# Test Report

| | | |
|---|---|---|
| **Applicant** | : | QINGDAO KINGFORCE INTELLIGENT TECHNOLOGY CO.,LTD |
| **Address** | : | 69, GUANGSHENG ROAD QINGDAO, CHINA |
| **Product Name** | : | Smart Lock |
| **Brand Mark** | : | Noqiz |
| **Model** | : | M19F |
| **Series model** | : | M19/ M15/ M22/ M12/ M31/ M12-HH/ M30/ M12-F/ M12-H/ M16 |
| **Report Number** | : | BLA-EMC-202504-A8302 |
| **FCC ID** | : | 2AWGO-M19F |
| **Date of Receipt** | : | Apr.22, 2025 |
| **Date of Test** | : | Apr.24, 2025 to Apr.29, 2025 |
| **Test Standard** | : | 47 CFR Part 15, Subpart C 15.247 |
| **Test Result** | : | Pass |

**Compiled by:** charlie **Review by:** Xavier **Approved by:** Steve Zheng

**Issued Date:** May 06, 2025

**BlueAsia of Technical Services(Shenzhen) Co.,Ltd.**
Address: Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China

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# Table of Contents

**1 General information ..... 5**

1.1 General information ..... 5
1.2 General description of EUT ..... 5

**2 Test summary ..... 6**

**3 Test Configuration ..... 7**

3.1 Test mode ..... 7
3.2 Operation Frequency each of channel ..... 8
3.3 Test channel ..... 8
3.4 Configuration diagram of EUT ..... 9
3.5 Auxiliary equipment ..... 9
3.6 Test environment ..... 9

**4 Laboratory information ..... 10**

4.1 Laboratory and accreditations ..... 10
4.2 Measurement uncertainty ..... 10

**5 Test equipment ..... 11**

**6 Test result ..... 13**

6.1 Antenna requirement ..... 13
6.2 Conducted peak output Power ..... 14
6.3 Minimum 6dB bandwidth ..... 15
6.4 Power spectrum density ..... 16
6.5 Conducted Band Edges Measurement ..... 17
6.6 Conducted spurious emissions ..... 19
6.7 Radiated spurious emissions ..... 21
6.8 Radiated emissions which fall in the restricted bands ..... 32

**7 Appendix A ..... 39**

7.1 Maximum PK Conducted Output Power ..... 39
7.2 -6dB Bandwidth ..... 41
7.3 Occupied Channel Bandwidth ..... 43
7.4 Maximum Power Spectral Density Level ..... 45
7.5 Band Edge ..... 47

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7.6 Conducted RF Spurious Emission ..... 50

**Appendix B: photographs of test setup ..... 54**

**Appendix C: photographs of EUT ..... 55**

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# Revise Record

| Version No. | Date | Description |
|---|---|---|
| 01 | May 06,2025 | Original |
| | | |
| | | |
| | | |

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# 1 General information

## 1.1 General information

| | |
|---|---|
| Applicant | QINGDAO KINGFORCE INTELLIGENT TECHNOLOGY CO.,LTD |
| Address | 69, GUANGSHENG ROAD QINGDAO, CHINA |
| Manufacturer | QINGDAO KINGFORCE INTELLIGENT TECHNOLOGY CO.,LTD |
| Address | 69, GUANGSHENG ROAD QINGDAO, CHINA |
| Factory | QINGDAO KINGFORCE INTELLIGENT TECHNOLOGY CO.,LTD |
| Address | 69, GUANGSHENG ROAD QINGDAO, CHINA |

## 1.2 General description of EUT

| | |
|---|---|
| Product Name | Smart Lock |
| Model No. | M19F |
| Series model | M19/ M15/ M22/ M12/ M31/ M12-HH/ M30/ M12-F/ M12-H/ M16 |
| Differences of Series model | The above models are identical in PCB layout,internal structure and components,only model No.and color is different. |
| Operation Frequency | 2402MHz-2480MHz |
| Modulation Type | GFSK |
| Channel Spacing: | 2MHz |
| Number of Channels | 40 |
| Antenna Type | PCB antenna |
| Antenna Gain | 3.1dBi(Provided by customer) |
| Power supply or adapter information | DC6V(dry accumulator1.5V*4) |
| Hardware Version | M19FBZB |
| Software Version | V1.0 |
| Engineer sample no | BLA-EMC-202504-A83 |
| *Note: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.* | |

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# 2 Test summary

| No. | Test item | FCC Part Section(s) | Test Method(Clause) | Result |
|---|---|---|---|---|
| 1 | Antenna Requirement | §15.203 | N/A | Pass |
| 2 | Conducted Emissions at AC Power Line (150kHz-30MHz) | §15.207 | ANSI C63.10-2013 Clause 6.2 | N/A |
| 3 | Conducted Peak Output Power | §15.247(b)(3) | ANSI C63.10-2013 Clause 7.8.5 | Pass |
| 4 | Minimum 6dB Bandwidth | §15.247a(2) | ANSI C63.10-2013 Clause 11.8.1 | Pass |
| 5 | Power Spectrum Density | §15.247(d) | ANSI C63.10-2013 Clause 11.10.2 | Pass |
| 6 | Conducted Band Edges Measurement | §15.247(d) | ANSI C63.10-2013 Clause 11.13 | Pass |
| 7 | Conducted Spurious Emissions | §15.247(d) | ANSI C63.10-2013 Clause 11.11 | Pass |
| 8 | Radiated Spurious Emissions | §15.209<br>§15.247(d) | ANSI C63.10-2013 Clause 6.4,6.5,6.6 | Pass |
| 9 | Radiated Emissions which fall in the restricted bands | §15.209<br>§15.247(d) | ANSI C63.10-2013 Clause 11.12 | Pass |

*N/A: Not Applicable*

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# 3 Test Configuration

## 3.1 Test mode

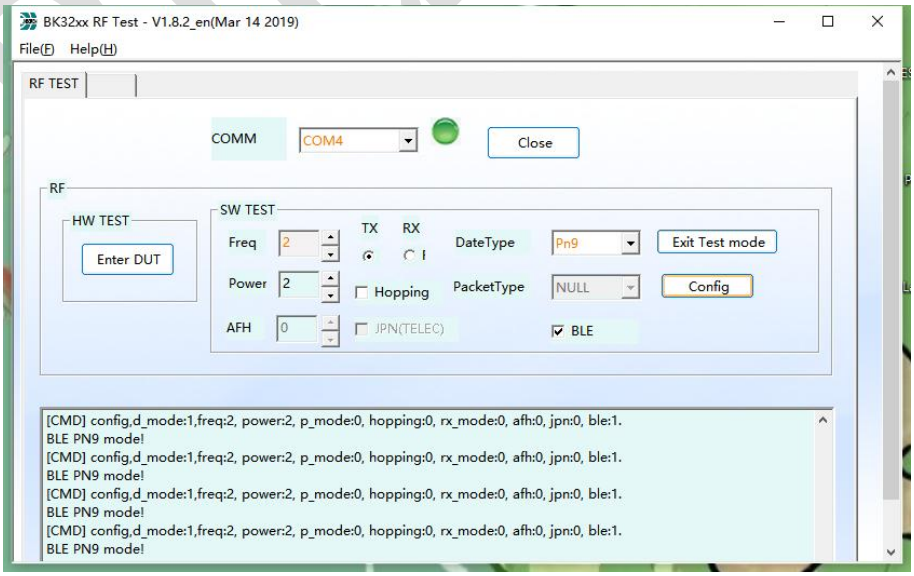
| Test Mode Note 1 | Description |
|---|---|
| TX | Keep the EUT in continuously transmitting with modulation mode. |
| RX | Keep the EUT in receiving mode |
| TX Low channel | Keep the EUT in continuously transmitting mode in low channel |
| TX middle channel | Keep the EUT in continuously transmitting mode in middle channel |
| TX high channel | Keep the EUT in continuously transmitting mode in high channel |

*Note 1: The EUT was configured to measure its highest possible emission and/or immunity level. The test modes were adapted according to the operation manual for use; the EUT was operated in the engineering mode Note 2 to fix the TX or Rx frequency that was for the purpose of the measurements.*

*Note 2: Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.*

| Power level setup in software | | | |
|---|---|---|---|
| Test Software Name | BK32xx RF Test - V1.8.2 en(Mar 14 2019) | | |
| Mode | Channel | Frequency (MHz) | Soft Set |
| GFSK | CH0 | 2402 | TX level : 2 |
| | CH20 | 2442 | |
| | CH39 | 2480 | |

Run Software



## 3.2 Operation Frequency each of channel

| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---|---|---|---|---|---|---|---|
| 0 | 2402MHz | 10 | 2422MHz | 20 | 2442MHz | 30 | 2462MHz |
| 1 | 2404MHz | 11 | 2424MHz | 21 | 2444MHz | 31 | 2464MHz |
| … | … | … | … | … | … | … | … |
| 8 | 2418MHz | 18 | 2438MHz | 28 | 2458MHz | 38 | 2478MHz |
| 9 | 2420MHz | 19 | 2440MHz | 29 | 2460MHz | 39 | 2480MHz |

## 3.3 Test channel

| Channel | Frequency |
|---|---|
| The lowest channel | 2402MHz |
| The middle channel | 2442MHz |
| The Highest channel | 2480MHz |

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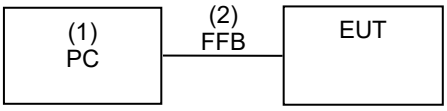
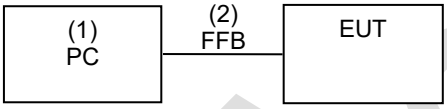
## 3.4 Configuration diagram of EUT

Radiated emission:




Note: see test photographs attached in APPENDIX A for the actual connections between Product and support equipment.

RF Test:




Support equipment:

| Name | Device type | Brand | Mode | Series No | Remark |
|---|---|---|---|---|---|
| (1) | PC | lenovo | E460C | N/A | N/A |
| (2) | Fixed frequency board | N/A | N/A | N/A | N/A |

## 3.5 Auxiliary equipment

| Device Type | Manufacturer | Model Name | Serial No. | Remark |
|---|---|---|---|---|
| PC | lenovo | E46OC | N/A | From lab（No.BLA-ZC-BS-2022005） |
| **Note:**"--" mean no any auxiliary device during testing. | | | | |

## 3.6 Test environment

| Environment | Temperature | Voltage |
|---|---|---|
| Normal | 25°C | DC 6V |

# 4 Laboratory information

## 4.1 Laboratory and accreditations

The test facility is recognized, certified, or accredited by the following organizations:

| | |
|---|---|
| Company name: | BlueAsia of Technical Services(Shenzhen) Co., Ltd. |
| Address: | Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China |
| CNAS accredited No.: | L9788 |
| A2LA Cert. No.: | 5071.01 |
| FCC Designation No.: | CN1252 |
| ISED CAB identifier No.: | CN0028 |
| Telephone: | +86-755-28682673 |
| FAX: | +86-755-28682673 |

## 4.2 Measurement uncertainty

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

| Parameter | Expanded Uncertainty |
|---|---|
| Radiated Emission(9kHz-30MHz) | ±4.34dB |
| Radiated Emission(30Mz-1000MHz) | ±4.24dB |
| Radiated Emission(1GHz-18GHz) | ±4.68dB |
| AC Power Line Conducted Emission(150kHz-30MHz) | ±3.45dB |
| Occupied Channel Bandwidth | ±5 % |
| RF output power, conducted | ±1.5 dB |
| Power Spectral Density, conducted | ±3.0 dB |
| Unwanted Emissions, conducted | ±3.0 dB |
| Temperature | ±3 °C |
| Supply voltages | ±3 % |
| Time | ±5 % |

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# 5 Test equipment

**Radiated Spurious Emissions (Below 1GHz)**

| Equipment | Name | Model | Manufacture | S/N | Cal. Date | Due. Date |
|---|---|---|---|---|---|---|
| BLA-EMC-002-01 | Anechoic chamber | 9*6*6 chamber | SKET | N/A | 2024/3/27 | 2027/3/26 |
| BLA-EMC-002-02 | Control room | 966 control room | SKET | N/A | 2024/3/27 | 2027/3/26 |
| BLA-EMC-009 | EMI receiver | ESR7 | R&S | 101199 | 2024/08/08 | 2025/08/07 |
| BLA-EMC-043 | Loop antenna | FMZB1519B | Schwarzbeck | 00102 | 2024/06/29 | 2026/06/28 |
| BLA-EMC-065 | Broadband antenna | VULB9168 | Schwarzbeck | 01065P | 2024/06/29 | 2026/06/27 |
| BLA-XC-01 | Coaxial Cable | N/A | BlueAsia | V01 | N/A | N/A |
| BLA-XC-02 | Coaxial Cable | N/A | BlueAsia | V02 | N/A | N/A |

**Radiated Spurious Emissions (Above 1GHz)**

| Equipment | Name | Model | Manufacture | S/N | Cal. Date | Due. Date |
|---|---|---|---|---|---|---|
| BLA-EMC-001-01 | Anechoic chamber | 9*6*6 chamber | SKET | N/A | 2023/11/16 | 2026/11/15 |
| BLA-EMC-001-02 | Control Room | 966 control room | SKET | N/A | 2023/11/16 | 2025/11/15 |
| BLA-EMC-008 | Spectrum | FSP40 | R&S | 100817 | 2024/08/08 | 2025/08/07 |
| BLA-EMC-012 | Broadband antenna | VULB9168 | Schwarzbeck | 00836 P:00227 | 2022/10/12 | 2025/10/11 |
| BLA-EMC-013 | Horn Antenna | BBHA9120D | Schwarzbeck | 01892 | 2024/06/29 | 2026/06/28 |
| BLA-EMC-014 | Amplifier | PA_000318G-45 | SKET | PA201804 3003 | 2024/08/08 | 2025/08/07 |
| BLA-EMC-046 | Filter bank | 2.4G/5G Filter bank | SKET | N/A | 2024/06/28 | 2025/06/27 |
| BLA-EMC-061 | Receiver | ESPI7 | R&S | 101477 | 2024/06/28 | 2025/06/27 |
| BLA-EMC-066 | Amplifier | LNPA_30M01 G-30 | SKET | SK202106 0801 | 2024/06/28 | 2025/06/27 |
| BLA-EMC-086 | Amplifier | LNPA_18G40 G-50dB | SKET | SK202207 1301 | 2024/06/28 | 2025/06/27 |
| BLA-EMC-087 | Horn Antenna | BBHA 9170 | Schwarzbeck | 1106 | 2024/06/29 | 2026/06/28 |
| BLA-XC-03 | Coaxial Cable | N/A | BlueAsia | V03 | N/A | N/A |
| BLA-XC-04 | Coaxial Cable | N/A | BlueAsia | V04 | N/A | N/A |

**RF conducted**

| Equipment | Name | Model | Manufacture | S/N | Cal. Date | Due. Date |
|---|---|---|---|---|---|---|
| BLA-EMC-003-003 | Shield room | 5*3*3 | SKET | N/A | 2023/11/16 | 2025/11/15 |
| BLA-EMC-016 | Signal Generator | N5182A | Agilent | MY52420567 | 2024/06/28 | 2025/06/27 |
| BLA-EMC-038 | Spectrum | N9020A | Agilent | MY49100060 | 2024/08/08 | 2025/08/07 |
| BLA-EMC-042 | Power sensor | RPR3006W | DARE | 14I00889SN042 | 2024/08/08 | 2025/08/07 |
| BLA-EMC-044 | Radio communication tester | CMW500 | R&S | 132429 | 2024/08/08 | 2025/08/07 |
| BLA-EMC-064 | Signal Generator | N5182B | KEYSIGHT | MY58108892 | 2024/06/28 | 2025/06/27 |
| BLA-EMC-079 | Spectrum | N9020A | Agilent | MY54420161 | 2024/08/08 | 2025/08/07 |
| BLA-EMC-088 | Audio Analyzer | ATS-1 | Audio Precision | ATS141094 | 2024/06/28 | 2025/06/27 |

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**Test Software Record**

| Software No. | Software Name | Manufacture | Software version | Test site |
|---|---|---|---|---|
| BLA-EMC-S001 | EZ-EMC | EZ | EEMC-3A1+ | RE |
| BLA-EMC-S002 | EZ-EMC | EZ | EEMC-3A1+ | RE |
| BLA-EMC-S010 | MTS 8310 | MW | 2.0.0.0 | RF |

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# 6 Test result

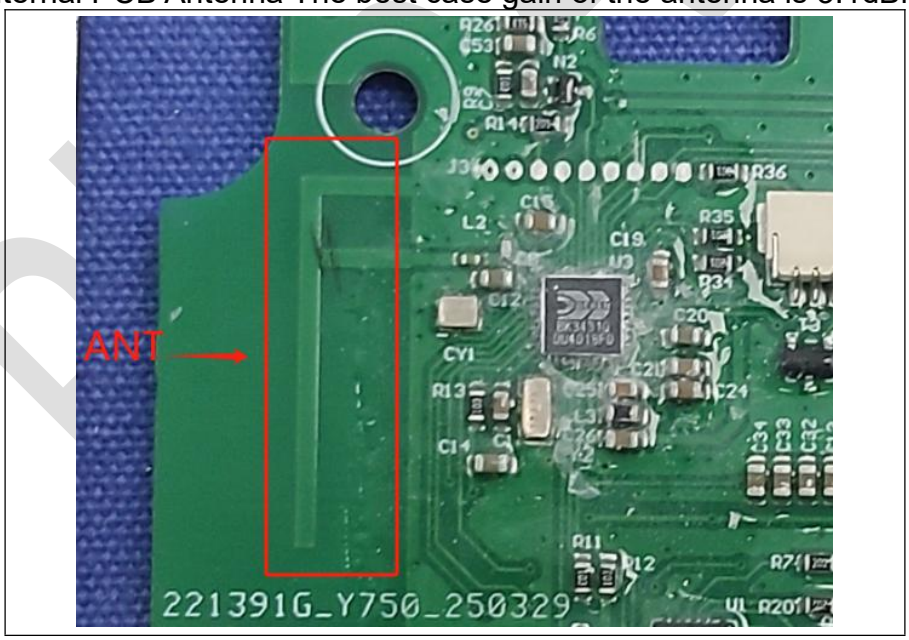
## 6.1 Antenna requirement

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.203 |
| **Test Method** | N/A |

