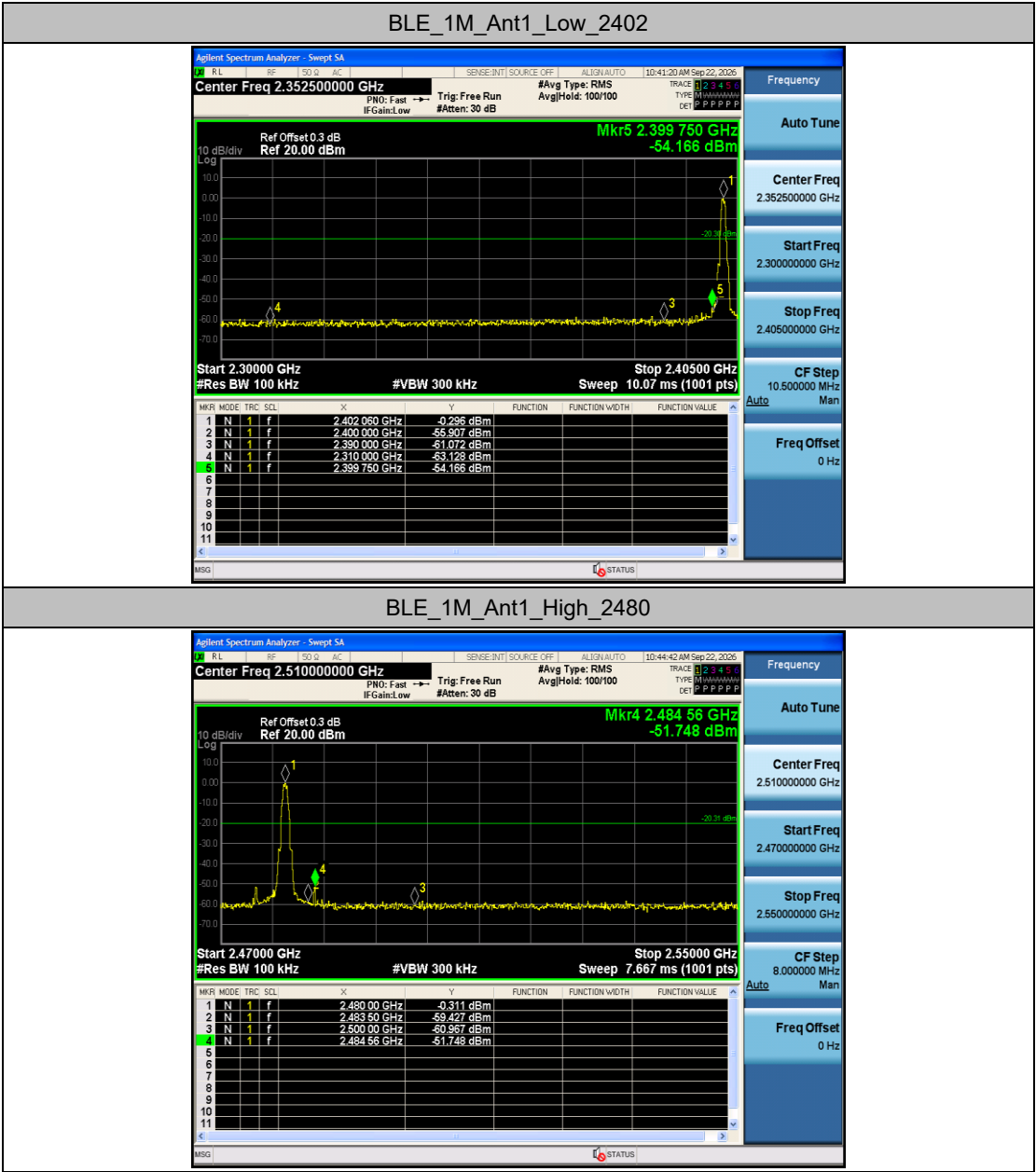


## Appendix E: Band edge measurements

### Test Result

| TestMode | Antenna | Channel | Freq(MHz) | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|---------|-----------|---------------|-------------|------------|---------|
| BLE_1M   | Ant1    | Low     | 2402      | -0.30         | -54.17      | ≤-20.3     | PASS    |
|          |         | High    | 2480      | -0.31         | -51.75      | ≤-20.31    | PASS    |

