



## Appendix B

### RF Test Data for BLE V4.2(DTS) (Conducted Measurement)

**Product Name:** Laser Engraver

**Trade Mark:** N/A

**Test Model:** ZBT\_3737O

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23.5° C   |
| Relative Humidity: | 52.2%     |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Wunder Wu |
| Supervised by:     | Li Huan   |



B.1 DTS Bandwidth

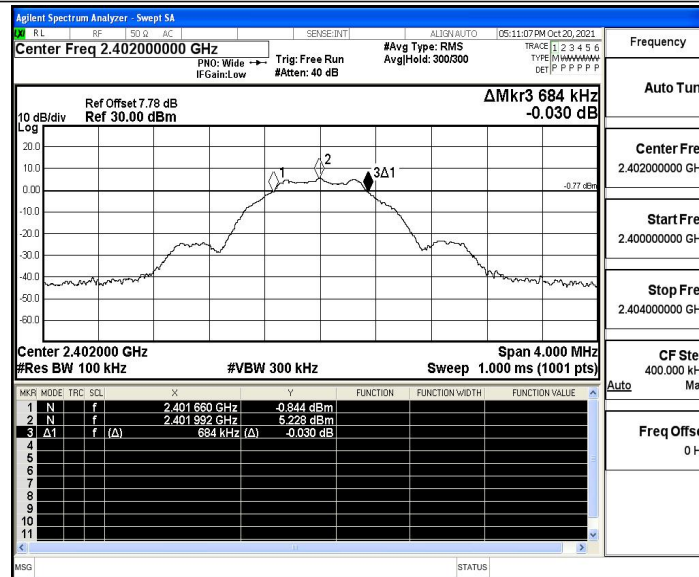
Test Result

| TestMode | Antenna | Channel | DTS BW<br>[MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|----------|---------|---------|-----------------|----------|----------|------------|---------|
| BLE_1M   | Ant1    | 2402    | 0.684           | 2401.660 | 2402.344 | ≥0.5       | PASS    |
|          |         | 2440    | 0.680           | 2439.656 | 2440.336 | ≥0.5       | PASS    |
|          |         | 2480    | 0.680           | 2479.660 | 2480.340 | ≥0.5       | PASS    |

