



# RADIO TEST REPORT

Test Report No. 14173126H-B

|                     |                                     |
|---------------------|-------------------------------------|
| Customer            | Sony Interactive Entertainment Inc. |
| Description of EUT  | Wireless communication module       |
| Model Number of EUT | J20H104                             |
| FCC ID              | AK8M21DFD1                          |
| Test Regulation     | FCC Part 15 Subpart C: 2021         |
| Test Result         | Complied (Refer to SECTION 3)       |
| Issue Date          | March 11, 2022                      |
| Remarks             | Bluetooth (BR / EDR) parts          |

Representative Test Engineer

Junya Okuno  
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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## **REVISION HISTORY**

**Original Test Report No.: 14173126H-B**

| Revision        | Test Report No. | Date           | Page Revised Contents |
|-----------------|-----------------|----------------|-----------------------|
| -<br>(Original) | 14173126H-B     | March 11, 2022 | -                     |

## 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     | Sony Interactive Entertainment Inc.           |
| Brand Name       | SONY                                          |
| Address          | 1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan |
| Telephone Number | +81-50-3807-5639                              |
| Contact Person   | Miho Nakamura                                 |

The information provided from 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
- \* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

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

### **2.1 Identification of EUT**

|               |                                                                                           |
|---------------|-------------------------------------------------------------------------------------------|
| Description   | Wireless communication module                                                             |
| Model Number  | J20H104                                                                                   |
| 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  | January 17, 2022                                                                          |
| Test Date     | January 18 to February 15, 2022                                                           |

### **2.2 Product Description**

#### **General Specification**

|        |          |
|--------|----------|
| Rating | DC 3.3 V |
|--------|----------|

## Radio Specification

### WLAN (IEEE802.11b/11g/11n-20/11ax-20)

|                                |                                          |                               |
|--------------------------------|------------------------------------------|-------------------------------|
| Equipment Type                 | Transceiver                              |                               |
| Frequency of Operation         | 2412 MHz to 2462 MHz                     |                               |
| Type of Modulation             | DSSS, OFDM                               |                               |
|                                | OFDMA<br>(IEEE802.11ax only)             | 20 MHz: 26/52/106/242-tone RU |
| Bandwidth & Channel spacing    | Less than 20 MHz & 5 MHz                 |                               |
| Method of frequency generation | Synthesizer                              |                               |
| Antenna Type                   | PIFA                                     |                               |
| Antenna Gain: $G_{ANT}$        | Antenna 1: 5.0 dBi<br>Antenna 2: 5.0 dBi |                               |
| Directional Gain *1)           | 8.01 dBi                                 |                               |
| Maximum clock frequency        | 640 MHz                                  |                               |

### WLAN (IEEE802.11a/11n-20/11ac-20/11ax-20/11n-40/11ac-40/11ax-40/11ac-80/11ax-80)

|                                |                                                                                                         |                                                                            |
|--------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Equipment Type                 | Transceiver                                                                                             |                                                                            |
| Frequency of Operation         | 20 M Band: 5180 MHz to 5240 MHz<br>5260 MHz to 5320 MHz<br>5500 MHz to 5720 MHz<br>5745 MHz to 5825 MHz |                                                                            |
|                                | 40 M Band: 5190 MHz to 5230 MHz<br>5270 MHz to 5310 MHz<br>5510 MHz to 5710 MHz<br>5755 MHz to 5795 MHz |                                                                            |
|                                | 80 M Band: 5210 MHz<br>5290 MHz<br>5530 MHz to 5690 MHz<br>5775 MHz                                     |                                                                            |
| Type of Modulation             | OFDM                                                                                                    |                                                                            |
|                                | OFDMA<br>(IEEE802.11ax only)                                                                            | 20 MHz: 26/52/106/242-tone RU                                              |
|                                |                                                                                                         | 40 MHz: 26/52/106/242/484-tone RU<br>80 MHz: 26/52/106/242/484/996-tone RU |
| Bandwidth & Channel spacing    | Less than 20 MHz / 40 MHz / 80 MHz &<br>20 MHz / 40 MHz / 80 MHz                                        |                                                                            |
| Method of frequency generation | Synthesizer                                                                                             |                                                                            |
| Antenna Type                   | PIFA                                                                                                    |                                                                            |
| Antenna Gain: $G_{ANT}$        | Antenna 1: 6.4 dBi<br>Antenna 3: 5.0 dBi                                                                |                                                                            |
| Directional Gain *1)           | 8.74 dBi                                                                                                |                                                                            |
| Maximum clock frequency        | 640 MHz                                                                                                 |                                                                            |

**BT1: Bluetooth (BR / EDR / Low Energy)**

|                                |                                                      |
|--------------------------------|------------------------------------------------------|
| Equipment Type                 | Transceiver                                          |
| Frequency of Operation         | 2402 MHz to 2480 MHz                                 |
| Type of Modulation             | BT: FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK)<br>BT LE: GFSK |
| Bandwidth / Channel spacing    | BT: 79 MHz / 1 MHz<br>BT LE: 1 MHz & 2 MHz / 2 MHz   |
| Method of frequency generation | Synthesizer                                          |
| Antenna Type                   | PIFA                                                 |
| Antenna Gain                   | Antenna 3: 5.8 dBi                                   |
| Maximum clock frequency        | 640 MHz                                              |

**BT2: Bluetooth (BR / EDR / Low Energy)**

|                                |                                                      |
|--------------------------------|------------------------------------------------------|
| Equipment Type                 | Transceiver                                          |
| Frequency of Operation         | 2402 MHz to 2480 MHz                                 |
| Type of Modulation             | BT: FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK)<br>BT LE: GFSK |
| Bandwidth / Channel spacing    | BT: 79 MHz / 1 MHz<br>BT LE: 1 MHz & 2 MHz / 2 MHz   |
| Method of frequency generation | Synthesizer                                          |
| Antenna Type                   | PIFA                                                 |
| Antenna Gain                   | Antenna 4: 5.8 dBi                                   |
| Maximum clock frequency        | 640 MHz                                              |

\*1) Directional antenna gain =  $10\log \left( \frac{G_{ANT1}}{(10^{20} + 10^{20})^2 / 2} \right)$

\*This test report applies to Bluetooth (BR/EDR) part.

## SECTION 3: Test Specification, Procedures & Results

### 3.1 Test Specification

|                    |                                                                                                                                                                                                              |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Specification | FCC Part 15 Subpart C<br>FCC Part 15 final revised on May 3, 2021 and effective July 2, 2021                                                                                                                 |
| 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 |

### 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                                   | 29.11 dB<br>0.67280 MHz, AV, N        | Complied<br>a)      | -                                               |
| Carrier Frequency Separation             | FCC: KDB 558074 D01<br>15.247 Meas Guidance v05r02<br>ISED: -            | FCC: Section 15.247(a)(1)<br>ISED: RSS-247 5.1 (b)                         | See data.                             | Complied<br>b)      | Conducted                                       |
| 20dB Bandwidth                           | FCC: KDB 558074 D01<br>15.247 Meas Guidance v05r02<br>ISED: -            | FCC: Section 15.247(a)(1)<br>ISED: RSS-247 5.1 (a)                         |                                       | Complied<br>b)      | Conducted                                       |
| Number of Hopping Frequency              | FCC: KDB 558074 D01<br>15.247 Meas Guidance v05r02<br>ISED: -            | FCC: Section 15.247(a)(1)(iii)<br>ISED: RSS-247 5.1 (d)                    |                                       | Complied<br>c)      | Conducted                                       |
| Dwell time                               | FCC: KDB 558074 D01<br>15.247 Meas Guidance v05r02<br>ISED: -            | FCC: Section 15.247(a)(1)(iii)<br>ISED: RSS-247 5.1 (d)                    |                                       | Complied<br>d)      | Conducted                                       |
| Maximum Peak Output Power                | FCC: KDB 558074 D01<br>15.247 Meas Guidance v05r02<br>ISED: RSS-Gen 6.12 | FCC: Section 15.247(a)(b)(1)<br>ISED: RSS-247 5.4 (b)                      |                                       | Complied<br>e)      | Conducted                                       |
| Spurious Emission & Band Edge Compliance | FCC: KDB 558074 D01<br>15.247 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 | 16.5 dB<br>2390.0 MHz<br>Vertical, AV | Complied<br>f) / g) | Conducted/<br>Radiated<br>(above 30 MHz)<br>*1) |

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) Radiated test was selected over 30 MHz based on section 15.247(d).

a) Refer to APPENDIX 1 (data of Conducted Emission)

b) Refer to APPENDIX 1 (data of 20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation)

c) Refer to APPENDIX 1 (data of Number of Hopping Frequency)

d) Refer to APPENDIX 1 (data of Dwell time)

e) Refer to APPENDIX 1 (data of Maximum Peak Output Power)

f) Refer to APPENDIX 1 (data of Conducted Spurious Emission)

g) Refer to APPENDIX 1 (data of Radiated Spurious Emission)

Symbols:

Complied The data of this test item has enough margin, more than the measurement uncertainty.

Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration

#### FCC Part 15.31 (e)

The stable voltage will be supplied by the end product, which will be required to have a power supply regulator. Therefore, the EUT complies with the requirement.

#### FCC Part 15.203/212 Antenna requirement

The EUT has a unique coupling/antenna connector (U.FL).

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          | -<br>a) | Conducted |
| a) Refer to APPENDIX 1 (data of 20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation) |                   |               |              |         |           |

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

**3.4 Uncertainty**

There is no applicable rule of uncertainty in this applied standard. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

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

**Conducted emission**

| Using Item | Frequency range       | Uncertainty (+/-) |
|------------|-----------------------|-------------------|
| AMN (LISN) | 0.009 MHz to 0.15 MHz | 3.7 dB            |
|            | 0.15 MHz to 30 MHz    | 3.3 dB            |

**Radiated emission**

| Measurement distance | Frequency range     |            | Uncertainty (+/-) |
|----------------------|---------------------|------------|-------------------|
| 3 m                  | 9 kHz to 30 MHz     |            | 3.2 dB            |
| 10 m                 |                     |            | 3.0 dB            |
| 3 m                  | 30 MHz to 200 MHz   | Horizontal | 4.8 dB            |
|                      |                     | Vertical   | 5.0 dB            |
|                      | 200 MHz to 1000 MHz | Horizontal | 5.1 dB            |
|                      |                     | Vertical   | 6.2 dB            |
| 10 m                 | 30 MHz to 200 MHz   | Horizontal | 4.8 dB            |
|                      |                     | Vertical   | 4.8 dB            |
|                      | 200 MHz to 1000 MHz | Horizontal | 5.0 dB            |
|                      |                     | Vertical   | 5.0 dB            |
| 3 m                  | 1 GHz to 6 GHz      |            | 4.9 dB            |
|                      | 6 GHz to 18 GHz     |            | 5.2 dB            |
| 1 m                  | 10 GHz to 26.5 GHz  |            | 5.4 dB            |
|                      | 26.5 GHz to 40 GHz  |            | 5.4 dB            |
| 10 m                 | 1 GHz to 18 GHz     |            | 5.4 dB            |

**Antenna Terminal test**

| Test Item                                        | Uncertainty (+/-) |
|--------------------------------------------------|-------------------|
| 20 dB Bandwidth / 99 % Occupied Bandwidth        | 0.96 %            |
| Maximum Peak Output Power / Average Output Power | 1.5 dB            |
| Carrier Frequency Separation                     | 0.42 %            |
| Dwell time / Burst rate                          | 0.10 %            |
| Conducted Spurious Emission                      | 2.7 dB            |

### 3.5 Test Location

UL Japan, Inc. Ise EMC Lab.

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

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

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

Telephone: +81 596 24 8999, Facsimile: +81 596 24 8124

| 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                                                       | -                      | -                            |

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0 m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

### 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 (BT)                                                                                                                                                                                                       | BR / EDR, Payload: PRBS9 |
| *EUT has the power settings by the software as follows;<br>Power Setting: 2.0 dBm<br>Software: MT_TEST_Tool_Ver6.5<br>(Date: January 14, 2022, Storage location: Driven by connected PC)                             |                          |
| *This setting of software is the worst case.<br>Any conditions under the normal use do not exceed the condition of setting.<br>In addition, end users cannot change the settings of the output power of the product. |                          |

## Details of Operating Mode(s)

| Test Item                                                                                                                                                                                                                                                                                                       | Mode                                    | Hopping | Tested Antenna                     | Tested Frequency     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------|------------------------------------|----------------------|
| Conducted Emission, Radiated Spurious Emission (Below 1 GHz)                                                                                                                                                                                                                                                    | Tx 3DH5 *1)                             | Off     | Antenna 3 (BT1)                    | 2402 MHz             |
|                                                                                                                                                                                                                                                                                                                 |                                         |         | Antenna 4 (BT2)                    | 2480 MHz             |
| Radiated Spurious Emission (Above 1 GHz), 20dB Bandwidth                                                                                                                                                                                                                                                        | Tx DH5<br>Tx 3DH5                       | Off     | Antenna 3 (BT1)                    | 2402 MHz             |
|                                                                                                                                                                                                                                                                                                                 |                                         |         | Antenna 4 (BT2)                    | 2441 MHz<br>2480 MHz |
| Carrier Frequency Separation                                                                                                                                                                                                                                                                                    | Tx DH5<br>Tx 3DH5                       | On      | Antenna 3 (BT1)                    | 2402 MHz             |
|                                                                                                                                                                                                                                                                                                                 |                                         |         | Antenna 4 (BT2)                    | 2441 MHz<br>2480 MHz |
| Number of Hopping Frequency                                                                                                                                                                                                                                                                                     | Tx DH5<br>Tx 3DH5                       | On      | Antenna 3 (BT1)<br>Antenna 4 (BT2) | -                    |
| Dwell time                                                                                                                                                                                                                                                                                                      | Tx DH1, DH3, DH5<br>Tx 3DH1, 3DH3, 3DH5 | On      | Antenna 3 (BT1)<br>Antenna 4 (BT2) | -                    |
| Maximum Peak Output Power                                                                                                                                                                                                                                                                                       | Tx DH5<br>Tx 2DH5<br>Tx 3DH5            | Off     | Antenna 3 (BT1)                    | 2402 MHz             |
|                                                                                                                                                                                                                                                                                                                 |                                         |         | Antenna 4 (BT2)                    | 2441 MHz<br>2480 MHz |
| Band Edge Compliance (Conducted)                                                                                                                                                                                                                                                                                | Tx DH5<br>Tx 3DH5                       | On      | Antenna 3 (BT1)                    | 2402 MHz             |
|                                                                                                                                                                                                                                                                                                                 |                                         | Off     | Antenna 4 (BT2)                    | 2480 MHz             |
| 99% Occupied Bandwidth                                                                                                                                                                                                                                                                                          | Tx DH5<br>Tx 3DH5                       | On      | Antenna 3 (BT1)                    | 2402 MHz             |
|                                                                                                                                                                                                                                                                                                                 |                                         | Off     | Antenna 4 (BT2)                    | 2441 MHz<br>2480 MHz |
| *As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test)                                                                                                                                                             |                                         |         |                                    |                      |
| *2DH mode (2Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3DH mode (3 Mb/s EDR: 8DPSK) as a representative.                                                                                                                                                                 |                                         |         |                                    |                      |
| *It is considered that the non-tested packet type (e.g. inquiry) can be omitted as it is complied with above all the test items based on Bluetooth Core specification.                                                                                                                                          |                                         |         |                                    |                      |
| *1) Conducted emissions and 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. |                                         |         |                                    |                      |

Simultaneous transmission (Only Antenna 3 simultaneously transmits BT1 and WLAN 5 GHz band on a single antenna.)

| Test Item                                                                                                                                                                                     | Mode *1)                                     | Antenna type    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------------|
| Radiated Spurious Emission                                                                                                                                                                    | Tx DH5 2480 MHz + Tx 11ax-20 (OFDM) 5500 MHz | Antenna 3 (BT1) |
| *1) The test was conducted on representative mode, the worst mode at Spurious emission test for BT and the mode had the highest power at Antenna terminal conducted test for WLAN 5 GHz band. |                                              |                 |

## 4.2 Configuration and Peripherals

**This page has been submitted for a separate exhibit.**

## **SECTION 5: Conducted Emission**

### **Test Procedure and Conditions**

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

#### For the tests on EUT with other peripherals (as a whole system)

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50 ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

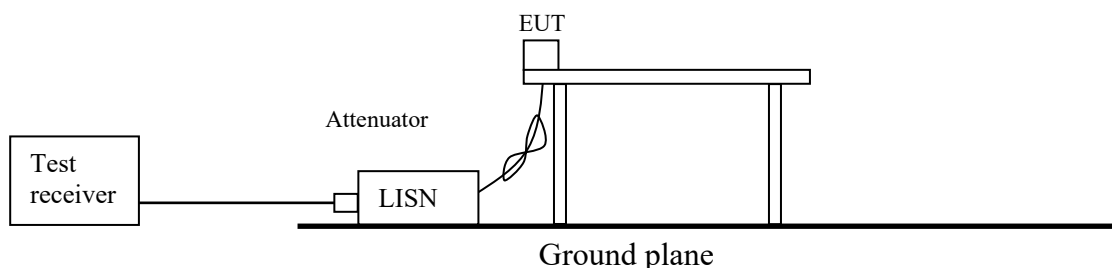
The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

|                          |                             |
|--------------------------|-----------------------------|
| <b>Detector</b>          | <b>: QP and CISPR AV</b>    |
| <b>Measurement Range</b> | <b>: 0.15 MHz to 30 MHz</b> |
| <b>Test Data</b>         | <b>: APPENDIX</b>           |
| <b>Test Result</b>       | <b>: Pass</b>               |

**Figure 1: Test Setup**



## **SECTION 6: Radiated Spurious Emission**

### **Test Procedure**

[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 1.0 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.

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.

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 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.

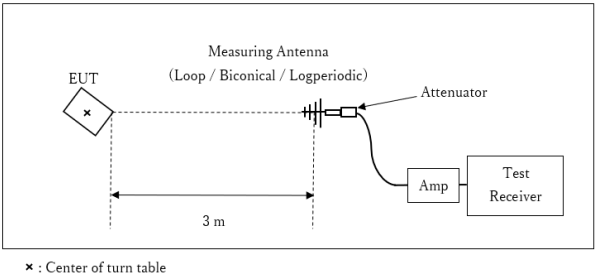
**20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).**

|                 |               |                          |                                                                                                                              |                              |
|-----------------|---------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Frequency       | Below 1 GHz   | Above 1 GHz              |                                                                                                                              | 20 dBc                       |
| Instrument used | Test Receiver | Spectrum Analyzer        |                                                                                                                              | Spectrum Analyzer            |
| Detector        | QP            | PK                       | AV *1)                                                                                                                       | PK                           |
| IF Bandwidth    | BW 120 kHz    | RBW: 1 MHz<br>VBW: 3 MHz | RBW: 1 MHz<br>VBW: 3 MHz<br>Detector:<br>Power Averaging (RMS)<br>Trace: 100 traces<br>Duty factor was added to the results. | RBW: 100 kHz<br>VBW: 300 kHz |

\*1) Average Power Measurement was performed based on KDB 558074 D01 15.247 Meas Guidance v05r02.

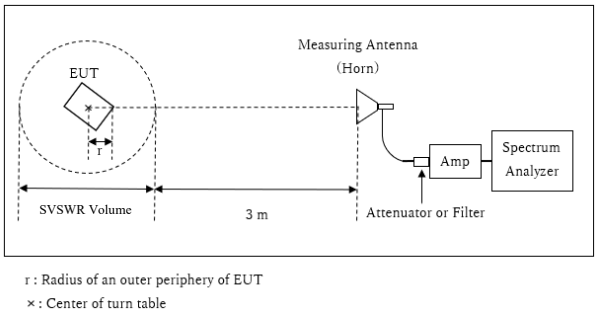
Figure 2: Test Setup

Below 1 GHz



Test Distance: 3 m

1 GHz to 10 GHz



[Other than Simultaneous transmission]  
Distance Factor:  $20 \times \log (3.95 \text{ m} / 3.0 \text{ m}) = 2.39 \text{ dB}$   
\* Test Distance:  $(3 + \text{SVSWR Volume} / 2) - r = 3.95 \text{ m}$

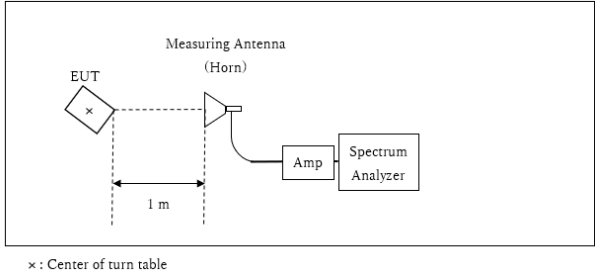
SVSWR Volume : 2.0 m  
 $r = 0.05 \text{ m}$

[Simultaneous transmission]  
Distance Factor:  $20 \times \log (3.9 \text{ m} / 3.0 \text{ m}) = 2.28 \text{ dB}$   
\* Test Distance:  $(3 + \text{SVSWR Volume} / 2) - r = 3.9 \text{ m}$

SVSWR Volume : 2.0 m  
 $r = 0.1 \text{ m}$

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

10 GHz to 26.5 GHz



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.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

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

## SECTION 7: 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                |
|--------------------------------------------------|-----------------------------------------|-----------------|--------------------|----------------------------------------------------------------|------------------|-------------|--------------------------------|
| 20dB Bandwidth                                   | 3 MHz                                   | 30 kHz          | 100 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: 50MHz BW) |
| Carrier Frequency Separation                     | 3 MHz                                   | 30 kHz          | 100 kHz            | Auto                                                           | Peak             | Max Hold    | Spectrum Analyzer              |
| Number of Hopping Frequency                      | 30 MHz                                  | 100 kHz         | 300 kHz            | Auto                                                           | Peak             | Max Hold    | Spectrum Analyzer              |
| Dwell Time                                       | Zero Span                               | 100 kHz, 1 MHz  | 300 kHz, 3 MHz     | As necessary capture the entire dwell time per hopping channel | Peak             | Clear Write | Spectrum Analyzer              |
| Conducted Spurious Emission *3) *4)              | 9 kHz to 150 kHz                        | 200 Hz          | 620 Hz             | Auto                                                           | Peak             | Max Hold    | Spectrum Analyzer              |
|                                                  | 150 kHz to 30 MHz                       | 9.1 kHz         | 27 kHz             |                                                                |                  |             |                                |
|                                                  | 30 MHz to 25 GHz                        | 100 kHz         | 300 kHz            |                                                                |                  |             |                                |
| Conducted Spurious Emission Band Edge compliance | 10 MHz                                  | 100 kHz         | 300 kHz            | Auto                                                           | Peak             | Max Hold    | Spectrum Analyzer              |

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

\*2) Reference data

\*3) 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 = 9.1 kHz).

\*4) 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.

The test results and limit are rounded off to two decimals place, so some differences might be observed.

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

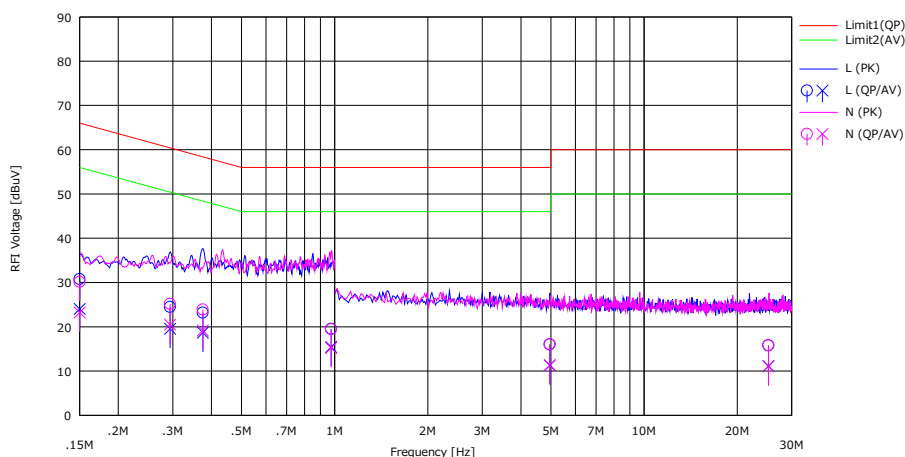
Test Data : APPENDIX  
Test Result : Pass

## APPENDIX 1: Test data

### Conducted Emission (BT1)

Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date February 15, 2022  
Temperature / Humidity 20 deg. C / 40 % RH  
Engineer Junya Okuno  
Mode Tx, Hopping Off, 3DH5 2402 MHz

Limit : FCC\_Part 15 Subpart C(15.207)



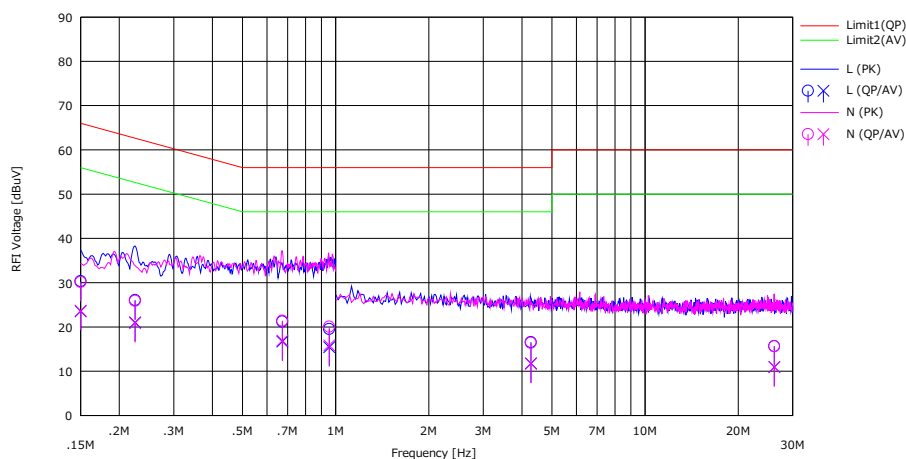
| No. | Freq.<br>[MHz] | Reading        |                | LISN<br>[dB] | LOSS<br>[dB] | Results        |                | Limit          |                | Margin       |              | Phase | Comment |
|-----|----------------|----------------|----------------|--------------|--------------|----------------|----------------|----------------|----------------|--------------|--------------|-------|---------|
|     |                | <QP><br>[dBuV] | <AV><br>[dBuV] |              |              | <QP><br>[dBuV] | <AV><br>[dBuV] | <QP><br>[dBuV] | <AV><br>[dBuV] | <QP><br>[dB] | <AV><br>[dB] |       |         |
| 1   | 0.15000        | 17.50          | 10.80          | 0.06         | 13.18        | 30.74          | 24.04          | 66.00          | 56.00          | 35.26        | 31.96        | L     |         |
| 2   | 0.29394        | 11.20          | 6.30           | 0.05         | 13.20        | 24.45          | 19.55          | 60.41          | 50.41          | 35.96        | 30.86        | L     |         |
| 3   | 0.37503        | 9.90           | 5.40           | 0.05         | 13.21        | 23.16          | 18.66          | 58.39          | 48.39          | 35.23        | 29.73        | L     |         |
| 4   | 0.97500        | 6.20           | 2.10           | 0.06         | 13.26        | 19.52          | 15.42          | 56.00          | 46.00          | 36.48        | 30.58        | L     |         |
| 5   | 4.95828        | 2.40           | -2.30          | 0.13         | 13.48        | 16.01          | 11.31          | 56.00          | 46.00          | 39.99        | 34.69        | L     |         |
| 6   | 25.24100       | 1.30           | -3.40          | 0.51         | 13.98        | 15.79          | 11.09          | 60.00          | 50.00          | 44.21        | 38.91        | L     |         |
| 7   | 0.15000        | 16.90          | 10.00          | 0.06         | 13.18        | 30.14          | 23.24          | 66.00          | 56.00          | 35.86        | 32.76        | N     |         |
| 8   | 0.29394        | 11.90          | 7.20           | 0.06         | 13.20        | 25.16          | 20.46          | 60.41          | 50.41          | 35.25        | 29.95        | N     |         |
| 9   | 0.37503        | 10.60          | 5.90           | 0.06         | 13.21        | 23.87          | 19.17          | 58.39          | 48.39          | 34.52        | 29.22        | N     |         |
| 10  | 0.97500        | 6.10           | 1.90           | 0.07         | 13.26        | 19.43          | 15.23          | 56.00          | 46.00          | 36.57        | 30.77        | N     |         |
| 11  | 4.95828        | 2.40           | -2.30          | 0.13         | 13.48        | 16.01          | 11.31          | 56.00          | 46.00          | 39.99        | 34.69        | N     |         |
| 12  | 25.24100       | 1.30           | -3.40          | 0.48         | 13.98        | 15.76          | 11.06          | 60.00          | 50.00          | 44.24        | 38.94        | N     |         |

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + LISN + LOSS (CABLE + ATT)  
Except for the above table: adequate margin data below the limits.

## Conducted Emission (BT2)

Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date February 15, 2022  
Temperature / Humidity 20 deg. C / 40 % RH  
Engineer Junya Okuno  
Mode Tx, Hopping Off, 3DH5 2480 MHz

Limit : FCC\_Part 15 Subpart C(15.207)



| No. | Freq.<br>[MHz] | Reading        |                | USN<br>[dB] | LOSS<br>[dB] | Results        |                | Limit          |                | Margin       |              | Phase | Comment |
|-----|----------------|----------------|----------------|-------------|--------------|----------------|----------------|----------------|----------------|--------------|--------------|-------|---------|
|     |                | (QP)<br>[dBuV] | (AV)<br>[dBuV] |             |              | (QP)<br>[dBuV] | (AV)<br>[dBuV] | (QP)<br>[dBuV] | (AV)<br>[dBuV] | (QP)<br>[dB] | (AV)<br>[dB] |       |         |
| 1   | 0.15000        | 17.10          | 10.30          | 0.06        | 13.18        | 30.34          | 23.54          | 66.00          | 56.00          | 35.66        | 32.46        | L     |         |
| 2   | 0.22501        | 12.80          | 7.80           | 0.05        | 13.19        | 26.04          | 21.04          | 62.63          | 52.63          | 36.59        | 31.59        | L     |         |
| 3   | 0.67280        | 7.90           | 3.40           | 0.05        | 13.23        | 21.18          | 16.68          | 56.00          | 46.00          | 34.82        | 29.32        | L     |         |
| 4   | 0.95351        | 6.20           | 2.10           | 0.06        | 13.26        | 19.52          | 15.42          | 56.00          | 46.00          | 36.48        | 30.58        | L     |         |
| 5   | 4.27690        | 3.00           | -1.80          | 0.11        | 13.45        | 16.56          | 11.76          | 56.00          | 46.00          | 39.44        | 34.24        | L     |         |
| 6   | 26.17730       | 1.10           | -3.60          | 0.53        | 14.00        | 15.63          | 10.93          | 60.00          | 50.00          | 44.37        | 39.07        | L     |         |
| 7   | 0.15000        | 16.90          | 10.40          | 0.06        | 13.18        | 30.14          | 23.64          | 66.00          | 56.00          | 35.86        | 32.36        | N     |         |
| 8   | 0.22501        | 12.60          | 7.60           | 0.07        | 13.19        | 25.86          | 20.86          | 62.63          | 52.63          | 36.77        | 31.77        | N     |         |
| 9   | 0.67280        | 8.10           | 3.60           | 0.06        | 13.23        | 21.39          | 16.89          | 56.00          | 46.00          | 34.61        | 29.11        | N     |         |
| 10  | 0.95351        | 6.70           | 2.50           | 0.07        | 13.26        | 20.03          | 15.83          | 56.00          | 46.00          | 35.97        | 30.17        | N     |         |
| 11  | 4.27690        | 2.80           | -1.90          | 0.12        | 13.45        | 16.37          | 11.67          | 56.00          | 46.00          | 39.63        | 34.33        | N     |         |
| 12  | 26.17730       | 1.10           | -3.60          | 0.50        | 14.00        | 15.60          | 10.90          | 60.00          | 50.00          | 44.40        | 39.10        | N     |         |

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + LISN + LOSS (CABLE + ATT)  
Except for the above table: adequate margin data below the limits.

