



RADIO TEST REPORT

Test Report No. 14173101H-A

Customer	Sony Interactive Entertainment Inc.
Description of EUT	Wireless communication module
Model Number of EUT	AW-XM501
FCC ID	AK8M20DAL1
Test Regulation	FCC Part 15 Subpart C: 2021
Test Result	Complied (Refer to SECTION 3)
Issue Date	February 17, 2022
Remarks	WLAN part For Permissive change Radiated Spurious Emission tests only

Representative Test Engineer

Nachi Konegawa
Engineer

Approved By

Takayuki Shimada
Leader



CERTIFICATE 5107.02

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

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- The information provided from the applicant for this report is identified in Section 1.
- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

REVISION HISTORY

Original Test Report No.: 14173101H-A

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	14173101H-A	February 17, 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	AW-XM501
Serial Number	Refer to SECTION 4.2
Condition	Engineering prototype (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 17 to 23, 2022

2.2 Product Description

General Specification

Rating	DC 3.3 V, DC 1.8 V
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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	PIFA	
Antenna Gain: G_{ANT}	Antenna 1: 5.0 dBi Antenna 2: 5.0 dBi	
Directional Gain *1)	8.01 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	PIFA	
Antenna Gain: G_{ANT}	Antenna 1: 6.4 dBi Antenna 3: 5.0 dBi	
Directional Gain *1)	8.74 dBi	
Maximum clock frequency	512 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) 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 = $10 \log \left(\frac{G_{ANT1}}{(10^{20} + 10^{20})^2 / 2} \right)$

*This test report applies to WLAN (2.4 GHz band) and Bluetooth (Low Energy) parts.

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 May 3, 2021 and effective July 2, 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

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 ISED: RSS-Gen 6.13	FCC: Section 15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	3.6 dB 915.7 MHz, Vertical, QP	Complied# a)	Radiated (above 30 MHz) *1)
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422. * 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) 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					

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

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 $k=2$.

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

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	-	-

* 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.

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, 1.0 m by 1.5 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.

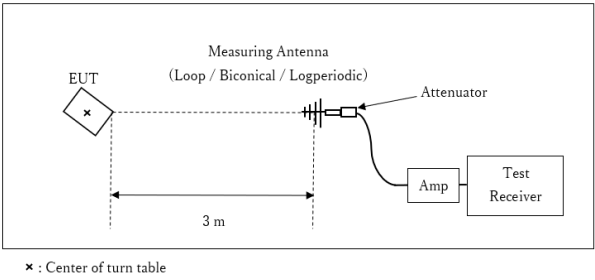
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

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	<u>11.12.2.5.1</u> RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces <u>11.12.2.5.2</u> 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.

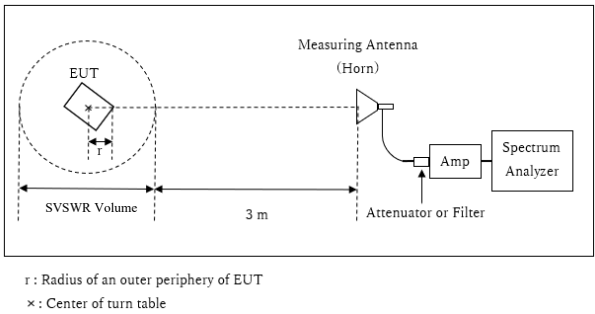
Figure 2: Test Setup

Below 1 GHz



Test Distance: 3 m

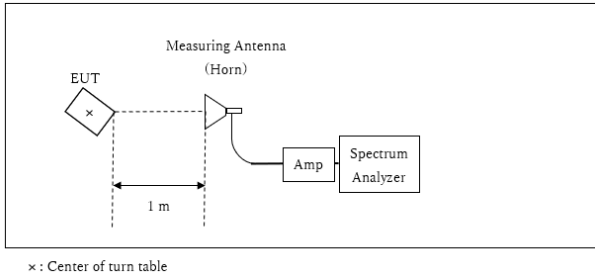
1 GHz to 10 GHz



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
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
 $r = 0.05 \text{ m}$

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

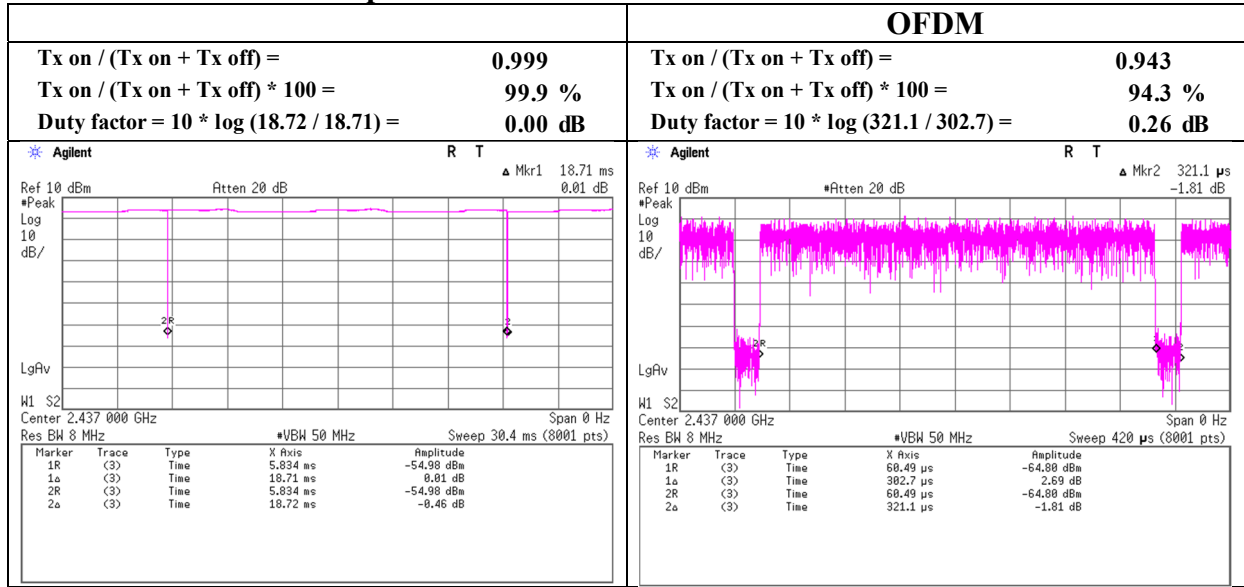
APPENDIX 1: Test Data

Burst rate confirmation

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Date	January 17, 2022
Temperature / Humidity	21 deg. C / 37 % RH
Engineer	Hiroki Numata
Mode	Tx

11b 1 Mbps

11ax-20 MCS 6



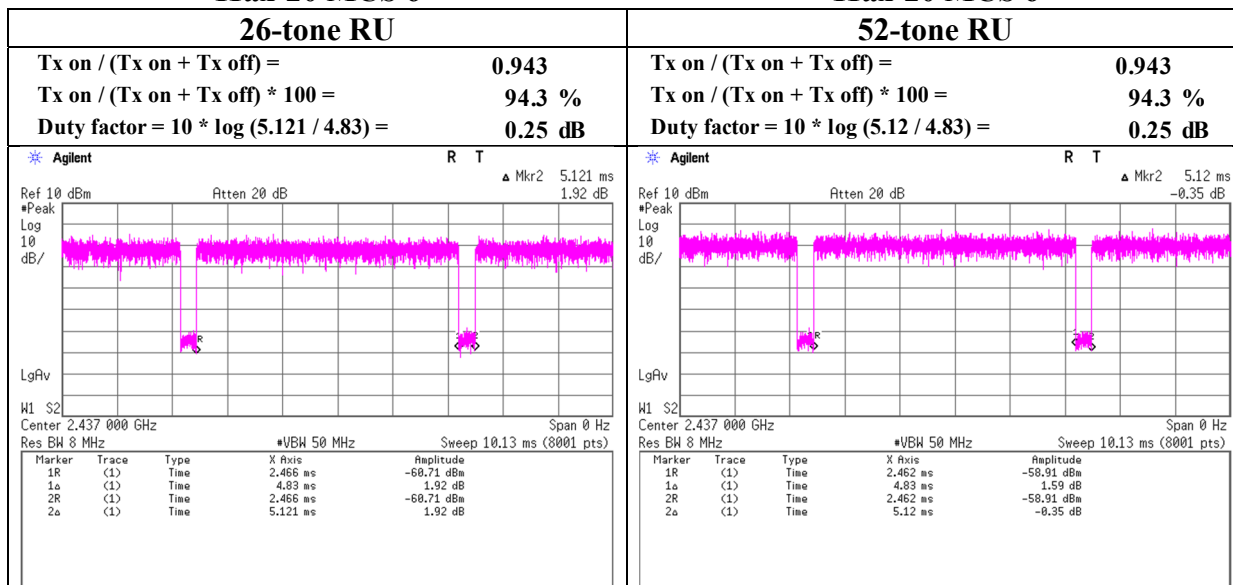
* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Burst rate confirmation

Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date January 19, 2022
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Nachi Konegawa
Mode Tx

