

# RADIO TEST REPORT

## Test Report No. 15274952H-C-R1

|                     |                       |
|---------------------|-----------------------|
| Customer            | SHIMANO INC.          |
| Description of EUT  | Motor Unit            |
| Model Number of EUT | 7KX1                  |
| FCC ID              | WY7-7KX1              |
| Test Regulation     | FCC Part 15 Subpart C |
| Test Result         | Complied              |
| Issue Date          | June 25, 2024         |
| Remarks             | -                     |

**Representative Test Engineer**Tetsuro Yoshida  
Engineer**Approved By**Takayuki Shimada  
Leader

CERTIFICATE 5107.02

- ☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan, Inc.
- ☒ There is no testing item of "Non-accreditation".

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- The laboratory is not responsible for information provided by the customer which can impact the validity of the results.
- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

# REVISION HISTORY

Original Test Report No.: 15274952H-C

This report is a revised version of 15274952H-C. 15274952H-C is replaced with this report.

| Revision        | Test Report No. | Date          | Page Revised Contents                                                                                                                                                                                                                                                                                |
|-----------------|-----------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -<br>(Original) | 15274952H-C     | June 11, 2024 | -                                                                                                                                                                                                                                                                                                    |
| 1               | 15274952H-C-R1  | June 25, 2024 | <b><u>SECTION 5: Radiated Spurious Emission</u></b><br>Corrected explanatory note *1):<br><br>“The test was performed that ... which is synchronous the worst duty cycle of ANT+.”<br>↓<br>“The test was performed that ... which is synchronous the worst duty cycle of ANT+ and SHIMANO ORIGINAL.” |

## Reference: Abbreviations (Including words undescribed in this report)

|                |                                                                 |         |                                                     |
|----------------|-----------------------------------------------------------------|---------|-----------------------------------------------------|
| A2LA           | The American Association for Laboratory Accreditation           | ICES    | Interference-Causing Equipment Standard             |
| AC             | Alternating Current                                             | IEC     | International Electrotechnical Commission           |
| AFH            | Adaptive Frequency Hopping                                      | IEEE    | Institute of Electrical and Electronics Engineers   |
| AM             | Amplitude Modulation                                            | IF      | Intermediate Frequency                              |
| Amp, AMP       | Amplifier                                                       | ILAC    | International Laboratory Accreditation Conference   |
| ANSI           | American National Standards Institute                           | ISED    | Innovation, Science and Economic Development Canada |
| Ant, ANT       | Antenna                                                         | ISO     | International Organization for Standardization      |
| AP             | Access Point                                                    | JAB     | Japan Accreditation Board                           |
| ASK            | Amplitude Shift Keying                                          | LAN     | Local Area Network                                  |
| Atten., ATT    | Attenuator                                                      | LIMS    | Laboratory Information Management System            |
| AV             | Average                                                         | MCS     | Modulation and Coding Scheme                        |
| BPSK           | Binary Phase-Shift Keying                                       | MRA     | Mutual Recognition Arrangement                      |
| BR             | Bluetooth Basic Rate                                            | N/A     | Not Applicable                                      |
| BT             | Bluetooth                                                       | NIST    | National Institute of Standards and Technology      |
| BT LE          | Bluetooth Low Energy                                            | NS      | No signal detect.                                   |
| BW             | BandWidth                                                       | NSA     | Normalized Site Attenuation                         |
| Cal Int        | Calibration Interval                                            | NVLAP   | National Voluntary Laboratory Accreditation Program |
| CCK            | Complementary Code Keying                                       | OBW     | Occupied Band Width                                 |
| Ch., CH        | Channel                                                         | OFDM    | Orthogonal Frequency Division Multiplexing          |
| CISPR          | Comite International Special des Perturbations Radioelectriques | P/M     | Power meter                                         |
| CW             | Continuous Wave                                                 | PCB     | Printed Circuit Board                               |
| DBPSK          | Differential BPSK                                               | PER     | Packet Error Rate                                   |
| DC             | Direct Current                                                  | PHY     | Physical Layer                                      |
| D-factor       | Distance factor                                                 | PK      | Peak                                                |
| DFS            | Dynamic Frequency Selection                                     | PN      | Pseudo random Noise                                 |
| DQPSK          | Differential QPSK                                               | PRBS    | Pseudo-Random Bit Sequence                          |
| DSSS           | Direct Sequence Spread Spectrum                                 | PSD     | Power Spectral Density                              |
| EDR            | Enhanced Data Rate                                              | QAM     | Quadrature Amplitude Modulation                     |
| EIRP, e.i.r.p. | Equivalent Isotropically Radiated Power                         | QP      | Quasi-Peak                                          |
| EMC            | ElectroMagnetic Compatibility                                   | QPSK    | Quadri-Phase Shift Keying                           |
| EMI            | ElectroMagnetic Interference                                    | RBW     | Resolution Band Width                               |
| EN             | European Norm                                                   | RDS     | Radio Data System                                   |
| ERP, e.r.p.    | Effective Radiated Power                                        | RE      | Radio Equipment                                     |
| EU             | European Union                                                  | RF      | Radio Frequency                                     |
| EUT            | Equipment Under Test                                            | RMS     | Root Mean Square                                    |
| Fac.           | Factor                                                          | RSS     | Radio Standards Specifications                      |
| FCC            | Federal Communications Commission                               | Rx      | Receiving                                           |
| FHSS           | Frequency Hopping Spread Spectrum                               | SA, S/A | Spectrum Analyzer                                   |
| FM             | Frequency Modulation                                            | SG      | Signal Generator                                    |
| Freq.          | Frequency                                                       | SVSWR   | Site-Voltage Standing Wave Ratio                    |
| FSK            | Frequency Shift Keying                                          | TR      | Test Receiver                                       |
| GFSK           | Gaussian Frequency-Shift Keying                                 | Tx      | Transmitting                                        |
| GNSS           | Global Navigation Satellite System                              | VBW     | Video BandWidth                                     |
| GPS            | Global Positioning System                                       | Vert.   | Vertical                                            |
| Hori.          | Horizontal                                                      | WLAN    | Wireless LAN                                        |

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## **SECTION 1: Customer Information**

|                  |                                                               |
|------------------|---------------------------------------------------------------|
| Company Name     | SHIMANO INC.                                                  |
| Address          | 3-77 Oimatsu-cho, Sakai-ku, Sakai City, Osaka 590-8577, Japan |
| Telephone Number | +81-72-223-7019                                               |
| Contact Person   | Osamu Kariyama                                                |

The information provided by the customer is as follows;

- Customer, Description of EUT, Model Number of EUT, FCC ID on the cover and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- SECTION 1: Customer Information
- SECTION 2: Equipment Under Test (EUT) other than the Receipt Date and Test Date
- SECTION 4: Operation of EUT during testing

## **SECTION 2: Equipment Under Test (EUT)**

### **2.1 Identification of EUT**

|               |                                                                                           |
|---------------|-------------------------------------------------------------------------------------------|
| Description   | Motor Unit                                                                                |
| Model Number  | 7KX1                                                                                      |
| Serial Number | Refer to SECTION 4.2                                                                      |
| Condition     | Production prototype<br>(Not for Sale: This sample is equivalent to mass-produced items.) |
| Modification  | No Modification by the test lab                                                           |
| Receipt Date  | February 28, 2024 (SHIMANO ORIGINAL)<br>May 8, 2024 (Other than SHIMANO ORIGINAL)         |
| Test Date     | March 12 to May 17, 2024                                                                  |

### **2.2 Product Description**

#### **General Specification**

|                       |                          |
|-----------------------|--------------------------|
| Rating                | DC 8.3 V to 13.5 V       |
| Operating temperature | -10 deg. C to +50 deg. C |

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### **Radio Specification**

This report contains data provided by the customer which can impact the validity of results. UL Japan, Inc. is only responsible for the validity of results after the integration of the data provided by the customer. The data provided by the customer is marked "a)" in the table below.

#### **SHIMANO ORIGINAL**

|                        |                  |
|------------------------|------------------|
| Equipment Type         | Transceiver      |
| Frequency of Operation | 2478 MHz         |
| Type of Modulation     | GFSK             |
| Antenna Type           | Monopole Antenna |
| Antenna Gain           | -0.53 dBi        |

#### **Bluetooth (Low Energy)**

|                        |                      |
|------------------------|----------------------|
| Equipment Type         | Transceiver          |
| Frequency of Operation | 2402 MHz to 2480 MHz |
| Type of Modulation     | GFSK                 |
| Antenna Type           | Monopole Antenna     |
| Antenna Gain           | 0.01 dBi             |

#### **ANT+**

|                        |                      |
|------------------------|----------------------|
| Equipment Type         | Transceiver          |
| Frequency of Operation | 2402 MHz to 2480 MHz |
| Type of Modulation     | GFSK                 |
| Antenna Type           | Monopole Antenna     |
| Antenna Gain           | 0.01 dBi             |

\*Bluetooth (Low Energy) and ANT+ do not transmit simultaneously.

## SECTION 3: Test Specification, Procedures & Results

### 3.1 Test Specification

|                    |                                                                                                                                                                                                              |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Specification | FCC Part 15 Subpart C<br>The latest version on the first day of the testing period                                                                                                                           |
| Title              | FCC 47 CFR Part 15 Radio Frequency Device Subpart C Intentional Radiators<br>Section 15.207 Conducted limits<br>Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz,<br>and 5725-5850 MHz |

\* Also the EUT complies with FCC Part 15 Subpart B.

### 3.2 Procedures and Results

| Item                                    | Test Procedure                                                              | Specification                                                              | Worst Margin                           | Results  | Remarks                                                     |
|-----------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------|----------|-------------------------------------------------------------|
| Conducted Emission                      | FCC: ANSI C63.10-2013<br>6. Standard test methods<br>ISED: RSS-Gen 8.8      | FCC: Section 15.207<br>ISED: RSS-Gen 8.8                                   | -                                      | N/A      | *1)                                                         |
| 6dB Bandwidth                           | FCC: KDB 558074 D01<br>15.247<br>Meas Guidance v05r02<br>ISED: -            | FCC: Section 15.247(a)(2)<br>ISED: RSS-247 5.2(a)                          | See data.                              | Complied | Conducted                                                   |
| Maximum Peak Output Power               | FCC: KDB 558074 D01<br>15.247<br>Meas Guidance v05r02<br>ISED: RSS-Gen 6.12 | FCC: Section 15.247(b)(3)<br>ISED: RSS-247 5.4(d)                          |                                        | Complied | Conducted                                                   |
| Power Density                           | FCC: KDB 558074 D01<br>15.247<br>Meas Guidance v05r02<br>ISED: -            | FCC: Section 15.247(e)<br>ISED: RSS-247 5.2(b)                             |                                        | Complied | Conducted                                                   |
| Spurious Emission Restricted Band Edges | FCC: KDB 558074 D01<br>15.247<br>Meas Guidance v05r02<br>ISED: RSS-Gen 6.13 | FCC: Section 15.247(d)<br>ISED: RSS-247 5.5<br>RSS-Gen 8.9<br>RSS-Gen 8.10 | 2.8 dB<br>2483.5 MHz<br>Horizontal, AV | Complied | Conducted (below 30 MHz)/<br>Radiated (above 30 MHz)<br>*2) |

Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593.

\* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

\*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.

\*2) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02 8.5 and 8.6.

#### **FCC Part 15.31 (e)**

This EUT provides the stable voltage constantly to RF Module regardless of input voltage.  
Therefore, the EUT complies with the requirement.

#### **FCC Part 15.203 Antenna requirement**

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT.  
Therefore, the equipment complies with the antenna requirement of Section 15.203.

### 3.3 Addition to Standard

| Item                   | Test Procedure    | Specification | Worst Margin | Results | Remarks   |
|------------------------|-------------------|---------------|--------------|---------|-----------|
| 99% Occupied Bandwidth | ISED: RSS-Gen 6.7 | ISED: -       | N/A          | -       | Conducted |

Other than above, no addition, exclusion nor deviation has been made from the standard.

### 3.4 Uncertainty

Measurement uncertainty is not taken into account when stating conformity with a specified requirement.  
Note: When margins obtained from test results are less than the measurement uncertainty, the test results may exceed the limit.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor  $k = 2$ .

#### Radiated emission

| Measurement distance | Frequency range     |            | Unit | Calculated Uncertainty (+/-) |
|----------------------|---------------------|------------|------|------------------------------|
| 3 m                  | 9 kHz to 30 MHz     |            | dB   | 3.3                          |
| 10 m                 |                     |            | dB   | 3.1                          |
| 3 m                  | 30 MHz to 200 MHz   | Horizontal | dB   | 4.7                          |
|                      |                     | Vertical   | dB   | 4.7                          |
|                      | 200 MHz to 1000 MHz | Horizontal | dB   | 4.8                          |
|                      |                     | Vertical   | dB   | 6.0                          |
| 10 m                 | 30 MHz to 200 MHz   | Horizontal | dB   | 5.2                          |
|                      |                     | Vertical   | dB   | 5.1                          |
|                      | 200 MHz to 1000 MHz | Horizontal | dB   | 5.2                          |
|                      |                     | Vertical   | dB   | 5.2                          |
| 3 m                  | 1 GHz to 6 GHz      |            | dB   | 5.0                          |
|                      | 6 GHz to 18 GHz     |            | dB   | 5.2                          |
| 1 m                  | 10 GHz to 18 GHz    |            | dB   | 5.3                          |
|                      | 18 GHz to 26.5 GHz  |            | dB   | 5.2                          |
|                      | 26.5 GHz to 40 GHz  |            | dB   | 4.7                          |
| 0.5 m                | 26.5 GHz to 40 GHz  |            | dB   | 4.8                          |

#### Antenna Terminal Conducted

| Item                                                                | Unit   | Calculated Uncertainty (+/-) |
|---------------------------------------------------------------------|--------|------------------------------|
| Antenna terminated conducted emission / Power density / Burst power | dB     | 3.47                         |
| Adjacent channel power (ACP)                                        | dB     | 2.28                         |
| Bandwidth (OBW)                                                     | %      | 0.96                         |
| Time readout (time span upto 100 msec)                              | %      | 0.11                         |
| Time readout (time span upto 1000 msec)                             | %      | 0.11                         |
| Time readout (time span upto 60 sec)                                | %      | 0.02                         |
| Power measurement (Power meter < 8 GHz)                             | dB     | 1.46                         |
| Power measurement (Call box < 6 GHz)                                | dB     | 1.69                         |
| Frequency readout (Frequency counter)                               | ppm    | 0.67                         |
| Frequency readout (Spectrum analyzer frequency readout function)    | ppm    | 2.13                         |
| Temperature (constant temperature bath)                             | deg. C | 0.69                         |
| Humidity (constant temperature bath)                                | %RH    | 2.98                         |
| Modulation characteristics                                          | %      | 6.93                         |
| Frequency for mobile                                                | ppm    | 0.08                         |
| Contention-based protocol                                           | dB     | 2.26                         |

### 3.5 Test Location

UL Japan, Inc. Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 Japan

Telephone: +81-596-24-8999

A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 884919

ISED Lab Company Number: 2973C / CAB identifier: JP0002

| Test site                  | Width x Depth x Height (m) | Size of reference ground plane (m) / horizontal conducting plane | Other rooms            | Maximum measurement distance |
|----------------------------|----------------------------|------------------------------------------------------------------|------------------------|------------------------------|
| No.1 semi-anechoic chamber | 19.2 x 11.2 x 7.7          | 7.0 x 6.0                                                        | No.1 Power source room | 10 m                         |
| No.2 semi-anechoic chamber | 7.5 x 5.8 x 5.2            | 4.0 x 4.0                                                        | -                      | 3 m                          |
| No.3 semi-anechoic chamber | 12.0 x 8.5 x 5.9           | 6.8 x 5.75                                                       | No.3 Preparation room  | 3 m                          |
| No.3 shielded room         | 4.0 x 6.0 x 2.7            | N/A                                                              | -                      | -                            |
| No.4 semi-anechoic chamber | 12.0 x 8.5 x 5.9           | 6.8 x 5.75                                                       | No.4 Preparation room  | 3 m                          |
| No.4 shielded room         | 4.0 x 6.0 x 2.7            | N/A                                                              | -                      | -                            |
| No.5 semi-anechoic chamber | 6.0 x 6.0 x 3.9            | 6.0 x 6.0                                                        | -                      | -                            |
| No.5 measurement room      | 6.4 x 6.4 x 3.0            | 6.4 x 6.4                                                        | -                      | -                            |
| No.6 shielded room         | 4.0 x 4.5 x 2.7            | 4.0 x 4.5                                                        | -                      | -                            |
| No.6 measurement room      | 4.75 x 5.4 x 3.0           | 4.75 x 4.15                                                      | -                      | -                            |
| No.7 shielded room         | 4.7 x 7.5 x 2.7            | 4.7 x 7.5                                                        | -                      | -                            |
| No.8 measurement room      | 3.1 x 5.0 x 2.7            | 3.1 x 5.0                                                        | -                      | -                            |
| No.9 measurement room      | 8.8 x 4.6 x 2.8            | 2.4 x 2.4                                                        | -                      | -                            |
| No.10 shielded room        | 3.8 x 2.8 x 2.8            | 3.8 x 2.8                                                        | -                      | -                            |
| No.11 measurement room     | 4.0 x 3.4 x 2.5            | N/A                                                              | -                      | -                            |
| No.12 measurement room     | 2.6 x 3.4 x 2.5            | N/A                                                              | -                      | -                            |
| Large Chamber              | 16.9 x 22.1 x 10.17        | 16.9 x 22.1                                                      | -                      | 10 m                         |
| Small Chamber              | 5.3 x 6.69 x 3.59          | 5.3 x 6.69                                                       | -                      | -                            |

### 3.6 Test Data, Test Instruments, and Test Set Up

Refer to APPENDIX.

## SECTION 4: Operation of EUT during testing

### 4.1 Operating Mode(s)

| Mode                                                                             | Remarks*                                                                    |       |                                                                                |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------|
| Bluetooth Low Energy (BT LE)                                                     | 1M-PHY Uncoded PHY (1M), Maximum Packet Size, PRBS9                         |       |                                                                                |
| Bluetooth Low Energy (BT LE)                                                     | 2M-PHY Uncoded PHY (2M), Maximum Packet Size, PRBS9                         |       |                                                                                |
| ANT+                                                                             | Maximum Packet Size, PRBS9                                                  |       |                                                                                |
| SHIMANO ORIGINAL                                                                 | Maximum Packet Size, SCRAMBLED *1)                                          |       |                                                                                |
| *The worst condition was determined based on the test result of RF Output Power. |                                                                             |       |                                                                                |
| *1) Transmitting duty was 100 % on all tests                                     |                                                                             |       |                                                                                |
| *Power of the EUT was set by the software as follows;                            |                                                                             |       |                                                                                |
| Mode                                                                             | BT LE                                                                       | ANT+  | SHIMANO ORIGINAL                                                               |
| Power Setting                                                                    | 0 dBm                                                                       | 4 dBm | 0 dBm                                                                          |
| Software                                                                         | 3KR1.4.15.215.7.bin<br>(Date: May 9, 2024,<br>Storage location: EUT memory) |       | 3KR1.4.15.199.9.bin<br>(Date: March 12, 2024,<br>Storage location: EUT memory) |

\*This setting of software is the worst case.

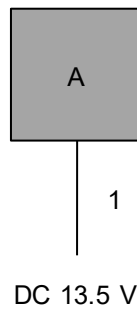
Any conditions under the normal use do not exceed the condition of setting.

In addition, end users cannot change the settings of the output power of the product.

\*The Details of Operating Mode(s)

| Test Item                                                                                                                                                                                                                                                                               | Operating Mode      | Tested Frequency |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------|
| Radiated Spurious Emission (Below 1 GHz),<br>Conducted Spurious Emission                                                                                                                                                                                                                | Tx BT LE 1M         | 2480 MHz *1)     |
|                                                                                                                                                                                                                                                                                         | Tx BT LE 2M         |                  |
|                                                                                                                                                                                                                                                                                         | Tx ANT+             | 2441 MHz *1)     |
|                                                                                                                                                                                                                                                                                         | Tx SHIMANO ORIGINAL | 2478 MHz         |
| 99% Occupied Bandwidth,<br>6dB Bandwidth,<br>Maximum Peak Output Power,<br>Radiated Spurious Emission (Above 1 GHz),<br>Power Density                                                                                                                                                   | Tx BT LE 1M         | 2402 MHz         |
|                                                                                                                                                                                                                                                                                         | Tx BT LE 2M         | 2440 MHz         |
|                                                                                                                                                                                                                                                                                         |                     | 2480 MHz         |
|                                                                                                                                                                                                                                                                                         | Tx ANT+             | 2402 MHz         |
|                                                                                                                                                                                                                                                                                         |                     | 2441 MHz         |
|                                                                                                                                                                                                                                                                                         |                     | 2480 MHz         |
|                                                                                                                                                                                                                                                                                         | Tx SHIMANO ORIGINAL | 2478 MHz         |
| *1) Spurious emissions for frequencies below 1 GHz were limited to the channel that had the highest power during the antenna terminal test, as preliminary testing indicated that changing the operating frequency had no significant impact on the emissions in those frequency bands. |                     |                  |

## 4.2 Configuration and Peripherals



\* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

### Description of EUT

| No. | Item       | Model number | Serial Number                                                                               | Manufacturer | Remarks |
|-----|------------|--------------|---------------------------------------------------------------------------------------------|--------------|---------|
| A   | Motor Unit | 7KX1         | 7KXVLS30001 *1)<br>7KXVLS10013 *2)<br>7KXVLS10003 *3)<br>7KXVLS10071 *4)<br>7KXVLS1002E *5) | SHIMANO INC. | EUT     |

### List of Cables Used

| No. | Name     | Length (m)                       | Shield     |            | Remarks |
|-----|----------|----------------------------------|------------|------------|---------|
|     |          |                                  | Cable      | Connector  |         |
| 1   | DC Cable | 2.85 (for RE*)<br>0.60 (for AT*) | Unshielded | Unshielded | -       |

- \*1) for RE\* of Mode BT LE and ANT+
- \*2) for AT\* of Mode BT LE and ANT+
- \*3) for RE\* of Mode SHIMANO ORIGINAL
- \*4) for AT\* of Mode SHIMANO ORIGINAL
- \*5) for Burst rate confirmation (PK with Duty Factor)

\*RE: Radiated Spurious Emission, AT: Antenna Terminal Conducted Tests

## SECTION 5: Radiated Spurious Emission

### Test Procedure

It was measured based on "8.5 and 8.6 of KDB 558074 D01 15.247 Meas Guidance v05r02".

