



Appendix A

RF Test Data for 2.4G BLE (Conducted Measurement)

Product Name: Rock lights and driver

Test Model: MD-D1BRNPT4

Environmental Conditions

| | |
|--------------------|-----------|
| Temperature: | 21.1 ° C |
| Relative Humidity: | 52.2% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Wunder Wu |
| Supervised by: | Huan Li |

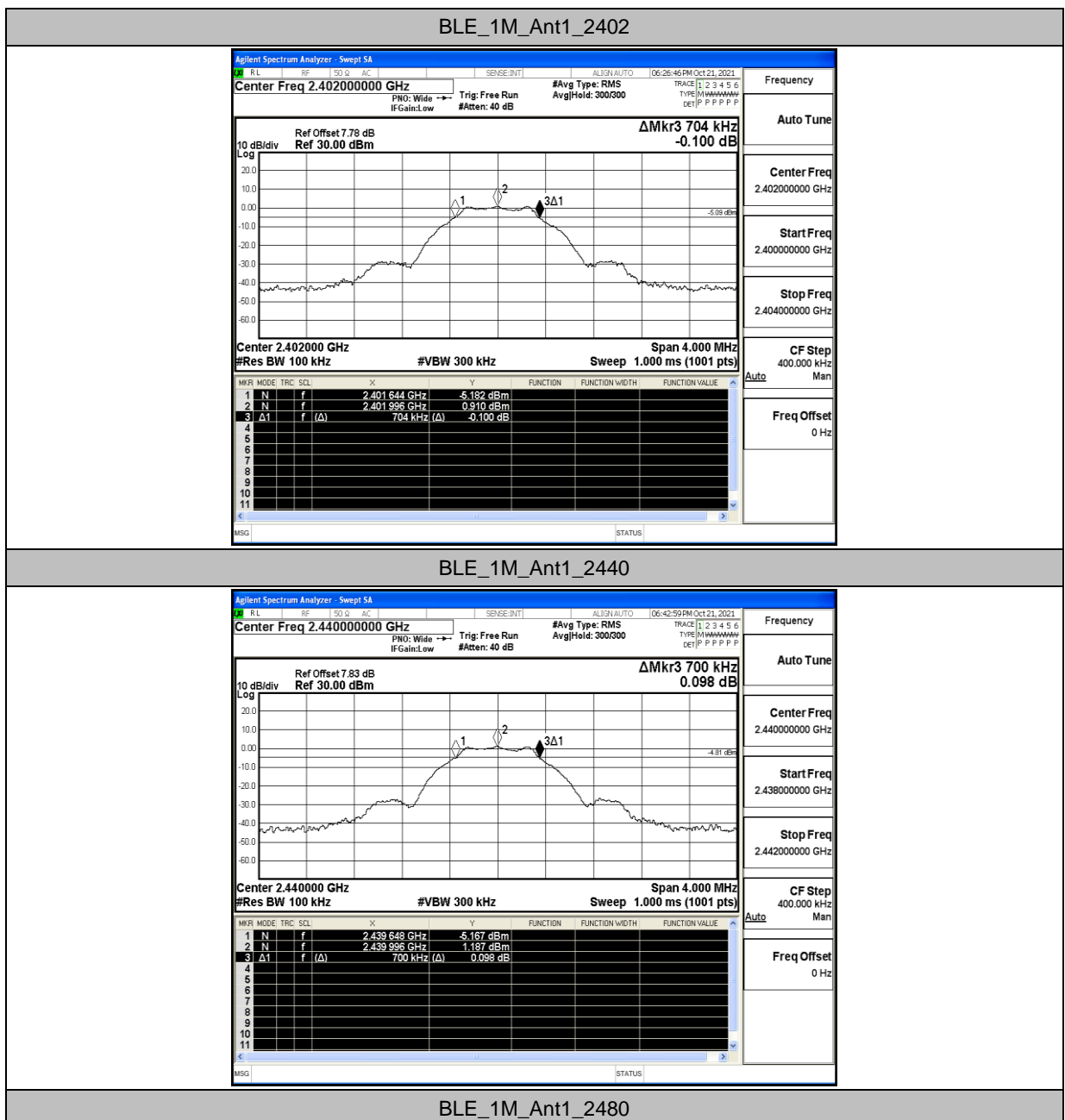


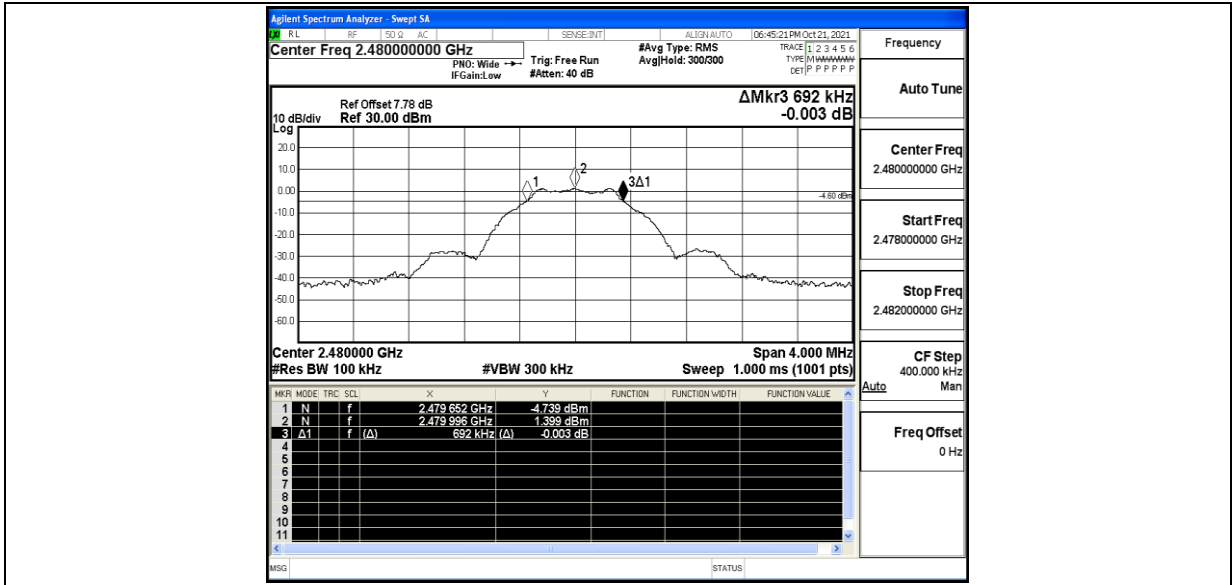
A.1 6dB Bandwidth

Test Result

| TestMode | Antenna | Channel | DTS BW [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|----------|---------|---------|--------------|----------|----------|------------|---------|
| BLE_1M | Ant1 | 2402 | 0.704 | 2401.644 | 2402.348 | ≥0.5 | PASS |
| | | 2440 | 0.700 | 2439.648 | 2440.348 | ≥0.5 | PASS |
| | | 2480 | 0.692 | 2479.652 | 2480.344 | ≥0.5 | PASS |