### 6.1.1 Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of a so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT antenna:
The antenna is internal PCB Antenna The best case gain of the antenna is 3.1dBi



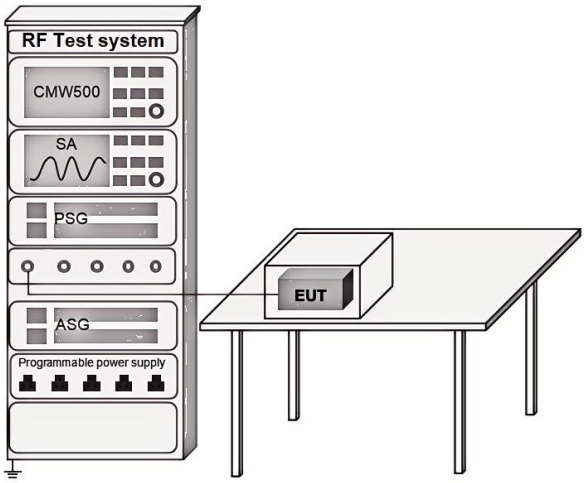
## 6.2 Conducted peak output Power

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247(b)(3) |
| **Test Method** | ANSI C63.10-2013 Clause 7.8.5 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |

### 6.2.1 Limit

| Frequency range(MHz) | Output power of the intentional radiator(watt) |
|---|---|
| 902-928 | 1 for ≥50 hopping channels |
| | 0.25 for 25≤ hopping channels <50 |
| | 1 for digital modulation |
| 2400-2483.5 | 1 for ≥75 non-overlapping hopping channels |
| | 0.125 for all other frequency hopping systems |
| | 1 for digital modulation |
| 5725-5850 | 1 for frequency hopping systems and digital modulation |

### 6.2.2 Test setup




### 6.2.3 Test data

Note：PK power sensor is used to read PK Conducted power power directly

Pass: Please refer to appendix A for details

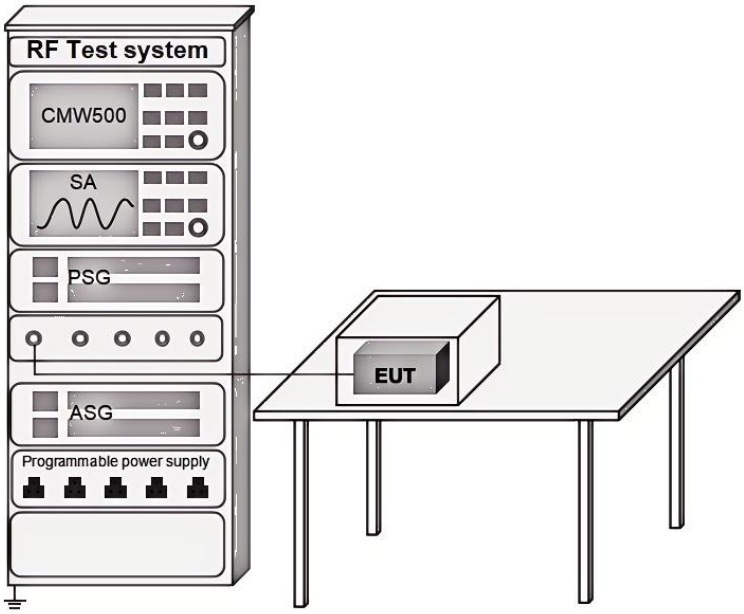
## 6.3 Minimum 6dB bandwidth

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247a(2) |
| **Test Method** | ANSI C63.10-2013 Clause 11.8.1 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |

### 6.3.1 Limit

≥500 kHz

### 6.3.2 Test setup




### 6.3.3 Test data

Pass: Please refer to appendix A for details

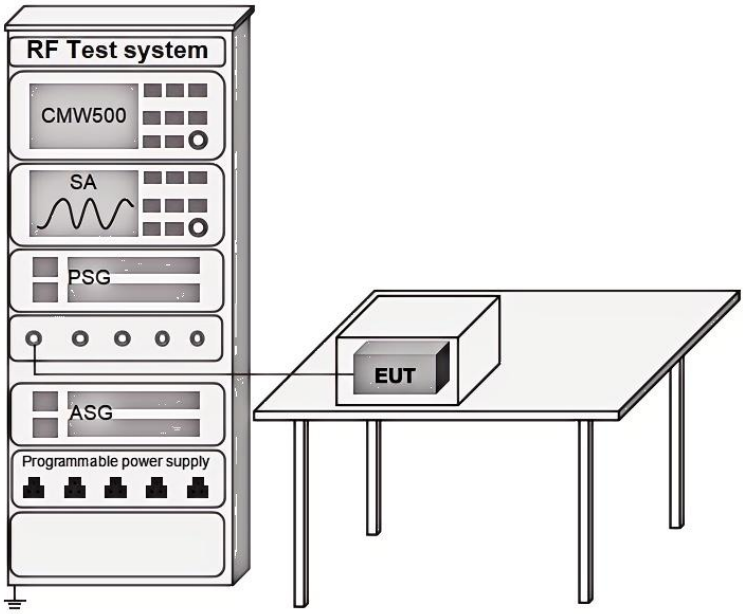
## 6.4 Power spectrum density

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247(d) |
| **Test Method** | ANSI C63.10-2013 Clause 11.10.2 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |

### 6.4.1 Limit

≤8dBm in any 3 kHz band during any time interval of continuous transmission

### 6.4.2 Test setup




### 6.4.3 Test data

Pass: Please refer to appendix A for details

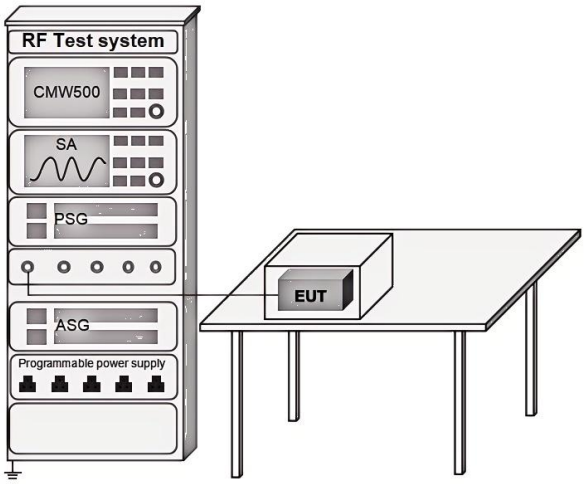
## 6.5 Conducted Band Edges Measurement

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247(d) |
| **Test Method** | ANSI C63.10-2013 Clause 11.13 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |

### 6.5.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20dB.
Attenuation below the general limits specified in §15.209(a) is not required.
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### 6.5.2 Test setup



### 6.5.3 Test data

Pass: Please refer to appendix A for details

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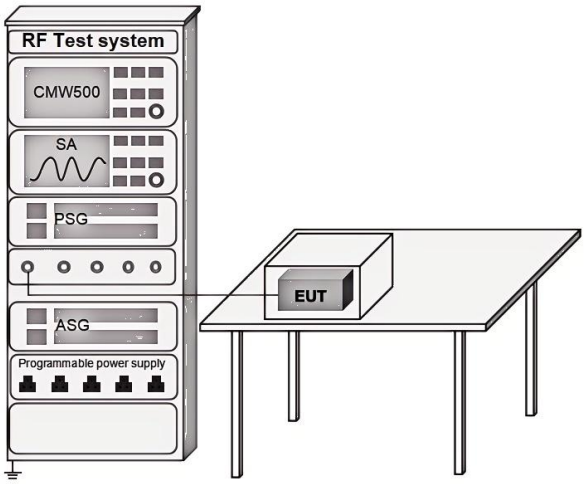
## 6.6 Conducted spurious emissions

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247(d) |
| **Test Method** | ANSI C63.10-2013 Clause 11.11 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |

### 6.6.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20dB.
Attenuation below the general limits specified in §15.209(a) is not required.
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### 6.6.2 Test setup



### 6.6.3 Test data

Pass: Please refer to appendix A for details

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## 6.7 Radiated spurious emissions

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247(d) |
| **Test Method** | ANSI C63.10-2013 Clause 6.4,6.5,6.6 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |

### 6.7.1 Limit

| Frequency(MHz) | Field strength(microvolts/meter) | Measurement distance(meters) |
|---|---|---|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

*Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.*

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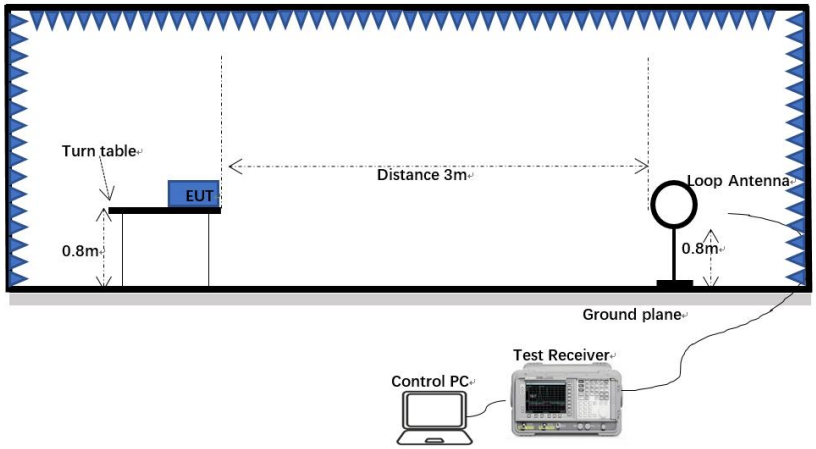
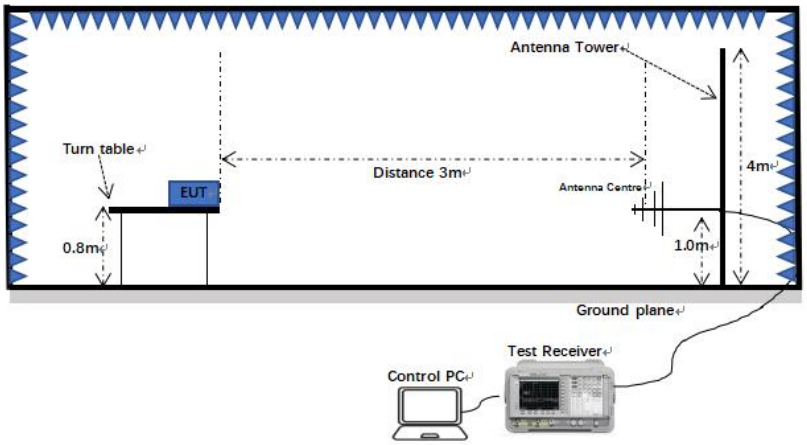
### 6.7.2 Test setup

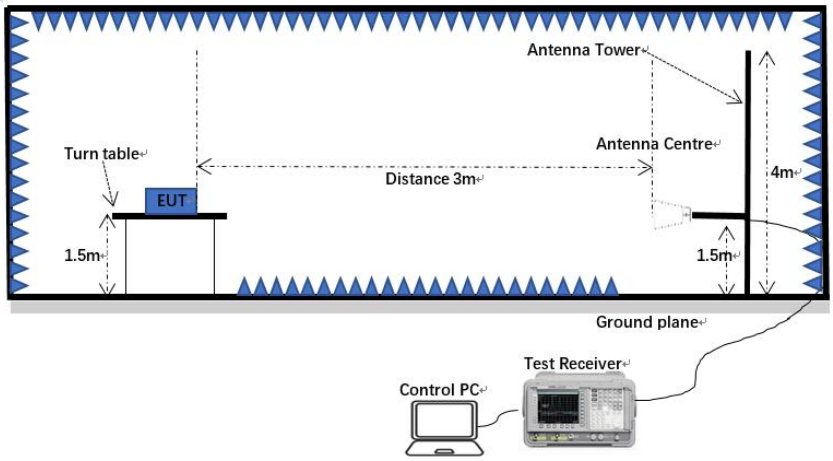
Below 1GHz：




30MHz-1GHz：




Above 1GHz：



### 6.7.3 Procedure

a) For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b) For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c) The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h) Test the EUT in the lowest channel, the middle channel, the highest channel.

i) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j) Repeat above procedures until all frequencies measured was complete.

*Note 1: Scan from 9 kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. Fundamental frequency is blocked by filter, and only spurious emission is shown.*

*Note 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.*

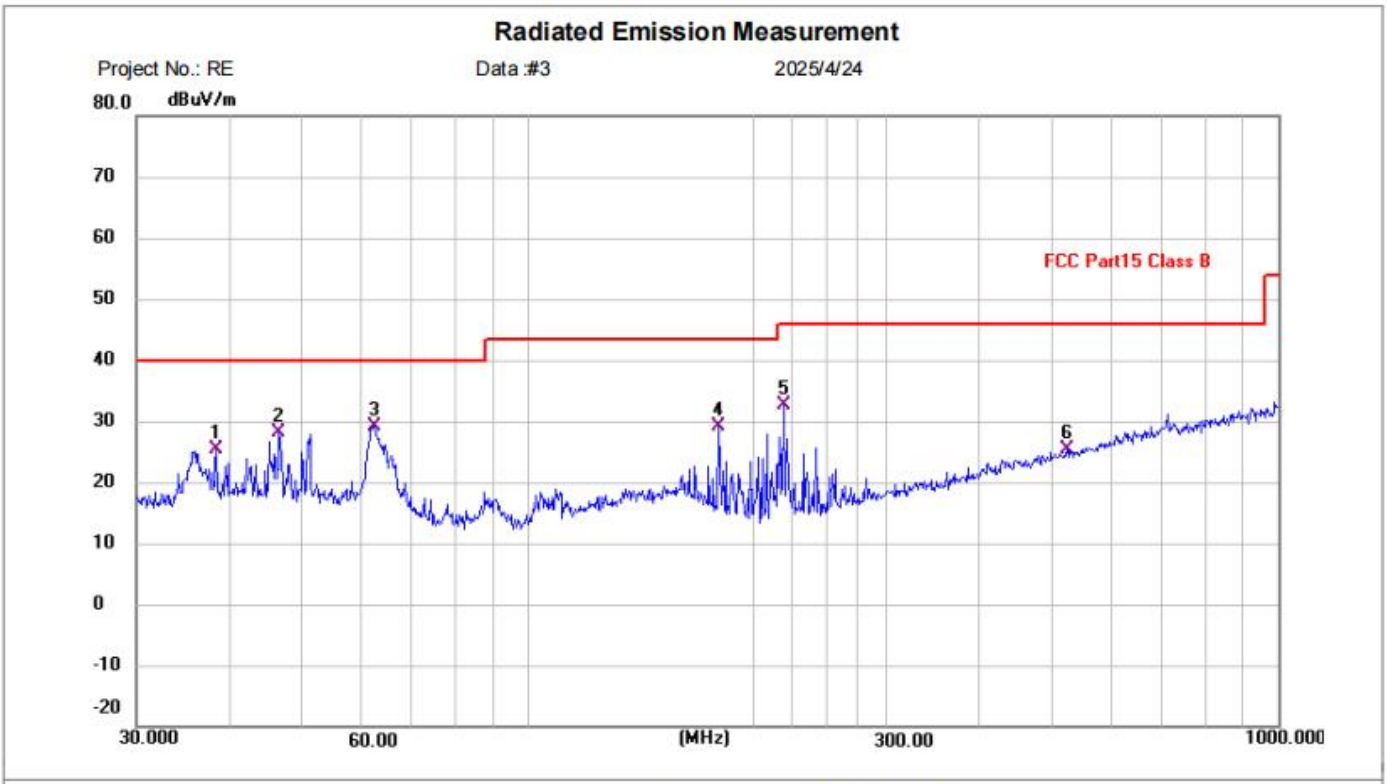
*Note 3: The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:*

Level (dBuV) = Reading (dBuV) + Factor (dB/m)

### 6.7.4 Test data

Below 1GHz

[Test mode: TX]; [Polarity: Horizontal]




Site
Limit: FCC Part15 Class B
EUT: Smart Lock
M/N: M19F
Mode: BLE TX Mode
Note:

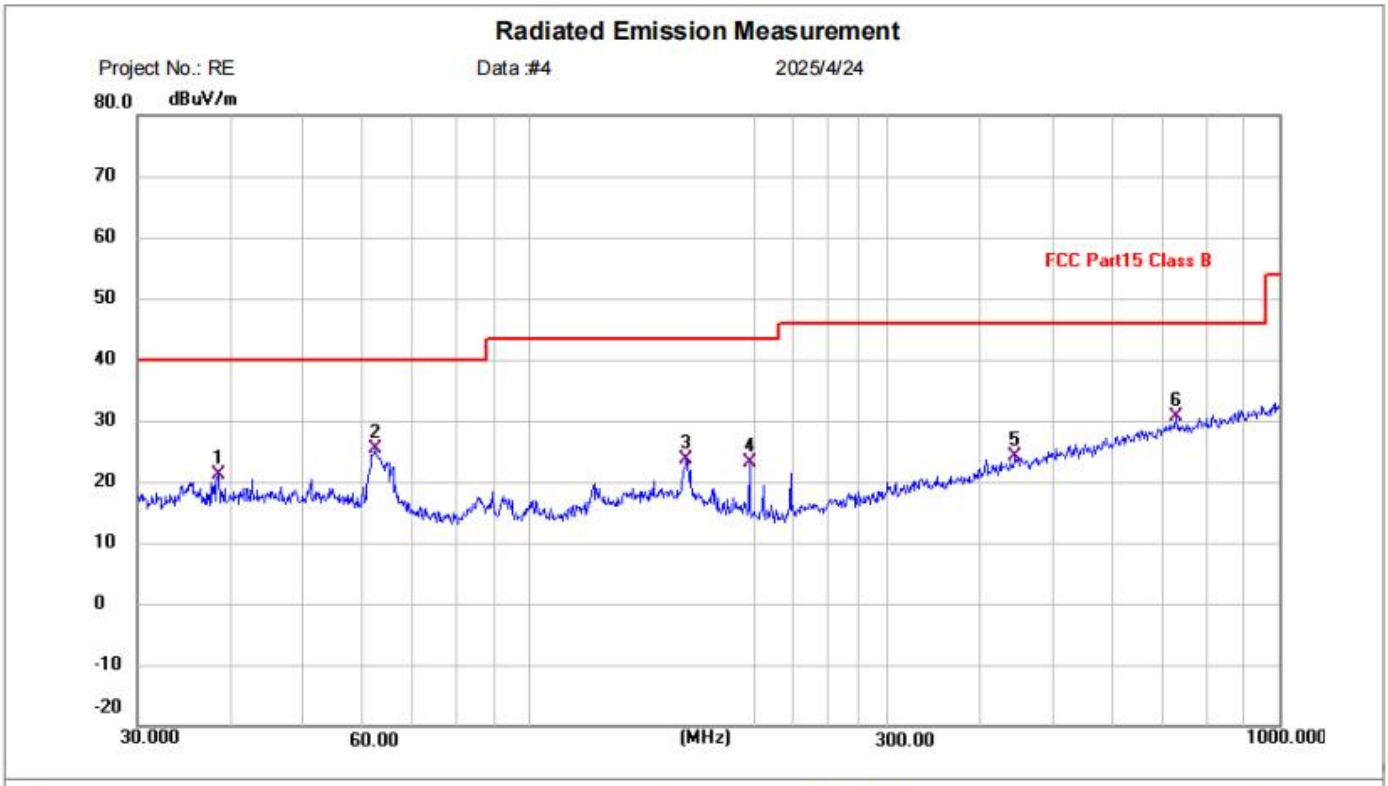
Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 38.3462 | 6.10 | 19.24 | 25.34 | 40.00 | -14.66 | QP | P | |
| 2 | 46.5030 | 8.61 | 19.49 | 28.10 | 40.00 | -11.90 | QP | P | |
| 3 * | 62.4313 | 11.03 | 18.14 | 29.17 | 40.00 | -10.83 | QP | P | |
| 4 | 179.3863 | 11.15 | 17.90 | 29.05 | 43.50 | -14.45 | QP | P | |
| 5 | 219.0753 | 16.36 | 16.34 | 32.70 | 46.00 | -13.30 | QP | P | |
| 6 | 522.7179 | -0.36 | 25.71 | 25.35 | 46.00 | -20.65 | QP | P | |

**Test Result: Pass**

[Test mode: TX]; [Polarity: Vertical]




Site
Limit: FCC Part15 Class B
EUT: Smart Lock
M/N: M19F
Mode: BLE TX Mode
Note:

Polarization: ***Vertical***
Power:

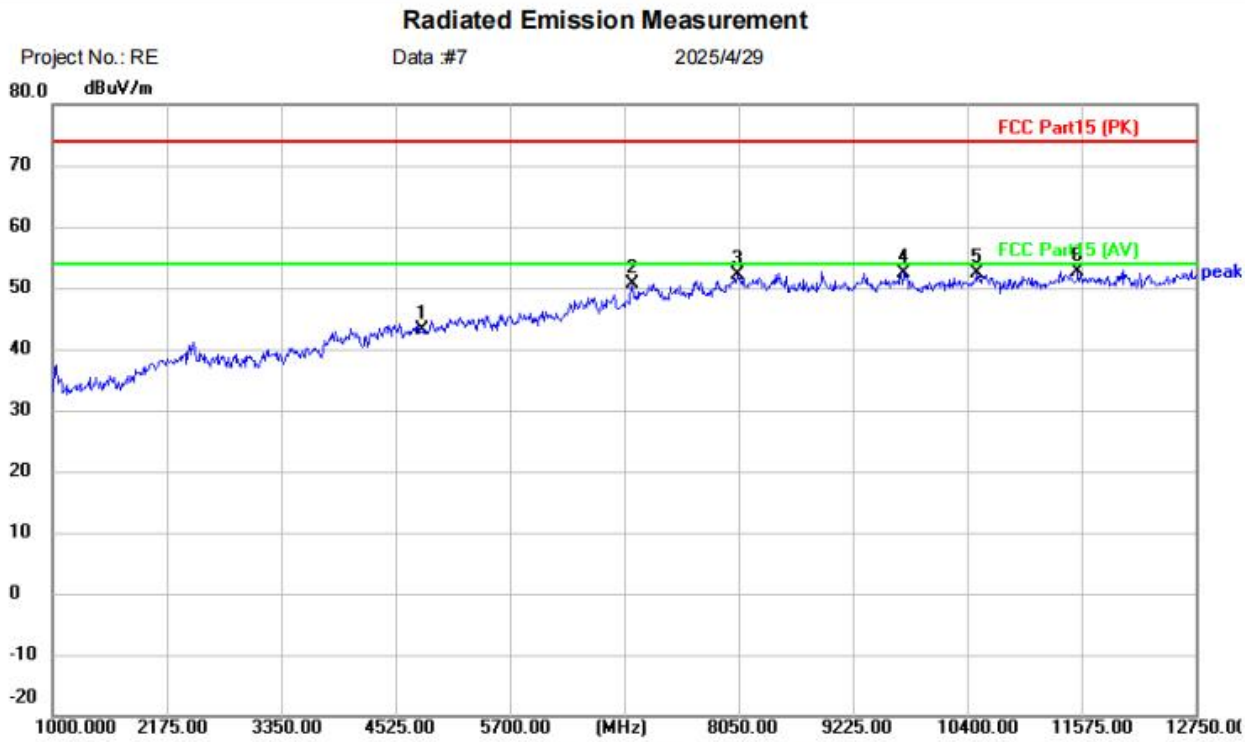
Temperature: (C)
Humidity: %RH

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 38.4809 | 1.97 | 19.24 | 21.21 | 40.00 | -18.79 | QP | P | |
| 2 * | 62.2128 | 7.27 | 18.16 | 25.43 | 40.00 | -14.57 | QP | P | |
| 3 | 162.0414 | 3.20 | 20.33 | 23.53 | 43.50 | -19.97 | QP | P | |
| 4 | 196.5098 | 6.57 | 16.48 | 23.05 | 43.50 | -20.45 | QP | P | |
| 5 | 444.8514 | -0.08 | 24.33 | 24.25 | 46.00 | -21.75 | QP | P | |
| 6 | 729.3583 | 1.65 | 29.00 | 30.65 | 46.00 | -15.35 | QP | P | |

**Test Result: Pass**

Above 1GHz:

[Test mode: TX low channel]; [Polarity: Horizontal]




Site
Limit: FCC Part15 (PK)
EUT: Smart Lock
M/N: M19F
Mode: BLE-TX-2402
Note:

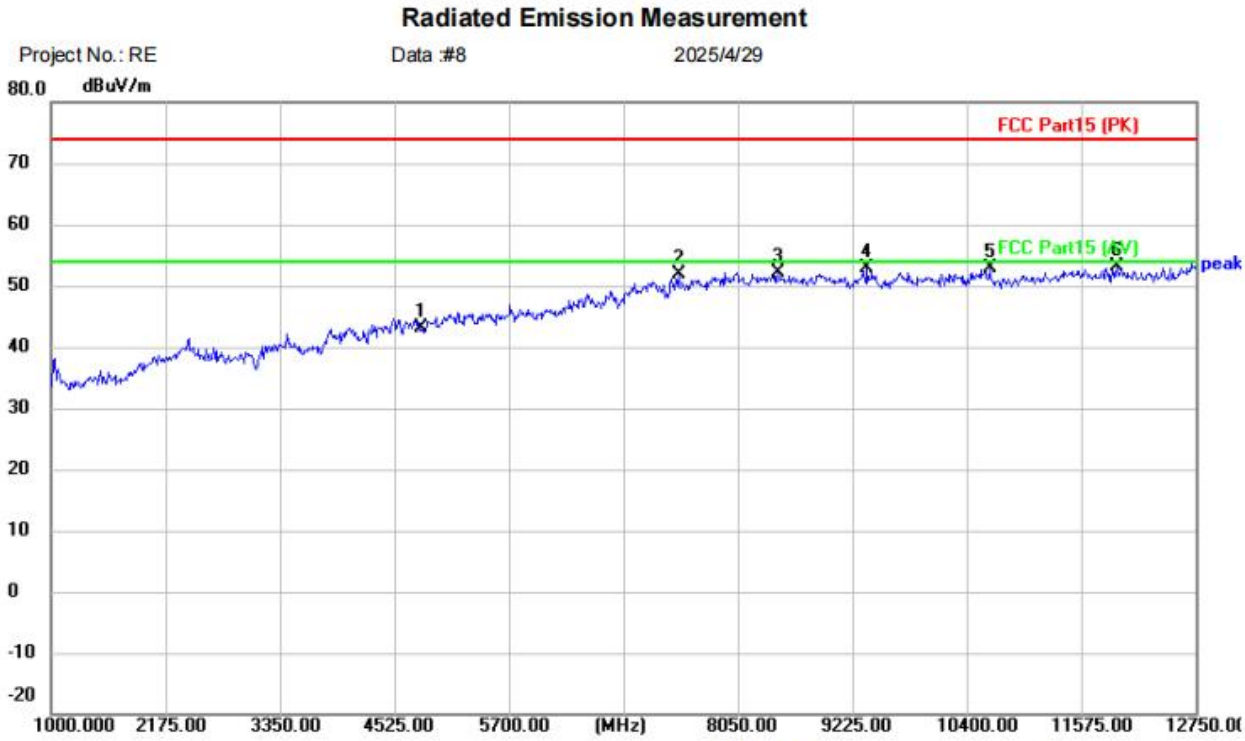
Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4804.000 | 39.21 | 4.02 | 43.23 | 74.00 | -30.77 | peak | |
| 2 | | 6957.250 | 40.07 | 10.55 | 50.62 | 74.00 | -23.38 | peak | |
| 3 | | 8038.250 | 39.17 | 12.85 | 52.02 | 74.00 | -21.98 | peak | |
| 4 | | 9753.750 | 37.39 | 15.11 | 52.50 | 74.00 | -21.50 | peak | |
| 5 | | 10505.75 | 37.46 | 15.01 | 52.47 | 74.00 | -21.53 | peak | |
| 6 | * | 11539.75 | 36.54 | 16.05 | 52.59 | 74.00 | -21.41 | peak | |

**Test Result: Pass**

[Test mode: TX low channel]; [Polarity: Vertical]




Site
Limit: FCC Part15 (PK)
EUT: Smart Lock
M/N: M19F
Mode: BLE-TX-2402
Note:

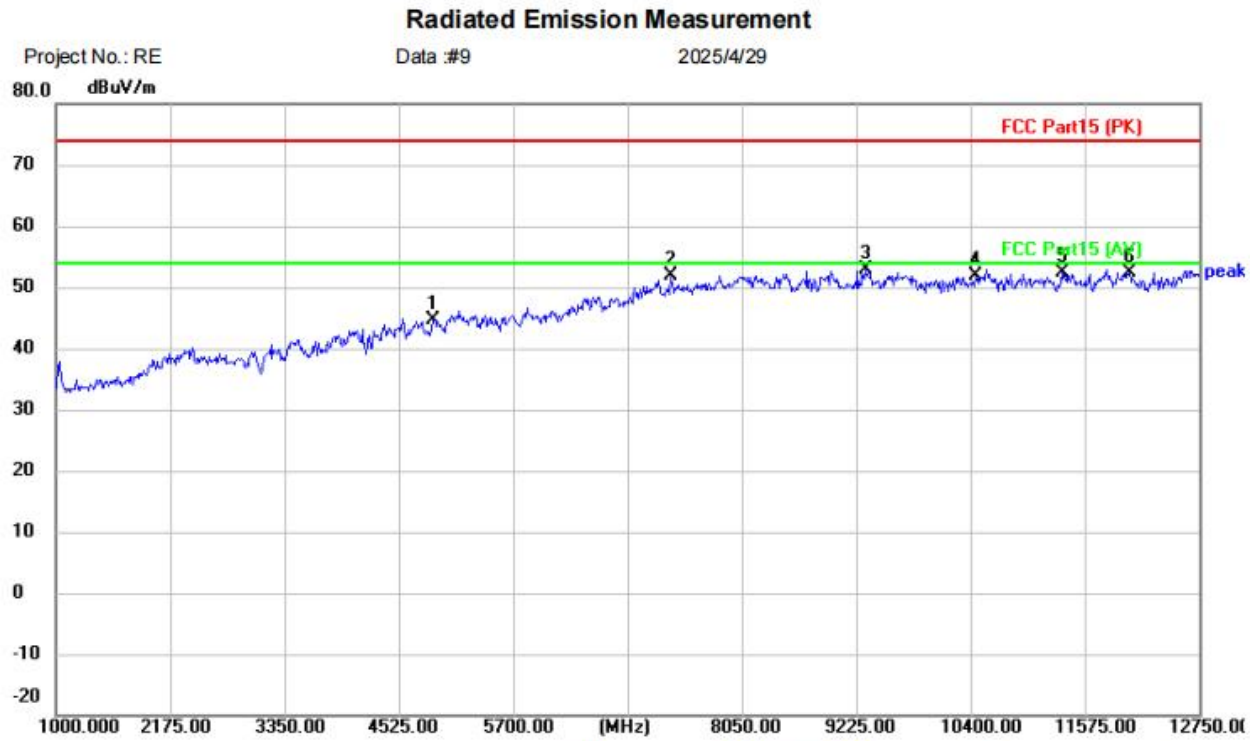
Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4804.000 | 39.07 | 4.02 | 43.09 | 74.00 | -30.91 | peak | |
| 2 | | 7439.000 | 39.84 | 11.96 | 51.80 | 74.00 | -22.20 | peak | |
| 3 | | 8461.250 | 39.18 | 12.93 | 52.11 | 74.00 | -21.89 | peak | |
| 4 | | 9377.750 | 38.56 | 14.32 | 52.88 | 74.00 | -21.12 | peak | |
| 5 | | 10635.00 | 38.22 | 14.55 | 52.77 | 74.00 | -21.23 | peak | |
| 6 | * | 11939.25 | 37.73 | 15.39 | 53.12 | 74.00 | -20.88 | peak | |

**Test Result: Pass**

[Test mode: TX middle channel]; [Polarity: Horizontal]




Site
Limit: FCC Part15 (PK)
EUT: Smart Lock
M/N: M19F
Mode: BLE-TX-2442
Note:

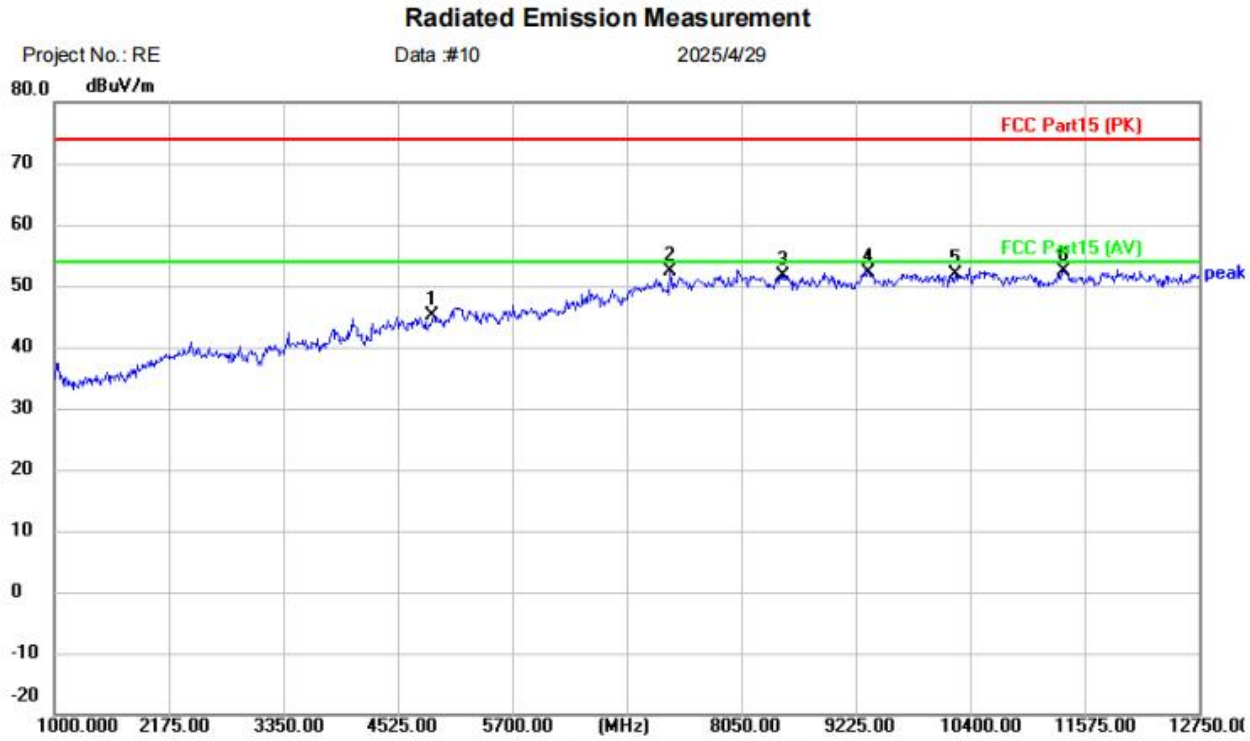
Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4884.000 | 40.26 | 4.44 | 44.70 | 74.00 | -29.30 | peak | |
| 2 | | 7321.500 | 40.95 | 11.04 | 51.99 | 74.00 | -22.01 | peak | |
| 3 | * | 9319.000 | 38.26 | 14.52 | 52.78 | 74.00 | -21.22 | peak | |
| 4 | | 10447.00 | 37.02 | 14.90 | 51.92 | 74.00 | -22.08 | peak | |
| 5 | | 11340.00 | 37.62 | 14.73 | 52.35 | 74.00 | -21.65 | peak | |
| 6 | | 12033.25 | 36.67 | 15.66 | 52.33 | 74.00 | -21.67 | peak | |