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane. Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

The height of the measuring antenna varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

### Test Antennas are used as below;

|              |                   |                  |             |
|--------------|-------------------|------------------|-------------|
| Frequency    | 30 MHz to 200 MHz | 200 MHz to 1 GHz | Above 1 GHz |
| Antenna Type | Biconical         | Logperiodic      | Horn        |

In any 100 kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

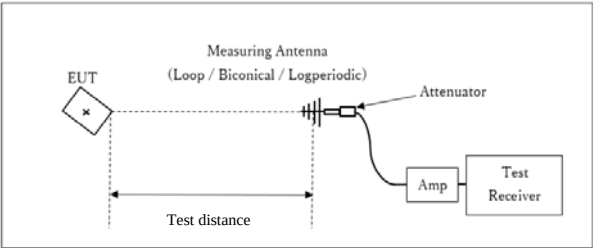
### 20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

|                 |               |                          |                                                                                                                                                                                                                                                                                          |                              |
|-----------------|---------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Frequency       | Below 1 GHz   | Above 1 GHz              |                                                                                                                                                                                                                                                                                          | 20 dBc                       |
| Instrument Used | Test Receiver | Spectrum Analyzer        |                                                                                                                                                                                                                                                                                          | Spectrum Analyzer            |
| Detector        | QP            | PK                       | AV                                                                                                                                                                                                                                                                                       | PK                           |
| IF Bandwidth    | BW 120 kHz    | RBW: 1 MHz<br>VBW: 3 MHz | <u>11.12.2.5.1</u><br>RBW: 1 MHz<br>VBW: 3 MHz<br>Detector:<br>Power Averaging (RMS)<br>Trace: 100 traces<br><u>11.12.2.5.2</u><br>The duty cycle was less than 98% for detected noise, a duty factor was added to the 11.12.2.5.1 results.<br><u>15.35(c) Peak with Duty factor *1)</u> | RBW: 100 kHz<br>VBW: 300 kHz |

\*1) The test was performed that the spurious evaluation as peak with duty factor since the pulse emission which is synchronous the worst duty cycle of ANT+ and SHIMANO ORIGINAL.

Figure 2: Test Setup

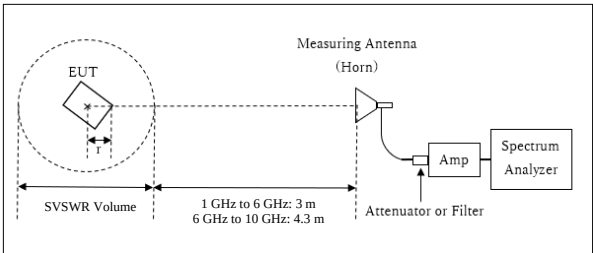
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz to 10 GHz



r : Radius of an outer periphery of EUT

× : Center of turn table

[1 GHz to 6 GHz]

Distance Factor:  $20 \times \log (4.0 \text{ m} / 3.0 \text{ m}) = 2.50 \text{ dB}$

\* Test Distance:  $(3 + \text{SVSWR Volume} / 2) - r = 4.0 \text{ m}$

SVSWR Volume : 2.0 m

[6 GHz to 10 GHz]

Distance Factor:  $20 \times \log (5.0 \text{ m} / 3.0 \text{ m}) = 4.44 \text{ dB}$

\* Test Distance:  $(4.3 + \text{SVSWR Volume} / 2) - r = 5.0 \text{ m}$

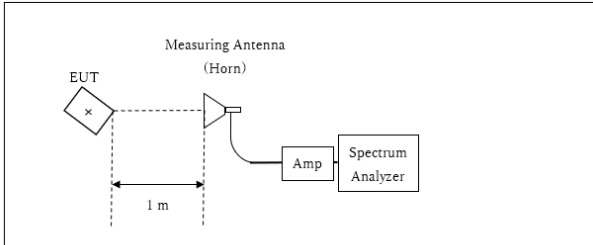
SVSWR Volume : 1.4 m

(SVSWR Volume has been calibrated based on CISPR 16-1-4.)

r = 0.0m

\* The test was performed with r = 0.0 m since EUT is small and it was the rather conservative condition.

10 GHz to 26.5 GHz



× : Center of turn table

Distance Factor:  $20 \times \log (1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

\*Test Distance: 1 m

The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Test results are rounded off and limit are rounded down, so some differences might be observed.

Measurement Range : 30 MHz to 26.5 GHz  
Test Data : APPENDIX  
Test Result : Pass

## SECTION 6: Antenna Terminal Conducted Tests

### Test Procedure

The tests were made with below setting connected to the antenna port.

| Test                                | Span                                    | RBW              | VBW                | Sweep time | Detector         | Trace    | Instrument Used                 |
|-------------------------------------|-----------------------------------------|------------------|--------------------|------------|------------------|----------|---------------------------------|
| 6dB Bandwidth                       | 2 MHz / 3 MHz / 5 MHz / 10 MHz          | 100 kHz          | 300 kHz            | Auto       | Peak             | Max Hold | Spectrum Analyzer               |
| 99% Occupied Bandwidth *1)          | Enough width to display emission skirts | 1 to 5 % of OBW  | Three times of RBW | Auto       | Peak             | Max Hold | Spectrum Analyzer               |
| Maximum Peak Output Power           | -                                       | -                | -                  | Auto       | Peak/Average *2) | -        | Power Meter (Sensor: 50 MHz BW) |
| Peak Power Density                  | 1.5 times the 6dB Bandwidth             | 3 kHz            | 10 kHz             | Auto       | Peak             | Max Hold | Spectrum Analyzer *3)           |
| Conducted Spurious Emission *4) *5) | 9 kHz to 150 kHz<br>150 kHz to 30 MHz   | 200 Hz<br>10 kHz | 620 Hz<br>30 kHz   | Auto       | Peak             | Max Hold | Spectrum Analyzer               |

\*1) Peak hold was applied as Worst-case measurement.

\*2) Reference data

\*3) Section 11.10.2 Method PKPSD (peak PSD) of "ANSI C63.10-2013".

\*4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was low enough as shown in the chart.  
(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz).

\*5) The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to  $45.5 - 51.5 = -6.0$  dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

Test results are rounded off and limit are rounded down, so some differences might be observed.  
The equipment and cables were not used for factor 0 dB of the data sheets.

Test Data : APPENDIX  
Test Result : Pass

APPENDIX 1: Test Data

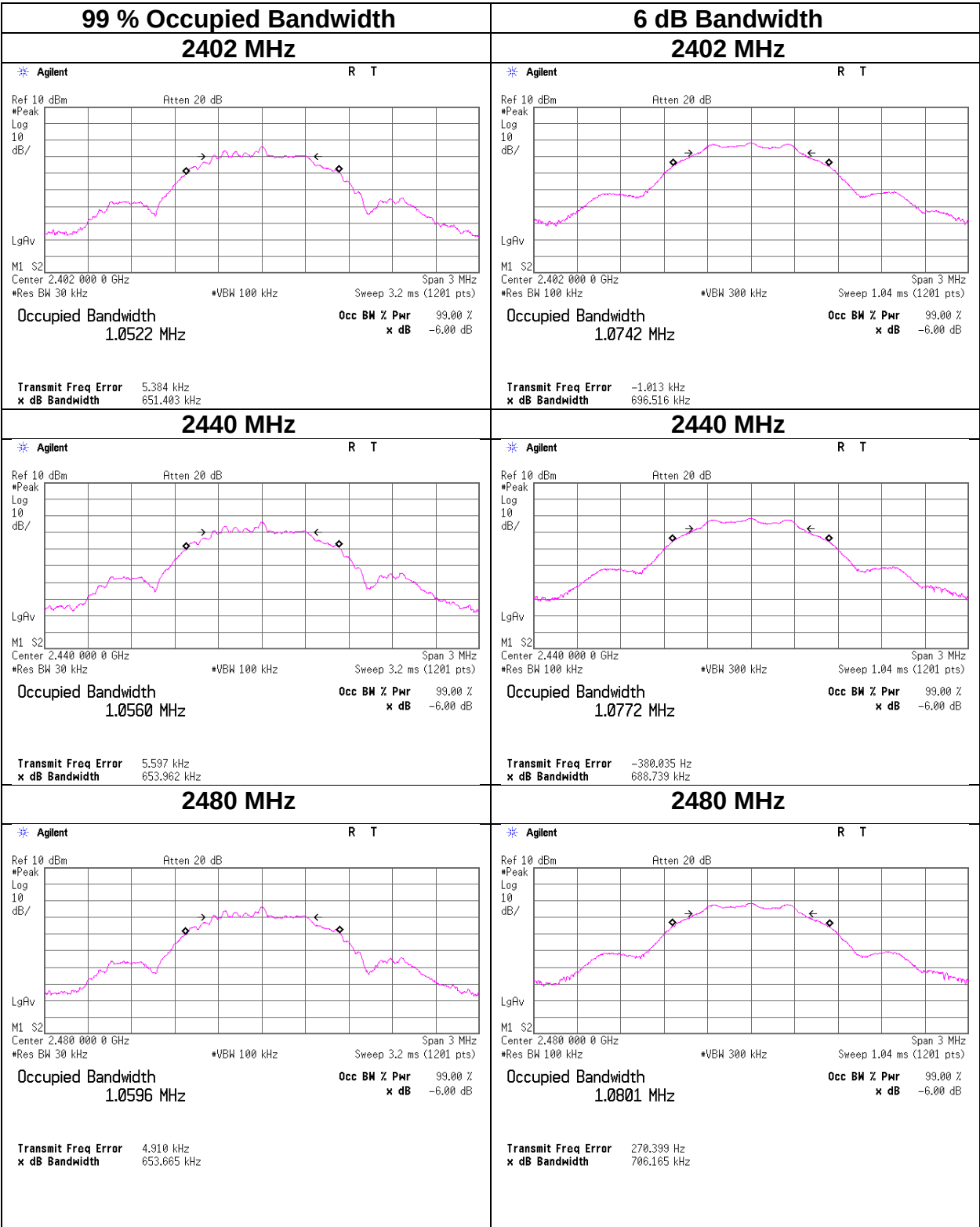
99 % Occupied Bandwidth and 6 dB Bandwidth

|                        |                     |                     |
|------------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.        |                     |
| Measurement Room       | No.10               | No.6                |
| Date                   | March 12, 2024      | May 15, 2024        |
| Temperature / Humidity | 24 deg. C / 35 % RH | 23 deg. C / 48 % RH |
| Engineer               | Takafumi Noguchi    | Shousei Hamaguchi   |
| Mode                   | Tx                  |                     |

| Mode                | Frequency<br>[MHz] | 99% Occupied<br>Bandwidth<br>[kHz] | 6dB Bandwidth<br>[MHz] | Limit for<br>6dB Bandwidth<br>[MHz] |
|---------------------|--------------------|------------------------------------|------------------------|-------------------------------------|
| BT LE 1M            | 2402               | 1052.2                             | 0.697                  | > 0.5000                            |
|                     | 2440               | 1056.0                             | 0.689                  | > 0.5000                            |
|                     | 2480               | 1059.6                             | 0.706                  | > 0.5000                            |
| BT LE 2M            | 2402               | 2059.7                             | 1.129                  | > 0.5000                            |
|                     | 2440               | 2064.9                             | 1.140                  | > 0.5000                            |
|                     | 2480               | 2067.7                             | 1.161                  | > 0.5000                            |
| ANT+                | 2402               | 845.8                              | 0.501                  | > 0.5000                            |
|                     | 2441               | 863.7                              | 0.501                  | > 0.5000                            |
|                     | 2480               | 821.3                              | 0.500                  | > 0.5000                            |
| SHIMANO<br>ORIGINAL | 2478               | 2102.4                             | 1.400                  | > 0.5000                            |

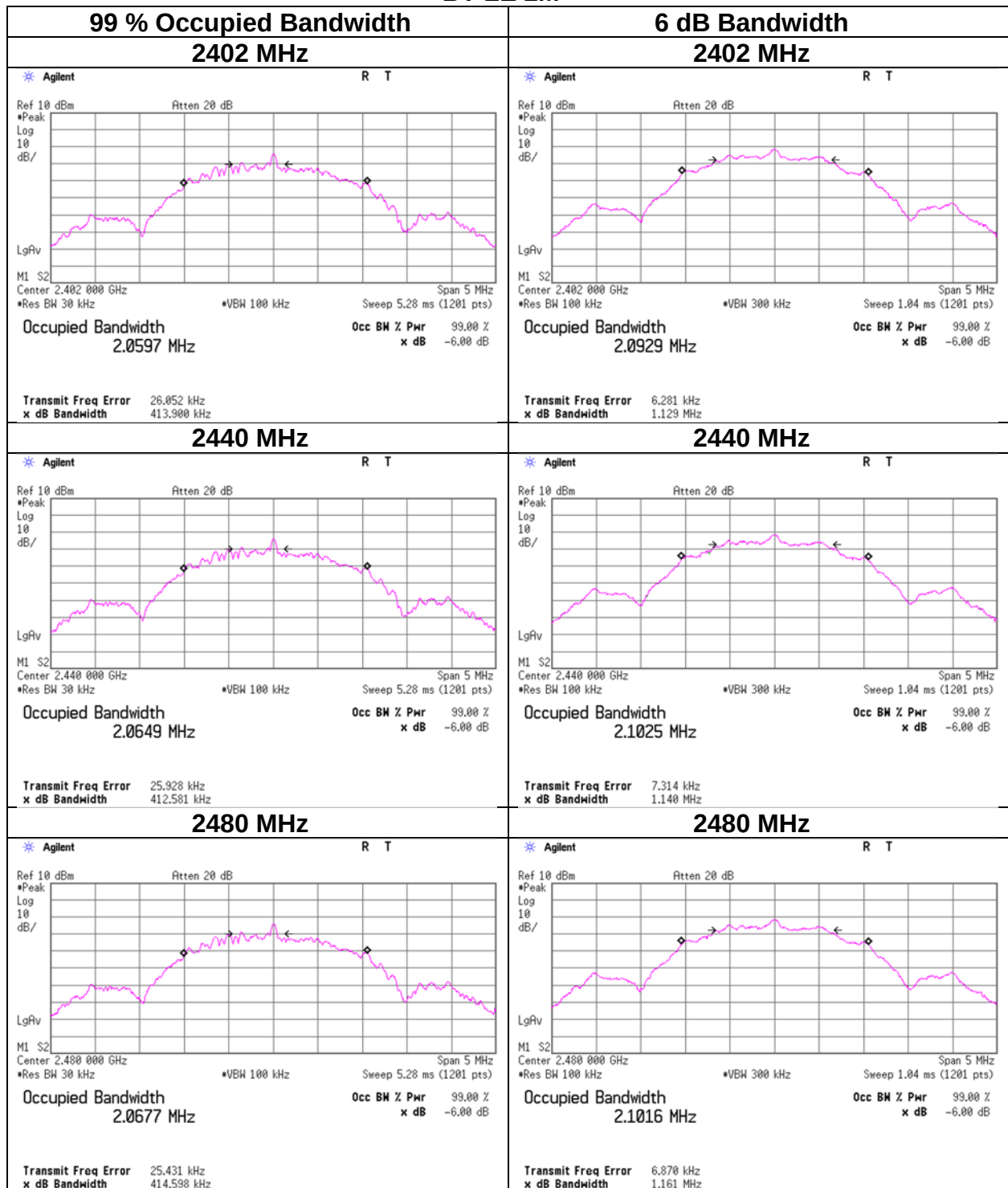
99 % Occupied Bandwidth and 6 dB Bandwidth

BT LE 1M



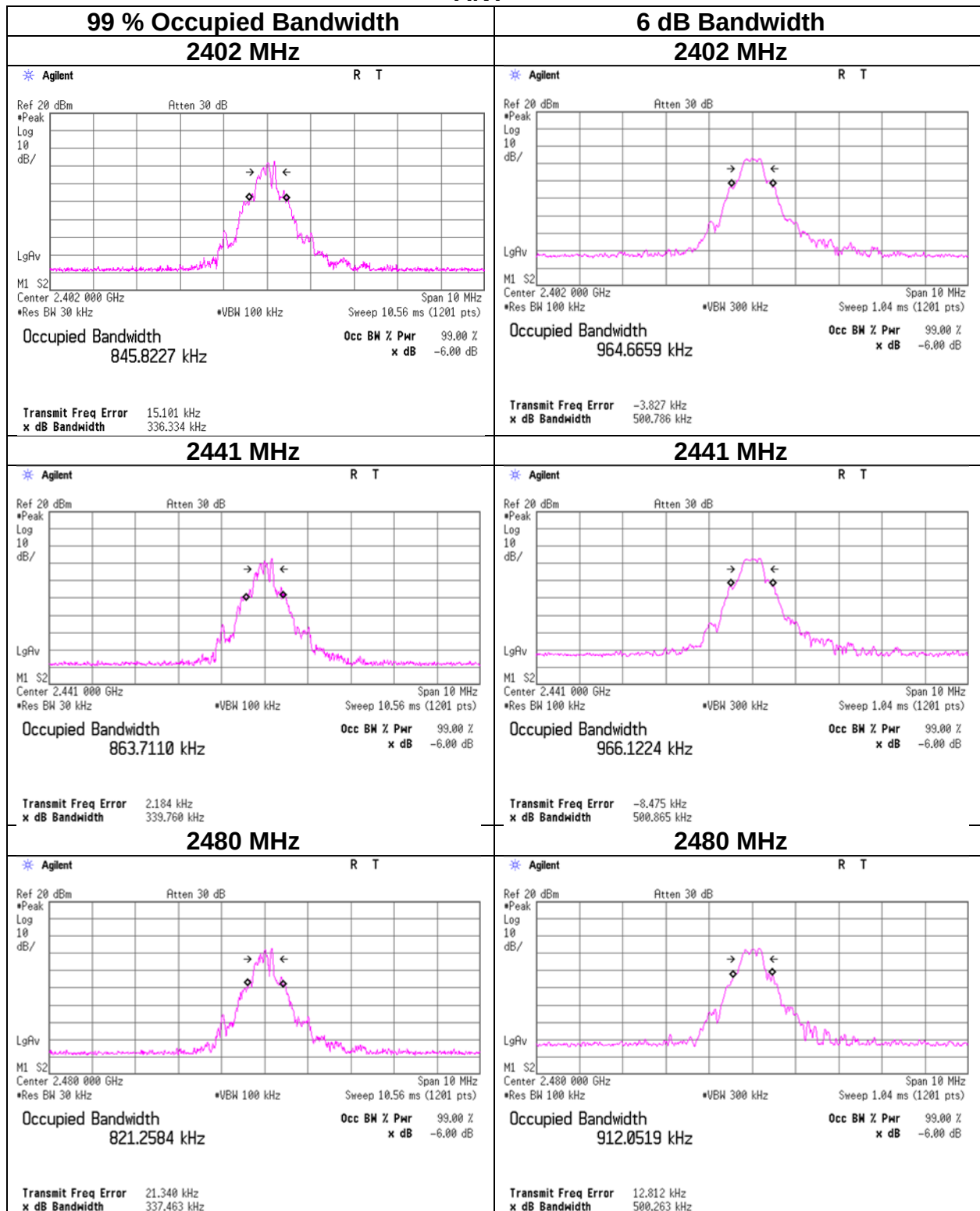
## 99 % Occupied Bandwidth and 6 dB Bandwidth

### BT LE 2M



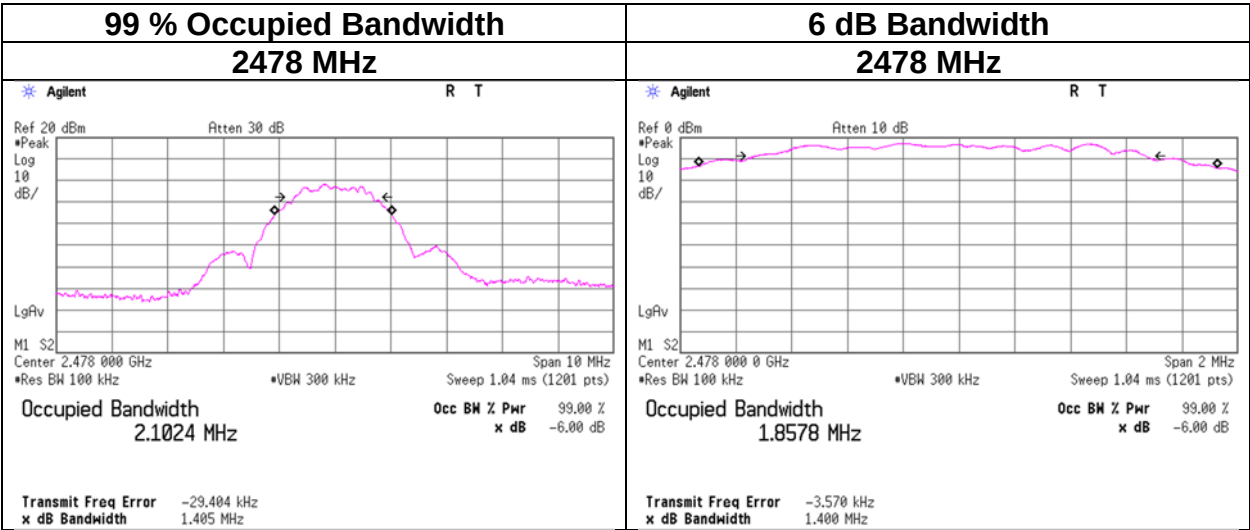
## 99 % Occupied Bandwidth and 6 dB Bandwidth

### ANT+



99 % Occupied Bandwidth and 6 dB Bandwidth

SHIMANO ORIGINAL



## Maximum Peak Output Power

Test place                      Ise EMC Lab. No.6 Measurement Room  
Date                                May 14, 2024  
Temperature / Humidity        21 deg. C / 47 % RH  
Engineer                         Shousei Hamaguchi  
Mode                                Tx BT LE

| 1M             |                  |                       |                        | Conducted Power |             |       |      |                | e.i.r.p. for RSS-247     |             |             |       |      |                |
|----------------|------------------|-----------------------|------------------------|-----------------|-------------|-------|------|----------------|--------------------------|-------------|-------------|-------|------|----------------|
| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result          |             | Limit |      | Margin<br>[dB] | Antenna<br>Gain<br>[dBi] | Result      |             | Limit |      | Margin<br>[dB] |
|                |                  |                       |                        | [dBm]           | [mW]        | [dBm] | [mW] |                |                          | [dBm]       | [mW]        | [dBm] | [mW] |                |
| 2402           | -11.39           | 1.89                  | 9.74                   | 0.24            | 1.06        | 30.00 | 1000 | 29.76          | 0.01                     | 0.25        | 1.06        | 36.02 | 4000 | 35.77          |
| 2440           | -11.22           | 1.90                  | 9.75                   | 0.43            | 1.10        | 30.00 | 1000 | 29.57          | 0.01                     | 0.44        | 1.11        | 36.02 | 4000 | 35.58          |
| 2480           | -11.20           | 1.91                  | 9.75                   | <b>0.46</b>     | <b>1.11</b> | 30.00 | 1000 | 29.54          | 0.01                     | <b>0.47</b> | <b>1.11</b> | 36.02 | 4000 | 35.55          |

| 2M             |                  |                       |                        | Conducted Power |      |       |      |                | e.i.r.p. for RSS-247     |             |             |       |      |                |
|----------------|------------------|-----------------------|------------------------|-----------------|------|-------|------|----------------|--------------------------|-------------|-------------|-------|------|----------------|
| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result          |      | Limit |      | Margin<br>[dB] | Antenna<br>Gain<br>[dBi] | Result      |             | Limit |      | Margin<br>[dB] |
|                |                  |                       |                        | [dBm]           | [mW] | [dBm] | [mW] |                |                          | [dBm]       | [mW]        | [dBm] | [mW] |                |
| 2402           | -11.44           | 1.89                  | 9.74                   | 0.19            | 1.04 | 30.00 | 1000 | 29.81          | 0.01                     | 0.20        | 1.05        | 36.02 | 4000 | 35.82          |
| 2440           | -11.28           | 1.90                  | 9.75                   | 0.37            | 1.09 | 30.00 | 1000 | 29.63          | 0.01                     | 0.38        | 1.09        | 36.02 | 4000 | 35.64          |
| 2480           | -11.24           | 1.91                  | 9.75                   | <b>0.42</b>     | 1.10 | 30.00 | 1000 | 29.58          | 0.01                     | <b>0.43</b> | <b>1.10</b> | 36.02 | 4000 | 35.59          |

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

\*The equipment and cables were not used for factor 0 dB of the data sheets.

