# FCC Test Report

Report No.: AGC15705231233FR01

| | | |
|---|---|---|
| **FCC ID** | : | 2BD7N-TBD0601 |
| **APPLICATION PURPOSE** | : | Original Equipment |
| **PRODUCT DESIGNATION** | : | Teburu Dice |
| **BRAND NAME** | : | Xplored S.r.l. |
| **MODEL NAME** | : | D6 |
| **APPLICANT** | : | Xplored SRL |
| **DATE OF ISSUE** | : | May 30, 2024 |
| **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 | / | May 30, 2024 | Valid | Initial Release |

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## 1. General Information

| | |
|---|---|
| Applicant | Xplored SRL |
| Address | Via S Maria del Campo 150, Rapallo 16035, Italy |
| Manufacturer | Xplored SRL |
| Address | Via S Maria del Campo 150, Rapallo 16035, Italy |
| Factory | Xplored SRL |
| Address | Via S Maria del Campo 150, Rapallo 16035, Italy |
| Product Designation | Teburu Dice |
| Brand Name | Xplored S.r.l. |
| Test Model | D6 |
| Series Model(s) | N/A |
| Difference Description | N/A |
| Date of receipt of test item | Dec. 18, 2023 |
| Date of Test | Dec. 18, 2023 – May 30, 2024 |
| Deviation from Standard | No any deviation from the test method |
| Condition of Test Sample | Normal |
| Test Result | Pass |
| Test Report Form No | AGCER-FCC-BLE-V1 |

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

| | | |
|---|---|---|
| Prepared By | Cici Li<br>(Project Engineer) | May 30, 2024 |
| Reviewed By | Calvin Liu<br>(Reviewer) | May 30, 2024 |
| Approved By | Max Zhang<br>Authorized Officer | May 30, 2024 |

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# 2. Product Information

## 2.1 Product Technical Description

| | |
|---|---|
| Frequency Band | 2400MHz-2483.5MHz |
| Operation Frequency Range | 2470MHz |
| Modulation Type | GFSK |
| Number of channels | 1 |
| Maximum Transmitter Power | -0.852dBm |
| Hardware Version | 1.0 |
| Software Version | 1.0 |
| Antenna Designation | PCB antenna |
| Antenna Gain | 0.14dBi |
| Power Supply | DC 3.7V by battery |

## 2.2 Test Frequency List

| Frequency Band | Channel Number | Frequency |
|---|---|---|
| 2400~2483.5MHz | 1 | 2470 MHz |

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

This submittal(s) (test report) is intended for FCC ID: 2BD7N-TBD0601, 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 C63.10-2013 | American National Standard for Testing Unlicensed Wireless Devices |
| 4 | KDB 558074 D01 15.247 Meas 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 Special Accessories

Not available for this EUT intended for grant.

### 2.6 Equipment Modifications

Not available for this EUT intended for grant.

### 2.7 Antenna Requirement

| Standard Requirement |
|---|
| **15.203 requirement:**<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.<br>**15.247(b) (4) requirement:**<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 |
| **EUT Antenna:** |
| The non-detachable antenna inside the device cannot be replaced by the user at will. The gain of the antenna is 0.14dBi. |

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# 3. Test Environment

## 3.1 Address of the Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

## 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.

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### 3.3 Environmental Conditions

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

### 3.4 Measurement Uncertainty

The reported uncertainty of measurement y ±U, where expended 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 | $U_c$ = ±2.9 dB |
| Uncertainty of Radiated Emission below 1GHz | $U_c$ = ±3.9 dB |
| Uncertainty of Radiated Emission above 1GHz | $U_c$ = ±4.9 dB |
| Uncertainty of total RF power, conducted | $U_c$ = ±0.8 dB |
| Uncertainty of RF power density, conducted | $U_c$ = ±2.6 dB |
| Uncertainty of spurious emissions, conducted | $U_c$ = ±2 % |
| Uncertainty of Occupied Channel Bandwidth | $U_c$ = ±2 % |

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### 3.5 List of Equipment Use

| ● 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) |
| ☒ | AGC-ER-E036 | Spectrum Analyzer | Agilent | N9020A | MY49100060 | 2023-06-01 | 2024-05-31 |
| ☒ | AGC-ER-E062 | Power Sensor | Agilent | U2021XA | MY54110007 | 2023-03-03 | 2024-03-02 |
| ☒ | AGC-ER-E062 | Power Sensor | Agilent | U2021XA | MY54110007 | 2024-02-01 | 2025-01-31 |
| ☒ | AGC-ER-E063 | Power Sensor | Agilent | U2021XA | MY54110009 | 2023-03-03 | 2024-03-02 |
| ☒ | AGC-ER-E063 | Power Sensor | Agilent | U2021XA | MY54110009 | 2024-02-01 | 2025-01-31 |
| ☒ | AGC-EM-A152 | 6dB Attenuator | Eeatsheep | LM-XX-6-5W | N/A | 2023-06-09 | 2024-06-08 |
| ☒ | AGC-ER-E083 | Signal Generator | Agilent | E4421B | US39340815 | 2023-06-01 | 2024-05-31 |
| ☒ | N/A | RF Connection Cable | N/A | 1# | N/A | Each time | N/A |
| ☒ | N/A | RF Connection Cable | N/A | 2# | N/A | Each time | N/A |

| ● 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) |
| ☐ | AGC-EM-E046 | EMI Test Receiver | R&S | ESCI | 10096 | 2023-02-18 | 2024-02-17 |
| ☒ | AGC-EM-E116 | EMI Test Receiver | R&S | ESCI | 100034 | 2023-06-03 | 2024-06-02 |
| ☒ | AGC-EM-E061 | Spectrum Analyzer | Agilent | N9010A | MY53470504 | 2023-06-01 | 2024-05-31 |
| ☒ | AGC-EM-E086 | Loop Antenna | ZHINAN | ZN30900C | 18051 | 2022-03-12 | 2024-03-11 |
| ☒ | AGC-EM-E086 | Loop Antenna | ZHINAN | ZN30900C | 18051 | 2024-03-05 | 2026-03-04 |
| ☒ | AGC-EM-E001 | Wideband Antenna | SCHWARZBECK | VULB9168 | D69250 | 2023-05-11 | 2025-05-10 |
| ☒ | AGC-EM-E029 | Broadband Ridged Horn Antenna | ETS | 3117 | 00034609 | 2023-03-23 | 2025-03-22 |
| ☒ | AGC-EM-E082 | Horn Antenna | SCHWARZBECK | BBHA 9170 | #768 | 2023-11-13 | 2024-11-12 |
| ☒ | AGC-EM-E146 | Pre-amplifier | ETS | 3117-PA | 00246148 | 2022-08-04 | 2024-08-03 |
| ☒ | AGC-EM-A119 | 2.4G Filter | SongYi | N/A | N/A | 2023-06-01 | 2024-05-31 |
| ☒ | AGC-EM-A138 | 6dB Attenuator | Eeatsheep | LM-XX-6-5W | N/A | 2023-06-09 | 2024-06-08 |
| ☐ | AGC-EM-A139 | 6dB Attenuator | Eeatsheep | LM-XX-6-5W | N/A | 2023-06-09 | 2024-06-08 |

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● 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) |
|---|---|---|---|---|---|---|---|
| ☐ | AGC-EM-E045 | EMI Test Receiver | R&S | ESPI | 101206 | 2023-06-03 | 2024-06-02 |
| ☐ | AGC-EM-E023 | AMN | R&S | 100086 | ESH2-Z5 | 2023-06-03 | 2024-06-02 |
| ☐ | AGC-EM-A130 | 6dB Attenuator | Eeatsheep | LM-XX-6-5W | DC-6GZ | 2023-06-09 | 2024-06-08 |

● Test Software

| Used | Equipment No. | Test Equipment | Manufacturer | Model No. | Version Information |
|---|---|---|---|---|---|
| ☐ | AGC-EM-S001 | CE Test System | R&S | ES-K1 | V1.71 |
| ☒ | AGC-EM-S003 | RE Test System | FARA | EZ-EMC | VRA-03A |
| ☒ | AGC-ER-S012 | BT/WIFI Test System | Tonscend | JS1120-2 | 2.6 |
| ☒ | 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:

EUT

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

☐ Test Accessories Come From The Manufacturer

| No. | Equipment | Model No. | Manufacturer | 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)(3) | RF Output Power | Pass |
| 3 | §15.247 (a)(2) | 6 dB Bandwidth | Pass |
| 4 | §15.247 (e) | Power Spectral Density | Pass |
| 4 | §15.247 (d) | Conducted Band Edge and Out-of-Band Emissions | Pass |
| 5 | §15.209 | Radiated Emission& Band Edge | Pass |
| 6 | §15.207 | AC Power Line Conducted Emission | Not applicable |

Note: The conducted emission tests at AC port are not required for devices which only employ battery power for operation.

