



■ Report No.:DDT-RE23062503-2E01

■ Issued Date: Jun. 26, 2023

## FCC CERTIFICATION TEST REPORT

### FOR

|                      |   |                                               |
|----------------------|---|-----------------------------------------------|
| Applicant            | : | Globe Electric Company Inc.                   |
| Address              | : | 150 Oneida, Montreal, Quebec, Canada, H9R 1A8 |
| Equipment under Test | : | Smart Light Switch                            |
| Model No.            | : | 50367                                         |
| Trade Mark           | : | Globe                                         |
| FCC ID               | : | 2AQUQGE50367                                  |
| Manufacturer         | : | Globe Electric Company Inc.                   |
| Address              | : | 150 Oneida, Montreal, Quebec, Canada, H9R 1A8 |

**Issued By: Dongguan Dongdian Testing Service Co., Ltd.**

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# REPORT

## Table of Contents

|      |                                                   |    |
|------|---------------------------------------------------|----|
|      | Test report declares.....                         | 4  |
| 1.   | Summary of Test Results.....                      | 6  |
| 2.   | General Test Information .....                    | 7  |
| 2.1. | Description of EUT .....                          | 7  |
| 2.2. | Accessories of EUT.....                           | 7  |
| 2.3. | Assistant equipment used for test.....            | 7  |
| 2.4. | Block diagram of EUT configuration for test ..... | 8  |
| 2.5. | Test environment conditions .....                 | 8  |
| 2.6. | Deviations of test standard.....                  | 8  |
| 2.7. | Test laboratory .....                             | 8  |
| 2.8. | Measurement uncertainty.....                      | 9  |
| 3.   | Equipment Used During Test.....                   | 10 |
| 4.   | 6 dB Bandwidth .....                              | 12 |
| 4.1. | Block diagram of test setup.....                  | 12 |
| 4.2. | Limits .....                                      | 12 |
| 4.3. | Test procedure .....                              | 12 |
| 4.4. | Test result.....                                  | 12 |
| 4.5. | Test graphs .....                                 | 13 |
| 5.   | Maximum Peak Output Power .....                   | 15 |
| 5.1. | Block diagram of test setup.....                  | 15 |
| 5.2. | Limits .....                                      | 15 |
| 5.3. | Test procedure .....                              | 15 |
| 5.4. | Test result peak.....                             | 15 |
| 5.5. | Test graphs peak.....                             | 16 |
| 6.   | Power Spectral Density.....                       | 18 |
| 6.1. | Block diagram of test setup.....                  | 18 |
| 6.2. | Limits .....                                      | 18 |
| 6.3. | Test procedure .....                              | 18 |
| 6.4. | Test result.....                                  | 18 |
| 6.5. | Test graphs .....                                 | 19 |
| 7.   | Band Edge Compliance (Conducted Method) .....     | 21 |
| 7.1. | Block diagram of test setup.....                  | 21 |
| 7.2. | Limits .....                                      | 21 |
| 7.3. | Test procedure .....                              | 21 |
| 7.4. | Test result.....                                  | 21 |
| 7.5. | Test graphs .....                                 | 22 |
| 8.   | RF Conducted Spurious Emissions .....             | 24 |

|       |                                               |    |
|-------|-----------------------------------------------|----|
| 8.1.  | Block diagram of test setup.....              | 24 |
| 8.2.  | Limits .....                                  | 24 |
| 8.3.  | Test procedure .....                          | 24 |
| 8.4.  | Test result.....                              | 25 |
| 8.5.  | Test graphs .....                             | 25 |
| 9.    | Duty Cycle .....                              | 32 |
| 9.1.  | Block diagram of test setup.....              | 32 |
| 9.2.  | Limit .....                                   | 32 |
| 9.3.  | Test procedure .....                          | 32 |
| 9.4.  | Test result.....                              | 32 |
| 9.5.  | Test graphs .....                             | 33 |
| 10.   | Radiated Emission .....                       | 35 |
| 10.1. | Block diagram of test setup.....              | 35 |
| 10.2. | Limit .....                                   | 36 |
| 10.3. | Test Procedure .....                          | 37 |
| 10.4. | Test result.....                              | 39 |
| 11.   | Emissions in Restricted Frequency Bands ..... | 54 |
| 11.1. | Block diagram of test setup.....              | 54 |
| 11.2. | Limit .....                                   | 54 |
| 11.3. | Test procedure .....                          | 54 |
| 11.4. | Test result.....                              | 54 |
| 12.   | Power Line Conducted Emission .....           | 63 |
| 12.1. | Block diagram of test setup.....              | 63 |
| 12.2. | Power line conducted emission limits .....    | 63 |
| 12.3. | Test procedure .....                          | 63 |
| 12.4. | Test result.....                              | 64 |
| 13.   | Antenna Requirements .....                    | 67 |
| 13.1. | Limit .....                                   | 67 |
| 13.2. | Result .....                                  | 67 |
| 14.   | Test Setup Photograph .....                   | 68 |
| 15.   | Photos of the EUT .....                       | 70 |

## Test Report Declare

|                             |   |                                               |
|-----------------------------|---|-----------------------------------------------|
| <b>Applicant</b>            | : | Globe Electric Company Inc.                   |
| <b>Address</b>              | : | 150 Oneida, Montreal, Quebec, Canada, H9R 1A8 |
| <b>Equipment under Test</b> | : | Smart Light Switch                            |
| <b>Model No.</b>            | : | 50367                                         |
| <b>Trade Mark</b>           | : | Globe                                         |
| <b>Manufacturer</b>         | : | Globe Electric Company Inc.                   |
| <b>Address</b>              | : | 150 Oneida, Montreal, Quebec, Canada, H9R 1A8 |

**Test Standard Used:**

FCC Rules and Regulations Part 15 Subpart C

**Test Procedure Used:**

ANSI C63.10:2013

**We Declare:**

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

**After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.**

|                         |                     |                      |                               |
|-------------------------|---------------------|----------------------|-------------------------------|
| <b>Report No.:</b>      | DDT-RE23062503-2E01 |                      |                               |
| <b>Date of Receipt:</b> | Mar. 09, 2023       | <b>Date of Test:</b> | Mar. 09, 2023 ~ Apr. 20, 2023 |

**Prepared By:***Bobo Chen***Bobo Chen/Engineer****Approved By:****Damon Hu/EMC Manager**

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

## Revision History

| Rev. | Revisions     | Issue Date    | Revised By |
|------|---------------|---------------|------------|
| ---  | Initial issue | Jun. 26, 2023 |            |
|      |               |               |            |

## 1. Summary of Test Results

| The EUT have been tested according to the applicable standards as referenced below. |                                                                      |         |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------|
| Description of Test Item                                                            | Standard                                                             | Verdict |
| 6dB Bandwidth                                                                       | FCC Part 15: 15.247(a)(2)                                            | Pass    |
| Peak Output Power                                                                   | FCC Part 15: 15.247(b)(3)                                            | Pass    |
| Power Spectral Density                                                              | FCC Part 15:15.247(e)                                                | Pass    |
| Band Edge Compliance<br>(conducted method)                                          | FCC Part 15: 15.247(d)                                               | Pass    |
| RF Conducted Spurious Emissions                                                     | FCC Part 15: 15.247(d)                                               | Pass    |
| Radiation Emission                                                                  | FCC Part 15: 15.205<br>FCC Part 15: 15.209<br>FCC Part 15: 15.247(d) | Pass    |
| Emission in Restricted Frequency Bands                                              | FCC Part 15: 15.205<br>FCC Part 15: 15.209<br>FCC Part 15: 15.247(d) | Pass    |
| Power Line Conducted Emission                                                       | FCC Part 15: 15.207(a)                                               | Pass    |
| Antenna Requirement                                                                 | FCC Part 15: 15.203                                                  | Pass    |
| Note: All of the data and records refer to DDT-RE23030729-2E01.                     |                                                                      |         |