## Maximum Peak Output Power

Test place                      Ise EMC Lab. No.6 Measurement Room  
Date                              May 14, 2024  
Temperature / Humidity      21 deg. C / 47 % RH  
Engineer                        Shousei Hamaguchi  
Mode                              Tx ANT+

| Freq. | Reading | Cable Loss | Atten. Loss | Conducted Power |      |       |      |        | Antenna Gain | e.i.r.p. for RSS-247 |      |       |      |        |
|-------|---------|------------|-------------|-----------------|------|-------|------|--------|--------------|----------------------|------|-------|------|--------|
|       |         |            |             | Result          |      | Limit |      | Margin |              | Result               |      | Limit |      | Margin |
|       |         |            |             | [dBm]           | [mW] | [dBm] | [mW] |        |              | [dBm]                | [mW] |       |      |        |
|       |         |            |             |                 |      |       |      |        |              |                      |      | [dB]  |      |        |
| [MHz] | [dBm]   | [dB]       | [dB]        | [dBm]           | [mW] | [dBm] | [mW] | [dB]   | [dBi]        | [dBm]                | [mW] | [dBm] | [mW] | [dB]   |
| 2402  | -7.51   | 1.89       | 9.74        | 4.12            | 2.58 | 30.00 | 1000 | 25.88  | 0.01         | 4.13                 | 2.59 | 36.02 | 4000 | 31.89  |
| 2441  | -7.52   | 1.90       | 9.75        | 4.13            | 2.59 | 30.00 | 1000 | 25.87  | 0.01         | 4.14                 | 2.59 | 36.02 | 4000 | 31.88  |
| 2480  | -7.59   | 1.91       | 9.75        | 4.07            | 2.55 | 30.00 | 1000 | 25.93  | 0.01         | 4.08                 | 2.56 | 36.02 | 4000 | 31.94  |

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

\*The equipment and cables were not used for factor 0 dB of the data sheets.

## Maximum Peak Output Power

Test place                      Ise EMC Lab. No.6 Measurement Room  
Date                                May 12, 2024  
Temperature / Humidity        24 deg. C / 35 % RH  
Engineer                         Takafumi Noguchi  
Mode                                Tx SHIMANO ORIGINAL

| Freq. | Reading | Cable Loss | Atten. Loss | Conducted Power |             |       |      |        | Antenna Gain | e.i.r.p. for RSS-247 |             |       |      |        |
|-------|---------|------------|-------------|-----------------|-------------|-------|------|--------|--------------|----------------------|-------------|-------|------|--------|
|       |         |            |             | Result          |             | Limit |      | Margin |              | Result               |             | Limit |      | Margin |
| [MHz] | [dBm]   | [dB]       | [dB]        | [dBm]           | [mW]        | [dBm] | [mW] | [dB]   | [dBi]        | [dBm]                | [mW]        | [dBm] | [mW] | [dB]   |
| 2478  | 0.07    | 2.38       | 6.13        | <b>8.58</b>     | <b>7.21</b> | 30.00 | 1000 | 21.42  | -0.53        | <b>8.05</b>          | <b>6.38</b> | 36.02 | 4000 | 27.97  |

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

\*The equipment and cables were not used for factor 0 dB of the data sheets.

## Average Output Power (Reference data for RF Exposure)

|                        |                     |                     |
|------------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.        | No.6                |
| Measurement Room       | No.10               |                     |
| Date                   | March 14, 2024      | May 14, 2024        |
| Temperature / Humidity | 22 deg. C / 20 % RH | 21 deg. C / 47 % RH |
| Engineer               | Takafumi Noguchi    | Shousei Hamaguchi   |
| Mode                   | Tx                  |                     |

### BT LE 1M

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>(Time average) |             | Duty<br>factor<br>[dB] | Result<br>(Burst power average) |             |
|----------------|------------------|-----------------------|------------------------|--------------------------|-------------|------------------------|---------------------------------|-------------|
|                |                  |                       |                        | [dBm]                    | [mW]        |                        | [dBm]                           | [mW]        |
| 2402           | -13.82           | 1.89                  | 9.74                   | <b>-2.19</b>             | <b>0.60</b> | 1.97                   | <b>-0.22</b>                    | <b>0.95</b> |
| 2440           | -13.90           | 1.90                  | 9.75                   | -2.25                    | 0.60        | 1.97                   | -0.28                           | 0.94        |
| 2480           | -13.92           | 1.91                  | 9.75                   | -2.26                    | 0.59        | 1.97                   | -0.29                           | 0.94        |

### BT LE 2M

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>(Time average) |             | Duty<br>factor<br>[dB] | Result<br>(Burst power average) |             |
|----------------|------------------|-----------------------|------------------------|--------------------------|-------------|------------------------|---------------------------------|-------------|
|                |                  |                       |                        | [dBm]                    | [mW]        |                        | [dBm]                           | [mW]        |
| 2402           | -16.82           | 1.89                  | 9.74                   | -5.19                    | 0.30        | 4.73                   | -0.46                           | 0.90        |
| 2440           | -16.70           | 1.90                  | 9.75                   | <b>-5.05</b>             | <b>0.31</b> | 4.73                   | <b>-0.32</b>                    | <b>0.93</b> |
| 2480           | -16.71           | 1.91                  | 9.75                   | -5.05                    | 0.31        | 4.73                   | -0.32                           | 0.93        |

### ANT+

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>(Time average) |             | Duty<br>factor<br>[dB] | Result<br>(Burst power average) |             |
|----------------|------------------|-----------------------|------------------------|--------------------------|-------------|------------------------|---------------------------------|-------------|
|                |                  |                       |                        | [dBm]                    | [mW]        |                        | [dBm]                           | [mW]        |
| 2402           | -30.82           | 1.89                  | 9.74                   | <b>-19.19</b>            | <b>0.01</b> | 23.05                  | <b>3.86</b>                     | <b>2.43</b> |
| 2441           | -30.89           | 1.90                  | 9.75                   | -19.24                   | 0.01        | 23.05                  | 3.81                            | 2.40        |
| 2480           | -31.00           | 1.91                  | 9.75                   | -19.34                   | 0.01        | 23.05                  | 3.71                            | 2.35        |

### SHIMANO ORIGINAL

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>(Time average) |             | Duty<br>factor<br>[dB] | Result<br>(Burst power average) |             |
|----------------|------------------|-----------------------|------------------------|--------------------------|-------------|------------------------|---------------------------------|-------------|
|                |                  |                       |                        | [dBm]                    | [mW]        |                        | [dBm]                           | [mW]        |
| 2402           | -0.13            | 2.38                  | 6.13                   | <b>8.38</b>              | <b>6.89</b> | 0.00                   | <b>8.38</b>                     | <b>6.89</b> |

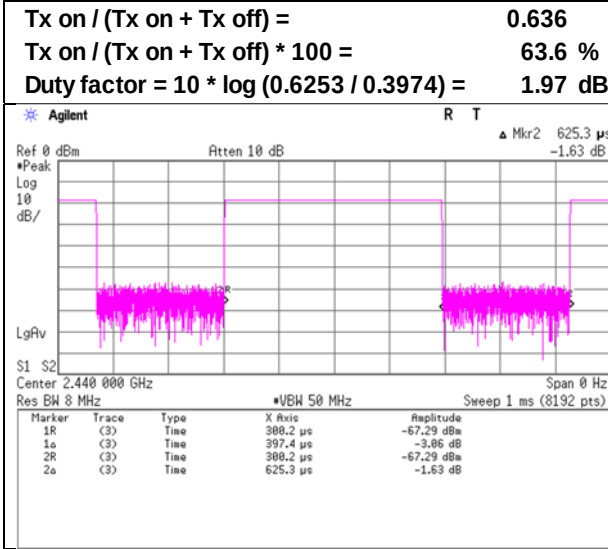
### Sample Calculation:

Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss  
Result (Burst power average) = Time average + Duty factor

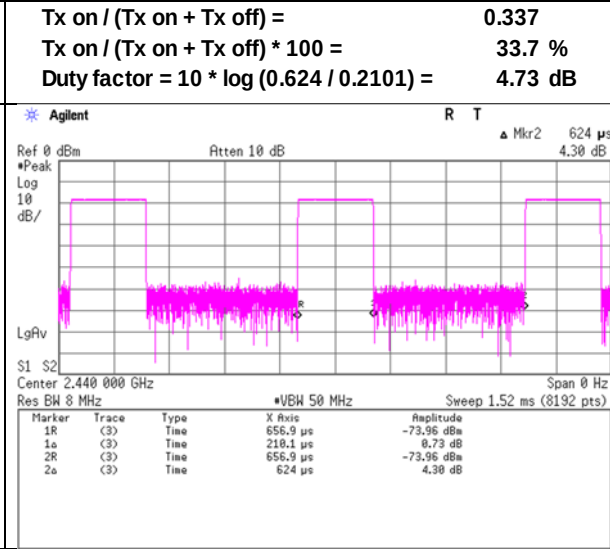
**Burst rate confirmation**

|                        |                                         |
|------------------------|-----------------------------------------|
| Test place             | Ise EMC Lab. No.3 Semi Anechoic Chamber |
| Date                   | May 10, 2024                            |
| Temperature / Humidity | 23 deg. C / 38 % RH                     |
| Engineer               | Tomoya Sone                             |
| Mode                   | Tx                                      |

**BT LE 1M**



**BT LE 2M**

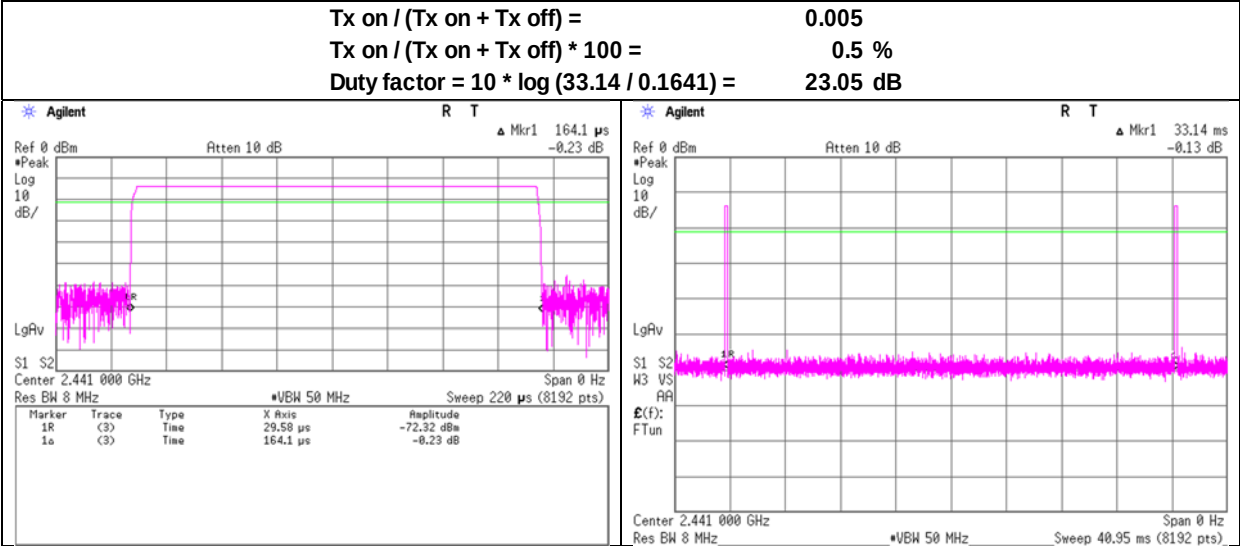


\* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

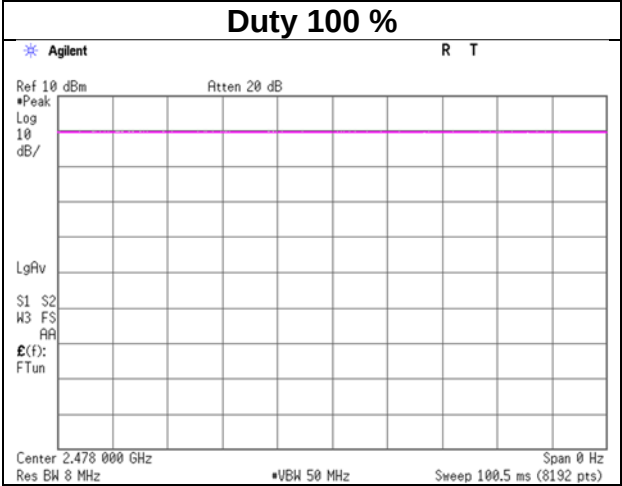
**Burst rate confirmation**

|                        |                                         |
|------------------------|-----------------------------------------|
| Test place             | Ise EMC Lab. No.3 Semi Anechoic Chamber |
| Date                   | May 10, 2024                            |
| Temperature / Humidity | 23 deg. C / 38 % RH                     |
| Engineer               | Tomoya Sone                             |
| Mode                   | Tx                                      |

**ANT+**



**SHIMANO ORIGINAL**

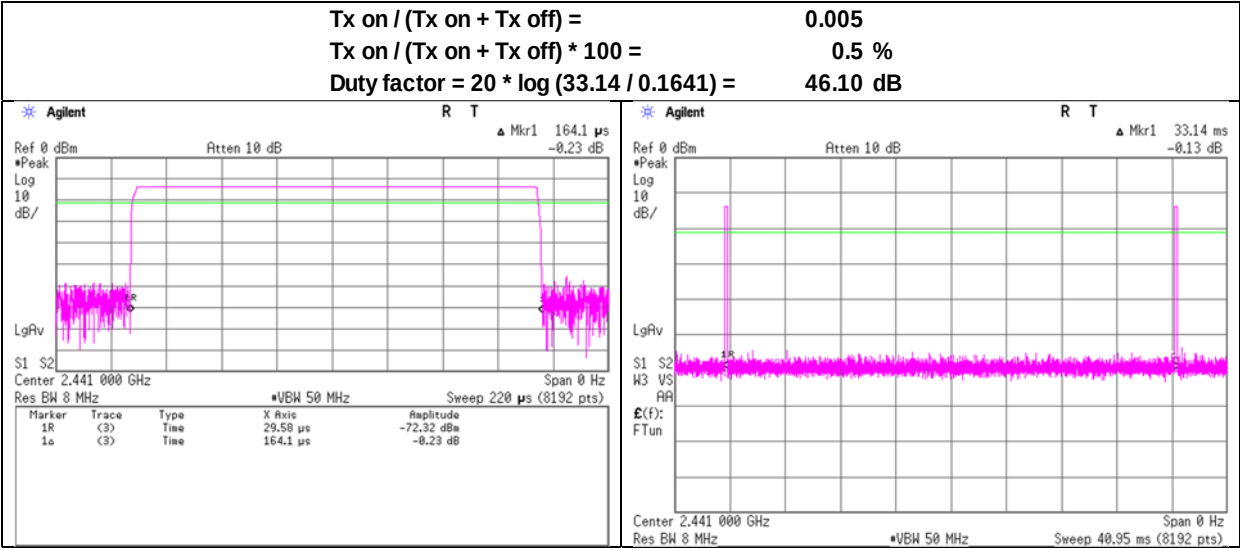


\* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

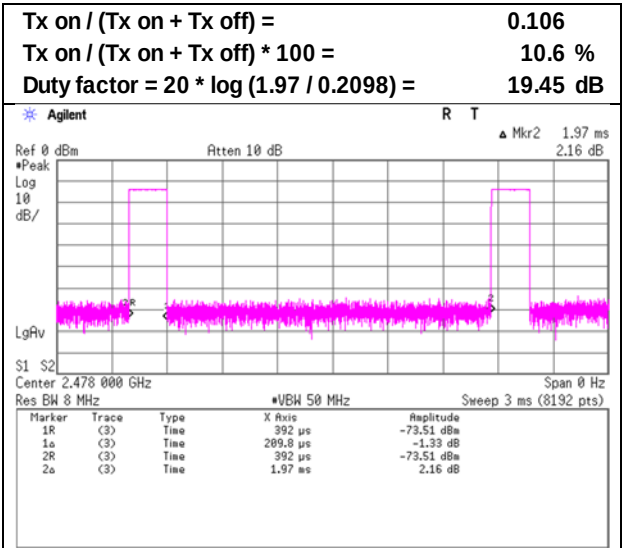
**Burst rate confirmation**  
**(Reference data for Peak with Duty factor)**

Test place                      Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date                              May 10, 2024  
Temperature / Humidity      23 deg. C / 38 % RH  
Engineer                        Tomoya Sone  
Mode                              Tx

**ANT+**



**SHIMANO ORIGINAL**



\* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

**Radiated Spurious Emission**

|                        |                      |                     |                     |
|------------------------|----------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.         |                     |                     |
| Semi Anechoic Chamber  | No.3                 | No.3                | No.2                |
| Date                   | May 9, 2024          | May 10, 2024        | May 17, 2024        |
| Temperature / Humidity | 20 deg. C / 40 % RH  | 23 deg. C / 38 % RH | 22 deg. C / 48 % RH |
| Engineer               | Tetsuro Yoshida      | Tomoya Sone         | Hiroki Numata       |
|                        | (6 GHz to 10 GHz)    | (1 GHz to 6 GHz)    | (Above 10 GHz)      |
| Mode                   | Tx BT LE 1M 2402 MHz |                     |                     |

| Polarity    | Frequency | Reading<br>(QP / PK) | Reading<br>(AV) | Ant.<br>Factor | Loss | Gain | Duty<br>Factor | Result<br>(QP / PK) | Result<br>(AV) | Limit<br>(QP / PK) | Limit<br>(AV) | Margin<br>(QP / PK) | Margin<br>(AV) | Remark      |
|-------------|-----------|----------------------|-----------------|----------------|------|------|----------------|---------------------|----------------|--------------------|---------------|---------------------|----------------|-------------|
| [Hori/Vert] | [MHz]     | [dBuV]               | [dBuV]          | [dB/m]         | [dB] | [dB] | [dB]           | [dBuV/m]            | [dBuV/m]       | [dBuV/m]           | [dBuV/m]      | [dB]                | [dB]           |             |
| Hori.       | 2390.0    | 44.7                 | 31.2            | 27.5           | 5.5  | 32.2 | 2.0            | 45.5                | 34.0           | 73.9               | 53.9          | 28.4                | 19.9           | *1)         |
| Hori.       | 4804.0    | 40.7                 | 32.5            | 31.4           | 7.6  | 31.2 | -              | 48.5                | 40.3           | 73.9               | 53.9          | 25.4                | 13.6           | Floor noise |
| Hori.       | 7206.0    | 44.5                 | 33.4            | 35.6           | 10.7 | 32.0 | -              | 58.7                | 47.7           | 73.9               | 53.9          | 15.2                | 6.2            | Floor noise |
| Hori.       | 9608.0    | 43.6                 | 33.2            | 35.6           | 11.2 | 32.6 | -              | 57.8                | 47.4           | 73.9               | 53.9          | 16.1                | 6.5            | Floor noise |
| Vert.       | 2390.0    | 42.6                 | 31.6            | 27.5           | 5.5  | 32.2 | 2.0            | 43.4                | 34.4           | 73.9               | 53.9          | 30.5                | 19.5           | *1)         |
| Vert.       | 4804.0    | 40.6                 | 32.4            | 31.4           | 7.6  | 31.2 | -              | 48.4                | 40.2           | 73.9               | 53.9          | 25.5                | 13.7           | Floor noise |
| Vert.       | 7206.0    | 44.3                 | 33.6            | 35.6           | 10.7 | 32.0 | -              | 58.6                | 47.8           | 73.9               | 53.9          | 15.3                | 6.1            | Floor noise |
| Vert.       | 9608.0    | 43.6                 | 33.1            | 35.6           | 11.2 | 32.6 | -              | 57.8                | 47.3           | 73.9               | 53.9          | 16.1                | 6.6            | Floor noise |

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)  
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor  
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).  
\*QP detector was used up to 1GHz.  
\*1) Not Out of Band emission(Leakage Power)

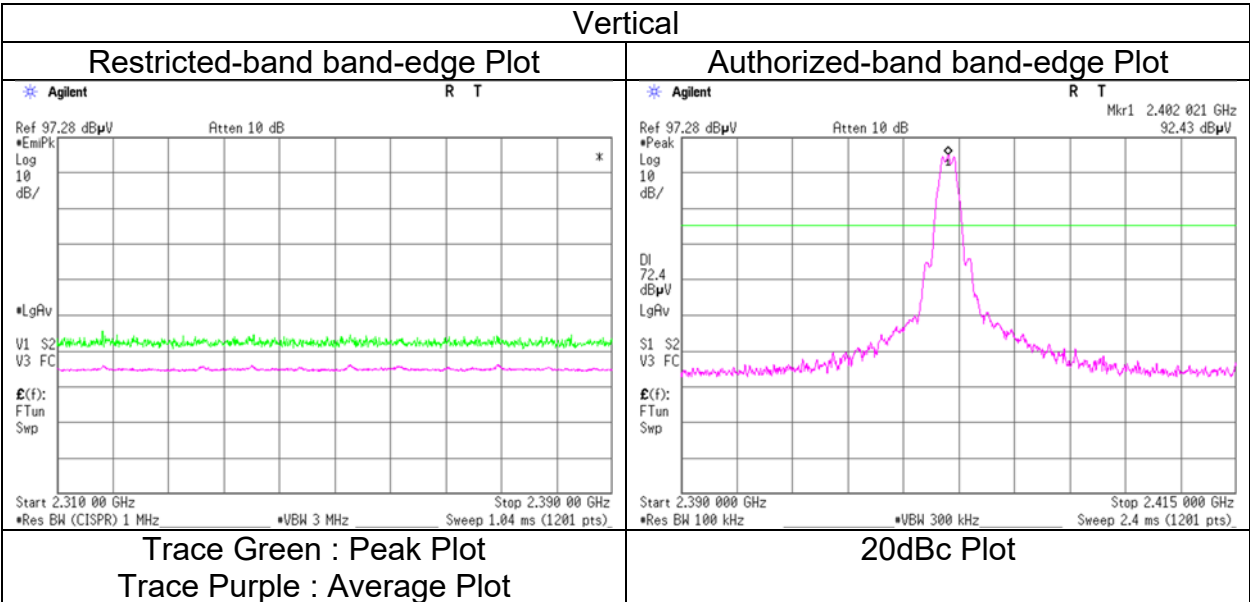
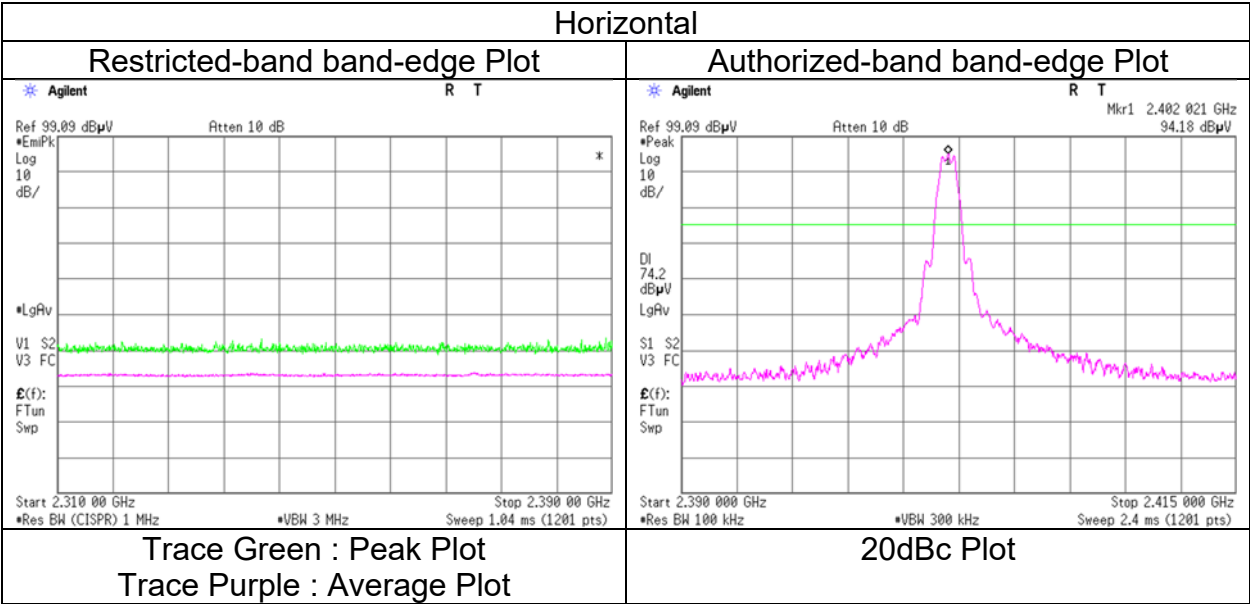
**20dBc Data Sheet**

| Polarity    | Frequency | Reading<br>(PK) | Ant<br>Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|-------------|-----------|-----------------|---------------|------|------|----------|----------|--------|---------|
| [Hori/Vert] | [MHz]     | [dBuV]          | [dB/m]        | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.       | 2402.0    | 94.2            | 27.5          | 5.5  | 32.2 | 95.0     | -        | -      | Carrier |
| Hori.       | 2400.0    | 45.9            | 27.5          | 5.5  | 32.2 | 46.7     | 75.0     | 28.3   |         |
| Vert.       | 2402.0    | 92.4            | 27.5          | 5.5  | 32.2 | 93.2     | -        | -      | Carrier |
| Vert.       | 2400.0    | 44.4            | 27.5          | 5.5  | 32.2 | 45.1     | 73.2     | 28.1   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)  
Distance factor:  
1 GHz - 6 GHz      20log (4 m / 3.0 m) = 2.5 dB  
6 GHz - 10 GHz      20log (5 m / 3.0 m) = 4.44 dB  
10 GHz - 26.5 GHz      20log (1.0 m / 3.0 m) = -9.5 dB

**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

|                        |                      |
|------------------------|----------------------|
| Test place             | Ise EMC Lab.         |
| Semi Anechoic Chamber  | No.3                 |
| Date                   | May 10, 2024         |
| Temperature / Humidity | 23 deg. C / 38 % RH  |
| Engineer               | Tomoya Sone          |
|                        | (1 GHz to 6 GHz)     |
| Mode                   | Tx BT LE 1M 2402 MHz |



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge and authorized band edge were shown in tabular data.

