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# FCC Test Report

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Report No.: AGC07105260701FR02

**FCC ID** : 2BR58-SOVA

**APPLICATION PURPOSE** : Original Equipment

**PRODUCT DESIGNATION** : Bluetooth Headphone

**BRAND NAME** : TANCHJIM

**MODEL NAME** : SOVA

**APPLICANT** : NANNING HEAVY HAMMER TECHNOLOGY CO., LTD.

**DATE OF ISSUE** : Sep. 08, 2026

**STANDARD(S)** : FCC Part 15 Subpart C §15.247

**REPORT VERSION** : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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**Report Revise Record**

| Report Version | Revise Time | Issued Date   | Valid Version | Notes           |
|----------------|-------------|---------------|---------------|-----------------|
| V1.0           | /           | Sep. 08, 2026 | Valid         | Initial Release |

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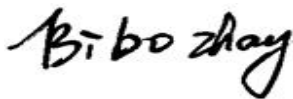
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## 1. General Information

|                              |                                                                                                            |
|------------------------------|------------------------------------------------------------------------------------------------------------|
| Applicant                    | NANNING HEAVY HAMMER TECHNOLOGY CO., LTD.                                                                  |
| Address                      | Room 101, 1st Floor, 33 Yongfu Road, Yongning District, NanningCity, Guangxi, China                        |
| Manufacturer                 | Nanning Heavy Hammer Technology Co., Ltd                                                                   |
| Address                      | Room 101, 1F, Nanning Qidi ASEAN Innovation Center, No. 33, Yongfu Road, Yongning District, Nanning, China |
| Factory                      | Dongguan Roker Intelligent Technology Co., Ltd.                                                            |
| Address                      | Building 3, No. 35, Dongping Road Changping Section, Changping Town, Dongguan, Guangdong, China            |
| Product Designation          | Bluetooth Headphone                                                                                        |
| Brand Name                   | TANCHJIM                                                                                                   |
| Test Model                   | SOVA                                                                                                       |
| Series Model(s)              | N/A                                                                                                        |
| Difference Description       | N/A                                                                                                        |
| Date of receipt of test item | Aug. 07, 2026                                                                                              |
| Date of Test                 | Aug. 07, 2026 – Sep. 08, 2026                                                                              |
| Deviation from Standard      | No any deviation from the test method                                                                      |
| Condition of Test Sample     | Normal                                                                                                     |
| Test Result                  | Pass                                                                                                       |
| Test Report Form No          | AGCER-FCC-BR_EDR-V1                                                                                        |

Note: The test results of this report relate only to the tested sample identified in this report.

|             |                                                                                     |               |
|-------------|-------------------------------------------------------------------------------------|---------------|
| Prepared By |  |               |
|             | Cool Cheng<br>(Project Engineer)                                                    | Sep. 08, 2026 |
| Reviewed By |  |               |
|             | Bibo Zhang<br>(Reviewer)                                                            | Sep. 08, 2026 |
| Approved By |  |               |
|             | Angela Li<br>(Authorized Officer)                                                   | Sep. 08, 2026 |

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## 2. Product Information

### 2.1 Product Technical Description

|                           |                                                                                                                                                |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Technology Type           | Classic Bluetooth                                                                                                                              |
| Frequency Band            | 2400M-2483.5MHz                                                                                                                                |
| Operation Frequency Range | 2402MHz-2480MHz                                                                                                                                |
| Bluetooth Version         | 6.0                                                                                                                                            |
| Modulation Type           | BR <input checked="" type="checkbox"/> GFSK, EDR <input checked="" type="checkbox"/> $\pi/4$ -DQPSK, <input checked="" type="checkbox"/> 8DPSK |
| Number of channels        | 79 of Channels                                                                                                                                 |
| Channel Separation        | 1 MHz                                                                                                                                          |
| Maximum Transmitter Power | 3.552dBm                                                                                                                                       |
| Hardware Version          | V1.8                                                                                                                                           |
| Software Version          | V3                                                                                                                                             |
| Antenna Designation       | PCB Antenna                                                                                                                                    |
| Antenna Gain              | 1.2dBi                                                                                                                                         |
| Power Supply              | DC 3.7V by battery or DC 5V by adapter                                                                                                         |

### 2.2 Test Frequency List

| Frequency Band | Channel Number | Test Frequency |
|----------------|----------------|----------------|
| 2400~2483.5MHz | 0              | 2402 MHz       |
|                | 1              | 2403 MHz       |
|                | :              | :              |
|                | 39             | 2441MHz        |
|                | :              | :              |
|                | 77             | 2479 MHz       |
|                | 78             | 2480 MHz       |

Note:  $f = 2402 + 1 \cdot k$  MHz,  $k=0, \dots, 78$ ; “f” is the operating frequency (MHz); “k” is the operating channel.

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### 2.3 Related Submittal(S) / Grant (S)

This submittal(s) (test report) is intended for FCC ID: 2BR58-SOVA, filing to comply with Part 2, Part 15 of the Federal Communication Commission rules.

### 2.4 Test Methodology

The tests were performed according to following standards:

| No. | Identity                                                            | Document Title                                                                                                                                                                            |
|-----|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | FCC 47 CFR Part 2                                                   | Frequency allocations and radio treaty matters; general rules and regulations                                                                                                             |
| 2   | FCC 47 CFR Part 15                                                  | Radio Frequency Devices                                                                                                                                                                   |
| 3   | ANSI C63.10-2020+Cor.1-2023+<br>C63.10a-2024+Errata to C63.10a-2024 | American National Standard for Testing Unlicensed Wireless Devices                                                                                                                        |
| 4   | KDB 558074<br>D01 15.247 Meas<br>Guidance v05r02                    | Guidance for compliance measurements on Digital Transmission Systems, Frequency Hopping Spread Spectrum system, and Hybrid system devices operating under Section 15.247 of the FCC rules |

### 2.5 Receiver Input Bandwidth

The input bandwidth of the receiver is 1.3MHz, in every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally, the type of connection (e.g. single of multi slot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also, the slave of the connection will use these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

### 2.6 Equally Average Use of Frequencies and Behaviour.

The generation of the hopping sequence in connection mode depends essentially on two input values:

1. LAP/UAP of the master of the connection.
2. Internal master clock.

The LAP (lower address part) are the 24 LSB's of the 48 BD\_ADDRESS. The BD\_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24MSB's of the 48BD\_ADDRESS

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For behavior action with other units only offset is used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5us. The clock has a cycle of about one day(23h30).

In most case it is implemented as 28 bits counter. For the deriving of the hopping sequence the entire. LAP (24 bits),4LSB's(4bits) (Input 1) and the 27MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR-operations) are performed to generate the Sequence.

This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behavior:

The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended.

The second connection will be established. A new hopping sequence is generated. Due to the fact the Bluetooth clock has a different value, because the period between the two transmission is longer (and it Cannot be shorter) than the minimum resolution of the clock(312.5us). The hopping sequence will always differ from the first one.

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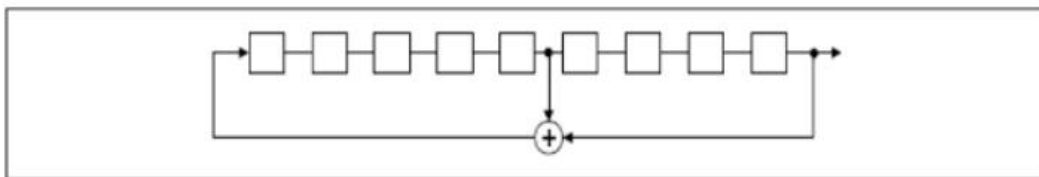
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## 2.7 Pseudorandom Frequency Hopping Sequence

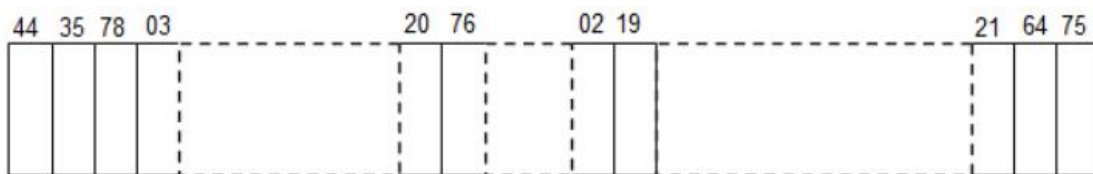
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONES; i.e. the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence:  $2^9 - 1 = 511$  bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of The PRBS Sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.

The system receivers have input bandwidths that match the hopping channel bandwidths of their Corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

## 2.8 Special Accessories

Not available for this EUT intended for grant.

## 2.9 Equipment Modifications

Not available for this EUT intended for grant.

## 2.10 Antenna Requirement

| Standard Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>15.203 requirement:</b><br/>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.</p> <p><b>15.247(b) (4) requirement:</b><br/>The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi</p> |
| EUT Antenna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>The non-detachable antenna inside the device cannot be replaced by the user at will. The gain of the antenna is 1.2 dBi.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

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### 3. Test Environment

#### 3.1 Address of The Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.  
Address: 101 & 201, Building 19(B5), Junfeng Industrial Park, Chongqing Road, P.R.C.

#### 3.2 Test Facility

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

##### **CNAS-Lab Code: L5488**

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to follow 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.: 5054.02**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to follow 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.

##### **FCC-Registration No.: 975832**

Attestation of Global Compliance (Shenzhen) 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 with Registration 975832.

