

# RF Test Data for Bluetooth LE (Conducted Measurements)

| General Description of EUT                                                              |                   |
|-----------------------------------------------------------------------------------------|-------------------|
| Product Name:                                                                           | SMART WATCH       |
| Test Model:                                                                             | KL2               |
| Sample ID:                                                                              | 20211124-13_01-02 |
| Environmental Conditions                                                                |                   |
| Temperature:                                                                            | 25℃               |
| Relative Humidity:                                                                      | 55%               |
| Test Voltage:                                                                           | DC 3.7V           |
| Test Engineer:                                                                          | Huangjianping     |
| Note: For a more detailed features description, please refer to the report TB-FCC185577 |                   |

## Contents

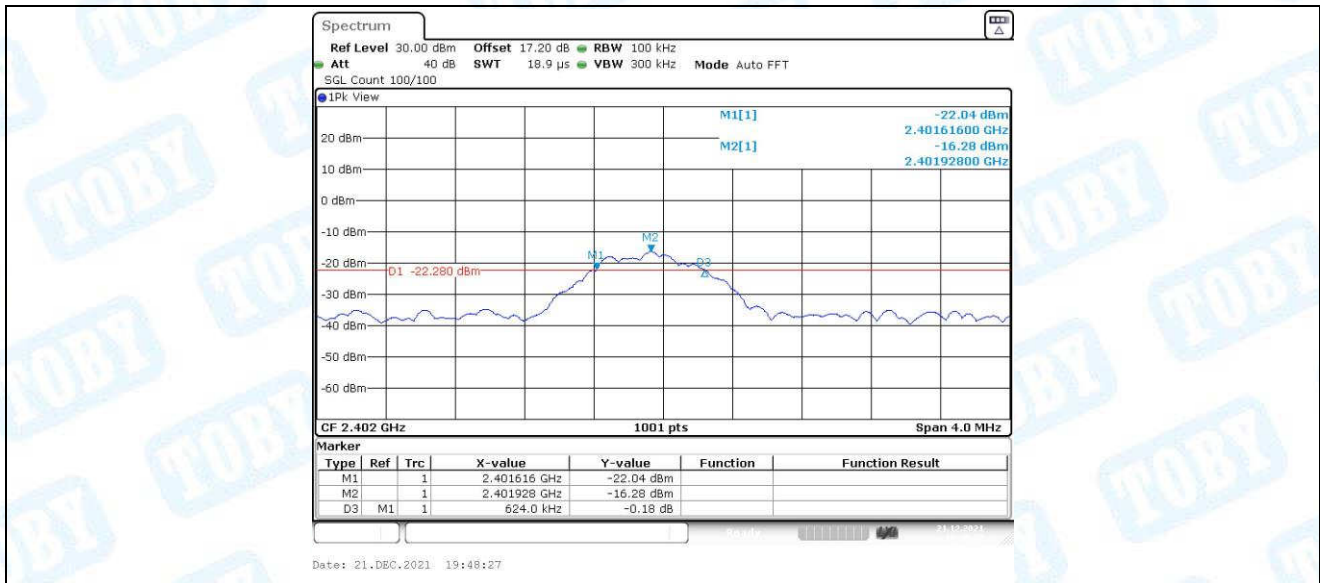
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## 1. DTS Bandwidth

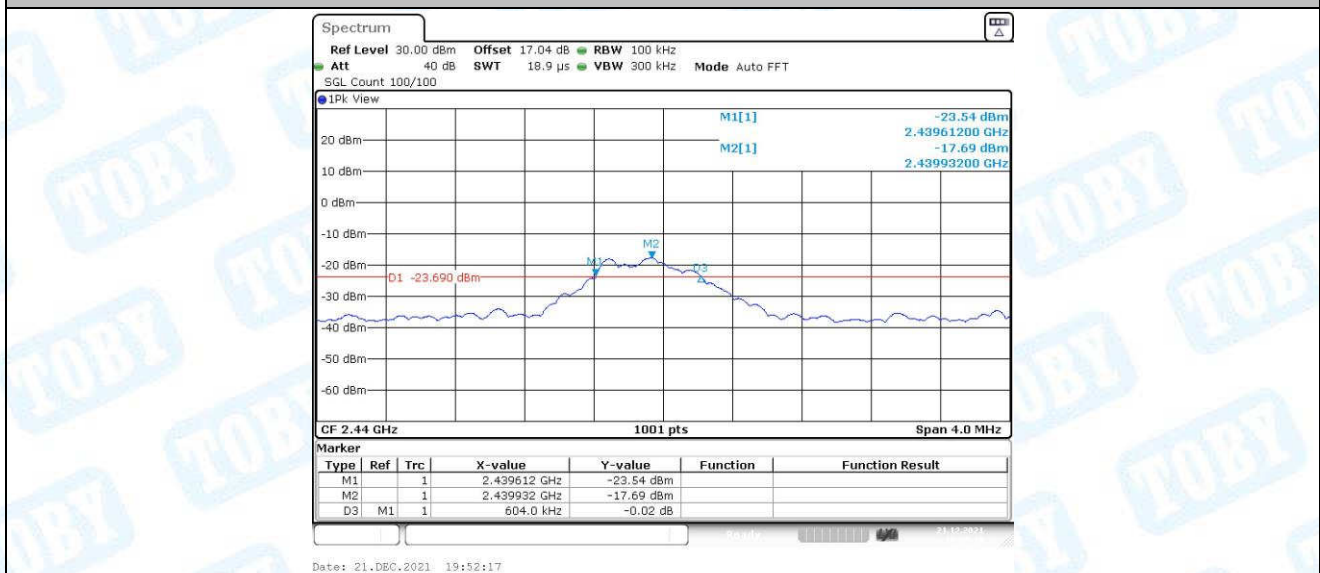
### 1.1. Test Result

| Test Mode | Antenna | Channel | DTS BW [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|-----------|---------|---------|--------------|---------|---------|------------|---------|
| BLE_1M    | Ant1    | 2402    | 0.62         | 2401.62 | 2402.24 | 0.5        | PASS    |
|           |         | 2440    | 0.60         | 2439.61 | 2440.22 | 0.5        | PASS    |
|           |         | 2480    | 0.64         | 2479.60 | 2480.24 | 0.5        | PASS    |
| BLE_2M    | Ant1    | 2402    | 1.08         | 2401.35 | 2402.43 | 0.5        | PASS    |
|           |         | 2440    | 0.72         | 2439.55 | 2440.26 | 0.5        | PASS    |
|           |         | 2480    | 0.97         | 2479.36 | 2480.32 | 0.5        | PASS    |