Radiated Spurious Emission

Test place  
Semi Anechoic Chamber  
Date  
Temperature / Humidity  
Engineer  
Mode

Ise EMC Lab.  
No.3  
May 9, 2024  
20 deg. C / 40 % RH  
Tetsuro Yoshida  
(6 GHz to 10 GHz)  
Tx BT LE 1M 2440 MHz

No.3  
May 10, 2024  
23 deg. C / 38 % RH  
Tomoya Sone  
(1 GHz to 6 GHz)

No.2  
May 17, 2024  
22 deg. C / 48 % RH  
Hiroki Numata  
(Above 10 GHz)

| Polarity    | Frequency | Reading<br>(QP / PK) | Reading<br>(AV) | Ant.<br>Factor | Loss | Gain | Duty<br>Factor | Result<br>(QP / PK) | Result<br>(AV) | Limit<br>(QP / PK) | Limit<br>(AV) | Margin<br>(QP / PK) | Margin<br>(AV) | Remark      |
|-------------|-----------|----------------------|-----------------|----------------|------|------|----------------|---------------------|----------------|--------------------|---------------|---------------------|----------------|-------------|
| [Hori/Vert] | [MHz]     | [dBuV]               | [dBuV]          | [dB/m]         | [dB] | [dB] | [dB]           | [dBuV/m]            | [dBuV/m]       | [dBuV/m]           | [dBuV/m]      | [dB]                | [dB]           |             |
| Hori.       | 4880.0    | 41.3                 | 31.9            | 31.4           | 7.6  | 31.2 | -              | 49.2                | 39.7           | 73.9               | 53.9          | 24.7                | 14.2           | Floor noise |
| Hori.       | 7320.0    | 43.6                 | 33.4            | 35.6           | 10.7 | 32.1 | -              | 57.8                | 47.7           | 73.9               | 53.9          | 16.1                | 6.2            | Floor noise |
| Hori.       | 9760.0    | 43.0                 | 33.1            | 35.9           | 11.3 | 32.7 | -              | 57.5                | 47.6           | 73.9               | 53.9          | 16.4                | 6.3            | Floor noise |
| Vert.       | 4880.0    | 41.5                 | 31.7            | 31.4           | 7.6  | 31.2 | -              | 49.4                | 39.6           | 73.9               | 53.9          | 24.6                | 14.3           | Floor noise |
| Vert.       | 7320.0    | 43.6                 | 33.1            | 35.6           | 10.7 | 32.1 | -              | 57.9                | 47.4           | 73.9               | 53.9          | 16.0                | 6.5            | Floor noise |
| Vert.       | 9760.0    | 43.6                 | 33.3            | 35.9           | 11.3 | 32.7 | -              | 58.1                | 47.8           | 73.9               | 53.9          | 15.8                | 6.1            | Floor noise |

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)  
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor  
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).  
\*QP detector was used up to 1GHz.

Distance factor:      1 GHz - 6 GHz      20log (4 m / 3.0 m) = 2.5 dB  
                             6 GHz - 10 GHz      20log (5 m / 3.0 m) = 4.44 dB  
                             10 GHz - 26.5 GHz      20log (1.0 m / 3.0 m) = -9.5 dB

**Radiated Spurious Emission**

|                        |                                      |                                 |                                    |                                 |
|------------------------|--------------------------------------|---------------------------------|------------------------------------|---------------------------------|
| Test place             | Ise EMC Lab.                         |                                 |                                    |                                 |
| Semi Anechoic Chamber  | No.3                                 | No.3                            | No.2                               | No.2                            |
| Date                   | May 9, 2024                          | May 10, 2024                    | May 16, 2024                       | May 17, 2024                    |
| Temperature / Humidity | 20 deg. C / 40 % RH                  | 23 deg. C / 38 % RH             | 24 deg. C / 58 % RH                | 22 deg. C / 48 % RH             |
| Engineer               | Tetsuro Yoshida<br>(6 GHz to 10 GHz) | Tomoya Sone<br>(1 GHz to 6 GHz) | Hiroyuki Furutaka<br>(Below 1 GHz) | Hiroki Numata<br>(Above 10 GHz) |
| Mode                   | Tx BT LE 1M 2480 MHz                 |                                 |                                    |                                 |

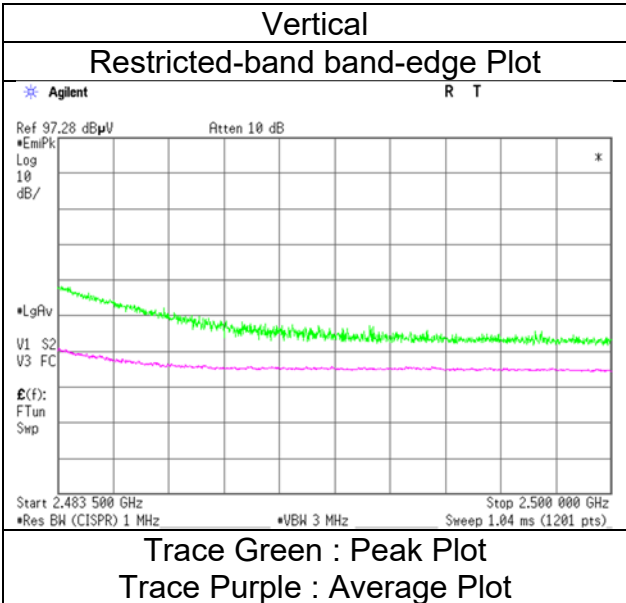
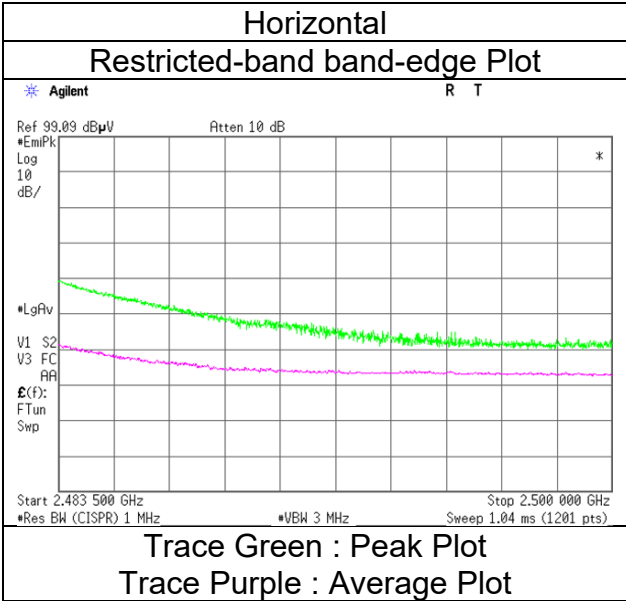
| Polarity    | Frequency | Reading<br>(QP / PK) | Reading<br>(AV) | Ant.<br>Factor | Loss | Gain | Duty<br>Factor | Result<br>(QP / PK) | Result<br>(AV) | Limit<br>(QP / PK) | Limit<br>(AV) | Margin<br>(QP / PK) | Margin<br>(AV) | Remark      |
|-------------|-----------|----------------------|-----------------|----------------|------|------|----------------|---------------------|----------------|--------------------|---------------|---------------------|----------------|-------------|
| [Hori/Vert] | [MHz]     | [dBuV]               | [dBuV]          | [dB/m]         | [dB] | [dB] | [dB]           | [dBuV/m]            | [dBuV/m]       | [dBuV/m]           | [dBuV/m]      | [dB]                | [dB]           |             |
| Hori.       | 38.6      | 20.4                 | -               | 15.3           | 6.7  | 28.5 | -              | 13.9                | -              | 40.0               | -             | 26.1                | -              |             |
| Hori.       | 63.6      | 21.8                 | -               | 7.0            | 7.0  | 28.5 | -              | 7.3                 | -              | 40.0               | -             | 32.7                | -              |             |
| Hori.       | 84.5      | 22.1                 | -               | 7.5            | 7.2  | 28.4 | -              | 8.4                 | -              | 40.0               | -             | 31.6                | -              |             |
| Hori.       | 89.0      | 22.5                 | -               | 8.3            | 7.3  | 28.4 | -              | 9.7                 | -              | 43.5               | -             | 33.9                | -              |             |
| Hori.       | 118.9     | 21.3                 | -               | 12.7           | 7.5  | 28.3 | -              | 13.2                | -              | 43.5               | -             | 30.3                | -              |             |
| Hori.       | 208.3     | 20.3                 | -               | 11.6           | 8.2  | 27.9 | -              | 12.1                | -              | 43.5               | -             | 31.4                | -              |             |
| Hori.       | 2483.5    | 58.9                 | 44.0            | 27.4           | 5.6  | 32.2 | 2.0            | 59.7                | 46.7           | 73.9               | 53.9          | 14.2                | 7.2            | *1)         |
| Hori.       | 4960.0    | 41.0                 | 32.3            | 31.6           | 7.6  | 31.1 | -              | 49.0                | 40.4           | 73.9               | 53.9          | 24.9                | 13.5           | Floor noise |
| Hori.       | 7440.0    | 43.6                 | 33.5            | 35.5           | 10.7 | 32.1 | -              | 57.7                | 47.6           | 73.9               | 53.9          | 16.2                | 6.3            | Floor noise |
| Hori.       | 9920.0    | 43.9                 | 33.2            | 36.1           | 11.3 | 32.8 | -              | 58.5                | 47.9           | 73.9               | 53.9          | 15.4                | 6.0            | Floor noise |
| Vert.       | 38.6      | 21.7                 | -               | 15.3           | 6.7  | 28.5 | -              | 15.2                | -              | 40.0               | -             | 24.8                | -              |             |
| Vert.       | 63.6      | 22.0                 | -               | 7.0            | 7.0  | 28.5 | -              | 7.5                 | -              | 40.0               | -             | 32.5                | -              |             |
| Vert.       | 84.5      | 22.5                 | -               | 7.5            | 7.2  | 28.4 | -              | 8.8                 | -              | 40.0               | -             | 31.2                | -              |             |
| Vert.       | 89.0      | 22.5                 | -               | 8.3            | 7.3  | 28.4 | -              | 9.7                 | -              | 43.5               | -             | 33.9                | -              |             |
| Vert.       | 118.9     | 21.2                 | -               | 12.7           | 7.5  | 28.3 | -              | 13.1                | -              | 43.5               | -             | 30.4                | -              |             |
| Vert.       | 208.3     | 20.4                 | -               | 11.6           | 8.2  | 27.9 | -              | 12.2                | -              | 43.5               | -             | 31.3                | -              |             |
| Vert.       | 2483.5    | 56.5                 | 40.6            | 27.4           | 5.6  | 32.2 | 2.0            | 57.3                | 43.3           | 73.9               | 53.9          | 16.6                | 10.6           | *1)         |
| Vert.       | 4960.0    | 40.8                 | 32.3            | 31.6           | 7.6  | 31.1 | -              | 48.9                | 40.3           | 73.9               | 53.9          | 25.0                | 13.6           | Floor noise |
| Vert.       | 7440.0    | 43.6                 | 33.4            | 35.5           | 10.7 | 32.1 | -              | 57.6                | 47.5           | 73.9               | 53.9          | 16.3                | 6.4            | Floor noise |
| Vert.       | 9920.0    | 43.7                 | 33.2            | 36.1           | 11.3 | 32.8 | -              | 58.4                | 47.8           | 73.9               | 53.9          | 15.5                | 6.1            | Floor noise |

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)  
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor  
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).  
\*QP detector was used up to 1GHz.  
\*1) Not Out of Band emission(Leakage Power)

Distance factor:      1 GHz - 6 GHz      20log (4 m / 3.0 m) = 2.5 dB  
                              6 GHz - 10 GHz      20log (5 m / 3.0 m) = 4.44 dB  
                              10 GHz - 26.5 GHz      20log (1.0 m / 3.0 m) = -9.5 dB

**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

|                        |                      |
|------------------------|----------------------|
| Test place             | Ise EMC Lab.         |
| Semi Anechoic Chamber  | No.3                 |
| Date                   | May 10, 2024         |
| Temperature / Humidity | 23 deg. C / 38 % RH  |
| Engineer               | Tomoya Sone          |
|                        | (1 GHz to 6 GHz)     |
| Mode                   | Tx BT LE 1M 2480 MHz |



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

**Radiated Spurious Emission**

|                        |                      |                     |                     |
|------------------------|----------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.         |                     |                     |
| Semi Anechoic Chamber  | No.3                 | No.3                | No.2                |
| Date                   | May 9, 2024          | May 10, 2024        | May 17, 2024        |
| Temperature / Humidity | 20 deg. C / 40 % RH  | 23 deg. C / 38 % RH | 22 deg. C / 48 % RH |
| Engineer               | Tetsuro Yoshida      | Tomoya Sone         | Hiroki Numata       |
|                        | (6 GHz to 10 GHz)    | (1 GHz to 6 GHz)    | (Above 10 GHz)      |
| Mode                   | Tx BT LE 2M 2402 MHz |                     |                     |

| Polarity    | Frequency | Reading   | Reading | Ant.   | Loss | Gain | Duty | Result    | Result   | Limit     | Limit    | Margin    | Margin | Remark      |
|-------------|-----------|-----------|---------|--------|------|------|------|-----------|----------|-----------|----------|-----------|--------|-------------|
| [Hori/Vert] | [MHz]     | (QP / PK) | (AV)    | Factor |      |      |      | (QP / PK) | (AV)     | (QP / PK) | (AV)     | (QP / PK) | (AV)   |             |
|             |           | [dBuV]    | [dBuV]  | [dB/m] | [dB] | [dB] | [dB] | [dBuV/m]  | [dBuV/m] | [dBuV/m]  | [dBuV/m] | [dB]      | [dB]   |             |
| Hori.       | 2390.0    | 45.1      | 31.7    | 27.5   | 5.5  | 32.2 | 4.7  | 45.9      | 37.2     | 73.9      | 53.9     | 28.1      | 16.7   | *1)         |
| Hori.       | 4804.0    | 40.8      | 32.5    | 31.4   | 7.6  | 31.2 | -    | 48.6      | 40.4     | 73.9      | 53.9     | 25.3      | 13.6   | Floor noise |
| Hori.       | 7206.0    | 44.2      | 33.3    | 35.6   | 10.7 | 32.0 | -    | 58.5      | 47.6     | 73.9      | 53.9     | 15.4      | 6.3    | Floor noise |
| Hori.       | 9608.0    | 43.5      | 33.2    | 35.6   | 11.2 | 32.6 | -    | 57.7      | 47.3     | 73.9      | 53.9     | 16.2      | 6.6    | Floor noise |
| Vert.       | 2390.0    | 42.9      | 31.4    | 27.5   | 5.5  | 32.2 | 4.7  | 43.7      | 36.9     | 73.9      | 53.9     | 30.2      | 17.0   | *1)         |
| Vert.       | 4804.0    | 40.7      | 32.7    | 31.4   | 7.6  | 31.2 | -    | 48.5      | 40.5     | 73.9      | 53.9     | 25.4      | 13.4   | Floor noise |
| Vert.       | 7206.0    | 44.2      | 33.4    | 35.6   | 10.7 | 32.0 | -    | 58.4      | 47.7     | 73.9      | 53.9     | 15.5      | 6.2    | Floor noise |
| Vert.       | 9608.0    | 43.7      | 33.3    | 35.6   | 11.2 | 32.6 | -    | 57.9      | 47.5     | 73.9      | 53.9     | 16.0      | 6.4    | Floor noise |

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)  
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor  
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).  
\*QP detector was used up to 1GHz.  
\*1) Not Out of Band emission(Leakage Power)

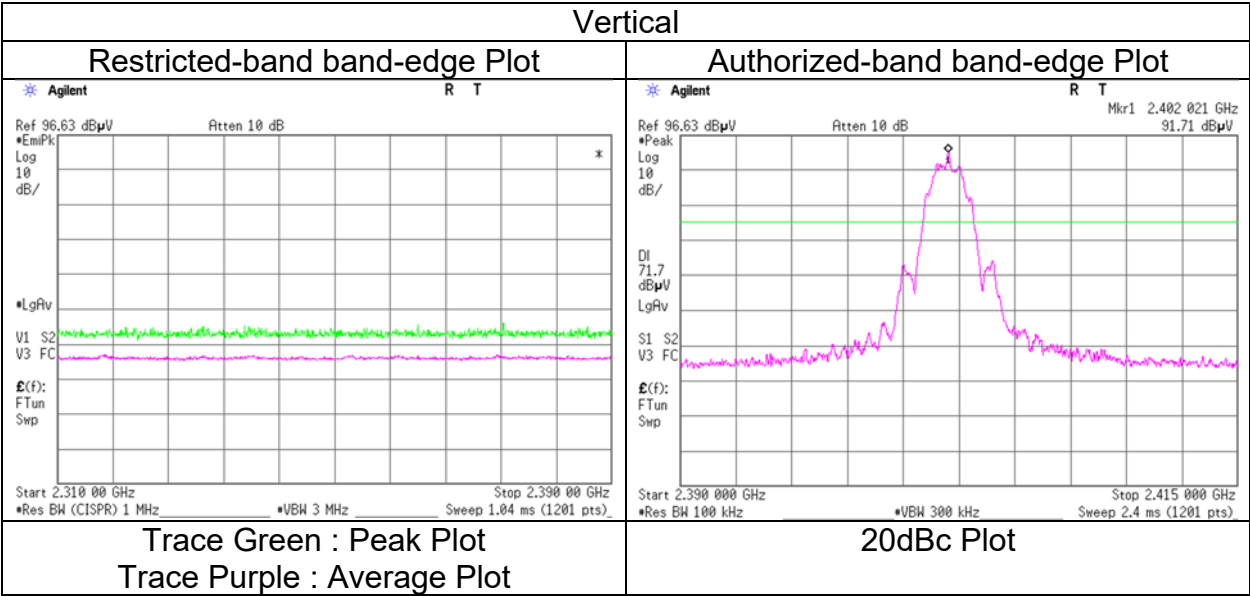
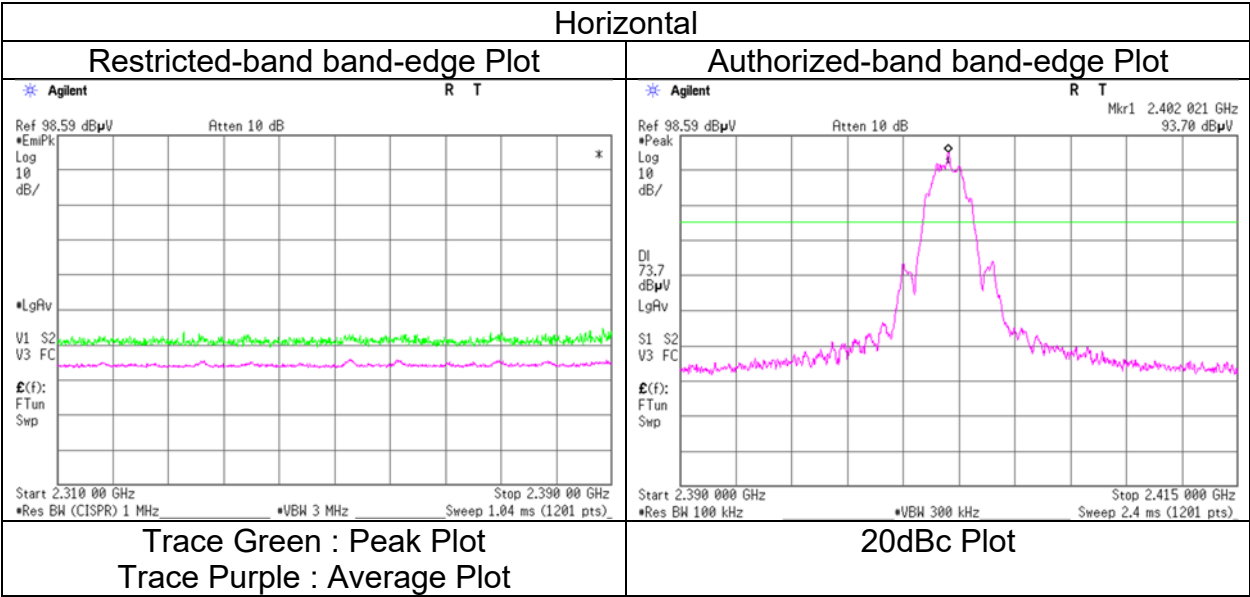
20dBc Data Sheet

| Polarity    | Frequency | Reading | Ant    | Loss | Gain | Result   | Limit    | Margin | Remark  |
|-------------|-----------|---------|--------|------|------|----------|----------|--------|---------|
| [Hori/Vert] | [MHz]     | (PK)    | Factor |      |      | [dBuV/m] | [dBuV/m] | [dB]   |         |
|             |           | [dBuV]  | [dB/m] | [dB] | [dB] |          |          |        |         |
| Hori.       | 2402.0    | 93.7    | 27.5   | 5.5  | 32.2 | 94.5     | -        | -      | Carrier |
| Hori.       | 2400.0    | 62.2    | 27.5   | 5.5  | 32.2 | 63.0     | 74.5     | 11.5   |         |
| Vert.       | 2402.0    | 91.7    | 27.5   | 5.5  | 32.2 | 92.5     | -        | -      | Carrier |
| Vert.       | 2400.0    | 60.0    | 27.5   | 5.5  | 32.2 | 60.8     | 72.5     | 11.7   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)  
Distance factor: 1 GHz - 6 GHz 20log (4 m / 3.0 m) = 2.5 dB  
6 GHz - 10 GHz 20log (5 m / 3.0 m) = 4.44 dB  
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

|                        |                      |
|------------------------|----------------------|
| Test place             | Ise EMC Lab.         |
| Semi Anechoic Chamber  | No.3                 |
| Date                   | May 10, 2024         |
| Temperature / Humidity | 23 deg. C / 38 % RH  |
| Engineer               | Tomoya Sone          |
|                        | (1 GHz to 6 GHz)     |
| Mode                   | Tx BT LE 2M 2402 MHz |



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge and authorized band edge were shown in tabular data.