##### **IC-Registration No.: 24842(CAB identifier: CN0063)**

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

### 3.3 Environmental Conditions

|                         | Normal Conditions                      |
|-------------------------|----------------------------------------|
| Temperature range (°C)  | 15 - 35                                |
| Relative humidity range | 20 % - 75 %                            |
| Pressure range (kPa)    | 86 - 106                               |
| Power supply            | DC 3.7V by battery or DC 5V by adapter |

### 3.4 Measurement Uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95%.

| Item                                          | Measurement Uncertainty    |
|-----------------------------------------------|----------------------------|
| Uncertainty of Conducted Emission for AC Port | $U_c = \pm 2.9 \text{ dB}$ |
| Uncertainty of Radiated Emission below 1GHz   | $U_c = \pm 3.9 \text{ dB}$ |
| Uncertainty of Radiated Emission above 1GHz   | $U_c = \pm 4.9 \text{ dB}$ |
| Uncertainty of total RF Power, Conducted      | $U_c = \pm 0.8 \text{ dB}$ |
| Uncertainty of RF Power Density, Conducted    | $U_c = \pm 2.6 \text{ dB}$ |
| Uncertainty of Spurious Emissions, Conducted  | $U_c = \pm 2 \%$           |
| Uncertainty of Occupied Channel Bandwidth     | $U_c = \pm 2 \%$           |
| Uncertainty of Dwell Time                     | $U_c = \pm 2 \%$           |

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### 3.5 List of Equipment Used

| ● RF Conducted Test System          |               |                      |               |                     |            |                           |                           |
|-------------------------------------|---------------|----------------------|---------------|---------------------|------------|---------------------------|---------------------------|
| Used                                | Equipment No. | Test Equipment       | Manufacturer  | Model No.           | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| <input checked="" type="checkbox"/> | AGC-ER-E036   | Spectrum Analyzer    | Agilent       | N9020A              | MY49100060 | 2026-05-20                | 2027-05-19                |
| <input checked="" type="checkbox"/> | AGC-ER-A007   | 6dB Fixed Attenuator | Mini circuits | BW-S6-2W263A+       | N/A        | 2026-01-31                | 2028-01-30                |
| <input checked="" type="checkbox"/> | AGC-ER-E083   | Signal Generator     | Agilent       | E4421B              | US39340815 | 2026-01-31                | 2028-01-30                |
| <input checked="" type="checkbox"/> | AGC-ER-W001   | RF Connection Cable  | Harbour       | FLCA-73P2-80-1500T3 | N/A        | 2026-01-15                | 2027-01-14                |
| <input checked="" type="checkbox"/> | AGC-ER-W002   | RF Connection Cable  | Harbour       | FLCA-73P2-80-1500T4 | N/A        | 2026-01-15                | 2027-01-14                |

| ● Radiated Spurious Emission        |               |                               |              |            |            |                           |                           |
|-------------------------------------|---------------|-------------------------------|--------------|------------|------------|---------------------------|---------------------------|
| Used                                | Equipment No. | Test Equipment                | Manufacturer | Model No.  | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| <input checked="" type="checkbox"/> | AGC-EM-E046   | EMI Test Receiver             | R&S          | ESCI       | 10096      | 2026-01-13                | 2027-01-12                |
| <input type="checkbox"/>            | AGC-EM-E116   | EMI Test Receiver             | R&S          | ESCI       | 100034     | 2026-05-20                | 2027-05-19                |
| <input checked="" type="checkbox"/> | AGC-EM-E061   | Spectrum Analyzer             | Agilent      | N9010A     | MY53470504 | 2026-05-20                | 2027-05-19                |
| <input checked="" type="checkbox"/> | AGC-EM-E086   | Loop Antenna                  | ZHINAN       | ZN30900C   | 18051      | 2026-01-14                | 2028-01-13                |
| <input checked="" type="checkbox"/> | AGC-EM-E001   | Wideband Antenna              | SCHWARZBECK  | VULB9168   | D69250     | 2025-03-14                | 2027-03-13                |
| <input checked="" type="checkbox"/> | AGC-EM-E029   | Broadband Ridged Horn Antenna | ETS          | 3117       | 00034609   | 2026-03-14                | 2027-03-13                |
| <input checked="" type="checkbox"/> | AGC-EM-E082   | Horn Antenna                  | SCHWARZBECK  | BBHA 9170  | #768       | 2025-09-10                | 2027-09-09                |
| <input checked="" type="checkbox"/> | AGC-EM-E146   | Pre-amplifier                 | ETS          | 3117-PA    | 00246148   | 2026-07-14                | 2028-07-13                |
| <input checked="" type="checkbox"/> | AGC-EM-A119   | 2.4G Filter                   | SongYi       | N/A        | N/A        | 2026-05-19                | 2027-05-18                |
| <input checked="" type="checkbox"/> | AGC-EM-A138   | 6dB Attenuator                | Eeatsheep    | LM-XX-6-5W | N/A        | 2025-05-16                | 2027-05-15                |
| <input type="checkbox"/>            | AGC-EM-A139   | 6dB Attenuator                | Eeatsheep    | LM-XX-6-5W | N/A        | 2025-05-16                | 2027-05-15                |
| <input checked="" type="checkbox"/> | AGC-EM-W024   | RE Connection Cable           | Harbour      | RE004      | N/A        | 2025-09-05                | 2027-09-04                |
| <input checked="" type="checkbox"/> | AGC-EM-W025   | RE Connection Cable           | Harbour      | RE005      | N/A        | 2025-09-05                | 2027-09-04                |

| ● AC Power Line Conducted Emission  |               |                     |              |            |            |                           |                           |
|-------------------------------------|---------------|---------------------|--------------|------------|------------|---------------------------|---------------------------|
| Used                                | Equipment No. | Test Equipment      | Manufacturer | Model No.  | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| <input checked="" type="checkbox"/> | AGC-EM-E045   | EMI Test Receiver   | R&S          | ESPI       | 101206     | 2026-05-19                | 2027-05-18                |
| <input checked="" type="checkbox"/> | AGC-EM-A130   | 6dB Attenuator      | Eeatsheep    | LM-XX-6-5W | DC-6GZ     | 2025-07-18                | 2027-07-17                |
| <input checked="" type="checkbox"/> | AGC-EM-E023   | AMN                 | R&S          | ESH2-Z5    | 100086     | 2026-05-19                | 2027-05-18                |
| <input checked="" type="checkbox"/> | AGC-EM-W026   | CE Connection Cable | Harbour      | CE001      | N/A        | 2026-07-14                | 2028-07-13                |
| ● Test Software                     |               |                     |              |            |            |                           |                           |

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| Used                                | Equipment No. | Test Equipment      | Manufacturer | Model No.            | Version Information |
|-------------------------------------|---------------|---------------------|--------------|----------------------|---------------------|
| <input checked="" type="checkbox"/> | AGC-EM-S001   | CE Test System      | R&S          | ES-K1                | V1.71               |
| <input type="checkbox"/>            | AGC-EM-S003   | RE Test System      | FARA         | EZ-EMC               | VRA-03A             |
| <input checked="" type="checkbox"/> | AGC-EM-S004   | RE Test System      | Tonscend     | TS+ Ver2.1(JS32-RE)  | 4.0.0.0             |
| <input checked="" type="checkbox"/> | AGC-ER-S012   | BT/WIFI Test System | Tonscend     | JS1120-2             | 2.6                 |
| <input checked="" type="checkbox"/> | AGC-EM-S011   | RSE Test System     | Tonscend     | TS+-Ver2.1(JS36-RSE) | 4.0.0.0             |

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## 4. System Test Configuration

### 4.1 EUT Configuration

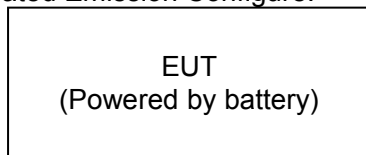
The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 4.2 EUT Exercise

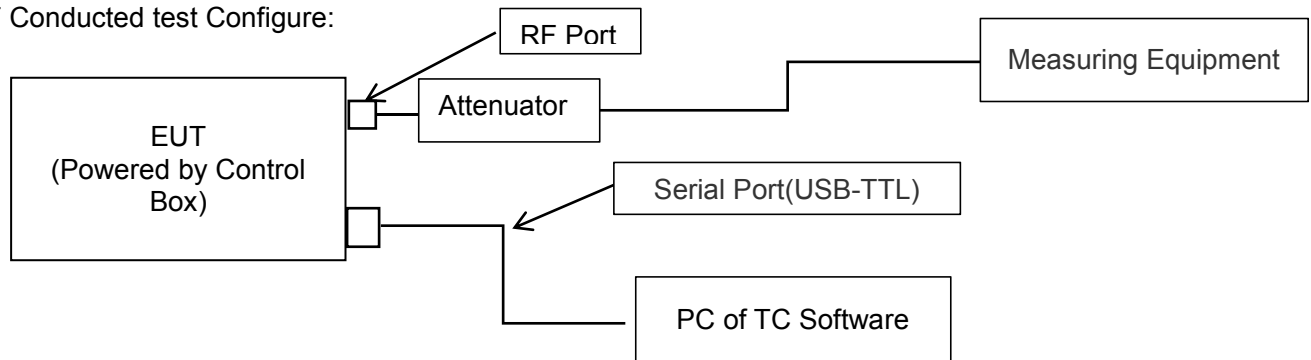
The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

### 4.3 Configuration of Tested System

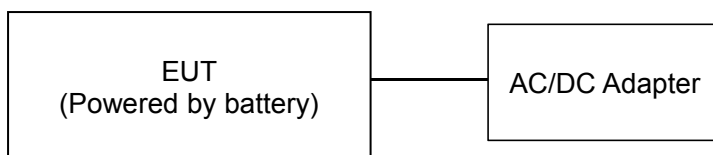
Radiated Emission Configure:



RF Conducted test Configure:



AC Power Line Conducted Emission Configure:



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#### 4.4 Equipment Used in Tested System

The following peripheral devices and interface cables were connected during the measurement:

☒ Test Accessories Come From The Laboratory

| No. | Equipment   | Manufacturer | Model No. | Specification Information | Cable |
|-----|-------------|--------------|-----------|---------------------------|-------|
| 1   | Adapter     | Apple        | A2452     | --                        | --    |
| 2   | Control Box | RISYM        | USB-TTL   | --                        | --    |

☐ Test Accessories Come From The Manufacturer

| No. | Equipment | Manufacturer | Model No. | Specification Information | Cable |
|-----|-----------|--------------|-----------|---------------------------|-------|
| 1   | --        | --           | --        | --                        | --    |

