KSIGN®
KSIGN (Guangdong) Testing Co., Ltd.
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# TEST REPORT

| | |
|---|---|
| **Report No.** : | **KS2104S0984E** |
| **FCC ID** : | **2AVYW-BT700PRO** |
| **Applicant** : | **TOPDON TECHNOLOGY Co., Ltd** |
| Address : | Unit 2005 20/F, No.3040 Xinghai Avenue, Qianhai Shimao Tower, Qianhai Shenzhen-Hong kong Cooperation Zone, Shenzhen, PR. China |
| Manufacturer : | TOPDON TECHNOLOGY Co., Ltd |
| Address : | Unit 2005 20/F, No.3040 Xinghai Avenue, Qianhai Shimao Tower, Qianhai Shenzhen-Hong kong Cooperation Zone, Shenzhen, PR. China |
| **Product Name** : | **Battery Tester** |
| Trade Mark : | TOPDON |
| Model/Type reference : | BT700 Pro |
| Listed Model(s) : | N/A |
| **Standard** : | **FCC CFR Title 47 Part 15 Subpart C Section 15.247** |
| Date of Receipt : | Apr. 23, 2021 |
| Date of Test Date : | Apr. 23, 2021~May. 11, 2021 |
| Date of issue : | May. 11, 2021 |
| **Test result** : | **Pass** |

| | | |
|---|---|---|
| Compiled by: (Printed name+signature) | Rory Huang | Rory Huang |
| Supervised by: ( Printed name+signature) | Eder Zhan | Eder Zhan |
| Approved by: ( Printed name+signature) | Cary Luo | Cary Luo |

| | |
|---|---|
| **Testing Laboratory Name** : | **KSIGN(Guangdong) Testing Co., Ltd.** |
| Address : | West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu,Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China |

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# 1. TEST SUMMARY

## 1.1. Test Standards

The tests were performed according to following standards:

**FCC Rules Part 15.247:** Operation within the bands of 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.

**KDB 558074 D01**：The measurement guidance provided herein is applicable only to Digital Transmission System (DTS) devices operating in the 902-928 MHz. 2400-2483.5 MHz and/or 5725-5850 MHz bands under § 15.247 of the FCC rules (Title 47 of the Code of Federal Regulations)

**ANSI C63.10-2013:** American National Standard for Testing Unlicensed Wireless Devices.

## 1.2. Report version

| Revised No. | Date of issue | Description |
|---|---|---|
| 01 | May. 11, 2021 | Original |
| | | |
| | | |

## 1.3. Test Description

| FCC Part 15 Subpart C(15.247) | | | |
|---|---|---|---|
| Test Item | Standard Section | Result | Test Engineer |
| | FCC | | |
| Antenna Requirement | 15.203 | Pass | Rory Huang |
| Conducted Emission | 15.207 | Pass | Rory Huang |
| Restricted Bands | 15.205 | Pass | Rory Huang |
| Peak Output Power | 15.247(b) | Pass | Rory Huang |
| Band Edge Emissions | 15.247(d) | Pass | Rory Huang |
| Power Spectral Density | 15.247(e) | Pass | Rory Huang |
| Radiated Emission | 15.205&15.209 | Pass | Rory Huang |
| 6dB Bandwidth | 15.247(a)(2) | Pass | Rory Huang |
| Spurious RF Conducted Emission | 15.247(d) | Pass | Rory Huang |

Note:

The measurement uncertainty is not included in the test result.

## 1.4. Test Facility

**Address of the report laboratory**

**KSIGN(Guangdong) Testing Co., Ltd.**

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu,Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China

**Laboratory accreditation**

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

**CNAS-Lab Code: L13261**
KSIGN(Guangdong) Testing Co., Ltd. has been assessed and proved to be in Compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

**A2LA-Lab Cert. No.: 5457.01**
KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

**IC Registration No.: CN0096**
The 3m alternate test site of KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: CN0096

**FCC-Registration No.: CN1272**

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

## 1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the KSIGN(Guangdong) Testing Co., Ltd. system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device. Below is the best measurement capability for KSIGN(Guangdong) Testing Co., Ltd.

| Test Items | Measurement Uncertainty | Notes |
|---|---|---|
| Transmitter power conducted | 0.42 dB | (1) |
| Transmitter power Radiated | 2.14 dB | (1) |
| Conducted spurious emissions 9kHz~40GHz | 1.60 dB | (1) |
| Radiated spurious emissions 9kHz~40GHz | 2.20 dB | (1) |
| Conducted Emissions 9kHz~30MHz | 3.20 dB | (1) |
| Radiated Emissions 30~1000MHz | 4.70 dB | (1) |
| Radiated Emissions 1~18GHz | 5.00 dB | (1) |
| Radiated Emissions 18~40GHz | 5.54 dB | (1) |
| Occupied Bandwidth | 2.80 dB | (1) |

**Note (1):** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

## 1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

| | |
|---|---|
| Temperature: | 15~35°C |
| Relative Humidity: | 30~60 % |
| Air Pressure: | 950~1050mba |

# 2. GENERAL INFORMATION

## 2.1. General Description of EUT

| | |
|---|---|
| Test Sample Number 1: | 1-1-1(Normal Sample),1-1-2(Engineering Sample） |
| Product Name: | Battery Tester |
| Trade Mark: | TOPDON |
| Model/Type reference: | BT700 Pro |
| Listed Model(s): | N/A |
| Model Difference: | N/A |
| Power supply: | DC 9V~15V |
| Power supply(battery) | DC 7.4V 2600mAh |
| Hardware version: | V2.3 |
| Software version: | V1.0 |
| **Bluetooth V4.0** | |
| Modulation: | GFSK |
| Operation frequency: | 2402MHz~2480MHz |
| Max Peak Output Power: | -0.57 dBm |
| Channel number: | 40 |
| Channel separation: | 2MHz |
| Antenna type: | PCB Antenna |
| Antenna gain: | 3 dBi |

## 2.2. Operation State

Operation Frequency List: The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. BT BLE, 40 channels are provided to the EUT. Channels 00/19/39 were selected for testing.

Operation Frequency List:

| Channel | Frequency (MHz) |
|---|---|
| **00** | **2402** |
| 01 | 2404 |
| ⋮ | ⋮ |
| **19** | **2440** |
| 20 | 2442 |
| 21 | 2444 |
| ⋮ | ⋮ |
| 38 | 2478 |
| **39** | **2480** |

Note: The display in grey were the channel selected for testing.

**Test mode**

| NO. | TEST MODE DESCRIPTION |
|---|---|
| 1 | Low channel TX （2402MHz） |
| 2 | Middle channel TX （2440MHz） |
| 3 | High channel TX （2480MHz） |

Note:

1. Only the result of the worst case was recorded in the report, if no other cases..
2. The test software is the SecureCRTSecure_V7.0.0.326 which can set the EUT into the individual test modes.

## 2.3. Measurement Instruments List

| Tonscend JS0806-2 Test system | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Until |
| 1 | Spectrum Analyzer | R&S | FSV40-N | 101798 | 03/22/2022 |
| 2 | Vector Signal Generator | Agilent | N5182A | MY50142520 | 03/18/2022 |
| 3 | Analog Signal Generator | HP | 83752A | 3344A00337 | 03/18/2022 |
| 4 | Power Sensor | Agilent | E9304A | MY50390009 | 03/18/2022 |
| 5 | Power Sensor | Agilent | E9300A | MY41498315 | 03/18/2022 |
| 6 | Wideband Radio Communication Tester | R&S | CMW500 | 157282 | 03/18/2022 |
| 7 | Climate Chamber | Angul | AGNH80L | 1903042120 | 03/18/2022 |
| 8 | Dual Output DC Power Supply | Agilent | E3646A | MY40009992 | 03/18/2022 |
| 9 | RF Control Unit | Tonscend | JS0806-2 | / | 03/18/2022 |

| Transmitter spurious emissions & Receiver spurious emissions | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Until |
| 1 | EMI Test Receiver | R&S | ESR | 102525 | 03/18/2022 |
| 2 | High Pass Filter | Chengdu E-Microwave | OHF-3-18-S | 0E01901038 | 03/22/2022 |
| 3 | High Pass Filter | Chengdu E-Microwave | OHF-6.5-18-S | 0E01901039 | 03/22/2022 |
| 4 | Spectrum Analyzer | HP | 8593E | 3831U02087 | 03/22/2022 |
| 5 | Ultra-Broadband logarithmic period Antenna | Schwarzbeck | VULB 9163 | 01230 | 03/29/2023 |
| 6 | Loop Antenna | Beijin ZHINAN | ZN30900C | 18050 | 03/27/2022 |
| 7 | Spectrum Analyzer | R&S | FSV40-N | 101798 | 03/22/2022 |
| 8 | Horn Antenna | Schwarzbeck | BBHA 9120 D | 2023 | 03/29/2023 |
| 9 | Pre-Amplifier | Schwarzbeck | BBV 9745 | 9745#129 | 03/22/2022 |
| 10 | Pre-Amplifier | EMCI | EMC051835SE | 980662 | 03/22/2022 |

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Until |
|---|---|---|---|---|---|
| 1 | LISN | R&S | ENV432 | 1326.6105.02 | 03/27/2022 |
| 2 | EMI Test Receiver | R&S | ESR | 102524 | 04/07/2022 |
| 3 | Manual RF Switch | JS TOYO | / | MSW-01/002 | 04/07/2022 |

Note:
1)The Cal. Interval was one year.
2)The cable loss has calculated in test result which connection between each test instruments.

## 2.5. Test Software

| Software name | Model | Version |
|---|---|---|
| Conducted emission Measurement Software | EZ-EMC | EMC-Con 3A1.1 |
| Radiated emission Measurement Software | EZ-EMC | FA-03A.2.RE |
| Bluetooth and WIFI Test System | JS1120-3 | 2.5.77.0418 |

# 3. TEST ITEM AND RESULTS

## 3.1. Antenna requirement

**Requirement**

**FCC CFR Title 47 Part 15 Subpart C Section 15.203:**

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 a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

**FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):**

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

**Test Result**

The directional gain of the antenna less than 6dBi, please refer to the EUT internal photographs antenna photo.

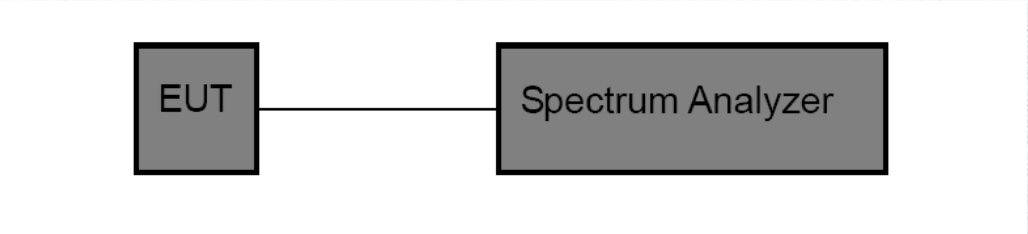
Note: The antenna is permanently fixed to the EUT

## 3.2. Peak Output Power

**Limit**

| Test Item | Limit | Frequency Range(MHz) |
|---|---|---|
| Peak Output Power | 1 Watt or 30 dBm | 2400~2483.5 |

**Test Configuration**




**Test Procedure**

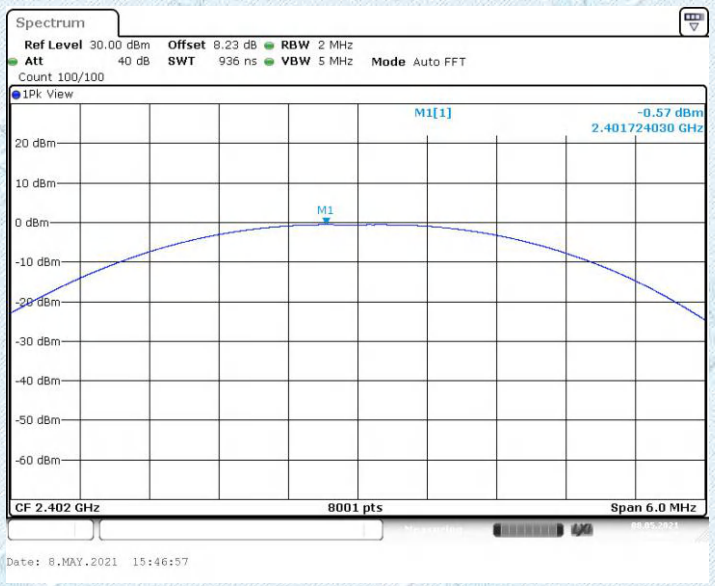
1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator..
2. Spectrum Setting:
Peak Detector: RBW≥DTS Bandwidth, VBW≥3*RBW.
Sweep time=Auto.
Detector= Peak.
Trace mode= Maxhold.
Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

**Test Mode**

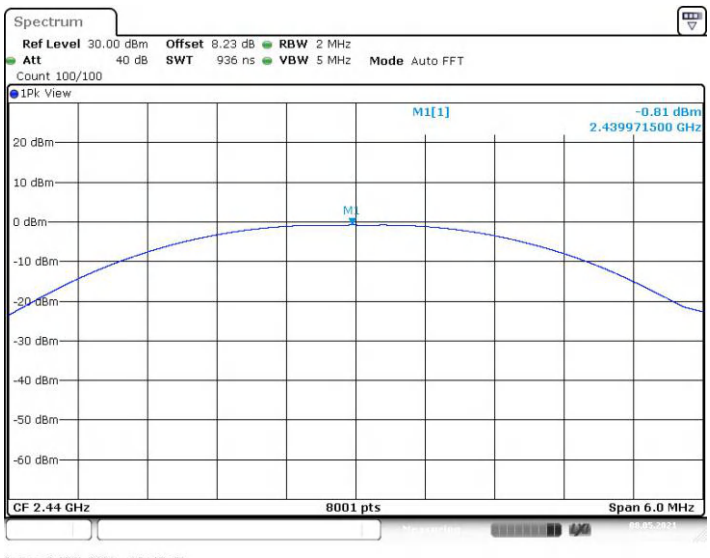
Please refer to the clause 2.2.

**Test Result**

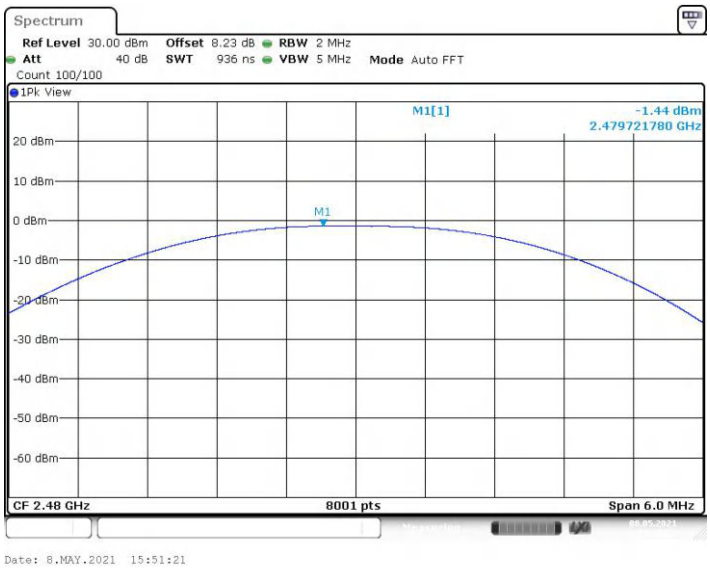
| Test Mode: | BLE Mode | |
|---|---|---|
| **Channel frequency (MHz)** | **Test Result (dBm)** | **Limit (dBm)** |
| 2402 | -0.57 | **30** |
| 2440 | -0.81 | |
| 2480 | -1.44 | |
| **BLE Mode** | | |
| **2402 MHz** | | |



| BLE Mode |
| --- |
| 2440 MHz |




| BLE Mode |
| --- |
| 2480 MHz |

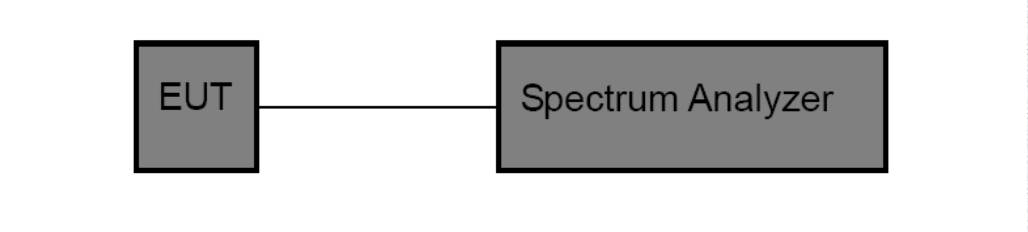


## 3.3. Power Spectral Density

**Limit**

| FCC Part 15 Subpart C(15.247) | | |
|---|---|---|
| **Test Item** | **Limit** | **Frequency Range(MHz)** |
| Power Spectral Density | 8dBm(in any 3 kHz) | 2400~2483.5 |

**Test Configuration**




**Test Procedure**

1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator.