**Radiated Spurious Emission**

|                        |                      |                     |                     |
|------------------------|----------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.         |                     |                     |
| Semi Anechoic Chamber  | No.3                 | No.3                | No.2                |
| Date                   | May 9, 2024          | May 10, 2024        | May 17, 2024        |
| Temperature / Humidity | 20 deg. C / 40 % RH  | 23 deg. C / 38 % RH | 22 deg. C / 48 % RH |
| Engineer               | Tetsuro Yoshida      | Tomoya Sone         | Hiroki Numata       |
|                        | (6 GHz to 10 GHz)    | (1 GHz to 6 GHz)    | (Above 10 GHz)      |
| Mode                   | Tx BT LE 2M 2440 MHz |                     |                     |

| Polarity    | Frequency | Reading<br>(QP / PK) | Reading<br>(AV) | Ant.<br>Factor | Loss | Gain | Duty<br>Factor | Result<br>(QP / PK) | Result<br>(AV) | Limit<br>(QP / PK) | Limit<br>(AV) | Margin<br>(QP / PK) | Margin<br>(AV) | Remark      |
|-------------|-----------|----------------------|-----------------|----------------|------|------|----------------|---------------------|----------------|--------------------|---------------|---------------------|----------------|-------------|
| [Hori/Vert] | [MHz]     | [dBuV]               | [dBuV]          | [dB/m]         | [dB] | [dB] | [dB]           | [dBuV/m]            | [dBuV/m]       | [dBuV/m]           | [dBuV/m]      | [dB]                | [dB]           |             |
| Hori.       | 4880.0    | 41.6                 | 31.8            | 31.4           | 7.6  | 31.2 | -              | 49.4                | 39.6           | 73.9               | 53.9          | 24.5                | 14.3           | Floor noise |
| Hori.       | 7320.0    | 43.8                 | 33.3            | 35.6           | 10.7 | 32.1 | -              | 58.1                | 47.5           | 73.9               | 53.9          | 15.8                | 6.4            | Floor noise |
| Hori.       | 9760.0    | 43.5                 | 33.3            | 35.9           | 11.3 | 32.7 | -              | 58.0                | 47.8           | 73.9               | 53.9          | 15.9                | 6.1            | Floor noise |
| Vert.       | 4880.0    | 41.4                 | 31.6            | 31.4           | 7.6  | 31.2 | -              | 49.3                | 39.5           | 73.9               | 53.9          | 24.6                | 14.4           | Floor noise |
| Vert.       | 7320.0    | 43.3                 | 33.1            | 35.6           | 10.7 | 32.1 | -              | 57.6                | 47.3           | 73.9               | 53.9          | 16.3                | 6.6            | Floor noise |
| Vert.       | 9760.0    | 43.7                 | 33.2            | 35.9           | 11.3 | 32.7 | -              | 58.2                | 47.7           | 73.9               | 53.9          | 15.7                | 6.2            | Floor noise |

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)  
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor  
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).  
\*QP detector was used up to 1GHz.

|                  |                   |                                 |
|------------------|-------------------|---------------------------------|
| Distance factor: | 1 GHz - 6 GHz     | 20log (4 m / 3.0 m) = 2.5 dB    |
|                  | 6 GHz - 10 GHz    | 20log (5 m / 3.0 m) = 4.44 dB   |
|                  | 10 GHz - 26.5 GHz | 20log (1.0 m / 3.0 m) = -9.5 dB |

**Radiated Spurious Emission**

|                        |                      |                     |                     |                     |
|------------------------|----------------------|---------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.         |                     |                     |                     |
| Semi Anechoic Chamber  | No.3                 | No.3                | No.2                | No.2                |
| Date                   | May 9, 2024          | May 10, 2024        | May 16, 2024        | May 17, 2024        |
| Temperature / Humidity | 20 deg. C / 40 % RH  | 23 deg. C / 38 % RH | 24 deg. C / 58 % RH | 22 deg. C / 48 % RH |
| Engineer               | Tetsuro Yoshida      | Tomoya Sone         | Hiroyuki Furutaka   | Hiroki Numata       |
|                        | (6 GHz to 10 GHz)    | (1 GHz to 6 GHz)    | (Below 1 GHz)       | (Above 10 GHz)      |
| Mode                   | Tx BT LE 2M 2480 MHz |                     |                     |                     |

| Polarity    | Frequency | Reading<br>(QP / PK) | Reading<br>(AV) | Ant.<br>Factor | Loss | Gain | Duty<br>Factor | Result<br>(QP / PK) | Result<br>(AV) | Limit<br>(QP / PK) | Limit<br>(AV) | Margin<br>(QP / PK) | Margin<br>(AV) | Remark      |
|-------------|-----------|----------------------|-----------------|----------------|------|------|----------------|---------------------|----------------|--------------------|---------------|---------------------|----------------|-------------|
| [Hori/Vert] | [MHz]     | [dBuV]               | [dBuV]          | [dB/m]         | [dB] | [dB] | [dB]           | [dBuV/m]            | [dBuV/m]       | [dBuV/m]           | [dBuV/m]      | [dB]                | [dB]           |             |
| Hori.       | 38.7      | 20.5                 | -               | 15.3           | 6.7  | 28.5 | -              | 14.0                | -              | 40.0               | -             | 26.0                | -              |             |
| Hori.       | 65.0      | 21.9                 | -               | 6.8            | 7.1  | 28.5 | -              | 7.2                 | -              | 40.0               | -             | 32.8                | -              |             |
| Hori.       | 84.0      | 22.2                 | -               | 7.5            | 7.2  | 28.5 | -              | 8.4                 | -              | 40.0               | -             | 31.6                | -              |             |
| Hori.       | 89.0      | 22.5                 | -               | 8.3            | 7.3  | 28.4 | -              | 9.7                 | -              | 43.5               | -             | 33.9                | -              |             |
| Hori.       | 119.0     | 21.3                 | -               | 12.7           | 7.5  | 28.3 | -              | 13.2                | -              | 43.5               | -             | 30.3                | -              |             |
| Hori.       | 209.0     | 20.3                 | -               | 11.6           | 8.2  | 27.9 | -              | 12.1                | -              | 43.5               | -             | 31.4                | -              |             |
| Hori.       | 2483.5    | 58.4                 | 34.3            | 27.4           | 5.6  | 32.2 | 4.7            | 59.1                | 39.8           | 73.9               | 53.9          | 14.8                | 14.2           | *1)         |
| Hori.       | 4960.0    | 39.8                 | 32.3            | 31.6           | 7.6  | 31.1 | -              | 47.9                | 40.3           | 73.9               | 53.9          | 26.1                | 13.6           | Floor noise |
| Hori.       | 7440.0    | 43.3                 | 33.2            | 35.5           | 10.7 | 32.1 | -              | 57.3                | 47.3           | 73.9               | 53.9          | 16.6                | 6.6            | Floor noise |
| Hori.       | 9920.0    | 43.7                 | 33.2            | 36.1           | 11.3 | 32.8 | -              | 58.3                | 47.8           | 73.9               | 53.9          | 15.6                | 6.1            | Floor noise |
| Vert.       | 38.7      | 21.8                 | -               | 15.3           | 6.7  | 28.5 | -              | 15.3                | -              | 40.0               | -             | 24.7                | -              |             |
| Vert.       | 65.0      | 22.1                 | -               | 6.8            | 7.1  | 28.5 | -              | 7.4                 | -              | 40.0               | -             | 32.6                | -              |             |
| Vert.       | 84.0      | 22.6                 | -               | 7.5            | 7.2  | 28.5 | -              | 8.8                 | -              | 40.0               | -             | 31.2                | -              |             |
| Vert.       | 89.0      | 22.5                 | -               | 8.3            | 7.3  | 28.4 | -              | 9.7                 | -              | 43.5               | -             | 33.9                | -              |             |
| Vert.       | 119.0     | 21.2                 | -               | 12.7           | 7.5  | 28.3 | -              | 13.1                | -              | 43.5               | -             | 30.4                | -              |             |
| Vert.       | 209.0     | 20.4                 | -               | 11.6           | 8.2  | 27.9 | -              | 12.2                | -              | 43.5               | -             | 31.3                | -              |             |
| Vert.       | 2483.5    | 55.1                 | 40.7            | 27.4           | 5.6  | 32.2 | 4.7            | 55.8                | 46.2           | 73.9               | 53.9          | 18.1                | 7.7            | *1)         |
| Vert.       | 4960.0    | 39.9                 | 32.4            | 31.6           | 7.6  | 31.1 | -              | 48.0                | 40.4           | 73.9               | 53.9          | 25.9                | 13.5           | Floor noise |
| Vert.       | 7440.0    | 43.3                 | 33.4            | 35.5           | 10.7 | 32.1 | -              | 57.3                | 47.4           | 73.9               | 53.9          | 16.6                | 6.5            | Floor noise |
| Vert.       | 9920.0    | 43.3                 | 33.2            | 36.1           | 11.3 | 32.8 | -              | 57.9                | 47.8           | 73.9               | 53.9          | 16.0                | 6.1            | Floor noise |

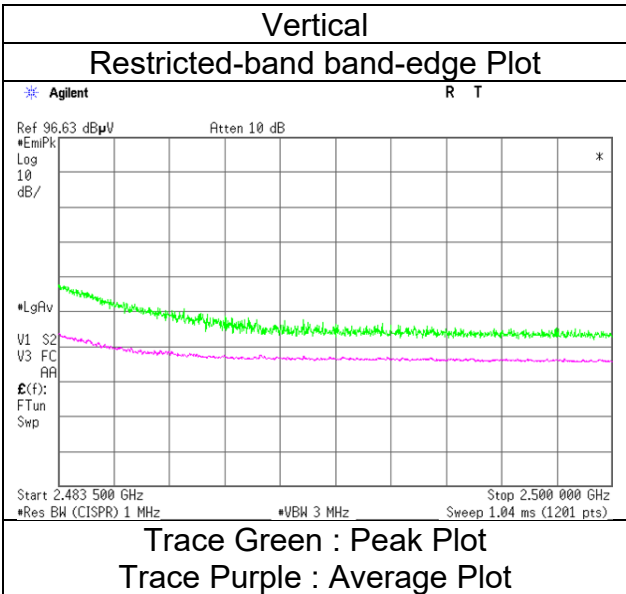
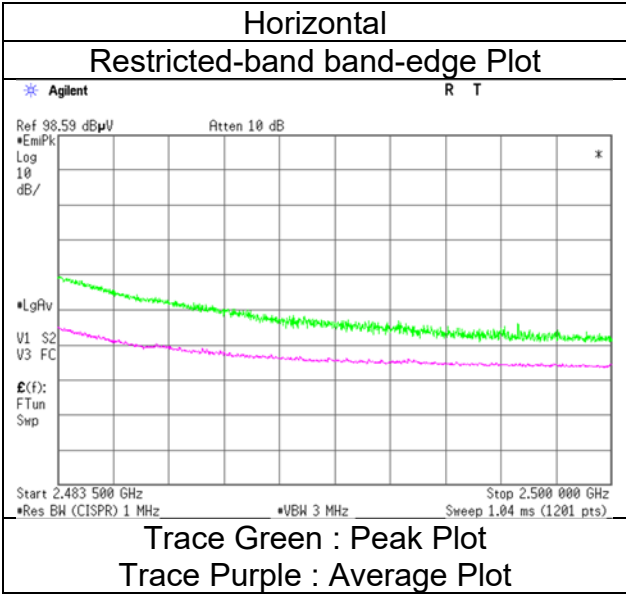
Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)  
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor  
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).  
\*QP detector was used up to 1GHz.  
\*1) Not Out of Band emission(Leakage Power)

|                  |                   |                                 |
|------------------|-------------------|---------------------------------|
| Distance factor: | 1 GHz - 6 GHz     | 20log (4 m / 3.0 m) = 2.5 dB    |
|                  | 6 GHz - 10 GHz    | 20log (5 m / 3.0 m) = 4.44 dB   |
|                  | 10 GHz - 26.5 GHz | 20log (1.0 m / 3.0 m) = -9.5 dB |

**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Test place  
Semi Anechoic Chamber  
Date  
Temperature / Humidity  
Engineer  
  
Mode

Ise EMC Lab.  
No.3  
May 10, 2024  
23 deg. C / 38 % RH  
Tomoya Sone  
(1 GHz to 6 GHz)  
Tx BT LE 2M 2480 MHz



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

## Radiated Spurious Emission

|                        |                     |                     |                     |
|------------------------|---------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.        | No.3                | No.2                |
| Semi Anechoic Chamber  | No.3                | No.3                | No.2                |
| Date                   | May 9, 2024         | May 10, 2024        | May 17, 2024        |
| Temperature / Humidity | 20 deg. C / 40 % RH | 23 deg. C / 38 % RH | 22 deg. C / 48 % RH |
| Engineer               | Tetsuro Yoshida     | Tomoya Sone         | Hiroki Numata       |
|                        | (6 GHz to 10 GHz)   | (1 GHz to 6 GHz)    | (Above 10 GHz)      |
| Mode                   | Tx ANT+ 2402 MHz    |                     |                     |

| Polarity    | Frequency | Reading<br>(QP / PK) | Reading<br>(AV) | Ant.<br>Factor | Loss | Gain | Duty<br>Factor | Result<br>(QP / PK) | Result<br>(AV) | Limit<br>(QP / PK) | Limit<br>(AV) | Margin<br>(QP / PK) | Margin<br>(AV) | Remark      |
|-------------|-----------|----------------------|-----------------|----------------|------|------|----------------|---------------------|----------------|--------------------|---------------|---------------------|----------------|-------------|
| [Hori/Vert] | [MHz]     | [dBuV]               | [dBuV]          | [dB/m]         | [dB] | [dB] | [dB]           | [dBuV/m]            | [dBuV/m]       | [dBuV/m]           | [dBuV/m]      | [dB]                | [dB]           |             |
| Hori.       | 2390.0    | 51.1                 | -               | 27.5           | 5.5  | 32.2 | -              | 51.9                | -              | 73.9               | -             | 22.0                | -              | *1)         |
| Hori.       | 4804.0    | 40.6                 | 32.3            | 31.4           | 7.6  | 31.2 | -              | 48.4                | 40.1           | 73.9               | 53.9          | 25.5                | 13.8           | Floor noise |
| Hori.       | 7206.0    | 44.5                 | 33.4            | 35.6           | 10.7 | 32.0 | -              | 58.8                | 47.7           | 73.9               | 53.9          | 15.1                | 6.2            | Floor noise |
| Hori.       | 9608.0    | 43.3                 | 33.4            | 35.6           | 11.2 | 32.6 | -              | 57.5                | 47.5           | 73.9               | 53.9          | 16.4                | 6.4            | Floor noise |
| Vert.       | 2390.0    | 49.5                 | -               | 27.5           | 5.5  | 32.2 | -              | 50.3                | -              | 73.9               | -             | 23.6                | -              | *1)         |
| Vert.       | 4804.0    | 40.5                 | 32.2            | 31.4           | 7.6  | 31.2 | -              | 48.3                | 40.0           | 73.9               | 53.9          | 25.6                | 13.9           | Floor noise |
| Vert.       | 7206.0    | 44.3                 | 33.4            | 35.6           | 10.7 | 32.0 | -              | 58.5                | 47.7           | 73.9               | 53.9          | 15.4                | 6.2            | Floor noise |
| Vert.       | 9608.0    | 43.4                 | 33.3            | 35.6           | 11.2 | 32.6 | -              | 57.6                | 47.4           | 73.9               | 53.9          | 16.3                | 6.5            | Floor noise |

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)  
 Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor  
 \*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).  
 \*QP detector was used up to 1GHz.  
 \*1) Not Out of Band emission(Leakage Power)

### 20dBc Data Sheet

| Polarity    | Frequency | Reading<br>(PK) | Ant<br>Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|-------------|-----------|-----------------|---------------|------|------|----------|----------|--------|---------|
| [Hori/Vert] | [MHz]     | [dBuV]          | [dB/m]        | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.       | 2402.0    | 98.4            | 27.5          | 5.5  | 32.2 | 99.2     | -        | -      | Carrier |
| Hori.       | 2400.0    | 46.3            | 27.5          | 5.5  | 32.2 | 47.1     | 79.2     | 32.1   |         |
| Vert.       | 2402.0    | 96.8            | 27.5          | 5.5  | 32.2 | 97.6     | -        | -      | Carrier |
| Vert.       | 2400.0    | 45.1            | 27.5          | 5.5  | 32.2 | 45.9     | 77.6     | 31.6   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

### PK with Duty factor

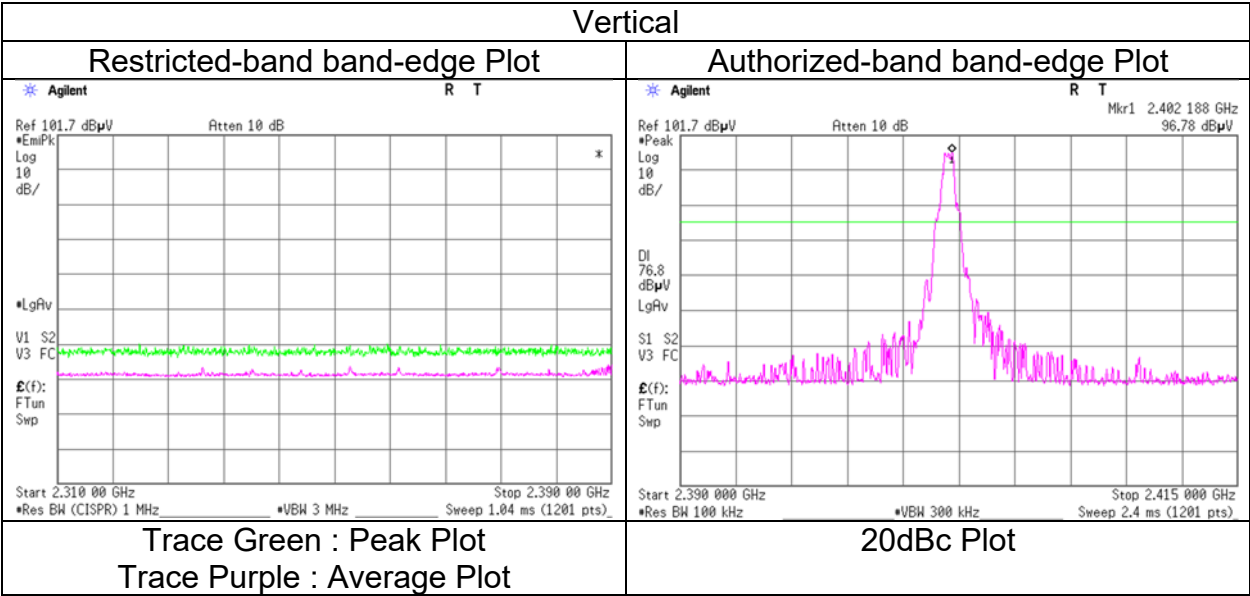
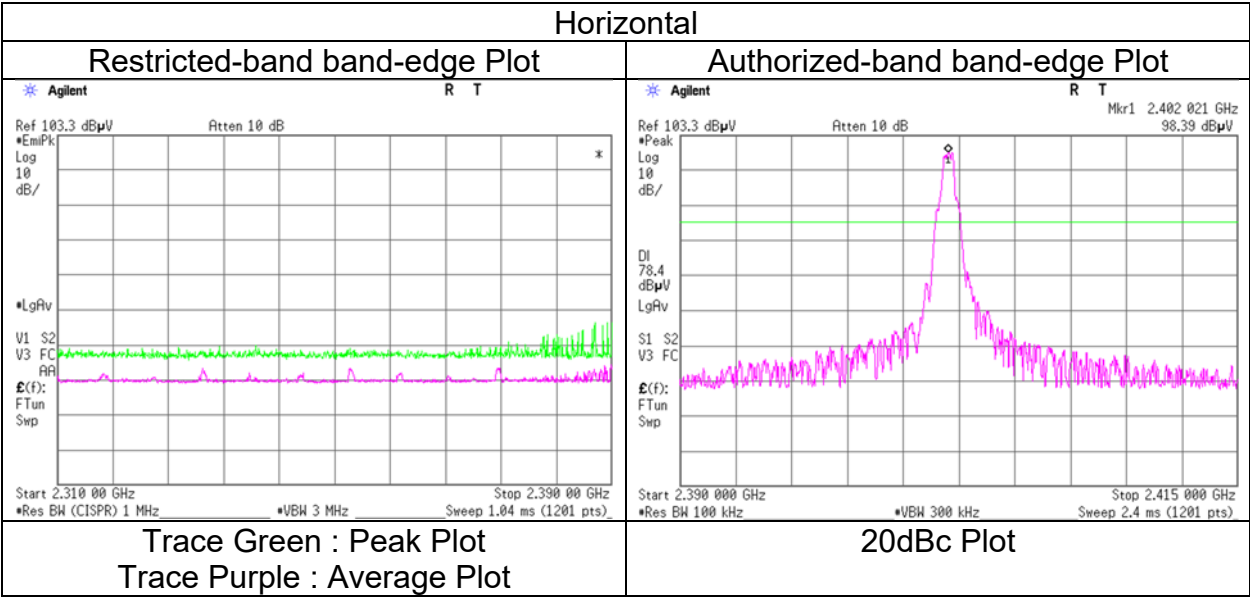
| Polarity    | Frequency | Reading<br>(PK) | Ant<br>Factor | Loss | Gain | Duty<br>Factor | Result   | Limit    | Margin | Remark |
|-------------|-----------|-----------------|---------------|------|------|----------------|----------|----------|--------|--------|
| [Hori/Vert] | [MHz]     | [dBuV]          | [dB/m]        | [dB] | [dB] | [dB]           | [dBuV/m] | [dBuV/m] | [dB]   |        |
| Hori.       | 2390.000  | 51.1            | 27.5          | 5.5  | 32.2 | -46.1          | 5.8      | 53.9     | 48.1   | *      |
| Vert.       | 2390.000  | 49.5            | 27.5          | 5.5  | 32.2 | -46.1          | 4.2      | 53.9     | 49.7   | *      |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor + Dwell time factor (Refer to dwell time data sheet)  
 \*Above noise was synchronized with carrier frequency.