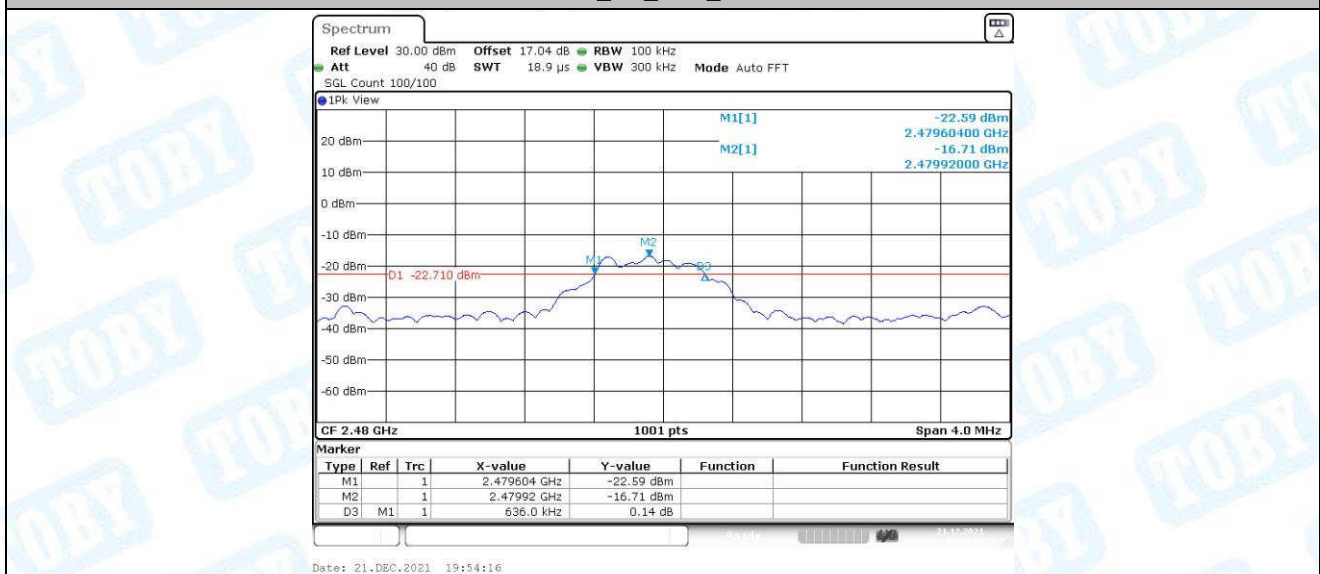
## 1.2. Test Graphs



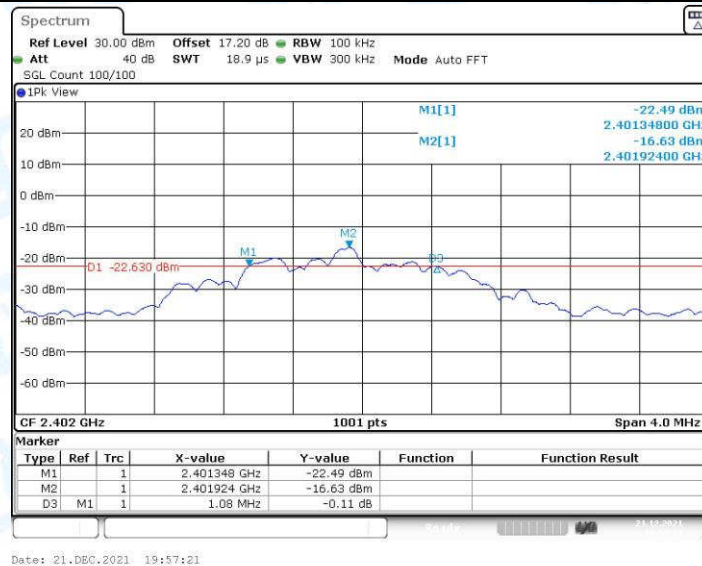
BLE\_1M\_Ant1\_2402



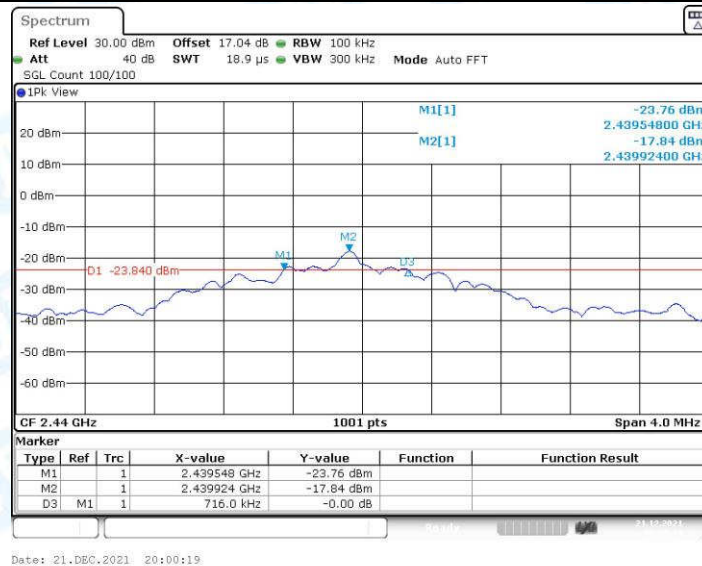
BLE\_1M\_Ant1\_2440



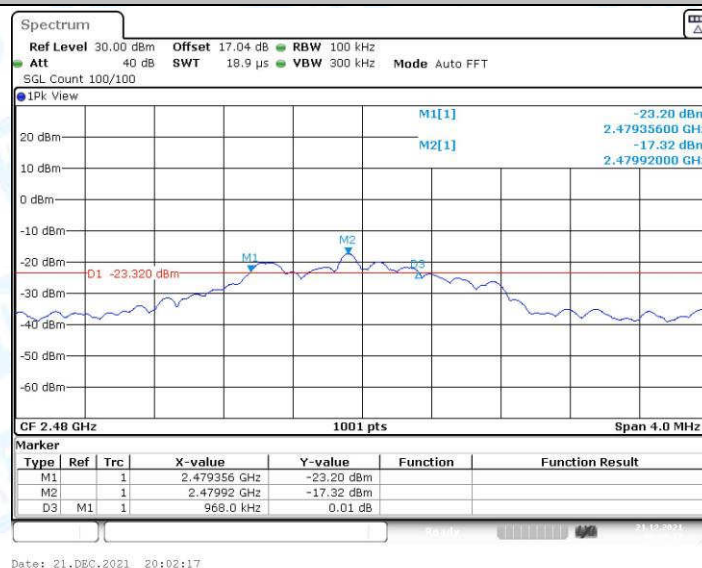
BLE\_1M\_Ant1\_2480



## BLE\_2M\_Ant1\_2402



## BLE\_2M\_Ant1\_2440



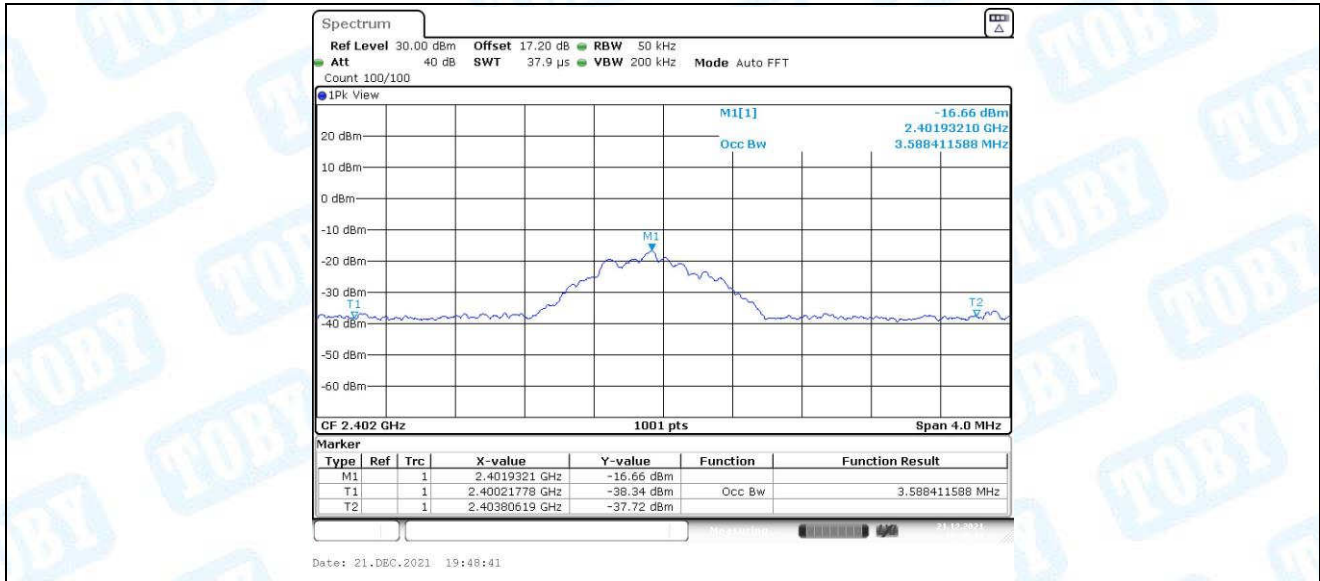
## BLE\_2M\_Ant1\_2480

## 2. Occupied Channel Bandwidth

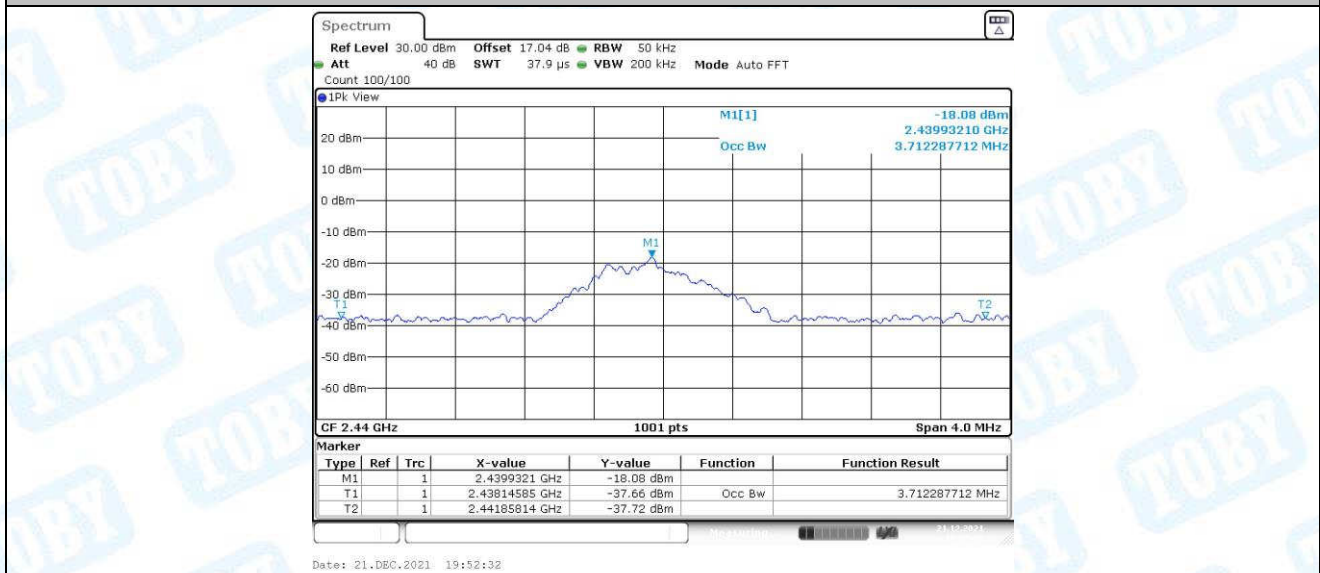
### 2.1. Test Result

| Test Mode | Antenna | Channel | OCB [MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|-----------|---------|---------|-----------|----------|----------|------------|---------|
| BLE_1M    | Ant1    | 2402    | 3.588     | 2400.218 | 2403.806 | ---        | PASS    |
|           |         | 2440    | 3.712     | 2438.146 | 2441.858 | ---        | PASS    |
|           |         | 2480    | 3.632     | 2478.178 | 2481.810 | ---        | PASS    |
| BLE_2M    | Ant1    | 2402    | 3.584     | 2400.206 | 2403.790 | ---        | PASS    |
|           |         | 2440    | 3.704     | 2438.154 | 2441.858 | ---        | PASS    |
|           |         | 2480    | 3.632     | 2478.178 | 2481.810 | ---        | PASS    |

