



## Appendix A

### RF Test Data for BLE (Conducted Measurement)

Product Name: SONOFF Smart Stackable Power Meter (Main Unit+4-Relays)

Test Model: SPM-Main

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 24.6° C   |
| Relative Humidity: | 54.1%     |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Kay Hu    |
| Supervised by:     | Li Huan   |

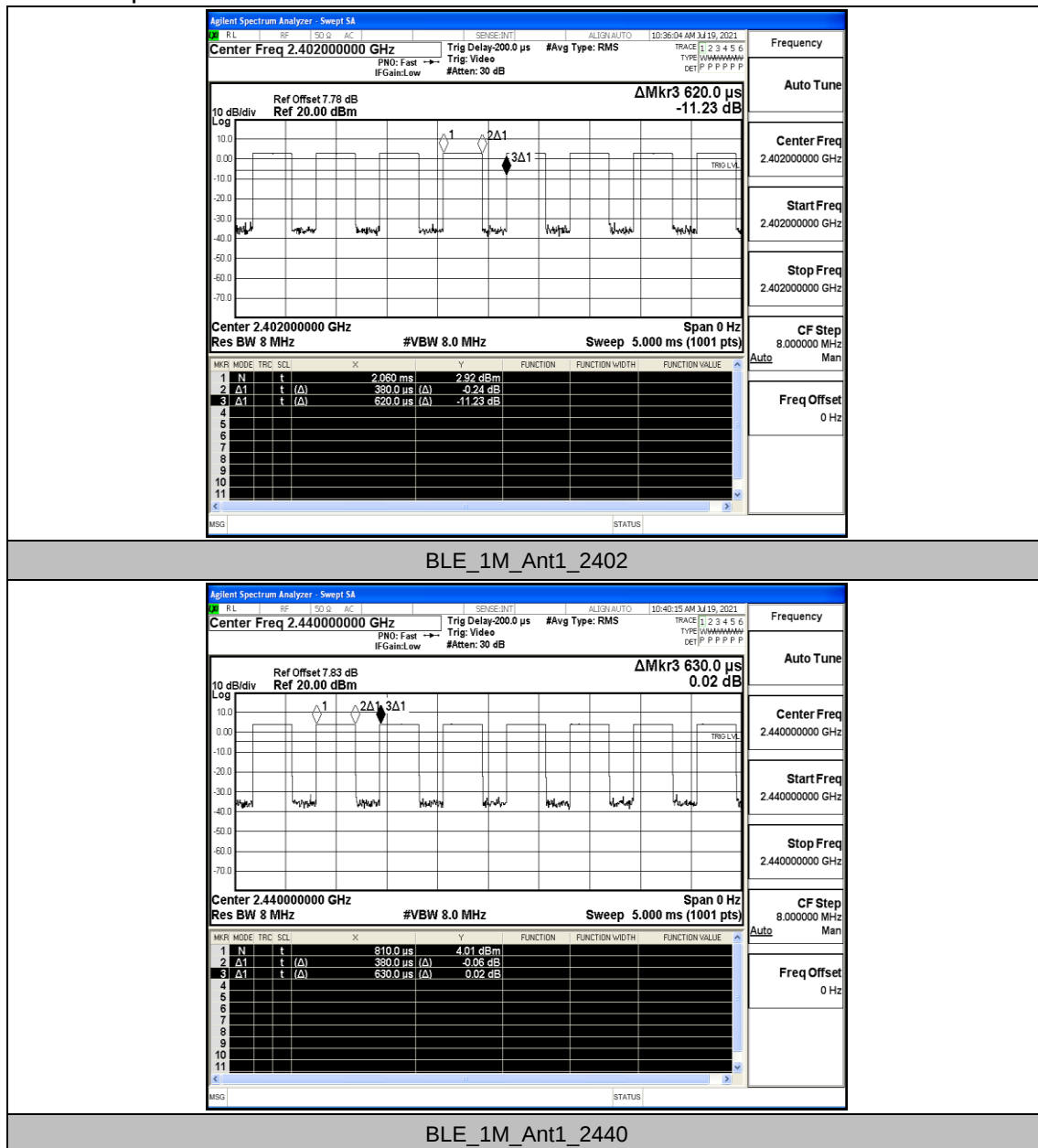


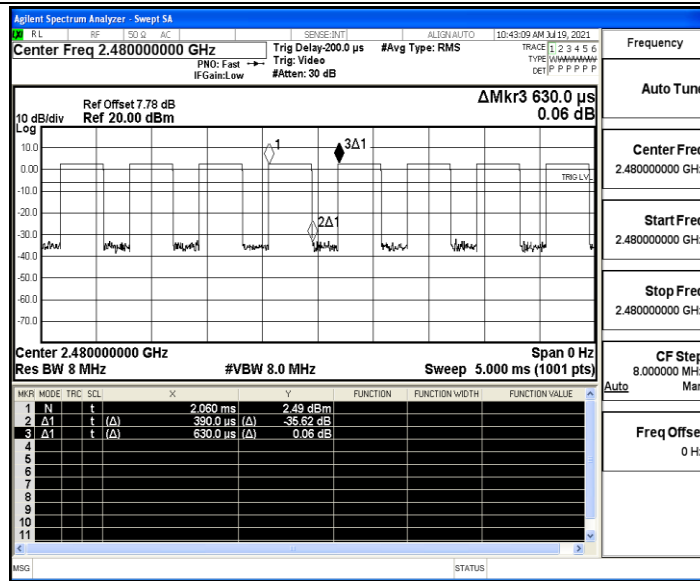
## A.1 Duty Cycle

### Test Result

| TestMode | Antenna | Channel | ON Time [ms] | Period [ms] | X      | DC [%] | xFactor | Limit | Verdict |
|----------|---------|---------|--------------|-------------|--------|--------|---------|-------|---------|
| BLE_1M   | Ant1    | 2402    | 0.38         | 0.62        | 0.6129 | 61.29  | 2.13    | ---   | PASS    |
|          |         | 2440    | 0.38         | 0.63        | 0.6032 | 60.32  | 2.20    | ---   | PASS    |
|          |         | 2480    | 0.39         | 0.63        | 0.6190 | 61.90  | 2.08    | ---   | PASS    |