Test Graphs





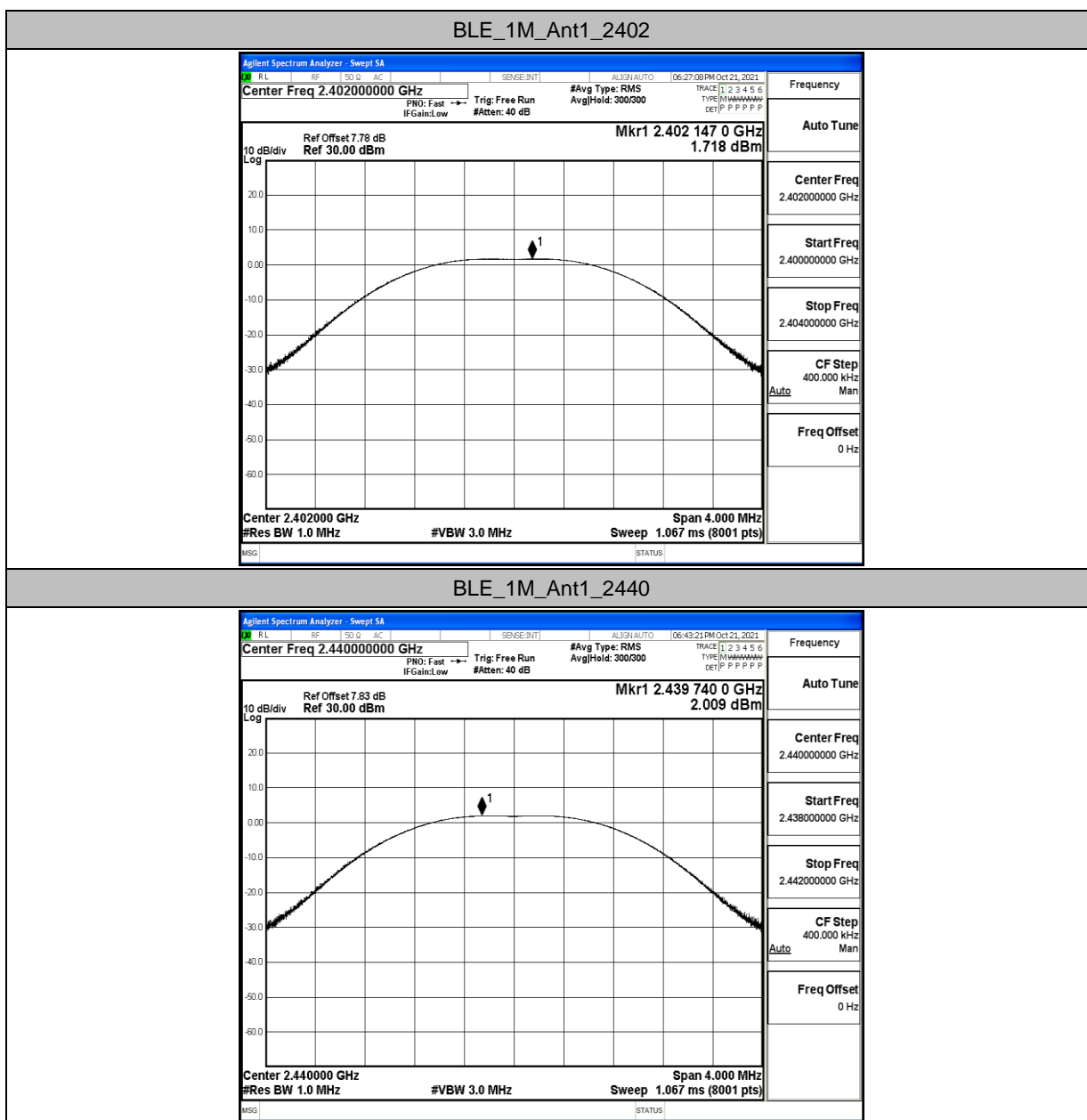


A.2 Maximum conducted output power

Test Result

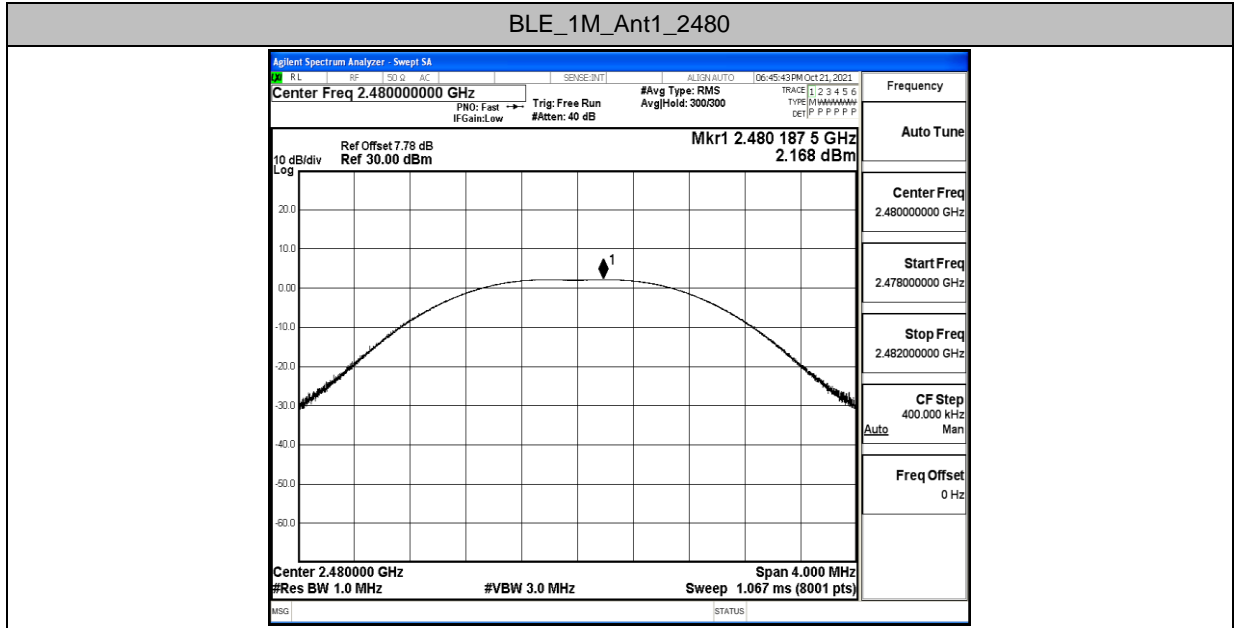
| TestMode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|---------|-------------|------------|---------|
| BLE_1M | Ant1 | 2402 | 1.72 | ≤30 | PASS |
| | | 2440 | 2.01 | ≤30 | PASS |
| | | 2480 | 2.17 | ≤30 | PASS |

