

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

Product Name: Solar Charge Controller

Trade Mark: N/A

Test Model: MS4840N

FCC ID: 2A524-MS4840N

Environmental Conditions

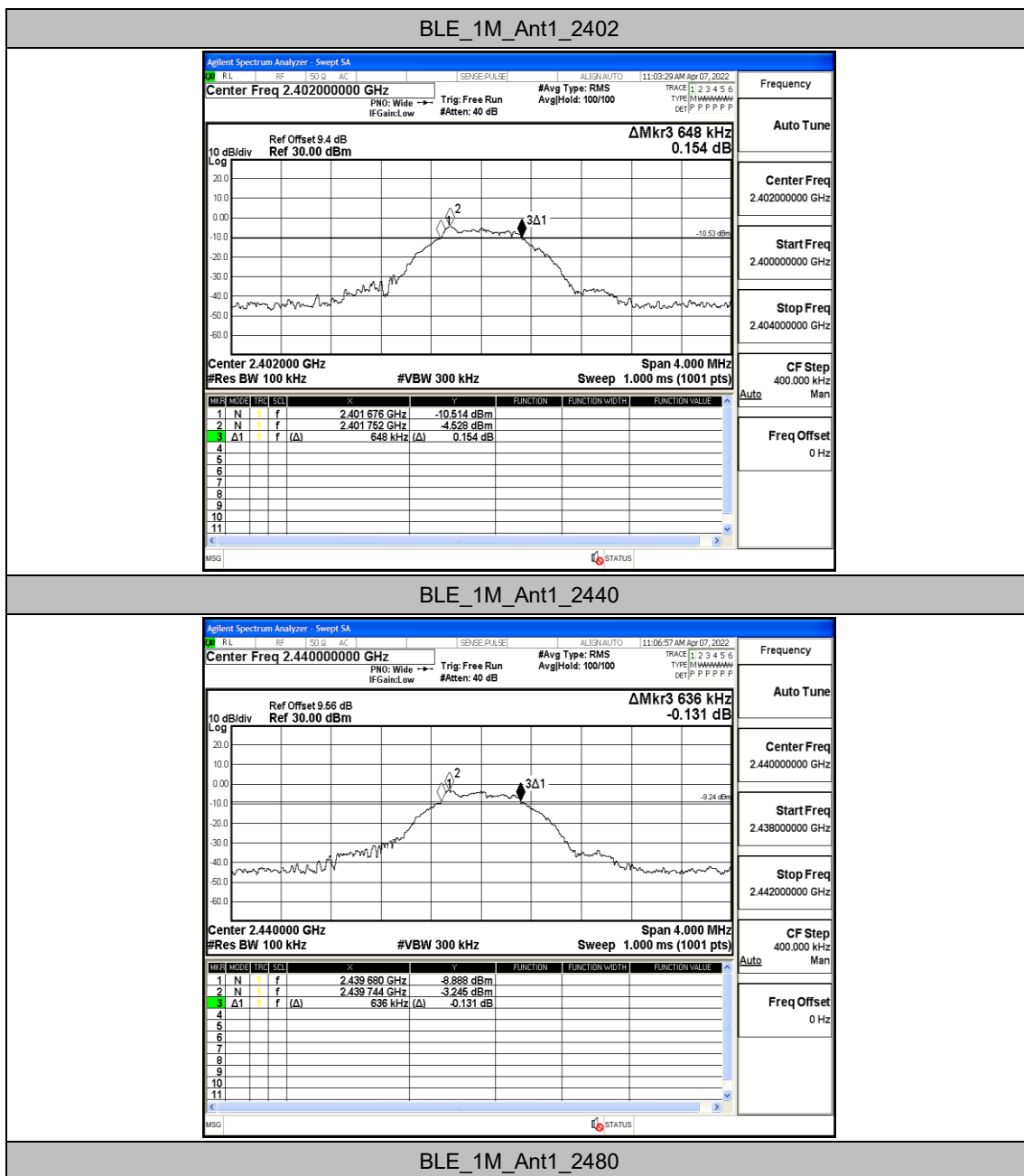
|                    |           |
|--------------------|-----------|
| Temperature:       | 25.5°C    |
| Relative Humidity: | 55%       |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Anna Hu   |
| Supervised by:     | Hugo Chen |
| NOTE               | N/A       |

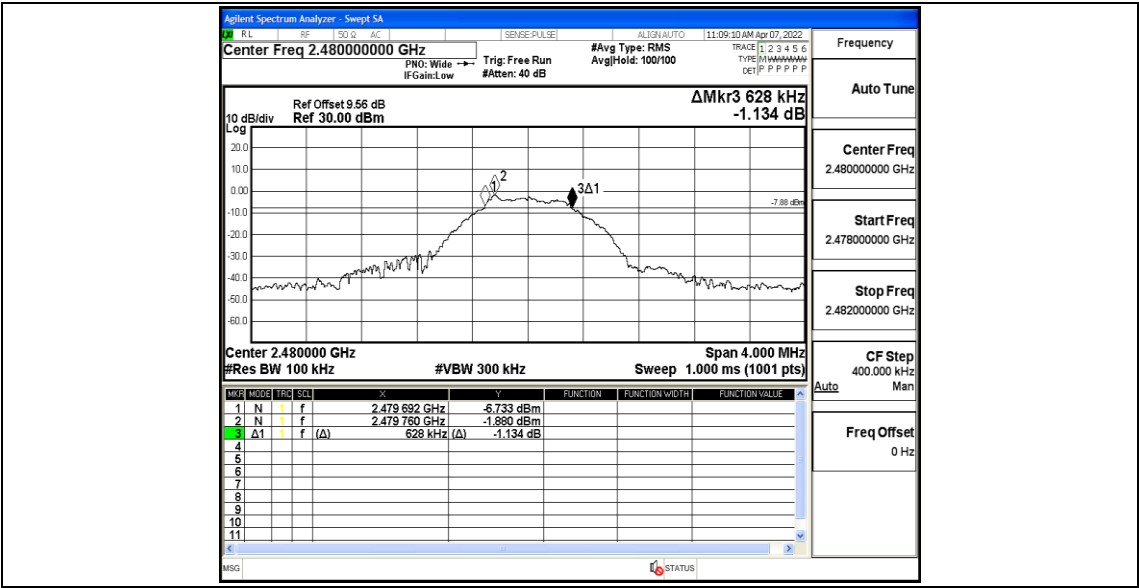
Appendix A: DTS Bandwidth

Test Result

| TestMode | Antenna | Channel | DTS BW<br>[MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|----------|---------|---------|-----------------|----------|----------|------------|---------|
| BLE_1M   | Ant1    | 2402    | 0.648           | 2401.676 | 2402.324 | 0.5        | PASS    |
|          |         | 2440    | 0.636           | 2439.680 | 2440.316 | 0.5        | PASS    |
|          |         | 2480    | 0.628           | 2479.692 | 2480.320 | 0.5        | PASS    |

