



RADIO TEST REPORT

Test Report No. 14242399S-A-R1

Customer	Canon Inc.
Description of EUT	Wireless LAN Module
Model Number of EUT	K30365
FCC ID	AZDK30365
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied (Refer to SECTION 3)
Issue Date	June 14, 2022
Remarks	Radiated Spurious Emission only For permissive change

Representative Test Engineer

Shiro Kobayashi
Engineer

Approved By

Shinichi Takano
Engineer



CERTIFICATE 1266.03

- ☐ 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".

Report Cover Page - Form-ULID-003532 (DCS:13-EM-F0429) Issue# 20.0

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- The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan, Inc. has been accredited.
- 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.: 14242399S-A

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	14242399S-A	May 18, 2022	-
1	14242399S-A-R1	June 14, 2022	P.10 Deletion of “* The test was performed with r = 0.0 m since EUT is small and it was the rather conservative condition.”

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	Canon Inc.
Address	451 Tsukagoshi 3-chome, Saiwai-ku, Kawasaki-shi, kanagawa 212-8530 Japan
Telephone Number	+81-3-3758-2111
Contact Person	Hiroyuki Saito

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 LAN Module
Model Number	K30365
Serial Number	Refer to SECTION 4.2
Condition	Production model
Modification	No Modification by the test lab
Receipt Date	March 14, 2022
Test Date	April 1 and 4, 2022

2.2 Product Description

General Specification

Rating	DC 3.3 V
Operating temperature	-5 deg. C to +55 deg. C

Radio Specification

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

Equipment Type	Transceiver
Frequency of Operation	2412 MHz to 2462 MHz
Type of Modulation	DSSS, OFDM
Antenna Type	Pattern antenna (meander)
Antenna Gain: G_{ANT}	-0.92 dBi

SECTION 3: Test Specification, Procedures & Results

3.1 Test Specification

Test Specification	FCC Part 15 Subpart C FCC Part 15 final revised on April 1, 2022 and effective May 2, 2022
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 ISED: RSS-Gen 6.13	FCC: Section15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	6.4 dB 2390.000 MHz, AV, Hori Mode: Tx 11n-20 2412 MHz	Complied a)	Radiated (above 30 MHz) *1)
Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593. * In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.					
*1) Radiated test was selected over 30 MHz based on section 15.247(d) 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 module is constantly provided the stable voltage from the host device regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

3.3 Addition to Standard

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 $k=2$.

Shonan EMC Lab.

Item	Frequency range	Uncertainty (+/-)			
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4,5,6,8 SR
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.2 dB	3.1 dB	3.1 dB	-
	30 MHz-200 MHz	4.6 dB	4.6 dB	4.6 dB	-
	200 MHz-1 GHz	6.0 dB	6.1 dB	6.1 dB	-
	1 GHz-6 GHz	4.7 dB	4.7 dB	4.7 dB	-
	6 GHz-18 GHz	5.2 dB	5.3 dB	5.3 dB	-
	18 GHz-40 GHz	5.4 dB	5.5 dB	5.5 dB	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.6 dB	5.6 dB	5.6 dB	-
	18 GHz-40 GHz	5.8 dB	5.8 dB	5.8 dB	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

3.5 Test Location

UL Japan, Inc. Shonan EMC Lab.

1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN

Telephone: +81 463 50 6400, Facsimile: +81 463 50 6401

A2LA Certificate Number: 1266.03

(FCC test firm registration number: 626366, ISED lab company number: 2973D / CAB identifier: JP0001)

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 Shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

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)

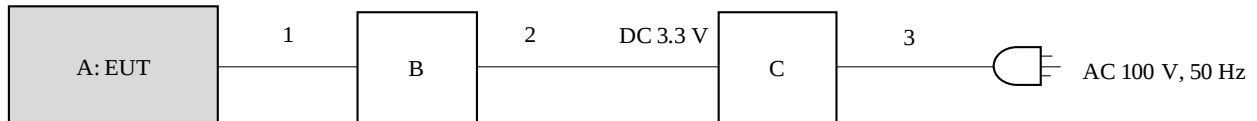
Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009.

Mode	Remarks*
IEEE 802.11b (11b)	1 Mbps, PN9
IEEE 802.11g (11g)	6 Mbps, PN9
IEEE 802.11n 20 MHz BW (11n-20)	MCS 0, PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power. Refer to the original test report 10420214S-D	
*Power of the EUT was set by the software as follows; Power Setting: 11b: 12, 11g:10, 11n-20: 10 Software: DutApiWiFi8801 BrdigeEth.exe Version: 2.0.0.79 (Date: 2022.04 01, 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.	

*The Details Of Operating Mode(s)

Test Item	Operating Mode	Tested Frequency
Radiated Spurious Emission (Below 1 GHz)	Tx 11g *1)	2412 MHz
Radiated Spurious Emission (Above 1 GHz)	Tx 11b Tx 11g Tx 11n-20	2412 MHz 2437 MHz 2462 MHz
*1) The mode was tested as a representative, because it had the highest power at antenna terminal test.		

4.2 Configuration and Peripherals



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

Description of EUT and Support Equipment

No.	Item	Model number	Serial Number	Manufacturer	Remarks
A	Wireless LAN Module	K30365	B1	Canon	EUT
B	WLAN JOINT PCB	-	-	Canon	-
C	Power Supply(DC)	PAN35-10A	DE001677	KIKUSUI	-

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Flat	0.05	Unshielded	Unshielded	-
2	DC	0.2 + 1.8	Unshielded	Unshielded	-
3	AC	1.8	Unshielded	Unshielded	-

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 0.5 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.

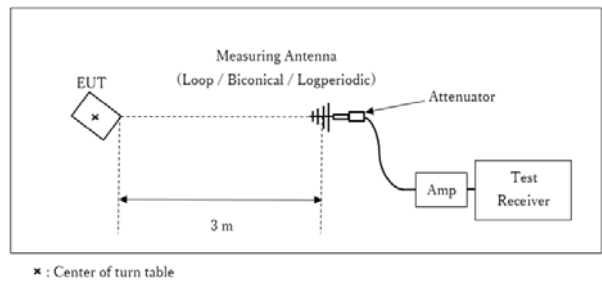
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

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	11.12.2.5.2 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (Linear voltage) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300 kHz

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

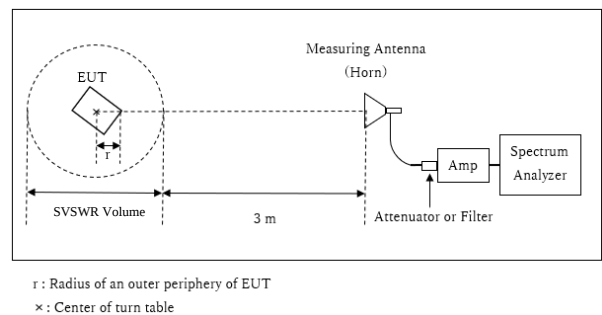
Figure 2: Test Setup

Below 1 GHz



Test Distance: 3 m

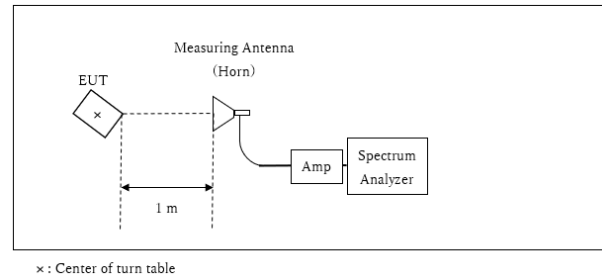
1 GHz to 10 GHz



Distance Factor: $20 \times \log (3.99 \text{ m} / 3.0 \text{ m}) = 2.48 \text{ dB}$
* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.99 \text{ m}$

SVSWR Volume : 2.0 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
 $r = 0.01 \text{ m}$

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.