Test Graphs





BLE_1M_Ant1_2480



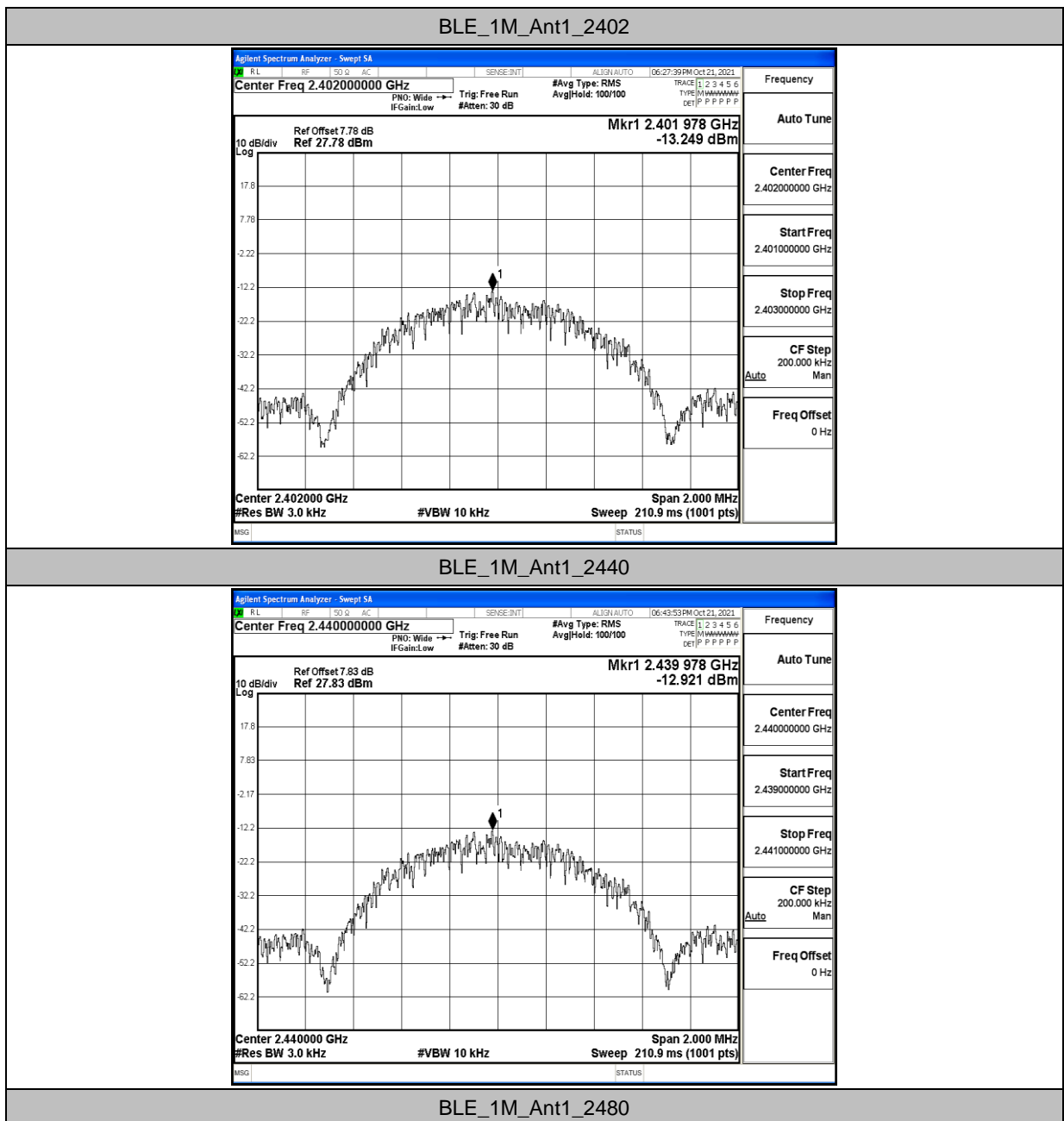


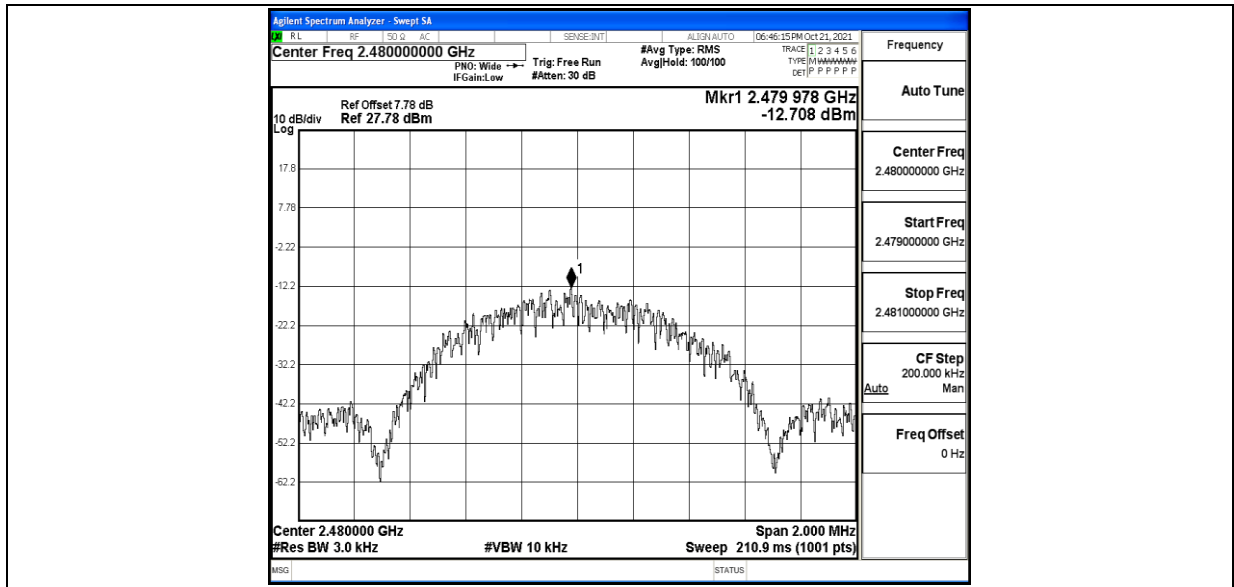
A.3 Maximum power spectral density

Test Result

| TestMode | Antenna | Channel | Result[dBm/3-100kHz] | Limit[dBm/3kHz] | Verdict |
|----------|---------|---------|----------------------|-----------------|---------|
| BLE_1M | Ant1 | 2402 | -13.25 | ≤8 | PASS |
| | | 2440 | -12.92 | ≤8 | PASS |
| | | 2480 | -12.71 | ≤8 | PASS |