## 2. General Test Information

### 2.1. Description of EUT

|                          |                                                             |
|--------------------------|-------------------------------------------------------------|
| EUT Name                 | : Smart Light Switch                                        |
| Model Number             | : 50367                                                     |
| EUT Function Description | : Please reference user manual of this device               |
| Power Supply             | : AC 120V/60Hz                                              |
| Radio Specification      | : Bluetooth V5.1                                            |
| Operation Frequency      | : 2402 MHz - 2480 MHz                                       |
| Modulation               | : GFSK                                                      |
| Data Rate                | : 1 Mbps, 2 Mbps                                            |
| Antenna Gain             | : PCB antenna, maximum PK gain:1.26 dBi                     |
| Sample Number            | : S23030729-02 for conductive<br>S23030729-03 for radiation |

Note: EUT is the ab. of equipment under test.

| Channel information |                 |         |                 |         |                 |
|---------------------|-----------------|---------|-----------------|---------|-----------------|
| Channel             | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 0                   | 2402            | 14      | 2430            | 28      | 2458            |
| 1                   | 2404            | 15      | 2432            | 29      | 2460            |
| 2                   | 2406            | 16      | 2434            | 30      | 2462            |
| 3                   | 2408            | 17      | 2436            | 31      | 2464            |
| 4                   | 2410            | 18      | 2438            | 32      | 2466            |
| 5                   | 2412            | 19      | 2440            | 33      | 2468            |
| 6                   | 2414            | 20      | 2442            | 34      | 2470            |
| 7                   | 2416            | 21      | 2444            | 35      | 2472            |
| 8                   | 2418            | 22      | 2446            | 36      | 2474            |
| 9                   | 2420            | 23      | 2448            | 37      | 2476            |
| 10                  | 2422            | 24      | 2450            | 38      | 2478            |
| 11                  | 2424            | 25      | 2452            | 39      | 2480            |
| 12                  | 2426            | 26      | 2454            |         |                 |
| 13                  | 2428            | 27      | 2456            |         |                 |

### 2.2. Accessories of EUT

| Description of Accessories | Manufacturer | Model number | Description | Remark |
|----------------------------|--------------|--------------|-------------|--------|
| N/A                        | N/A          | N/A          | N/A         | N/A    |

### 2.3. Assistant equipment used for test

| Assistant equipment | Manufacturer | Model number | EMC Compliance | SN  |
|---------------------|--------------|--------------|----------------|-----|
| N/A                 | N/A          | N/A          | N/A            | N/A |

## 2.4. Block diagram of EUT configuration for test



Test software: RDTool.exe

The test software was used to control EUT work in Continuous Tx mode, and select test channel, wireless mode as below table:

The pathloss of external cable: 0.5dB (According to the manufacturer's claims)

| Tested mode, channel, information |                  |         |                 |
|-----------------------------------|------------------|---------|-----------------|
| Mode                              | Setting Tx Power | Channel | Frequency (MHz) |
| GFSK 1M                           | 2                | CH0     | 2402            |
|                                   | 2                | CH19    | 2440            |
|                                   | 2                | CH39    | 2480            |
| GFSK 2M                           | 2                | CH0     | 2402            |
|                                   | 2                | CH19    | 2440            |
|                                   | 2                | CH39    | 2480            |

## 2.5. Test environment conditions

|                    |                   |
|--------------------|-------------------|
| Temperature range: | +15°C to +35 °C   |
| Humidity range:    | 20% to 75%        |
| Pressure range:    | 86 kPa to 106 kPa |

## 2.6. Deviations of test standard

No deviation.

## 2.7. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808.

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: ddt@dgddt.com.

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20155, G-20118

## 2.8. Measurement uncertainty

| Test Item                                                                                                                                     | Uncertainty                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bandwidth                                                                                                                                     | 1.1%                                                                                                                                                                  |
| Peak Output Power (Conducted) (Spectrum analyzer)                                                                                             | 0.86 dB ( $10 \text{ MHz} \leq f < 3.6 \text{ GHz}$ );<br>1.38 dB ( $3.6 \text{ GHz} \leq f < 8 \text{ GHz}$ )                                                        |
| Peak Output Power (Conducted) (Power Sensor)                                                                                                  | 0.74 dB                                                                                                                                                               |
| Power Spectral Density                                                                                                                        | 0.74 dB ( $10 \text{ MHz} \leq f < 3.6 \text{ GHz}$ );<br>1.38 dB ( $3.6 \text{ GHz} \leq f < 8 \text{ GHz}$ )                                                        |
| Frequencies Stability                                                                                                                         | $6.7 \times 10^{-8}$ (Antenna couple method)<br>$5.5 \times 10^{-8}$ (Conducted method)                                                                               |
| Conducted spurious emissions                                                                                                                  | 0.86 dB ( $10 \text{ MHz} \leq f < 3.6 \text{ GHz}$ );<br>1.40 dB ( $3.6 \text{ GHz} \leq f < 8 \text{ GHz}$ )<br>1.66 dB ( $8 \text{ GHz} \leq f < 22 \text{ GHz}$ ) |
| Uncertainty for radio frequency (RBW < 20 kHz)                                                                                                | $3 \times 10^{-8}$                                                                                                                                                    |
| Temperature                                                                                                                                   | 0.4 °C                                                                                                                                                                |
| Humidity                                                                                                                                      | 2 %                                                                                                                                                                   |
| Uncertainty for Radiation Emission test<br>(9 kHz – 30 MHz)                                                                                   | 3.44 dB                                                                                                                                                               |
| Uncertainty for Radiation Emission test<br>(30 MHz - 1 GHz)                                                                                   | 4.70 dB (Antenna Polarize: V)<br>4.84 dB (Antenna Polarize: H)                                                                                                        |
| Uncertainty for Radiation Emission test<br>(1 GHz - 40 GHz)                                                                                   | 4.10 dB (1 - 6 GHz)<br>4.40 dB (6 GHz - 18 GHz)<br>3.54 dB (18 GHz - 26 GHz)<br>4.30 dB (26 GHz - 40 GHz)                                                             |
| Uncertainty for Power line conduction emission test                                                                                           | 3.34dB (150KHz-30MHz)<br>3.72dB (9KHz-150KHz)                                                                                                                         |
| Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2. |                                                                                                                                                                       |