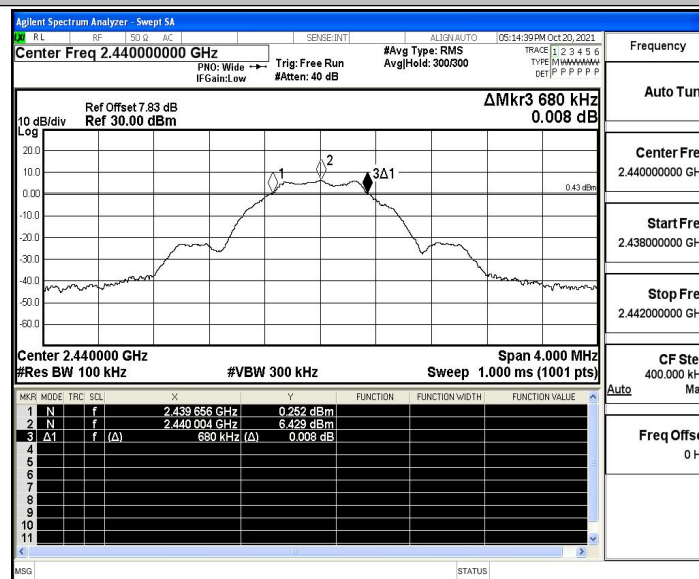


## Test Graphs

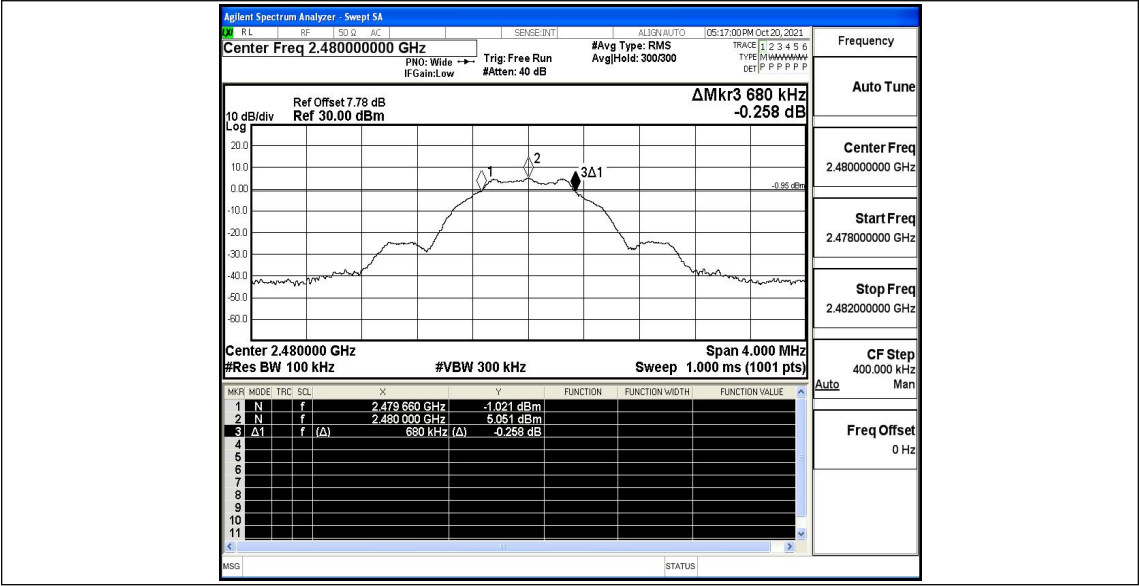
BLE\_1M\_Ant1\_2402



BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480





B.2 Maximum conducted output power

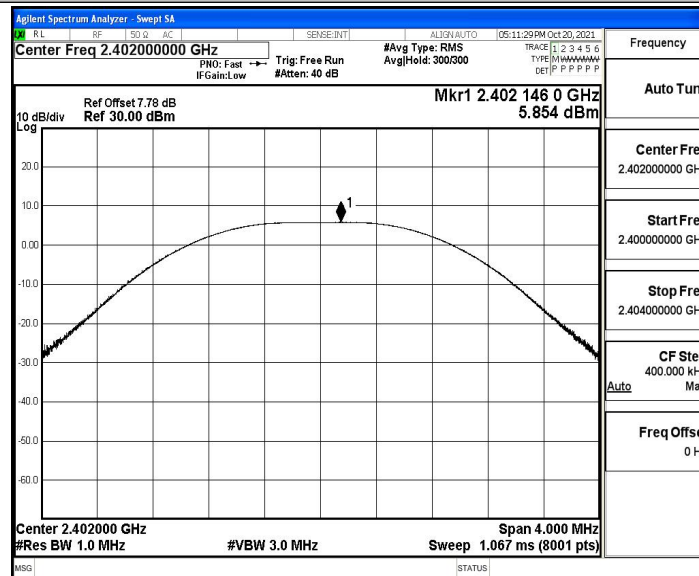
Test Result

| TestMode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|---------|-------------|------------|---------|
| BLE_1M   | Ant1    | 2402    | 5.85        | ≤30        | PASS    |
|          |         | 2440    | 6.99        | ≤30        | PASS    |
|          |         | 2480    | 5.57        | ≤30        | PASS    |