Test Graphs

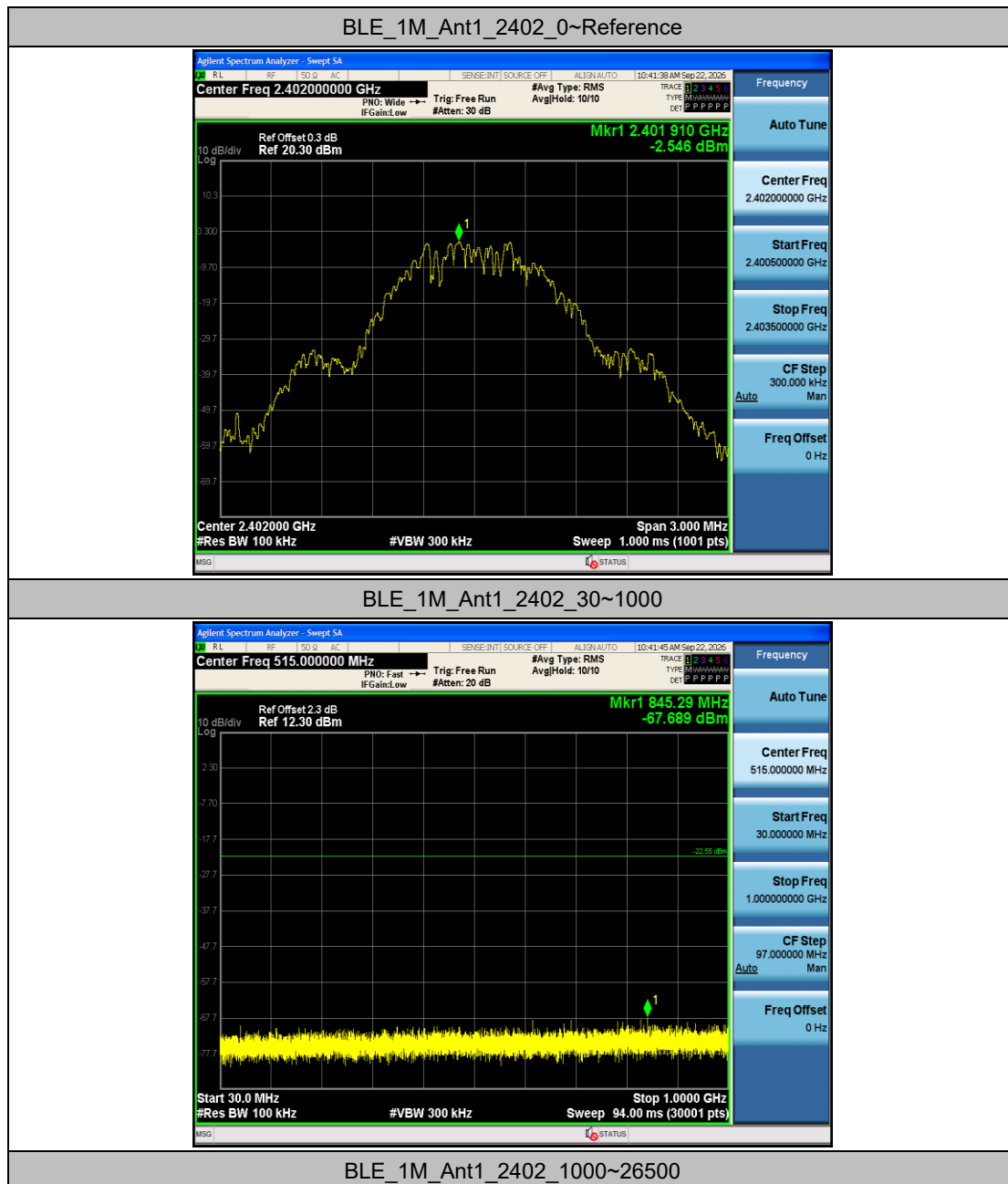


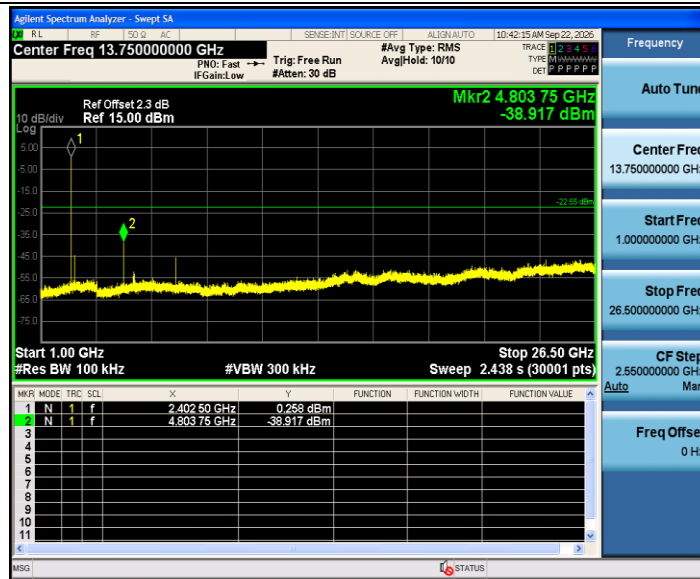
## Appendix F: Conducted Spurious Emission

### Test Result

| TestMode | Antenna | Freq(MHz) | FreqRange<br>[MHz] | RefLevel<br>[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|-----------|--------------------|-------------------|-------------|------------|---------|
| BLE_1M   | Ant1    | 2402      | Reference          | -2.55             | -2.55       | ---        | PASS    |
|          |         |           | 30~1000            | -2.55             | -67.69      | ≤-22.55    | PASS    |
|          |         |           | 1000~26500         | -2.55             | -38.92      | ≤-22.55    | PASS    |
|          |         | 2440      | Reference          | -1.77             | -1.77       | ---        | PASS    |
|          |         |           | 30~1000            | -1.77             | -68.23      | ≤-21.77    | PASS    |
|          |         |           | 1000~26500         | -1.77             | -41.32      | ≤-21.77    | PASS    |
|          |         | 2480      | Reference          | -0.66             | -0.66       | ---        | PASS    |
|          |         |           | 30~1000            | -0.66             | -67.91      | ≤-20.66    | PASS    |
|          |         |           | 1000~26500         | -0.66             | -40.64      | ≤-20.66    | PASS    |