## Test Graphs



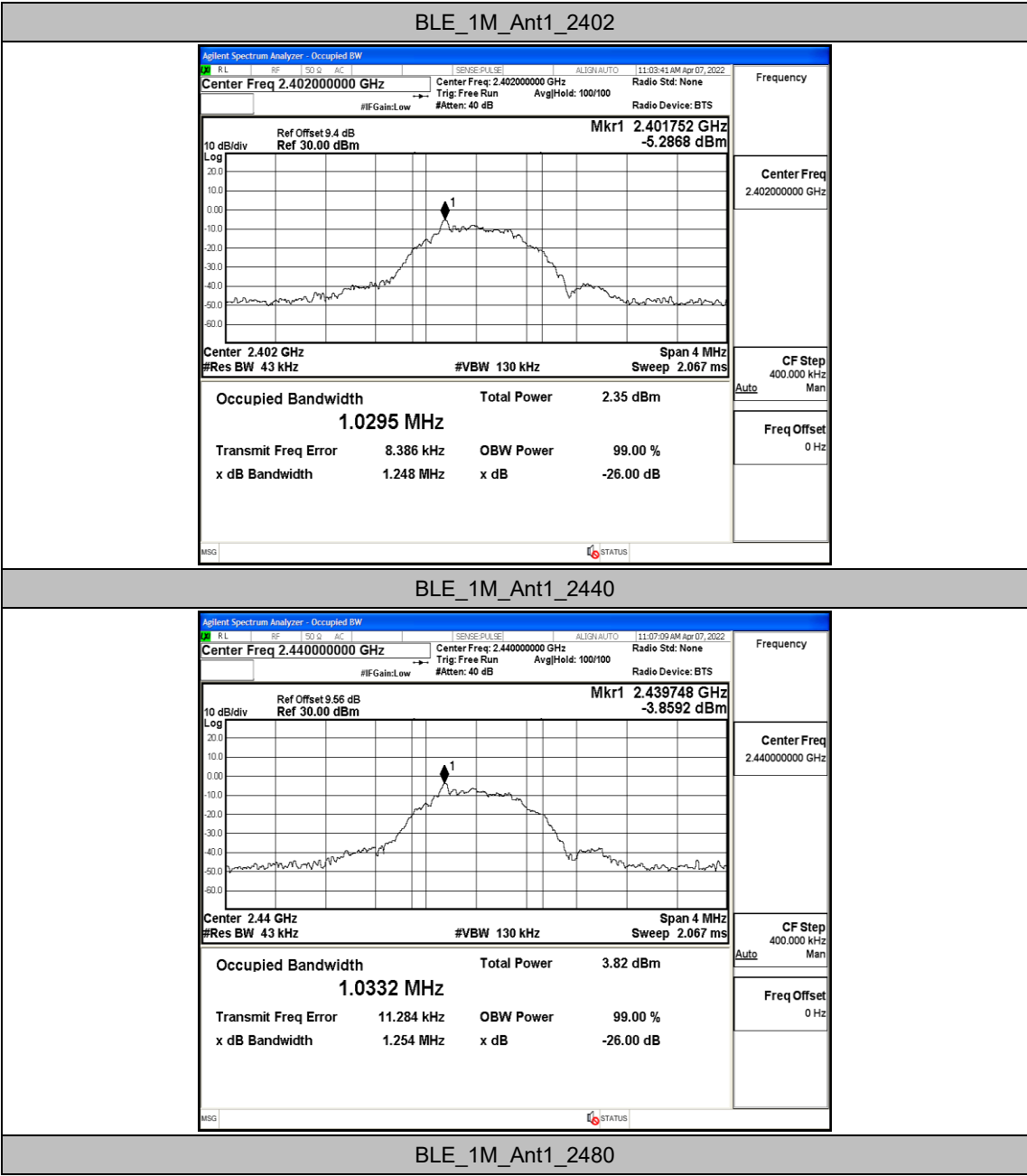


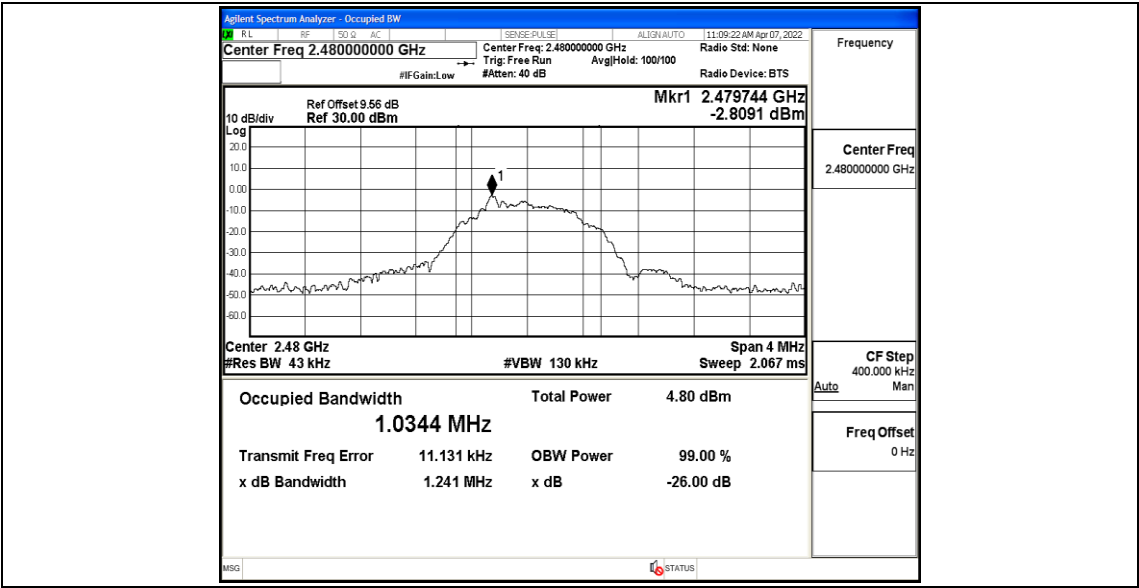
Appendix B: Occupied Channel Bandwidth

Test Result

| TestMode | Antenna | Channel | OCB [MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|----------|---------|---------|-----------|----------|----------|------------|---------|
| BLE_1M   | Ant1    | 2402    | 1.0295    | 2401.494 | 2402.523 | ---        | ---     |
|          |         | 2440    | 1.0332    | 2439.495 | 2440.528 | ---        | ---     |
|          |         | 2480    | 1.0344    | 2479.494 | 2480.528 | ---        | ---     |