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#### 4.5 Summary of Test Results

| Item | FCC Rules            | Description of Test                           | Result |
|------|----------------------|-----------------------------------------------|--------|
| 1    | §15.203&15.247(b)(4) | Antenna Equipment                             | Pass   |
| 2    | §15.247 (b)(1)       | RF Output Power                               | Pass   |
| 3    | §15.247 (a)(1)       | 20 dB Bandwidth                               | Pass   |
| 4    | §15.247 (d)          | Conducted Band Edge and Out-of-Band Emissions | Pass   |
| 5    | §15.209              | Radiated Spurious Emission                    | Pass   |
| 6    | §15.247 (a)(1)(iii)  | Number of Hopping Frequency                   | Pass   |
| 7    | §15.247 (a)(1)(iii)  | Time of Occupancy                             | Pass   |
| 8    | §15.247 (a)(1)       | Frequency Separation                          | Pass   |
| 9    | §15.207              | AC Power Line Conducted Emission              | Pass   |

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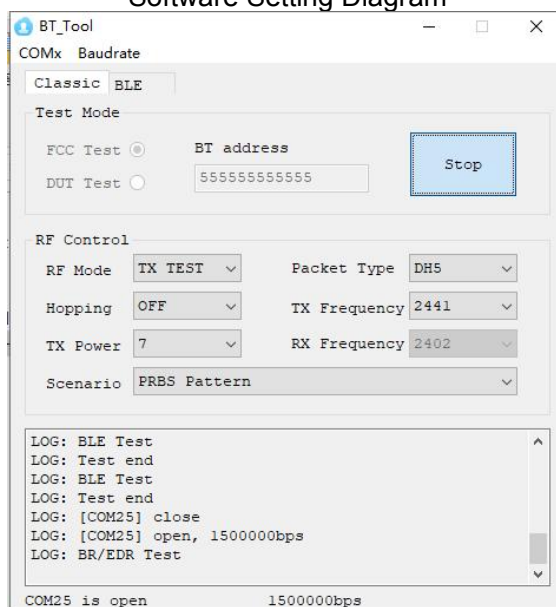
## 5. Description of Test Modes

| Summary table of Test Cases     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Item                       | Data Rate / Modulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                 | Bluetooth – BR_EDR (GFSK/π /4-DQPSK/8DPSK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Radiated & Conducted Test Cases | Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps (Battery powered or AC/DC adapter)<br>Mode 2: Bluetooth Tx CH39_2441 MHz_1Mbps (Battery powered or AC/DC adapter)<br>Mode 3: Bluetooth Tx CH78_2480 MHz_1Mbps (Battery powered or AC/DC adapter)<br>Mode 4: Bluetooth Tx CH00_2402 MHz_2Mbps (Battery powered or AC/DC adapter)<br>Mode 5: Bluetooth Tx CH39_2441 MHz_2Mbps (Battery powered or AC/DC adapter)<br>Mode 6: Bluetooth Tx CH78_2480 MHz_2Mbps (Battery powered or AC/DC adapter)<br>Mode 7: Bluetooth Tx CH00_2402 MHz_3Mbps (Battery powered or AC/DC adapter)<br>Mode 8: Bluetooth Tx CH39_2441 MHz_3Mbps (Battery powered or AC/DC adapter)<br>Mode 9: Bluetooth Tx CH78_2480 MHz_3Mbps (Battery powered or AC/DC adapter)<br>Mode10: Bluetooth Tx Hopping-1Mbps (Battery powered or AC/DC adapter)<br>Mode11: Bluetooth Tx Hopping-2Mbps (Battery powered or AC/DC adapter)<br>Mode12: Bluetooth Tx Hopping-3Mbps (Battery powered or AC/DC adapter) |
| AC Conducted Emission           | Mode 1: Charging mode with adapter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Note:

- Only the result of the worst case was recorded in the report, if no other cases.
- The battery is full-charged during the test.
- For Radiated Emission, 3axis were chosen for testing for each applicable mode.
- For Conducted Test method, a temporary antenna connector is provided by the manufacture.
- The manufacturer of RF external cable claims that the cable loss is 0.5dB, and the cable loss and attenuator have been compensated into the Corrections Configuration of measuring equipment.
- Input correction factor includes external cable loss and attenuator amplitude compensation. The formula is:  
Input compensation coefficient (dB) = Cable Loss (dB) + Attenuator attenuation value (dB)

Software Setting Diagram



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## 6. RF Output Power Measurement

### 6.1 Provisions Applicable

The maximum out power permissible output power is 1 Watt for all frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels.

The maximum out power permissible output power is 0.125 watts for all other frequency hopping systems in the 2400-2483.5 MHz band.

### 6.2 Measurement Procedure

☒ For Peak power test:

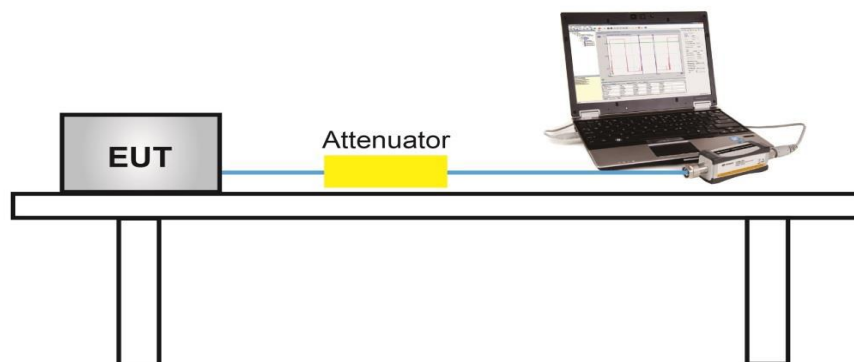
1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
3. RBW > 20 dB bandwidth of the emission being measured.
4. VBW  $\geq$  RBW.
5. Sweep: Auto.
6. Detector function: Peak.
7. Trace: Max hold.
8. Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

☐ For Average power test:

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required

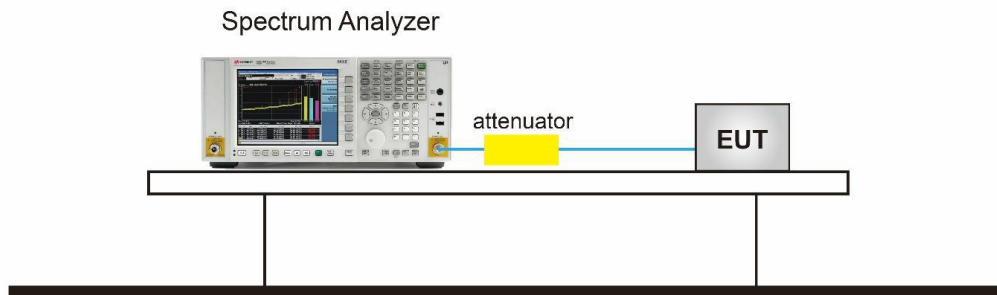
### 6.3 Measurement Setup (Block Diagram of Configuration)

