



RADIO TEST REPORT

Test Report No. : 13671150H-A

Applicant : Sony Interactive Entertainment Inc.
Type of EUT : Wireless communication module
Model Number of EUT : J20H100
FCC ID : AK8M19DFR1
Test regulation : FCC Part 15 Subpart C: 2021
Class II Permissive Change
*WLAN (2.4 GHz band) part
(Radiated Spurious Emission test only)
Test Result : Complied (Refer to SECTION 3.2)

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by the A2LA accreditation body.
6. This test report covers Radio technical requirements.
It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in Section 1.

Date of test: January 21 to 28, 2021

Representative test engineer: J. Okuno
Junya Okuno
Engineer
Consumer Technology Division

Approved by: Takayuki S.
Takayuki Shimada
Leader
Consumer Technology Division



CERTIFICATE 5107.02

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

UL Japan, Inc.
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REVISION HISTORY

Original Test Report No.: 13671150H-A

| Revision | Test report No. | Date | Page revised | Contents |
|--------------|-----------------|----------------|--------------|----------|
| - (Original) | 13671150H-A | March 22, 2021 | - | - |

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Reference: Abbreviations (Including words undescribed in this report)

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

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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 |
| Facsimile Number | +81-50-3807-9594 |
| Contact Person | Miho Nakamura |

***Remarks:**

Sony Interactive Entertainment Inc. designates Foxconn Industrial Internet Co Ltd as manufacturer of the product (Wireless communication module).

The information provided from the customer is as follows;

- Applicant, Type 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
 - 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

| | |
|------------------------|--|
| Type | Wireless communication module |
| Model Number | J20H100 |
| Serial Number | Refer to SECTION 4.2 |
| Country of Manufacture | China |
| Receipt Date | January 12, 2021 |
| Condition | Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.) |
| Modification | No modification by the test lab. |

2.2 Product Description

Model: J20H100 (referred to as the EUT in this report) is a Wireless communication module.

Product Specification

| | |
|-----------------------|------------------------|
| Operating Temperature | -5 deg. C to 85 deg. C |
| Power Supply | DC 3.3 V, DC 1.8 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 (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 | IFA | |
| Antenna Gain: G_{ANT} | Antenna 1: 4.0 dBi Antenna 2: 3.5 dBi | |
| Directional Gain *1) | 6.76 dBi | |
| Maximum clock frequency | 320 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 5260 MHz to 5320 MHz 5500 MHz to 5720 MHz 5745 MHz to 5825 MHz | |
| | 40 M Band: 5190 MHz to 5230 MHz 5270 MHz to 5310 MHz 5510 MHz to 5710 MHz 5755 MHz to 5795 MHz | |
| | 80 M Band: 5210 MHz 5290 MHz 5530 MHz to 5690 MHz 5775 MHz | |
| Type of Modulation | OFDM | |
| | OFDMA (IEEE802.11ax only) | 20 MHz: 26/52/106/242-tone RU |
| | | 40 MHz: 26/52/106/242/484-tone RU 80 MHz: 26/52/106/242/484/996-tone RU |
| Bandwidth & Channel spacing | Less than 20 MHz / 40 MHz / 80 MHz & 20 MHz / 40 MHz / 80 MHz | |
| Method of frequency generation | Synthesizer | |
| Antenna Type | IFA | PIFA |
| Antenna Gain: G_{ANT} | Antenna 1: 6.0 dBi | Antenna 3: 4.5 dBi |
| Directional Gain *1) | 8.29 dBi | |
| Maximum clock frequency | 512 MHz | |

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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) BT LE: GFSK |
| Bandwidth / Channel spacing | BT:79 MHz / 1 MHz 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 | 128 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) BT LE: GFSK |
| Bandwidth / Channel spacing | BT:79 MHz / 1 MHz 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 | 128 MHz |

*1) Directional antenna gain = $10 \log \left(\frac{G_{ANT1}}{10^{20}} + \frac{G_{ANT2}}{10^{20}} \right)^2 / 2$

*This test report applies to WLAN (2.4 GHz band) part.

2.3 Contents of modification

Each antenna was changed from original application.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on January 12, 2021 and effective February 11, 2021

Title : FCC 47 CFR Part 15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz,
and 5725-5850 MHz

* The revision does not affect the test result conducted before its effective date.

3.2 Procedures and results

| Item | Test Procedure | Specification | Worst margin | Results | Remarks |
|---|---|---|--|----------------|-----------------------------------|
| Spurious Emission Restricted Band Edges | FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 | FCC: Section15.247(d) | 5.5 dB 595.620 MHz, Vertical, QP | Complied a) | Radiated (above 30 MHz) *1) |
| | ISED: RSS-Gen 6.13 | ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10 | | | |
| Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422. | | | | | |
| *1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02 8.5 and 8.6. | | | | | |
| a) 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. | | | |

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

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

[Antenna 1 and 2] The antenna is not removable from the EUT.

[Antenna 3 and 4] 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

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 $k=2$.
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Radiated emission

| Measurement distance | Frequency range | Uncertainty (+/-) |
|----------------------|--|-------------------|
| 3 m | 9 kHz to 30 MHz | 3.3 dB |
| 10 m | | 3.2 dB |
| 3 m | 30 MHz to 200 MHz (Horizontal) (Vertical) | 4.8 dB |
| | | 5.0 dB |
| | 200 MHz to 1000 MHz (Horizontal) (Vertical) | 5.2 dB |
| | | 6.3 dB |
| 10 m | 30 MHz to 200 MHz (Horizontal) (Vertical) | 4.8 dB |
| | | 4.8 dB |
| | 200 MHz to 1000 MHz (Horizontal) (Vertical) | 5.0 dB |
| | | 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 | 5.5 dB |
| | 26.5 GHz to 40 GHz | 5.5 dB |
| 10 m | 1 GHz to 18 GHz | 5.2 dB |

3.5 Test Location

UL Japan, Inc. Ise EMC Lab.

*A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 199967

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

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| 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.11 measurement room | 6.2 x 4.7 x 3.0 | 4.8 x 4.6 | - | - |

* 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)

[WLAN]

Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009.

| Mode | Remarks* |
|--|------------------|
| IEEE 802.11b (11b) | 1 Mbps, PN9 |
| IEEE 802.11ax MIMO 20 MHz BW (11ax-20) | MCS 6 (1TX), PN9 |
| *The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel) | |
| *Power of the EUT was set by the software as follows; Power settings: OFDM: 8.0 dBm OFDMA: -2.0 dBm (26-tone RU), 1.5 dBm (52-tone RU), 4.5 dBm (106-tone RU), 8.0 dBm(242-tone RU) Software: Dut Labtool Version: 1.0.0.100 (Date: December 30, 2020, Storage location: Driven by connected PC) | |
| *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product. | |

*Details of Operating mode for WLAN

| Test Item | Operating Mode | Tested Antenna | Tested frequency |
|---|-----------------------|-----------------------|-------------------------|
| Radiated Spurious Emission (Below 1 GHz) | 11ax-20 OFDM Tx *1) | Antenna 1 + 2 | 2462 MHz |
| Radiated Spurious Emission (Above 1 GHz) | 11b Tx | Antenna 1 + 2 | 2412 MHz |
| | 11ax-20 OFDMA Tx *2) | | 2437 MHz |
| | 11ax-20 OFDM Tx *3) | | 2462 MHz |
| *1) The mode was tested as a representative, because it had the highest power at antenna terminal test. *2) OFDMA configuration tests were conducted only at the band edge since they had lower power and density than OFDM. *3) Since 11g and 11n-20, 11ax-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest output power. | | | |

4.2 Configuration and peripherals

This page has been submitted for a separate exhibit.

SECTION 5: Radiated Spurious Emission

Test Procedure

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

[For below 1 GHz]

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

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

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 VBW: 3 MHz | 11.12.2.5.1 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces 11.12.2.5.2 The duty cycle was less than 98% for detected noise, a duty factor was added to the 11.12.2.5.1 results. | RBW: 100 kHz VBW: 300 kHz |

*1) Average Power Measurement was performed based on ANSI C63.10-2013.

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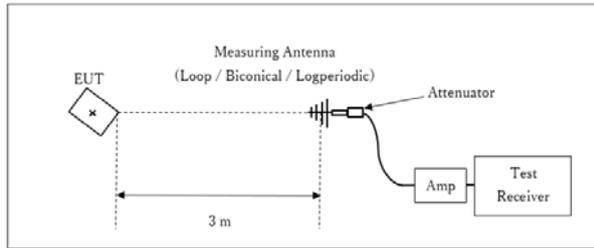
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Figure 2: Test Setup

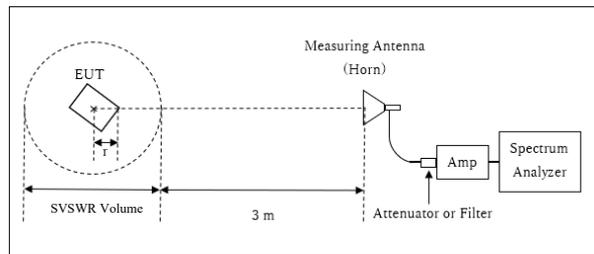
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz



r : Radius of an outer periphery of EUT
 × : Center of turn table

Distance Factor: $20 \times \log(3.75 \text{ m} / 3.0 \text{ m}) = 1.94 \text{ dB}$

* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.75 \text{ m}$

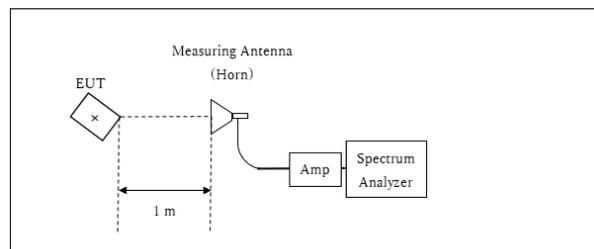
SVSWR Volume: 1.5 m

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

$r = 0.0 \text{ m}$

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

10 GHz – 26.5 GHz



× : Center of turn table

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

*Test Distance: 1 m

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

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

Measurement range : 30 MHz - 26.5 GHz
Test data : APPENDIX
Test result : Pass

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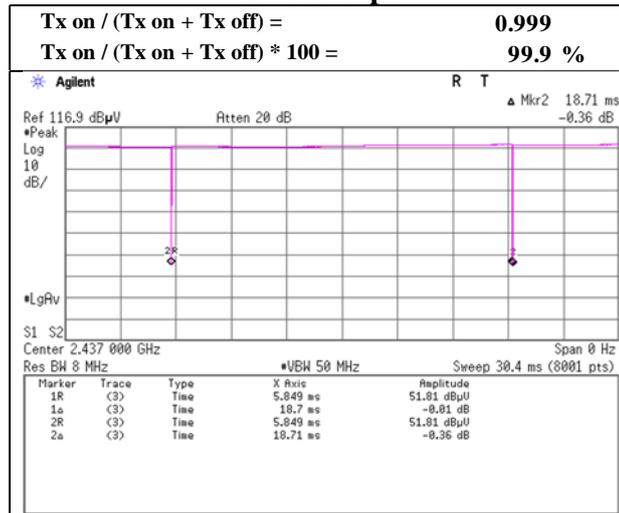
Facsimile : +81 596 24 8124

APPENDIX 1: Test data

Burst rate confirmation

Report No. 13671150H
 Test place Ise EMC Lab.
 Semi Anechoic Chamber No.2
 Date January 21, 2021
 Temperature / Humidity 23 deg. C / 34 % RH
 Engineer Nachi Konegawa
 Mode Tx