Distance factor:      1 GHz - 6 GHz      20log (4 m / 3.0 m) = 2.5 dB  
                               6 GHz - 10 GHz      20log (5 m / 3.0 m) = 4.44 dB  
                               10 GHz - 26.5 GHz      20log (1.0 m / 3.0 m) = -9.5 dB

**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

|                        |                     |
|------------------------|---------------------|
| Test place             | Ise EMC Lab.        |
| Semi Anechoic Chamber  | No.3                |
| Date                   | May 10, 2024        |
| Temperature / Humidity | 23 deg. C / 38 % RH |
| Engineer               | Tomoya Sone         |
|                        | (1 GHz to 6 GHz)    |
| Mode                   | Tx ANT+ 2402 MHz    |



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge and authorized band edge were shown in tabular data.

Radiated Spurious Emission

|                        |                     |                     |                     |                     |
|------------------------|---------------------|---------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.        |                     |                     |                     |
| Semi Anechoic Chamber  | No.3                | No.3                | No.2                | No.2                |
| Date                   | May 9, 2024         | May 10, 2024        | May 16, 2024        | May 17, 2024        |
| Temperature / Humidity | 20 deg. C / 40 % RH | 23 deg. C / 38 % RH | 24 deg. C / 58 % RH | 22 deg. C / 48 % RH |
| Engineer               | Tetsuro Yoshida     | Tomoya Sone         | Hiroyuki Furutaka   | Hiroki Numata       |
|                        | (6 GHz to 10 GHz)   | (1 GHz to 6 GHz)    | (Below 1 GHz)       | (Above 10 GHz)      |
| Mode                   | Tx ANT+ 2441 MHz    |                     |                     |                     |

| Polarity    | Frequency | Reading (QP / PK) | Reading (AV) | Ant. Factor | Loss | Gain | Duty Factor | Result (QP / PK) | Result (AV) | Limit (QP / PK) | Limit (AV) | Margin (QP / PK) | Margin (AV) | Remark      |
|-------------|-----------|-------------------|--------------|-------------|------|------|-------------|------------------|-------------|-----------------|------------|------------------|-------------|-------------|
| [Hori/Vert] | [MHz]     | [dBuV]            | [dBuV]       | [dB/m]      | [dB] | [dB] | [dB]        | [dBuV/m]         | [dBuV/m]    | [dBuV/m]        | [dBuV/m]   | [dB]             | [dB]        |             |
| Hori.       | 55.1      | 21.5              | -            | 9.3         | 7.0  | 28.5 | -           | 9.2              | -           | 40.0            | -          | 30.8             | -           |             |
| Hori.       | 64.5      | 21.6              | -            | 6.8         | 7.1  | 28.5 | -           | 7.0              | -           | 40.0            | -          | 33.0             | -           |             |
| Hori.       | 93.6      | 21.9              | -            | 9.0         | 7.3  | 28.4 | -           | 9.8              | -           | 43.5            | -          | 33.7             | -           |             |
| Hori.       | 103.7     | 21.4              | -            | 10.7        | 7.4  | 28.4 | -           | 11.1             | -           | 43.5            | -          | 32.4             | -           |             |
| Hori.       | 212.3     | 20.3              | -            | 11.5        | 8.2  | 27.9 | -           | 12.1             | -           | 43.5            | -          | 31.4             | -           |             |
| Hori.       | 223.8     | 20.6              | -            | 11.6        | 8.3  | 27.9 | -           | 12.6             | -           | 46.0            | -          | 33.4             | -           |             |
| Hori.       | 4882.0    | 40.4              | 31.8         | 31.4        | 7.6  | 31.2 | -           | 48.3             | 39.7        | 73.9            | 53.9       | 25.6             | 14.2        | Floor noise |
| Hori.       | 7323.0    | 44.1              | 33.4         | 35.6        | 10.7 | 32.1 | -           | 58.3             | 47.7        | 73.9            | 53.9       | 15.6             | 6.2         | Floor noise |
| Hori.       | 9764.0    | 43.2              | 33.1         | 35.9        | 11.3 | 32.7 | -           | 57.7             | 47.6        | 73.9            | 53.9       | 16.2             | 6.3         | Floor noise |
| Vert.       | 55.1      | 21.5              | -            | 9.3         | 7.0  | 28.5 | -           | 9.2              | -           | 40.0            | -          | 30.8             | -           |             |
| Vert.       | 64.5      | 21.7              | -            | 6.8         | 7.1  | 28.5 | -           | 7.1              | -           | 40.0            | -          | 32.9             | -           |             |
| Vert.       | 93.6      | 22.0              | -            | 9.0         | 7.3  | 28.4 | -           | 9.9              | -           | 43.5            | -          | 33.6             | -           |             |
| Vert.       | 103.7     | 21.5              | -            | 10.7        | 7.4  | 28.4 | -           | 11.2             | -           | 43.5            | -          | 32.3             | -           |             |
| Vert.       | 212.3     | 20.4              | -            | 11.5        | 8.2  | 27.9 | -           | 12.2             | -           | 43.5            | -          | 31.3             | -           |             |
| Vert.       | 223.8     | 20.7              | -            | 11.6        | 8.3  | 27.9 | -           | 12.7             | -           | 46.0            | -          | 33.3             | -           |             |
| Vert.       | 4882.0    | 40.5              | 31.7         | 31.4        | 7.6  | 31.2 | -           | 48.4             | 39.6        | 73.9            | 53.9       | 25.5             | 14.3        | Floor noise |
| Vert.       | 7323.0    | 44.2              | 33.4         | 35.6        | 10.7 | 32.1 | -           | 58.4             | 47.6        | 73.9            | 53.9       | 15.5             | 6.3         | Floor noise |
| Vert.       | 9764.0    | 43.5              | 33.1         | 35.9        | 11.3 | 32.7 | -           | 58.0             | 47.6        | 73.9            | 53.9       | 15.9             | 6.4         | Floor noise |

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)  
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor  
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).  
\*QP detector was used up to 1GHz.

|                  |                   |                                 |
|------------------|-------------------|---------------------------------|
| Distance factor: | 1 GHz - 6 GHz     | 20log (4 m / 3.0 m) = 2.5 dB    |
|                  | 6 GHz - 10 GHz    | 20log (5 m / 3.0 m) = 4.44 dB   |
|                  | 10 GHz - 26.5 GHz | 20log (1.0 m / 3.0 m) = -9.5 dB |

## Radiated Spurious Emission

|                        |                     |                     |
|------------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.        | No.2                |
| Semi Anechoic Chamber  | No.3                | No.3                |
| Date                   | May 9, 2024         | May 10, 2024        |
| Temperature / Humidity | 20 deg. C / 40 % RH | 23 deg. C / 38 % RH |
| Engineer               | Tetsuro Yoshida     | Tomoya Sone         |
|                        | (6 GHz to 10 GHz)   | (1 GHz to 6 GHz)    |
| Mode                   | Tx ANT+ 2480 MHz    | (Above 10 GHz)      |

| Polarity    | Frequency | Reading<br>(QP / PK) | Reading<br>(AV) | Ant.<br>Factor | Loss | Gain | Duty<br>Factor | Result<br>(QP / PK) | Result<br>(AV) | Limit<br>(QP / PK) | Limit<br>(AV) | Margin<br>(QP / PK) | Margin<br>(AV) | Remark      |
|-------------|-----------|----------------------|-----------------|----------------|------|------|----------------|---------------------|----------------|--------------------|---------------|---------------------|----------------|-------------|
| [Hori/Vert] | [MHz]     | [dBuV]               | [dBuV]          | [dB/m]         | [dB] | [dB] | [dB]           | [dBuV/m]            | [dBuV/m]       | [dBuV/m]           | [dBuV/m]      | [dB]                | [dB]           |             |
| Hori.       | 2483.5    | 62.9                 | -               | 27.4           | 5.6  | 32.2 | -              | 63.6                | -              | 73.9               | -             | 10.3                | -              | *1)         |
| Hori.       | 4960.0    | 40.2                 | 32.2            | 31.6           | 7.6  | 31.1 | -              | 48.3                | 40.2           | 73.9               | 53.9          | 25.6                | 13.7           | Floor noise |
| Hori.       | 7440.0    | 43.4                 | 33.3            | 35.5           | 10.7 | 32.1 | -              | 57.4                | 47.4           | 73.9               | 53.9          | 16.5                | 6.5            | Floor noise |
| Hori.       | 9920.0    | 43.6                 | 33.1            | 36.1           | 11.3 | 32.8 | -              | 58.2                | 47.8           | 73.9               | 53.9          | 15.7                | 6.1            | Floor noise |
| Vert.       | 2483.5    | 60.5                 | -               | 27.4           | 5.6  | 32.2 | -              | 61.3                | -              | 73.9               | -             | 12.6                | -              | *1)         |
| Vert.       | 4960.0    | 40.2                 | 32.1            | 31.6           | 7.6  | 31.1 | -              | 48.2                | 40.1           | 73.9               | 53.9          | 25.7                | 13.8           | Floor noise |
| Vert.       | 7440.0    | 43.7                 | 33.3            | 35.5           | 10.7 | 32.1 | -              | 57.8                | 47.3           | 73.9               | 53.9          | 16.1                | 6.6            | Floor noise |
| Vert.       | 9920.0    | 43.2                 | 33.0            | 36.1           | 11.3 | 32.8 | -              | 57.9                | 47.7           | 73.9               | 53.9          | 16.0                | 6.2            | Floor noise |

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)  
 Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor  
 \*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

\*QP detector was used up to 1GHz.

\*1) Not Out of Band emission(Leakage Power)

### PK with Duty factor

| Polarity    | Frequency | Reading<br>(PK) | Ant<br>Factor | Loss | Gain | Duty<br>Factor | Result   | Limit    | Margin | Remark |
|-------------|-----------|-----------------|---------------|------|------|----------------|----------|----------|--------|--------|
| [Hori/Vert] | [MHz]     | [dBuV]          | [dB/m]        | [dB] | [dB] | [dB]           | [dBuV/m] | [dBuV/m] | [dB]   |        |
| Hori.       | 2483.500  | 62.9            | 27.4          | 5.6  | 32.2 | -46.1          | 17.5     | 53.9     | 36.4   | *      |
| Vert.       | 2483.500  | 60.5            | 27.4          | 5.6  | 32.2 | -46.1          | 15.2     | 53.9     | 38.7   | *      |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor + Dwell time factor (Refer to dwell time data sheet)

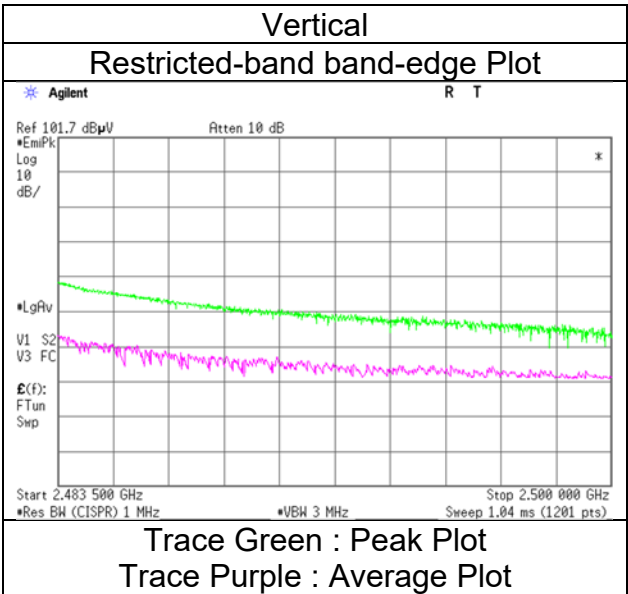
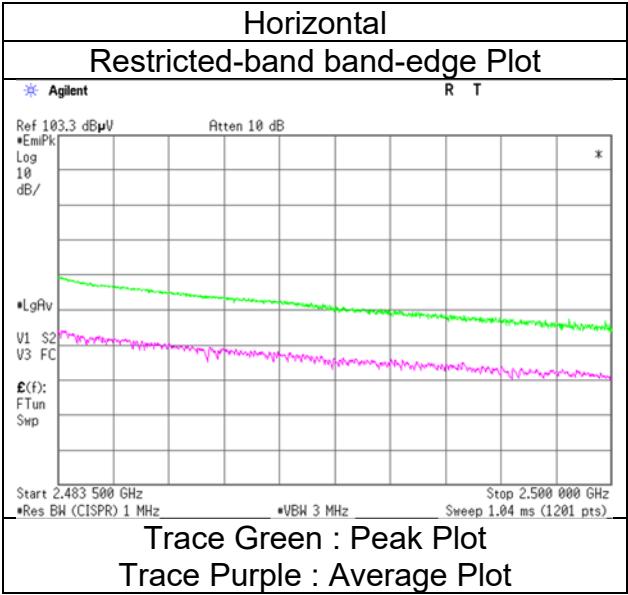
\*Above noise was synchronized with carrier frequency.

Distance factor:  
 1 GHz - 6 GHz      20log (4 m / 3.0 m) = 2.5 dB  
 6 GHz - 10 GHz    20log (5 m / 3.0 m) = 4.44 dB  
 10 GHz - 26.5 GHz   20log (1.0 m / 3.0 m) = -9.5 dB

**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Test place  
Semi Anechoic Chamber  
Date  
Temperature / Humidity  
Engineer  
  
Mode

Ise EMC Lab.  
No.3  
May 10, 2024  
23 deg. C / 38 % RH  
Tomoya Sone  
(1 GHz to 6 GHz)  
Tx ANT+ 2480 MHz



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

## Radiated Spurious Emission

|                        |                     |                     |                     |
|------------------------|---------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.        | No.3                | No.3                |
| Semi Anechoic Chamber  | No.3                | No.3                | No.3                |
| Date                   | March 12, 2024      | March 13, 2024      | March 14, 2024      |
| Temperature / Humidity | 20 deg. C / 41 % RH | 23 deg. C / 41 % RH | 21 deg. C / 39 % RH |
| Engineer               | Tomoya Sone         | Shousei Hamaguchi   | Shousei Hamaguchi   |
|                        | (1 GHz to 6 GHz)    | (6 GHz to 26.5 GHz) | (Below 1 GHz)       |
| Mode                   | Tx SHIMANO ORIGINAL |                     |                     |

| Polarity    | Frequency | Reading (QP / PK) | Reading (AV) | Ant. Factor | Loss | Gain | Duty Factor | Result (QP / PK) | Result (AV) | Limit (QP / PK) | Limit (AV) | Margin (QP / PK) | Margin (AV) | Remark      |
|-------------|-----------|-------------------|--------------|-------------|------|------|-------------|------------------|-------------|-----------------|------------|------------------|-------------|-------------|
| [Hori/Vert] | [MHz]     | [dBuV]            | [dBuV]       | [dB/m]      | [dB] | [dB] | [dB]        | [dBuV/m]         | [dBuV/m]    | [dBuV/m]        | [dBuV/m]   | [dB]             | [dB]        |             |
| Hori.       | 51.4      | 21.2              | -            | 9.8         | 7.3  | 32.2 | -           | 6.0              | -           | 40.0            | -          | 34.0             | -           |             |
| Hori.       | 93.5      | 20.3              | -            | 9.6         | 7.8  | 32.2 | -           | 5.6              | -           | 43.5            | -          | 37.9             | -           |             |
| Hori.       | 133.5     | 20.0              | -            | 11.5        | 8.3  | 32.1 | -           | 7.6              | -           | 43.5            | -          | 35.9             | -           |             |
| Hori.       | 253.4     | 19.6              | -            | 11.8        | 9.3  | 32.0 | -           | 8.6              | -           | 46.0            | -          | 37.4             | -           |             |
| Hori.       | 346.9     | 19.3              | -            | 15.0        | 10.0 | 32.0 | -           | 12.3             | -           | 46.0            | -          | 33.7             | -           |             |
| Hori.       | 474.8     | 19.4              | -            | 17.1        | 10.8 | 32.0 | -           | 15.2             | -           | 46.0            | -          | 30.8             | -           |             |
| Hori.       | 2390.0    | 42.2              | 33.8         | 27.5        | 5.5  | 32.2 | -           | 43.0             | 34.6        | 73.9            | 53.9       | 30.9             | 19.3        |             |
| Hori.       | 2483.5    | 58.7              | 50.3         | 27.4        | 5.6  | 32.2 | -           | 59.4             | 51.1        | 73.9            | 53.9       | 14.5             | 2.8         |             |
| Hori.       | 4956.0    | 50.0              | -            | 31.6        | 7.6  | 31.1 | -           | 58.0             | -           | 73.9            | -          | 15.9             | -           |             |
| Hori.       | 7434.0    | 40.1              | 32.4         | 35.5        | 10.7 | 33.5 | -           | 52.8             | 45.1        | 73.9            | 53.9       | 21.1             | 8.8         | Floor noise |
| Hori.       | 9912.0    | 42.1              | 34.2         | 36.2        | 11.3 | 34.1 | -           | 55.5             | 47.7        | 73.9            | 53.9       | 18.4             | 6.2         | Floor noise |
| Vert.       | 51.4      | 21.2              | -            | 9.8         | 7.3  | 32.2 | -           | 6.0              | -           | 40.0            | -          | 34.0             | -           |             |
| Vert.       | 93.5      | 20.3              | -            | 9.6         | 7.8  | 32.2 | -           | 5.6              | -           | 43.5            | -          | 37.9             | -           |             |
| Vert.       | 133.5     | 20.0              | -            | 11.5        | 8.3  | 32.1 | -           | 7.6              | -           | 43.5            | -          | 35.9             | -           |             |
| Vert.       | 253.4     | 19.6              | -            | 11.8        | 9.3  | 32.0 | -           | 8.6              | -           | 46.0            | -          | 37.4             | -           |             |
| Vert.       | 346.9     | 19.3              | -            | 15.0        | 10.0 | 32.0 | -           | 12.3             | -           | 46.0            | -          | 33.7             | -           |             |
| Vert.       | 474.8     | 19.4              | -            | 17.1        | 10.8 | 32.0 | -           | 15.2             | -           | 46.0            | -          | 30.8             | -           |             |
| Vert.       | 2390.0    | 43.9              | 33.0         | 27.5        | 5.5  | 32.2 | -           | 44.7             | 33.8        | 73.9            | 53.9       | 29.2             | 20.1        |             |
| Vert.       | 2483.5    | 61.0              | 50.1         | 27.4        | 5.6  | 32.2 | -           | 61.8             | 50.8        | 73.9            | 53.9       | 12.2             | 3.1         |             |
| Vert.       | 4956.0    | 52.0              | -            | 31.6        | 7.6  | 31.1 | -           | 60.1             | -           | 73.9            | -          | 13.8             | -           |             |
| Vert.       | 7434.0    | 40.1              | 32.4         | 35.5        | 10.7 | 33.5 | -           | 52.8             | 45.1        | 73.9            | 53.9       | 21.1             | 8.8         | Floor noise |
| Vert.       | 9912.0    | 42.1              | 34.2         | 36.2        | 11.3 | 34.1 | -           | 55.5             | 47.7        | 73.9            | 53.9       | 18.4             | 6.2         | Floor noise |

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)  
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor  
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).  
\*QP detector was used up to 1GHz.