2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.b-6.ii of KDB 558074 D01 DTS Meas Guidance v05r02.

3. Spectrum Setting:
   Set analyser center frequency to DTS channel center frequency.
   Set the span to 1.5 times the DTS bandwidth.
   Set the RBW to: 10 kHz
   Set the VBW to: 30 kHz
   Detector: peak
   Sweep time: auto
   Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

**Test Mode**

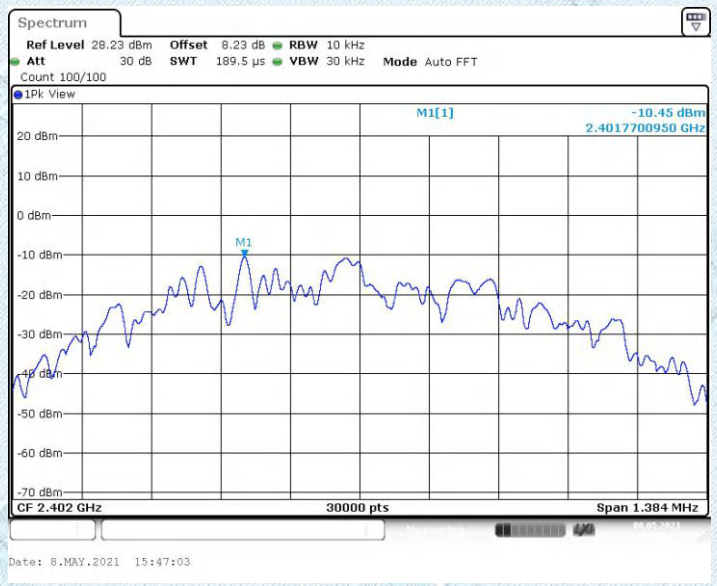
Please refer to the clause 2.2.

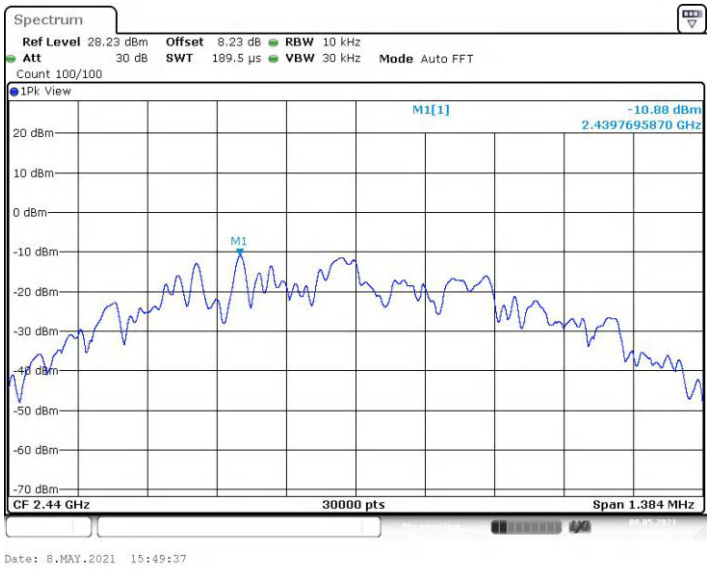
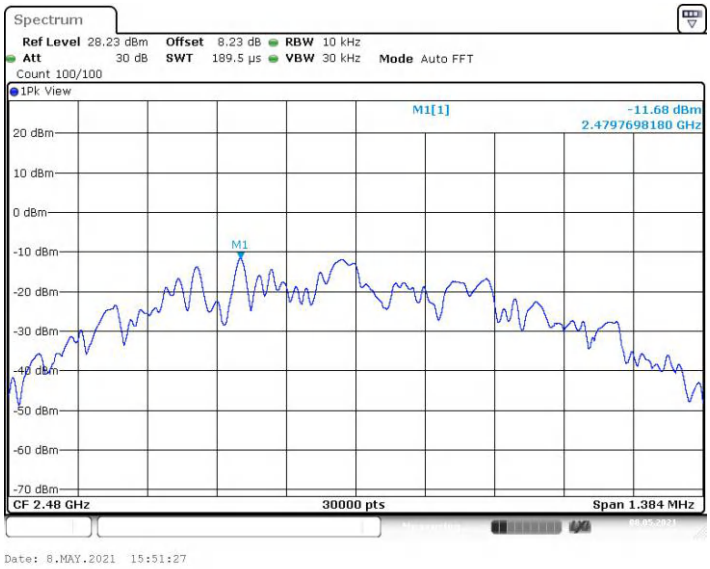
**Test Result**

Note:

Power Density(dBm/3kHz)=Power Density(dBm/10kHz)-10*Log(10/3)

| Test Mode: | BLE Mode | | |
|---|---|---|---|
| **Channel Frequency (MHz)** | **Power Density (dBm/10kHz)** | **Power Density (dBm/3kHz)** | **Limit (dBm)** |
| 2402 | -10.45 | -15.68 | 8dBm/3kHz |
| 2440 | -10.88 | -16.11 | |
| 2480 | -11.68 | -16.91 | |
| **BLE Mode** | | | |
| **2402 MHz** | | | |



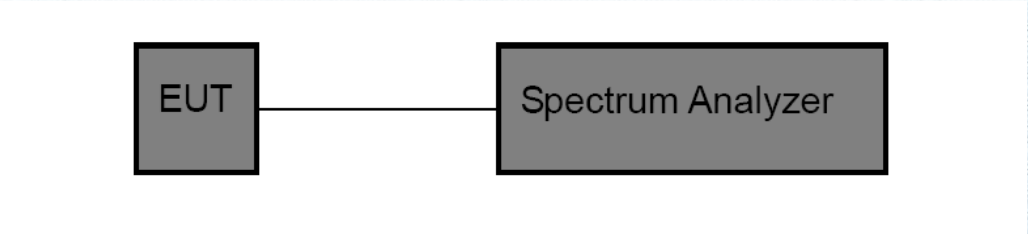
| BLE Mode |
| --- |
| 2440 MHz |
|  |
| BLE Mode |
| 2480 MHz |
|  |

## 3.4. 6dB Bandwidth

**Limit**

| Test Item | Limit | Frequency Range(MHz) |
|---|---|---|
| Bandwidth | >=500 KHz (6dB bandwidth) | 2400~2483.5 |

**Test Configuration**




**Test Procedure**

1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator.

2. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.
3. The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.
4. Spectrum Setting:
   6dB bandwidth:
   (1) Set RBW = 100 kHz.
   (2) Set the video bandwidth (VBW) ≥ 3 RBW.
   (3) Detector = Peak.
   (4) Trace mode = Max hold.
   (5) Sweep = Auto couple.
   (6) Allow the trace to stabilize.
   (7) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

**Test Mode**

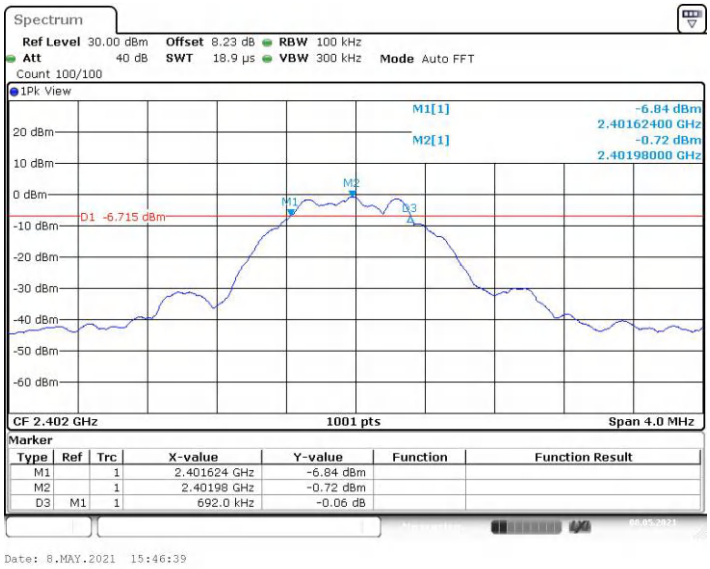
Please refer to the clause 2.2.

**Test Results**

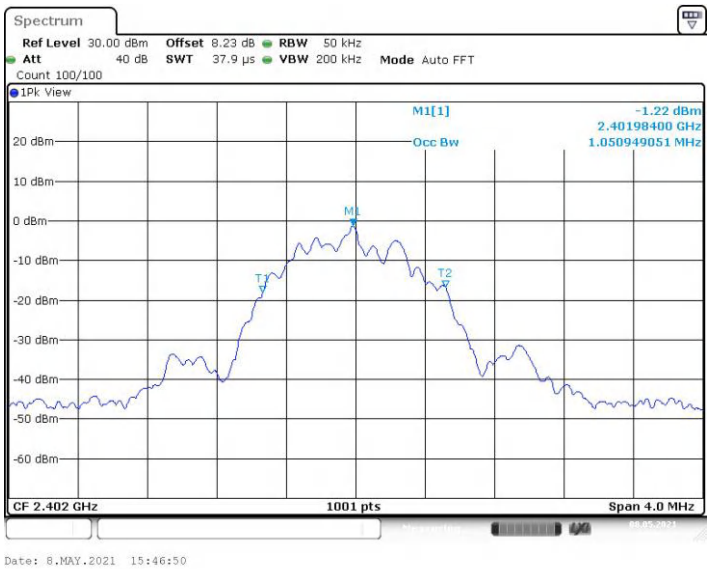
| Test Mode: | BLE Mode | | |
|---|---|---|---|
| **Channel frequency (MHz)** | **6dB Bandwidth (MHz)** | **99% Bandwidth (MHz)** | **Limit (MHz)** |
| 2402 | 0.692 | 1.051 | ≧0.5 |
| 2440 | 0.692 | 1.051 | |
| 2480 | 0.692 | 1.055 | |
| **BLE Mode** | | | |

**2402 MHz**

**6dB Bandwidth**



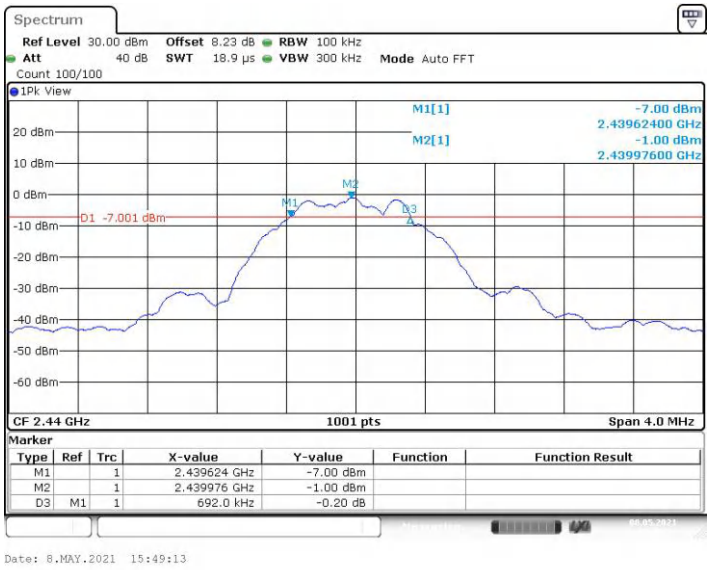

**99% Bandwidth**



**BLE Mode**

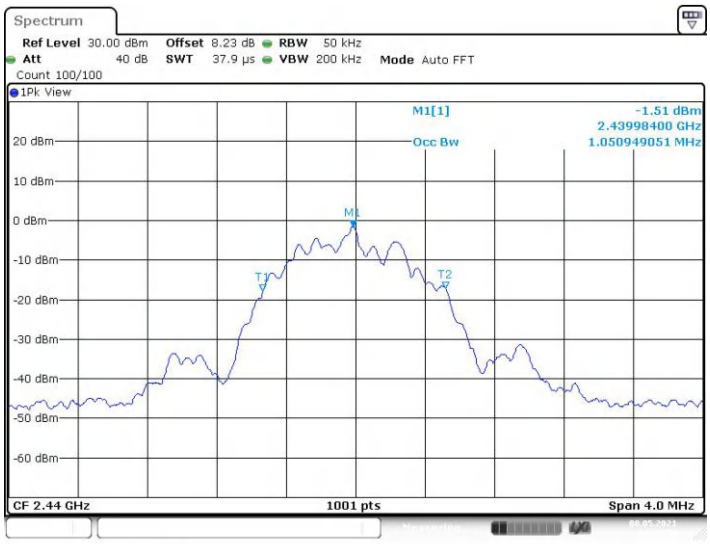
**2440 MHz**

**6dB Bandwidth**




Date: 8.MAY.2021 15:49:13

**99% Bandwidth**

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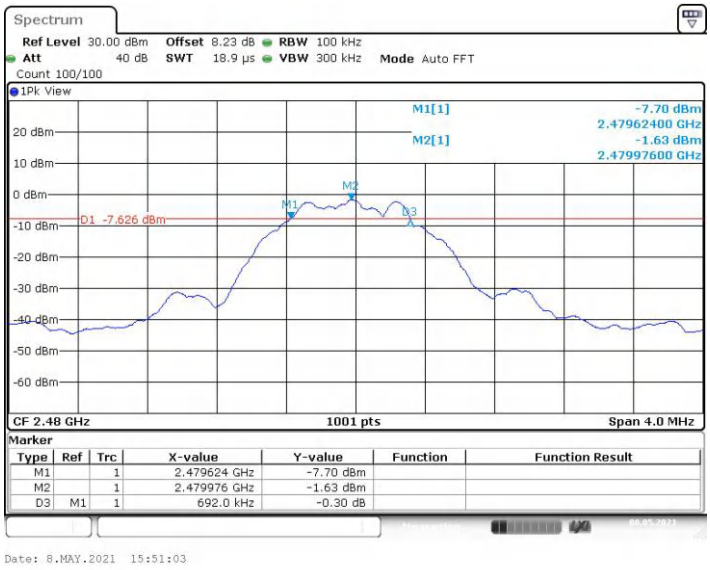
**BLE Mode**

**2480 MHz**

**6dB Bandwidth**



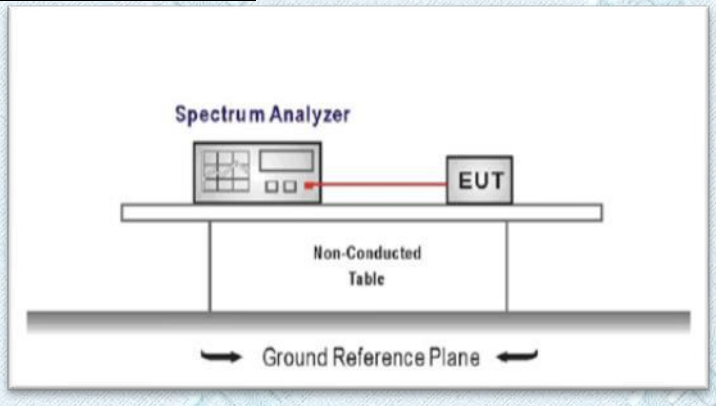

**99% Bandwidth**

## 3.5. Band edge and Spurious Emission (conducted)

**Limit**

**FCC CFR Title 47 Part 15 Subpart C Section15.247 (d):**
In any 100 kHz bandwidth outside the frequency band 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, based on either an RF conducted or a radiated measurement.

**Test Configuration**




**Test Procedure**

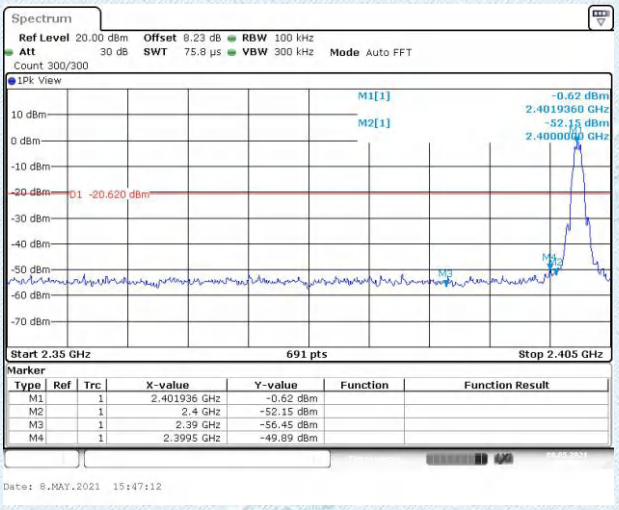
1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator.
2. Spectrum Setting:
   RBW=100KHz
   VBW=300KHz.
   Detector function: Peak.
   Trace: Max hold.
   Sweep = Auto couple.