Antenna polarization	Carrier	Spurious (30 MHz - 1 GHz)	Spurious (1 GHz - 2.8 GHz)	Spurious (2.8 GHz - 10 GHz)	Spurious (10 GHz - 18 GHz)	Spurious (18 GHz - 26.5 GHz)
Horizontal	X	X	X	X	X	X
Vertical	X	X	X	X	X	X

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

Measurement Range

Test Data

Test Result

: 30 MHz to 26.5 GHz

: APPENDIX

: Pass

APPENDIX 1: Test Data**Radiated Spurious Emission**

Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	2	1
Date	April 1, 2022	April 4, 2022
Temperature / Humidity	23 deg.C, 42 %RH	18 deg.C, 45 %RH
Engineer	Yohsuke Matsuzawa	Shiro Kobayashi
	(1 GHz -10 GHz)	(10 GHz -26.5 GHz)
Mode	Tx 11b 2412 MHz	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2387.583	PK	53.12	28.57	13.90	38.73	2.48	59.34	73.9	14.5	142	135	-
Hori.	2390.000	PK	53.27	28.57	13.91	38.72	2.48	59.51	73.9	14.3	142	135	-
Hori.	4824.000	PK	44.70	31.91	6.43	38.56	2.48	46.96	73.9	26.9	155	353	-
Hori.	7236.000	PK	44.38	37.59	7.96	39.18	2.48	53.23	73.9	20.6	150	0	-
Hori.	9648.000	PK	45.23	38.97	9.22	39.71	2.48	56.19	73.9	17.7	150	0	-
Hori.	12060.000	PK	45.52	38.61	11.65	38.50	-9.54	47.74	73.9	26.1	150	0	-
Hori.	2387.583	AV	35.62	28.57	13.90	38.73	2.48	41.84	53.9	12.0	142	135	-
Hori.	2390.000	AV	36.06	28.57	13.91	38.72	2.48	42.30	53.9	11.6	142	135	-
Hori.	4824.000	AV	34.00	31.91	6.43	38.56	2.48	36.26	53.9	17.6	155	353	-
Hori.	7236.000	AV	34.56	37.59	7.96	39.18	2.48	43.41	53.9	10.4	150	0	Floor noise
Hori.	9648.000	AV	34.76	38.97	9.22	39.71	2.48	45.72	53.9	8.1	150	0	Floor noise
Hori.	12060.000	AV	34.14	38.61	11.65	38.50	-9.54	36.36	53.9	17.5	150	0	Floor noise
Vert.	2386.872	PK	50.38	28.58	13.90	38.73	2.48	56.61	73.9	17.2	151	196	-
Vert.	2390.000	PK	51.11	28.57	13.91	38.72	2.48	57.35	73.9	16.5	151	196	-
Vert.	4824.000	PK	45.00	31.91	6.43	38.56	2.48	47.26	73.9	26.6	168	358	-
Vert.	7236.000	PK	44.45	37.59	7.96	39.18	2.48	53.30	73.9	20.6	150	0	-
Vert.	9648.000	PK	45.00	38.97	9.22	39.71	2.48	55.96	73.9	17.9	150	0	-
Vert.	12060.000	PK	45.00	38.61	11.65	38.50	-9.54	47.22	73.9	26.6	150	0	-
Vert.	2386.872	AV	35.97	28.58	13.90	38.73	2.48	42.20	53.9	11.7	151	196	-
Vert.	2390.000	AV	36.05	28.57	13.91	38.72	2.48	42.29	53.9	11.6	151	196	-
Vert.	4824.000	AV	35.19	31.91	6.43	38.56	2.48	37.45	53.9	16.4	168	358	-
Vert.	7236.000	AV	34.71	37.59	7.96	39.18	2.48	43.56	53.9	10.3	150	0	Floor noise
Vert.	9648.000	AV	34.00	38.97	9.22	39.71	2.48	44.96	53.9	8.9	150	0	Floor noise
Vert.	12060.000	AV	34.05	38.61	11.65	38.50	-9.54	36.27	53.9	17.6	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	95.25	28.53	13.92	38.71	2.48	101.47	-	-	Carrier
Hori.	2396.983	PK	50.76	28.56	13.91	38.72	2.48	56.99	81.4	24.4	-
Hori.	2398.000	PK	49.72	28.55	13.91	38.72	2.48	55.94	81.4	25.4	-
Hori.	2400.000	PK	49.53	28.55	13.91	38.72	2.48	55.75	81.4	25.6	-
Vert.	2412.000	PK	91.40	28.53	13.92	38.71	2.48	97.62	-	-	Carrier
Vert.	2396.988	PK	46.95	28.56	13.91	38.72	2.48	53.18	77.6	24.4	-
Vert.	2398.150	PK	46.88	28.55	13.91	38.72	2.48	53.10	77.6	24.5	-
Vert.	2400.000	PK	45.56	28.55	13.91	38.72	2.48	51.78	77.6	25.8	-