Test Graphs





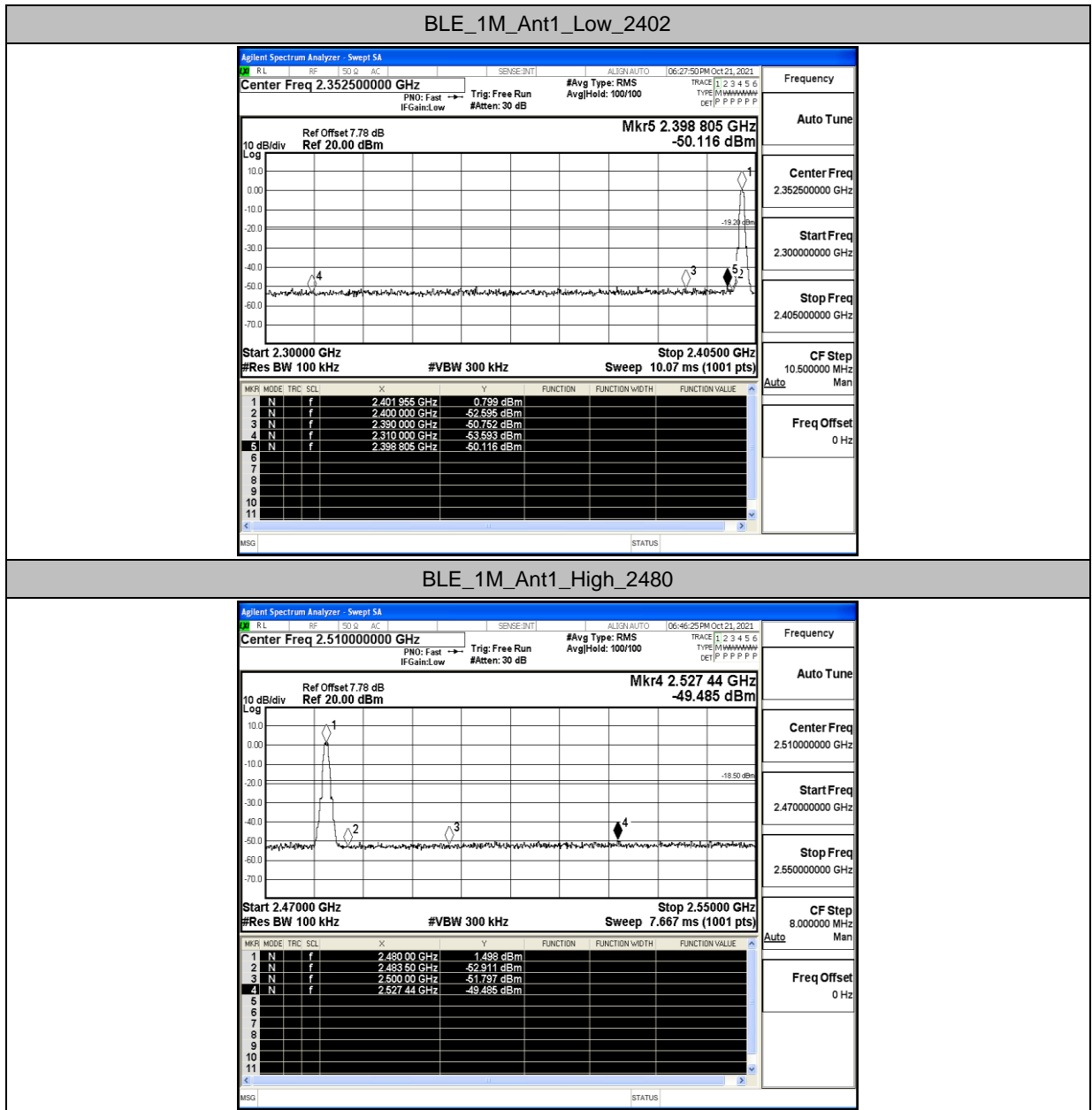


A.4 Band edge measurements

Test Result

| TestMode | Antenna | ChName | Channel | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|--------|---------|---------------|-------------|------------|---------|
| BLE_1M | Ant1 | Low | 2402 | 0.80 | -50.12 | ≤-19.2 | PASS |
| | | High | 2480 | 1.50 | -49.49 | ≤-18.5 | PASS |