☐ For Average power test setup



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☒ For peak power test setup

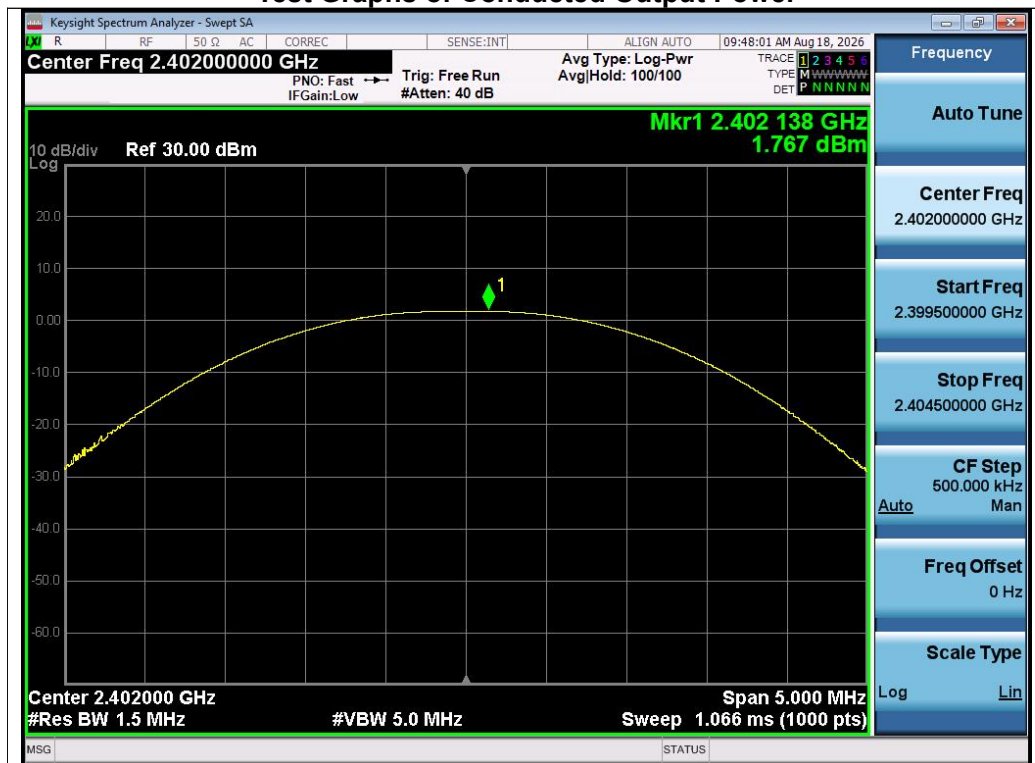


## 6.4 Measurement Result

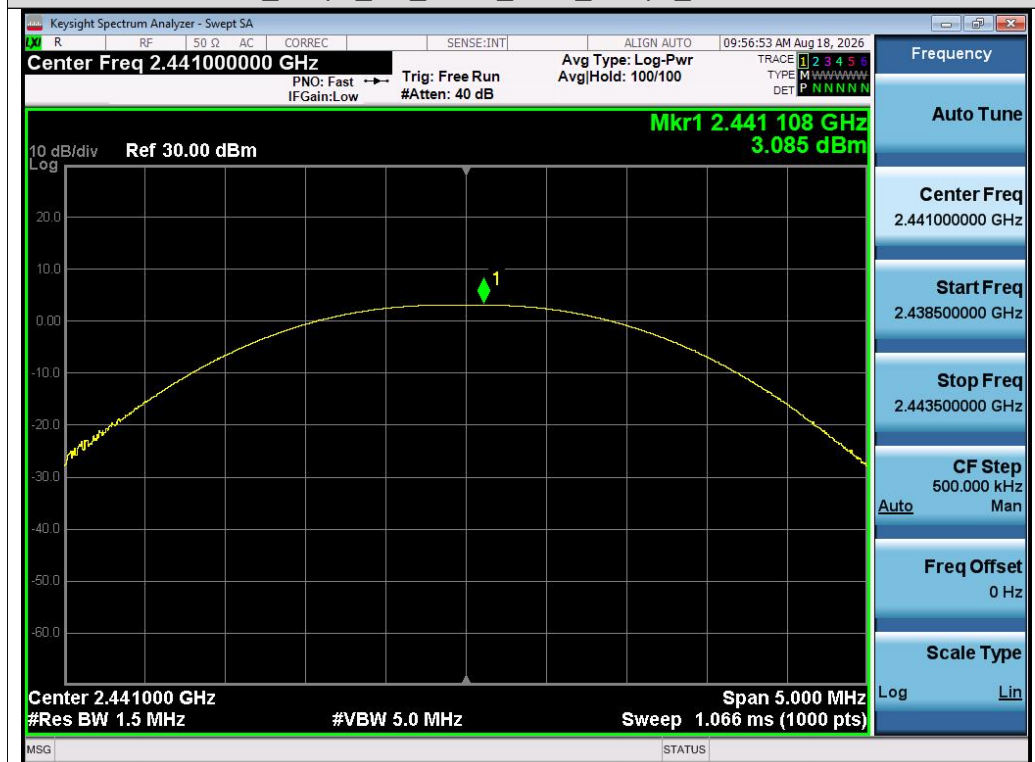
| Test Data of Conducted Output Power |                      |                  |              |              |
|-------------------------------------|----------------------|------------------|--------------|--------------|
| Test Mode                           | Test Frequency (MHz) | Peak Power (dBm) | Limits (dBm) | Pass or Fail |
| GFSK                                | 2402                 | 1.767            | $\leq 21$    | Pass         |
|                                     | 2441                 | 3.085            | $\leq 21$    | Pass         |
|                                     | 2480                 | 3.462            | $\leq 21$    | Pass         |
| $\pi/4$ -DQPSK                      | 2402                 | 1.751            | $\leq 21$    | Pass         |
|                                     | 2441                 | 3.105            | $\leq 21$    | Pass         |
|                                     | 2480                 | 3.552            | $\leq 21$    | Pass         |
| 8DPSK                               | 2402                 | 1.797            | $\leq 21$    | Pass         |
|                                     | 2441                 | 3.145            | $\leq 21$    | Pass         |
|                                     | 2480                 | 3.534            | $\leq 21$    | Pass         |

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### Test Graphs of Conducted Output Power



### Test\_Graph\_BR\_ANT1\_2402\_1Mbps\_Peak Power



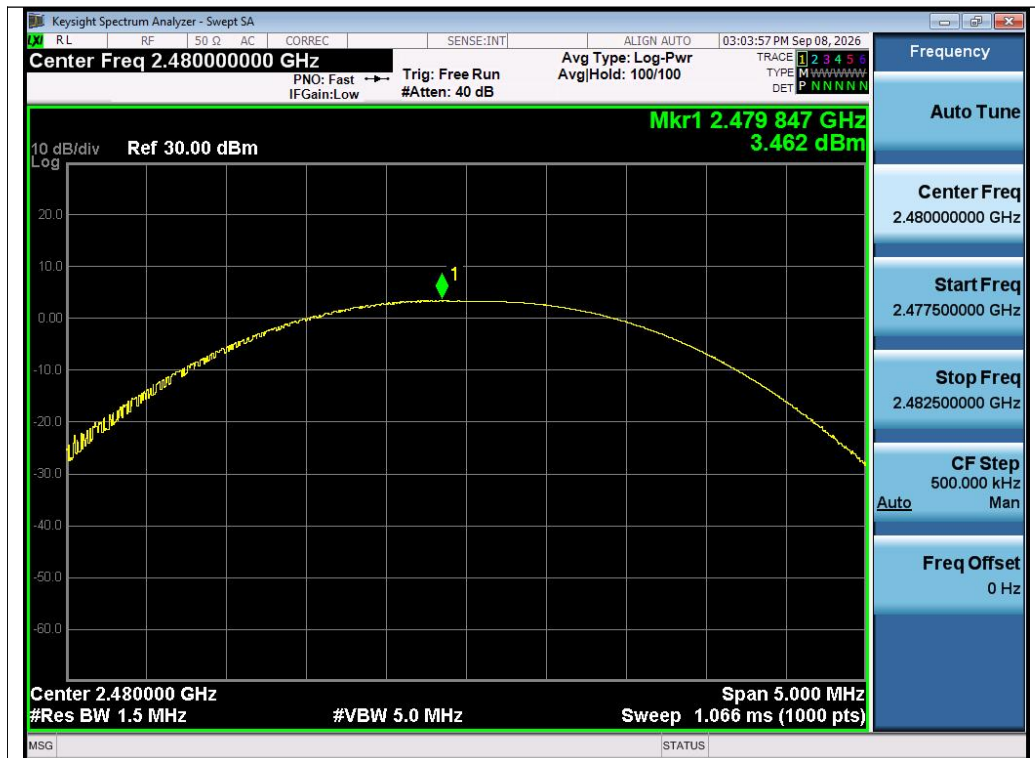
### Test\_Graph\_BR\_ANT1\_2441\_1Mbps\_Peak Power

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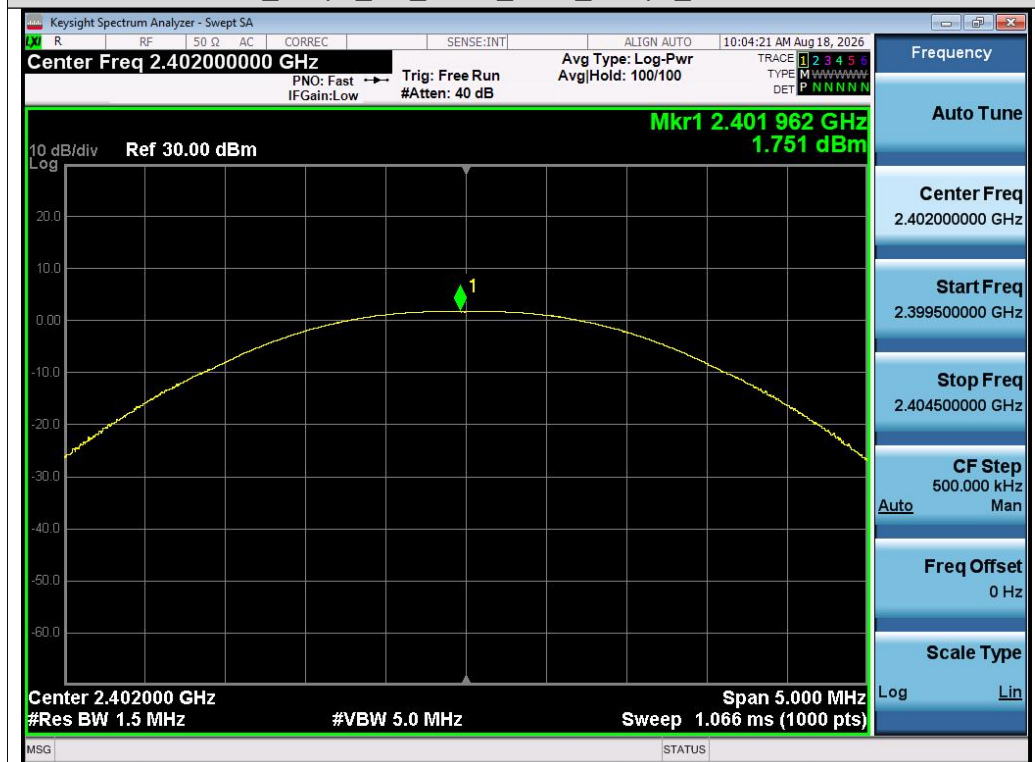
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Test\_Graph\_BR\_ANT1\_2480\_1Mbps\_Peak Power