11ax-20 MCS 6

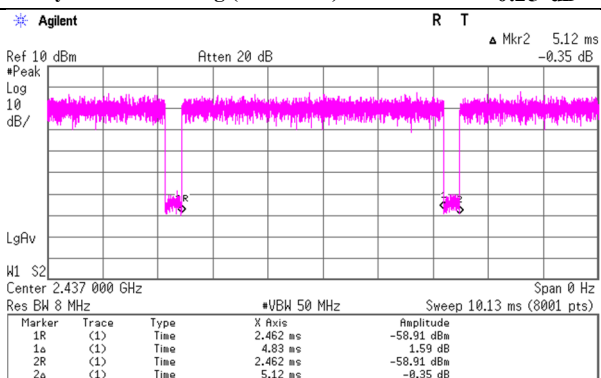
26-tone RU



11ax-20 MCS 6

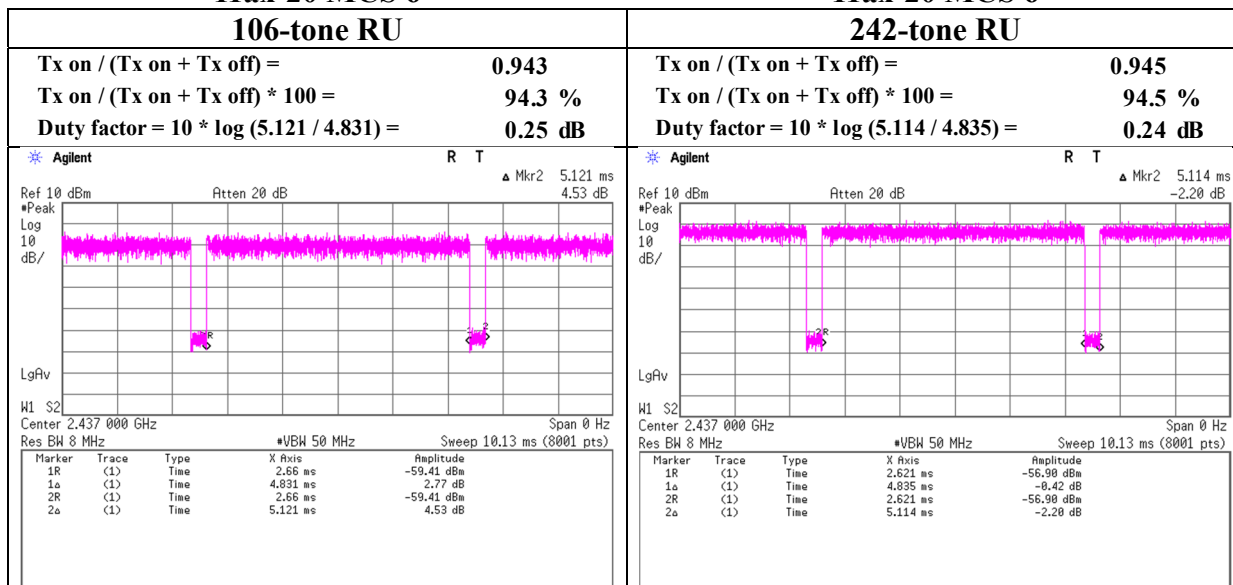
52-tone RU

$Tx\ on / (Tx\ on + Tx\ off) =$ $Tx\ on / (Tx\ on + Tx\ off) * 100 =$ $Duty\ factor = 10 * \log (5.12 / 4.83) =$	0.943 94.3 % 0.25 dB
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11ax-20 MCS 6

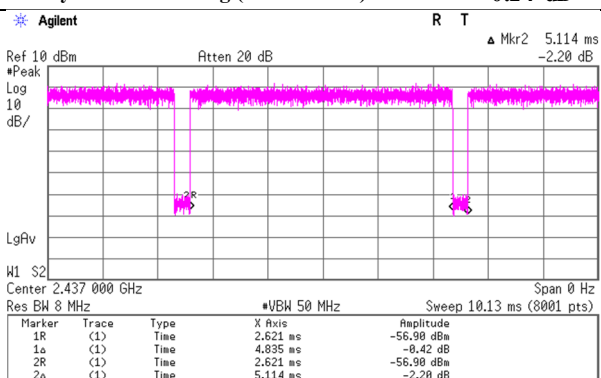
106-tone RU



11ax-20 MCS 6

242-tone RU

$Tx\ on / (Tx\ on + Tx\ off) =$ $Tx\ on / (Tx\ on + Tx\ off) * 100 =$ $Duty\ factor = 10 * \log (5.114 / 4.835) =$	0.945 94.5 % 0.24 dB
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* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Radiated Spurious Emission

Test place	Ise EMC Lab.	No.3
Semi Anechoic Chamber	No.3	No.3
Date	January 17, 2022	January 23, 2022
Temperature / Humidity	21 deg. C / 37 % RH	18 deg. C / 32 % RH
Engineer	Hiroki Numata	Hiroyuki Furutaka
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 11b 2412 MHz	

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2390.0	42.9	34.3	27.6	5.5	32.6	-	43.4	34.7	73.9	53.9	30.5	19.2	*1)
Hori.	4824.0	41.0	32.7	31.5	7.8	31.6	-	48.7	40.4	73.9	53.9	25.3	13.5	Floor noise
Hori.	7236.0	41.9	33.4	35.8	9.4	32.6	-	54.3	45.9	73.9	53.9	19.6	8.0	Floor noise
Hori.	9648.0	41.9	32.3	38.8	9.8	33.0	-	57.5	47.9	73.9	53.9	16.4	6.0	Floor noise
Vert.	2390.0	43.8	35.4	27.6	5.5	32.6	-	44.2	35.9	73.9	53.9	29.7	18.0	*1)
Vert.	4824.0	40.4	32.0	31.5	7.8	31.6	-	48.1	39.7	73.9	53.9	25.8	14.2	Floor noise
Vert.	7236.0	42.2	33.1	35.8	9.4	32.6	-	54.7	45.6	73.9	53.9	19.2	8.3	Floor noise
Vert.	9648.0	41.2	32.2	38.8	9.8	33.0	-	56.8	47.8	73.9	53.9	17.1	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)

20dBc Data Sheet

Polarity	Frequency	Reading (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2412.0	97.4	27.5	5.5	32.6	97.8	-	-	Carrier
Hori.	2400.0	35.3	27.5	5.5	32.6	35.8	77.8	42.1	
Vert.	2412.0	95.2	27.5	5.5	32.6	95.6	-	-	Carrier
Vert.	2400.0	35.5	27.5	5.5	32.6	35.9	75.6	39.7	

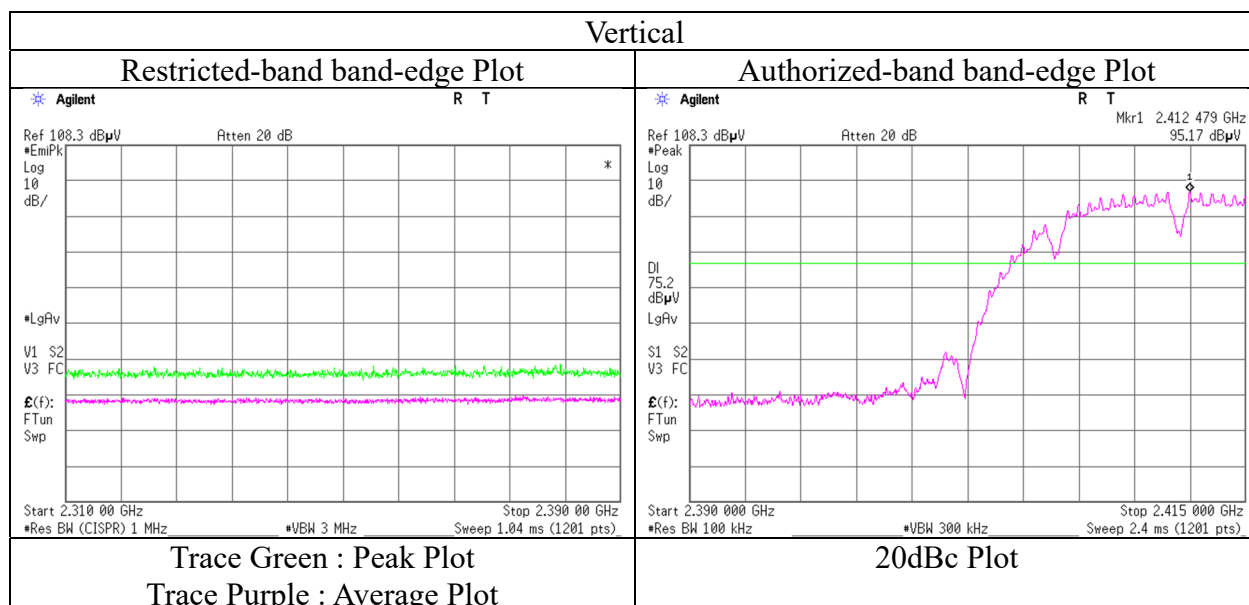
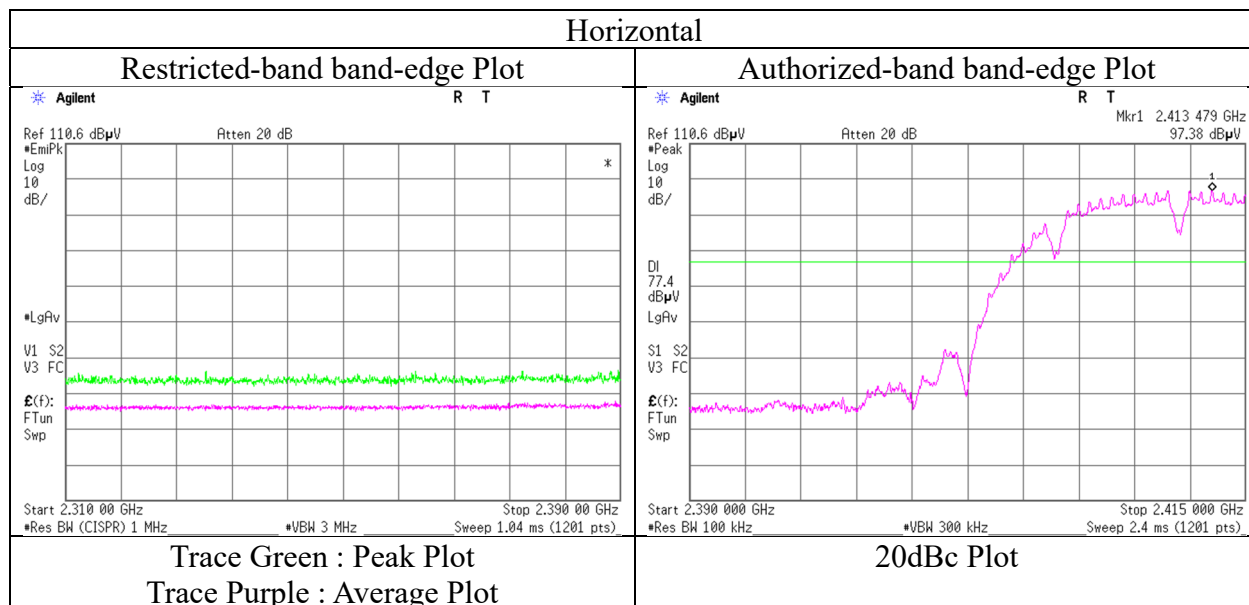
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 17, 2022
Temperature / Humidity	21 deg. C / 37 % RH
Engineer	Hiroki Numata
	(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