**Test Result: Pass**

[Test mode: TX middle channel]; [Polarity: Vertical]




Site
Limit: FCC Part15 (PK)
EUT: Smart Lock
M/N: M19F
Mode: BLE-TX-2442
Note:

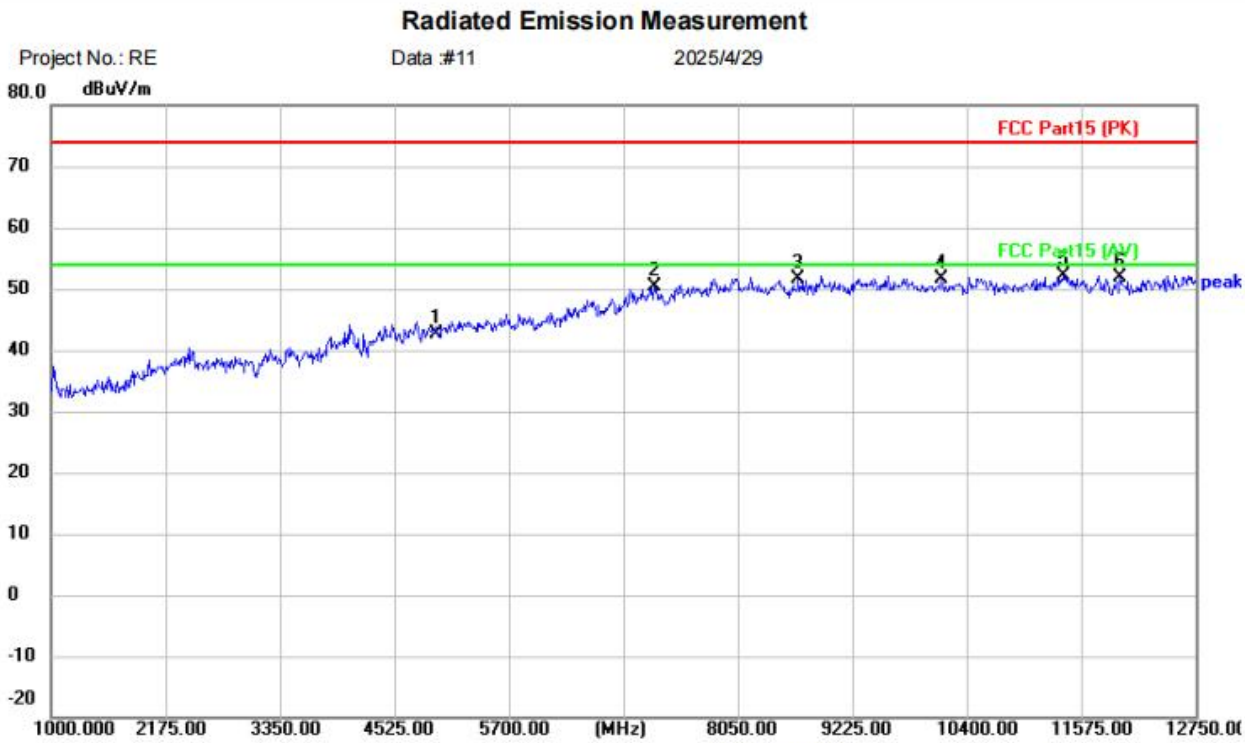
Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4884.000 | 40.64 | 4.44 | 45.08 | 74.00 | -28.92 | peak | |
| 2 | * | 7321.500 | 41.30 | 11.04 | 52.34 | 74.00 | -21.66 | peak | |
| 3 | | 8484.750 | 38.86 | 12.87 | 51.73 | 74.00 | -22.27 | peak | |
| 4 | | 9354.250 | 37.60 | 14.65 | 52.25 | 74.00 | -21.75 | peak | |
| 5 | | 10247.25 | 37.40 | 14.59 | 51.99 | 74.00 | -22.01 | peak | |
| 6 | | 11363.50 | 37.31 | 15.00 | 52.31 | 74.00 | -21.69 | peak | |

**Test Result: Pass**

[Test mode: TX High channel]; [Polarity: Horizontal]




Site
Limit: FCC Part15 (PK)
EUT: Smart Lock
M/N: M19F
Mode: BLE-TX-2480
Note:

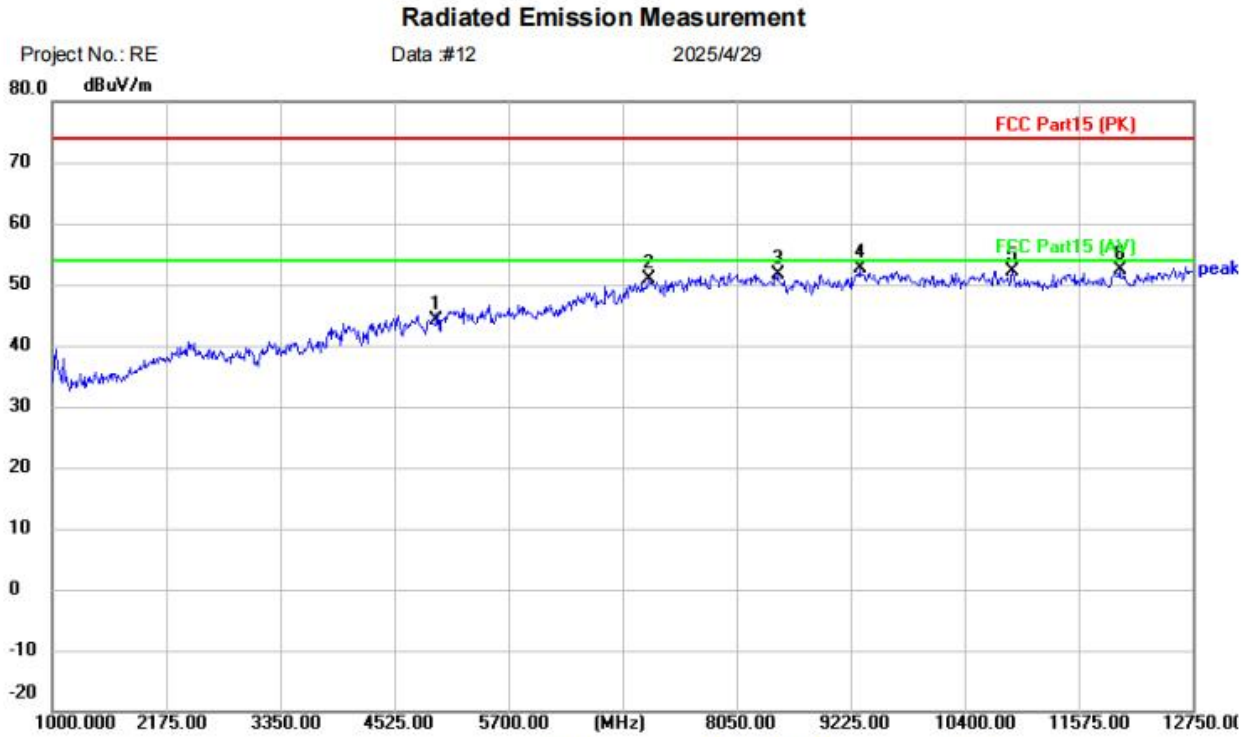
Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4960.000 | 37.85 | 4.90 | 42.75 | 74.00 | -31.25 | peak | |
| 2 | | 7192.250 | 39.03 | 11.31 | 50.34 | 74.00 | -23.66 | peak | |
| 3 | | 8672.750 | 38.49 | 13.15 | 51.64 | 74.00 | -22.36 | peak | |
| 4 | | 10141.50 | 37.22 | 14.47 | 51.69 | 74.00 | -22.31 | peak | |
| 5 | * | 11387.00 | 36.80 | 15.27 | 52.07 | 74.00 | -21.93 | peak | |
| 6 | | 11974.50 | 36.21 | 15.65 | 51.86 | 74.00 | -22.14 | peak | |

**Test Result: Pass**

[Test mode: TX High channel]; [Polarity: Vertical]




Site
Limit: FCC Part15 (PK)
EUT: Smart Lock
M/N: M19F
Mode: BLE-TX-2480
Note:

Polarization: ***Vertical***
Power:

Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4960.000 | 39.18 | 4.90 | 44.08 | 74.00 | -29.92 | peak | |
| 2 | | 7145.250 | 39.36 | 11.50 | 50.86 | 74.00 | -23.14 | peak | |
| 3 | | 8473.000 | 38.76 | 12.90 | 51.66 | 74.00 | -22.34 | peak | |
| 4 | * | 9319.000 | 38.11 | 14.52 | 52.63 | 74.00 | -21.37 | peak | |
| 5 | | 10893.50 | 37.93 | 14.32 | 52.25 | 74.00 | -21.75 | peak | |
| 6 | | 11998.00 | 36.66 | 15.84 | 52.50 | 74.00 | -21.50 | peak | |

**Test Result: Pass**

When scanning in the range of 1GHz~ 40GHz and the interference above 12.75GHz is very small, it is a low noise signal. The point shown in the figure above is the highest emission that can be found during the test, so only the above point is shown. The fundamental frequency is blocked by the filter. Only stray emission.

## 6.8 Radiated emissions which fall in the restricted bands

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247(d) |
| **Test Method** | ANSI C63.10-2013 Clause 6.12 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |

### 6.8.1 Limit

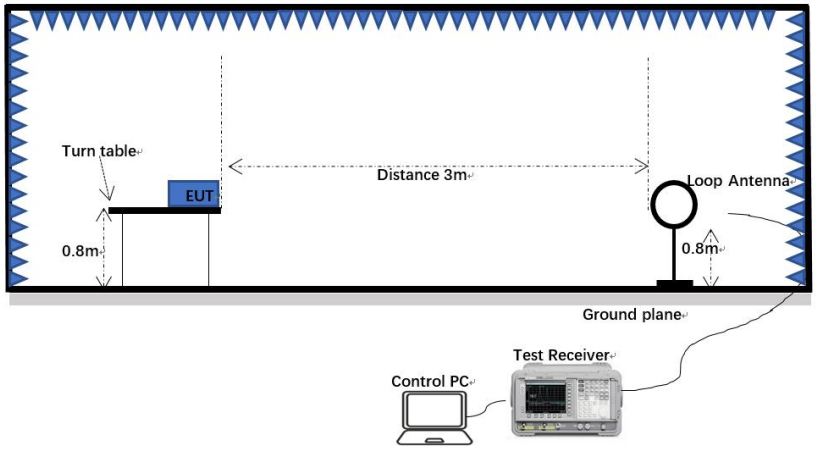
| Frequency(MHz) | Field strength(microvolts/meter) | Measurement distance(meters) |
|---|---|---|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

*Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.*

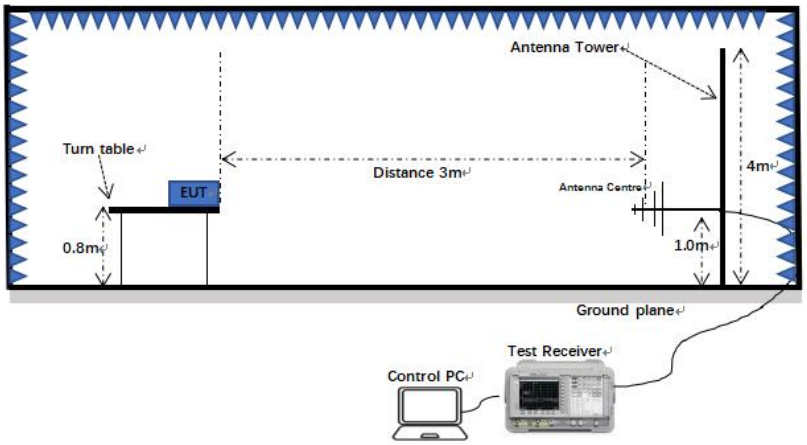
BlueAsia

### 6.8.2 Test setup

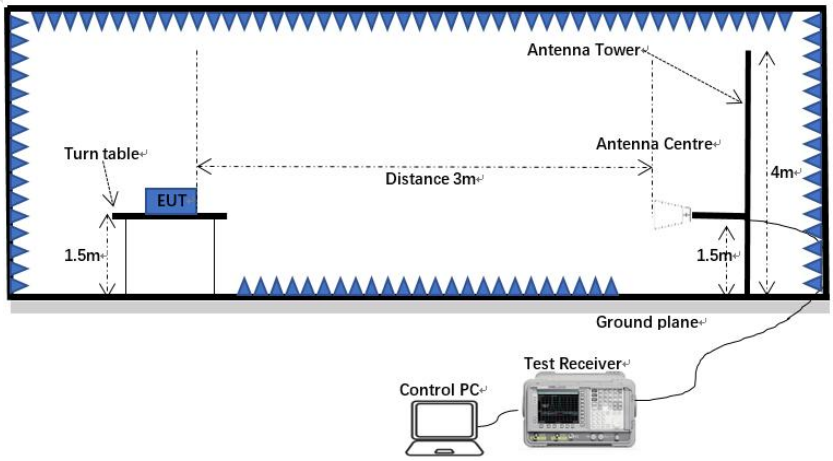
Below 1GHz：




30MHz-1GHz：




Above 1GHz：



### 6.8.3 Procedure

a) For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b) For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c) The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h) Test the EUT in the lowest channel, the middle channel, the highest channel.

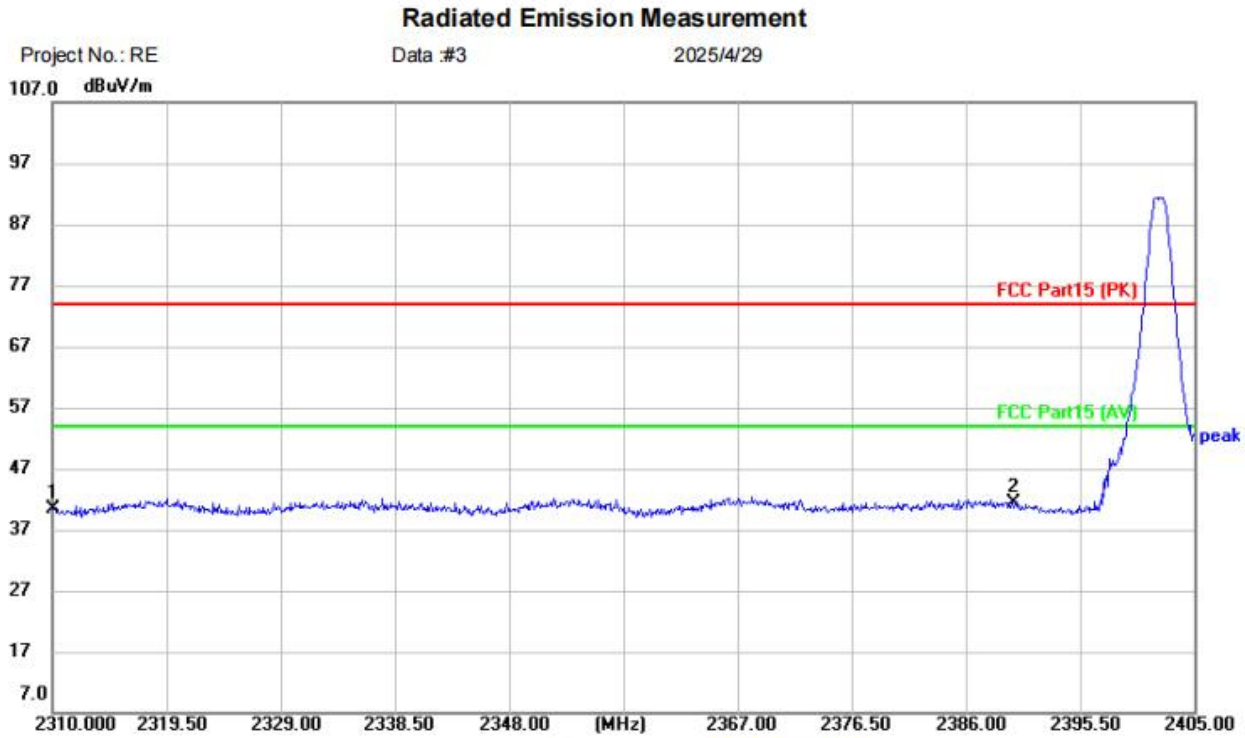
i) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j) Repeat above procedures until all frequencies measured was complete.