### Test Graphs





BLE\_1M\_Ant1\_2480

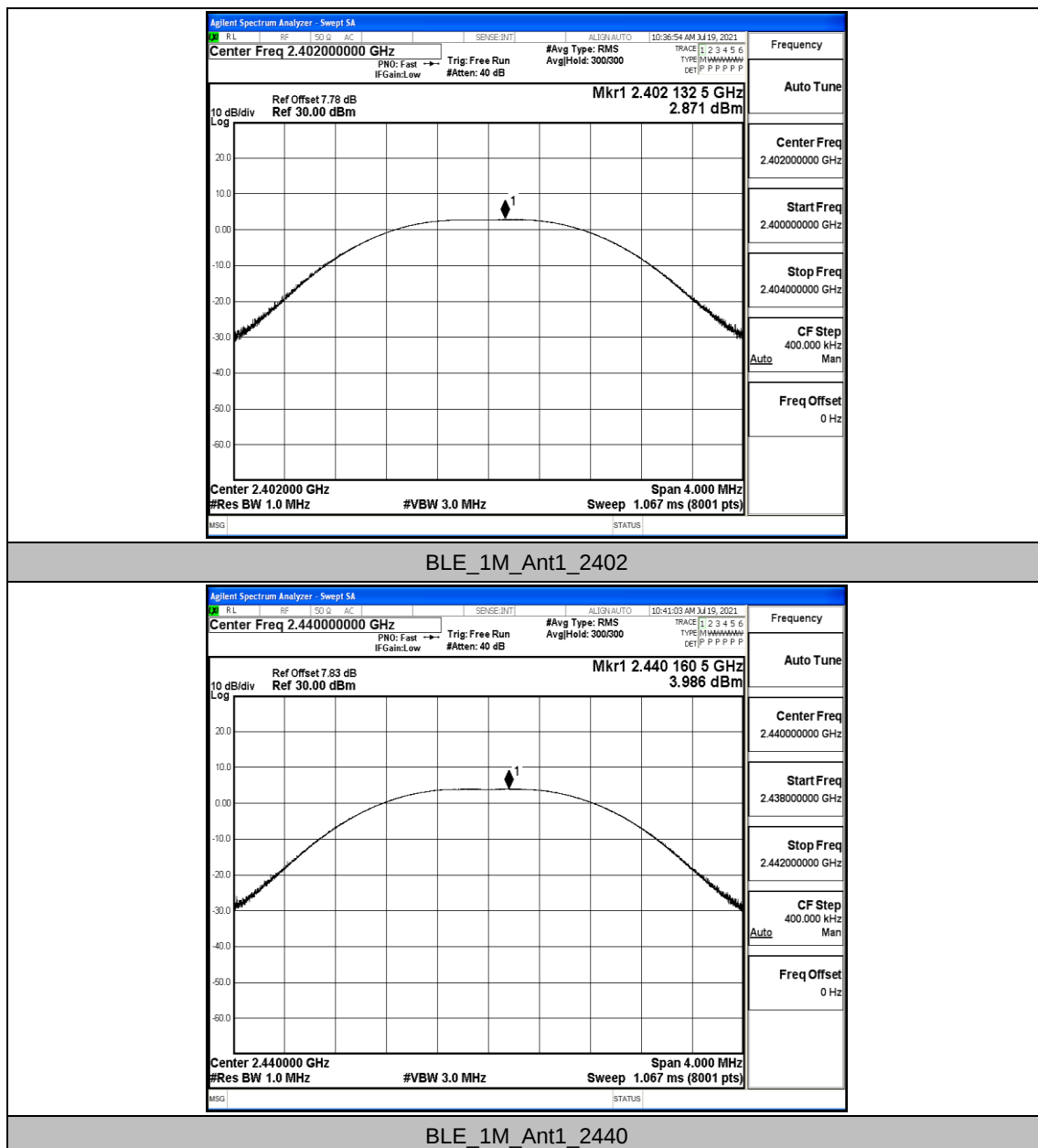


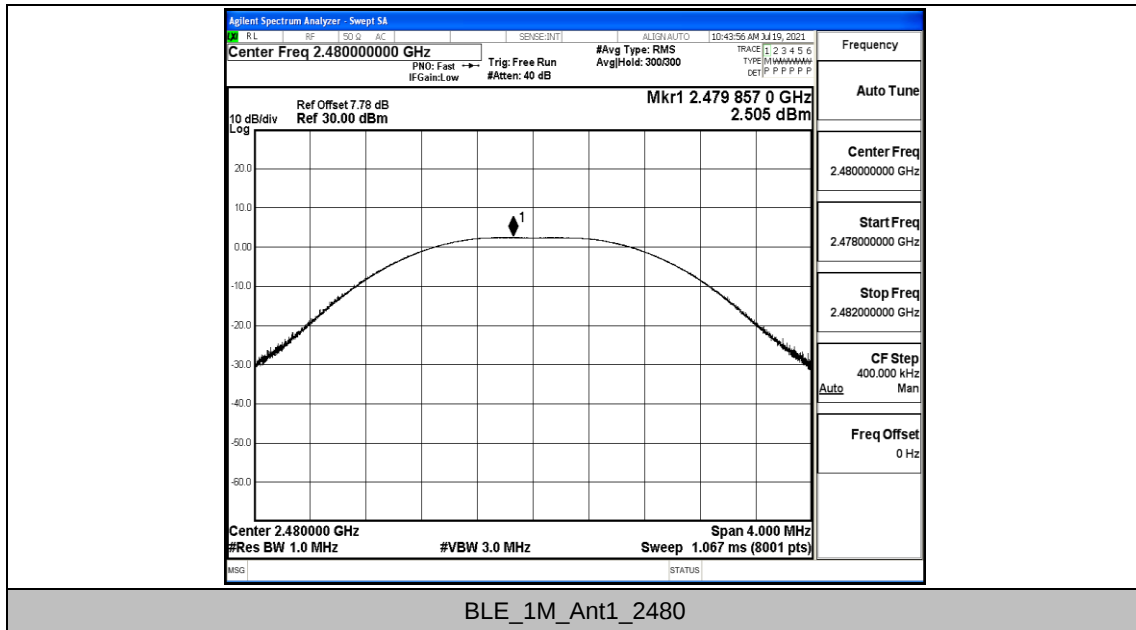
## A.2 Maximum conducted output power

### Test Result

| TestMode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|---------|-------------|------------|---------|
| BLE_1M   | Ant1    | 2402    | 2.87        | ≤30        | PASS    |
|          |         | 2440    | 3.99        | ≤30        | PASS    |
|          |         | 2480    | 2.51        | ≤30        | PASS    |