Test Graphs



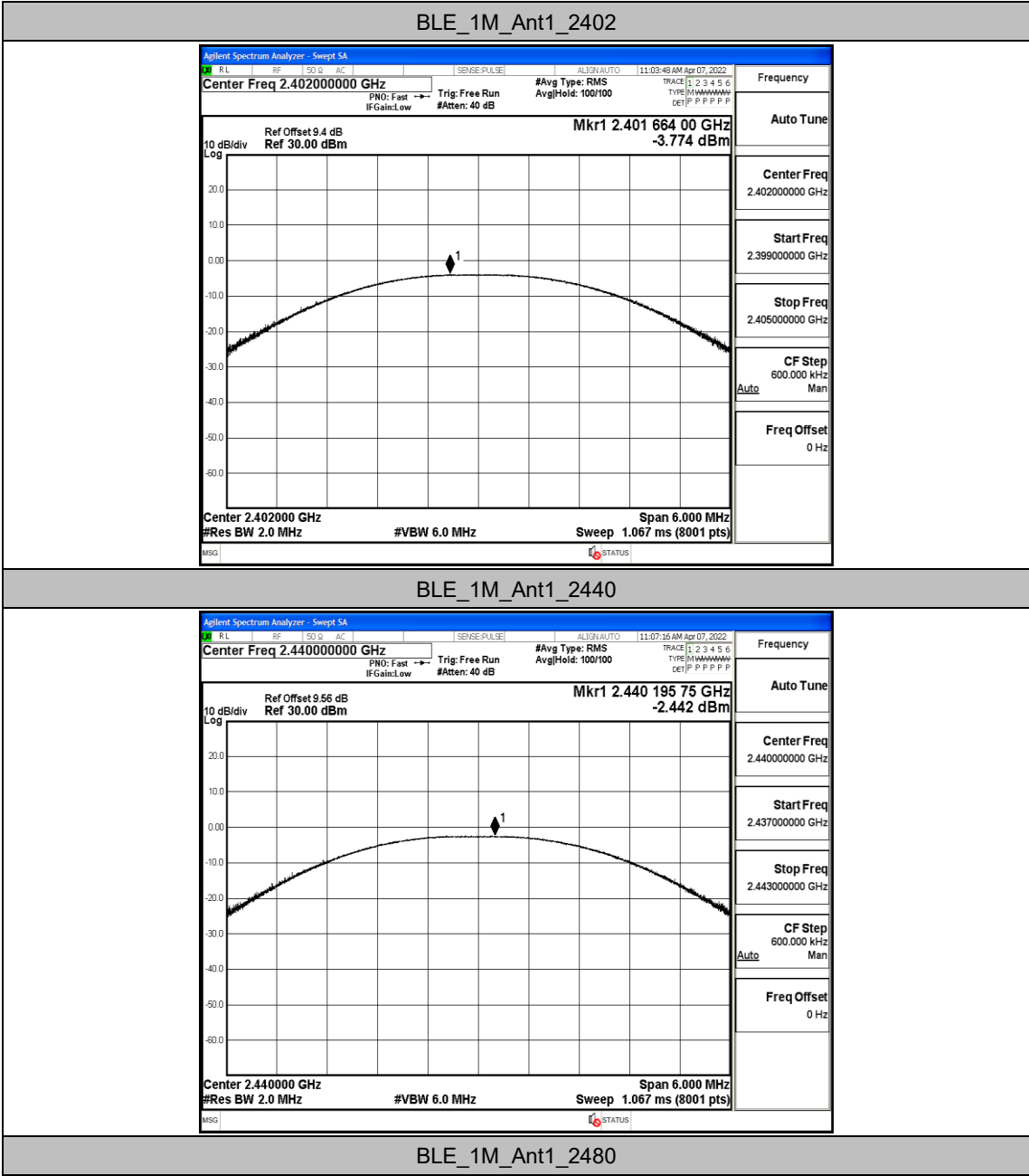


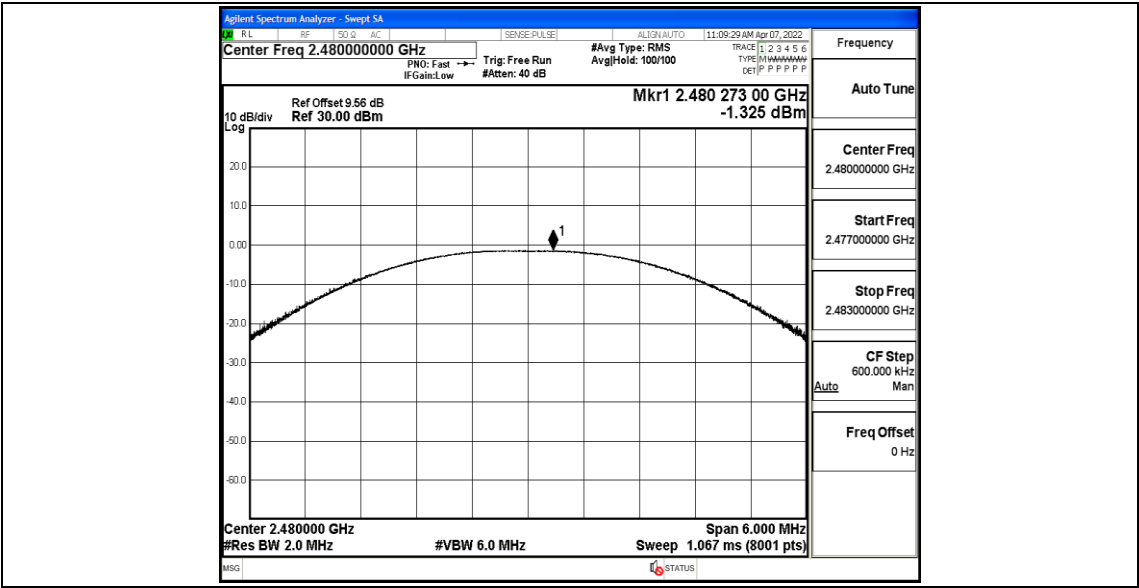
Appendix C: Maximum conducted output power

Test Result

| TestMode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|---------|-------------|------------|---------|
| BLE_1M   | Ant1    | 2402    | -3.77       | ≤30        | PASS    |
|          |         | 2440    | -2.44       | ≤30        | PASS    |
|          |         | 2480    | -1.33       | ≤30        | PASS    |