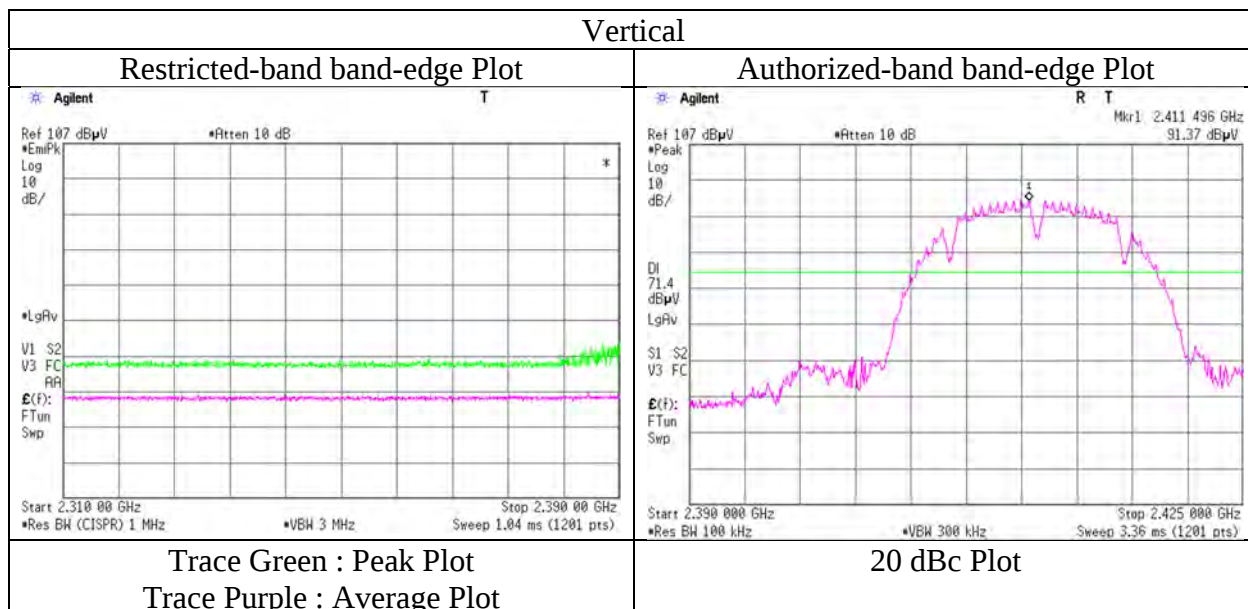
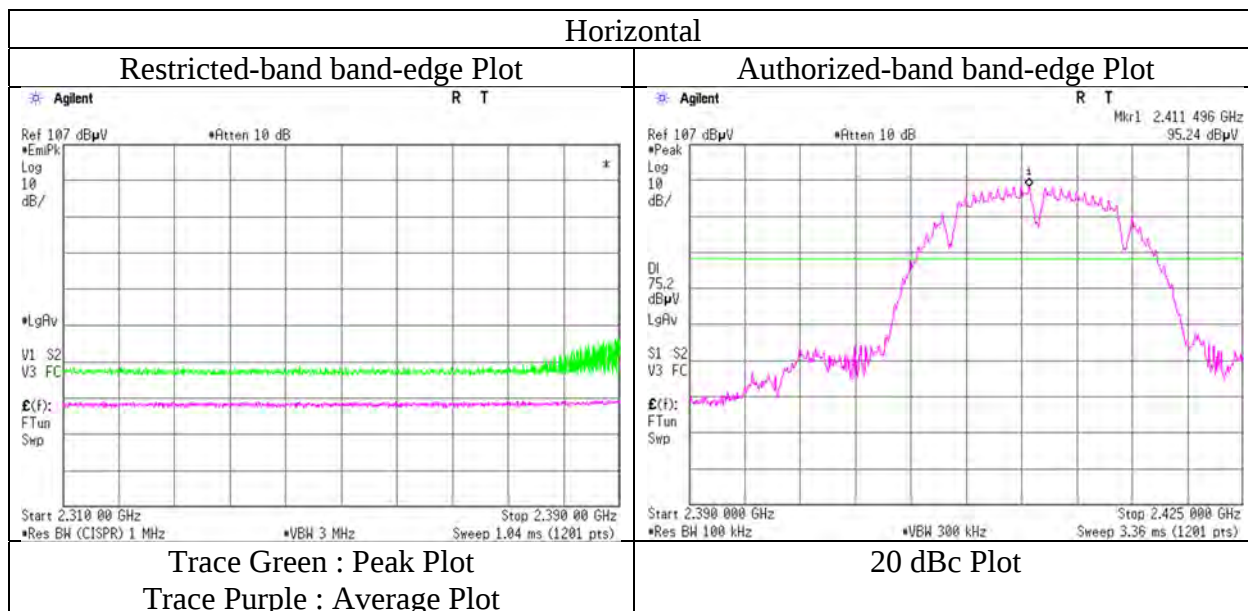
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	April 1, 2022
Temperature / Humidity	23 deg.C, 42 %RH
Engineer	Yohsuke Matsuzawa
	(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	Shonan EMC Lab.	
Semi Anechoic Chamber	2	1
Date	April 1, 2022	April 4, 2022
Temperature / Humidity	23 deg.C, 42 %RH	18 deg.C, 45 %RH
Engineer	Yohsuke Matsuzawa (1 GHz -10 GHz)	Shiro Kobayashi (10 GHz -26.5 GHz)
Mode	Tx 11b 2437 MHz	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	45.26	31.92	6.45	38.58	2.48	47.53	73.9	26.3	176	243	-
Hori.	7311.000	PK	45.38	37.64	8.02	39.22	2.48	54.30	73.9	19.6	150	0	-
Hori.	9748.000	PK	45.35	39.25	9.26	39.73	2.48	56.61	73.9	17.2	150	0	-
Hori.	12185.000	PK	45.22	38.65	11.70	38.43	-9.54	47.60	73.9	26.3	150	0	-
Hori.	4874.000	AV	34.68	31.92	6.45	38.58	2.48	36.95	53.9	16.9	176	243	-
Hori.	7311.000	AV	35.13	37.64	8.02	39.22	2.48	44.05	53.9	9.8	150	0	Floor noise
Hori.	9748.000	AV	35.73	39.25	9.26	39.73	2.48	46.99	53.9	6.9	150	0	Floor noise
Hori.	12185.000	AV	33.41	38.65	11.70	38.43	-9.54	35.79	53.9	18.1	150	0	Floor noise
Vert.	4874.000	PK	44.78	31.92	6.45	38.58	2.48	47.05	73.9	26.8	174	194	-
Vert.	7311.000	PK	45.56	37.64	8.02	39.22	2.48	54.48	73.9	19.4	150	0	-
Vert.	9748.000	PK	44.53	39.25	9.26	39.73	2.48	55.79	73.9	18.1	150	0	-
Vert.	12185.000	PK	45.02	38.65	11.70	38.43	-9.54	47.40	73.9	26.5	150	0	-
Vert.	4874.000	AV	34.30	31.92	6.45	38.58	2.48	36.57	53.9	17.3	174	194	-
Vert.	7311.000	AV	34.86	37.64	8.02	39.22	2.48	43.78	53.9	10.1	150	0	Floor noise
Vert.	9748.000	AV	35.60	39.25	9.26	39.73	2.48	46.86	53.9	7.0	150	0	Floor noise
Vert.	12185.000	AV	33.44	38.65	11.70	38.43	-9.54	35.82	53.9	18.0	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	2	1
Date	April 1, 2022	April 4, 2022
Temperature / Humidity	23 deg.C, 42 %RH	18 deg.C, 45 %RH
Engineer	Yohsuke Matsuzawa	Shiro Kobayashi
	(1 GHz -10 GHz)	(10 GHz -26.5 GHz)
Mode	Tx 11b 2462 MHz	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	52.03	28.44	14.00	38.67	2.48	58.28	73.9	15.6	127	136	-
Hori.	2487.130	PK	52.36	28.43	14.00	38.67	2.48	58.60	73.9	15.3	127	136	-
Hori.	4924.000	PK	45.57	31.98	6.49	38.61	2.48	47.91	73.9	25.9	174	351	-
Hori.	7386.000	PK	44.36	37.78	8.06	39.25	2.48	53.43	73.9	20.4	150	0	-
Hori.	9848.000	PK	45.72	39.38	9.31	39.75	2.48	57.14	73.9	16.7	150	0	-
Hori.	12310.000	PK	45.26	38.43	11.75	38.36	-9.54	47.54	73.9	26.3	150	0	-
Hori.	2483.500	AV	35.37	28.44	14.00	38.67	2.48	41.62	53.9	12.2	127	136	-
Hori.	2487.130	AV	35.46	28.43	14.00	38.67	2.48	41.70	53.9	12.2	127	136	-
Hori.	4924.000	AV	35.71	31.98	6.49	38.61	2.48	38.05	53.9	15.8	174	351	-
Hori.	7386.000	AV	35.29	37.78	8.06	39.25	2.48	44.36	53.9	9.5	150	0	Floor noise
Hori.	9848.000	AV	35.96	39.38	9.31	39.75	2.48	47.38	53.9	6.5	150	0	Floor noise
Hori.	12310.000	AV	33.72	38.43	11.75	38.36	-9.54	36.00	53.9	17.9	150	0	Floor noise
Vert.	2483.500	PK	48.83	28.44	14.00	38.67	2.48	55.08	73.9	18.8	147	202	-
Vert.	2484.091	PK	49.23	28.44	14.00	38.67	2.48	55.48	73.9	18.4	147	202	-
Vert.	4924.000	PK	43.78	31.98	6.49	38.61	2.48	46.12	73.9	27.7	126	235	-
Vert.	7386.000	PK	44.46	37.78	8.06	39.25	2.48	53.53	73.9	20.3	150	0	-
Vert.	9848.000	PK	45.33	39.38	9.31	39.75	2.48	56.75	73.9	17.1	150	0	-
Vert.	12310.000	PK	44.77	38.43	11.75	38.36	-9.54	47.05	73.9	26.8	150	0	-
Vert.	2483.500	AV	35.71	28.44	14.00	38.67	2.48	41.96	53.9	11.9	147	202	-
Vert.	2484.091	AV	35.65	28.44	14.00	38.67	2.48	41.90	53.9	12.0	147	202	-
Vert.	4924.000	AV	35.31	31.98	6.49	38.61	2.48	37.65	53.9	16.2	126	235	-
Vert.	7386.000	AV	35.47	37.78	8.06	39.25	2.48	44.54	53.9	9.3	150	0	Floor noise
Vert.	9848.000	AV	35.86	39.38	9.31	39.75	2.48	47.28	53.9	6.6	150	0	Floor noise
Vert.	12310.000	AV	33.74	38.43	11.75	38.36	-9.54	36.02	53.9	17.8	150	0	Floor noise

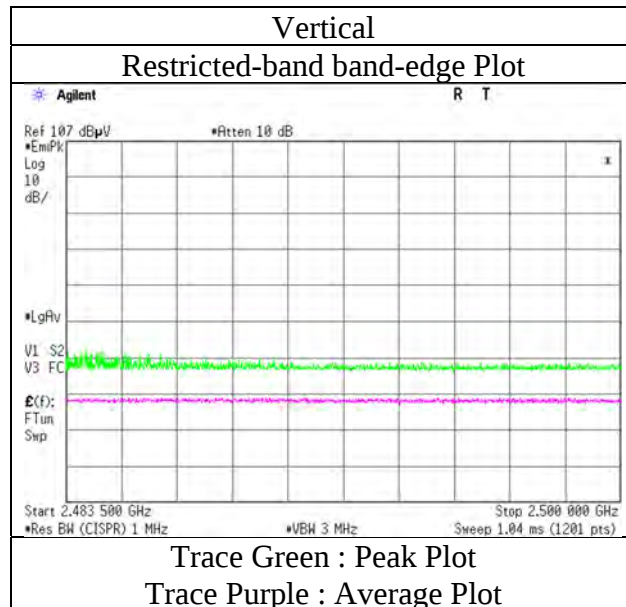
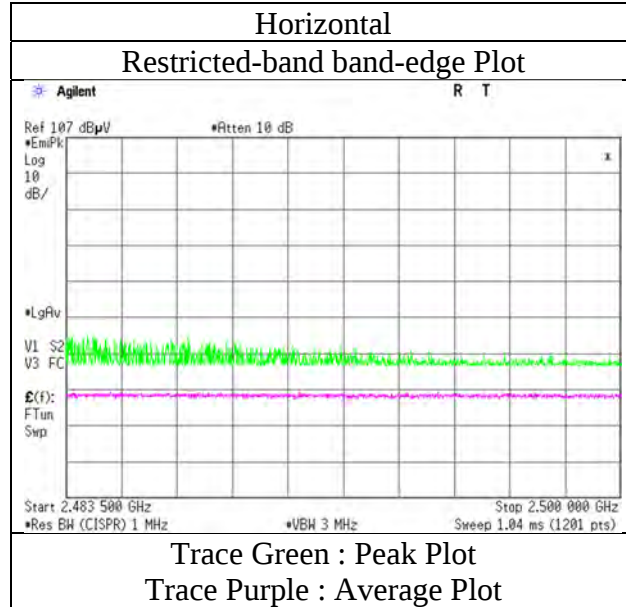
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.99\text{ m} / 3.0\text{ m}) = 2.48\text{ dB}$