Test\_Graph\_EDR\_ANT1\_2402\_2Mbps\_Peak Power

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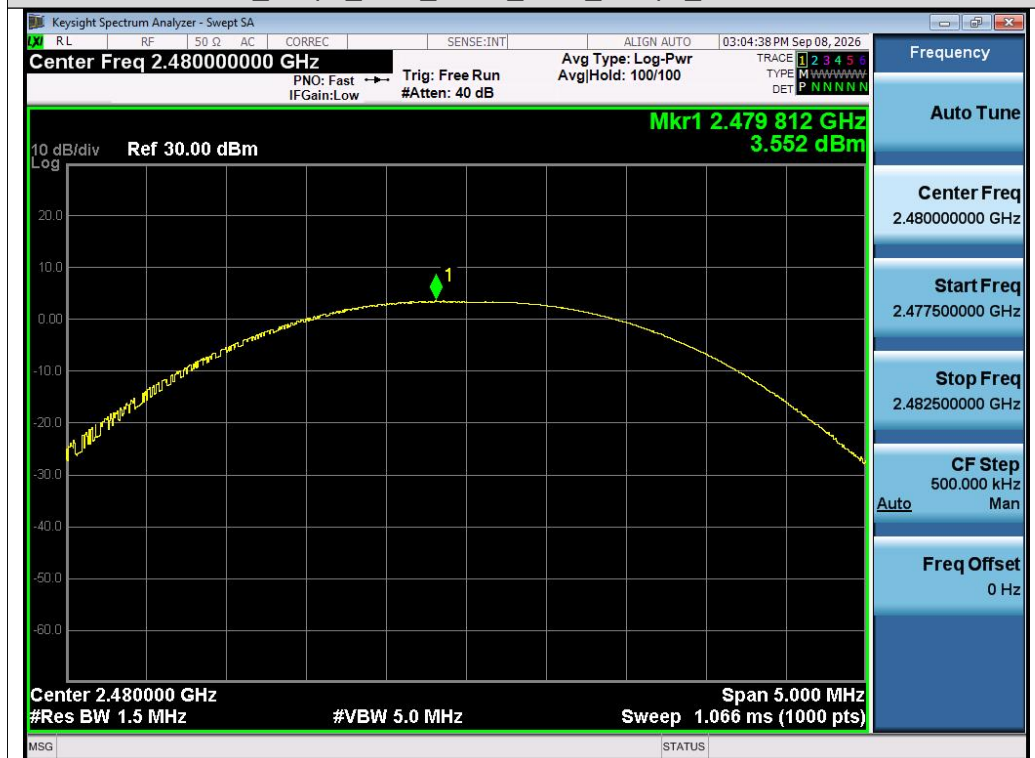
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Test\_Graph\_EDR\_ANT1\_2441\_2Mbps\_Peak Power



Test\_Graph\_EDR\_ANT1\_2480\_2Mbps\_Peak Power

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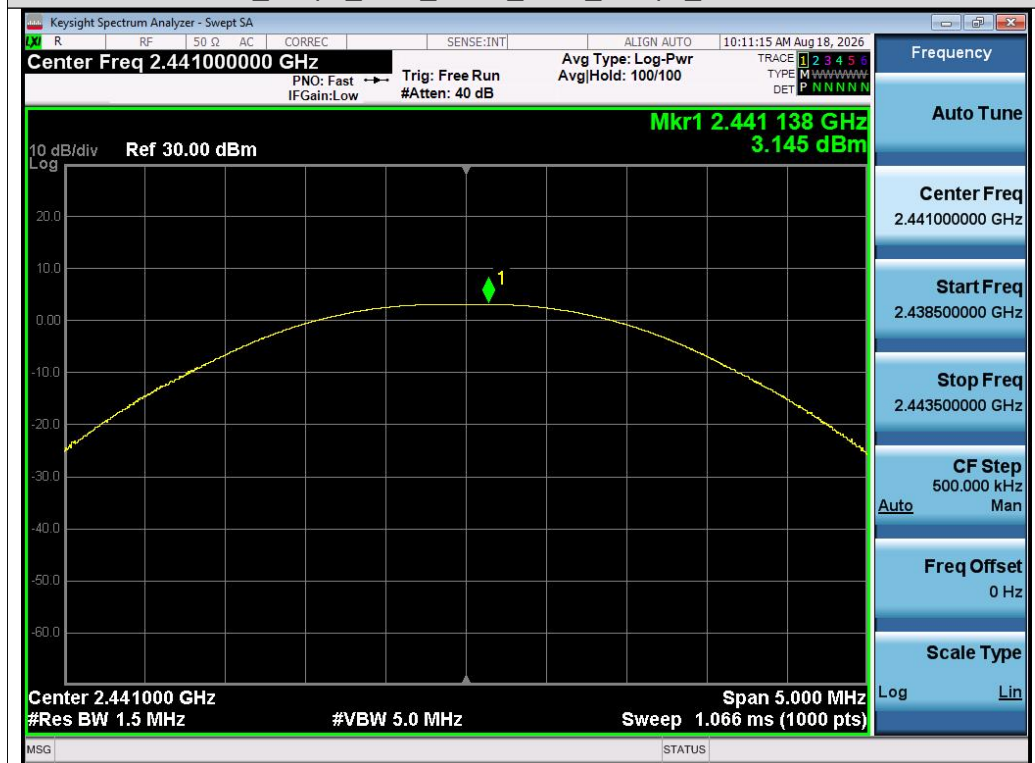
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Test\_Graph\_EDR\_ANT1\_2402\_3Mbps\_Peak Power



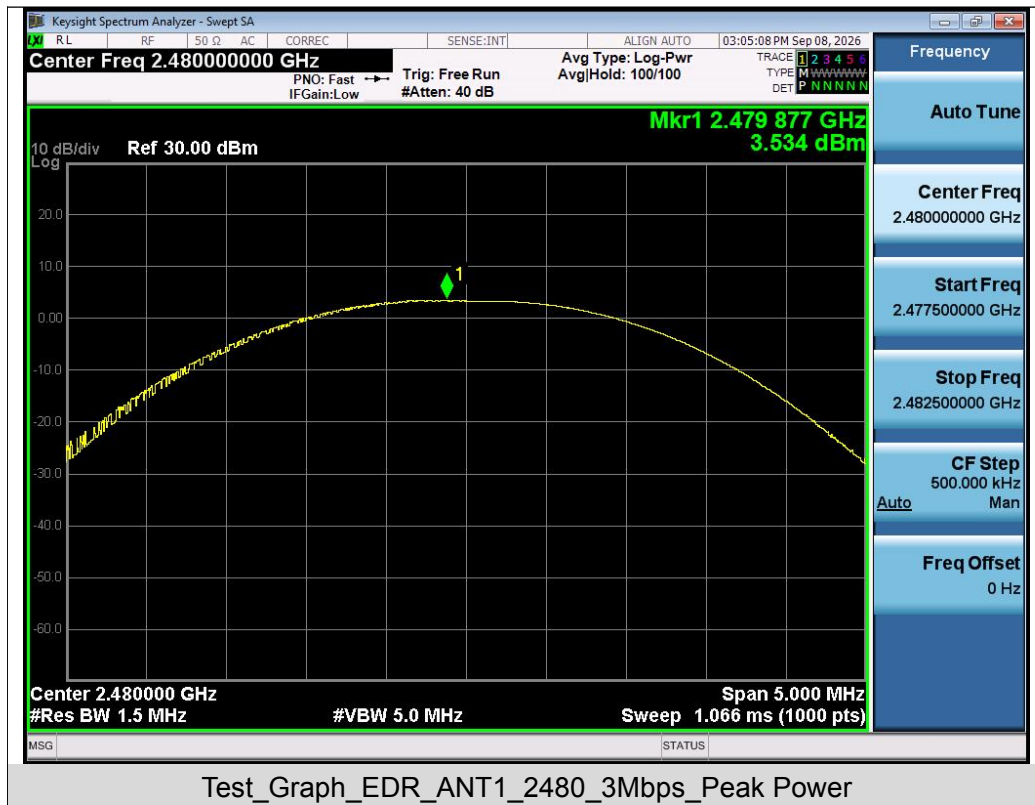
Test\_Graph\_EDR\_ANT1\_2441\_3Mbps\_Peak Power

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## 7. 20dB Bandwidth and 99% Occupied Bandwidth Measurement

### 7.1 Provisions Applicable

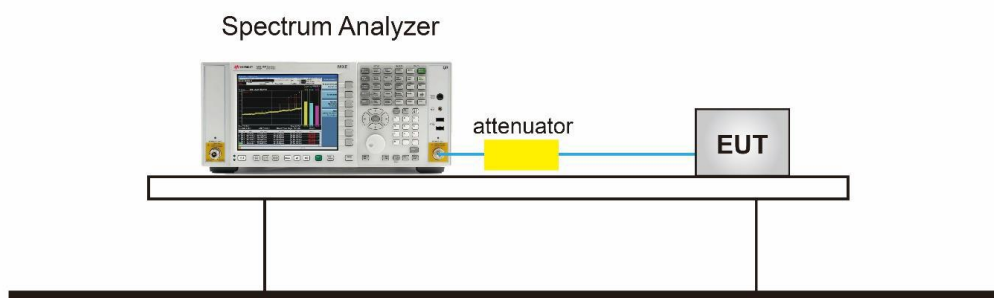
There is no corresponding limit requirement for this test item.

### 7.2 Measurement Procedure

The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 6.9.2 (20dB BW).

- The 20dB bandwidth spectrum analyzer setting reference is as follows:
  1. Set RBW  $\geq 1\%$  to 5% of the 20dB bandwidth
  2. VBW = Approximately three times RBW
  3. Span = Approximately 2 to 5 times the 20dB bandwidth, centered on a hopping channel
  4. Detector = Peak
  5. Trace mode = Max hold
  6. Sweep = Auto couple
  7. Allow the trace to stabilize
  8. Measure the maximum width of the emission that is constrained by the frequencies associated
  9. with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level in the fundamental emission.
  10. dB relative to the maximum level in the fundamental emission.
- The 99% bandwidth spectrum analyzer setting reference is as follows:
  1. Span = 1.5 times to 5 times the OBW
  2. Set RBW = 1% to 5% the OBW
  3. VBW  $\geq 3 \times$  RBW
  4. Detector = Peak
  5. Trace mode = Max hold
  6. Sweep = Auto couple
  7. Allow the trace was allowed to stabilize