## Test Graphs

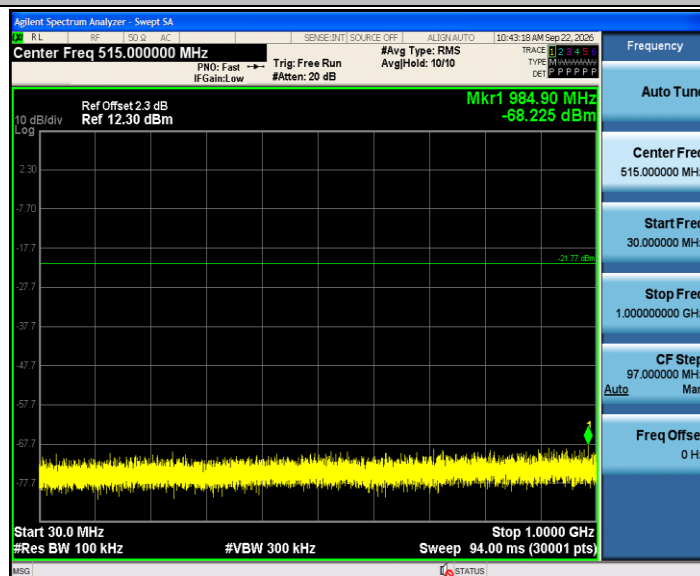




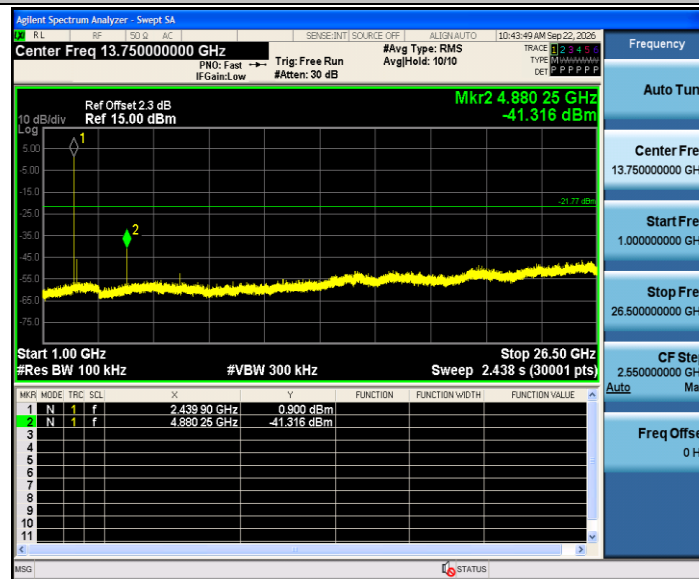
BLE\_1M\_Ant1\_2440\_0~Reference



BLE\_1M\_Ant1\_2440\_30~1000



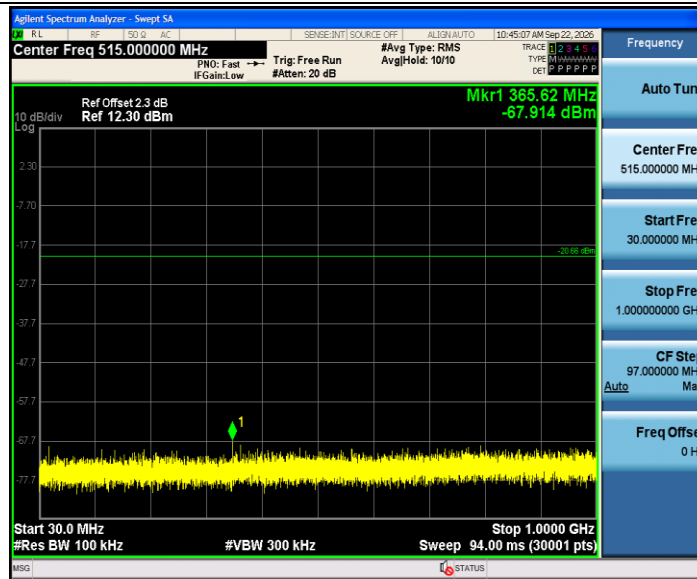
# BLE\_1M\_Ant1\_2440\_1000~26500



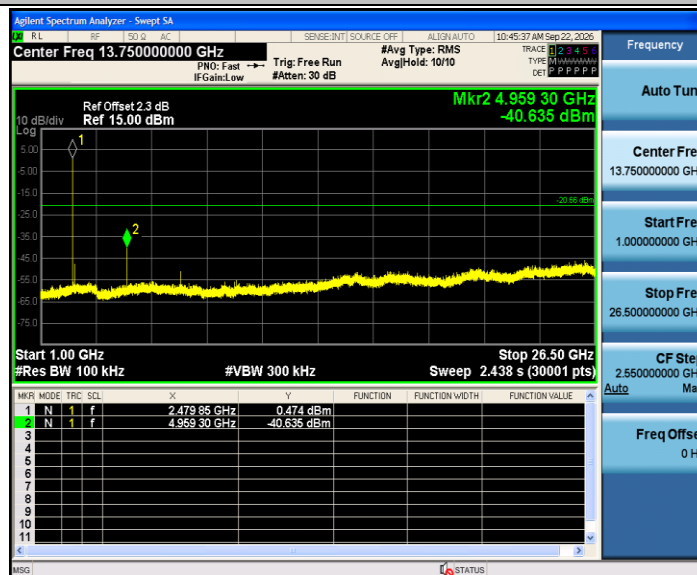
# BLE\_1M\_Ant1\_2480\_0~Reference



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



BLE\_1M\_Ant1\_2480\_1000~26500

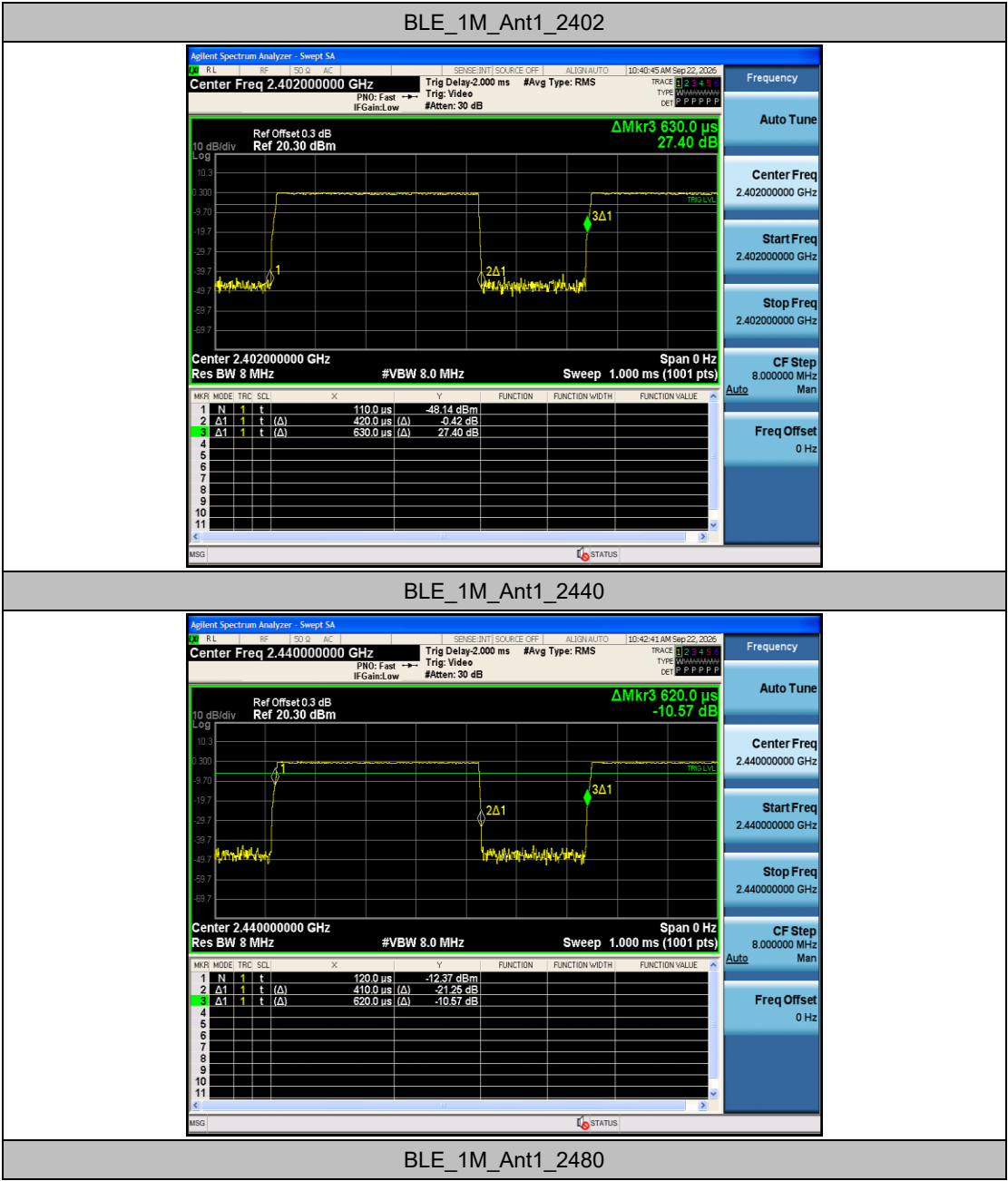


## Appendix G: Duty Cycle

### Test Result

| TestMode | Antenna | Freq(MHz) | ON Time<br>[ms] | Period<br>[ms] | X      | DC<br>[%] | xFactor | Limit | Verdict |
|----------|---------|-----------|-----------------|----------------|--------|-----------|---------|-------|---------|
| BLE_1M   | Ant1    | 2402      | 0.42            | 0.63           | 0.6667 | 66.67     | 1.76    | ---   | ---     |
|          |         | 2440      | 0.41            | 0.62           | 0.6613 | 66.13     | 1.80    | ---   | ---     |
|          |         | 2480      | 0.41            | 0.62           | 0.6613 | 66.13     | 1.80    | ---   | ---     |

Test Graphs