## 20dB Bandwidth, 99% Occupied Bandwidth and Carrier Frequency Separation

|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 20, 2022                   |
| Temperature / Humidity | 19 deg. C / 31 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx, Hopping Off, Tx, Hopping On    |

### BT1

| Mode | Freq.<br>[MHz] | 20dB Bandwidth<br>[MHz] | 99% Occupied<br>Bandwidth<br>[kHz] | Carrier Frequency<br>Separation<br>[MHz] | Limit for Carrier<br>Frequency separation<br>[MHz] |
|------|----------------|-------------------------|------------------------------------|------------------------------------------|----------------------------------------------------|
| DH5  | 2402.0         | 0.817                   | 738.441                            | 1.000                                    | $\geq 0.545$                                       |
| DH5  | 2441.0         | 0.841                   | 743.964                            | 1.000                                    | $\geq 0.561$                                       |
| DH5  | 2480.0         | 0.846                   | 745.693                            | 1.000                                    | $\geq 0.564$                                       |
| DH5  | Hopping On     | -                       | 78615.000                          | -                                        | -                                                  |
| 3DH5 | 2402.0         | 1.319                   | 1186.100                           | 1.000                                    | $\geq 0.879$                                       |
| 3DH5 | 2441.0         | 1.316                   | 1184.600                           | 1.000                                    | $\geq 0.877$                                       |
| 3DH5 | 2480.0         | 1.313                   | 1186.100                           | 1.000                                    | $\geq 0.875$                                       |
| 3DH5 | Hopping On     | -                       | 78698.200                          | -                                        | -                                                  |

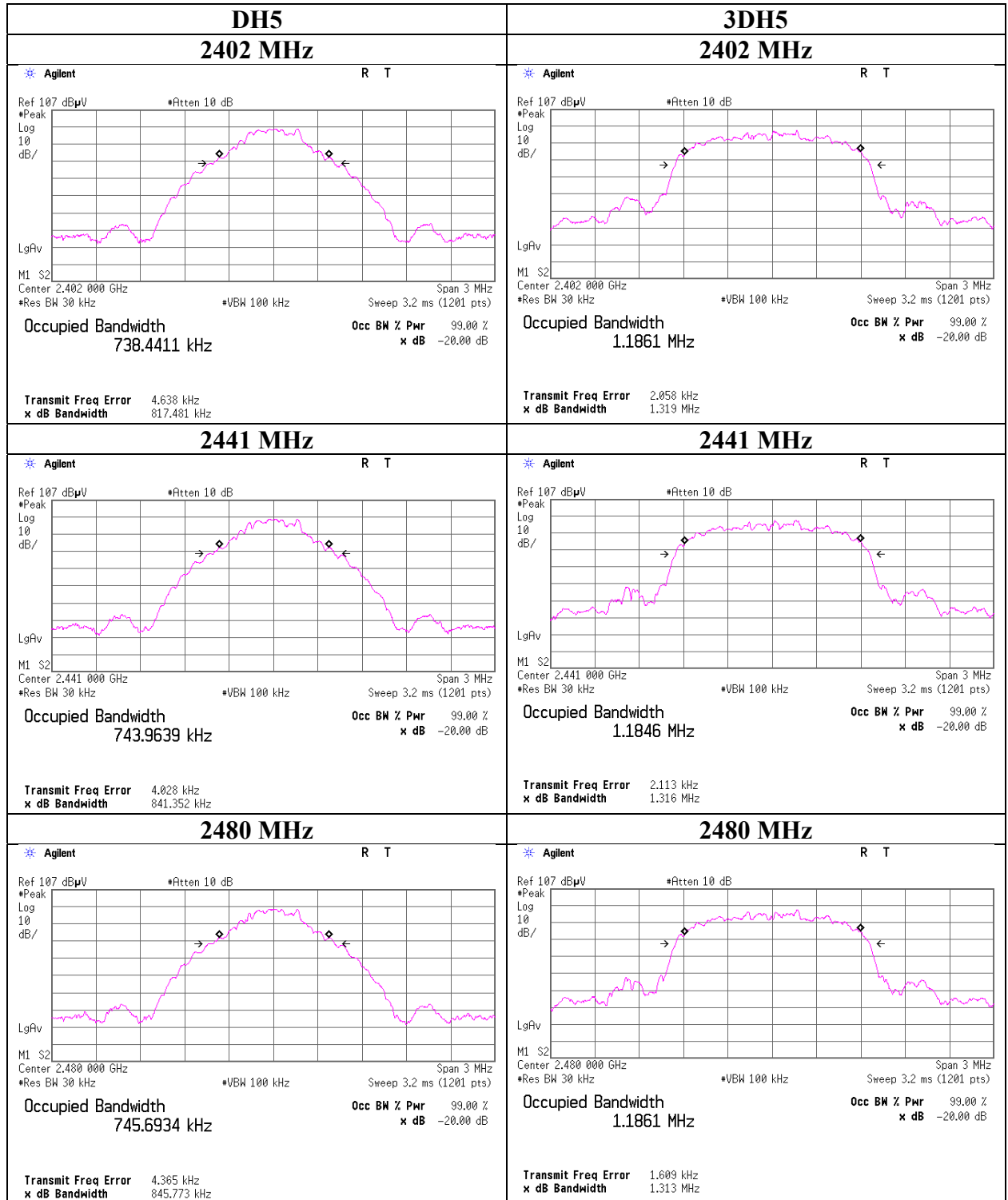
### BT2

| Mode | Freq.<br>[MHz] | 20dB Bandwidth<br>[MHz] | 99% Occupied<br>Bandwidth<br>[kHz] | Carrier Frequency<br>Separation<br>[MHz] | Limit for Carrier<br>Frequency separation<br>[MHz] |
|------|----------------|-------------------------|------------------------------------|------------------------------------------|----------------------------------------------------|
| DH5  | 2402.0         | 0.841                   | 748.486                            | 1.000                                    | $\geq 0.561$                                       |
| DH5  | 2441.0         | 0.844                   | 744.171                            | 1.000                                    | $\geq 0.563$                                       |
| DH5  | 2480.0         | 0.840                   | 739.886                            | 1.000                                    | $\geq 0.560$                                       |
| DH5  | Hopping On     | -                       | 78611.000                          | -                                        | -                                                  |
| 3DH5 | 2402.0         | 1.318                   | 1184.400                           | 1.000                                    | $\geq 0.879$                                       |
| 3DH5 | 2441.0         | 1.318                   | 1186.600                           | 1.000                                    | $\geq 0.879$                                       |
| 3DH5 | 2480.0         | 1.320                   | 1186.200                           | 1.000                                    | $\geq 0.880$                                       |
| 3DH5 | Hopping On     | -                       | 78687.700                          | -                                        | -                                                  |

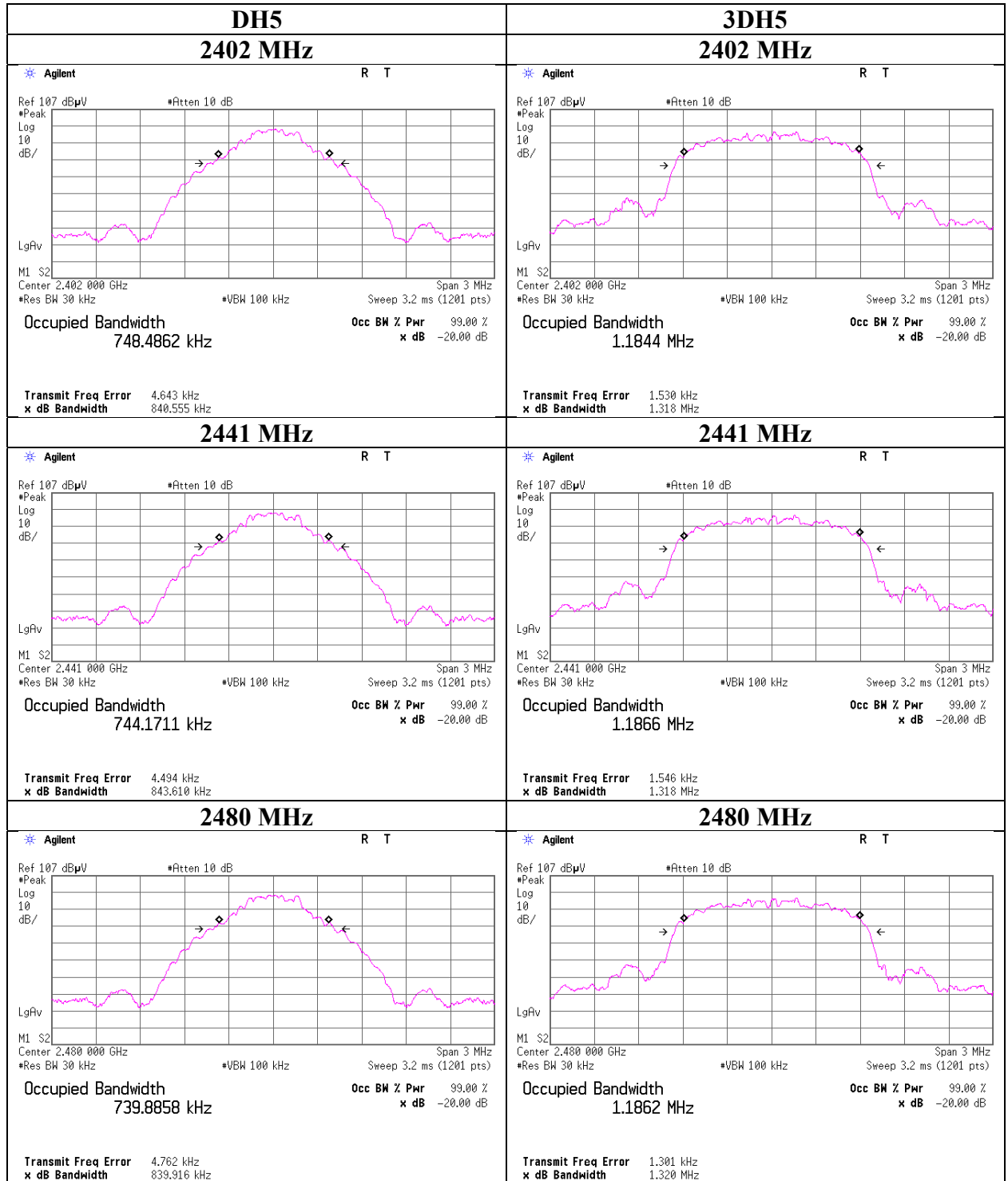
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).

No limit applies to 20dB Bandwidth.

## 20dB Bandwidth and 99% Occupied Bandwidth (BT1)

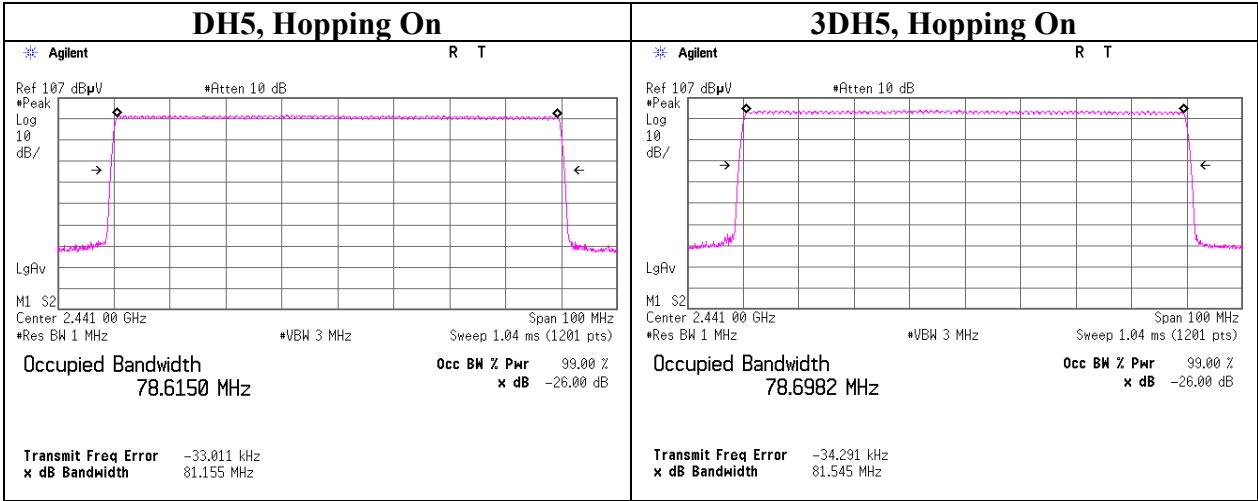


## 20dB Bandwidth and 99% Occupied Bandwidth (BT2)

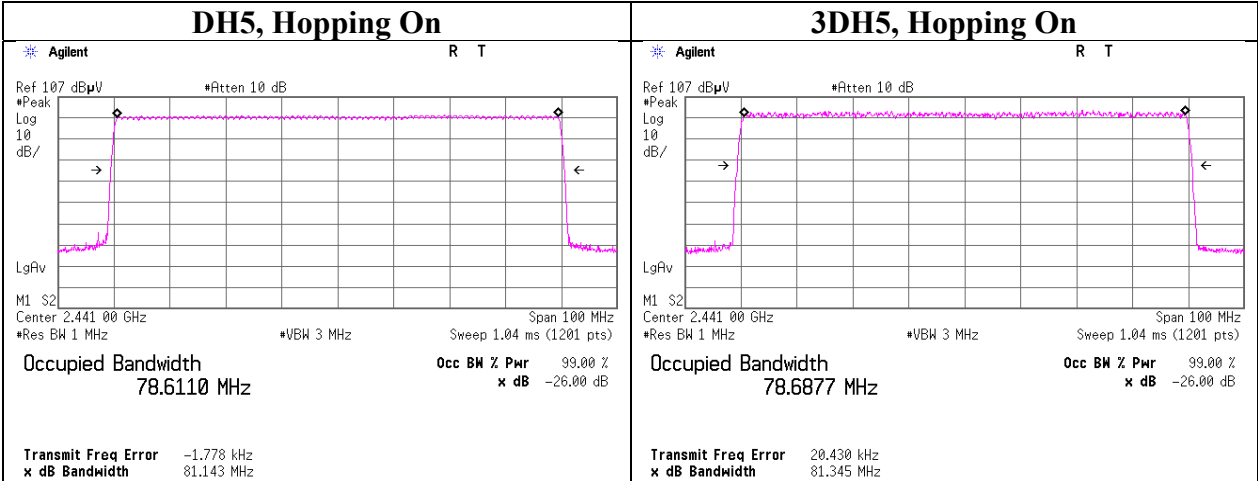


20dB Bandwidth and 99% Occupied Bandwidth

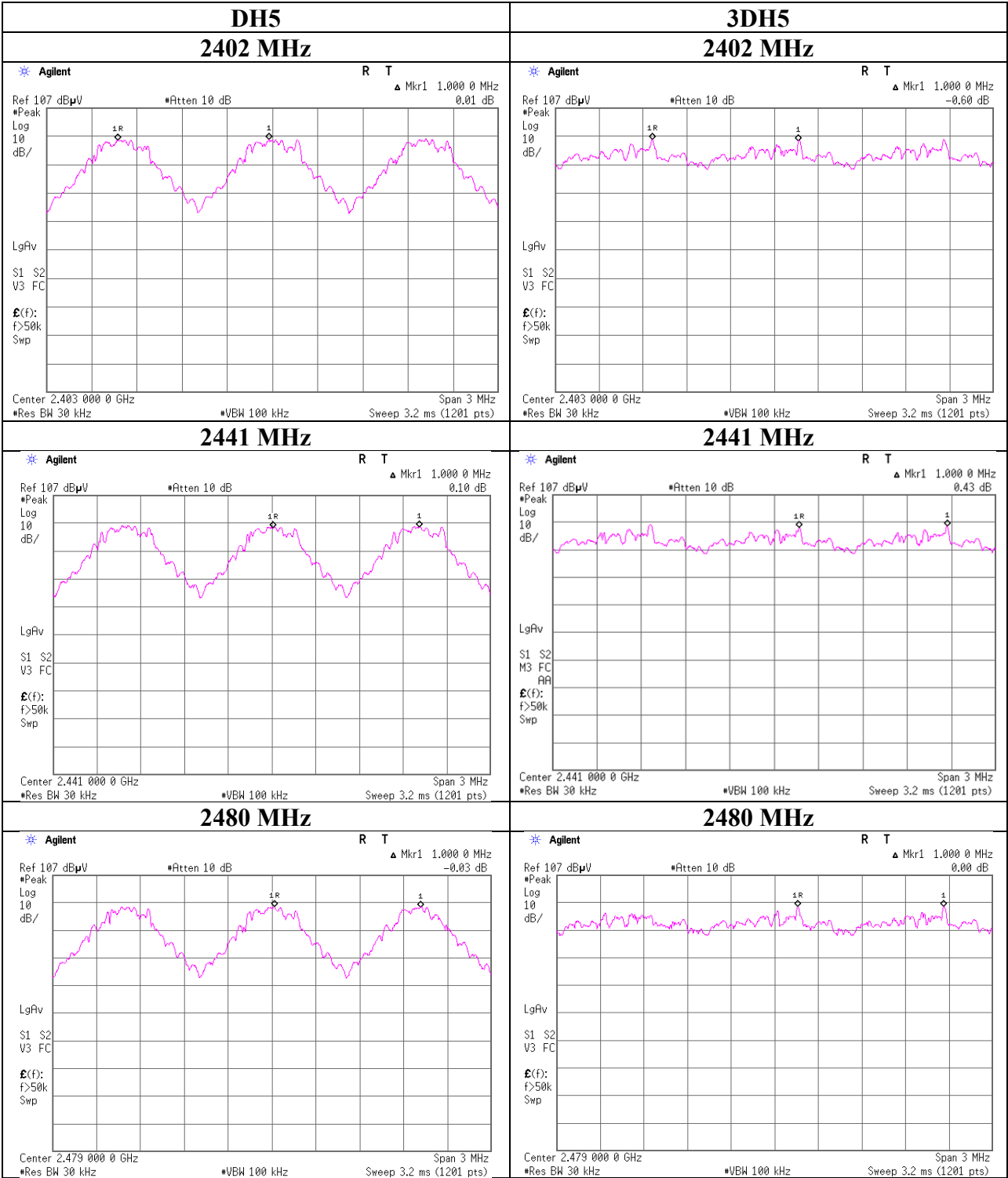
BT1



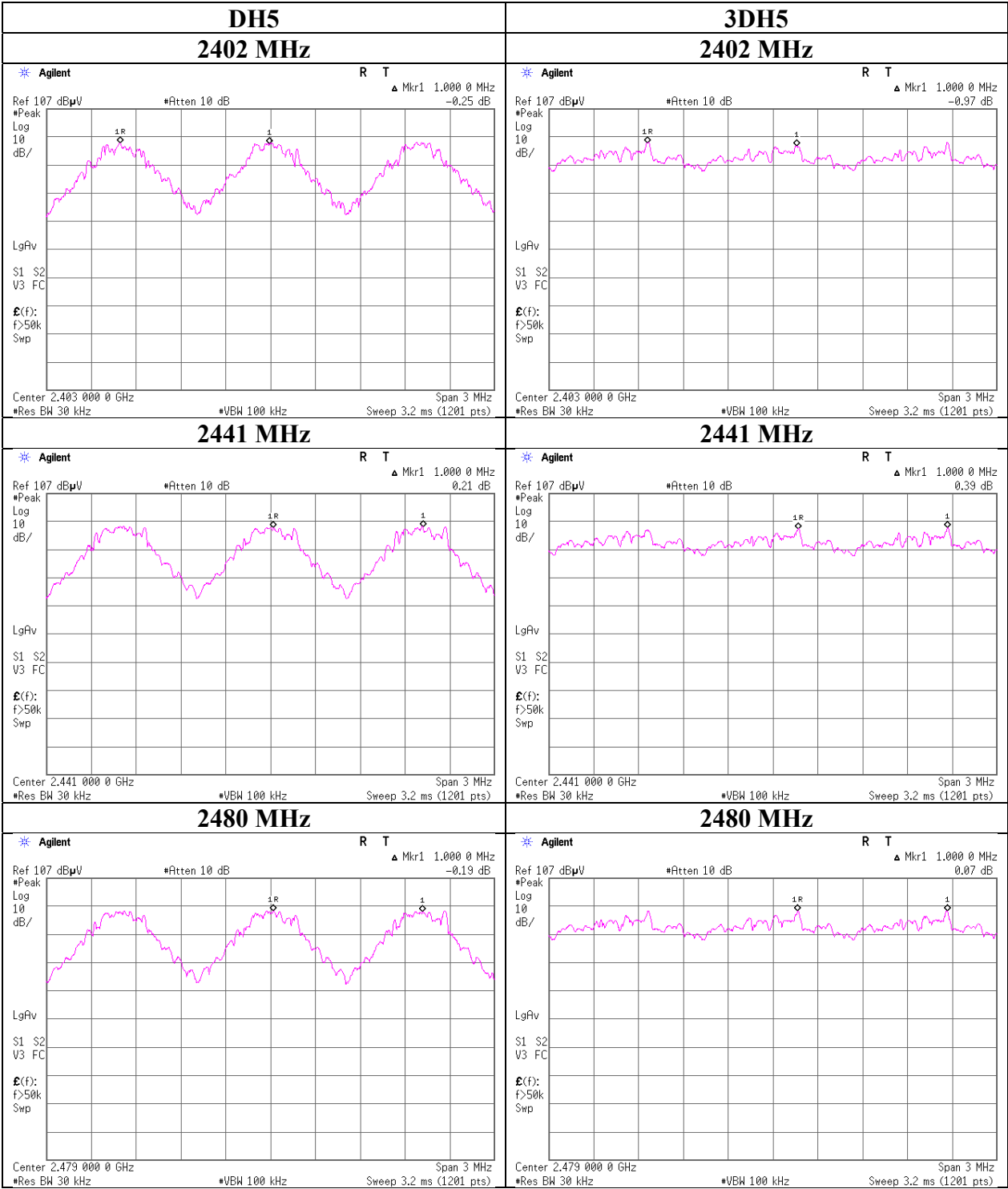
BT2



Carrier Frequency Separation  
(BT1)



**Carrier Frequency Separation**  
**(BT2)**



---

### **Number of Hopping Frequency**

|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 21, 2022                   |
| Temperature / Humidity | 21 deg. C / 30 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx, Hopping On                     |

#### BT1

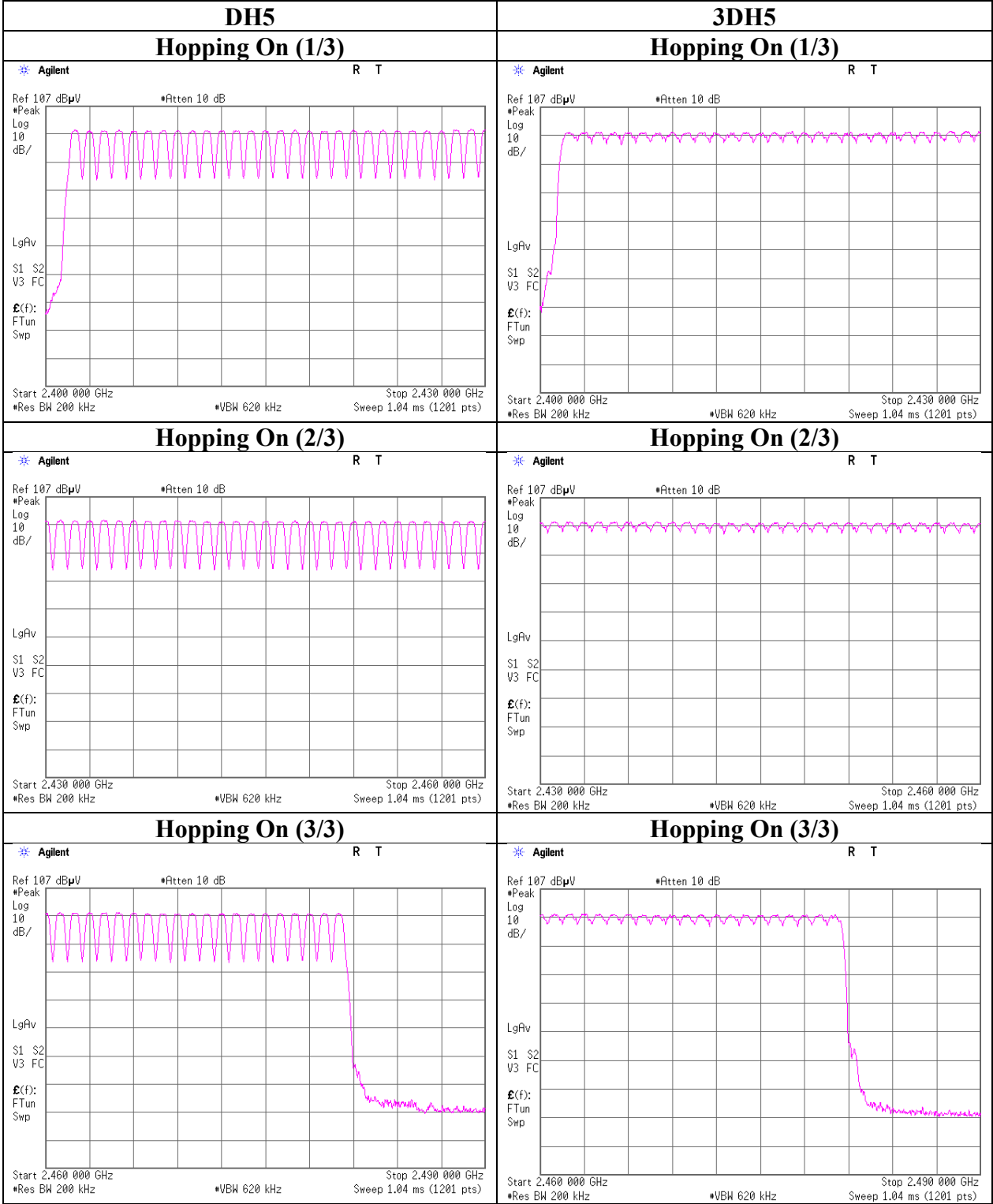
| Mode | Number of channel<br>[channels] | Limit<br>[channels] |
|------|---------------------------------|---------------------|
| DH5  | 79                              | $\geq 15$           |
| 3DH5 | 79                              | $\geq 15$           |

#### BT2

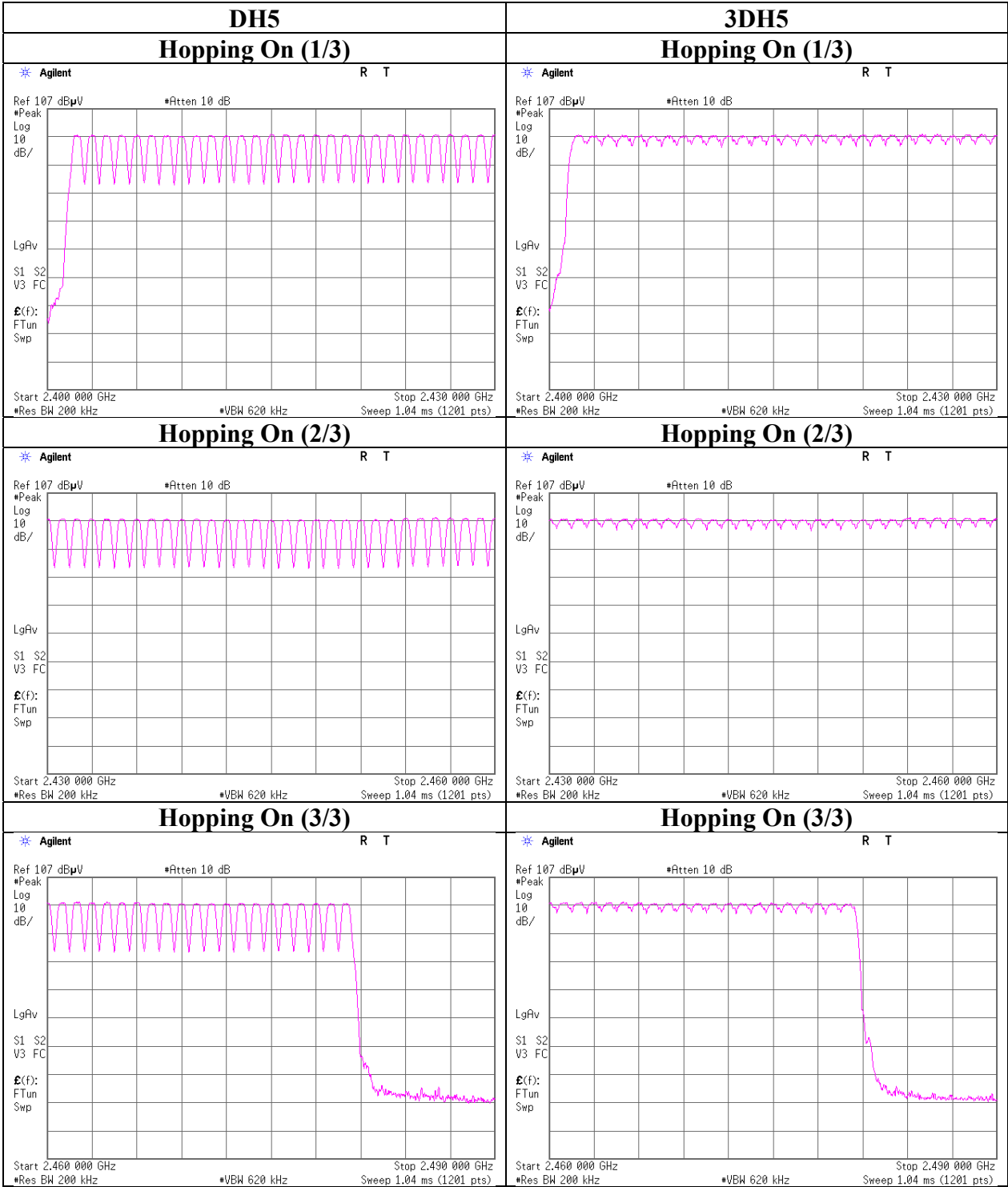
| Mode | Number of channel<br>[channels] | Limit<br>[channels] |
|------|---------------------------------|---------------------|
| DH5  | 79                              | $\geq 15$           |
| 3DH5 | 79                              | $\geq 15$           |

Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.