### 7.3 Measurement Setup (Block Diagram of Configuration)

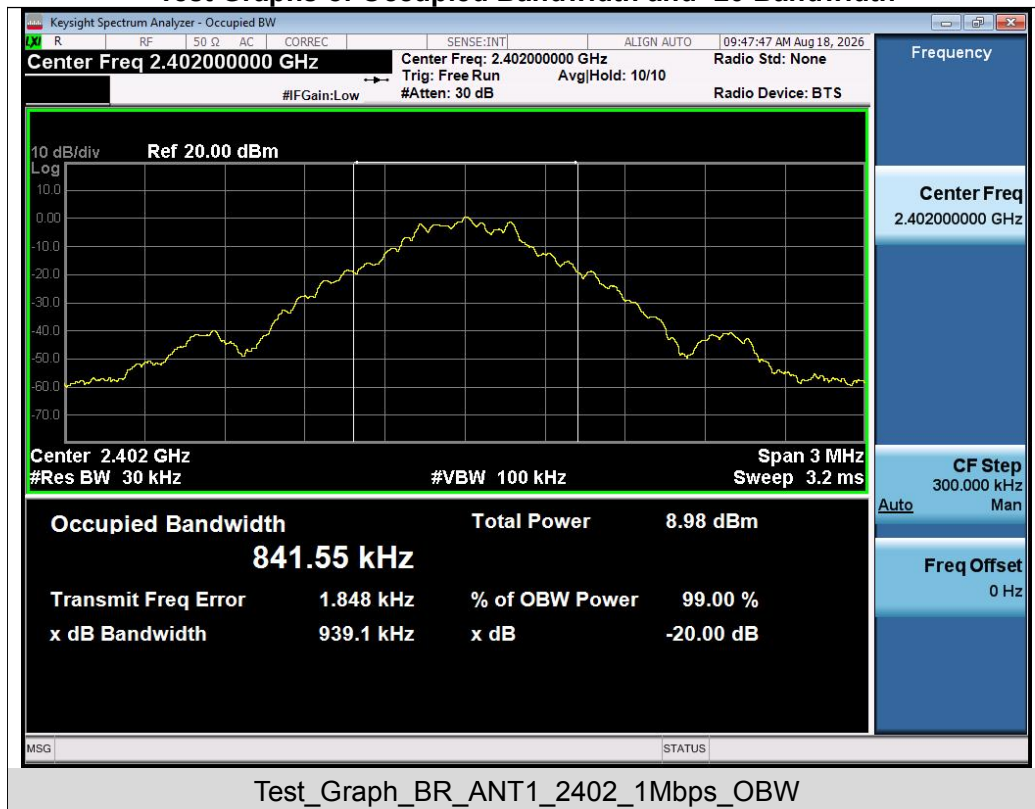


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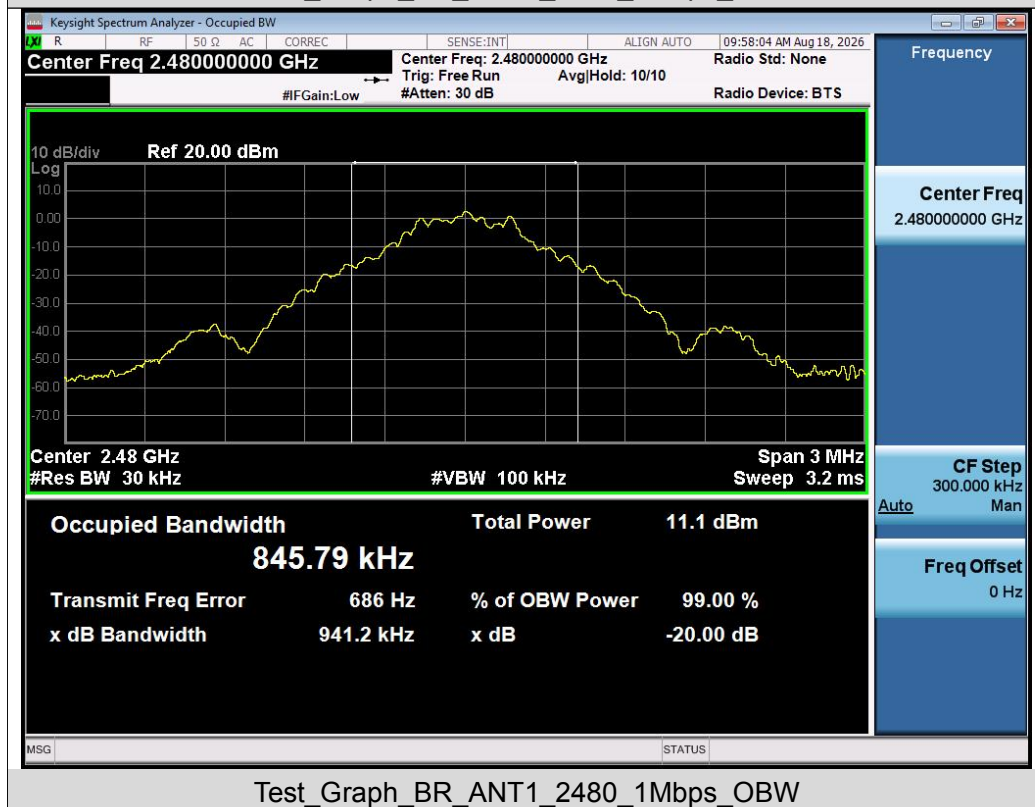
## 7.4 Measurement Results

| Test Data of Occupied Bandwidth and -20dB Bandwidth |                      |                              |                       |        |              |
|-----------------------------------------------------|----------------------|------------------------------|-----------------------|--------|--------------|
| Test Mode                                           | Test Frequency (MHz) | 99% Occupied Bandwidth (MHz) | -20dB Bandwidth (MHz) | Limits | Pass or Fail |
| GFSK                                                | 2402                 | 0.842                        | 0.939                 | N/A    | Pass         |
|                                                     | 2441                 | 0.842                        | 0.940                 | N/A    | Pass         |
|                                                     | 2480                 | 0.846                        | 0.941                 | N/A    | Pass         |
| $\pi$ /4-DQPSK                                      | 2402                 | 1.125                        | 1.185                 | N/A    | Pass         |
|                                                     | 2441                 | 1.125                        | 1.186                 | N/A    | Pass         |
|                                                     | 2480                 | 1.124                        | 1.186                 | N/A    | Pass         |
| 8DPSK                                               | 2402                 | 1.128                        | 1.196                 | N/A    | Pass         |
|                                                     | 2441                 | 1.127                        | 1.196                 | N/A    | Pass         |
|                                                     | 2480                 | 1.127                        | 1.194                 | N/A    | Pass         |

## Test Graphs of Occupied Bandwidth and -20 Bandwidth



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Test\_Graph\_EDR\_ANT1\_2402\_2Mbps\_OBW



Test\_Graph\_EDR\_ANT1\_2441\_2Mbps\_OBW

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Test\_Graph\_EDR\_ANT1\_2480\_2Mbps\_OBW



Test\_Graph\_EDR\_ANT1\_2402\_3Mbps\_OBW

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## 8. Conducted Band Edge and Out-of-Band Emissions

### 8.1 Provisions Applicable

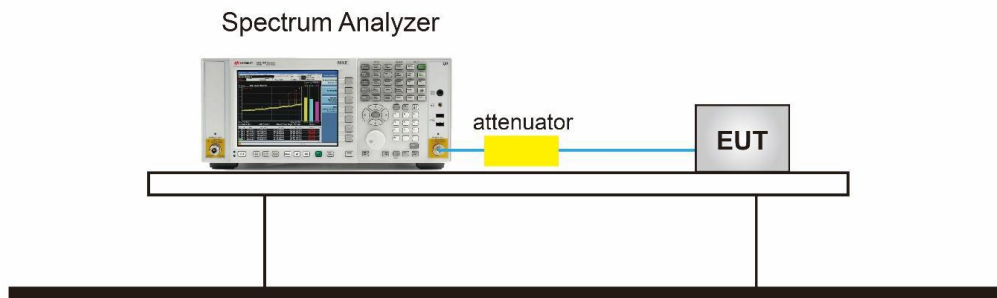
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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 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, the attenuation required under this paragraph shall be 30dB instead of 20dB

### 8.2 Measurement Procedure

The testing follows the ANSI C63.10 Section 6.10.4 and 7.8.7:

- Reference level measurement
  1. Span = Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation.
  2. RBW = 100kHz
  3. VBW = 300kHz
  4. Detector = Peak
  5. Sweep time = Auto couple
  6. Trace mode = Max hold
  7. Allow the trace to stabilize. Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission.
  8. Input compensation coefficient (dB) = Cable Loss (dB) + Attenuator attenuation value (dB)
- Emission level measurement
  1. Span = Wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
  2. RBW = 100kHz
  3. VBW = 300kHz
  4. Detector = Peak
  5. Sweep time = Auto couple
  6. Trace mode = Max hold
  7. Trace was allowed to stabilize
  8. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this section.
  9. Input compensation coefficient (dB) = Cable Loss (dB) + Attenuator attenuation value (dB)

### 8.3 Measurement Setup (Block Diagram of Configuration)



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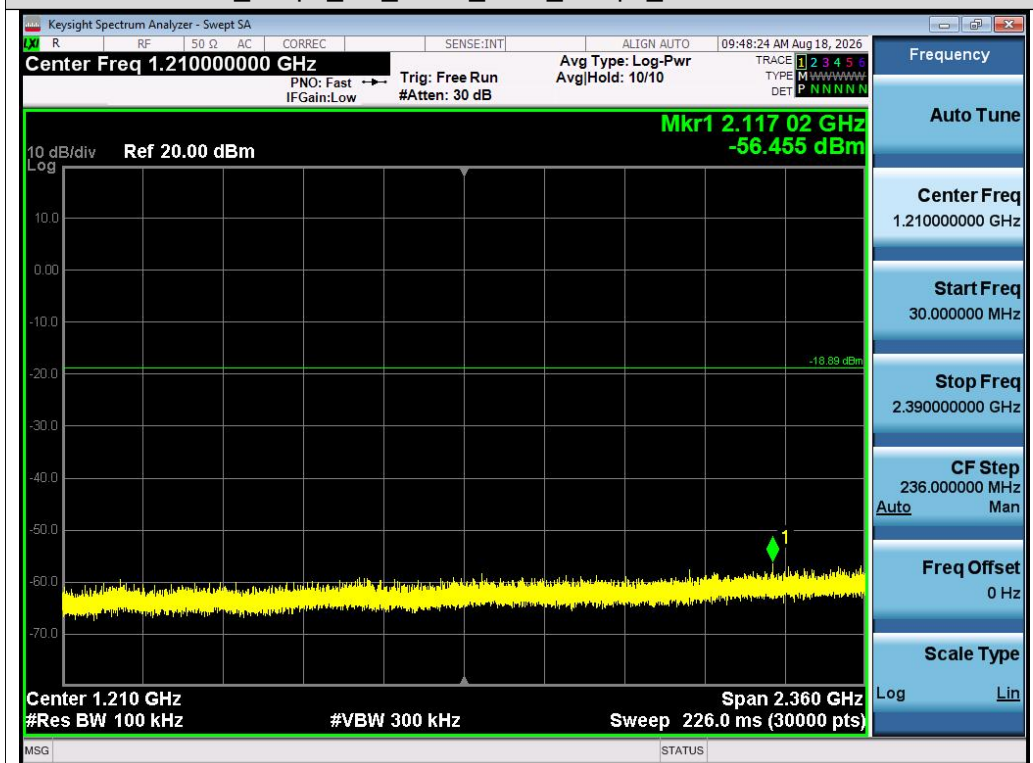
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## 8.4 Measurement Results