Test Graphs



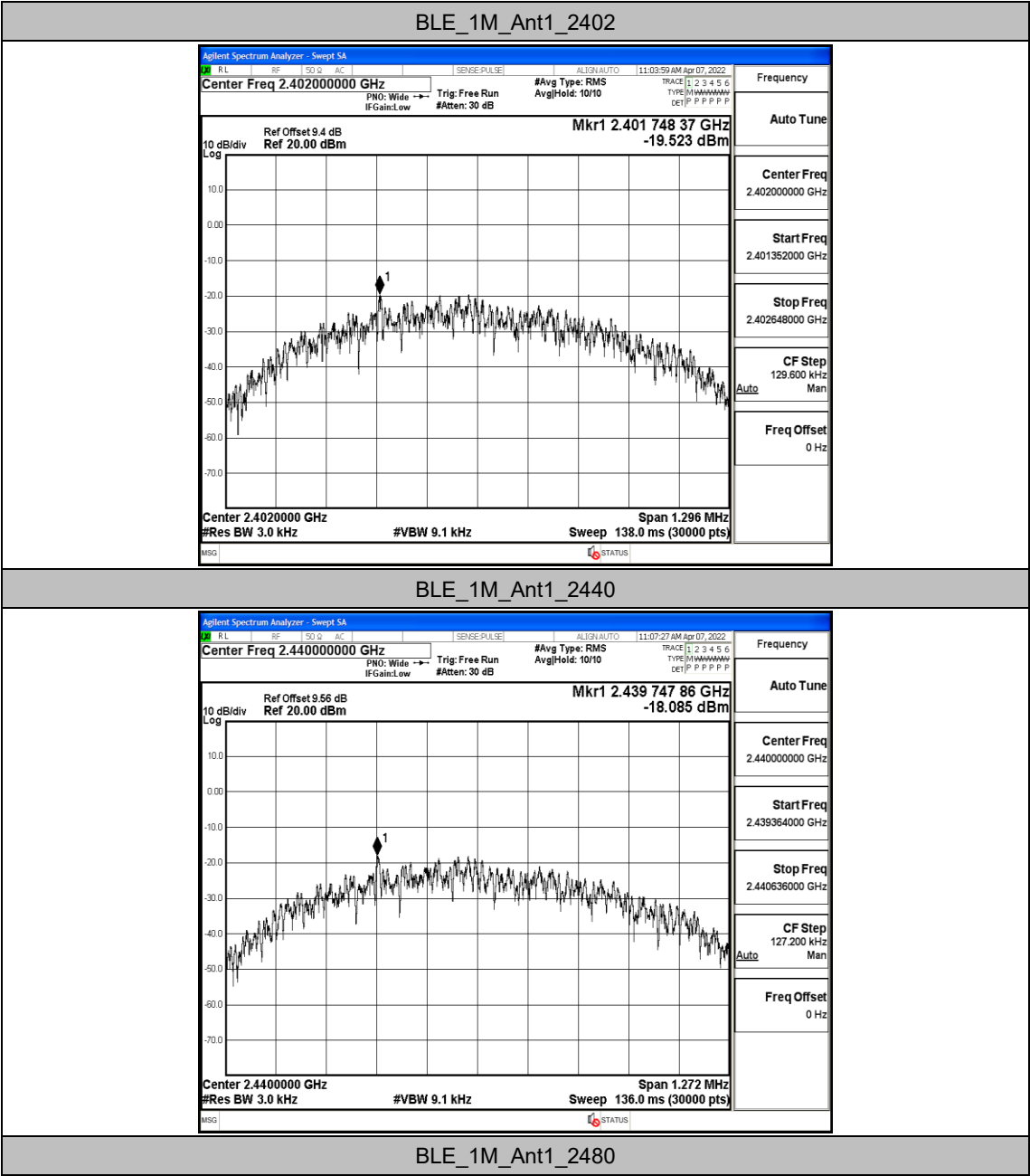


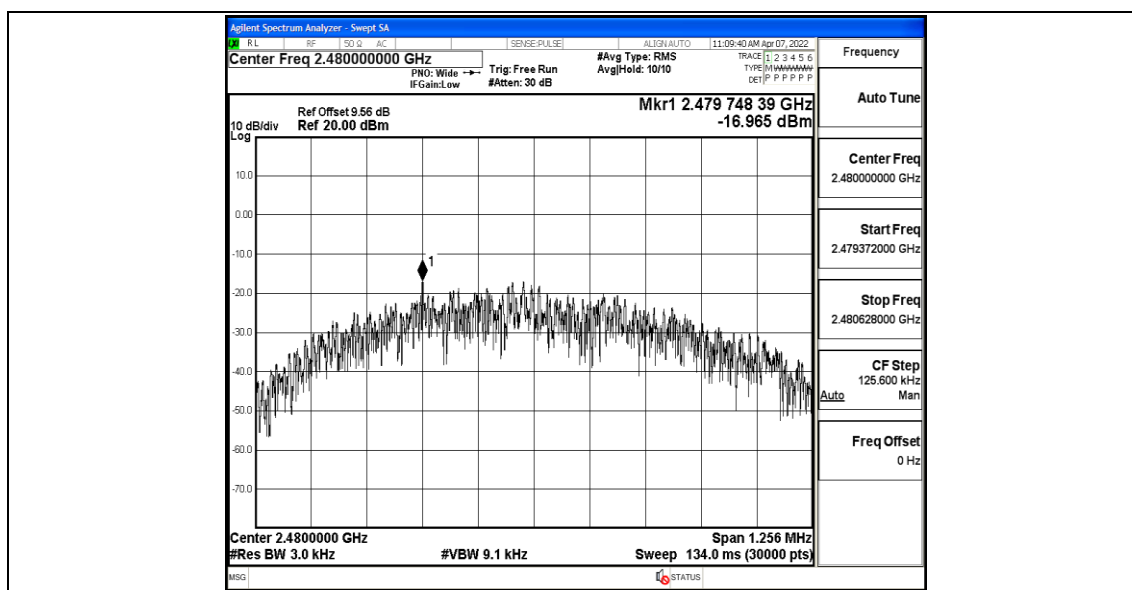
Appendix D: Maximum power spectral density

Test Result

| TestMode | Antenna | Channel | Result[dBm/3-100kHz] | Limit[dBm/3kHz] | Verdict |
|----------|---------|---------|----------------------|-----------------|---------|
| BLE_1M   | Ant1    | 2402    | -19.52               | ≤8.00           | PASS    |
|          |         | 2440    | -18.09               | ≤8.00           | PASS    |
|          |         | 2480    | -16.97               | ≤8.00           | PASS    |