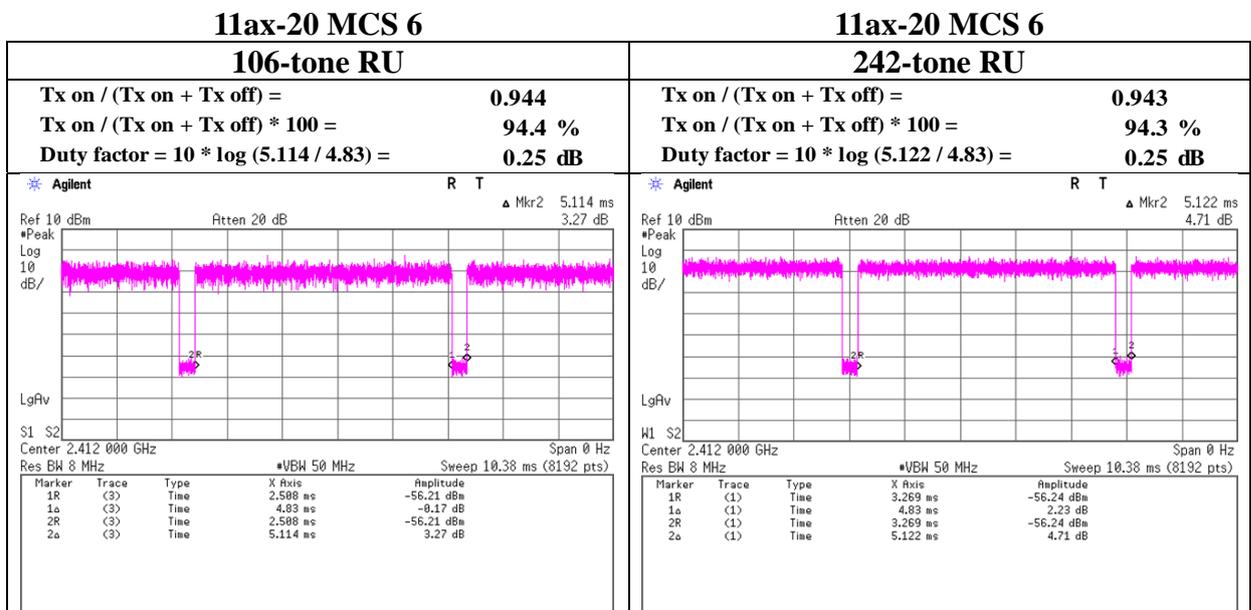
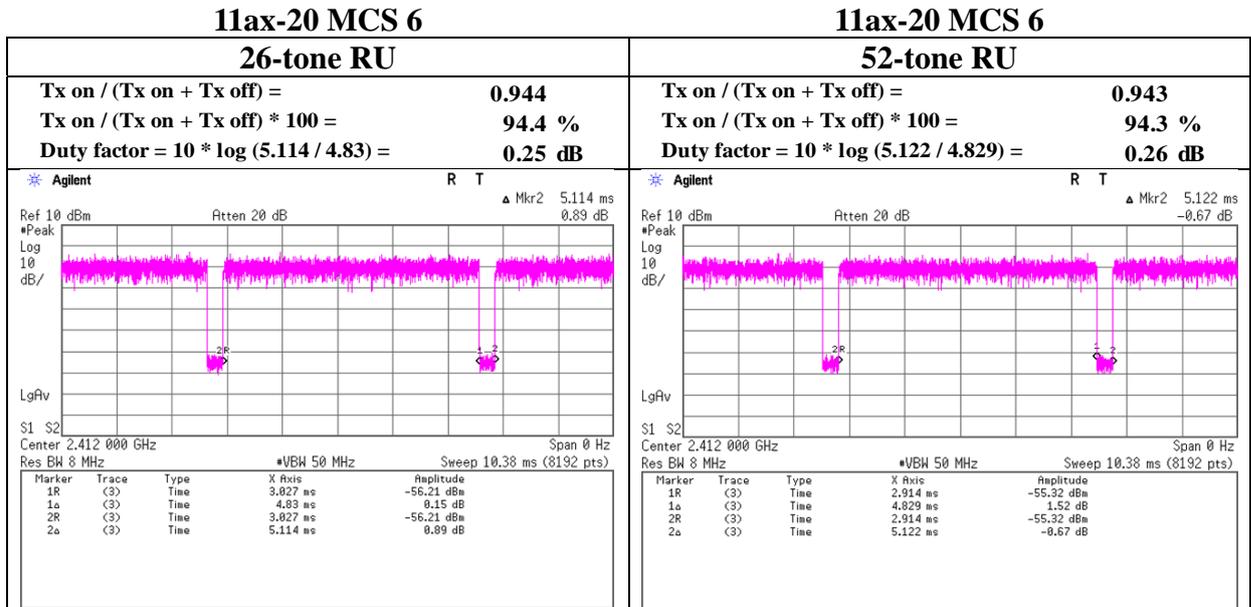
11b 1 Mbps



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

Burst rate confirmation

Report No. 13671150H
 Test place Ise EMC Lab.
 Semi Anechoic Chamber No.2
 Date January 24, 2021
 Temperature / Humidity 25 deg. C / 40 % RH
 Engineer Akihiko Maeda
 Mode Tx



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

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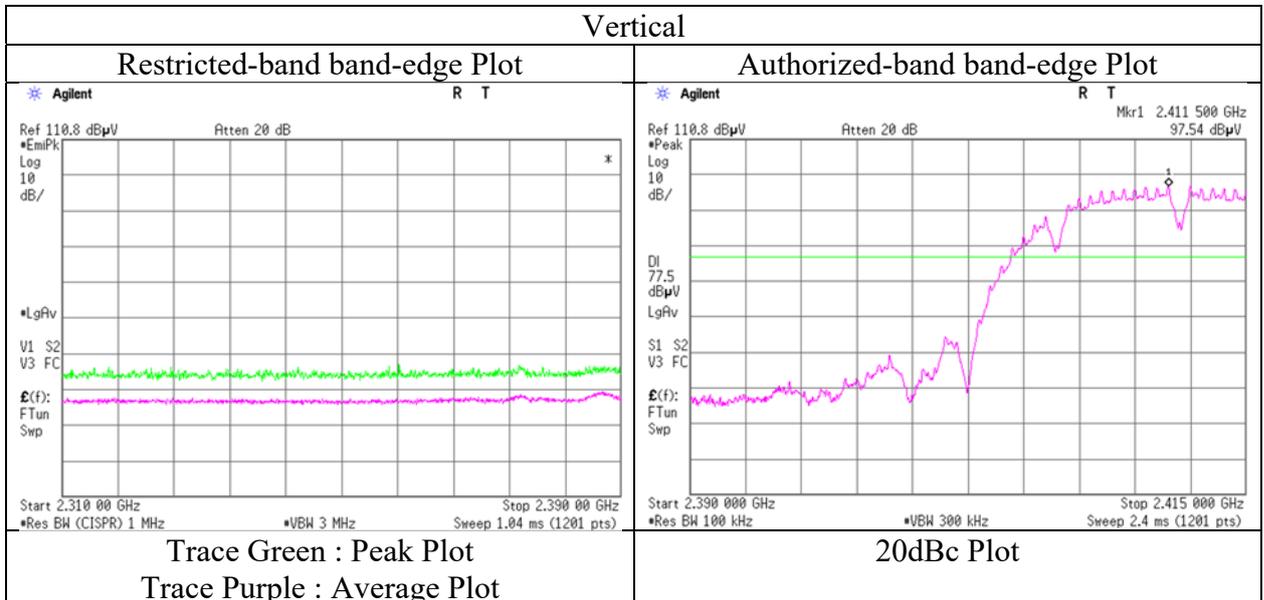
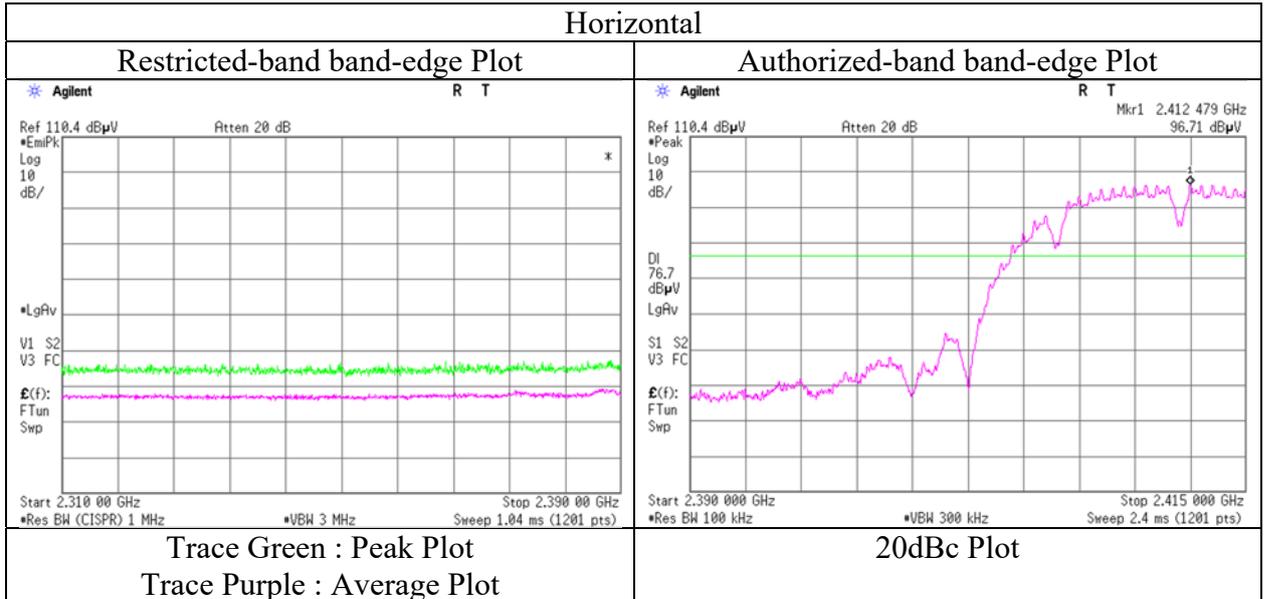
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Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 21, 2021
Temperature / Humidity 23 deg. C / 34 % RH
Engineer Nachi Konegawa
(1 GHz - 10 GHz)
Mode Tx 11b 2412 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

| | | | |
|------------------------|------------------------------------|------------------------------------|------------------------------------|
| Report No. | 13671150H | | |
| Test place | Ise EMC Lab. | | |
| Semi Anechoic Chamber | No.2 | No.2 | No.2 |
| Date | January 21, 2021 | January 26, 2021 | January 27, 2021 |
| Temperature / Humidity | 23 deg. C / 34 % RH | 20 deg. C / 41 % RH | 20 deg. C / 50 % RH |
| Engineer | Nachi Konegawa (1 GHz - 10 GHz) | Akihiko Maeda (10 GHz - 18 GHz) | Junya Okuno (18 GHz - 26.5 GHz) |
| Mode | Tx 11b 2437 MHz | | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori. | 4874.000 | PK | 42.1 | 31.6 | 6.1 | 33.8 | - | 46.1 | 73.9 | 27.8 | Floor noise |
| Hori. | 7311.000 | PK | 42.8 | 36.2 | 6.8 | 33.6 | - | 52.2 | 73.9 | 21.7 | Floor noise |
| Hori. | 9748.000 | PK | 43.0 | 38.8 | 7.7 | 34.2 | - | 55.3 | 73.9 | 18.6 | Floor noise |
| Hori. | 4874.000 | AV | 33.6 | 31.6 | 6.1 | 33.8 | - | 37.6 | 53.9 | 16.3 | Floor noise |
| Hori. | 7311.000 | AV | 34.2 | 36.2 | 6.8 | 33.6 | - | 43.6 | 53.9 | 10.3 | Floor noise |
| Hori. | 9748.000 | AV | 34.4 | 38.8 | 7.7 | 34.2 | - | 46.6 | 53.9 | 7.3 | Floor noise |
| Vert. | 4874.000 | PK | 42.3 | 31.6 | 6.1 | 33.8 | - | 46.2 | 73.9 | 27.7 | Floor noise |
| Vert. | 7311.000 | PK | 42.9 | 36.2 | 6.8 | 33.6 | - | 52.3 | 73.9 | 21.6 | Floor noise |
| Vert. | 9748.000 | PK | 43.1 | 38.8 | 7.7 | 34.2 | - | 55.4 | 73.9 | 18.5 | Floor noise |
| Vert. | 4874.000 | AV | 33.7 | 31.6 | 6.1 | 33.8 | - | 37.7 | 53.9 | 16.2 | Floor noise |
| Vert. | 7311.000 | AV | 34.4 | 36.2 | 6.8 | 33.6 | - | 43.8 | 53.9 | 10.1 | Floor noise |
| Vert. | 9748.000 | AV | 34.4 | 38.8 | 7.7 | 34.2 | - | 46.7 | 53.9 | 7.2 | Floor noise |