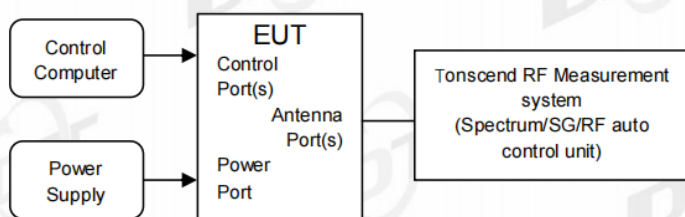
### 3. Equipment Used During Test

| Equipment                                                     | Manufacturer    | Model No.                                                           | Serial No.        | Last Cal.                      | Cal. Interval |
|---------------------------------------------------------------|-----------------|---------------------------------------------------------------------|-------------------|--------------------------------|---------------|
| <b>☑RF Connected Test (Tonscend RF Measurement System 3#)</b> |                 |                                                                     |                   |                                |               |
| Signal & Spectrum analyzer                                    | R&S             | FSV40                                                               | 101407            | Jul. 21, 2022                  | 1 Year        |
| Wideband Radio Communication tester                           | R&S             | CMW500                                                              | 117491            | May 18, 2022                   | 1 Year        |
| Vector Signal Generator                                       | Agilent         | N5182A                                                              | MY19060405        | May 18, 2022                   | 1 Year        |
| Vector Signal Generator                                       | Agilent         | N5182A                                                              | MY48180912        | May 18, 2022                   | 1 Year        |
| RF Control Unit                                               | Tonscend        | JS0806-2                                                            | 20C8060230        | May 18, 2022                   | 1 Year        |
| Temp&Humi Programmable                                        | ZHIXIANG        | ZXGDJS-150L                                                         | ZX170110-A        | May 26, 2022                   | 1 Year        |
| Test Software                                                 | JS Tonscend     | JS1120-3                                                            | Ver.3.2.22        | N/A                            | N/A           |
| <b>☑Radiation 3#chamber</b>                                   |                 |                                                                     |                   |                                |               |
| EMI Test Receiver                                             | R&S             | ESU26                                                               | 100472            | May 19, 2022                   | 1 Year        |
| Spectrum analyzer                                             | Agilent         | E4447A                                                              | MY50180031        | May 17, 2022                   | 1 Year        |
| Active Loop antenna                                           | Schwarzbeck     | FMZB-1519                                                           | 1519-038          | Sep. 29, 2022                  | 1 Year        |
| Trilog Broadband Antenna                                      | Schwarzbeck     | VULB 9163                                                           | 01429             | Jul. 22, 2022                  | 1 Year        |
| Double Ridged Horn Antenna                                    | Schwarzbeck     | BBHA9120 D                                                          | 02468             | Sep. 29, 2022                  | 1 Year        |
| Broad Band Horn Antenna                                       | Schwarzbeck     | BBHA 9170                                                           | 790               | May 06, 2022                   | 1 Year        |
| Pre-amplifier                                                 | COM-POWER       | PAM-118A                                                            | 18040084          | Aug.17, 2022                   | 1 Year        |
| Pre-amplifier                                                 | COM-POWER       | PAM-840A                                                            | 461369            | Apr. 11, 2022<br>Apr. 11, 2023 | 1 Year        |
| RE Cable                                                      | N/A             | W23.02 CP1-X2 + W23.09 AP1-X8+ JCT26S-NJ-NJ-1.5M+ JCT26S-NJ-NJ-1.5M | 4.5M+8M+1.5M+1.5M | Aug.17, 2022                   | 1 Year        |
| RF Cable                                                      | Yuhu Technology | JCTB810-NJ-NJ-9M                                                    | 21123964          | May. 19, 2022                  | 1 Year        |
| RF Cable                                                      | Yuhu Technology | ZT26S-SMAJ-SMAJ-1M                                                  | 21073466          | Aug.17, 2022                   | 1 Year        |
| Micro-Tronics filters                                         | REBES           | BRM50702                                                            | G555              | N/A                            | N/A           |
| Micro-Tronics filters                                         | REBES           | BRM50716                                                            | G392              | N/A                            | N/A           |
| High Pass filter                                              | XB              | XBLBQ-GTA67                                                         | 210820-2-3        | N/A                            | N/A           |
| Test software                                                 | Tonscend        | JS32-RE                                                             | V 5.0.0.1         | N/A                            | N/A           |
| Test software                                                 | Audix           | E3                                                                  | V 6.1.1.1         | N/A                            | N/A           |
| <b>☑Power Line Conducted Emissions Test 1#</b>                |                 |                                                                     |                   |                                |               |
| Test Receiver                                                 | R&S             | ESCI                                                                | 100551            | Aug. 26, 2022                  | 1 Year        |
| LISN 1                                                        | R&S             | ENV216                                                              | 101109            | Aug. 26, 2022                  | 1 Year        |
| LISN 2                                                        | R&S             | ESH2-Z5                                                             | 100309            | Aug. 26, 2022                  | 1 Year        |

|               |        |         |            |               |        |
|---------------|--------|---------|------------|---------------|--------|
| Pulse Limiter | R&S    | ESH3-Z2 | 101242     | Aug. 26, 2022 | 1 Year |
| CE Cable 1    | HUBSER | N/A     | W10.01     | Aug. 26, 2022 | 1 Year |
| Test software | Audix  | E3      | V 6.11111b | N/A           | N/A    |
| Test Receiver | R&S    | ESCI    | 100551     | Aug. 26, 2022 | 1 Year |

## 4. 6 dB Bandwidth

### 4.1. Block diagram of test setup



### 4.2. Limits

For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz

### 4.3. Test procedure

- (1) The test according to ANSI C63.10-2013 clause 11.8.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously
- (4) Use the following spectrum analyzer settings for 6 dB Bandwidth:
 

|                |                              |
|----------------|------------------------------|
| RBW:           | 100 kHz                      |
| VBW:           | $\geq [3 \times \text{RBW}]$ |
| Detector Mode: | Peak                         |
| Sweep time:    | Auto                         |
| Trace mode     | Max hold                     |
- (5) Allow the trace to stabilize, measure the 6 dB bandwidth of signal, and record the results in the report.

### 4.4. Test result

| Test Mode | Antenna | Frequency [MHz] | DTS BW [MHz] | FL[MHz] | FH[MHz] | Limit [MHz] | Verdict |
|-----------|---------|-----------------|--------------|---------|---------|-------------|---------|
| BLE_1M    | Ant1    | 2402            | 0.70         | 2401.64 | 2402.34 | 0.5         | PASS    |
|           |         | 2440            | 0.70         | 2439.64 | 2440.34 | 0.5         | PASS    |
|           |         | 2480            | 0.70         | 2479.64 | 2480.34 | 0.5         | PASS    |
| BLE_2M    | Ant1    | 2402            | 1.26         | 2401.34 | 2402.60 | 0.5         | PASS    |
|           |         | 2440            | 1.26         | 2439.34 | 2440.60 | 0.5         | PASS    |
|           |         | 2480            | 1.26         | 2479.34 | 2480.60 | 0.5         | PASS    |

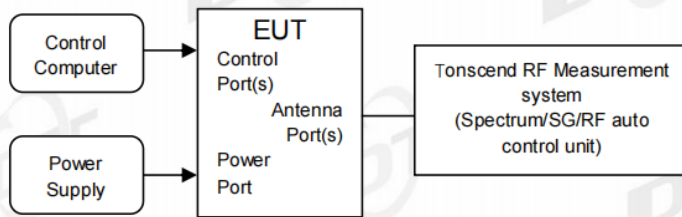
## 4.5. Test graphs





## 5. Maximum Peak Output Power

### 5.1. Block diagram of test setup



### 5.2. Limits

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi, the e.i.r.p shall not exceed 4W.

### 5.3. Test procedure

- (1) The test according to ANSI C63.10-2013 clause 11.9.1.1.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously.
- (4) Use the following spectrum analyzer settings for the maximum peak output power measurement:

|                |                |
|----------------|----------------|
| RBW:           | ≥DTS bandwidth |
| VBW:           | ≥3 x RBW       |
| Span           | ≥3 x RBW       |
| Detector Mode: | Peak           |
| Sweep time:    | Auto           |
| Trace mode     | Max hold       |

- (5) Allow the trace to stabilize, use peak marker function to determine the peak amplitude level.