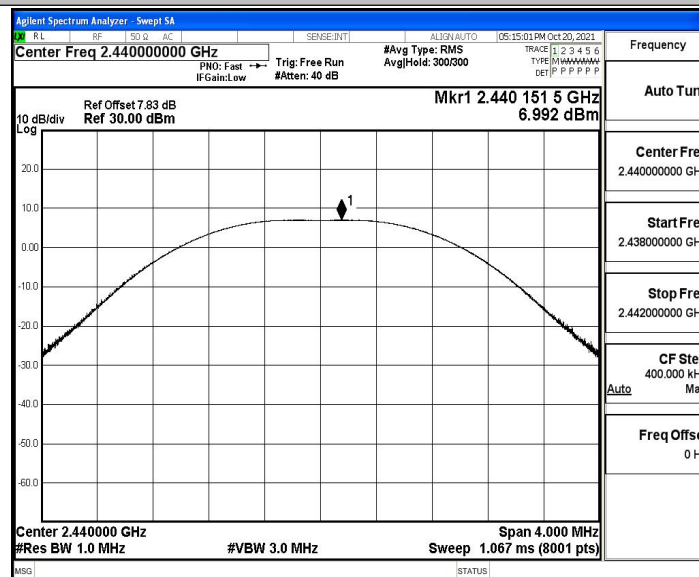


## Test Graphs

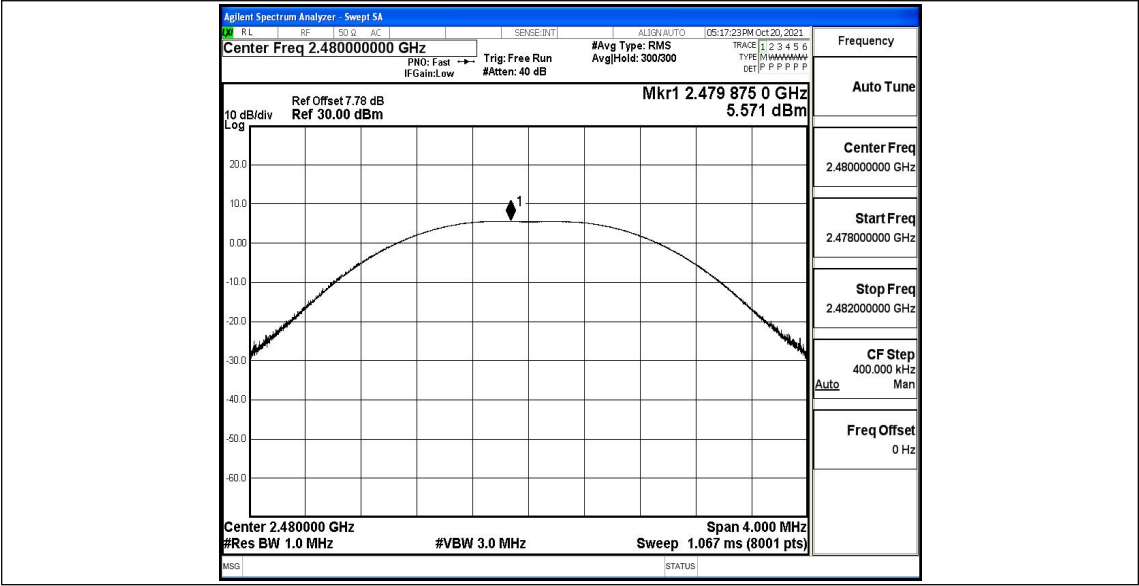
BLE\_1M\_Ant1\_2402



BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480





**B.3 Maximum power spectral density**

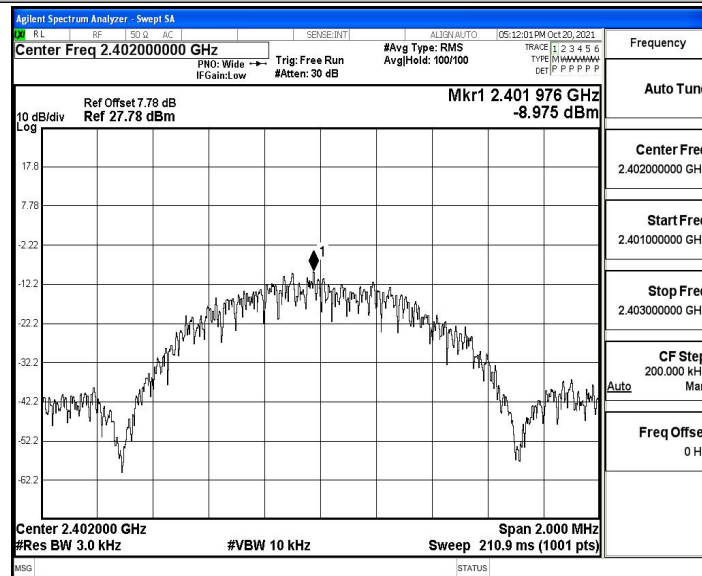
**Test Result**

| TestMode | Antenna | Channel | Result[dBm/3-100kHz] | Limit[dBm/3kHz] | Verdict |
|----------|---------|---------|----------------------|-----------------|---------|
| BLE_1M   | Ant1    | 2402    | -8.98                | ≤8              | PASS    |
|          |         | 2440    | -7.78                | ≤8              | PASS    |
|          |         | 2480    | -9.15                | ≤8              | PASS    |