### Test Graphs





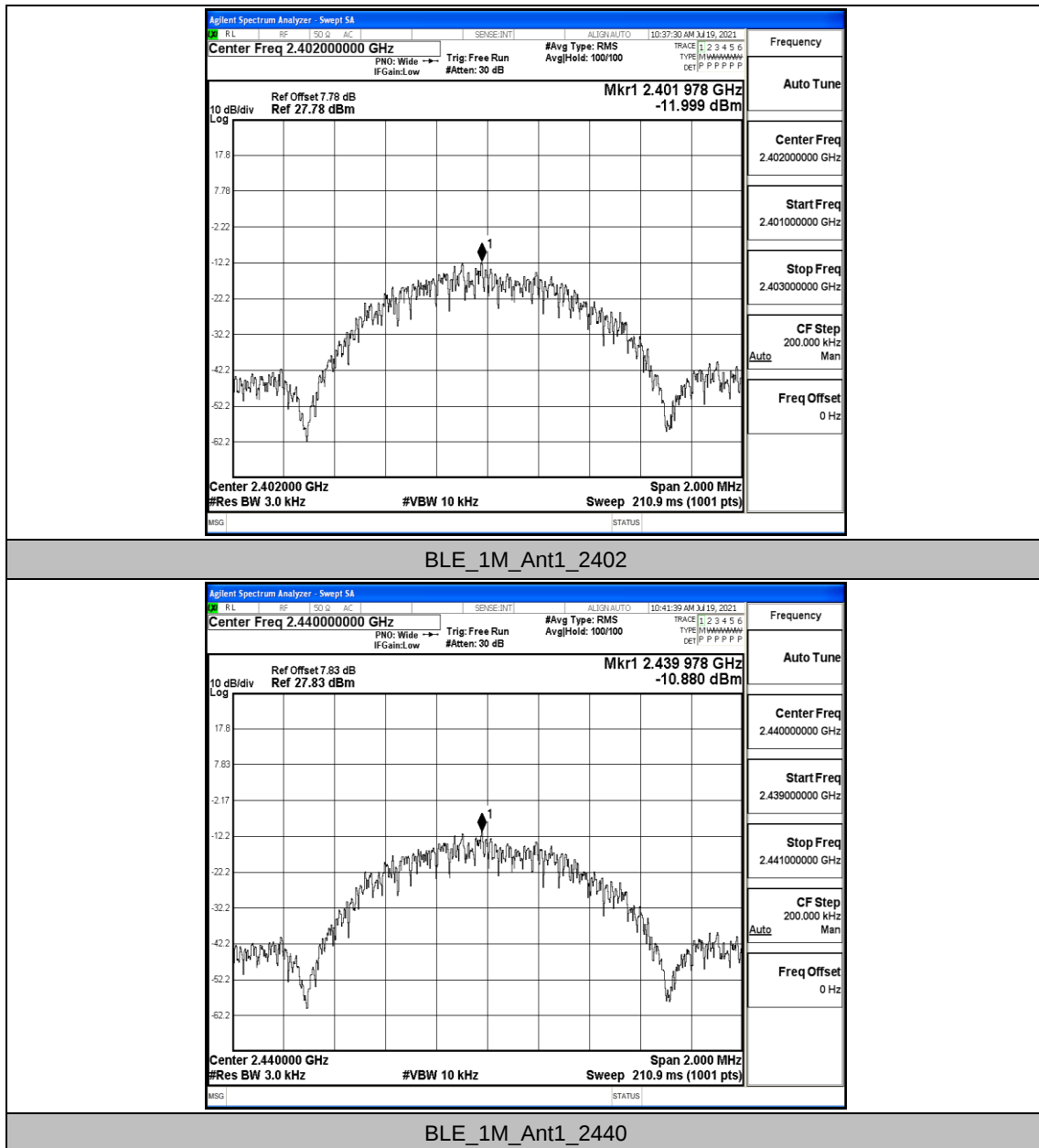


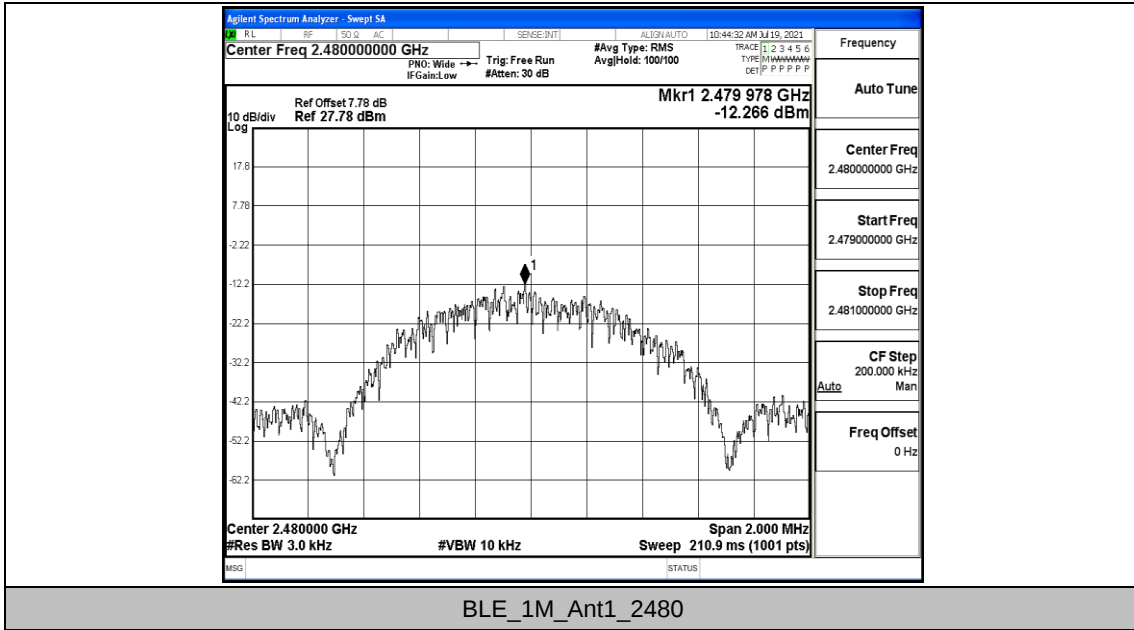
## A.3 Maximum power spectral density

### Test Result

| TestMode | Antenna | Channel | Result[dBm/3kHz] | Limit[dBm/3kHz] | Verdict |
|----------|---------|---------|------------------|-----------------|---------|
| BLE_1M   | Ant1    | 2402    | -12              | ≤8              | PASS    |
|          |         | 2440    | -10.88           | ≤8              | PASS    |
|          |         | 2480    | -12.27           | ≤8              | PASS    |