*Note 1: Level (dBuV) = Reading (dBuV) + Factor (dB/m)*
*Note 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.*

### 6.8.4 Test data

[Test mode: TX low channel]; [Polarity: Horizontal]




Site
Limit: FCC Part15 (PK)
EUT: Smart Lock
M/N: M19F
Mode: BLE-TX-2402
Note:

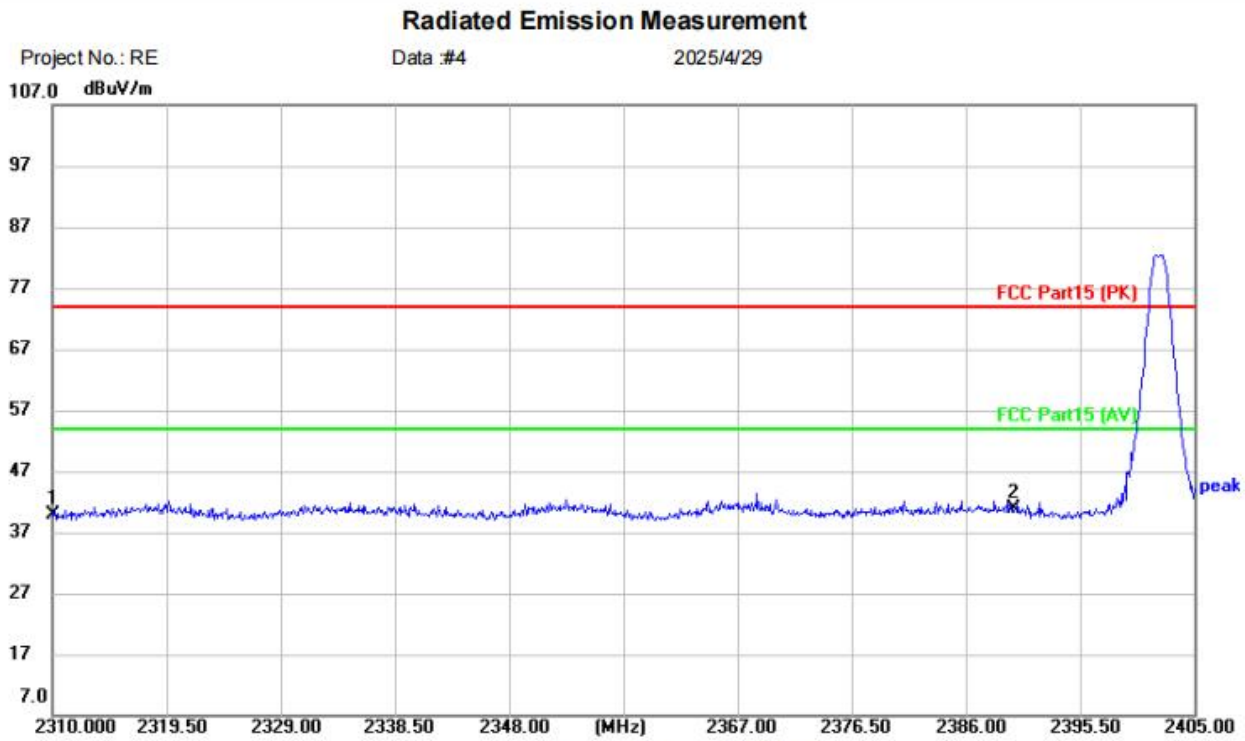
Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 2310.000 | 43.30 | -2.87 | 40.43 | 74.00 | -33.57 | peak | |
| 2 | * | 2390.000 | 43.77 | -2.44 | 41.33 | 74.00 | -32.67 | peak | |

**Test Result: Pass**

[Test mode:TX low channel]; [Polarity: Vertical]




Site
Limit: FCC Part15 (PK)
EUT: Smart Lock
M/N: M19F
Mode: BLE-TX-2402
Note:

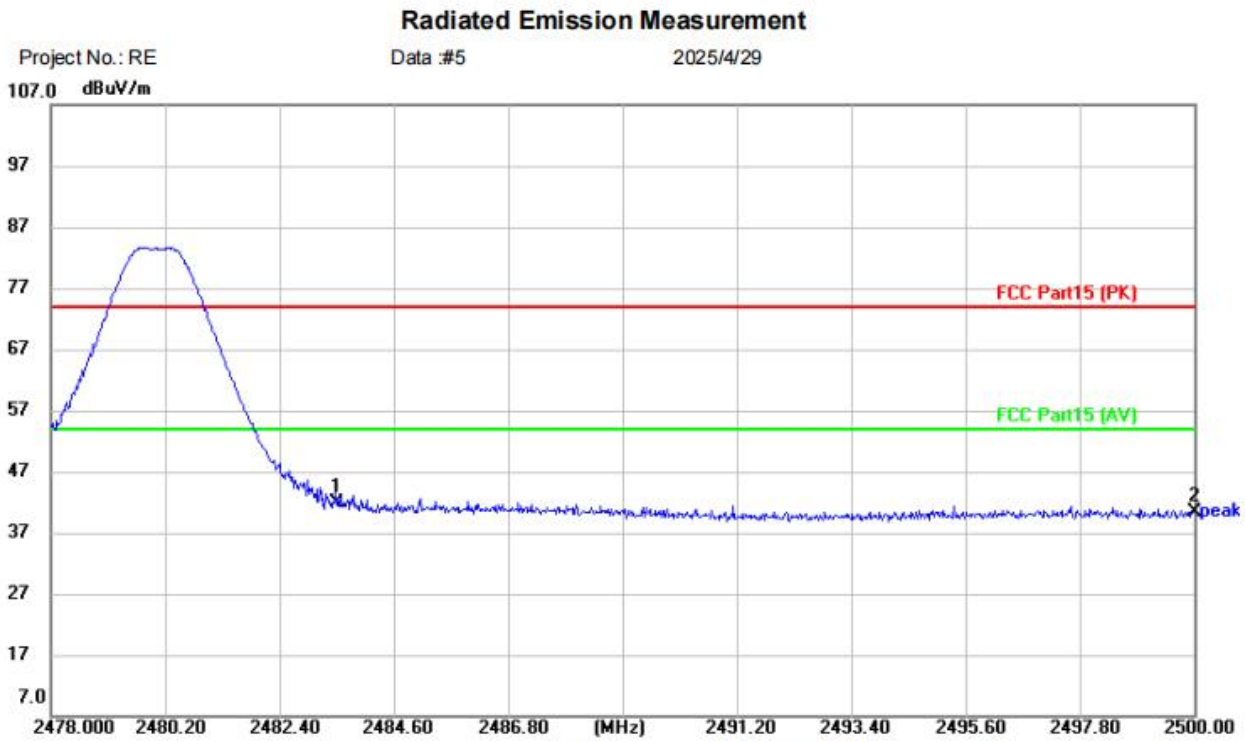
Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 2310.000 | 42.71 | -2.87 | 39.84 | 74.00 | -34.16 | peak | |
| 2 | * | 2390.000 | 43.26 | -2.44 | 40.82 | 74.00 | -33.18 | peak | |

**Test Result: Pass**

[Test mode: TX High channel]; [Polarity: Horizontal]




Site
Limit: FCC Part15 (PK)
EUT: Smart Lock
M/N: M19F
Mode: BLE-TX-2480
Note:

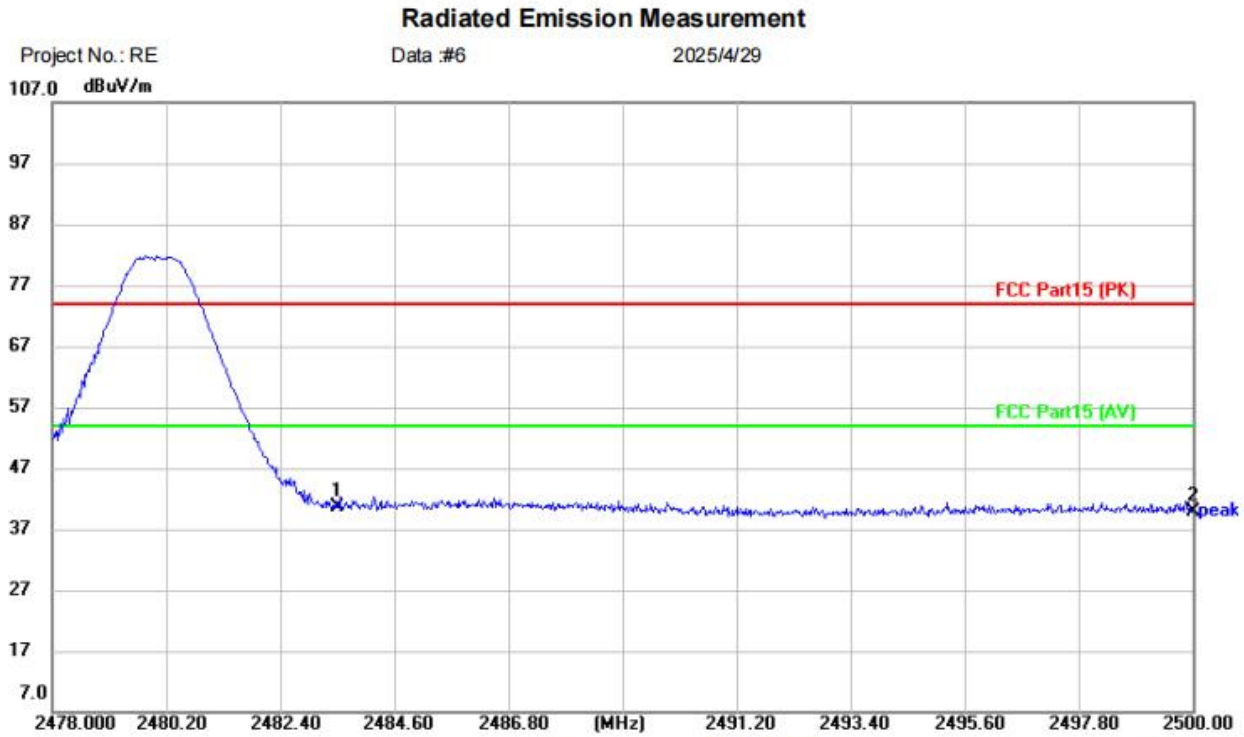
Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | * | 2483.500 | 44.87 | -2.91 | 41.96 | 74.00 | -32.04 | peak | |
| 2 | | 2500.000 | 43.40 | -3.00 | 40.40 | 74.00 | -33.60 | peak | |

**Test Result: Pass**

[Test mode:TX High channel]; [Polarity: Vertical]




Site
Limit: FCC Part15 (PK)
EUT: Smart Lock
M/N: M19F
Mode: BLE-TX-2480
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | * | 2483.500 | 43.56 | -2.91 | 40.65 | 74.00 | -33.35 | peak | |
| 2 | | 2500.000 | 42.84 | -3.00 | 39.84 | 74.00 | -34.16 | peak | |

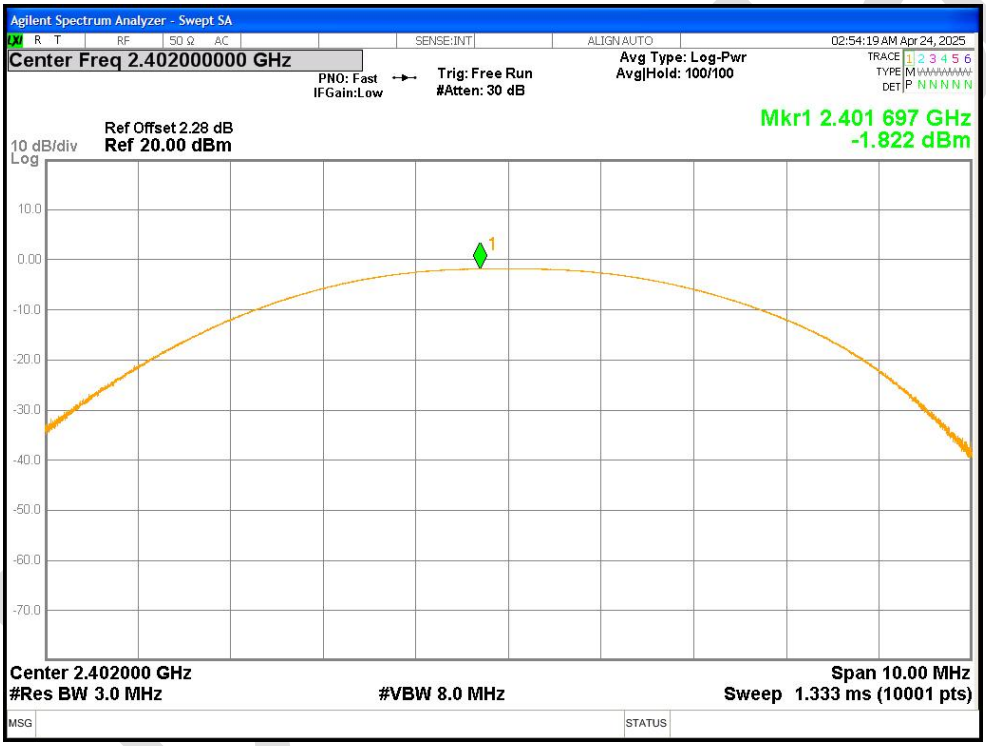
**Test Result: Pass**

# 7 Appendix A

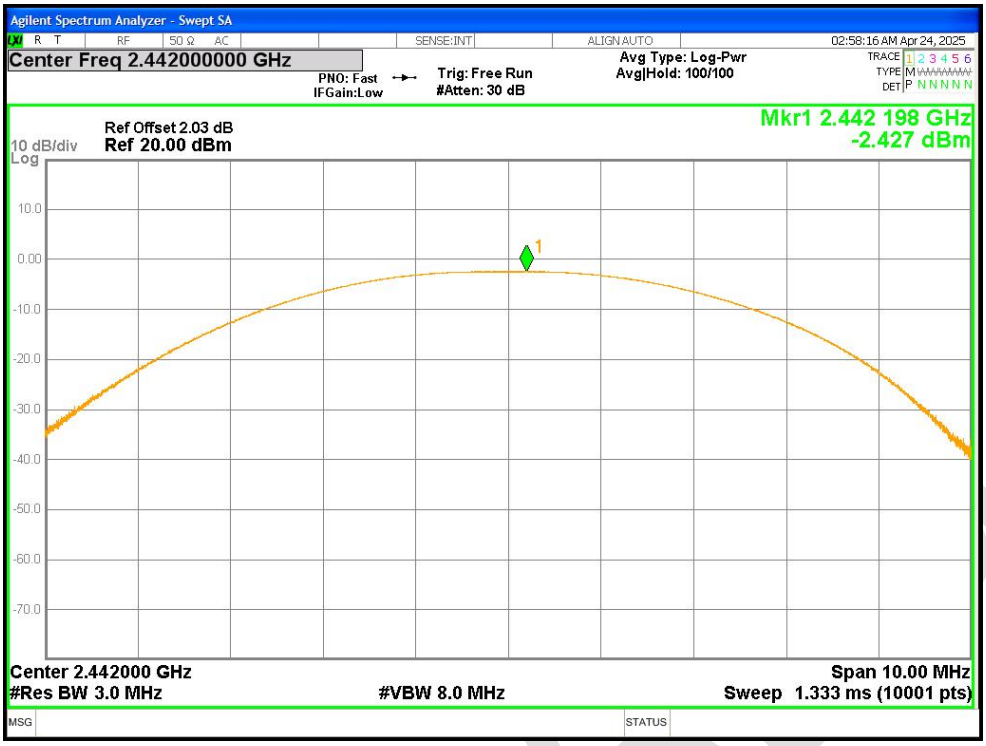
## 7.1 Maximum PK Conducted Output Power

| Condition | Mode | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | -1.822 | 30 | Pass |
| NVNT | BLE 1M | 2442 | Ant1 | -2.427 | 30 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | -1.716 | 30 | Pass |