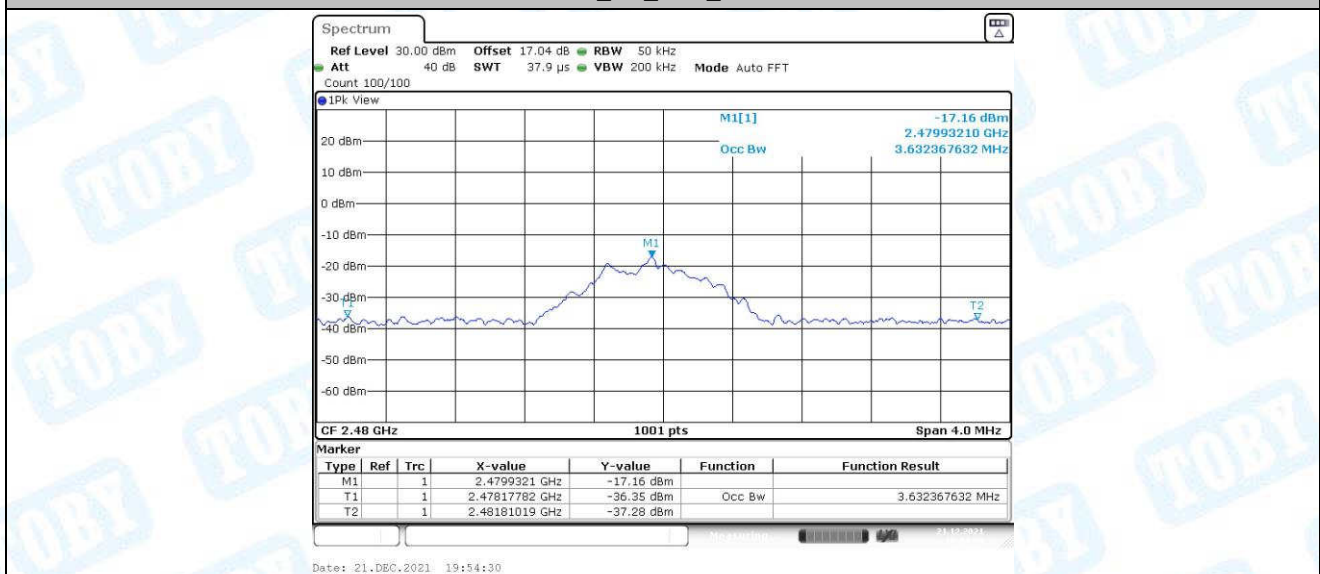
## 2.2. Test Graphs



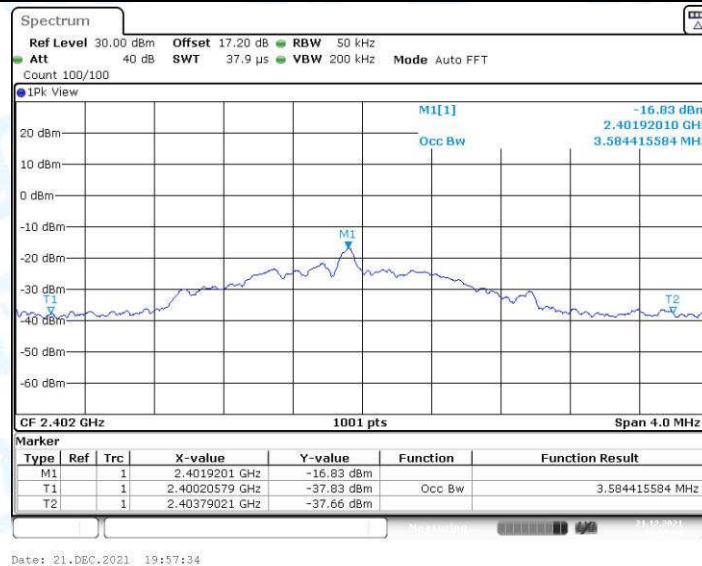
BLE\_1M\_Ant1\_2402



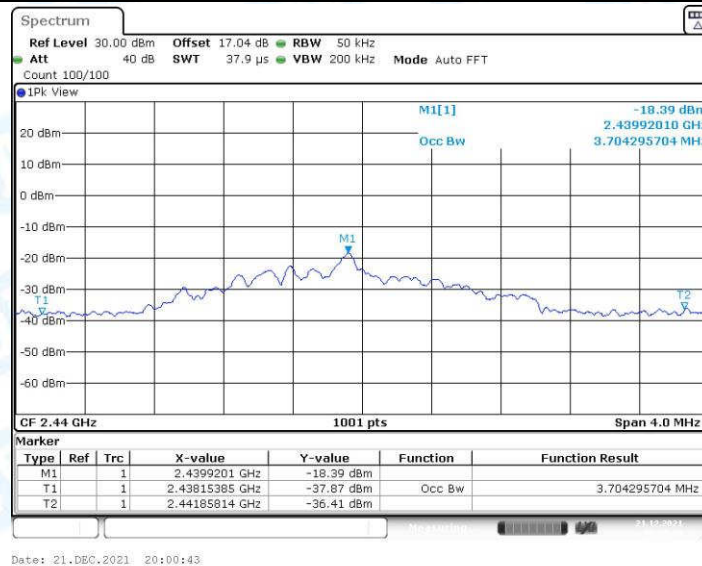
BLE\_1M\_Ant1\_2440



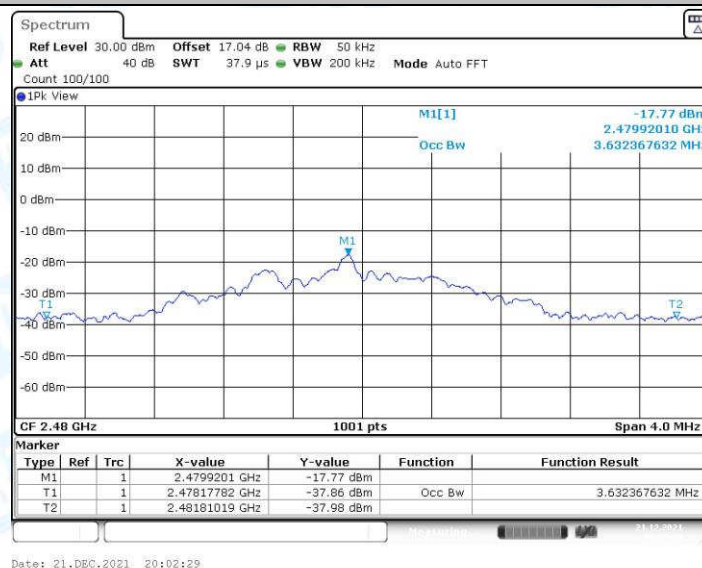
BLE\_1M\_Ant1\_2480



## BLE\_2M\_Ant1\_2402



## BLE\_2M\_Ant1\_2440



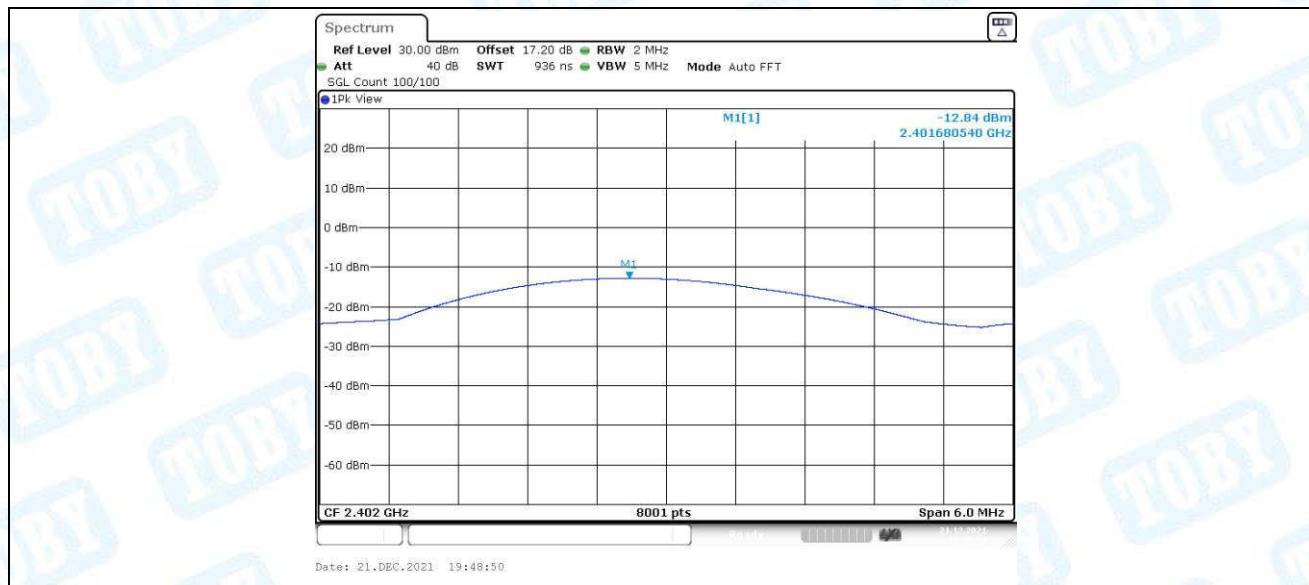
## BLE\_2M\_Ant1\_2480

### 3. Maximum conducted output power

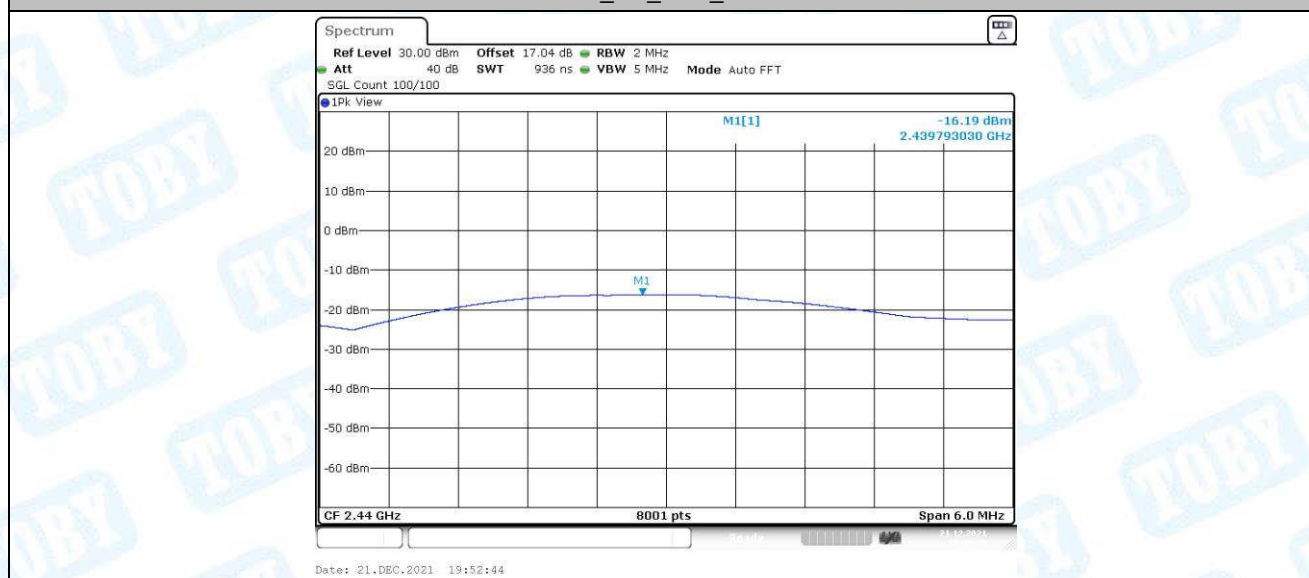
#### 3.1. Test Result

| Test Mode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|-----------|---------|---------|-------------|------------|---------|
| BLE_1M    | Ant1    | 2402    | -12.84      | ≤30        | PASS    |
|           |         | 2440    | -16.19      | ≤30        | PASS    |
|           |         | 2480    | -14.62      | ≤30        | PASS    |
| BLE_2M    | Ant1    | 2402    | -14.96      | ≤30        | PASS    |
|           |         | 2440    | -15.87      | ≤30        | PASS    |
|           |         | 2480    | -15.25      | ≤30        | PASS    |

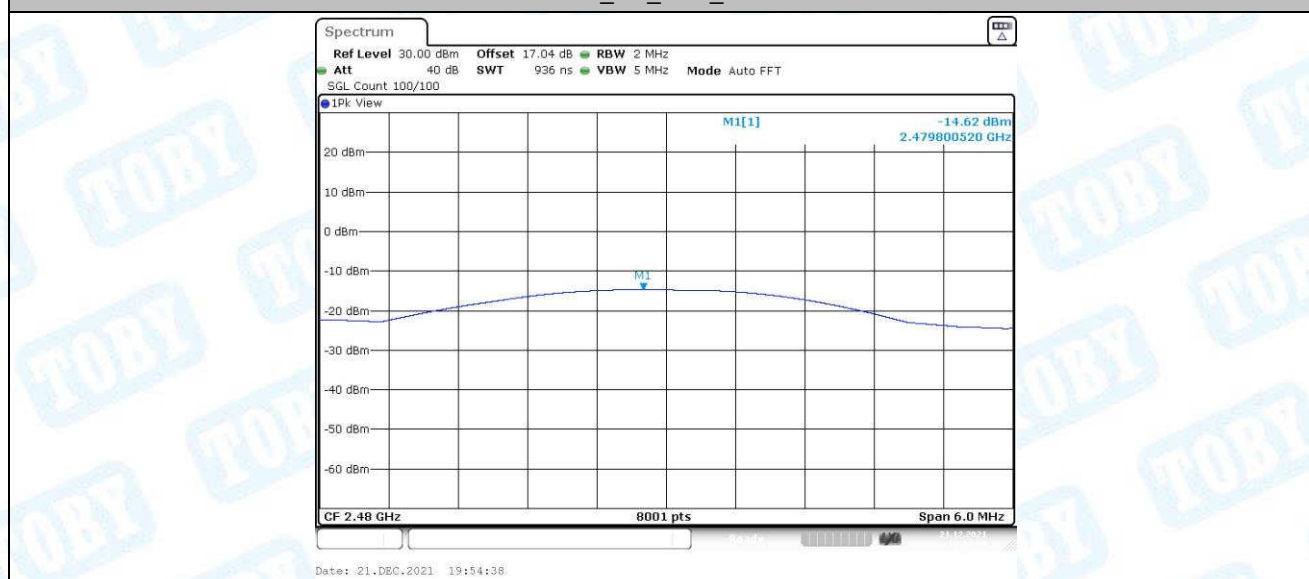
### 3.2. Test Graphs



BLE\_1M\_Ant1\_2402



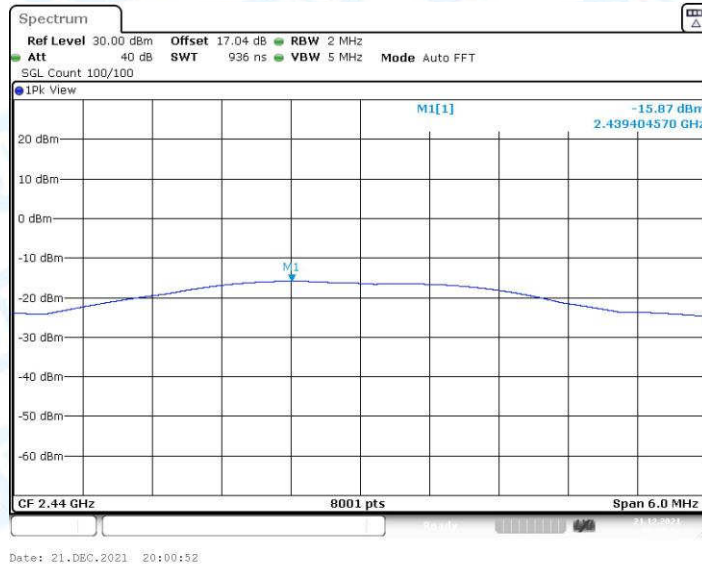
BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480