### Test Graphs of Spurious Emissions in Non-Restricted Frequency Bands



Test\_Graph\_BR\_ANT1\_2402\_1Mbps\_Reference Level



Test\_Graph\_BR\_ANT1\_2402\_1Mbps\_Lower Band Emissions

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Test\_Graph\_BR\_ANT1\_2402\_1Mbps\_Higher Band Emissions



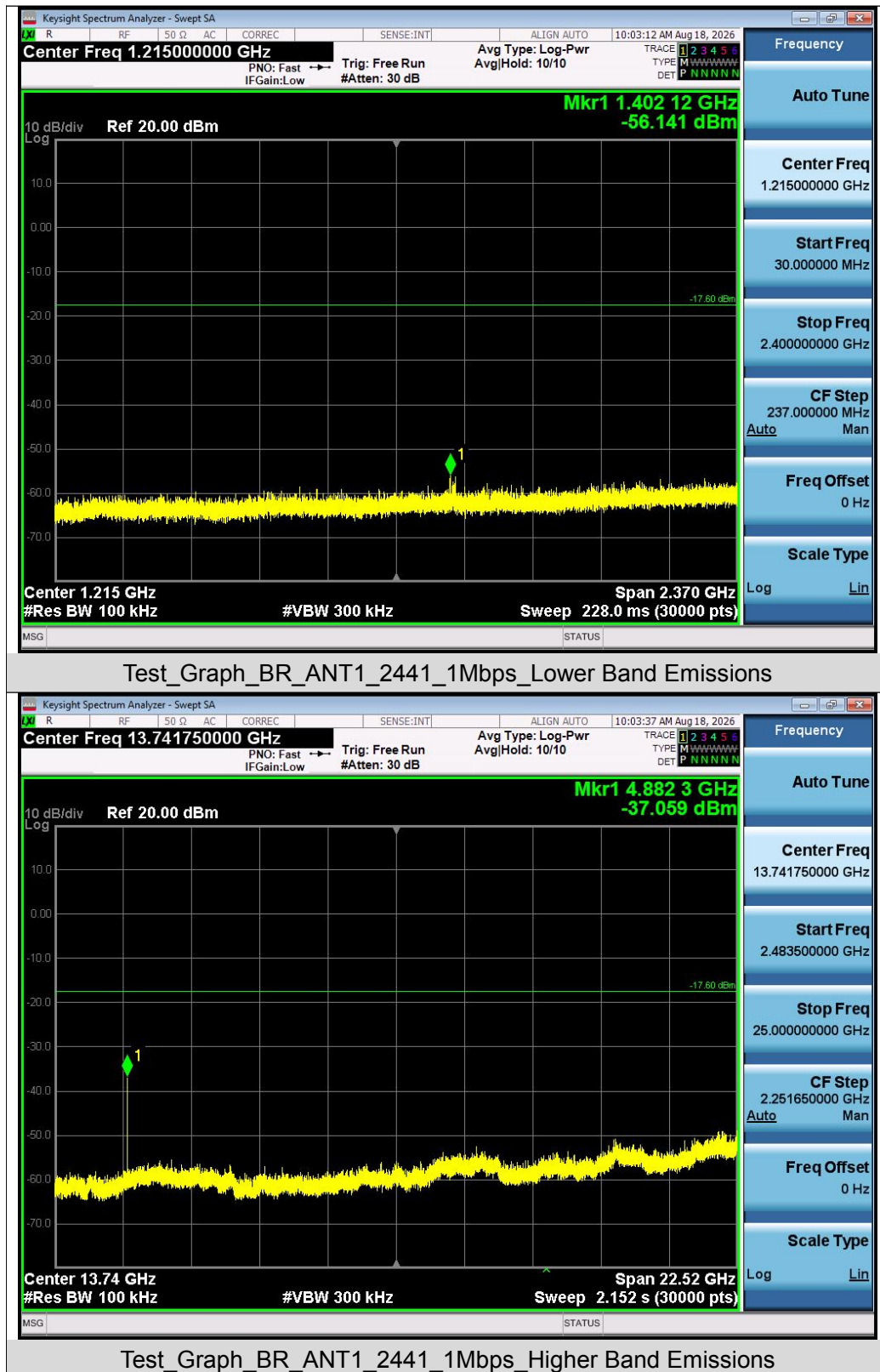
Test\_Graph\_BR\_ANT1\_2441\_1Mbps\_Reference Level

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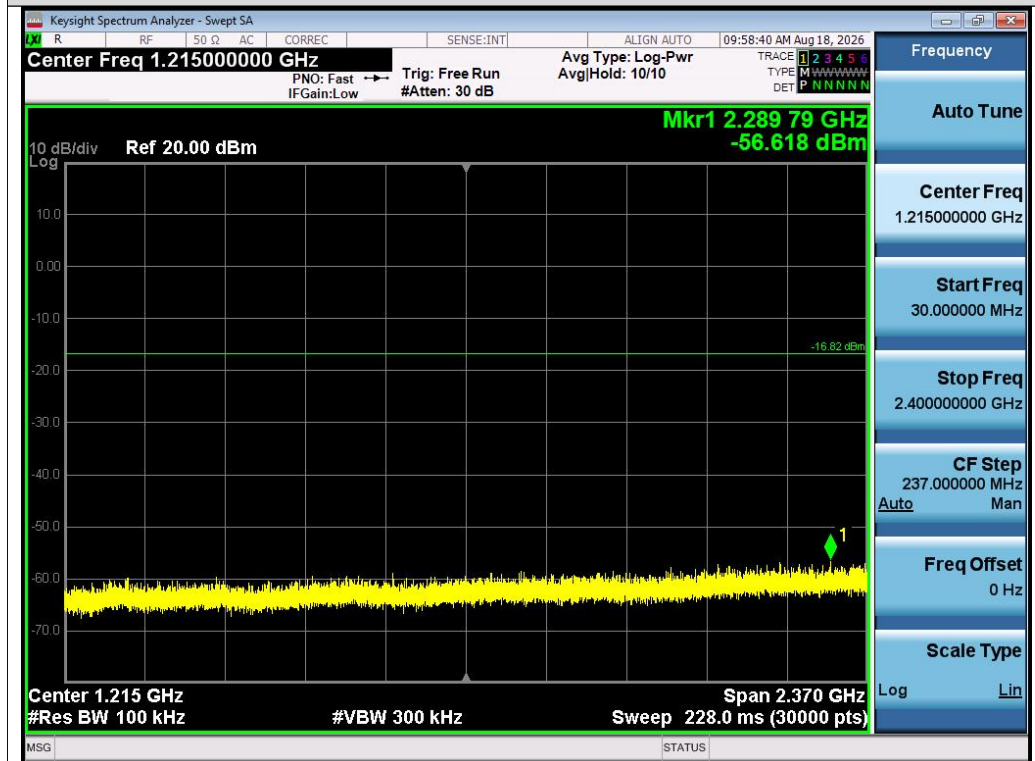
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Test\_Graph\_BR\_ANT1\_2480\_1Mbps\_Reference Level



Test\_Graph\_BR\_ANT1\_2480\_1Mbps\_Lower Band Emissions

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Test\_Graph\_BR\_ANT1\_2480\_1Mbps\_Higher Band Emissions