Test place	Ise EMC Lab.	No.3
Semi Anechoic Chamber	No.3	No.3
Date	January 17, 2022	January 23, 2022
Temperature / Humidity	21 deg. C / 37 % RH	18 deg. C / 32 % RH
Engineer	Hiroki Numata	Hiroyuki Furutaka
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 11b 2437 MHz	

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	4874.0	40.7	32.0	31.5	7.8	31.6	-	48.4	39.7	73.9	53.9	25.5	14.2	Floor noise
Hori.	7311.0	41.8	33.4	35.9	9.3	32.7	-	54.3	46.0	73.9	53.9	19.6	7.9	Floor noise
Hori.	9748.0	42.8	31.6	39.1	9.8	33.1	-	58.7	47.5	73.9	53.9	15.2	6.4	Floor noise
Vert.	4874.0	39.7	32.0	31.5	7.8	31.6	-	47.5	39.7	73.9	53.9	26.4	14.2	Floor noise
Vert.	7311.0	42.3	33.2	35.9	9.3	32.7	-	54.8	45.8	73.9	53.9	19.1	8.1	Floor noise
Vert.	9748.0	42.6	31.7	39.1	9.8	33.1	-	58.5	47.6	73.9	53.9	15.4	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	$20\log(3.95 \text{ m} / 3.0 \text{ m}) = 2.39 \text{ dB}$
10 GHz - 26.5 GHz	$20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

Radiated Spurious Emission

Test place	Ise EMC Lab.	No.3
Semi Anechoic Chamber	No.3	No.3
Date	January 17, 2022	January 23, 2022
Temperature / Humidity	21 deg. C / 37 % RH	18 deg. C / 32 % RH
Engineer	Hiroki Numata	Hiroyuki Furutaka
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 11b 2462 MHz	

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2483.5	42.8	34.2	27.4	5.6	32.5	-	43.3	34.7	73.9	53.9	30.6	19.2	*1)
Hori.	4924.0	41.5	32.8	31.6	7.8	31.6	-	49.3	40.6	73.9	53.9	24.6	13.3	Floor noise
Hori.	7386.0	41.9	33.3	36.0	9.3	32.7	-	54.6	46.0	73.9	53.9	19.3	7.9	Floor noise
Hori.	9848.0	41.4	31.8	39.2	9.9	33.1	-	57.3	47.7	73.9	53.9	16.6	6.2	Floor noise
Vert.	2483.5	43.4	34.3	27.4	5.6	32.5	-	43.9	34.8	73.9	53.9	30.0	19.1	*1)
Vert.	4924.0	40.4	32.0	31.6	7.8	31.6	-	48.3	39.8	73.9	53.9	25.6	14.1	Floor noise
Vert.	7386.0	42.2	33.2	36.0	9.3	32.7	-	54.9	45.9	73.9	53.9	19.0	8.0	Floor noise
Vert.	9848.0	42.3	31.8	39.2	9.9	33.1	-	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 1GHz.

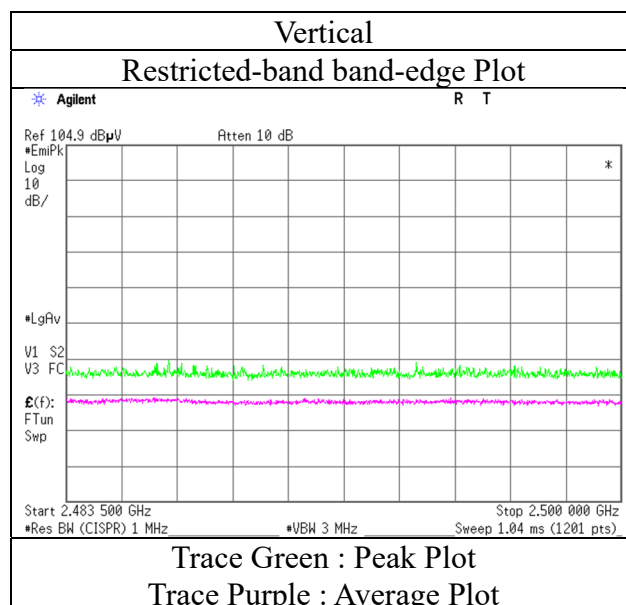
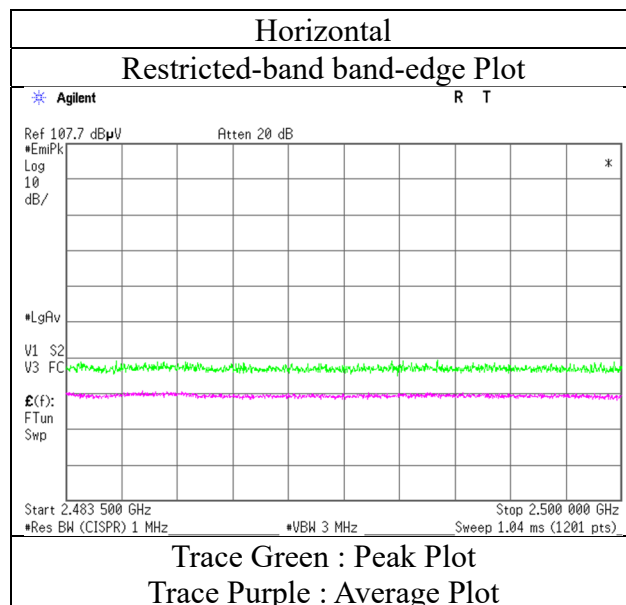
*1) Not Out of Band emission(Leakage Power)

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)

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab.
No.3
January 17, 2022
21 deg. C / 37 % RH
Hiroki Numata
(1 GHz - 10 GHz)
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

Test place	Ise EMC Lab.	No.3
Semi Anechoic Chamber		No.3
Date	January 17, 2022	January 23, 2022
Temperature / Humidity	21 deg. C / 37 % RH	18 deg. C / 32 % RH
Engineer	Hiroki Numata	Hiroyuki Furutaka
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 11ax-20 OFDM 2412 MHz	

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2390.0	57.8	45.1	27.6	5.5	32.6	0.3	58.3	45.8	73.9	53.9	15.6	8.1	*1)
Hori.	4824.0	40.1	31.9	31.5	7.8	31.6	-	47.8	39.6	73.9	53.9	26.2	14.3	Floor noise
Hori.	7236.0	41.5	33.3	35.8	9.4	32.6	-	54.0	45.8	73.9	53.9	19.9	8.1	Floor noise
Hori.	9648.0	42.7	32.1	38.8	9.8	33.0	-	58.3	47.7	73.9	53.9	15.6	6.2	Floor noise
Vert.	2390.0	57.3	44.1	27.6	5.5	32.6	0.3	57.7	44.8	73.9	53.9	16.2	9.1	*1)
Vert.	4824.0	41.1	32.0	31.5	7.8	31.6	-	48.8	39.6	73.9	53.9	25.1	14.3	Floor noise
Vert.	7236.0	42.1	33.5	35.8	9.4	32.6	-	54.5	46.0	73.9	53.9	19.4	7.9	Floor noise
Vert.	9648.0	41.9	32.2	38.8	9.8	33.0	-	57.5	47.8	73.9	53.9	16.4	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 [Hori/Vert]	Frequency [MHz]	Reading (PK) [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.0	94.4	27.5	5.5	32.6	94.8	-	-	Carrier
Hori.	2400.0	51.7	27.5	5.5	32.6	52.2	74.8	22.7	
Vert.	2412.0	92.8	27.5	5.5	32.6	93.3	-	-	Carrier
Vert.	2400.0	51.4	27.5	5.5	32.6	51.9	73.3	21.4	