BLE\_2M\_Ant1\_2402



BLE\_2M\_Ant1\_2440



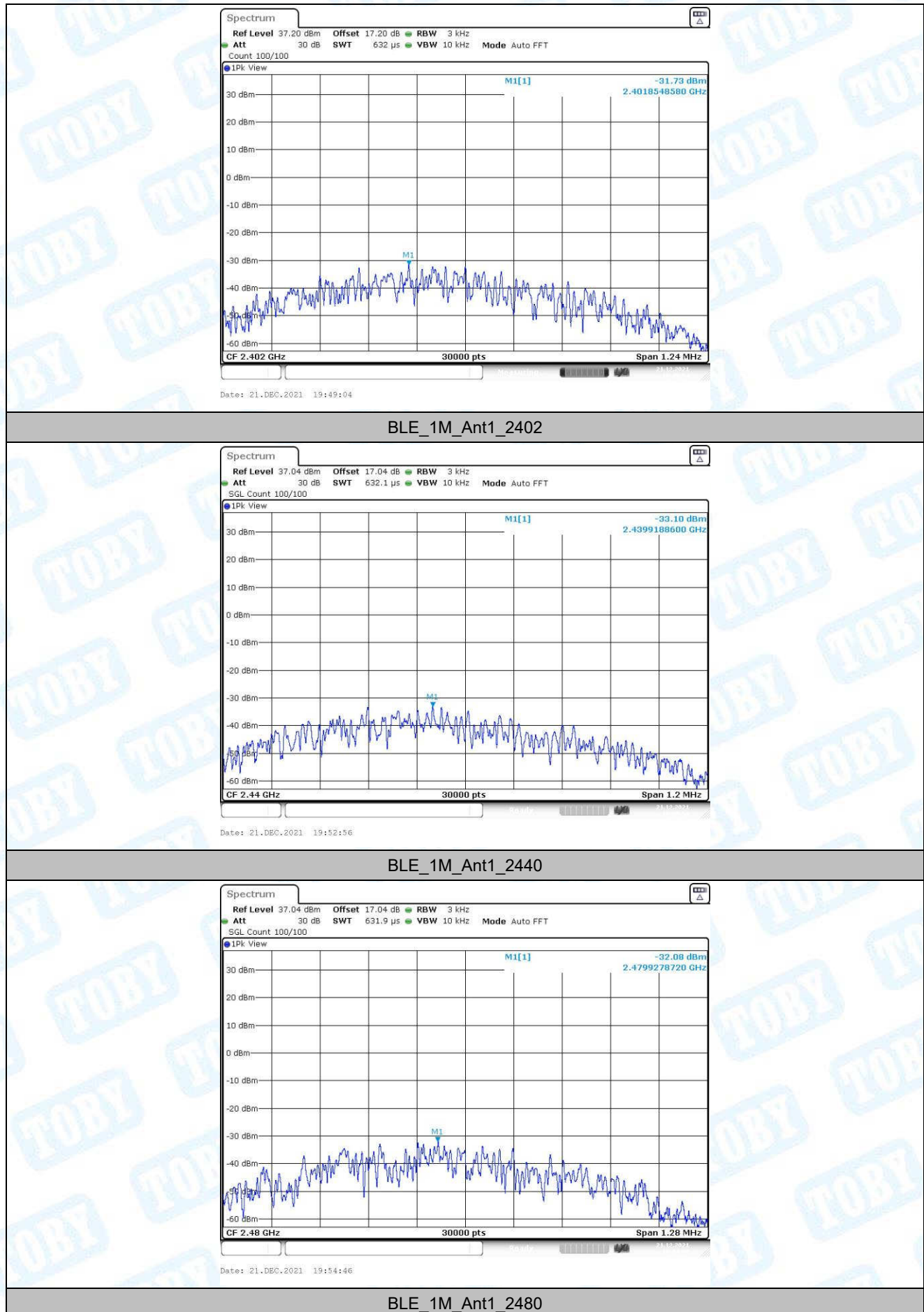
BLE\_2M\_Ant1\_2480

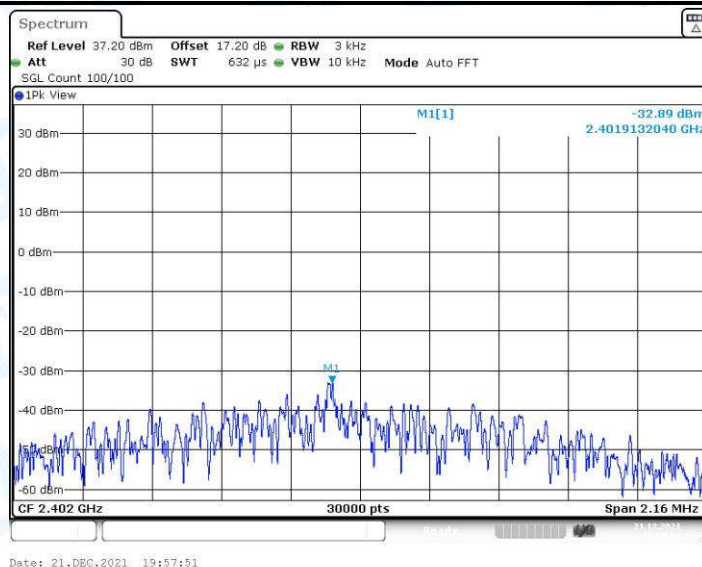
## 4. Maximum power spectral density

### 4.1. Test Result

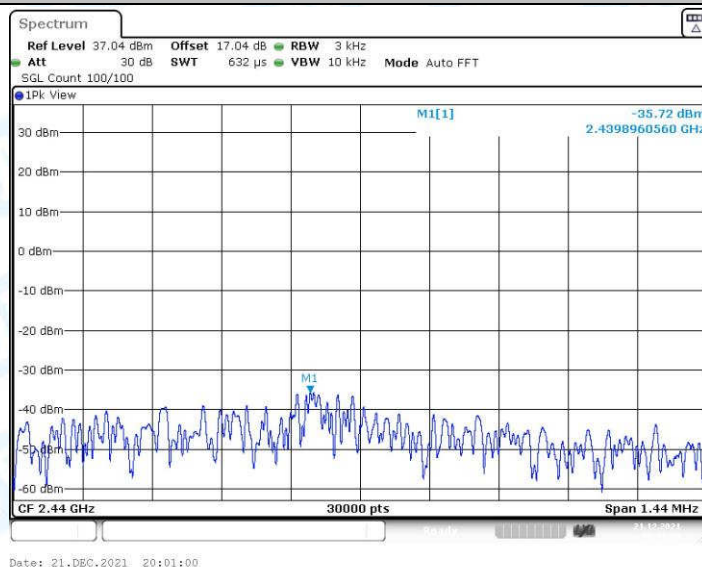
| Test Mode | Antenna | Channel | Result[dBm/3kHz] | Limit[dBm/3kHz] | Verdict |
|-----------|---------|---------|------------------|-----------------|---------|
| BLE_1M    | Ant1    | 2402    | -31.73           | ≤8              | PASS    |
|           |         | 2440    | -33.1            | ≤8              | PASS    |
|           |         | 2480    | -32.08           | ≤8              | PASS    |
| BLE_2M    | Ant1    | 2402    | -32.89           | ≤8              | PASS    |
|           |         | 2440    | -35.72           | ≤8              | PASS    |
|           |         | 2480    | -33.65           | ≤8              | PASS    |

## 4.2. Test Graphs

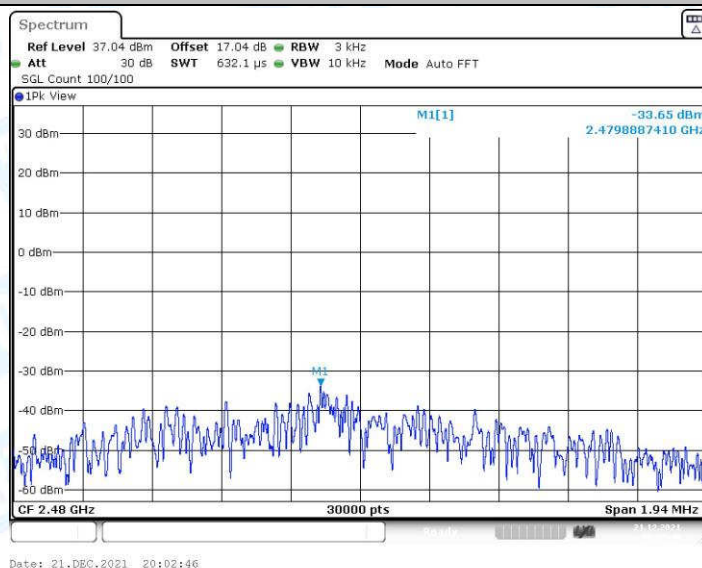




BLE\_2M\_Ant1\_2402



BLE\_2M\_Ant1\_2440



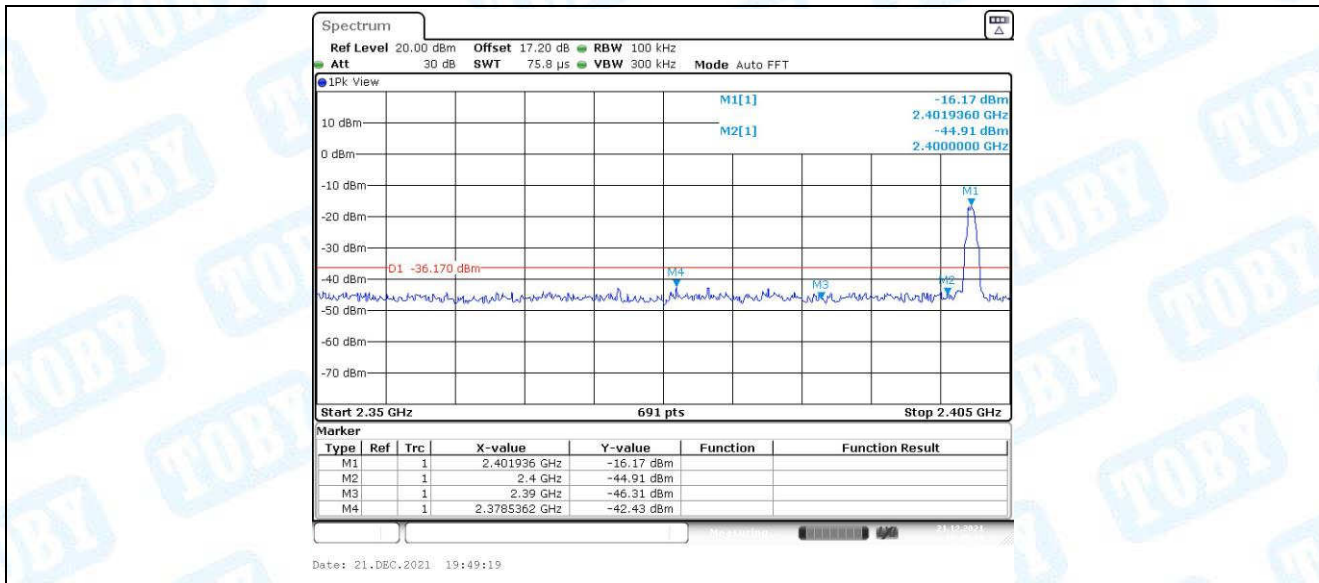
BLE\_2M\_Ant1\_2480

## 5. Band edge measurements

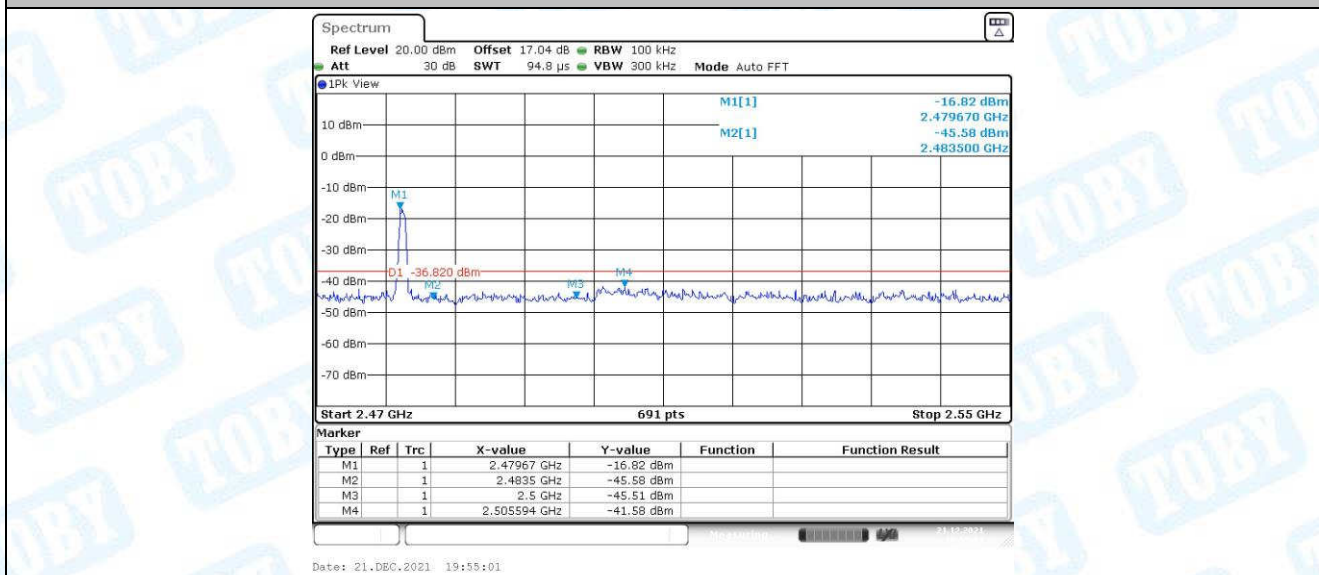
### 5.1. Test Result

| Test Mode | Antenna | ChName | Channel | Ref.Level[dBm] | Result[dBm] | Limit[dBm]    | Verdict |
|-----------|---------|--------|---------|----------------|-------------|---------------|---------|
| BLE_1M    | Ant1    | Low    | 2402    | -16.17         | -42.43      | $\leq -36.17$ | PASS    |
|           |         | High   | 2480    | -16.82         | -41.58      | $\leq -36.82$ | PASS    |
| BLE_2M    | Ant1    | Low    | 2402    | -16.08         | -42.47      | $\leq -36.08$ | PASS    |
|           |         | High   | 2480    | -16.76         | -41.9       | $\leq -36.76$ | PASS    |