Number of Hopping Frequency  
(BT1)



Number of Hopping Frequency  
(BT2)



## Dwell time

|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 18, 2022                   |
| Temperature / Humidity | 22 deg. C / 33 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx, Hopping On                     |

### BT1

| Mode | Number of transmission<br>in a 31.6(79 Hopping x 0.4)<br>/ 12.8 (32 Hopping x 0.4) second period |   |        |   |                       | Length of<br>transmission<br>[msec] | Result<br>[msec] | Limit<br>[msec] |
|------|--------------------------------------------------------------------------------------------------|---|--------|---|-----------------------|-------------------------------------|------------------|-----------------|
| DH1  | 51.0 times                                                                                       | / | 5 sec. | x | 31.6 sec. = 323 times | 0.391                               | 126              | 400             |
| DH3  | 28.0 times                                                                                       | / | 5 sec. | x | 31.6 sec. = 177 times | 1.652                               | 292              | 400             |
| DH5  | 19.2 times                                                                                       | / | 5 sec. | x | 31.6 sec. = 122 times | 2.903                               | 354              | 400             |
| 3DH1 | 50.6 times                                                                                       | / | 5 sec. | x | 31.6 sec. = 320 times | 0.397                               | 127              | 400             |
| 3DH3 | 26.8 times                                                                                       | / | 5 sec. | x | 31.6 sec. = 170 times | 1.654                               | 281              | 400             |
| 3DH5 | 20.8 times                                                                                       | / | 5 sec. | x | 31.6 sec. = 132 times | 2.900                               | 383              | 400             |

### BT2

B12

| Mode | Number of transmission<br>in a 31.6(79 Hopping x 0.4)<br>/ 12.8 (32 Hopping x 0.4) second period |   |        |   |                       | Length of<br>transmission<br>[msec] | Result<br>[msec] | Limit<br>[msec] |
|------|--------------------------------------------------------------------------------------------------|---|--------|---|-----------------------|-------------------------------------|------------------|-----------------|
| DH1  | 50.4 times                                                                                       | / | 5 sec. | x | 31.6 sec. = 319 times | 0.390                               | 125              | 400             |
| DH3  | 28.2 times                                                                                       | / | 5 sec. | x | 31.6 sec. = 179 times | 1.649                               | 295              | 400             |
| DH5  | 20.4 times                                                                                       | / | 5 sec. | x | 31.6 sec. = 129 times | 2.900                               | 374              | 400             |
| 3DH1 | 51.2 times                                                                                       | / | 5 sec. | x | 31.6 sec. = 324 times | 0.397                               | 129              | 400             |
| 3DH3 | 27.2 times                                                                                       | / | 5 sec. | x | 31.6 sec. = 172 times | 1.652                               | 284              | 400             |
| 3DH5 | 20.8 times                                                                                       | / | 5 sec. | x | 31.6 sec. = 132 times | 2.913                               | 385              | 400             |

Sample Calculation

Result = Number of transmission x Length of transmission

### BT1

\*Average data of 5 tests.(except Inquiry)

| Mode | Sampling [times] |    |    |    |    | Average<br>[times] |
|------|------------------|----|----|----|----|--------------------|
|      | 1                | 2  | 3  | 4  | 5  |                    |
| DH1  | 50               | 51 | 52 | 51 | 51 | 51                 |
| DH3  | 29               | 26 | 29 | 26 | 30 | 28                 |
| DH5  | 17               | 17 | 20 | 23 | 19 | 19.2               |
| 3DH1 | 50               | 51 | 51 | 50 | 51 | 50.6               |
| 3DH3 | 28               | 26 | 24 | 28 | 28 | 26.8               |
| 3DH5 | 23               | 19 | 19 | 24 | 19 | 20.8               |

### BT2

\*Average data of 5 tests.(except Inquiry)

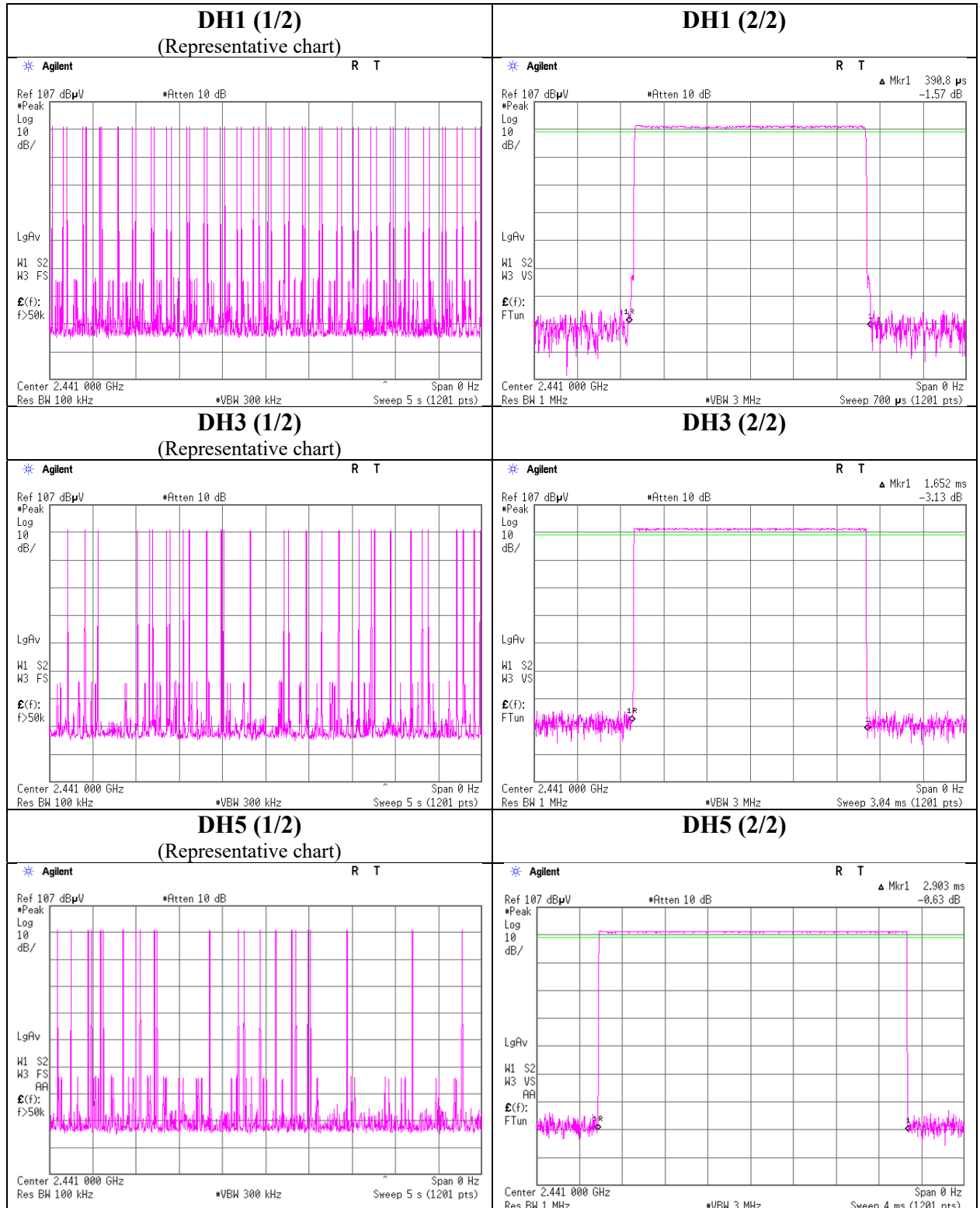
| Mode | Sampling [times] |    |    |    |    | Average<br>[times] |
|------|------------------|----|----|----|----|--------------------|
|      | 1                | 2  | 3  | 4  | 5  |                    |
| DH1  | 50               | 50 | 51 | 50 | 51 | 50.4               |
| DH3  | 29               | 26 | 28 | 31 | 27 | 28.2               |
| DH5  | 19               | 22 | 21 | 21 | 19 | 20.4               |
| 3DH1 | 51               | 51 | 51 | 51 | 52 | 51.2               |
| 3DH3 | 25               | 28 | 28 | 25 | 30 | 27.2               |
| 3DH5 | 23               | 20 | 21 | 21 | 19 | 20.8               |

Sample Calculation

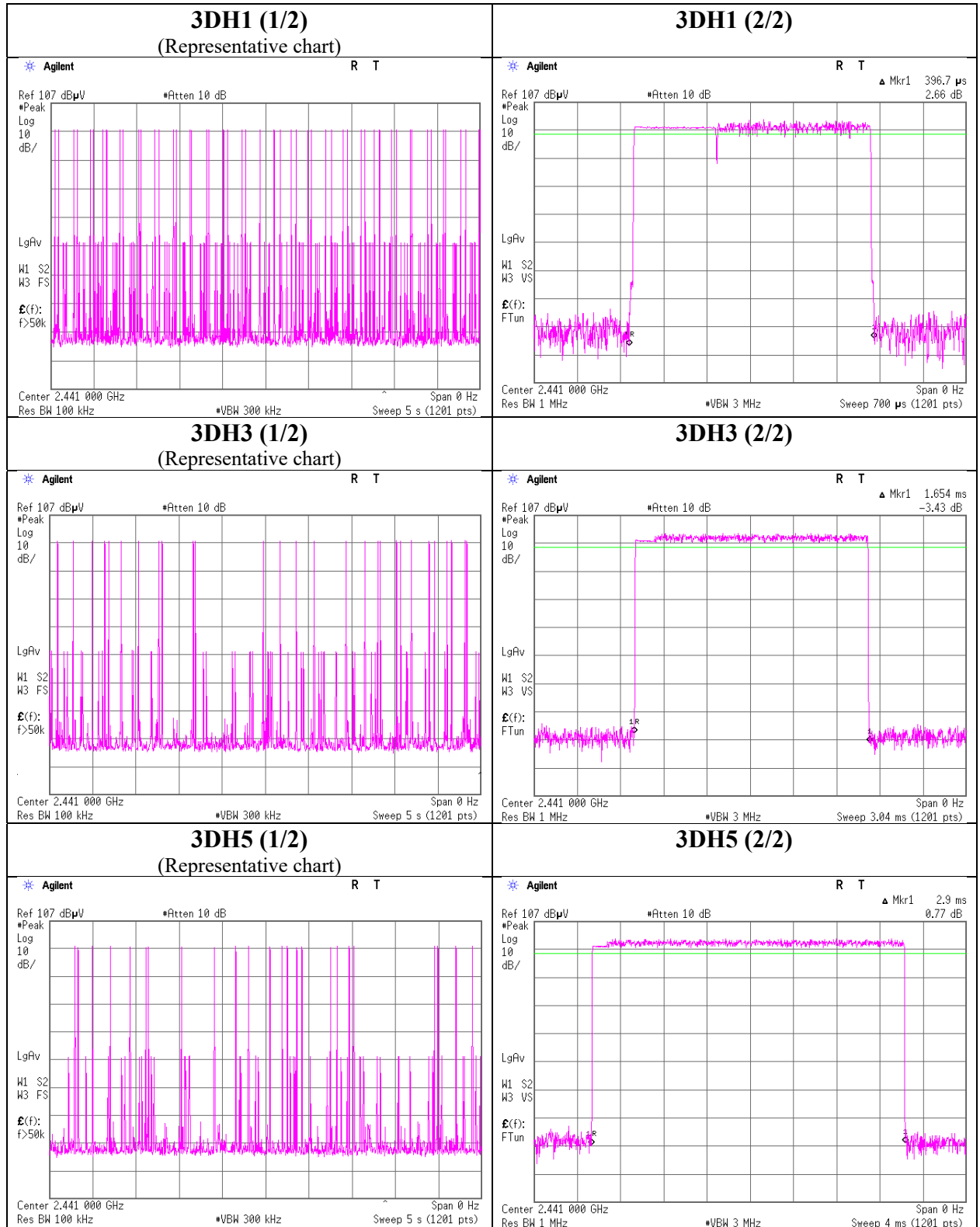
Average = Summation (Sampling 1 to 5) / 5

This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in  $N \times 0.4s$ , where  $N$  is the number of channels being used in the hopping sequence ( $20 \leq N \leq 79$ ), is always less than 0.4s regardless of packet size. This is confirmed in the test report for  $N = 79$ .

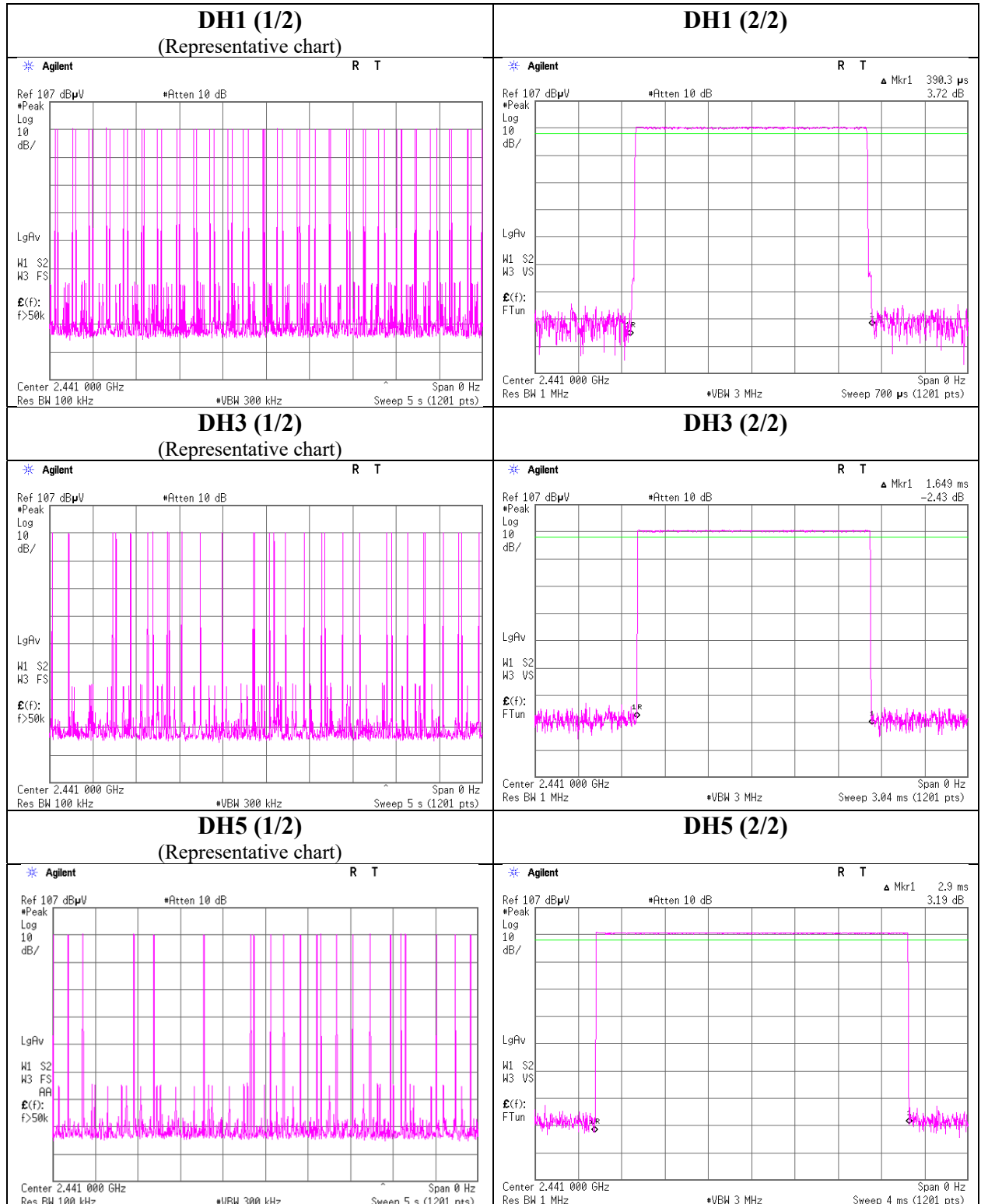
**Dwell time**  
**(BT1)**



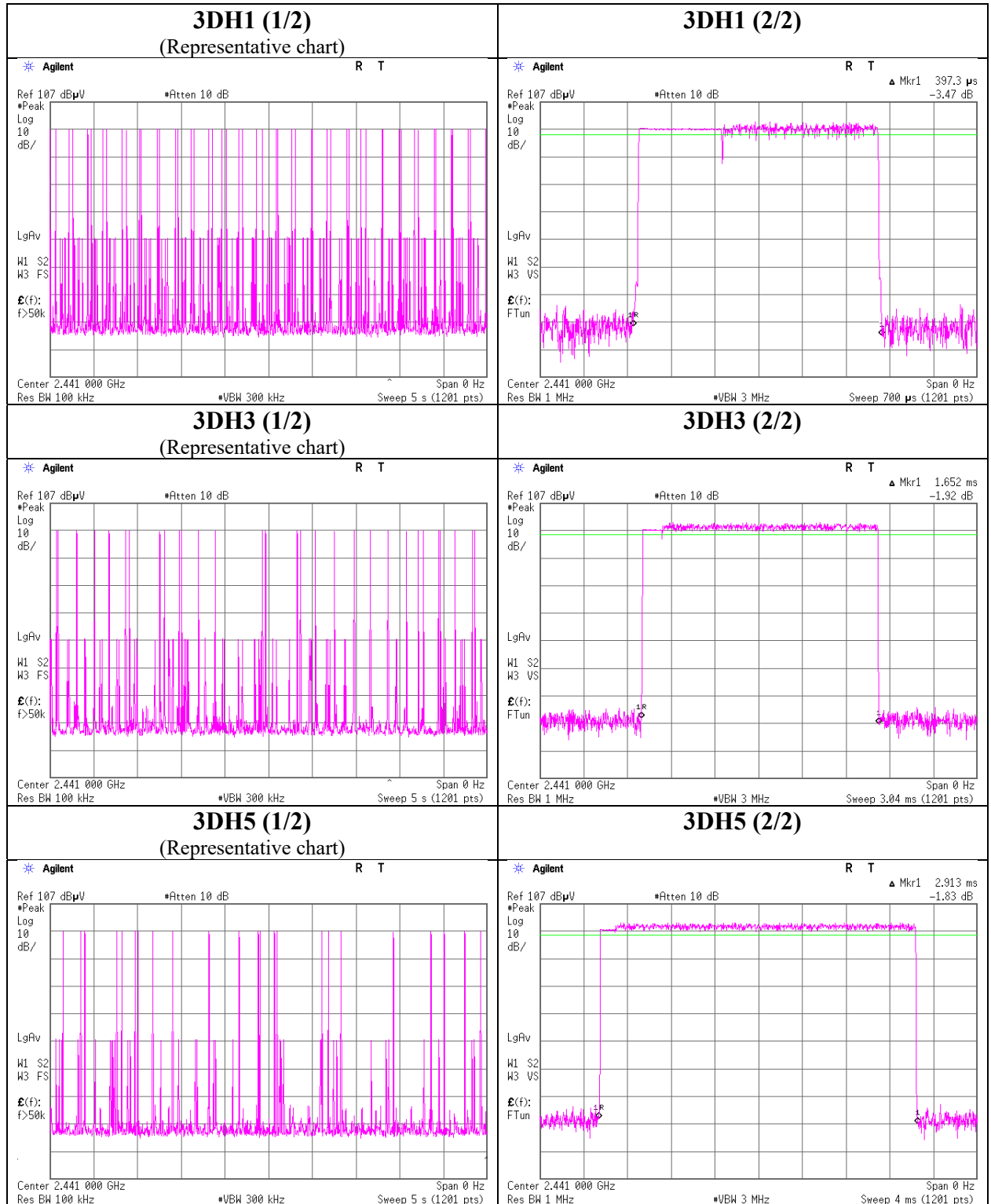
**Dwell time**  
(BT1)



**Dwell time**  
**(BT2)**



# Dwell time (BT2)



## Maximum Peak Output Power

Test place                      Ise EMC Lab. No.8 Measurement Room  
Date                              January 18, 2022  
Temperature / Humidity      22 deg. C / 33 % RH  
Engineer                        Ken Fujita  
Mode                              Tx, Hopping Off

| BT1  |                |                  |                       |                        | Conducted Power |      |       |      |        | e.i.r.p. for RSS-247     |        |       |       |      |        |
|------|----------------|------------------|-----------------------|------------------------|-----------------|------|-------|------|--------|--------------------------|--------|-------|-------|------|--------|
| Mode | Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result          |      | Limit |      | Margin | Antenna<br>Gain<br>[dBi] | Result |       | Limit |      | Margin |
|      |                |                  |                       |                        | [dBm]           | [mW] | [dBm] | [mW] |        |                          | [dBm]  | [mW]  | [dBm] | [mW] |        |
| DH5  | 2402.0         | -8.77            | 0.65                  | 10.04                  | 1.92            | 1.56 | 20.96 | 125  | 19.04  | 5.80                     | 7.72   | 5.92  | 36.02 | 4000 | 28.30  |
| DH5  | 2441.0         | -8.78            | 0.65                  | 10.04                  | 1.91            | 1.55 | 20.96 | 125  | 19.05  | 5.80                     | 7.71   | 5.90  | 36.02 | 4000 | 28.31  |
| DH5  | 2480.0         | -8.98            | 0.65                  | 10.04                  | 1.71            | 1.48 | 20.96 | 125  | 19.25  | 5.80                     | 7.51   | 5.64  | 36.02 | 4000 | 28.51  |
| 2DH5 | 2402.0         | -6.33            | 0.65                  | 10.04                  | 4.36            | 2.73 | 20.96 | 125  | 16.60  | 5.80                     | 10.16  | 10.38 | 36.02 | 4000 | 25.86  |
| 2DH5 | 2441.0         | -6.34            | 0.65                  | 10.04                  | 4.35            | 2.72 | 20.96 | 125  | 16.61  | 5.80                     | 10.15  | 10.35 | 36.02 | 4000 | 25.87  |
| 2DH5 | 2480.0         | -6.48            | 0.65                  | 10.04                  | 4.21            | 2.64 | 20.96 | 125  | 16.75  | 5.80                     | 10.01  | 10.02 | 36.02 | 4000 | 26.01  |
| 3DH5 | 2402.0         | -5.85            | 0.65                  | 10.04                  | 4.84            | 3.05 | 20.96 | 125  | 16.12  | 5.80                     | 10.64  | 11.59 | 36.02 | 4000 | 25.38  |
| 3DH5 | 2441.0         | -5.89            | 0.65                  | 10.04                  | 4.80            | 3.02 | 20.96 | 125  | 16.16  | 5.80                     | 10.60  | 11.48 | 36.02 | 4000 | 25.42  |
| 3DH5 | 2480.0         | -6.11            | 0.65                  | 10.04                  | 4.58            | 2.87 | 20.96 | 125  | 16.38  | 5.80                     | 10.38  | 10.91 | 36.02 | 4000 | 25.64  |

| BT2  |                |                  |                       |                        | Conducted Power |      |       |      |        | e.i.r.p. for RSS-247     |        |       |       |      |        |
|------|----------------|------------------|-----------------------|------------------------|-----------------|------|-------|------|--------|--------------------------|--------|-------|-------|------|--------|
| Mode | Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result          |      | Limit |      | Margin | Antenna<br>Gain<br>[dBi] | Result |       | Limit |      | Margin |
|      |                |                  |                       |                        | [dBm]           | [mW] | [dBm] | [mW] |        |                          | [dBm]  | [mW]  | [dBm] | [mW] |        |
| DH5  | 2402.0         | -9.14            | 0.60                  | 10.04                  | 1.50            | 1.41 | 20.96 | 125  | 19.46  | 5.80                     | 7.30   | 5.37  | 36.02 | 4000 | 28.72  |
| DH5  | 2441.0         | -9.26            | 0.60                  | 10.04                  | 1.38            | 1.37 | 20.96 | 125  | 19.58  | 5.80                     | 7.18   | 5.22  | 36.02 | 4000 | 28.84  |
| DH5  | 2480.0         | -9.01            | 0.60                  | 10.04                  | 1.63            | 1.46 | 20.96 | 125  | 19.33  | 5.80                     | 7.43   | 5.53  | 36.02 | 4000 | 28.59  |
| 2DH5 | 2402.0         | -6.87            | 0.60                  | 10.04                  | 3.77            | 2.38 | 20.96 | 125  | 17.19  | 5.80                     | 9.57   | 9.06  | 36.02 | 4000 | 26.45  |
| 2DH5 | 2441.0         | -6.80            | 0.60                  | 10.04                  | 3.84            | 2.42 | 20.96 | 125  | 17.12  | 5.80                     | 9.64   | 9.20  | 36.02 | 4000 | 26.38  |
| 2DH5 | 2480.0         | -6.69            | 0.60                  | 10.04                  | 3.95            | 2.48 | 20.96 | 125  | 17.01  | 5.80                     | 9.75   | 9.44  | 36.02 | 4000 | 26.27  |
| 3DH5 | 2402.0         | -6.34            | 0.60                  | 10.04                  | 4.30            | 2.69 | 20.96 | 125  | 16.66  | 5.80                     | 10.10  | 10.23 | 36.02 | 4000 | 25.92  |
| 3DH5 | 2441.0         | -6.40            | 0.60                  | 10.04                  | 4.24            | 2.65 | 20.96 | 125  | 16.72  | 5.80                     | 10.04  | 10.09 | 36.02 | 4000 | 25.98  |
| 3DH5 | 2480.0         | -6.23            | 0.60                  | 10.04                  | 4.41            | 2.76 | 20.96 | 125  | 16.55  | 5.80                     | 10.21  | 10.50 | 36.02 | 4000 | 25.81  |

Sample Calculation:

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

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

Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not influence on the output power and bandwidth of the EUT.

As this device had AFH mode and frequency separation could not meet the requirement of over 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

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

|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 18, 2022                   |
| Temperature / Humidity | 22 deg. C / 33 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx, Hopping Off                    |

### BT1

| Mode | Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>(Time average) |      |
|------|----------------|------------------|-----------------------|------------------------|--------------------------|------|
|      |                |                  |                       |                        | [dBm]                    | [mW] |
| DH5  | 2402.0         | -10.35           | 0.65                  | 10.04                  | 0.34                     | 1.08 |
| DH5  | 2441.0         | -10.43           | 0.65                  | 10.04                  | 0.26                     | 1.06 |
| DH5  | 2480.0         | -10.81           | 0.65                  | 10.04                  | -0.12                    | 0.97 |
| 2DH5 | 2402.0         | -10.27           | 0.65                  | 10.04                  | 0.42                     | 1.10 |
| 2DH5 | 2441.0         | -10.31           | 0.65                  | 10.04                  | 0.38                     | 1.09 |
| 2DH5 | 2480.0         | -10.62           | 0.65                  | 10.04                  | 0.07                     | 1.02 |
| 3DH5 | 2402.0         | -10.26           | 0.65                  | 10.04                  | 0.43                     | 1.10 |
| 3DH5 | 2441.0         | -10.32           | 0.65                  | 10.04                  | 0.37                     | 1.09 |
| 3DH5 | 2480.0         | -10.65           | 0.65                  | 10.04                  | 0.04                     | 1.01 |

### BT2

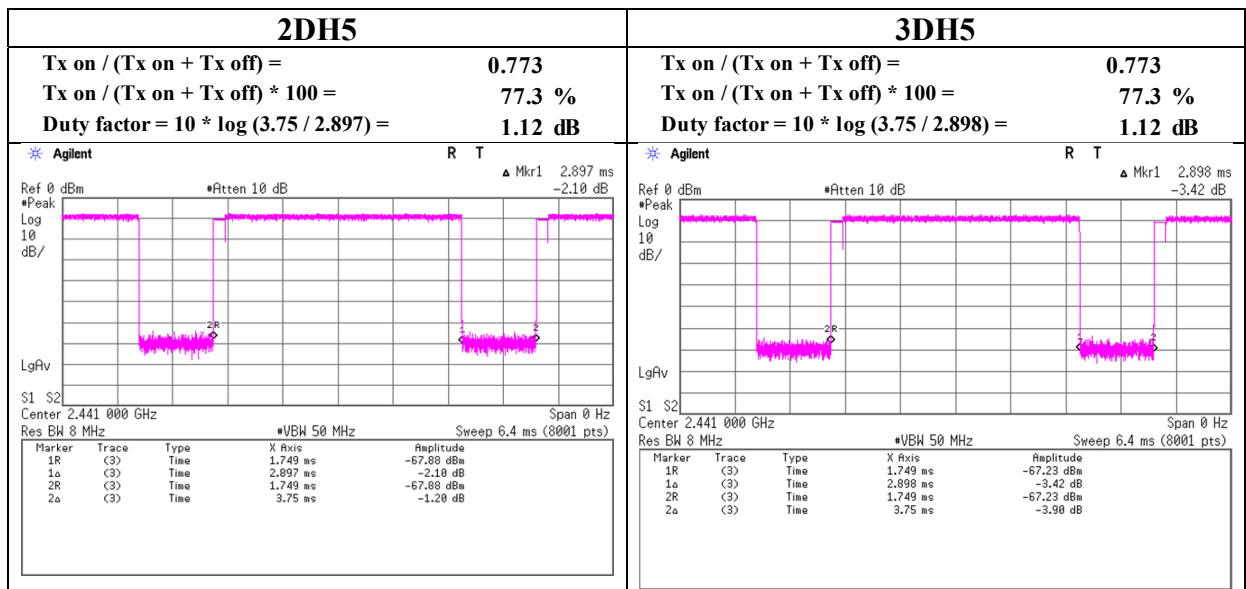
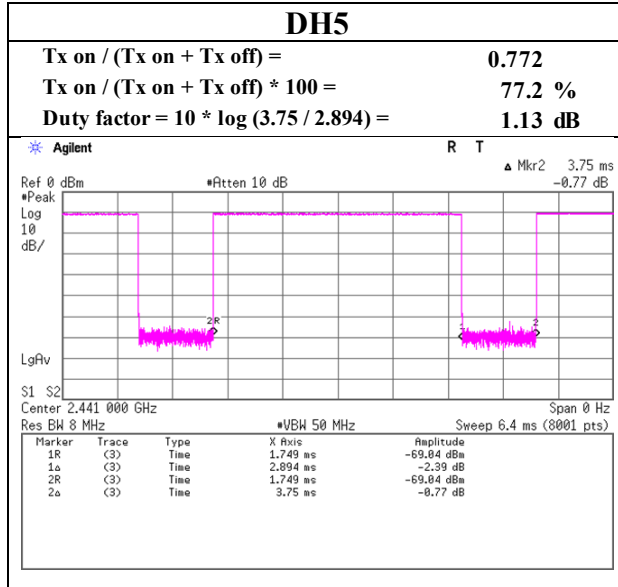
| Mode | Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>(Time average) |      |
|------|----------------|------------------|-----------------------|------------------------|--------------------------|------|
|      |                |                  |                       |                        | [dBm]                    | [mW] |
| DH5  | 2402.0         | -10.70           | 0.60                  | 10.04                  | -0.06                    | 0.99 |
| DH5  | 2441.0         | -10.81           | 0.60                  | 10.04                  | -0.17                    | 0.96 |
| DH5  | 2480.0         | -10.84           | 0.60                  | 10.04                  | -0.20                    | 0.95 |
| 2DH5 | 2402.0         | -10.72           | 0.60                  | 10.04                  | -0.08                    | 0.98 |
| 2DH5 | 2441.0         | -10.78           | 0.60                  | 10.04                  | -0.14                    | 0.97 |
| 2DH5 | 2480.0         | -10.82           | 0.60                  | 10.04                  | -0.18                    | 0.96 |
| 3DH5 | 2402.0         | -10.88           | 0.60                  | 10.04                  | -0.24                    | 0.95 |
| 3DH5 | 2441.0         | -10.91           | 0.60                  | 10.04                  | -0.27                    | 0.94 |
| 3DH5 | 2480.0         | -10.94           | 0.60                  | 10.04                  | -0.30                    | 0.93 |

Sample Calculation:

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

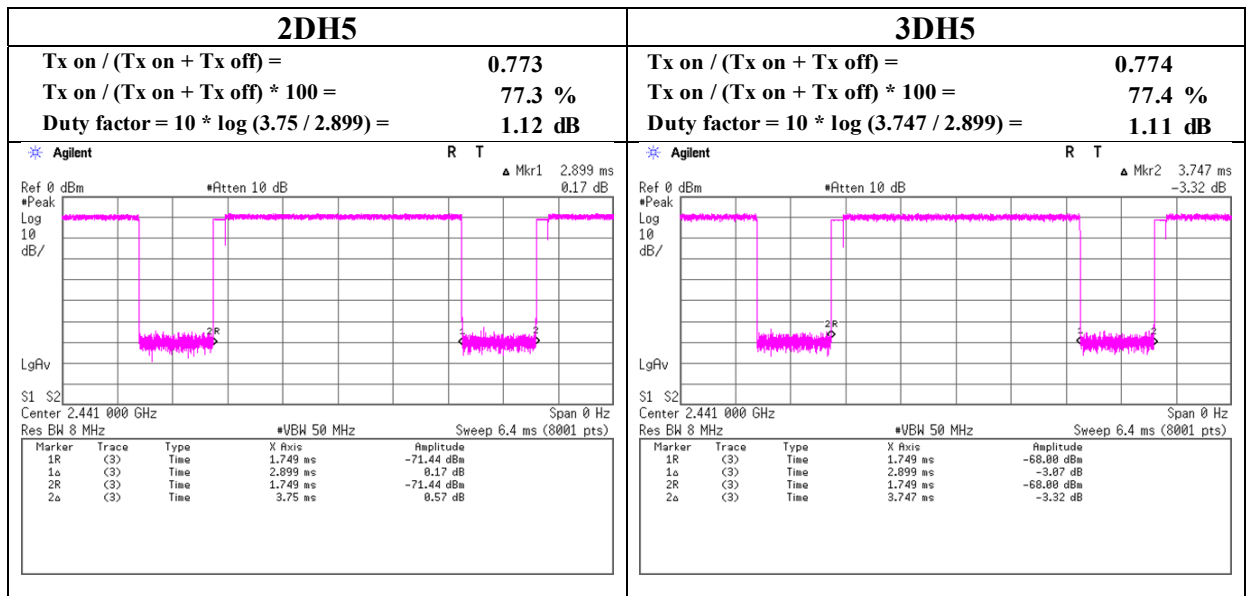
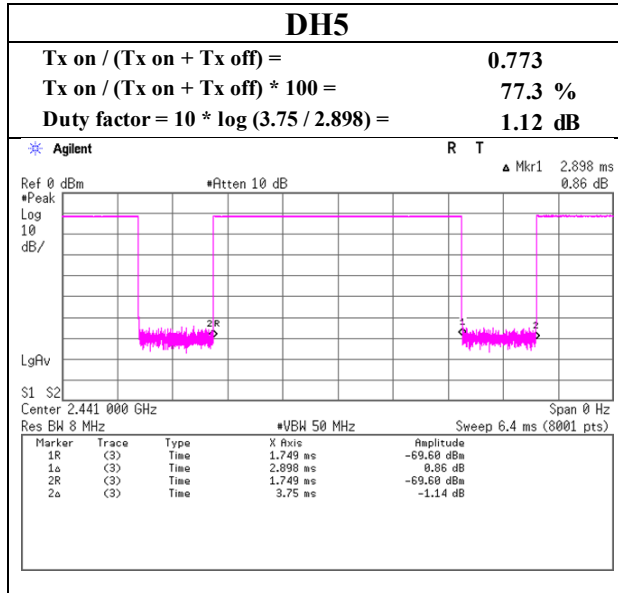
## Burst Rate Confirmation (BT1)

|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 18, 2022                   |
| Temperature / Humidity | 22 deg. C / 33 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx, Hopping Off                    |



## Burst Rate Confirmation (BT2)

|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 18, 2022                   |
| Temperature / Humidity | 22 deg. C / 33 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx, Hopping Off                    |



## Radiated Spurious Emission (BT1)

|                        |                               |                     |
|------------------------|-------------------------------|---------------------|
| Test place             | Ise EMC Lab.                  |                     |
| Semi Anechoic Chamber  | No.3                          | No.3                |
| Date                   | January 25, 2022              | February 3, 2022    |
| Temperature / Humidity | 20 deg. C / 37 % RH           | 21 deg. C / 33 % RH |
| Engineer               | Hiroki Numata                 | Hiroki Numata       |
|                        | (1 GHz - 10 GHz)              | (10 GHz - 26.5 GHz) |
| Mode                   | Tx, Hopping Off, DH5 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.       | 2294.8    | 43.8                 | 33.3            | 28.0           | 5.4  | 32.6 | 1.1            | 44.6                | 35.3           | 73.9               | 53.9          | 29.3                | 18.6           | *2)         |
| Hori.       | 2350.4    | 45.0                 | 33.4            | 27.7           | 5.5  | 32.6 | -              | 45.6                | 33.9           | 73.9               | 53.9          | 28.3                | 20.0           |             |
| Hori.       | 2390.0    | 48.6                 | 34.2            | 27.6           | 5.5  | 32.6 | 1.1            | 49.1                | 35.8           | 73.9               | 53.9          | 24.8                | 18.1           | *1)         |
| Hori.       | 4804.0    | 40.3                 | 32.2            | 31.5           | 7.8  | 31.7 | -              | 48.0                | 39.8           | 73.9               | 53.9          | 26.0                | 14.1           | Floor noise |
| Hori.       | 7206.0    | 42.5                 | 33.5            | 35.7           | 9.4  | 32.6 | -              | 54.9                | 46.0           | 73.9               | 53.9          | 19.0                | 7.9            | Floor noise |
| Hori.       | 9608.0    | 42.4                 | 32.3            | 38.7           | 9.8  | 33.0 | -              | 57.9                | 47.8           | 73.9               | 53.9          | 16.0                | 6.1            | Floor noise |
| Vert.       | 2294.8    | 49.2                 | 34.8            | 28.0           | 5.4  | 32.6 | 1.1            | 50.0                | 36.7           | 73.9               | 53.9          | 23.9                | 17.2           | *2)         |
| Vert.       | 2350.4    | 47.5                 | 34.0            | 27.7           | 5.5  | 32.6 | -              | 48.1                | 34.6           | 73.9               | 53.9          | 25.8                | 19.4           |             |
| Vert.       | 2390.0    | 49.1                 | 34.3            | 27.6           | 5.5  | 32.6 | 1.1            | 49.6                | 36.0           | 73.9               | 53.9          | 24.3                | 17.9           | *1)         |
| Vert.       | 4804.0    | 40.3                 | 31.8            | 31.5           | 7.8  | 31.7 | -              | 47.9                | 39.5           | 73.9               | 53.9          | 26.0                | 14.5           | Floor noise |
| Vert.       | 7206.0    | 42.2                 | 33.5            | 35.7           | 9.4  | 32.6 | -              | 54.6                | 45.9           | 73.9               | 53.9          | 19.3                | 8.0            | Floor noise |
| Vert.       | 9608.0    | 43.0                 | 32.2            | 38.7           | 9.8  | 33.0 | -              | 58.5                | 47.7           | 73.9               | 53.9          | 15.4                | 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.

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

\*2) Noise synchronized with duty of carrier frequency

### 20dBc Data Sheet

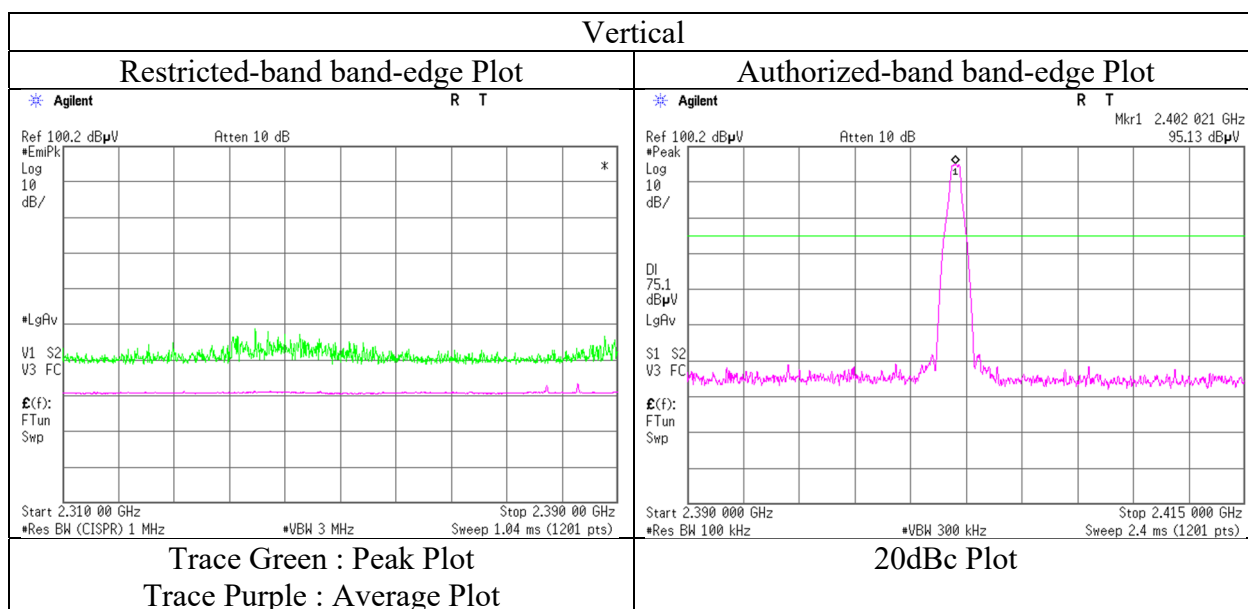
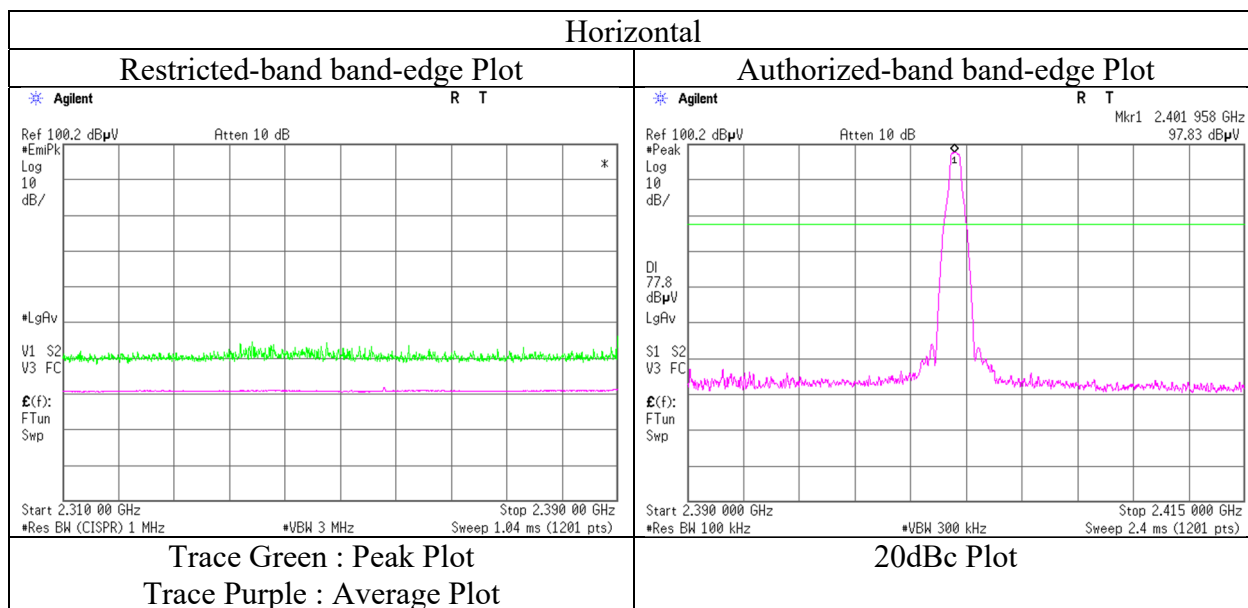
| Polarity    | Frequency | Reading<br>(PK) | Ant<br>Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|-------------|-----------|-----------------|---------------|------|------|----------|----------|--------|---------|
| [Hori/Vert] | [MHz]     | [dBuV]          | [dB/m]        | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.       | 2402.0    | 97.8            | 27.5          | 5.5  | 32.6 | 98.3     | -        | -      | Carrier |
| Hori.       | 2400.0    | 36.3            | 27.5          | 5.5  | 32.6 | 36.7     | 78.3     | 41.6   |         |
| Vert.       | 2402.0    | 95.1            | 27.5          | 5.5  | 32.6 | 95.6     | -        | -      | Carrier |
| Vert.       | 2400.0    | 37.1            | 27.5          | 5.5  | 32.6 | 37.6     | 75.6     | 38.0   |         |

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

Distance factor:  
1 GHz - 10 GHz      20log (3.95 m / 3.0 m) = 2.39 dB  
10 GHz - 26.5 GHz      20log (1.0 m / 3.0 m) = -9.5 dB

# **Radiated Spurious Emission** **(Reference Plot for band-edge)** **(BT1)**

|                        |                               |
|------------------------|-------------------------------|
| Test place             | Ise EMC Lab.                  |
| Semi Anechoic Chamber  | No.3                          |
| Date                   | January 25, 2022              |
| Temperature / Humidity | 20 deg. C / 37 % RH           |
| Engineer               | Hiroki Numata                 |
|                        | (1 GHz - 10 GHz)              |
| Mode                   | Tx, Hopping Off, DH5 2402 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 (BT1)

|                        |                               |                     |
|------------------------|-------------------------------|---------------------|
| Test place             | Ise EMC Lab.                  |                     |
| Semi Anechoic Chamber  | No.3                          | No.3                |
| Date                   | January 25, 2022              | February 3, 2022    |
| Temperature / Humidity | 20 deg. C / 37 % RH           | 21 deg. C / 33 % RH |
| Engineer               | Hiroki Numata                 | Hiroki Numata       |
|                        | (1 GHz - 10 GHz)              | (10 GHz - 26.5 GHz) |
| Mode                   | Tx, Hopping Off, DH5 2441 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.       | 4882.0    | 40.2                 | 31.7            | 31.6           | 7.8  | 31.6 | -              | 47.9                | 39.5           | 73.9               | 53.9          | 26.0                | 14.4           | Floor noise |
| Hori.       | 7323.0    | 41.2                 | 33.4            | 35.9           | 9.3  | 32.7 | -              | 53.8                | 46.0           | 73.9               | 53.9          | 20.1                | 7.9            | Floor noise |
| Hori.       | 9764.0    | 41.6                 | 31.5            | 39.2           | 9.9  | 33.1 | -              | 57.6                | 47.5           | 73.9               | 53.9          | 16.4                | 6.5            | Floor noise |
| Vert.       | 4882.0    | 40.5                 | 32.4            | 31.6           | 7.8  | 31.6 | -              | 48.2                | 40.2           | 73.9               | 53.9          | 25.7                | 13.7           | Floor noise |
| Vert.       | 7323.0    | 41.8                 | 33.2            | 35.9           | 9.3  | 32.7 | -              | 54.4                | 45.8           | 73.9               | 53.9          | 19.5                | 8.1            | Floor noise |
| Vert.       | 9764.0    | 42.0                 | 31.7            | 39.2           | 9.9  | 33.1 | -              | 58.0                | 47.7           | 73.9               | 53.9          | 15.9                | 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 - 10 GHz       $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$   
                              10 GHz - 26.5 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

## Radiated Spurious Emission (BT1)

|                        |                               |                     |
|------------------------|-------------------------------|---------------------|
| Test place             | Ise EMC Lab.                  |                     |
| Semi Anechoic Chamber  | No.3                          | No.3                |
| Date                   | January 25, 2022              | February 3, 2022    |
| Temperature / Humidity | 20 deg. C / 37 % RH           | 21 deg. C / 33 % RH |
| Engineer               | Hiroki Numata                 | Hiroki Numata       |
|                        | (1 GHz - 10 GHz)              | (10 GHz - 26.5 GHz) |
| Mode                   | Tx, Hopping Off, DH5 2480 MHz |                     |

| Polarity<br>[Hori/Vert] | Frequency<br>[MHz] | Reading<br>(QP / PK)<br>[dBuV] | Reading<br>(AV)<br>[dBuV] | Ant.<br>Factor<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty<br>Factor<br>[dB] | Result<br>(QP / PK)<br>[dBuV/m] | Result<br>(AV)<br>[dBuV/m] | Limit<br>(QP / PK)<br>[dBuV/m] | Limit<br>(AV)<br>[dBuV/m] | Margin<br>(QP / PK)<br>[dB] | Margin<br>(AV)<br>[dB] | Remark      |
|-------------------------|--------------------|--------------------------------|---------------------------|--------------------------|--------------|--------------|------------------------|---------------------------------|----------------------------|--------------------------------|---------------------------|-----------------------------|------------------------|-------------|
| Hori.                   | 2483.5             | 43.5                           | 34.4                      | 27.4                     | 5.6          | 32.5         | 1.1                    | 44.0                            | 36.0                       | 73.9                           | 53.9                      | 29.9                        | 17.9                   | *1)         |
| Hori.                   | 4960.0             | 39.6                           | 32.1                      | 31.7                     | 7.8          | 31.6         | -                      | 47.5                            | 40.0                       | 73.9                           | 53.9                      | 26.4                        | 13.9                   | Floor noise |
| Hori.                   | 7440.0             | 42.0                           | 33.9                      | 36.1                     | 9.3          | 32.7         | -                      | 54.7                            | 46.7                       | 73.9                           | 53.9                      | 19.2                        | 7.2                    | Floor noise |
| Hori.                   | 9920.0             | 41.3                           | 32.0                      | 39.1                     | 9.9          | 33.2         | -                      | 57.2                            | 47.9                       | 73.9                           | 53.9                      | 16.8                        | 6.1                    | Floor noise |
| Vert.                   | 2483.5             | 49.1                           | 35.1                      | 27.4                     | 5.6          | 32.5         | 1.1                    | 49.6                            | 36.7                       | 73.9                           | 53.9                      | 24.3                        | 17.2                   | *1)         |
| Vert.                   | 4960.0             | 40.0                           | 31.9                      | 31.7                     | 7.8          | 31.6         | -                      | 47.9                            | 39.8                       | 73.9                           | 53.9                      | 26.0                        | 14.1                   | Floor noise |
| Vert.                   | 7440.0             | 42.3                           | 33.3                      | 36.1                     | 9.3          | 32.7         | -                      | 55.0                            | 46.0                       | 73.9                           | 53.9                      | 18.9                        | 7.9                    | Floor noise |
| Vert.                   | 9920.0             | 41.7                           | 31.5                      | 39.1                     | 9.9          | 33.2         | -                      | 57.6                            | 47.4                       | 73.9                           | 53.9                      | 16.3                        | 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).

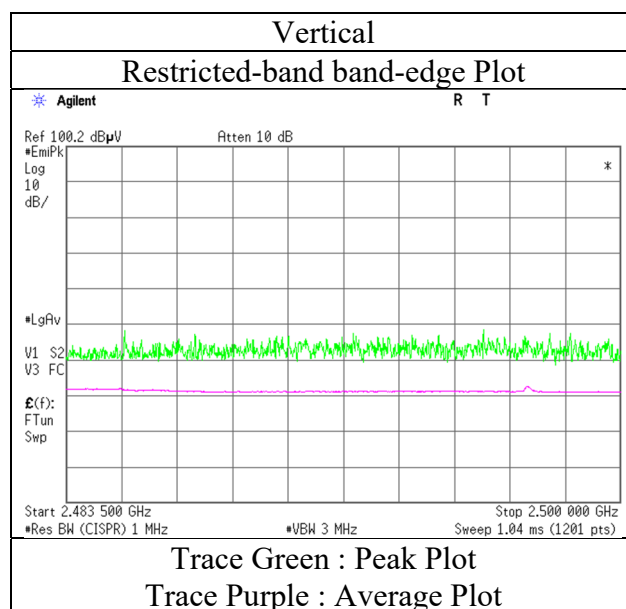
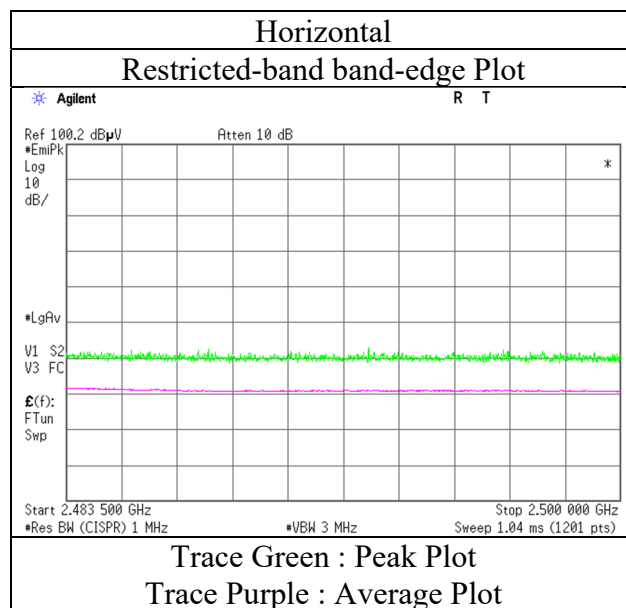
\*QP detector was used up to 1GHz.

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

|                  |                   |                                  |
|------------------|-------------------|----------------------------------|
| Distance factor: | 1 GHz - 10 GHz    | 20log (3.95 m / 3.0 m) = 2.39 dB |
|                  | 10 GHz - 26.5 GHz | 20log (1.0 m / 3.0 m) = -9.5 dB  |

## Radiated Spurious Emission (Reference Plot for band-edge) (BT1)

|                        |                               |
|------------------------|-------------------------------|
| Test place             | Ise EMC Lab.                  |
| Semi Anechoic Chamber  | No.3                          |
| Date                   | January 25, 2022              |
| Temperature / Humidity | 20 deg. C / 37 % RH           |
| Engineer               | Hiroki Numata                 |
|                        | (1 GHz - 10 GHz)              |
| Mode                   | Tx, Hopping Off, DH5 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 (BT1)

|                        |                                |                     |                     |
|------------------------|--------------------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.                   |                     |                     |
| Semi Anechoic Chamber  | No.3                           | No.3                | No.3                |
| Date                   | January 25, 2022               | February 3, 2022    | February 9, 2022    |
| Temperature / Humidity | 20 deg. C / 37 % RH            | 21 deg. C / 33 % RH | 20 deg. C / 42 % RH |
| Engineer               | Hiroki Numata                  | Hiroki Numata       | Junki Nagatomi      |
|                        | (1 GHz - 10 GHz)               | (10 GHz - 26.5 GHz) | (Below 1 GHz)       |
| Mode                   | Tx, Hopping Off, 3DH5 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.       | 32.0      | 22.5                 | -               | 18.0           | 7.1  | 32.3 | -              | 15.4                | -              | 40.0               | -             | 24.6                | -              |             |
| Hori.       | 64.2      | 22.6                 | -               | 7.0            | 7.6  | 32.3 | -              | 5.0                 | -              | 40.0               | -             | 35.0                | -              |             |
| Hori.       | 75.2      | 27.3                 | -               | 6.5            | 7.8  | 32.3 | -              | 9.4                 | -              | 40.0               | -             | 30.7                | -              |             |
| Hori.       | 86.2      | 22.8                 | -               | 7.9            | 8.0  | 32.3 | -              | 6.4                 | -              | 40.0               | -             | 33.6                | -              |             |
| Hori.       | 377.5     | 30.1                 | -               | 15.3           | 10.6 | 32.1 | -              | 23.9                | -              | 46.0               | -             | 22.1                | -              |             |
| Hori.       | 615.5     | 27.1                 | -               | 19.5           | 12.1 | 32.1 | -              | 26.6                | -              | 46.0               | -             | 19.4                | -              |             |
| Hori.       | 2350.4    | 43.2                 | 33.4            | 27.7           | 5.5  | 32.6 | -              | 43.8                | 34.0           | 73.9               | 53.9          | 30.1                | 19.9           |             |
| Hori.       | 2390.0    | 46.7                 | 33.8            | 27.6           | 5.5  | 32.6 | 1.1            | 47.1                | 35.4           | 73.9               | 53.9          | 26.8                | 18.5           | *1)         |
| Hori.       | 4804.0    | 40.8                 | 32.3            | 31.5           | 7.8  | 31.7 | -              | 48.4                | 39.9           | 73.9               | 53.9          | 25.5                | 14.0           | Floor noise |
| Hori.       | 7206.0    | 41.8                 | 33.8            | 35.7           | 9.4  | 32.6 | -              | 54.3                | 46.2           | 73.9               | 53.9          | 19.6                | 7.7            | Floor noise |
| Hori.       | 9608.0    | 42.0                 | 32.3            | 38.7           | 9.8  | 33.0 | -              | 57.5                | 47.8           | 73.9               | 53.9          | 16.4                | 6.1            | Floor noise |
| Vert.       | 32.1      | 22.5                 | -               | 18.0           | 7.1  | 32.3 | -              | 15.4                | -              | 40.0               | -             | 24.6                | -              |             |
| Vert.       | 63.3      | 25.3                 | -               | 7.2            | 7.6  | 32.3 | -              | 7.8                 | -              | 40.0               | -             | 32.2                | -              |             |
| Vert.       | 75.4      | 35.2                 | -               | 6.5            | 7.8  | 32.3 | -              | 17.3                | -              | 40.0               | -             | 22.7                | -              |             |
| Vert.       | 86.2      | 25.4                 | -               | 7.9            | 8.0  | 32.3 | -              | 9.0                 | -              | 40.0               | -             | 31.0                | -              |             |
| Vert.       | 378.3     | 25.1                 | -               | 15.3           | 10.6 | 32.1 | -              | 18.9                | -              | 46.0               | -             | 27.1                | -              |             |
| Vert.       | 616.6     | 27.4                 | -               | 19.5           | 12.1 | 32.1 | -              | 26.9                | -              | 46.0               | -             | 19.1                | -              |             |
| Vert.       | 2350.4    | 52.2                 | 34.7            | 27.7           | 5.5  | 32.6 | -              | 52.8                | 35.3           | 73.9               | 53.9          | 21.1                | 18.6           |             |
| Vert.       | 2390.0    | 46.3                 | 33.8            | 27.6           | 5.5  | 32.6 | 1.1            | 46.8                | 35.4           | 73.9               | 53.9          | 27.1                | 18.5           | *1)         |
| Vert.       | 4804.0    | 41.6                 | 32.4            | 31.5           | 7.8  | 31.7 | -              | 49.2                | 40.0           | 73.9               | 53.9          | 24.7                | 13.9           | Floor noise |
| Vert.       | 7206.0    | 43.8                 | 34.1            | 35.7           | 9.4  | 32.6 | -              | 56.3                | 46.6           | 73.9               | 53.9          | 17.7                | 7.3            | Floor noise |
| Vert.       | 9608.0    | 44.1                 | 32.3            | 38.7           | 9.8  | 33.0 | -              | 59.6                | 47.8           | 73.9               | 53.9          | 14.3                | 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)

### 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    | 96.0            | 27.5          | 5.5  | 32.6 | 96.4     | -        | -      | Carrier |
| Hori.       | 2400.0    | 36.4            | 27.5          | 5.5  | 32.6 | 36.8     | 76.4     | 39.6   |         |
| Vert.       | 2402.0    | 96.1            | 27.5          | 5.5  | 32.6 | 96.5     | -        | -      | Carrier |
| Vert.       | 2400.0    | 38.1            | 27.5          | 5.5  | 32.6 | 38.6     | 76.5     | 37.9   |         |

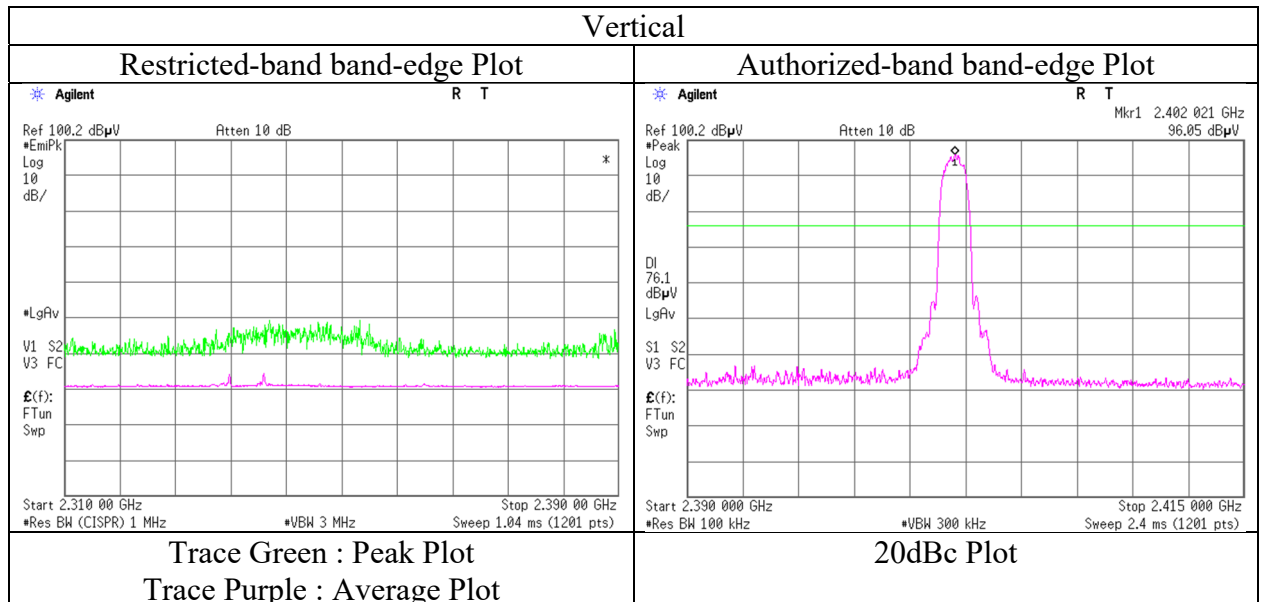
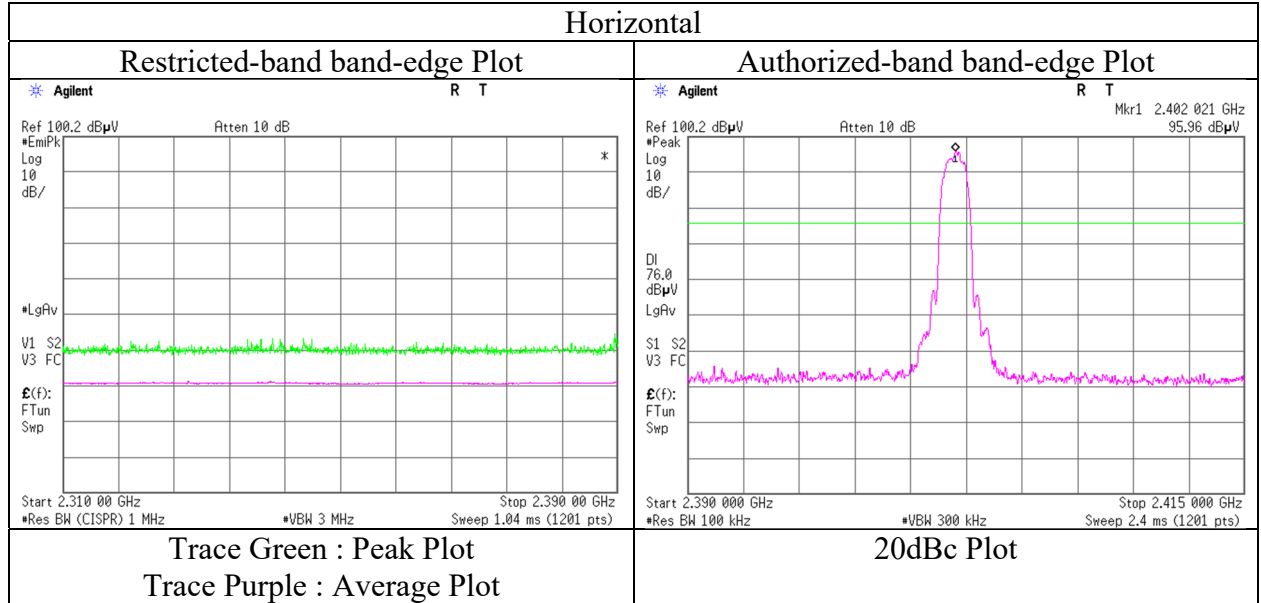
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Distance factor: 1 GHz - 10 GHz 20log(3.95 m / 3.0 m) = 2.39 dB