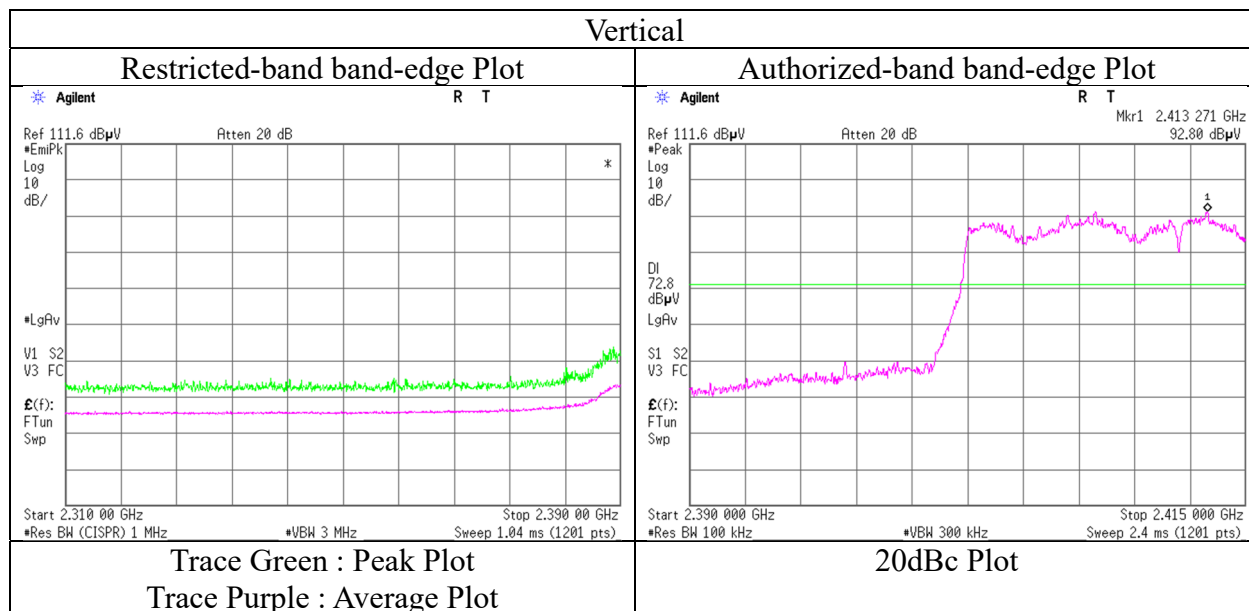
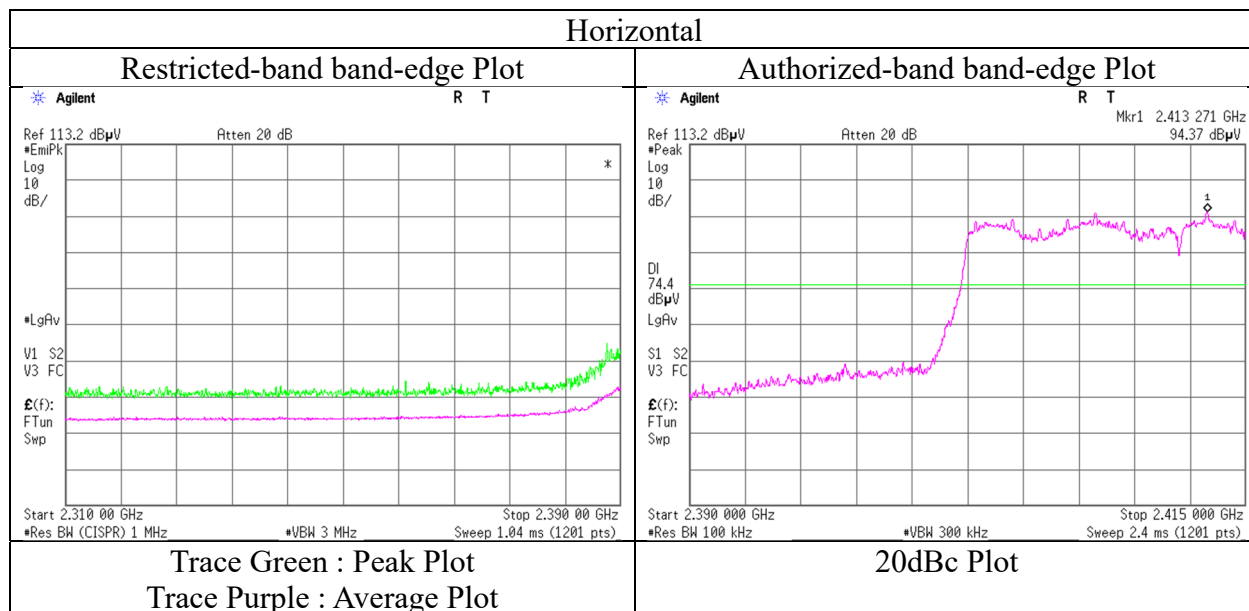
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 17, 2022
Temperature / Humidity	21 deg. C / 37 % RH
Engineer	Hiroki Numata
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDM 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

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 19, 2022
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Nachi Konegawa
(1 GHz - 10 GHz)
Mode Tx 11ax-20 OFDMA 2412 MHz (26-tone RU)

RU Index 0

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2390.0	45.8	34.2	27.6	5.5	32.6	0.3	46.3	34.9	73.9	53.9	27.6	19.0	*1)
Vert.	2390.0	50.7	36.1	27.6	5.5	32.6	0.3	51.2	36.9	73.9	53.9	22.7	17.0	*1)

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 (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2412.0	92.0	27.5	5.5	32.6	92.4	-	-	Carrier
Hori.	2400.0	43.1	27.5	5.5	32.6	43.6	72.4	28.8	
Vert.	2412.0	91.0	27.5	5.5	32.6	91.4	-	-	Carrier
Vert.	2400.0	41.9	27.5	5.5	32.6	42.4	71.4	29.0	

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

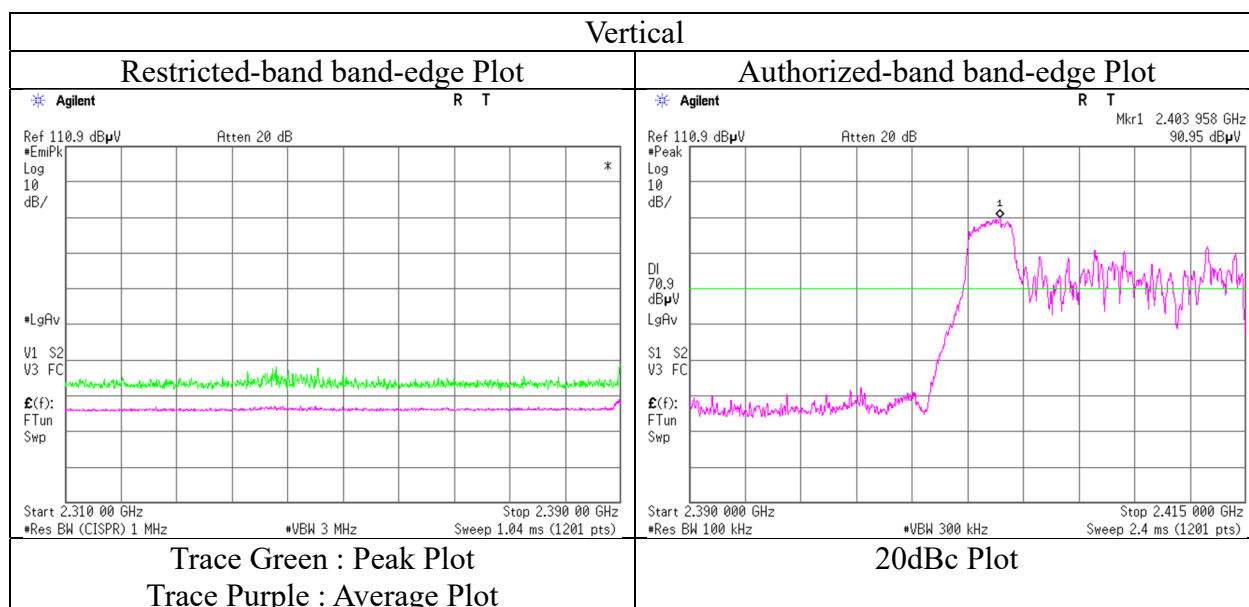
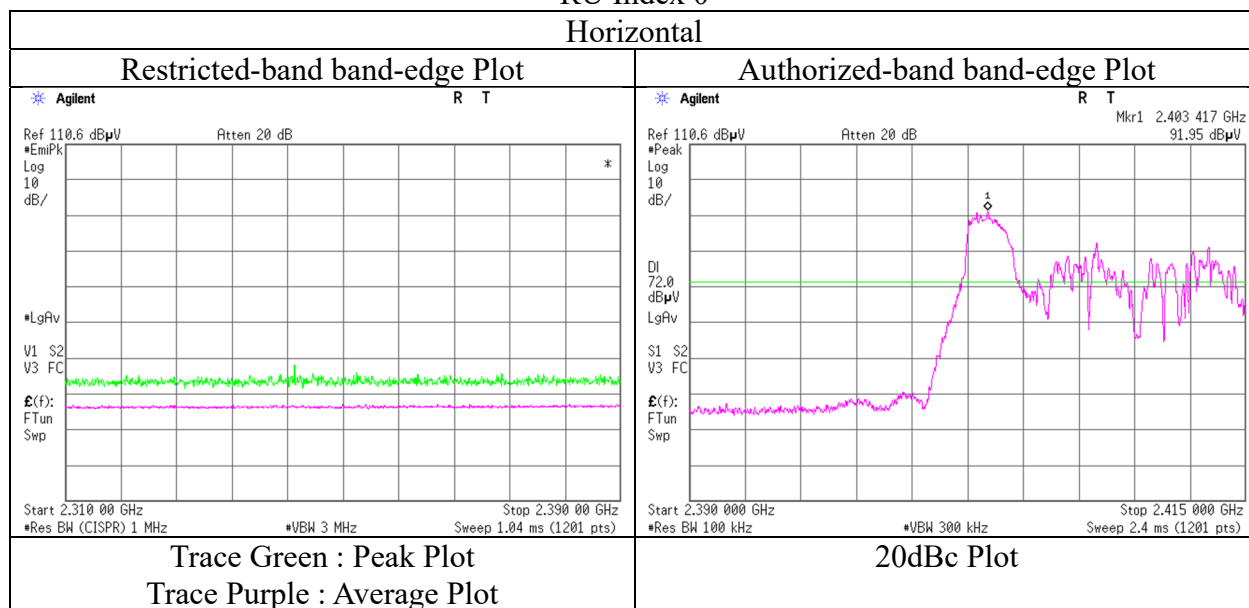
Distance factor: 1 GHz - 10 GHz 20log(3.95 m / 3.0 m) = 2.39 dB

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

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 19, 2022
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Nachi Konegawa
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 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

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 19, 2022
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Nachi Konegawa
 (1 GHz - 10 GHz)
Mode Tx 11ax-20 OFDMA 2412 MHz (52-tone RU)

RU Index 37

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2390.0	47.0	34.4	27.6	5.5	32.6	0.3	47.5	35.2	73.9	53.9	26.4	18.7	*1)
Vert.	2390.0	50.9	36.6	27.6	5.5	32.6	0.3	51.4	37.3	73.9	53.9	22.5	16.6	*1)

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 (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2412.0	91.7	27.5	5.5	32.6	92.1	-	-	Carrier
Hori.	2400.0	42.8	27.5	5.5	32.6	43.2	72.1	28.9	
Vert.	2412.0	91.2	27.5	5.5	32.6	91.7	-	-	Carrier
Vert.	2400.0	42.4	27.5	5.5	32.6	42.8	71.7	28.8	