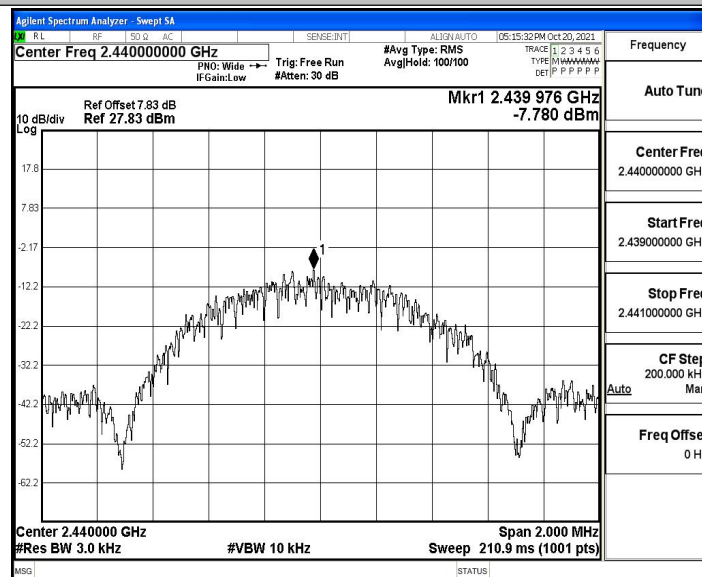


## Test Graphs

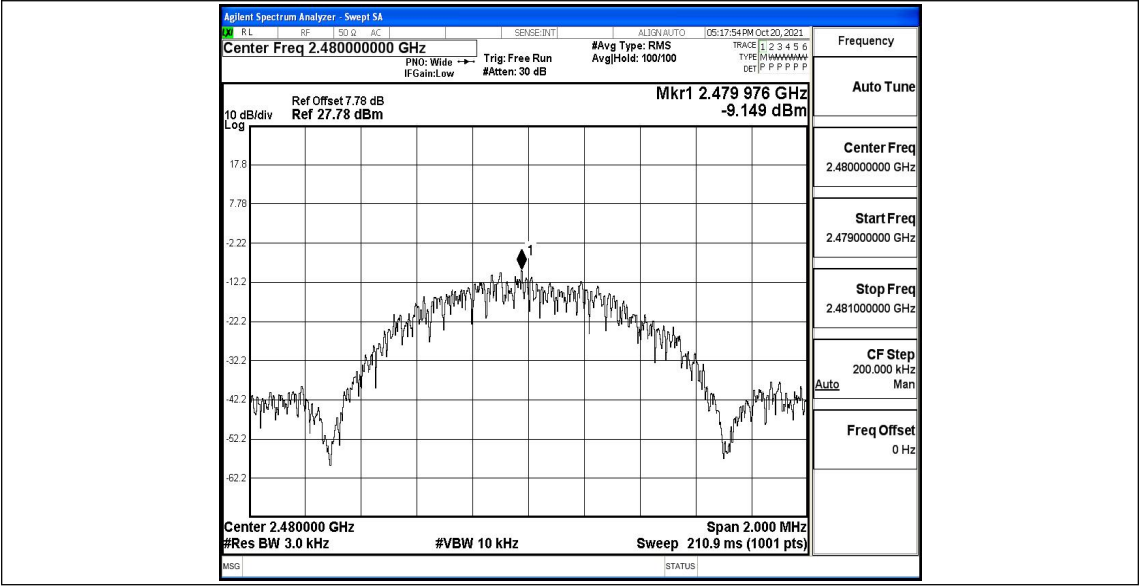
BLE\_1M\_Ant1\_2402



BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480





## B.4 Band edge measurements

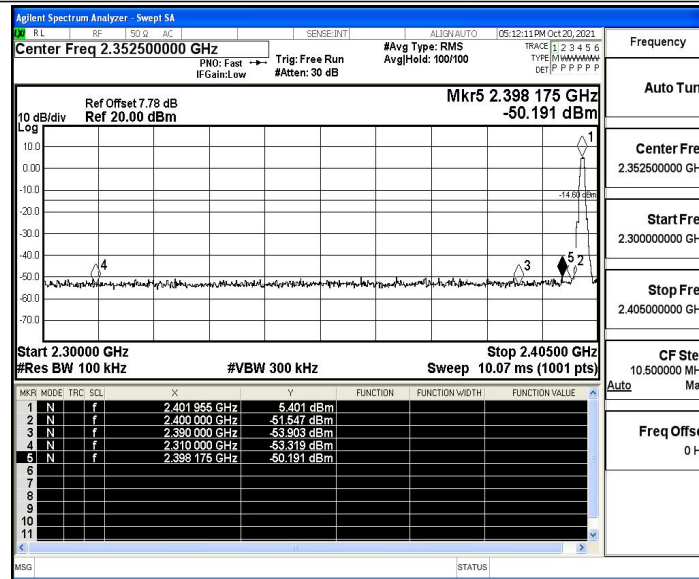
### Test Result

| TestMode | Antenna | ChName | Channel | RefLevel[dBm] | Result[dBm] | Limit[dBm]    | Verdict |
|----------|---------|--------|---------|---------------|-------------|---------------|---------|
| BLE_1M   | Ant1    | Low    | 2402    | 5.40          | -50.19      | $\leq -14.6$  | PASS    |
|          |         | High   | 2480    | 5.15          | -48.74      | $\leq -14.85$ | PASS    |