### 5.4. Test result peak

| Test Mode | Antenna | Frequency [MHz] | Conducted Peak Power[dBm] | Conducted Limit[dBm] | EIRP[dBm] | EIRP Limit[dBm] | Verdict |
|-----------|---------|-----------------|---------------------------|----------------------|-----------|-----------------|---------|
| BLE_1M    | Ant1    | 2402            | 4.99                      | ≤30                  | 6.25      | ≤36             | PASS    |
|           |         | 2440            | 5.19                      | ≤30                  | 6.45      | ≤36             | PASS    |
|           |         | 2480            | 4.33                      | ≤30                  | 5.59      | ≤36             | PASS    |
| BLE_2M    | Ant1    | 2402            | 5.17                      | ≤30                  | 6.43      | ≤36             | PASS    |
|           |         | 2440            | 5.37                      | ≤30                  | 6.63      | ≤36             | PASS    |
|           |         | 2480            | 4.50                      | ≤30                  | 5.76      | ≤36             | PASS    |

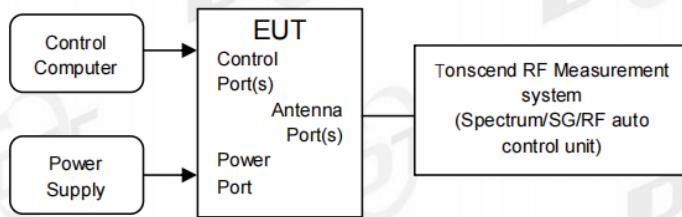
## 5.5. Test graphs peak





## 6. Power Spectral Density

### 6.1. Block diagram of test setup



### 6.2. Limits

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### 6.3. Test procedure

- (1) The test according to ANSI C63.10-2013 clause 11.10.2.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously.
- (4) Use the following spectrum analyzer settings for Power Spectral Density measurement:
 

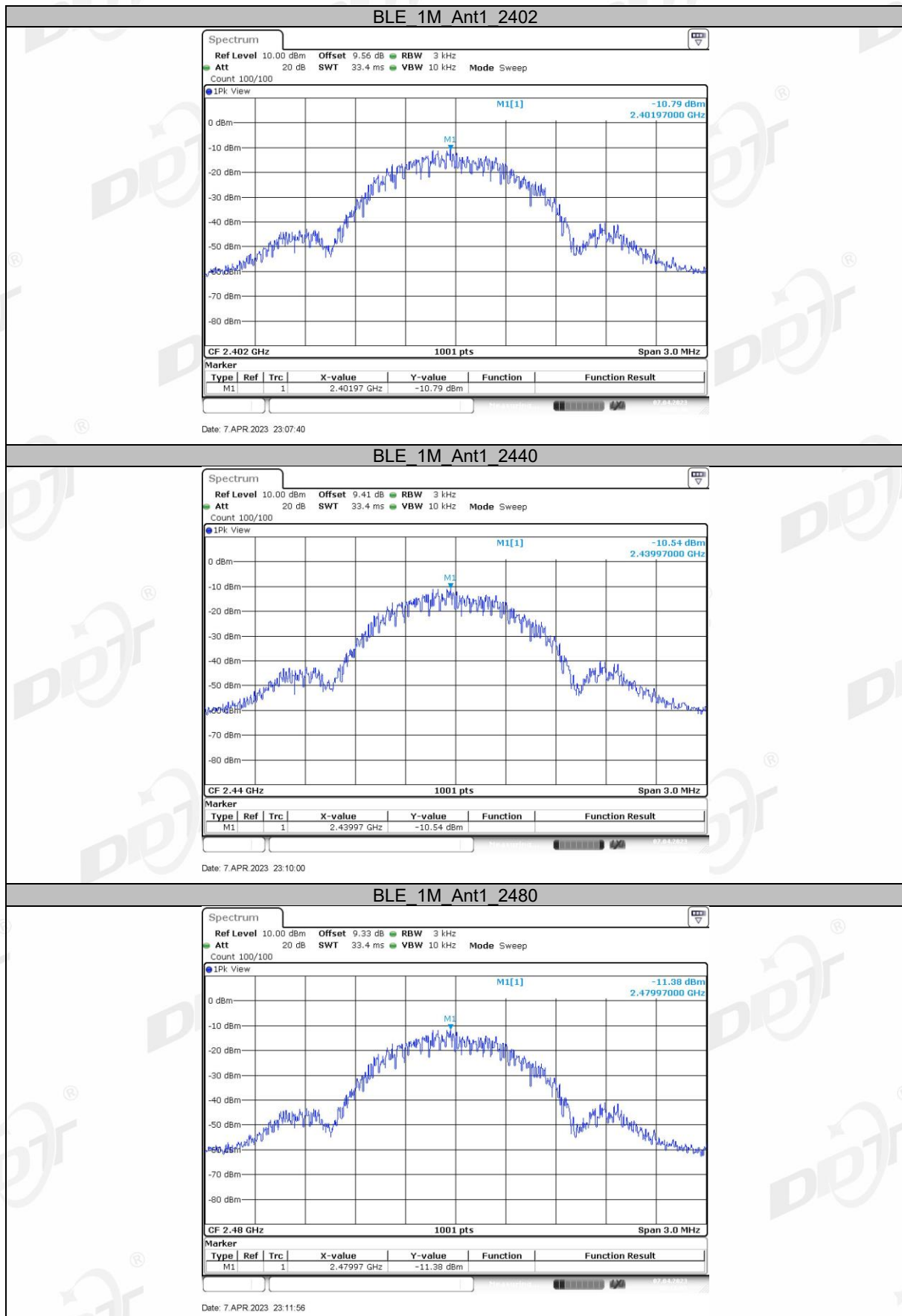
|                  |                                                    |
|------------------|----------------------------------------------------|
| Center frequency | DTS Channel center frequency                       |
| RBW:             | $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$ |
| VBW:             | $\geq 3\text{RBW}$                                 |
| Span             | 1.5 times the DTS bandwidth                        |
| Detector Mode:   | Peak                                               |
| Sweep time:      | Auto                                               |
| Trace mode       | Max hold                                           |
- (5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.