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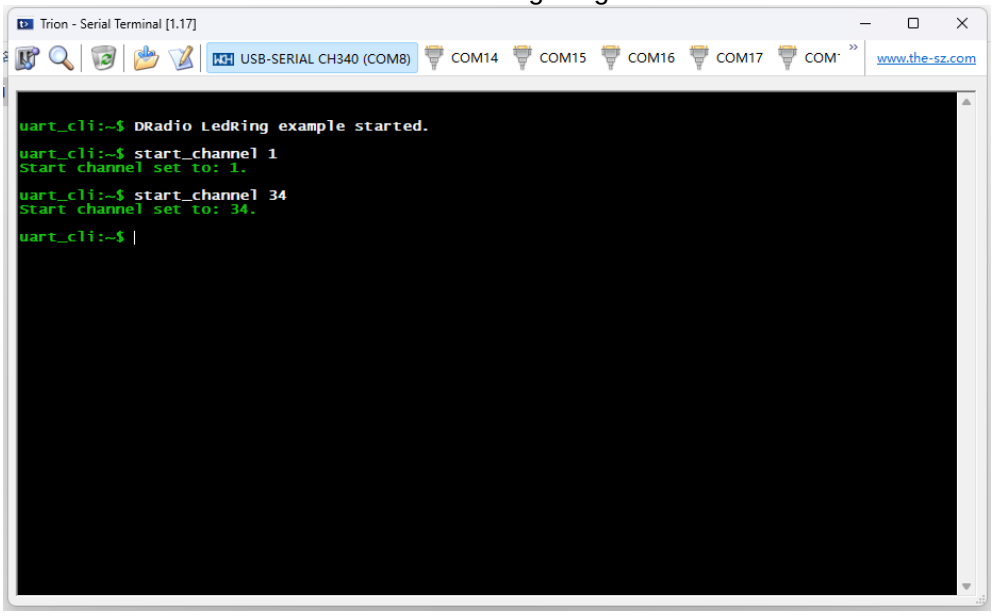
## 5. Description of Test Modes

| Summary Table of Test Cases | |
|---|---|
| Test Item | Data Rate / Modulation |
| | 2.4G / GFSK |
| Radiated & Conducted Test Cases | Mode 1: 2.4G Tx CH00_2470 MHz(Battery powered) |
| AC Conducted Emission | N/A |

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. The battery is full-charged during the test.
3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
4. For Conducted Test method, a temporary antenna connector is provided by the manufacture.

Software Setting Diagram

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## 6. Duty Cycle Measurement

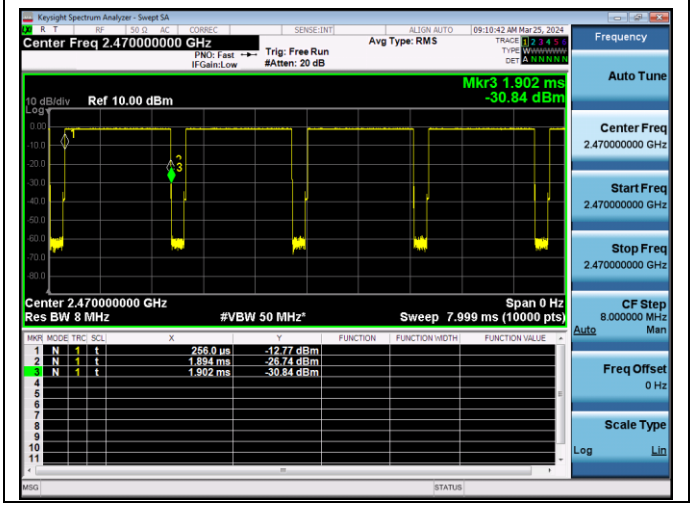
The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = Peak. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

| Operating mode | T(μs) | Duty Cycle (%) | Duty Cycle Factor (dB) | 1/ T Minimum VBW (kHz) |
|---|---|---|---|---|
| 2.4G | 1638 | 99.51 | 0.02 | 0.61 |

Remark:
1. Duty Cycle factor = 10 * log (1/ Duty cycle)
2. The duty cycle of each frequency band mode reflects the determination requirements of the low channel measurement value

The test plots as follows:

2.4G

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# 7. RF Output Power Measurement

## 7.1 Provisions Applicable

For DTSs employing digital modulation techniques operating in the bands 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W.

## 7.2 Measurement Procedure

☒ For Peak Power, the testing follows ANSI C63.10 Section 11.9.1.1 Method Max peak power:

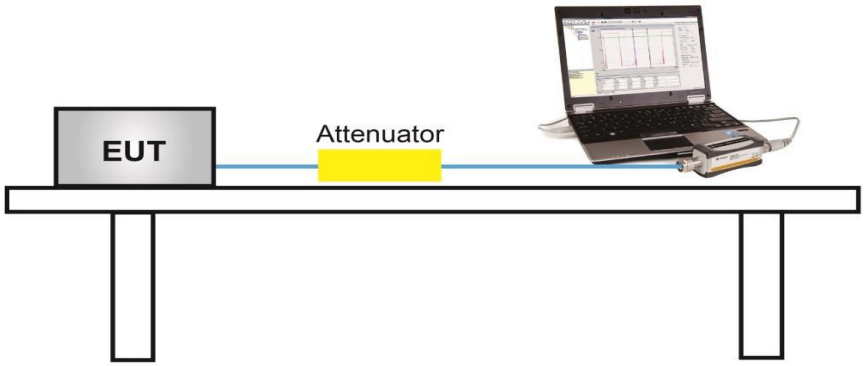
1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the RBW⩾DTS bandwidth
3. Set the VBW⩾[3 × RBW].
4. Span⩾[3 × RBW].
5. Sweep= auto couple.
6. Detector Function= Peak.
7. Trace mode= Max hold.
8. Allow trace to stabilize. Use the marker-to-peak function to set the 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, the testing follows ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G:

1. The RF output of EUT was connected to the power meter by RF cable and attenuator.
2. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

## 7.3 Measurement Setup (Block Diagram of Configuration)

☒For Average power test setup

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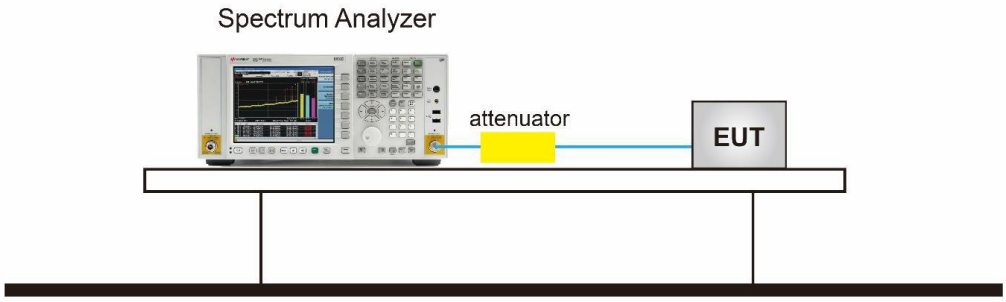
☒For peak power test setup




### 7.4 Measurement Result

| Test Data of Conducted Output Power | | | | |
|---|---|---|---|---|
| Test Mode | Test Frequency (MHz) | Peak Power (dBm) | Limits (dBm) | Pass or Fail |
| GFSK | 2470 | -0.852 | ≤30 | Pass |

**Test Result of Average Output Power (Reporting Only)**

| Test Data of Conducted Output Power | | | | |
|---|---|---|---|---|
| Test Mode | Test Frequency (MHz) | Peak Power (dBm) | Limits (dBm) | Pass or Fail |
| GFSK | 2470 | -2.867 | ≤30 | Pass |

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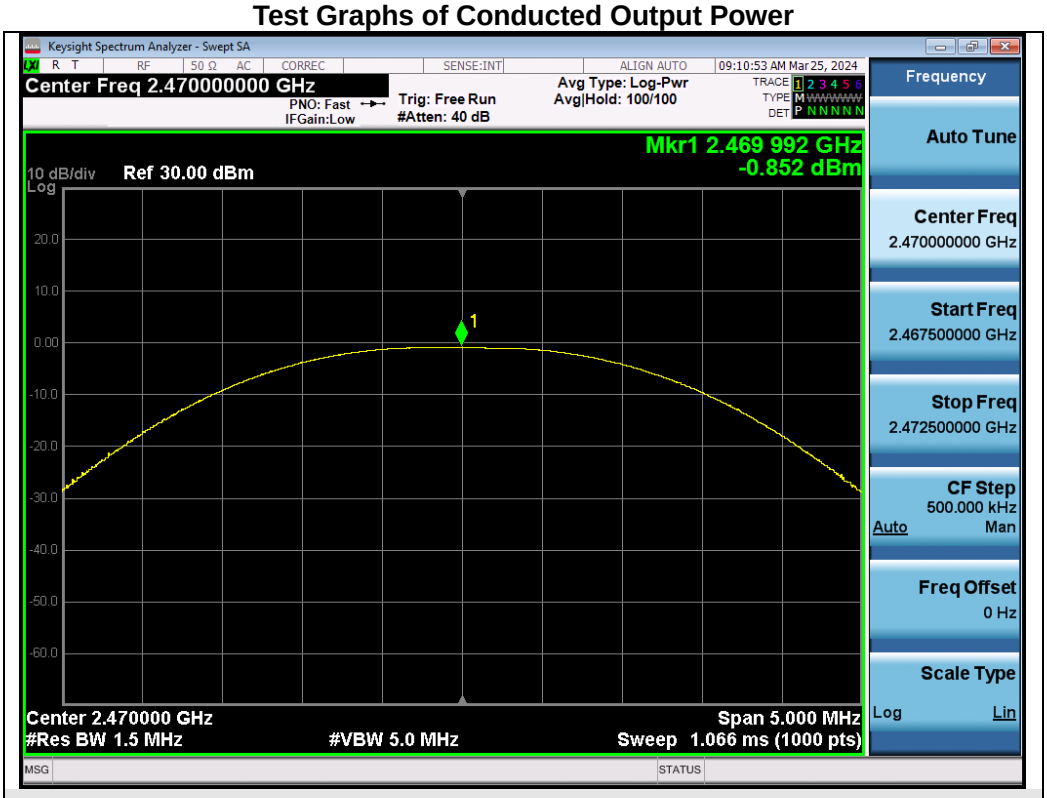
## Test Graphs of Conducted Output Power




Test_Graph_GFSK_ANT1_2470_Peak Power

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# 8. 6dB Bandwidth Measurement

## 8.1 Provisions Applicable

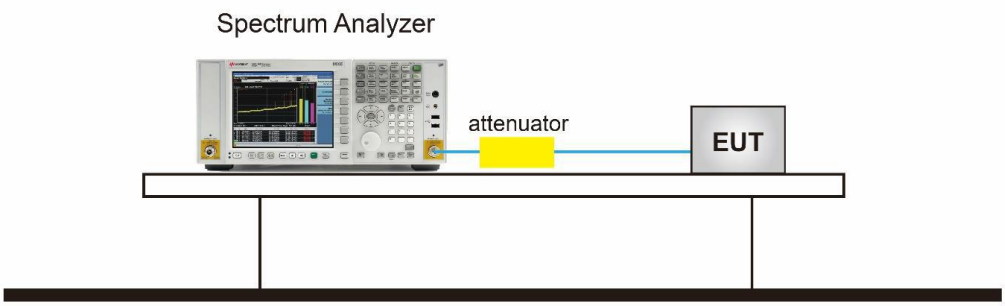
The minimum 6 dB bandwidth shall be 500 kHz.