Test Graphs



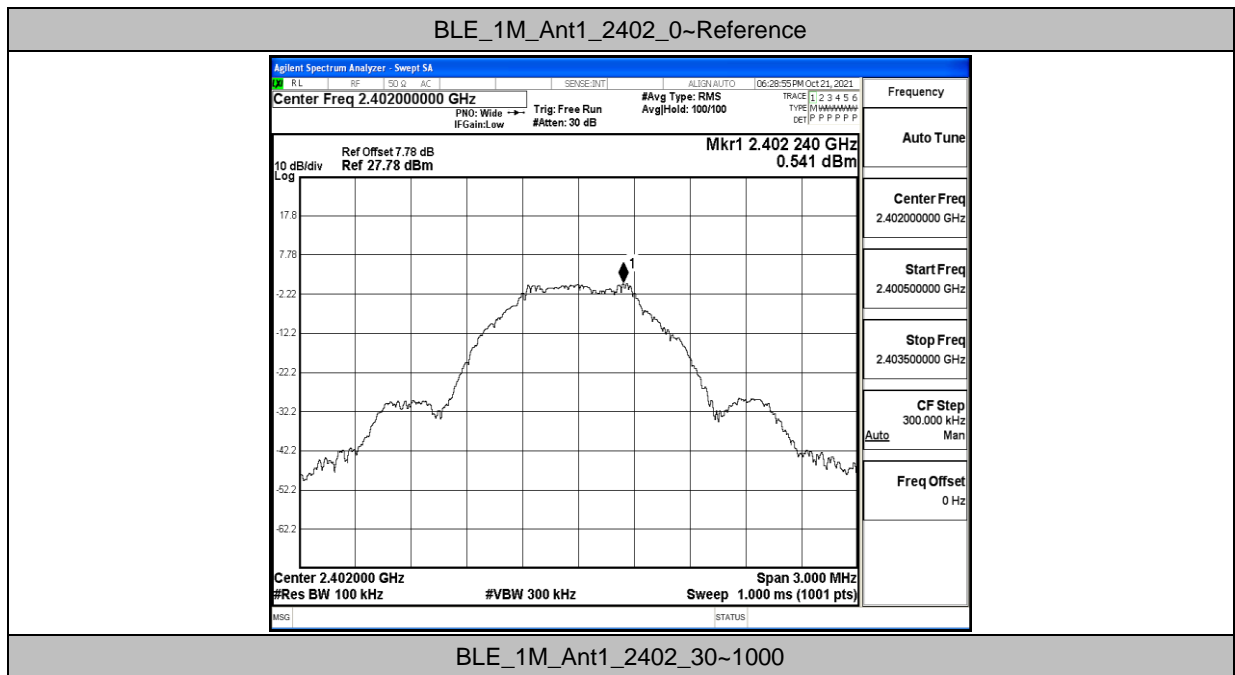


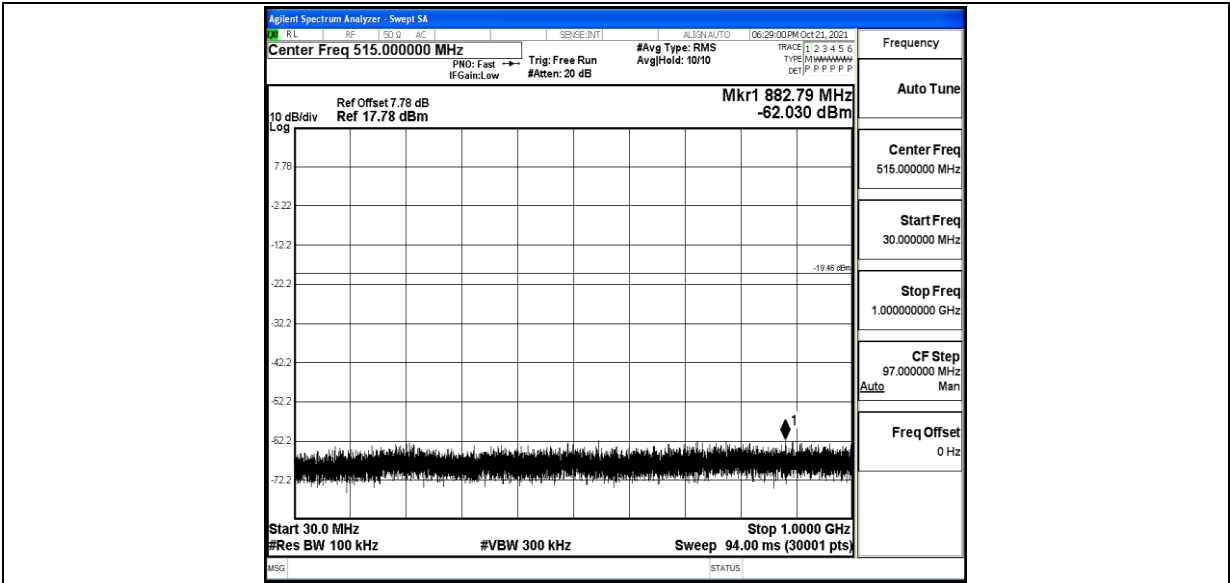
A.5 Conducted Spurious Emission

Test Result

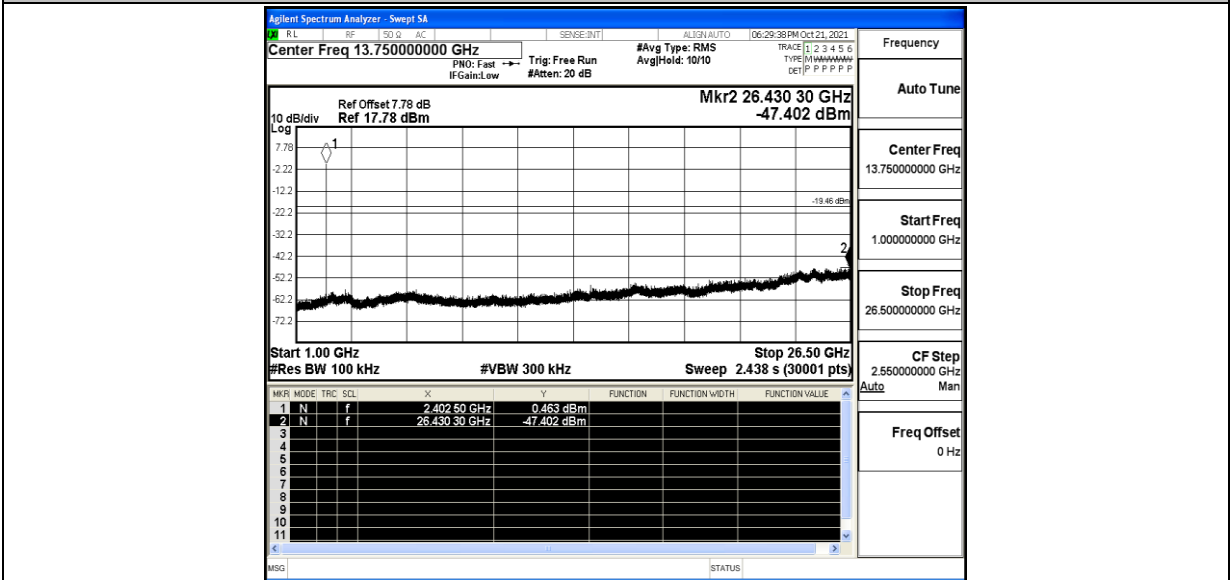
| TestMode | Antenna | Channel | FreqRange [MHz] | RefLevel [dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|---------|-----------------|----------------|-------------|------------|---------|
| BLE_1M | Ant1 | 2402 | Reference | 0.54 | 0.54 | --- | PASS |
| | | | 30~1000 | 0.54 | -62.03 | ≤-19.46 | PASS |
| | | | 1000~26500 | 0.54 | -47.4 | ≤-19.46 | PASS |
| | | 2440 | Reference | 1.13 | 1.13 | --- | PASS |
| | | | 30~1000 | 1.13 | -62.1 | ≤-18.87 | PASS |
| | | | 1000~26500 | 1.13 | -47.4 | ≤-18.87 | PASS |
| | | 2480 | Reference | 1.26 | 1.26 | --- | PASS |
| | | | 30~1000 | 1.26 | -61.99 | ≤-18.74 | PASS |
| | | | 1000~26500 | 1.26 | -47.25 | ≤-18.74 | PASS |