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

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission

| | | | |
|------------------------|------------------------------------|------------------------------------|------------------------------------|
| Report No. | 13671150H | | |
| Test place | Ise EMC Lab. | | |
| Semi Anechoic Chamber | No.2 | No.2 | No.2 |
| Date | January 21, 2021 | January 26, 2021 | January 27, 2021 |
| Temperature / Humidity | 23 deg. C / 34 % RH | 20 deg. C / 41 % RH | 20 deg. C / 50 % RH |
| Engineer | Nachi Konegawa (1 GHz - 10 GHz) | Akihiko Maeda (10 GHz - 18 GHz) | Junya Okuno (18 GHz - 26.5 GHz) |
| Mode | Tx 11b 2462 MHz | | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|-------------|
| Hori. | 2483.500 | PK | 44.6 | 27.4 | 4.4 | 34.6 | - | 41.8 | 73.9 | 32.1 | |
| Hori. | 4924.000 | PK | 42.4 | 31.5 | 6.1 | 33.8 | - | 46.3 | 73.9 | 27.6 | Floor noise |
| Hori. | 7386.000 | PK | 42.7 | 36.1 | 6.9 | 33.6 | - | 52.0 | 73.9 | 21.9 | Floor noise |
| Hori. | 9848.000 | PK | 43.0 | 39.0 | 7.8 | 34.3 | - | 55.5 | 73.9 | 18.4 | Floor noise |
| Hori. | 2483.500 | AV | 34.4 | 27.4 | 4.4 | 34.6 | - | 31.6 | 53.9 | 22.3 | |
| Hori. | 4924.000 | AV | 33.9 | 31.5 | 6.1 | 33.8 | - | 37.8 | 53.9 | 16.1 | Floor noise |
| Hori. | 7386.000 | AV | 34.1 | 36.1 | 6.9 | 33.6 | - | 43.4 | 53.9 | 10.5 | Floor noise |
| Hori. | 9848.000 | AV | 34.4 | 39.0 | 7.8 | 34.3 | - | 46.8 | 53.9 | 7.1 | Floor noise |
| Vert. | 2483.500 | PK | 45.5 | 27.4 | 4.4 | 34.6 | - | 42.7 | 73.9 | 31.3 | |
| Vert. | 4924.000 | PK | 42.5 | 31.5 | 6.1 | 33.8 | - | 46.4 | 73.9 | 27.5 | Floor noise |
| Vert. | 7386.000 | PK | 42.8 | 36.1 | 6.9 | 33.6 | - | 52.1 | 73.9 | 21.8 | Floor noise |
| Vert. | 9848.000 | PK | 43.2 | 39.0 | 7.8 | 34.3 | - | 55.6 | 73.9 | 18.3 | Floor noise |
| Vert. | 2483.500 | AV | 36.0 | 27.4 | 4.4 | 34.6 | - | 33.2 | 53.9 | 20.7 | |
| Vert. | 4924.000 | AV | 33.9 | 31.5 | 6.1 | 33.8 | - | 37.8 | 53.9 | 16.1 | Floor noise |
| Vert. | 7386.000 | AV | 34.4 | 36.1 | 6.9 | 33.6 | - | 43.7 | 53.9 | 10.2 | Floor noise |
| Vert. | 9848.000 | AV | 34.6 | 39.0 | 7.8 | 34.3 | - | 47.0 | 53.9 | 6.9 | Floor noise |

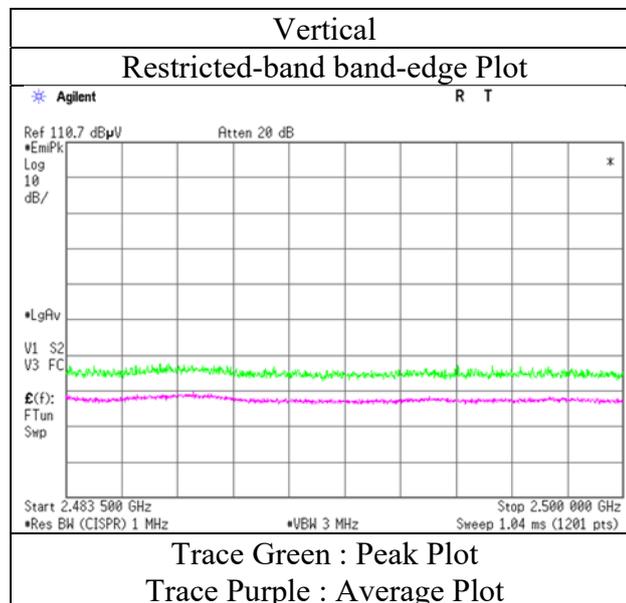
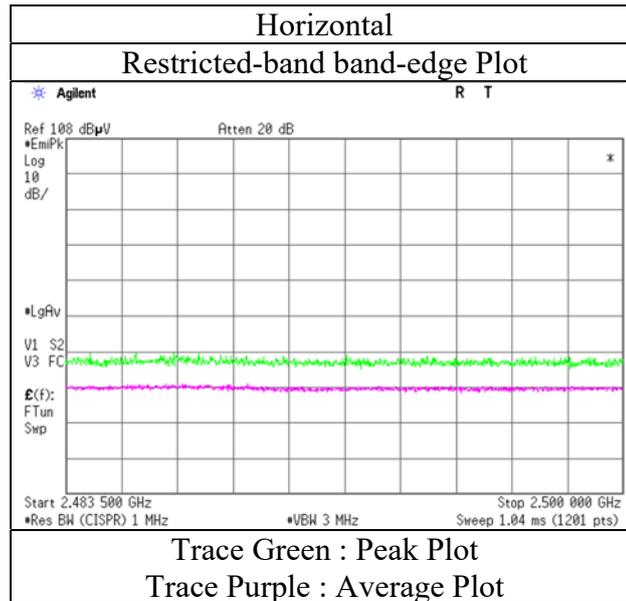
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$
 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)

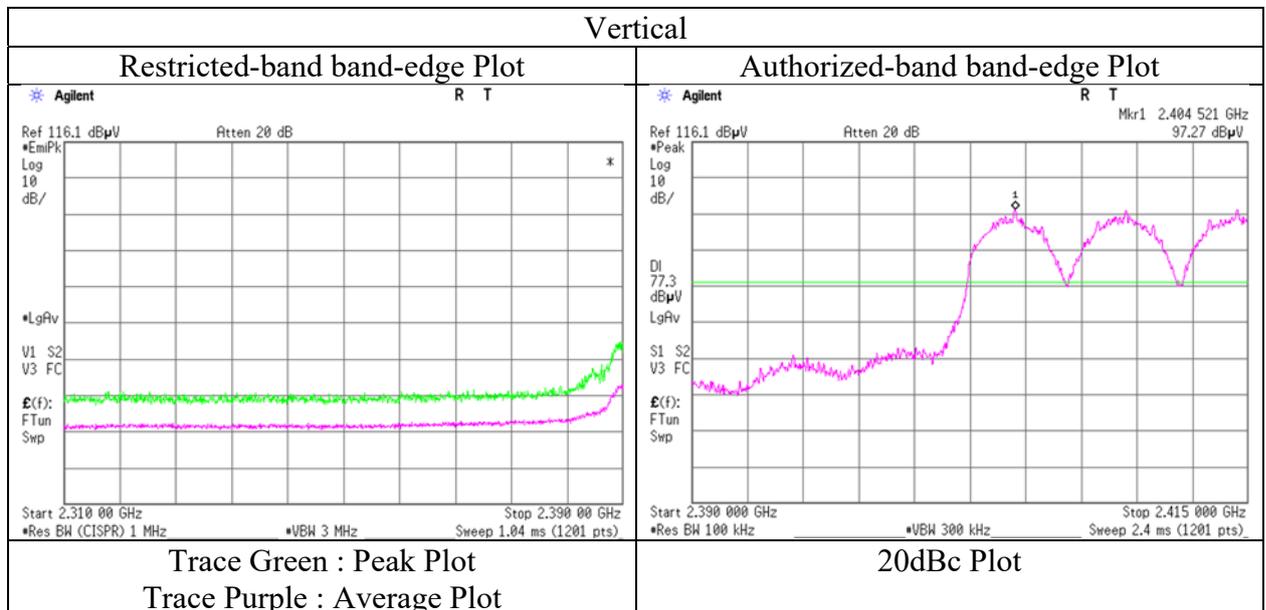
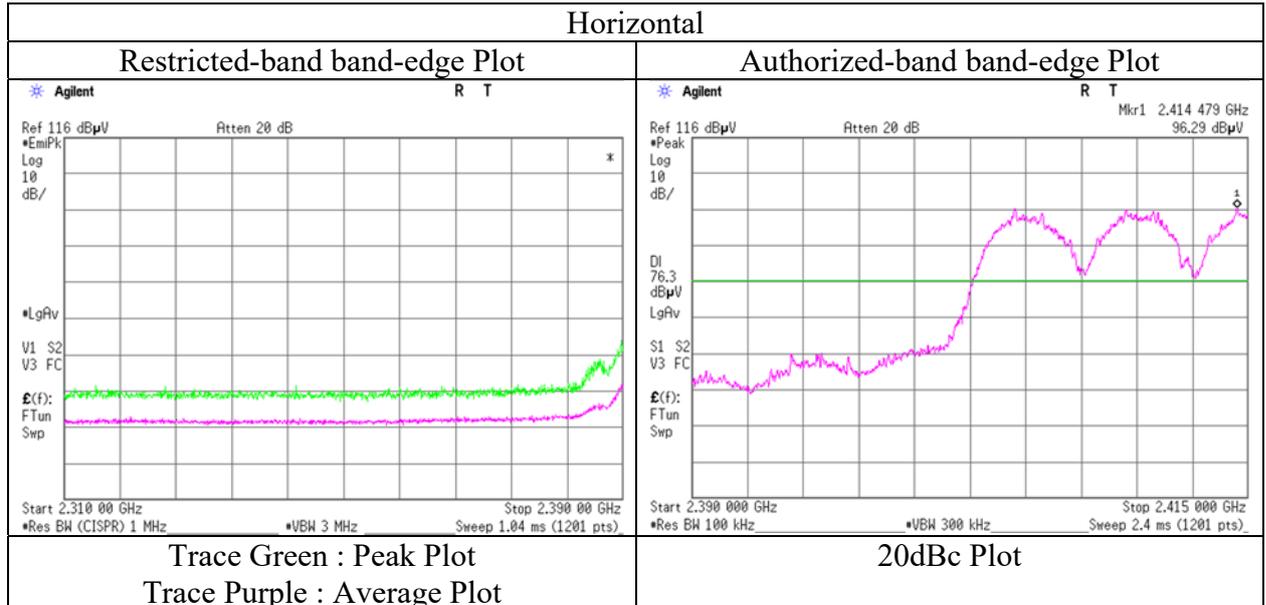
Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 21, 2021
Temperature / Humidity 23 deg. C / 34 % RH
Engineer Nachi Konegawa
(1 GHz - 10 GHz)
Mode Tx 11b 2462 MHz



* 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 (Reference Plot for band-edge)

| | |
|------------------------|------------------------------------|
| Report No. | 13671150H |
| Test place | Ise EMC Lab. |
| Semi Anechoic Chamber | No.2 |
| Date | January 21, 2021 |
| Temperature / Humidity | 23 deg. C / 34 % RH |
| Engineer | Nachi Konegawa (1 GHz - 10 GHz) |
| Mode | Tx 11ax-20 2412 MHz (OFDM) |



* 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.