## 8.2 Measurement Procedure

The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 11.8.1 (6dB BW).

1. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
4. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the OBW and set the Video bandwidth (VBW) ⩾ 3 * RBW.
5. Measure and record the results in the test report.

## 8.3 Measurement Setup (Block Diagram of Configuration)

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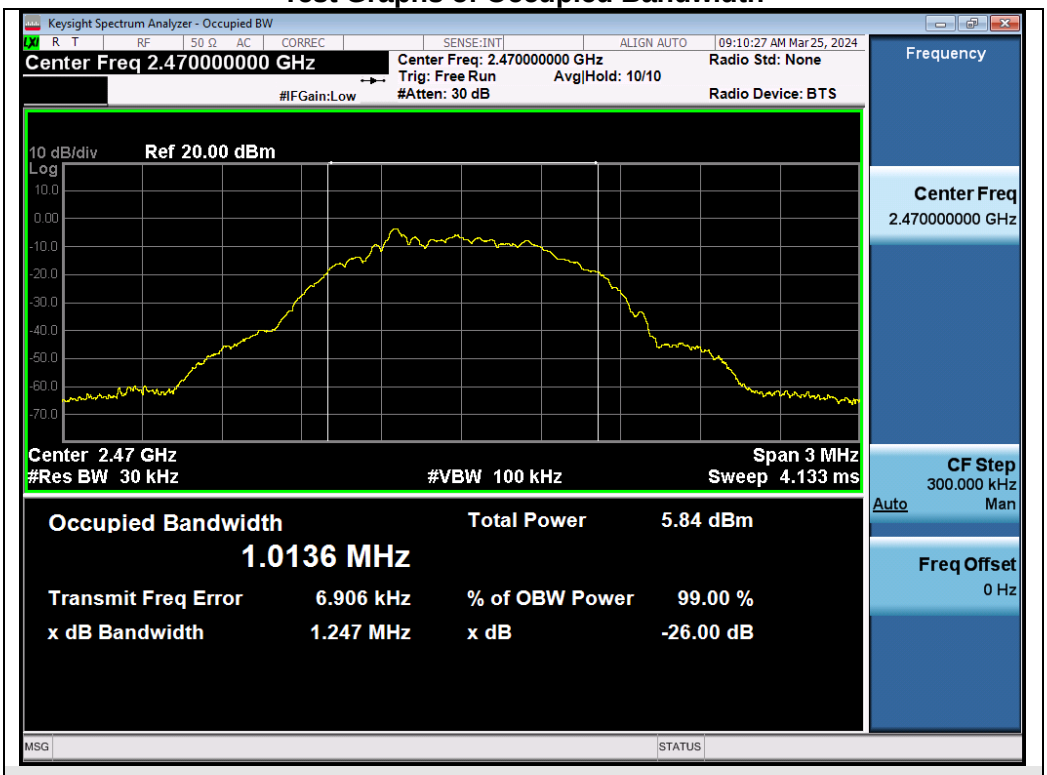
## 8.4 Measurement Results

| Test Data of Occupied Bandwidth and DTS Bandwidth | | | | | |
|---|---|---|---|---|---|
| Test Mode | Test Frequency (MHz) | Occupied Bandwidth (MHz) | DTS BW (MHz) | DTS BW Limits (MHz) | Pass or Fail |
| GFSK | 2470 | 1.014 | 0.676 | ⩾0.5 | Pass |

**Test Graphs of Occupied Bandwidth**




Test_Graph_GFSK_ANT1_2470_OBW

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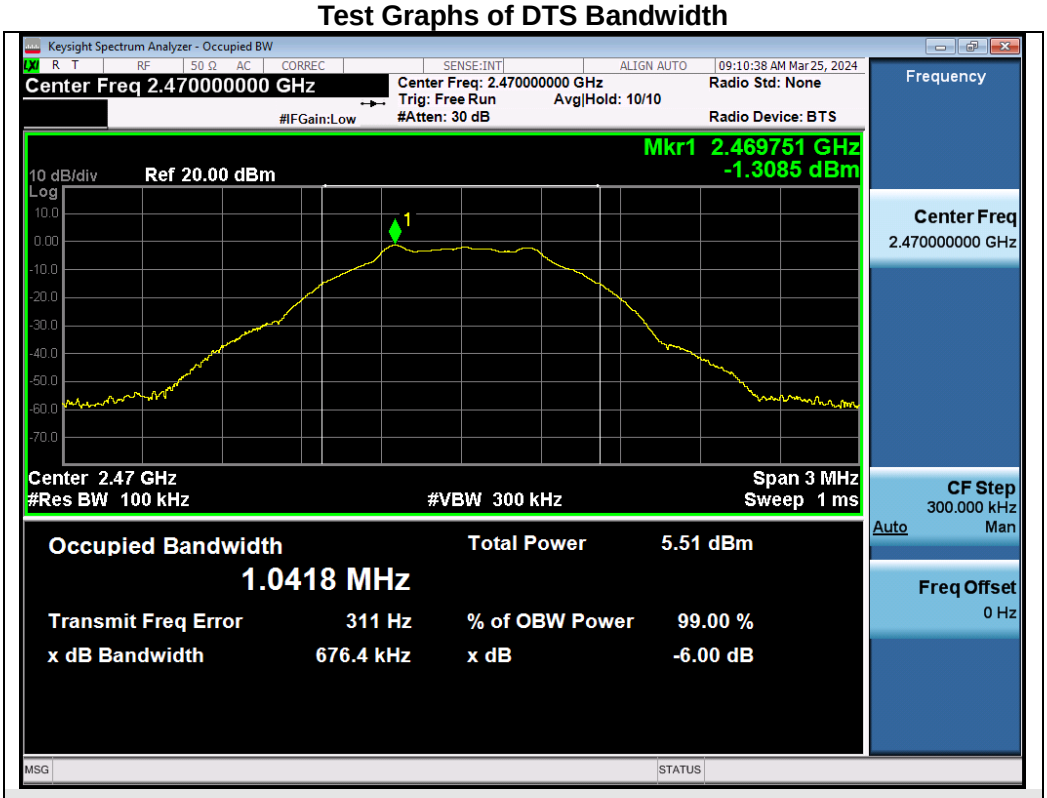
## Test Graphs of DTS Bandwidth




Test_Graph_GFSK_ANT1_2470_DTSBW

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# 9. Power Spectral Density Measurement

## 9.1 Provisions Applicable

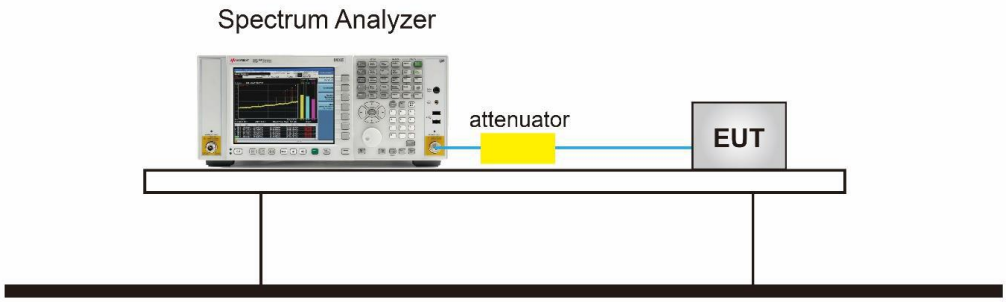
The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

## 9.2 Measurement Procedure

The testing follows the ANSI C63.10 Section 11.10.2 Method PKPSD.

1. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz in order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
4. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
5. Measure and record the results in the test report.
6. The Measured power density (dBm)/ 100kHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

## 9.3 Measurement Setup (Block Diagram of Configuration)

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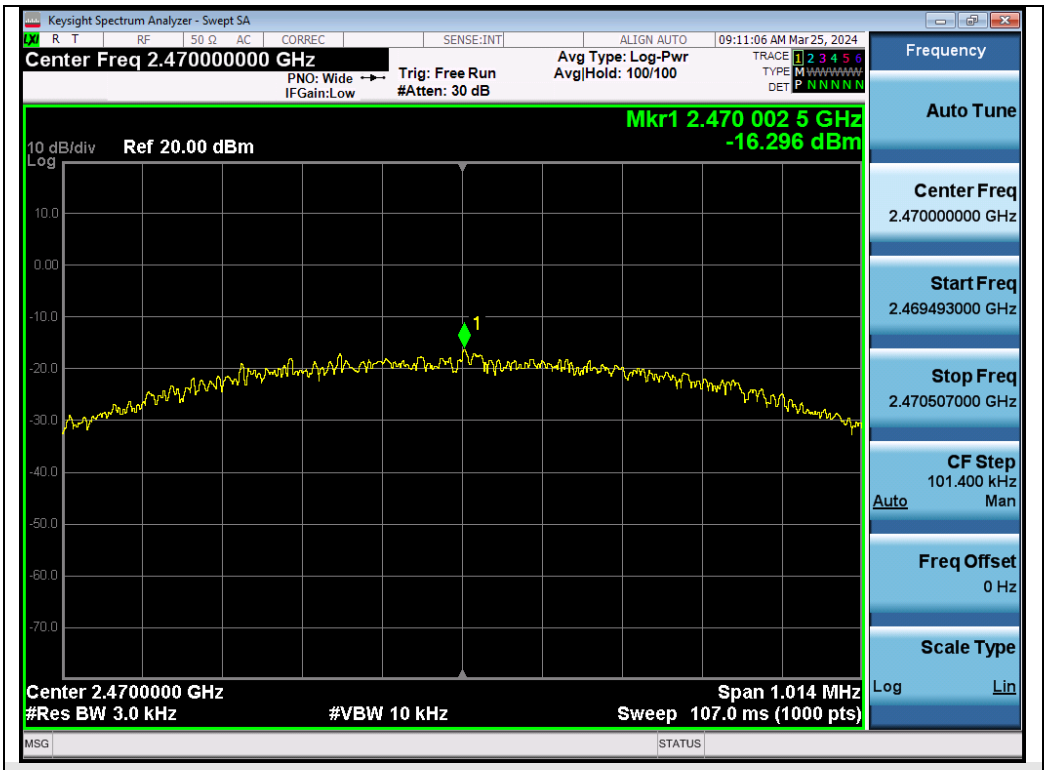
## 9.4 Measurement Results

| Test Data of Conducted Output Power Spectral Density | | | | |
|---|---|---|---|---|
| Test Mode | Test Frequency (MHz) | Power density (dBm/3kHz) | Limit (dBm/3kHz) | Pass or Fail |
| GFSK | 2470 | -16.296 | ≤8 | Pass |

### Test Graphs of Conducted Output Power Spectral Density




Test_Graph_GFSK_ANT1_2470_PSD

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

## 10.1 Provisions Applicable

The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth per the PSD procedure.

## 10.2 Measurement Procedure

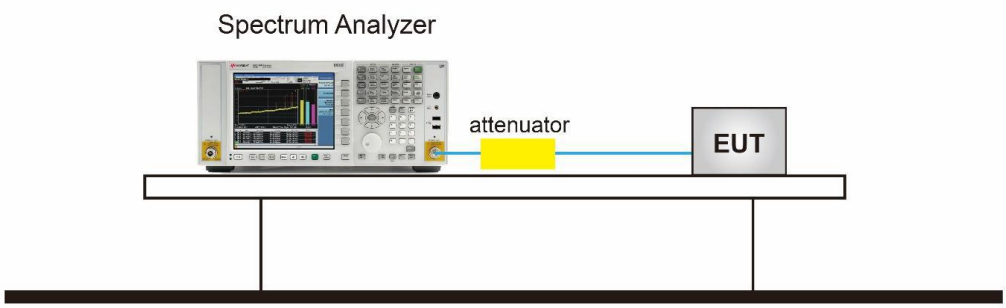
- Reference level measurement

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to ≥ 1.5 times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW ≥ 3 x RBW
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize

- Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

## 10.3 Measurement Setup (Block Diagram of Configuration)

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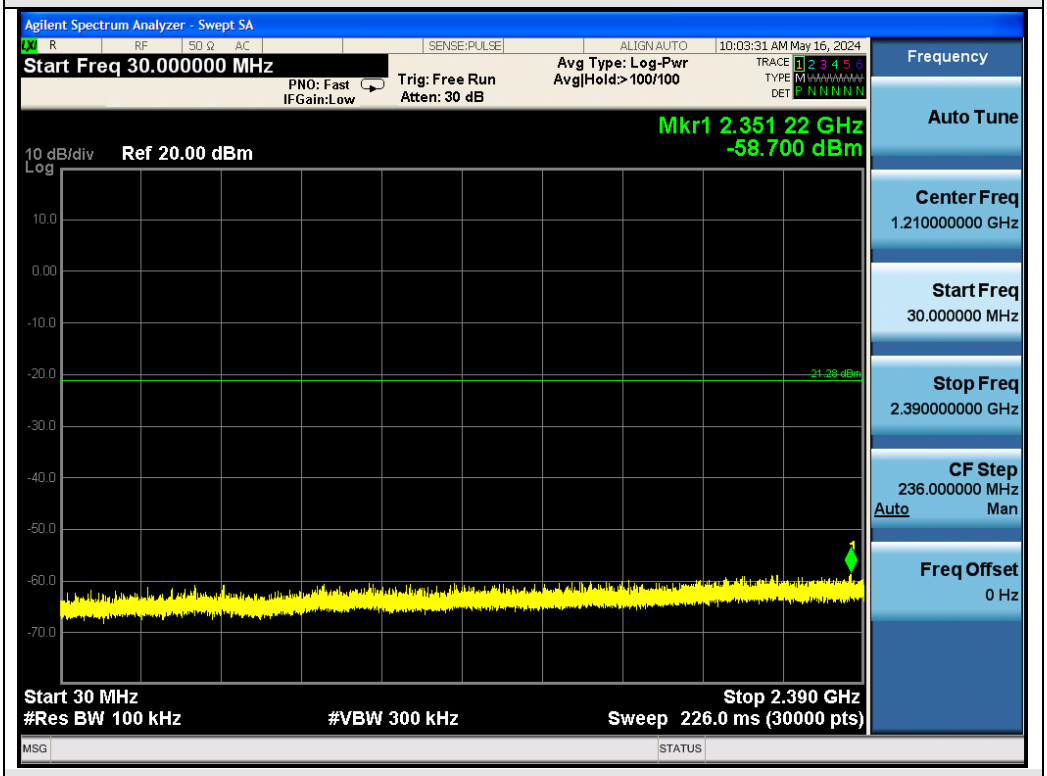
## 10.4 Measurement Results

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

Test_Graph_GFSK_ANT1_2470_Reference Level




Test_Graph_GFSK_ANT1_2470_Lower Band Emissions

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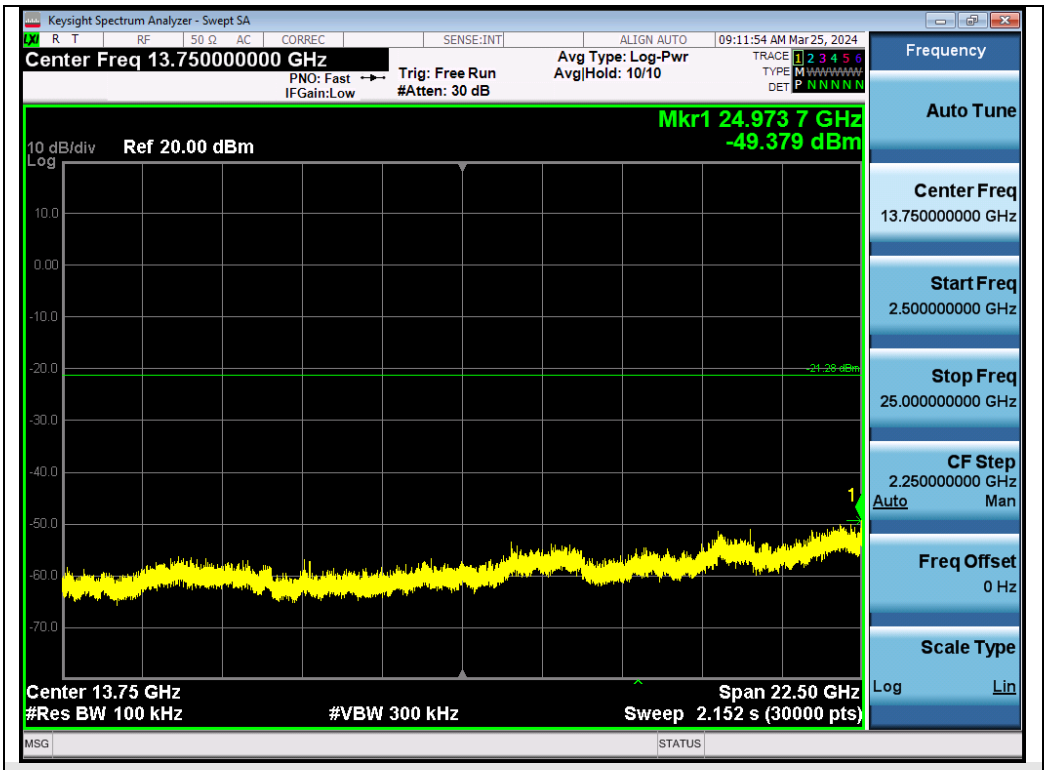