Test Graphs

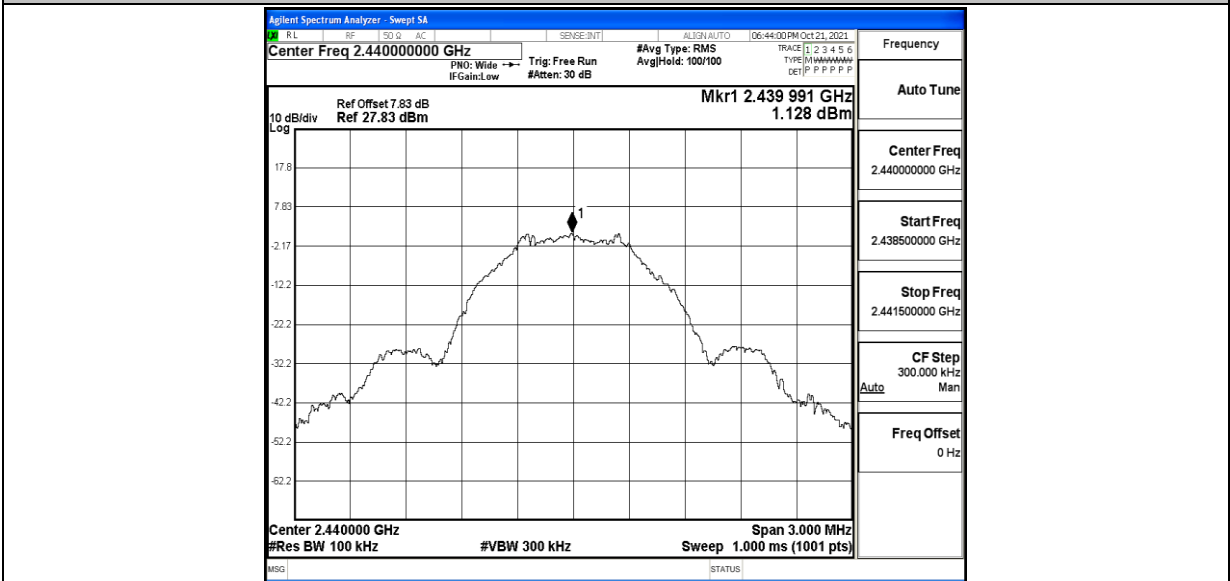




BLE_1M_Ant1_2402_1000~26500

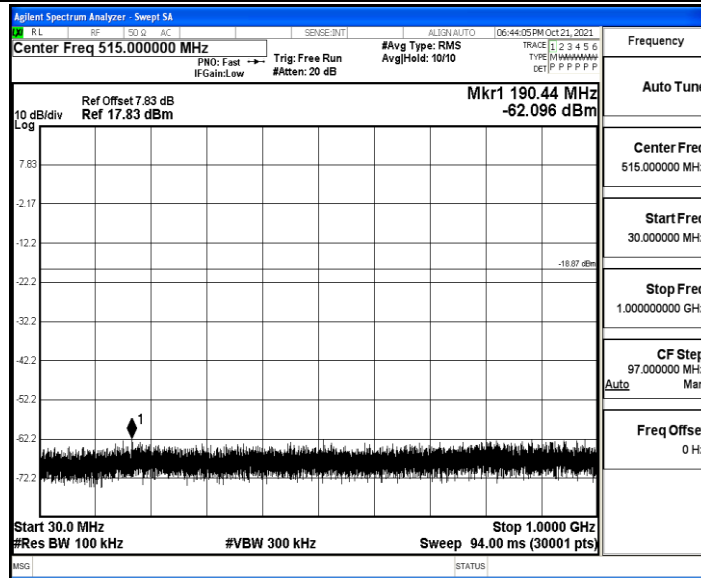


BLE_1M_Ant1_2440_0~Reference

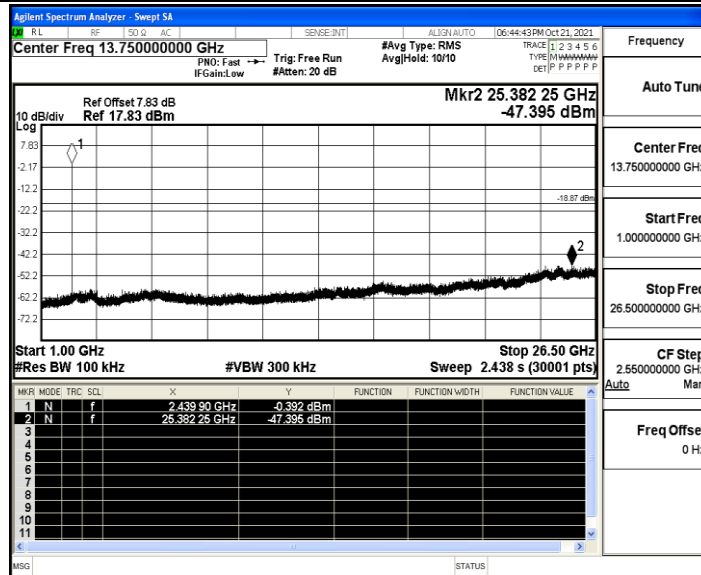




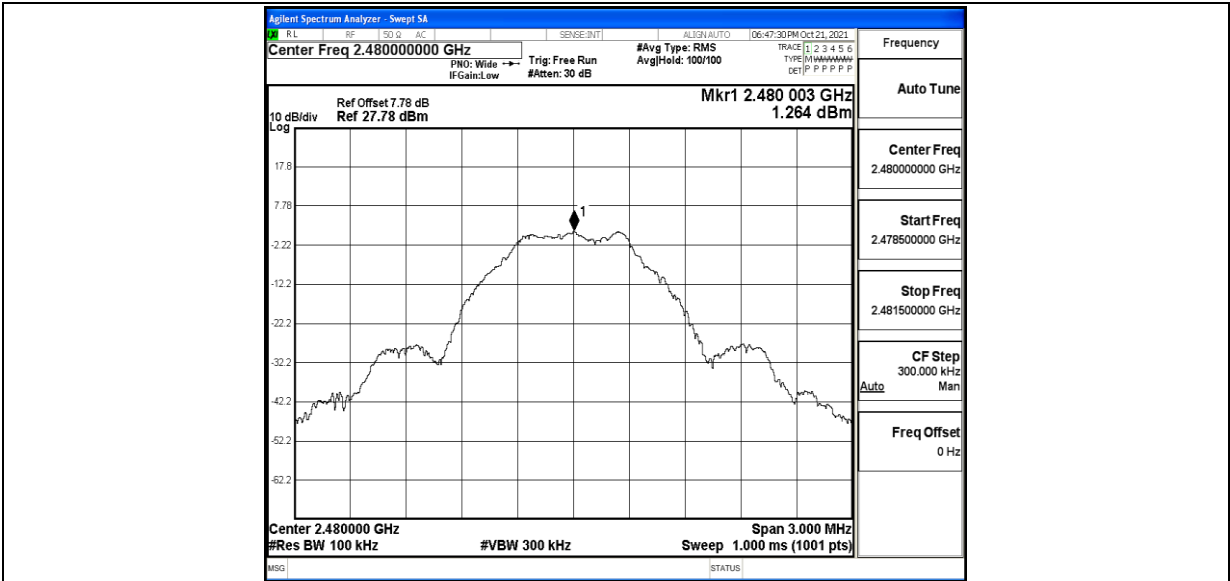
BLE_1M_Ant1_2440_30~1000



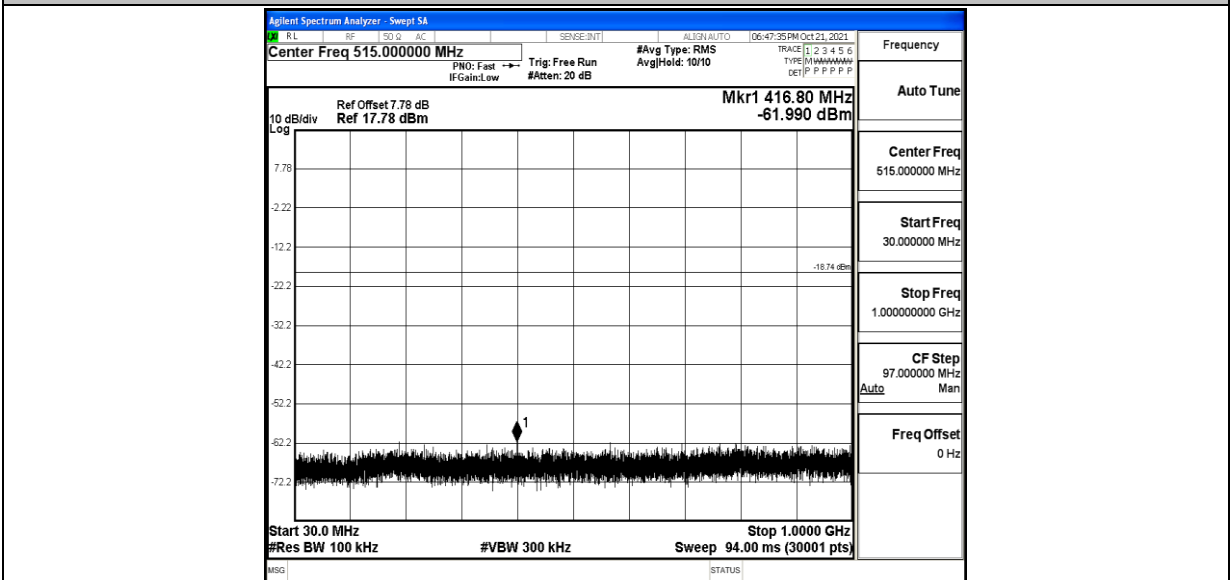
BLE_1M_Ant1_2440_1000~26500