UL Japan, Inc.

Ise EMC Lab.

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Facsimile : +81 596 24 8124

Radiated Spurious Emission

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2412 MHz (26-tone RU)

RU Index 0

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori. | 2390.000 | PK | 46.5 | 27.6 | 4.3 | 34.6 | - | 43.8 | 73.9 | 30.1 | |
| Hori. | 2390.000 | AV | 36.5 | 27.6 | 4.3 | 34.6 | 0.3 | 34.1 | 53.9 | 19.8 | *1) |
| Vert. | 2390.000 | PK | 50.8 | 27.6 | 4.3 | 34.6 | - | 48.1 | 73.9 | 25.8 | |
| Vert. | 2390.000 | AV | 36.5 | 27.6 | 4.3 | 34.6 | 0.3 | 34.1 | 53.9 | 19.8 | *1) |

Result = 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).

Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$

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

20dBc Data Sheet

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|---------|
| Hori. | 2412.000 | PK | 94.7 | 27.5 | 4.3 | 34.6 | 91.9 | - | - | Carrier |
| Hori. | 2400.000 | PK | 45.2 | 27.6 | 4.3 | 34.6 | 42.5 | 71.9 | 29.5 | |
| Vert. | 2412.000 | PK | 91.5 | 27.5 | 4.3 | 34.6 | 88.7 | - | - | Carrier |
| Vert. | 2400.000 | PK | 41.9 | 27.6 | 4.3 | 34.6 | 39.2 | 68.7 | 29.6 | |

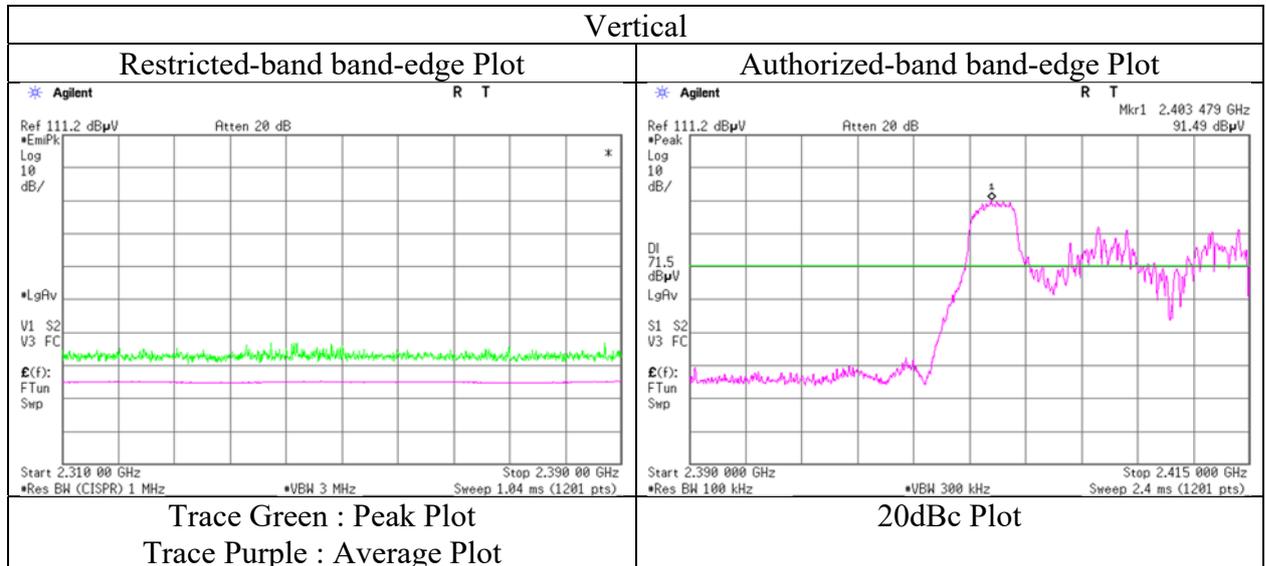
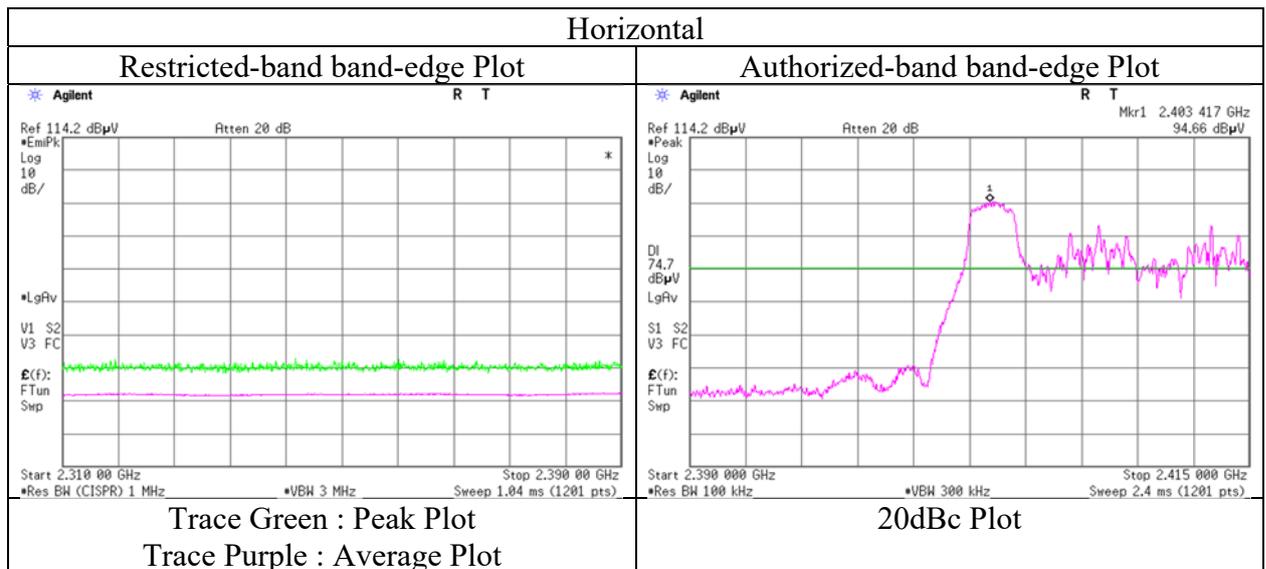
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2412 MHz (26-tone RU)

RU Index 0



* 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

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2412 MHz (52-tone RU)

RU Index 37

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori. | 2390.000 | PK | 46.8 | 27.6 | 4.3 | 34.6 | - | 44.1 | 73.9 | 29.8 | |
| Hori. | 2390.000 | AV | 36.1 | 27.6 | 4.3 | 34.6 | 0.3 | 33.7 | 53.9 | 20.2 | *1) |
| Vert. | 2390.000 | PK | 50.2 | 27.6 | 4.3 | 34.6 | - | 47.5 | 73.9 | 26.4 | |
| Vert. | 2390.000 | AV | 36.5 | 27.6 | 4.3 | 34.6 | 0.3 | 34.1 | 53.9 | 19.8 | *1) |

Result = 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).

Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$

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

20dBc Data Sheet

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|---------|
| Hori. | 2412.000 | PK | 94.4 | 27.5 | 4.3 | 34.6 | 91.6 | - | - | Carrier |
| Hori. | 2400.000 | PK | 45.9 | 27.6 | 4.3 | 34.6 | 43.2 | 71.6 | 28.4 | |
| Vert. | 2412.000 | PK | 91.2 | 27.5 | 4.3 | 34.6 | 88.4 | - | - | Carrier |
| Vert. | 2400.000 | PK | 42.2 | 27.6 | 4.3 | 34.6 | 39.5 | 68.4 | 28.9 | |

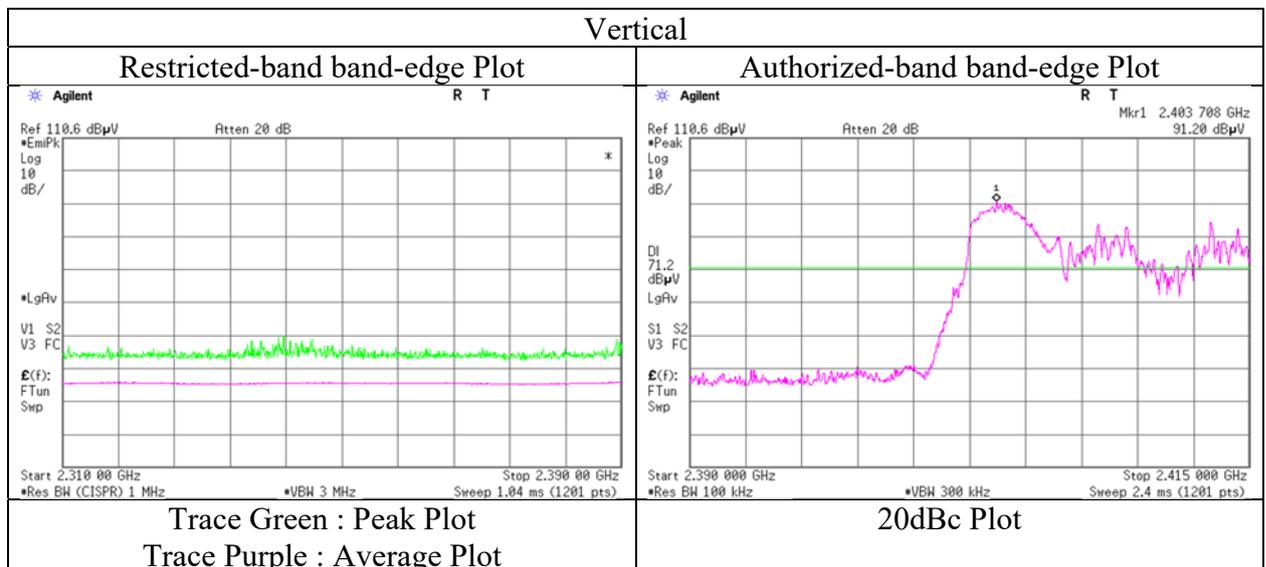
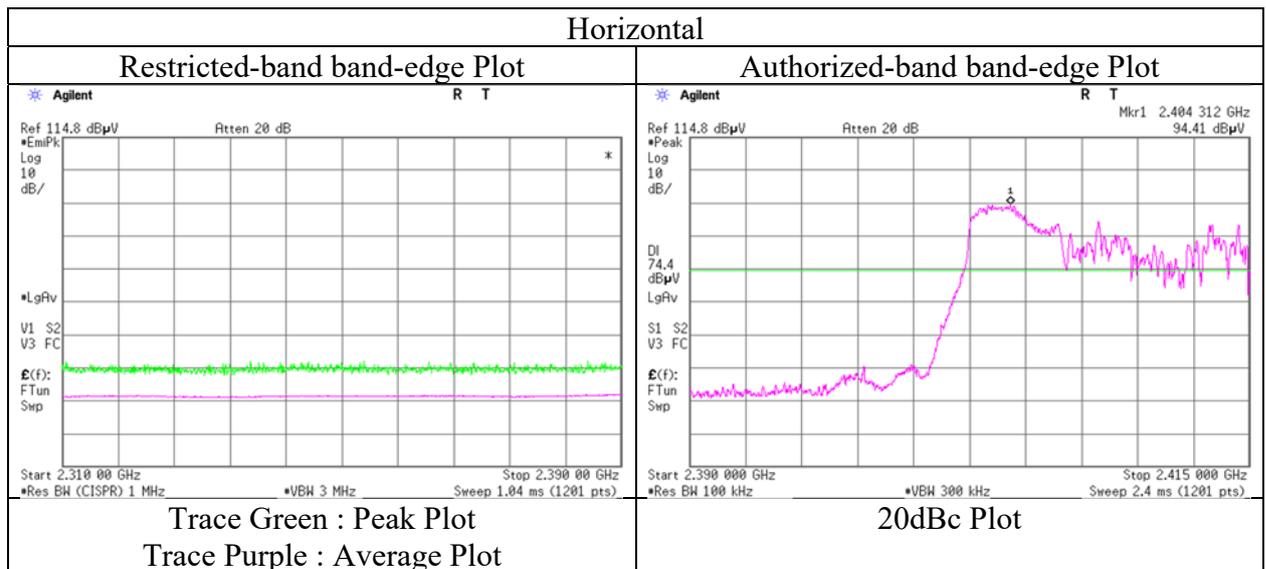
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2412 MHz (52-tone RU)