## Appendix H: Emissions in Restricted Bands

### Test Result

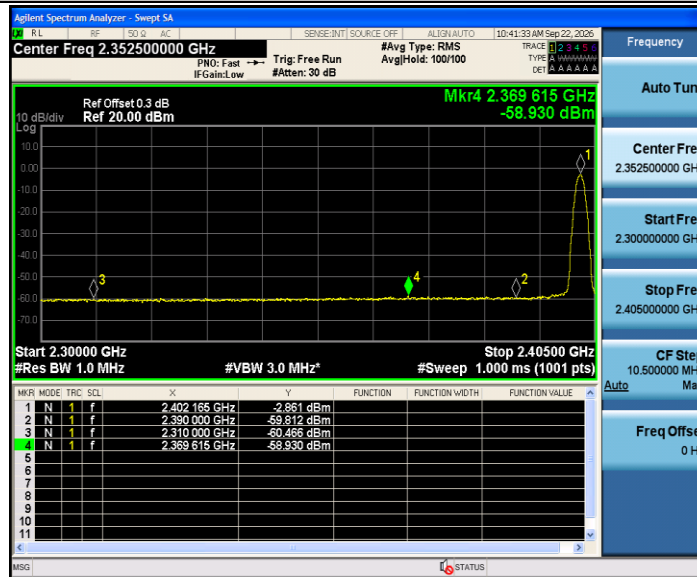
| TestMode | Antenna | ChName | Freq(MHz) | Detector | Freq [MHz] | Result [dBm] | Gain [dB] | DC Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Verdict |
|----------|---------|--------|-----------|----------|------------|--------------|-----------|----------------|-----------------|----------------|---------|
| BLE_1M   | Ant1    | Low    | 2402      | AV       | 2310.000   | -60.47       | 2.00      | 1.76           | 38.49           | ≤54            | PASS    |
|          |         |        |           | AV       | 2369.615   | -58.93       | 2.00      | 1.76           | 40.03           | ≤54            | PASS    |
|          |         |        |           | AV       | 2390.000   | -59.81       | 2.00      | 1.76           | 39.15           | ≤54            | PASS    |
|          |         |        |           | Peak     | 2310.000   | -50.7        | 2.00      | 0.00           | 46.50           | ≤74            | PASS    |
|          |         |        |           | Peak     | 2376.440   | -49.06       | 2.00      | 0.00           | 48.14           | ≤74            | PASS    |
|          |         |        |           | Peak     | 2390.000   | -51.22       | 2.00      | 0.00           | 45.98           | ≤74            | PASS    |
|          |         | High   | 2480      | AV       | 2483.500   | -58.01       | 2.00      | 1.80           | 40.99           | ≤54            | PASS    |
|          |         |        |           | AV       | 2483.920   | -57.97       | 2.00      | 1.80           | 41.03           | ≤54            | PASS    |
|          |         |        |           | AV       | 2500.000   | -59.71       | 2.00      | 1.80           | 39.29           | ≤54            | PASS    |
|          |         |        |           | Peak     | 2483.500   | -48.2        | 2.00      | 0.00           | 49.00           | ≤74            | PASS    |
|          |         |        |           | Peak     | 2484.560   | -43.91       | 2.00      | 0.00           | 53.29           | ≤74            | PASS    |
|          |         |        |           | Peak     | 2500.000   | -52.1        | 2.00      | 0.00           | 45.10           | ≤74            | PASS    |