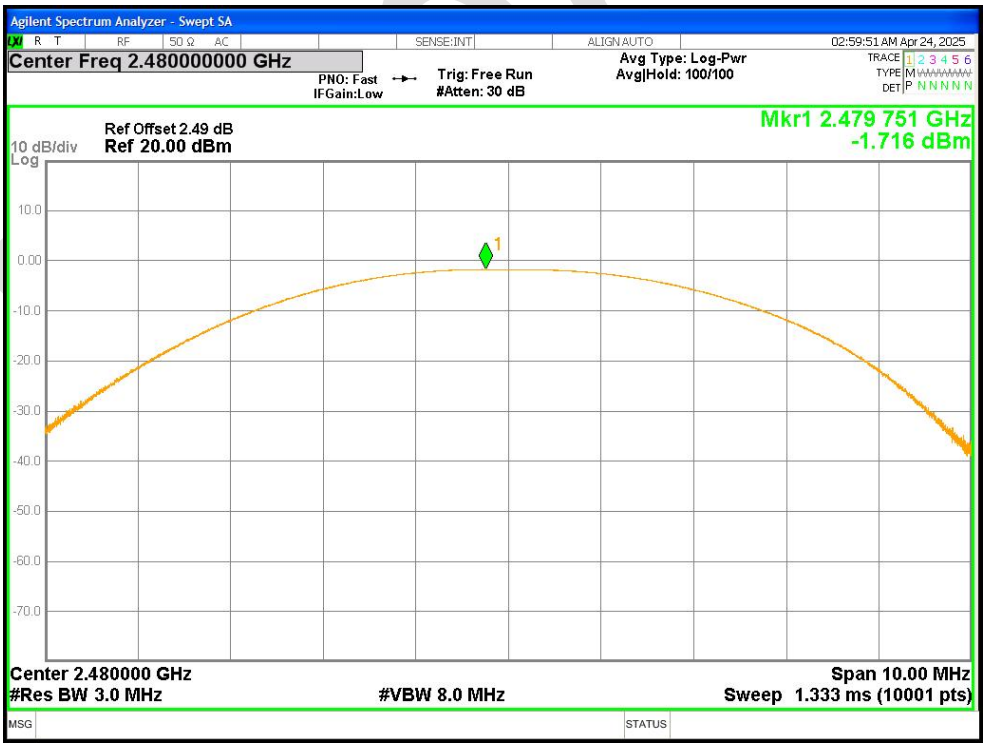
Power NVNT BLE 1M 2402MHz Ant1




Power NVNT BLE 1M 2442MHz Ant1



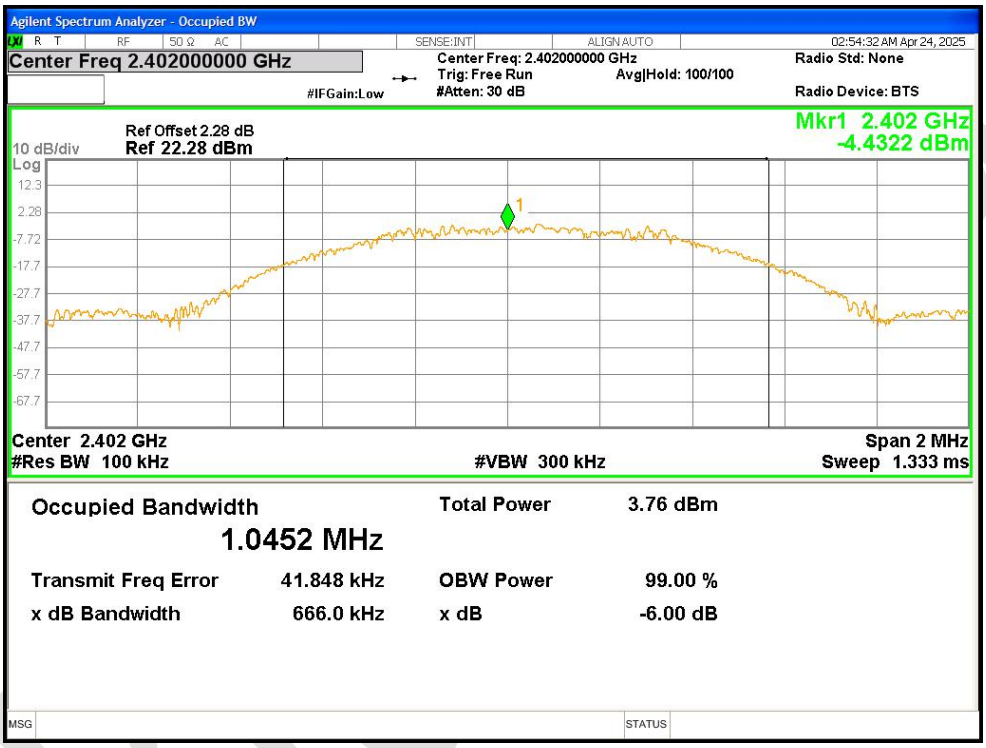

Power NVNT BLE 1M 2480MHz Ant1



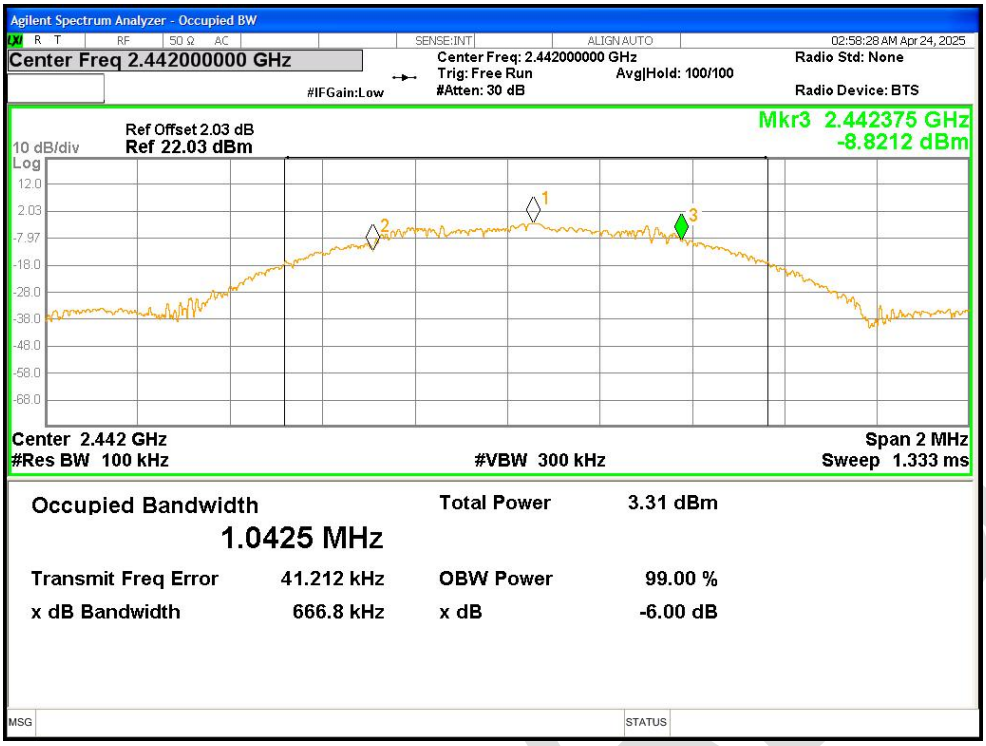
## 7.2 -6dB Bandwidth

| Condition | Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | 0.666 | 0.5 | Pass |
| NVNT | BLE 1M | 2442 | Ant1 | 0.667 | 0.5 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | 0.663 | 0.5 | Pass |

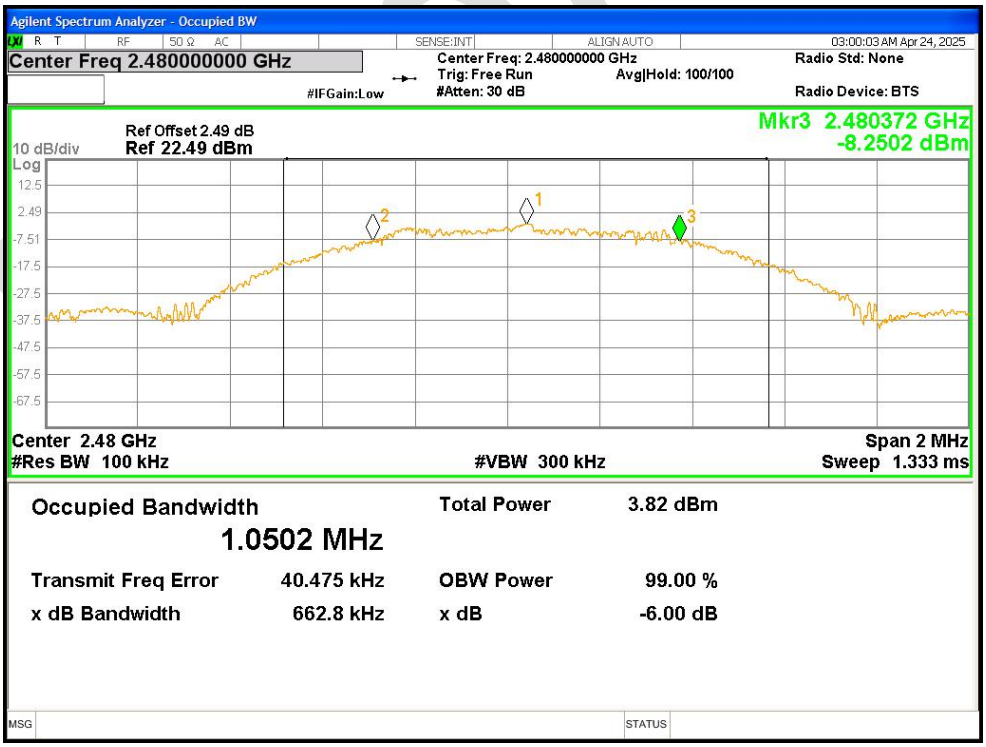
-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1




-6dB Bandwidth NVNT BLE 1M 2442MHz Ant1



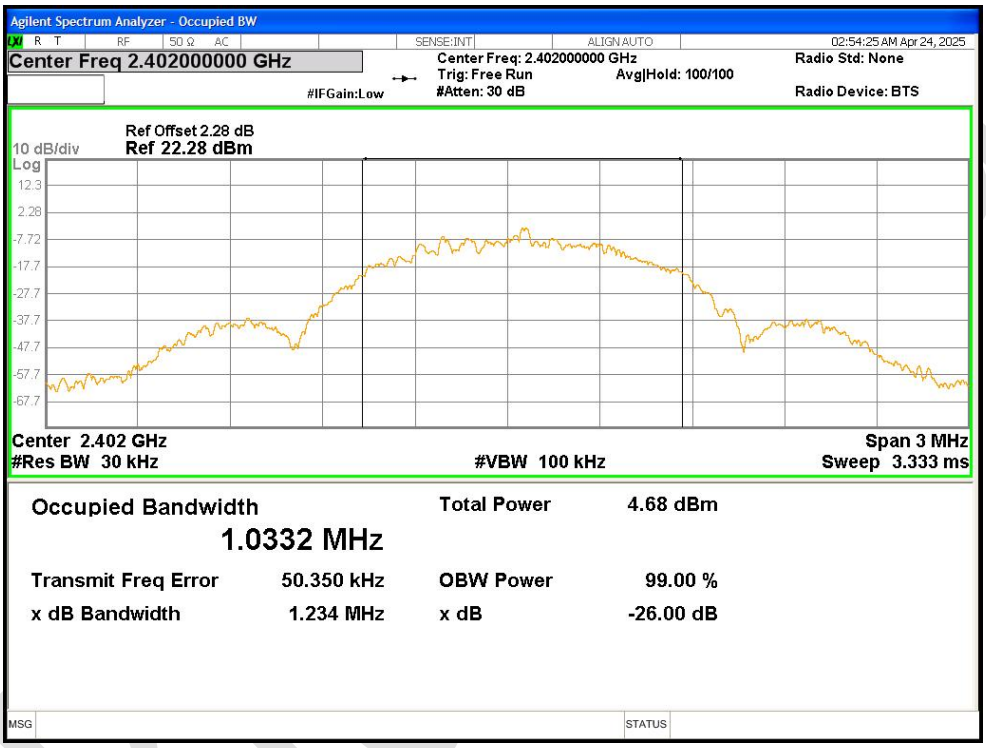

-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



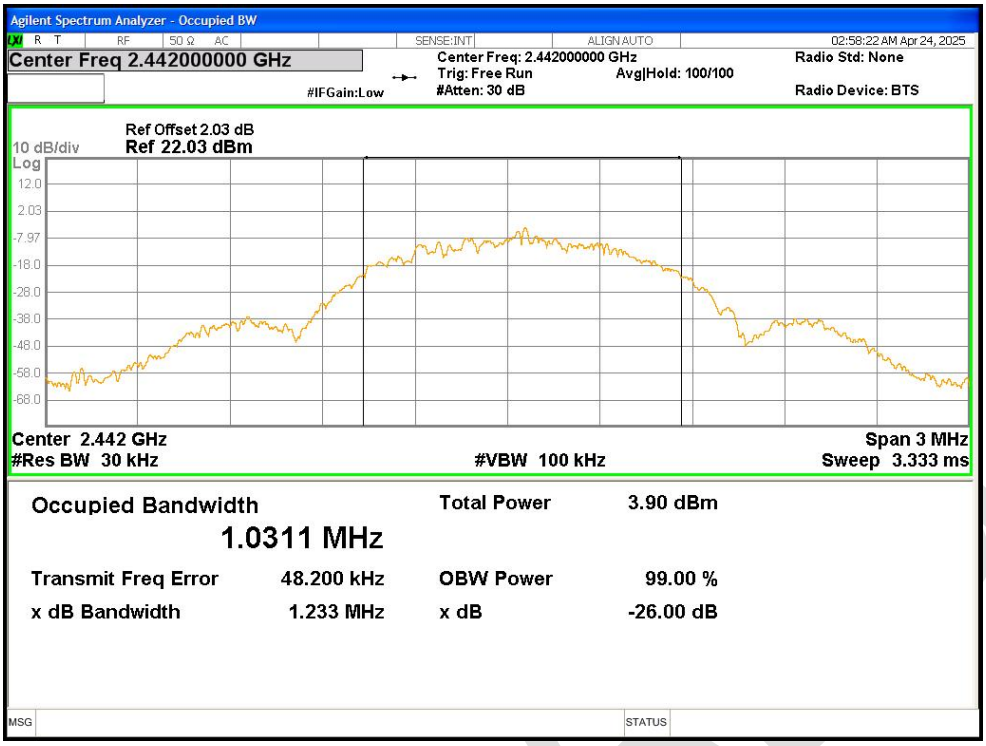
## 7.3 Occupied Channel Bandwidth

| Condition | Mode | Frequency (MHz) | Antenna | 99% OBW (MHz) |
|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | 1.033200019 |
| NVNT | BLE 1M | 2442 | Ant1 | 1.031149665 |
| NVNT | BLE 1M | 2480 | Ant1 | 1.035505125 |

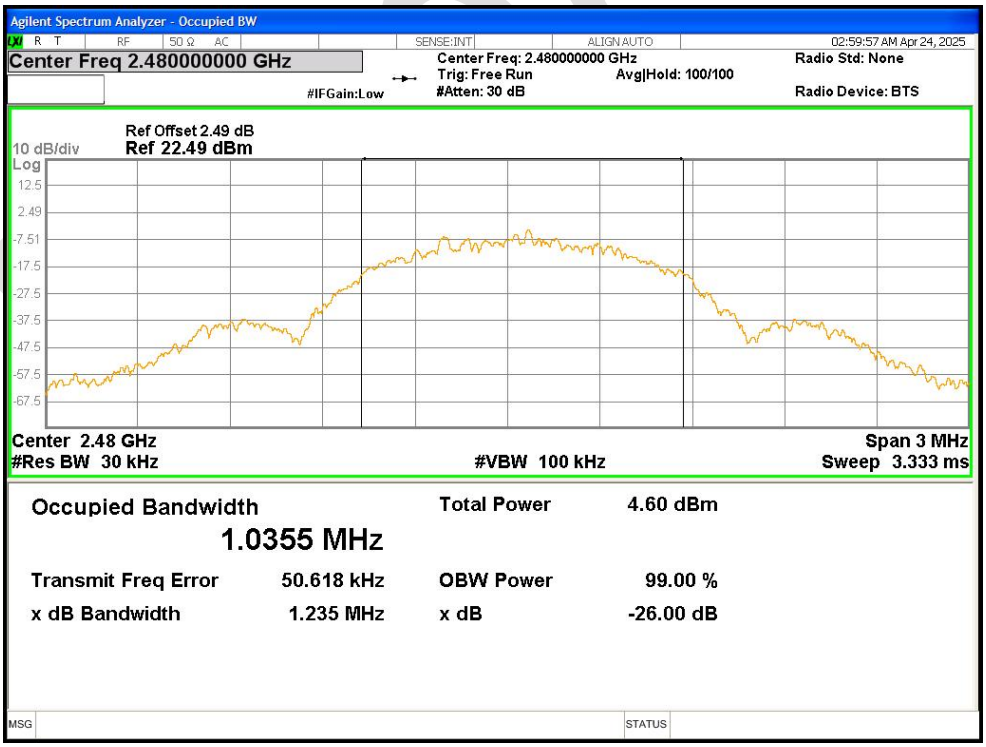
OBW NVNT BLE 1M 2402MHz Ant1




OBW NVNT BLE 1M 2442MHz Ant1



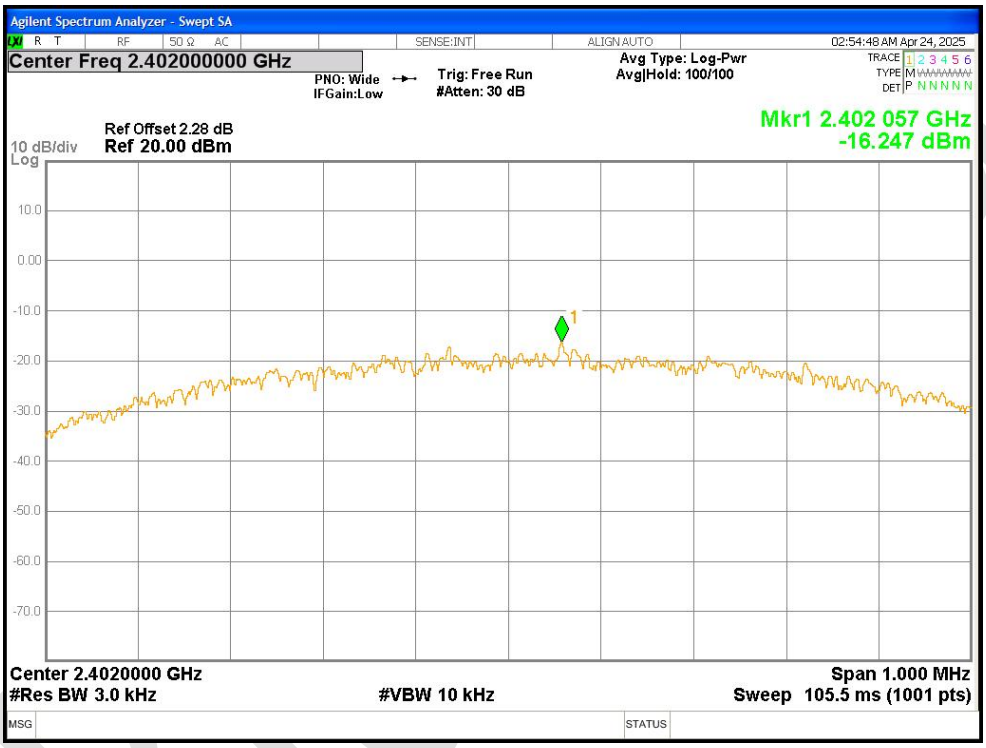

OBW NVNT BLE 1M 2480MHz Ant1



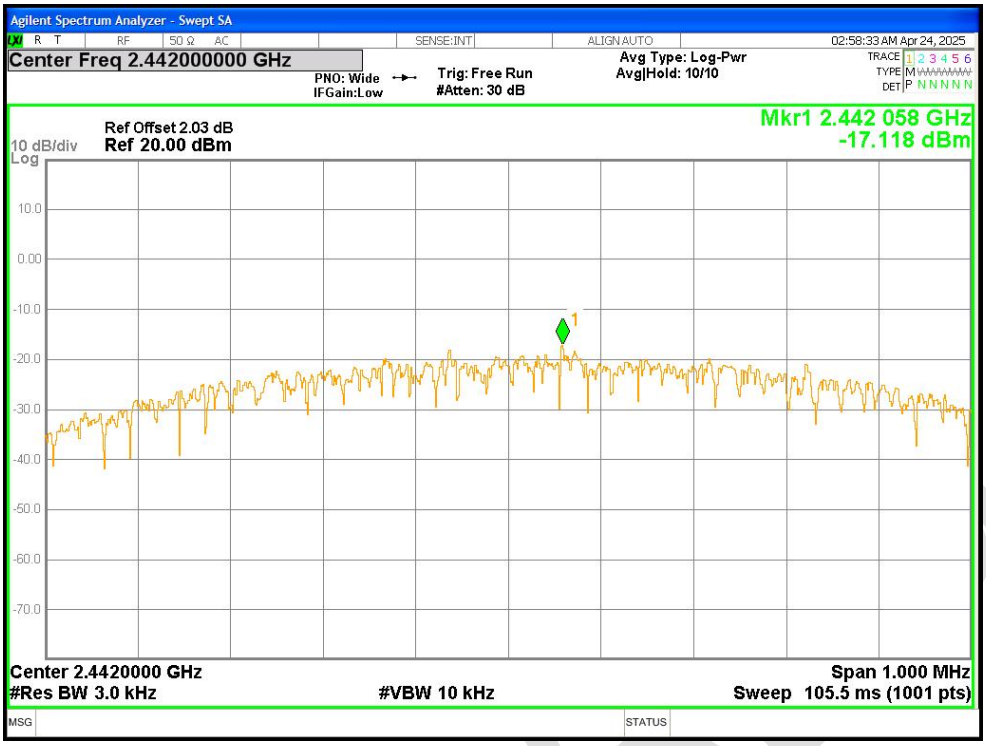
## 7.4 Maximum Power Spectral Density Level