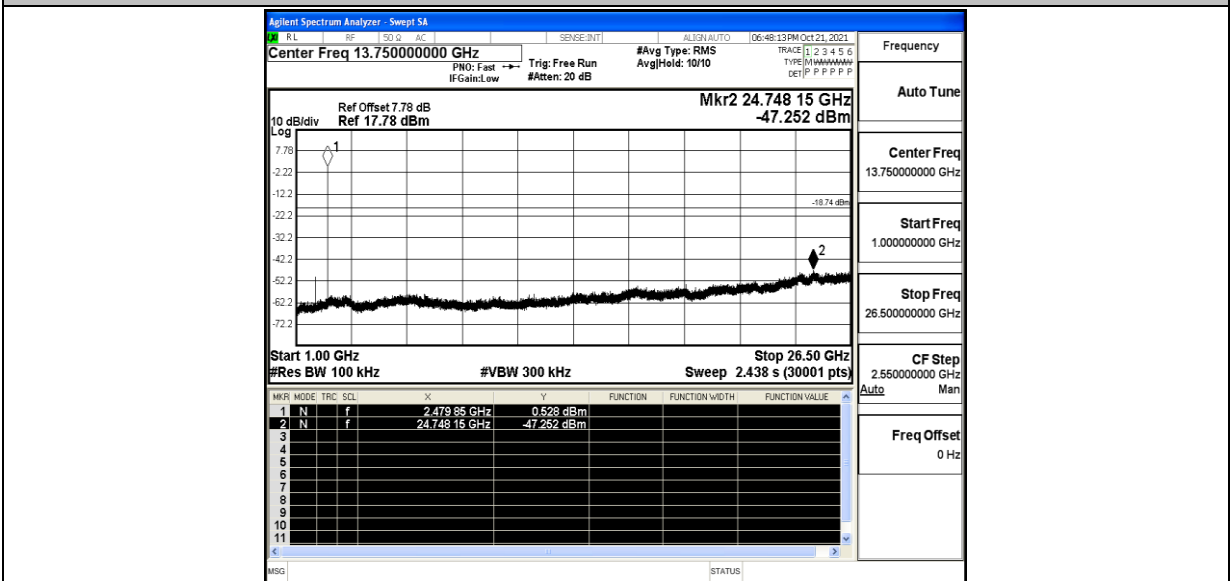
BLE_1M_Ant1_2480_0~Reference



BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500



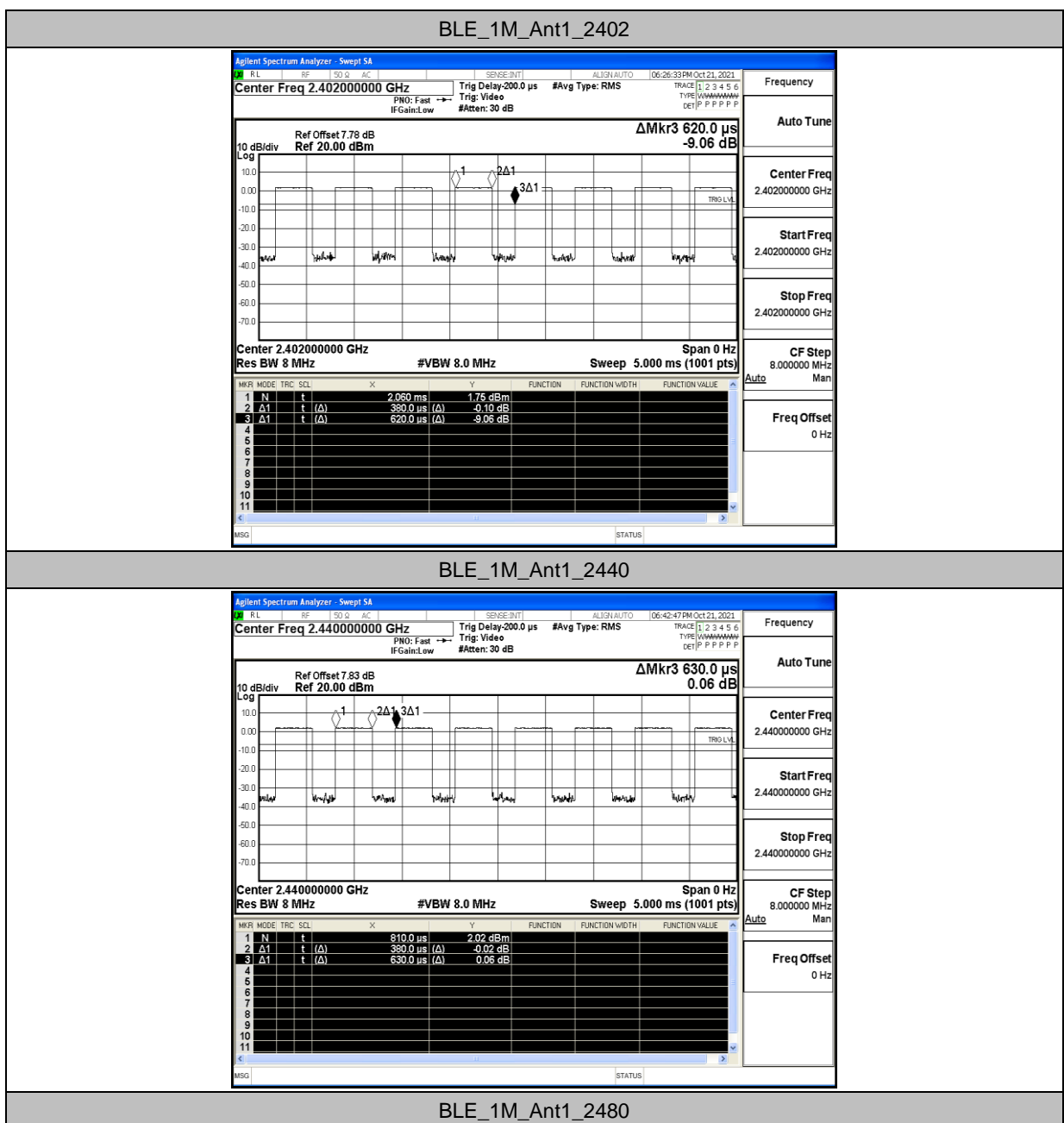


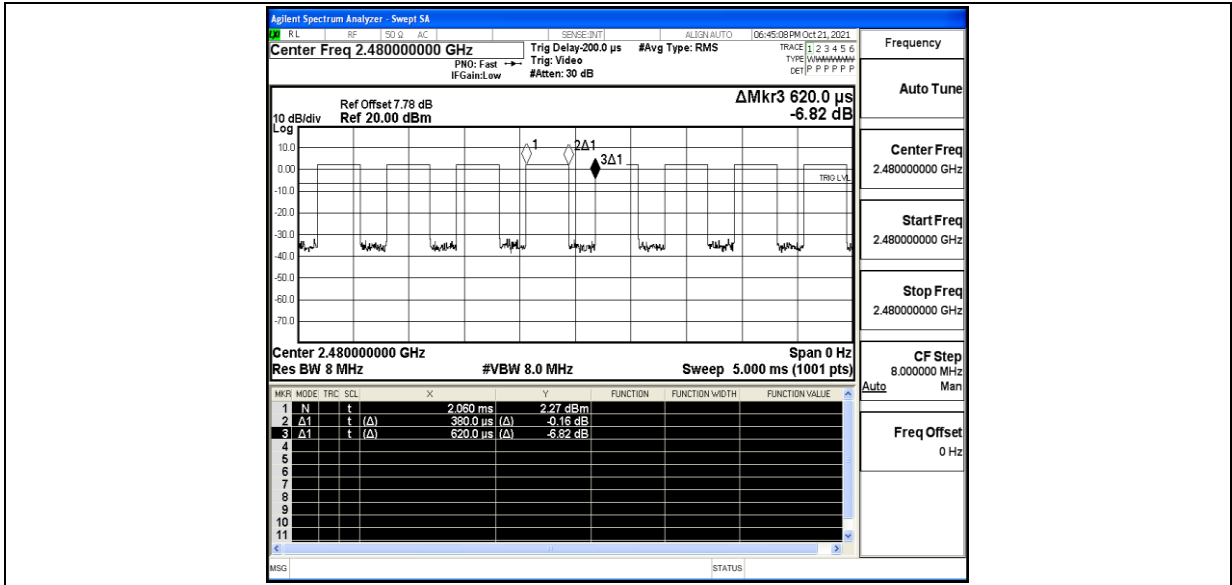
A.6 Duty Cycle

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 | 0.38 | 0.62 | 0.6129 | 61.29 | 2.13 | --- | PASS |

