

Appendix: Bluetooth LE

Contents

| | |
|---|----|
| Appendix A: DTS Bandwidth..... | 3 |
| Test Result..... | 3 |
| Test Graphs..... | 4 |
| Appendix B: Occupied Channel Bandwidth..... | 7 |
| Test Result..... | 7 |
| Test Graphs..... | 8 |
| Appendix C: Maximum conducted output power..... | 11 |
| Test Result..... | 11 |
| Test Graphs..... | 12 |
| Appendix D: Maximum power spectral density..... | 15 |
| Test Result..... | 15 |
| Test Graphs..... | 16 |
| Appendix E: Band edge measurements..... | 19 |
| Test Result..... | 19 |
| Test Graphs..... | 20 |
| Appendix F: Conducted Spurious Emission..... | 22 |
| Test Result..... | 22 |
| Test Graphs..... | 23 |
| Appendix G: Duty Cycle..... | 32 |
| Test Result..... | 32 |
| Test Graphs..... | 33 |

Appendix A: DTS Bandwidth**Test Result**

| Test Mode | Antenna | Channel | DTS BW [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|-----------|---------|---------|--------------|----------|----------|------------|---------|
| BLE_1M | Ant1 | 2402 | 0.676 | 2401.740 | 2402.416 | 0.5 | PASS |
| | | 2440 | 0.704 | 2439.736 | 2440.440 | 0.5 | PASS |
| | | 2480 | 0.660 | 2479.764 | 2480.424 | 0.5 | PASS |
| BLE_2M | Ant1 | 2402 | 1.396 | 2401.428 | 2402.824 | 0.5 | PASS |
| | | 2440 | 1.160 | 2439.532 | 2440.692 | 0.5 | PASS |
| | | 2480 | 1.172 | 2479.516 | 2480.688 | 0.5 | PASS |

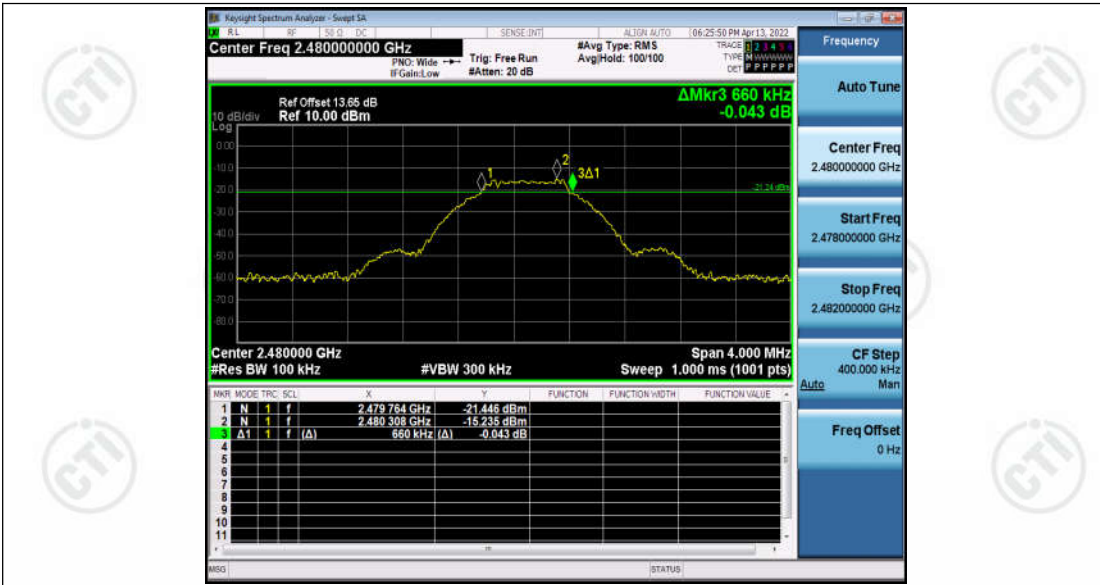
Test Graphs



BLE_1M_Ant1_2402



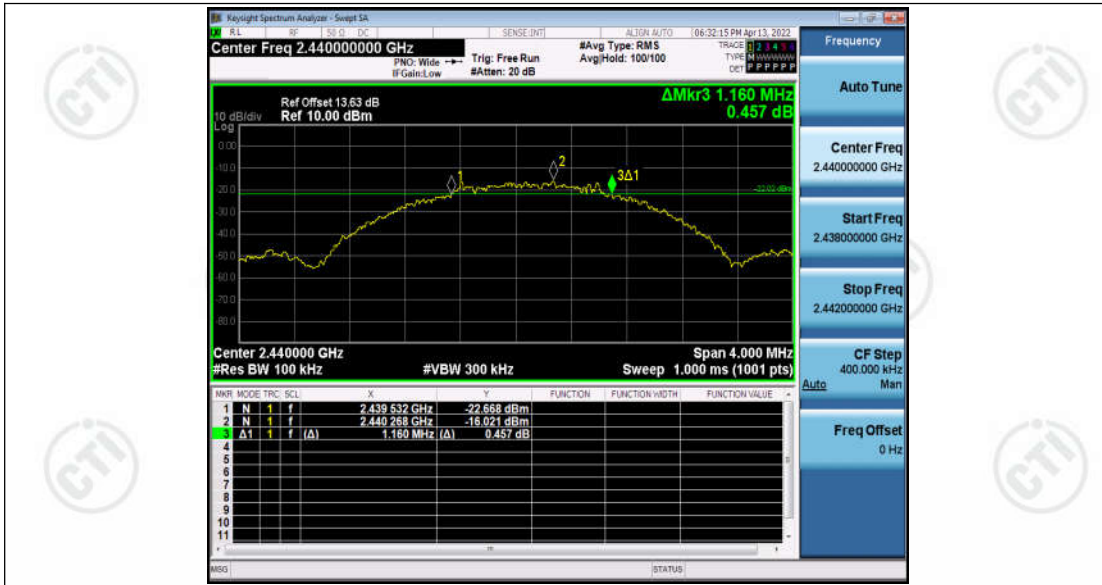
BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

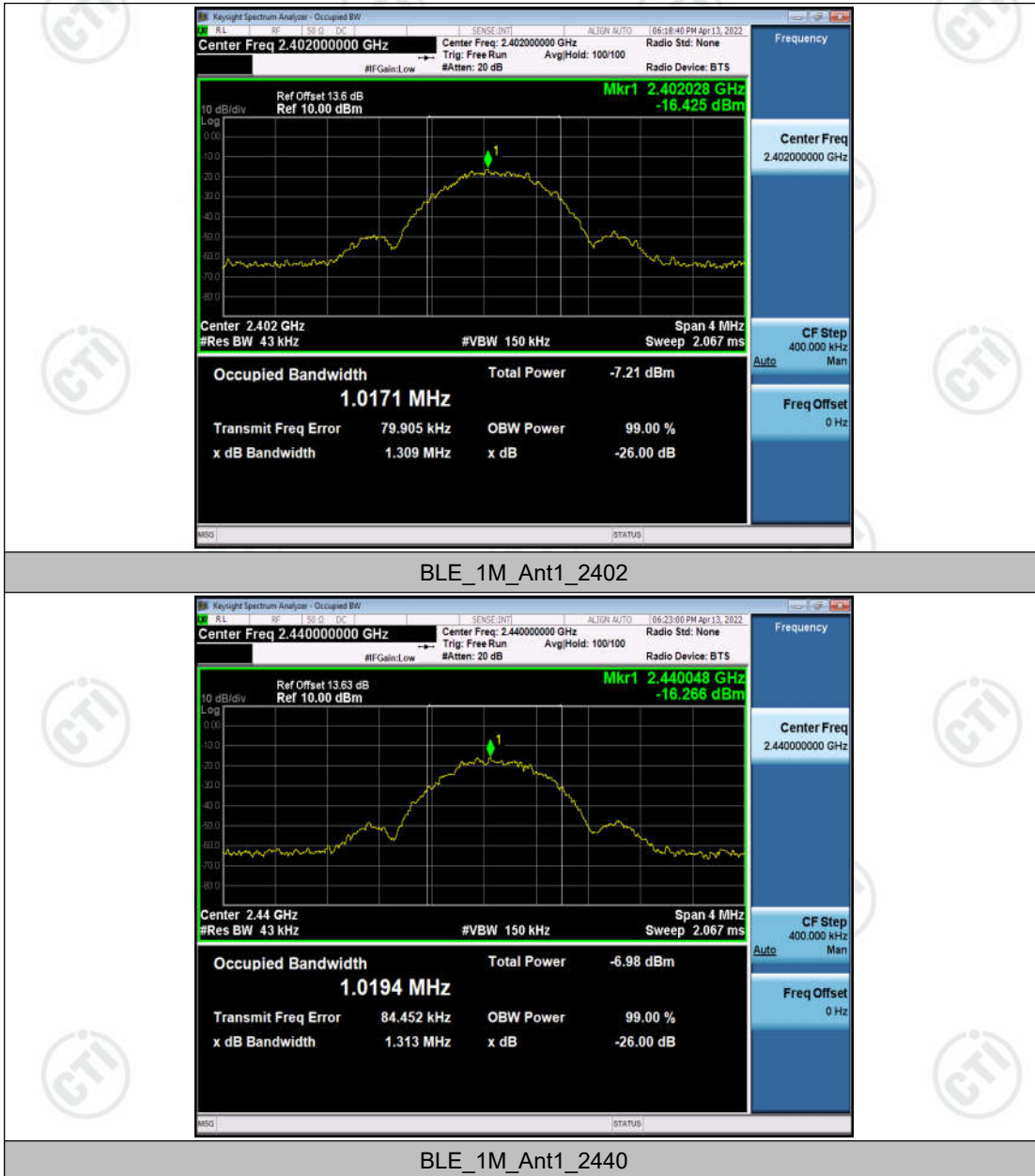


BLE_2M_Ant1_2480

Appendix B: Occupied Channel Bandwidth**Test Result**

| Test Mode | Antenna | Channel | OCB [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|-----------|---------|---------|-----------|----------|----------|------------|---------|
| BLE_1M | Ant1 | 2402 | 1.0171 | 2401.571 | 2402.588 | --- | PASS |
| | | 2440 | 1.0194 | 2439.575 | 2440.594 | --- | PASS |
| | | 2480 | 1.0189 | 2479.575 | 2480.594 | --- | PASS |
| BLE_2M | Ant1 | 2402 | 2.0468 | 2401.056 | 2403.103 | --- | PASS |
| | | 2440 | 2.0468 | 2439.051 | 2441.097 | --- | PASS |
| | | 2480 | 2.0490 | 2479.063 | 2481.112 | --- | PASS |