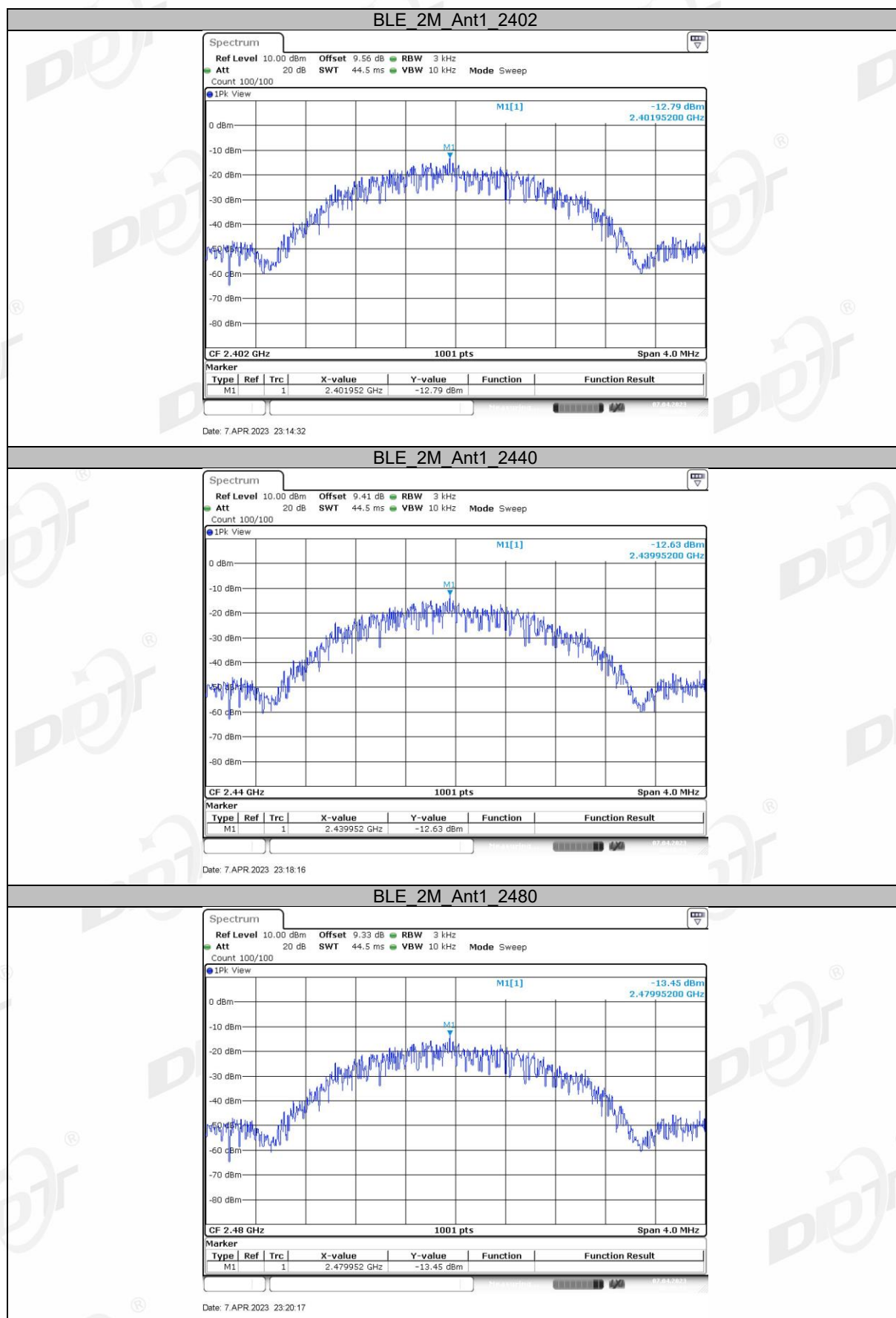
If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### 6.4. Test result

| Test Mode | Antenna | Frequency [MHz] | Result [dBm/3kHz] | Limit [dBm/3kHz] | Verdict |
|-----------|---------|-----------------|-------------------|------------------|---------|
| BLE_1M    | Ant1    | 2402            | -10.79            | $\leq 8.00$      | PASS    |
|           |         | 2440            | -10.54            | $\leq 8.00$      | PASS    |
|           |         | 2480            | -11.38            | $\leq 8.00$      | PASS    |
| BLE_2M    | Ant1    | 2402            | -12.79            | $\leq 8.00$      | PASS    |
|           |         | 2440            | -12.63            | $\leq 8.00$      | PASS    |
|           |         | 2480            | -13.45            | $\leq 8.00$      | PASS    |

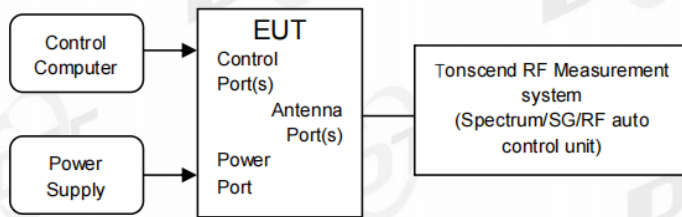
## 6.5. Test graphs





## 7. Band Edge Compliance (Conducted Method)

### 7.1. Block diagram of test setup



### 7.2. Limits

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

### 7.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Establish a reference level by using the following procedure:

|                |                                          |
|----------------|------------------------------------------|
| RBW:           | 100 kHz                                  |
| VBW:           | 300 kHz                                  |
| Span           | Encompass frequency range to be measured |
| Detector Mode: | Peak                                     |
| Sweep time:    | Auto                                     |
| Trace mode     | Max hold                                 |

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

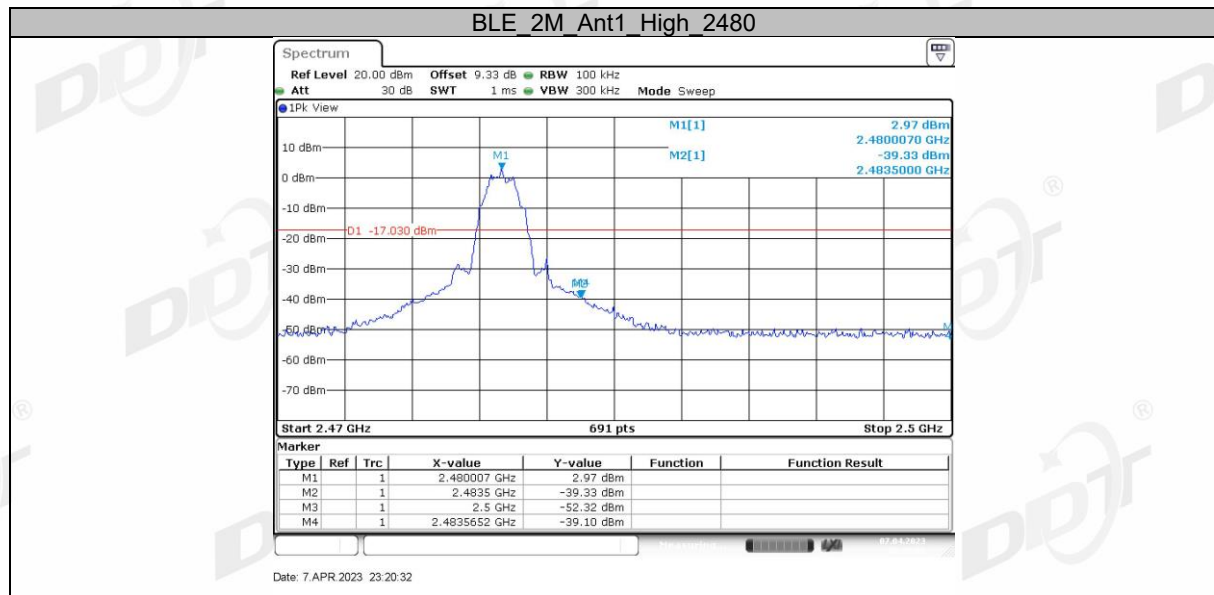
(4) Then mark the maximum amplitude of all unwanted emissions outside of the authorized frequency band.