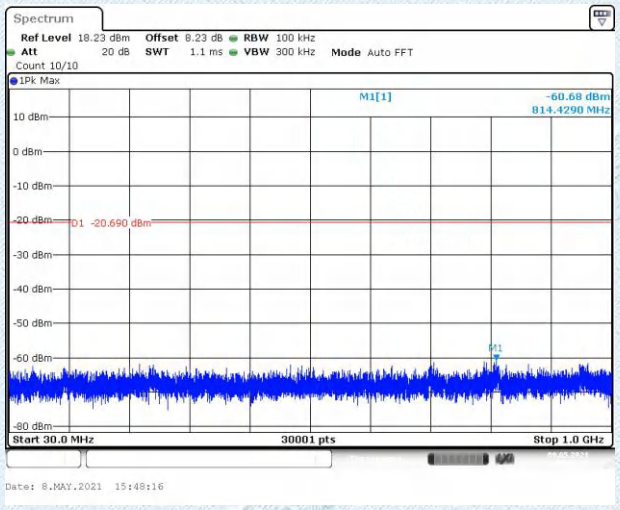
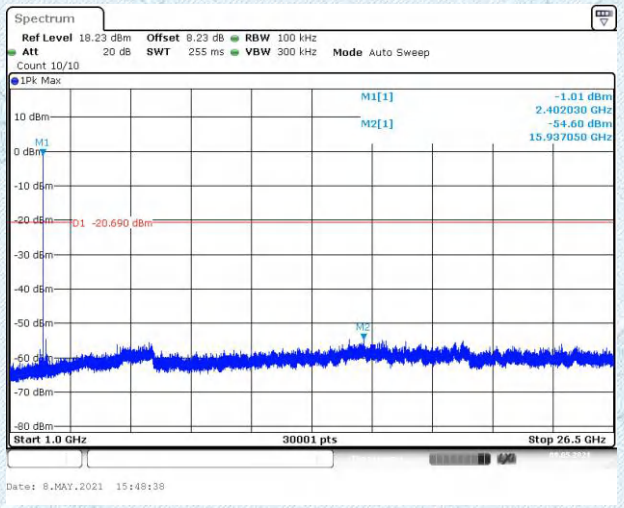
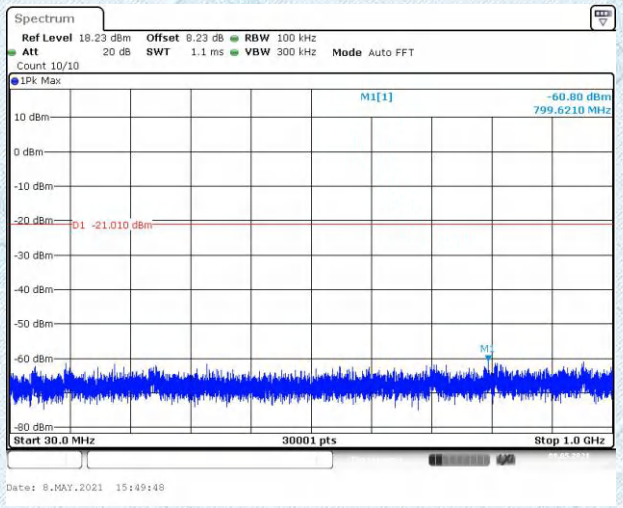
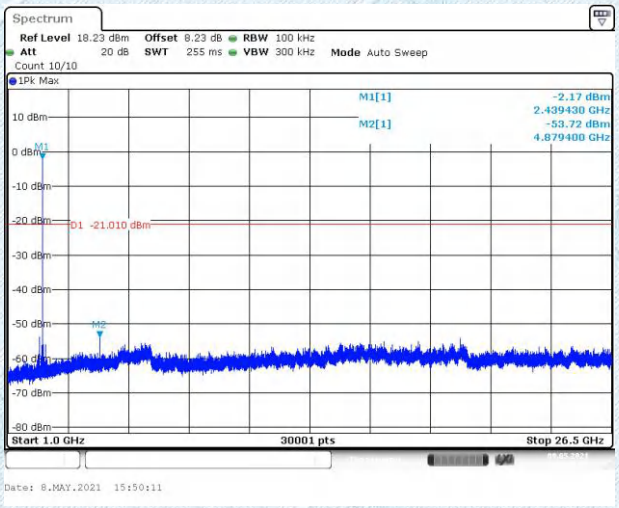
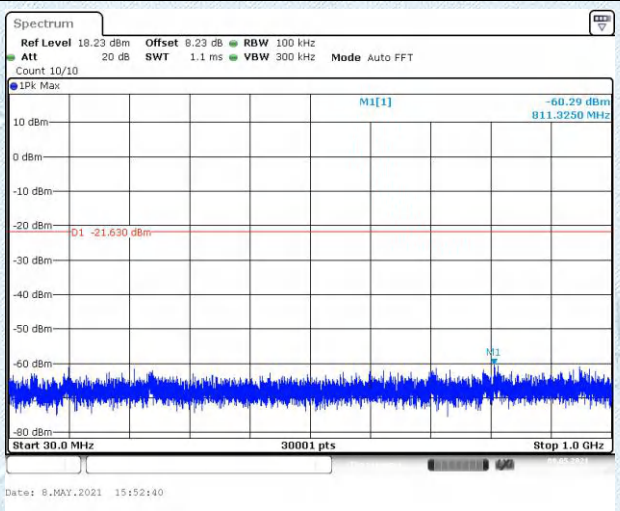
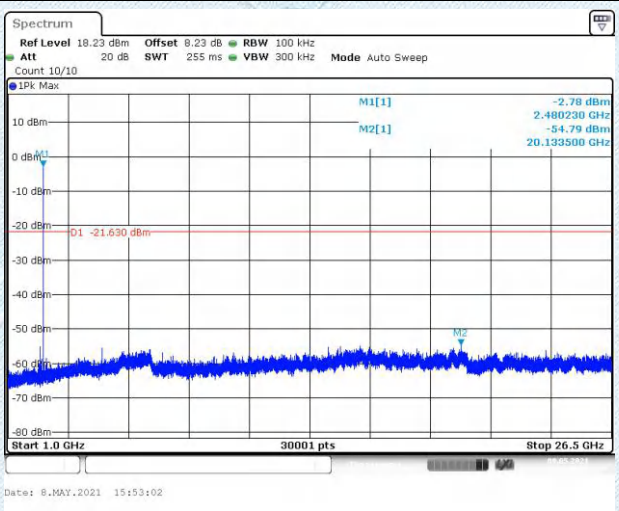
   Allow the trace to stabilize.

**Test Mode**

Please refer to the clause 2.2.

## Test Results

| GFSK | |
|---|---|
| CH00-Bandedge | CH39-Bandedge |
|  |  |

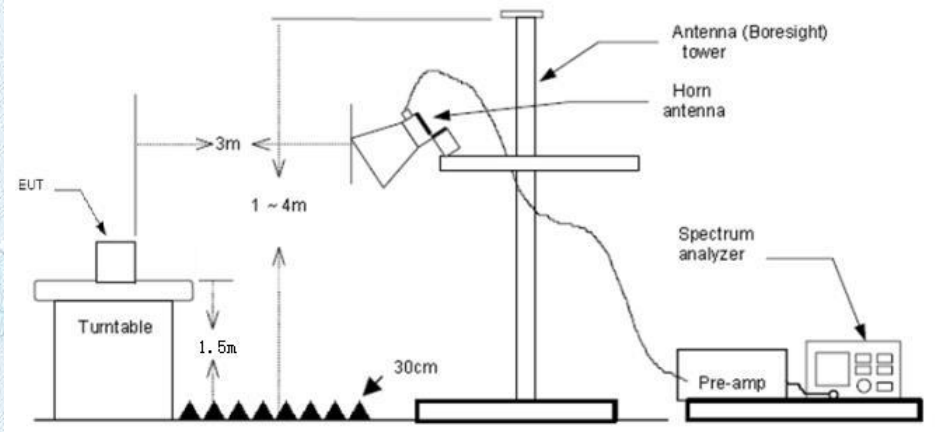
| GFSK | |
|---|---|
| CH00-SE | |
|  |  |
| CH19-SE | |
|  |  |
| CH39-SE | |
|  |  |

## 3.6. Band Edge Emissions(Radiated)

**Limit**

| Restricted Frequency Band (MHz) | (dBuV/m)(at 3m) | |
|---|---|---|
| | Peak | Average |
| 2310 ~2390 | 74 | 54 |
| 2483.5 ~2500 | 74 | 54 |
| **Note: All restriction bands have been tested, only the worst case is reported.** | | |

**Test Configuration**




**Test Procedure**

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. The receiver set as follow:
   RBW=1MHz, VBW=3MHz PEAK detector for Peak value.
   RBW=1MHz, VBW=10Hz with PEAK Detector for Average Value.

**Test Mode**

Please refer to the clause 2.2.

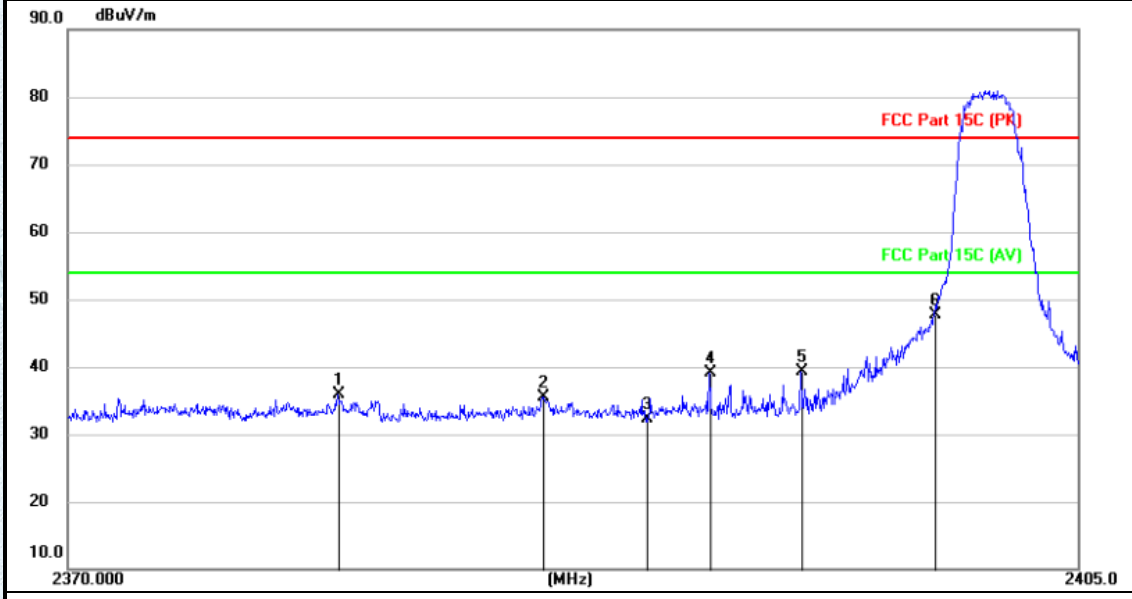
**Test Results**

Note:

(1)Measurement = Reading level + Correct Factor

(2)Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor

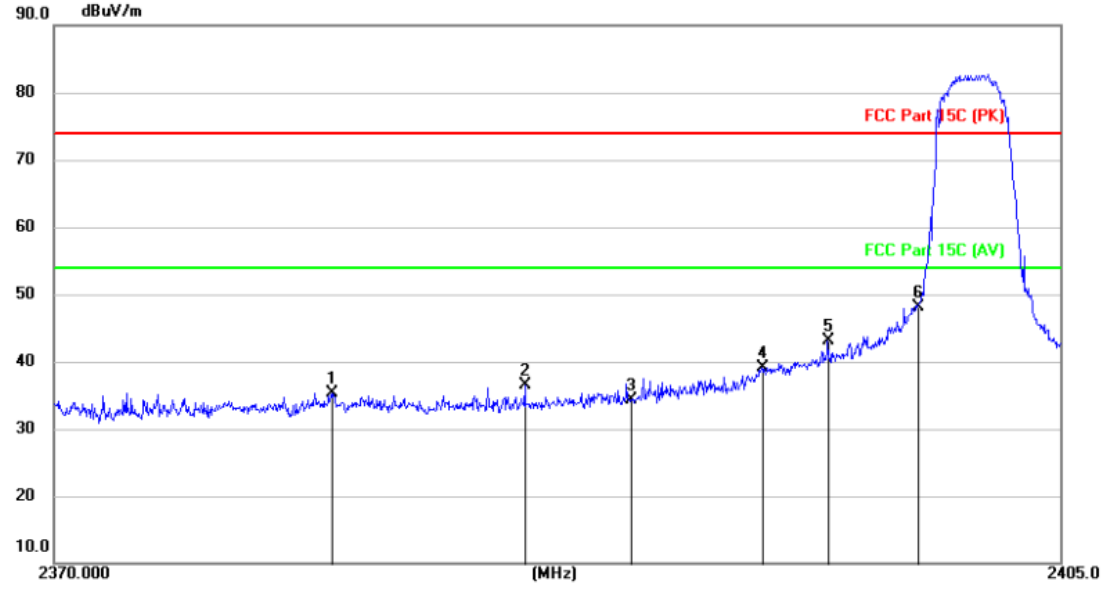
| | |
|---|---|
| Test Voltage | DC 3.3V |
| **Ant. Pol.:** | Horizontal |
| **Test Mode:** | TX BLE Mode 2402MHz |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | Detector |
| 1 | | 2379.307 | 46.78 | -10.92 | 35.86 | 74.00 | -38.14 | peak |
| 2 | | 2386.394 | 46.40 | -10.92 | 35.48 | 74.00 | -38.52 | peak |
| 3 | | 2390.000 | 43.26 | -10.92 | 32.34 | 74.00 | -41.66 | peak |
| 4 | | 2392.190 | 50.08 | -10.92 | 39.16 | 74.00 | -34.84 | peak |
| 5 | | 2395.378 | 50.24 | -10.91 | 39.33 | 74.00 | -34.67 | peak |
| 6 | * | 2400.000 | 58.60 | -10.92 | 47.68 | 74.00 | -26.32 | peak |

**Emission Level= Read Level+ Correct Factor**

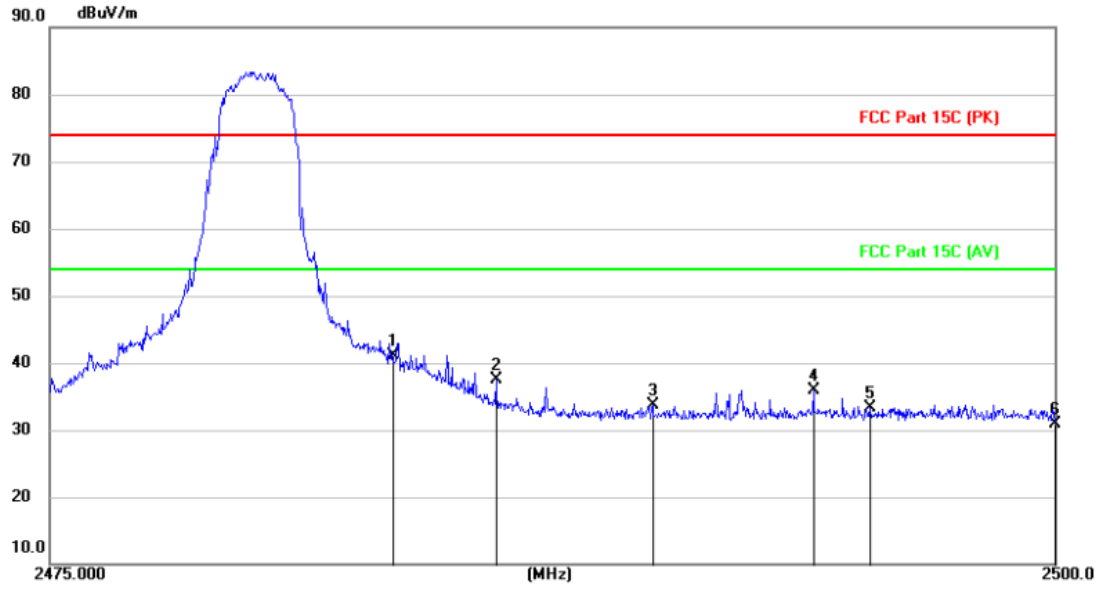
| | |
|---|---|
| Test Voltage | DC 3.3V |
| **Ant. Pol.** | Vertical |
| **Test Mode:** | TX BLE Mode 2402MHz |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | Detector |
| 1 | | 2379.642 | 46.31 | -10.92 | 35.39 | 74.00 | -38.61 | peak |
| 2 | | 2386.317 | 47.44 | -10.92 | 36.52 | 74.00 | -37.48 | peak |
| 3 | | 2390.000 | 45.31 | -10.92 | 34.39 | 74.00 | -39.61 | peak |
| 4 | | 2394.570 | 50.03 | -10.91 | 39.12 | 74.00 | -34.88 | peak |
| 5 | | 2396.890 | 53.93 | -10.92 | 43.01 | 74.00 | -30.99 | peak |
| 6 | * | 2400.000 | 59.03 | -10.92 | 48.11 | 74.00 | -25.89 | peak |