Test Graphs





BLE_1M_Ant1_2480



BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

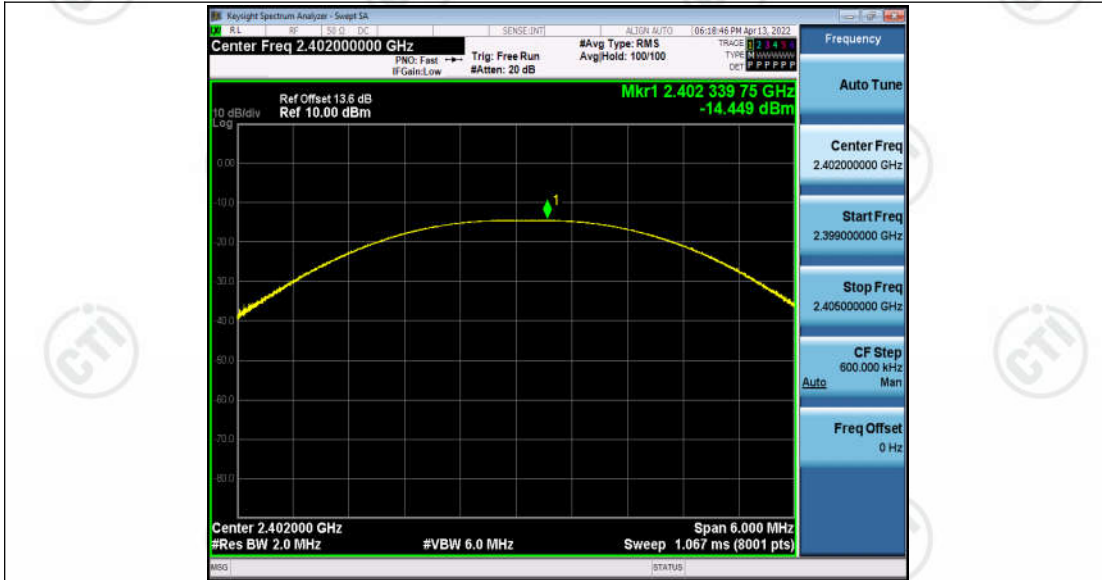


BLE_2M_Ant1_2480

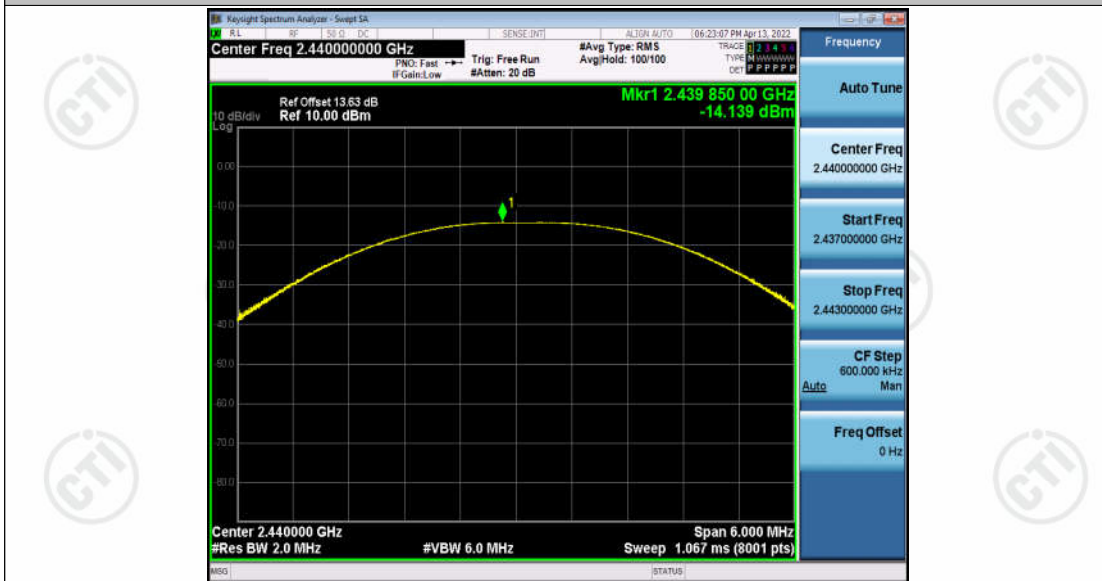
Appendix C: Maximum conducted output power**Test Result**

| Test Mode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|-----------|---------|---------|-------------|------------|---------|
| BLE_1M | Ant1 | 2402 | -14.45 | <=30 | PASS |
| | | 2440 | -14.14 | <=30 | PASS |
| | | 2480 | -14.5 | <=30 | PASS |
| BLE_2M | Ant1 | 2402 | -14.48 | <=30 | PASS |
| | | 2440 | -14.26 | <=30 | PASS |
| | | 2480 | -14.47 | <=30 | PASS |