10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

# **Radiated Spurious Emission** **(Reference Plot for band-edge** **(BT1)**

|                        |                                |
|------------------------|--------------------------------|
| Test place             | Ise EMC Lab.                   |
| Semi Anechoic Chamber  | No.3                           |
| Date                   | January 25, 2022               |
| Temperature / Humidity | 20 deg. C / 37 % RH            |
| Engineer               | Hiroki Numata                  |
|                        | (1 GHz - 10 GHz)               |
| Mode                   | Tx, Hopping Off, 3DH5 2402 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 (BT1)

|                        |                                |                     |
|------------------------|--------------------------------|---------------------|
| Test place             | Ise EMC Lab.                   |                     |
| Semi Anechoic Chamber  | No.3                           | No.3                |
| Date                   | January 25, 2022               | February 3, 2022    |
| Temperature / Humidity | 20 deg. C / 37 % RH            | 21 deg. C / 33 % RH |
| Engineer               | Hiroki Numata                  | Hiroki Numata       |
|                        | (1 GHz - 10 GHz)               | (10 GHz - 26.5 GHz) |
| Mode                   | Tx, Hopping Off, 3DH5 2441 MHz |                     |

| Polarity<br>[Hori/Vert] | Frequency<br>[MHz] | Reading<br>(QP / PK)<br>[dBuV] | Reading<br>(AV)<br>[dBuV] | Ant.<br>Factor<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty<br>Factor<br>[dB] | Result<br>(QP / PK)<br>[dBuV/m] | Result<br>(AV)<br>[dBuV/m] | Limit<br>(QP / PK)<br>[dBuV/m] | Limit<br>(AV)<br>[dBuV/m] | Margin<br>(QP / PK)<br>[dB] | Margin<br>(AV)<br>[dB] | Remark      |
|-------------------------|--------------------|--------------------------------|---------------------------|--------------------------|--------------|--------------|------------------------|---------------------------------|----------------------------|--------------------------------|---------------------------|-----------------------------|------------------------|-------------|
| Hori.                   | 4882.0             | 40.0                           | 31.9                      | 31.6                     | 7.8          | 31.6         | -                      | 47.7                            | 39.6                       | 73.9                           | 53.9                      | 26.2                        | 14.3                   | Floor noise |
| Hori.                   | 7323.0             | 43.0                           | 33.0                      | 35.9                     | 9.3          | 32.7         | -                      | 55.6                            | 45.6                       | 73.9                           | 53.9                      | 18.3                        | 8.3                    | Floor noise |
| Hori.                   | 9764.0             | 41.8                           | 31.7                      | 39.2                     | 9.9          | 33.1         | -                      | 57.8                            | 47.6                       | 73.9                           | 53.9                      | 16.1                        | 6.3                    | Floor noise |
| Vert.                   | 4882.0             | 40.3                           | 32.3                      | 31.6                     | 7.8          | 31.6         | -                      | 48.1                            | 40.0                       | 73.9                           | 53.9                      | 25.8                        | 13.9                   | Floor noise |
| Vert.                   | 7323.0             | 41.7                           | 33.0                      | 35.9                     | 9.3          | 32.7         | -                      | 54.3                            | 45.6                       | 73.9                           | 53.9                      | 19.6                        | 8.3                    | Floor noise |
| Vert.                   | 9764.0             | 41.9                           | 31.7                      | 39.2                     | 9.9          | 33.1         | -                      | 57.9                            | 47.6                       | 73.9                           | 53.9                      | 16.0                        | 6.3                    | 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 - 10 GHz    | 20log (3.95 m / 3.0 m) = 2.39 dB |
|                  | 10 GHz - 26.5 GHz | 20log (1.0 m / 3.0 m) = -9.5 dB  |

## Radiated Spurious Emission (BT1)

|                        |                                |                     |
|------------------------|--------------------------------|---------------------|
| Test place             | Ise EMC Lab.                   |                     |
| Semi Anechoic Chamber  | No.3                           | No.3                |
| Date                   | January 25, 2022               | February 3, 2022    |
| Temperature / Humidity | 20 deg. C / 37 % RH            | 21 deg. C / 33 % RH |
| Engineer               | Hiroki Numata                  | Hiroki Numata       |
|                        | (1 GHz - 10 GHz)               | (10 GHz - 26.5 GHz) |
| Mode                   | Tx, Hopping Off, 3DH5 2480 MHz |                     |

| Polarity<br>[Hori/Vert] | Frequency<br>[MHz] | Reading<br>(QP / PK)<br>[dBuV] | Reading<br>(AV)<br>[dBuV] | Ant.<br>Factor<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty<br>Factor<br>[dB] | Result<br>(QP / PK)<br>[dBuV/m] | Result<br>(AV)<br>[dBuV/m] | Limit<br>(QP / PK)<br>[dBuV/m] | Limit<br>(AV)<br>[dBuV/m] | Margin<br>(QP / PK)<br>[dB] | Margin<br>(AV)<br>[dB] | Remark      |
|-------------------------|--------------------|--------------------------------|---------------------------|--------------------------|--------------|--------------|------------------------|---------------------------------|----------------------------|--------------------------------|---------------------------|-----------------------------|------------------------|-------------|
| Hori.                   | 2483.5             | 43.0                           | 34.3                      | 27.4                     | 5.6          | 32.5         | 1.1                    | 43.5                            | 35.9                       | 73.9                           | 53.9                      | 30.5                        | 18.0                   | *1)         |
| Hori.                   | 2490.0             | 43.7                           | 32.8                      | 27.5                     | 5.6          | 32.5         | 1.1                    | 44.2                            | 34.4                       | 73.9                           | 53.9                      | 29.7                        | 19.5                   | *2)         |
| Hori.                   | 4960.0             | 40.3                           | 32.2                      | 31.7                     | 7.8          | 31.6         | -                      | 48.2                            | 40.1                       | 73.9                           | 53.9                      | 25.7                        | 13.8                   | Floor noise |
| Hori.                   | 7440.0             | 41.2                           | 34.0                      | 36.1                     | 9.3          | 32.7         | -                      | 54.0                            | 46.8                       | 73.9                           | 53.9                      | 19.9                        | 7.1                    | Floor noise |
| Hori.                   | 9920.0             | 42.0                           | 31.9                      | 39.1                     | 9.9          | 33.2         | -                      | 57.8                            | 47.8                       | 73.9                           | 53.9                      | 16.1                        | 6.1                    | Floor noise |
| Vert.                   | 2483.5             | 46.4                           | 34.3                      | 27.4                     | 5.6          | 32.5         | 1.1                    | 46.9                            | 35.9                       | 73.9                           | 53.9                      | 27.0                        | 18.0                   | *1)         |
| Vert.                   | 2490.0             | 49.7                           | 35.1                      | 27.5                     | 5.6          | 32.5         | 1.1                    | 50.2                            | 36.7                       | 73.9                           | 53.9                      | 23.7                        | 17.2                   | *2)         |
| Vert.                   | 4960.0             | 40.3                           | 32.2                      | 31.7                     | 7.8          | 31.6         | -                      | 48.2                            | 40.1                       | 73.9                           | 53.9                      | 25.7                        | 13.8                   | Floor noise |
| Vert.                   | 7440.0             | 41.2                           | 34.0                      | 36.1                     | 9.3          | 32.7         | -                      | 54.0                            | 46.8                       | 73.9                           | 53.9                      | 19.9                        | 7.1                    | Floor noise |
| Vert.                   | 9920.0             | 42.0                           | 31.9                      | 39.1                     | 9.9          | 33.2         | -                      | 57.8                            | 47.8                       | 73.9                           | 53.9                      | 16.1                        | 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)

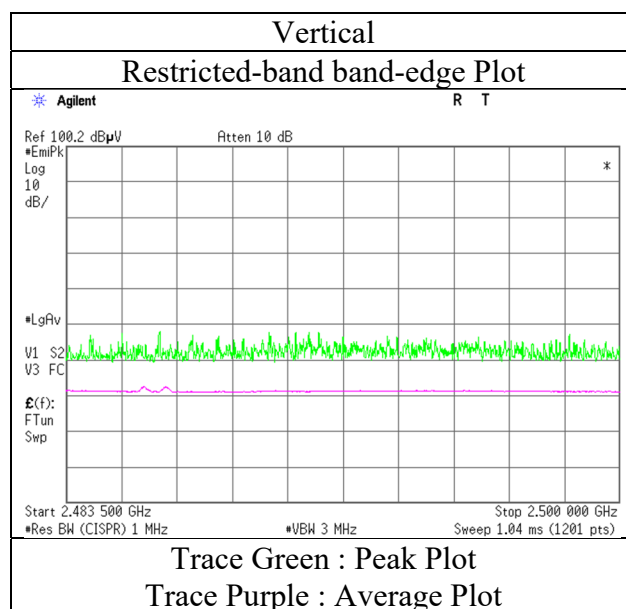
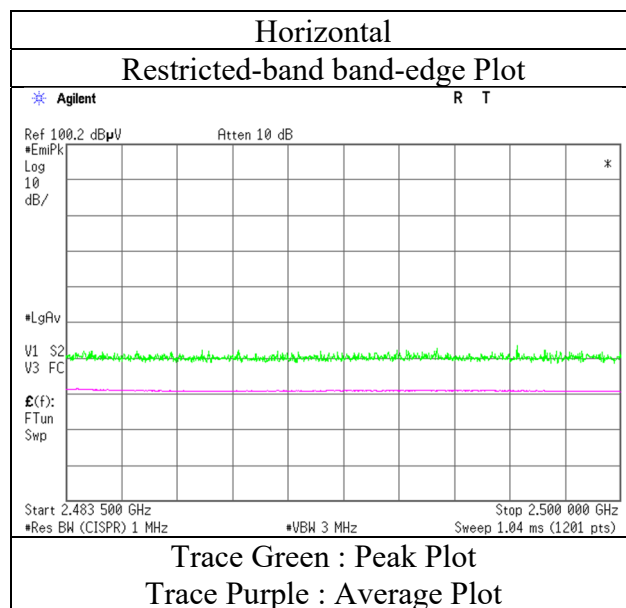
\*2) Noise synchronized with duty of carrier frequency

Distance factor:      1 GHz - 10 GHz       $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$   
                                  10 GHz - 26.5 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

**Radiated Spurious Emission**  
**(Reference Plot for band-edge**  
**(BT1)**

Test place  
Semi Anechoic Chamber  
Date  
Temperature / Humidity  
Engineer  
Mode

Ise EMC Lab.  
No.3  
January 25, 2022  
20 deg. C / 37 % RH  
Hiroki Numata  
(1 GHz - 10 GHz)  
Tx, Hopping Off, 3DH5 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 (BT2)

|                        |                               |                     |
|------------------------|-------------------------------|---------------------|
| Test place             | Ise EMC Lab.                  |                     |
| Semi Anechoic Chamber  | No.3                          | No.3                |
| Date                   | January 25, 2022              | February 3, 2022    |
| Temperature / Humidity | 22 deg. C / 32 % RH           | 21 deg. C / 33 % RH |
| Engineer               | Nachi Konegawa                | Hiroki Numata       |
|                        | (1 GHz - 10 GHz)              | (10 GHz - 26.5 GHz) |
| Mode                   | Tx, Hopping Off, DH5 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.       | 2340.9    | 46.6                 | 34.3            | 27.8           | 5.5  | 32.6 | -              | 47.2                | 34.9           | 73.9               | 53.9          | 26.7                | 19.0           |             |
| Hori.       | 2390.0    | 45.0                 | 33.8            | 27.6           | 5.5  | 32.6 | 1.1            | 45.5                | 35.4           | 73.9               | 53.9          | 28.4                | 18.5           | *1)         |
| Hori.       | 4804.0    | 41.8                 | 32.2            | 31.5           | 7.8  | 31.7 | -              | 49.4                | 39.9           | 73.9               | 53.9          | 24.5                | 14.1           | Floor noise |
| Hori.       | 7206.0    | 42.5                 | 33.8            | 35.7           | 9.4  | 32.6 | -              | 54.9                | 46.2           | 73.9               | 53.9          | 19.0                | 7.7            | Floor noise |
| Hori.       | 9608.0    | 42.9                 | 32.3            | 38.7           | 9.8  | 33.0 | -              | 58.4                | 47.8           | 73.9               | 53.9          | 15.5                | 6.1            | Floor noise |
| Vert.       | 2340.9    | 54.3                 | 36.5            | 27.8           | 5.5  | 32.6 | -              | 54.9                | 37.2           | 73.9               | 53.9          | 19.0                | 16.7           |             |
| Vert.       | 2390.0    | 51.5                 | 35.8            | 27.6           | 5.5  | 32.6 | 1.1            | 52.0                | 37.4           | 73.9               | 53.9          | 21.9                | 16.5           | *1)         |
| Vert.       | 4804.0    | 40.8                 | 32.6            | 31.5           | 7.8  | 31.7 | -              | 48.4                | 40.3           | 73.9               | 53.9          | 25.5                | 13.6           | Floor noise |
| Vert.       | 7206.0    | 42.5                 | 34.0            | 35.7           | 9.4  | 32.6 | -              | 55.0                | 46.4           | 73.9               | 53.9          | 19.0                | 7.5            | Floor noise |
| Vert.       | 9608.0    | 43.3                 | 32.4            | 38.7           | 9.8  | 33.0 | -              | 58.8                | 47.9           | 73.9               | 53.9          | 15.1                | 6.0            | 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

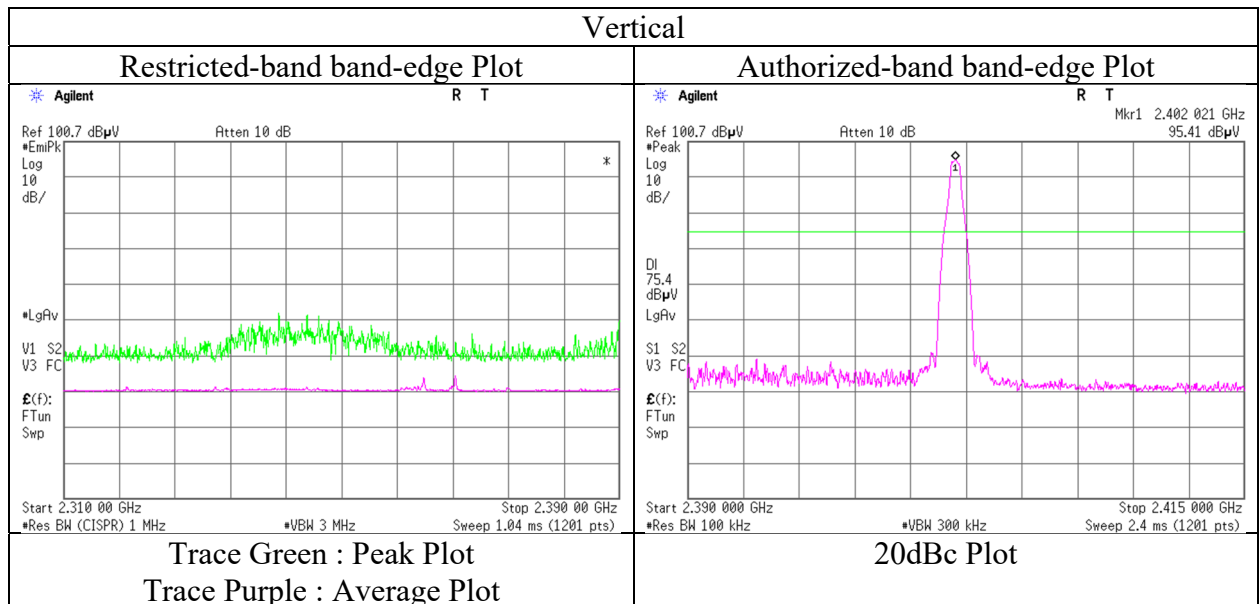
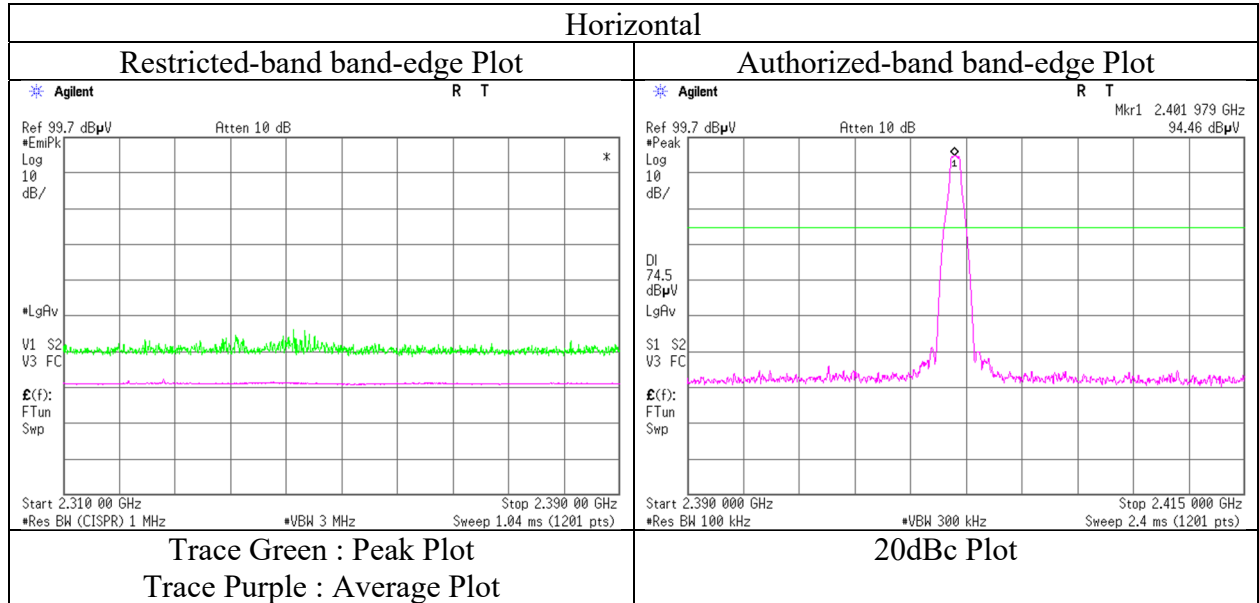
| Polarity    | Frequency | Reading<br>(PK) | Ant<br>Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|-------------|-----------|-----------------|---------------|------|------|----------|----------|--------|---------|
| [Hori/Vert] | [MHz]     | [dBuV]          | [dB/m]        | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.       | 2402.0    | 94.5            | 27.5          | 5.5  | 32.6 | 94.9     | -        | -      | Carrier |
| Hori.       | 2400.0    | 35.6            | 27.5          | 5.5  | 32.6 | 36.0     | 74.9     | 38.9   |         |
| Vert.       | 2402.0    | 95.4            | 27.5          | 5.5  | 32.6 | 95.9     | -        | -      | Carrier |
| Vert.       | 2400.0    | 38.3            | 27.5          | 5.5  | 32.6 | 38.7     | 75.9     | 37.1   |         |

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

Distance factor:      1 GHz - 10 GHz      20log (3.95 m / 3.0 m) = 2.39 dB  
                              10 GHz - 26.5 GHz      20log (1.0 m / 3.0 m) = -9.5 dB

**Radiated Spurious Emission**  
**(Reference Plot for band-edge**  
**(BT2)**

|                        |                               |
|------------------------|-------------------------------|
| Test place             | Ise EMC Lab.                  |
| Semi Anechoic Chamber  | No.3                          |
| Date                   | January 25, 2022              |
| Temperature / Humidity | 22 deg. C / 32 % RH           |
| Engineer               | Nachi Konegawa                |
|                        | (1 GHz - 10 GHz)              |
| Mode                   | Tx, Hopping Off, DH5 2402 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 (BT2)

|                        |                               |                     |
|------------------------|-------------------------------|---------------------|
| Test place             | Ise EMC Lab.                  |                     |
| Semi Anechoic Chamber  | No.3                          | No.3                |
| Date                   | January 25, 2022              | February 3, 2022    |
| Temperature / Humidity | 22 deg. C / 32 % RH           | 21 deg. C / 33 % RH |
| Engineer               | Nachi Konegawa                | Hiroki Numata       |
|                        | (1 GHz - 10 GHz)              | (10 GHz - 26.5 GHz) |
| Mode                   | Tx, Hopping Off, DH5 2441 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.       | 4882.0    | 40.9                 | 32.3            | 31.6           | 7.8  | 31.6 | -              | 48.6                | 40.1           | 73.9               | 53.9          | 25.3                | 13.9           | Floor noise |
| Hori.       | 7323.0    | 42.6                 | 33.7            | 35.9           | 9.3  | 32.7 | -              | 55.2                | 46.3           | 73.9               | 53.9          | 18.7                | 7.6            | Floor noise |
| Hori.       | 9764.0    | 42.3                 | 31.4            | 39.2           | 9.9  | 33.1 | -              | 58.2                | 47.4           | 73.9               | 53.9          | 15.7                | 6.6            | Floor noise |
| Vert.       | 4882.0    | 41.0                 | 32.4            | 31.6           | 7.8  | 31.6 | -              | 48.8                | 40.1           | 73.9               | 53.9          | 25.1                | 13.8           | Floor noise |
| Vert.       | 7323.0    | 42.6                 | 33.9            | 35.9           | 9.3  | 32.7 | -              | 55.2                | 46.5           | 73.9               | 53.9          | 18.7                | 7.4            | Floor noise |
| Vert.       | 9764.0    | 42.9                 | 31.5            | 39.2           | 9.9  | 33.1 | -              | 58.8                | 47.5           | 73.9               | 53.9          | 15.1                | 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.

|                  |                   |                                  |
|------------------|-------------------|----------------------------------|
| Distance factor: | 1 GHz - 10 GHz    | 20log (3.95 m / 3.0 m) = 2.39 dB |
|                  | 10 GHz - 26.5 GHz | 20log (1.0 m / 3.0 m) = -9.5 dB  |

## Radiated Spurious Emission (BT2)

|                        |                               |                     |
|------------------------|-------------------------------|---------------------|
| Test place             | Ise EMC Lab.                  |                     |
| Semi Anechoic Chamber  | No.3                          | No.3                |
| Date                   | January 25, 2022              | February 3, 2022    |
| Temperature / Humidity | 22 deg. C / 32 % RH           | 21 deg. C / 33 % RH |
| Engineer               | Nachi Konegawa                | Hiroki Numata       |
|                        | (1 GHz - 10 GHz)              | (10 GHz - 26.5 GHz) |
| Mode                   | Tx, Hopping Off, DH5 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.       | 2483.5    | 42.3                 | 34.0            | 27.4           | 5.6  | 32.5 | 1.1            | 42.8                | 35.6           | 73.9               | 53.9          | 31.1                | 18.3           | *1)         |
| Hori.       | 4960.0    | 40.5                 | 32.2            | 31.7           | 7.8  | 31.6 | -              | 48.4                | 40.1           | 73.9               | 53.9          | 25.5                | 13.8           | Floor noise |
| Hori.       | 7440.0    | 42.7                 | 34.1            | 36.1           | 9.3  | 32.7 | -              | 55.4                | 46.9           | 73.9               | 53.9          | 18.5                | 7.1            | Floor noise |
| Hori.       | 9920.0    | 43.5                 | 32.0            | 39.1           | 9.9  | 33.2 | -              | 59.4                | 47.9           | 73.9               | 53.9          | 14.5                | 6.0            | Floor noise |
| Vert.       | 2483.5    | 44.1                 | 34.1            | 27.4           | 5.6  | 32.5 | 1.1            | 44.5                | 35.6           | 73.9               | 53.9          | 29.4                | 18.3           | *1)         |
| Vert.       | 4960.0    | 40.9                 | 32.1            | 31.7           | 7.8  | 31.6 | -              | 48.8                | 40.0           | 73.9               | 53.9          | 25.1                | 13.9           | Floor noise |
| Vert.       | 7440.0    | 42.6                 | 33.7            | 36.1           | 9.3  | 32.7 | -              | 55.3                | 46.4           | 73.9               | 53.9          | 18.6                | 7.5            | Floor noise |
| Vert.       | 9920.0    | 42.4                 | 31.9            | 39.1           | 9.9  | 33.2 | -              | 58.3                | 47.8           | 73.9               | 53.9          | 15.6                | 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).

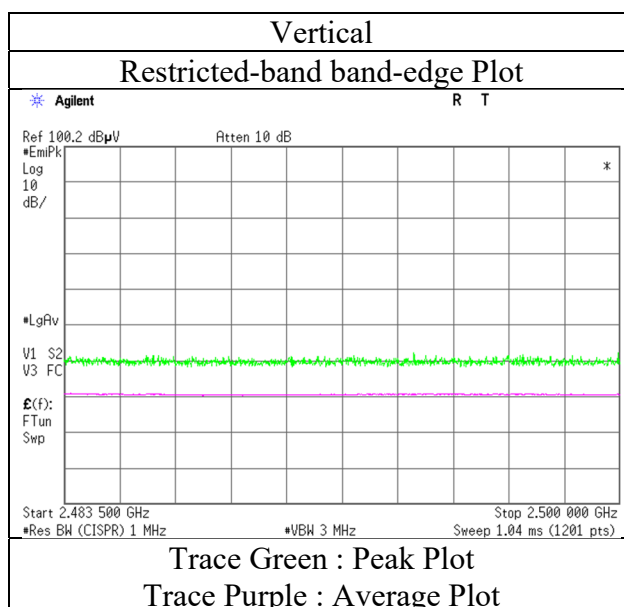
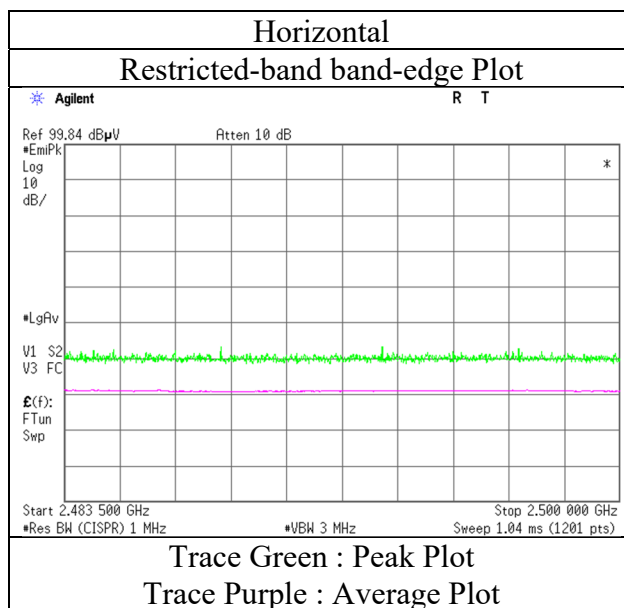
\*QP detector was used up to 1 GHz.