Test_Graph_GFSK_ANT1_2470_Higher Band Emissions

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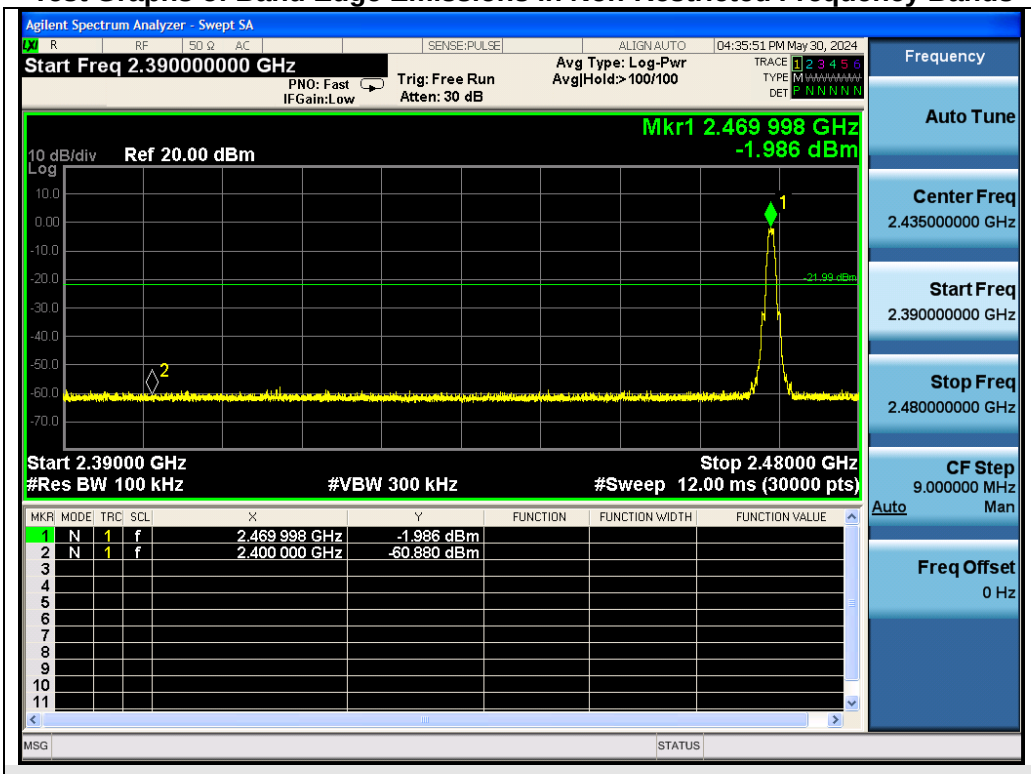
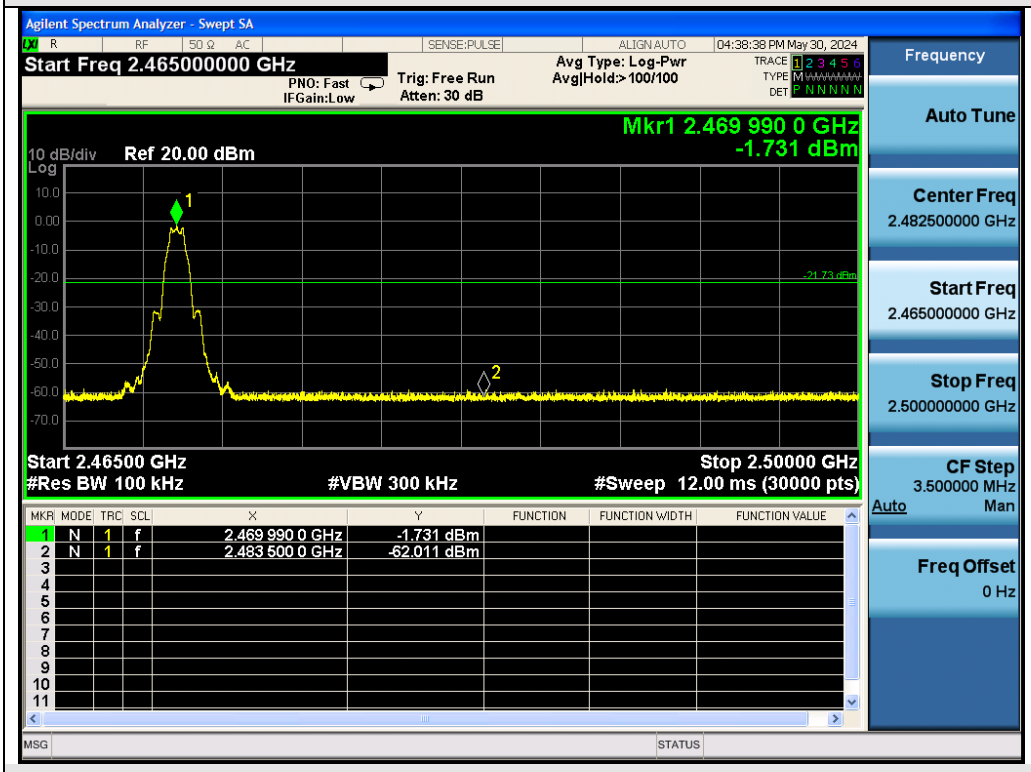
## Test Graphs of Band Edge Emissions in Non-Restricted Frequency Bands




Test_Graph_GFSK_ANT1_2470_Lower Band Edge Emissions




Test_Graph_GFSK_ANT1_2470_Higher Band Edge Emissions

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# 11. Radiated Spurious Emission

## 11.1 Measurement Limit

FCC Part 15.209 Limit in the below table to be followed

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

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

## 11.2 Measurement Procedure

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the

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pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.

8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

The following table is the setting of spectrum analyzer and receiver.

| Spectrum Parameter | Setting |
|---|---|
| Start ~Stop Frequency | 9kHz~150kHz/RB 200Hz for QP |
| Start ~Stop Frequency | 150kHz~30MHz/RB 9kHz for QP |
| Start ~Stop Frequency | 30MHz~1000MHz/RB 120kHz for QP |
| Start ~Stop Frequency | 1GHz~26.5GHz<br>1MHz/3MHz for Peak, 1MHz/3MHz for Average |

| Receiver Parameter | Setting |
|---|---|
| Start ~Stop Frequency | 9kHz~150kHz/RB 200Hz for QP |
| Start ~Stop Frequency | 150kHz~30MHz/RB 9kHz for QP |
| Start ~Stop Frequency | 30MHz~1000MHz/RB 120kHz for QP |

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- **Quasi-Peak Measurements below 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as shown in the table above
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

- **Peak Measurements above 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

- **Average Measurements above 1GHz (Method VB)**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW setting requirements are as follows:
4. If the EUT is configured to transmit with duty cycle ≥ 98%, set VBW = 10 Hz.
5. If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.
6. Detector = Peak
7. Sweep time = auto
8. Trace mode = max hold
8. Trace was allowed to stabilize

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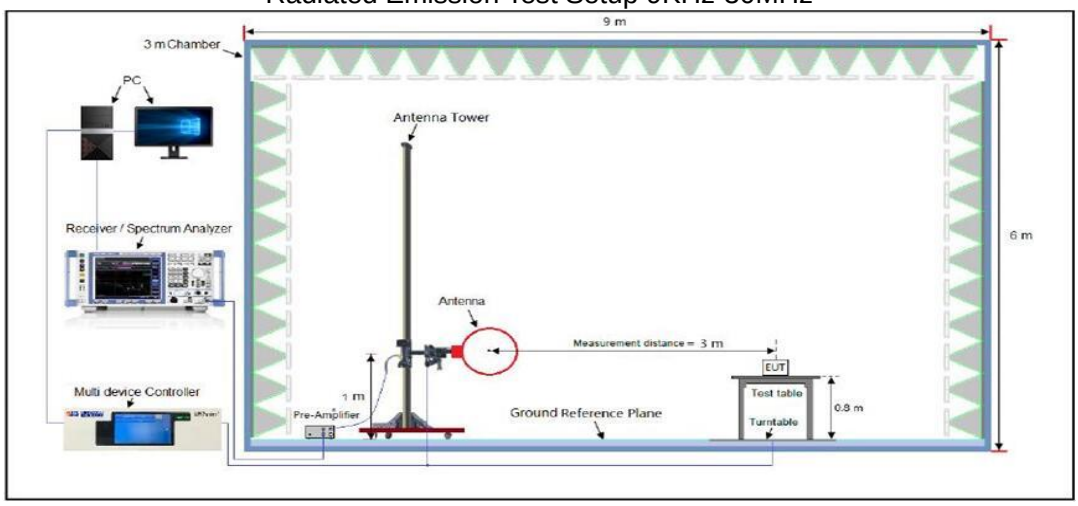
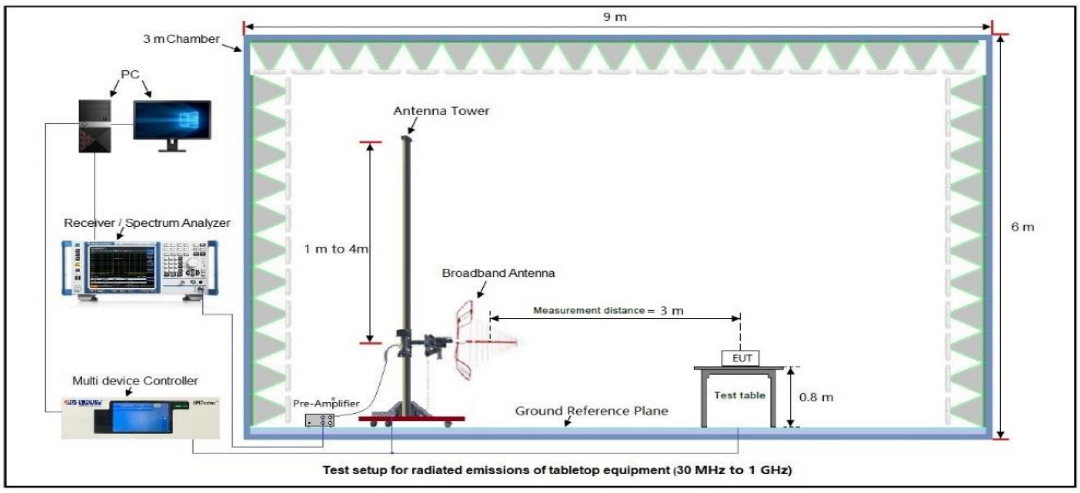
## 11.3 Measurement Setup (Block Diagram of Configuration)