### 7.4. Test result

| EUT Set Mode | CH or Frequency | Measured Range        | Verdict |
|--------------|-----------------|-----------------------|---------|
| GFSK 1M      | CH0             | 2.310 GHz - 2.410 GHz | Pass    |
|              | CH39            | 2.470 GHz - 2.500 GHz | Pass    |
| GFSK 2M      | CH0             | 2.310 GHz - 2.410 GHz | Pass    |
|              | CH39            | 2.470 GHz - 2.500 GHz | Pass    |

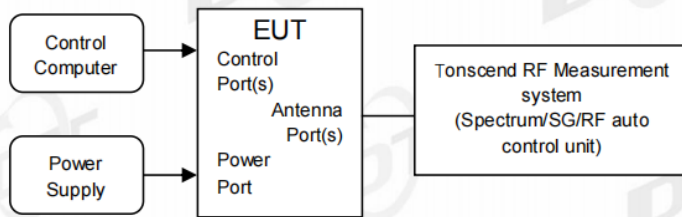
## 7.5. Test graphs





## 8. RF Conducted Spurious Emissions

### 8.1. Block diagram of test setup



### 8.2. Limits

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

### 8.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Establish a reference level by using the following procedure:

|                  |                                                               |
|------------------|---------------------------------------------------------------|
| Center frequency | Test frequency                                                |
| RBW:             | 100 kHz                                                       |
| VBW:             | 300 kHz                                                       |
| Span             | Wide enough to capture the peak level of the in-band emission |
| Detector Mode:   | Peak                                                          |
| Sweep time:      | Auto                                                          |
| Trace mode       | Max hold                                                      |

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Set the spectrum analyzer as follows:

|                              |                                          |
|------------------------------|------------------------------------------|
| RBW:                         | 100 kHz                                  |
| VBW:                         | 300 kHz                                  |
| Span                         | Encompass frequency range to be measured |
| Number of measurement points | $\geq \text{span}/\text{RBW}$            |
| Detector Mode:               | Peak                                     |
| Sweep time:                  | Auto                                     |
| Trace mode                   | Max hold                                 |

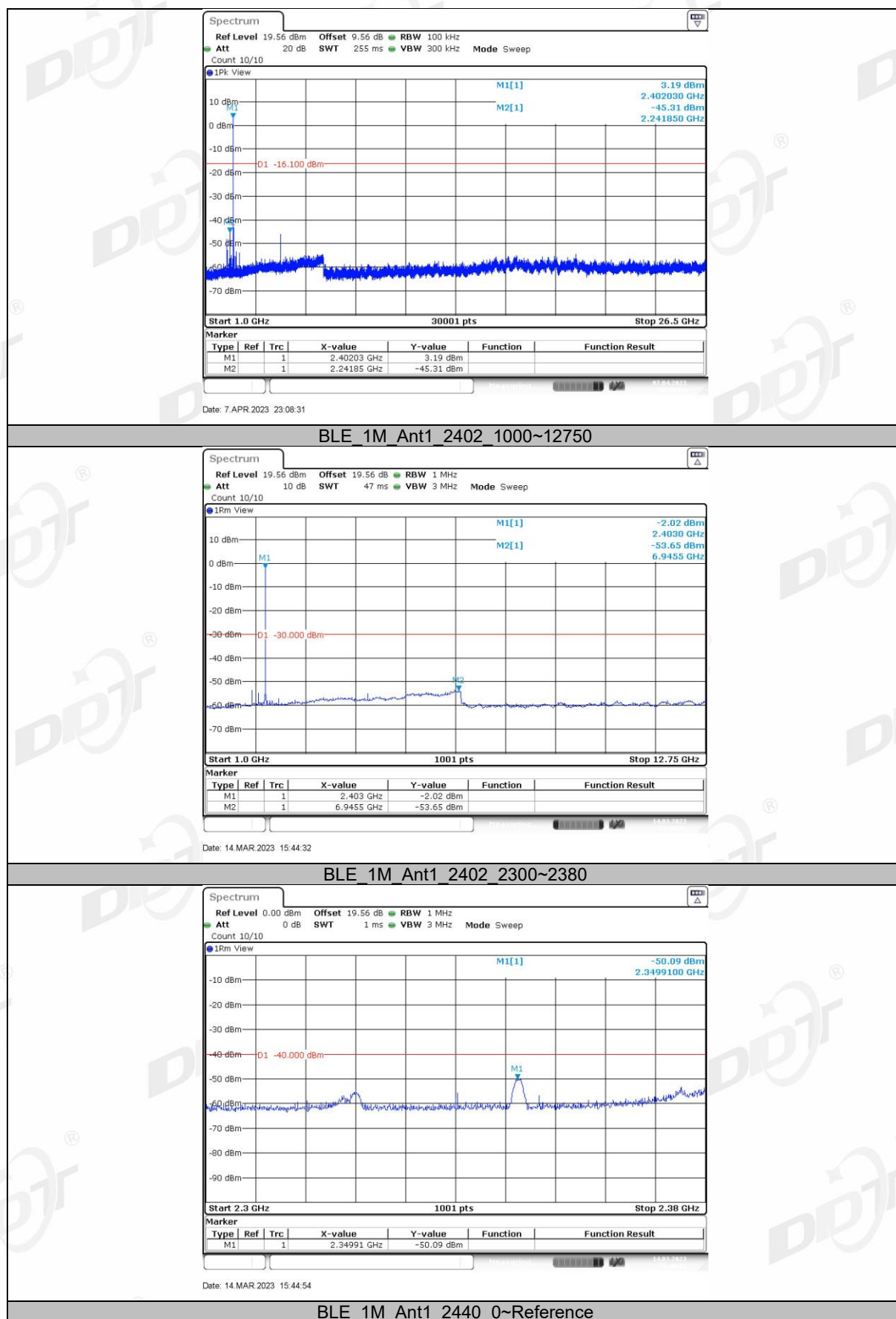
Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