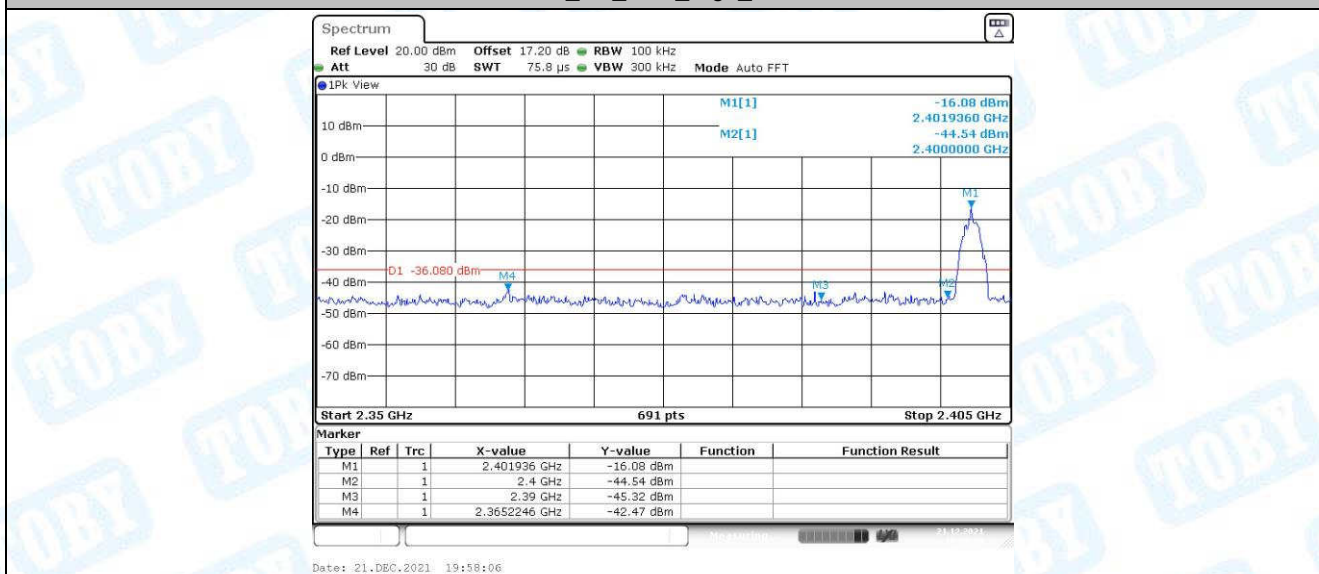
## 5.2.Test Graphs



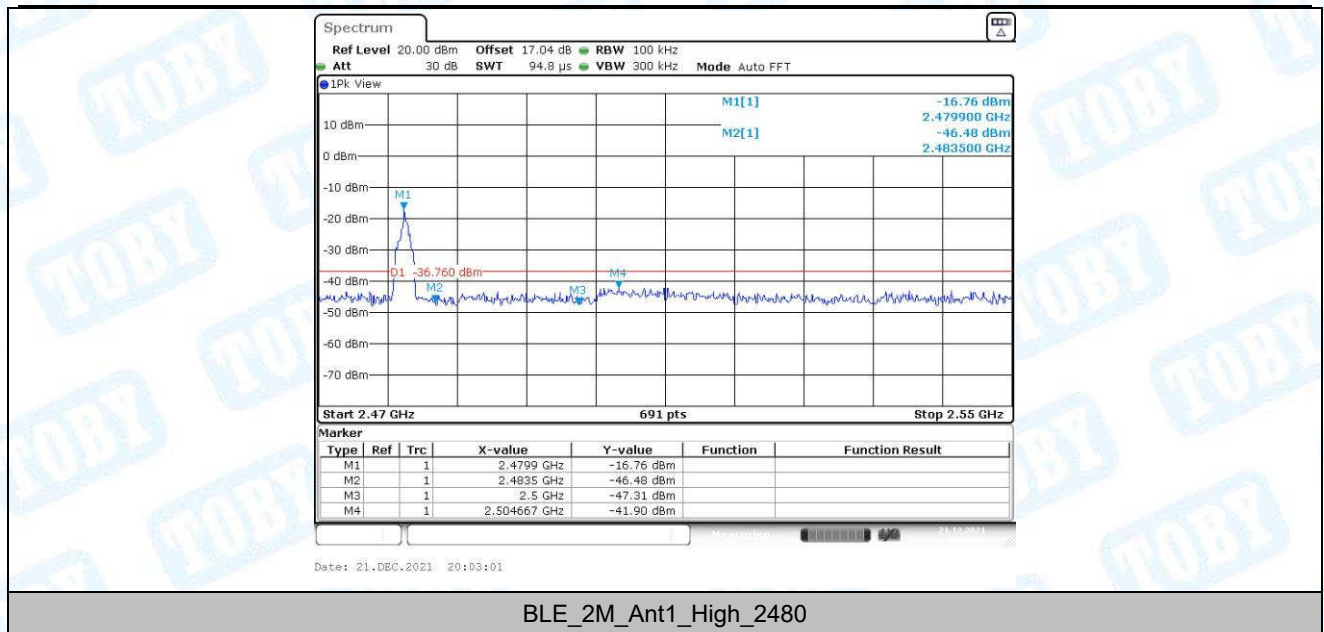
BLE\_1M\_Ant1\_Low\_2402



BLE\_1M\_Ant1\_High\_2480



BLE\_2M\_Ant1\_Low\_2402



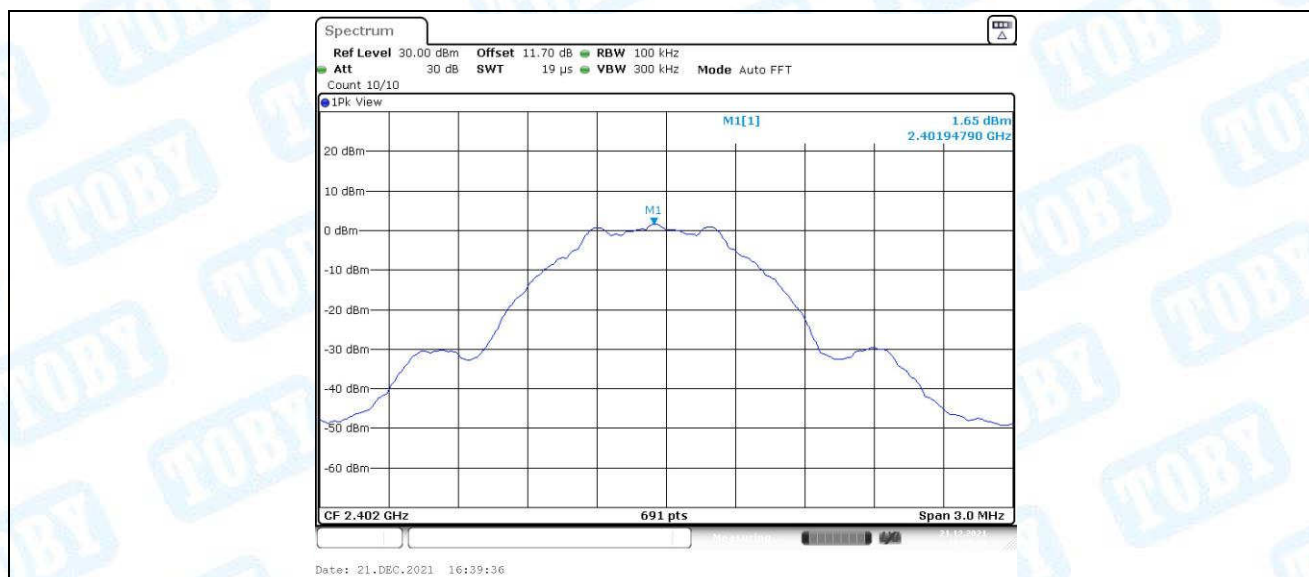
BLE\_2M\_Ant1\_High\_2480

## 6. Conducted Spurious Emission

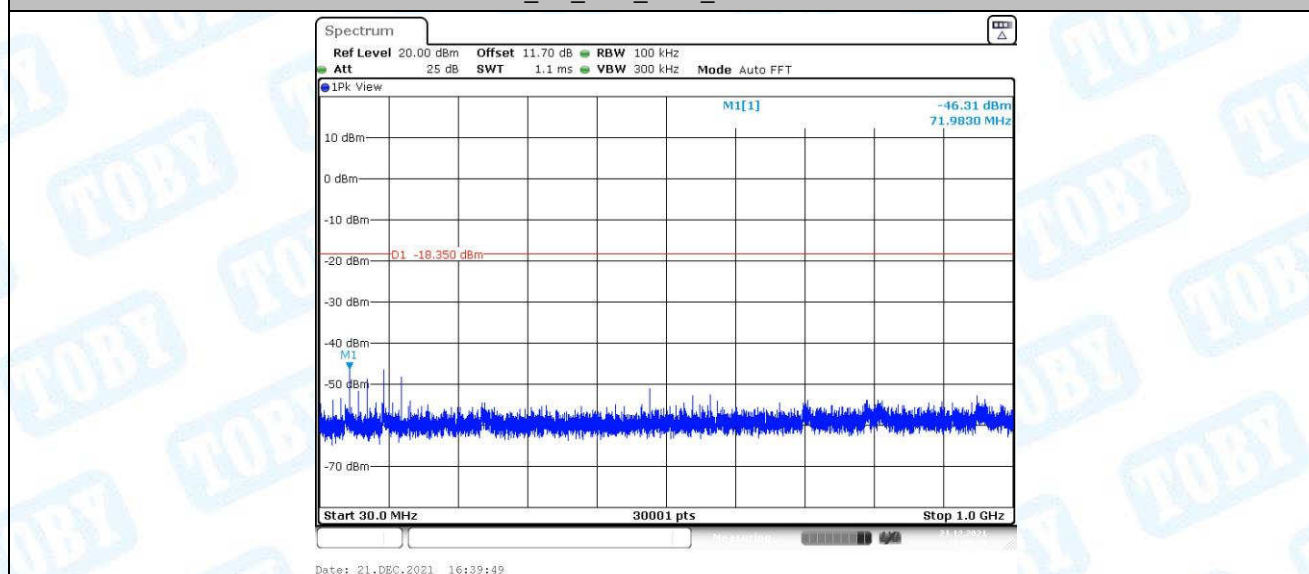
### 6.1. Test Result

| Test Mode | Antenna | Channel | Freq. Range [MHz] | Ref. Level [dBm] | Result[dBm] | Limit[dBm]    | Verdict |
|-----------|---------|---------|-------------------|------------------|-------------|---------------|---------|
| BLE_1M    | Ant1    | 2402    | Reference         | 1.65             | 1.65        | ---           | PASS    |
|           |         |         | 30~1000           | 1.65             | -46.31      | $\leq -18.35$ | PASS    |
|           |         |         | 1000~26500        | 1.65             | -46.89      | $\leq -18.35$ | PASS    |
|           |         | 2440    | Reference         | 1.58             | 1.58        | ---           | PASS    |
|           |         |         | 30~1000           | 1.58             | -45.94      | $\leq -18.42$ | PASS    |
|           |         |         | 1000~26500        | 1.58             | -47.06      | $\leq -18.42$ | PASS    |
|           |         | 2480    | Reference         | 1.36             | 1.36        | ---           | PASS    |
|           |         |         | 30~1000           | 1.36             | -46.26      | $\leq -18.64$ | PASS    |
|           |         |         | 1000~26500        | 1.36             | -47.34      | $\leq -18.64$ | PASS    |
| BLE_2M    | Ant1    | 2402    | Reference         | 1.69             | 1.69        | ---           | PASS    |
|           |         |         | 30~1000           | 1.69             | -46.43      | $\leq -18.31$ | PASS    |
|           |         |         | 1000~26500        | 1.69             | -46.53      | $\leq -18.31$ | PASS    |
|           |         | 2440    | Reference         | 1.57             | 1.57        | ---           | PASS    |
|           |         |         | 30~1000           | 1.57             | -45.47      | $\leq -18.43$ | PASS    |
|           |         |         | 1000~26500        | 1.57             | -46.45      | $\leq -18.43$ | PASS    |
|           |         | 2480    | Reference         | 1.37             | 1.37        | ---           | PASS    |
|           |         |         | 30~1000           | 1.37             | -46.58      | $\leq -18.63$ | PASS    |
|           |         |         | 1000~26500        | 1.37             | -46.84      | $\leq -18.63$ | PASS    |