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

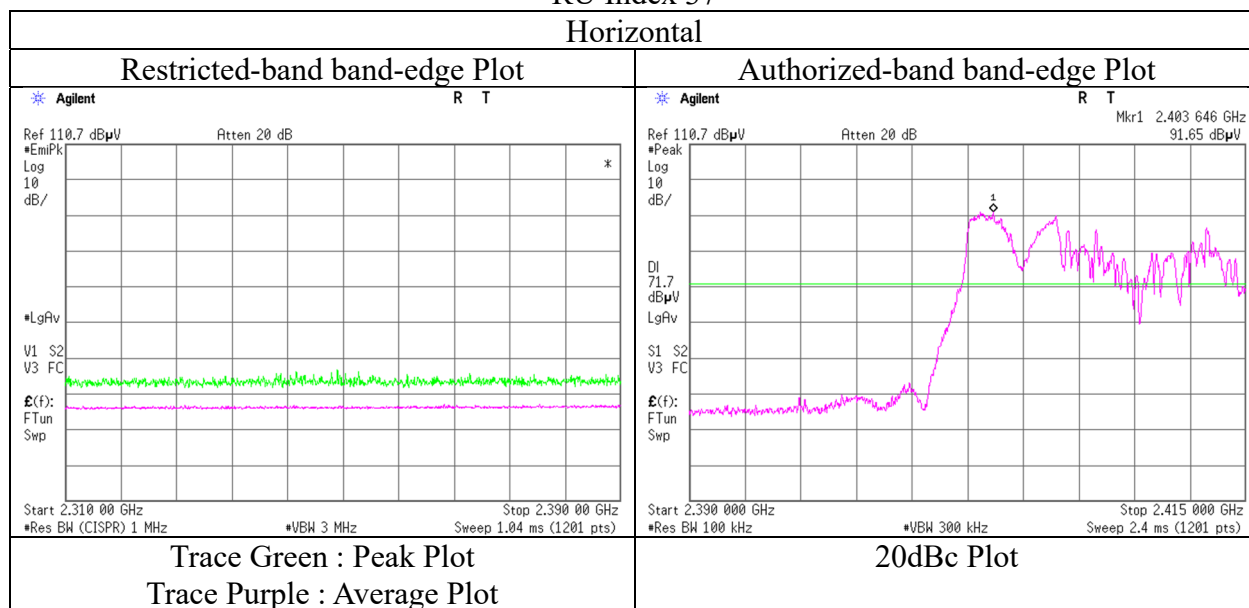
 10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission (Reference Plot for band-edge)

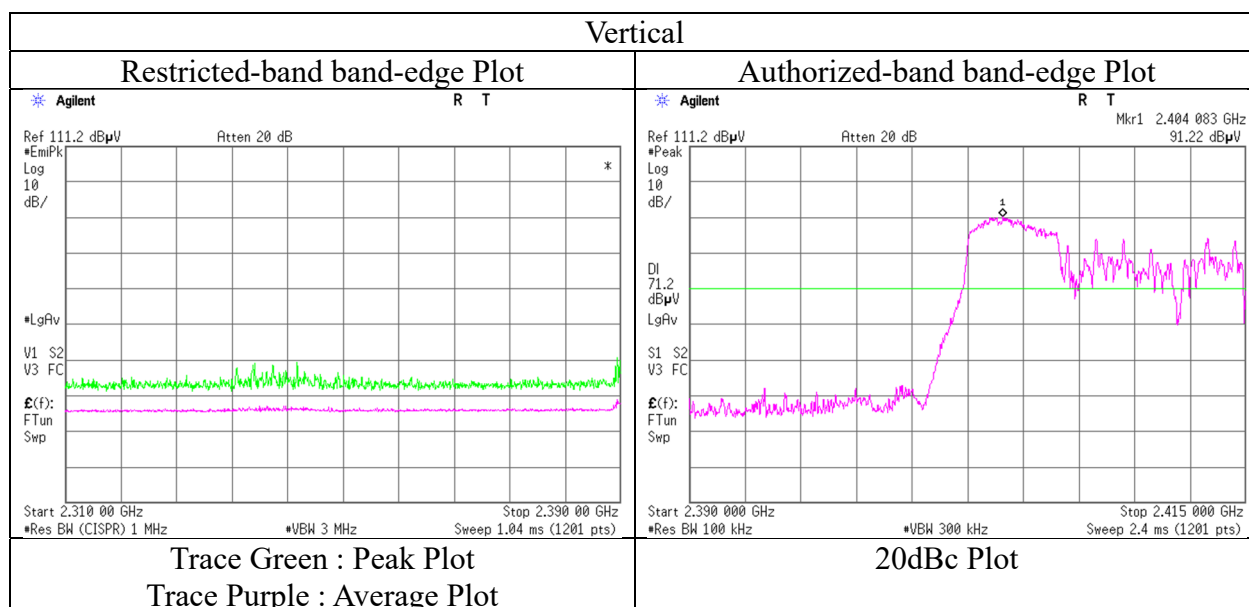
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 19, 2022
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Nachi Konegawa
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2412 MHz (52-tone RU)

RU Index 37

Horizontal



Vertical



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

Radiated Spurious Emission

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 19, 2022
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Nachi Konegawa (1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2412 MHz (106-tone RU)

RU Index 53

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2390.0	47.6	35.9	27.6	5.5	32.6	0.3	48.1	36.7	73.9	53.9	25.8	17.2	*1)
Vert.	2390.0	51.1	37.9	27.6	5.5	32.6	0.3	51.6	38.7	73.9	53.9	22.3	15.2	*1)

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 (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2412.0	93.1	27.5	5.5	32.6	93.6	-	-	Carrier
Hori.	2400.0	46.1	27.5	5.5	32.6	46.5	73.6	27.0	
Vert.	2412.0	91.9	27.5	5.5	32.6	92.4	-	-	Carrier
Vert.	2400.0	46.1	27.5	5.5	32.6	46.6	72.4	25.8	

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

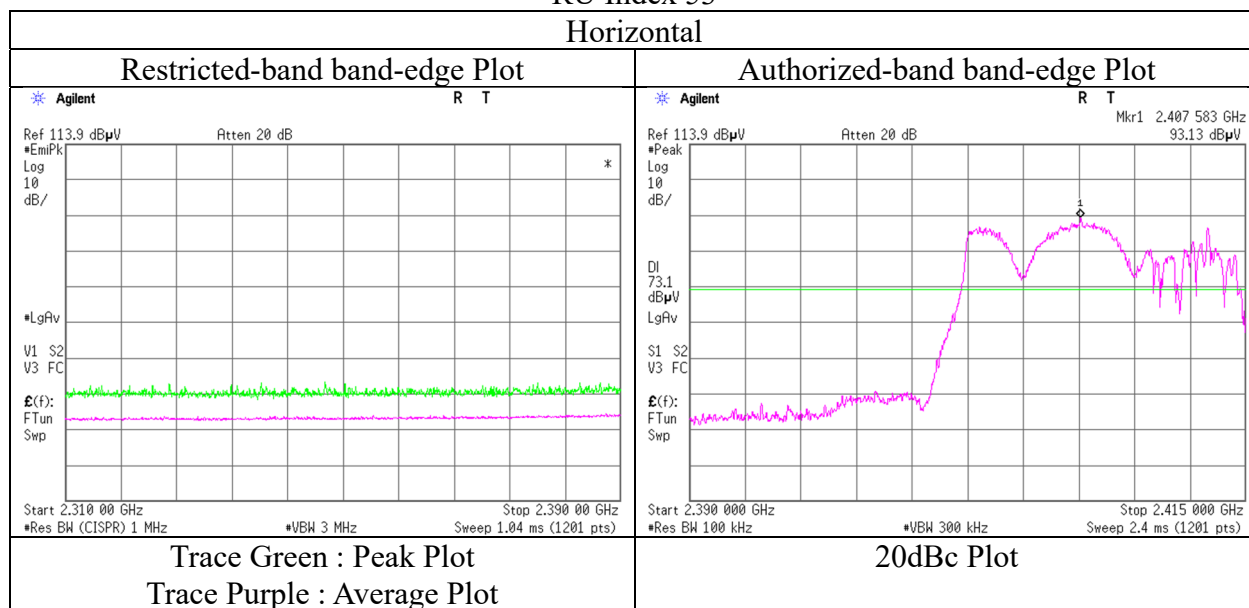
10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission (Reference Plot for band-edge)

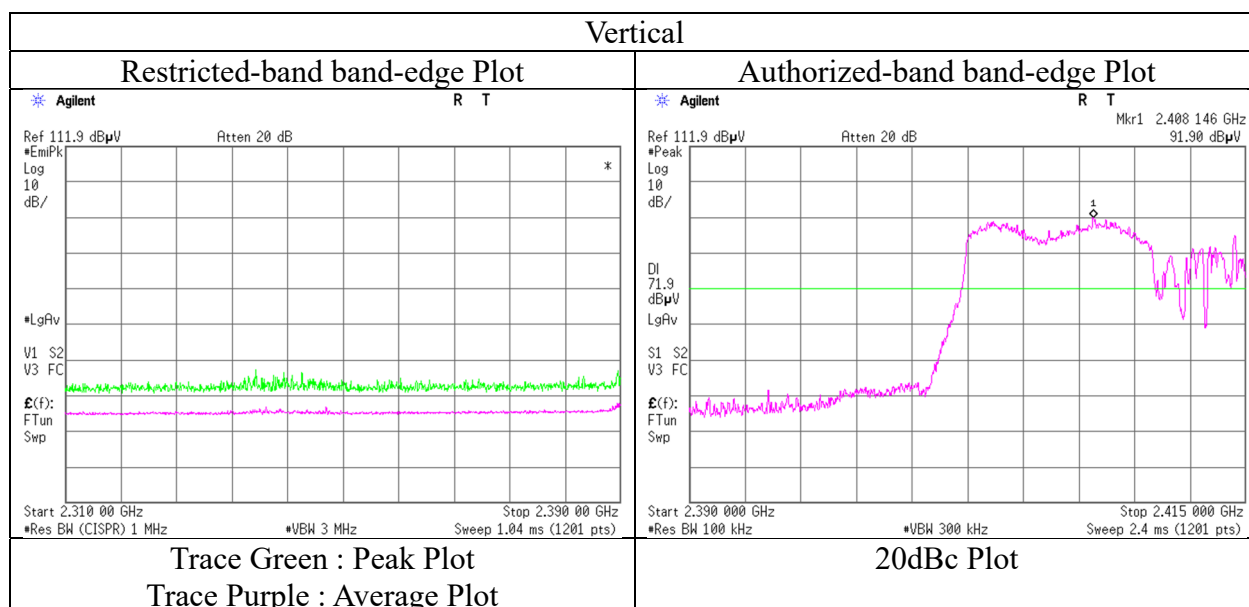
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 19, 2022
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Nachi Konegawa
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2412 MHz (106-tone RU)