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

|                  |                   |                                  |
|------------------|-------------------|----------------------------------|
| Distance factor: | 1 GHz - 10 GHz    | 20log (3.95 m / 3.0 m) = 2.39 dB |
|                  | 10 GHz - 26.5 GHz | 20log (1.0 m / 3.0 m) = -9.5 dB  |

## Radiated Spurious Emission (Reference Plot for band-edge) (BT2)

|                        |                               |
|------------------------|-------------------------------|
| Test place             | Ise EMC Lab.                  |
| Semi Anechoic Chamber  | No.3                          |
| Date                   | January 25, 2022              |
| Temperature / Humidity | 22 deg. C / 32 % RH           |
| Engineer               | Nachi Konegawa                |
|                        | (1 GHz - 10 GHz)              |
| Mode                   | Tx, Hopping Off, DH5 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 (BT2)

|                        |                                |                     |
|------------------------|--------------------------------|---------------------|
| Test place             | Ise EMC Lab.                   |                     |
| Semi Anechoic Chamber  | No.3                           | No.3                |
| Date                   | January 25, 2022               | February 3, 2022    |
| Temperature / Humidity | 22 deg. C / 32 % RH            | 21 deg. C / 33 % RH |
| Engineer               | Nachi Konegawa                 | Hiroki Numata       |
|                        | (1 GHz - 10 GHz)               | (10 GHz - 26.5 GHz) |
| Mode                   | Tx, Hopping Off, 3DH5 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.       | 2346.1    | 43.9                 | 33.8            | 27.7           | 5.5  | 32.6 | -              | 44.5                | 34.4           | 73.9               | 53.9          | 29.4                | 19.5           |             |
| Hori.       | 2390.0    | 43.2                 | 33.6            | 27.6           | 5.5  | 32.6 | 1.1            | 43.7                | 35.3           | 73.9               | 53.9          | 30.2                | 18.7           | *1)         |
| Hori.       | 4804.0    | 40.8                 | 32.5            | 31.5           | 7.8  | 31.7 | -              | 48.4                | 40.1           | 73.9               | 53.9          | 25.5                | 13.8           | Floor noise |
| Hori.       | 7206.0    | 42.2                 | 33.9            | 35.7           | 9.4  | 32.6 | -              | 54.6                | 46.4           | 73.9               | 53.9          | 19.3                | 7.5            | Floor noise |
| Hori.       | 9608.0    | 43.0                 | 32.3            | 38.7           | 9.8  | 33.0 | -              | 58.5                | 47.8           | 73.9               | 53.9          | 15.4                | 6.1            | Floor noise |
| Vert.       | 2346.1    | 52.1                 | 35.5            | 27.7           | 5.5  | 32.6 | -              | 52.7                | 36.1           | 73.9               | 53.9          | 21.2                | 17.8           |             |
| Vert.       | 2390.0    | 50.3                 | 35.2            | 27.6           | 5.5  | 32.6 | 1.1            | 50.8                | 36.8           | 73.9               | 53.9          | 23.1                | 17.1           | *1)         |
| Vert.       | 4804.0    | 41.5                 | 32.4            | 31.5           | 7.8  | 31.7 | -              | 49.1                | 40.0           | 73.9               | 53.9          | 24.8                | 13.9           | Floor noise |
| Vert.       | 7206.0    | 42.2                 | 34.2            | 35.7           | 9.4  | 32.6 | -              | 54.7                | 46.7           | 73.9               | 53.9          | 19.2                | 7.2            | Floor noise |
| Vert.       | 9608.0    | 42.8                 | 32.2            | 38.7           | 9.8  | 33.0 | -              | 58.3                | 47.7           | 73.9               | 53.9          | 15.6                | 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)

### 20dBc Data Sheet

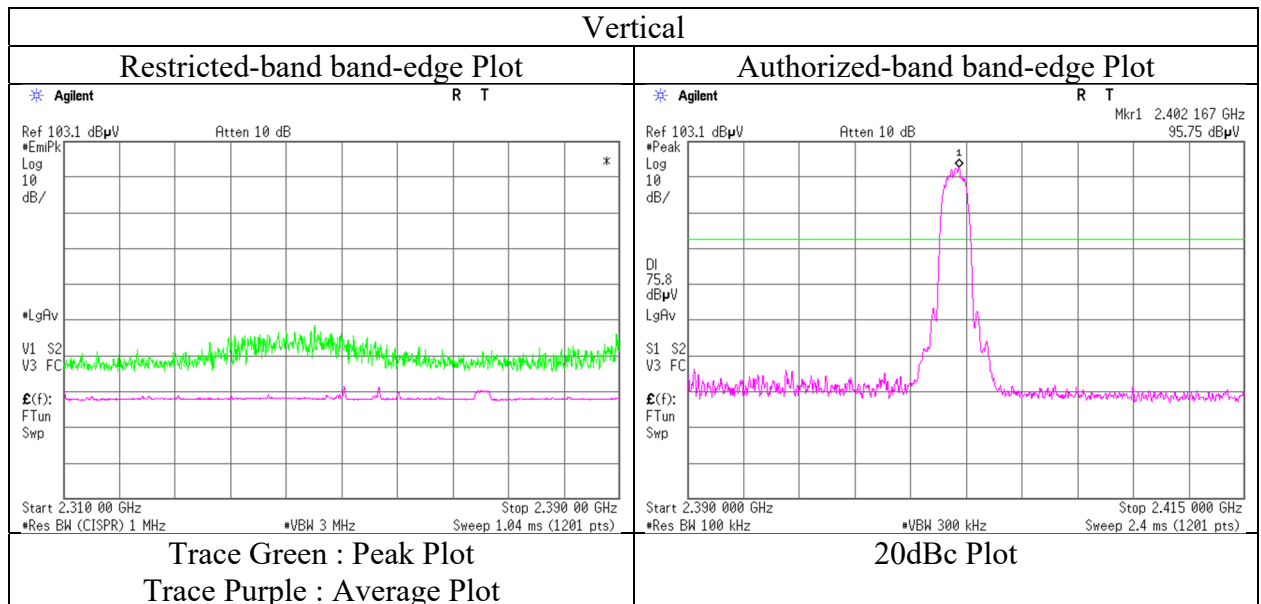
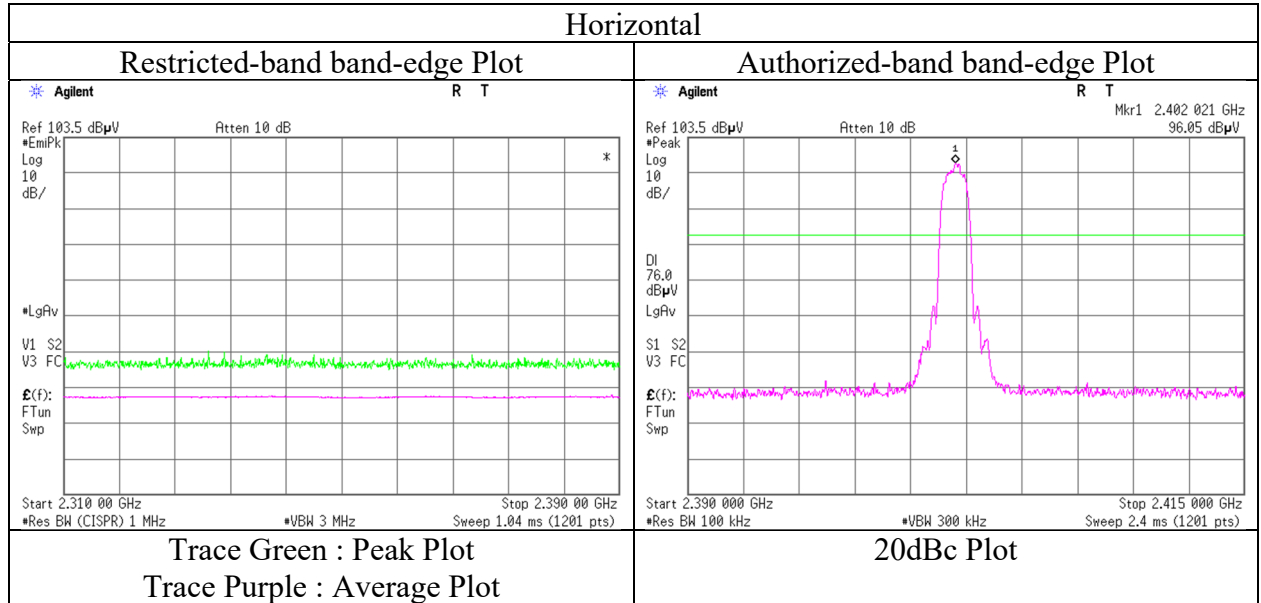
| Polarity    | Frequency | Reading<br>(PK) | Ant<br>Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|-------------|-----------|-----------------|---------------|------|------|----------|----------|--------|---------|
| [Hori/Vert] | [MHz]     | [dBuV]          | [dB/m]        | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.       | 2402.0    | 96.1            | 27.5          | 5.5  | 32.6 | 96.5     | -        | -      | Carrier |
| Hori.       | 2400.0    | 34.3            | 27.5          | 5.5  | 32.6 | 34.7     | 76.5     | 41.8   |         |
| Vert.       | 2402.0    | 95.8            | 27.5          | 5.5  | 32.6 | 96.2     | -        | -      | Carrier |
| Vert.       | 2400.0    | 38.6            | 27.5          | 5.5  | 32.6 | 39.1     | 76.2     | 37.1   |         |

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

Distance factor:      1 GHz - 10 GHz      20log (3.95 m / 3.0 m) = 2.39 dB  
                              10 GHz - 26.5 GHz      20log (1.0 m / 3.0 m) = -9.5 dB

# **Radiated Spurious Emission** **(Reference Plot for band-edge)** **(BT2)**

|                        |                                |
|------------------------|--------------------------------|
| Test place             | Ise EMC Lab.                   |
| Semi Anechoic Chamber  | No.3                           |
| Date                   | January 25, 2022               |
| Temperature / Humidity | 22 deg. C / 32 % RH            |
| Engineer               | Nachi Konegawa                 |
|                        | (1 GHz - 10 GHz)               |
| Mode                   | Tx, Hopping Off, 3DH5 2402 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 (BT2)

|                        |                                |                     |
|------------------------|--------------------------------|---------------------|
| Test place             | Ise EMC Lab.                   | No.3                |
| Semi Anechoic Chamber  | No.3                           | No.3                |
| Date                   | January 25, 2022               | February 3, 2022    |
| Temperature / Humidity | 22 deg. C / 32 % RH            | 21 deg. C / 33 % RH |
| Engineer               | Nachi Konegawa                 | Hiroki Numata       |
|                        | (1 GHz - 10 GHz)               | (10 GHz - 26.5 GHz) |
| Mode                   | Tx, Hopping Off, 3DH5 2441 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.       | 4882.0    | 32.3                 | -               | 31.6           | 7.8  | 31.6 | -              | 40.1                | -              | 73.9               | -             | 33.8                | -              | Floor noise |
| Hori.       | 7323.0    | 33.9                 | -               | 35.9           | 9.3  | 32.7 | -              | 46.5                | -              | 73.9               | -             | 27.4                | -              | Floor noise |
| Hori.       | 9764.0    | 31.8                 | -               | 39.2           | 9.9  | 33.1 | -              | 47.8                | -              | 73.9               | -             | 26.1                | -              | Floor noise |
| Vert.       | 4882.0    | 32.2                 | -               | 31.6           | 7.8  | 31.6 | -              | 40.0                | -              | 73.9               | -             | 33.9                | -              | Floor noise |
| Vert.       | 7323.0    | 34.0                 | -               | 35.9           | 9.3  | 32.7 | -              | 46.6                | -              | 73.9               | -             | 27.3                | -              | Floor noise |
| Vert.       | 9764.0    | 31.6                 | -               | 39.2           | 9.9  | 33.1 | -              | 47.6                | -              | 73.9               | -             | 26.3                | -              | 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 - 10 GHz    | 20log (3.95 m / 3.0 m) = 2.39 dB |
|                  | 10 GHz - 26.5 GHz | 20log (1.0 m / 3.0 m) = -9.5 dB  |

## Radiated Spurious Emission (BT2)

|                        |                                |                     |                     |
|------------------------|--------------------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.                   |                     |                     |
| Semi Anechoic Chamber  | No.3                           | No.3                | No.3                |
| Date                   | January 25, 2022               | February 3, 2022    | February 9, 2022    |
| Temperature / Humidity | 22 deg. C / 32 % RH            | 21 deg. C / 33 % RH | 20 deg. C / 42 % RH |
| Engineer               | Nachi Konegawa                 | Hiroki Numata       | Junki Nagatomi      |
|                        | (1 GHz - 10 GHz)               | (10 GHz - 26.5 GHz) | (Below 1 GHz)       |
| Mode                   | Tx, Hopping Off, 3DH5 2480 MHz |                     |                     |

| Polarity<br>[Hori/Vert] | Frequency<br>[MHz] | Reading<br>(QP / PK)<br>[dBuV] | Reading<br>(AV)<br>[dBuV] | Ant.<br>Factor<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty<br>Factor<br>[dB] | Result<br>(QP / PK)<br>[dBuV/m] | Result<br>(AV)<br>[dBuV/m] | Limit<br>(QP / PK)<br>[dBuV/m] | Limit<br>(AV)<br>[dBuV/m] | Margin<br>(QP / PK)<br>[dB] | Margin<br>(AV)<br>[dB] | Remark      |
|-------------------------|--------------------|--------------------------------|---------------------------|--------------------------|--------------|--------------|------------------------|---------------------------------|----------------------------|--------------------------------|---------------------------|-----------------------------|------------------------|-------------|
| Hori.                   | 32.0               | 22.5                           | -                         | 18.0                     | 7.1          | 32.3         | -                      | 15.4                            | -                          | 40.0                           | -                         | 24.6                        | -                      |             |
| Hori.                   | 64.3               | 22.6                           | -                         | 7.0                      | 7.7          | 32.3         | -                      | 4.9                             | -                          | 40.0                           | -                         | 35.1                        | -                      |             |
| Hori.                   | 75.2               | 26.4                           | -                         | 6.5                      | 7.8          | 32.3         | -                      | 8.5                             | -                          | 40.0                           | -                         | 31.6                        | -                      |             |
| Hori.                   | 86.5               | 22.6                           | -                         | 7.9                      | 8.0          | 32.3         | -                      | 6.2                             | -                          | 40.0                           | -                         | 33.8                        | -                      |             |
| Hori.                   | 379.1              | 30.8                           | -                         | 15.3                     | 10.6         | 32.1         | -                      | 24.6                            | -                          | 46.0                           | -                         | 21.4                        | -                      |             |
| Hori.                   | 621.0              | 26.7                           | -                         | 19.5                     | 12.1         | 32.1         | -                      | 26.2                            | -                          | 46.0                           | -                         | 19.8                        | -                      |             |
| Hori.                   | 2483.5             | 42.8                           | 33.9                      | 27.4                     | 5.6          | 32.5         | 1.1                    | 43.3                            | 35.5                       | 73.9                           | 53.9                      | 30.6                        | 18.5                   | *1)         |
| Hori.                   | 2492.9             | 42.7                           | 33.8                      | 27.5                     | 5.6          | 32.5         | 1.1                    | 43.2                            | 35.4                       | 73.9                           | 53.9                      | 30.7                        | 18.5                   | *2)         |
| Hori.                   | 4960.0             | 40.6                           | 32.1                      | 31.7                     | 7.8          | 31.6         | -                      | 48.6                            | 40.0                       | 73.9                           | 53.9                      | 25.4                        | 13.9                   | Floor noise |
| Hori.                   | 7440.0             | 42.5                           | 33.9                      | 36.1                     | 9.3          | 32.7         | -                      | 55.3                            | 46.6                       | 73.9                           | 53.9                      | 18.6                        | 7.3                    | Floor noise |
| Hori.                   | 9920.0             | 42.0                           | 31.8                      | 39.1                     | 9.9          | 33.2         | -                      | 57.9                            | 47.6                       | 73.9                           | 53.9                      | 16.0                        | 6.3                    | Floor noise |
| Vert.                   | 32.0               | 22.5                           | -                         | 18.0                     | 7.1          | 32.3         | -                      | 15.4                            | -                          | 40.0                           | -                         | 24.6                        | -                      |             |
| Vert.                   | 64.2               | 24.6                           | -                         | 7.0                      | 7.6          | 32.3         | -                      | 7.0                             | -                          | 40.0                           | -                         | 33.0                        | -                      |             |
| Vert.                   | 75.2               | 34.5                           | -                         | 6.5                      | 7.8          | 32.3         | -                      | 16.6                            | -                          | 40.0                           | -                         | 23.5                        | -                      |             |
| Vert.                   | 86.5               | 25.1                           | -                         | 7.9                      | 8.0          | 32.3         | -                      | 8.7                             | -                          | 40.0                           | -                         | 31.3                        | -                      |             |
| Vert.                   | 381.8              | 25.3                           | -                         | 15.4                     | 10.6         | 32.1         | -                      | 19.2                            | -                          | 46.0                           | -                         | 26.8                        | -                      |             |
| Vert.                   | 621.0              | 28.5                           | -                         | 19.5                     | 12.1         | 32.1         | -                      | 28.0                            | -                          | 46.0                           | -                         | 18.0                        | -                      |             |
| Vert.                   | 2483.5             | 46.8                           | 34.3                      | 27.4                     | 5.6          | 32.5         | 1.1                    | 47.3                            | 35.9                       | 73.9                           | 53.9                      | 26.7                        | 18.0                   | *1)         |
| Vert.                   | 2492.9             | 50.1                           | 35.3                      | 27.5                     | 5.6          | 32.5         | 1.1                    | 50.6                            | 36.9                       | 73.9                           | 53.9                      | 23.3                        | 17.0                   | *2)         |
| Vert.                   | 4960.0             | 40.4                           | 32.4                      | 31.7                     | 7.8          | 31.6         | -                      | 48.4                            | 40.4                       | 73.9                           | 53.9                      | 25.6                        | 13.5                   | Floor noise |
| Vert.                   | 7440.0             | 42.9                           | 33.8                      | 36.1                     | 9.3          | 32.7         | -                      | 55.6                            | 46.5                       | 73.9                           | 53.9                      | 18.3                        | 7.4                    | Floor noise |
| Vert.                   | 9920.0             | 42.1                           | 31.7                      | 39.1                     | 9.9          | 33.2         | -                      | 58.0                            | 47.6                       | 73.9                           | 53.9                      | 15.9                        | 6.3                    | 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.

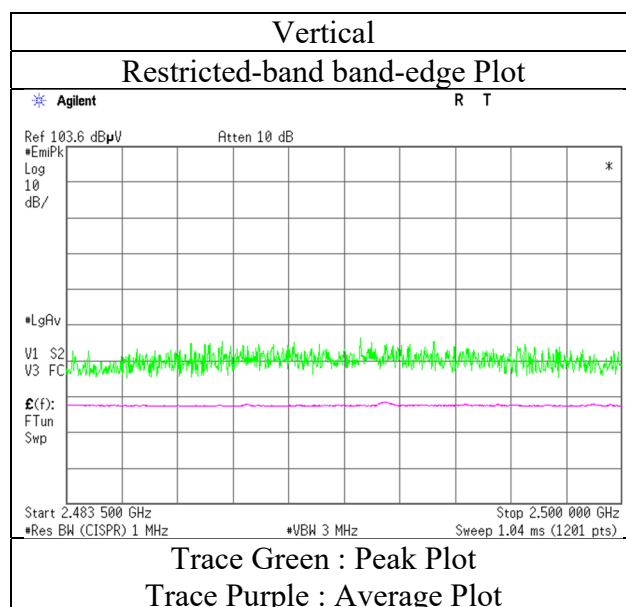
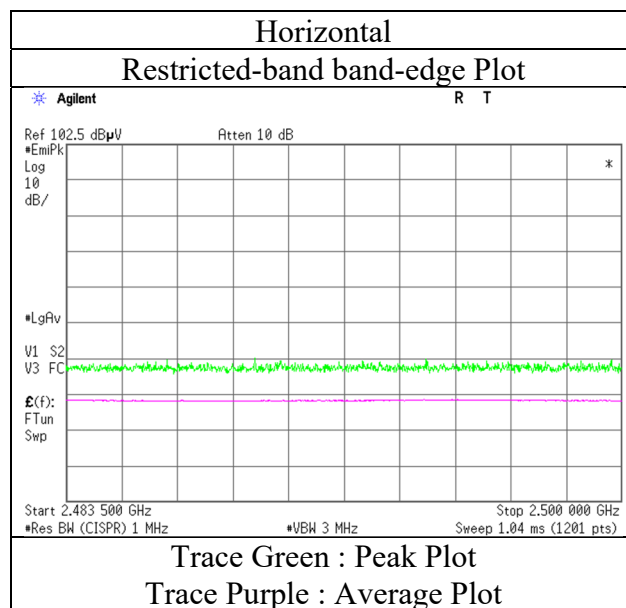
\*1) Not Out of Band emission(Leakage Power)

\*2) Noise synchronized with duty of carrier frequency

Distance factor:      1 GHz - 10 GHz      20log (3.95 m / 3.0 m) = 2.39 dB  
                                  10 GHz - 26.5 GHz      20log (1.0 m / 3.0 m) = -9.5 dB

## Radiated Spurious Emission (Reference Plot for band-edge) (BT2)

|                        |                                |
|------------------------|--------------------------------|
| Test place             | Ise EMC Lab.                   |
| Semi Anechoic Chamber  | No.3                           |
| Date                   | January 25, 2022               |
| Temperature / Humidity | 22 deg. C / 32 % RH            |
| Engineer               | Nachi Konegawa                 |
|                        | (1 GHz - 10 GHz)               |
| Mode                   | Tx, Hopping Off, 3DH5 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 (BT1)

|                        |                                                         |                     |                     |
|------------------------|---------------------------------------------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.                                            |                     |                     |
| Semi Anechoic Chamber  | No.3                                                    | No.3                | No.3                |
| Date                   | February 7, 2022                                        | February 8, 2022    | February 10, 2022   |
| Temperature / Humidity | 19 deg. C / 30 % RH                                     | 20 deg. C / 32 % RH | 18 deg. C / 37 % RH |
| Engineer               | Yuichiro Yamazaki                                       | Yuichiro Yamazaki   | Yuichiro Yamazaki   |
|                        | (1 GHz - 10 GHz)                                        | (10 GHz - 26.5 GHz) | (Below 1 GHz)       |
| Mode                   | Tx, Hopping Off, DH5 2480 MHz + 11ax-20 (OFDM) 5500 MHz |                     |                     |

| Polarity<br>[Hori/Vert] | Frequency<br>[MHz] | Reading<br>(QP / PK)<br>[dBuV] | Reading<br>(AV)<br>[dBuV] | Ant.<br>Factor<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty<br>Factor<br>[dB] | Result<br>(QP / PK)<br>[dBuV/m] | Result<br>(AV)<br>[dBuV/m] | Limit<br>(QP / PK)<br>[dBuV/m] | Limit<br>(AV)<br>[dBuV/m] | Margin<br>(QP / PK)<br>[dB] | Margin<br>(AV)<br>[dB] | Remark      |
|-------------------------|--------------------|--------------------------------|---------------------------|--------------------------|--------------|--------------|------------------------|---------------------------------|----------------------------|--------------------------------|---------------------------|-----------------------------|------------------------|-------------|
| Hori.                   | 75.0               | 40.7                           | -                         | 6.5                      | 7.8          | 32.3         | -                      | 22.7                            | -                          | 40.0                           | -                         | 17.3                        | -                      |             |
| Hori.                   | 210.5              | 34.5                           | -                         | 11.7                     | 9.3          | 32.2         | -                      | 23.3                            | -                          | 43.5                           | -                         | 20.2                        | -                      |             |
| Hori.                   | 375.3              | 38.9                           | -                         | 15.3                     | 10.6         | 32.1         | -                      | 32.6                            | -                          | 46.0                           | -                         | 13.4                        | -                      |             |
| Hori.                   | 617.8              | 35.6                           | -                         | 19.5                     | 12.1         | 32.1         | -                      | 35.1                            | -                          | 46.0                           | -                         | 10.9                        | -                      |             |
| Hori.                   | 806.6              | 33.2                           | -                         | 21.0                     | 13.1         | 31.5         | -                      | 35.8                            | -                          | 46.0                           | -                         | 10.2                        | -                      |             |
| Hori.                   | 959.3              | 31.6                           | -                         | 22.2                     | 13.9         | 30.7         | -                      | 37.0                            | -                          | 46.0                           | -                         | 9.0                         | -                      |             |
| Hori.                   | 2483.5             | 44.0                           | 35.6                      | 27.4                     | 5.4          | 32.5         | 1.1                    | 44.4                            | 37.0                       | 73.9                           | 53.9                      | 29.6                        | 16.9                   | *1)         |
| Hori.                   | 4960.0             | 39.8                           | 32.4                      | 31.7                     | 7.7          | 31.6         | -                      | 47.7                            | 40.2                       | 73.9                           | 53.9                      | 26.3                        | 13.7                   | Floor noise |
| Hori.                   | 7440.0             | 41.8                           | 33.9                      | 36.1                     | 9.2          | 32.7         | -                      | 54.4                            | 46.5                       | 73.9                           | 53.9                      | 19.5                        | 7.4                    | Floor noise |
| Hori.                   | 9920.0             | 42.0                           | 33.7                      | 39.1                     | 9.8          | 33.2         | -                      | 57.7                            | 49.5                       | 73.9                           | 53.9                      | 16.2                        | 4.4                    | Floor noise |
| Vert.                   | 75.0               | 51.9                           | -                         | 6.5                      | 7.8          | 32.3         | -                      | 33.9                            | -                          | 40.0                           | -                         | 6.1                         | -                      |             |
| Vert.                   | 183.4              | 32.7                           | -                         | 16.3                     | 9.0          | 32.2         | -                      | 25.8                            | -                          | 43.5                           | -                         | 17.7                        | -                      |             |
| Vert.                   | 375.3              | 35.9                           | -                         | 15.3                     | 10.6         | 32.1         | -                      | 29.6                            | -                          | 46.0                           | -                         | 16.4                        | -                      |             |
| Vert.                   | 617.7              | 39.8                           | -                         | 19.5                     | 12.1         | 32.1         | -                      | 39.3                            | -                          | 46.0                           | -                         | 6.7                         | -                      |             |
| Vert.                   | 806.7              | 36.5                           | -                         | 21.0                     | 13.1         | 31.5         | -                      | 39.1                            | -                          | 46.0                           | -                         | 6.9                         | -                      |             |
| Vert.                   | 959.5              | 30.1                           | -                         | 22.2                     | 13.9         | 30.7         | -                      | 35.5                            | -                          | 46.0                           | -                         | 10.5                        | -                      |             |
| Vert.                   | 2483.5             | 45.5                           | 35.1                      | 27.4                     | 5.4          | 32.5         | 1.1                    | 45.9                            | 36.6                       | 73.9                           | 53.9                      | 28.1                        | 17.3                   | *1)         |
| Vert.                   | 4960.0             | 40.5                           | 31.3                      | 31.7                     | 7.7          | 31.6         | -                      | 48.3                            | 39.1                       | 73.9                           | 53.9                      | 25.6                        | 14.8                   | Floor noise |
| Vert.                   | 7440.0             | 42.2                           | 32.9                      | 36.1                     | 9.2          | 32.7         | -                      | 54.8                            | 45.5                       | 73.9                           | 53.9                      | 19.1                        | 8.4                    | Floor noise |
| Vert.                   | 9920.0             | 41.4                           | 32.6                      | 39.1                     | 9.8          | 33.2         | -                      | 57.2                            | 48.3                       | 73.9                           | 53.9                      | 16.7                        | 5.6                    | 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).

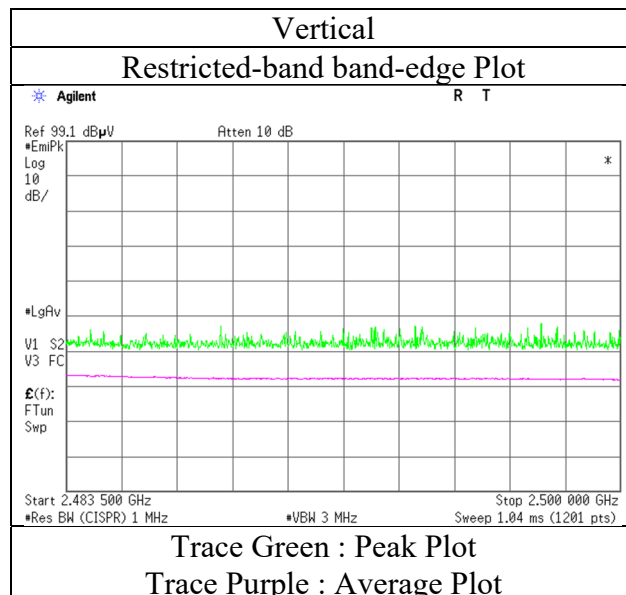
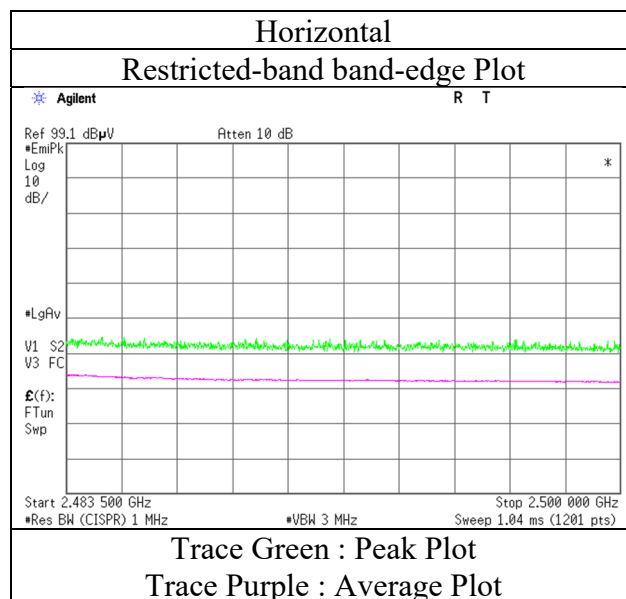
\*QP detector was used up to 1GHz.

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

Distance factor:      1 GHz - 10 GHz      20log (3.9 m / 3.0 m) = 2.28 dB  
                              10 GHz - 26.5 GHz      20log (1.0 m / 3.0 m) = -9.5 dB

## Radiated Spurious Emission (Reference Plot for band-edge) (BT1)

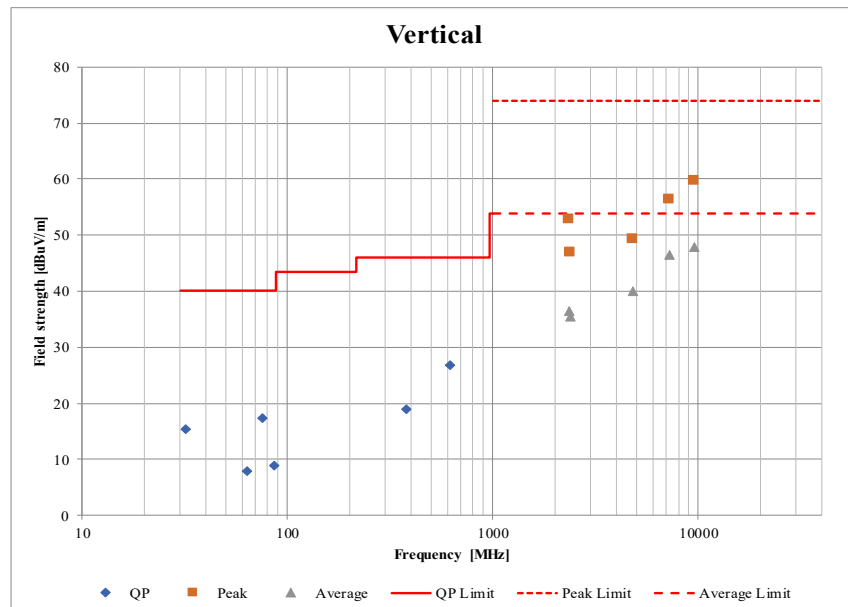
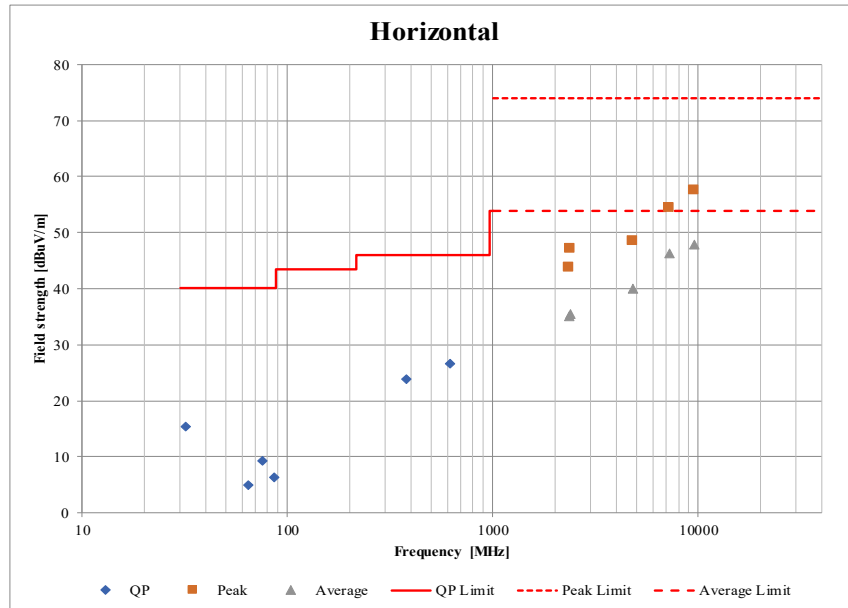
|                        |                                                         |
|------------------------|---------------------------------------------------------|
| Test place             | Ise EMC Lab.                                            |
| Semi Anechoic Chamber  | No.3                                                    |
| Date                   | February 7, 2022                                        |
| Temperature / Humidity | 19 deg. C / 30 % RH                                     |
| Engineer               | Yuichiro Yamazaki                                       |
|                        | (1 GHz - 10 GHz)                                        |
| Mode                   | Tx, Hopping Off, DH5 2480 MHz + 11ax-20 (OFDM) 5500 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**  
**(Plot data, Worst case mode for Maximum Peak Output Power)**  
**(BT1)**

|                        |                                |                     |                     |
|------------------------|--------------------------------|---------------------|---------------------|
| Test place             | Ise EMC Lab.                   |                     |                     |
| Semi Anechoic Chamber  | No.3                           | No.3                | No.3                |
| Date                   | January 25, 2022               | February 3, 2022    | February 9, 2022    |
| Temperature / Humidity | 20 deg. C / 37 % RH            | 21 deg. C / 33 % RH | 20 deg. C / 42 % RH |
| Engineer               | Hiroki Numata                  | Hiroki Numata       | Junki Nagatomi      |
|                        | (1 GHz - 10 GHz)               | (10 GHz - 26.5 GHz) | (Below 1 GHz)       |
| Mode                   | Tx, Hopping Off, 3DH5 2402 MHz |                     |                     |



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

Conducted Spurious Emission

(BT1)