RU Index 37



* 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

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2412 MHz (106-tone RU)

RU Index 53

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori. | 2390.000 | PK | 52.9 | 27.6 | 4.3 | 34.6 | - | 50.2 | 73.9 | 23.7 | |
| Hori. | 2390.000 | AV | 38.8 | 27.6 | 4.3 | 34.6 | 0.3 | 36.4 | 53.9 | 17.5 | *1) |
| Vert. | 2390.000 | PK | 50.7 | 27.6 | 4.3 | 34.6 | - | 48.0 | 73.9 | 25.9 | |
| Vert. | 2390.000 | AV | 37.0 | 27.6 | 4.3 | 34.6 | 0.3 | 34.6 | 53.9 | 19.3 | *1) |

Result = 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).

Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$

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

20dBc Data Sheet

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|---------|
| Hori. | 2412.000 | PK | 94.4 | 27.5 | 4.3 | 34.6 | 91.6 | - | - | Carrier |
| Hori. | 2400.000 | PK | 51.8 | 27.6 | 4.3 | 34.6 | 49.1 | 71.6 | 22.6 | |
| Vert. | 2412.000 | PK | 89.9 | 27.5 | 4.3 | 34.6 | 87.1 | - | - | Carrier |
| Vert. | 2400.000 | PK | 47.6 | 27.6 | 4.3 | 34.6 | 44.9 | 67.1 | 22.3 | |

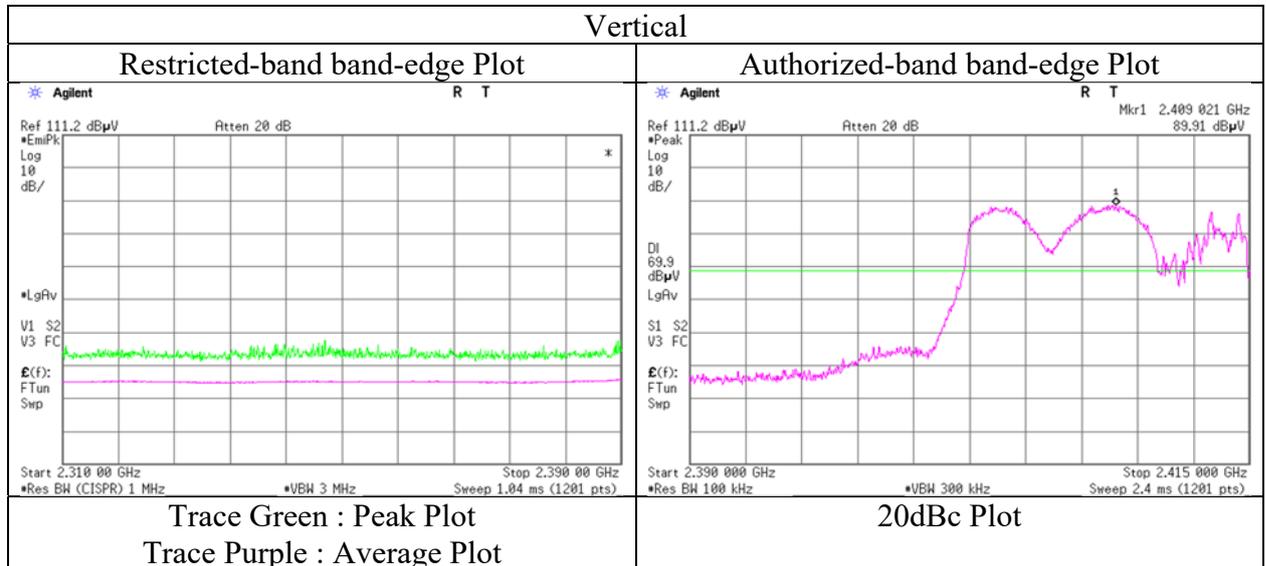
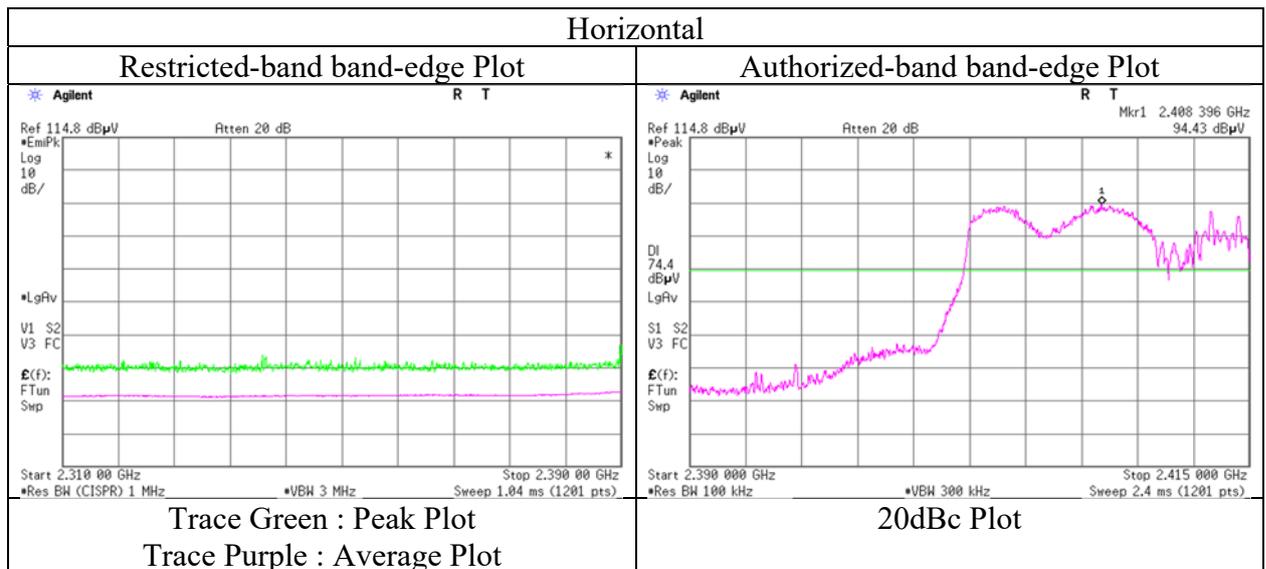
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2412 MHz (106-tone RU)

RU Index 53



* 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.

UL Japan, Inc.

Ise EMC Lab.

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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2412 MHz (242-tone RU)

RU Index 61

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori. | 2389.025 | PK | 62.1 | 27.6 | 4.3 | 34.6 | - | 59.4 | 73.9 | 14.5 | |
| Hori. | 2390.000 | PK | 60.9 | 27.6 | 4.3 | 34.6 | - | 58.2 | 73.9 | 15.7 | |
| Hori. | 2389.025 | AV | 49.6 | 27.6 | 4.3 | 34.6 | 0.3 | 47.2 | 53.9 | 6.7 | |
| Hori. | 2390.000 | AV | 48.5 | 27.6 | 4.3 | 34.6 | 0.3 | 46.1 | 53.9 | 7.8 | *1) |
| Vert. | 2389.025 | PK | 58.0 | 27.6 | 4.3 | 34.6 | - | 55.3 | 73.9 | 18.6 | |
| Vert. | 2390.000 | PK | 56.3 | 27.6 | 4.3 | 34.6 | - | 53.6 | 73.9 | 20.3 | |
| Vert. | 2389.025 | AV | 44.7 | 27.6 | 4.3 | 34.6 | 0.3 | 42.3 | 53.9 | 11.6 | |
| Vert. | 2390.000 | AV | 43.7 | 27.6 | 4.3 | 34.6 | 0.3 | 41.3 | 53.9 | 12.6 | *1) |

Result = 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).

Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$

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

20dBc Data Sheet

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|---------|
| Hori. | 2412.000 | PK | 95.9 | 27.5 | 4.3 | 34.6 | 93.1 | - | - | Carrier |
| Hori. | 2400.000 | PK | 58.1 | 27.6 | 4.3 | 34.6 | 55.4 | 73.1 | 17.8 | |
| Vert. | 2412.000 | PK | 91.9 | 27.5 | 4.3 | 34.6 | 89.1 | - | - | Carrier |
| Vert. | 2400.000 | PK | 52.5 | 27.6 | 4.3 | 34.6 | 49.8 | 69.1 | 19.4 | |

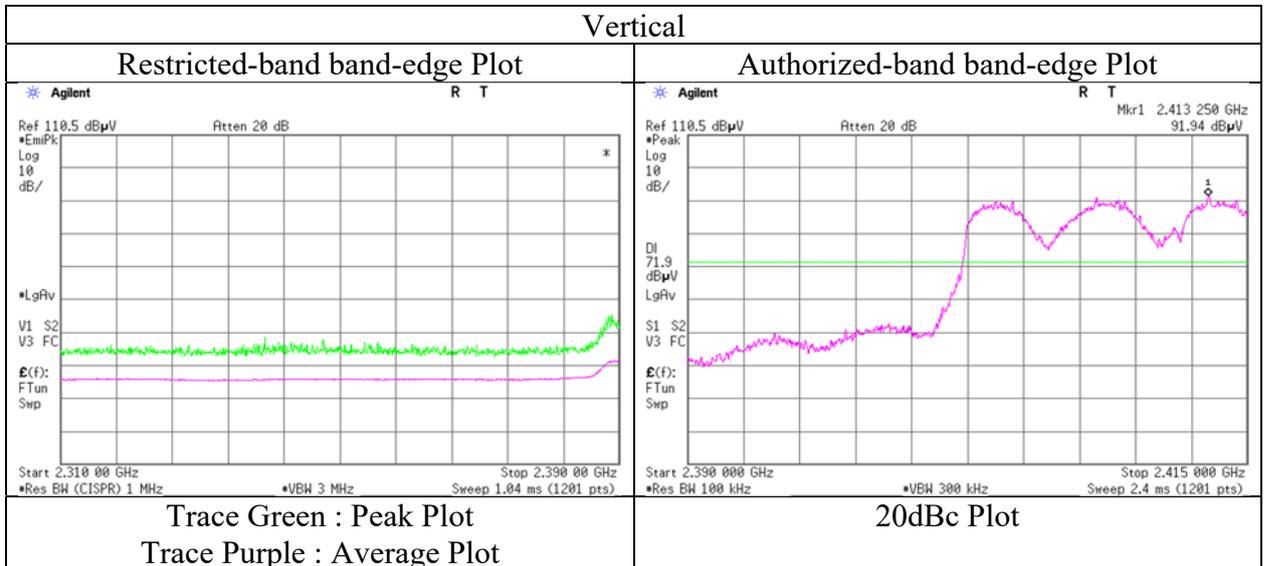
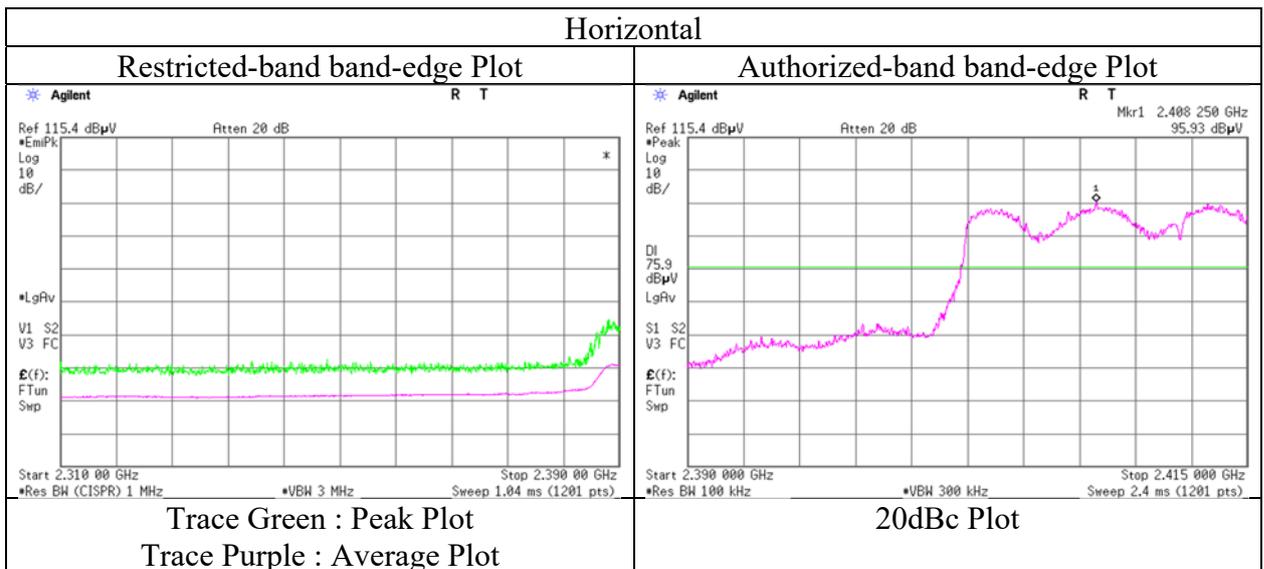
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$

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

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2412 MHz (242-tone RU)

RU Index 61



* 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.

UL Japan, Inc.

Ise EMC Lab.

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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

| | | | |
|------------------------|------------------------------------|------------------------------------|------------------------------------|
| Report No. | 13671150H | | |
| Test place | Ise EMC Lab. | | |
| Semi Anechoic Chamber | No.2 | No.2 | No.2 |
| Date | January 21, 2021 | January 26, 2021 | January 27, 2021 |
| Temperature / Humidity | 23 deg. C / 34 % RH | 20 deg. C / 41 % RH | 20 deg. C / 50 % RH |
| Engineer | Nachi Konegawa (1 GHz - 10 GHz) | Akihiko Maeda (10 GHz - 18 GHz) | Junya Okuno (18 GHz - 26.5 GHz) |
| Mode | Tx 11ax-20 2437 MHz (OFDM) | | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|-------------|
| Hori. | 4874.000 | PK | 42.3 | 31.6 | 6.1 | 33.8 | - | 46.3 | 73.9 | 27.6 | Floor noise |
| Hori. | 7311.000 | PK | 42.7 | 36.2 | 6.8 | 33.6 | - | 52.1 | 73.9 | 21.8 | Floor noise |
| Hori. | 9748.000 | PK | 43.2 | 38.8 | 7.7 | 34.2 | - | 55.4 | 73.9 | 18.5 | Floor noise |
| Hori. | 4874.000 | AV | 33.7 | 31.6 | 6.1 | 33.8 | - | 37.7 | 53.9 | 16.2 | Floor noise |
| Hori. | 7311.000 | AV | 34.4 | 36.2 | 6.8 | 33.6 | - | 43.8 | 53.9 | 10.1 | Floor noise |
| Hori. | 9748.000 | AV | 34.4 | 38.8 | 7.7 | 34.2 | - | 46.7 | 53.9 | 7.2 | Floor noise |
| Vert. | 4874.000 | PK | 42.7 | 31.6 | 6.1 | 33.8 | - | 46.6 | 73.9 | 27.3 | Floor noise |
| Vert. | 7311.000 | PK | 42.9 | 36.2 | 6.8 | 33.6 | - | 52.4 | 73.9 | 21.5 | Floor noise |
| Vert. | 9748.000 | PK | 43.7 | 38.8 | 7.7 | 34.2 | - | 55.9 | 73.9 | 18.0 | Floor noise |
| Vert. | 4874.000 | AV | 33.8 | 31.6 | 6.1 | 33.8 | - | 37.8 | 53.9 | 16.1 | Floor noise |
| Vert. | 7311.000 | AV | 34.4 | 36.2 | 6.8 | 33.6 | - | 43.9 | 53.9 | 10.0 | Floor noise |
| Vert. | 9748.000 | AV | 34.6 | 38.8 | 7.7 | 34.2 | - | 46.8 | 53.9 | 7.1 | Floor noise |

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

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission

| | | | | |
|------------------------|----------------------------|---------------------|---------------------|---------------------|
| Report No. | 13671150H | | | |
| Test place | Ise EMC Lab. | | | |
| Semi Anechoic Chamber | No.2 | No.2 | No.2 | No.2 |
| Date | January 21, 2021 | January 26, 2021 | January 27, 2021 | January 28, 2021 |
| Temperature / Humidity | 23 deg. C / 34 % RH | 20 deg. C / 41 % RH | 20 deg. C / 50 % RH | 20 deg. C / 38 % RH |
| Engineer | Nachi Konegawa | Akihiko Maeda | Junya Okuno | Junya Okuno |
| | (1 GHz - 10 GHz) | (10 GHz - 18 GHz) | (18 GHz - 26.5 GHz) | (Below 1 GHz) |
| Mode | Tx 11ax-20 2462 MHz (OFDM) | | | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|-------------|
| Hori. | 50.915 | QP | 29.0 | 10.8 | 7.0 | 28.6 | - | 18.2 | 40.0 | 21.8 | |
| Hori. | 165.916 | QP | 32.2 | 15.3 | 8.0 | 28.2 | - | 27.2 | 43.5 | 16.3 | |
| Hori. | 360.572 | QP | 37.8 | 15.2 | 9.3 | 28.2 | - | 34.1 | 46.0 | 11.9 | |
| Hori. | 589.675 | QP | 32.8 | 19.1 | 10.1 | 29.4 | - | 32.7 | 46.0 | 13.3 | |
| Hori. | 595.320 | QP | 33.8 | 19.3 | 10.2 | 29.4 | - | 33.8 | 46.0 | 12.2 | |
| Hori. | 829.620 | QP | 32.6 | 21.1 | 11.1 | 29.1 | - | 35.6 | 46.0 | 10.4 | |
| Hori. | 2483.500 | PK | 54.6 | 27.4 | 4.4 | 34.6 | - | 51.8 | 73.9 | 22.1 | |
| Hori. | 4924.000 | PK | 42.5 | 31.5 | 6.1 | 33.8 | - | 46.4 | 73.9 | 27.5 | Floor noise |
| Hori. | 7386.000 | PK | 42.6 | 36.1 | 6.9 | 33.6 | - | 51.9 | 73.9 | 22.0 | Floor noise |
| Hori. | 9848.000 | PK | 43.1 | 39.0 | 7.8 | 34.3 | - | 55.6 | 73.9 | 18.3 | Floor noise |
| Hori. | 2483.500 | AV | 42.8 | 27.4 | 4.4 | 34.6 | 0.3 | 40.3 | 53.9 | 13.6 | *1) |
| Hori. | 4924.000 | AV | 33.7 | 31.5 | 6.1 | 33.8 | - | 37.6 | 53.9 | 16.3 | Floor noise |
| Hori. | 7386.000 | AV | 34.1 | 36.1 | 6.9 | 33.6 | - | 43.4 | 53.9 | 10.5 | Floor noise |
| Hori. | 9848.000 | AV | 34.3 | 39.0 | 7.8 | 34.3 | - | 46.8 | 53.9 | 7.1 | Floor noise |
| Vert. | 50.880 | QP | 42.6 | 10.8 | 7.0 | 28.6 | - | 31.8 | 40.0 | 8.2 | |
| Vert. | 172.550 | QP | 33.2 | 15.6 | 8.0 | 28.2 | - | 28.6 | 43.5 | 14.9 | |
| Vert. | 360.572 | QP | 37.0 | 15.2 | 9.3 | 28.2 | - | 33.3 | 46.0 | 12.7 | |
| Vert. | 589.945 | QP | 37.3 | 19.1 | 10.1 | 29.4 | - | 37.2 | 46.0 | 8.8 | |
| Vert. | 595.620 | QP | 40.5 | 19.3 | 10.2 | 29.4 | - | 40.6 | 46.0 | 5.5 | |
| Vert. | 829.512 | QP | 31.8 | 21.1 | 11.1 | 29.1 | - | 34.8 | 46.0 | 11.2 | |
| Vert. | 2483.500 | PK | 57.5 | 27.4 | 4.4 | 34.6 | - | 54.7 | 73.9 | 19.2 | |
| Vert. | 4924.000 | PK | 42.6 | 31.5 | 6.1 | 33.8 | - | 46.5 | 73.9 | 27.4 | Floor noise |
| Vert. | 7386.000 | PK | 42.8 | 36.1 | 6.9 | 33.6 | - | 52.1 | 73.9 | 21.8 | Floor noise |
| Vert. | 9848.000 | PK | 43.4 | 39.0 | 7.8 | 34.3 | - | 55.9 | 73.9 | 18.1 | Floor noise |
| Vert. | 2483.500 | AV | 46.9 | 27.4 | 4.4 | 34.6 | 0.3 | 44.3 | 53.9 | 9.6 | *1) |
| Vert. | 4924.000 | AV | 33.8 | 31.5 | 6.1 | 33.8 | - | 37.7 | 53.9 | 16.2 | Floor noise |
| Vert. | 7386.000 | AV | 34.3 | 36.1 | 6.9 | 33.6 | - | 43.6 | 53.9 | 10.3 | Floor noise |
| Vert. | 9848.000 | AV | 34.5 | 39.0 | 7.8 | 34.3 | - | 46.9 | 53.9 | 7.0 | Floor noise |