RU Index 53

Horizontal



Vertical



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

Radiated Spurious Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 19, 2022
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Nachi Konegawa
(1 GHz - 10 GHz)
Mode Tx 11ax-20 OFDMA 2412 MHz (242-tone RU)

RU Index 61

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2390.0	53.3	42.3	27.6	5.5	32.6	0.2	53.8	43.0	73.9	53.9	20.1	10.9	*1)
Vert.	2390.0	56.0	43.9	27.6	5.5	32.6	0.2	56.5	44.7	73.9	53.9	17.5	9.2	*1)

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 (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2412.0	94.8	27.5	5.5	32.6	95.2	-	-	Carrier
Hori.	2400.0	49.3	27.5	5.5	32.6	49.8	75.2	25.5	
Vert.	2412.0	93.1	27.5	5.5	32.6	93.5	-	-	Carrier
Vert.	2400.0	52.6	27.5	5.5	32.6	53.1	73.5	20.4	

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

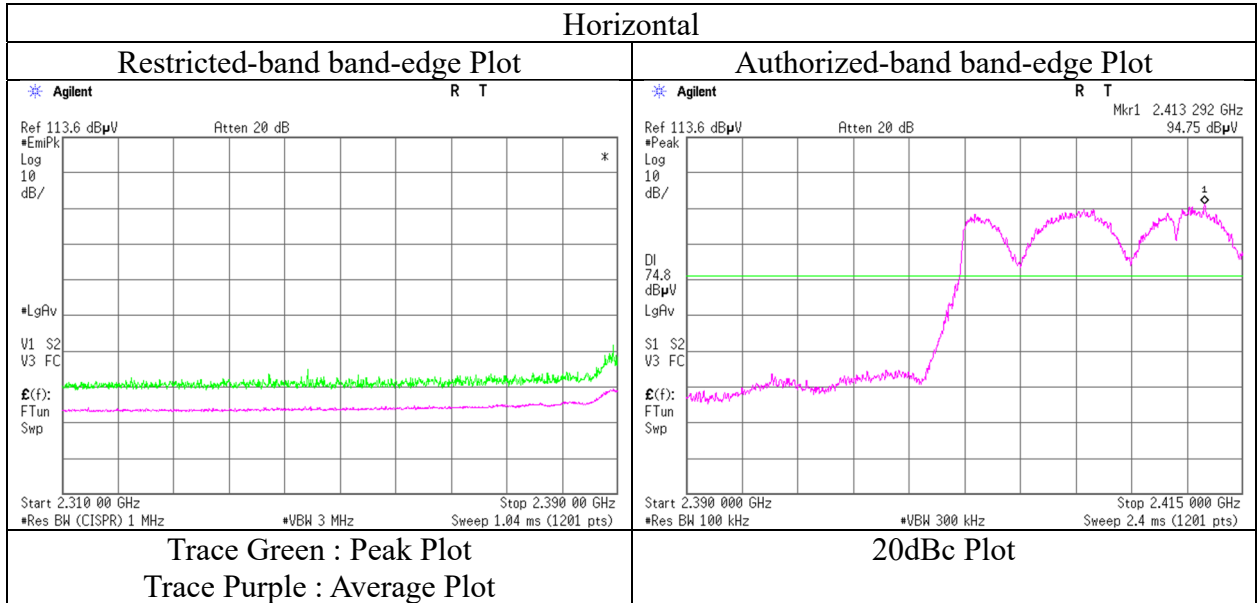
10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission (Reference Plot for band-edge)

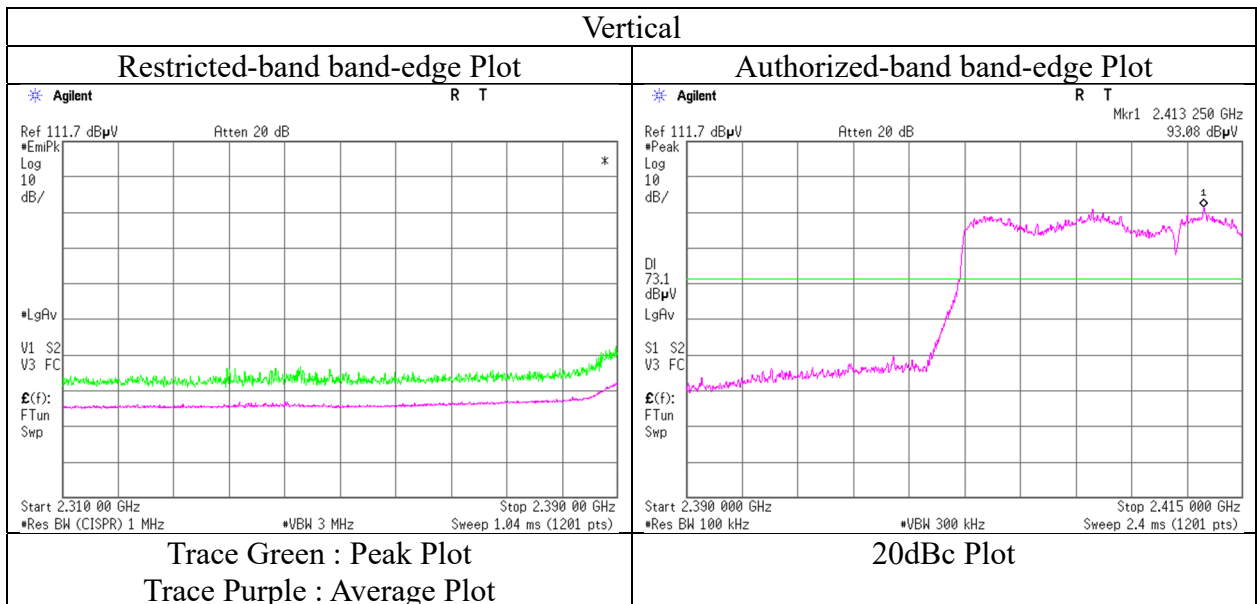
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 19, 2022
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Nachi Konegawa
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2412 MHz (242-tone RU)

RU Index 61

Horizontal



Vertical



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

Radiated Spurious Emission

Test place	Ise EMC Lab.	No.3
Semi Anechoic Chamber	No.3	No.3
Date	January 17, 2022	January 23, 2022
Temperature / Humidity	21 deg. C / 37 % RH	18 deg. C / 32 % RH
Engineer	Hiroki Numata	Hiroyuki Furutaka
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 11ax-20 OFDM 2437 MHz	

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	4874.0	41.2	32.5	31.5	7.8	31.6	-	48.9	40.3	73.9	53.9	25.0	13.7	Floor noise
Hori.	7311.0	41.8	33.6	35.9	9.3	32.7	-	54.4	46.1	73.9	53.9	19.5	7.8	Floor noise
Hori.	9748.0	42.1	31.9	39.1	9.8	33.1	-	58.0	47.8	73.9	53.9	15.9	6.1	Floor noise
Vert.	4874.0	40.0	32.0	31.5	7.8	31.6	-	47.7	39.7	73.9	53.9	26.2	14.2	Floor noise
Vert.	7311.0	41.8	33.5	35.9	9.3	32.7	-	54.4	46.1	73.9	53.9	19.5	7.8	Floor noise
Vert.	9748.0	42.5	31.7	39.1	9.8	33.1	-	58.3	47.6	73.9	53.9	15.6	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

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	January 17, 2022	January 23, 2022	January 23, 2022
Temperature / Humidity	21 deg. C / 37 % RH	18 deg. C / 32 % RH	20 deg. C / 33 % RH
Engineer	Hiroki Numata (1 GHz - 10 GHz)	Hiroyuki Furutaka (10 GHz - 26.5 GHz)	Nachi Konegawa (Below 1 GHz)
Mode	Tx 11ax-20 OFDM 2462 MHz		

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	72.7	43.3	-	6.3	7.8	32.3	-	25.2	-	40.0	-	14.8	-	
Hori.	160.3	35.6	-	15.5	8.8	32.2	-	27.7	-	43.5	-	15.9	-	
Hori.	373.7	38.1	-	15.3	10.5	32.1	-	31.8	-	46.0	-	14.2	-	
Hori.	539.5	41.1	-	17.9	11.6	32.1	-	38.5	-	46.0	-	7.5	-	
Hori.	611.3	39.4	-	19.5	12.1	32.1	-	38.9	-	46.0	-	7.2	-	
Hori.	909.9	36.7	-	22.3	13.6	30.9	-	41.7	-	46.0	-	4.3	-	
Hori.	2483.5	59.2	46.0	27.4	5.6	32.5	0.3	59.6	46.8	73.9	53.9	14.3	7.1	*1)
Hori.	4924.0	40.0	31.9	31.6	7.8	31.6	-	47.8	39.7	73.9	53.9	26.1	14.2	Floor noise
Hori.	7386.0	41.8	33.0	36.0	9.3	32.7	-	54.5	45.7	73.9	53.9	19.4	8.2	Floor noise
Hori.	9848.0	42.1	31.9	39.2	9.9	33.1	-	58.1	47.9	73.9	53.9	15.8	6.0	Floor noise
Vert.	72.7	43.1	-	6.3	7.8	32.3	-	25.0	-	40.0	-	15.0	-	
Vert.	195.0	31.6	-	16.5	9.1	32.2	-	25.0	-	43.5	-	18.5	-	
Vert.	373.8	37.6	-	15.3	10.5	32.1	-	31.3	-	46.0	-	14.7	-	
Vert.	575.8	37.8	-	18.8	11.8	32.1	-	36.3	-	46.0	-	9.7	-	
Vert.	610.2	37.6	-	19.5	12.0	32.1	-	37.0	-	46.0	-	9.0	-	
Vert.	915.7	37.4	-	22.3	13.7	30.9	-	42.4	-	46.0	-	3.6	-	
Vert.	2483.5	57.9	44.6	27.4	5.6	32.5	0.3	58.4	45.4	73.9	53.9	15.6	8.5	*1)
Vert.	4924.0	39.9	31.7	31.6	7.8	31.6	-	47.7	39.5	73.9	53.9	26.2	14.4	Floor noise
Vert.	7386.0	41.8	33.3	36.0	9.3	32.7	-	54.5	46.0	73.9	53.9	19.4	7.9	Floor noise
Vert.	9848.0	42.2	31.9	39.2	9.9	33.1	-	58.1	47.8	73.9	53.9	15.8	6.1	Floor noise