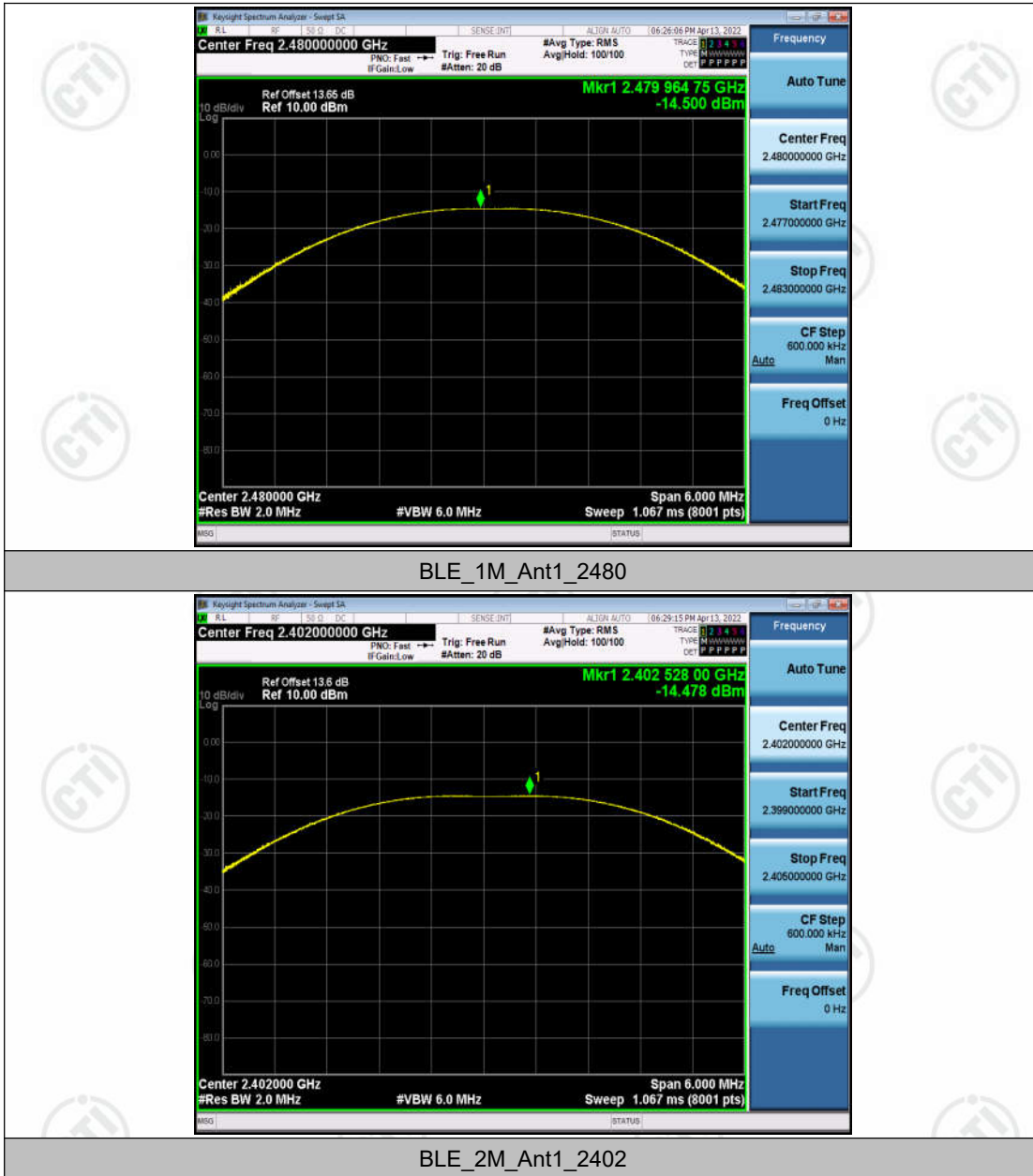
Test Graphs

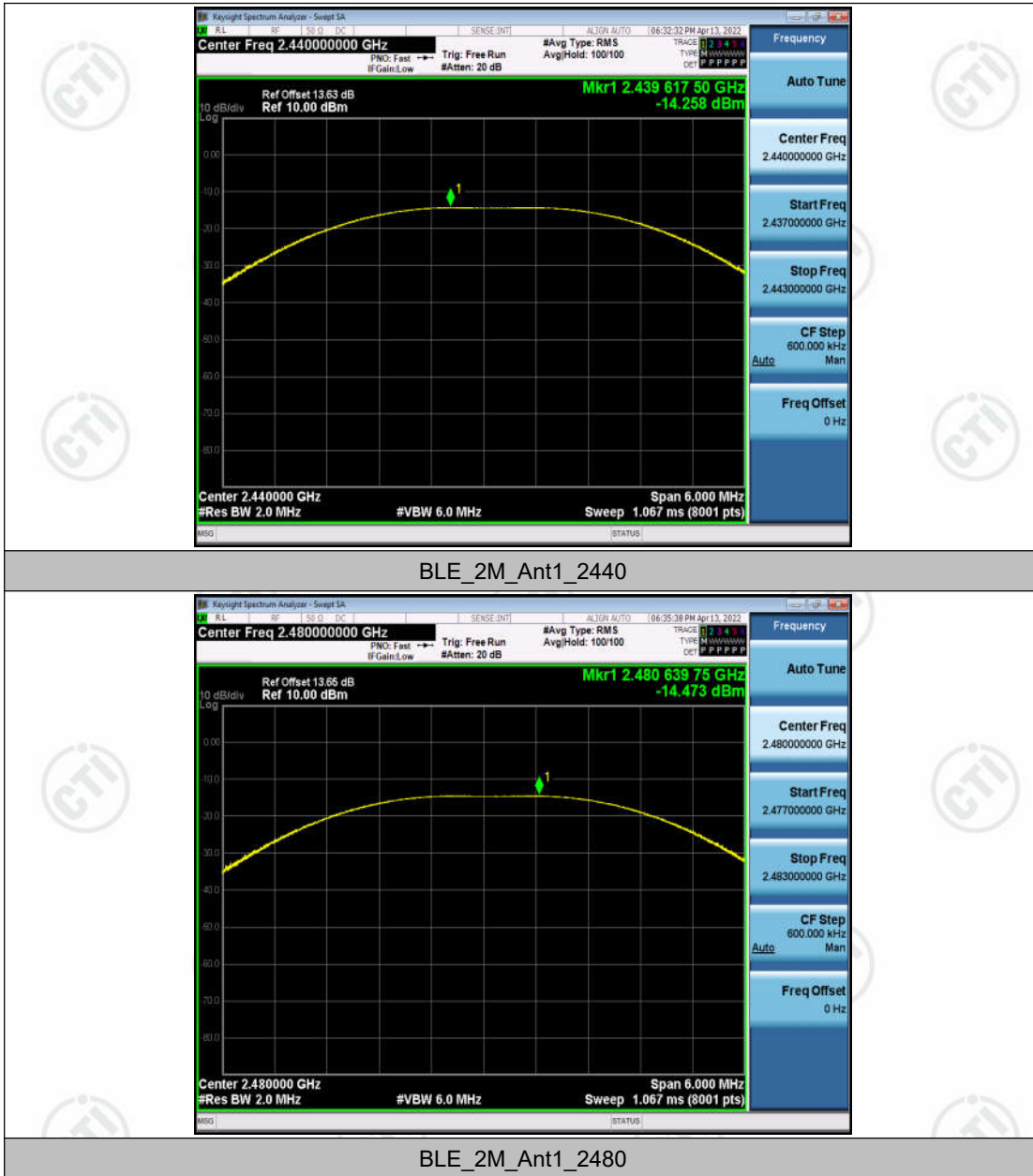


BLE_1M_Ant1_2402



BLE_1M_Ant1_2440

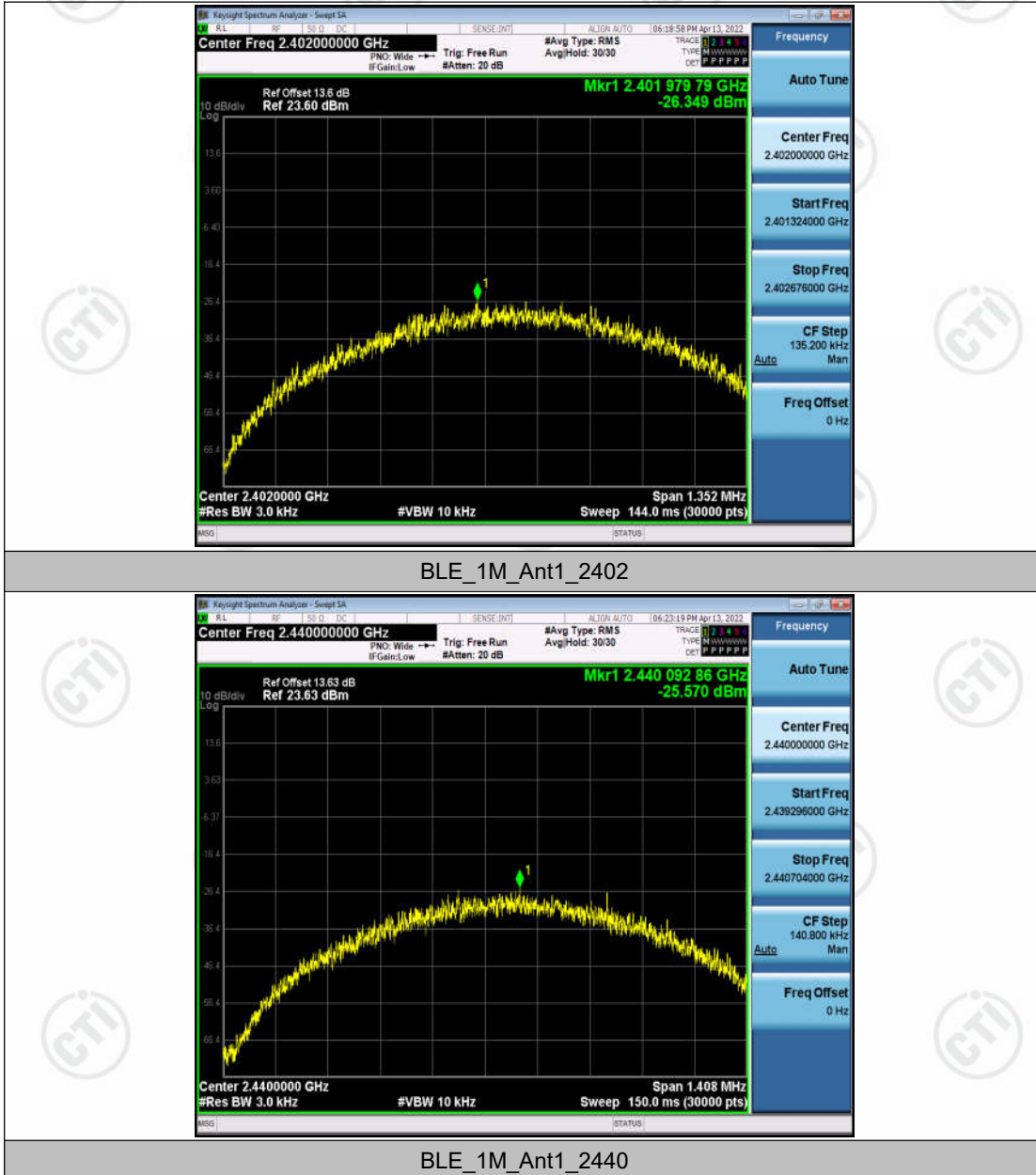


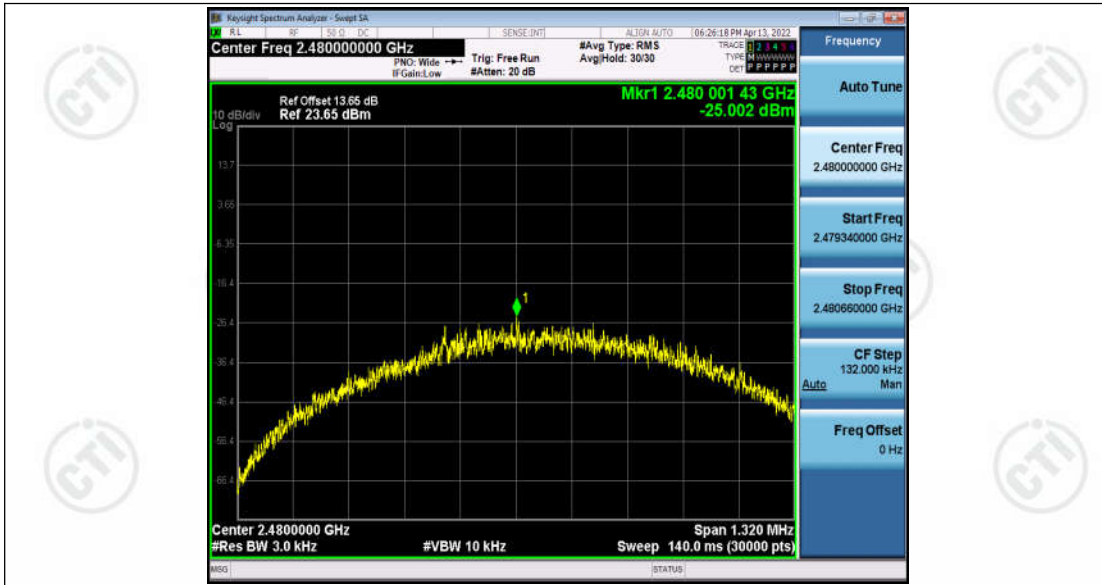


Appendix D: Maximum power spectral density**Test Result**

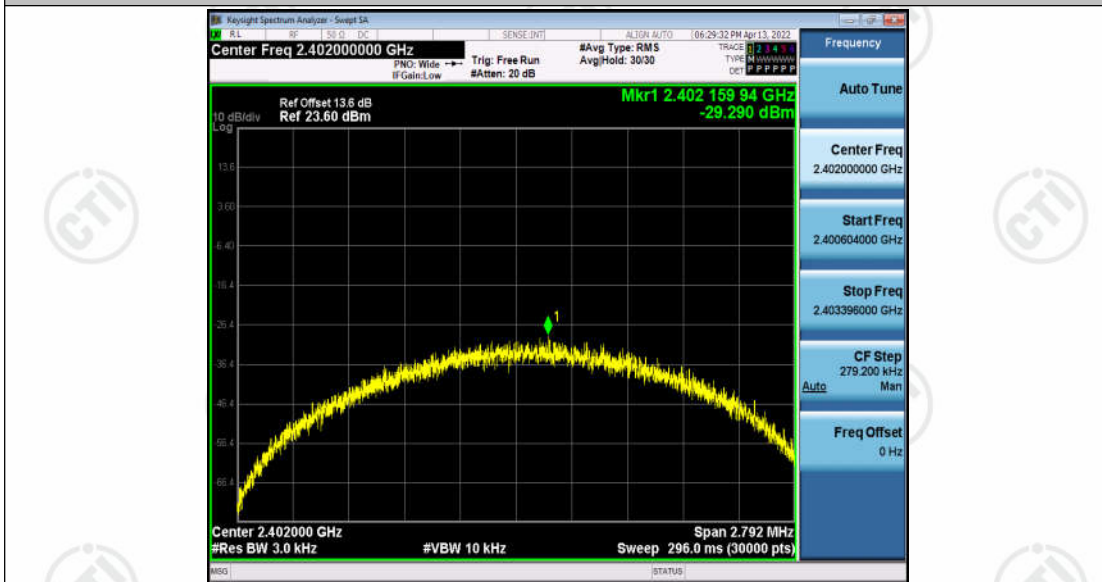
| Test Mode | Antenna | Channel | Result[dBm/3-100kHz] | Limit[dBm/3kHz] | Verdict |
|-----------|---------|---------|----------------------|-----------------|---------|
| BLE_1M | Ant1 | 2402 | -26.35 | <=8 | PASS |
| | | 2440 | -25.57 | <=8 | PASS |
| | | 2480 | -25 | <=8 | PASS |
| BLE_2M | Ant1 | 2402 | -29.29 | <=8 | PASS |
| | | 2440 | -29.31 | <=8 | PASS |
| | | 2480 | -30.01 | <=8 | PASS |