10 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

Test place Shonan EMC Lab.
Semi Anechoic Chamber 2
Date April 1, 2022
Temperature / Humidity 23 deg.C, 42 %RH
Engineer Yohsuke Matsuzawa
 (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

Test place Shonan EMC Lab.
Semi Anechoic Chamber 1 2
Date April 4, 2022 April 1, 2022
Temperature / Humidity 18 deg.C, 45 %RH 23 deg.C, 42 %RH
Engineer Shiro Kobayashi Yohsuke Matsuzawa
(30 MHz -1 GHz, 10 GHz -26.5 GHz) (1 GHz -10 GHz)
Mode Tx 11g 2412 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	38.400	QP	21.78	15.40	7.23	31.84	0.00	12.57	40.0	27.4	100	0	-
Hori.	240.000	QP	22.26	11.54	6.10	31.76	0.00	8.14	46.0	37.8	130	305	-
Hori.	384.000	QP	21.17	15.31	7.14	31.80	0.00	11.82	46.0	34.1	100	0	-
Hori.	768.000	QP	21.10	20.44	9.22	31.92	0.00	18.84	46.0	27.1	100	0	-
Hori.	960.000	QP	20.37	22.07	10.14	30.95	0.00	21.63	46.0	24.3	100	0	-
Hori.	2390.000	PK	51.56	28.57	13.91	38.72	2.48	57.80	73.9	16.1	157	236	-
Hori.	4824.000	PK	44.68	31.91	6.43	38.56	2.48	46.94	73.9	26.9	213	109	-
Hori.	7236.000	PK	45.37	37.59	7.96	39.18	2.48	54.22	73.9	19.6	150	0	-
Hori.	9648.000	PK	45.58	38.97	9.22	39.71	2.48	56.54	73.9	17.3	150	0	-
Hori.	12060.000	PK	45.03	38.61	11.65	38.50	-9.54	47.25	73.9	26.6	150	0	-
Hori.	2390.000	AV	39.10	28.57	13.91	38.72	2.48	45.34	53.9	8.5	157	236	-
Hori.	4824.000	AV	35.23	31.91	6.43	38.56	2.48	37.49	53.9	16.4	213	109	-
Hori.	7236.000	AV	35.26	37.59	7.96	39.18	2.48	44.11	53.9	9.7	150	0	Floor noise
Hori.	9648.000	AV	35.68	38.97	9.22	39.71	2.48	46.64	53.9	7.2	150	0	Floor noise
Hori.	12060.000	AV	33.88	38.61	11.65	38.50	-9.54	36.10	53.9	17.8	150	0	Floor noise
Vert.	38.400	QP	21.85	15.40	7.23	31.84	0.00	12.64	40.0	27.3	100	0	-
Vert.	115.200	QP	21.51	12.58	8.16	31.80	0.00	10.45	43.5	33.0	100	0	-
Vert.	192.000	QP	21.45	16.49	8.99	31.77	0.00	15.16	43.5	28.3	100	202	-
Vert.	240.000	QP	25.37	11.54	6.10	31.76	0.00	11.25	46.0	34.7	220	180	-
Vert.	268.800	QP	21.19	12.79	6.32	31.76	0.00	8.54	46.0	37.4	100	0	-
Vert.	384.000	QP	21.19	15.31	7.14	31.80	0.00	11.84	46.0	34.1	100	0	-
Vert.	576.000	QP	21.30	18.57	8.24	32.00	0.00	16.11	46.0	29.8	100	0	-
Vert.	768.000	QP	21.09	20.44	9.22	31.92	0.00	18.83	46.0	27.1	100	0	-
Vert.	960.000	QP	20.36	22.07	10.14	30.95	0.00	21.62	46.0	24.3	100	0	-
Vert.	2390.000	PK	50.56	28.57	13.91	38.72	2.48	56.80	73.9	17.1	154	199	-
Vert.	4824.000	PK	44.57	31.91	6.43	38.56	2.48	46.83	73.9	27.0	187	280	-
Vert.	7236.000	PK	45.00	37.59	7.96	39.18	2.48	53.85	73.9	20.0	150	0	-
Vert.	9648.000	PK	45.31	38.97	9.22	39.71	2.48	56.27	73.9	17.6	150	0	-
Vert.	12060.000	PK	45.46	38.61	11.65	38.50	-9.54	47.68	73.9	26.2	150	0	-
Vert.	2390.000	AV	37.57	28.57	13.91	38.72	2.48	43.81	53.9	10.0	154	199	-
Vert.	4824.000	AV	35.21	31.91	6.43	38.56	2.48	37.47	53.9	16.4	187	280	-
Vert.	7236.000	AV	35.03	37.59	7.96	39.18	2.48	43.88	53.9	10.0	150	0	Floor noise
Vert.	9648.000	AV	35.57	38.97	9.22	39.71	2.48	46.53	53.9	7.3	150	0	Floor noise
Vert.	12060.000	AV	33.90	38.61	11.65	38.50	-9.54	36.12	53.9	17.7	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.99\text{ m} / 3.0\text{ m}) = 2.48\text{ dB}$ 10 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$ **20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)**