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

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

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

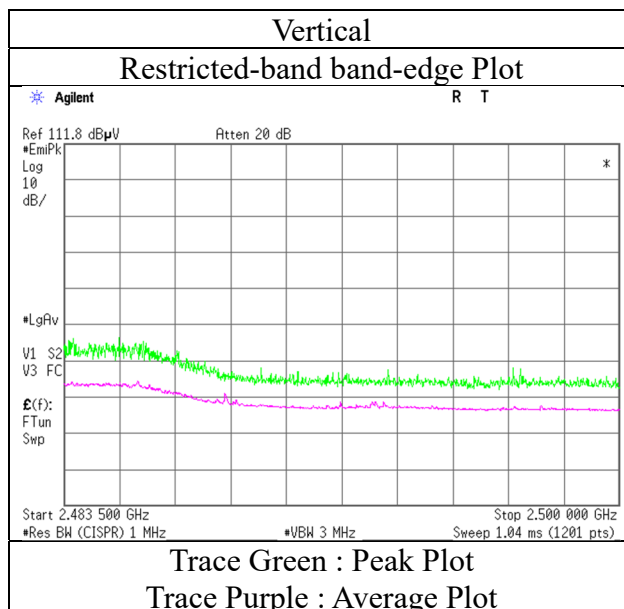
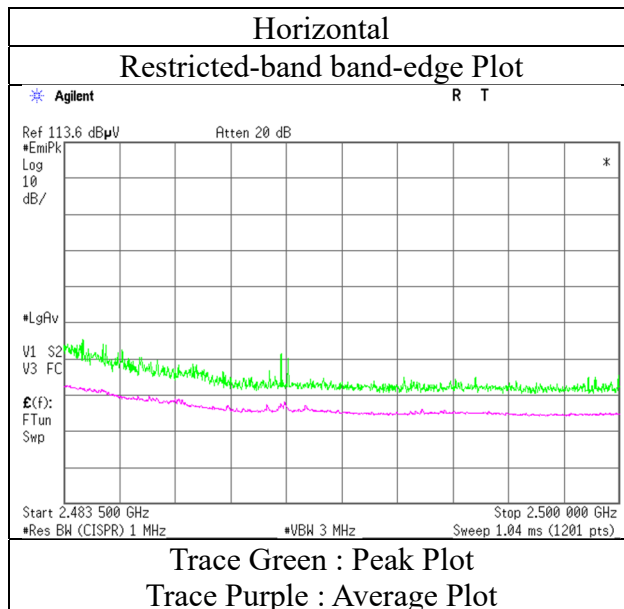
*QP detector was used up to 1GHz.

*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)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 17, 2022
Temperature / Humidity	21 deg. C / 37 % RH
Engineer	Hiroki Numata
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDM 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

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 19, 2022
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Nachi Konegawa
(1 GHz - 10 GHz)
Mode Tx 11ax-20 OFDMA 2462 MHz (26-tone RU)

RU Index 8

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2483.5	45.8	34.3	27.4	5.6	32.5	0.3	46.3	35.0	73.9	53.9	27.6	18.9	*1)
Vert.	2483.5	44.7	34.2	27.4	5.6	32.5	0.3	45.1	35.0	73.9	53.9	28.8	19.0	*1)

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.

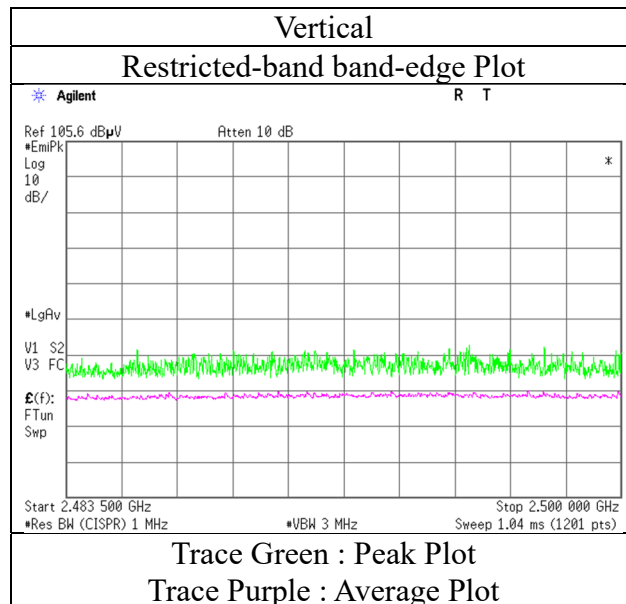
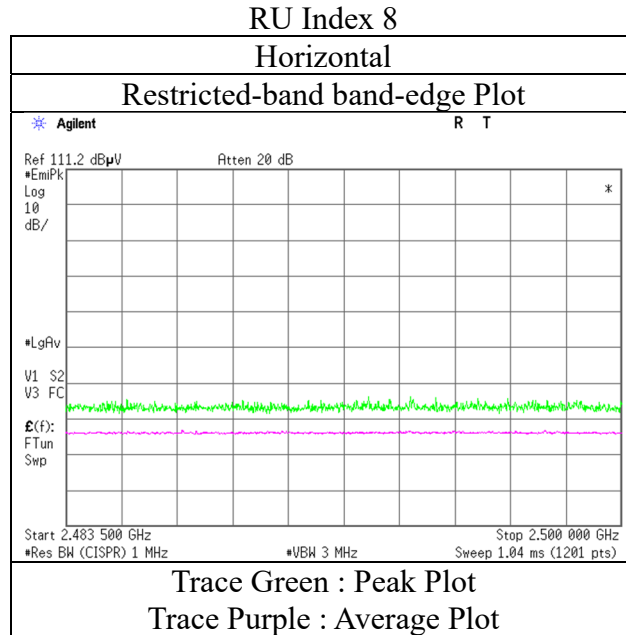
*1) Not Out of Band emission(Leakage Power)

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

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Ise EMC Lab.
No.3
January 19, 2022
20 deg. C / 39 % RH
Nachi Konegawa
(1 GHz - 10 GHz)
Tx 11ax-20 OFDMA 2462 MHz (26-tone RU)



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

Radiated Spurious Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 19, 2022
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Nachi Konegawa
(1 GHz - 10 GHz)
Mode Tx 11ax-20 OFDMA 2462 MHz (52-tone RU)

RU Index 40

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2483.5	44.7	35.1	27.4	5.6	32.5	0.3	45.2	35.8	73.9	53.9	28.7	18.1	*1)
Vert.	2483.5	44.1	34.7	27.4	5.6	32.5	0.3	44.6	35.4	73.9	53.9	29.3	18.5	*1)

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.

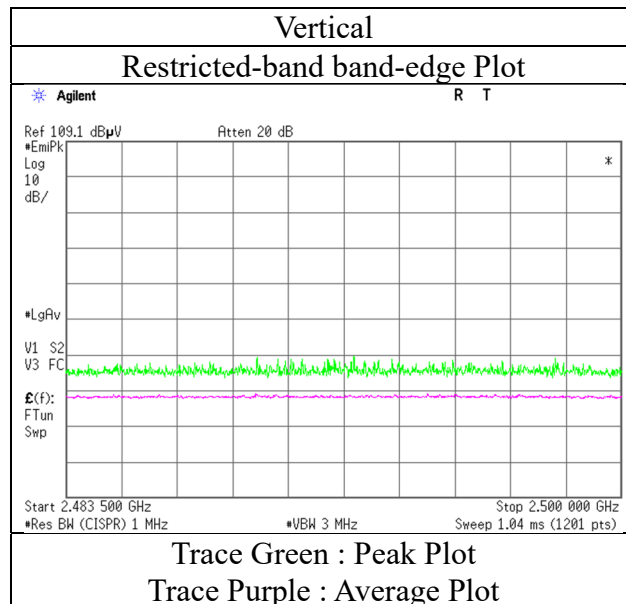
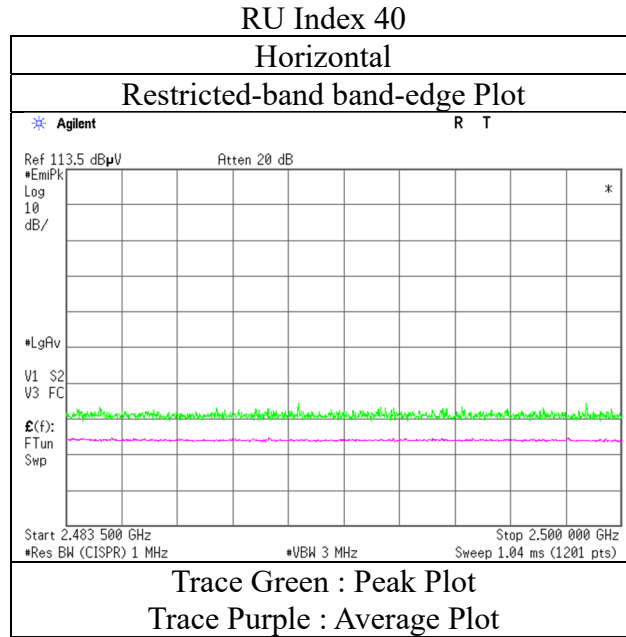
*1) Not Out of Band emission(Leakage Power)

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

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Ise EMC Lab.
No.3
January 19, 2022
20 deg. C / 39 % RH
Nachi Konegawa
(1 GHz - 10 GHz)
Tx 11ax-20 OFDMA 2462 MHz (52-tone RU)



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

Radiated Spurious Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 19, 2022
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Nachi Konegawa
 (1 GHz - 10 GHz)
Mode Tx 11ax-20 OFDMA 2462 MHz (106-tone RU)

RU Index 54

Polarity	Frequency	Reading (QP / PK)	Reading (A V)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (A V)	Limit (QP / PK)	Limit (A V)	Margin (QP / PK)	Margin (A V)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2483.5	47.0	38.2	27.4	5.6	32.5	0.3	47.5	38.9	73.9	53.9	26.4	15.0	*1)
Vert.	2483.5	51.7	37.6	27.4	5.6	32.5	0.3	52.2	38.4	73.9	53.9	21.7	15.6	*1)

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

Result (A V) = 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).