**Emission Level= Read Level+ Correct Factor**

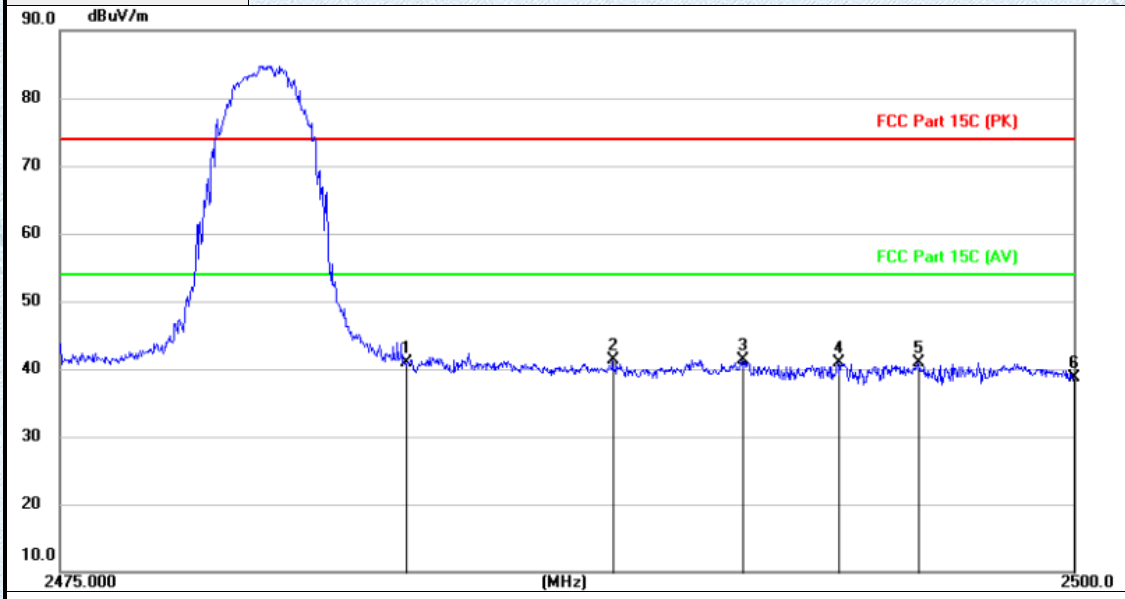
| | |
|---|---|
| Test Voltage | DC 3.3V |
| **Ant. Pol.** | Horizontal |
| **Test Mode:** | TX BLE Mode 2480 MHz |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | Detector |
| 1 | * | 2483.500 | 51.90 | -10.88 | 41.02 | 74.00 | -32.98 | peak |
| 2 | | 2486.088 | 48.43 | -10.88 | 37.55 | 74.00 | -36.45 | peak |
| 3 | | 2489.972 | 44.50 | -10.89 | 33.61 | 74.00 | -40.39 | peak |
| 4 | | 2493.983 | 46.81 | -10.89 | 35.92 | 74.00 | -38.08 | peak |
| 5 | | 2495.383 | 44.25 | -10.87 | 33.38 | 74.00 | -40.62 | peak |
| 6 | | 2500.000 | 41.88 | -10.88 | 31.00 | 74.00 | -43.00 | peak |

**Emission Level= Read Level+ Correct Factor**

| | |
|---|---|
| Test Voltage | DC 3.3V |
| **Ant. Pol.** | Vertical |
| **Test Mode:** | TX BLE Mode 2480 MHz |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | Detector |
| 1 | | 2483.500 | 51.73 | -10.88 | 40.85 | 74.00 | -33.15 | peak |
| 2 | * | 2488.597 | 52.27 | -10.89 | 41.38 | 74.00 | -32.62 | peak |
| 3 | | 2491.813 | 52.21 | -10.89 | 41.32 | 74.00 | -32.68 | peak |
| 4 | | 2494.155 | 51.79 | -10.89 | 40.90 | 74.00 | -33.10 | peak |
| 5 | | 2496.142 | 51.85 | -10.87 | 40.98 | 74.00 | -33.02 | peak |
| 6 | | 2500.000 | 49.65 | -10.88 | 38.77 | 74.00 | -35.23 | peak |

**Emission Level= Read Level+ Correct Factor**

## 3.7. Spurious Emission (Radiated)

**Limit**

**Radiated Emission Limits (9 kHz~1000 MHz)**

| Frequency (MHz) | Field Strength (microvolt/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 |

**Radiated Emission Limit (Above 1000MHz)**

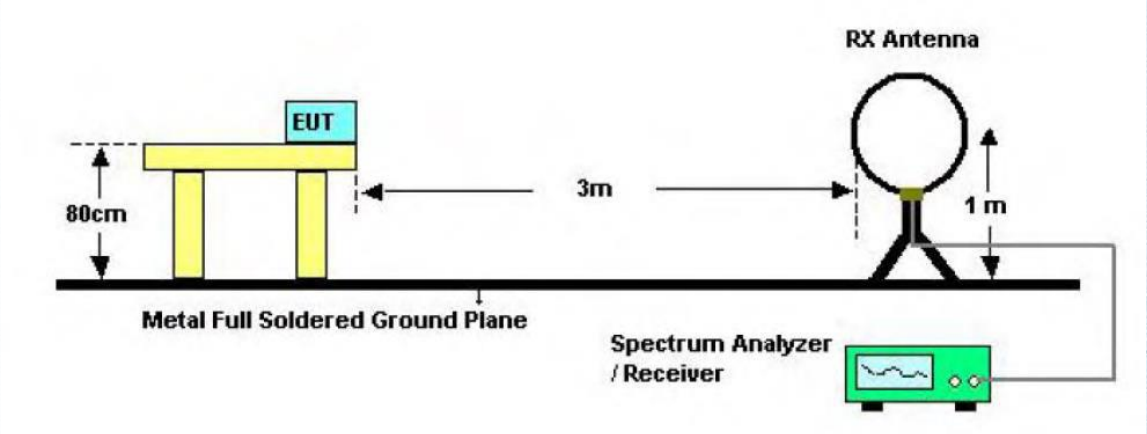
| Frequency (MHz) | Distance Meters(at 3m) | |
|---|---|---|
| | Peak | Average |
| Above 1000 | 74 | 54 |

**Note:**

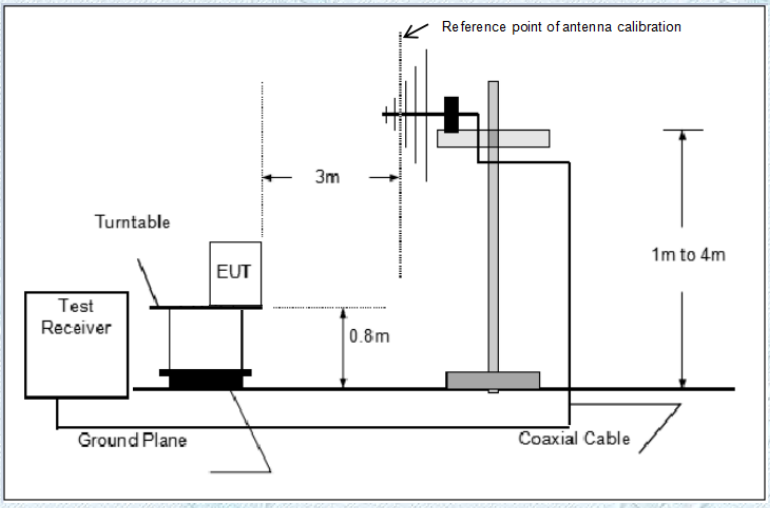
(1) The tighter limit applies at the band edges.

(2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

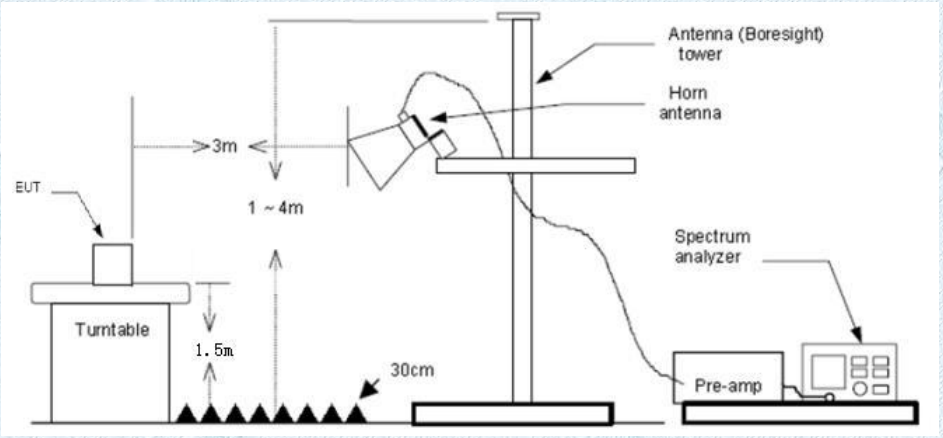
**Test Configuration**




Below 30MHz Test Setup




Below 1000MHz Test Setup




Above 1GHz Test Setup

**Test Procedure**

1. The EUT was setup and tested according to ANSI C63.10:2013
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Below 1 GHz:
   RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
   If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
   (3) From 1 GHz to 10$^{th}$ harmonic:
   RBW=1MHz, VBW=3MHz Peak detector for Peak value.
   RBW=1MHz, VBW=10Hz Peak detector for Average value.

**Test Mode**

Please refer to the clause 2.2.

**Test Result**

**9 KHz~30 MHz and 18GHz~25GHz**

From 9 KHz~30 MHz and 18GHz~25GHz: Conclusion: PASS

Note:

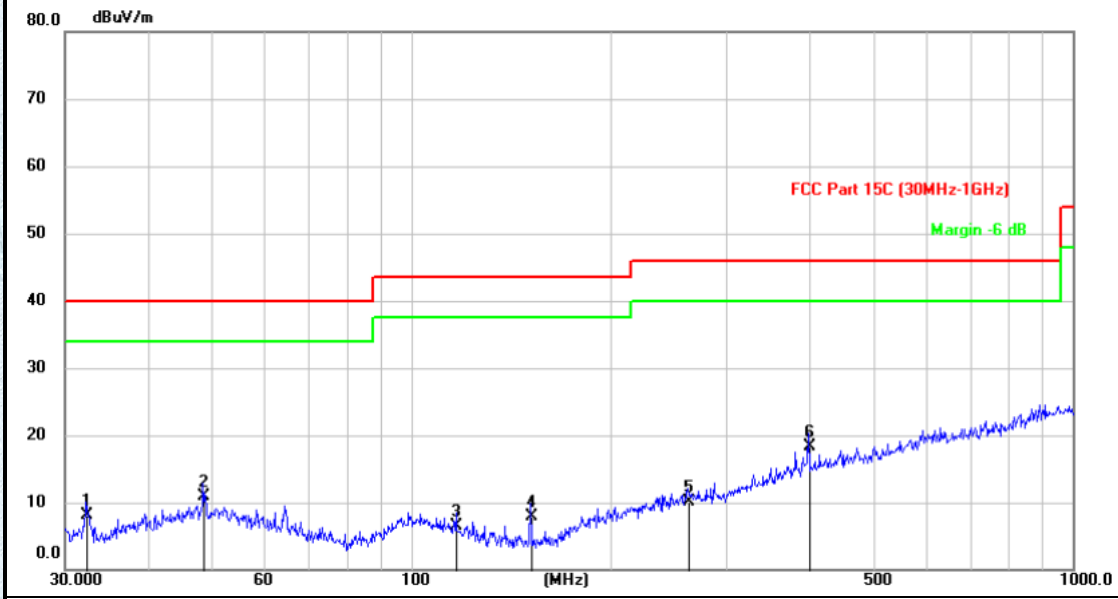
1) Measurement = Reading level + Correct Factor
   Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
2) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
3) The emission levels of other frequencies are very lower than the limit and not show in test report.
4) The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
5) Pre-scan CH00, CH19 and CH39 modulation, and found the GFSK_CH00 which it is worse case for 30MHz-1GHz , so only show the test data for worse case.

**BELOW 30MHZ**

No emission found between lowest internal used/generated frequencies to 30MHz.

**30MHz-1GHz**

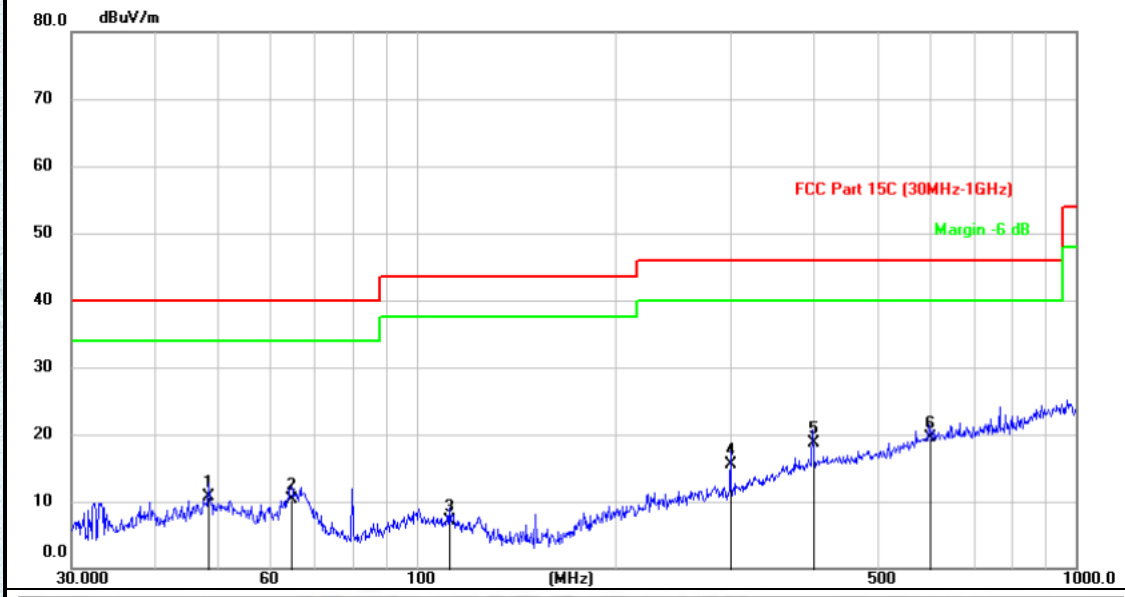
| | |
|---|---|
| **test voltage** | DC 3.3V |
| **Ant. Pol.** | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | Detector |
| 1 | | 32.3378 | 27.03 | -18.90 | 8.13 | 40.00 | -31.87 | QP |
| 2 | | 48.6208 | 26.61 | -15.75 | 10.86 | 40.00 | -29.14 | QP |
| 3 | | 116.9905 | 25.65 | -19.11 | 6.54 | 43.50 | -36.96 | QP |
| 4 | | 152.0231 | 29.34 | -21.35 | 7.99 | 43.50 | -35.51 | QP |
| 5 | | 261.9753 | 25.66 | -15.52 | 10.14 | 46.00 | -35.86 | QP |
| 6 | * | 400.0109 | 29.16 | -10.91 | 18.25 | 46.00 | -27.75 | QP |