Note:

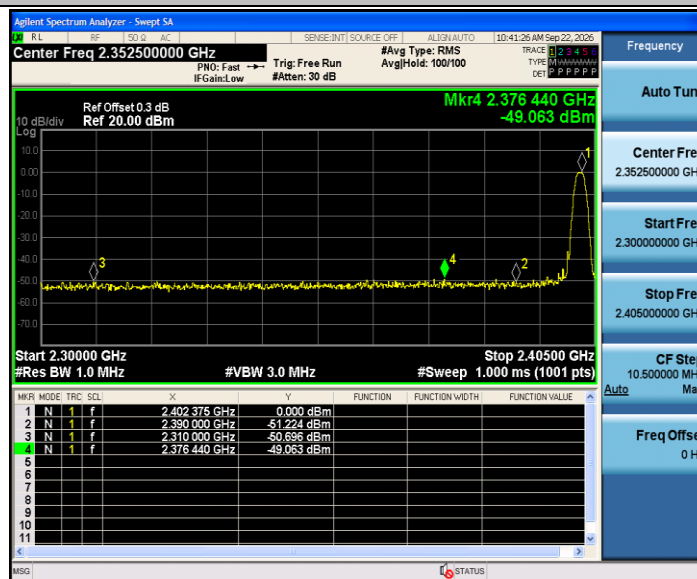
The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

## Test Graphs

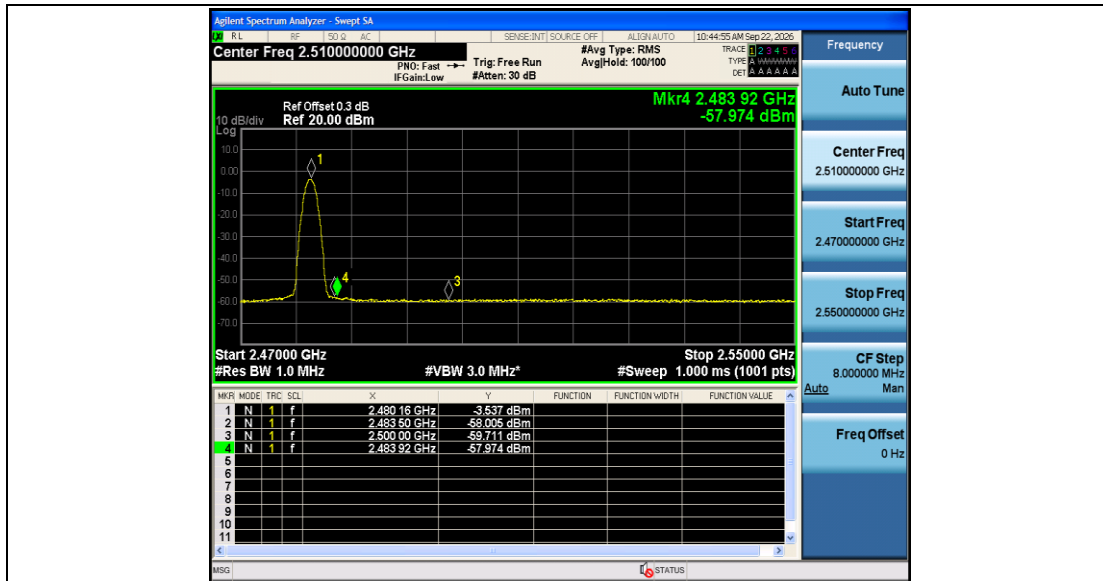
BLE\_1M\_Ant1\_Low\_2402\_AV



BLE\_1M\_Ant1\_Low\_2402\_Peak



BLE\_1M\_Ant1\_High\_2480\_AV



BLE\_1M\_Ant1\_High\_2480\_Peak