### 20dBc Data Sheet

| Polarity    | Frequency | Reading (PK) | Ant Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|-------------|-----------|--------------|------------|------|------|----------|----------|--------|---------|
| [Hori/Vert] | [MHz]     | [dBuV]       | [dB/m]     | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.       | 2478.0    | 102.4        | 27.4       | 5.6  | 32.2 | 103.2    | -        | -      | Carrier |
| Hori.       | 2400.0    | 34.2         | 27.5       | 5.5  | 32.2 | 35.0     | 83.2     | 48.2   |         |
| Vert.       | 2478.0    | 102.9        | 27.4       | 5.6  | 32.2 | 103.7    | -        | -      | Carrier |
| Vert.       | 2400.0    | 34.4         | 27.5       | 5.5  | 32.2 | 35.2     | 83.7     | 48.5   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

### PK with Duty Factor

| Polarity    | Frequency | Reading (PK) | Ant Factor | Loss | Gain | Duty Factor | Result   | Limit    | Margin | Remark |
|-------------|-----------|--------------|------------|------|------|-------------|----------|----------|--------|--------|
| [Hori/Vert] | [MHz]     | [dBuV]       | [dB/m]     | [dB] | [dB] | [dB]        | [dBuV/m] | [dBuV/m] | [dB]   |        |
| Hori.       | 4956.000  | 50.0         | 31.6       | 7.6  | 31.1 | -19.5       | 38.6     | 53.9     | 15.3   | *      |
| Vert.       | 4956.000  | 52.0         | 31.6       | 7.6  | 31.1 | -19.5       | 40.6     | 53.9     | 13.3   | *      |

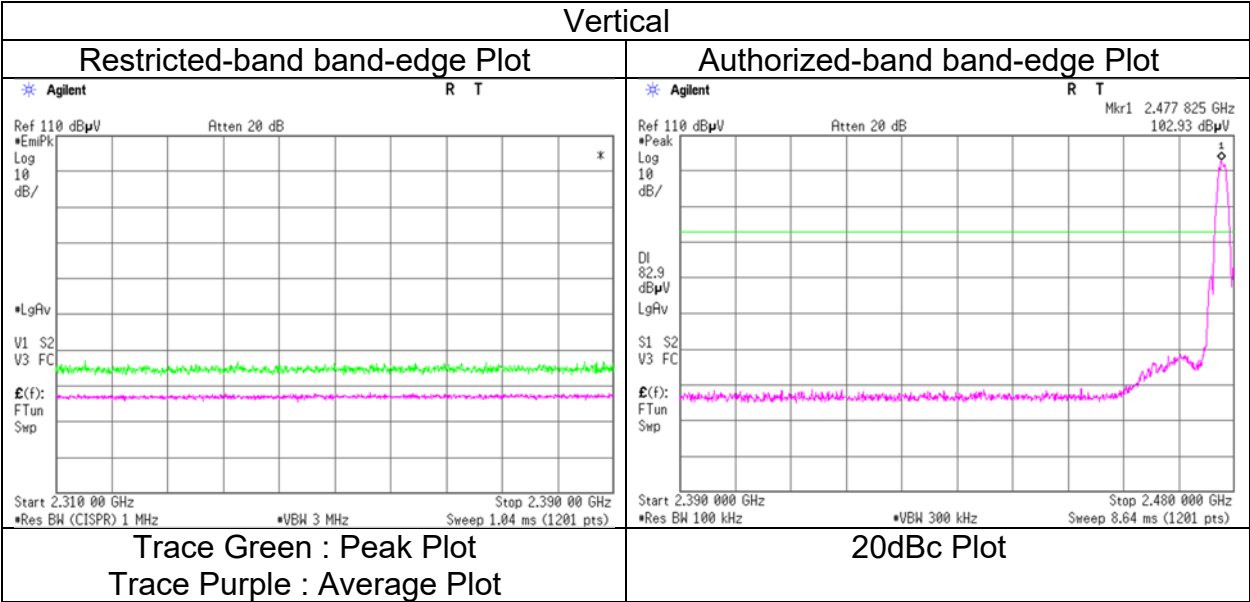
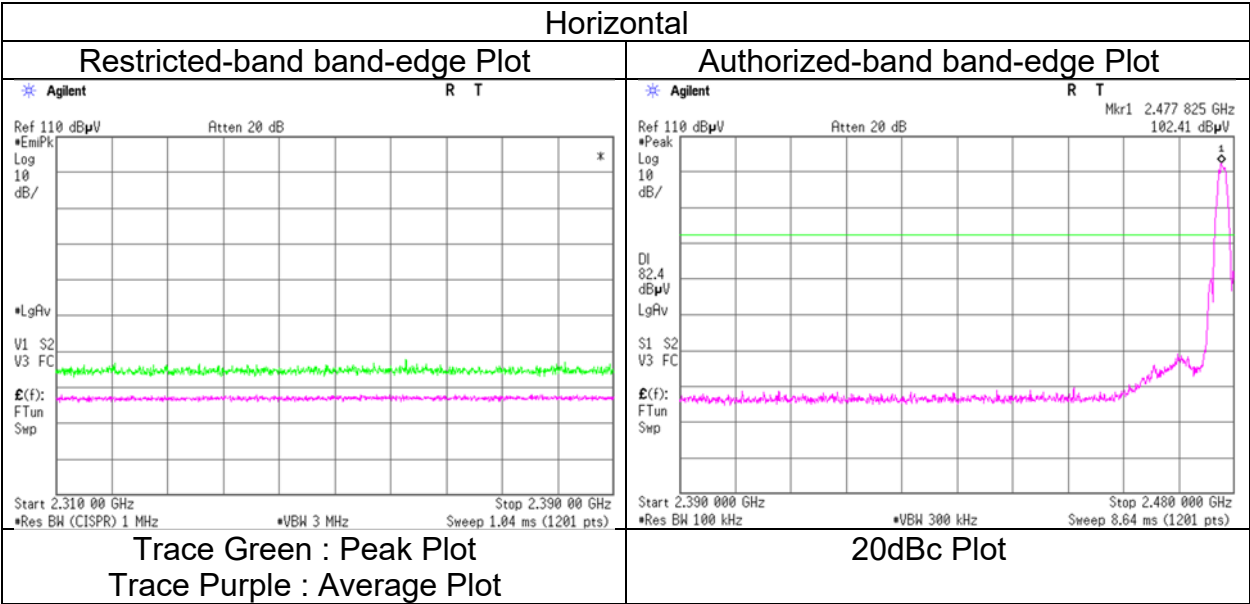
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor (Refer to Burst rate confirmation sheet)

\*Above noise was synchronized with carrier frequency.

Distance factor:  
1 GHz - 6 GHz      20log (4 m / 3.0 m) = 2.50 dB  
6 GHz - 10 GHz    20log (5 m / 3.0 m) = 4.44 dB  
10 GHz - 26.5 GHz   20log (1.0 m / 3.0 m) = -9.54 dB

**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

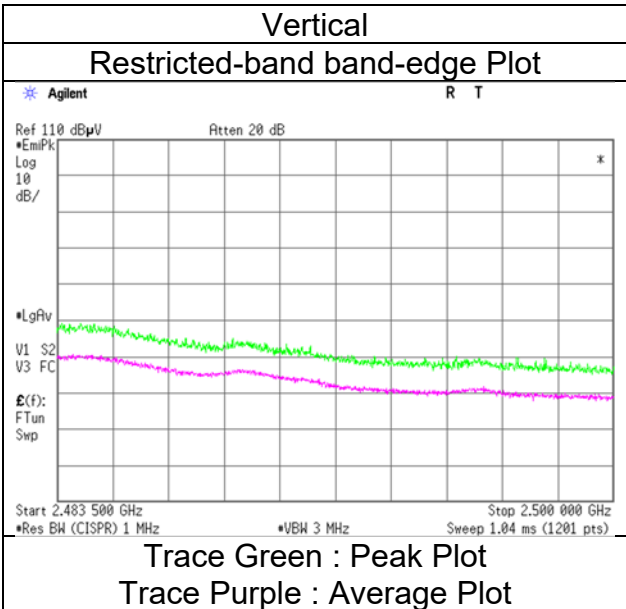
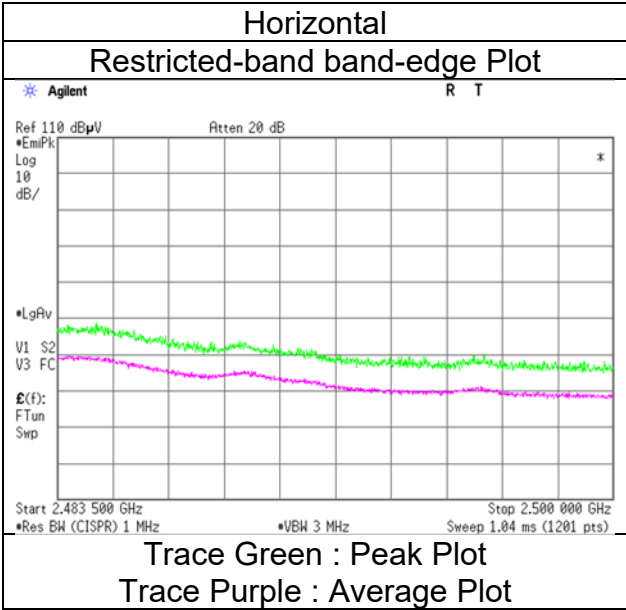
|                        |                     |
|------------------------|---------------------|
| Test place             | Ise EMC Lab.        |
| Semi Anechoic Chamber  | No.3                |
| Date                   | March 12, 2024      |
| Temperature / Humidity | 20 deg. C / 41 % RH |
| Engineer               | Tomoya Sone         |
|                        | (1 GHz to 6 GHz)    |
| Mode                   | Tx SHIMANO ORIGINAL |



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge and authorized band edge were shown in tabular data.

**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

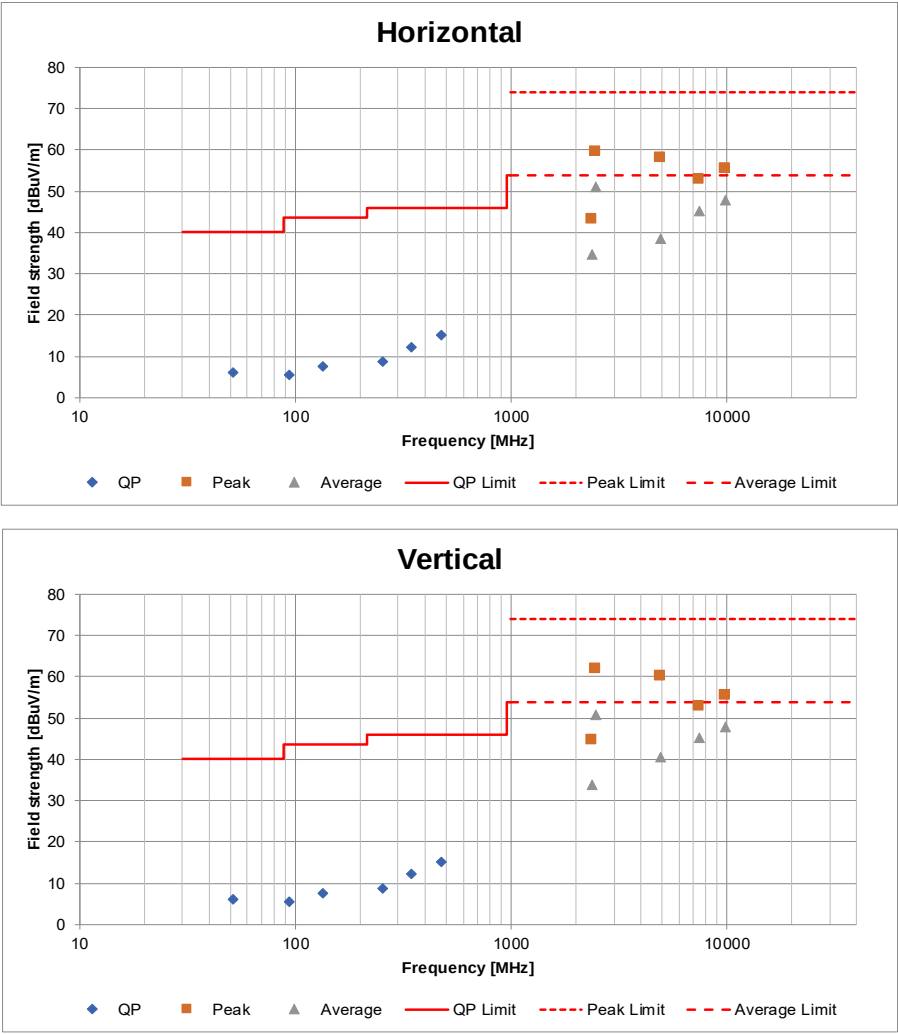
|                        |                     |
|------------------------|---------------------|
| Test place             | Ise EMC Lab.        |
| Semi Anechoic Chamber  | No.3                |
| Date                   | March 12, 2024      |
| Temperature / Humidity | 20 deg. C / 41 % RH |
| Engineer               | Tomoya Sone         |
|                        | (1 GHz to 6 GHz)    |
| Mode                   | Tx SHIMANO ORIGINAL |



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

**Radiated Spurious Emission**  
**(Plot data, Worst case mode for Maximum Peak Output Power)**

|                        |                     |                     |                     |
|------------------------|---------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.        | No.3                | No.3                |
| Semi Anechoic Chamber  | No.3                | March 13, 2024      | March 14, 2024      |
| Date                   | March 12, 2024      | 23 deg. C / 41 % RH | 21 deg. C / 39 % RH |
| Temperature / Humidity | 20 deg. C / 41 % RH | Shousei Hamaguchi   | Shousei Hamaguchi   |
| Engineer               | Tomoya Sone         | (6 GHz to 26.5 GHz) | (Below 1 GHz)       |
| Mode                   | (1 GHz to 6 GHz)    |                     |                     |
|                        | Tx SHIMANO ORIGINAL |                     |                     |

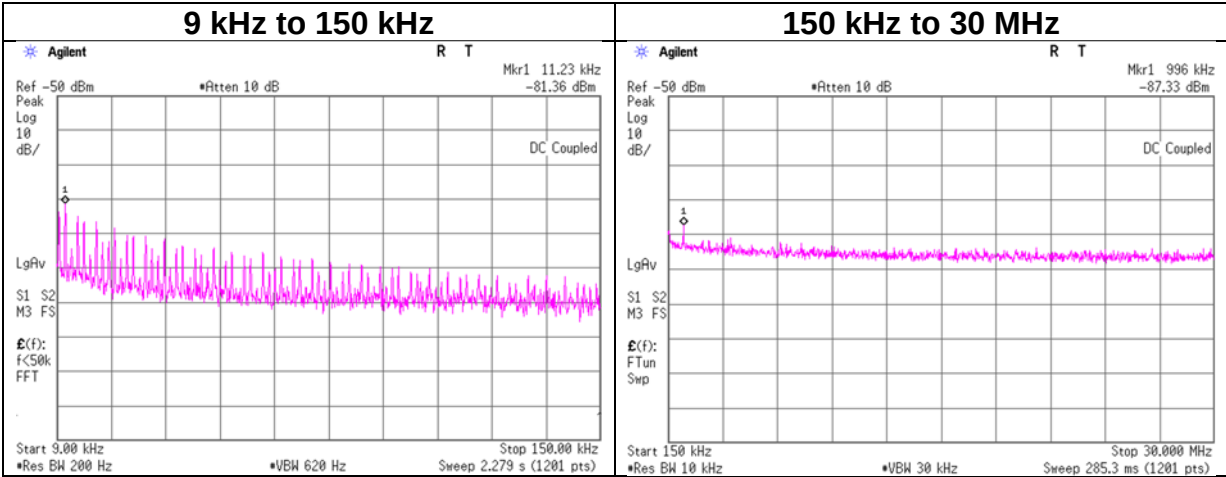


\*These plots data contain sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Test place  
Date  
Temperature / Humidity  
Engineer  
Mode

Ise EMC Lab. No.6 Measurement Room  
May 15, 2024  
23 deg. C / 48 % RH  
Shousei Hamaguchi  
Tx BT LE 1M 2480 MHz



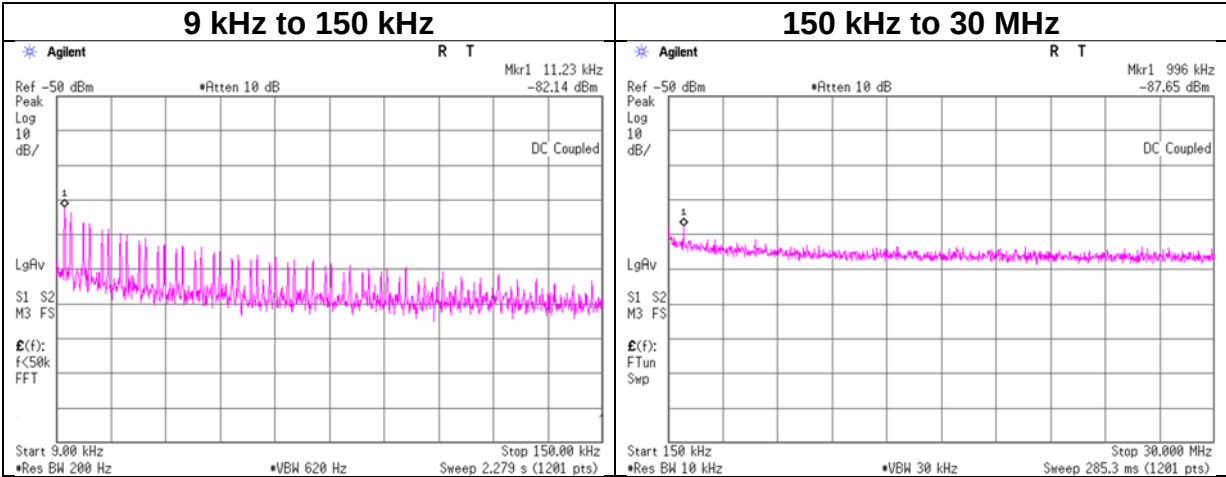
| Frequency | Reading | Cable Loss | Attenuator Loss | Antenna Gain* | N                  | EIRP  | Distance | Ground bounce | E                         | Limit    | Margin | Remark |
|-----------|---------|------------|-----------------|---------------|--------------------|-------|----------|---------------|---------------------------|----------|--------|--------|
| [kHz]     | [dBm]   | [dB]       | [dB]            | [dBi]         | (Number of Output) | [dBm] | [m]      | [dB]          | (field strength) [dBuV/m] | [dBuV/m] | [dB]   |        |
| 11.23     | -81.4   | 1.00       | 9.7             | 2.0           | 1                  | -68.7 | 300      | 6.0           | -7.4                      | 46.5     | 53.9   |        |
| 996.00    | -87.3   | 1.02       | 9.7             | 2.0           | 1                  | -74.6 | 30       | 6.0           | 6.6                       | 27.6     | 21.0   |        |

$E \text{ [dBuV/m]} = \text{EIRP [dBm]} - 20 \log (\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8 \text{ [dBuV/m]}$   
 $\text{EIRP[dBm]} = \text{Reading [dBm]} + \text{Cable loss [dB]} + \text{Attenuator Loss [dB]} + \text{Antenna gain [dBi]} + 10 * \log (N)$   
N: Number of output  
\*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

Conducted Spurious Emission

Test place  
Date  
Temperature / Humidity  
Engineer  
Mode

Ise EMC Lab. No.6 Measurement Room  
May 15, 2024  
23 deg. C / 48 % RH  
Shousei Hamaguchi  
Tx BT LE 2M 2480 MHz



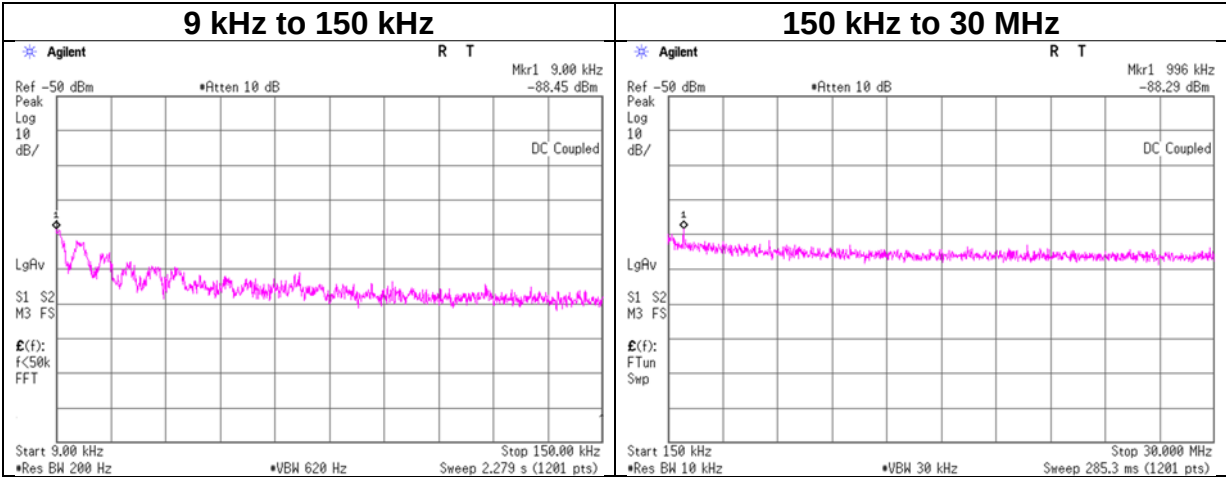
| Frequency | Reading | Cable Loss | Attenuator Loss | Antenna Gain* | N                  | EIRP  | Distance | Ground bounce | E                         | Limit    | Margin | Remark |
|-----------|---------|------------|-----------------|---------------|--------------------|-------|----------|---------------|---------------------------|----------|--------|--------|
| [kHz]     | [dBm]   | [dB]       | [dB]            | [dBi]         | (Number of Output) | [dBm] | [m]      | [dB]          | (field strength) [dBuV/m] | [dBuV/m] | [dB]   |        |
| 11.23     | -82.1   | 1.00       | 9.7             | 2.0           | 1                  | -69.5 | 300      | 6.0           | -8.2                      | 46.5     | 54.7   |        |
| 996.00    | -87.7   | 1.02       | 9.7             | 2.0           | 1                  | -74.9 | 30       | 6.0           | 6.3                       | 27.6     | 21.3   |        |

$E\text{ [dBuV/m]} = EIRP\text{ [dBm]} - 20\log(\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8\text{ [dBuV/m]}$   
 $EIRP\text{[dBm]} = \text{Reading [dBm]} + \text{Cable loss [dB]} + \text{Attenuator Loss [dB]} + \text{Antenna gain [dBi]} + 10 * \log(N)$   
N: Number of output  
\*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

Conducted Spurious Emission

Test place  
Date  
Temperature / Humidity  
Engineer  
Mode

Ise EMC Lab. No.6 Measurement Room  
May 15, 2024  
23 deg. C / 48 % RH  
Shousei Hamaguchi  
Tx ANT 2441 MHz



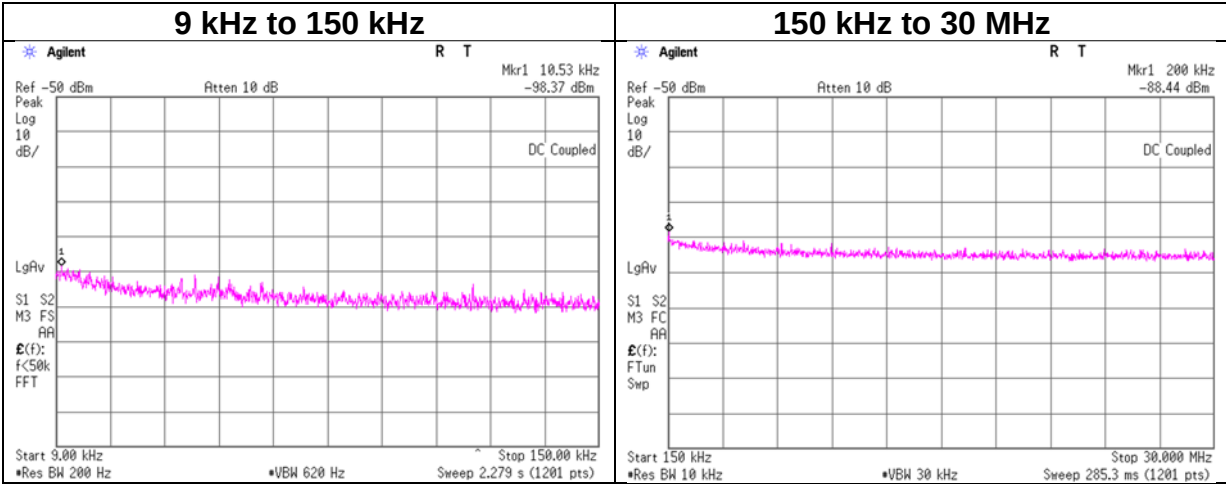
| Frequency | Reading | Cable Loss | Attenuator Loss | Antenna Gain* | N                  | EIRP  | Distance | Ground bounce | E                         | Limit    | Margin | Remark |
|-----------|---------|------------|-----------------|---------------|--------------------|-------|----------|---------------|---------------------------|----------|--------|--------|
| [kHz]     | [dBm]   | [dB]       | [dB]            | [dBi]         | (Number of Output) | [dBm] | [m]      | [dB]          | (field strength) [dBuV/m] | [dBuV/m] | [dB]   |        |
| 9.00      | -88.5   | 1.00       | 9.7             | 2.0           | 1                  | -75.8 | 300      | 6.0           | -14.5                     | 48.5     | 63.0   |        |
| 996.00    | -88.3   | 1.02       | 9.7             | 2.0           | 1                  | -75.6 | 30       | 6.0           | 5.7                       | 27.6     | 21.9   |        |

$E\text{ [dBuV/m]} = EIRP\text{ [dBm]} - 20\log(\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8\text{ [dBuV/m]}$   
 $EIRP\text{[dBm]} = \text{Reading [dBm]} + \text{Cable loss [dB]} + \text{Attenuator Loss [dB]} + \text{Antenna gain [dBi]} + 10 * \log(N)$   
N: Number of output  
\*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