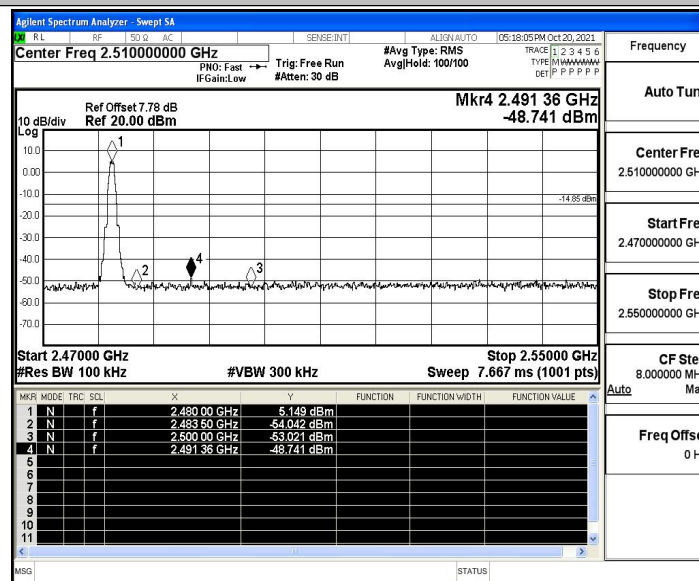


## Test Graphs

BLE\_1M\_Ant1\_Low\_2402



BLE\_1M\_Ant1\_High\_2480





## B.5 Conducted Spurious Emission

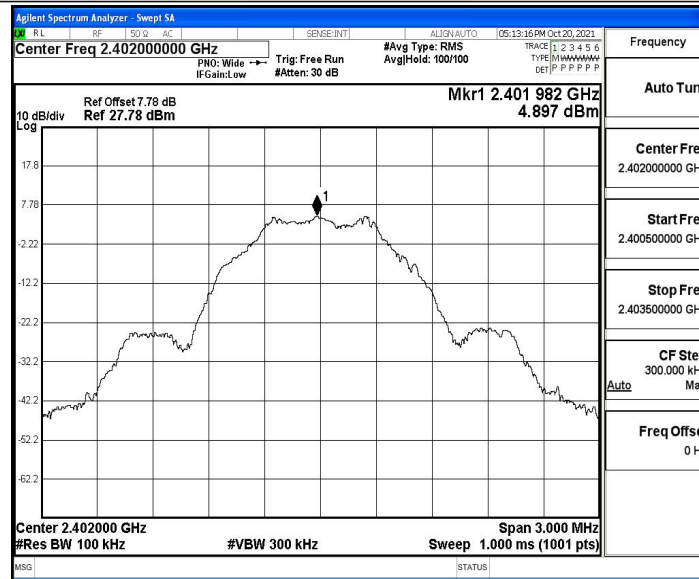
### Test Result

| TestMode | Antenna | Channel | FreqRange<br>[MHz] | RefLevel<br>[dBm] | Result[dBm] | Limit[dBm]    | Verdict |
|----------|---------|---------|--------------------|-------------------|-------------|---------------|---------|
| BLE_1M   | Ant1    | 2402    | Reference          | 4.90              | 4.90        | ---           | PASS    |
|          |         |         | 30~1000            | 4.90              | -61.44      | $\leq -15.1$  | PASS    |
|          |         |         | 1000~26500         | 4.90              | -47.28      | $\leq -15.1$  | PASS    |
|          |         | 2440    | Reference          | 6.03              | 6.03        | ---           | PASS    |
|          |         |         | 30~1000            | 6.03              | -61.5       | $\leq -13.98$ | PASS    |
|          |         |         | 1000~26500         | 6.03              | -47.27      | $\leq -13.98$ | PASS    |
|          |         | 2480    | Reference          | 4.94              | 4.94        | ---           | PASS    |
|          |         |         | 30~1000            | 4.94              | -61.06      | $\leq -15.06$ | PASS    |
|          |         |         | 1000~26500         | 4.94              | -47.2       | $\leq -15.06$ | PASS    |