**Emission Level= Read Level+ Correct Factor**

| test voltage | DC 3.3V |
|---|---|
| Ant. Pol. | Vertical |

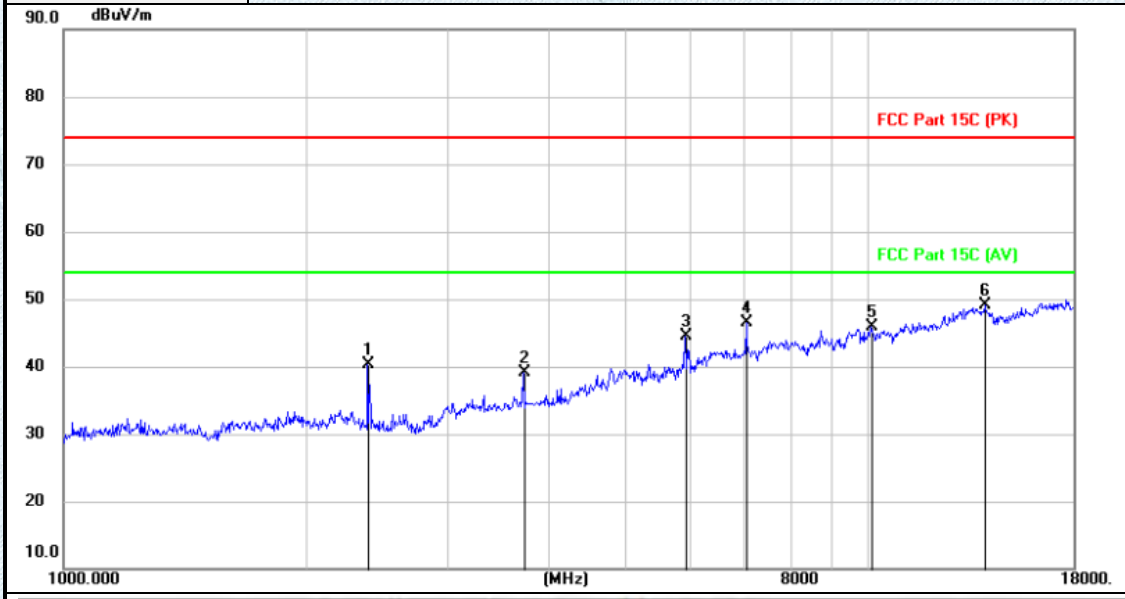



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | Detector |
| 1 | | 48.4506 | 26.45 | -15.76 | 10.69 | 40.00 | -29.31 | QP |
| 2 | | 64.6594 | 28.82 | -18.58 | 10.24 | 40.00 | -29.76 | QP |
| 3 | | 112.4060 | 25.75 | -18.66 | 7.09 | 43.50 | -36.41 | QP |
| 4 | | 300.0514 | 30.14 | -14.66 | 15.48 | 46.00 | -30.52 | QP |
| 5 | | 400.0109 | 29.60 | -10.91 | 18.69 | 46.00 | -27.31 | QP |
| 6 | * | 600.1625 | 27.17 | -7.67 | 19.50 | 46.00 | -26.50 | QP |

**Emission Level= Read Level+ Correct Factor**

**Adobe 1GHz**

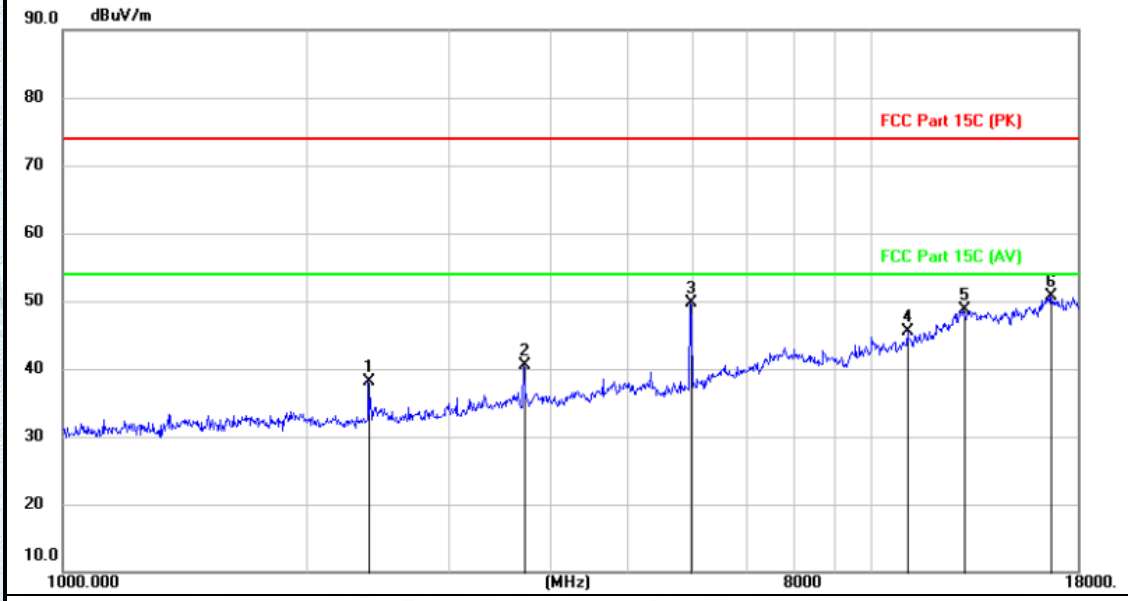
| | |
|---|---|
| **test voltage** | DC 3.3V |
| **Ant. Pol.** | Horizontal |
| **Test Mode:** | TX BLE Mode 2402MHz |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | Detector |
| 1 | | 2390.600 | 51.16 | -10.92 | 40.24 | 74.00 | -33.76 | peak |
| 2 | | 3726.800 | 48.20 | -9.12 | 39.08 | 74.00 | -34.92 | peak |
| 3 | | 5931.700 | 48.45 | -3.96 | 44.49 | 74.00 | -29.51 | peak |
| 4 | | 7062.200 | 47.04 | -0.52 | 46.52 | 74.00 | -27.48 | peak |
| 5 | | 10089.900 | 41.67 | 4.22 | 45.89 | 74.00 | -28.11 | peak |
| 6 | * | 13981.200 | 37.81 | 11.21 | 49.02 | 74.00 | -24.98 | peak |

**Emission Level= Read Level+ Correct Factor**

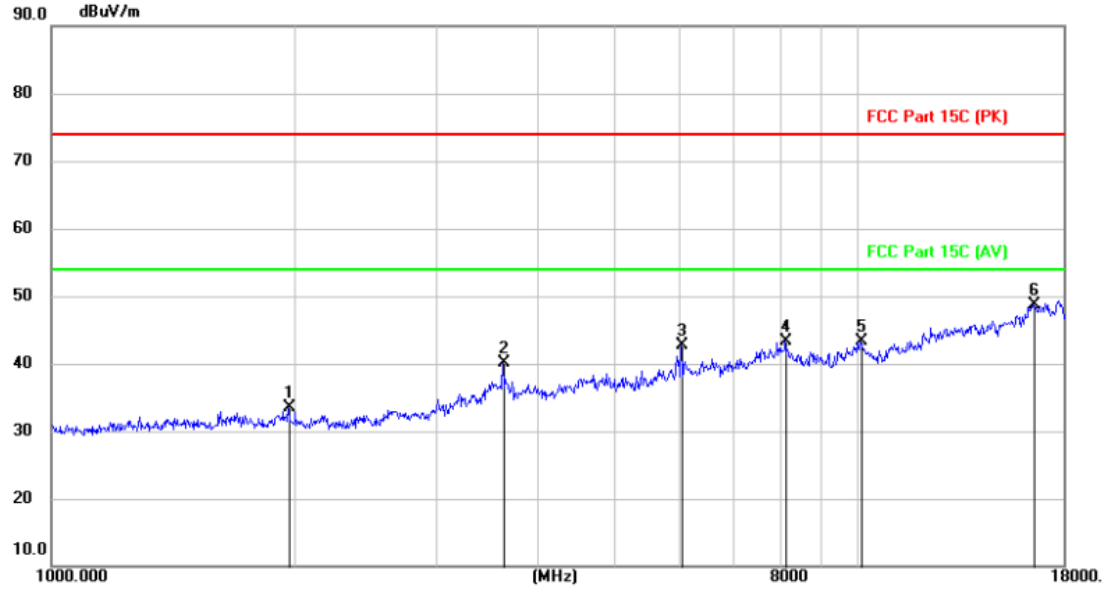
| | |
|---|---|
| **test voltage** | DC 3.3V |
| **Ant. Pol.** | Vertical |
| **Test Mode:** | TX BLE Mode 2402MHz |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | Detector |
| 1 | | 2392.300 | 48.97 | -10.92 | 38.05 | 74.00 | -35.95 | peak |
| 2 | | 3720.000 | 49.60 | -9.13 | 40.47 | 74.00 | -33.53 | peak |
| 3 | | 5977.600 | 53.57 | -3.85 | 49.72 | 74.00 | -24.28 | peak |
| 4 | | 11099.700 | 39.56 | 5.93 | 45.49 | 74.00 | -28.51 | peak |
| 5 | | 13003.700 | 38.74 | 9.93 | 48.67 | 74.00 | -25.33 | peak |
| 6 | * | 16694.400 | 37.20 | 13.51 | 50.71 | 74.00 | -23.29 | peak |

**Emission Level= Read Level+ Correct Factor**

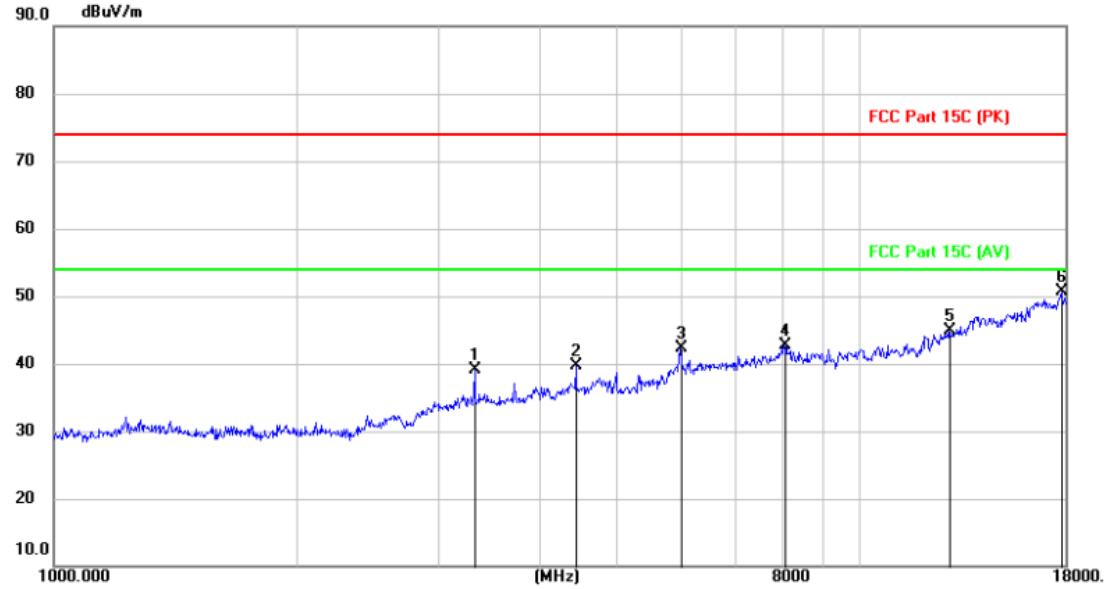
| | |
|---|---|
| **test voltage** | DC 3.3V |
| **Ant. Pol.** | Horizontal |
| **Test Mode:** | TX BLE Mode 2440MHz |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | Detector |
| 1 | | 1969.000 | 44.66 | -11.09 | 33.57 | 74.00 | -40.43 | peak |
| 2 | | 3631.600 | 49.44 | -9.34 | 40.10 | 74.00 | -33.90 | peak |
| 3 | | 6049.000 | 46.37 | -3.64 | 42.73 | 74.00 | -31.27 | peak |
| 4 | | 8134.900 | 41.25 | 2.03 | 43.28 | 74.00 | -30.72 | peak |
| 5 | | 10081.400 | 39.18 | 4.21 | 43.39 | 74.00 | -30.61 | peak |
| 6 | * | 16521.000 | 34.92 | 13.78 | 48.70 | 74.00 | -25.30 | peak |

**Emission Level= Read Level+ Correct Factor**

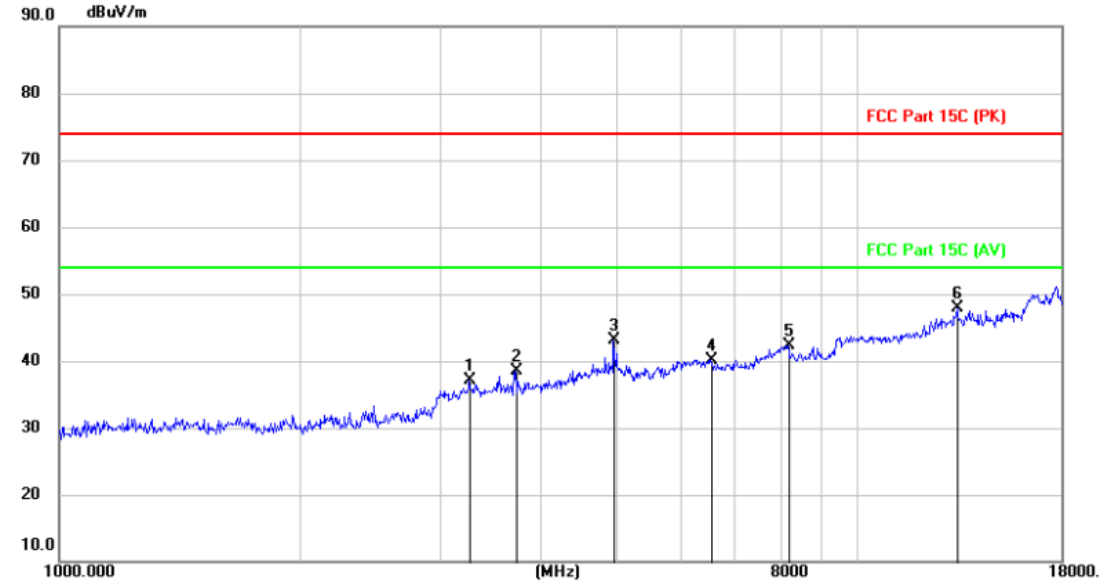
| | |
|---|---|
| **test voltage** | DC 3.3V |
| **Ant. Pol.** | Vertical |
| **Test Mode:** | TX BLE Mode 2440MHz |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | Detector |
| 1 | | 3332.400 | 49.15 | -9.98 | 39.17 | 74.00 | -34.83 | peak |
| 2 | | 4447.600 | 46.62 | -6.92 | 39.70 | 74.00 | -34.30 | peak |
| 3 | | 5987.800 | 46.10 | -3.83 | 42.27 | 74.00 | -31.73 | peak |
| 4 | | 8065.200 | 40.55 | 2.06 | 42.61 | 74.00 | -31.39 | peak |
| 5 | | 12922.100 | 35.08 | 9.79 | 44.87 | 74.00 | -29.13 | peak |
| 6 | * | 17794.300 | 37.14 | 13.53 | 50.67 | 74.00 | -23.33 | peak |

**Emission Level= Read Level+ Correct Factor**

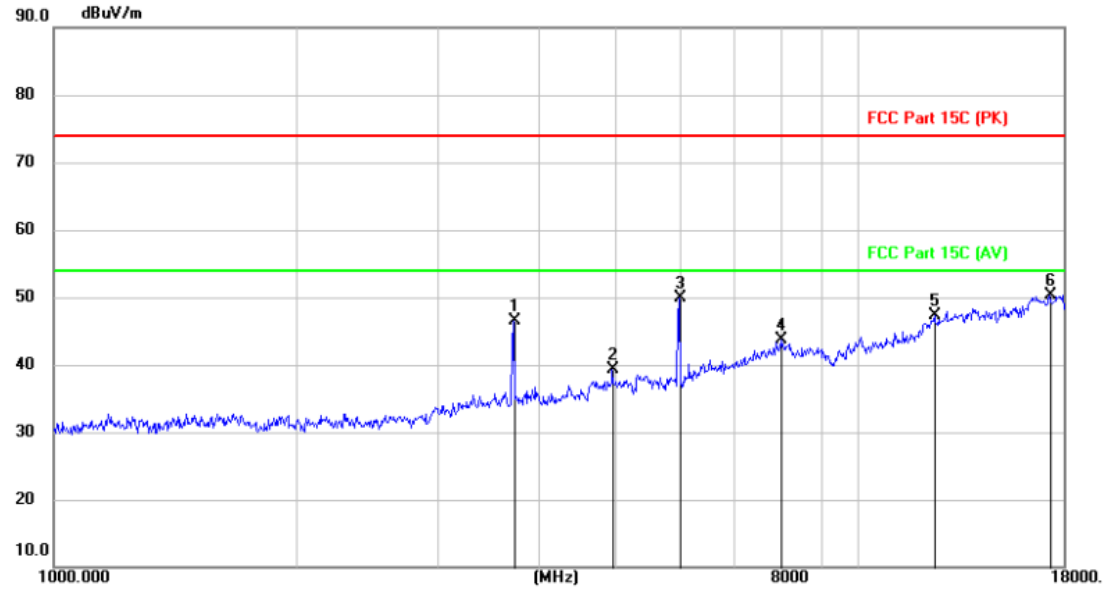
| | |
|---|---|
| **test voltage** | DC 3.3V |
| **Ant. Pol.** | Horizontal |
| **Test Mode:** | TX BLE Mode 2480MHz |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | Detector |
| 1 | | 3266.100 | 47.27 | -10.11 | 37.16 | 74.00 | -36.84 | peak |
| 2 | | 3730.200 | 47.66 | -9.10 | 38.56 | 74.00 | -35.44 | peak |
| 3 | | 4959.300 | 48.61 | -5.51 | 43.10 | 74.00 | -30.90 | peak |
| 4 | | 6553.900 | 42.06 | -1.95 | 40.11 | 74.00 | -33.89 | peak |
| 5 | | 8179.100 | 40.23 | 2.03 | 42.26 | 74.00 | -31.74 | peak |
| 6 | * | 13343.700 | 37.58 | 10.40 | 47.98 | 74.00 | -26.02 | peak |