Test Graphs



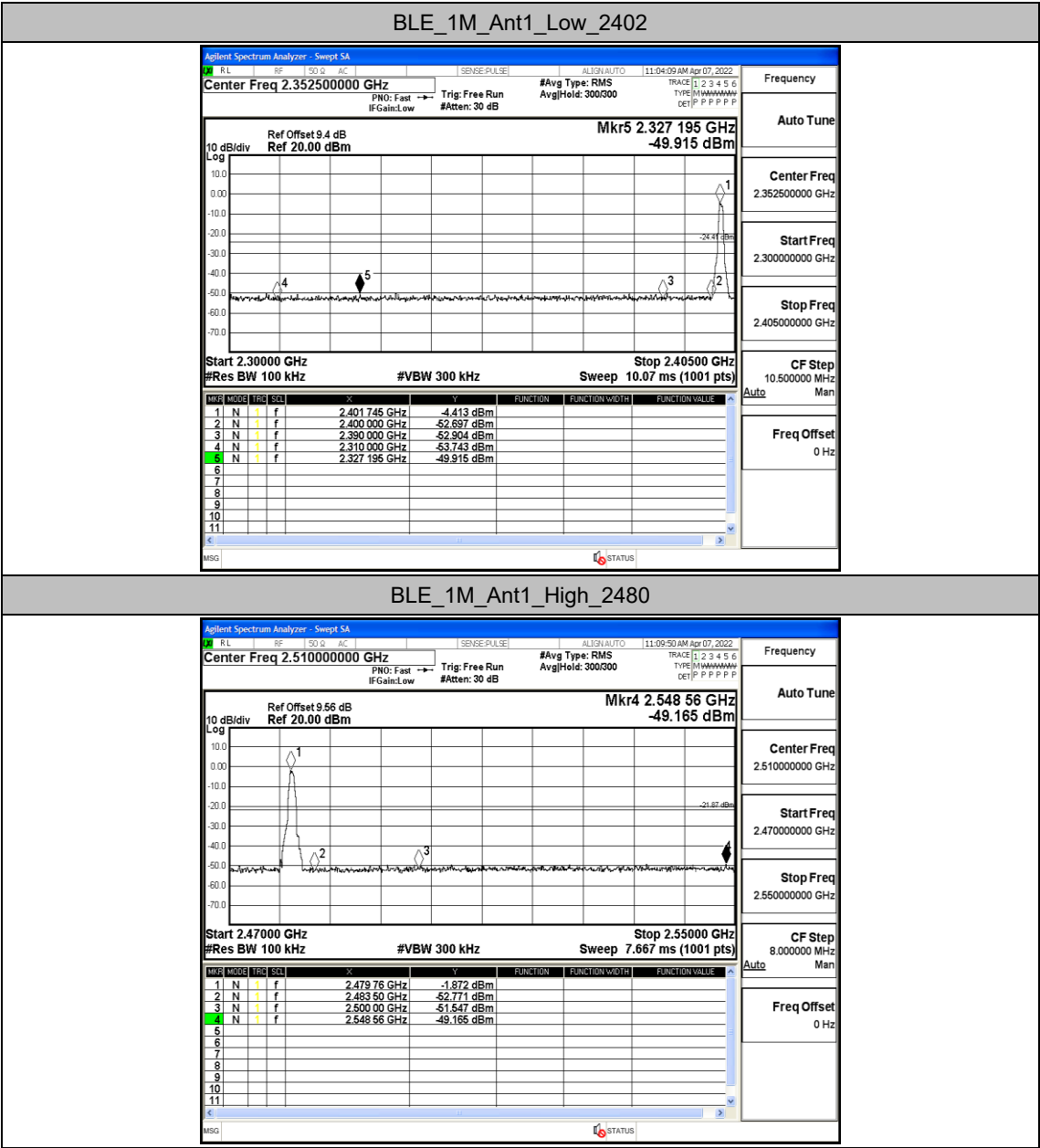


Appendix E: Band edge measurements

Test Result

| TestMode | Antenna | ChName | Channel | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|--------|---------|---------------|-------------|------------|---------|
| BLE_1M   | Ant1    | Low    | 2402    | -4.41         | -49.92      | ≤-24.41    | PASS    |
|          |         | High   | 2480    | -1.87         | -49.17      | ≤-21.87    | PASS    |