Test Graphs

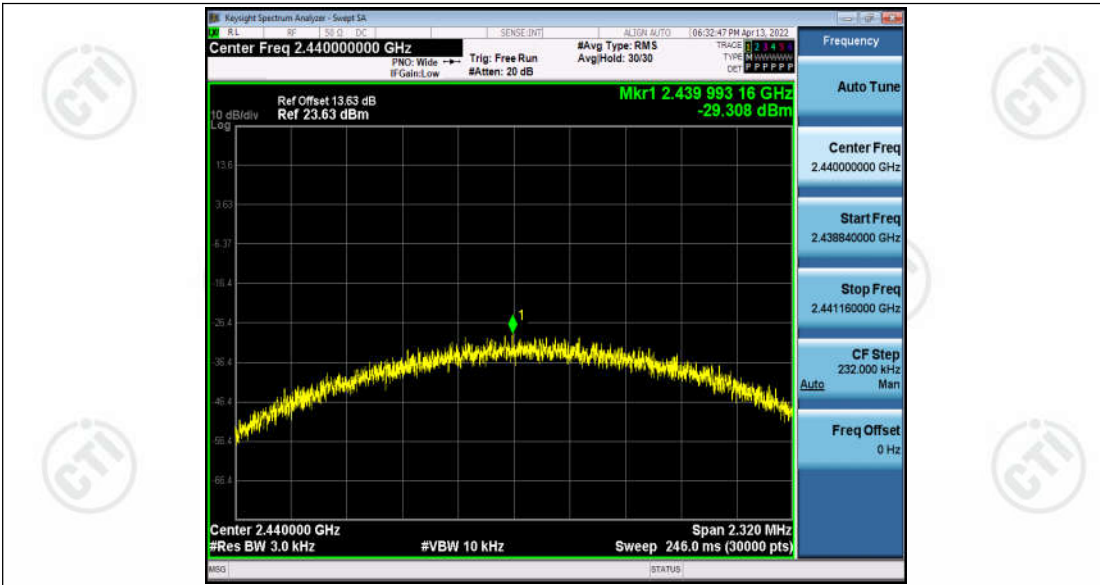




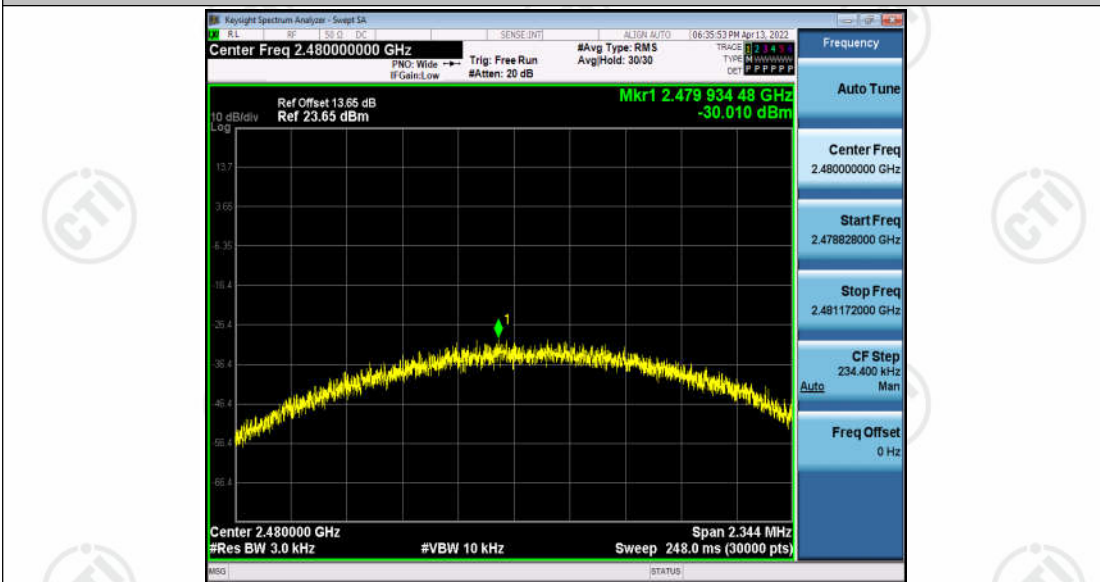
BLE_1M_Ant1_2480



BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

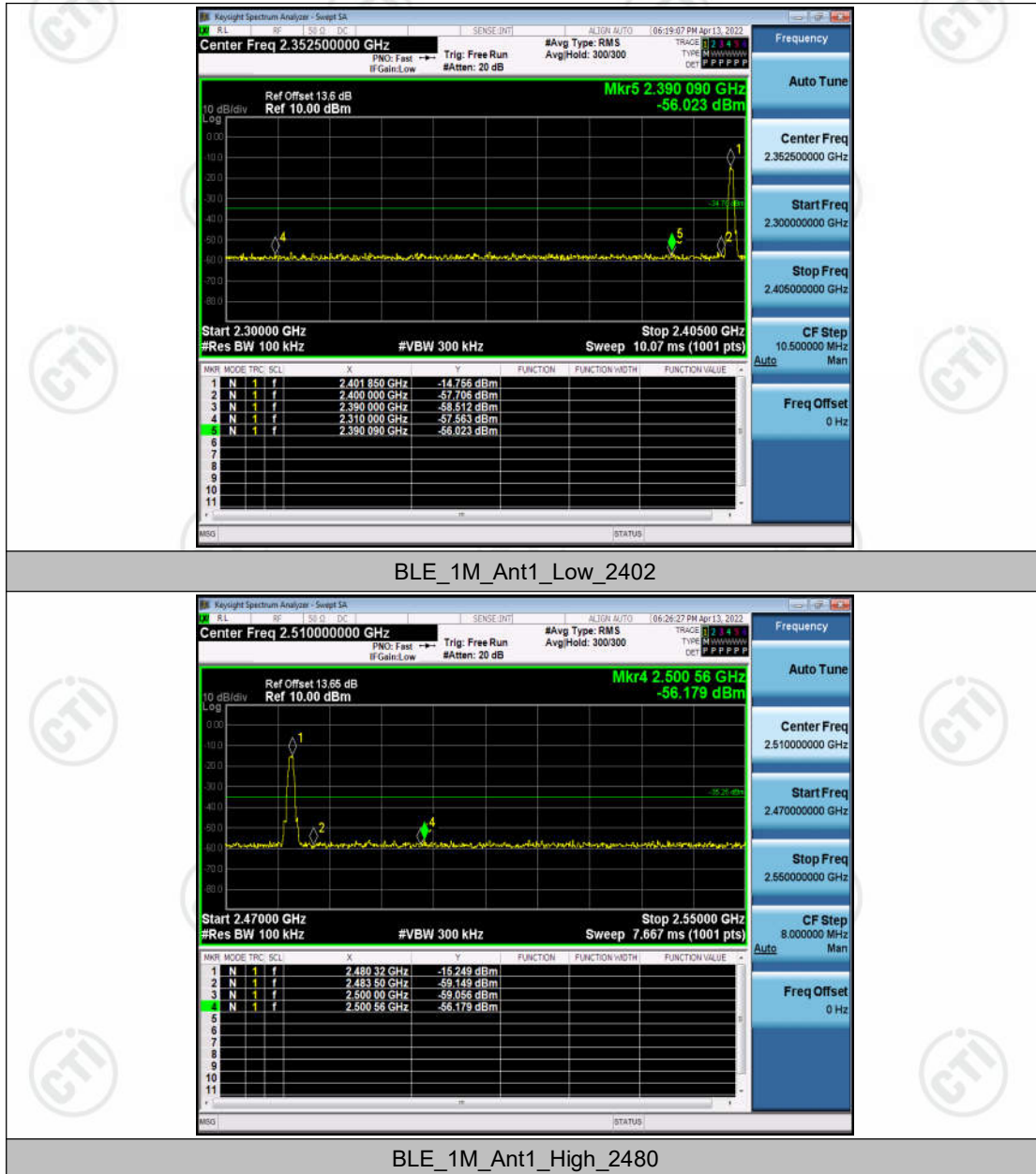


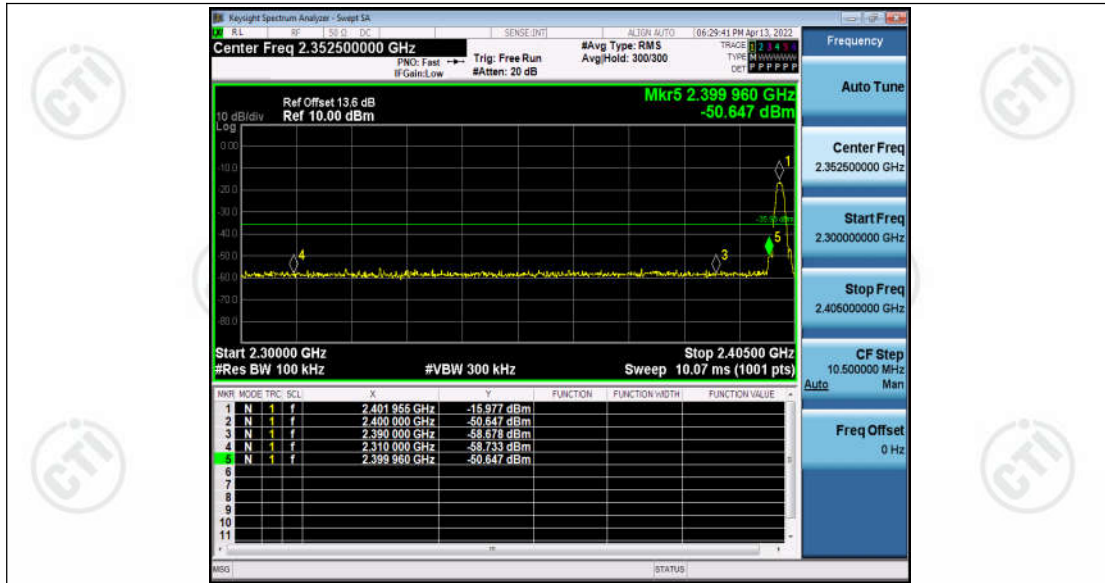
BLE_2M_Ant1_2480

Appendix E: Band edge measurements**Test Result**

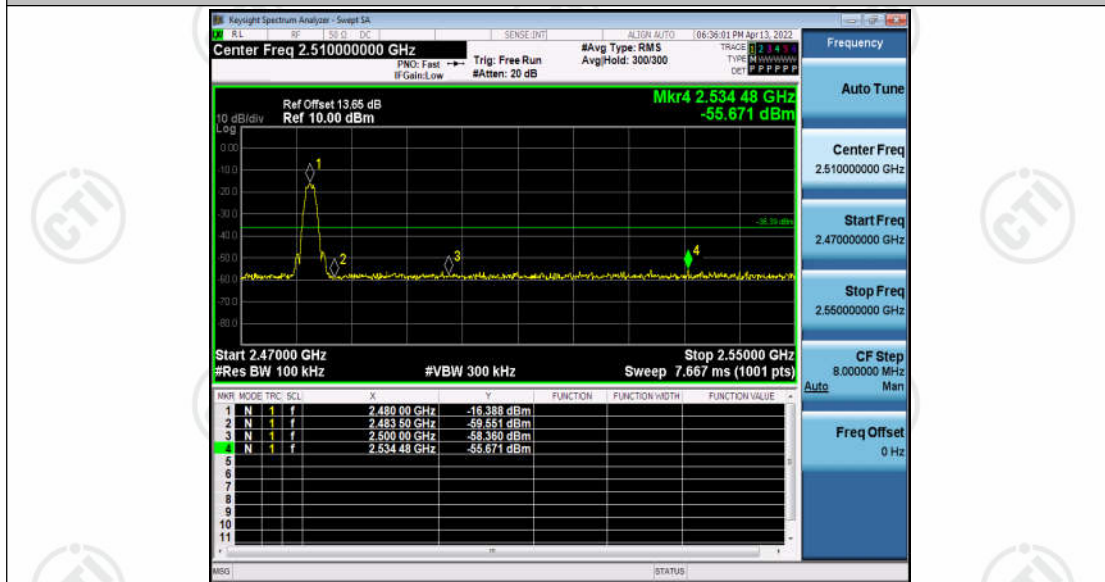
| Test Mode | Antenna | ChName | Channel | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|-----------|---------|--------|---------|---------------|-------------|------------|---------|
| BLE_1M | Ant1 | Low | 2402 | -14.76 | -56.02 | <=-34.76 | PASS |
| | | High | 2480 | -15.25 | -56.18 | <=-35.25 | PASS |
| BLE_2M | Ant1 | Low | 2402 | -15.98 | -50.65 | <=-35.98 | PASS |
| | | High | 2480 | -16.39 | -55.67 | <=-36.39 | PASS |

Test Graphs





BLE_2M_Ant1_Low_2402



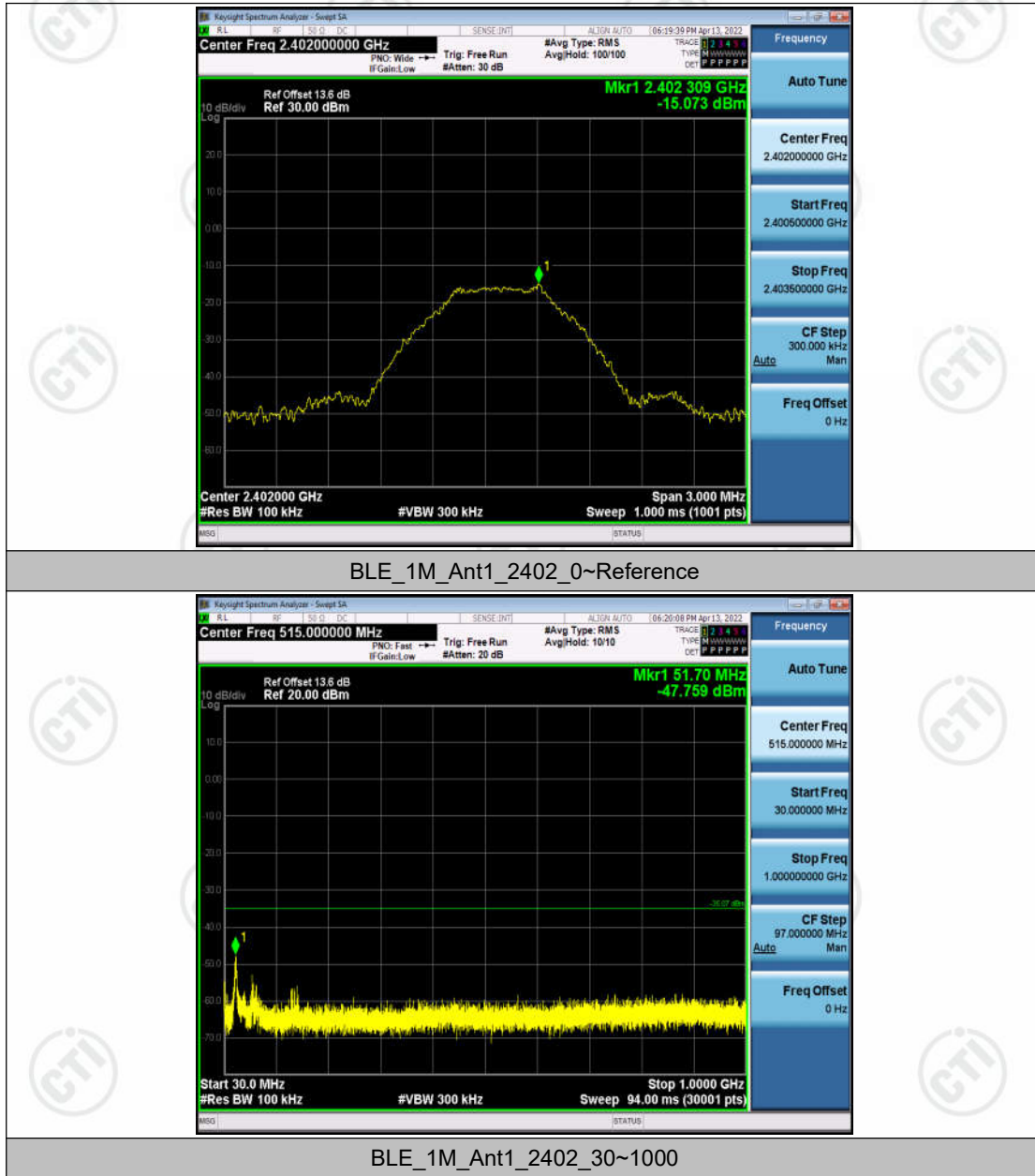
BLE_2M_Ant1_High_2480

Appendix F: Conducted Spurious Emission

Test Result

| Test Mode | Antenna | Channel | FreqRange [MHz] | RefLevel [dBm] | Result[dBm] | Limit[dBm] | Verdict |