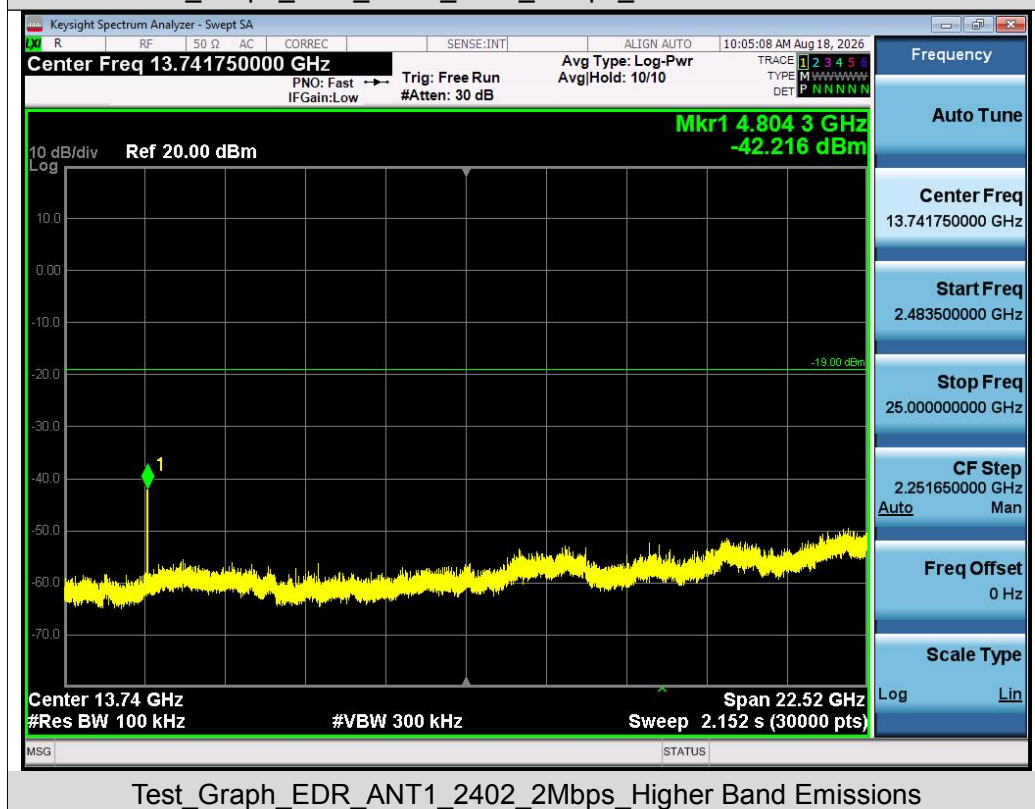
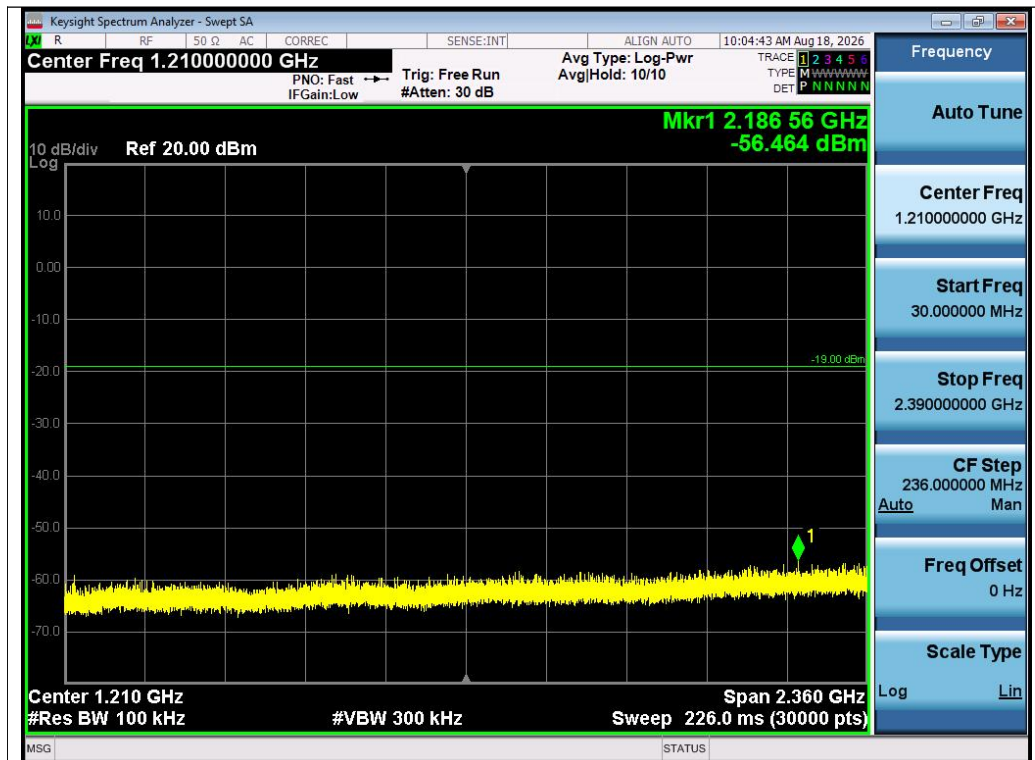
Test\_Graph\_EDR\_ANT1\_2402\_2Mbps\_Reference Level

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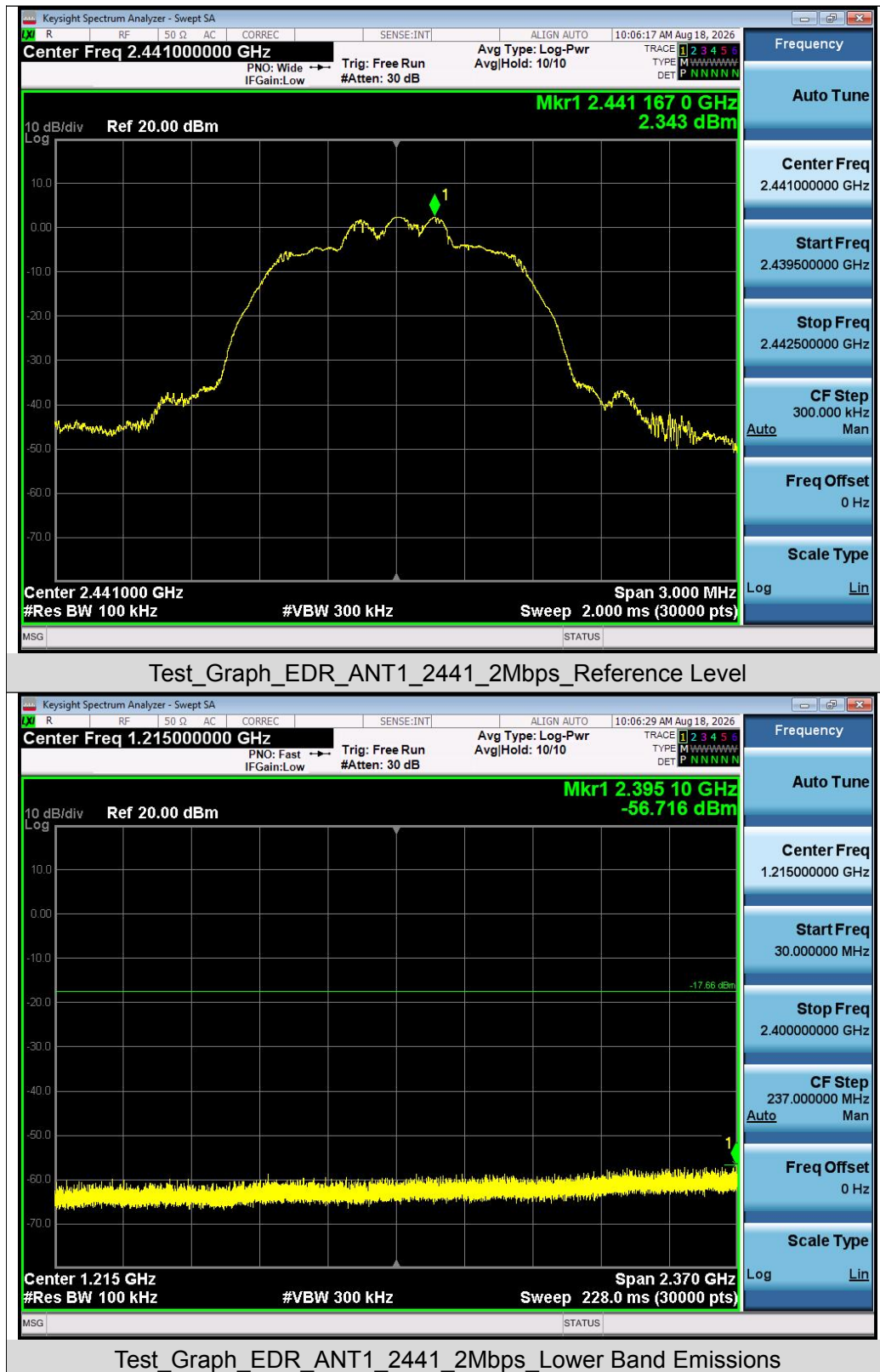


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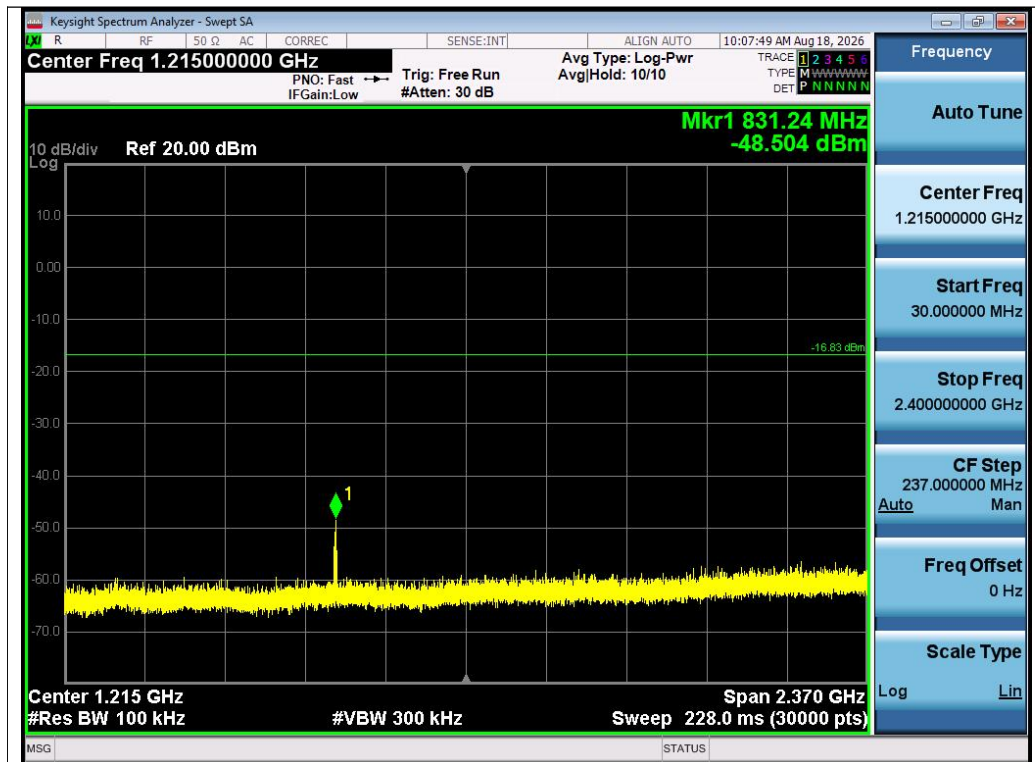
Test\_Graph\_EDR\_ANT1\_2441\_2Mbps\_Higher Band Emissions



Test\_Graph\_EDR\_ANT1\_2480\_2Mbps\_Reference\_Level

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