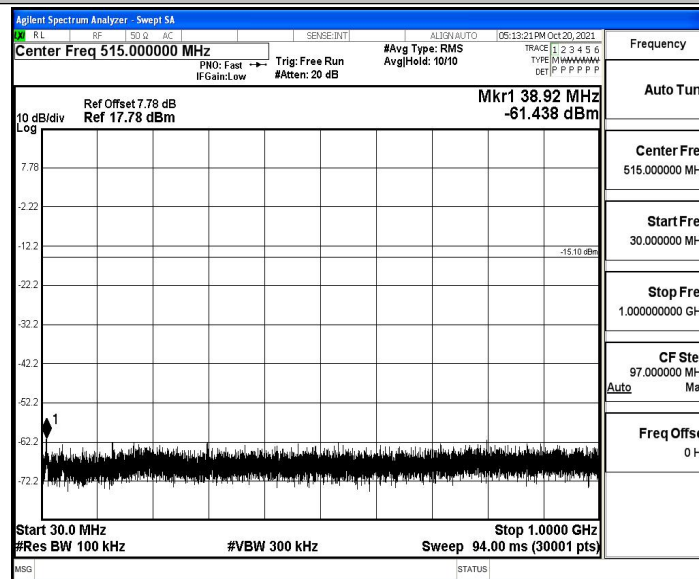


## Test Graphs

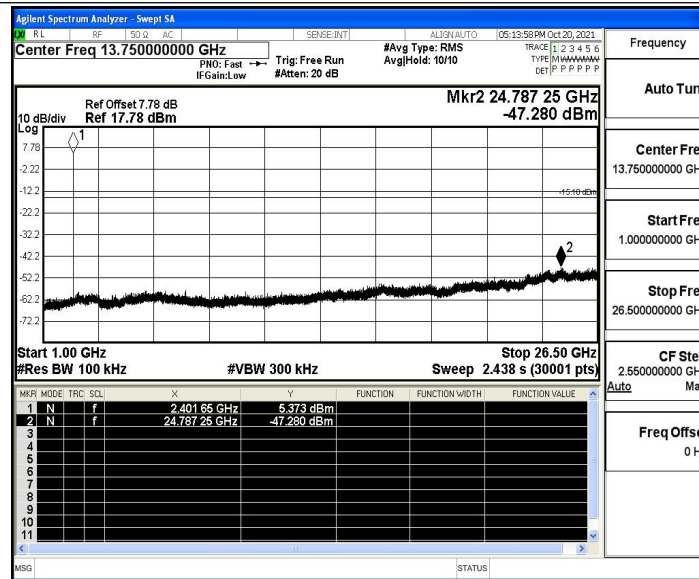
BLE\_1M\_Ant1\_2402\_0~Reference



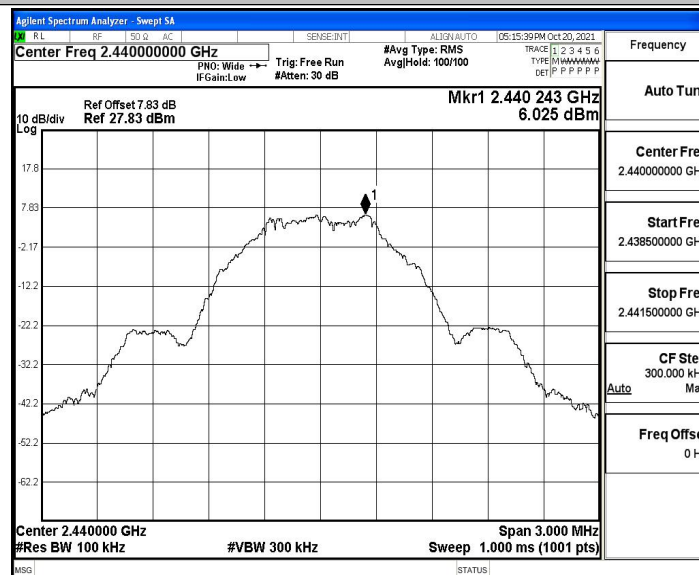
BLE\_1M\_Ant1\_2402\_30~1000



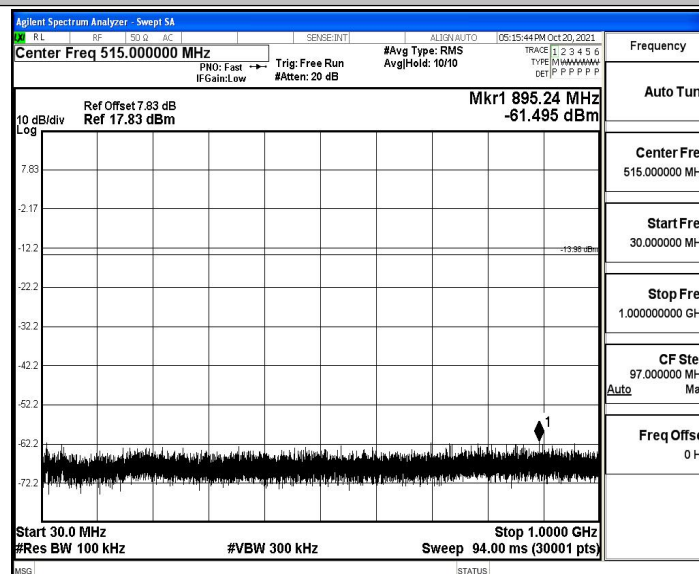
BLE\_1M\_Ant1\_2402\_1000~26500



BLE\_1M\_Ant1\_2440\_0~Reference

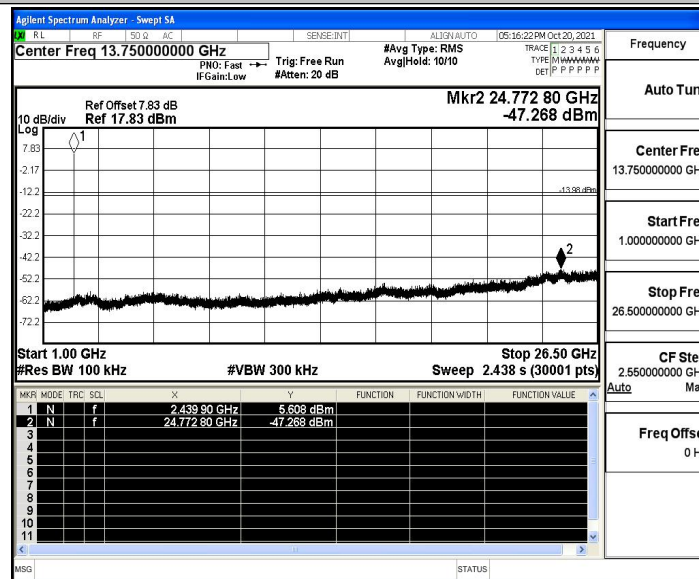


BLE\_1M\_Ant1\_2440\_30~1000

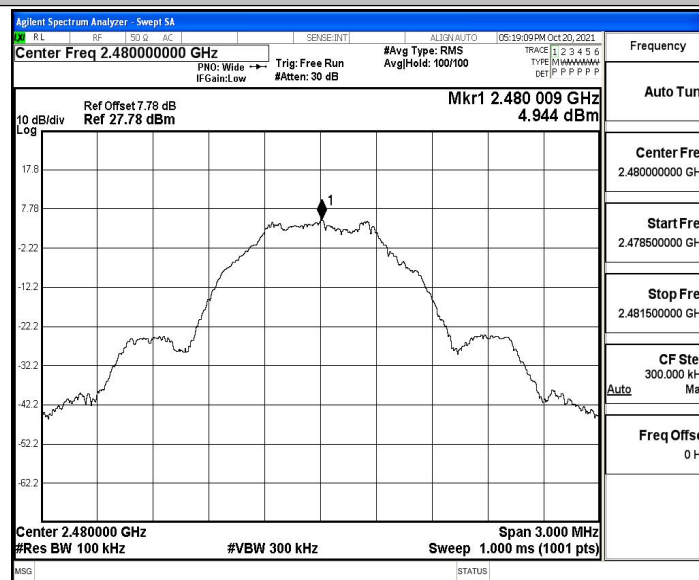




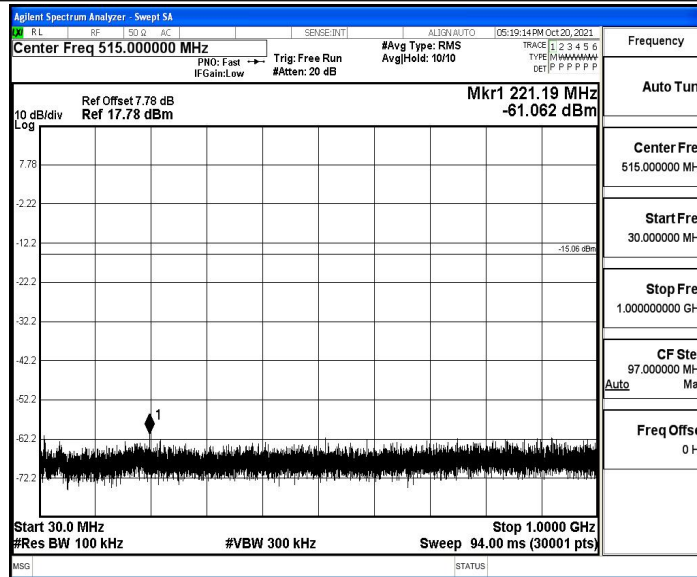
## BLE\_1M\_Ant1\_2440\_1000~26500



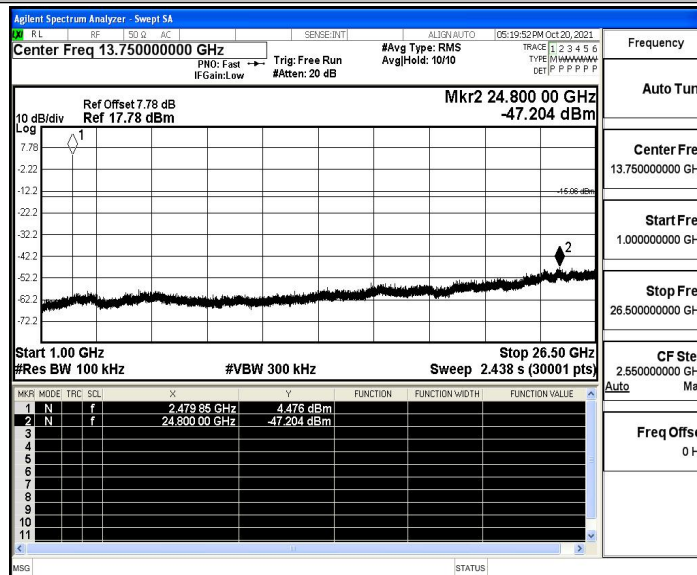