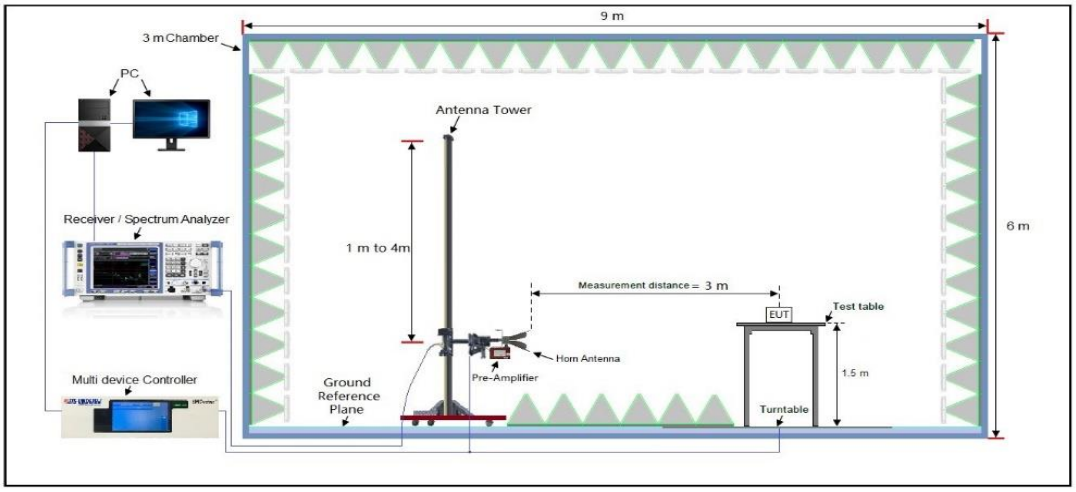
Radiated Emission Test Setup 9KHz-30MHz




Radiated Emission Test Setup 30MHz-1000MHz




Radiated Emission Test Setup Above 1000MHz

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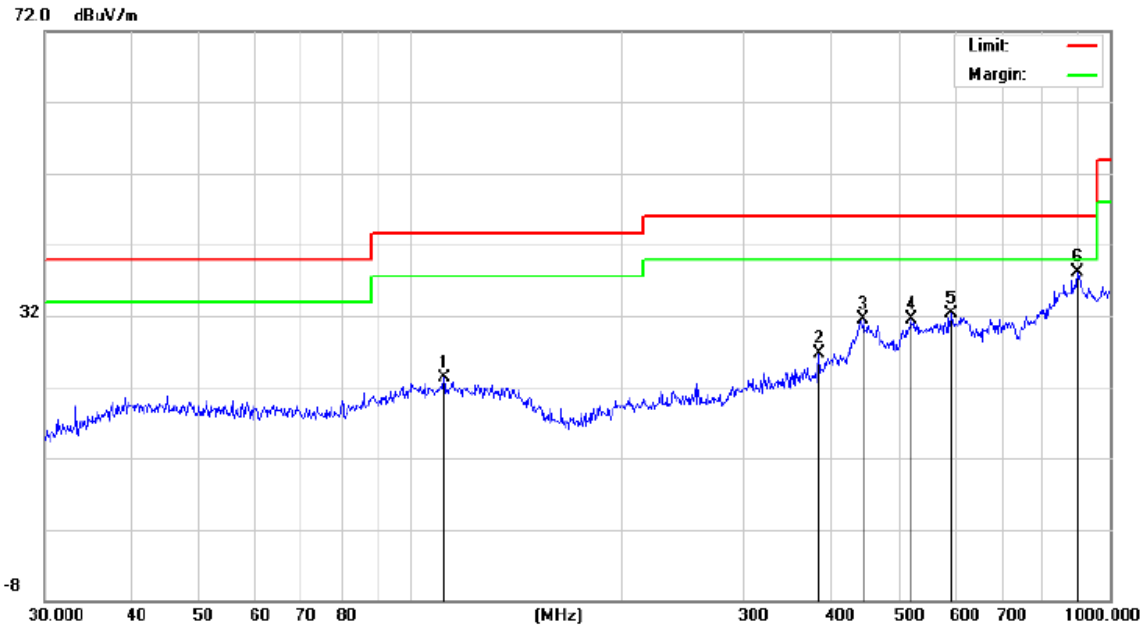
## 11.4 Measurement Result

**Radiated Emission Below 30MHz**

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

| Radiated Emission Test Results at 30MHz-1GHz | | | |
|---|---|---|---|
| **EUT Name** | Teburu Dice | **Model Name** | D6 |
| **Temperature** | 22.7℃ | **Relative Humidity** | 59.8% |
| **Pressure** | 960hPa | **Test Voltage** | DC 3.7V by battery |
| **Test Mode** | Mode 1 | **Antenna Polarity** | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dB/m | dB | Detector |
| 1 | | 111.7380 | 6.90 | 16.32 | 23.22 | 43.50 | -20.28 | peak |
| 2 | | 383.9318 | 8.12 | 18.63 | 26.75 | 46.00 | -19.25 | peak |
| 3 | | 444.8514 | 6.53 | 24.93 | 31.46 | 46.00 | -14.54 | peak |
| 4 | | 520.8882 | 6.38 | 25.14 | 31.52 | 46.00 | -14.48 | peak |
| 5 | | 593.0497 | 7.45 | 24.82 | 32.27 | 46.00 | -13.73 | peak |
| 6 | * | 900.1474 | 6.42 | 31.78 | 38.20 | 46.00 | -7.80 | peak |

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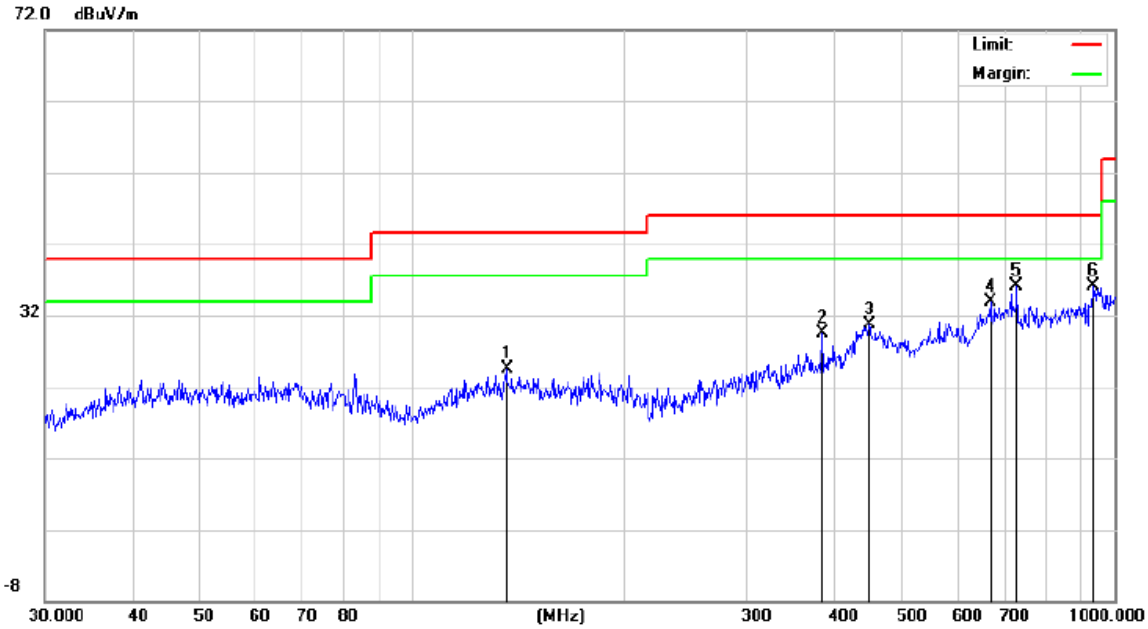
| Radiated Emission Test Results at 30MHz-1GHz | | | |
|---|---|---|---|
| **EUT Name** | Teburu Dice | **Model Name** | D6 |
| **Temperature** | 22.7℃ | **Relative Humidity** | 59.8% |
| **Pressure** | 960hPa | **Test Voltage** | DC 3.7V by battery |
| **Test Mode** | Mode 1 | **Antenna Polarity** | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dB/m | dB | Detector |
| 1 | | 136.4598 | 6.31 | 18.11 | 24.42 | 43.50 | -19.08 | peak |
| 2 | | 383.9318 | 7.95 | 21.56 | 29.51 | 46.00 | -16.49 | peak |
| 3 | | 447.9822 | 5.00 | 25.74 | 30.74 | 46.00 | -15.26 | peak |
| 4 | | 665.8035 | 6.40 | 27.56 | 33.96 | 46.00 | -12.04 | peak |
| 5 | * | 726.8052 | 7.92 | 28.15 | 36.07 | 46.00 | -9.93 | peak |
| 6 | | 935.5463 | 5.64 | 30.40 | 36.04 | 46.00 | -9.96 | peak |