| Condition | Mode | Frequency (MHz) | Antenna | Max PSD (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | -16.247 | 8 | Pass |
| NVNT | BLE 1M | 2442 | Ant1 | -17.118 | 8 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | -16.35 | 8 | Pass |

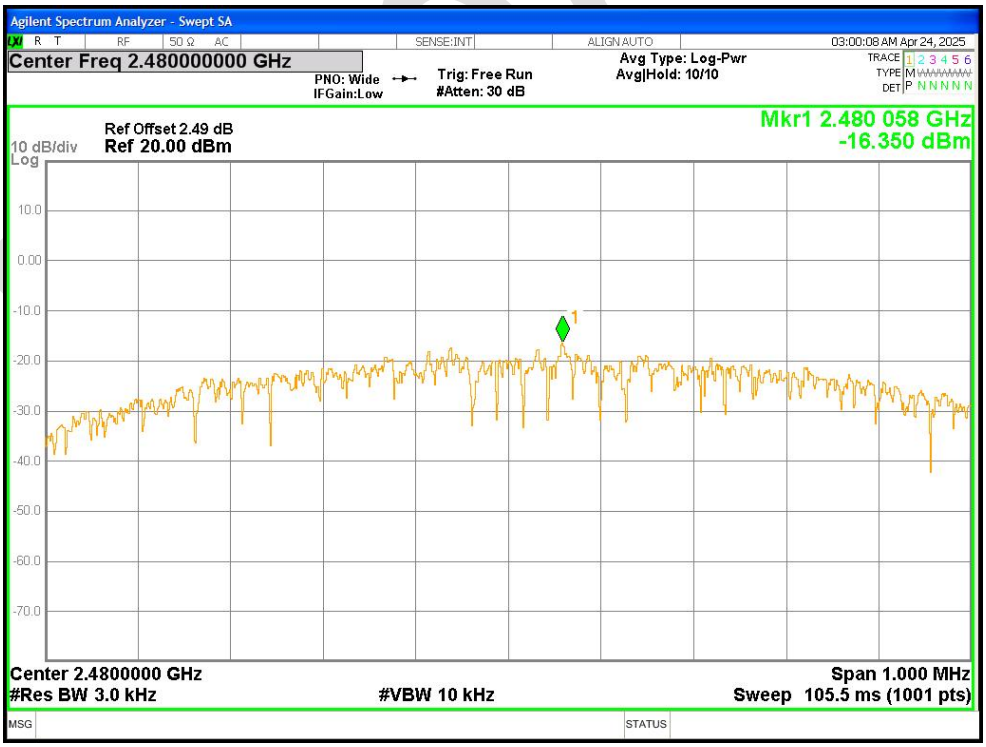
PSD NVNT BLE 1M 2402MHz Ant1




PSD NVNT BLE 1M 2442MHz Ant1



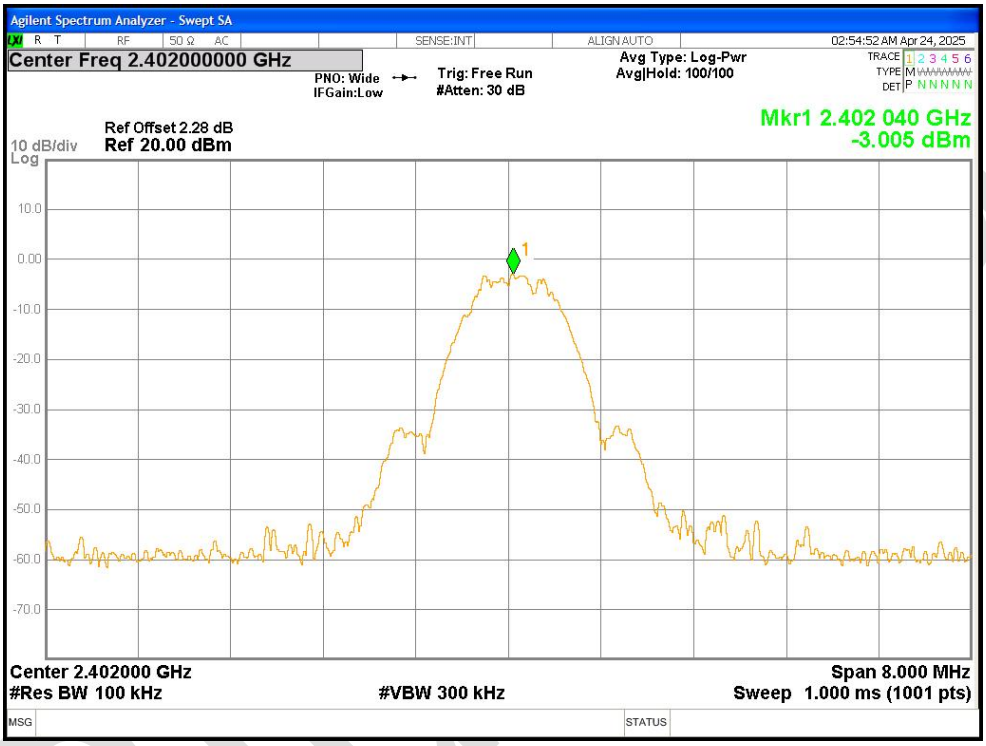

PSD NVNT BLE 1M 2480MHz Ant1



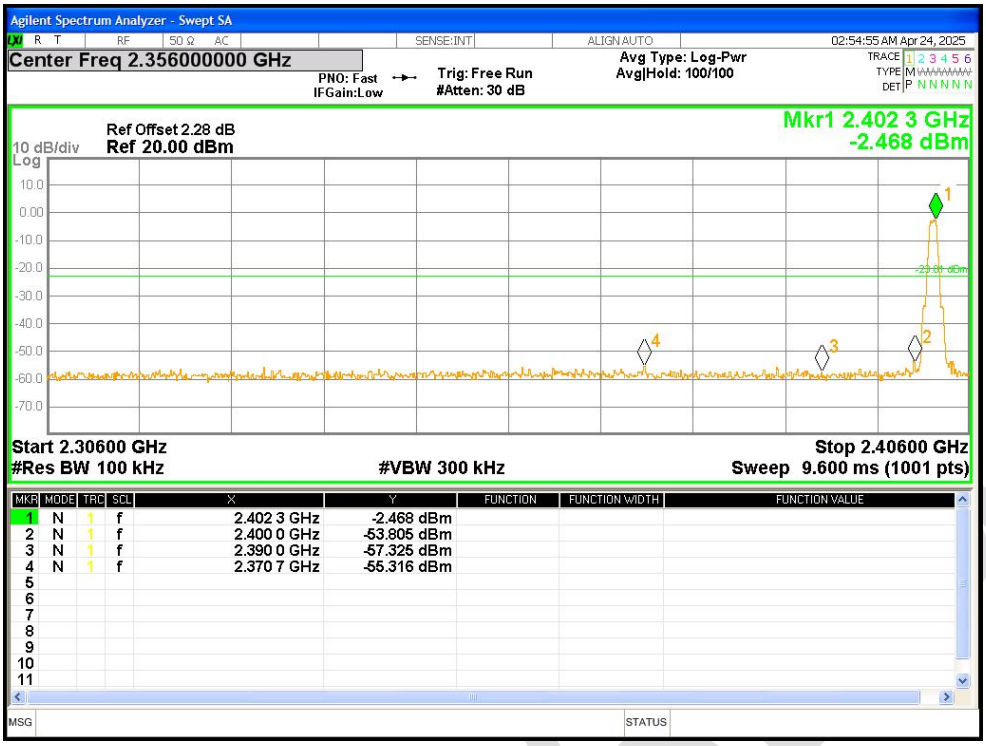
## 7.5 Band Edge

| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | -52.31 | -20 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | -52.26 | -20 | Pass |

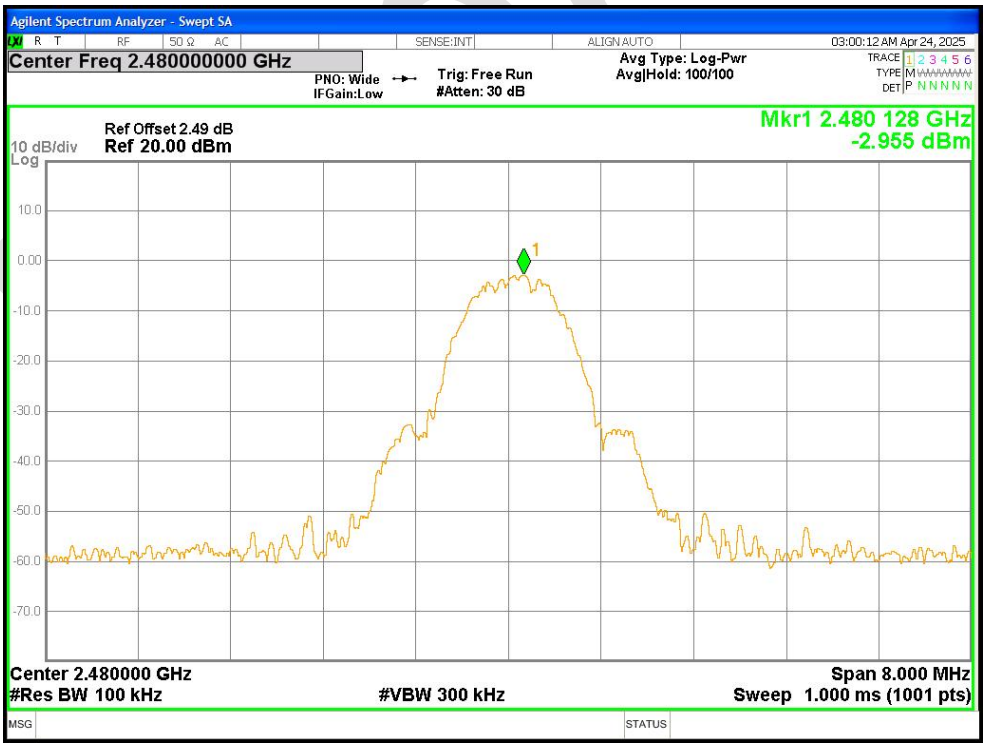
Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



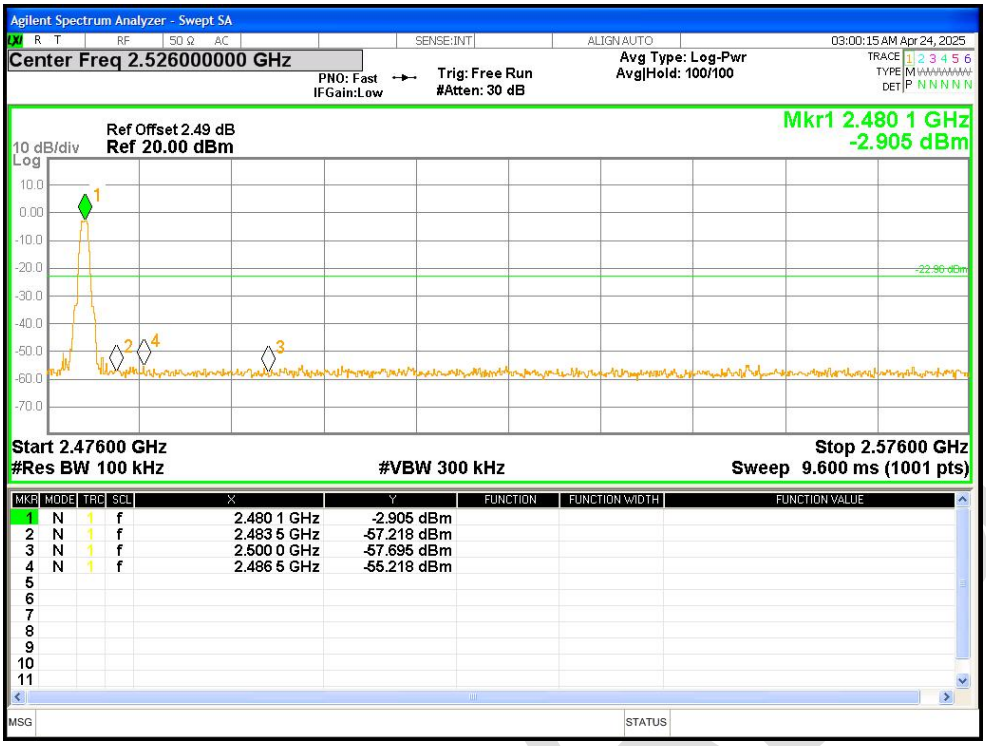

Band Edge NVNT BLE 1M 2402MHz Ant1 Emission




Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



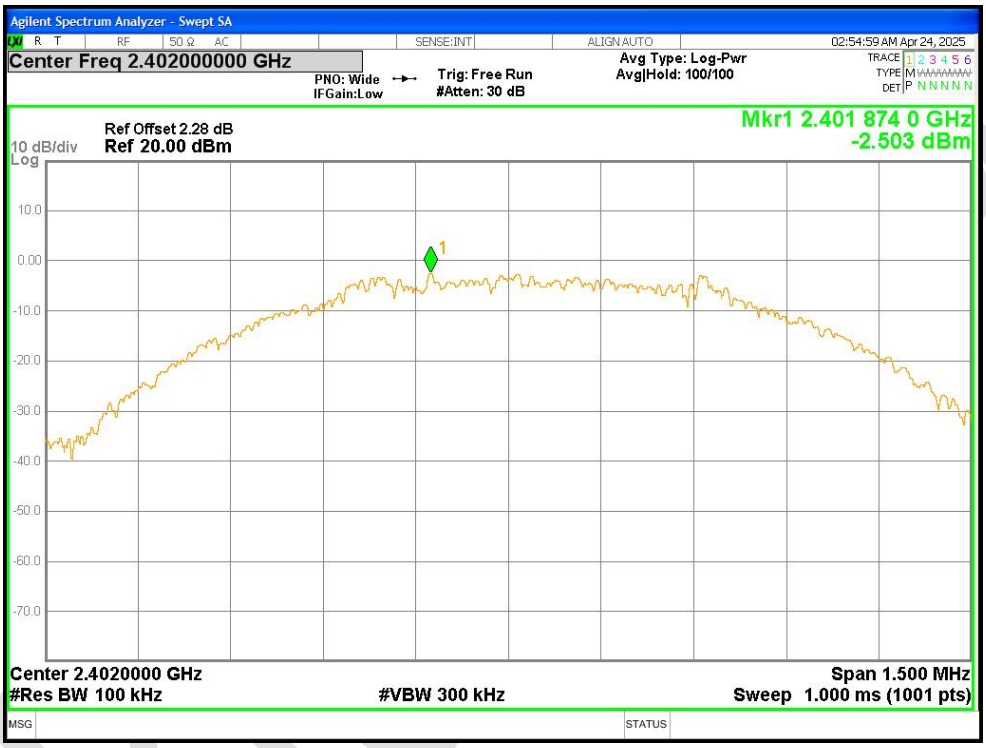

Band Edge NVNT BLE 1M 2480MHz Ant1 Emission


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.526000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
03:00:15 AM Apr 24, 2025
Ref Offset 2.49 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.480 1 GHz
-2.905 dBm
-22.96 dBm
Start 2.47600 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.57600 GHz
Sweep 9.600 ms (1001 pts)
1 N 1 f 2.480 1 GHz -2.905 dBm
2 N 1 f 2.483 5 GHz -57.218 dBm
3 N 1 f 2.500 0 GHz -57.695 dBm
4 N 1 f 2.486 5 GHz -55.218 dBm