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

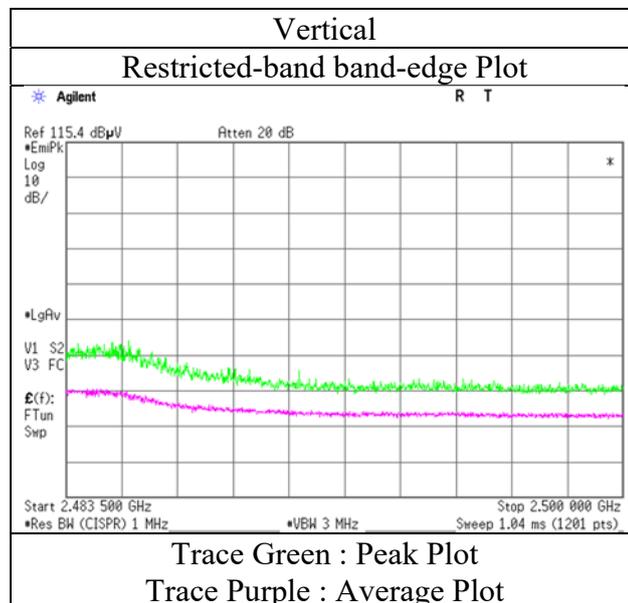
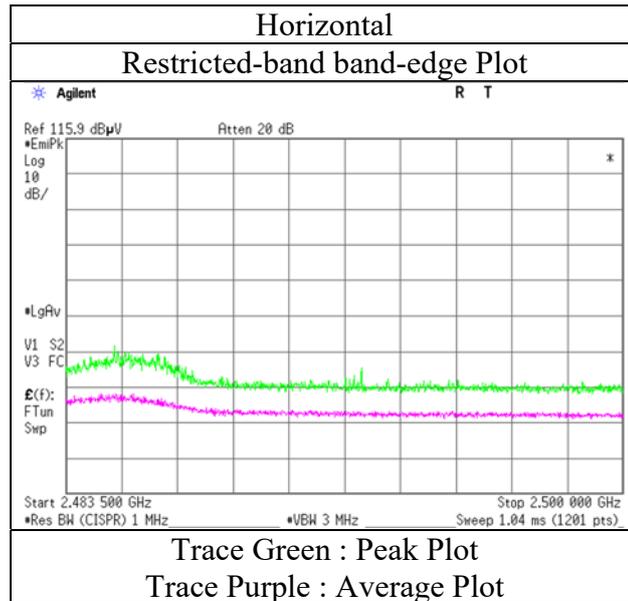
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 21, 2021
Temperature / Humidity 23 deg. C / 34 % RH
Engineer Nachi Konegawa
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2462 MHz (OFDM)



* 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

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2462 MHz (26-tone RU)

RU Index 8

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori. | 2483.500 | PK | 44.3 | 27.4 | 4.4 | 34.6 | - | 41.5 | 73.9 | 32.4 | |
| Hori. | 2483.500 | AV | 35.8 | 27.4 | 4.4 | 34.6 | 0.3 | 33.2 | 53.9 | 20.7 | *1) |
| Vert. | 2483.500 | PK | 43.6 | 27.4 | 4.4 | 34.6 | - | 40.8 | 73.9 | 33.1 | |
| Vert. | 2483.500 | AV | 35.0 | 27.4 | 4.4 | 34.6 | 0.3 | 32.4 | 53.9 | 21.5 | *1) |

Result = 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).

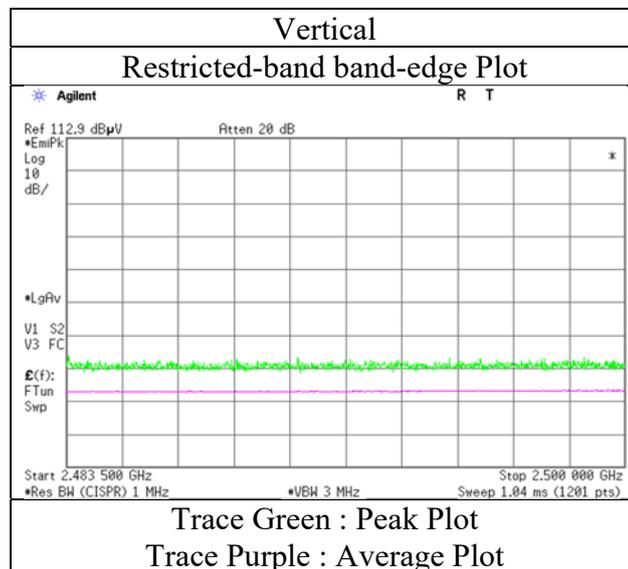
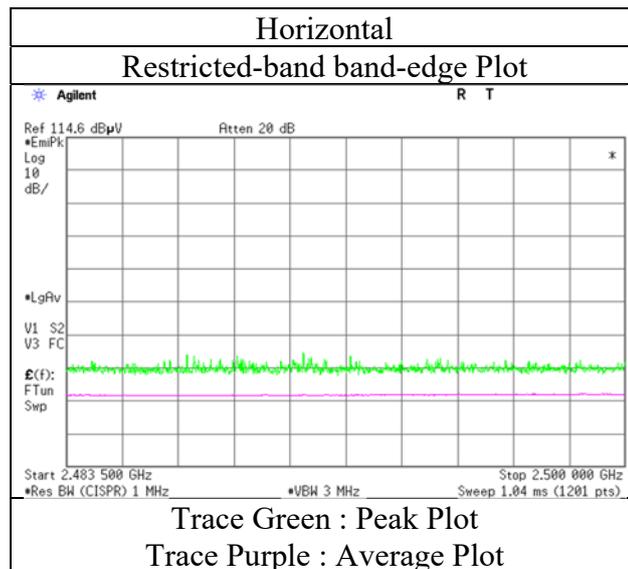
Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2462 MHz (26-tone RU)

RU Index 8



* 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

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2462 MHz (52-tone RU)

RU Index 40

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori. | 2483.500 | PK | 45.6 | 27.4 | 4.4 | 34.6 | - | 42.8 | 73.9 | 31.1 | |
| Hori. | 2483.500 | AV | 36.3 | 27.4 | 4.4 | 34.6 | 0.3 | 33.8 | 53.9 | 20.2 | *1) |
| Vert. | 2483.500 | PK | 44.0 | 27.4 | 4.4 | 34.6 | - | 41.2 | 73.9 | 32.7 | |
| Vert. | 2483.500 | AV | 35.7 | 27.4 | 4.4 | 34.6 | 0.3 | 33.2 | 53.9 | 20.8 | *1) |

Result = 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).

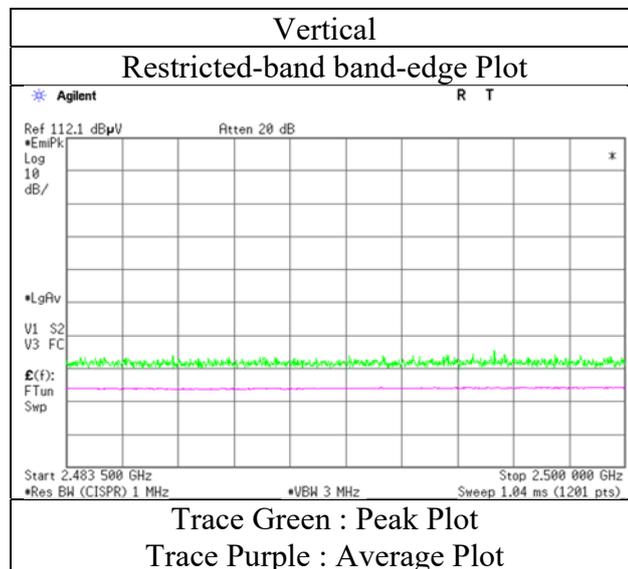
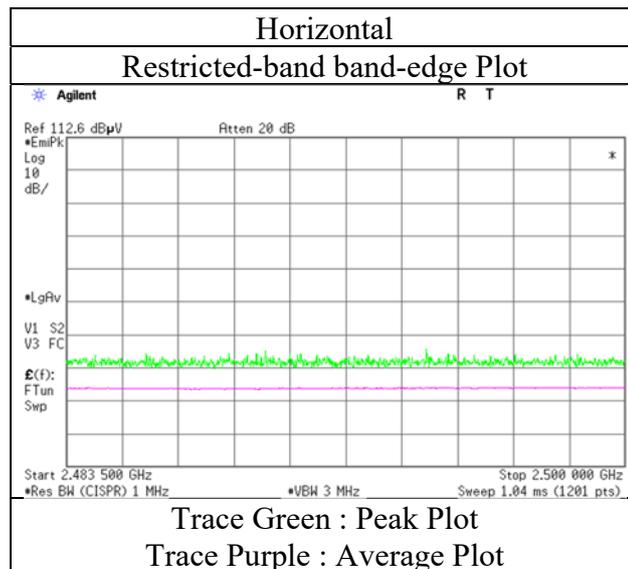
Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2462 MHz (52-tone RU)

RU Index 40



* 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

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2462 MHz (106-tone RU)

RU Index 54

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori. | 2483.500 | PK | 47.3 | 27.4 | 4.4 | 34.6 | - | 44.5 | 73.9 | 29.4 | |
| Hori. | 2483.500 | AV | 37.1 | 27.4 | 4.4 | 34.6 | 0.3 | 34.5 | 53.9 | 19.4 | *1) |
| Vert. | 2483.500 | PK | 45.5 | 27.4 | 4.4 | 34.6 | - | 42.7 | 73.9 | 31.2 | |
| Vert. | 2483.500 | AV | 36.2 | 27.4 | 4.4 | 34.6 | 0.3 | 33.6 | 53.9 | 20.3 | *1) |

Result = 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).