### Test Graphs





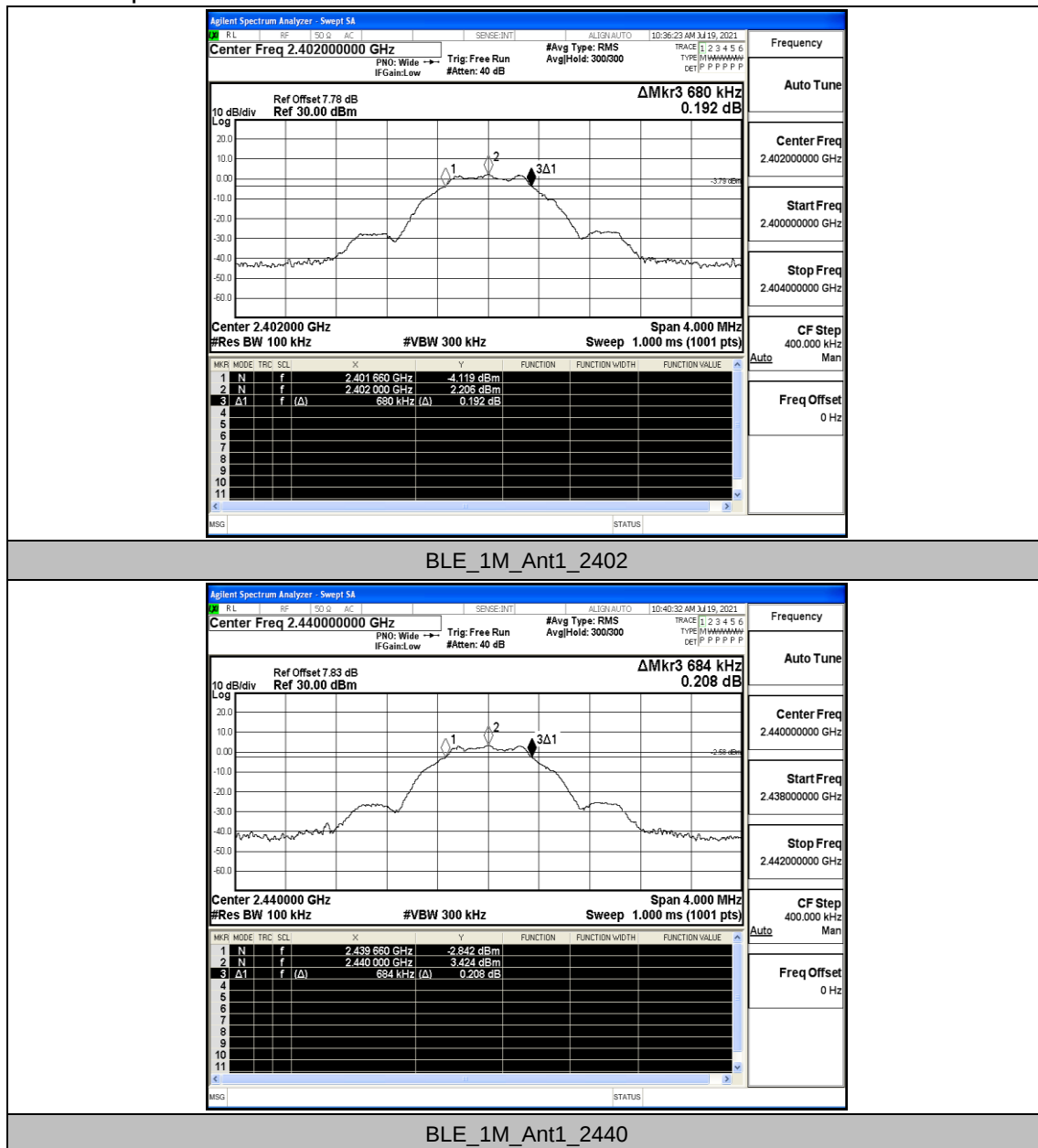


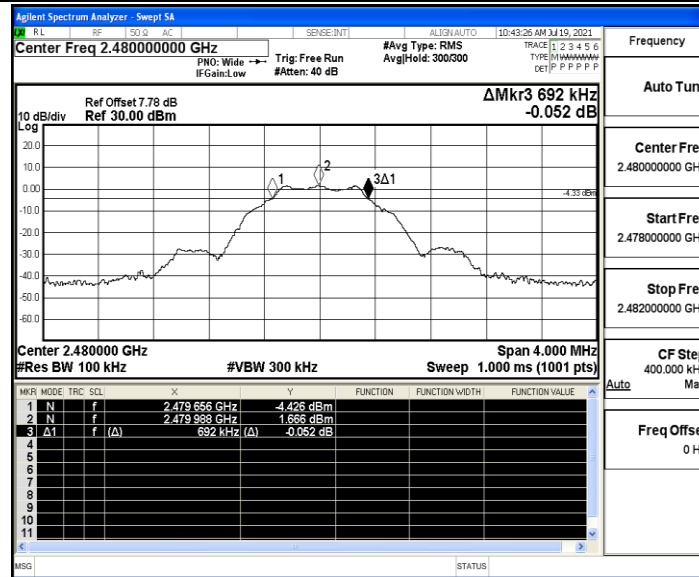
## A.4 6dB Bandwidth

### Test Result

| TestMode | Antenna | Channel | DTS BW [MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|----------|---------|---------|--------------|----------|----------|------------|---------|
| BLE_1M   | Ant1    | 2402    | 0.680        | 2401.660 | 2402.340 | ≥0.5       | PASS    |
|          |         | 2440    | 0.684        | 2439.660 | 2440.344 | ≥0.5       | PASS    |
|          |         | 2480    | 0.692        | 2479.656 | 2480.348 | ≥0.5       | PASS    |