**RESULT: Pass**

**Note:** 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

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**Radiated Emissions Test Results for Above 1GHz**

| | | | |
|---|---|---|---|
| **EUT Name** | Teburu Dice | **Model Name** | D6 |
| **Temperature** | 22.7℃ | **Relative Humidity** | 59.8% |
| **Pressure** | 960hPa | **Test Voltage** | DC 3.7V by battery |
| **Test Mode** | Mode 1 | **Antenna Polarity** | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4940.000 | 48.51 | 0.08 | 48.59 | 74 | -25.41 | peak |
| 4940.000 | 37.94 | 0.08 | 38.02 | 54 | -15.98 | AVG |
| 7410.000 | 43.12 | 2.21 | 45.33 | 74 | -28.67 | peak |
| 7410.000 | 32.57 | 2.21 | 34.78 | 54 | -19.22 | AVG |
| | | | | | | |
| | | | | | | |

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

| | | | |
|---|---|---|---|
| **EUT Name** | Teburu Dice | **Model Name** | D6 |
| **Temperature** | 22.7℃ | **Relative Humidity** | 59.8% |
| **Pressure** | 960hPa | **Test Voltage** | DC 3.7V by battery |
| **Test Mode** | Mode 1 | **Antenna Polarity** | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4940.000 | 47.88 | 0.08 | 47.96 | 74 | -26.04 | peak |
| 4940.000 | 37.54 | 0.08 | 37.62 | 54 | -16.38 | AVG |
| 7410.000 | 42.19 | 2.21 | 44.4 | 74 | -29.6 | peak |
| 7410.000 | 30.26 | 2.21 | 32.47 | 54 | -21.53 | AVG |
| | | | | | | |
| | | | | | | |

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

**RESULT: Pass**

**Note:**

1. The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.
2. Factor = Antenna Factor + Cable loss – Pre-amplifier gain, Margin =Emission Level-Limit.
3. The “Factor” value can be calculated automatically by software of measurement system.

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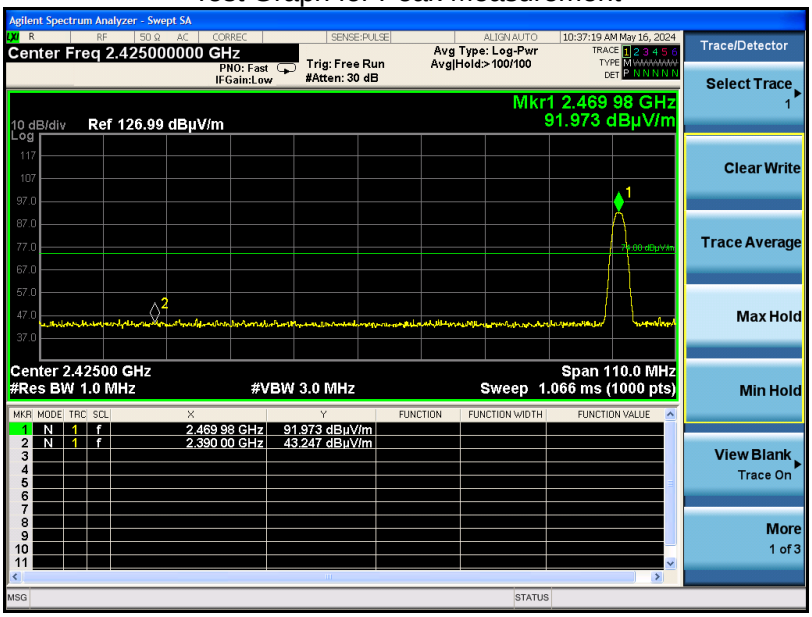
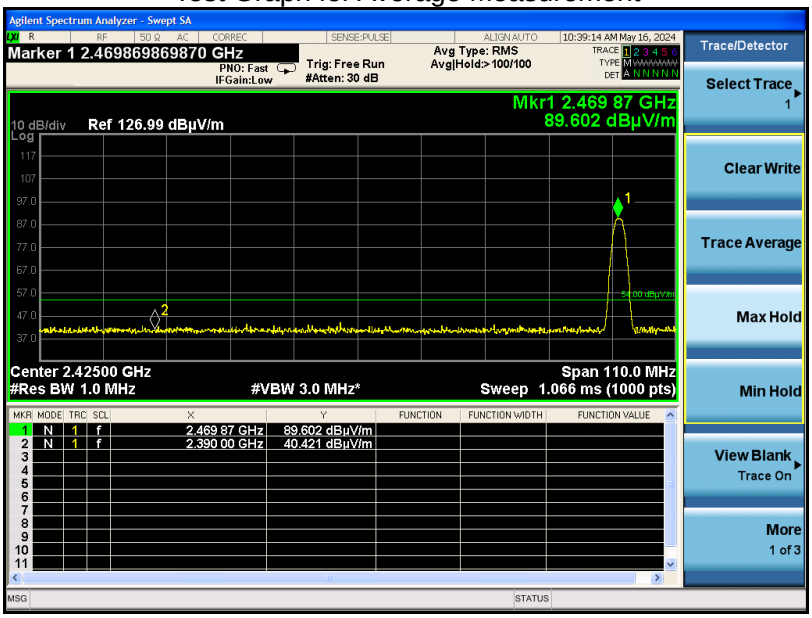
## Band Edge Emission Test Results for Restricted Bands

| | | | |
|---|---|---|---|
| **EUT Name** | Teburu Dice | **Model Name** | D6 |
| **Temperature** | 22.5℃ | **Relative Humidity** | 56.4% |
| **Pressure** | 960hPa | **Test Voltage** | DC 3.7V by battery |
| **Test Mode** | Mode 1 | **Antenna Polarity** | Horizontal |

Test Graph for Peak Measurement




Test Graph for Average Measurement




**RESULT: Pass**

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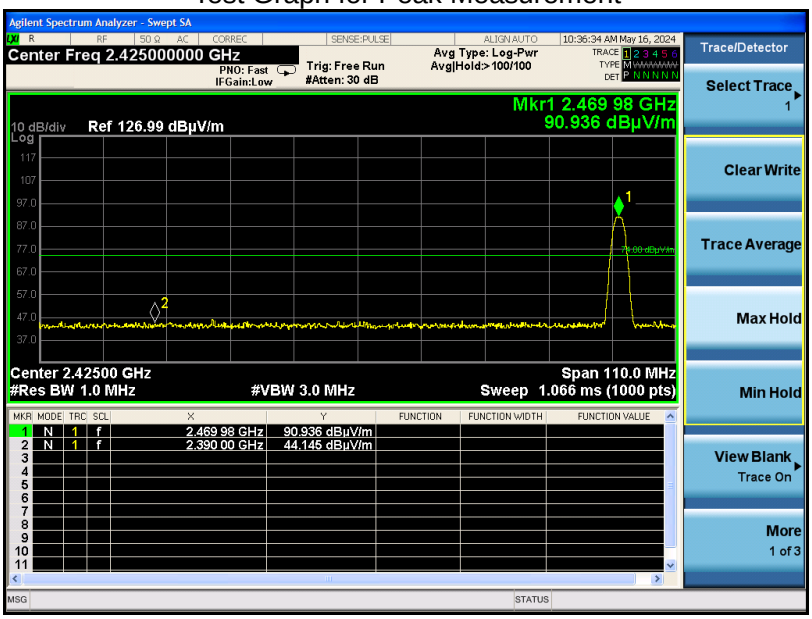
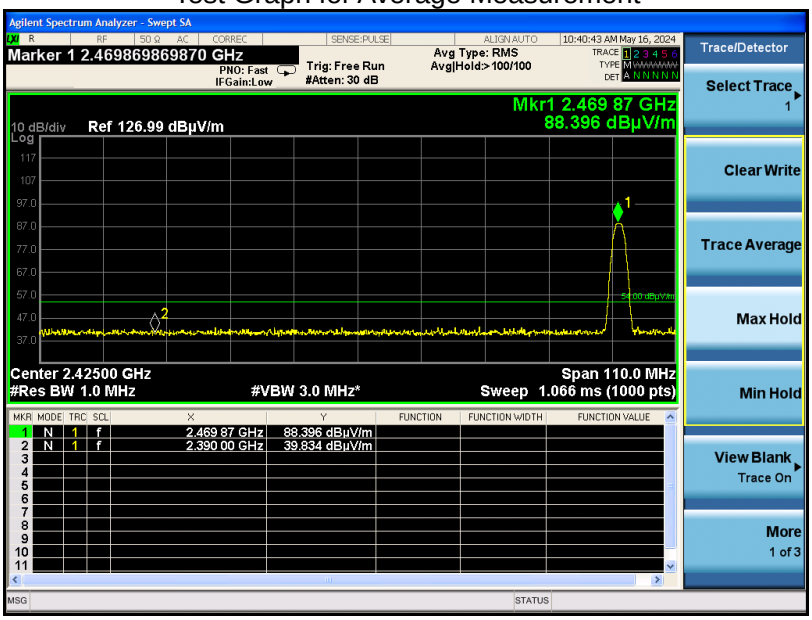
## Band Edge Emission Test Results for Restricted Bands

| | | | |
|---|---|---|---|
| **EUT Name** | Teburu Dice | **Model Name** | D6 |
| **Temperature** | 22.5℃ | **Relative Humidity** | 56.4% |
| **Pressure** | 960hPa | **Test Voltage** | DC 3.7V by battery |
| **Test Mode** | Mode 1 | **Antenna Polarity** | Vertical |