## BLE\_1M\_Ant1\_2480\_0~Reference



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



BLE\_1M\_Ant1\_2480\_1000~26500





## B.6 Duty Cycle

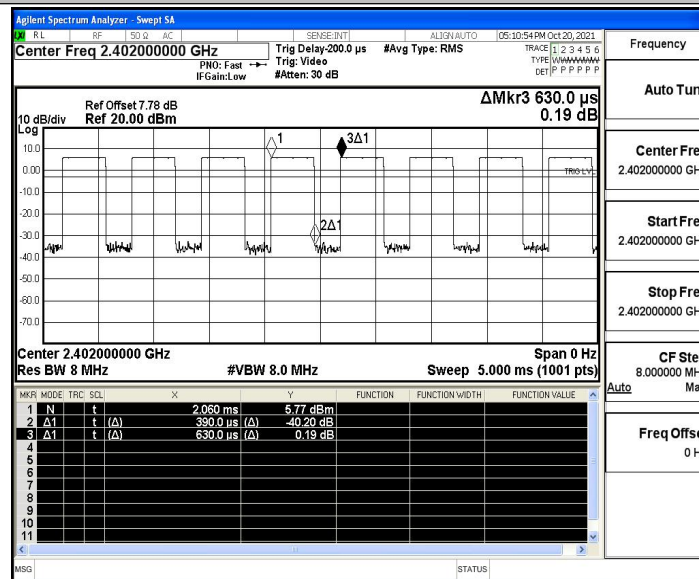
### Test Result

| TestMode | Antenna | Channel | ON Time<br>[ms] | Period<br>[ms] | X      | DC<br>[%] | xFactor | Limit | Verdict |
|----------|---------|---------|-----------------|----------------|--------|-----------|---------|-------|---------|
| BLE_1M   | Ant1    | 2402    | 0.39            | 0.63           | 0.6190 | 61.90     | 2.08    | ---   | 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    |