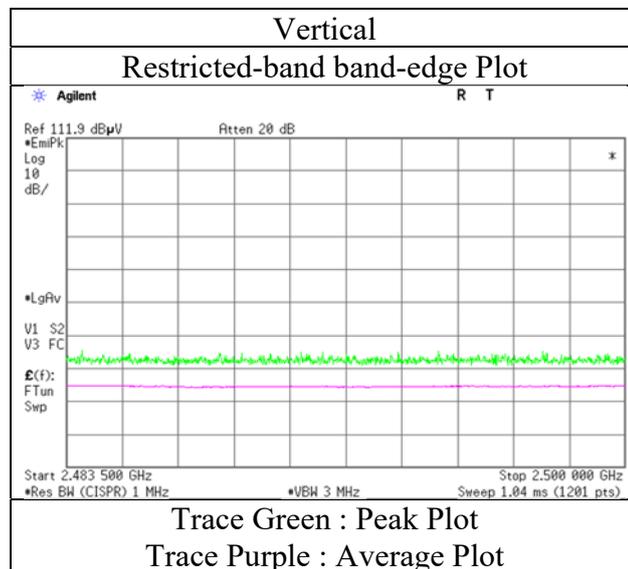
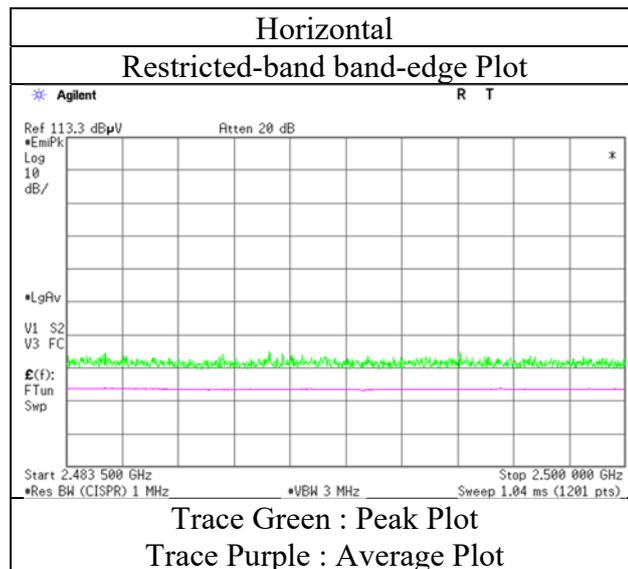
Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2462 MHz (106-tone RU)

RU Index 54



* 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

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2462 MHz (242-tone RU)

RU Index 61

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori. | 2483.500 | PK | 56.9 | 27.4 | 4.4 | 34.6 | - | 54.1 | 73.9 | 19.8 | |
| Hori. | 2483.500 | AV | 44.6 | 27.4 | 4.4 | 34.6 | 0.3 | 42.0 | 53.9 | 11.9 | *1) |
| Vert. | 2483.500 | PK | 55.0 | 27.4 | 4.4 | 34.6 | - | 52.2 | 73.9 | 21.7 | |
| Vert. | 2483.500 | AV | 44.0 | 27.4 | 4.4 | 34.6 | 0.3 | 41.4 | 53.9 | 12.5 | *1) |

Result = 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).

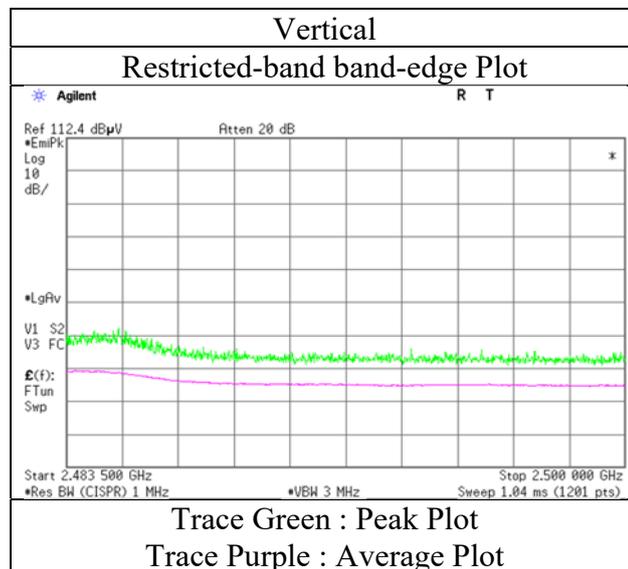
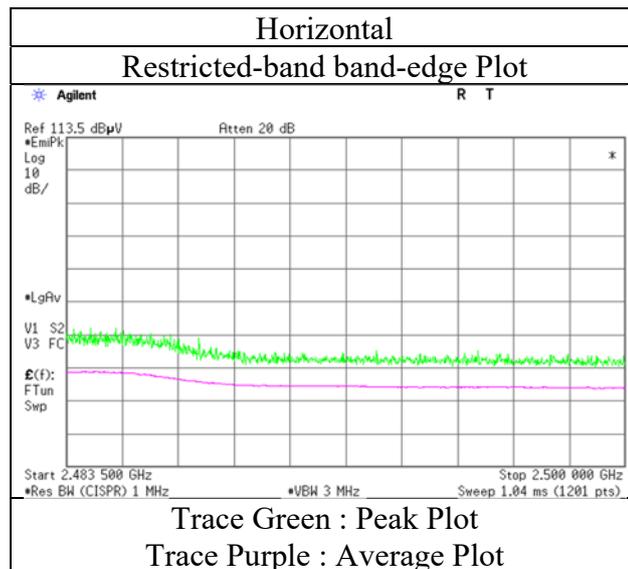
Distance factor: 1 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13671150H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 24, 2021
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Akihiko Maeda
(1 GHz - 10 GHz)
Mode Tx 11ax-20 2462 MHz (242-tone RU)

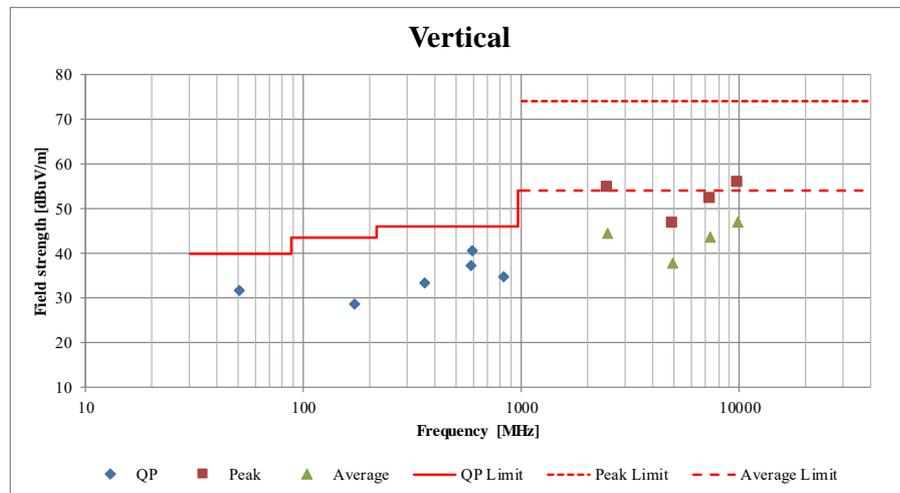
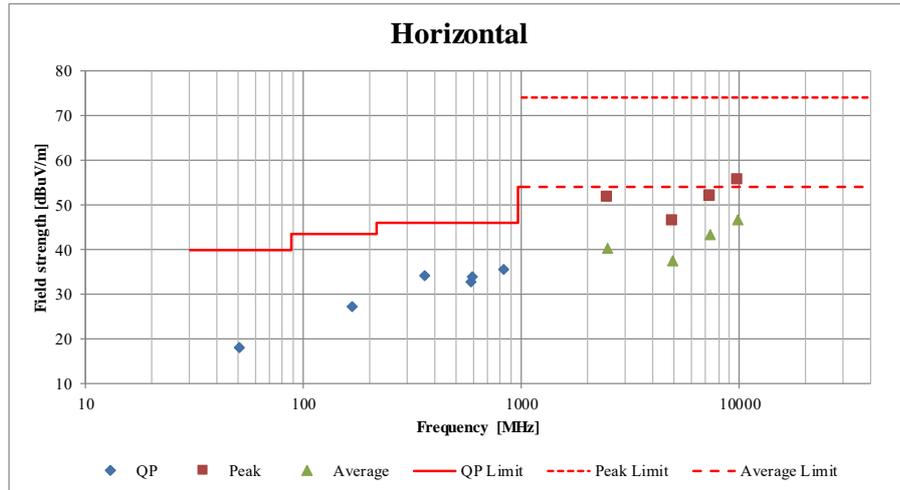
RU Index 61



* 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)

| | | | | |
|------------------------|----------------------------|---------------------|---------------------|---------------------|
| Report No. | 13671150H | | | |
| Test place | Ise EMC Lab. | | | |
| Semi Anechoic Chamber | No.2 | No.2 | No.2 | No.2 |
| Date | January 21, 2021 | January 26, 2021 | January 27, 2021 | January 28, 2021 |
| Temperature / Humidity | 23 deg. C / 34 % RH | 20 deg. C / 41 % RH | 20 deg. C / 50 % RH | 20 deg. C / 38 % RH |
| Engineer | Nachi Konegawa | Akihiko Maeda | Junya Okuno | Junya Okuno |
| | (1 GHz - 10 GHz) | (10 GHz - 18 GHz) | (18 GHz - 26.5 GHz) | (Below 1 GHz) |
| Mode | Tx 11ax-20 2462 MHz (OFDM) | | | |



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

APPENDIX 2: Test instruments

Test equipment

| Test Item | Local ID | LIMS ID | Description | Manufacturer | Model | Serial | Last Calibration Date | Cal Int |
|-----------|---------------|---------|----------------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|---------|
| RE | MAEC-02 | 142004 | AC2_Semi Anechoic Chamber(NSA) | TDK | Semi Anechoic Chamber 3m | DA-06902 | 2020/05/26 | 24 |
| RE | MOS-41 | 192300 | Thermo-Hygrometer | CUSTOM. Inc | CTH-201 | 0013 | 2020/12/06 | 12 |
| RE | MMM-01 | 141542 | Digital Tester | Fluke Corporation | FLUKE 26-3 | 78030611 | 2020/08/18 | 12 |
| RE | MJM-27 | 142228 | Measure | KOMELON | KMC-36 | - | - | - |
| RE | COTS-MEMI-02 | 178648 | EMI measurement program | TSJ (Techno Science Japan) | TEPTO-DV | - | - | - |
| RE | MAEC-02-SVSWR | 142006 | AC2_Semi Anechoic Chamber(SVSWR) | TDK | Semi Anechoic Chamber 3m | DA-06902 | 2019/04/01 | 24 |
| RE | MHA-06 | 141512 | Horn Antenna 1-18GHz | Schwarzbeck Mess - Elektronik | BBHA9120D | 254 | 2020/09/14 | 12 |
| RE | MCC-216 | 141392 | Microwave Cable | Junkosha | MWX221 | 1604S253(1 m) / 537073/126E(5 m) | 2020/02/18 | 12 |
| RE | MPA-10 | 141579 | Pre Amplifier | Keysight Technologies Inc | 8449B | 3008A02142 | 2021/01/12 | 12 |
| RE | MHF-06 | 141404 | High Pass Filter 3.5-24GHz | TOKIMEC | TF323DCA | 601 | 2020/05/25 | 12 |
| RE | MSA-03 | 141884 | Spectrum Analyzer | Keysight Technologies Inc | E4448A | MY44020357 | 2020/03/04 | 12 |
| RE | MHA-02 | 141503 | Horn Antenna 18-26.5GHz | EMCO | 3160-09 | 1265 | 2020/06/15 | 12 |
| RE | MBA-08 | 141427 | Biconical Antenna | Schwarzbeck Mess - Elektronik | VHA9103B+BBA9106 | 8031 | 2020/07/29 | 12 |
| RE | MLA-21 | 141265 | Logperiodic Antenna(200-1000MHz) | Schwarzbeck Mess - Elektronik | VUSLP9111B | 9111B-190 | 2020/07/29 | 12 |
| RE | MCC-12 | 141317 | Coaxial Cable | UL Japan Inc. | - | - | 2020/09/25 | 12 |
| RE | MAT-07 | 141203 | Attenuator(6dB) | Weinschel Corp | 2 | BK7970 | 2020/11/13 | 12 |
| RE | MPA-09 | 141578 | Pre Amplifier | Keysight Technologies Inc | 8447D | 2944A10845 | - | - |
| RE | MTR-03 | 141942 | Test Receiver | Rohde & Schwarz | ESCI | 100300 | 2020/08/18 | 12 |
| RE | MSA-15 | 141902 | Spectrum Analyzer | Keysight Technologies Inc | E4440A | MY46187105 | 2020/10/15 | 12 |

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

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

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

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

Test item: RE: Radiated Emission test

UL Japan, Inc.

Ise EMC Lab.

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