**Emission Level= Read Level+ Correct Factor**

| | |
|---|---|
| **test voltage** | DC 3.3V |
| **Ant. Pol.** | Vertical |
| **Test Mode:** | TX BLE Mode 2480MHz |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | (dBuV) | (dB/m) | (dBuV/m) | (dBuV/m) | (dB) | Detector |
| 1 | | 3733.600 | 55.68 | -9.09 | 46.59 | 74.00 | -27.41 | peak |
| 2 | | 4959.300 | 44.75 | -5.51 | 39.24 | 74.00 | -34.76 | peak |
| 3 | | 5989.500 | 53.80 | -3.82 | 49.98 | 74.00 | -24.02 | peak |
| 4 | | 8032.900 | 41.60 | 2.06 | 43.66 | 74.00 | -30.34 | peak |
| 5 | | 12458.000 | 38.39 | 8.88 | 47.27 | 74.00 | -26.73 | peak |
| 6 | * | 17287.700 | 37.04 | 13.24 | 50.28 | 74.00 | -23.72 | peak |

**Emission Level= Read Level+ Correct Factor**

## 3.8. Conducted Emission

**Limit**

**Conducted Emission Test Limit**

| Frequency | Maximum RF Line Voltage (dBμV) | |
|---|---|---|
| | Quasi-peak Level | Average Level |
| 150kHz~500kHz | 66 ~ 56 * | 56 ~ 46 * |
| 500kHz~5MHz | 56 | 46 |
| 5MHz~30MHz | 60 | 50 |

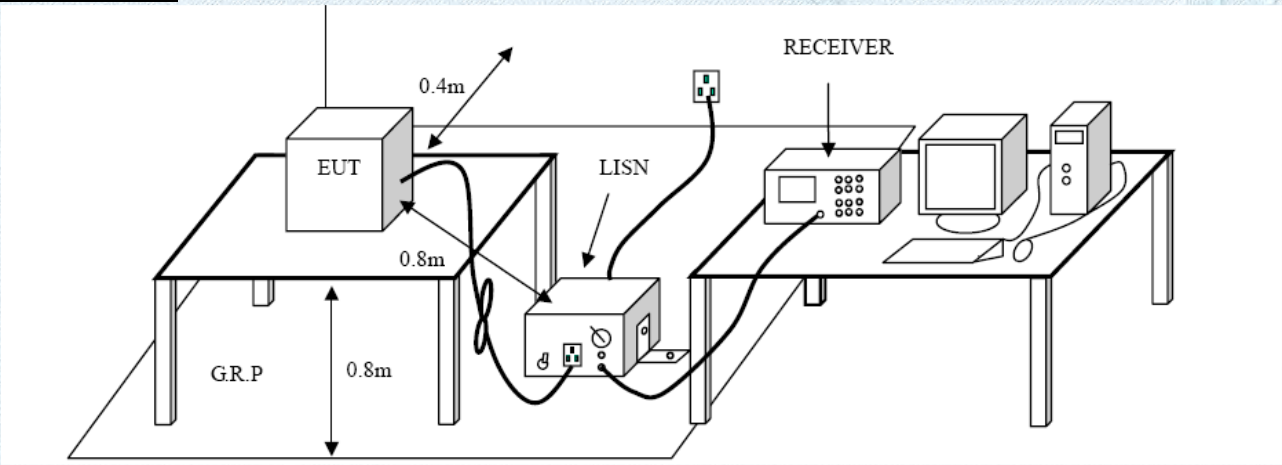
Notes:

(1) *Decreasing linearly with logarithm of the frequency.

(2) The lower limit shall apply at the transition frequencies.

(3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

**Test Configuration**




**Test Procedure**

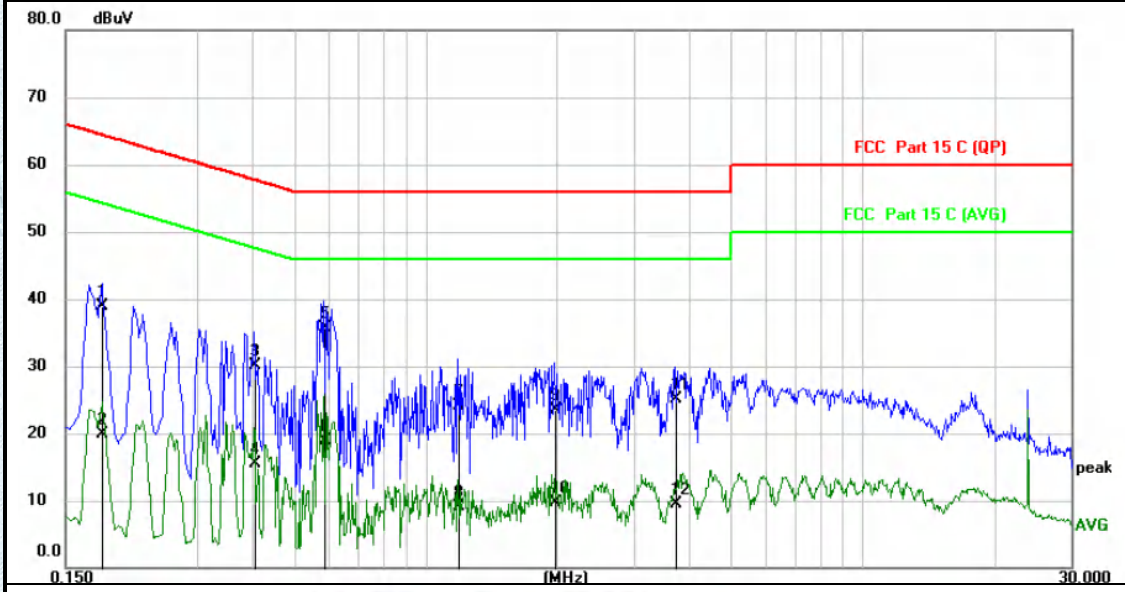
1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment.
   The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
4. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
5. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
7. During the above scans, the emissions were maximized by cable manipulation.

**Test Mode:**

Please refer to the clause 2.2.

**Test Results**

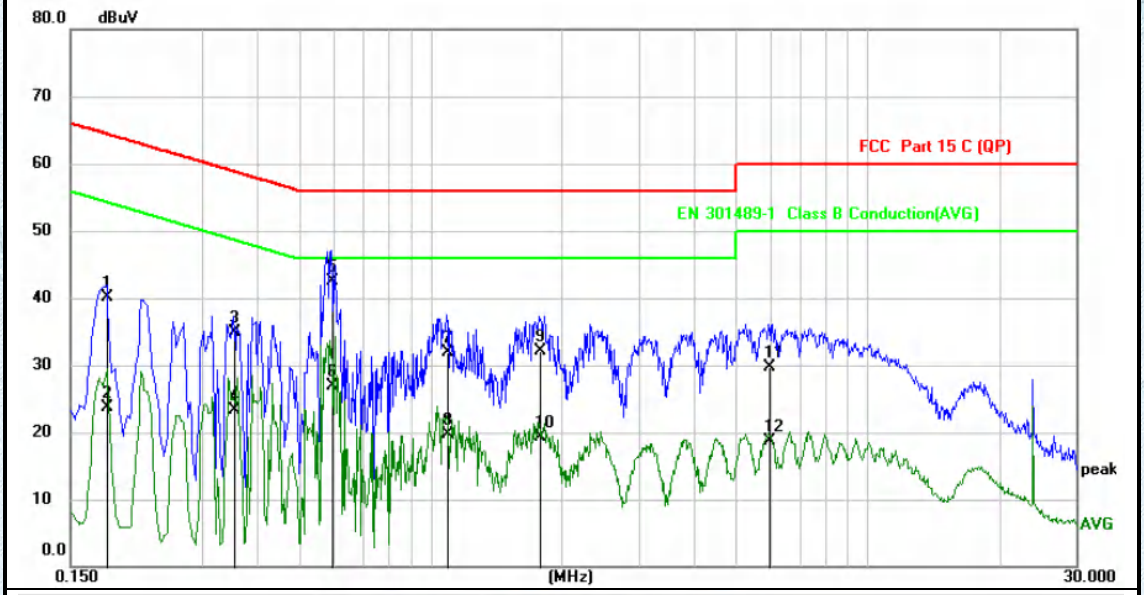
| | |
|---|---|
| **Test Voltage:** | AC 120V/60Hz |
| **Terminal:** | Line |
| **Test Mode:** | Charging |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector |
| 1 | | 0.1819 | 28.25 | 10.74 | 38.99 | 64.40 | -25.41 | QP |
| 2 | | 0.1819 | 9.12 | 10.74 | 19.86 | 54.40 | -34.54 | AVG |
| 3 | | 0.4060 | 19.62 | 10.53 | 30.15 | 57.73 | -27.58 | QP |
| 4 | | 0.4060 | 5.03 | 10.53 | 15.56 | 47.73 | -32.17 | AVG |
| 5 | * | 0.5860 | 25.26 | 10.47 | 35.73 | 56.00 | -20.27 | QP |
| 6 | | 0.5860 | 8.43 | 10.47 | 18.90 | 46.00 | -27.10 | AVG |
| 7 | | 1.1860 | 13.65 | 10.41 | 24.06 | 56.00 | -31.94 | QP |
| 8 | | 1.1860 | -1.37 | 10.41 | 9.04 | 46.00 | -36.96 | AVG |
| 9 | | 1.9740 | 12.93 | 10.56 | 23.49 | 56.00 | -32.51 | QP |
| 10 | | 1.9740 | -0.93 | 10.56 | 9.63 | 46.00 | -36.37 | AVG |
| 11 | | 3.7380 | 14.41 | 10.61 | 25.02 | 56.00 | -30.98 | QP |
| 12 | | 3.7380 | -1.19 | 10.61 | 9.42 | 46.00 | -36.58 | AVG |

Remarks:
1.Measurement = Reading Level+ Correct Factor
2.Over = Measurement -Limit

| | |
|---|---|
| **Test Voltage:** | AC 120V/60Hz |
| **Terminal:** | Neutral |
| **Test Mode:** | Charging |

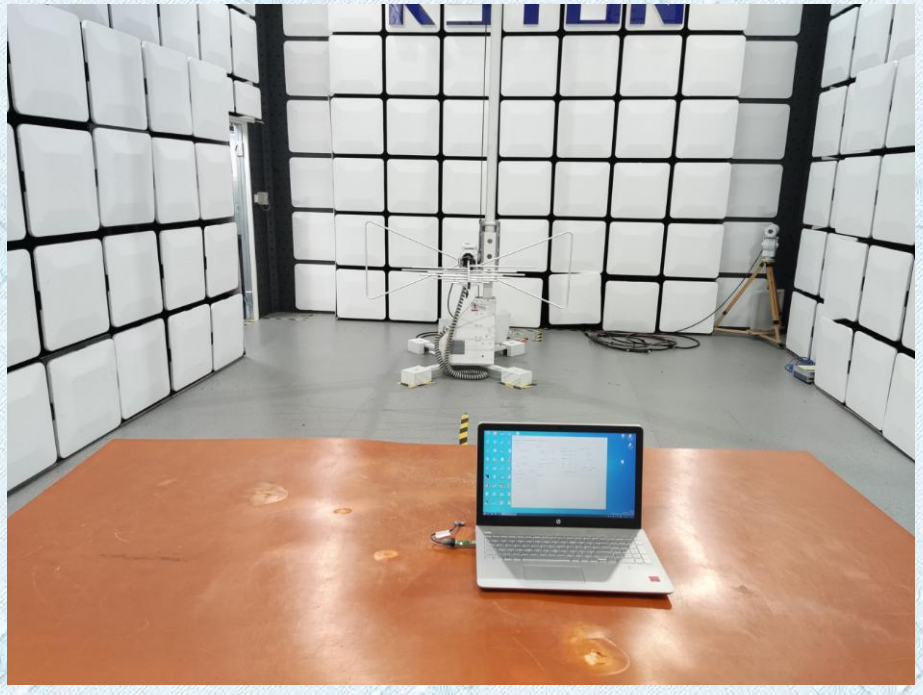



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector |
| 1 | | 0.1819 | 29.28 | 10.74 | 40.02 | 64.40 | -24.38 | QP |
| 2 | | 0.1819 | 12.89 | 10.74 | 23.63 | 54.40 | -30.77 | AVG |
| 3 | | 0.3540 | 24.36 | 10.53 | 34.89 | 58.87 | -23.98 | QP |
| 4 | | 0.3540 | 12.75 | 10.53 | 23.28 | 48.87 | -25.59 | AVG |
| 5 | * | 0.5940 | 32.11 | 10.46 | 42.57 | 56.00 | -13.43 | QP |
| 6 | | 0.5940 | 16.49 | 10.46 | 26.95 | 46.00 | -19.05 | AVG |
| 7 | | 1.0900 | 21.46 | 10.49 | 31.95 | 56.00 | -24.05 | QP |
| 8 | | 1.0900 | 9.24 | 10.49 | 19.73 | 46.00 | -26.27 | AVG |
| 9 | | 1.7780 | 21.57 | 10.53 | 32.10 | 56.00 | -23.90 | QP |
| 10 | | 1.7780 | 8.82 | 10.53 | 19.35 | 46.00 | -26.65 | AVG |
| 11 | | 5.9500 | 19.18 | 10.59 | 29.77 | 60.00 | -30.23 | QP |
| 12 | | 5.9500 | 8.04 | 10.59 | 18.63 | 50.00 | -31.37 | AVG |

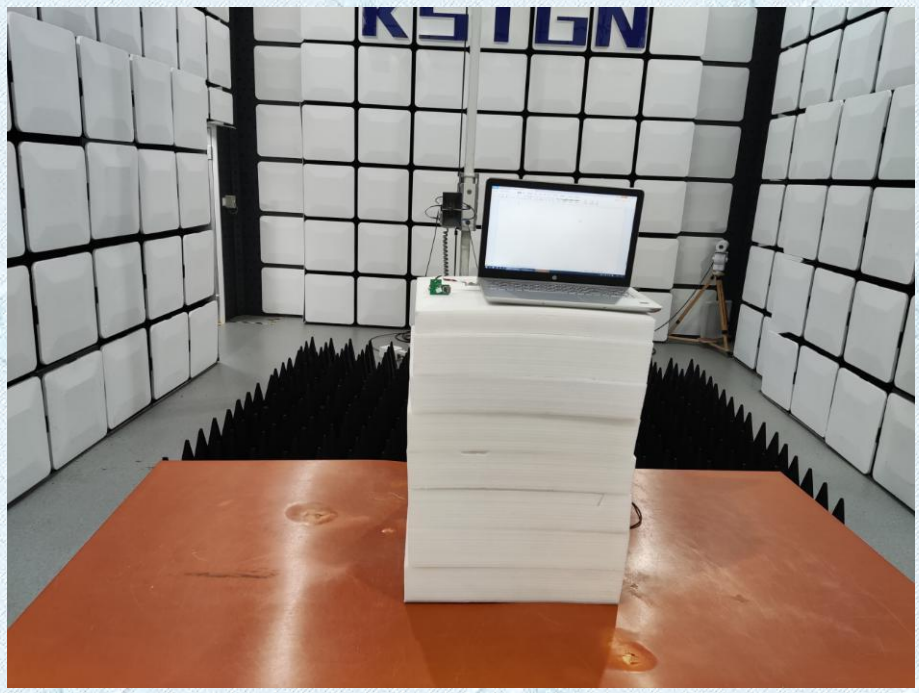
Remarks:
1.Measurement = Reading Level+ Correct Factor
2.Over = Measurement -Limit