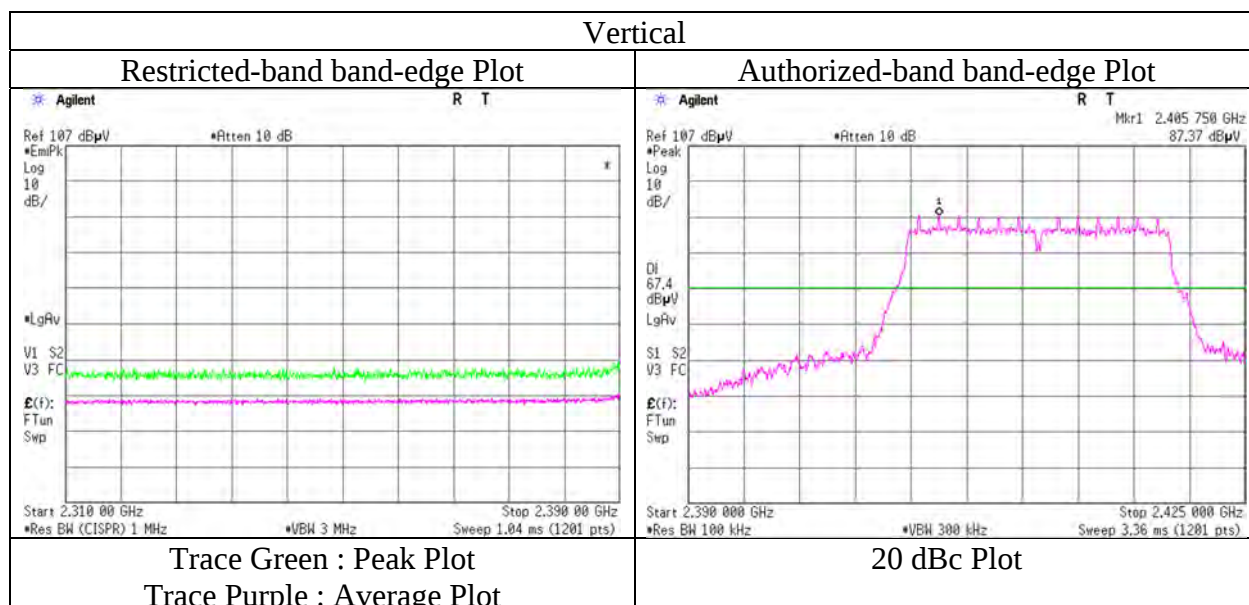
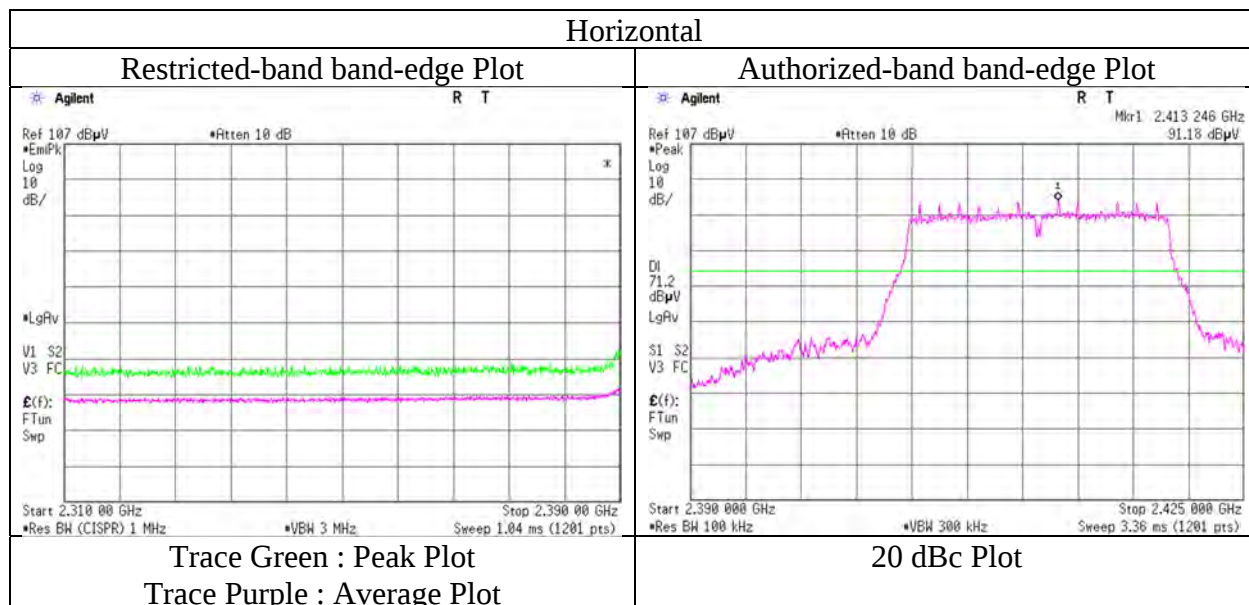
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	91.18	28.53	13.92	38.71	2.48	97.40	-	-	Carrier
Hori.	2400.000	PK	52.40	28.55	13.91	38.72	2.48	58.62	77.4	18.7	-
Vert.	2412.000	PK	87.56	28.53	13.92	38.71	2.48	93.78	-	-	Carrier
Vert.	2400.000	PK	51.52	28.55	13.91	38.72	2.48	57.74	73.7	15.9	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.99\text{ m} / 3.0\text{ m}) = 2.48\text{ dB}$ 10 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	April 1, 2022
Temperature / Humidity	23 deg.C, 42 %RH
Engineer	Yohsuke Matsuzawa
	(1 GHz -10 GHz)
Mode	Tx 11g 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	Shonan EMC Lab.	
Semi Anechoic Chamber	2	1
Date	April 1, 2022	April 4, 2022
Temperature / Humidity	23 deg.C, 42 %RH	18 deg.C, 45 %RH
Engineer	Yohsuke Matsuzawa	Shiro Kobayashi
	(1 GHz -10 GHz)	(10 GHz -26.5 GHz)
Mode	Tx 11g 2437 MHz	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	44.12	31.92	6.45	38.58	2.48	46.39	73.9	27.5	201	249	-
Hori.	7311.000	PK	44.33	37.64	8.02	39.22	2.48	53.25	73.9	20.6	150	0	-
Hori.	9748.000	PK	45.00	39.25	9.26	39.73	2.48	56.26	73.9	17.6	150	0	-
Hori.	12185.000	PK	44.75	38.65	11.70	38.43	-9.54	47.13	73.9	26.7	150	0	-
Hori.	4874.000	AV	35.00	31.92	6.45	38.58	2.48	37.27	53.9	16.6	201	249	-
Hori.	7311.000	AV	35.68	37.64	8.02	39.22	2.48	44.60	53.9	9.3	150	0	Floor noise
Hori.	9748.000	AV	35.41	39.25	9.26	39.73	2.48	46.67	53.9	7.2	150	0	Floor noise
Hori.	12185.000	AV	33.48	38.65	11.70	38.43	-9.54	35.86	53.9	18.0	150	0	Floor noise
Vert.	4874.000	PK	43.55	31.92	6.45	38.58	2.48	45.82	73.9	28.0	184	154	-
Vert.	7311.000	PK	44.56	37.64	8.02	39.22	2.48	53.48	73.9	20.4	150	0	-
Vert.	9748.000	PK	45.12	39.25	9.26	39.73	2.48	56.38	73.9	17.5	150	0	-
Vert.	12185.000	PK	45.20	38.65	11.70	38.43	-9.54	47.58	73.9	26.3	150	0	-
Vert.	4874.000	AV	35.12	31.92	6.45	38.58	2.48	37.39	53.9	16.5	184	154	-
Vert.	7311.000	AV	35.62	37.64	8.02	39.22	2.48	44.54	53.9	9.3	150	0	Floor noise
Vert.	9748.000	AV	35.51	39.25	9.26	39.73	2.48	46.77	53.9	7.1	150	0	Floor noise
Vert.	12185.000	AV	33.51	38.65	11.70	38.43	-9.54	35.89	53.9	18.0	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	2	1
Date	April 1, 2022	April 4, 2022
Temperature / Humidity	23 deg.C, 42 %RH	18 deg.C, 45 %RH
Engineer	Yohsuke Matsuzawa (1 GHz -10 GHz)	Shiro Kobayashi (10 GHz -26.5 GHz)
Mode	Tx 11g 2462 MHz	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	50.22	28.44	14.00	38.67	2.48	56.47	73.9	17.4	209	124	-
Hori.	2484.298	PK	49.26	28.44	14.00	38.67	2.48	55.51	73.9	18.3	209	124	-
Hori.	4924.000	PK	44.48	31.98	6.49	38.61	2.48	46.82	73.9	27.0	170	343	-
Hori.	7386.000	PK	44.87	37.78	8.06	39.25	2.48	53.94	73.9	19.9	150	0	-
Hori.	9848.000	PK	45.76	39.38	9.31	39.75	2.48	57.18	73.9	16.7	150	0	-
Hori.	12310.000	PK	45.56	38.43	11.75	38.36	-9.54	47.84	73.9	26.0	150	0	-
Hori.	2483.500	AV	39.63	28.44	14.00	38.67	2.48	45.88	53.9	8.0	209	124	-
Hori.	2484.298	AV	38.78	28.44	14.00	38.67	2.48	45.03	53.9	8.8	209	124	-
Hori.	4924.000	AV	35.38	31.98	6.49	38.61	2.48	37.72	53.9	16.1	170	343	-
Hori.	7386.000	AV	35.47	37.78	8.06	39.25	2.48	44.54	53.9	9.3	150	0	Floor noise
Hori.	9848.000	AV	36.00	39.38	9.31	39.75	2.48	47.42	53.9	6.4	150	0	Floor noise
Hori.	12310.000	AV	33.79	38.43	11.75	38.36	-9.54	36.07	53.9	17.8	150	0	Floor noise
Vert.	2483.500	PK	46.32	28.44	14.00	38.67	2.48	52.57	73.9	21.3	107	8	-
Vert.	2484.146	PK	47.52	28.44	14.00	38.67	2.48	53.77	73.9	20.1	107	8	-
Vert.	4924.000	PK	44.55	31.98	6.49	38.61	2.48	46.89	73.9	27.0	196	206	-
Vert.	7386.000	PK	45.16	37.78	8.06	39.25	2.48	54.23	73.9	19.6	150	0	-
Vert.	9848.000	PK	45.81	39.38	9.31	39.75	2.48	57.23	73.9	16.6	150	0	-
Vert.	12310.000	PK	45.38	38.43	11.75	38.36	-9.54	47.66	73.9	26.2	150	0	-
Vert.	2483.500	AV	36.56	28.44	14.00	38.67	2.48	42.81	53.9	11.0	107	8	-
Vert.	2484.146	AV	36.78	28.44	14.00	38.67	2.48	43.03	53.9	10.8	107	8	-
Vert.	4924.000	AV	35.08	31.98	6.49	38.61	2.48	37.42	53.9	16.4	196	206	-
Vert.	7386.000	AV	35.46	37.78	8.06	39.25	2.48	44.53	53.9	9.3	150	0	Floor noise
Vert.	9848.000	AV	36.11	39.38	9.31	39.75	2.48	47.53	53.9	6.3	150	0	Floor noise
Vert.	12310.000	AV	33.66	38.43	11.75	38.36	-9.54	35.94	53.9	17.9	150	0	Floor noise