Conducted Spurious Emission

Test place  
Date  
Temperature / Humidity  
Engineer  
Mode

Ise EMC Lab. No.6 Measurement Room  
March 12, 2024  
24 deg. C / 35 % RH  
Takafumi Noguchi  
Tx SHIMANO ORIGINAL



| Frequency | Reading | Cable Loss | Attenuator Loss | Antenna Gain* | N                  | EIRP  | Distance | Ground bounce | E                         | Limit    | Margin | Remark |
|-----------|---------|------------|-----------------|---------------|--------------------|-------|----------|---------------|---------------------------|----------|--------|--------|
| [kHz]     | [dBm]   | [dB]       | [dB]            | [dBi]         | (Number of Output) | [dBm] | [m]      | [dB]          | (field strength) [dBuV/m] | [dBuV/m] | [dB]   |        |
| 10.53     | -98.4   | 1.00       | 9.8             | 2.0           | 1                  | -85.5 | 300      | 6.0           | -24.3                     | 47.1     | 71.4   |        |
| 200.00    | -88.4   | 1.00       | 9.8             | 2.0           | 1                  | -75.6 | 300      | 6.0           | -14.3                     | 21.5     | 35.8   |        |

$E\text{ [dBuV/m]} = \text{EIRP [dBm]} - 20 \log(\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8\text{ [dBuV/m]}$   
 $\text{EIRP[dBm]} = \text{Reading [dBm]} + \text{Cable loss [dB]} + \text{Attenuator Loss [dB]} + \text{Antenna gain [dBi]} + 10 * \log(N)$   
N: Number of output  
\*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

## Power Density

|                        |                                    |                     |
|------------------------|------------------------------------|---------------------|
| Test place             | Ise EMC Lab. No.6 Measurement Room |                     |
| Date                   | March 12, 2024                     | May 15, 2024        |
| Temperature / Humidity | 24 deg. C / 35 % RH                | 23 deg. C / 48 % RH |
| Engineer               | Takafumi Noguchi                   | Shousei Hamaguchi   |
| Mode                   | Tx                                 |                     |

### BT LE 1M

| Freq. | Reading       | Cable Loss | Atten. Loss | Result        |              | Limit         | Margin |
|-------|---------------|------------|-------------|---------------|--------------|---------------|--------|
| [MHz] | [dBm / 3 kHz] | [dB]       | [dB]        | [dBm / 3 kHz] | [mW / 3 kHz] | [dBm / 3 kHz] | [dB]   |
| 2402  | -26.90        | 1.89       | 9.74        | -15.27        | 0.03         | 8.00          | 23.27  |
| 2440  | -26.72        | 1.90       | 9.75        | -15.07        | 0.03         | 8.00          | 23.07  |
| 2480  | -26.72        | 1.91       | 9.75        | -15.06        | 0.03         | 8.00          | 23.06  |

### BT LE 2M

| Freq. | Reading       | Cable Loss | Atten. Loss | Result        |              | Limit         | Margin |
|-------|---------------|------------|-------------|---------------|--------------|---------------|--------|
| [MHz] | [dBm / 3 kHz] | [dB]       | [dB]        | [dBm / 3 kHz] | [mW / 3 kHz] | [dBm / 3 kHz] | [dB]   |
| 2402  | -29.24        | 1.89       | 9.74        | -17.61        | 0.02         | 8.00          | 25.61  |
| 2440  | -29.15        | 1.90       | 9.75        | -17.50        | 0.02         | 8.00          | 25.50  |
| 2480  | -29.09        | 1.91       | 9.75        | -17.43        | 0.02         | 8.00          | 25.43  |

### ANT+

| Freq. | Reading       | Cable Loss | Atten. Loss | Result        |              | Limit         | Margin |
|-------|---------------|------------|-------------|---------------|--------------|---------------|--------|
| [MHz] | [dBm / 3 kHz] | [dB]       | [dB]        | [dBm / 3 kHz] | [mW / 3 kHz] | [dBm / 3 kHz] | [dB]   |
| 2402  | -18.30        | 1.89       | 9.74        | -6.67         | 0.22         | 8.00          | 14.67  |
| 2441  | -18.36        | 1.90       | 9.75        | -6.71         | 0.21         | 8.00          | 14.71  |
| 2480  | -18.35        | 1.91       | 9.75        | -6.69         | 0.21         | 8.00          | 14.69  |

### SHIMANO ORIGINAL

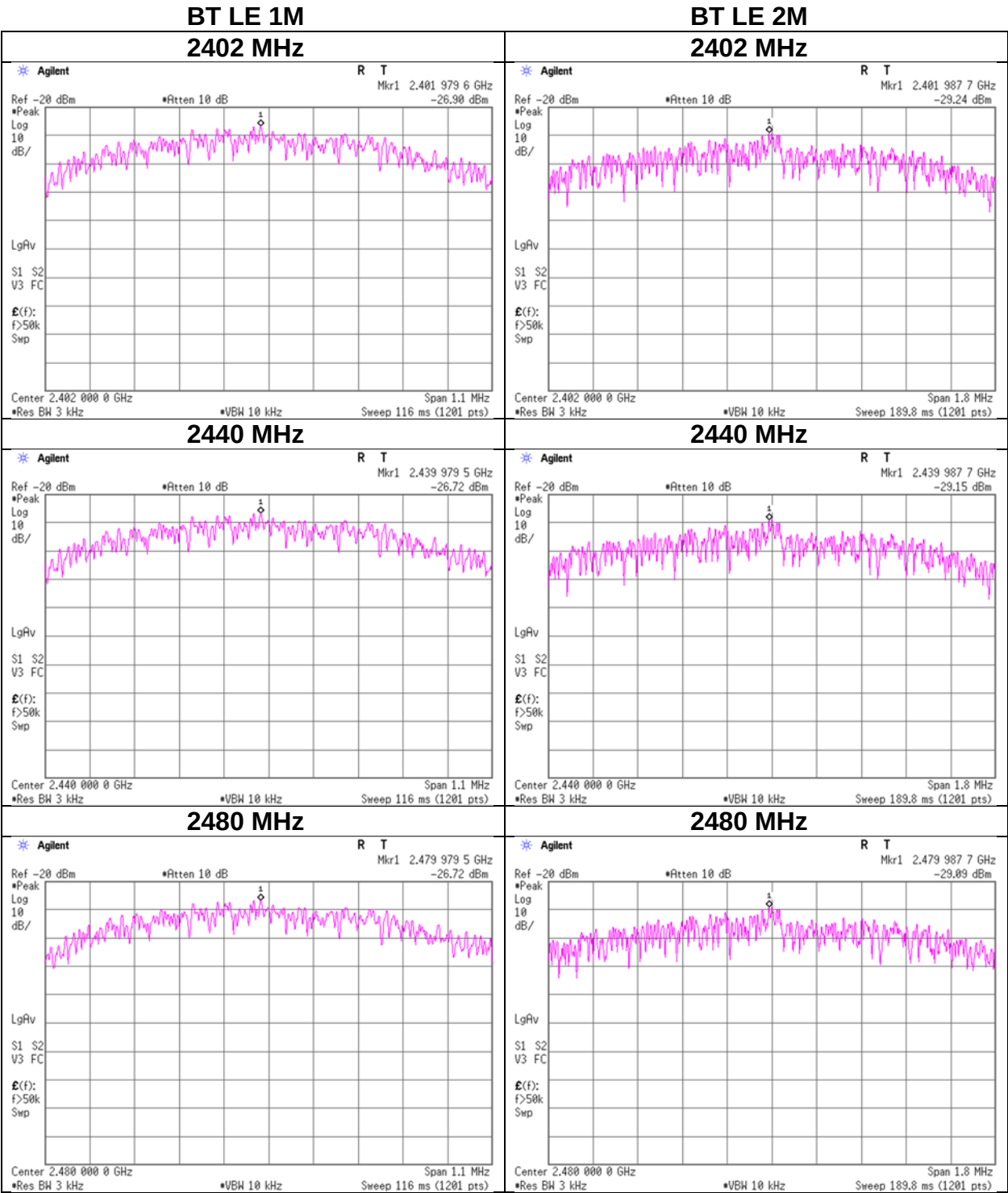
| Freq. | Reading       | Cable Loss | Atten. Loss | Result        |              | Limit         | Margin |
|-------|---------------|------------|-------------|---------------|--------------|---------------|--------|
| [MHz] | [dBm / 3 kHz] | [dB]       | [dB]        | [dBm / 3 kHz] | [mW / 3 kHz] | [dBm / 3 kHz] | [dB]   |
| 2478  | -20.80        | 2.38       | 6.13        | -12.29        | 0.06         | 8.00          | 20.29  |

Sample Calculation:

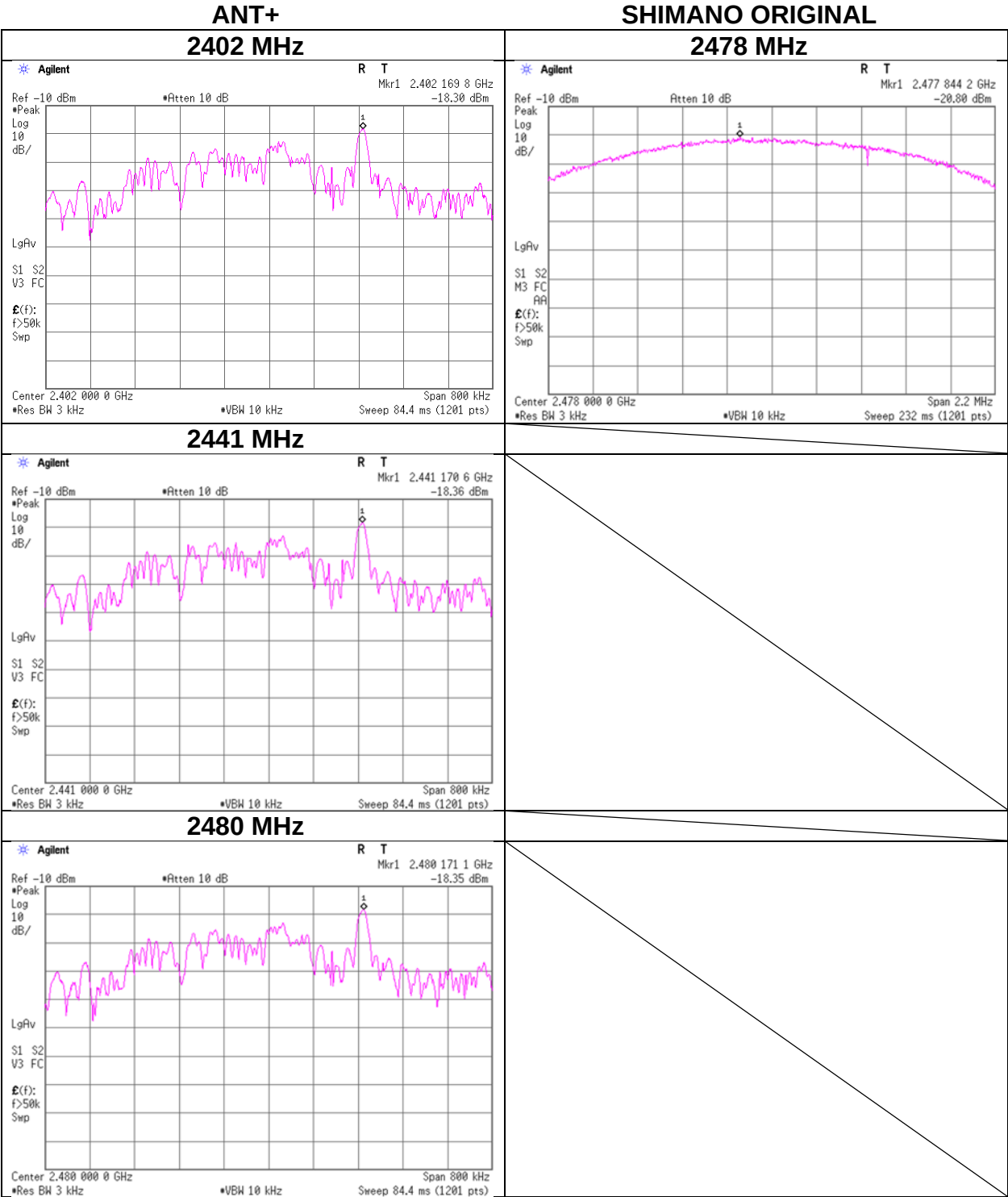
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

\*The equipment and cables were not used for factor 0 dB of the data sheets.

Power Density



Power Density



## APPENDIX 2: Test Instruments

### Test Equipment used by March 14, 2024

| Test Item | LIMS ID | Description                         | Manufacturer                    | Model                                       | Serial                  | Last Calibration Date | Cal Int |
|-----------|---------|-------------------------------------|---------------------------------|---------------------------------------------|-------------------------|-----------------------|---------|
| AT        | 141156  | Attenuator(10dB)                    | Weinschel Corp                  | 2                                           | BL1173                  | 11/17/2023            | 12      |
| AT        | 141172  | Attenuator(6dB)(above 1GHz)         | HIROSE ELECTRIC CO.,LTD.        | AT-106                                      | -                       | 12/11/2023            | 12      |
| AT        | 141328  | Microwave Cable 1G-40GHz            | Suhner                          | SUCOFLEX102                                 | 28636/2                 | 04/01/2024            | 12      |
| AT        | 141558  | Digital Tester(TRUE RMS MULTIMETER) | Fluke Corporation               | 115                                         | 17930030                | 05/17/2024            | 12      |
| AT        | 141561  | Thermo-Hygrometer                   | CUSTOM. Inc                     | CTH-201                                     | 1401                    | -                     | -       |
| AT        | 141809  | Power Meter                         | Anritsu Corporation             | ML2495A                                     | 825002                  | 05/26/2023            | 12      |
| AT        | 141900  | Spectrum Analyzer                   | Keysight Technologies Inc       | E4440A                                      | MY46185823              | 06/16/2023            | 12      |
| AT        | 196430  | Microwave Cable                     | Huber+Suhner                    | SF102D/11PC24/11 PC24/1000mm                | 537059/126EA            | 02/26/2024            | 12      |
| RE        | 141232  | High Pass Filter 3.5-18.0GHz        | UL Japan                        | HPF SELECTOR                                | 001                     | 09/04/2023            | 12      |
| RE        | 141266  | Logperiodic Antenna (200-1000MHz)   | Schwarzbeck Mess-Elektronik OHG | VUSLP9111B                                  | 9111B-191               | 08/10/2023            | 12      |
| RE        | 141323  | Coaxial cable                       | UL Japan                        | -                                           | -                       | 09/10/2023            | 12      |
| RE        | 141507  | Horn Antenna 1-18GHz                | Schwarzbeck Mess-Elektronik OHG | BBHA9120D                                   | 258                     | 11/20/2023            | 12      |
| RE        | 141513  | Horn Antenna 15-40GHz               | Schwarzbeck Mess-Elektronik OHG | BBHA9170                                    | BBHA9170306             | 07/19/2023            | 12      |
| RE        | 141532  | DIGITAL HiTESTER                    | HIOKI E.E. CORPORATION          | 3805                                        | 051201197               | 01/31/2024            | 12      |
| RE        | 141580  | MicroWave System Amplifier          | Keysight Technologies Inc       | 83017A                                      | MY39500779              | 03/08/2024            | 12      |
| RE        | 141582  | Pre Amplifier                       | SONOMA INSTRUMENT               | 310                                         | 260834                  | 02/17/2024            | 12      |
| RE        | 141885  | Spectrum Analyzer                   | Keysight Technologies Inc       | E4448A                                      | US44300523              | 11/29/2023            | 12      |
| RE        | 141951  | EMI Test Receiver                   | Rohde & Schwarz                 | ESR26                                       | 101408                  | 04/10/2023            | 12      |
| RE        | 142008  | AC3_Semi Anechoic Chamber(NSA)      | TDK                             | Semi Anechoic Chamber 3m                    | DA-10005                | 12/11/2023            | 24      |
| RE        | 142013  | AC3_Semi Anechoic Chamber(SVSWR)    | TDK                             | Semi Anechoic Chamber 3m                    | DA-10005                | 10/18/2023            | 12      |
| RE        | 142183  | Measure                             | KOMELON                         | KMC-36                                      | -                       | 10/20/2023            | 12      |
| RE        | 142314  | Attenuator                          | Pasternack Enterprises          | PE7390-6                                    | D/C 1504                | 06/23/2023            | 12      |
| RE        | 178648  | EMI measurement program             | TSJ (Techno Science Japan)      | TEPTO-DV                                    | -                       | -                     | -       |
| RE        | 197990  | Biconical Antenna                   | Schwarzbeck Mess-Elektronik OHG | VHBB 9124 + BBA 9106                        | 01365                   | 11/29/2023            | 12      |
| RE        | 238713  | Double Ridge Horn Antenna           | Schwarzbeck Mess-Elektronik OHG | BBHA 9120 C                                 | 688                     | 08/10/2023            | 12      |
| RE        | 244709  | Thermo-Hygrometer                   | HIOKI E.E. CORPORATION          | LR5001                                      | 231202103               | 01/25/2024            | 12      |
| RE        | 246001  | Microwave Cable                     | Huber+Suhner                    | SF103/11PC35/11P C35/1000mm / SF126E/5000mm | 800673(1m) / 610204(5m) | 03/06/2024            | 12      |

### Test Equipment used on and after May 9, 2024

| Test Item | LIMS ID | Description                          | Manufacturer                             | Model                                             | Serial                     | Last Calibration Date | Cal Int |
|-----------|---------|--------------------------------------|------------------------------------------|---------------------------------------------------|----------------------------|-----------------------|---------|
| RE        | 141232  | High Pass Filter 3.5-18.0GHz         | UL Japan                                 | HPF SELECTOR                                      | 001                        | 09/04/2023            | 12      |
| RE        | 141265  | Logperiodic Antenna (200-1000MHz)    | Schwarzbeck<br>Mess-Elektronik OHG       | VUSLP9111B                                        | 9111B-190                  | 07/11/2023            | 12      |
| RE        | 141317  | Coaxial Cable                        | UL Japan                                 | -                                                 | -                          | 09/12/2023            | 12      |
| RE        | 141427  | Biconical Antenna                    | Schwarzbeck<br>Mess-Elektronik OHG       | VHA9103B+<br>BBA9106                              | 08031                      | 07/11/2023            | 12      |
| RE        | 141503  | Horn Antenna 18-26.5GHz              | EMCO                                     | 3160-09                                           | 1265                       | 06/23/2023            | 12      |
| RE        | 141507  | Horn Antenna 1-18GHz                 | Schwarzbeck<br>Mess-Elektronik OHG       | BBHA9120D                                         | 258                        | 11/20/2023            | 12      |
| RE        | 141532  | DIGITAL HITESTER                     | HIOKI E.E.<br>CORPORATION                | 3805                                              | 051201197                  | 01/31/2024            | 12      |
| RE        | 141542  | Digital Tester                       | Fluke Corporation                        | FLUKE 26-3                                        | 78030611                   | 08/01/2023            | 12      |
| RE        | 141579  | Pre Amplifier                        | Keysight Technologies Inc                | 8449B                                             | 3008A02142                 | 02/17/2024            | 12      |
| RE        | 141580  | Microwave System Amplifier           | Keysight Technologies Inc                | 83017A                                            | MY39500779                 | 03/08/2024            | 12      |
| RE        | 141594  | Pre Amplifier                        | Keysight Technologies Inc                | 8447D                                             | 2944A10150                 | 02/17/2024            | 12      |
| RE        | 141901  | Spectrum Analyzer                    | Keysight Technologies Inc                | E4440A                                            | MY48250080                 | 01/26/2024            | 12      |
| RE        | 141903  | Spectrum Analyzer                    | Keysight Technologies Inc                | E4440A                                            | MY46186390                 | 01/26/2024            | 12      |
| RE        | 141949  | Test Receiver                        | Rohde & Schwarz                          | ESCI                                              | 100767                     | 05/17/2023            | 12      |
| RE        | 142004  | AC2_Semi Anechoic Chamber (NSA)      | TDK                                      | Semi Anechoic Chamber 3m                          | DA-06902                   | 12/12/2023            | 24      |
| RE        | 142006  | AC2_Semi Anechoic Chamber (SVSWR)    | TDK                                      | Semi Anechoic Chamber 3m                          | DA-06902                   | 10/20/2023            | 12      |
| RE        | 142013  | AC3_Semi Anechoic Chamber (SVSWR)    | TDK                                      | Semi Anechoic Chamber 3m                          | DA-10005                   | 10/18/2023            | 12      |
| RE        | 142183  | Measure                              | KOMELON                                  | KMC-36                                            | -                          | 10/20/2023            | 12      |
| RE        | 142228  | Measure, Tape, Steel                 | KOMELON                                  | KMC-36                                            | -                          | -                     | -       |
| RE        | 178648  | EMI measurement program              | TSJ<br>(Techno Science Japan)            | TEPTO-DV                                          | -                          | -                     | -       |
| RE        | 220646  | Attenuator                           | Huber+Suhner                             | 6806_N-50-1                                       | -                          | 03/12/2024            | 12      |
| RE        | 238713  | Double Ridge Horn Antenna            | Schwarzbeck<br>Mess-Elektronik OHG       | BBHA 9120 C                                       | 688                        | 08/10/2023            | 12      |
| RE        | 244707  | Thermo-Hygrometer                    | HIOKI E.E.<br>CORPORATION                | LR5001                                            | 231202102                  | 01/25/2024            | 12      |
| RE        | 244709  | Thermo-Hygrometer                    | HIOKI E.E.<br>CORPORATION                | LR5001                                            | 231202103                  | 01/25/2024            | 12      |
| RE        | 245787  | Double Ridge Horn Antenna            | Schwarzbeck<br>Mess-Elektronik OHG       | BBHA 9120 C                                       | 689                        | 03/06/2024            | 12      |
| RE        | 246001  | Microwave Cable                      | Huber+Suhner                             | SF103/11PC35/<br>11PC35/1000mm /<br>SF126E/5000mm | 800673(1m) /<br>610204(5m) | 03/06/2024            | 12      |
| AT        | 141244  | Attenuator (10dB)                    | Weinschel - API<br>Technologies Corp     | WA8-10-34                                         | A198                       | 02/17/2024            | 12      |
| AT        | 141327  | Coaxial Cable                        | UL Japan                                 | -                                                 | -                          | 02/09/2024            | 12      |
| AT        | 141419  | Attenuator                           | Weinschel Associates                     | WA56-10                                           | 56100305                   | 05/18/2023            | 12      |
| AT        | 141558  | Digital Tester (TRUE RMS MULTIMETER) | Fluke Corporation                        | 115                                               | 17930030                   | 05/29/2023            | 12      |
| AT        | 141814  | Power Meter                          | Raditeq (Formerly DARE!!<br>Instruments) | RPR3006W                                          | 14I00048SNO<br>082         | 10/04/2023            | 12      |
| AT        | 141900  | Spectrum Analyzer                    | Keysight Technologies Inc                | E4440A                                            | MY46185823                 | 06/16/2023            | 12      |
| AT        | 197220  | Microwave cable                      | Huber+Suhner                             | SF126E/11PC35/<br>11PC35/2000MM                   | 537003/126E                | 03/14/2024            | 12      |
| AT        | 244712  | Thermo-Hygrometer                    | HIOKI E.E.<br>CORPORATION                | LR5001                                            | 231202106                  | 01/25/2024            | 12      |

\*Hyphens for Last Calibration Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

The expiration date of the calibration is the end of the expired month.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

Test item:

RE: Radiated Emission

AT: Antenna Terminal Conducted test