# 4.EUT TEST PHOTOS

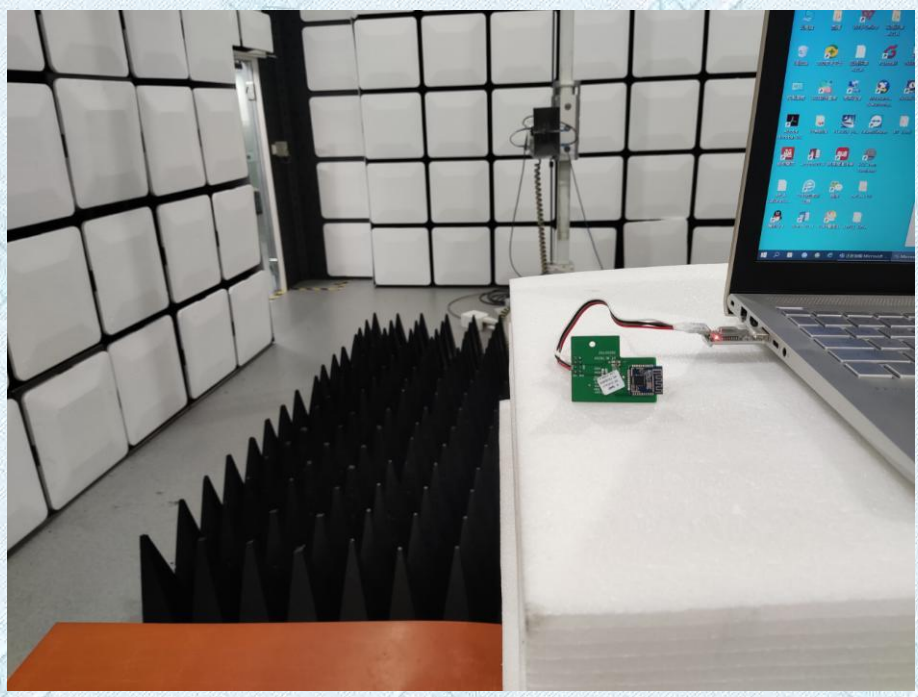
Radiated Measurement (Below 1GHz)



Radiated Measurement (Above 1GHz)

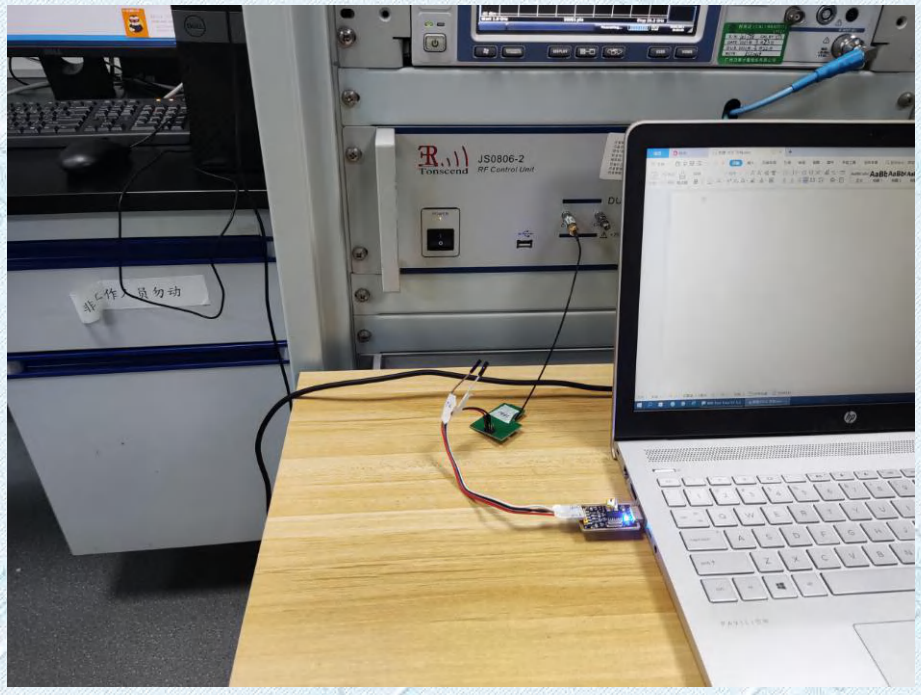


Radiated Measurement (Above 1GHz)

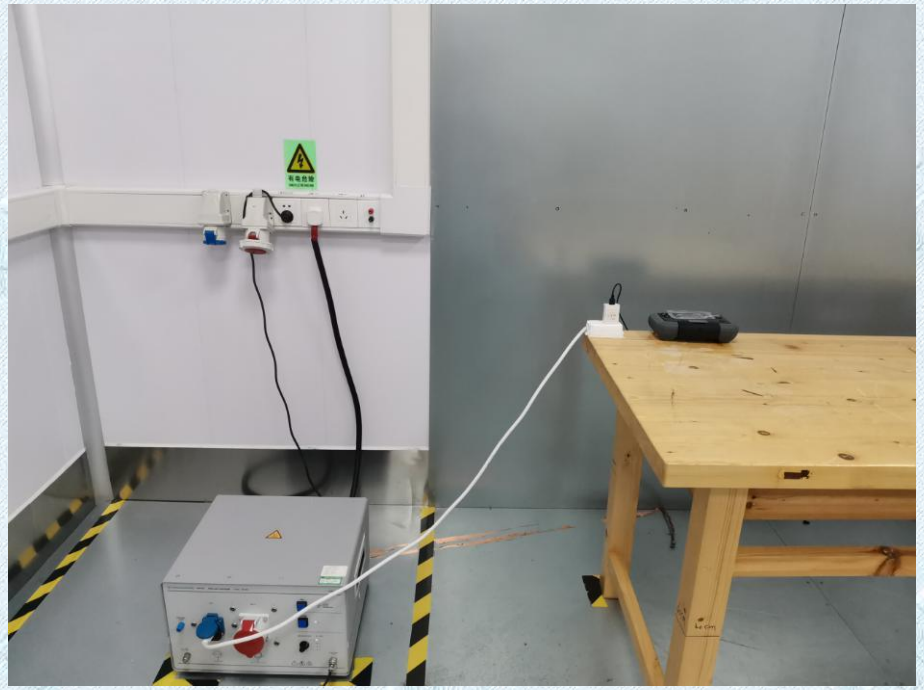


RF Conducted

RF Conducted




Conducted Emission



# 5.PHOTOGRAPHS OF EUT CONSTRUCTIONAL

## External Photographs



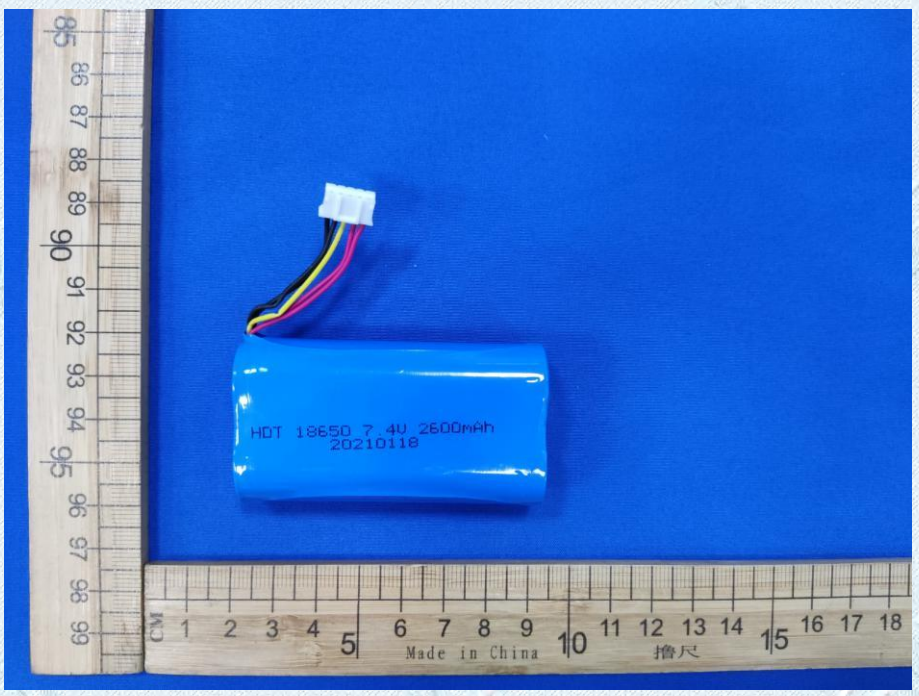
BT700Pro
BATTERY TESTER
TOPDON
Made in China