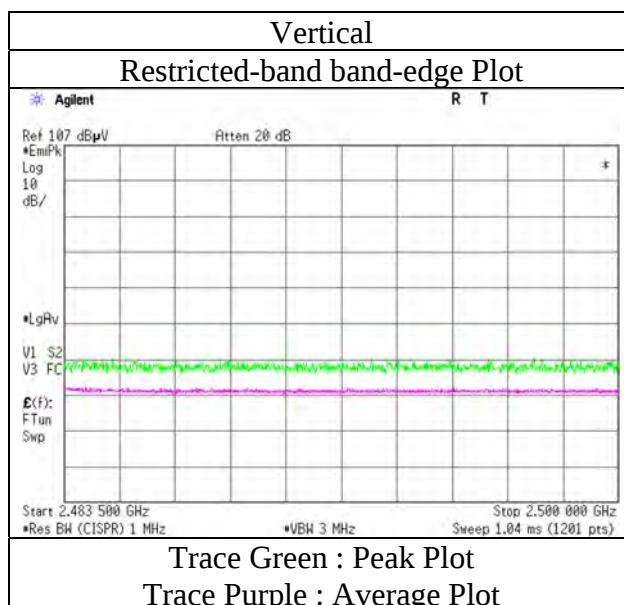
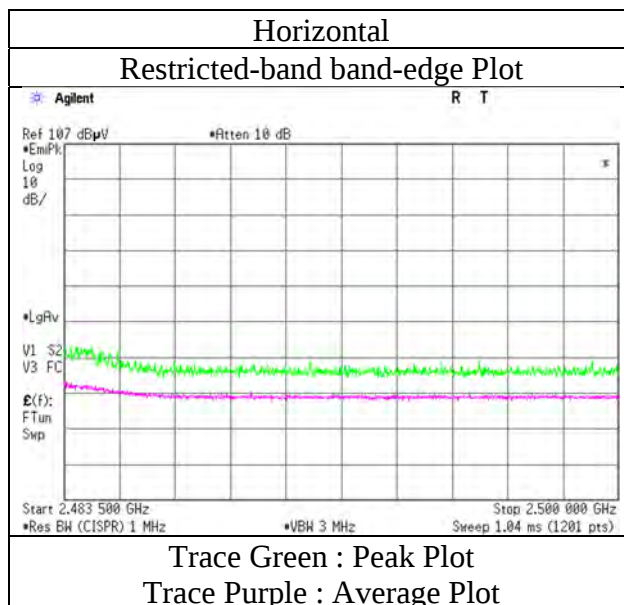
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.99\text{ m} / 3.0\text{ m}) = 2.48\text{ dB}$

10 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	2	1
Date	April 1, 2022	April 4, 2022
Temperature / Humidity	23 deg.C, 42 %RH	18 deg.C, 45 %RH
Engineer	Yohsuke Matsuzawa	Shiro Kobayashi
	(1 GHz -10 GHz)	(10 GHz -26.5 GHz)
Mode	Tx 11g 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	Shonan EMC Lab.	
Semi Anechoic Chamber	2	1
Date	April 1, 2022	April 4, 2022
Temperature / Humidity	23 deg.C, 42 %RH	18 deg.C, 45 %RH
Engineer	Yohsuke Matsuzawa (1 GHz -10 GHz)	Shiro Kobayashi (10 GHz -26.5 GHz)
Mode	Tx 11n-20 2412 MHz	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	54.57	28.57	13.91	38.72	2.48	60.81	73.9	13.0	287	142	-
Hori.	4824.000	PK	44.52	31.91	6.43	38.56	2.48	46.78	73.9	27.1	192	197	-
Hori.	7236.000	PK	44.46	37.59	7.96	39.18	2.48	53.31	73.9	20.5	150	0	-
Hori.	9648.000	PK	45.68	38.97	9.22	39.71	2.48	56.64	73.9	17.2	150	0	-
Hori.	12060.000	PK	45.42	38.61	11.65	38.50	-9.54	47.64	73.9	26.2	150	0	-
Hori.	2390.000	AV	41.18	28.57	13.91	38.72	2.48	47.42	53.9	6.4	287	142	-
Hori.	4824.000	AV	35.12	31.91	6.43	38.56	2.48	37.38	53.9	16.5	192	197	-
Hori.	7236.000	AV	35.20	37.59	7.96	39.18	2.48	44.05	53.9	9.8	150	0	Floor noise
Hori.	9648.000	AV	35.52	38.97	9.22	39.71	2.48	46.48	53.9	7.4	150	0	Floor noise
Hori.	12060.000	AV	33.88	38.61	11.65	38.50	-9.54	36.10	53.9	17.8	150	0	Floor noise
Vert.	2390.000	PK	50.00	28.57	13.91	38.72	2.48	56.24	73.9	17.6	159	193	-
Vert.	4824.000	PK	44.67	31.91	6.43	38.56	2.48	46.93	73.9	26.9	189	197	-
Vert.	7236.000	PK	45.06	37.59	7.96	39.18	2.48	53.91	73.9	19.9	150	0	-
Vert.	9648.000	PK	45.82	38.97	9.22	39.71	2.48	56.78	73.9	17.1	150	0	-
Vert.	12060.000	PK	45.41	38.61	11.65	38.50	-9.54	47.63	73.9	26.2	150	0	-
Vert.	2390.000	AV	39.37	28.57	13.91	38.72	2.48	45.61	53.9	8.2	159	193	-
Vert.	4824.000	AV	35.28	31.91	6.43	38.56	2.48	37.54	53.9	16.3	189	197	-
Vert.	7236.000	AV	35.23	37.59	7.96	39.18	2.48	44.08	53.9	9.8	150	0	Floor noise
Vert.	9648.000	AV	35.73	38.97	9.22	39.71	2.48	46.69	53.9	7.2	150	0	Floor noise
Vert.	12060.000	AV	33.77	38.61	11.65	38.50	-9.54	35.99	53.9	17.9	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.99\text{ m} / 3.0\text{ m}) = 2.48\text{ dB}$

10 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	90.73	28.53	13.92	38.71	2.48	96.95	-	-	Carrier
Hori.	2400.000	PK	52.63	28.55	13.91	38.72	2.48	58.85	76.9	18.0	-
Vert.	2412.000	PK	87.43	28.53	13.92	38.71	2.48	93.65	-	-	Carrier
Vert.	2400.000	PK	49.31	28.55	13.91	38.72	2.48	55.53	73.6	18.0	-

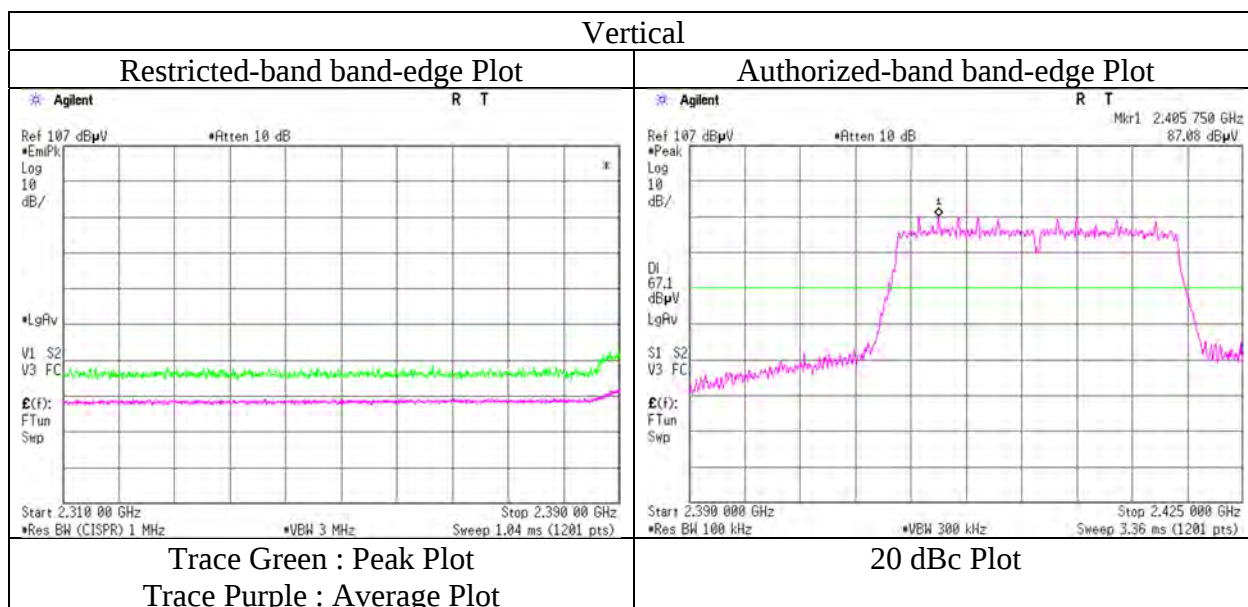
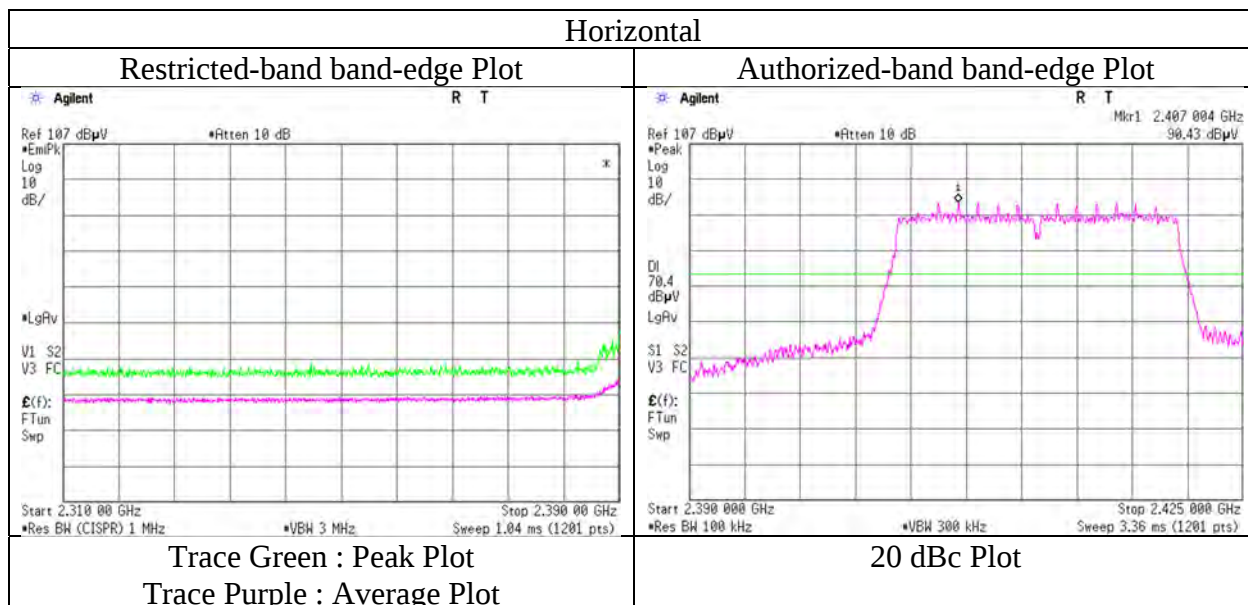
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.99\text{ m} / 3.0\text{ m}) = 2.48\text{ dB}$