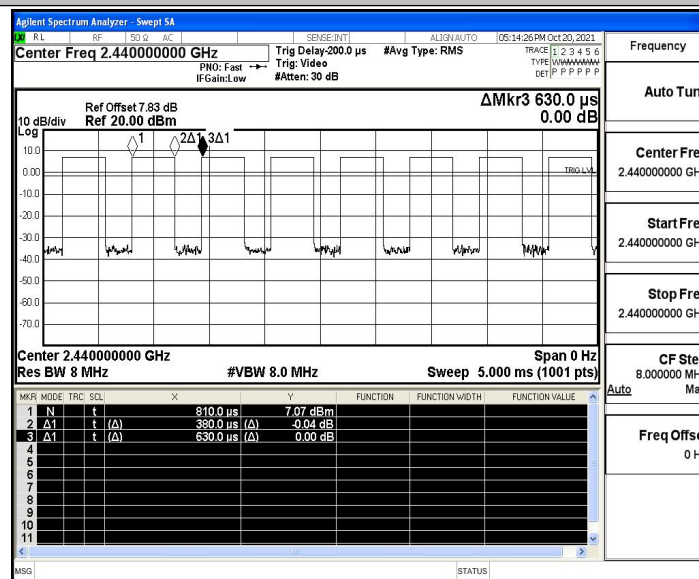


## Test Graphs

BLE\_1M\_Ant1\_2402



BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480





## B.7 Emissions in Restricted Bands

### Test Result

| TestMode | Antenna | ChName | Channel | Detector | Freq.<br>[MHz] | Result<br>[dBm] | Limit<br>[dBm] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Verdict |
|----------|---------|--------|---------|----------|----------------|-----------------|----------------|--------------------|-------------------|---------|
| BLE_1M   | Ant1    | Low    | 2402    | AV       | 2310.000       | -48.64          | ≤-41.20        | 46.56              | ≤54               | PASS    |
|          |         |        |         | AV       | 2389.565       | -47.59          | ≤-41.20        | 47.61              | ≤54               | PASS    |
|          |         |        |         | AV       | 2390.000       | -48.12          | ≤-41.20        | 47.08              | ≤54               | PASS    |
|          |         |        |         | Peak     | 2310.000       | -41.53          | ≤-21.20        | 53.67              | ≤74               | PASS    |
|          |         |        |         | Peak     | 2314.280       | -38.86          | ≤-21.20        | 56.34              | ≤74               | PASS    |
|          |         |        |         | Peak     | 2390.000       | -41.23          | ≤-21.20        | 53.97              | ≤74               | PASS    |
|          |         | High   | 2480    | AV       | 2483.500       | -45.9           | ≤-41.20        | 49.30              | ≤54               | PASS    |
|          |         |        |         | AV       | 2483.520       | -45.9           | ≤-41.20        | 49.30              | ≤54               | PASS    |
|          |         |        |         | AV       | 2500.000       | -47.56          | ≤-41.20        | 47.64              | ≤54               | PASS    |
|          |         |        |         | Peak     | 2483.500       | -40.9           | ≤-21.20        | 54.30              | ≤74               | PASS    |
|          |         |        |         | Peak     | 2497.760       | -37.13          | ≤-21.20        | 58.07              | ≤74               | PASS    |
|          |         |        |         | Peak     | 2500.000       | -40.82          | ≤-21.20        | 54.38              | ≤74               | PASS    |

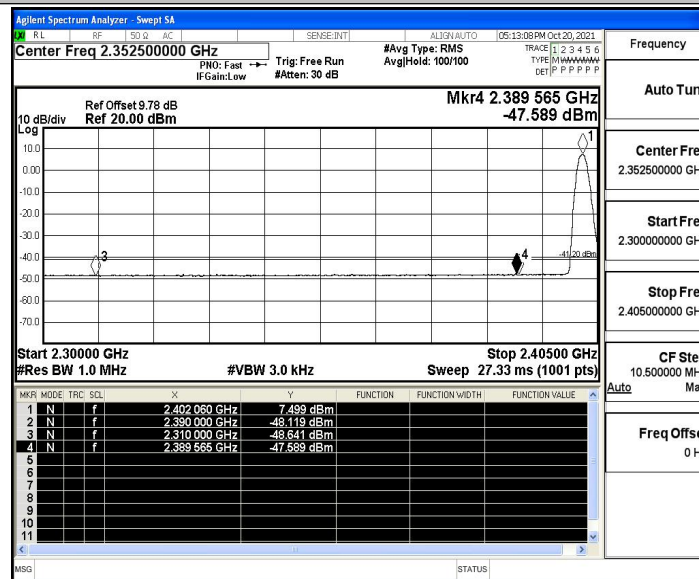
Note:

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.

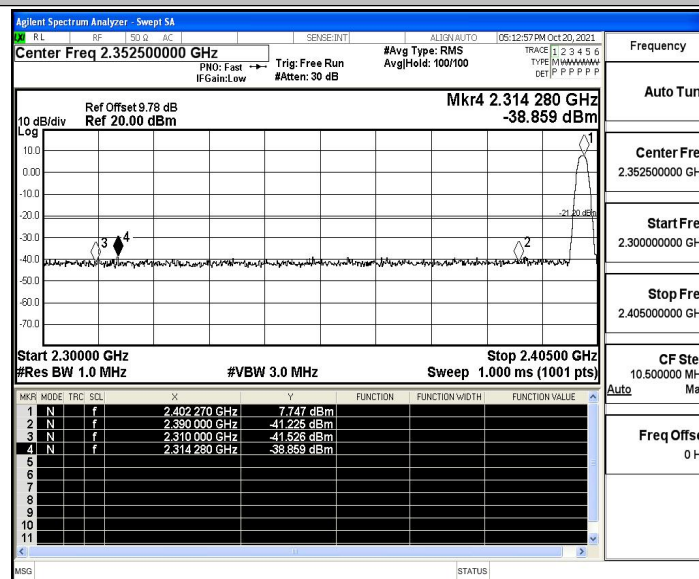


## Test Graphs

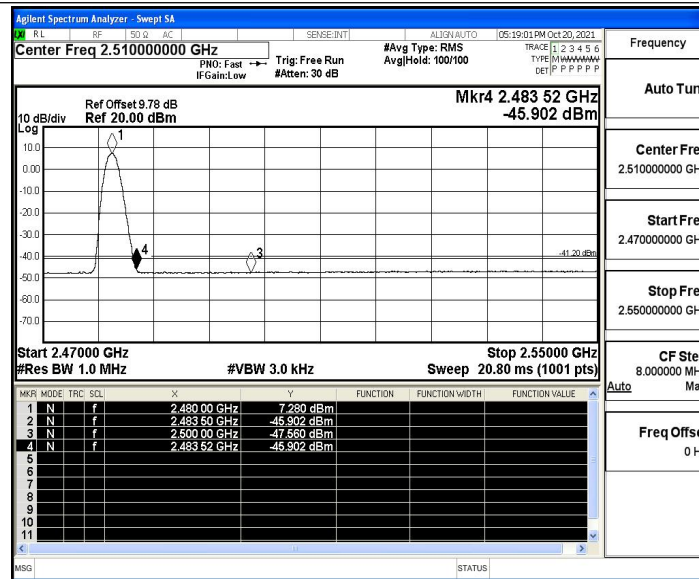
BLE\_1M\_Ant1\_Low\_2402\_AV



BLE\_1M\_Ant1\_Low\_2402\_Peak



BLE\_1M\_Ant1\_High\_2480\_AV



## BLE\_1M\_Ant1\_High\_2480\_Peak