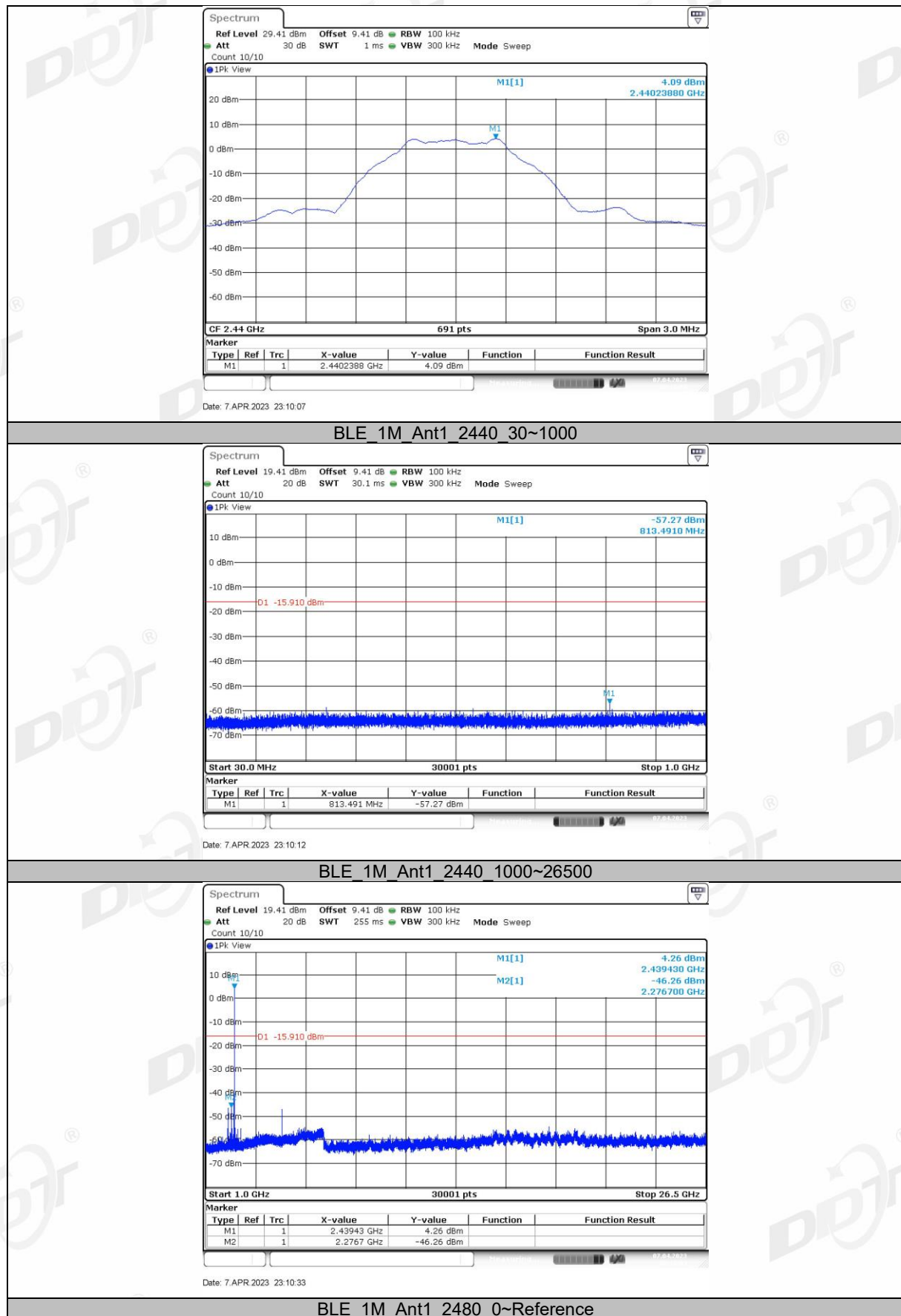
#### 8.4. Test result

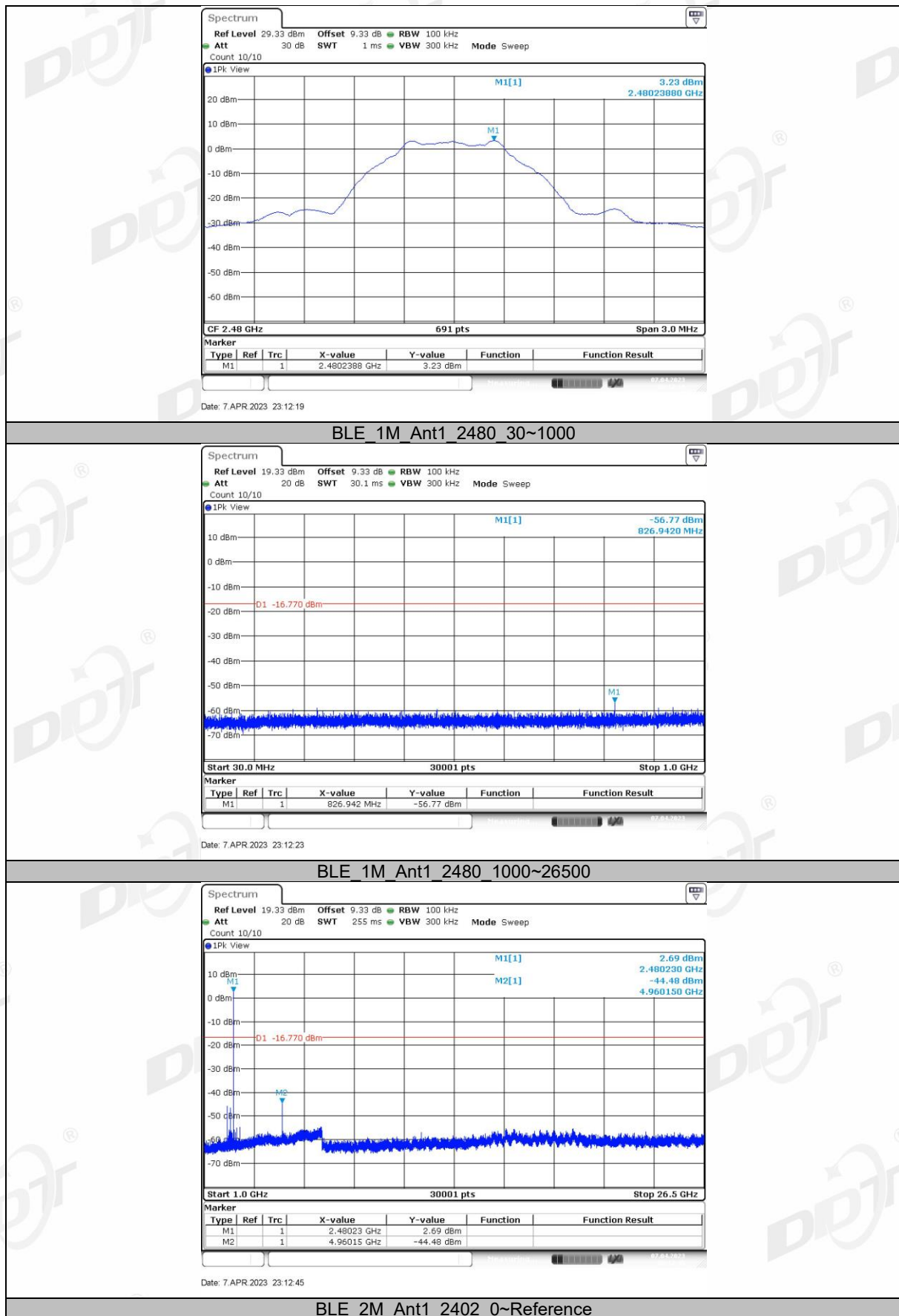
| Mode    | Freq. (MHz) | Verdict |
|---------|-------------|---------|
| GFSK 1M | 2402        | Pass    |
|         | 2440        | Pass    |
|         | 2480        | Pass    |
| GFSK 2M | 2402        | Pass    |
|         | 2440        | Pass    |
|         | 2480        | Pass    |