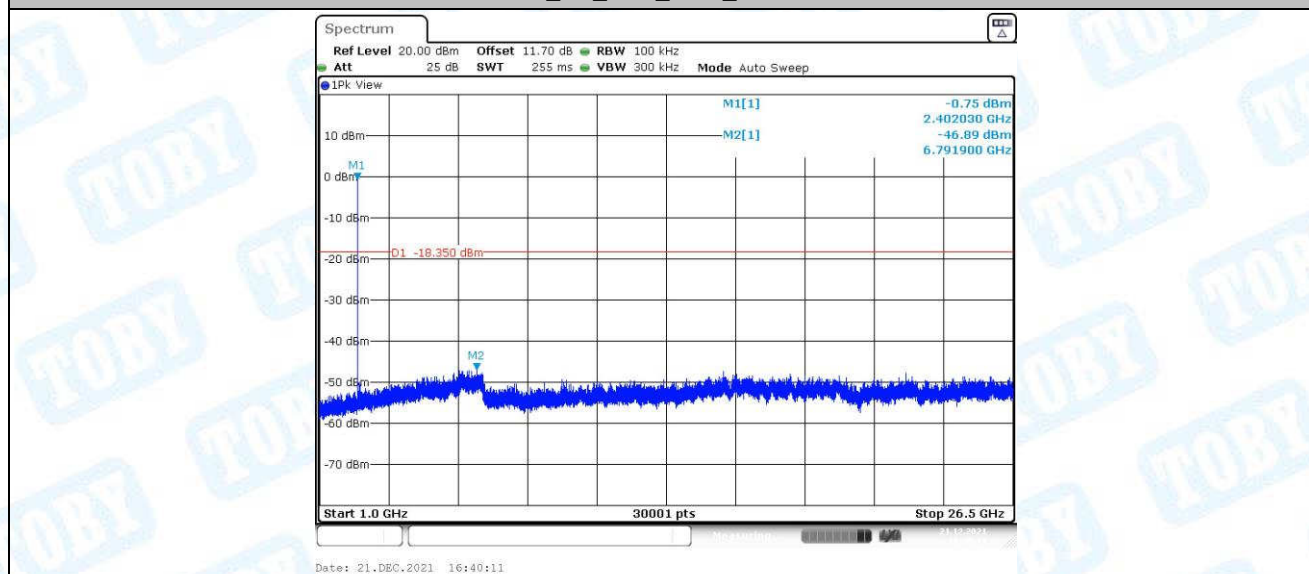
## 6.2. Test Graphs



BLE\_1M\_Ant1\_2402\_0~Reference



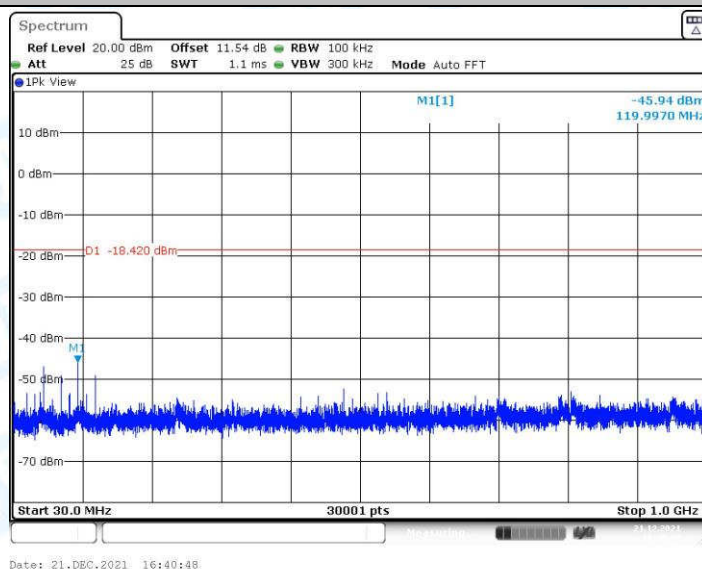
BLE\_1M\_Ant1\_2402\_30~1000



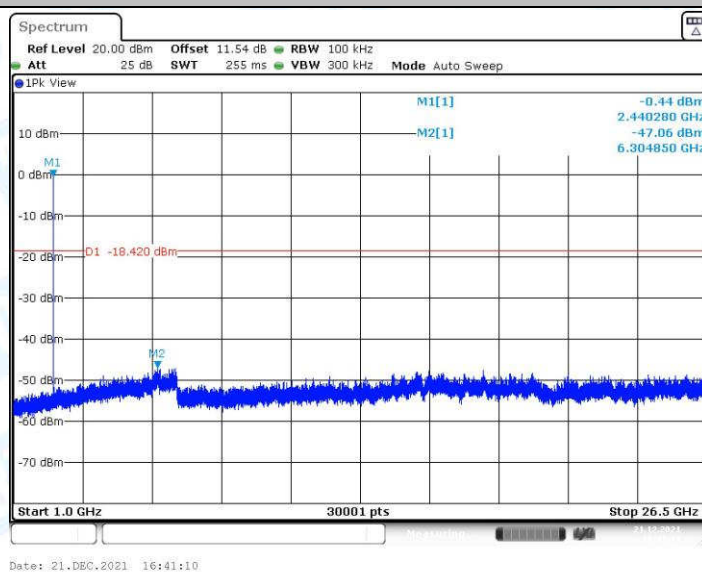
BLE\_1M\_Ant1\_2402\_1000~26500



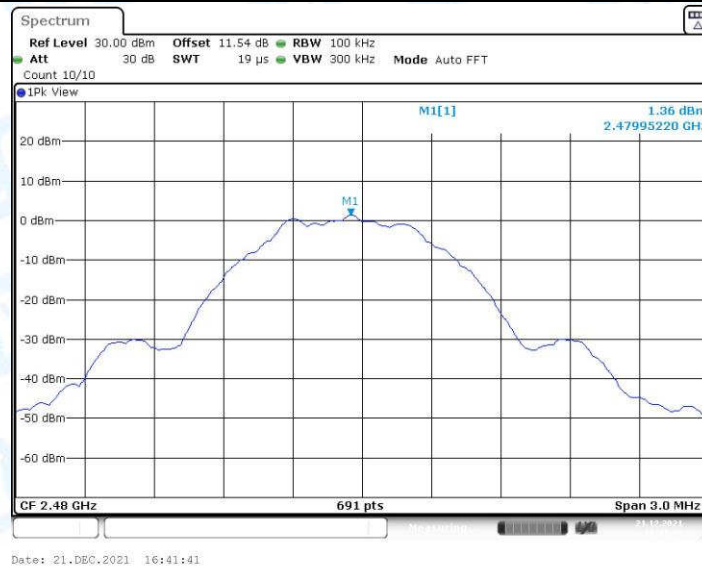
## BLE\_1M\_Ant1\_2440\_0~Reference



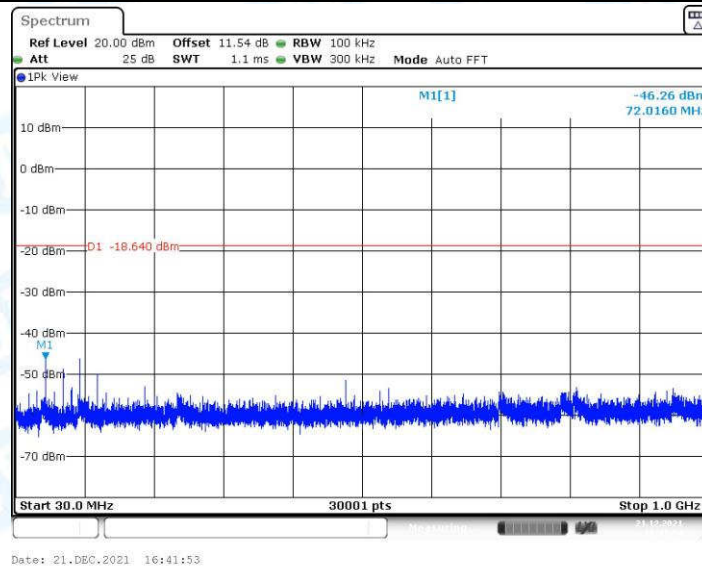
## BLE\_1M\_Ant1\_2440\_30~1000



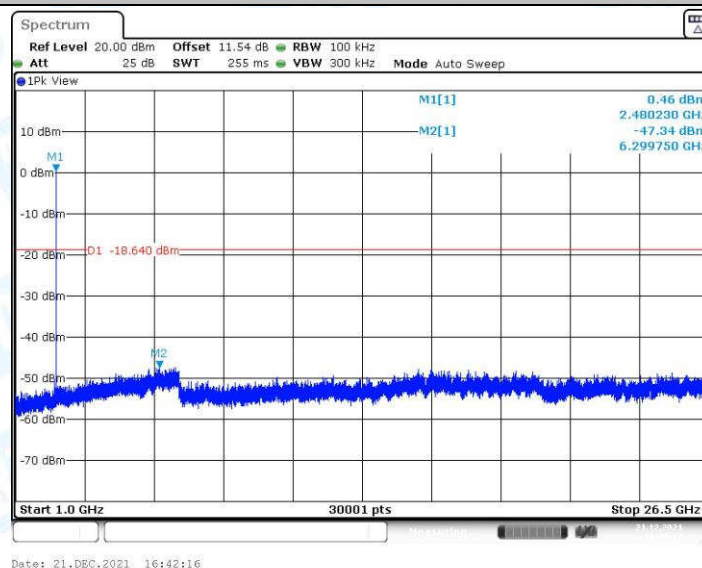
## BLE\_1M\_Ant1\_2440\_1000~26500



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



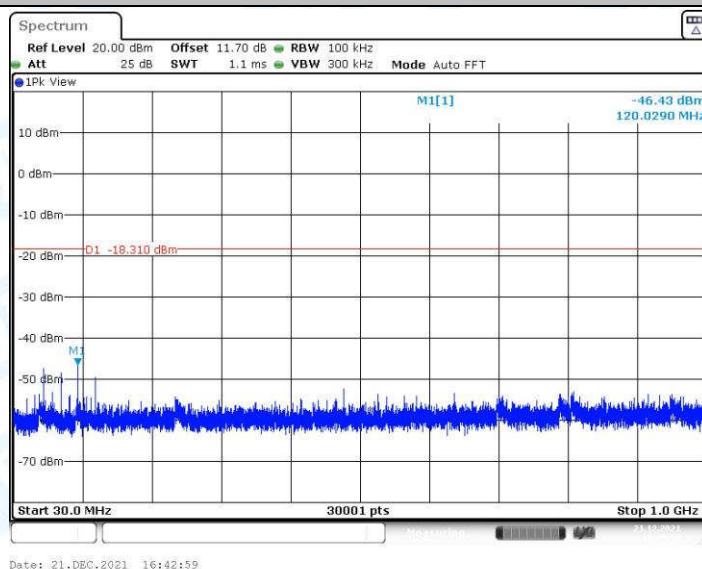
## BLE\_1M\_Ant1\_2480\_30~1000



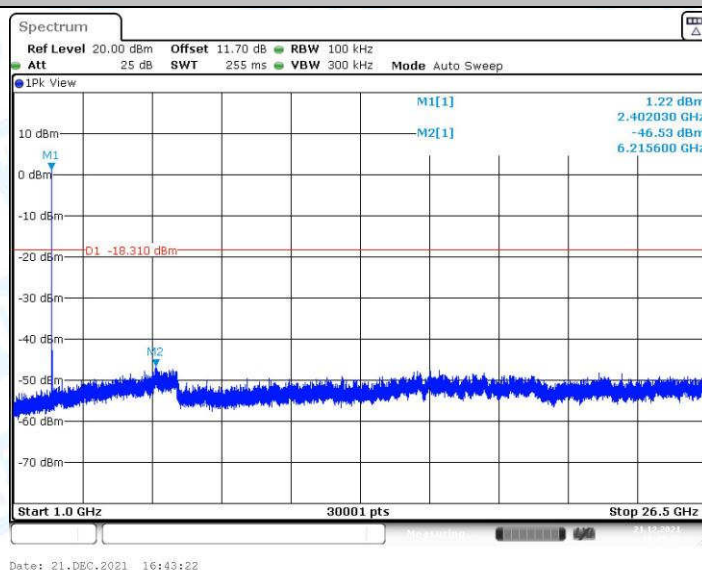
## BLE\_1M\_Ant1\_2480\_1000~26500



## BLE\_2M\_Ant1\_2402\_0~Reference



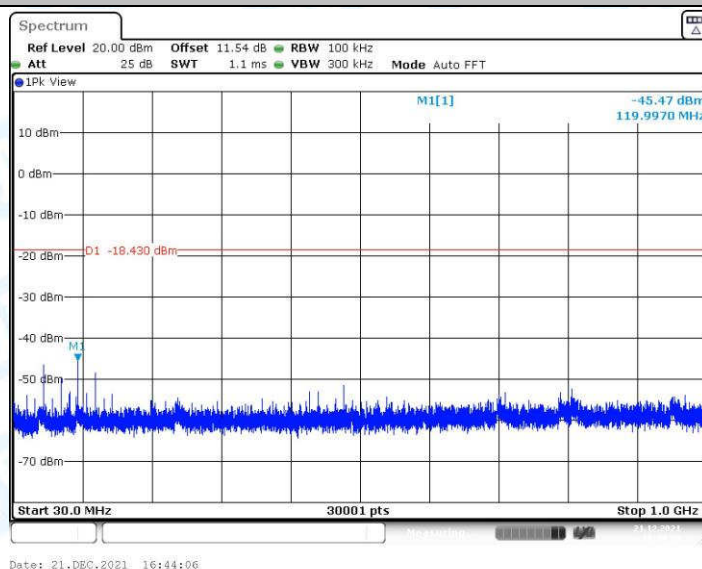
## BLE\_2M\_Ant1\_2402\_30~1000



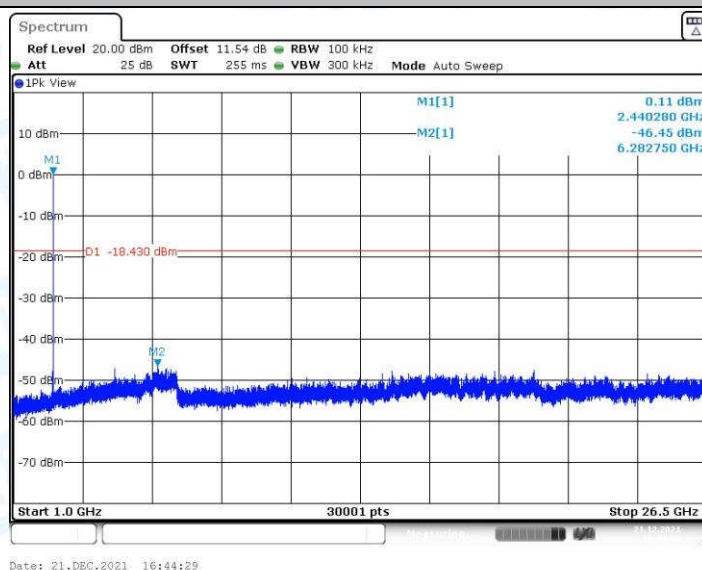
## BLE\_2M\_Ant1\_2402\_1000~26500



## BLE\_2M\_Ant1\_2440\_0~Reference



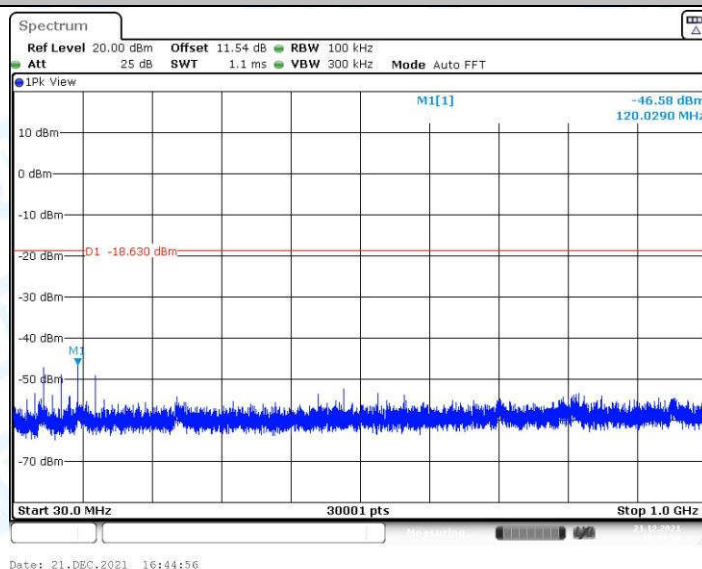
## BLE\_2M\_Ant1\_2440\_30~1000



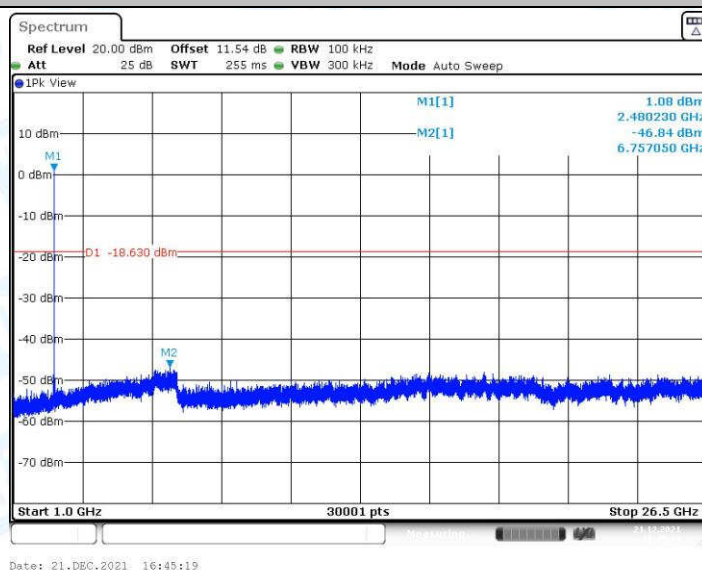
## BLE\_2M\_Ant1\_2440\_1000~26500



## BLE\_2M\_Ant1\_2480\_0~Reference



## BLE\_2M\_Ant1\_2480\_30~1000



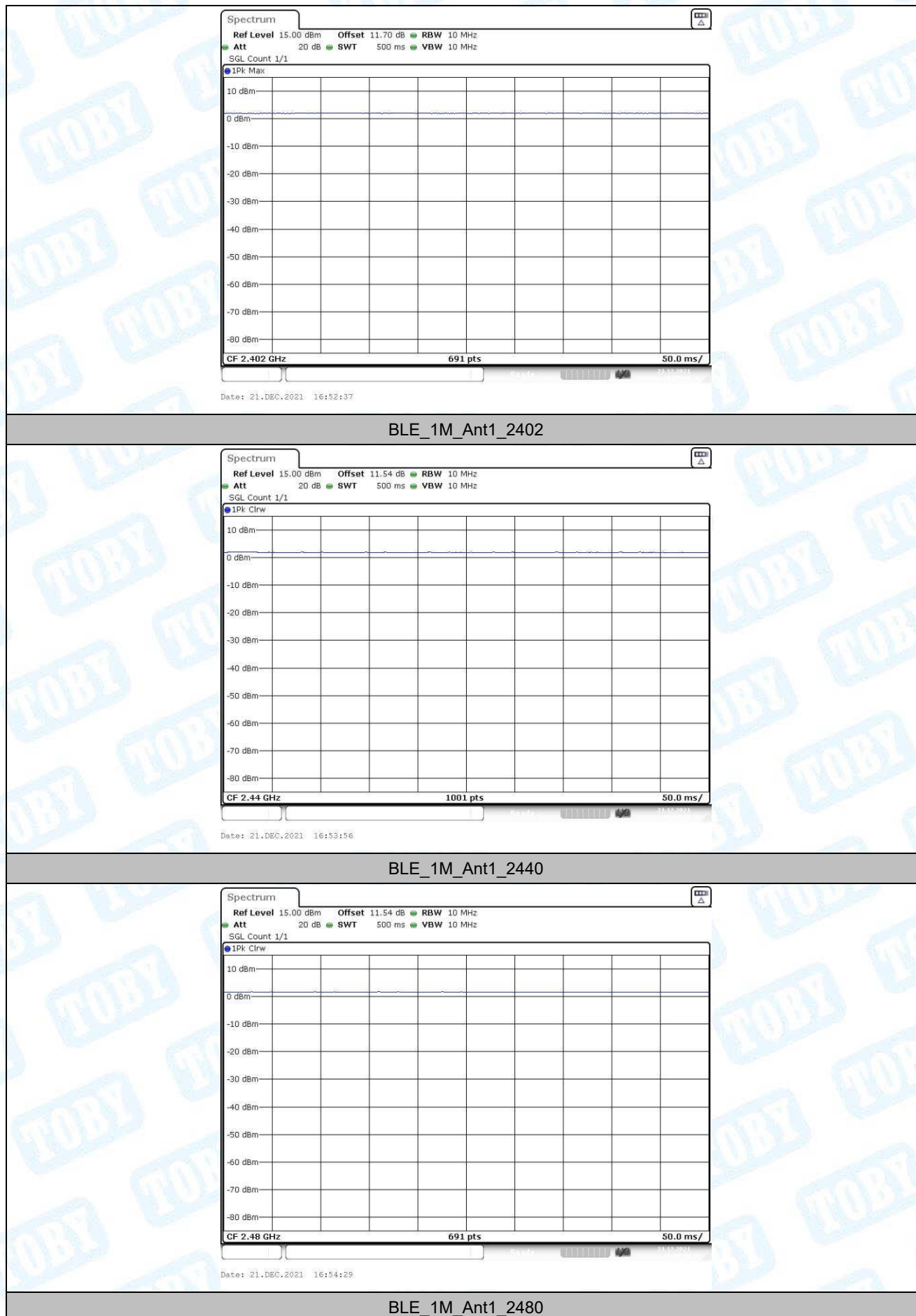
## BLE\_2M\_Ant1\_2480\_1000~26500

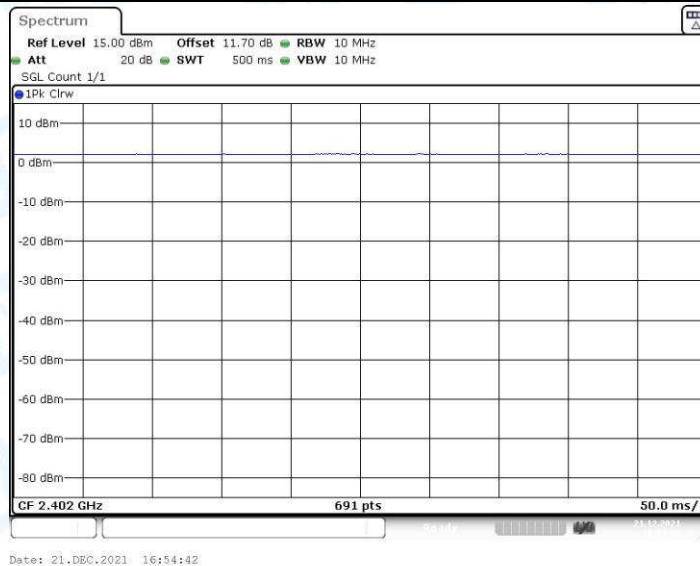
## 7. Duty Cycle

### 7.1. Test Result

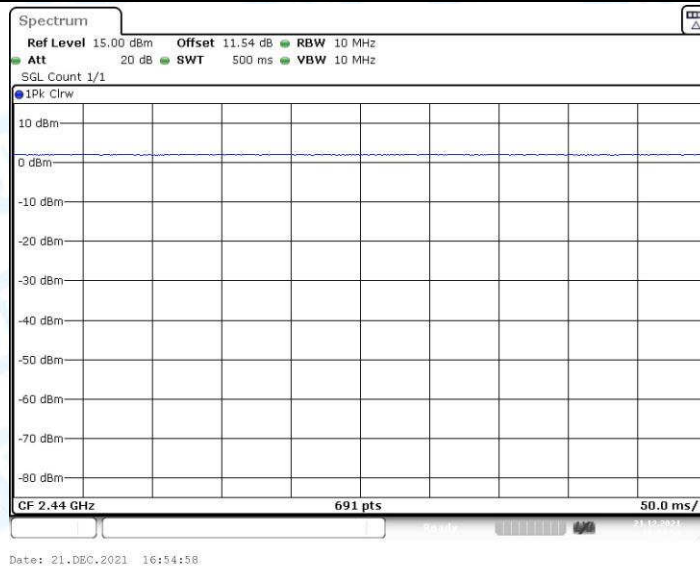
| Test Mode | Antenna | Channel | Transmission Duration [ms] | Transmission Period [ms] | Duty Cycle [%] | Limit | Verdict |
|-----------|---------|---------|----------------------------|--------------------------|----------------|-------|---------|
| BLE_1M    | Ant1    | 2402    | 0.00                       | 0.00                     | 100            | ---   | PASS    |
|           |         | 2440    | 0.00                       | 0.00                     | 100            | ---   | PASS    |
|           |         | 2480    | 0.01                       | 0.00                     | 100            | ---   | PASS    |
| BLE_2M    | Ant1    | 2402    | 0.00                       | 0.00                     | 100            | ---   | PASS    |
|           |         | 2440    | 0.00                       | 0.00                     | 100            | ---   | PASS    |
|           |         | 2480    | 0.00                       | 0.00                     | 100            | ---   | PASS    |

## 7.2. Test Graphs

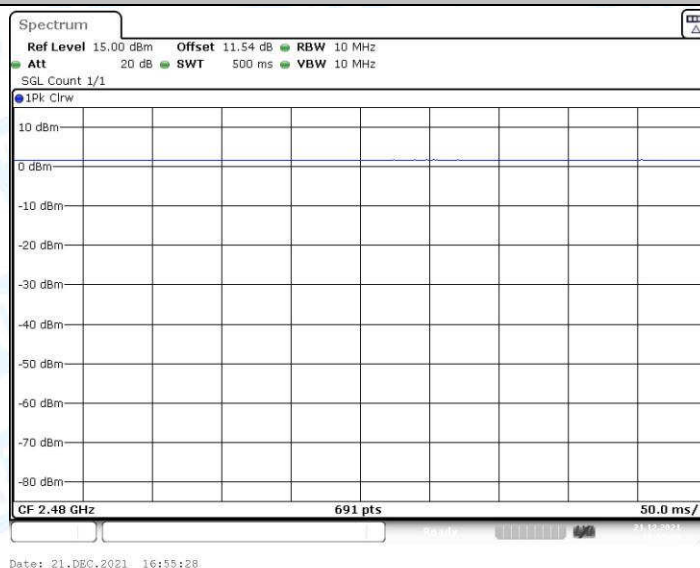




## BLE\_2M\_Ant1\_2402



## BLE\_2M\_Ant1\_2440



## BLE\_2M\_Ant1\_2480

## 8. Emissions in Restricted Bands

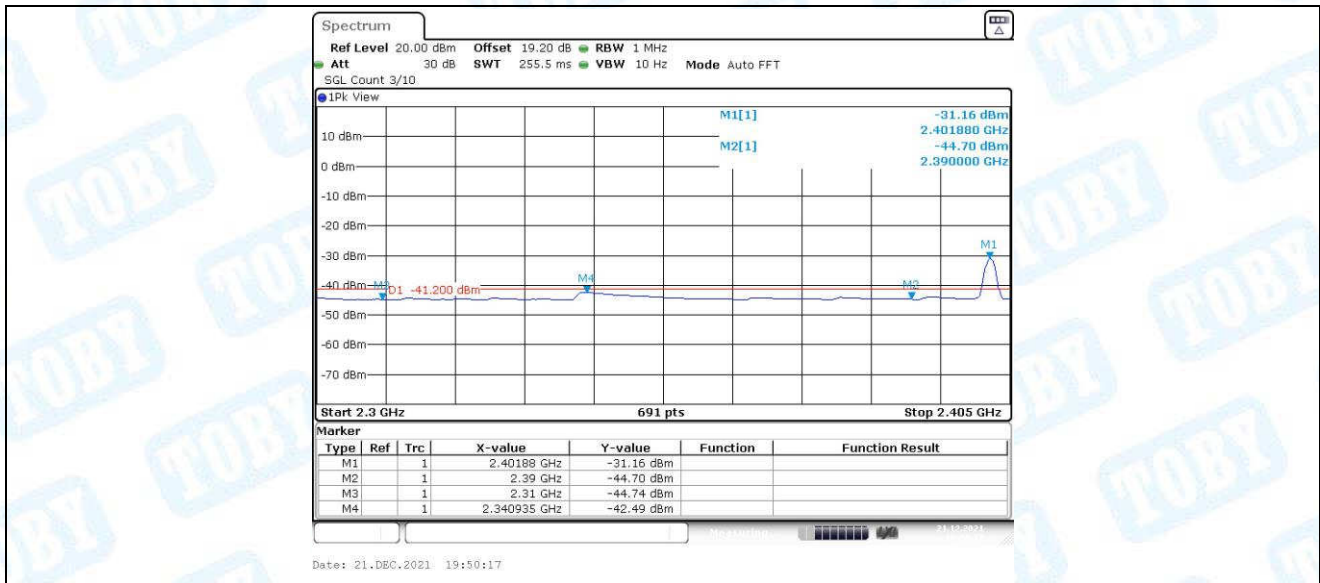
### 8.1. Test Result

| Test Mode | Antenna | ChName | Channel | Detector | Freq. [MHz] | Result [dBm] | Limit [dBm] | Verdict |