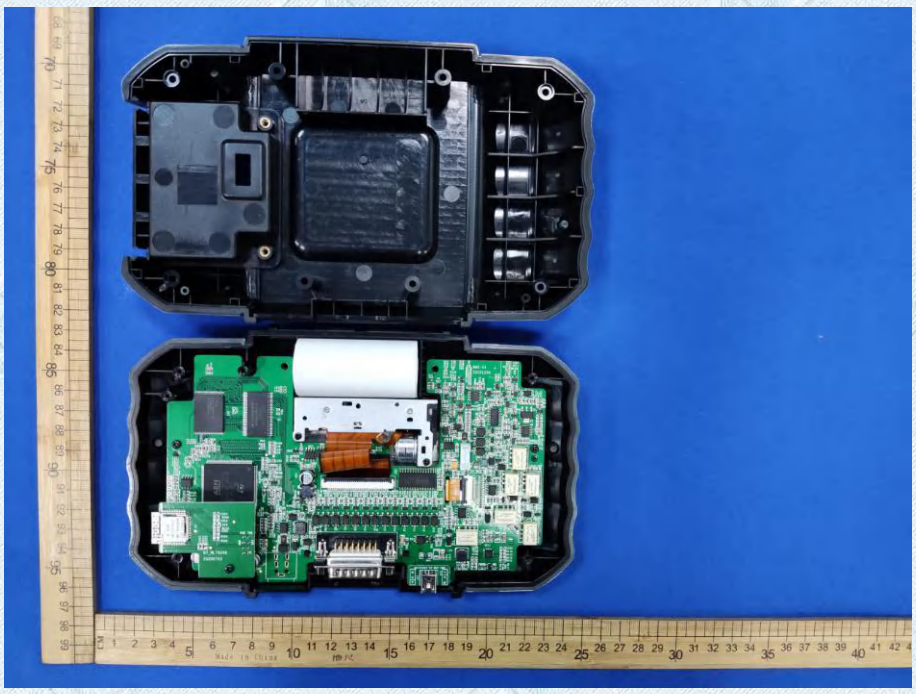

BT700Pro
TOPDON
Made in China

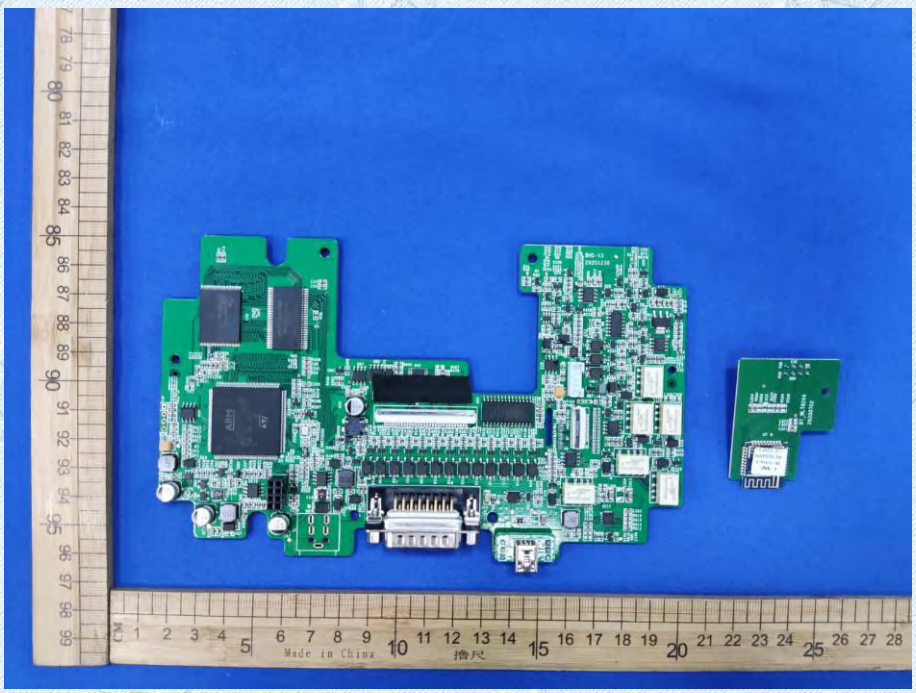

BT700Pro
TOPDON
Made in China


BT700Pro
Made in China

# Internal photos

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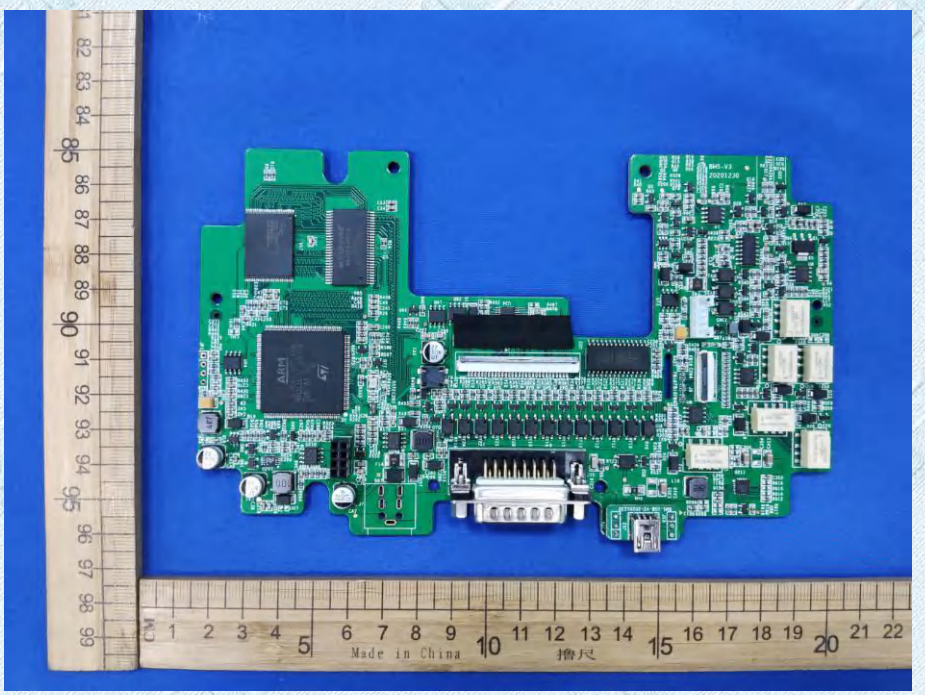
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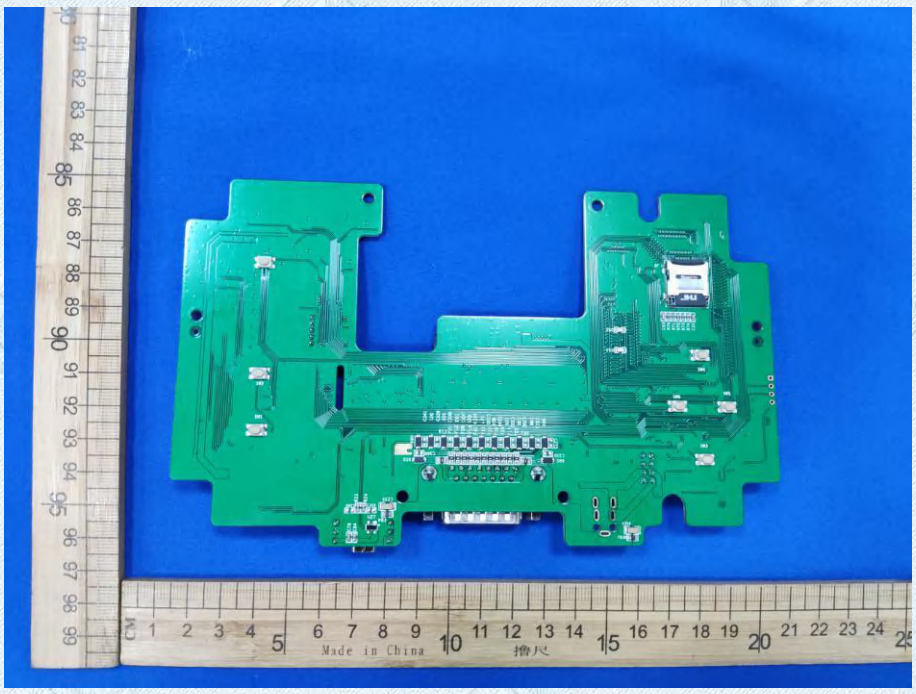
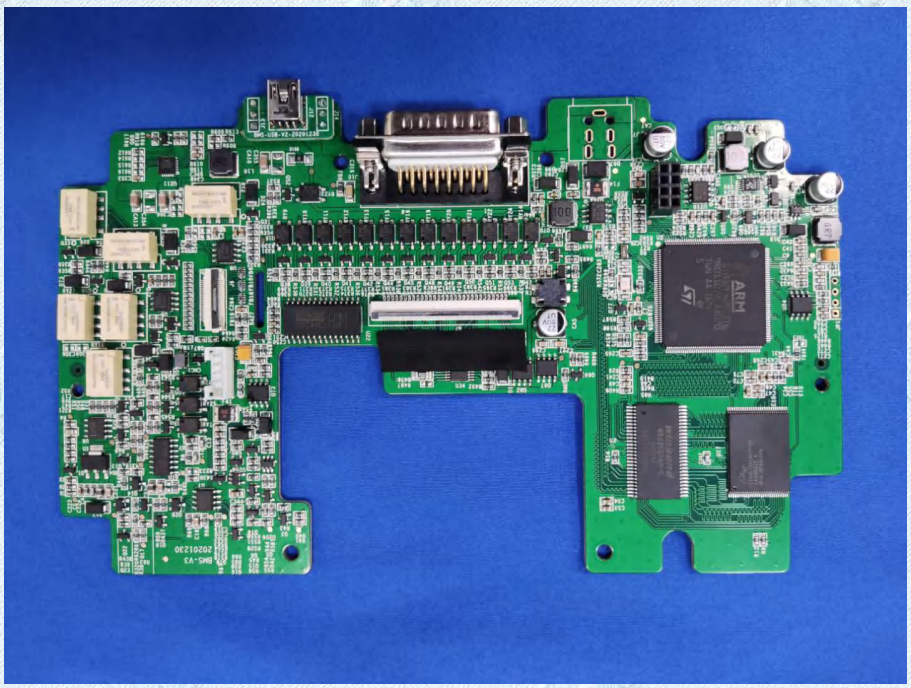
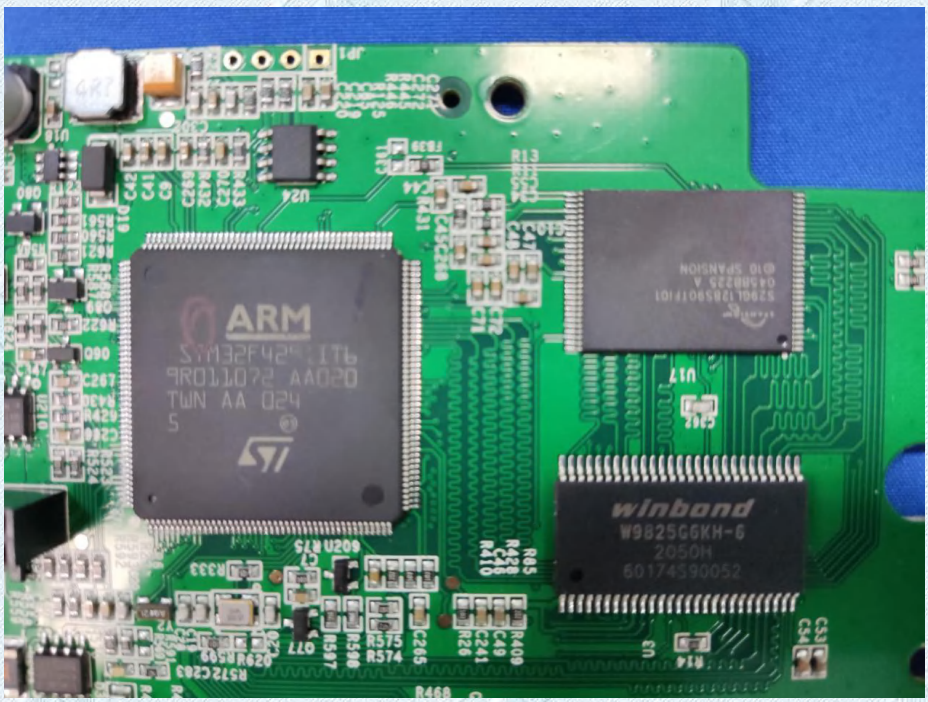
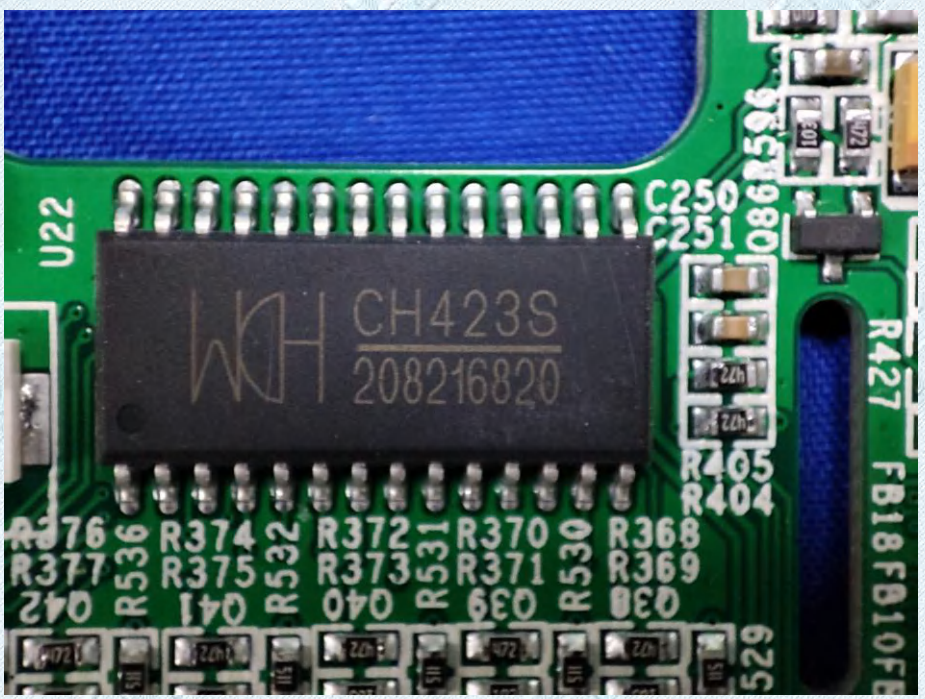

Made in China




ARM
winbond
W9825G6KH-6


U22
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C250
C251
R427
R405
R404
R376
R374
R372
R370
R368
R377
R375
R373
R371
R369
R536
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R530


C35
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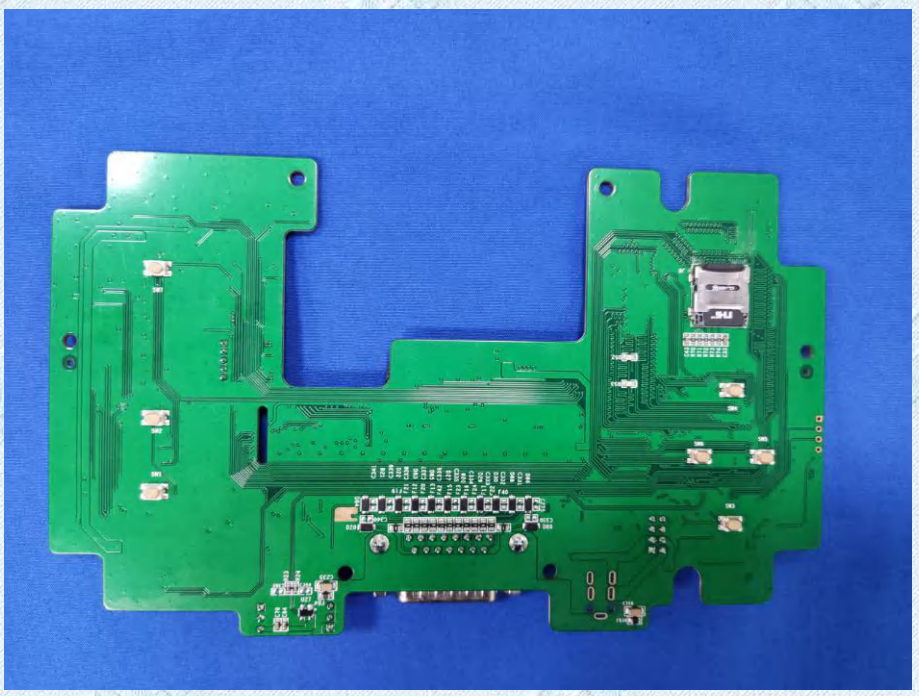
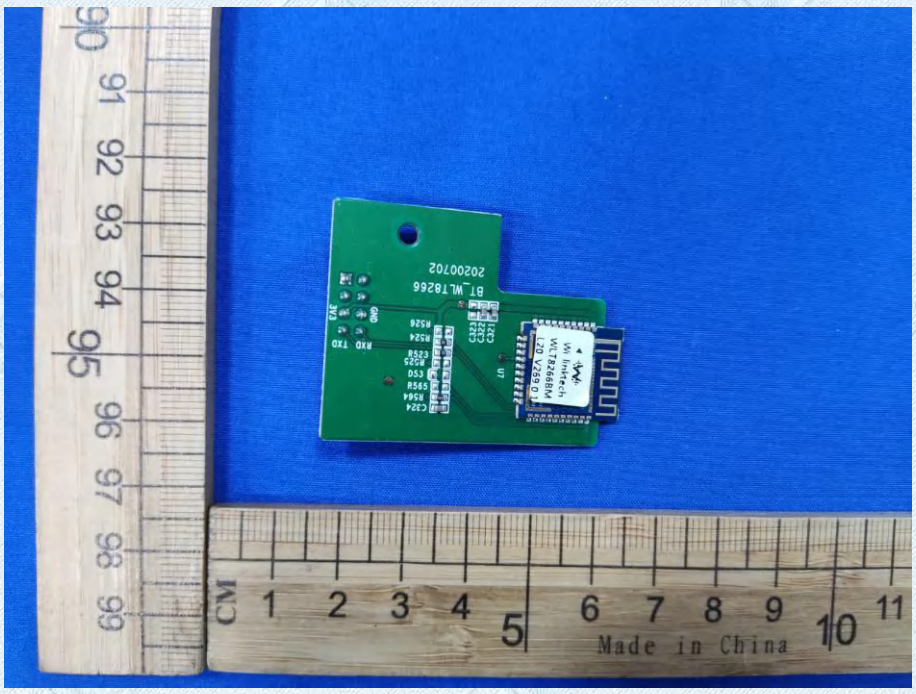
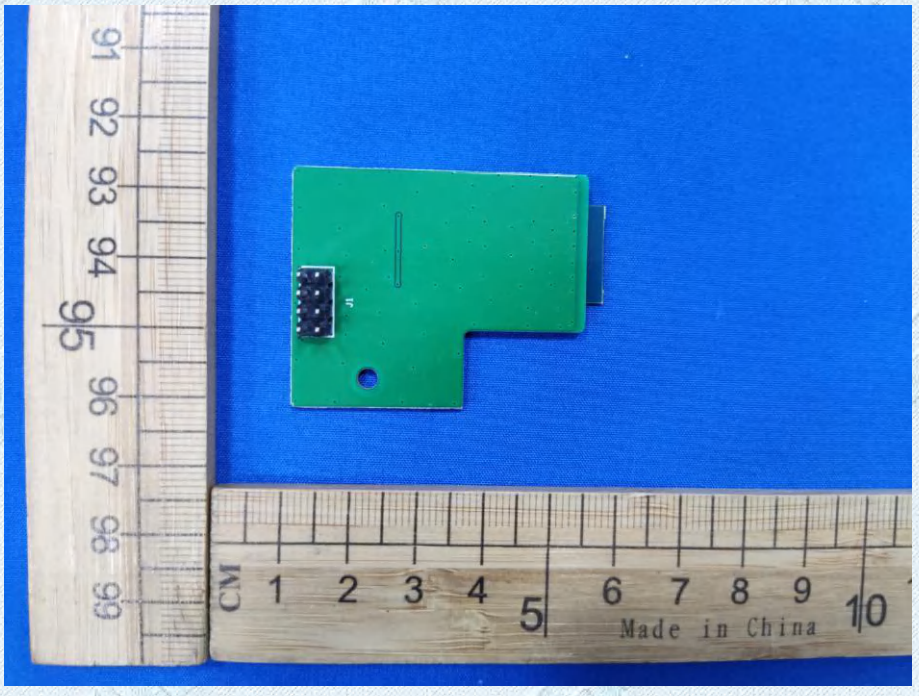
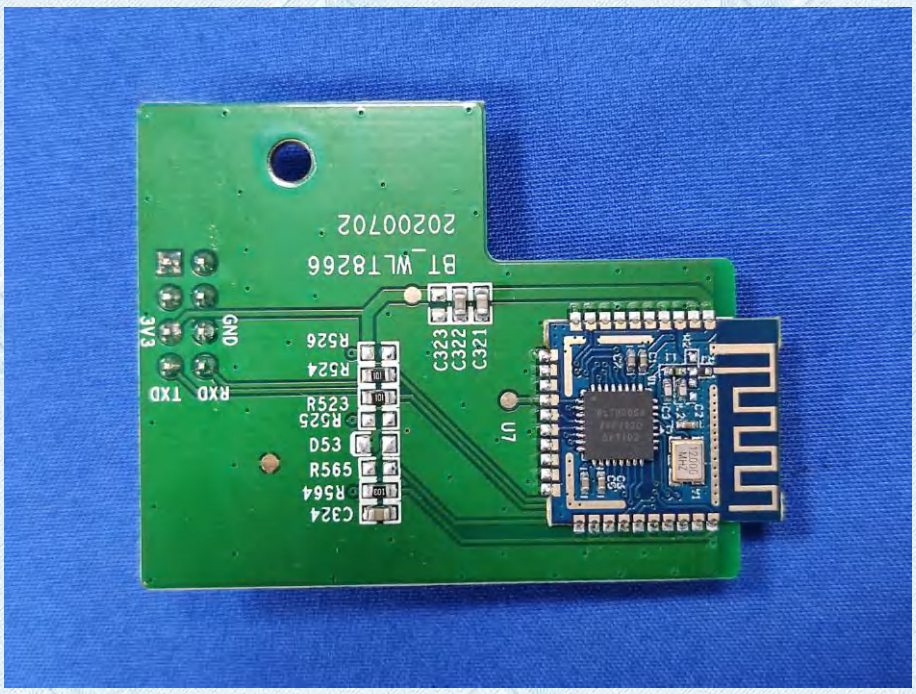



Made in China


Made in China


20200702
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3V3
GND
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RXD
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R524
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D53
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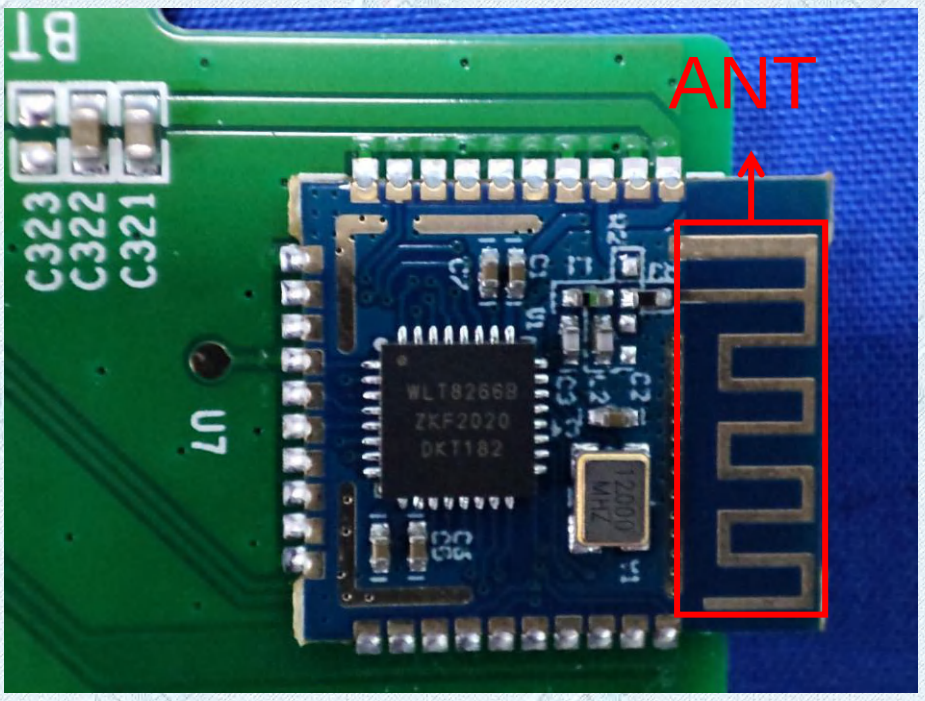
R564
C324
C323
C322
C321
U7


BT
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U7
ANT
WLT8266B
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2000
MHZ

******THE END*****