Test Graphs







A.7 Emissions in Restricted Bands

Test Result

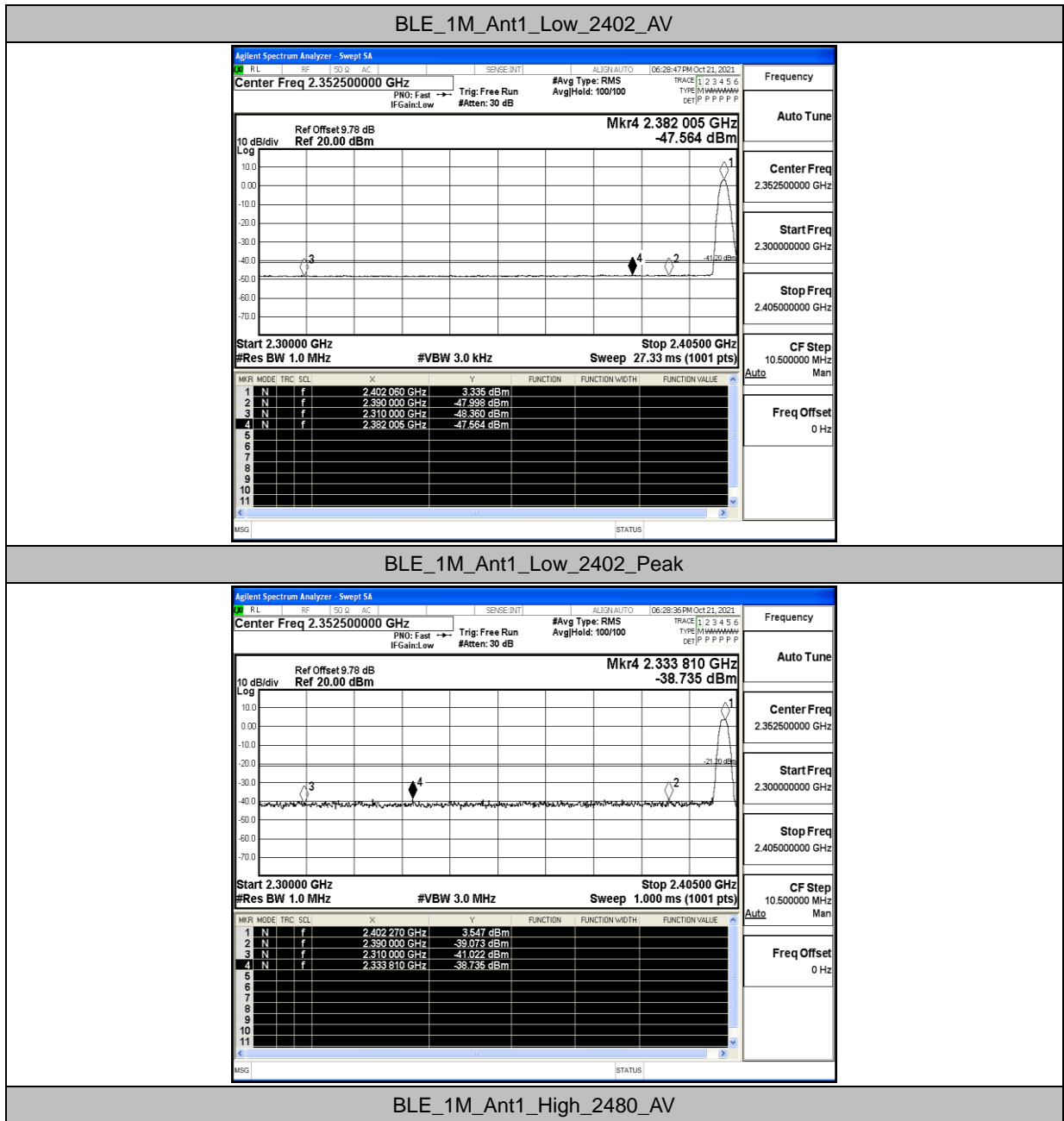
| TestMode | Antenna | ChName | Channel | Detector | Freq. [MHz] | Result [dBm] | Limit [dBm] | Result [dBuV/m] | Limit [dBuV/m] | Verdict |
|----------|---------|--------|---------|----------|-------------|--------------|-------------|-----------------|----------------|---------|
| BLE_1M | Ant1 | Low | 2402 | AV | 2310.000 | -48.36 | ≤-41.20 | 46.84 | ≤54 | PASS |
| | | | | AV | 2382.005 | -47.56 | ≤-41.20 | 47.64 | ≤54 | PASS |
| | | | | AV | 2390.000 | -48 | ≤-41.20 | 47.20 | ≤54 | PASS |
| | | | | Peak | 2310.000 | -41.02 | ≤-21.20 | 54.18 | ≤74 | PASS |
| | | | | Peak | 2333.810 | -38.74 | ≤-21.20 | 56.46 | ≤74 | PASS |
| | | | | Peak | 2390.000 | -39.07 | ≤-21.20 | 56.13 | ≤74 | PASS |
| | | High | 2480 | AV | 2483.500 | -46.86 | ≤-41.20 | 48.34 | ≤54 | PASS |
| | | | | AV | 2483.520 | -46.86 | ≤-41.20 | 48.34 | ≤54 | PASS |
| | | | | AV | 2500.000 | -47.34 | ≤-41.20 | 47.86 | ≤54 | PASS |
| | | | | Peak | 2483.500 | -40.78 | ≤-21.20 | 54.42 | ≤74 | PASS |
| | | | | Peak | 2485.440 | -38.91 | ≤-21.20 | 56.29 | ≤74 | PASS |
| | | | | Peak | 2500.000 | -40.86 | ≤-21.20 | 54.34 | ≤74 | PASS |

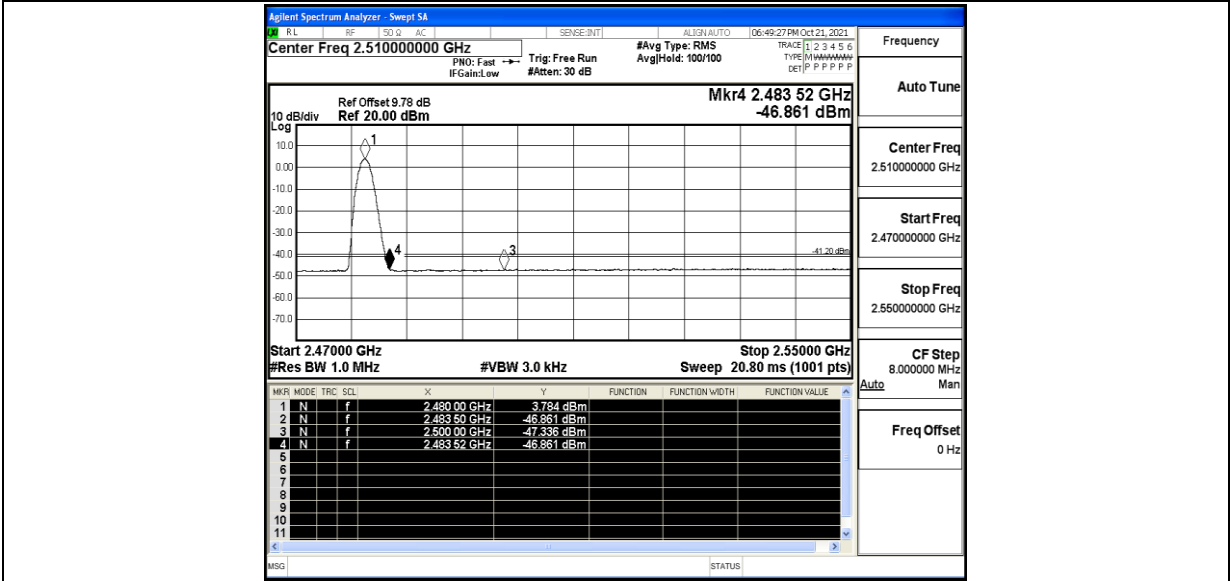
Note:

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_Peak