|-----------|---------|--------|---------|----------|-------------|--------------|-------------|---------|
| BLE_1M    | Ant1    | Low    | 2402    | AV       | 2310.000    | -44.74       | ≤-41.20     | PASS    |
|           |         |        |         | AV       | 2340.935    | -42.49       | ≤-41.20     | PASS    |
|           |         |        |         | AV       | 2390.000    | -44.7        | ≤-41.20     | PASS    |
|           |         |        |         | Peak     | 2310.000    | -32.92       | ≤-21.20     | PASS    |
|           |         |        |         | Peak     | 2342.457    | -30.05       | ≤-21.20     | PASS    |
|           |         |        |         | Peak     | 2390.000    | -32.5        | ≤-21.20     | PASS    |
|           |         | High   | 2480    | AV       | 2483.500    | -43.88       | ≤-41.20     | PASS    |
|           |         |        |         | AV       | 2497.246    | -43.66       | ≤-41.20     | PASS    |
|           |         |        |         | AV       | 2500.000    | -43.89       | ≤-41.20     | PASS    |
|           |         |        |         | Peak     | 2483.500    | -34.45       | ≤-21.20     | PASS    |
|           |         |        |         | Peak     | 2497.826    | -30.83       | ≤-21.20     | PASS    |
|           |         |        |         | Peak     | 2500.000    | -32.61       | ≤-21.20     | PASS    |
| BLE_2M    | Ant1    | Low    | 2402    | AV       | 2310.000    | -44.75       | ≤-41.20     | PASS    |
|           |         |        |         | AV       | 2340.935    | -42.46       | ≤-41.20     | PASS    |
|           |         |        |         | AV       | 2390.000    | -44.7        | ≤-41.20     | PASS    |
|           |         |        |         | Peak     | 2310.000    | -35.31       | ≤-21.20     | PASS    |
|           |         |        |         | Peak     | 2346.717    | -32.09       | ≤-21.20     | PASS    |
|           |         |        |         | Peak     | 2390.000    | -36.06       | ≤-21.20     | PASS    |
|           |         | High   | 2480    | AV       | 2483.500    | -43.89       | ≤-41.20     | PASS    |
|           |         |        |         | AV       | 2497.246    | -43.64       | ≤-41.20     | PASS    |
|           |         |        |         | AV       | 2500.000    | -43.94       | ≤-41.20     | PASS    |
|           |         |        |         | Peak     | 2483.500    | -39.37       | ≤-21.20     | PASS    |
|           |         |        |         | Peak     | 2493.420    | -35.29       | ≤-21.20     | PASS    |
|           |         |        |         | Peak     | 2500.000    | -37.07       | ≤-21.20     | PASS    |