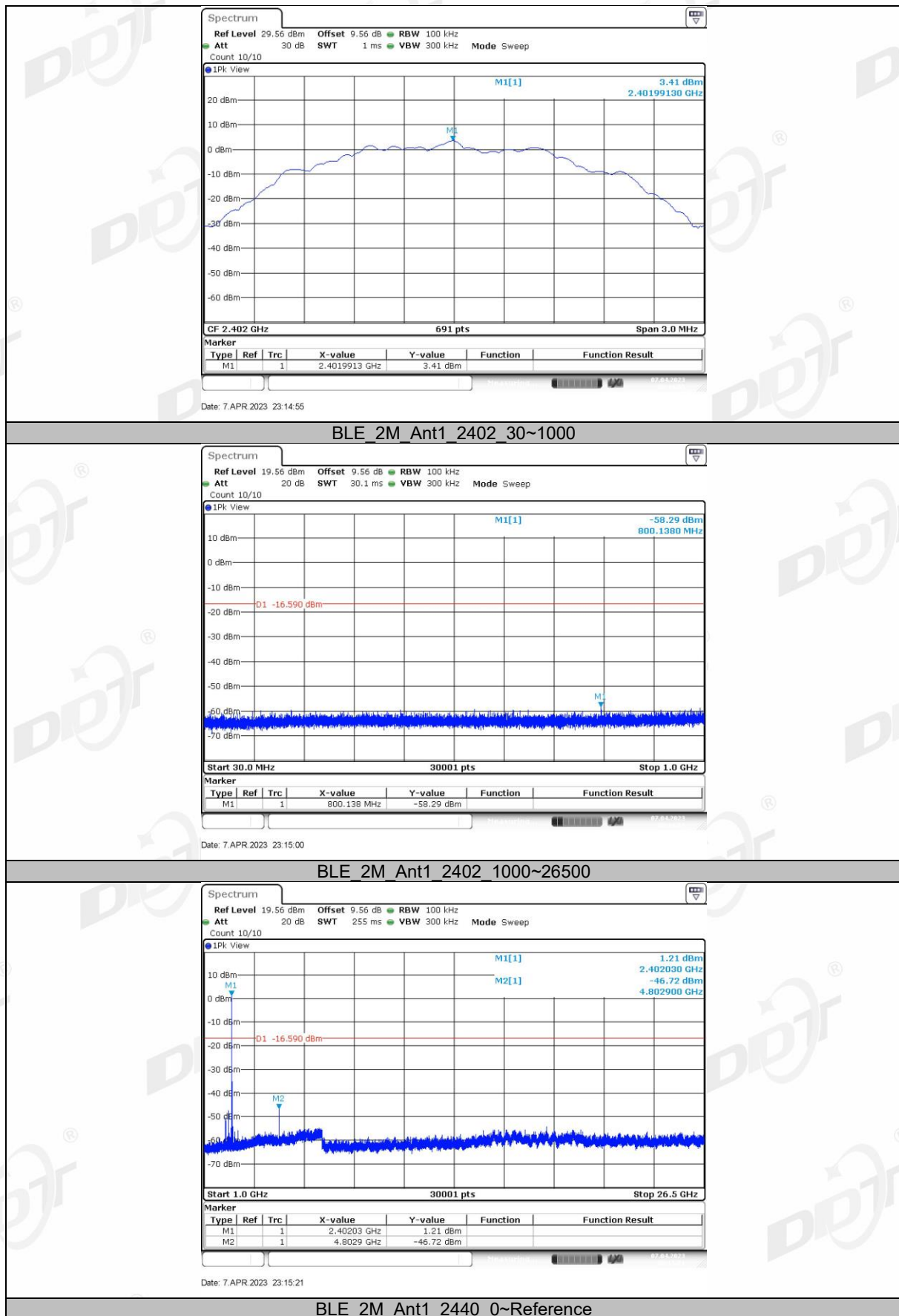
#### 8.5. Test graphs

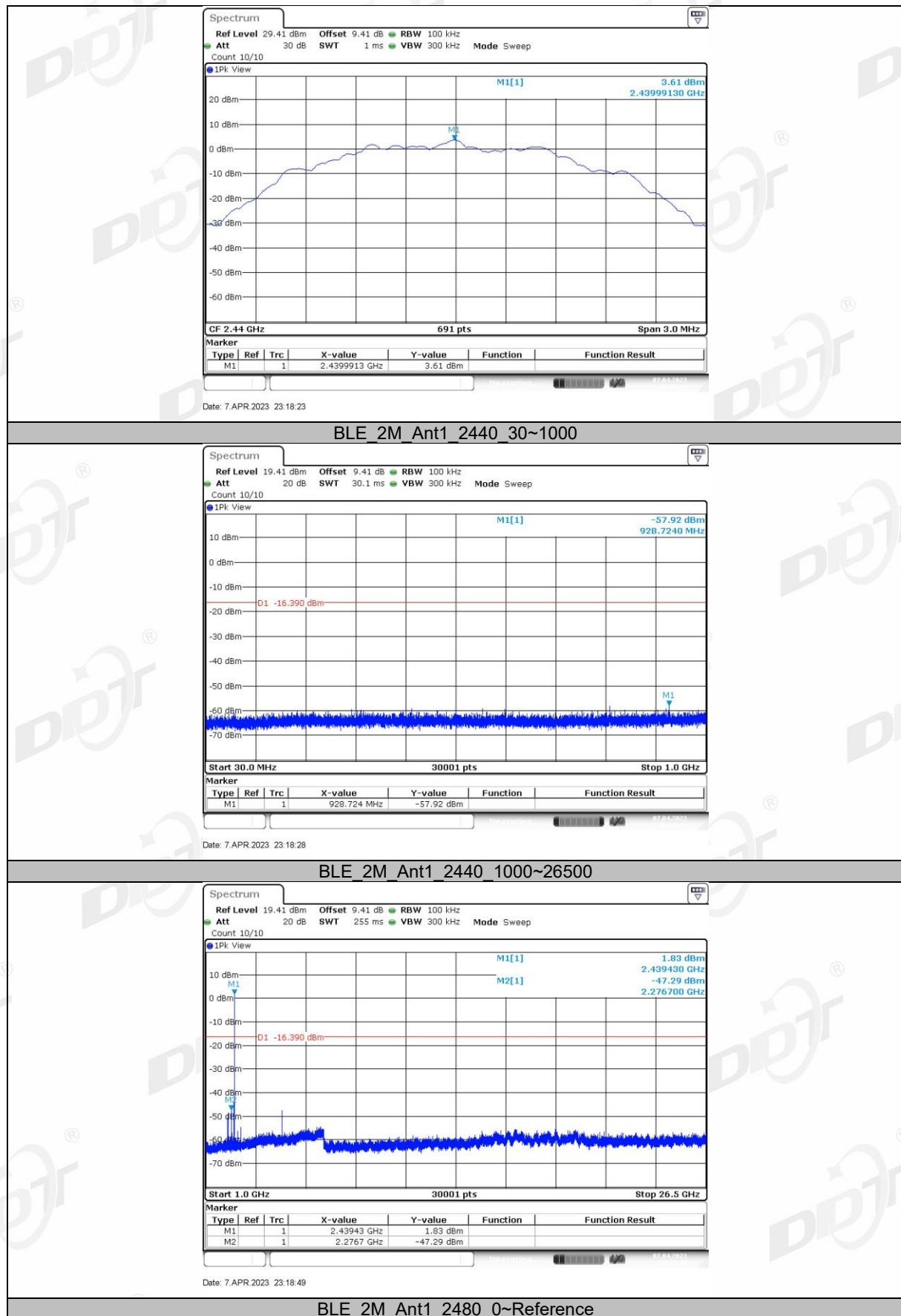








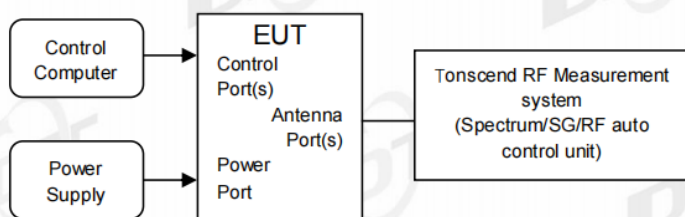






## 9. Duty Cycle

### 9.1. Block diagram of test setup



### 9.2. Limit

Just for Report.

### 9.3. Test procedure

- (1) Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, The cable loss and attenuator loss have been put into spectrum analyzer as amplitude offset.

set the Spectrum Analyzer as below:

Centre Frequency: The centre frequency of the middle hopping channel.

Resolution BW: 10 MHz.

Video BW: 10 MHz.

Span: Zero span.

Detector: Peak.

Trace Mode: Clear Write.

Sweep: Video Trigger

- (2) When the trace is complete, measure the sending time of 1 burst and the duty cycle of 1 burst cycle.

- (3) Calculate dwell time follow below formula:

Duty cycle= Pulse's on time / Burst cycle

### 9.4. Test result

| Test Mode | Antenna | Frequency [MHz] | ON Time [ms] | Period [ms] | Duty Cycle [%] | Duty Cycle Factor[dB] |
|-----------|---------|-----------------|--------------|-------------|----------------|-----------------------|
| BLE_1M    | Ant1    | 2402            | 0.37         | 0.62        | 59.68          | 2.24                  |
|           |         | 2440            | 0.37         | 0.62        | 59.68          | 2.24                  |
|           |         | 2480            | 0.37         | 0.62        | 59.68          | 2.24                  |
| BLE_2M    | Ant1    | 2402            | 0.19         | 0.63        | 30.16          | 5.21                  |
|           |         | 2440            | 0.19         | 0.63        | 30.16          | 5.21                  |
|           |         | 2480            | 0.19         | 0.63        | 30.16          | 5.21                  |

## 9.5. Test graphs