|-----------|---------|---------|-----------------|----------------|-------------|------------|---------|
| BLE_1M | Ant1 | 2402 | Reference | -15.07 | -15.07 | --- | PASS |
| | | | 30~1000 | --- | -47.759 | <=-35.073 | PASS |
| | | | 1000~26500 | --- | -42.832 | <=-35.073 | PASS |
| | | 2440 | Reference | -15.07 | -15.07 | --- | PASS |
| | | | 30~1000 | --- | -46.902 | <=-35.068 | PASS |
| | | | 1000~26500 | --- | -41.882 | <=-35.068 | PASS |
| | | 2480 | Reference | -15.65 | -15.65 | --- | PASS |
| | | | 30~1000 | --- | -46.726 | <=-35.654 | PASS |
| | | | 1000~26500 | --- | -43.056 | <=-35.654 | PASS |
| BLE_2M | Ant1 | 2402 | Reference | -16.64 | -16.64 | --- | PASS |
| | | | 30~1000 | --- | -47.407 | <=-36.641 | PASS |
| | | | 1000~26500 | --- | -45.084 | <=-36.641 | PASS |
| | | 2440 | Reference | -16.92 | -16.92 | --- | PASS |
| | | | 30~1000 | --- | -47.152 | <=-36.915 | PASS |
| | | | 1000~26500 | --- | -42.964 | <=-36.915 | PASS |
| | | 2480 | Reference | -16.52 | -16.52 | --- | PASS |
| | | | 30~1000 | --- | -47.751 | <=-36.522 | PASS |
| | | | 1000~26500 | --- | -45.149 | <=-36.522 | PASS |