### Test Graphs





BLE\_1M\_Ant1\_2480

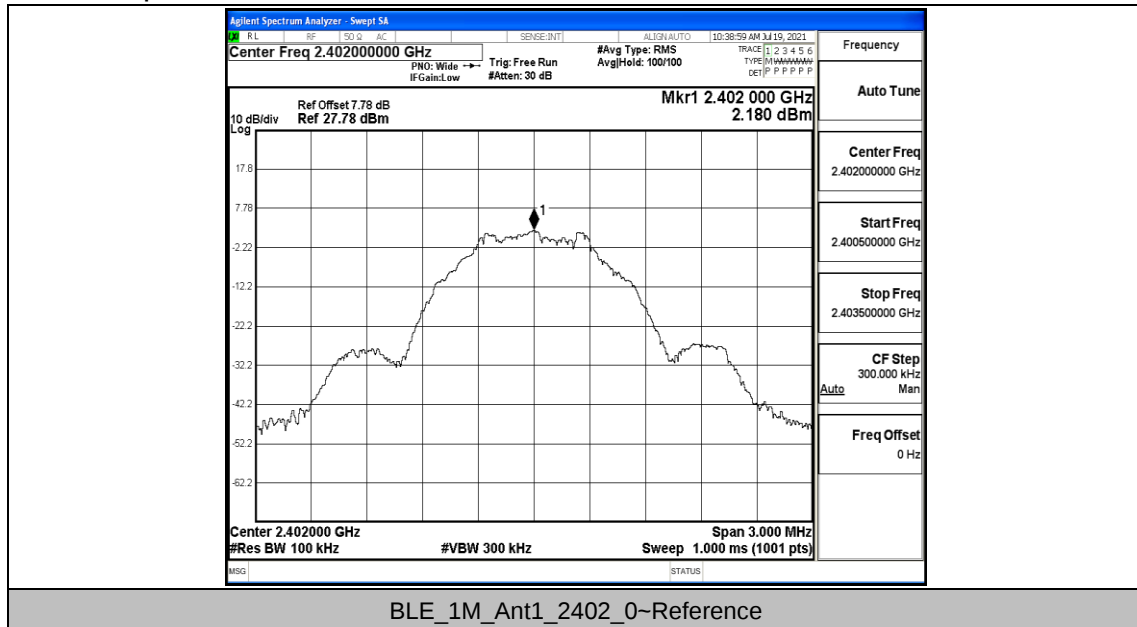


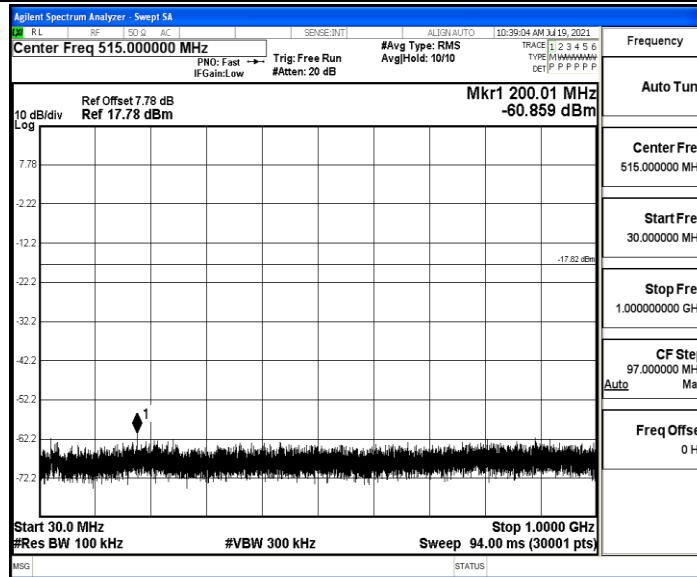
## A.5 Conducted Spurious Emission

### Test Result

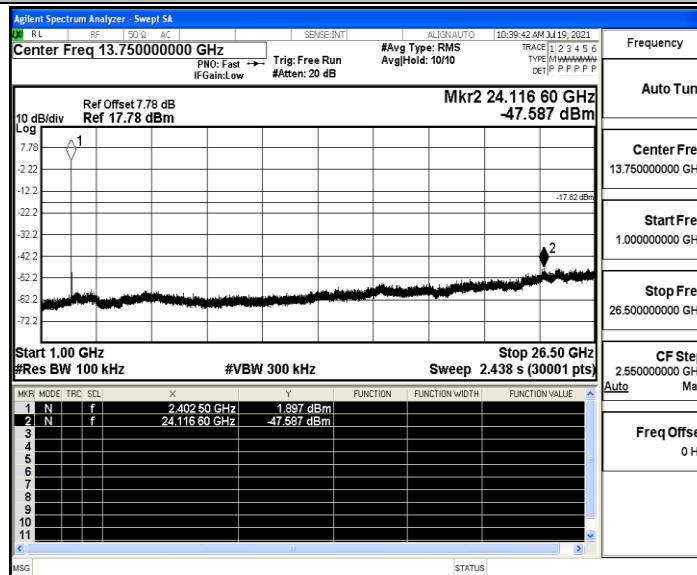
| TestMode | Antenna | Channel | FreqRange [MHz] | RefLevel [dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|---------|-----------------|----------------|-------------|------------|---------|
| BLE_1M   | Ant1    | 2402    | Reference       | 2.18           | 2.18        | ---        | PASS    |
|          |         |         | 30~1000         | 2.18           | -60.86      | ≤-17.82    | PASS    |
|          |         |         | 1000~26500      | 2.18           | -47.59      | ≤-17.82    | PASS    |
|          |         | 2440    | Reference       | 3.21           | 3.21        | ---        | PASS    |
|          |         |         | 30~1000         | 3.21           | -61.08      | ≤-16.79    | PASS    |
|          |         |         | 1000~26500      | 3.21           | -47.49      | ≤-16.79    | PASS    |
|          |         | 2480    | Reference       | 1.87           | 1.87        | ---        | PASS    |
|          |         |         | 30~1000         | 1.87           | -61.03      | ≤-18.13    | PASS    |
|          |         |         | 1000~26500      | 1.87           | -48.25      | ≤-18.13    | PASS    |