Test place

Ise EMC Lab. No.8 Measurement Room

Date

January 21, 2022

Temperature / Humidity

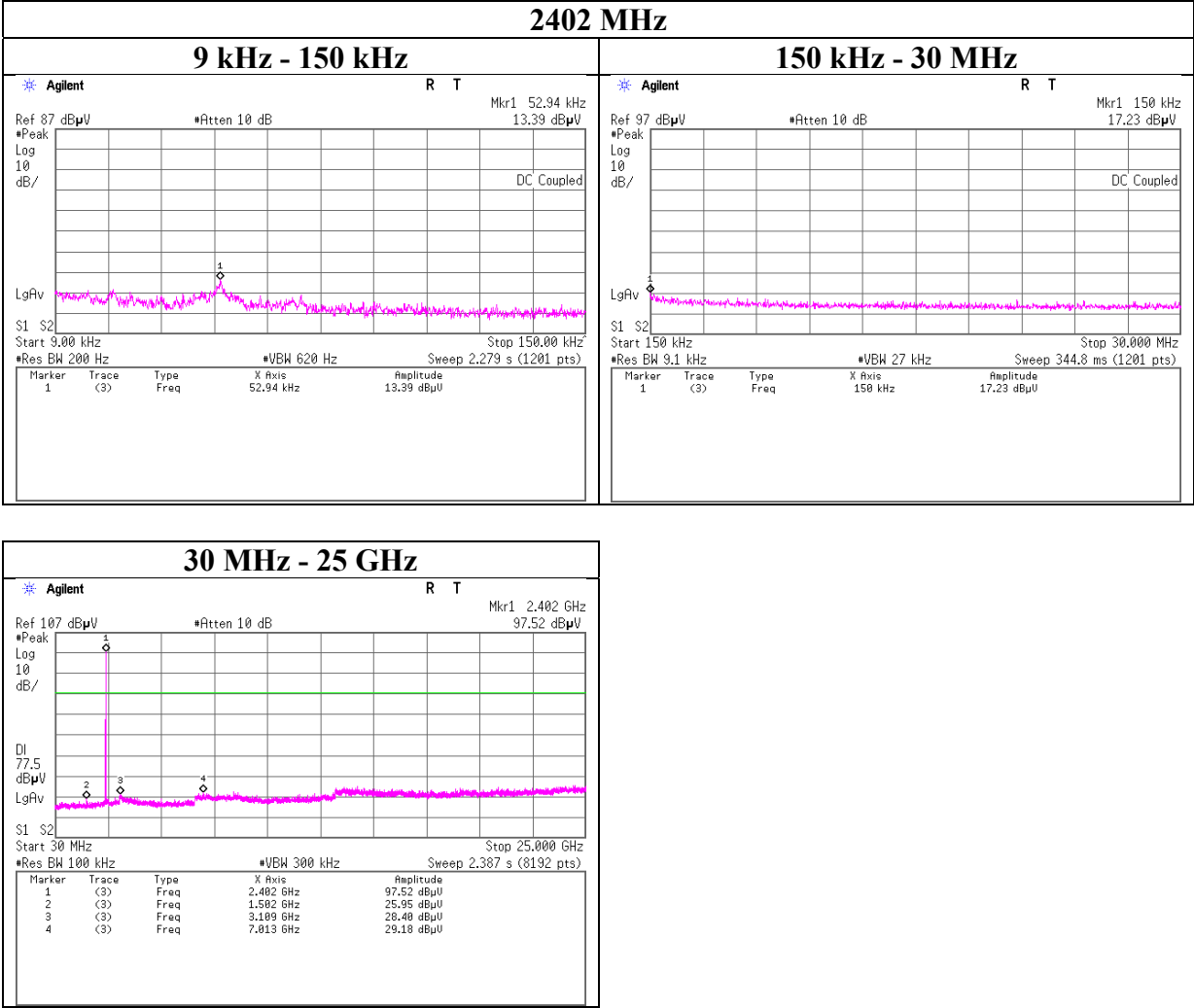
21 deg. C / 30 % RH

Engineer

Ken Fujita

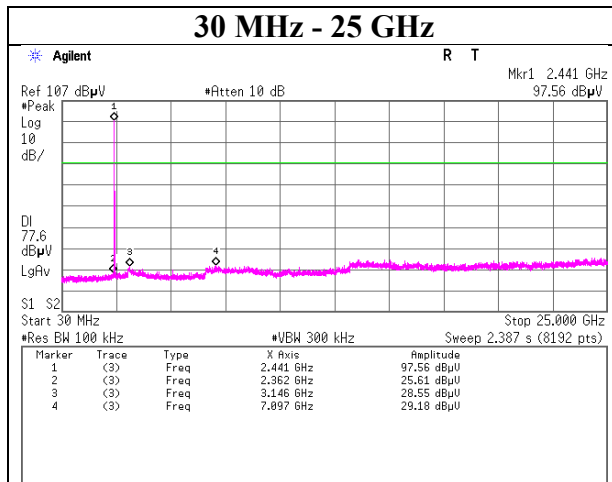
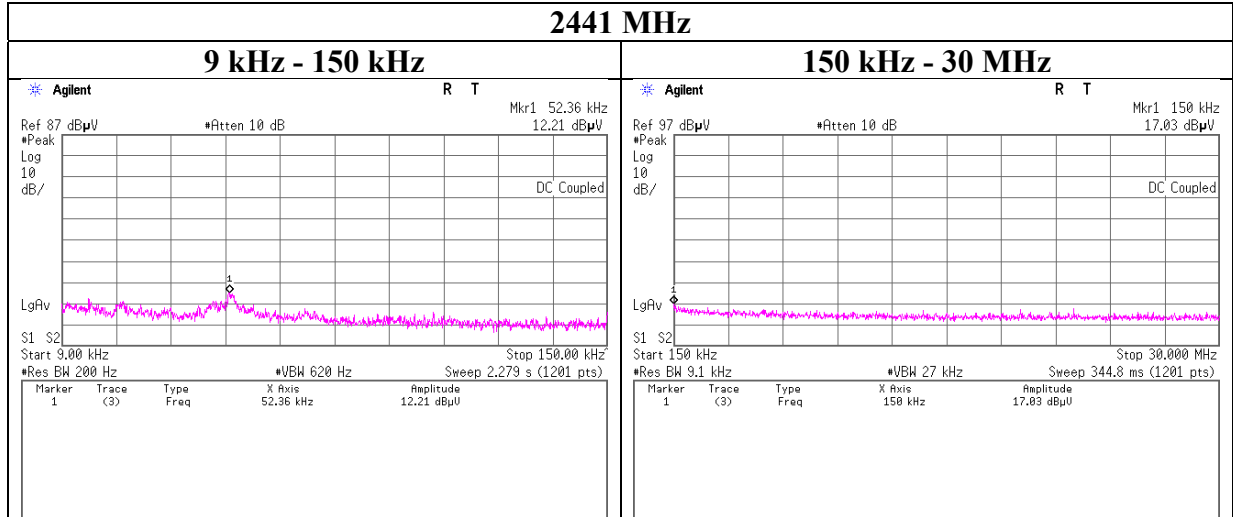
Mode

Tx, Hopping Off, DH5



## Conducted Spurious Emission (BT1)

|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 21, 2022                   |
| Temperature / Humidity | 21 deg. C / 30 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx, Hopping Off, DH5               |



Conducted Spurious Emission

(BT1)

Test place

Ise EMC Lab. No.8 Measurement Room

Date

January 21, 2022

Temperature / Humidity

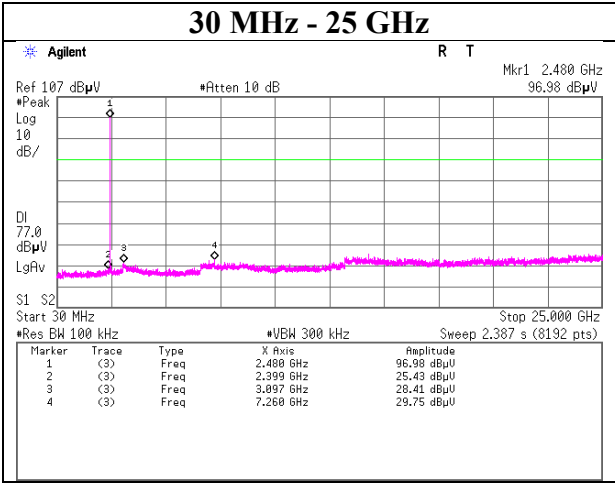
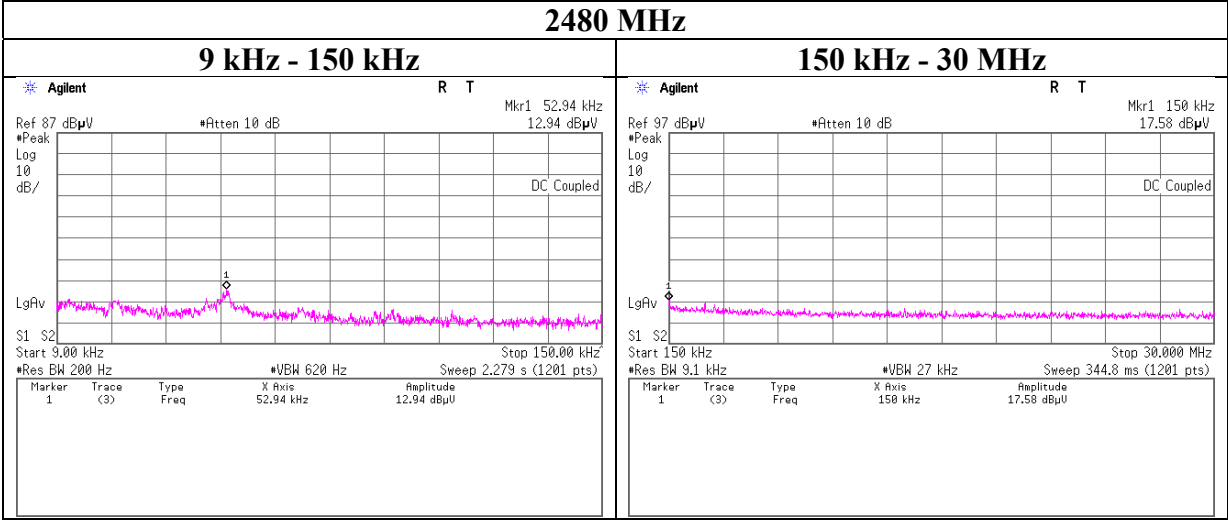
21 deg. C / 30 % RH

Engineer

Ken Fujita

Mode

Tx, Hopping Off, DH5



Conducted Spurious Emission

(BT1)

Test place

Ise EMC Lab. No.8 Measurement Room

Date

January 21, 2022

Temperature / Humidity

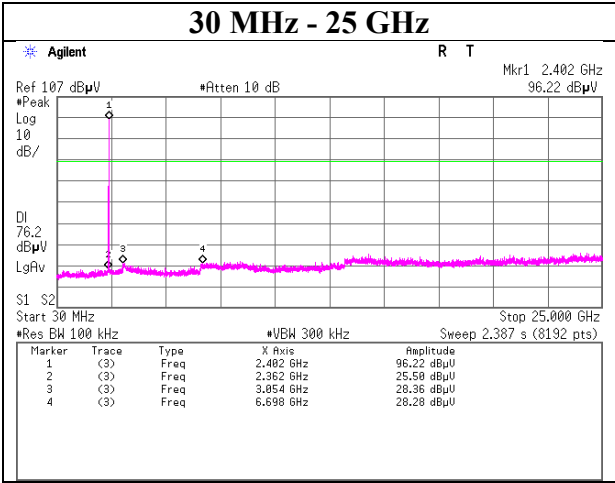
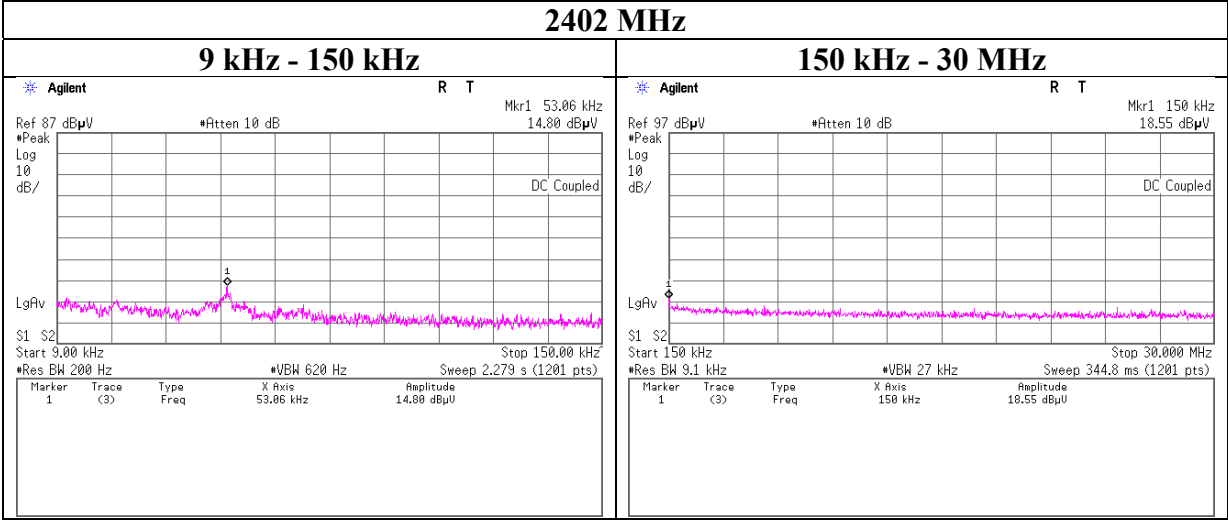
21 deg. C / 30 % RH

Engineer

Ken Fujita

Mode

Tx, Hopping Off, 3DH5



Conducted Spurious Emission

(BT1)

Test place

Ise EMC Lab. No.8 Measurement Room

Date

January 21, 2022

Temperature / Humidity

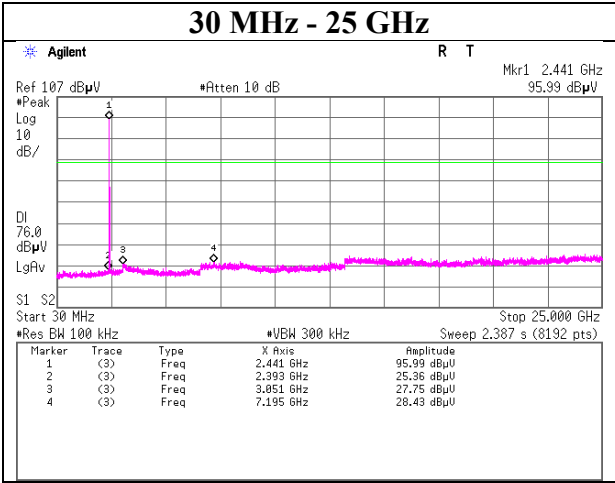
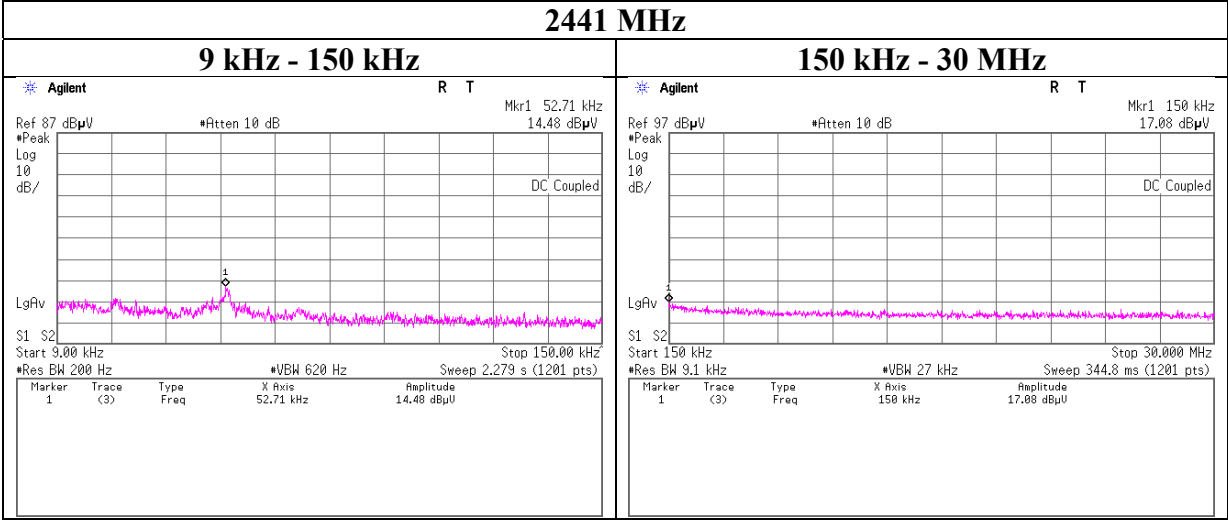
21 deg. C / 30 % RH

Engineer

Ken Fujita

Mode

Tx, Hopping Off, 3DH5



Conducted Spurious Emission

(BT1)

Test place

Ise EMC Lab. No.8 Measurement Room

Date

January 21, 2022

Temperature / Humidity

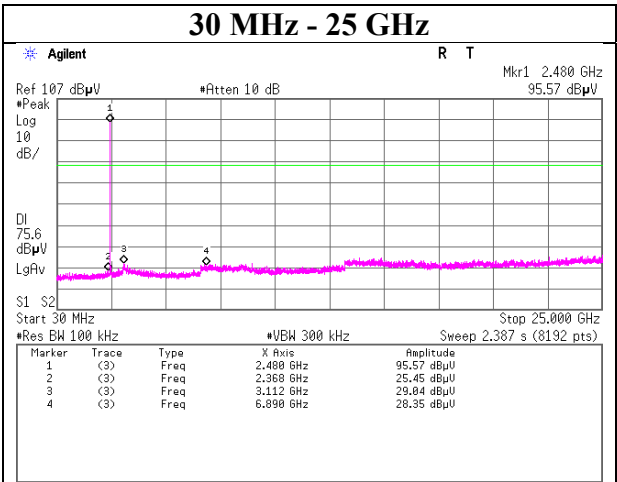
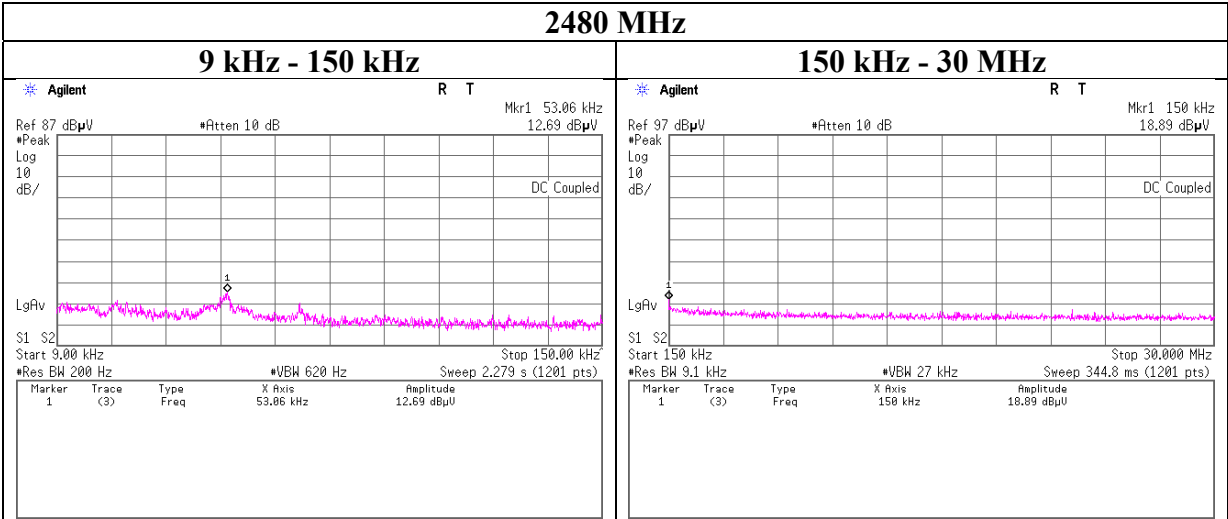
21 deg. C / 30 % RH

Engineer

Ken Fujita

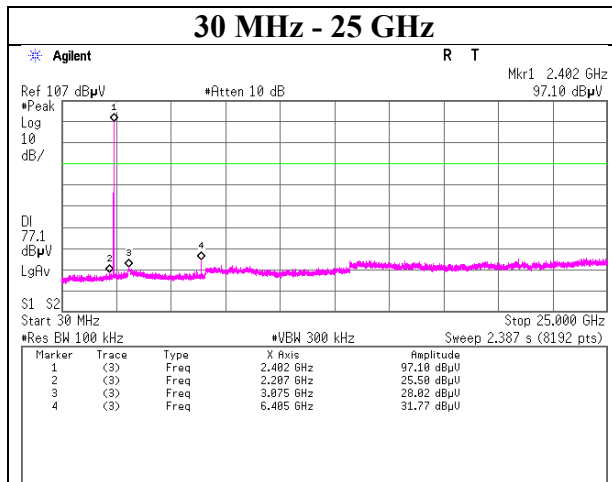
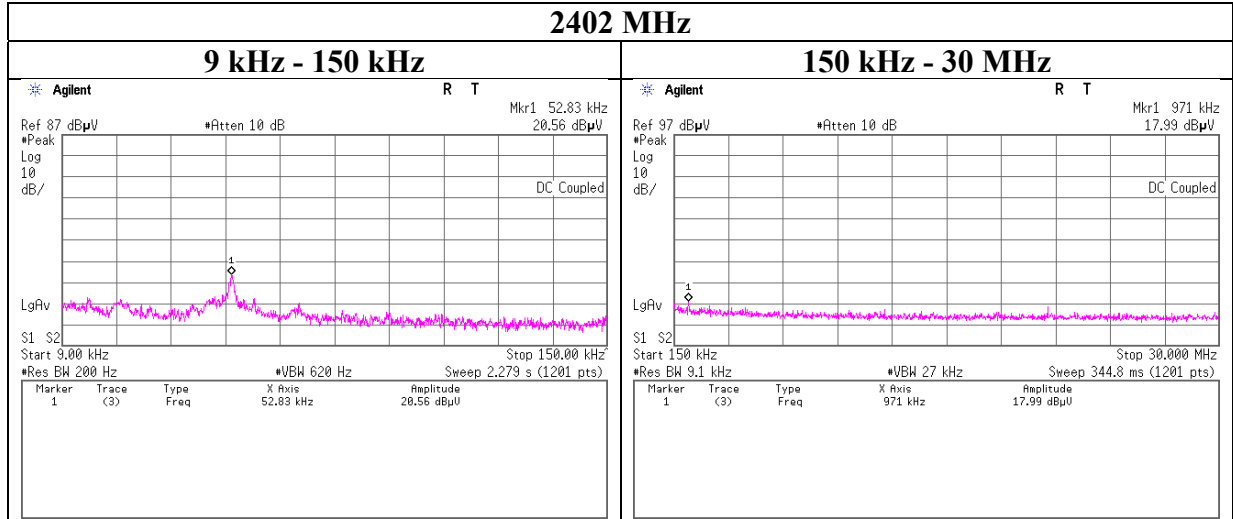
Mode

Tx, Hopping Off, 3DH5



## Conducted Spurious Emission (BT2)

|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 21, 2022                   |
| Temperature / Humidity | 21 deg. C / 30 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx, Hopping Off, DH5               |



Conducted Spurious Emission

(BT2)

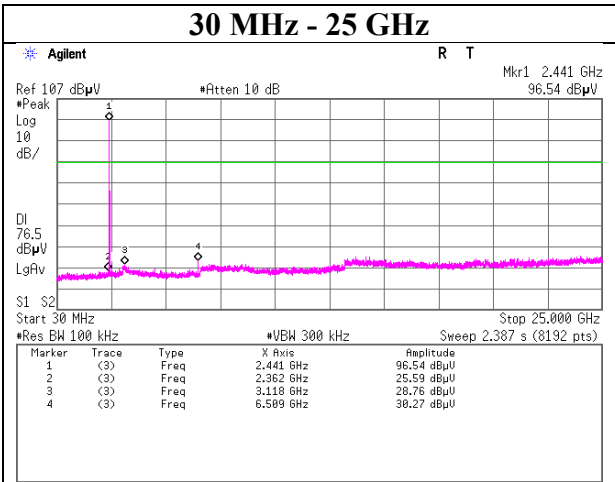
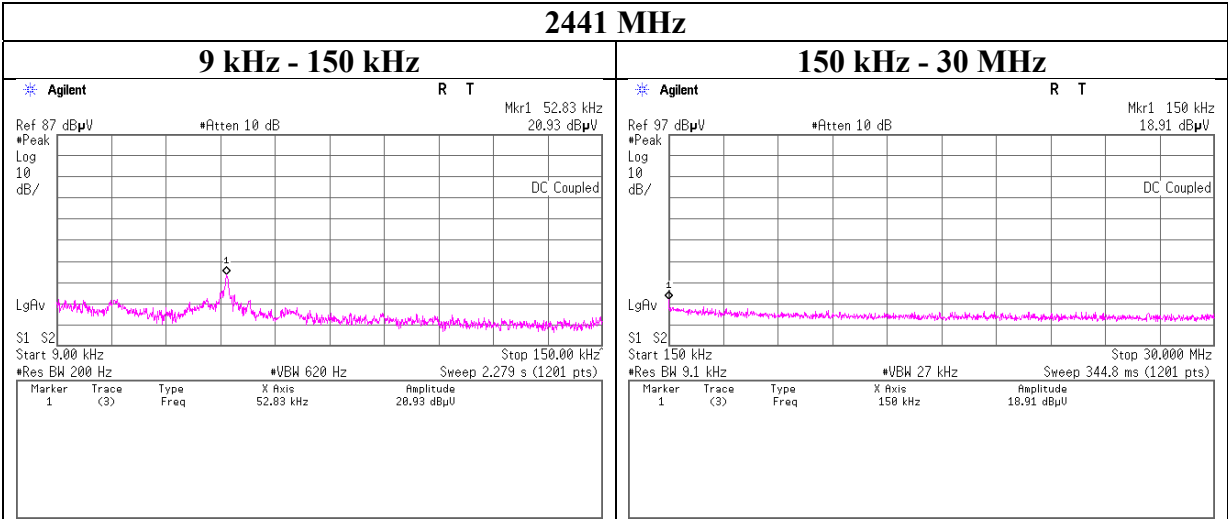
Test placeIse EMC Lab. No.8 Measurement Room

DateJanuary 21, 2022

Temperature / Humidity21 deg. C / 30 % RH

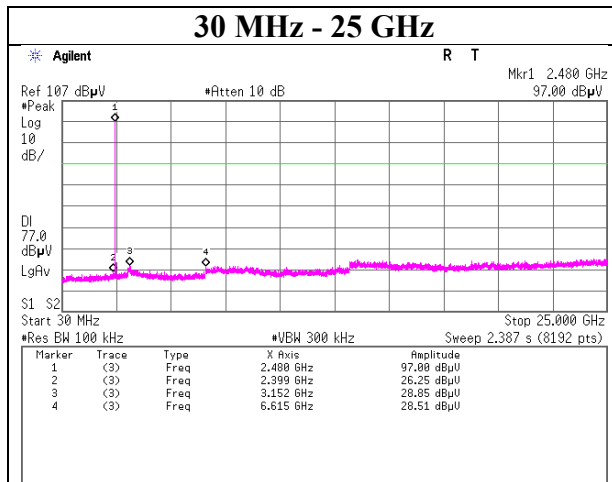
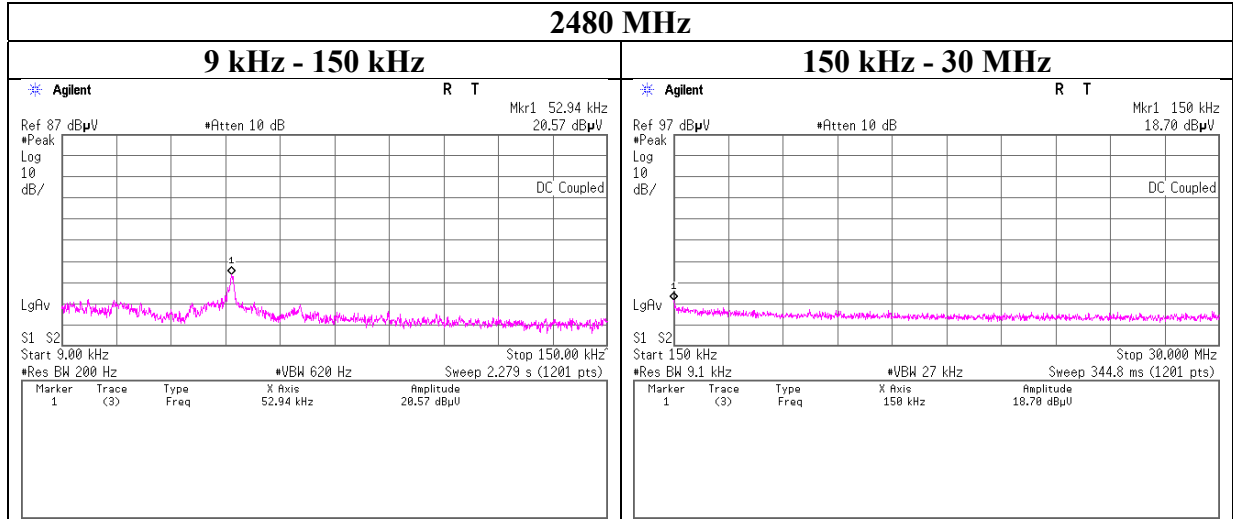
EngineerKen Fujita

ModeTx, Hopping Off, DH5



## Conducted Spurious Emission (BT2)

|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 21, 2022                   |
| Temperature / Humidity | 21 deg. C / 30 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx, Hopping Off, DH5               |



Conducted Spurious Emission

(BT2)

Test place

Ise EMC Lab. No.8 Measurement Room

Date

January 21, 2022

Temperature / Humidity

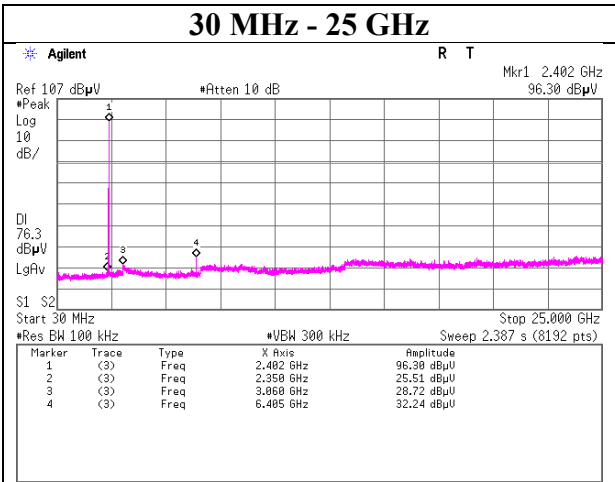
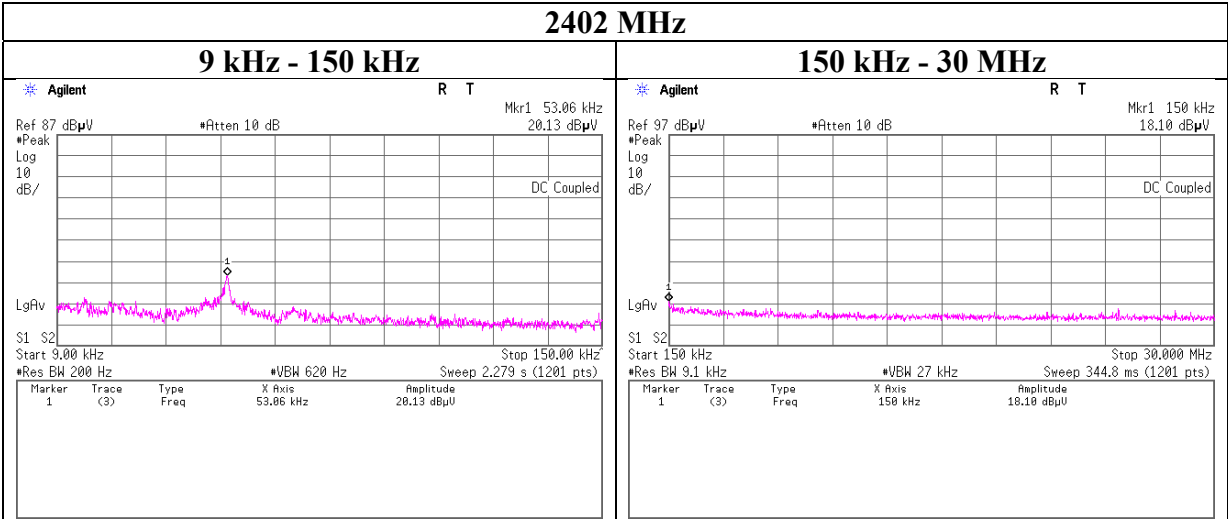
21 deg. C / 30 % RH