Test Graphs

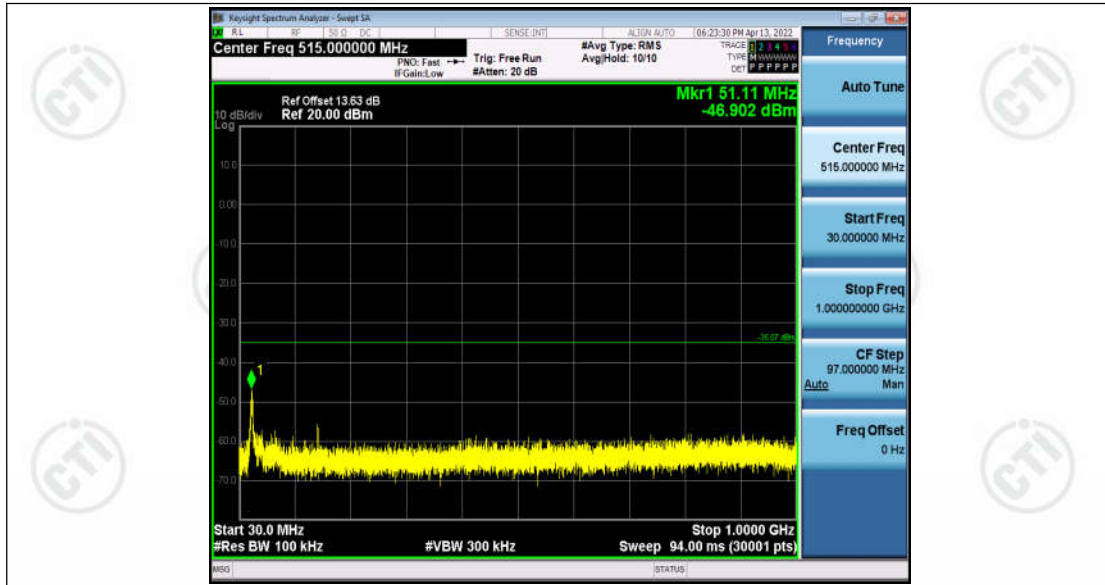




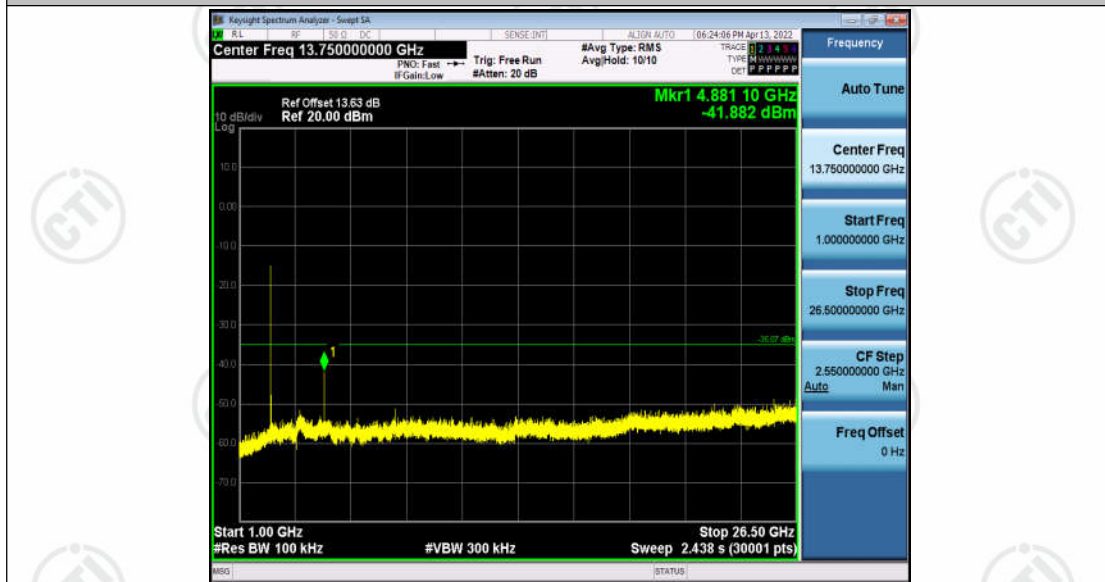
BLE_1M_Ant1_2402_1000~26500



BLE_1M_Ant1_2440_0~Reference



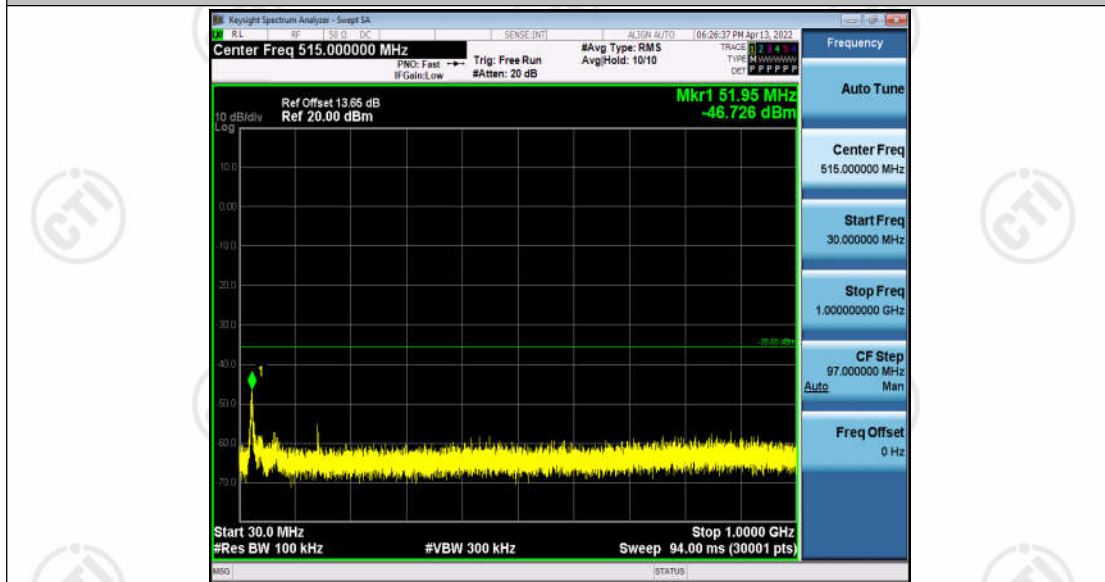
BLE_1M_Ant1_2440_30~1000



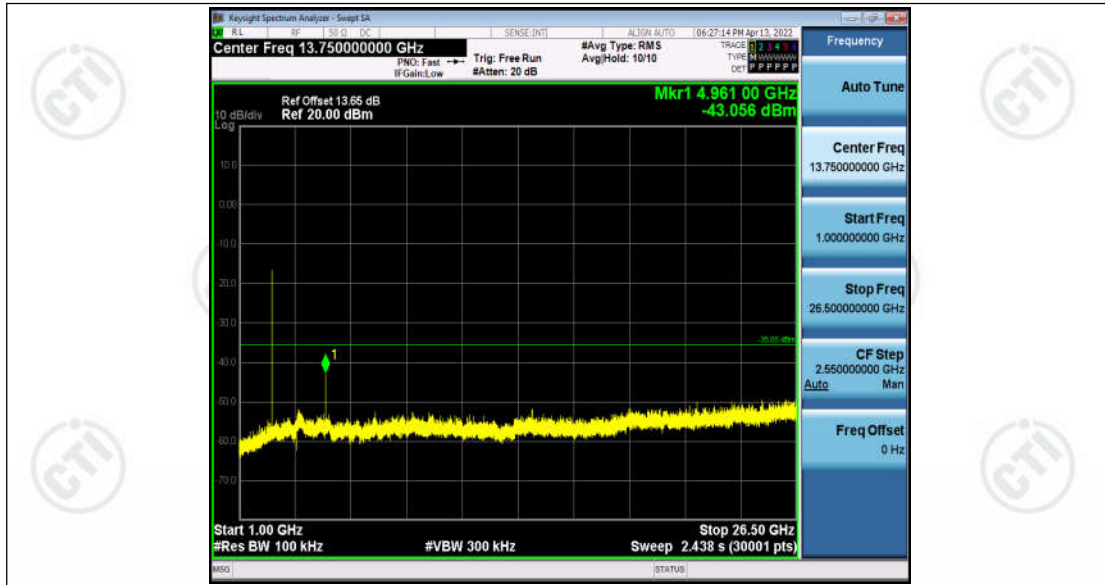
BLE_1M_Ant1_2440_1000~26500



BLE_1M_Ant1_2480_0~Reference



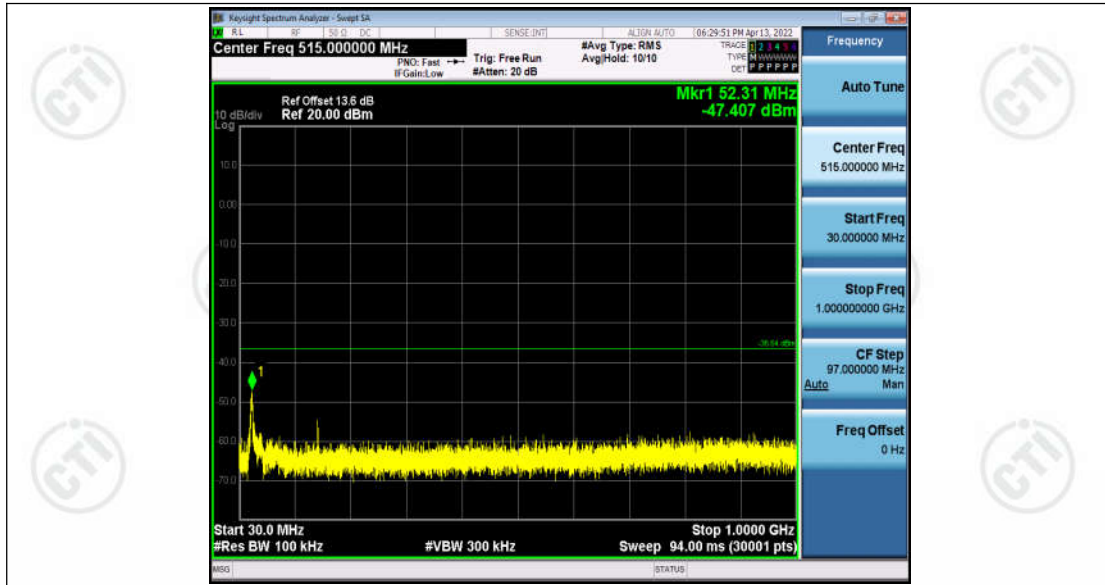
BLE_1M_Ant1_2480_30~1000



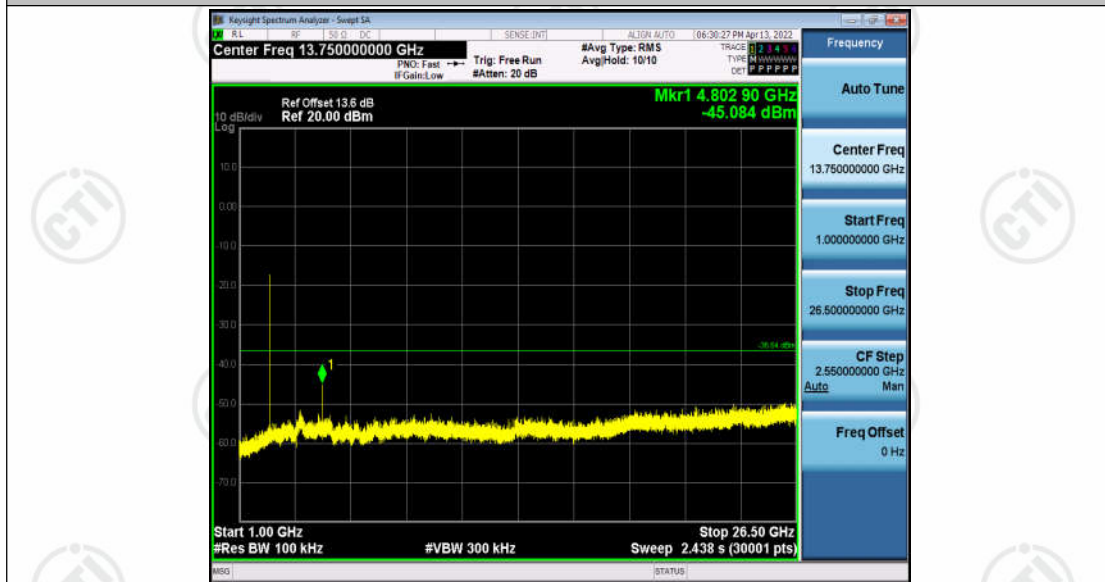
BLE_1M_Ant1_2480_1000~26500



BLE_2M_Ant1_2402_0~Reference



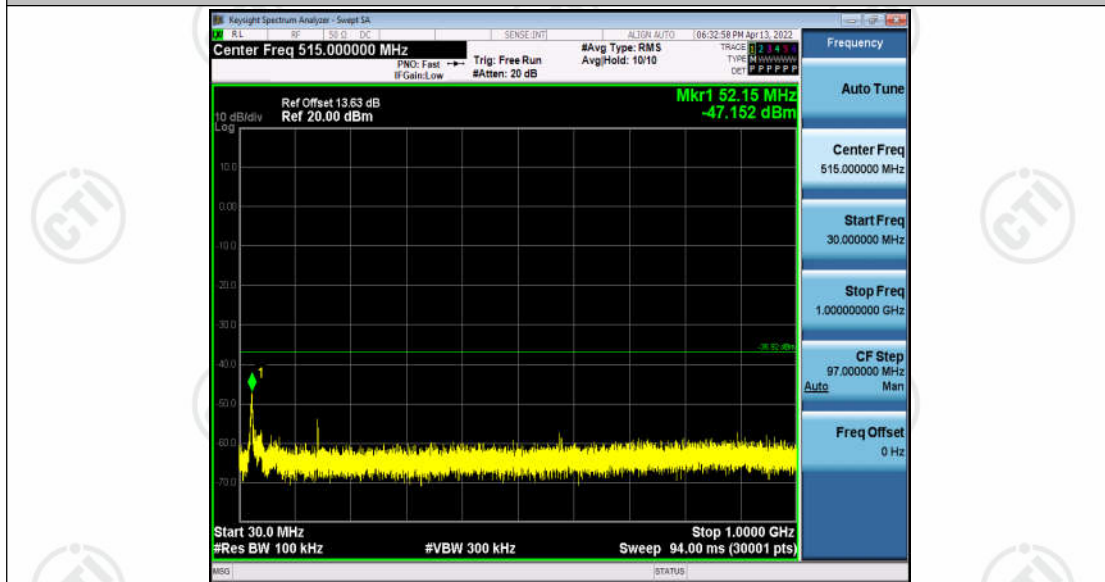
BLE_2M_Ant1_2402_30~1000