### Test Graphs

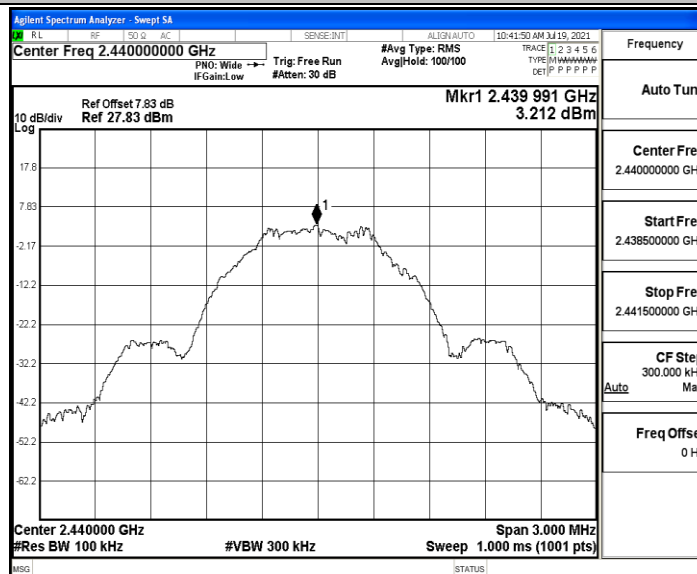




BLE\_1M\_Ant1\_2402\_30~1000

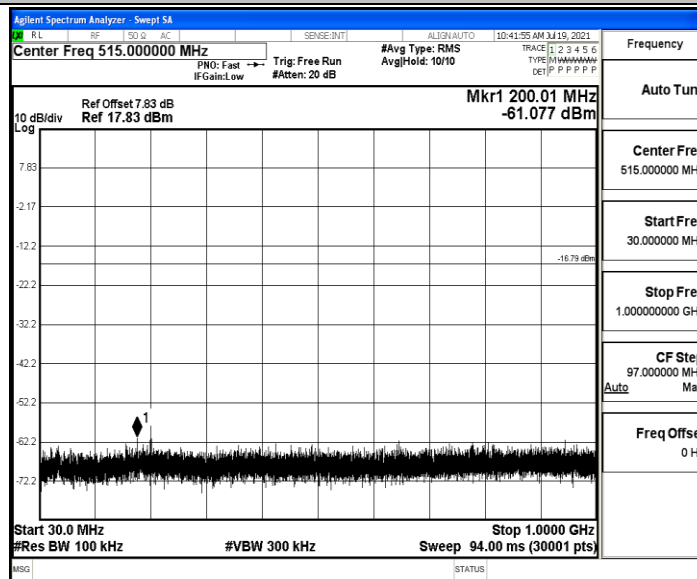


BLE\_1M\_Ant1\_2402\_1000~26500

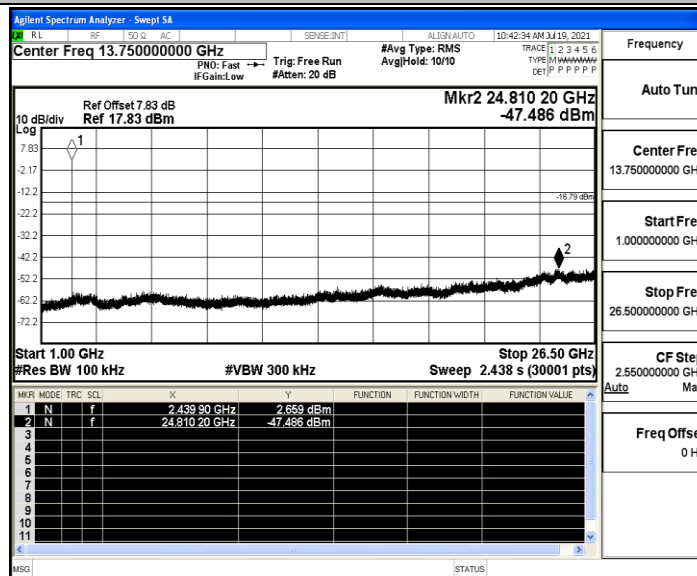




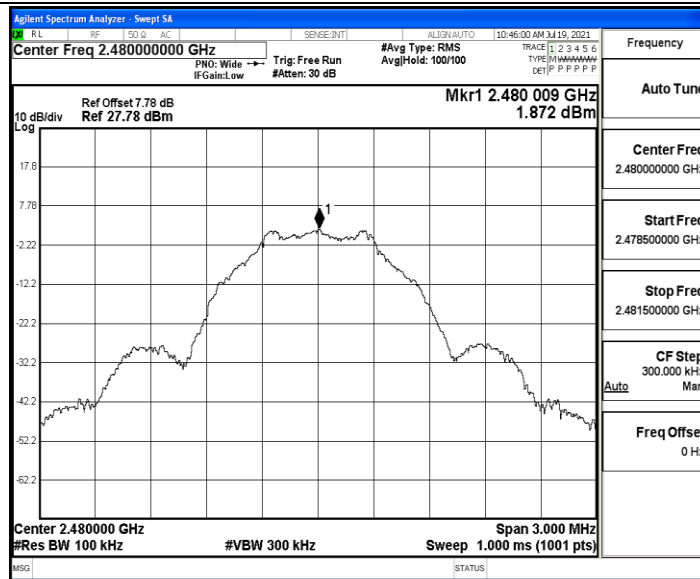
## BLE\_1M\_Ant1\_2440\_0~Reference



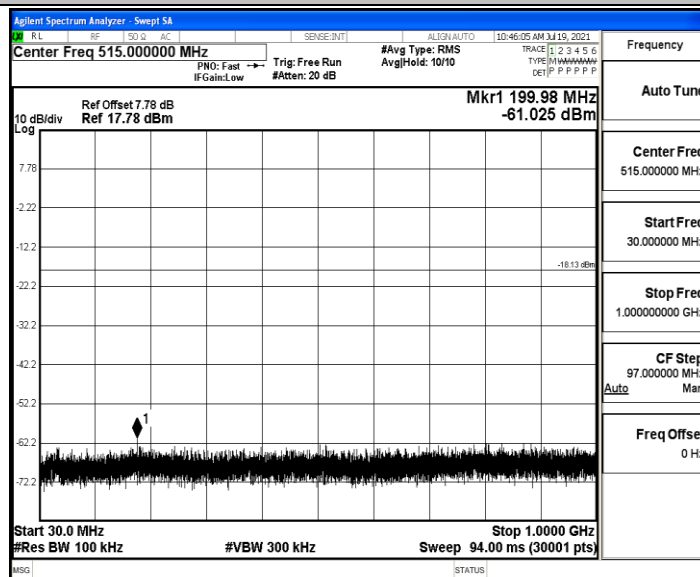
## BLE\_1M\_Ant1\_2440\_30~1000



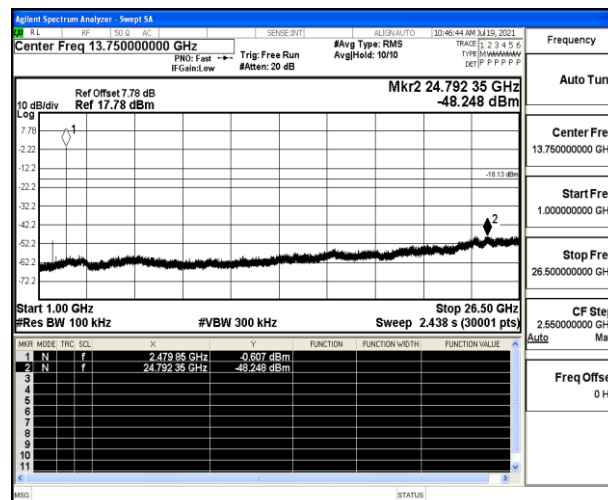
## BLE\_1M\_Ant1\_2440\_1000~26500



BLE\_1M\_Ant1\_2480\_0~Reference