Test Graph for Peak Measurement




Test Graph for Average Measurement

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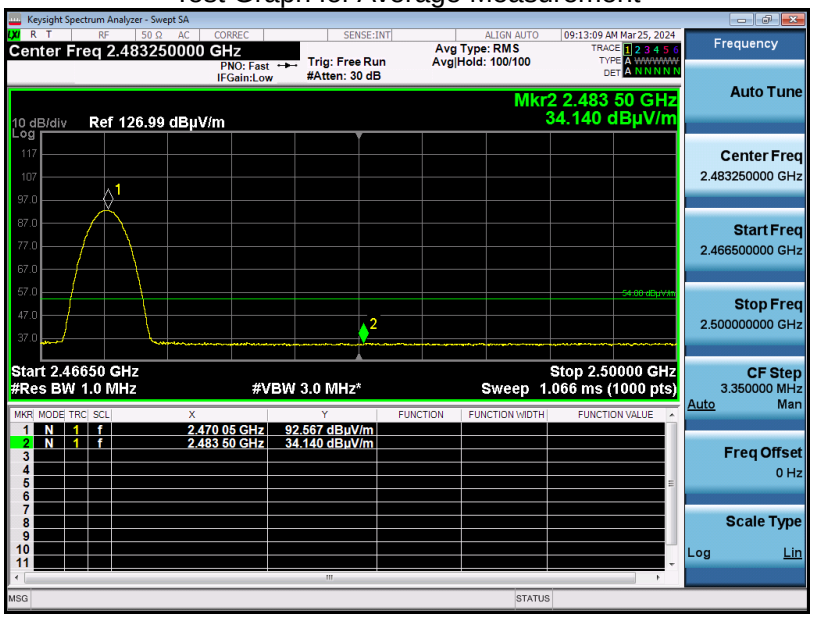
## Band Edge Emission Test Results for Restricted Bands

| | | | |
|---|---|---|---|
| **EUT Name** | Teburu Dice | **Model Name** | D6 |
| **Temperature** | 25℃ | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | DC 3.7V by battery |
| **Test Mode** | Mode 1 | **Antenna Polarity** | Horizontal |

Test Graph for Peak Measurement

Test Graph for Average Measurement




**RESULT: Pass**

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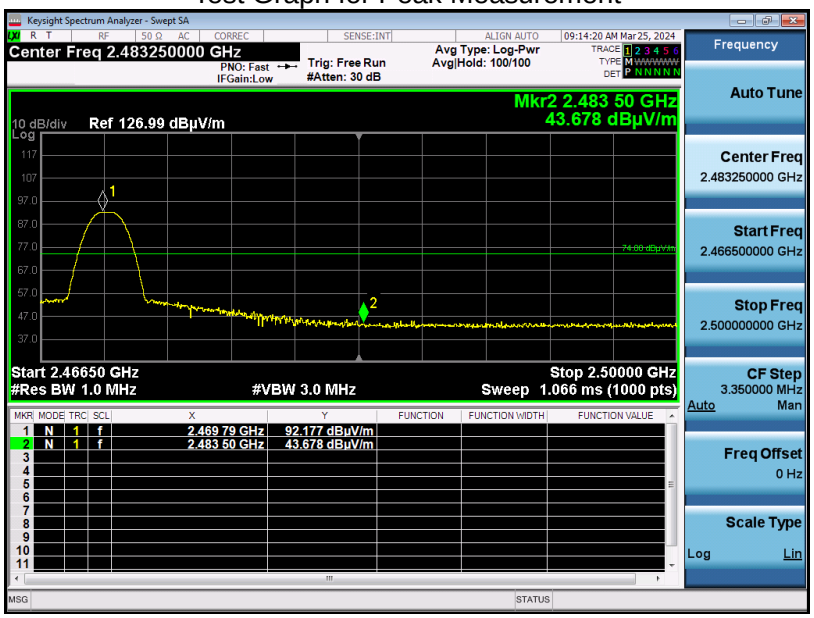
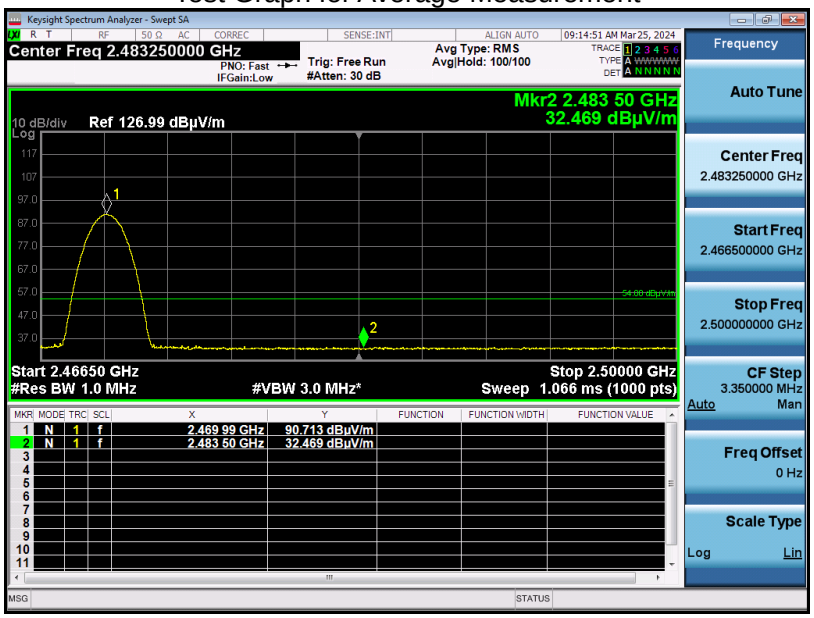
## Band Edge Emission Test Results for Restricted Bands

| | | | |
|---|---|---|---|
| **EUT Name** | Teburu Dice | **Model Name** | D6 |
| **Temperature** | 25℃ | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | DC 3.7V by battery |
| **Test Mode** | Mode 1 | **Antenna Polarity** | Vertical |

Test Graph for Peak Measurement




Test Graph for Average Measurement




**RESULT: Pass**

Note: The factor had been edited in the “Input Correction” of the Spectrum Analyzer.

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# 12. AC Power Line Conducted Emission Test

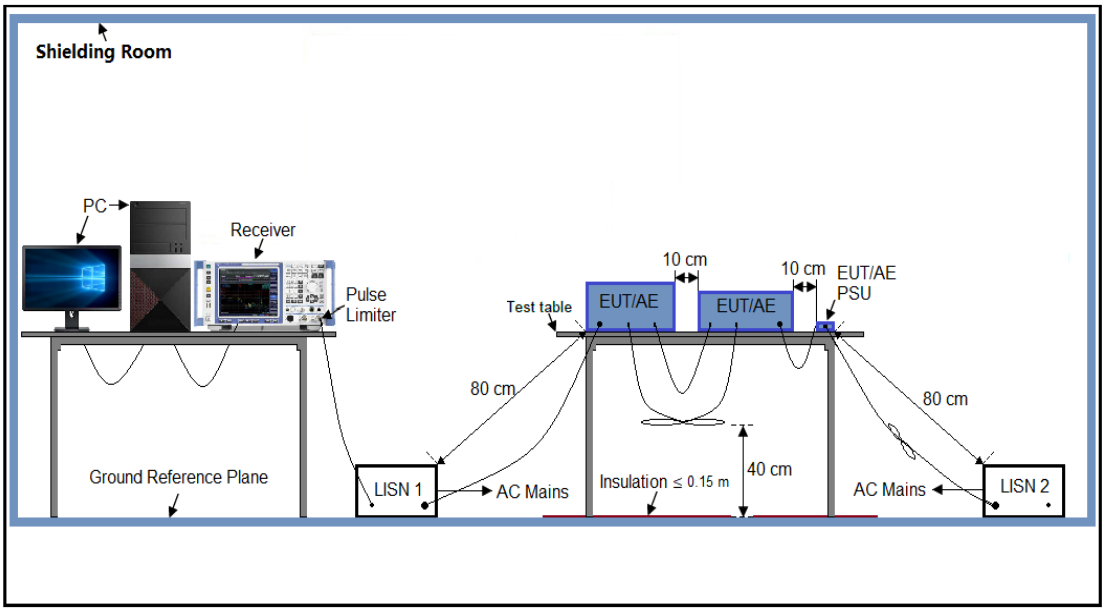
## 12.1 Measurement Limit

| Frequency | Maximum RF Line Voltage | |
|---|---|---|
| | Q.P. (dBμV) | Average (dBμV) |
| 150kHz~500kHz | 66-56 | 56-46 |
| 500kHz~5MHz | 56 | 46 |
| 5MHz~30MHz | 60 | 50 |

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

## 12.2 Measurement Setup (Block Diagram of Configuration)

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### 12.3 Preliminary Procedure of Line Conducted Emission Test

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 3.7V power from battery.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

### 12.4 Final Procedure of Line Conducted Emission Test

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

### 12.5 Measurement Results

Note: The conducted emission tests at AC port are not required for devices which only employ battery power for operation.

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## Appendix I: Photographs of Test Setup

Refer to the Report No.: AGC15705231233AP02

## Appendix II: Photographs of Test EUT

Refer to the Report No.: AGC15705231233AP03

**-----End of Report-----**

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2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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