Engineer

Ken Fujita

Mode

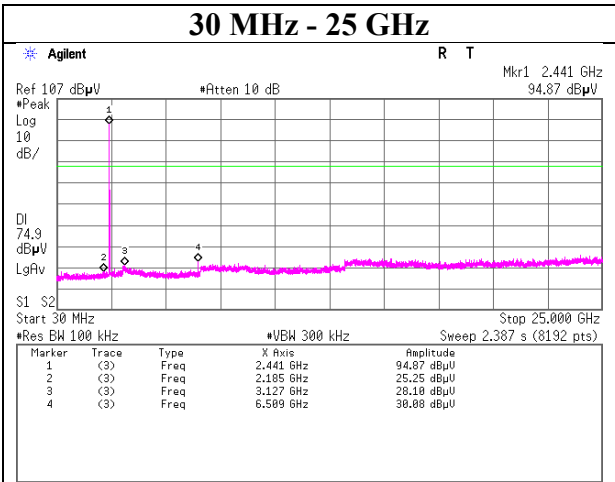
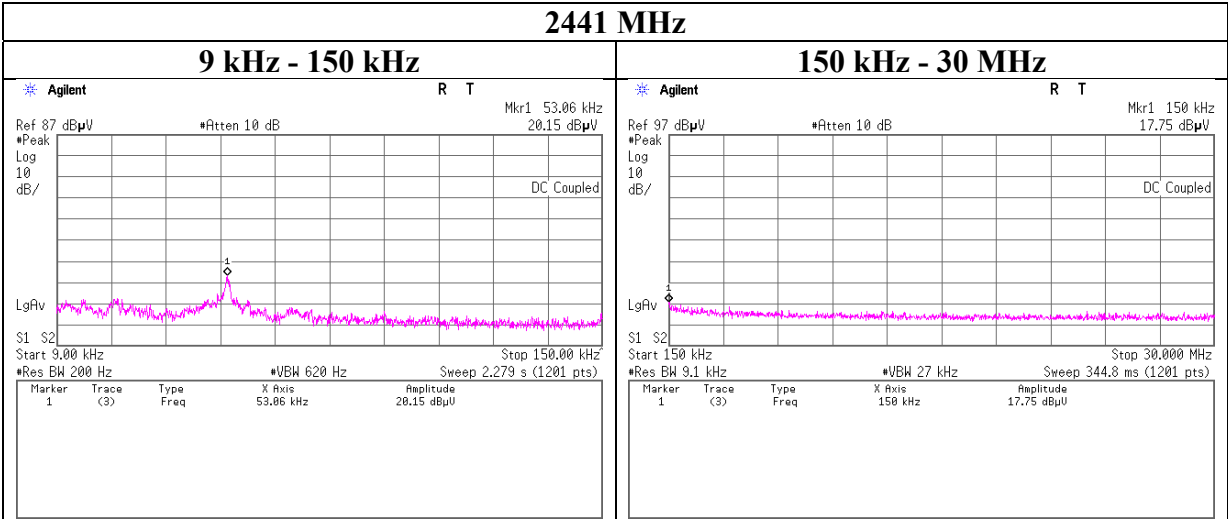
Tx, Hopping Off, 3DH5



Conducted Spurious Emission  
(BT2)

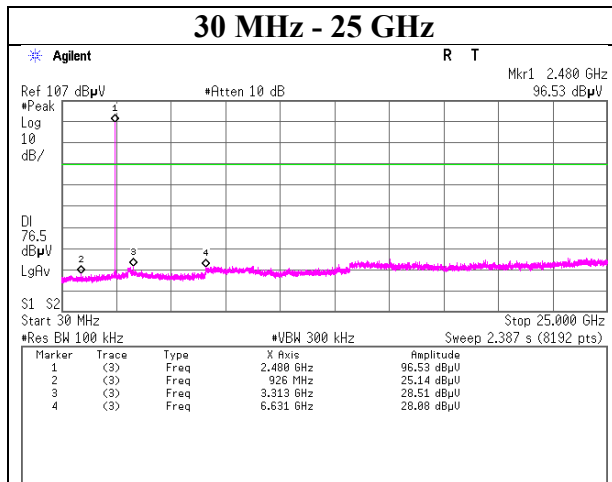
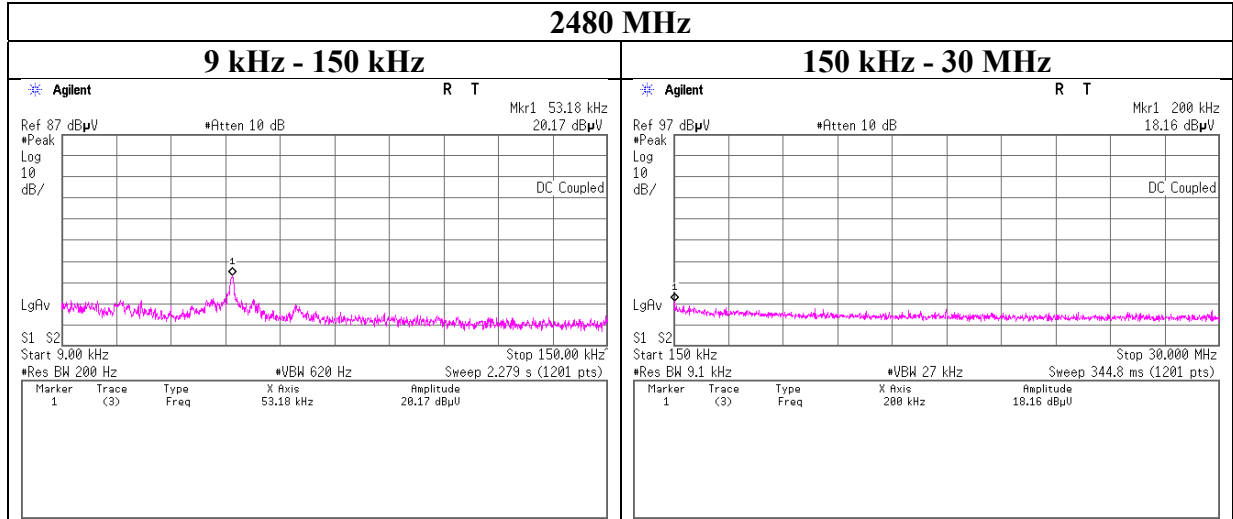
Test place  
Date  
Temperature / Humidity  
Engineer  
Mode

Ise EMC Lab. No.8 Measurement Room  
January 21, 2022  
21 deg. C / 30 % RH  
Ken Fujita  
Tx, Hopping Off, 3DH5



## Conducted Spurious Emission (BT2)

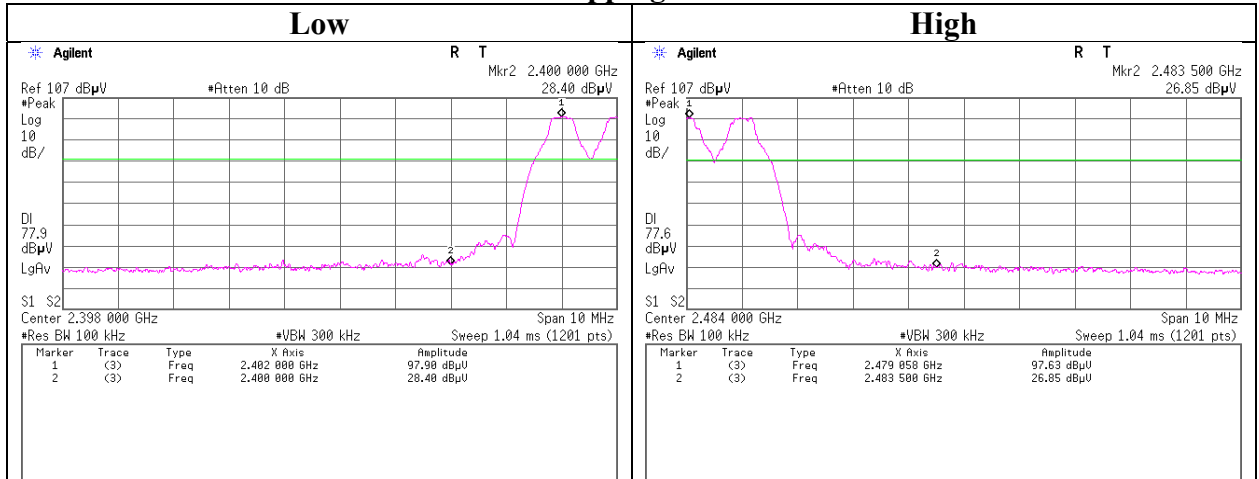
|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 21, 2022                   |
| Temperature / Humidity | 21 deg. C / 30 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx, Hopping Off, 3DH5              |



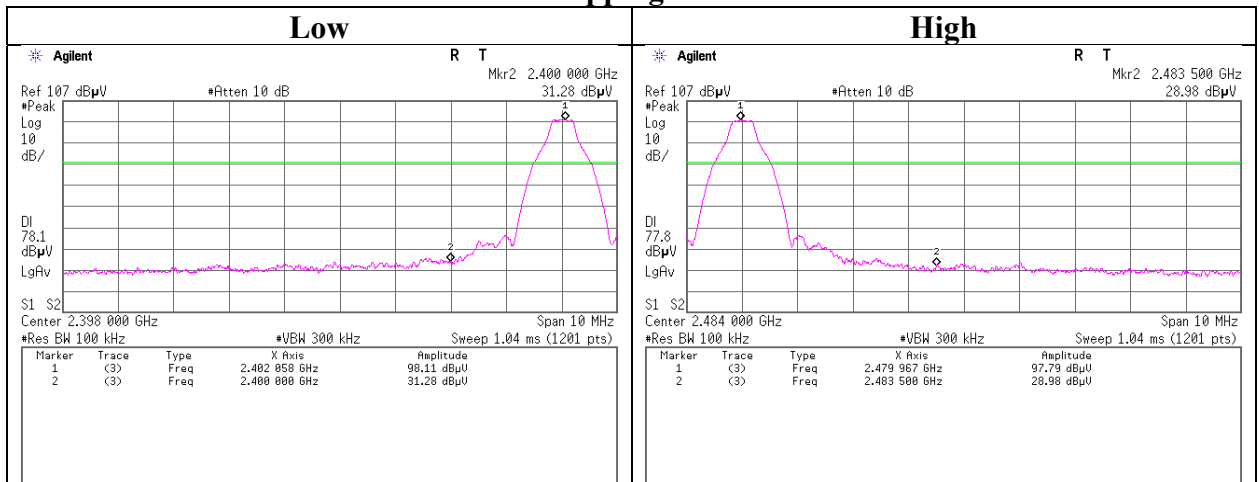
## Conducted Emission Band Edge compliance (BT1)

|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 21, 2022                   |
| Temperature / Humidity | 21 deg. C / 30 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx DH5                             |

### Hopping On



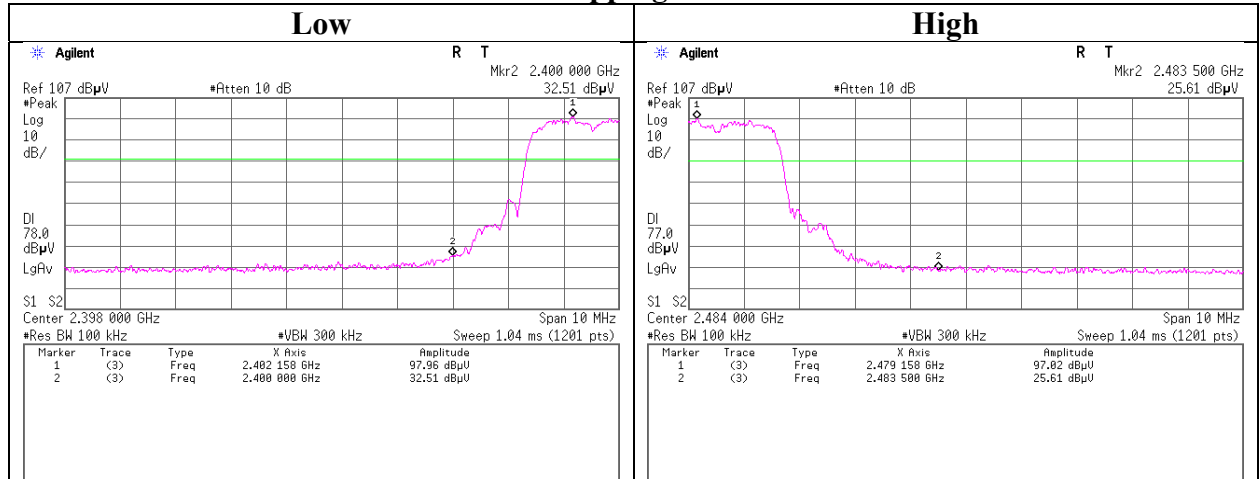
### Hopping Off



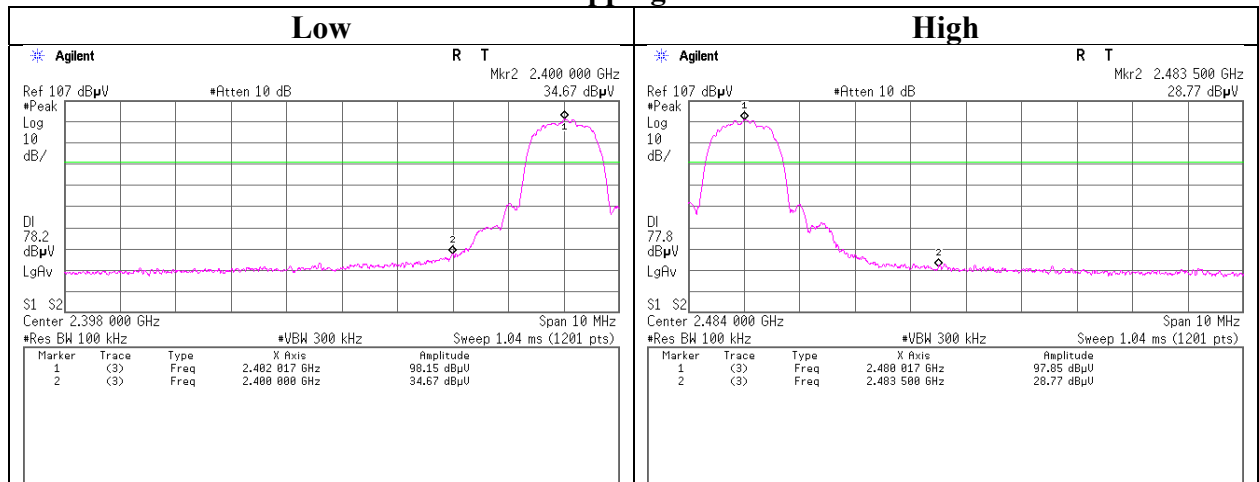
## Conducted Emission Band Edge compliance (BT1)

|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 21, 2022                   |
| Temperature / Humidity | 21 deg. C / 30 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx 3DH5                            |

### Hopping On



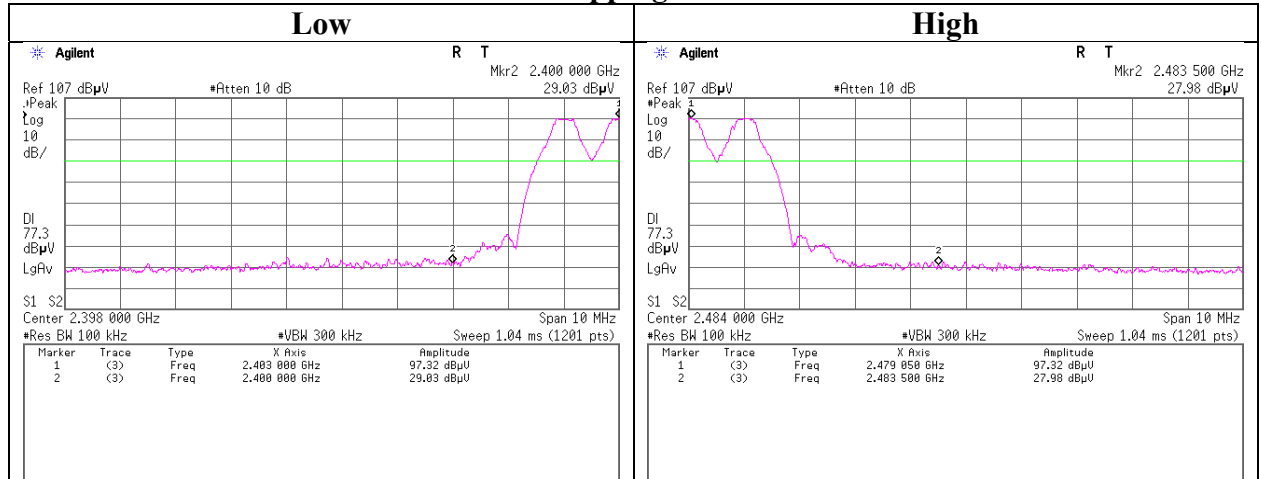
### Hopping Off



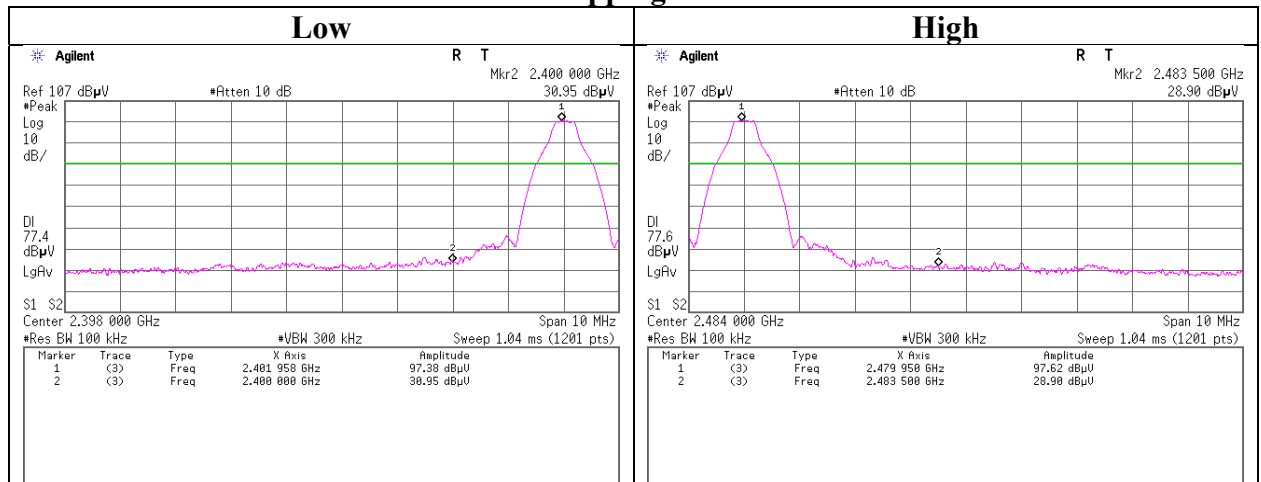
## Conducted Emission Band Edge compliance (BT2)

|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 21, 2022                   |
| Temperature / Humidity | 21 deg. C / 30 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx DH5                             |

### Hopping On



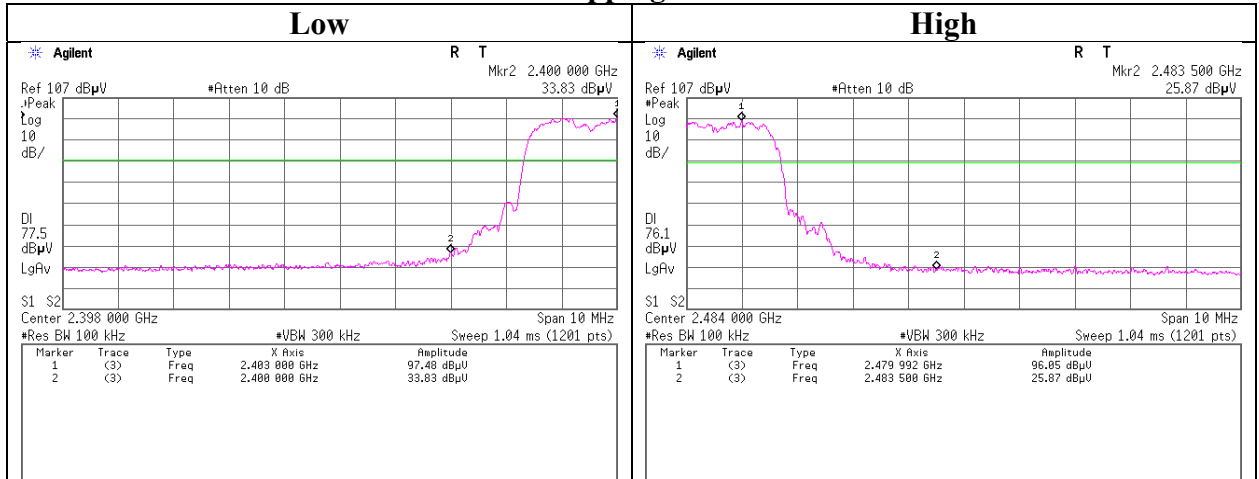
### Hopping Off



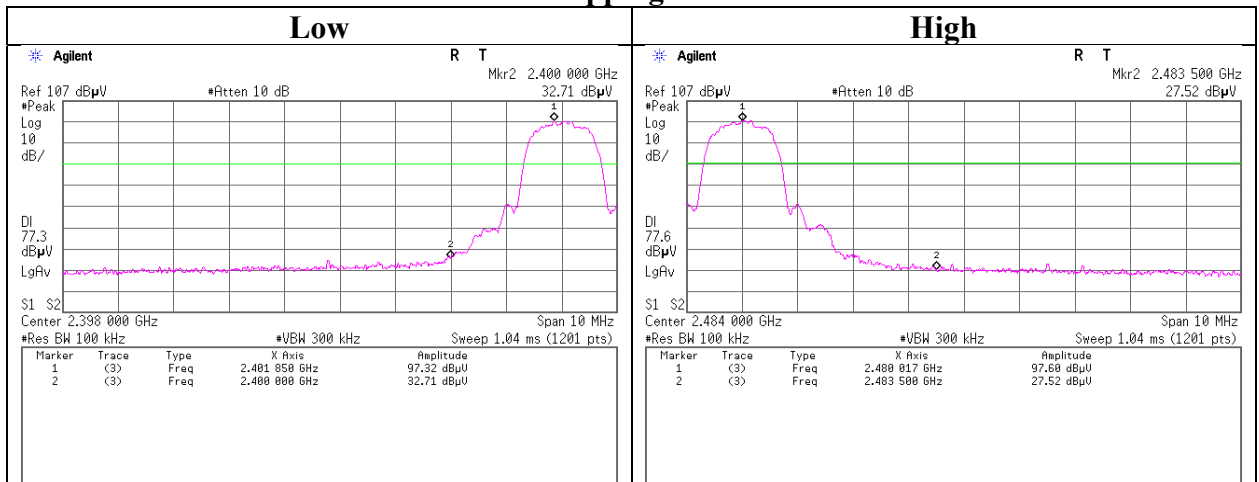
## Conducted Emission Band Edge compliance (BT2)

|                        |                                    |
|------------------------|------------------------------------|
| Test place             | Ise EMC Lab. No.8 Measurement Room |
| Date                   | January 21, 2022                   |
| Temperature / Humidity | 21 deg. C / 30 % RH                |
| Engineer               | Ken Fujita                         |
| Mode                   | Tx 3DH5                            |

### Hopping On



### Hopping Off



**APPENDIX 2: Test Instruments****Test equipment (1/2)**

| Test Item | Local ID      | LIMS ID | Description                       | Manufacturer                    | Model                                           | Serial                    | Last Calibration Date | Cal Int |
|-----------|---------------|---------|-----------------------------------|---------------------------------|-------------------------------------------------|---------------------------|-----------------------|---------|
| CE        | MAEC-03       | 142008  | AC3_Semi Anechoic Chamber(NSA)    | TDK                             | Semi Anechoic Chamber 3m                        | DA-10005                  | 05/22/2020            | 24      |
| CE        | MOS-13        | 141554  | Thermo-Hygrometer                 | CUSTOM. Inc                     | CTH-201                                         | 1301                      | 01/10/2022            | 12      |
| CE        | MMM-08        | 141532  | DIGITAL HiTESTER                  | HIOKI E.E. CORPORATION          | 3805                                            | 51201197                  | 01/16/2022            | 12      |
| CE        | MJM-16        | 142183  | Measure                           | KOMELON                         | KMC-36                                          | -                         | -                     | -       |
| CE        | COTS-MEMI-02  | 178648  | EMI measurement program           | TSJ (Techno Science Japan)      | TEPTO-DV                                        | -                         | -                     | -       |
| CE        | MLS-24        | 141358  | LISN(AMN)                         | Schwarzbeck Mess-Elektronik OHG | NSLK8127                                        | 8127-730                  | 07/18/2021            | 12      |
| CE        | MTR-03        | 141942  | Test Receiver                     | Rohde & Schwarz                 | ESCI                                            | 100300                    | 08/05/2021            | 12      |
| CE        | MAT-67        | 141248  | Attenuator                        | JFW Industries, Inc.            | 50FP-013H2 N                                    | -                         | 12/17/2021            | 12      |
| CE        | MCC-112       | 141216  | Coaxial cable                     | Fujikura/Suhner/TSJ             | 5D-2W/SFM14/sucoform141-PE/421-010/RFM-E321(SW) | -/00640                   | 07/19/2021            | 12      |
| CE        | MSA-16        | 141903  | Spectrum Analyzer                 | Keysight Technologies Inc       | E4440A                                          | MY46186390                | 01/07/2022            | 12      |
| RE        | MAEC-03       | 142008  | AC3_Semi Anechoic Chamber(NSA)    | TDK                             | Semi Anechoic Chamber 3m                        | DA-10005                  | 05/22/2020            | 24      |
| RE        | MOS-13        | 141554  | Thermo-Hygrometer                 | CUSTOM. Inc                     | CTH-201                                         | 1301                      | 01/10/2022            | 12      |
| RE        | MMM-08        | 141532  | DIGITAL HiTESTER                  | HIOKI E.E. CORPORATION          | 3805                                            | 51201197                  | 01/16/2022            | 12      |
| RE        | MJM-16        | 142183  | Measure                           | KOMELON                         | KMC-36                                          | -                         | -                     | -       |
| RE        | COTS-MEMI-02  | 178648  | EMI measurement program           | TSJ (Techno Science Japan)      | TEPTO-DV                                        | -                         | -                     | -       |
| RE        | MAEC-03-SVSWR | 142013  | AC3_Semi Anechoic Chamber(SVSWR)  | TDK                             | Semi Anechoic Chamber 3m                        | DA-10005                  | 04/01/2021            | 24      |
| RE        | MSA-03        | 141884  | Spectrum Analyzer                 | Keysight Technologies Inc       | E4448A                                          | MY44020357                | 03/10/2021            | 12      |
| RE        | MHA-20        | 141507  | Horn Antenna 1-18GHz              | Schwarzbeck Mess-Elektronik OHG | BBHA9120D                                       | 258                       | 11/09/2021            | 12      |
| RE        | MPA-11        | 141580  | MicroWave System Amplifier        | Keysight Technologies Inc       | 83017A                                          | MY39500779                | 03/03/2021            | 12      |
| RE        | MCC-231       | 177964  | Microwave Cable                   | Junkosha INC.                   | MMX221                                          | 1901S329(1m)/1902S579(5m) | 03/04/2021            | 12      |
| RE        | MHF-25        | 141232  | High Pass Filter 3.5-18.0GHz      | UL Japan                        | HPF SELECTOR                                    | 001                       | 09/30/2021            | 12      |
| RE        | MHA-16        | 141513  | Horn Antenna 15-40GHz             | Schwarzbeck Mess-Elektronik OHG | BBHA9170                                        | BBHA9170306               | 06/07/2021            | 12      |
| RE        | MHF-22        | 141293  | High Pass Filter 7-20GHz          | TOKIMEC                         | TF37NCCB                                        | 602                       | 02/18/2021            | 12      |
| RE        | MCC-177       | 141226  | Microwave Cable                   | Junkosha                        | MMX221-00500DMSDMS                              | 1502S304                  | 03/01/2021            | 12      |
| RE        | MTR-03        | 141942  | Test Receiver                     | Rohde & Schwarz                 | ESCI                                            | 100300                    | 08/05/2021            | 12      |
| RE        | MAT-95        | 142314  | Attenuator                        | Pasternack Enterprises          | PE7390-6                                        | D/C 1504                  | 06/09/2021            | 12      |
| RE        | MBA-08        | 141427  | Biconical Antenna                 | Schwarzbeck Mess-Elektronik OHG | VHA9103B+ BBA9106                               | 08031                     | 07/10/2021            | 12      |
| RE        | MCC-51        | 141323  | Coaxial cable                     | UL Japan                        | -                                               | -                         | 07/19/2021            | 12      |
| RE        | MLA-22        | 141266  | Logperiodic Antenna (200-1000MHz) | Schwarzbeck Mess-Elektronik OHG | VUSLP9111B                                      | 9111B-191                 | 08/21/2021            | 12      |
| RE        | MPA-13        | 141582  | Pre Amplifier                     | SONOMA INSTRUMENT               | 310                                             | 260834                    | 02/18/2021            | 12      |

## Test equipment (2/2)

| Test Item | Local ID  | LIMS ID | Description                 | Manufacturer                      | Model                     | Serial     | Last Calibration Date | Cal Int |
|-----------|-----------|---------|-----------------------------|-----------------------------------|---------------------------|------------|-----------------------|---------|
| AT        | MRENT-130 | 141855  | Spectrum Analyzer           | Keysight Technologies Inc         | E4440A                    | MY46187750 | 11/28/2021            | 12      |
| AT        | MPM-16    | 141812  | Power Meter                 | Keysight Technologies Inc         | 8990B                     | MY51000271 | 08/11/2021            | 12      |
| AT        | MPSE-23   | 141835  | Power sensor                | Keysight Technologies Inc         | N1923A                    | MY54070004 | 08/11/2021            | 12      |
| AT        | MAT-58    | 141334  | Attenuator(10dB)            | Suhner                            | 6810.19.A                 | -          | 12/08/2021            | 12      |
| AT        | MOS-28    | 141567  | Thermo-Hygrometer           | CUSTOM. Inc                       | CTH-201                   | 0008       | 01/10/2022            | 12      |
| AT        | MAT-23    | 141361  | Attenuator(10dB)<br>1-18GHz | Orient Microwave                  | BX10-0476-00              | -          | 04/07/2021            | 12      |
| AT        | MAT-26    | 141244  | Attenuator(10dB)            | Weinschel - API Technologies Corp | WA8-10-34                 | A198       | 02/24/2021            | 12      |
| AT        | MTA-36    | 142820  | Terminator                  | Baumer                            | 50ΩSMA                    | -          | -                     | -       |
| AT        | MTA-38    | 142821  | Terminator                  | OMC                               | BL01-6118-00<br>(50Ω SMA) | -          | -                     | -       |
| AT        | MTA-39    | 141929  | Terminator                  | OMC                               | BL01-6118-00<br>(50Ω SMA) | -          | 09/30/2021            | 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: CE: Conducted Emission  
RE: Radiated Emission  
AT: Antenna Terminal Conducted