Test Graphs

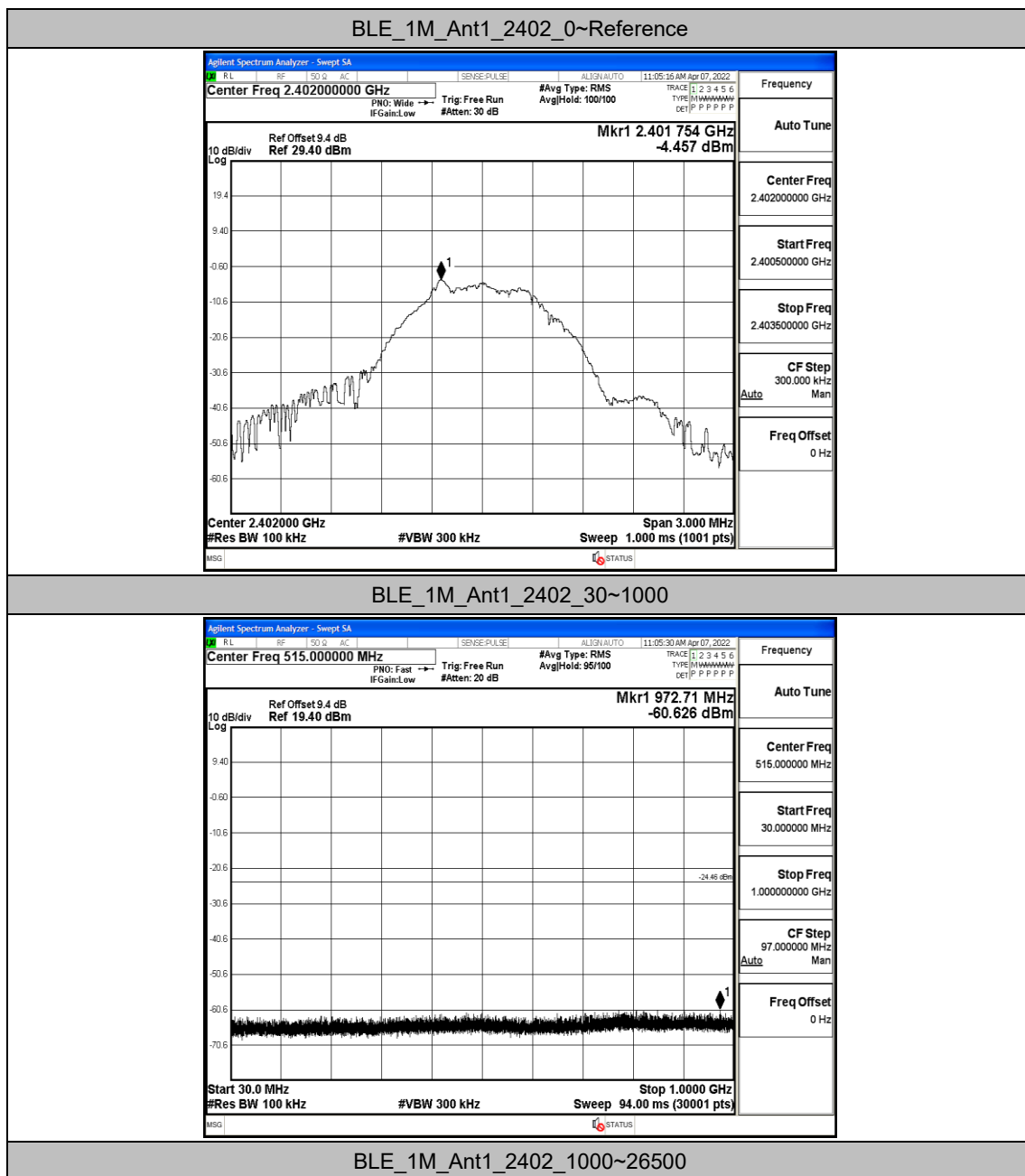


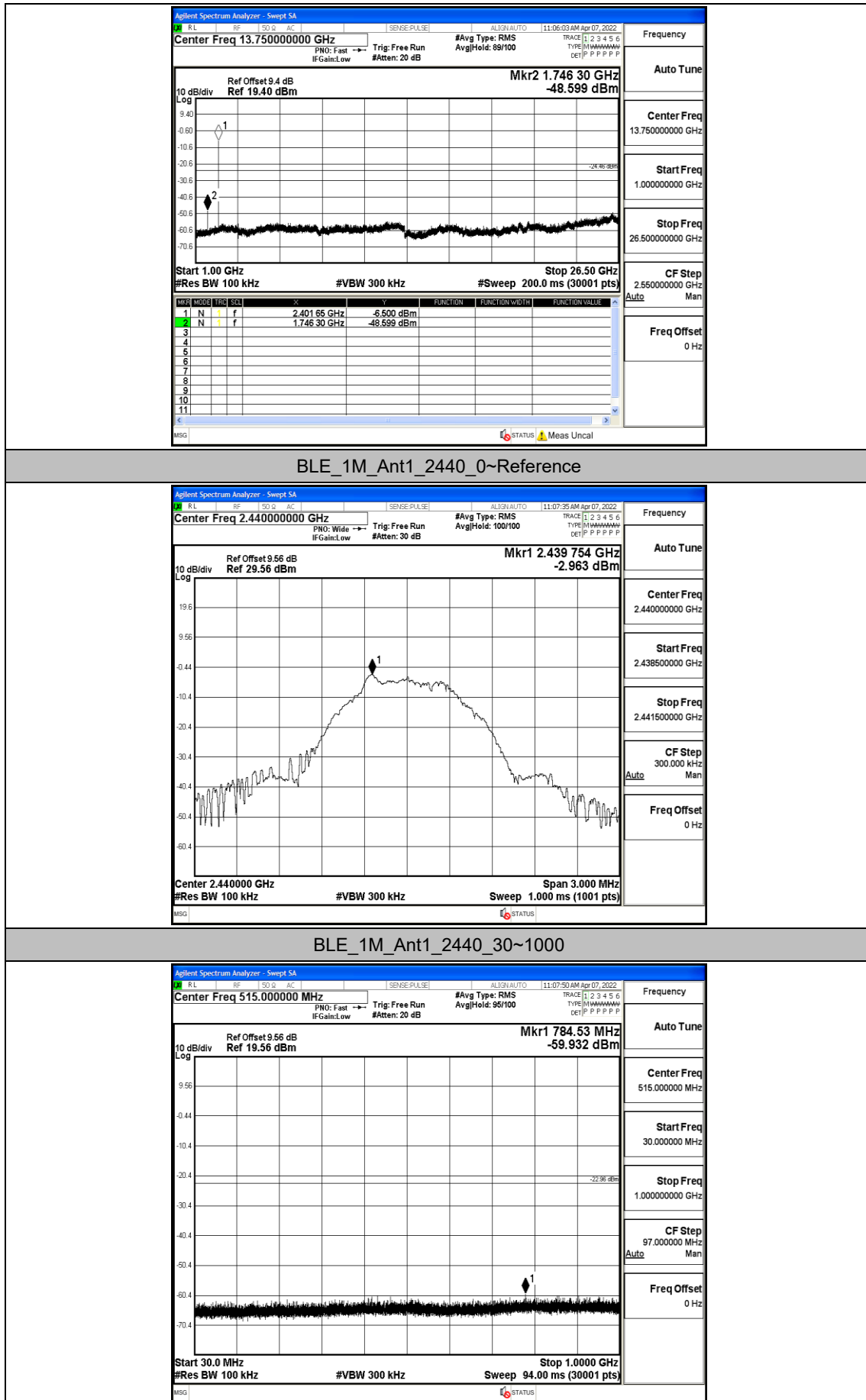
## Appendix F: Conducted Spurious Emission

### Test Result

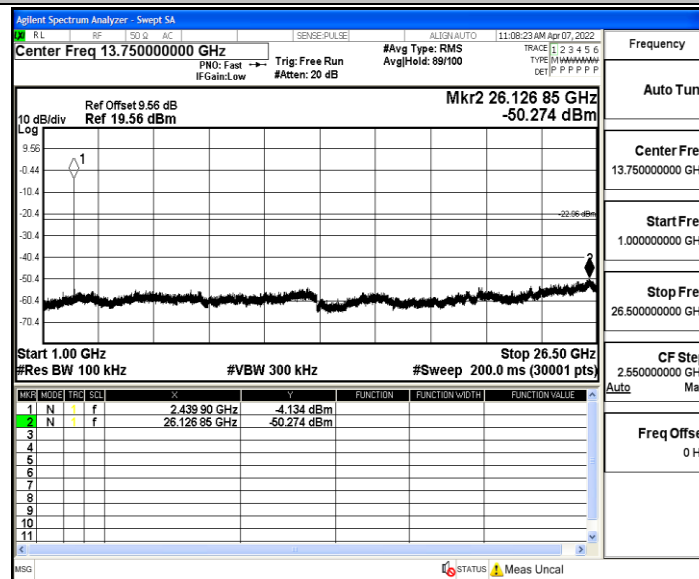
| TestMode | Antenna | Channel | FreqRange<br>[MHz] | RefLevel<br>[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|---------|--------------------|-------------------|-------------|------------|---------|
| BLE_1M   | Ant1    | 2402    | Reference          | -4.46             | -4.46       | ---        | PASS    |
|          |         |         | 30~1000            | -4.46             | -60.63      | ≤-24.46    | PASS    |
|          |         |         | 1000~26500         | -4.46             | -48.6       | ≤-24.46    | PASS    |
|          |         | 2440    | Reference          | -2.96             | -2.96       | ---        | PASS    |
|          |         |         | 30~1000            | -2.96             | -59.93      | ≤-22.96    | PASS    |
|          |         |         | 1000~26500         | -2.96             | -50.27      | ≤-22.96    | PASS    |
|          |         | 2480    | Reference          | -1.91             | -1.91       | ---        | PASS    |
|          |         |         | 30~1000            | -1.91             | -59.96      | ≤-21.91    | PASS    |
|          |         |         | 1000~26500         | -1.91             | -50.54      | ≤-21.91    | PASS    |