BLE\_1M\_Ant1\_2480\_30~1000



BLE\_1M\_Ant1\_2480\_1000~26500

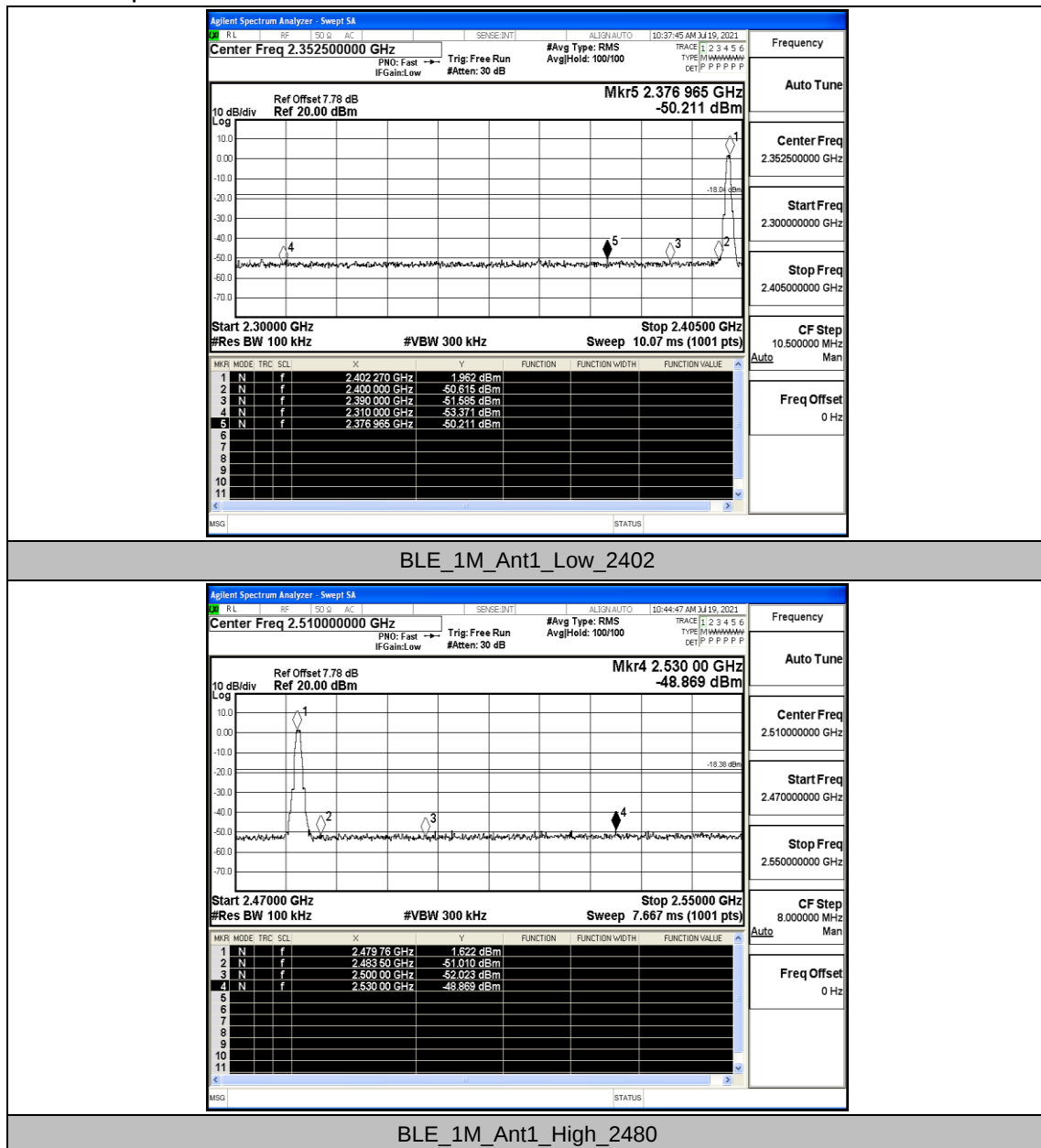


## A.6 Band edge measurements

### Test Result

| TestMode | Antenna | ChName | Channel | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|--------|---------|---------------|-------------|------------|---------|
| BLE_1M   | Ant1    | Low    | 2402    | 1.96          | -50.21      | ≤-18.04    | PASS    |
|          |         | High   | 2480    | 1.62          | -48.87      | ≤-18.38    | PASS    |