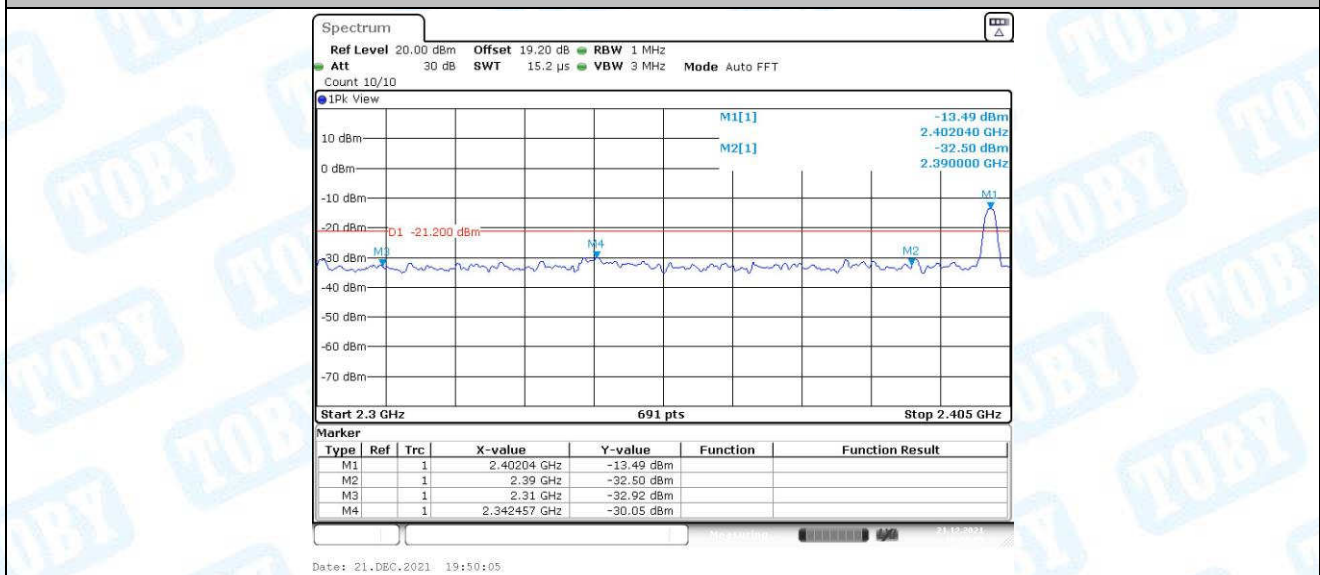
Note:

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.

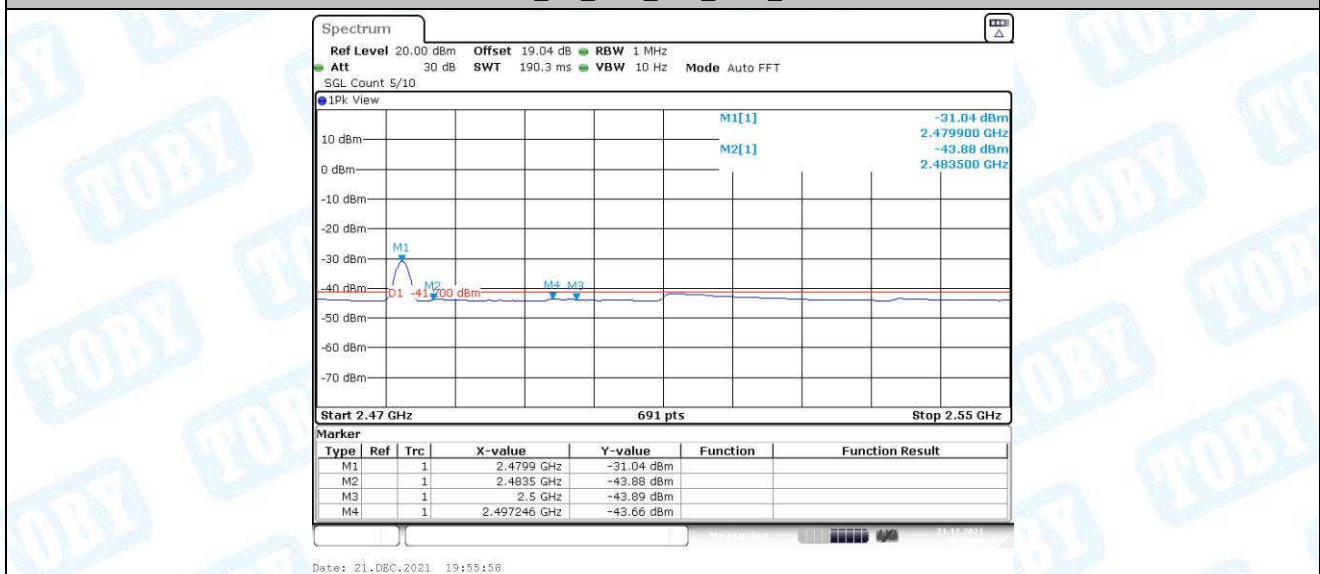
## 8.2.Test Graphs



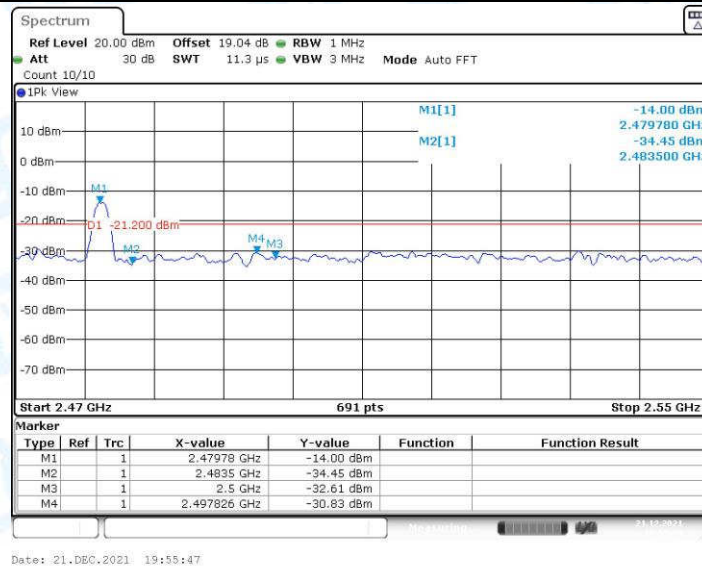
BLE\_1M\_Ant1\_Low\_2402\_AV



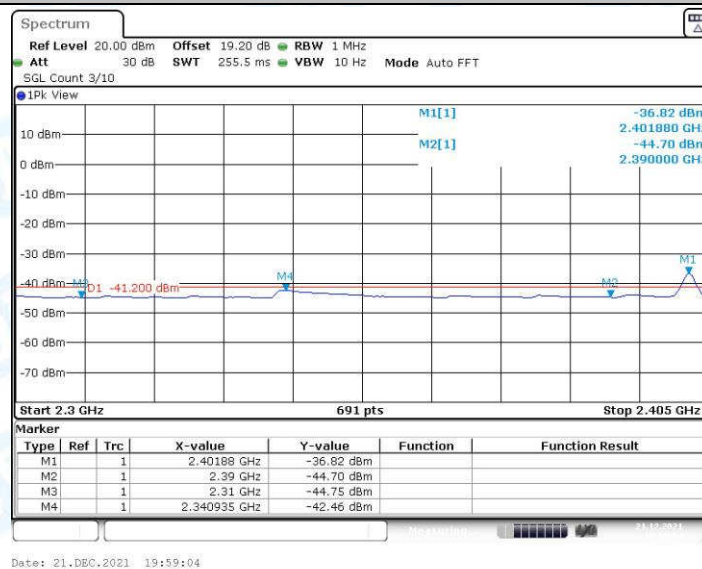
BLE\_1M\_Ant1\_Low\_2402\_Peak



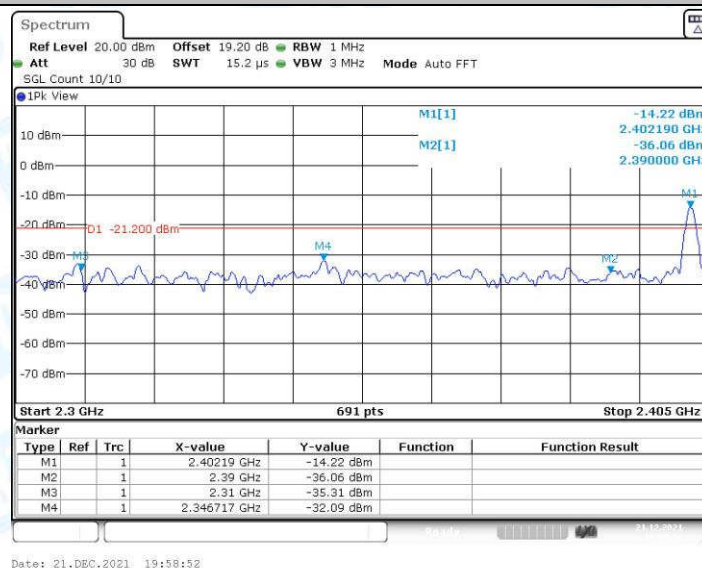
BLE\_1M\_Ant1\_High\_2480\_AV



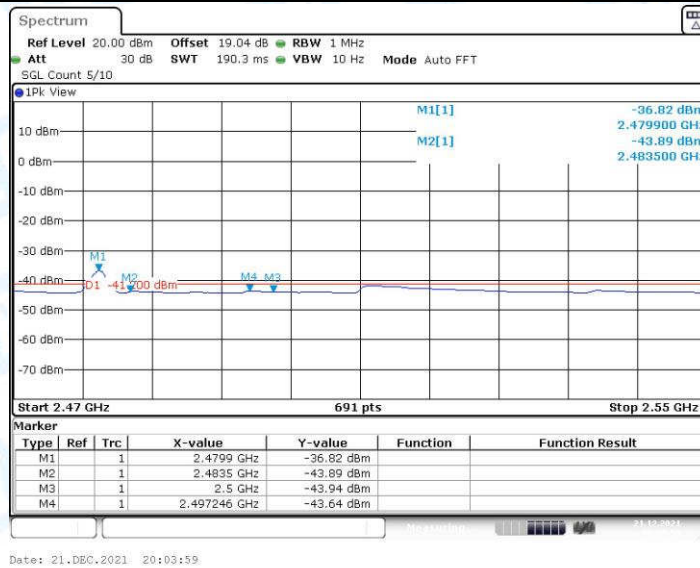
## BLE\_1M\_Ant1\_High\_2480\_Peak



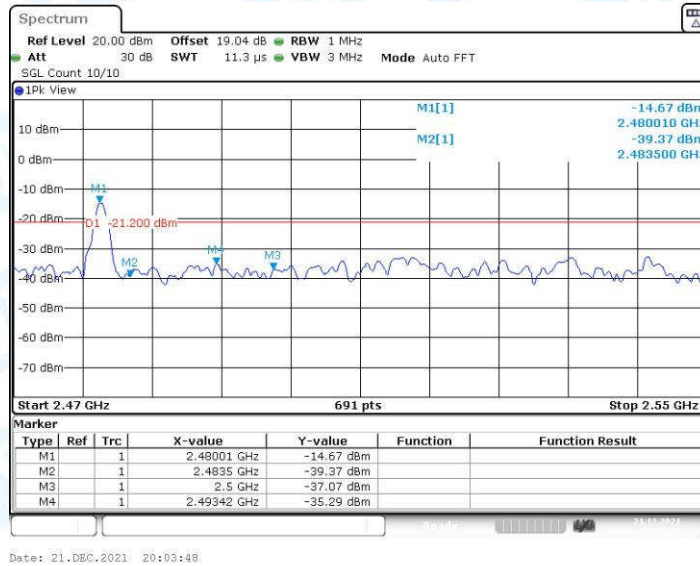
## BLE\_2M\_Ant1\_Low\_2402\_AV



## BLE\_2M\_Ant1\_Low\_2402\_Peak



### BLE\_2M\_Ant1\_High\_2480\_AV



### BLE\_2M\_Ant1\_High\_2480\_Peak

-----End of the report-----