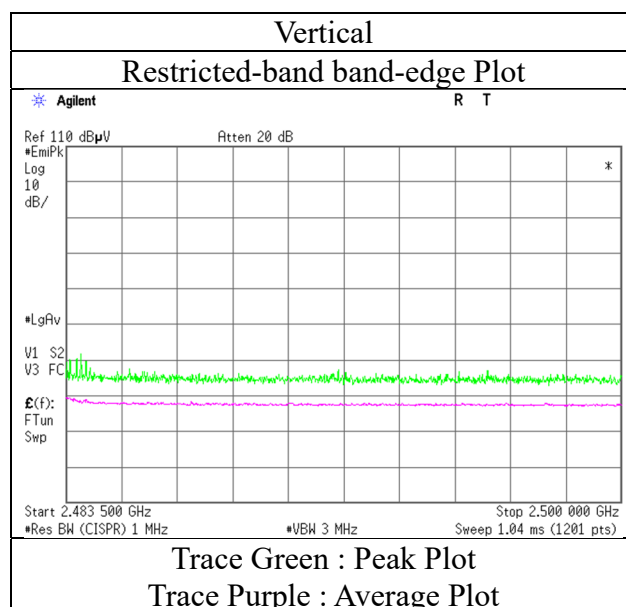
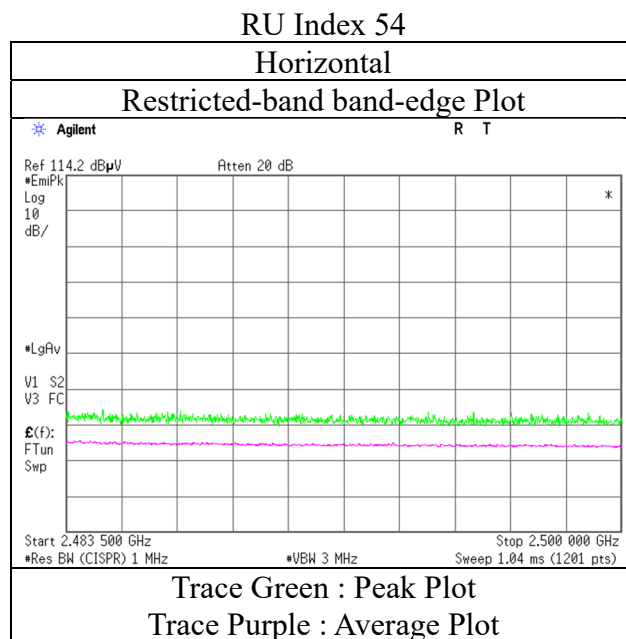
*QP detector was used up to 1GHz.

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

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

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 19, 2022
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Nachi Konegawa
	(1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2462 MHz (106-tone RU)



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

Radiated Spurious Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 19, 2022
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Nachi Konegawa
(1 GHz - 10 GHz)
Mode Tx 11ax-20 OFDMA 2462 MHz (242-tone RU)

RU Index 61

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2483.5	52.1	42.8	27.4	5.6	32.5	0.2	52.6	43.5	73.9	53.9	21.3	10.4	*1)
Vert.	2483.5	59.5	48.3	27.4	5.6	32.5	0.2	60.0	49.0	73.9	53.9	13.9	4.9	*1)

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).

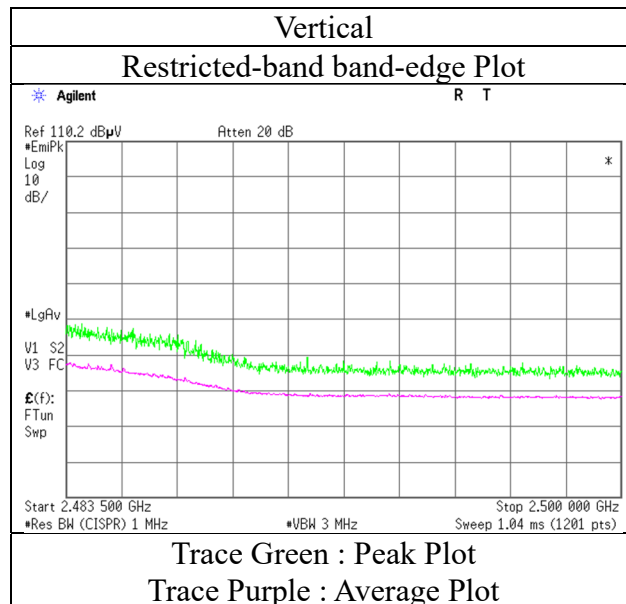
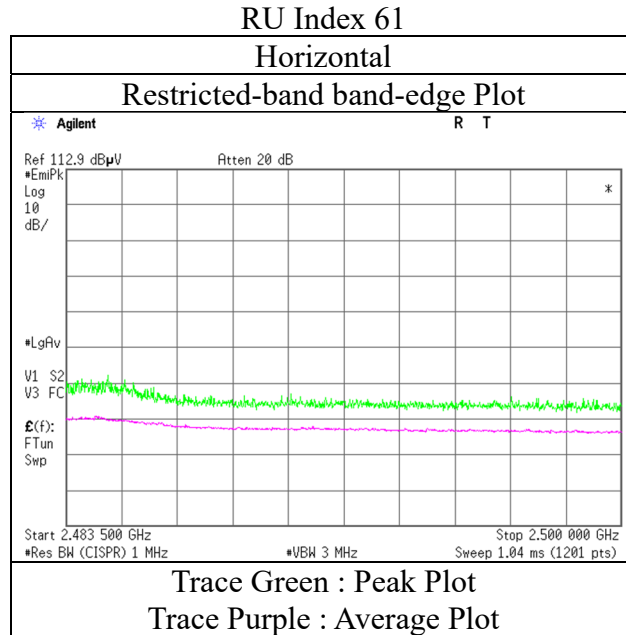
*QP detector was used up to 1GHz.

*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)

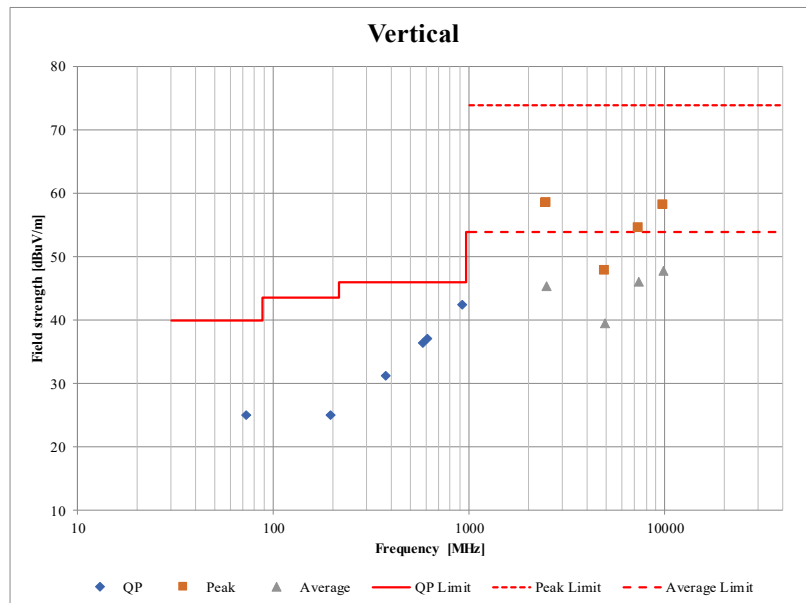
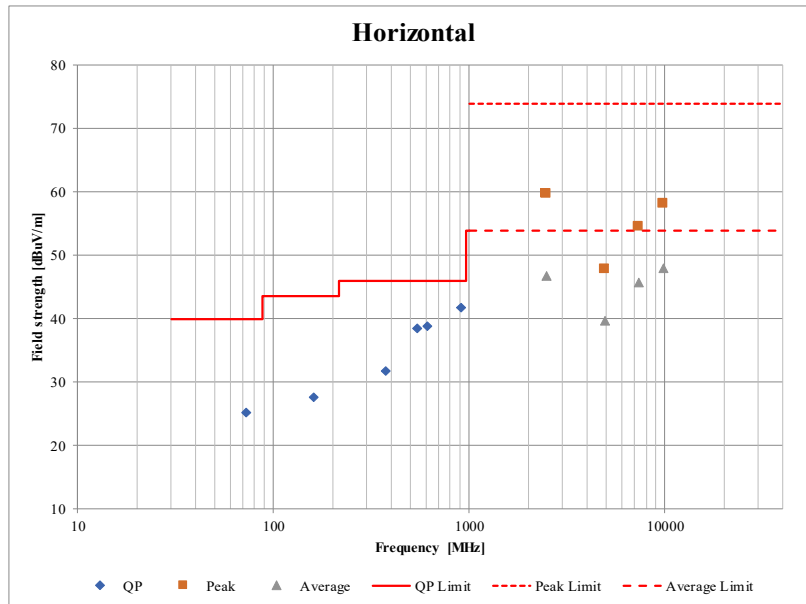
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 19, 2022
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Nachi Konegawa (1 GHz - 10 GHz)
Mode	Tx 11ax-20 OFDMA 2462 MHz (242-tone RU)



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

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

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	January 17, 2022	January 23, 2022	January 23, 2022
Temperature / Humidity	21 deg. C / 37 % RH	18 deg. C / 32 % RH	20 deg. C / 33 % RH
Engineer	Hiroki Numata	Hiroyuki Furutaka	Nachi Konegawa
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)	(Below 1 GHz)
Mode	Tx 11ax-20 OFDM 2462 MHz		



*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	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	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	MHA-16	141513	Horn Antenna 15-40GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9170	BBHA9170306	06/07/2021	12
RE	MHF-25	141232	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	09/30/2021	12
RE	MSA-03	141884	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY44020357	03/10/2021	12
RE	MAEC-03	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/22/2020	24
RE	MAT-95	142314	Attenuator	Pasternack Enterprises	PE7390-6	D/C 1504	06/09/2021	12
RE	MBA-05	141425	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103+BBA9106	VHA 91031302	08/28/2021	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
RE	MTR-08	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	08/05/2021	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:

RE: Radiated Emission