### Test Graphs





## A.7 Emissions in Restricted Bands

### Test Result

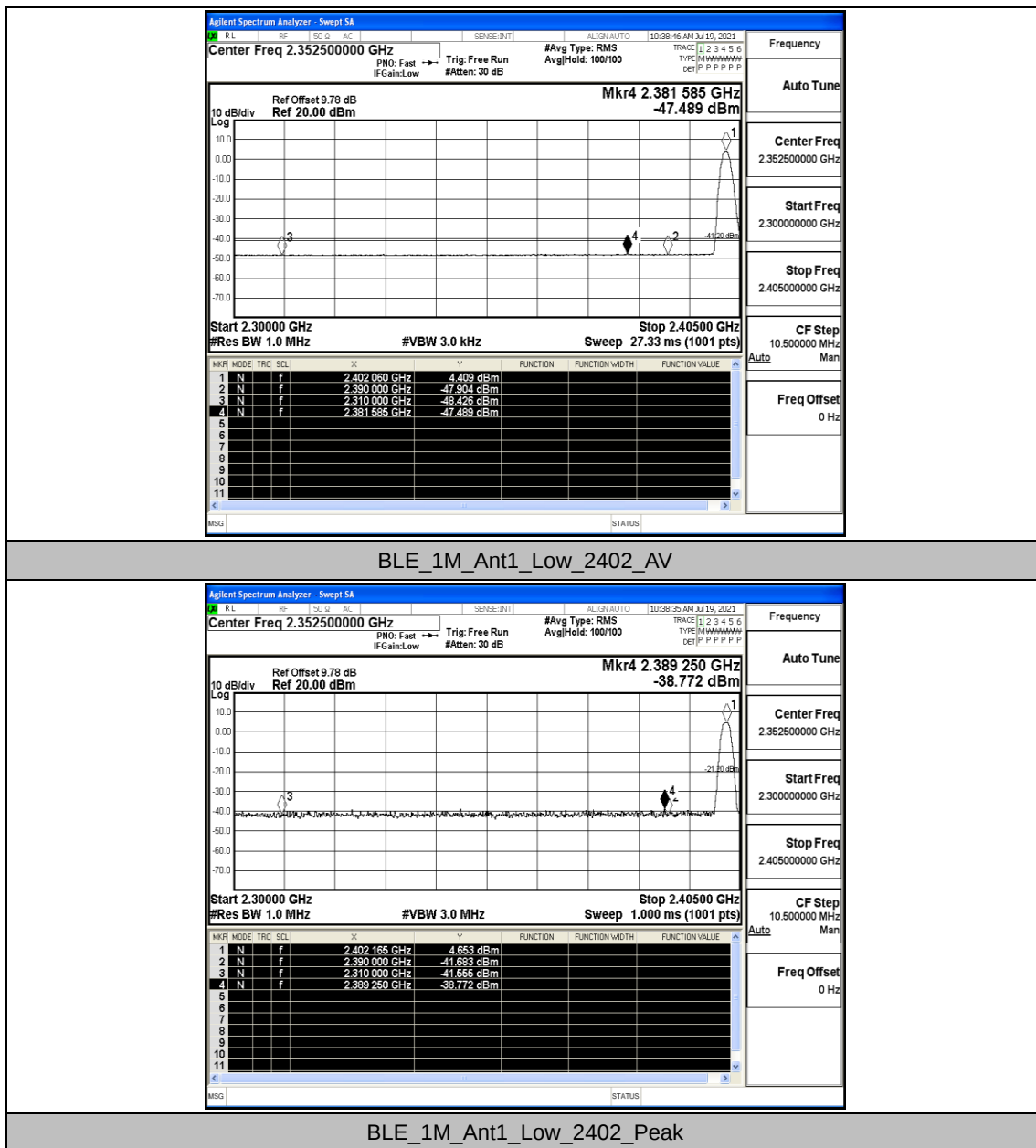
| TestMode | Antenna | Channel | Detector | Freq.<br>[MHz] | Result<br>[dBm] | Limit<br>[dBm] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Verdict |
|----------|---------|---------|----------|----------------|-----------------|----------------|--------------------|-------------------|---------|
| BLE_1M   | Ant1    | 2402    | AV       | 2310.000       | -48.43          | ≤-41.20        | 46.77              | ≤54               | PASS    |
|          |         |         | AV       | 2381.585       | -47.49          | ≤-41.20        | 47.71              | ≤54               | PASS    |
|          |         |         | AV       | 2390.000       | -47.9           | ≤-41.20        | 47.30              | ≤54               | PASS    |
|          |         |         | Peak     | 2310.000       | -41.56          | ≤-21.20        | 53.64              | ≤74               | PASS    |
|          |         |         | Peak     | 2389.250       | -38.77          | ≤-21.20        | 56.43              | ≤74               | PASS    |
|          |         |         | Peak     | 2390.000       | -41.68          | ≤-21.20        | 53.52              | ≤74               | PASS    |
|          |         | 2480    | AV       | 2483.500       | -46.74          | ≤-41.20        | 48.46              | ≤54               | PASS    |
|          |         |         | AV       | 2483.520       | -46.74          | ≤-41.20        | 48.46              | ≤54               | PASS    |
|          |         |         | AV       | 2500.000       | -47.42          | ≤-41.20        | 47.78              | ≤54               | PASS    |
|          |         |         | Peak     | 2483.500       | -41.29          | ≤-21.20        | 53.91              | ≤74               | PASS    |
|          |         |         | Peak     | 2496.000       | -38.64          | ≤-21.20        | 56.56              | ≤74               | PASS    |
|          |         |         | Peak     | 2500.000       | -41.29          | ≤-21.20        | 53.91              | ≤74               | PASS    |

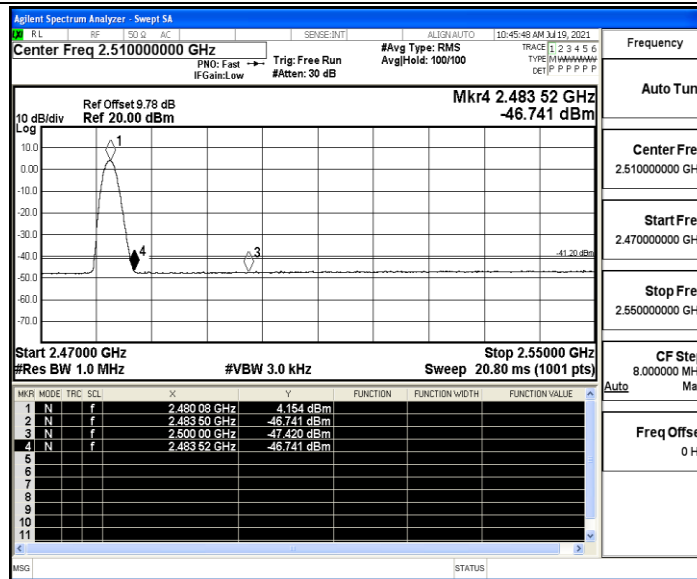
Note:

1. The Antenna Gain is compensated in the graph.
2. 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.

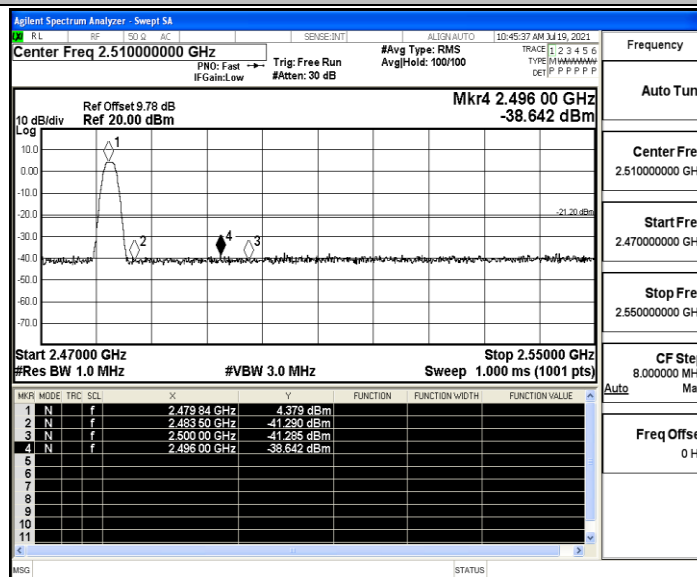


## Test Graphs





BLE\_1M\_Ant1\_High\_2480\_AV



BLE\_1M\_Ant1\_High\_2480\_Peak