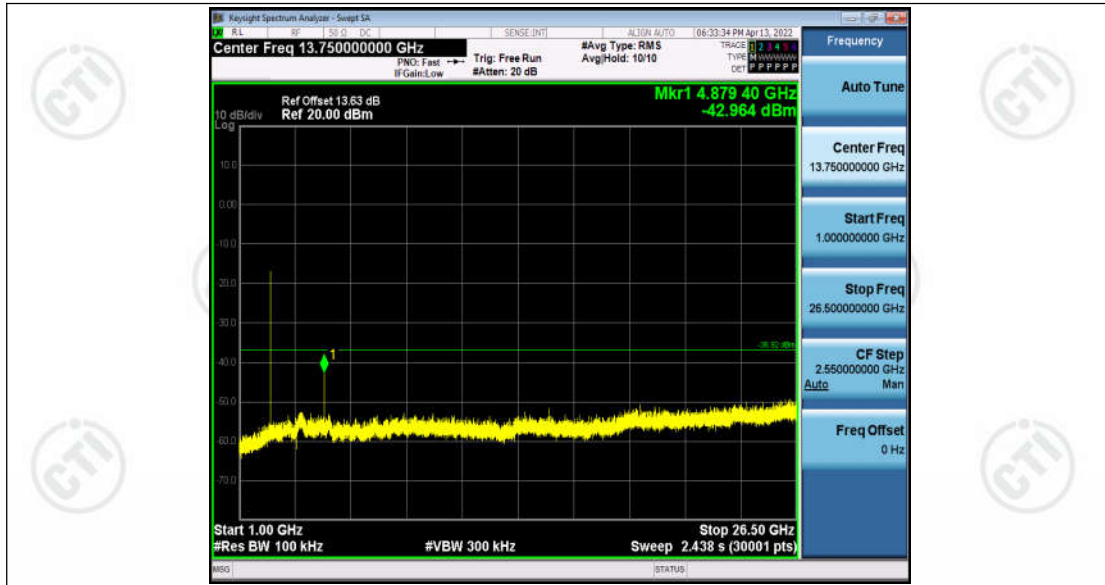
BLE_2M_Ant1_2402_1000~26500



BLE_2M_Ant1_2440_0~Reference



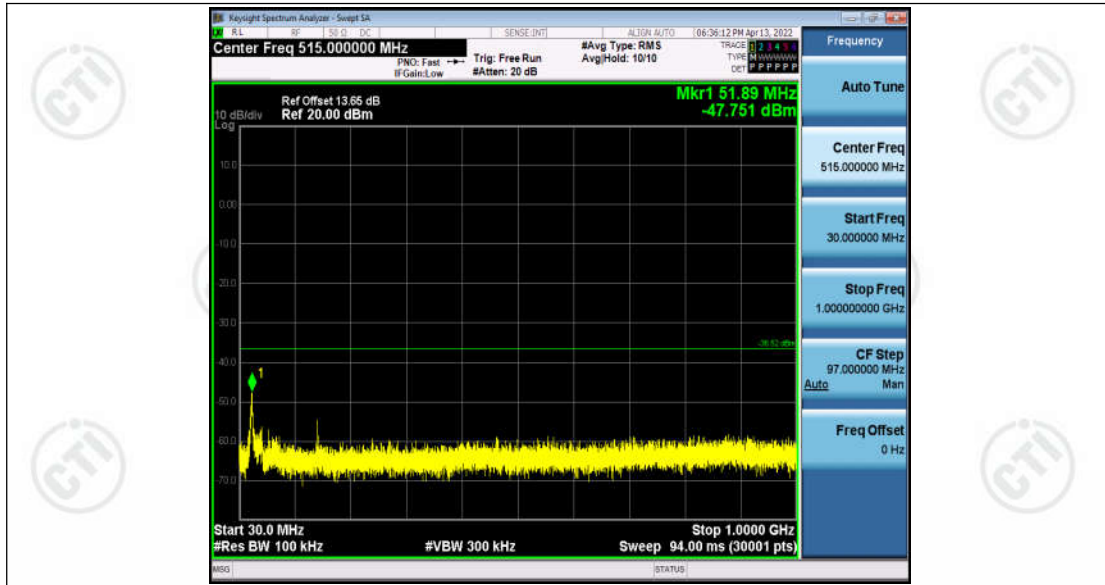
BLE_2M_Ant1_2440_30~1000



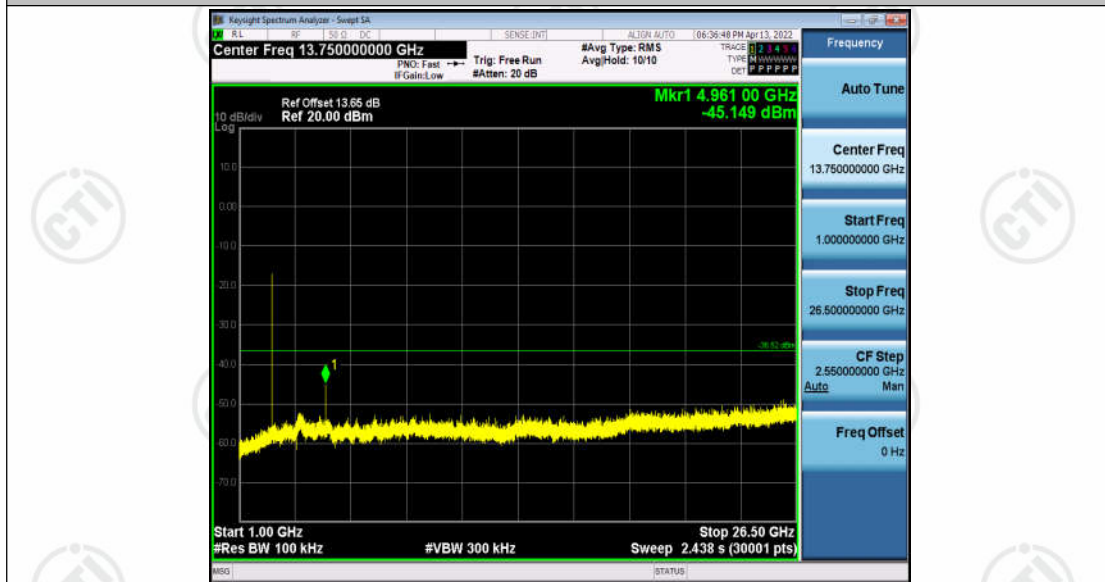
BLE_2M_Ant1_2440_1000~26500



BLE_2M_Ant1_2480_0~Reference



BLE_2M_Ant1_2480_30~1000

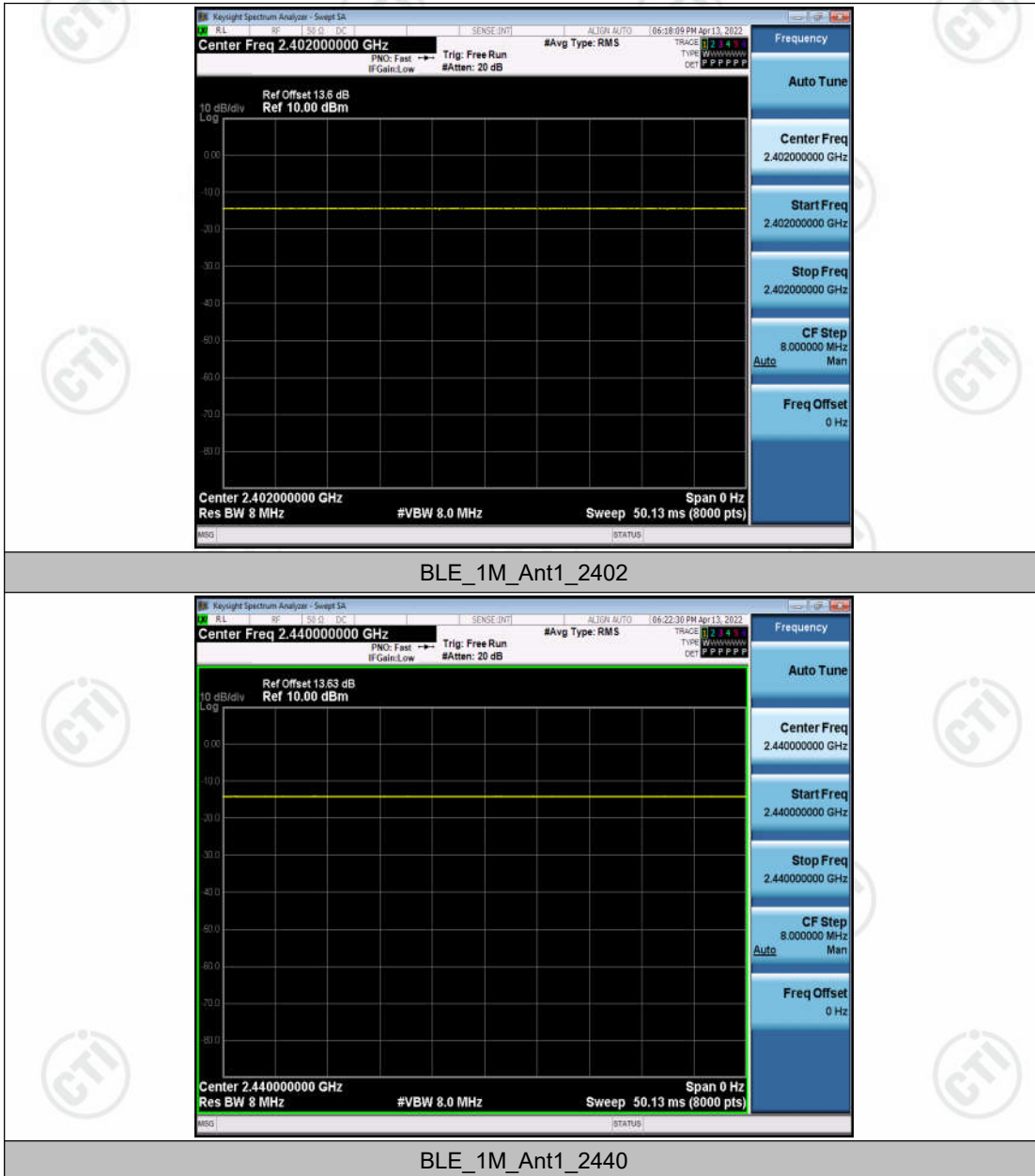


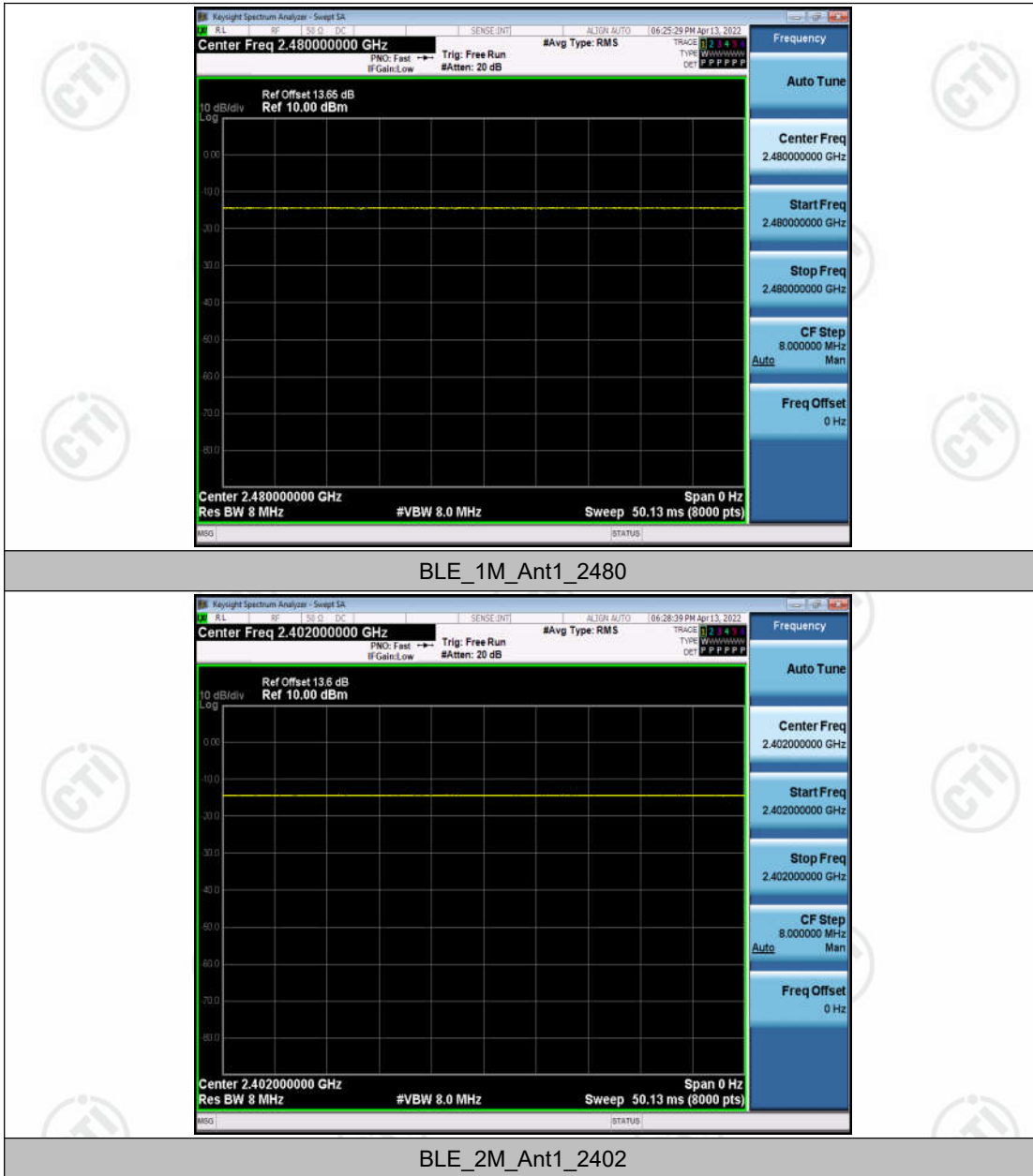
BLE_2M_Ant1_2480_1000~26500

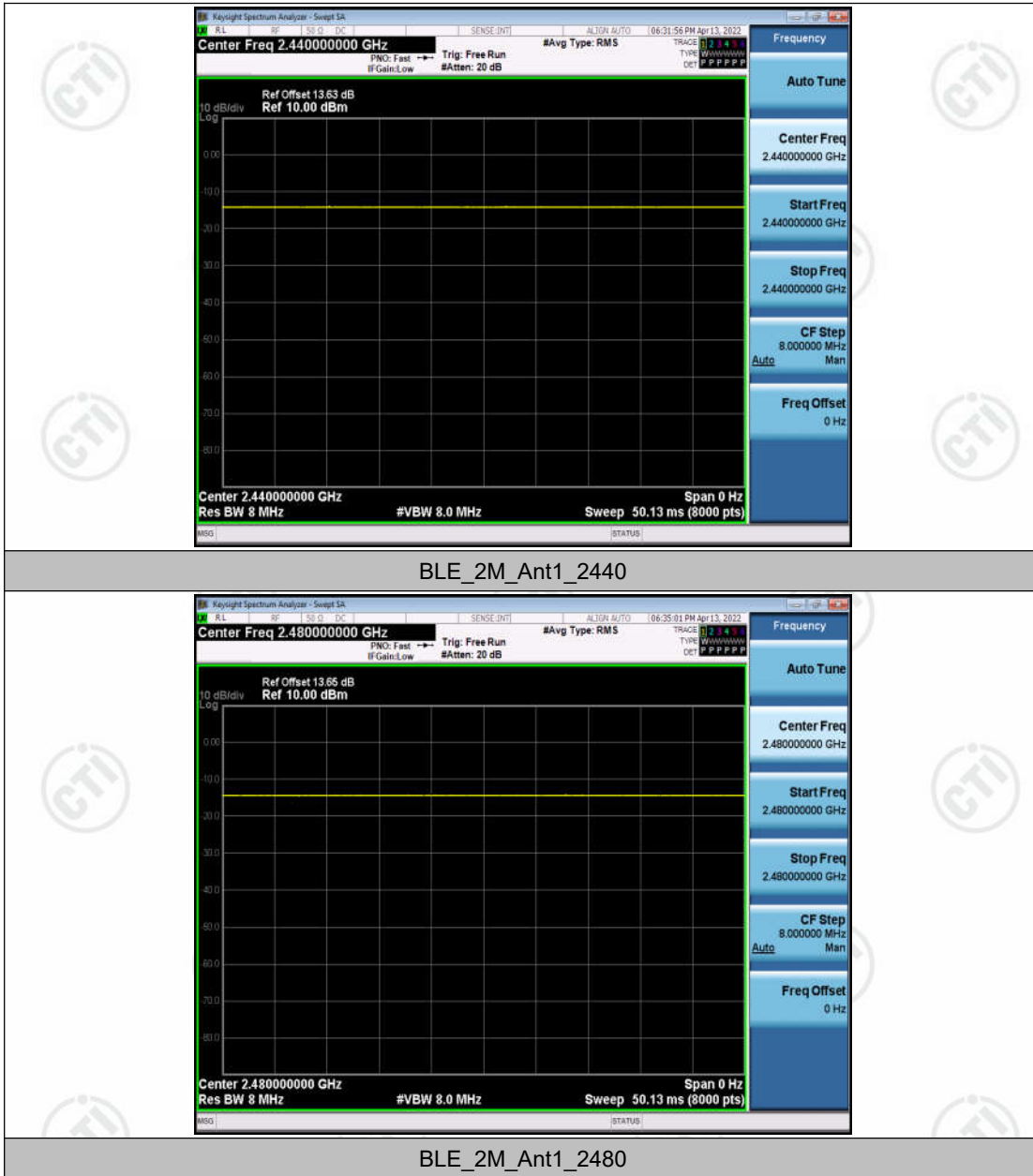
Appendix G: Duty Cycle**Test Result**

| Test Mode | Antenna | Channel | Transmission Duration [ms] | Transmission Period [ms] | Duty Cycle [%] | Limit | Verdict |
|-----------|---------|---------|----------------------------|--------------------------|----------------|-------|---------|
| BLE_1M | Ant1 | 2402 | 50.00 | 50.00 | 100.00 | --- | PASS |
| | | 2440 | 50.00 | 50.00 | 100.00 | --- | PASS |
| | | 2480 | 50.00 | 50.00 | 100.00 | --- | PASS |
| BLE_2M | Ant1 | 2402 | 50.00 | 50.00 | 100.00 | --- | PASS |
| | | 2440 | 50.00 | 50.00 | 100.00 | --- | PASS |
| | | 2480 | 50.00 | 50.00 | 100.00 | --- | PASS |

Test Graphs







*** End of Report ***