10 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab.	1
Semi Anechoic Chamber	2	April 4, 2022
Date	April 1, 2022	18 deg.C, 45 %RH
Temperature / Humidity	23 deg.C, 42 %RH	Shiro Kobayashi
Engineer	Yohsuke Matsuzawa	(10 GHz -26.5 GHz)
	(1 GHz -10 GHz)	
Mode	Tx 11n-20 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	Shonan EMC Lab.	
Semi Anechoic Chamber	2	1
Date	April 1, 2022	April 4, 2022
Temperature / Humidity	23 deg.C, 42 %RH	18 deg.C, 45 %RH
Engineer	Yohsuke Matsuzawa	Shiro Kobayashi
	(1 GHz -10 GHz)	(10 GHz -26.5 GHz)
Mode	Tx 11n-20 2437 MHz	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	45.62	31.92	6.45	38.58	2.48	47.89	73.9	26.0	243	205	-
Hori.	7311.000	PK	45.64	37.64	8.02	39.22	2.48	54.56	73.9	19.3	150	0	-
Hori.	9748.000	PK	45.46	39.25	9.26	39.73	2.48	56.72	73.9	17.1	150	0	-
Hori.	12185.000	PK	45.63	38.65	11.70	38.43	-9.54	48.01	73.9	25.8	150	0	-
Hori.	4874.000	AV	35.00	31.92	6.45	38.58	2.48	37.27	53.9	16.6	243	205	-
Hori.	7311.000	AV	35.53	37.64	8.02	39.22	2.48	44.45	53.9	9.4	150	0	Floor noise
Hori.	9748.000	AV	35.96	39.25	9.26	39.73	2.48	47.22	53.9	6.6	150	0	Floor noise
Hori.	12185.000	AV	33.57	38.65	11.70	38.43	-9.54	35.95	53.9	17.9	150	0	Floor noise
Vert.	4874.000	PK	45.57	31.92	6.45	38.58	2.48	47.84	73.9	26.0	234	229	-
Vert.	7311.000	PK	44.57	37.64	8.02	39.22	2.48	53.49	73.9	20.4	150	0	-
Vert.	9748.000	PK	45.31	39.25	9.26	39.73	2.48	56.57	73.9	17.3	150	0	-
Vert.	12185.000	PK	45.04	38.65	11.70	38.43	-9.54	47.42	73.9	26.4	150	0	-
Vert.	4874.000	AV	34.67	31.92	6.45	38.58	2.48	36.94	53.9	16.9	234	229	-
Vert.	7311.000	AV	35.55	37.64	8.02	39.22	2.48	44.47	53.9	9.4	150	0	Floor noise
Vert.	9748.000	AV	35.84	39.25	9.26	39.73	2.48	47.10	53.9	6.8	150	0	Floor noise
Vert.	12185.000	AV	33.50	38.65	11.70	38.43	-9.54	35.88	53.9	18.0	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	2	1
Date	April 1, 2022	April 4, 2022
Temperature / Humidity	23 deg.C, 42 %RH	18 deg.C, 45 %RH
Engineer	Yohsuke Matsuzawa (1 GHz -10 GHz)	Shiro Kobayashi (10 GHz -26.5 GHz)
Mode	Tx 11n-20 2462 MHz	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	53.23	28.44	14.00	38.67	2.48	59.48	73.9	14.4	284	121	-
Hori.	2484.311	PK	55.12	28.44	14.00	38.67	2.48	61.37	73.9	12.5	284	121	-
Hori.	4924.000	PK	45.00	31.98	6.49	38.61	2.48	47.34	73.9	26.5	245	197	-
Hori.	7386.000	PK	45.11	37.78	8.06	39.25	2.48	54.18	73.9	19.7	150	0	-
Hori.	9848.000	PK	45.37	39.38	9.31	39.75	2.48	56.79	73.9	17.1	150	0	-
Hori.	2483.500	AV	40.52	28.44	14.00	38.67	2.48	46.77	53.9	7.1	284	121	-
Hori.	2484.311	AV	39.87	28.44	14.00	38.67	2.48	46.12	53.9	7.7	284	121	-
Hori.	4924.000	AV	35.22	31.98	6.49	38.61	2.48	37.56	53.9	16.3	245	197	-
Hori.	7386.000	AV	35.30	37.78	8.06	39.25	2.48	44.37	53.9	9.5	150	0	Floor noise
Hori.	9848.000	AV	36.08	39.38	9.31	39.75	2.48	47.50	53.9	6.4	150	0	Floor noise
Vert.	2483.500	PK	50.13	28.44	14.00	38.67	2.48	56.38	73.9	17.5	146	193	-
Vert.	2484.366	PK	51.26	28.44	14.00	38.67	2.48	57.51	73.9	16.3	146	193	-
Vert.	4924.000	PK	44.68	31.98	6.49	38.61	2.48	47.02	73.9	26.8	179	192	-
Vert.	7386.000	PK	45.14	37.78	8.06	39.25	2.48	54.21	73.9	19.6	150	0	-
Vert.	9848.000	PK	45.56	39.38	9.31	39.75	2.48	56.98	73.9	16.9	150	0	-
Vert.	2483.500	AV	39.68	28.44	14.00	38.67	2.48	45.93	53.9	7.9	146	193	-
Vert.	2484.366	AV	38.73	28.44	14.00	38.67	2.48	44.98	53.9	8.9	146	193	-
Vert.	4924.000	AV	34.97	31.98	6.49	38.61	2.48	37.31	53.9	16.5	179	192	-
Vert.	7386.000	AV	35.32	37.78	8.06	39.25	2.48	44.39	53.9	9.5	150	0	Floor noise
Vert.	9848.000	AV	36.13	39.38	9.31	39.75	2.48	47.55	53.9	6.3	150	0	Floor noise