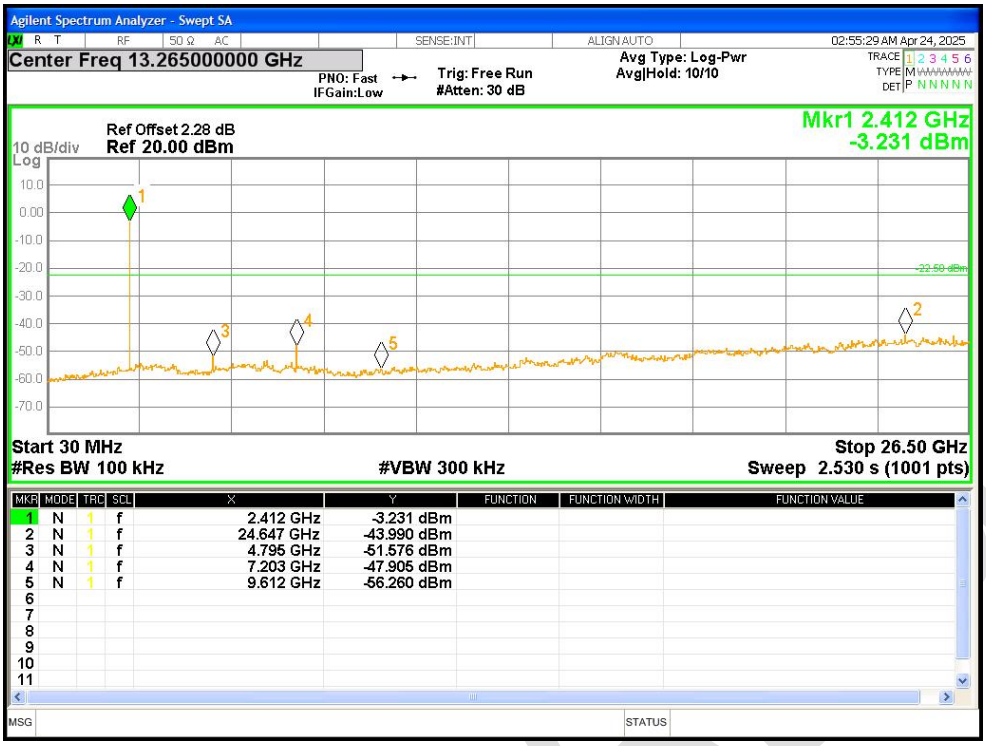
## 7.6 Conducted RF Spurious Emission

| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | -41.49 | -20 | Pass |
| NVNT | BLE 1M | 2442 | Ant1 | -26.22 | -20 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | -25.7 | -20 | Pass |

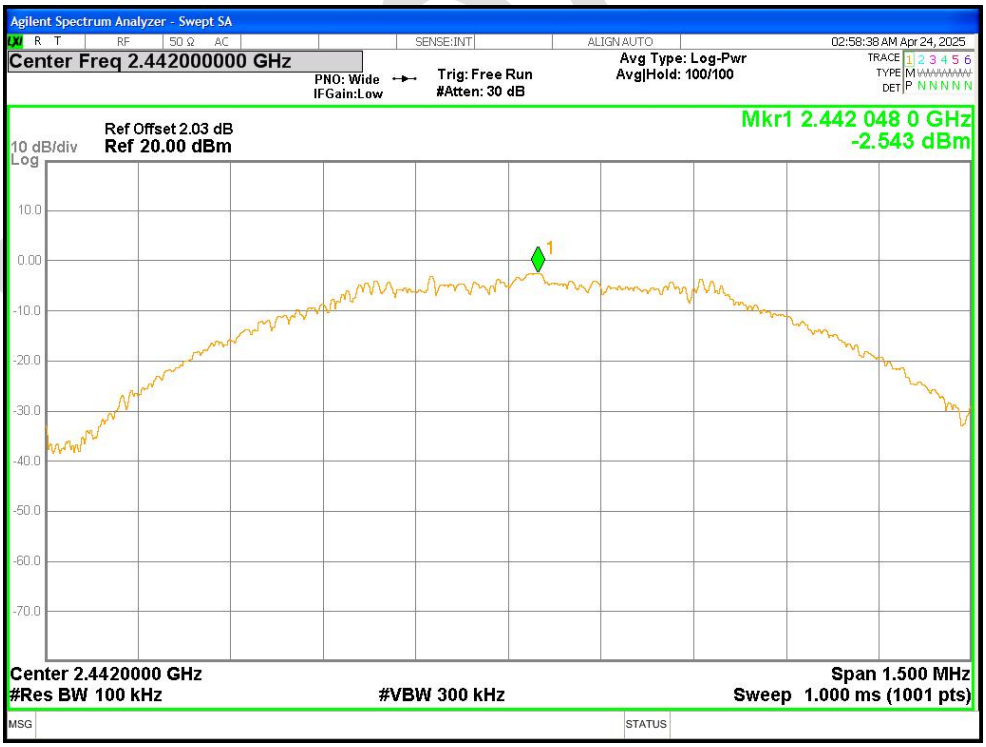
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



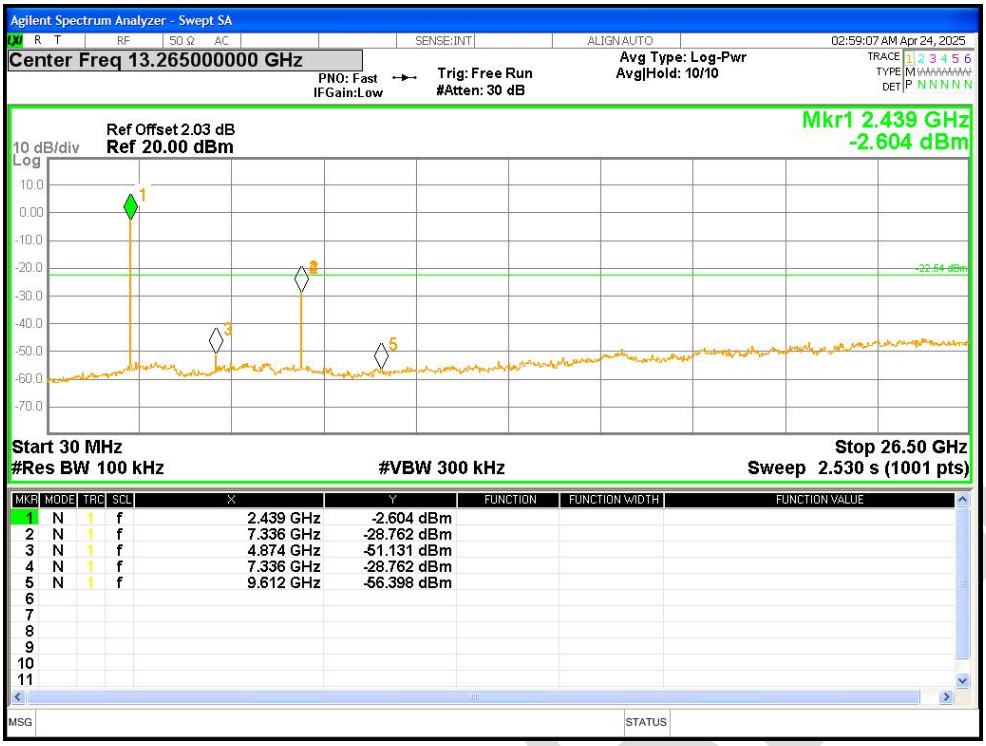

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



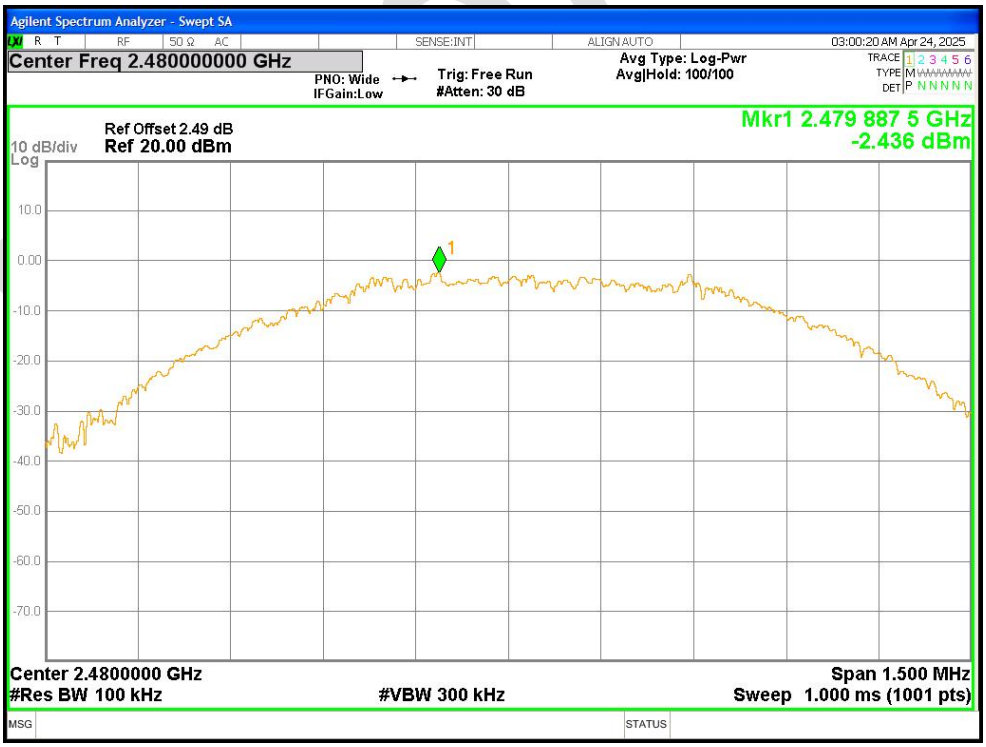

Tx. Spurious NVNT BLE 1M 2442MHz Ant1 Ref



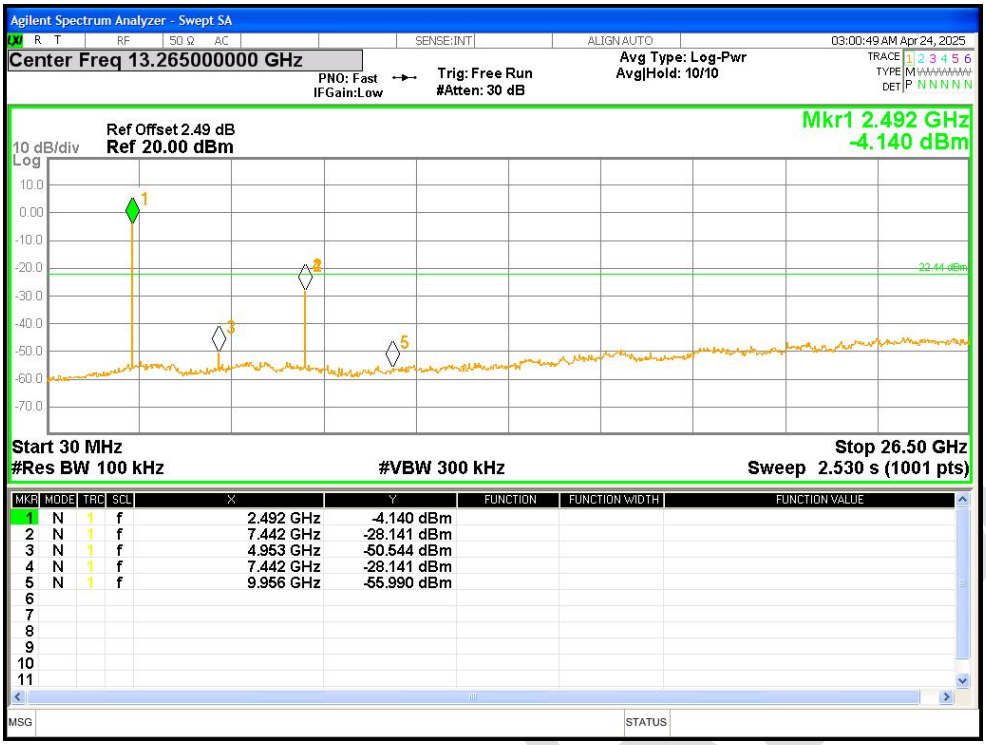

Tx. Spurious NVNT BLE 1M 2442MHz Ant1 Emission




Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref

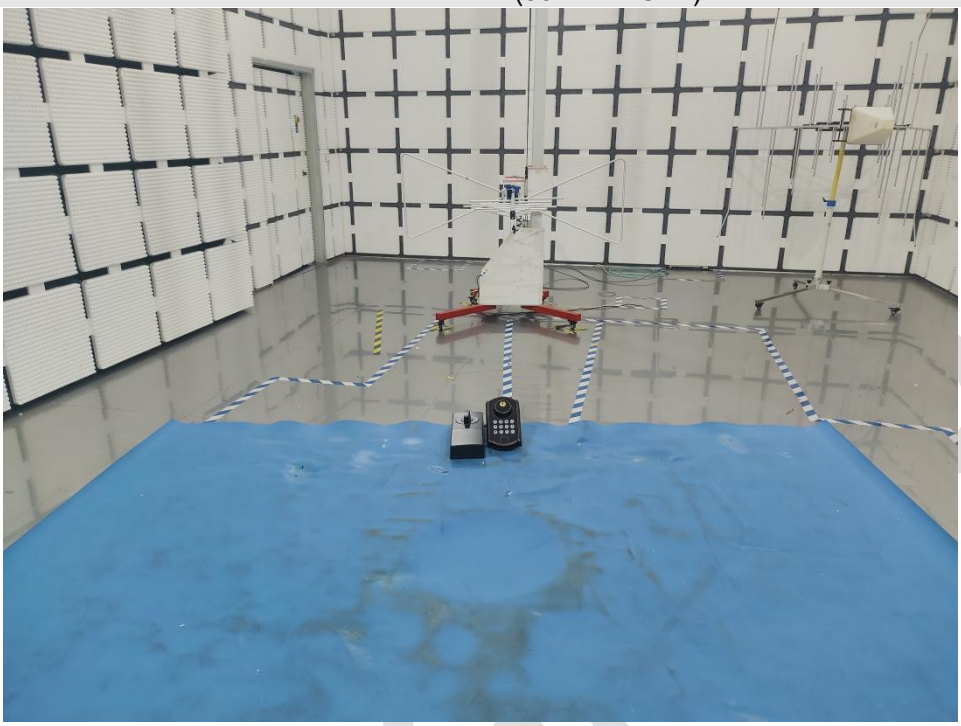



Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission

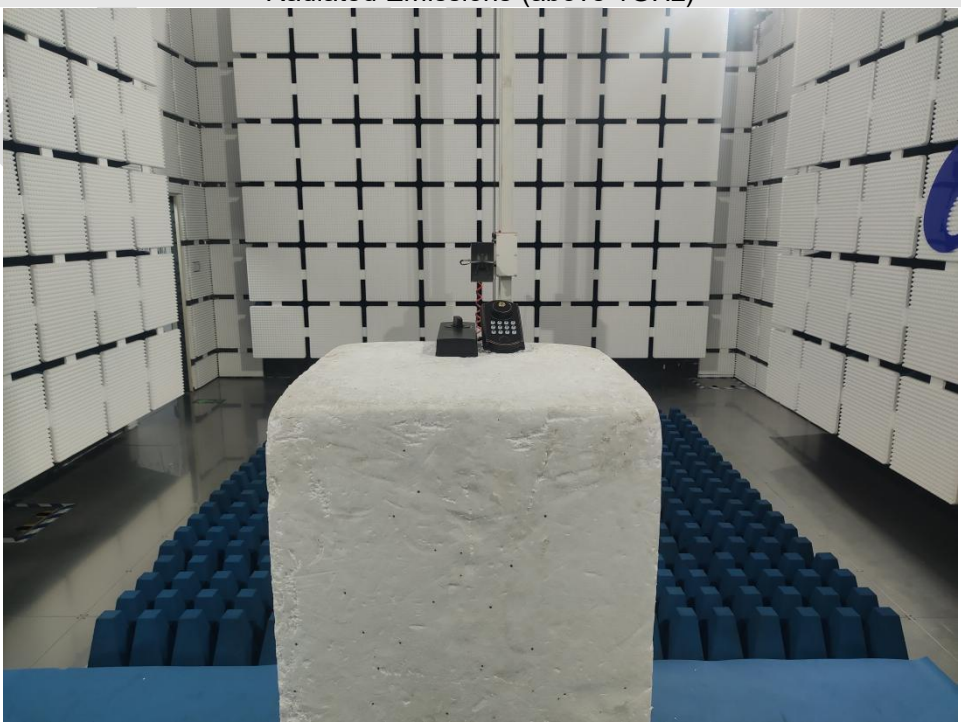

Agilent Spectrum Analyzer - Swept SA
Center Freq 13.265000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
03:00:49 AM Apr 24, 2025
Ref Offset 2.49 dB
Ref 20.00 dBm
10 dB/div
Log
Mkr1 2.492 GHz
-4.140 dBm
-22.44 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.530 s (1001 pts)
1 N 1 f 2.492 GHz -4.140 dBm
2 N 1 f 7.442 GHz -28.141 dBm
3 N 1 f 4.953 GHz -50.544 dBm
4 N 1 f 7.442 GHz -28.141 dBm
5 N 1 f 9.956 GHz -55.990 dBm

# Appendix B: photographs of test setup

Radiated Emissions (30MHz-1GHz)



Radiated Emissions (above 1GHz)



# Appendix C: photographs of EUT

Reference to the test report no. BLA-EMC-202504-A8301

**----END OF REPORT----**

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