## Test Graphs

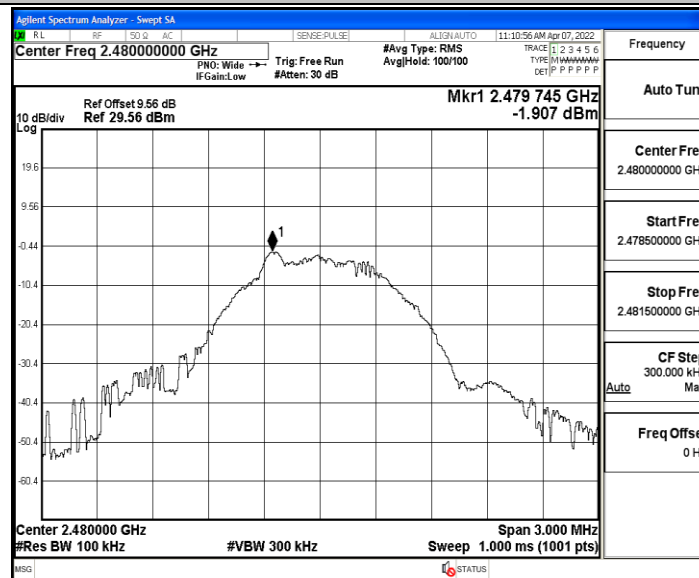




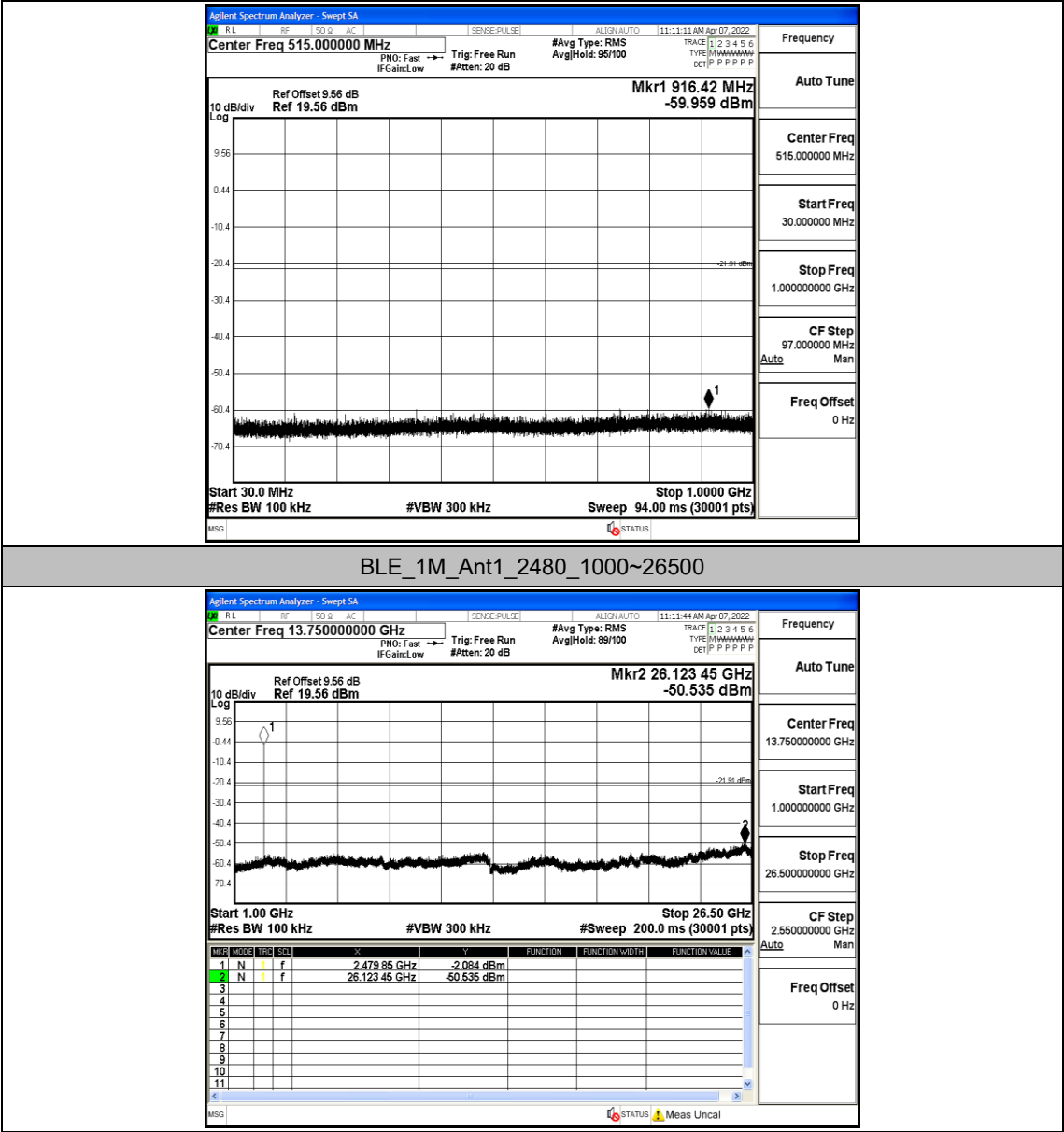
## BLE\_1M\_Ant1\_2440\_1000~26500



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



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

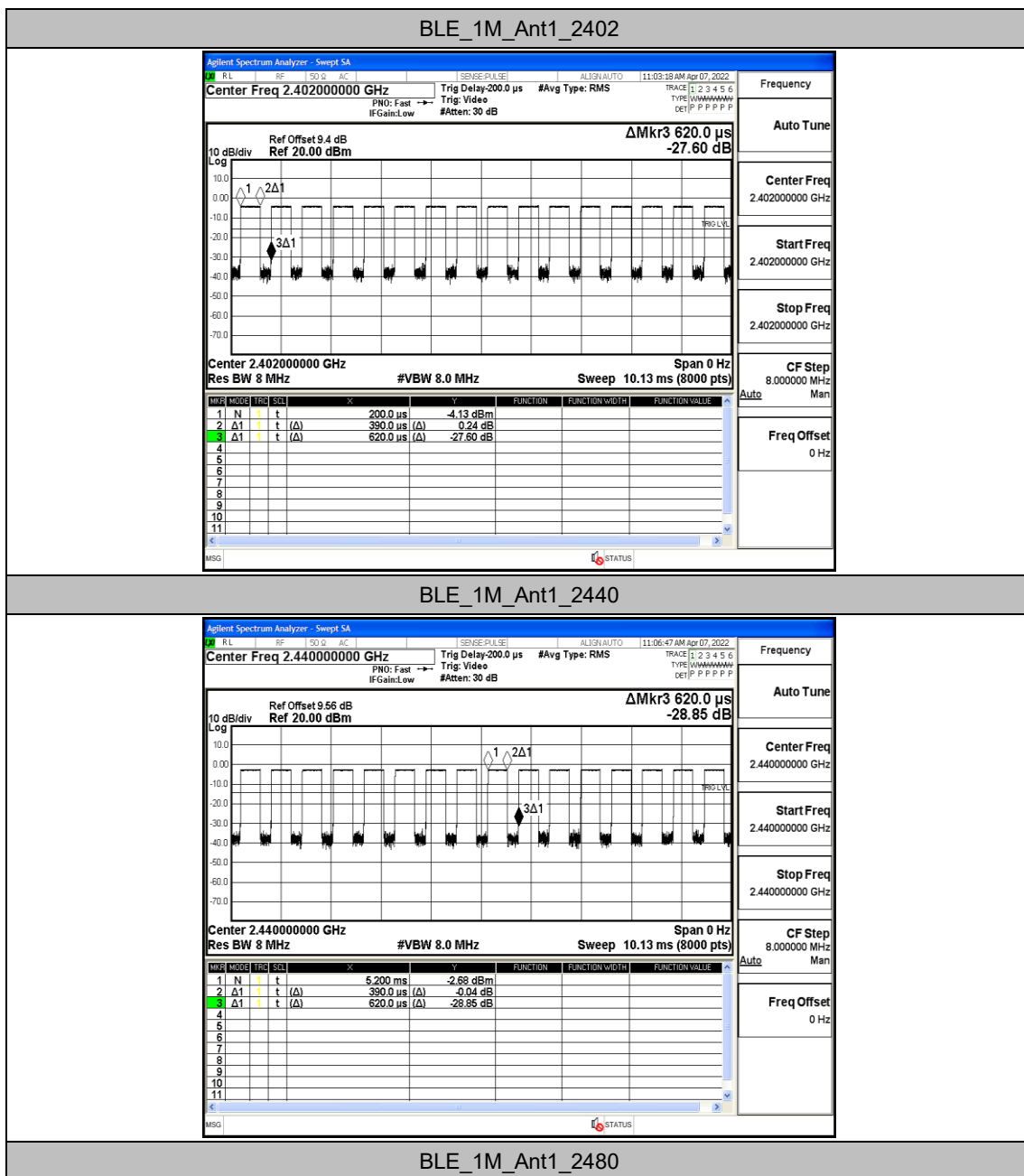


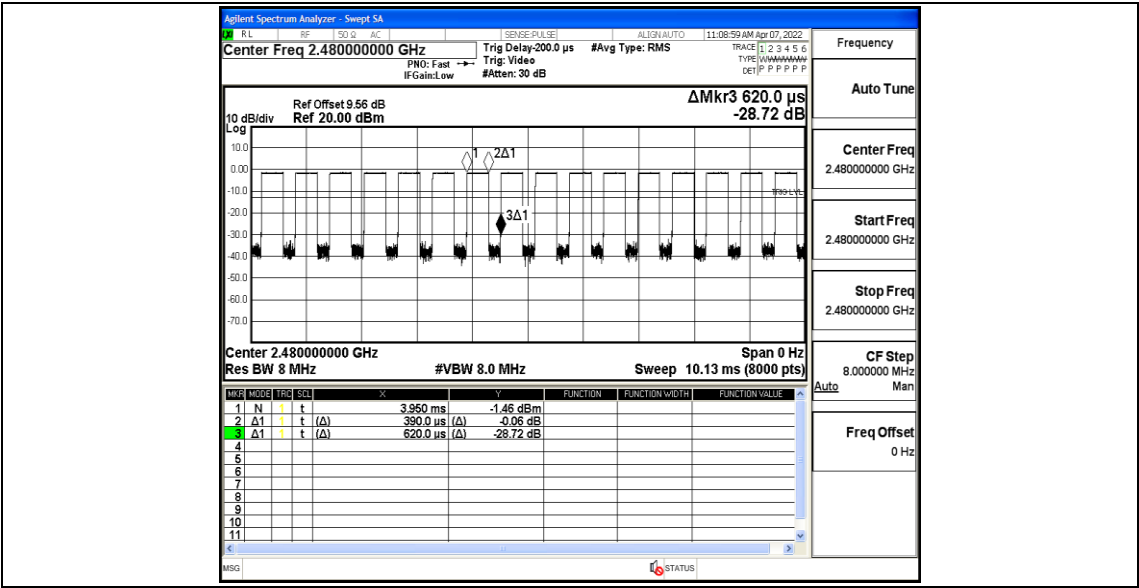
Appendix G: Duty Cycle

Test Result

| TestMode | Antenna | Channel | Transmission<br>Duration [ms] | Transmission<br>Period [ms] | Duty Cycle<br>[%] | 1/T  |
|----------|---------|---------|-------------------------------|-----------------------------|-------------------|------|
| BLE_1M   | Ant1    | 2402    | 0.39                          | 0.62                        | 62.90             | 2.56 |
|          |         | 2440    | 0.39                          | 0.62                        | 62.90             | 2.56 |
|          |         | 2480    | 0.39                          | 0.62                        | 62.90             | 2.56 |

## Test Graphs





## Appendix H: Emissions in Restricted Bands

### Test Result

| TestMode | Antenna | ChName | Channel | Detector | Freq.<br>[MHz] | Result<br>[dBm] | Limit<br>[dBm] | Verdict |
|----------|---------|--------|---------|----------|----------------|-----------------|----------------|---------|
| BLE_1M   | Ant1    | Low    | 2402    | AV       | 2310.000       | -48.5           | ≤-41.20        | PASS    |
|          |         |        |         | AV       | 2376.755       | -47.55          | ≤-41.20        | PASS    |
|          |         |        |         | AV       | 2390.000       | -48.16          | ≤-41.20        | PASS    |
|          |         |        |         | Peak     | 2310.000       | -42.54          | ≤-21.20        | PASS    |
|          |         |        |         | Peak     | 2323.940       | -38.13          | ≤-21.20        | PASS    |
|          |         |        |         | Peak     | 2390.000       | -41.18          | ≤-21.20        | PASS    |
|          |         | High   | 2480    | AV       | 2483.500       | -47.49          | ≤-41.20        | PASS    |
|          |         |        |         | AV       | 2498.560       | -47.18          | ≤-41.20        | PASS    |
|          |         |        |         | AV       | 2500.000       | -47.48          | ≤-41.20        | PASS    |
|          |         |        |         | Peak     | 2483.500       | -41.37          | ≤-21.20        | PASS    |
|          |         |        |         | Peak     | 2490.080       | -38.15          | ≤-21.20        | PASS    |
|          |         |        |         | Peak     | 2500.000       | -42.28          | ≤-21.20        | PASS    |

#### Note:

1. The Antenna Gain is compensated in the graph with 2dBi and Antenna Gain which is Higher.
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