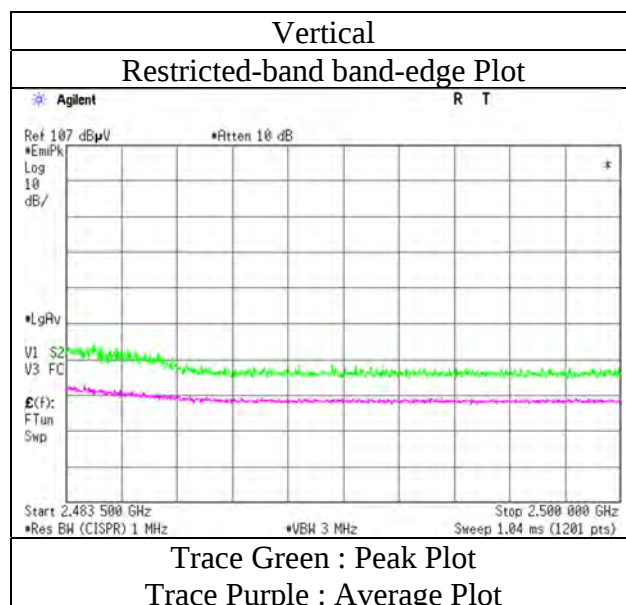
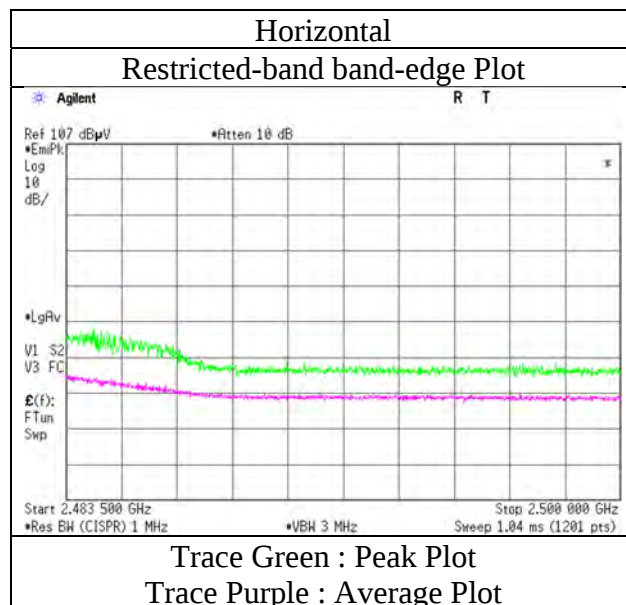
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.99\text{ m} / 3.0\text{ m}) = 2.48\text{ dB}$

10 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

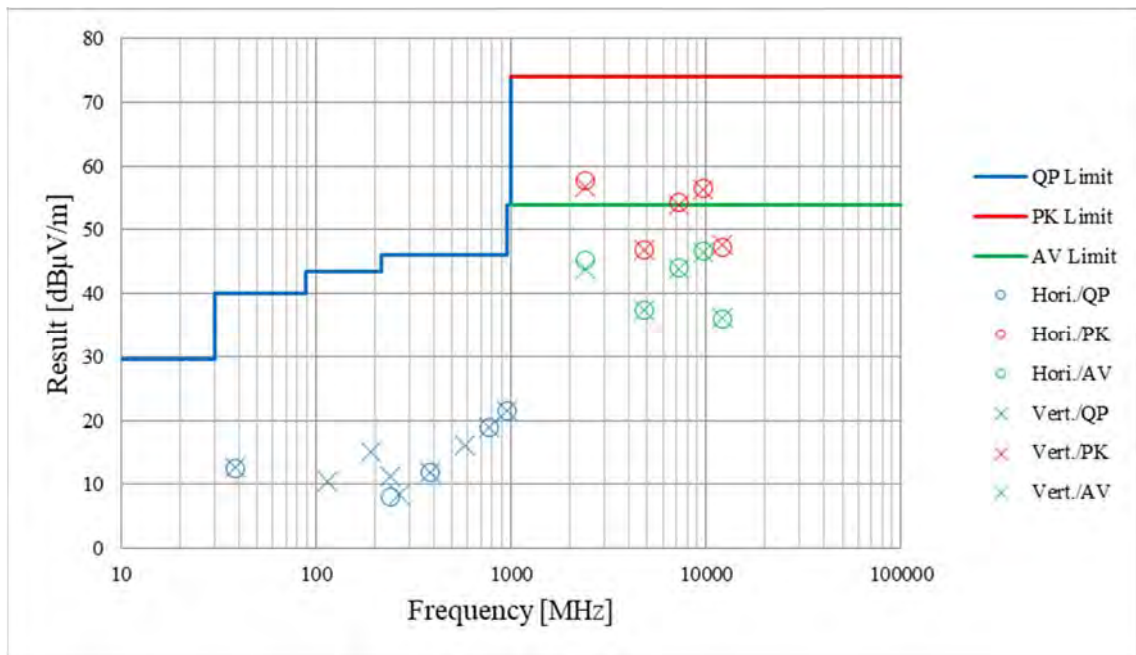
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	2	1
Date	April 1, 2022	April 4, 2022
Temperature / Humidity	23 deg.C, 42 %RH	18 deg.C, 45 %RH
Engineer	Yohsuke Matsuzawa	Shiro Kobayashi
	(1 GHz -10 GHz)	(10 GHz -26.5 GHz)
Mode	Tx 11n-20 2462 MHz	



* 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
(Plot data, Worst case mode for Maximum Peak Output Power of Original Test Report)

Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	1	2
Date	April 4, 2022	April 1, 2022
Temperature / Humidity	18 deg.C, 45 %RH	23 deg.C, 42 %RH
Engineer	Shiro Kobayashi	Yohsuke matsuzawa
	(30 MHz -1 GHz, 10 GHz -26.5 GHz)	(1 GHz -10 GHz)
Mode	Tx 11g 2412 MHz	



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

APPENDIX 2: Test Instruments

Test Equipment [1/2]

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	COTS-SEMI-5	170932	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3(RE,CE,ME,PE)	-	-	-
RE	KAT6-04	144899	Attenuator	Inmet	18N-6dB	-	2021/12/10	12
RE	KJM-09	145929	Measure	KOMELON	KMC-36	-	-	-
RE	KSA-08	145089	Spectrum Analyzer	Keysight Technologies Inc	E4446A	MY46180525	2021/10/13	12
RE	SAEC-01(NSA)	145597	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	2021/04/30	12
RE	SAEC-01(SVSWR)	145561	Semi-Anechoic Chamber	TDK	SAEC-01(SVSWR)	1	2021/05/09	12
RE	SAEC-02(SVSWR)	145598	Semi-Anechoic Chamber	TDK	SAEC-02(SVSWR)	2	2021/05/20	12
RE	SAF-01	145003	Pre Amplifier	SONOMA	310N	290211	2022/02/24	12
RE	SAF-04	145127	Pre Amplifier	Toyo Corporation	TPA0118-36	2072554	2021/05/17	12
RE	SAF-05	145128	Pre Amplifier	Toyo Corporation	TPA0118-36	1440490	2021/05/17	12
RE	SAF-08	145007	Pre Amplifier	Toyo Corporation	HAP18-26W	19	2022/03/03	12
RE	SAT10-05	145136	Attenuator	Keysight Technologies Inc	8493C-010	74864	2021/10/07	12
RE	SAT3-09	144959	Attenuator	JFW	50HF-003N	-	2021/08/16	12
RE	SBA-01	145161	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	BBA9106	91032664	2021/04/10	12
RE	SCC-A1/A3/A5/A7/A8/A13/SRSE-01	144967	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	2021/04/13	12
RE	SCC-A2/A4/A6/A7/A8/A13/SRSE-01	144968	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	2021/04/12	12
RE	SCC-G05	145039	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	2022/01/06	12
RE	SCC-G15	145176	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	2022/03/03	12
RE	SCC-G41	151617	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S006	2022/01/06	12
RE	SCC-G50	178573	Coaxial Cable	Huber+Suhner	SUCOFLEX_104_E	MY13407/4E	2022/03/03	12
RE	SCC-G51	178572	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	800288 /4A	2022/03/03	12
RE	SCC-G57	179540	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	802815/2	2021/05/18	12
RE	SCC-G62	196985	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	803650/2	2022/03/08	12
RE	SCC-G68	200008	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	575616/4	2021/07/06	12
RE	SFL-02	145301	Highpass Filter	MICRO-TRONICS	HPM50111	51	2021/10/07	12
RE	SFL-18	145305	Highpass Filter	MICRO-TRONICS	HPM50111	119	2022/03/02	12
RE	SHA-02	145384	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	9120D-726	2022/03/10	12
RE	SHA-04	145512	Horn Antenna	ETS-Lindgren	3160-09	00094868	2021/06/14	12

Test Equipment [2/2]

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	SHA-08	194683	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 C	694	2022/03/01	12
RE	SJM-20	207277	Measuring	ASKUL	-	-	-	-
RE	SLA-05	145527	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	193	2021/04/10	12
RE	SOS-20	191837	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/08/02	12
RE	SOS-21	191838	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/08/02	12
RE	STR-01	145790	Test Receiver	Rohde & Schwarz	ESU40	100093	2021/04/27	12
RE	STS-01	145792	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997812	2021/09/14	12
RE	STS-02	145793	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997819	2021/04/28	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